M380
Owner Manual

Rev. "F"

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IMPORTANT CUSTOMER NOTE:
Please note that this is preliminary copy of the
Express 4500 Owner Manual. Material has not yet been
validated for correctness and accuracy.

Table of Contents

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Introduction_____

Welcome

Dear Wanderlodge Owner:

Thanks for choosing a Wanderlodge!

We want to personally welcome you to our Family of Friends and we invite you to visit us at our Fort Valley facilities whenever you wish. We are always happy to see you and we are deeply interested in your experiences as you use and enjoy your Wanderlodge motor home. We recognize that it is our relationship to you, the Wanderlodge owner, which contributes most to the prestige of ownership of this finest over-the-road motor home.

We trust that as you become more intimately acquainted with your new motor home, the sound, careful thoughts behind every aspect of its design will become increasingly evident and your initial decision to choose Wanderlodge will be positively reinforced with every mile.

We encourage that you take the time to become familiar with this introduction section before taking your first trip in your new motor home. Inside you will find information that will be beneficial on future trips with your motor home such as: vehicle loading, emergency exits, safety information, etc.

We acknowledge the good faith you have demonstrated in our product. All of us at Wanderlodge take great pride in our handiwork and want to do everything possible to engender in you what has become the Wanderlodge experience; the deep satisfaction that comes from years of a sure confidence of having chosen the very best.

Limited Warranty

Blue Bird Wanderlodge (Wanderlodge), a division of Blue Bird Body Company, warrants each Wanderlodge to the original purchaser to be free from defects in material and workmanship under normal use and service within the limits described below:

1. For a period of (3) years or 36,000 miles, whichever occurs first, from date of delivery to the original purchaser, Wanderlodge® warrants the:
    a. Chassis frame rails and cross members to be free from defects in structural integrity (breaking or cracking).
    b. Body shell (those structural metal components welded or riveted together forming floor, sidewalls, roof, front and rear sections) to be free from defects in structural integrity (breaking or cracking) including rust-through.
    c. Paint adhesion to the body shell (those structural components forming side walls, roof, front and rear sections). Paint failures caused by corrosive atmospheric conditions and road chemicals are specifically not covered.

2. For a period of three (3) years from date of delivery to the original purchaser, Wanderlodge warrants the steer and drive axles (tag axle not included), excluding brakes and wheel ends.

3. For a period of two (2) years from the date of delivery to the original purchaser warrants all other components installed by Blue Bird and Wanderlodge, except diesel engines, automatic transmissions, tires and batteries, which are warranted by their manufacturers.

For demonstrators, the delivery date to the dealer will be the warranty start date. Mileage accumulated by the factory or dealer apply to any warranty mileage limits stated above. This limited warranty applies to the original purchaser during the warranty period. A transfer request and fee are required within thirty (30) days of resale to transfer the warranty.

Wanderlodge's obligation covered in this limited warranty is limited to the repair or replacement of such parts as shall, under normal use and service, appear to have been defective in workmanship or material. Without restricting the generality of this limitation, loss of use, commercial loss, towing charges, lodging, telephone calls, inconvenience, and loss of time are specifically not covered. This warranty shall not apply to any parts or components which must be repaired or replaced during the warranty period as a result of what is, in the opinion of Wanderlodge, normal wear and/or deterioration in the course of normal operations and use, accident damage, misuse and/or abuse.

If distributors, dealers or customers have any vehicle modifications or equipment installations performed without the written approval of Wanderlodge to the extent the modifications or equipment installations adversely affect other vehicle components or performance, Wanderlodge shall not accept any product liability or claims under the terms of the limited warranty. These claims become the sole responsibility of the company performing the modifications and/or installations.

ANY IMPLIED WARRANTIES, INCLUDING THOSE OF MERCHANTABILITY OR FITNESS, ARE LIMITED TO THE WARRANTY PERIOD OF THIS WRITTEN WARRANTY. WANDERLODGE SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM BREACH OF THIS WRITTEN WARRANTY OR ANY IMPLIED WARRANTY. NO PERSON, INCLUDING SALESPEOPLE, DEALERS, SERVICE CENTERS, OR FACTORY REPRESENTATIVES OF WANDERLODGE, IS AUTHORIZED TO MAKE ANY REPRESENTATION OR WARRANTY CONCERNING WANDERLODGE PRODUCTS EXCEPT TO REFER TO THIS LIMITED WARRANTY.

Wanderlodge reserves the right to make changes in design and changes or improvements upon its products without imposing any obligations upon itself to install the same upon products therefore manufactured. Defects shall be repaired promptly after discovery of the defect and within the warranty period as stated herein. All claims for warranty adjustments must be received by Wanderlodge not later than 30 days after the repair date, and shall be channeled through an authorized Wanderlodge dealer or factory representative. Any suit alleging a breach of this limited warranty or any other alleged warranty must be filed within one year of breach.

All rights under this limited warranty shall be governed by the law of Georgia, U.S.A.

> **NOTE: This information was correct at time of printing. For any vendor changes made to equipment and/or manual after printing date refer to the actual vendor owner manual supplied with motor home.**

Wanderlodge®   /   One Wanderlodge Way   /   Fort Valley, Georgia 31030   /   (478) 825-2021

Introduction

This section of your Owner's Manual contains general hints and recommendations for using your motor home. Checklists and suggestions are offered which cover just about every phase of motor home travel.

The remaining sections of this manual describe the operation and use of the individual items and systems which comprise your motor home.

Manufacturer's manuals for components and appliances are included in your owner's kit. Please refer to these for more detailed information.

We hope that this manual will help answer questions that may arise about the use, operation and maintenance of your motor home. Any suggestions or recommendations that you might have for including or expanding on material of interest will be carefully considered for incorporation in future publications. We are always interested in providing our motor home owners with the most current and comprehensive information about our product.

Some Other Thoughts to Consider

- Automobile insurance to cover you and your family.
- Avoid cash. Use traveler's checks and credit cards wherever possible.
- Confirm reservations well in advance of arrival.
- Make a clothing check list for everyone.

Citizen's Band Transceiver

You might also bear in mind that your motor home is equipped with a CB unit (Citizen's Band receiver-transmitter) In the event of an emergency situation which requires outside assistance; remember to call for help on Channel 9. This channel is restricted to emergency use only and it is monitored 24 hours per day! Don't hesitate to use your CB if you see someone else in need of assistance.

Hot Weather Operation

Wherever possible, choose a shaded parking site so that the motor home will be cooler during the hottest part of the day. The optional patio awning will be especially useful in lowering inside temperature. Air conditioning units are indispensable in hot climates. Keep in mind that their proper operation depends on adequate line voltage. Low voltage causes motors to run hotter and reduces compressor motor life. Supply voltage in some campgrounds may not be as high as necessary, especially where there are heavy loads on the lines from other air conditioners. Check the right hand overhand auxiliary panel 120 VAC meters when in doubt.

Cold Weather Operation

If frost or condensation accumulates in closets or cabinets during long periods of cold weather operation, leave the doors to these areas slightly ajar to provide air circulation. Be sure that roof vents are open when using the gas cook top.

Campground Courtesy

Don't forget the "Golden Rule". Being considerate of your neighbors will help make friends. A few of the "do's" and "don'ts" are:

- Good housekeeping – put all litter in the proper receptacles and leave your site neat and clean.
- Don't allow your water or sewer hook-ups to leak.
- Respect your neighbor's desire to retire at an early hour. Avoid loud noises and bright lights after dark.
- Drive slowly through camp areas at any hour for the safety of pedestrians.

Insurance

As with your automobile, it is important that you have adequate protection with insurance coverage for personal liability, property damage, comprehensive, collision, medical payments, loss of use, etc.

Canadian and Mexican Insurance

Insurance for travel in Canada can usually be covered by your present U.S. policy for the recreational vehicle, often at no extra cost. Consult your individual company for procedures and be sure of your coverage before entry.

For travel in Mexico (at the present time), there are no U.S. insurance companies that can provide recognized Mexican coverage, with the exception of that required for travel through a narrow strip of Mexican territory in and around parts of entry and the U.S./Mexican border.

Mexican insurance is controlled and rates are set by the Mexican government. There are several reliable companies handling Mexican insurance, with similar rates for the necessary coverage. The principle differences between them are the "fringe benefits", received in the form of informational travelogues and other helpful information, such as dining places considered acceptable for sanitary conditions, fuel stations, and so on.

Some insurance services include detailed route maps with "where to stay" recommendations and "things to see" mile-by-mile (or kilometer-by-kilometer post). While the rates set by Mexico may seem quite expensive at first glance, you usually end up not spending quite as much as expected because you can usually arrange to hold your state-side policy in abeyance during the same period you are in Mexico, thus not having to pay unnecessarily for double coverage. In addition, you may be able to obtain substantial refunds on the Mexican collision insurance after your return to the U.S. Be sure to obtain a certification from the park operator at each location in Mexico to certify the dates that your motor home was parked there. If your motor home is parked for most of the time, instead of constantly traveling, your refund may be a major portion of the original cost. This feature is referred to as the 'in-storage" credit. (It is a good idea to always check with your insurance company before taking a trip to find out whether applicable insurance rules and regulations have changed. Keep up to date on your coverage.)

Carry insurance papers at all times!

Safety Considerations

Using LP Gas

Check for leaks at the connections on the LP gas system soon after purchase and initial filling of the LP tank; continued periodic checks of the system are recommended. Even though the manufacturer and dealer have already made tests for leakage, this check is advisable because of the vibrations encountered during travel. Apply a soapy water solution to the outside of gas piping connections to find gas leakage (bubbles). Do not use products that contain ammonia or chlorine. Usually, tightening of connections will be sufficient. If not, ask your authorized dealer service to make the needed repairs.

Liquefied Petroleum Gas (LPG) is heavier than air. Leaking gas tends to flow to low places, and will sometimes pocket in a low area. LP gas can usually be detected by an identifiable odor characteristic to garlic.

> **▲CAUTION:** Never light a match or allow any open flame in the presence of leaking gas! Be sure that the main LP gas supply valve is closed or galley panel switch is OFF during refueling to prevent accidental ignition of gas fumes by appliance ignitors.

WARNING: When motor home is to be stored in a confined area, turn off the LPG at the main tank shutoff valve, or more conveniently, at the galley systems control panel. Your Wanderlodge has been provided with an automatic 80% fill valve to protect you from the dangers of an overfilled LPG tank.

Electrical Systems

Your motor home has been engineered and checked for your complete electrical system safety. Circuit breakers and fuses are installed to protect electrical circuits from overloading. Before making modifications or additions to the electrical system, consult your dealer for assistance in obtaining a safe and secure installation.

Do not "jump" circuit protectors!

Emergency Stops

Always carry road flares and/or reflective triangular highway warning markers for emergency warning display. Pull off the roadway as far as possible when changing flats or for other emergency situations. Turn on your hazard warning flashers when parked alongside a roadway, even if only for a short while. Have your motor home occupants leave the vehicle and stand clear of the area when parked on the edge of a highway.

In Case of Tire Blowout

Michelin Tire Corporation has tested extensively and recommends the following when a blowout occurs:

1. Quickly step on the gas
2. Adjust steering as needed.
3. Stay off the brakes.
4. Keep driving until you find a safe place to pull over.

Engine Exhaust Gas

Avoid inhaling exhaust gases because they contain carbon monoxide, which by itself is colorless and odorless. Carbon monoxide is a dangerous gas that can cause unconsciousness and is potentially lethal. If at any time you suspect that any exhaust fumes are entering the passenger compartment, have the cause determined and corrected as soon as possible.

The best protection against carbon monoxide entry into the vehicle body is properly maintained engine exhaust system, body and ventilation system. It is a good practice to have the exhaust system and body inspected by a competent mechanic each time the vehicle is raised for lubrication or oil change. It should also be inspected whenever a change is noticed in the sound of the exhaust system, and if the exhaust system, underbody or rear of the vehicle has been damaged.

To allow proper operation of the vehicle's ventilation system, keep ventilation inlets clear of snow, leaves or other obstructions.

Sitting in a parked vehicle with the engine on for extending periods, without proper ventilation, is not recommended!

More Safety Considerations

- Sanitize fresh water supply system periodically.

- Prevent water connection fittings from contacting the ground or drain the hose to reduce chances of contamination.

- Consider using a qualified technician for repairing gas or electrical appliances.

- Check fire extinguishers periodically for proper charge.

- Avoid overloading your vehicle.

- Be careful not to cause an improper load distribution which can adversely affect road ability.

- Ensure that tires are in good condition and properly inflated at all times.

- Under-inflated tires overheat and are prone to blowouts!

- Check and tighten wheel lug nuts; manufacturer recommends after first 50-100 miles and every 1,000 miles thereafter.

Emergency Exits

Sliding windows, which can be easily opened, may be used as an emergency exit. Squeeze the window latch and slide the window open. Emergency exit windows are identified by an EXIT decal on the glass.

Owner's Manual Requirements

The minimum required educational information in the owner's manual shall include:

1. A sample of the weight label's contents affixed to the unit as appropriate.

2. An explanation of the following:

   - Vehicle weight distribution

   - How to weigh the vehicle

      ➢ These definitions:

      ➢ Gross Axle Weight Rating (GAWR)

      ➢ Gross Combination Weight Rating (GCWR)

      ➢ Gross Vehicle Weight Rating (GVWR)

      ➢ Unloaded Vehicle Weight (UVW)

      ➢ Net Carrying Capacity (NCC)

3. Towing guidelines.

MOTOR HOME WEIGHT INFORMATION

Model _____

GVWR _____

UVW   _____

NCC   _____

GCWR **_____**

GVWR

(Gross Vehicle Weight Rating) means the maximum permissible weight of this motor home. The GVWR is equal to or greater than the sum of the Unloaded Vehicle Weight plus the Net Carrying Capacity.

UVW

(Unloaded Vehicle Weight) means the weight of this motor home as built at the factory with full fuel, engine oil, and coolants. The UVW does not include cargo, fresh water, LP gas, occupants, or dealer installed accessories.

NCC

(Net Carrying Capacity) means the maximum weight of all occupants including the driver, personal belongings, food, fresh water, LP gas, tools, tongue weight of towed vehicle, dealer installed accessories, etc., that can be carried by this motor home.

(NCC is equal to or less than GVWR minus UVW).

GCWR

(Gross Combination Weight Rating) means the value specified by the motor home manufacturer as the maximum allowable loaded weight of this motor home with its towed trailer or towed vehicle.

This motor home is capable of carrying up to 98 gallons of fresh water (including water heater) for a total of 816 pounds. Reference: Weight of fresh water is 8.33 lbs./gal.; Weight of LP gas is 4.5 lbs./gal. (average).

CONSULT WEIGHT DECAL LOCATED IN MOTOR HOME

FOR ACTUAL WEIGHTS

Vehicle Loading

The Federal Certification Label, located inside and above the driver's windshield between the sun visor mounting brackets describes the maximum weight-carrying capacities of your motor home and for each axle, respectively abbreviated by "GVWR" and "GAWR".

The Gross Vehicle Weight Rating (GVWR) is the maximum motor home weight allowable with all systems filled and with passengers and supplies aboard.

Each axle also has a maximum load-bearing capacity referred to as the Gross Axle Weight Rating (GAWR).

The load capacity is the difference between the GVWR and the actual weight. This means that the total weight of all food, clothing, other supplies and passengers must not permit the load capacity to be exceeded.

To find the actual weight, with the motor home fully loaded, drive to a scale and read the weight on the front and rear wheels separately to determine axle loading. The load on each axle should not exceed its GAWR. If weight ratings are exceeded, move or remove items to bring all weights below the ratings.

When loading your motor home, store heavy gear first. Be sure to keep heavy gear on or as close to the floor as possible. Heavy items should be stored centrally to distribute the weight evenly between the front and the rear axles. Store only light objects on high shelves. Distribute weight to obtain even side-to-side balance of the loaded unit. Secure loose items to prevent weight shifts that could adversely affect the balance and road ability of the vehicle.

Motor Home Service – Replacement Parts

A paint color label is located adjacent to the Federal Certification Label above the pilot's sun visor.

Data plates located on the rear of the chassis (raise rear engine compartment door for access) provide information useful for identifying your motor home if you are planning on ordering parts. Identification plates provide information such as:

1. Body Serial Number
2. Model Year
3. Body Service Number
4. Chassis Serial Number
5. Chassis Service Number

Economical Driving

How you drive, where you drive and when you drive – these factors all have an effect on determining how many miles you can get from a gallon of fuel. Careful maintenance will also contribute to fuel economy.

Frequent stops and starts during a trip diminish miles per gallon. Planning even short shopping trips so you can take advantage of through-streets to avoid the traffic lights. Pace your driving like the professional drivers to avoid unnecessary stops.

An idling engine also consumes fuel. If you are faced with more than a few minutes wait, and you are not in traffic, it may be advisable to shut off the engine and re-start later.

A properly lubricated vehicle means less friction between moving parts. Consult the maintenance schedules for proper lubricants, lubrication intervals and general motor home maintenance scheduling.

Fuel economy is also related directly to the amount of work accomplished by the engine. Heavier loads require more power: Keep excess weight to a minimum.

Cellular Phone Wiring

A roof mounted antenna and wiring (terminals in driver's area) are supplied for cellular phone hookup.

Fog Lights

Clear fog lamps are mounted stationary in the front bumper. The fog lamps illuminate only with low beam headlights, provided the dash switch is activated.

Traveling in Your Motor Home

NOTE:
1. Overall height is approximately 12 ½ feet. This breaks down to: Tip of exhaust pipe 143", roofing 135", A/C 148", satellite antenna dome 151" (12'-7").

2. It is recommended that compartment doors be locked so they do not open while in transit. There are many modern recreational vehicle parks with good facilities, including State, County and Federal Parks, where electrical, water and sewer connections are readily available. Directories are published which describe these parks in detail, and list available services and hookups.

On overnight short weekend trips, your motor home has more than adequate holding tanks and water supply capacity in the event that campgrounds or parking sites are not equipped with these facilities.

On longer trips, where sewer connections and utility hookups are unavailable, it will be necessary to stop from time to time to dispose of holding tank wastes and replenish the water supply. Many gas stations (chain and individually-owned) have installed sanitary dumping stations for just this purpose.

When stopping for the night, park the motor home in a location that is relatively level and where the ground is firm. This will ensure your comfort as well as the leveling of your refrigerator (for most efficient operation).

Making a long trip is not very different from making a weekend excursion since everything you need is right at hand and you are home wherever you travel. When packing for an extended trip, try to avoid taking nonessential items.

When planning to stay in the same location for several days, weeks, or even months, be sure to maintain the motor home level. Use the leveling jacks system for this purpose. (See of this manual).

Hook up to the water supply by attaching the water hose to the commercial water supply inlet.

Plug the electrical cable into the shoreline receptacle. Be sure to observe all grounding and connection precautions!

Connect sewage hookup into the disposal facility.

Winter Traveling

Certain precautions should be taken when traveling in your motor home during the cold winter months. Keep these suggestions in mind:

- Provide heat in the motor home at all times.

- Have a plentiful supply of LPG and diesel.

- If your stay is longer than overnight and you do not use the generator, try to have a shoreline hooked up to outside AC power.

- Minimize your use of electricity if 120 vac is unavailable.

- Leave cabinet doors and wardrobe doors slightly open at night to allow for proper air circulation.

Remember that low temperatures in combination with high winds will cause an equivalent chill temperature much below that indicated by your thermometer. For instance, with an outside temperature of zero degrees and a wind velocity of 10 miles per hour the equivalent chill temperature would be -20 degrees Fahrenheit!

There is no substitute for common sense when traveling in cold weather.

General Storage Notes

Drawing draperies will reduce fading of rugs and upholstery. Leaving an air freshener agent will minimize odors from plastics and other materials. Slight opening of windows and vents will allow air circulation without worry of water entering. Covering wheels to eliminate direct rays of the sun on tires will reduce sidewall cracking.

NOTE: Remove all items from the motor home that may freeze, including canned foods, miscellaneous liquids, etc. Remove all contents of the refrigerator/freezer, clean unit and leave doors ajar.

Reporting Safety Defects

If you believe your vehicle has a safety defect which could cause a crash or could cause injury or death, you should immediately inform the National Highway Traffic Safety Administration (NHTSA) in addition to notifying Blue Bird Wanderlodge.

If NHTSA receives similar complaints, it may open an investigation, and if it finds that a safety defect exists in a group of vehicles it may order a recall and remedy campaign. However, NHTSA cannot become involved in individual problems between you, your dealer, or Blue Bird Wanderlodge.

To contact NHTSA, you may either call the Auto Safety Hotline toll free at 1-800-424-9393 (or 366-0123 in Washington, D.C., area). Or write to: NHTSA, U.S. Department of Transportation, Washington, D.C. 20590. You can also obtain other information about Motor Vehicle Safety from the hotline.

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1-1 Safety Features_____

1-1.1 Seat Belts and Restraint Systems

1-1.1.1 Pilot and Co-Pilot Seats

The seatbelts in the pilot and co-pilot area use a 3-point system built into the seat itself. Seatbelts can be operated by grasping the shoulder buckle and moving it diagonally across the body buckling it into the red and black receptacle. To remove simply press red button located at receptacle on seatbelt. Seatbelts automatically retract.

1-1.1.2 Living Room Area

Two lap belts are provided at the sofa area in living room. These are manual non-retracting lap belts. These belts are operated by sitting between the belts and manually latching over your waist. Be sure to pull snug to your waist. An improperly adjusted seatbelt can be hazardous. To remove, simply press red button on seatbelt buckle.

NOTE: these are the only four approved areas for seating while motor home is in transit.

1-1.2 Smoke Alarm

Your motor home is equipped with two FireX smoke alarms located on the ceiling in the dining and bedroom areas. These alarms meet U.L. Standard 217 and NFPA Standard 74 for operation of smoke detection devices.

▲WARNING: There is no way to ensure there will be no injury or loss of life in a fire; however, the smoke detector is intended to help reduce the risk of tragedy. Additional smoke detectors may help to reduce the risk. Proper use and care of the smoke detector could save lives.

1-1.2.1   Operation

Once a 9 Volt DC battery is correctly connected, the smoke alarm is operating. The LED will flash every minute showing the battery is supplying power. A load alarm will sound when a production of combustion is sensed.

NOTE: The unit will not operate without a battery. A battery flag will pop up preventing the unit from being installed to the mounting bracket without a battery. Carbon zinc batteries average a service life of one year. Alkaline batteries average a service life of one to two years.

1-1.2.2   How to Test

Simply press the test button on the smoke alarm cover for approximately
three seconds. The alarm will sound if all electronic circuitry, horn and battery are working properly. The smoke alarm should be tested at least once a week when the motor home is in use. Prior to each trip, and when the motor home has been in storage, is when the smoke alarm must be tested. When testing the smoke alarm it is advised to stand at arms length. To test that smoke reaches the sensor, blow smoke in a careful fire-safe manner into your smoke alarm.

 CAUTION: Never use an open flame to test the smoke alarm. You may ignite and set fire to the alarm and to the motor home.

1-1.2.3   Maintenance

A smoke alarm is designed to be as maintenance free as possible. However, there are some simple steps to perform in order to keep the smoke alarm working properly:

- Test the smoke alarm once a week.
- Keep a supply of 9 Volt DC batteries on hand.
- Vacuum the slots in the cover and sides with a soft brush attachment every month. Test the smoke alarm once the unit has been vacuumed.
- The smoke alarm should be cleaned every six months to help keep the unit working efficiently.
- The smoke alarm will beep once a minute when a low battery condition exists. The battery must be replaced immediately.

1-1.2.4   Troubleshooting

If the alarm does not sound when the test button is pushed, or with a smoke test, try the following:

- Inspect for obvious damage.
- Check for the recommended battery type.
- Check the battery for proper connection or replace the battery if needed.
- Gently vacuum as recommended.

If these procedures do not correct the problem, do not attempt repairs. If the smoke alarm is within the warranty period and the terms indicate the nature of the problem, return the unit to your dealer. Smoke detectors beyond the warranty period cannot be economically repaired.

1-1.3 LP-Gas Detector

The LP-Gas detector is provided for safety. The gas leakage detector sounds an alarm and closes down the main LPG supply in the event of an LPG leak. This unit does meet California requirements. It detects both LP-Gas and methane gas. Liquefied Petroleum (LP) Gas is heavier than air; methane gas is lighter than air. LP-Gas will settle to the lowest point, generally the floor of the motor home. Methane gas will rise. The gas detector is also sensitive to other fumes such as hair spray, of which most contain butane as the propellant. Butane, like propane, is heavier than air and will settle to the floor level where it will be detected. When this occurs, press reset button for 60 seconds to stop the alert.

Other combustibles, which will be detected, include alcohol, liquor, deodorants, colognes, perfumes, wine, adhesives, lacquer, kerosene, gasoline, glues, most cleaning agents and propellant of aerosol cans. Most are lighter than air in their vapor state and will only be detected when the motor home is closed up.

1-1.3.1   Operation

Upon first application of power, the LED will flash yellow for three minutes, while the detector is stabilizing. At the end of the start cycle, the LED will turn Green, indicating full operation. If the detector senses unsafe levels of gas, it will immediately sound an alarm. The gas detector operates on 12 Volt DC, with a current draw less than 1/10th of one amp.

⚠️ **CAUTION: The detector will not alarm during the three minutes warm up cycle**.

1-1.3.2   Testing

Press the TEST switch any time during the warm up cycle or while in normal operation. The LED should flash red and the alarm should sound. Release the switch. This is the only way the detector should be tested. The test feature checks full operation of the detector.
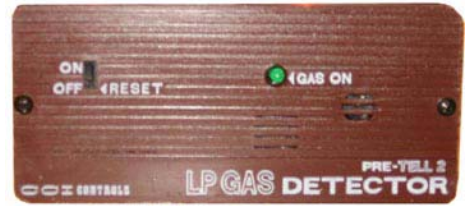
▲**WARNING: Test the operation of this detector after the motor home has been in storage, before each trip and at least once per week during use.**

1-1.3.3   Alarm

The red LED will flash and the alarm will sound whenever a dangerous level of propane or methane gas is detected. The detector will continue to alarm until the gas clears or the TEST/MUTE switch is pressed.

1-1.3.4   Procedures to take during an alarm:

1. Turn off all gas appliances, (stove, heaters, furnace), extinguish all flames and smoking material. Evacuate, leave doors and windows open.

2. Turn off the propane tank valve.

3. Determine and repair the source of the leak. Seek professional help if necessary.

⚠️**CAUTION: Do not re-enter until the problem is corrected.**

1-1.3.5   Alarm Mute:

Press the Test-Mute button when the detector is in alarm.
1. The red LED will continue to flash and the alarm will beep every 30 seconds until the gas level has dropped to a safe level.
2. The LED will flash green until the end of the MUTE cycle.
3. If dangerous gas levels return before the end of the MUTE cycle, the alarm will beep four times and return to phase 1.
4. After two minutes the detector will return to normal operation
    (solid green) or resound the alarm if dangerous levels of gas remain in the area.

1-1.3.6   Fault Alarm:

Should the microprocessor sense a fault in the gas detector, a fault alarm will sound twice every 15 seconds. The LED will alternately flash red to green and the MUTE switch will not respond to any command. The gas detector must be repaired or replaced.

1-1.4 Carbon Monoxide Detector
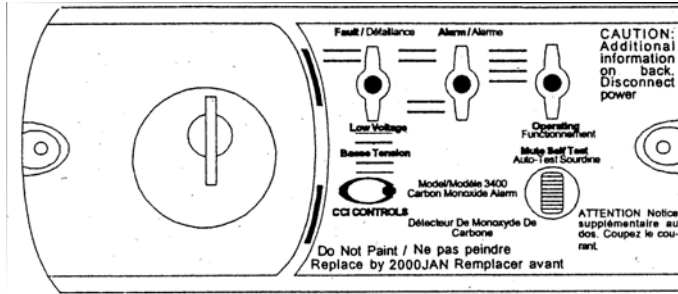
This motor home is equipped with a CCI Controls Carbon Monoxide detector. Carbon monoxide (CO) is a colorless, odorless and tasteless gas. Even low levels of CO have been known to cause brain and other vital organ damage in unborn infants, with no effect on the mother. In cases of mild exposure, the symptoms may include: a slight headache, drowsiness, confusion and fast heart rate. Extreme exposure can result in unconsciousness, convulsions, cardio-respiratory failure and death. Young children and household pets may be the first affected. The CO detector is designed to detect the toxic CO fumes that result from vehicle exhaust and incomplete combustion sources like a furnace, gas stove or water heater. Consequently, it is uncommon for household smoke from cigarettes or normal cooking to cause the alarm to sound.

NOTE: Activation of this device indicates the presence of carbon monoxide (CO), which can be fatal. A concentration of above 100 PPM will cause a warning condition. Individuals with medical problems may consider using detection devices with lower carbon monoxide alarming capabilities. Prolonged exposure to the horn at a close distance may be harmful to your hearing.

1-1.4.1   Getting Started

These instructions include information on the installation, maintenance, and operation of the carbon monoxide (CO) alarm that is installed in your recreational vehicle (RV). It is important to keep these instructions in a handy location so you can refer to them as necessary. A properly installed and maintained CO alarm is an important part of your RV safety plan. Therefore, you and your family should read this manual thoroughly before operating your RV.

Your CO gas detector is operating at all times when it is connected to its power source. This detector will only operate when supplied with the stated operating voltage. This detector is a safety device. It must not be connected in such a way as to allow it to be switched off by the use of a wall switch or similar device, or to become disconnected from its power supply due t the use of a GFCI protected circuit. When the coach is equipped with an optional master cutoff switch for storage only, the detector will be turned off when this switch is turned OFF. This is acceptable as the coach is not to be used with the optional master cutoff switch in the off position.

In the event you have questions regarding the use of this CO alarm, call (800) 521-5228, Monday through Friday, 8 a.m. to 5 p.m. Pacific Standard Time. For the most current information visit the CCI website at: http://www.ccicontrols.com.

▲WARNING: Actuation of your CO alarm indicates the presence of carbon monoxide (CO) which can KILL YOU.

When the alarm sounds on this device and the RED Alarm Indicator light flashes, they indicate the presence of carbon monoxide (CO) which can be FATAL. The alarm will continue to sound until the carbon monoxide has dissipated or until the mute button is activated.

If alarm sounds:
1. Press the MUTE button.
2. Call for emergency services. (fire department 911)
3. Immediately move to fresh air outside or by an open door or window. Do a head count to check that all persons are accounted for. Do not re-enter the premises or move away from the open door or window until the emergency service personnel have arrived, the premises have been aired out, and your alarm returns to its normal condition.
4. After following steps 1-3, if your alarm reactivates within a 24 hour period, repeat steps 1-3 and call a qualified appliance technician.

Have the technician investigate for sources of CO from fuel burning equipment and appliances, and inspect for proper operation of this equipment. If problems are identified during this inspection have the equipment and appliances serviced immediately.

NOTE: Any combustion equipment or appliance not inspected by the technician and consult the manufacturer's instructions, or contact the manufacturers directly, for more information about CO safety of this equipment. Make sure that motor vehicles are not, and have not been, operating in an attached garage or adjacent to the residence.

⚠️**CAUTION: This alarm will only indicate the presence of carbon monoxide (CO) gas at the sensor. CO gas may be present in other areas of the RV.**

1-1.4.2   Operation

The CO alarm will only detect CO gas if the proper power is supplied. Once power is supplied (or re-supplied) to the alarm, it will perform a brief warm-up and self-check process before beginning to monitor for carbon monoxide gas.

⚠️**CAUTION: This alarm will only indicate the presence of carbon monoxide gas at the sensor. Carbon monoxide gas may be present in other areas.**

1-1.4.3   CO Alarm Indicator Lights and Conditions

Power. Once 12 volts DC power is supplied, the GREEN power indicator will turn on indicating the alarm is ready to detect CO gas.

Alarm Condition. When CO gas is present in alarm concentrations, an alarm will sound and the RED alarm indicator light will flash. The detector will continue to alarm until the CO gas has dissipated or until the MUTE button is momentarily pressed. If the MUTE button is pressed during an alarm condition, the alarm will stop sounding and the RED alarm indicator light will also stop flashing. If CO gas is still present in alarm concentrations, the alarm will resume within a few minutes depending on the concentration.

Fault/Low Voltage. In addition to sounding an alarm when CO gas reaches a specific concentration at the gas sensor, the CO alarm also performs two other valuable functions:

1. An automatic self diagnostic system check (called supervision) on the alarm's electronics to ensure reliable, trouble-free operation.
2. Acts as a low voltage indicator for the battery that supplies voltage to the alarm.

Fault Condition. In the event the CO alarm senses a fault in its electronics, the ORANGE Fault indicator light will illuminate continuously (not flashing) and then sound a beep once every five seconds. The GREEN power indicator will then turn off, indicating that the alarm is no longer monitoring for CO gas. If such action should occur, call CCI Controls for assistance during normal business hours. (8 a.m. to 5 p.m. PST).

Low Voltage Condition. This CO alarm has been designed to operate from a 12 volt DC power source. Without the correct voltage, the CO alarm may not detect carbon monoxide at the gas sensor. In the event that the CO alarm senses that a low voltage condition exists, the ORANGE

Low Voltage indicator will illuminate continuously (not flashing) and then sound a beep once every sixty seconds. The GREEN Power indicator light will then turn off indicating that the alarm is no longer monitoring for CO gas.

In many instances, low voltage is an indication that the battery supplying voltage to the CO alarm needs recharging. If recharging your battery does not cause the ORANGE Low Voltage Indicator to turn off and the GREEN Power Indicator to turn on, call CCI Controls for assistance during normal business hours. (8 a.m. to 5 p.m. PST)

NOTE: Unlike the separate indicator lights for the GREEN power and the RED alarm, the Fault and Low Voltage conditions share the same ORANGE indicator light.

Mute/Self-Test. The Mute/Self-Test button serves two purposes: (1) to mute or silence the alarm and (2) to perform a self-test. See Alarm Condition above and Testing Your CO Alarm.

1-1.4.4   Testing Your CO Alarm

▲WARNING: Test alarm operation after vehicle has been in storage, before each trip, and at least once per week during use.

It is important to test your CO alarm regularly.
To test the electronics of the CO alarm, press and release the test button. The alarm should sound a beep four times and the RED alarm indicator light will flash four times. In addition, the indicator lights are also tested. The GREEN power indicator light will turn off and the ORANGE Fault/Low Voltage indicator light will illuminate temporarily. If the CO alarm does not respond in this manner, then refer to the troubleshooting section.

1-1.4.5   Cleaning

Use a vacuum cleaner to remove dust or any other buildup on the detector. Do not wash. Wipe the detector with a damp cloth and dry it with a towel. Do not open the detector for cleaning. Do not paint the detector. It is recommended that the carbon monoxide detector be replaced every 10 years.

1-1.4.6 Troubleshooting

Description	Green Light	Red Light	Orange	Sounder	Resolution
Normal Operation	On	Off	Off	No Sound	
CO Gas Detected	On	Flashing	Off	Four Beeps then a pulse, every 5 seconds.	Follow "What you should know if the CO alarm sounds" section
Low Battery Condition	Off	Off	On	A single beep once every 60 seconds.	Recharge the vehicle battery.
No Power	Off	Off	Off	Off	You only have protection if the unit is powered.
Fault Condition	Off	Off	On	Beep once every 5 seconds	Call CCI Controls.
Test Mode	Dims off, then turns back on.	Flashes four times, then stops.	Dims on, then turns back off.	Four Beeps then a pulse, every 5 seconds.	Unit functional when Green light turns back on.

1-1.4.7 What You Should Know About Interaction with Other Products

Never ignore a CO alarm. A true alarm is an indication of potentially dangerous levels of carbon monoxide. This CO alarm is designed to provide an early warning signal to alert you to the presence of CO gas at the gas sensor. The alarm is designed to sound before most people will experience dangerous symptoms of CO poisoning. If you have special health conditions or medical problems, you should consider purchasing other warning devices which provide audible and visual signals for CO concentrations under 30 parts per million (PPM).

The glues, paints and other materials used in construction of new RV's and RV's that have been in storage often produce hydrocarbon vapors that may be detected. These hydrocarbon vapors may cause the alarm to sound. When this occurs, air out the RV with fresh air.

In concentrated amounts, some common household products may cause the alarm to sound. These items could include alcohol, liquor, kerosene, gasoline, deodorants, colognes, and household cleaning products and aerosols. When this occurs, air out the RV an dthe CO alarm with fresh air.

1-1.4.7.1 Sometimes the CO Alarm Will Sound Because Of:

- Simultaneous use of several fuel burning appliances competing for internal air.
- Negative air pressure resulting from the use of exhaust fans
- High outside wind causing CO to back up in the air vent pipes
- Vent pipe connections vibrating loose from clothes dryers, heaters or furnaces

- Obstructed vent pipes or unvented fuel burning appliances
- Temperature inversions which can trap exhaust gases near the ground.
- Car or RV idling nearby

IMPORTANT NOTES: Some products may prevent or delay your CO gas alarm from detecting carbon monoxide. Therefore, your CO gas alarm should not be:
- *Installed too low where items such as water and other household chemicals can pollute the sensor*
- *Covered, obstructed or painted*
- *Exposed to sulfur products or powders of any kind*

1-1.4.8   Technical Information

Sensor Level	70 ppm or more of carbon monoxide gas and before 10% carboxyhermoglobin (COHb) exposure level.
Operating	Green LED Illuminated
Alarm	Alarm will sound and red LED will flash.
Fault Condition	Orange LED illuminated. Alarm will beep every 5 seconds.
Low Voltage Condition	Orange LED illuminated. Alarm will beep every 60 seconds.
Audio Alarm	85dB at 10 Feet
Supply Voltage	12 volts DC nominal
Current Draw	50 milliamps maximum
Dimensions	$3\text{-}^1/_2$ x 7 x 1-⅝ inches 8.89x17.78x4.12 cm
Storage Temperature	-40°F to 100°F -40°C to 37.8°C Humidity 95% max noncondensing
Operating Temperature	40°F to 100°F 4.4°C to 37.8°C Humidity 95% max noncondensing
Listing	Humidity 95% max noncondensing UL/CSA Listed

Call (800) 521-5228
If you have any questions about your
Carbon Monoxide Gas Alarm

1-1.4.9   Limited Warranty

CCO Controls Warrants the equipment described hereon to be free from defects in material and workmanship under normal use and service when installed and used in accordance with all applicable state and local laws and regulations. CCI Controls sole obligation hereunder shall be limited to repairing or replacing the component or components shown to have been defective at time of shipment or to have become inoperative within the term of the warranty. This warranty does not cover transportation to and from the service locations, loss of time, inconvenience, commercial loss, loss of use, incidental changes, or other consequential damages. This warranty shall be for the term of two years from the date of the first sale by the dealer to the consumer. The consumer may be asked to produce the original sales contract or receipt to identify the date of purchase.

This CO gas alarm contains no user-serviceable parts. If you have questions as to servicing this alarm, contact CCI Controls. This warranty is voided if the alarm's casing is opened.

1-1.5 Fire Extinguisher

Your motor home is equipped with two Badger fire extinguishers. One located by the entrance door and the other by an outside bay. Please read the following operating instructions below before using your fire extinguisher. If there is any doubt on how to operate the fire extinguisher, you and your family should practice using it. Be sure to replace or recharge the extinguisher immediately after use.

1-1.5.1 Basic Operation and Use

In case of fire. . .
1. Call the fire department
2. Get everyone out.
3. Plan your retreat.
4. The contents are discharged by pressure - DO NOT DISCHARGE AT A PERSON'S FACE - STAND A MINIMUM OF 6' to 10' FROM THE FIRE.
5. Hold the extinguisher firmly in an upright position.
6. Stay low to avoid inhalation of smoke and aim discharge just under the flames, using a side to side motion, sweeping the entire width of the fire. For wall fires, start at the bottom, sweep from side to side and progress upward. For floor fires, sweep side to side and move forward as fire diminishes to reach far edge of fire.
7. NEVER move into area where fire was burning even though it appears to have been extinguished. You could be trapped and burned if the fire reflashes.
8. NEVER use water extinguishers on electrical fires.
9. NEVER use extinguishers at distances of less than 6 to 10 feet.

Use the PASS word!

Pull the pin to unlock the extinguisher

Aim at the base (bottom) of the fire and stand 6-10 feet away.

Squeeze the lever to discharge the agent.

Sweep the spray from left to right until totally extinguished.

1-1.5.2 Inspection and Care

Be sure that the extinguisher is in its proper location so that there will be no delay in case of fire.

Your extinguisher should be checked once each month or more frequently if necessary to determine that:
1. The pointer on the pressure gauge is in the green operable area.
2. The nozzle opening has not been closed with some foreign object.
3. A ring pull is provided to prevent accidental discharge. This pin is secured by means of a plastic wire lockseal. On some models, the carry handle is sealed in place by a tape crossing over the lower portion. Check to make sure that the lockseal is intact. A broken lockseal is in indication of tampering and that there may have been a partial or total loss of contents.
4. Weigh the extinguisher at least every six months; and if below the weight designated under "Maintenance" on the extinguisher label, the extinguisher shoul be recharged.

1-1.5.3 Fire Classification Symbols

If your extinguisher bears these A, B or C symbols it can be used on the following fire types.

Ordinary Combustibles: Can be used on paper, cloth, wood, upholstery, and other ordinary combustibles.

Flammable Liquids: Can be used on gasoline, oil, grease, and other flammable liquids.

Electrical Equipment: Can be used on live electrical equipment.

Combustible Cooking Media: For use on cooking appliances that use combustible cooking media (vegetable or animal oils and fats).

FIRE EXTINGUISHER AND AGENTS

TYPE EXTINGUISHER	BASIC AGENT	MAY BE USED ON
Regular (ordinary) Dry Chemical	Sodium Bicarbonate	B C
Multi-Purpose (ABC) Dry Chemical	Ammonium Phospate	A B C
Purple "K" Dry Chemical	Potassium Bicarbonate	B C
Carbon Dioxide	An Inert Gas	B C
Water	Tap Water	A
Halotron 1	Vaporizing Liquid	A B C
		B C
Wet Chemical	Potassium Acetate Solution	A B C (WC-25)
		B C (WC-10)
		K (WC-100 & WC-250)

1-1.6 Emergency Egress

An egress window is designated for use as an exit in the case of an emergency. Inside the motor home the egress is easily identified by the red locking handle. It is also marked as an "EXIT." Outside of the motor home, the egress window is identified by hinges along the top of the window. The glass slider in the egress window operates the same as all other windows. To open the egress window, lift the red handle and push outward on the window. Pull the window closed and lower the handles to lock the egress window.

1-1.6.1   Maintenance

The egress window should be opened twice a year to ensure proper operation. Over time, the rubber seal will tend to stick to the egress window. Occasional operation will help prevent the rubber seal from sticking.

1-1.7 Engine Brake

1-1.7.1   What is it?

Engine braking systems are designed to supplement a standard wheel braking system. These devices are not designed to bring the motor home to a complete stop; however, they can assist in controlling the speed of the motor home. Use of the engine braking system can save on costly service brake repairs.

The "C" (Cummins) brake is an engine-braking device that operates on a different principle than an exhaust brake. An engine brake functions by releasing the engine's compression. The effect of the engine brake increases with engine speed. When the engine brake is activated, the Allison transmission automatically downshifts, utilizing the gear selected and maximizing the engine braking effect.

When the foot switch is activated, an electrical signal is sent to the engine's ECM (electronic control module). The ECM controls a hydraulic circuit that then opens the exhaust valves near the end of the compression stroke. The potential engine braking power depends on turbocharger boost pressure, engine speed, compression ratio, injector timing and when the exhaust valves open.

1-1.7.2   Where is it?

Located on the driver's left console is a High/Low switch. This switch allows for the selection of different levels of engine braking power. Selecting "LOW" activates the engine brake on three cylinders. Selecting the "HI" setting activates the engine brake on six cylinders.

1-1.7.3   How do you turn it on?

The engine brake will not be enabled when:
- The cruise control is active.
- The engine speed goes below 850 RPM.
- An electronic fault code is active.

1-1.7.4   How do you turn it off?

The throttle sensor is a component part of the accelerator pedal assembly and deactivates the engine brakes when the throttle is applied. Applying the service brakes while in cruise control will disengage the cruise control and enable the engine brakes. The engine brake foot switch will not disengage the cruise control. Use the engine brake when going down a hill, freeway or off ramp. The engine brake will allow the engine temperature to drop while going downhill.

NOTE: Idle the engine 3 to 5 minutes at approximately 1000 RPM to warm the engine before activating the engine brakes. Do not operate the engine brakes until the engine oil temperature is above 30°C (86° F).

**▲WARNING: The engine brake is designed to assist the motor home service brakes.**

1-1.8 Backup Alarm

Anytime motor home is in reverse a backup alarm will sound to warn that motor home is backing up. The alarm may be turned off by a switch on the dash marked Backup Alarm. A good reason to turn alarm off would be backing up a motor home into a spot in the early hours of the morning to avoid disturbing other residents.

1-1.9 Air/City Horns

Operate the horn by pressing on the center section of the wheel. Select air or city horn with the HORN SELECTOR switch on the dash. The air horn is a very loud horn much like the one on a semi-truck. The city horn is similar to your typical vehicle horn.

The air horn is a simple device, with limited parts, easy to adjust or repair. In most cases this can be done without removing or replacing the complete unit.
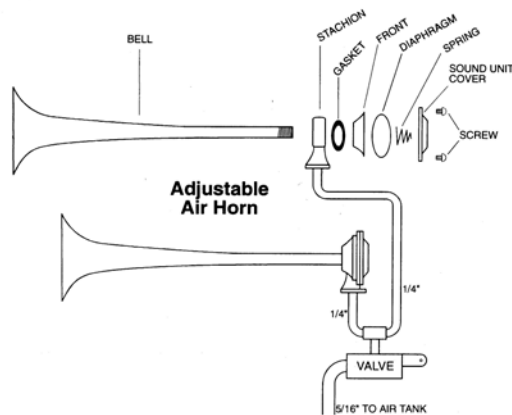
The Grover Product Line consists of two basic styles. There is the Adjustable model and Non-Adjustable model. These can be recognized by the mounting of the bell to the sound unit, examples below. The Adjustable models are all part numbers starting 10 in the four digit part number. The Non-Adjustable models start with 16, 17 and 20 in the four-digit number.

All Grover Air Horns are designed to operate at a minimum air pressure of 60psi and are factory tested at this pressure. The other main factor is the air volume, this is especially important in the 10 series dual mounted installation. By volume we are talking about the ability to pass enough air through a given line size. With dual 10s line size of at least 5/16" is required from tank to valve, from there through a tee ¼" tube is OK. Kit #1098 Tubing, Fitting are recommended for large horns.

Common Complaint
Air horn does not blow, or sounds weak. Assuming the plumbing is correct, we will check for tuning, when we refer to tune we are not talking about adjusting to high or low tone, it is in tune or out, blows weak or without the intensity you would expect from a air horn approximately 130db.

Procedure:
To tune a horn, 10s first check bushing threads exposed forward of sound unit should be one or two in most cases. To tune, hold bell end with left hand firmly with left hand firmly and with right hand grasp complete sound unit and rotate counter clockwise slightly, only enough to turn bell, in or out to expose threads slightly forward of sound unit. A good starting point to tune is one thread exposed, tighten bell up to sound unit and try, if sound is not pronounced, loosen unit move slightly 1/8 turn in or out, and retry until sound is bright and crisp.
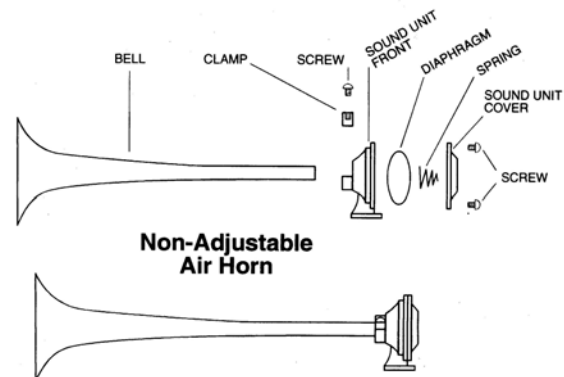
In some cases it becomes necessary to replace Spring, Diaphragm, or Gasket. Use Kit #1094.

On the Non-Adjustable style horns, Use Repair Kit #1681 for 1700 series and Kit #1607 for 1600 series horns. The only other item to check on these models, is the bell seating into the sound unit and tightness of clamp.

1-1.9.1   Backup Lights

Backup lights are similar to vehicle backup lights. They engage when the motor home is in reverse to warn motor home is backing up.

1-1.10   Landing Lights

There are three sets of landing lights. Two are on the left side of the motor home, two are on the right side of the motor home, and two are on the rear of the motor home. They may be switched on or off by selecting one of three buttons marked REAR LAND, LEFT LAND, or RIGHT LAND, on the panel just to the left of the main instrument panel on the dash. A common use would be to aid owner in various operations performed such as loading the motor home, entertaining, or anytime light is needed in that area of the motor home. The reverse landing lights will only operate while the motor home is in reverse or neutral. They will not operate if motor home is in drive.

1-1.11   Spot Lights

The spotlights are located on the roof in the front of the motor home. They are operated by and on/off switch and toggle switch used for directional purposes on the right hand side of the dash beside the ignition switch.

1-1.12 Vehicle Loading

The Federal Certification Label, located inside and above the driver's windshield between the sun visor mounting brackets describes the maximum weight-carrying capacities of your motor home and for each axle, respectively abbreviated by "GVWR" and "GAWR."

The Gross Vehicle Weight Rating (GVWR) is the maximum motor home weight allowable with all systems filled and with passengers and supplies aboard.

Each axle also has a maximum load-bearing capacity referred to as the Gross Axle Weight Rating (GAWR).

The load capacity is the difference between the GVWR and the actual weight. This means that the total weight of all food, clothing, other supplies and passengers must not permit the load capacity to be exceeded.

To find the actual weight, with the motor home fully loaded, drive to a scale, read the weight on the front, and rear wheels separately to determine axle loading. The load on each axle should not exceed its GAWR. If weight ratings are exceeded, move or remove items to bring all weights below the ratings.

When loading your motor home, store heavy gear first. Be sure to keep heavy gear on or as close to the floor as possible. Heavy items should be stored centrally to distribute the weight evenly between the front and the rear axles. Store only light objects on high shelves. Distribute weight to obtain even side-to-side balance of the loaded unit. Secure loose items to prevent weight shifts that could adversely affect the balance and road ability of the vehicle.

1-1.12.1   Motor Home Weight Information

Model   _____

GVWR _____

UVW   _____

NCC   _____

GCWR **_____**

GVWR

(Gross Vehicle Weight Rating) means the maximum permissible weight of this motor home. The GVWR is equal to or greater than the sum of the Unloaded Vehicle Weight plus the Net Carrying Capacity.

UVW

(Unloaded Vehicle Weight) means the weight of this motor home as built at the factory with full fuel, engine oil, and coolants. The UVW does not include cargo, fresh water, LP gas, occupants, or dealer installed accessories.

NCC

(Net Carrying Capacity) means the maximum weight of all occupants including the driver, personal belongings, food, fresh water, LP gas, tools, tongue weight of towed vehicle, dealer installed accessories, etc., that can be carried by this motor home.

(NCC is equal to or less than GVWR minus UVW).

GCWR

(Gross Combination Weight Rating) means the value specified by the motor home manufacturer as the maximum allowable loaded weight of this motor home with its towed trailer or towed vehicle.

This motor home is capable of carrying up to 100 gallons of fresh water (including water heater) for a total of 830 pounds. Reference: Weight of fresh water is 8.3 lbs./gal.; Weight of LP gas is 4.2 lbs./gal. (average).

NOTE: Consult weight decal located in motor home for actual weights.

1-2 Security Features_____

1-2.1 Electric Compartment Locks

1-2.1.1 Entrance Door Dead Bolt Lock Operation

The entrance door has an automotive style two position catch. The second position is required for FMVSS certification. For maximum security and minimum wind noise be sure the door is fully closed. A dead bolt lock is also provided for your security; however, it will only engage and retract if the door is fully closed. Should you inadvertently open the automotive latch with the dead bolt engaged, you will have to shut the door to retract the dead bolt.

Dead bolt can be activated from switches located on the upper right hand dash panel; the entrance door systems control panel, and the bedroom control panel.

1-2.2 Keyless Entry/Security

Your motor home is equipped with a Keyless Entry system. There are two possible models that your motor home may have, the Crime Guard System or the Black Widow System, depending on when you purchased your motor home. These are operated much like that of a keyless entry system in an automobile.

1-2.3 Black Widow Security System

If your motor home is equipped with the Black Widow Security System basic directions for operation are as follows:

1-2.3.1 About Your Black Widow Security System

The security systems combine the benefits of easy-to-use convenience with "no nonsense" protection of person and property. *Please review this manual to become familiar with your Black Widow vehicle security system.* To operate your security system, the three principle components are first described: the Remote Control Transmitter, the Red Status Indicator Light, and the Easy Valet™ Switch.

1-2.3.2 Standard Features

The system has the following standard features:

- 5-button remote transmitter
- Status indicator (LED)
- Valet/Service mode switch
- Remote Start capabilities
- Extended Range Receiver
- Multi-tone siren (120 dB)
- Dual stage impact detector
- Remote panic
- Valet mode
- Remote chirp delete

- Remote sensor bypass
- Passive or active arming
- Stop and Go Feature
- Auto Cold Start
- Flashing Parking Lights
- Auto Rearm
- Passive/Active Arming
- Bay Door Release
- Rear Engine Door Release

1-2.3.3 Optional Features

This system has many optional features that may require additional parts and/or labor. Please contact your dealer for more details.

- Remote keyless entry (Door lock/unlock)
- Illuminated entry
- LCD FM 2-way Remote
- Horn honk
- Window roll-up
- Back up battery
- Additional sensors: glass breakage/microwave

NOTE: Some features may not be appropriate for certain models. Automatic transmission and electronic fuel injection are required, on models using this system.

1-2.3.4 Remote Transmitter Functions

Button 1 Arms the system and locks the doors*. Button 1 also activates the Panic feature.
Button 2 Disarms the system and unlocks the doors*.
Button 3 Activates the Bay Door Release feature.
Button 4 Activates the Remote Start Feature.
Button 5 Auxiliary Shift Key.
Button 5 then **4** Activates the 2nd auxiliary function.

1-2.3.5 Arming Operation

To arm the system press transmitter button 1:
- The siren will chirp once.
- The parking lights will flash once.
- The doors will lock*.
- The LED will turn solid for 10 seconds then start flashing slowly, the system is now armed.

While the system is armed the alarm will trigger if:
- A door is opened.
- The bay door is opened.
- The shock sensor detects an impact to the vehicle.

When the alarm is triggered the siren will sound, the parking lights will flash, and the horn will honk*. If the alarm is triggered while the remote start is engaged, the remote start will immediately shut down.

1-2.3.6 Passive Arming

The passive arming feature allows the system to arm automatically without user intervention. *This programmable feature may be enabled during installation.*

To arm the system passively:
1. Turn the ignition key off.†
2. Exit the vehicle and close all doors.
- The LED will start flashing rapidly to indicate that the system is preparing to arm. (The system can be armed at any time by pressing transmitter button 1.)
- The siren will chirp 30 seconds after the last door is closed to indicate the system is now armed.
- The doors will lock‡*

*Optional feature
† The ignition must have been on for at least 10 seconds prior to exiting the vehicle or Passive Arming will be bypassed.
‡ If the Passive Locking feature was enabled during installation.

1-2.3.7 Disarming Operation

- To disarm the system press transmitter button 2.
- The siren will chirp twice ¥
- The parking lights will flash twice. ¥
- The doors will unlock. †
- The dome light will turn on for 30 seconds. *

¥ *if the siren was triggered while away, the system will respond with 3 chirps and 3 parking light features.*
† *If the Passenger Unlock Feature is enabled, pressing the unlock button will unlock only the driver's door. Pressing the unlock button again unlocks all doors.*

1-2.3.8 Tamper Alert

If the alarm was triggered while away from the vehicle, the siren will chirp 3 times on disarming for tamper indication. After disarming the alarm, enter vehicle and turn ignition on. The LED will flash the zone that was triggered 5 times (see LED chart).

1-2-3.9 Auto Rearm

The Auto Rearm feature allows the system to automatically re-arm itself in the event the system is disarmed and ignition is not turned on within 30 seconds.

NOTE: This programmable feature may be disabled during installation. The Passive Arming feature and Auto Rearm feature are related. In order to disable the Auto Rearm feature, the Passive Arming feature must also be disabled during installation. This feature will not work on vehicles with the illuminated entry feature enabled.

1-2.3.10 Silent Arming/Disarming

Press transmitter button 5 (the Shift Button) then the Arm or Disarm button for one-time silent operation.

1-2.3.11 Chirp Delete

For full time silent operation, the ARM/DISARM chirps can be permanently disabled. This feature must be programmed during installation.

1-2.3.12 Ignition Lock*

The ignition locking feature allows the doors to automatically lock when the ignition key is turned on, and automatically unlock when the ignition key is turned off. This feature may be disabled during installation.

1-2.3.13 Remote Panic

In the event of an emergency (PANIC) situation, the system's siren can be triggered for 45 seconds to attract attention. To activate the Panic Feature, press transmitter button 1 for 3 seconds:

- The siren will sound.
- The parking lights will flash.

Press button 1 to exit panic mode and rearm the system. Press button 2 to exit panic mode and disarm the system. The Panic Feature **will** operate when the ignition is on.

1-2.3.14 Emergency Override

If the transmitter becomes lost or fails to operate, the system can be disarmed by using the emergency override feature.

To override the system:
1. Enter the vehicle.
   - Because the system is armed, the siren will sound.
2. Turn on the ignition key.
3. Press the Valet switch for 5 seconds.
   - The siren will stop sounding.
   - Starter defeat bypassed.

Optional feature
† *The ignition must have been on for at least 10 seconds prior to exiting the vehicle or Passive Arming will be bypassed.*
‡ *If the Passive Locking feature was enabled during installation.*

1-2.3.15 Valet Mode

When the system is placed into the Valet Mode the security system will be disabled. However, the optional keyless entry and remote start features will still function if installed.

NOTE: Remote Start feature may be disabled during valet mode if programmed during installation.

To enter the Valet Mode:
1. Be sure the system is disarmed.
2. Turn the ignition key on.
3. Press and hold the valet/service mode switch for 3 seconds.
   - The siren will chirp once.
   - The LED will turn on solid indicating the system is in Valet Mode.

To exit Valet Mode:
1. Turn the ignition key on.
2. Press and hold the valet/service mode switch for 3 seconds.
   - The LED will turn off.
   - The Siren will chirp 2 times.

1-2.3.16 Bay Door Release

Press button 3 for approximately 2 seconds to open the bay door.

1-2.3.17 Bay Door Disarm

The Bay Door Disarm feature allows the alarm to disarm automatically whenever transmitter button 3 is used to activate the optional trunk release. This eliminates having to first, disarm the alarm before activating the bay door release.

NOTE: The feature is programmed during installation.

1-2.3.18 Remote Sensor Bypass

To arm the system and bypass the shock sensor, press button 1 to arm, then within 2 seconds press button 2 again. The siren will chirp 5 times and sensors will be ignored until the system is disarmed and rearmed.

1-2.3.19 Optional Secure Override Code

If your system was programmed to override with a personal override code-pressing the override switch from 1 to 15 times.
To disarm the system with your personal override code please use the following steps:
1. Open Door, Alarm system will trigger
2. Turn ignition key to on.
3. Press the override switch to the selected number of times and hold on the last one for 5 seconds until the alarm turns off.

1-2.3.20 Remote Starting the Motor Home

IMPORTANT: Only start the motor home in a well ventilated area. Do not use in a closed garage or indoors. Be sure to familiarize yourself with all features prior to using this product.

To remote start the motor home:
Press the transmitter button 4 for 3 seconds.
- The parking lights turn on.
- Approximately 2 seconds later the system will attempt to start the motor home.
- Once the motor home has started, the heater or air conditioner will turn on and run for the pre-programmed time (15 or 25 minutes). If the engine fails to start on the first attempt, it will repeat the starting procedure 2 more times. If the vehicle fails to start after a total of 3 times the system will shut down.
-

Driving motor home after Remote Starting:
Unlock the door by pressing button 2 on the remote transmitter. Enter motor home, turn ignition key to the on position.

NOTE: Do not turn the key all the way to the start position as you may damage the starter.

Once the ignition key is turned to the on position, press the brake pedal and shift the motor home into the proper gear and you may now drive the motor home.

NOTE: If brake pedal is pressed prior to turning on ignition, engine will turn off).

1-2.3.21 Remote Engine Shutdown

If the motor home has been remotely started and you desire to turn the vehicle off, simply press and hold button 4 on the remote transmitter for three seconds. After the motor has turned off the doors will relock. This feature must be programmed during installation.

1-2.3.22 Auto Cold Start

This feature allows the system to start and run the motor home every one or two hours (selectable by the installer) for a period of 24 hours. This allows the engine to remain at an operational temperature in extremely cold weather. Auto Cold Start must be enabled during installation or it cannot be engaged.

Engaging the Auto Cold Start feature:
To turn Auto Cold Start on:
1. Press and hold the brake pedal.
2. While holding the brake pedal down, push the Valet switch and transmitter button 2 for two seconds.
    - The parking lights will flash four times to indicate the Cold Start feature is engaged.
3. Release the brake pedal.

Disengaging the Auto Cold Start feature:
The Auto Cold Start feature can be deactivated in one of three ways:
- Press the brake pedal.
- Turn on the ignition.
- Remote start the motor home using the transmitter.

1-2.3.24 Stop and Go

The Stop and Go features allows the motor home to remain running without use of the ignition key during short stops.

To activate the Stop and Go feature:
1.   With engine running push transmitter button 4 (on FM 2-way press button 2).
     - The parking lights will turn on.
2.   Remove the key from the ignition.
3.   Exit the motor home and lock the doors manually or using transmitter button 1.

To resume driver control:
1.   Unlock the doors manually or by pressing transmitter button 2.
2.   Turn on the ignition.
     - The motor home resumes driver control.

1-2.3.25 Safety Features

The system will not start the motor home if the brake pedal is pressed. Also, if the brake pedal is pressed while remote running, the remote start will shut down.

1-2.3.26 Replacing Lost or Stolen Remote Transmitters

This system can "learn" a maximum of 4 remote transmitters. To add a transmitter or replace lost/stolen transmitters, please consult with an authorized dealer.

SYSTEM REFERENCE INDICATORS	
STATUS INDICATOR (LED) FUNCTIONS	**PARKING LIGHTS FUNCTIONS**
On Solid = Valet Mode	On Solid = Coach Remote Starting
Slow Flash = System Armed	Flash 1x = System armed
Rapid Flash = Passive Arming	Flash 2x = System disarmed
TAMPER ALERT LED FUNCTIONS	Flash 3x = Tamper indication (after disarming)
1 flash = sensor #2	Flash 4x = Defective zone warning
2 flashes = shock sensor	(after arming)
4 flashes = door	
5 flashes = bay door	
flash-flash-pause-flash-pause = shock sensor	

1-2.3.27 Entering Programming

To enter System Programming:
1.   Turn on ignition.
2.   Within 5 seconds, press valet switch 5 times.
     - The siren will chirp 3 times, indicating that you have entered Programming.
3.   Press the valet switch the number times equal to the Feature you want to change.
     - The siren will chirp each time the valet switch is pressed.
4.   Within 5 seconds, press the transmitter button corresponding to the desired operating mode for that Feature.
     - The siren will chirp to indicate the setting.
          - One chirp = Button 1
          - Two chirps = Button 2
          - Three chirps = Button 3
5.   Repeat steps 3 and 4 to change additional features.
6.   Turn off ignition to save changes.

NOTE: The optional FM transmitter may not be used for feature programming.

Programmable Features				
Step	Function	Button 1	Button 2	Button 3
1.	Arming Mode	Active	Passive	
2.	Auto Rearm	Off	On	
3.	Normal/Silent Arming	Normal	Silent	
4.	Ignition Locking	On	Off	Override Code Set
5.	Ignition Unlocking	All Doors	Driver only	Off
6.	Door Unlock Pulse	Single	Double	
7.	Door Lock Pulse Width	1 Second	3 Seconds	
8.	Passive Locking	Off	On	
9.	Entry Delay with Passive Arming	Off	On	
10.	Bad Zone Report	5 Seconds	Off	
11.	Auxiliary 2 Auto Activate on Arming	Off	On	
12.	Auxiliary 1 Output	Momentary	10 Seconds Timed	Latched
13.	Auxiliary 2 Output	Momentary	10 Seconds Timed	Latched
14.	Bay Door Disarm Feature	Off	On	
15.	Remote Start in Valet Mode (optional)	Enabled	Disabled	
16.	Lock with Remote Start	On	Off	
17.	Lock with Remote Shutdown	On	Off	
18.	Engine Run Time	12 minutes	24 minutes	
19.	Cold Temperature Starting	Every 2 hours	Every hour	
20.	Engine Start Sense	Smart Start	Tach Start	
21.	Engine Programming	Learn RPM	Gas Engine	Diesel Engine
22.	FM Module Program (optional)	Learn Module	Learn FM Transmitter	
23.	Ignition 2 Relay Programming	Ignition 2	Accessory 2	Starter 2
24.	Horn Output	Horn Output	Ignition 3 Output	

1-2.3.28 Programmable Features

1. **Arming Mode.** Select between manual arming (Active) or automatic arming (Passive).
2. **Auto Rearm.** Automatically rearms the system in case of accidental disarming. The system must be armed for at least 10 seconds before disarming, and the bay door must not be opened or Auto Rearm will be bypassed.
3. **Arming Chirps.** Select Normal or Silent Arming.
4. **Ignition Locking / Override Code Set.** Automatically locks the doors when the ignition is turned on. The system will not lock the doors if any door is open with then ignition is turned on. Pressing Button 3 during this step enters the Override Code Set mode. Press the valet switch the desired number of times from 1-15 to set the code.
5. **Ignition Unlocking.** Automatically unlocks the doors when the ignition is turned off. Select from all door unlock, driver's door only unlock, or no unlock.

NOTE: Driver's door only unlock requires wiring the system for Passenger Unlock.
6. **Door Unlock Pulse – Single/Double.** Selects between a single pulse or a double pulse door unlock output.
7. **Door Lock Pulse Width.** Selects between a 1-second and a 3-second output for motor homes equipped with vacuum door locking systems.
8. **Passive Locking.** Selects whether or not the system will automatically lock the doors with Auto Rearm and Passive Arming.
9. **Door Entry Delay with Passive Arming.** When selected, the door input trigger will be delayed for 15 seconds, allowing access to the emergency override switch. Only delays when the system is armed passively.
10. **Bad Zone Report.** Siren will chirp 3 times if any zone remains open 5 seconds after arming. If motor home has delayed dome light, program this feature to OFF.
11. **Auxiliary 2 Auto Activate on Arming.** When selected, the Auxiliary 2 output will pulse upon system arming to activate accessory items when the system is armed.
12. **Auxiliary Function 1 –** Selectable for Momentary, Timed or Latched operation.

When Momentary operation is selected, the system will provide an output for as long as the Transmitter button is held.

When Latched operation is selected, the system will provide an output that turns on when the transmitter button is pressed and turns off when the transmitter button is pressed again.

When Timed operation is selected, the system will provide an output that turns on for 10 seconds each time the transmitter button is pressed. If the button is pressed again during the 10 seconds, the output will turn off.

13. **Auxiliary Function 2** – Selectable for Momentary, Timed, or Latched operation.
14. **Bay Door Disarm Feature.** When selected, activating the Auxiliary 1 function to open the bay door will automatically disarm the system.
15. **Remote Start in Valet Mode.** Determines if the remote start feature will operate when the alarm is set for valet mode.
16. **Lock with Remote Start.** Automatically locks the doors after successfully remote starting.
17. **Lock with Remote Shutdown.** Automatically locks the doors 5 seconds after the remote start is shut down.
18. **Engine Run Time.** Selects between 12 and 24 minutes run cycle.
19. **Cold Temperature Starting.** Allows the vehicle to automatically start and run every 2 hours or every hour for severe cold weather.
20. **Engine Start Sense.** Selects between Smart Start for tachless operation, or Tach Start for actual RPM monitored starting. (see Step #21)
21. **Engine Programming.** Pressing transmitter button 1 "learns" the RPM. For diesel vehicles, after learning Tach signal enter step #21 again and set for diesel by pressing button 3.
22. **FM Transmitter Module.** Pressing button 1 learns the add-on FM module ID so the FM transmitter can operate the system. Pressing button 2 learns the FM transmitter. After pressing button 2 on the AM remote, press transmitter button 1 on each FM remote (max 2).
23. **Ignition 2 Relay Programming.** Selects between second ignition, second accessory, or second starter output operation for heavy gauge BROWN wire.
24. **Horn Output.** Selects between horn output or ignition 3 output for the horn wire.

Engine Programming for Remote Start
In order for the system to properly start and run the motor home, the unit must be able to determine if the motor home is cranking or if the engine is actually running. This system is equipped with two means of detecting the engine's run status: Smart Start and Tach Start.

The **Smart Start** feature detects the engine's run status using specially designed software that interprets certain characteristics of the engine, and does not require a connection to the motor home's tachometer wire. This feature allows a faster installation, but may not be compatible with all motor homees, or under extreme temperatures.

The **Tach Start** feature requires connection to the motor homes tachometer wire, or an injector wire if the tach wire is not available. The Tach Start feature provides reliable operation with virtually any vehicle and in severe temperature extremes. When the Tach Start feature is selected, the vehicle's tach signal must be "learned" through system programming. (see below)

To Program the Tach Start feature:
1. Enter System Programming, (see Entering Programming)
2. Program Step #20 to Tach Start using transmitter button 2.
3. Re-enter system programming, and go to Step #21.
4. Immediately start the vehicle with the key to avoid the programming sequence timing out.
5. Press transmitter button 1 to learn the vehicle's tach signal.
   - The siren will chirp and the LED will flash once if the tach was learned.
   - The siren will chirp and the LED will flash 5 times if the tach was not learned.
6. Turn off ignition to save settings.

The default setting for the engine mode is Gas Engine. For diesel vehicles, the engine type for Step #21 must be set to Diesel Engine. When programmed for diesel engines, the BLUE/YELLOW wire

(glow plug input) is monitored to make sure the glow plugs have warmed up before the engine begins cranking. If the glow plug wire is not connected, the unit has a built-in timer that waits 15 seconds before cranking the starter.

Complete Default Reset
Following this procedure will set all User and Installer Programming Parameters to factory default settings.
1. Enter System Programming.
2. Press Transmitter Button 3.
    *   The siren will chirp 6 times indicating the reset signal was received.
    *   All Programming options are now set to factory default settings.
3. Turn ignition off.

Test System and Adjust Shock Sensor
Arm, disarm, and start the system, checking that the siren and parking lights are functioning normally. Make sure that the programmed features are performing correctly, ie.: ignition locks, passive arming, passive locks, etc.

1. Test the doors and bay door inputs (make sure all doors trigger the system.)
2. Adjust the shock sensor. (see Real-time Sensor Adjustment Mode).
3. Arm the system and disarm it with the ignition and valet switch.
4. If programmed to passively arm make sure that the system arms properly.
5. Tie up wire harness, and replace any under dash panels.
6. Make sure the customer has physical knowledge of the location of the valet/override switch.

Real-time Sensor Adjustment Mode
This mode allows active testing of the shock sensor and optional sensor input making adjustments without arming the alarm.

NOTE: Arm and Disarm chirps must be enabled for proper operation. Sensor Adjustment Mode does not operate with the optional FM transmitter.

To Enter Sensor Adjustment Mode:
1. Turn the ignition on.
2. Press the Shift Button (Button 5) 3 times, then press Button 3.
    *   The siren will chirp 4 times, indicating that the sensor is ready to be tested.
3. Test the sensitivity. The siren will chirp to indicate a sensor is triggered.
    *   One chirp indicates the shock sensor.
    *   Two chirps indicates the warn away.
    *   Three chirps indicates the optional sensor.
4. To make shock sensor adjustments:
    *   Turn the adjustment screw on the sensor clockwise to increase the sensitivity.
    *   Turn the adjustment screw on the sensor counter clockwise to decrease the sensitivity.
5. Turn off the ignition when the desired sensitivity level is reach.

Adding Transmitters
To add a new transmitter to the system have the desired transmitters ready and follow the Code Learning sequence.

To Enter Code Learning Mode:
1. Turn the ignition on, off, on, off and leave on.
    *   The siren will chirp.
2. Press the Override switch.
    *   The status LED will turn on red.
    *   The siren will chirp.
3. Press the Lock Button on the transmitter.
    *   The siren will chirp once.
4. Press Lock Button on the transmitter again.
    *   The siren will chirp twice.
5. Repeat steps 3 and 4 for each additional transmitter.
6. Turn off the ignition.
    *   The siren will chirp 3 times.

1-2.3.29 Troubleshooting

Problem	Probable Cause	Suggested Correction
Alarm does not operate.	Alarm in Valet Mode; Ignition input has voltage on it; Missing +12V or ground.	Take alarm out of Valet Mode; Turn key off and verify yellow wire is connected to correct ignition wire; Check +12V and ground connections.
Alarm will not Passively Arm.	Unit is not programmed for Passive Arming, wrong polarity door input wire, Yellow ignition input has 12V+ on it.	Program step #1 for Passive Arming; Correct door switch polarity; Change Ignition input wire; make sure alarm is not in Valet.
Alarm will not enter Code Learning Mode.	Ignition was not left in the on position after turnint it on & off three times; Sequence not performed rapidly enough (5 sec.); Valet/Override Switch is defective or not plugged in.	Leave ignition in on position; Repeat procedure quicker; Replace valet switch.
Alarm chirps 4 times 5 seconds after system is Armed.	Factory Dome light Delay is longer than 5 seconds; Door open or defective pin switch; Shock sensor is not properly adjsuted or defective.	If dome light delay is longer than 5 seconds program step #10 to OFF. Replace defective pin switch; Adjust or replace shock sensor.
Parking lights do not flash.	Wrong wire connected, Wrong polarity selected, or RED Wire #1 not connected to battery power.	Connect WHITE wire to proper wire, Reverse jumper polarity (see Jumper Settings), Connect RED wire #1 to +12V.
Door locks do not lock or unlock correctly, or action is reversed.	Defective GREEN or BLUE wire in door lock connector plug, GREEN and BLUEwires reversed, or wrong door lock wiring diagram used.	Check GREEN and BLUE wires on door lock connector plug; Verify vehicle's type of door lock system; Reverse wiring to door relays.
Illuminated Entry does not activate on upon disarm.	External relay required, or Wrong polarity wired for relay.	Add relay.
Range is poor.	Antenna wire is grounded; Module is picking up interference from coaches electrical system.	Make sure antenna is not connected to ground; Relocate module or route antenna away from computer modules.
Coach will not remote start.	Safety inputs are triggered.	Check Brake Switch Input (+) or Bay Door Input (-).
Coach cranks and begins to run, then shuts off.	Smart Start is not compatible with this coach; Coaches tach signal is not learned.	Connect the BLACK/GRAY wire, and program the unit to learn the coaches tach signal.
Keyless entry does not operate with remote.	Wrong door lock polarity; Wrong lock wires connected.	See Bypassing Factory Theft Deterrent Systems.
Ignition triggered door lock feature does not operate.	Yellow wire shows +12V; Door is open; Door trigger input wrong polarity.	Connect yellow wire to proper ignition wire; Close door; Change door trigger polarity.
Coach horn honks when system disarmed and door is opened.	Coaches factory security system needs to be disarmed.	Locate the disarm wire (usually located in driver's kick panel) and connect VIOLET/WHITE wire to disarm factory system.
Coach will not start and alarm does not function properly.	Coach battery dead or drops below 9 volts when trying to start the coach.	Charge or replace battery.

1-2.4 Crime Guard Security System

The following information explains how to operate your Crime Guard Security System. Use this section if this is the system that was delivered with your motor home.

1-2.4.1 About your New Crime Guard System

Crime Guard systems combine the benefits of easy-to-use convenience with "no nonsense" protection of person and property. *Please review this manual to become familiar with your Crime Guard vehicle security system.* To operate your security system, the three principle components are first described: the Remote Control Transmitter, the Red Status Indicator Light, and the Easy Valet™ Switch.

The Remote Control Transmitter: Your system comes with two pre-learned remote controls, or "transmitters", and is capable of being operated by as many as four transmitters. The transmitter has three buttons: A large upper button, a small middle button, and a small lower button.

Every transmitter has its own unique, invisible electronic "code". Each time the transmitter is used, this code randomly changes, effectively protecting your system against "code grabber" devices, like those used to copy cellular phone security codes. Another exclusive patented feature, Automatic Transmitter Verification (ATV™), ensures that only your transmitters operate your system, and is explained further under "Automatic Transmitter Verification" found later in this manual. These features, and many others, ensure that Crime Guard systems are the most secure vehicle security systems available.

That Status Indicator Light: The Red Status Indicator Light reports the status of the security system at all times, and also serves as a visual deterrent to break-ins and theft. In addition, the Status Indicator Light is part of the ATV™ visual display, and is also used for the Alarm Memory Recall feature. Specific description of the Status Indicator Light is found under section "Status Indicator Light" later in this section.

The Valet Switch: The Valet Switch has three main functions:

1. The Valet Switch can be used to turn off the security operation of the system, including the Last Door Arming System feature (if used). This is referred to as "placing the system into Easy Valet Mode".
2. The Valet Switch can also be used, in conjunction with the vehicle's ignition key, to perform an emergency disarming of the security system in the event the transmitter is lost or becomes inoperable. This is referred to as an "Emergency Override".
3. The Valet Switch is used in the procedure of programming operational features and also for encoding transmitters to the system.

1-2.4.2 Using Your Crime Guard System

Your new Crime Guard security system is designed to deter theft of both your vehicle and its content. Arming the system turns on the protection operations, disables the vehicle's starter and locks the doors provided an interface is installed. Once the system is armed, any intrusion attempt will activate it, sounding the siren and flashing the lights to attract attention. Disarming the system turns off the protection, allowing normal use of the vehicle.

There are two methods of arming the security system:

1. The first method is to use the transmitter, by pressing and releasing its large upper button. The system must not already be armed or be in Easy Valet Mode and the vehicle's ignition switch must be off. In normal operation, each press of the large upper button reverses the system between the armed and disarmed states.

2. The second method is Last Door Arming, which configures the system to automatically arm every time you exit the vehicle. This method of arming is programmable, and may be used or not used as desired.

Upon Arming:
- The siren will chirp twice (or four times if a zone is bypassed) unless the silent arming procedure is followed.
- The parking lights will flash twice (or four times if a zone is bypassed).
- The doors will lock*
- The starter interrupt will engage.
- The Status Indicator Light will begin to flash slowly.

Three seconds after arming, the security system becomes fully armed, and will activate to an alarm condition should an intrusion attempt be detected. Further transmitter operations and options are discussed later in this manual.

The doorlock interface must be installed.

Arming Bypass:
When arming the system using the transmitter, if any protected zone or sensor circuit is in a violated condition, the affected zone or circuit will be automatically bypassed. This is "Arming Bypass", which allows the system to still arm and protect the other normal, non-violated zones. In the case of a bypassed zone or circuit, should the violated conditions return to normal, 5 seconds after becoming normal the system restores protection to the previously bypassed zone or circuit.

If the hood and trunk zone, or sensor circuit is bypassed when the system is armed, instead of the normal arming confirmation the siren will chirp four times and the parking lights will flash four times to alert you. However, if a door zone is bypassed, the siren and light confirmation will be the normal two chirps and flashes, as many vehicles are equipped with a delayed interior light illumination. In these vehicles, the interior light delay would typically cause the system to indicate a bypass if the system is armed during the delay. In these cases, the arming indication is normal, and the door zone is protected by the system five seconds after the interior light turns off.

1-2.4.3 Last Door Arming by Exiting the Vehicle

Last Door Arming:
Last Door Arming is a programmable feature, which configures the system to arm itself without needing a command from the transmitter. This convenient feature offers a high level of security and may entitle the vehicle owner to an insurance discount since the user does not need to remember to arm the system each time the vehicle is exited.

The Last Door Arming feature may be coupled, if desired, with the automatic locking of the vehicle's doors when the system arms itself. *

The Last Door Arming process:
1. When the vehicle's ignition has been turned off, the system waits until a door is opened. When the door is closed, or when the last door is closed when more than one door is opened, the siren will chirp twice, the parking lights will flash twice, and the Status Indicator Light will begin flashing rapidly. The Last Door Arming countdown has begun.
2. Thirty seconds later the siren will again chirp twice, the parking lights will again flash twice, the starter interrupt will engage, and the Status Indicator Light will begin flashing slowly. If programmed to do, the vehicle's doors will also lock*. Three seconds after these actions occur, the system is fully armed.

The doorlock interface must be installed.

NOTES:
- *If a door is reopened during the thirty-second period between the first and second set of double chirps, the countdown will stop and reset. When the reopened door is closed again, the 30-second countdown starts over again at the beginning.*
- *Last Door Arming is separate from, and does not effect the operation of arming by using the transmitter.*
- *All protected points must be closed or otherwise in a non-violated state for the Last Door Arming sequence to start. Unlike active arming from the transmitter, the system cannot bypass an open or detected zone and arm itself.*

To temporarily prevent the system from arming itself:
- Place the system in Valet Mode using the Valet Switch.
- Leave a vehicle door open. Although this varies depending on the vehicle, in many cases turning on the interior light will be detected by the system as an open door.
- Although the system will not Last Door Arm while the ignition is on, leaving the ignition key turned on without the engine running is not recommended.

1-2.4.4 System Armed and Activated

While the system is in the armed state:
- The Status Indicator Light will be flashing slowly to confirm that the system is armed, and also serve as a visual deterrent.
- The starter interrupt circuit is engaged.
- Protected zones are being monitored for intrusion attempts.

Should activation into the alarm condition occur:
- The changing-tone electronic siren will loudly sound.
- The parking and interior lights will flash.
- The doors will lock,* regardless of their locked or unlocked status. This feature is unique – if the system detects that a door is opened, it waits until the door is closed before relocking it, denying the thief reentry.

An activated alarm condition has a duration of 30 seconds (60 is optional) unless the system is disarmed using the transmitter or the Easy Valet™ switch. If all protected zones are secure at the end of the alarm condition, the system will stop and rearm automatically, ready to detect another entry attempt. If a protected zone is still violated at the end of the alarm condition, the system will reactivate for up to two additional alarm cycles. After the third alarm cycle the system will automatically rearm and bypass the open zone until that zone returns to a normal "non-violated" state.
- Once the system resets after it has been activated, upon disarming the audible and visual confirmation will change to indicate the activation. This is the "Activation Alert", which is explained in the Activation Alert section later in this manual.

*The doorlock interface must be installed.

1-2.4.5 Disarming the System

There are three methods of disarming the security system:
1. The first method is to press and release the transmitter's large upper button to disarm the system. This is the normal "daily use" method.
2. The second method is to press and release twice within 5 seconds the transmitter's small middle button. This is "silent disarming".
3. The third method is for emergencies, should the transmitter become lost or inoperable. This is the "Emergency Override", and uses the ignition key and Valet Switch.

1-2.4.6 Remote Disarming by Transmitter

To Disarm the System: Press and release the large upper button. The siren will chirp once to confirm disarming. The parking lights will flash once to confirm disarming. The doors will unlock.

To Silently Disarm the System: First press and release the small middle button, then press and release the small middle button again. The parking lights will flash once to confirm disarming. The doors will unlock.

Upon Disarming:
- The siren will chirp once (or three times if an alarm activation occurred) unless the silent disarming procedure is followed.
- The parking and interior lights will flash once (then, if programmed, illuminate for 30 seconds or until the vehicle's ignition is turned on).
- The doors will unlock, either all doors or driver's door only.
- The starter interrupt will disengage.
- The Status Indicator Light will show one of these features or conditions:
  - Flashing rapidly = Automatic Rearming feature is in progress.
  - Off = System disarmed (Automatic Rearming feature not selected).
  - Flash/Pause = Indicates violated zone if system has been activated.

The doorlock interface, in either standard form or driver's door priority form, must be installed.

Safety Disarm Feature:

Pressing and releasing the large upper button while the system is activated into the alarm condition will disarm the system, but the doors will remain locked. This is the "Safety Disarm" feature, which allows the vehicle to remain secure, even though an activated system has been disarmed.

Safety disarm will also cancel Automatic Rearming. This feature is also very useful when the vehicle is exposed to environmental conditions, such as storms, trains or heavy vehicles, which may cause false activations.

Safety Disarm is a temporary "one time" operation, which occurs only while the system is activated. To remotely unlock the doors after a Safety Disarm, simply arm, then disarm the system again.

Activation Alert:

If the system experiences an alarm condition and resets itself, upon disarming the siren will chirp three times and the parking lights will flash three times instead of the normal one chirp and one light flash. Additionally, the Status Indicator Light will be flashing a "Zone Violation Code", when the alarm condition activation occurred, the Status Indicator Light changes from flashing slowly to flashing two to four times between pausing to indicate which protected zone was violated.
- The Zone Violation code will continue to be displayed until the vehicle's ignition is turned on.
- The Status Indicator Light will display the Zone Violation Code in place of fast flashes indicating Automatic Rearming.
- Should the system be rearmed before the ignition clears the Zone Violation Code memory, the Status Indicator Light shows the normal slow flashing.
- The system can store up to two consecutive Zone Violation Codes. If more activations occurred, the two most recent codes are displayed.

Automatic Rearming:
Automatic Rearming is a programmable feature, which ensures that your system is never inadvertently disarmed. It is possible to accidentally or unknowingly operate the transmitter from a pocket or purse. You may not even be aware of an accidental disarming due to the enhanced operating distance offered by the Extended Range Transmitter.

How it Works:
Whenever the system is disarmed by the transmitter, this feature starts a 90 second countdown, which is indicated by a rapidly flashing Status Indicator Light. During this 90-second period, if no protected entry points are opened and the vehicle's ignition is NOT turned on, the system will automatically arm itself at the end of the countdown. If desired, the system can also be programmed to automatically relock the doors when this occurs.

Automatic Rearming Notes:
- Turning the vehicle's ignition on cancels Automatic Rearming.
- Opening a door will suspend the 90-second countdown.
- All protected zones must remain non-violated during the 90 second Automatic Rearming period. For example, if a vehicle door is opened during the 90-second period, the countdown will stop. When the door is closed, the system resets and starts a new 90-second countdown period.
- The Automatic Rearming sequence is indicated by a fast flashing Status Indicator Light, unless the system has been activated, in which case an Alarm Condition Memory Recall code will flash instead. The ignition switch must be turned on to erase Zone Violation Code.
- If the system is disarmed while it is activated (siren sounding and lights flashing) Safety Disarm will cancel the Automatic Rearming for that disarming operation only. The next time the system is armed, Automatic Rearming will be initiated upon the subsequent disarming.

1-2.4.7 Disarming by Emergency Override

Emergency Override:
In the event that your transmitter is lost, damaged, or its batteries have become exhausted, the Valet Switch and the vehicle's ignition key may be used to disarm the system. Please note that for this operation the pressing of the Valet Switch may be customized; this is the SecureCode feature, the programming of which is described in "Feature #2 745i³ Programmable Features found later in this manual.

The following Emergency Override instructions reflect the SecureCode entry of the Valet Switch as the "as received" default setting of "1 press". Instead of "1 press" of the Valet Switch, a customized programming of the SecureCode would require from 2 to 12 presses.

To Disarm the System without using a Transmitter:
1. With the system in the armed condition, enter the vehicle via the driver's door (be aware that the system will activate an alarm condition when the door is opened).
2. Using the ignition key, turn the vehicle's ignition on.
3. Within 5 seconds, enter the SecureCode by pressing and releasing the Valet Switch once. The system will disarm.

If the SecureCode entry of the Valet Switch is the "as received" default setting of "1 press", the system will disarm the moment the Valet Switch is released from the single press. If a customized SecureCode has been programmed, the system will disarm a few seconds after the correct entry. If an incorrect entry is made, the system will not disarm.

A procedure, which is separate, but similar, to an Emergency Override, is the Easy Valet Mode, which prevents the system from performing any automatic arming operations, which may be programmed to occur. See section "Easy Valet Mode" later in this manual.

1-2.4.8 Remote Panic

To Activate Panic:
Press and hold the large upper button for 3 seconds.

To Deactivate Panic:
Press and release the large upper button.

Upon Activating Panic:
- The electronic siren will sound.
- The vehicle's exterior parking lights will flash.
- The vehicle's doors will unlock*
  - The Panic feature is designed for situations in which the user feels threatened and/or a need to attract attention.
  - Panic can be activated anytime, whether the vehicle's ignition is turned on or off, and has a 30 second duration (60 seconds is optional) unless it is deactivated using the remote control.

- At the end of the Panic cycle the system will reset, enter the armed state, and lock the doors*

The door lock interface must be installed. If the vehicle has been configured for Driver's Door Priority, Panic will unlock the driver's door.

1-2.4.9 Easy Valet Mode

Easy Valet Mode: This allows you to turn off all of the "alarm" operations of the security system while retaining the remote convenience features such as Keyless Entry, Panic, and the Auxiliary Outputs. The system may only be placed into Easy Valet when it's disarmed; if armed, an Emergency Override must be performed before placing into Easy Valet Mode. Once the system is in Easy Valet Mode, it cannot become armed from the transmitter, Last Door Arming, or Automatic Rearming.

Although both use the Valet Switch, Easy Valet Mode and Emergency Override are two similar, but different procedures. Emergency Override disarms an armed and activated system, and requires the ignition key. Easy Valet Mode turns off the alarm operations of the disarmed system, but without the need of the ignition key.

Easy Valet mode is designed for situations in which it is not convenient for the security portion of the system to be operational. For example, during extended stopovers for vehicle servicing, maintenance, valet parking, washing, etc.

The Valet Switch is in the Status Indicator Light/Valet Switch Assembly. The installed has the option of utilizing an additional, separate Valet Switch should mounting in a hidden location be desired. Please become familiar with the location of the Easy Valet Switch.

To Enter "Easy Valet" Mode:

With the system disarmed, press and hold the valet switch for 2 seconds.
- The siren will chirp twice, the parking lights will flash twice and the Status Indicator Light will illuminate solid red to confirm that the system is in Easy Valet mode.
- To remind the user that the system is in Easy Valet Mode, the siren will chirp once every time the vehicle's ignition is turned off.

To Exit "Easy Valet" Mode:

Press and release the valet switch.
- The Status Indicator Light will turn off to confirm exit from Easy Valet mode.

1-2.4.10 Status Indicator Light

The red Status Indicator Light visually confirms the status of the system and provides a high level of visual deterrence. Additionally, the Status Indicator Light is also part of the patented Automatic Transmitter Verification feature and the Alarm Condition Memory Recall feature. The Status Indicator Light, which shares a housing assembly with the Valet Switch, is normally mounted in a location where it can be easily seen by the driver, as well as from outside the vehicle.

Security System Status: The primary function of the Status Indicator Light is to indicate the status of the security system:

1. **Off** = The system is disarmed and not performing automatic functions.
2. **On Constant** = The system is in the Easy Valet Mode.
3. **Flashing Slow** = The system is fully armed.
4. **Flashing Fast** = Last Door Arming or Automatic Rearming is in progress.

Automatic Transmitter Verification: For the first 10 seconds after the vehicle's ignition is turned on, the Status Indicator Light will flash a number of times equal to the number of transmitters that are capable of operating the system:

5. **1 Flash/pause** = 1 transmitter is programmed.
6. **2 Flashes/pause** = 2 transmitters are programmed.
7. **3 Flashes/pause** = 3 transmitters are programmed.
8. **4 Flashes/pause** = 4 transmitters are programmed.

Alarm Condition Memory Recall: If the system enters an alarm condition, the red Status Indicator Light will stop flashing slowly and begin to flash in sequence to indicate which protected zone caused the alarm condition. The Status Indicator Light will flash and pause to indicate which protected zone was violated while the system is still armed, after it's disarmed, and until the vehicle's ignition is turned on. The system's Alarm Condition Memory Recall circuit can store two consecutive zone violations. If there have been multiple violations, the Status Indicator Light will replay the two most recent violations in the order in which the occurred.

9. **2 Flashes/Pause** = System was triggered through the hood or trunk.
10. **3 Flashes/Pause** = System was triggered through the door.
11. **4 Flashes/Pause** = System was triggered by the sensor.

NOTE: Turning on the ignition will clear the Alarm Condition Memory Recall.

1-2.4.11 Glass Breakage and 2-Zone Impact Sensor

Sensors: The Crime Guard 745i³ security system is equipped with a Glass Breakage and Dual-Zone Infrasonic Impact Sensor to increase the effectiveness of the system. The impact sensor is just one in a comprehensive line of available sensors. Other available option is: piezo shock sensors, and microwave/radar sensors, which can detect motion inside and outside the vehicle.
*   The Crime Guard 745i³ control module features dual auxiliary sensor ports, which easily allows the addition of a further optional sensor.
*   The system will automatically bypass the sensor zone if it is triggered five times during a single armed period. If desired, this feature can be programmed to not operate.

Prewarning Detection Circuit: When the sensor's prewarn zone is violated the security system will respond by chirping the siren three times and relocking all of the doors* If the prewarn circuit is triggered five times while the system is armed, the circuit will automatically shutdown until the security system is disarmed and armed again.

1-2.4.12 Remote Sensor Bypass

To Activate Remote Sensor Bypass:

Arm the system, then within 4 seconds press and release the small lower button. The siren will chirp twice to confirm arming the siren then chirps once to confirm sensor bypass. The parking lights will flash twice to confirm arming. The doors will lock upon arming.*

Remote Sensor Bypass allows the option of "turning off" the sensor anytime the system is armed using the transmitter. When the sensor is bypassed, only the sensor zone is bypassed and all other protected zones will remain fully operational and vigilant. The sensor zone will reset to its normal operation the next time the system arms.
*The doorlock interface must be installed.

1-2.4.13 Backup Battery

This security system is equipped with a backup battery inside the control module. The backup batter will provide an alternative power source to operate the Crime Guard system if the vehicle's battery is disconnected. A built-in protection circuit will not allow the backup battery to supply power into the vehicle's electrical system.

While operating on the backup battery, the system will not have the flashing lights output, the Status Indicator Light, nor power any sensors in order to conserve power. The siren will continue to operate

at its maximum sound output, all protected entry zones (besides the sensor) will continue to be monitored, and the Starter Interrupt will operate while the system is armed. The backup battery should be replaced by your authorized Crime Guard dealer every 18 months, or any time the backup has operated the system on its own.

Anticipated life for the backup battery under the following conditions:
- 2 days as the system's only power source while armed.
- 25 activated alarm cycles: An activated cycle has a 30 second duration during which the siren is sounding. The cycle ends when the system automatically resets itself to the armed state.
- 50 separate arming or disarming commands.
- 18 months if the backup battery circuit has not been used.

1-2.4.14 2nd and 3rd Vehicle Operation

Up to three systems may be independently operated using a single transmitter. The transmitter's button functions can be programmed to be different for each vehicle. This ability to change the button assignment prevents arming and disarming the multiple systems simultaneously. (Refer to the following chart for button function assignment)

Arm/Disarm	Aux Channel #1	Aux Channel #2
Large Button	Upper Small Button	Lower Small Button
Upper Small Button	Large Button	Lower Small Button
Lower Small Button	Large Button	Upper Small Button

1-2.4.15 Vehicle Recovery

Your system is equipped with three separately programmable Vehicle Recovery protection features, which also provide Anti-Carjacking protection. The Vehicle Recovery operation may be selectively activated by the ignition, by an open door, or by the transmitter.

How it Works:
Once the Vehicle Recovery process has begun, the user has 53 seconds to cancel the process by entering the system's programmed SecureCode using the Valet Switch. If Vehicle Recovery is not cancelled, 53 seconds after being activated the siren will begin to chirp for 7 seconds to alert the user that the system is about to enter into an alarm condition.

If the Vehicle Recovery process is not cancelled before the 60-second countdown expires, the system will enter an alarm condition, sounding the siren and flashing the parking lights. 30 seconds after this occurs, or should the ignition be turned off in the meantime, the stator interrupt will engage.

Once the system enters the alarm condition, it will not respond to the transmitter, nor will the system reset automatically after 60 seconds.

Once the alarm condition, the Vehicle Recovery Protection can only be disengaged by:
1. Turning the vehicle's ignition off.
2. Turning the ignition back on.
3. Within 5 seconds, perform an Emergency Override using the Valet Switch. If the SecureCode has been customized, the correct number of Valet Switch presses must be made.

Level #1: Vehicle Recovery activated by the vehicle's ignition: The Vehicle Recovery process is started every time the vehicle's ignition is turned on. This is programmable feature #12.

Level #2: Vehicle Recovery activated an open door: The Vehicle Recovery process is started by a door of the vehicle being opened, but only if the ignition is on when the door is opened. This is programmable feature #13.

Level #3: Vehicle Recovery activated using a remote control: The Vehicle Recovery process is started by pressing holding the transmitter's small lower button for 3 seconds, but only if the vehicle's ignition is on. This is programmable feature #14.

1-2.4.16 Automatic Transmitter Verification

The patented ATV™ technology, which is standard on all Crime Guard models, is the only defense against an inherent weakness found in any remote-controlled vehicle security system. In all such systems, allowance is made for multiple transmitters to operate the system. In a matter of seconds, anyone familiar with the programming procedure can easily code their own unauthorized transmitter into the system. Although every vehicle remote-controlled keyless entry or security system is susceptible, Crime Guard security systems audibly alerts you if the system's programming mode has been accessed and visually informs you at all times of the number of remote controls capable of operating your system. Someday this technology will be standard on all remote-controlled keyless entry and security systems; today, only the most advanced systems offer this complete protection.

How it Works:
Audible ATV™ Warning: Anytime the system has a transmitter programmed, for 48 hours thereafter the siren will emit a brief series of chirps every time the vehicle's ignition is turned on. This audible warning alerts you that the system has had transmitter programming activity. Please note that the audible ATV™ Warning, in addition to the extended Status Indicator Light visual display, will be active for the first 48 hours after the system is installed.

Visual ATV™: In normal everyday use, for a period of 10 seconds after the vehicle's ignition is turned on, the system's Status Indicator Light reports the total number transmitters, which can operate the system. However, if the ATV™ Warning has been activated, this visual display period is extended to 90 seconds. For example: After turning on the vehicle's ignition, if the Status Indicator light flashes twice between pauses, two transmitters are programmed to operate the system. If the indication were three flashes between pauses, three transmitters are capable of operating the system.

In the event that the ATV™ Warning is activated, or if the Status Indicator Light shows a different number of authorized transmitters, you can easily reprogram your transmitter to eliminate the threat. To do so, refer to section To Custom Program a New SecureCode later in this manual.
Personal Security Advisement: Only recently have law enforcement authorities discovered the prevalence of this type of theft, as it is virtually undetectable. In most of these cases, the theft of personal items from the vehicle has been dismissed as the owner's failure to lock the vehicle's doors!

1-2.4.17 Programming the 745i³

The Crime Guard 745i³ is a sophisticated, yet flexible security and convenience system. Many of its operations may be configured as the user desires. "Programming Mode" allows you the ability to configure 20 operational features. Another programming level allows you to add transmitters to operate your system, and an additional programming level enables you customize the Secure Code.

Your vehicle ignition key and the Valet Switch are used to enter the Programming Mode, following the three steps listed below. Once in Programming Mode, the Valet Switch is used to access the desired feature, and the transmitter is then used to change the chosen feature's status. During the process, the siren and the Status Indicator Light indicate certain conditions of Programming Mode and the chosen feature's status.

Once the system is in Programming Mode, the Valet Switch is then pressed and released the number of times equal to the feature number, which is to be accessed for programming. After pressing the Valet Switch as many times as the feature number, the siren will chirp the same number of times and the Status Light will also flash the same number, between pauses.

Once the feature has been selected its status, or setting, can be chosen by pressing the appropriate button on the transmitter. Basically, pressing the transmitter's large upper button turns the feature on,

or pressing the transmitter's small lower button turns the feature off. Features which are not "on or off" features, such as the alarm duration of 30 to 60 seconds, are noted otherwise.

To Enter Programming Mode:
1. Turn the vehicle's ignition on.
2. Turn the ignition off.
3. Within 5 seconds, press and release the Valet Switch 5 times.
   - The siren will chirp then sound briefly and the Status Light will flash to confirm that the system is entering Programming Mode.
   - Once in Programming Mode, if 10 seconds of no programming activity occurs, the system will exit Programming Mode. Programming activity is the pressing of the Valet Switch or pressing a transmitter button once a feature is accessed.

To Access a Feature:
4. Within 10 seconds, press and release the Valet Switch the same number of times as the desired feature's number.
   - The siren will chirp and the Status Light will flash as many times as the Valet Switch was pressed to indicate the feature number which is now accessed.

To Change a Feature:
5. After accessing the desired feature, within 10 seconds, press and release either the transmitter's large upper button or the small lower button.
   - Pressing the large upper button turns the feature on; the siren will chirp once and the Status Light will turn on.
   - Pressing the small lower button turns the feature off, the siren will chirp twice and the Status Light will turn off.

To Access and Change further Features:
6. If there are more features to be programmed, within 10 seconds of the previous action press and release the Valet Switch the same number of times as the next desired feature's number.
   - Again the siren will chirp and the Status Light will flash as many times as the Valet Switch was pressed to indicate the new features numbers which is now accessed.
   - Use the transmitter as described in Step 5 to change the newly accessed feature as desired.
   - Repeat this Step 6 for each additional feature until all features are programmed.

To Exit Programming Mode:
7. Allow 10 seconds to pass without performing any programming actions; or turn the vehicle's ignition on.
   - The siren will sound briefly and the Status Light will go out to confirm that the system is exiting Programming mode.

IMPORTANT NOTE: Once the system is in Programming Mode, if at any time 10 seconds elapse without programming activity, the system will automatically exit Programming Mode. To prevent the system from prematurely exiting Programming Mode, the feature can be entered again by pressing the Valet Switch, or if a feature is accessed, by pressing either of the buttons. Features can be selected in any order as desired.

The following pages explain each of the programmable features in detail, including how to program transmitters and how to customize your system's SecureCode. Following the features explanation is a convenient feature programming checklist, which greatly simplifies the feature programming process.

1-2.4.18 The 745i³ Programmable Features

Feature #1   Transmitter Programming Mode
The first level in the programmable features menu is Transmitter Programming Mode, by which additional or replacement transmitters can be programmed to operate the system. It is important to note that when a transmitter is programmed into the system, the ATV Warning is activated and all previous transmitter codes in the system's memory are deleted.

If a third or fourth transmitter is to be added to operate the system, all of the transmitters must be programmed into the system's memory at the same time, as the first new transmitter code entered will erase the existing transmitter codes. Therefore, if your system should ever be compromised by the addition of an authorized transmitter, the ATV feature will warn you. By simply reprogramming all of your transmitters into the system, the unauthorized transmitter will be erased.

To program a transmitter:
Follow Steps 1 to 4 under Programming the 745i[3]; at Step 4 the Valet Switch will be pressed and released one time only. The system's response will be one siren chirp, and the Status Light flashing one time, pausing, and then repeating. Within 10 seconds, press and release the large upper button of the transmitter. The system confirms "learning" the transmitter's codes chirping the siren once. Repeat this action with each transmitter to be programmed. Only the large upper button of the transmitter needs pressing and release; all of the other transmitter button's operations will be learned automatically.

To program a transmitter to a "2nd" or "3rd" system:
Up to three Crime Guard systems may be independently operated using a single transmitter. To accomplish this, the transmitter's button functions are different for each of the vehicles. This prevents Arming or Disarming the multiple systems simultaneously when all are within range of the transmitter.

To program a transmitter for 2nd or 3rd systems, when programming press and release either of the small buttons instead of the large upper button. The system will automatically assign the transmitter's other functions in a different order. The following chart shows button function assignment.

Arm/Disarm	Auxiliary Output #2	Auxiliary Output #3
Large Button	Small Button	Small Button
Small Button	Large Button	Small Button
Small Button	Large Button	Small Button

Only the "Arm/Disarm" button is pressed when programming.

Feature #2   Secure Code Programming Mode
(Factory Default Setting: 1 Press)
SecureCode is a unique patented feature, which allows you to custom, select the number of Valet Switch presses which would be required in order to perform an Emergency Override. Instead of "1 press" of the Valet Switch, a customized programming of the SecureCode would require from 2 to 12 presses. If any of the three Vehicle Recovery features are utilized, a customized SecureCode would require that the correct SecureCode entry of Valet Switch be made to cancel the Vehicle Recovery activation.

The "as received" factory default setting of "1 press" is the most convenient, as an Emergency Override will occur instantly when the Valet Switch is pressed, but it is not as secure as a customized setting. When a customized SecureCode has been programmed, the system will disarm a few seconds after the correct entry.

To custom program a new SecureCode:
Follow Steps 1 through 4 in the section for Programming the 745i[3]; at Step 4 the Valet Switch will be pressed and released two times. The system's response will be two siren chirps, and the Status Light flashing twice, pausing, then repeating. Within 10 seconds, press and release the transmitter's large upper button; the siren will chirp twice to confirm system is ready to accept the new SecureCode entry. Now press and release the Valet Switch the desired number of times. The SecureCode can be programmed for 1 to 12 presses, but the entry must be made within 5 seconds. Wait for the siren to chirp the same number of times as the Valet Switch presses to confirm the new SecureCode entry.

IMPORTANT: If no additional features need to be programmed, exit Programming Mode by allowing the 10 second time limit to expire without any further programming activity. Do not exit Programming Mode by turning on the ignition switch.

Feature #3   ***Chirp Confirmation***
                        (Factory Default Setting On)
This feature allows the permanent removal of the system's chirping the siren as an audible confirmation when performing functions such as Arming and Disarming. Please note that utilizing this feature to remove the confirmation chirps does not effect siren chirping operations associated with the ATV Warning, sensor prewarning or Programming Mode.

Changing Chirp Confirmation:
Follow Steps 1 through 4 in the section for [Programming the 745i](#)³; at Step 4 the Valet Switch will be pressed and released three times. The system's response will be three siren chirps, and the Status Light flashing three times, pausing, then repeating. Within 10 sections, press and release the transmitter's large upper button to turn the Chirp Confirmation on (the siren will chirp once) or the small lower button to turn the Chirp Confirmation off (the siren will chirp twice).

Feature #4   ***30 or 60 Section Alarm Duration***
                        (Factory Default Setting 30 Seconds)
This feature allows the option of a 30 or 60 second Alarm Duration, which is when the system has activated in Armed state, sounding the siren and flashing the parking lights.

Changing the Alarm Duration:
Follow Steps 1 through 4 in the section for [Programming the 745i](#)³, at Step 4 the Valet Switch will be pressed and released four times. The system's response will be four siren chirps, and the Status Light flashing four times, pausing, then repeating. Within 10 seconds, press and release the transmitter's large upper button to set the Alarm Duration for 30 seconds (the siren will chirp once) or the small lower button to set the Alarm Duration for 60 seconds (the siren will chirp twice)

Feature #5   ***Automatic Sensor Zone Bypass***
                        (Factory Default Setting On)

This feature configures the system to automatically bypass the sensor protection zone if the sensor should be triggered five times during a single Armed state. If the sensor is bypassed, it will be reinstated the next time the system becomes Armed.
Programming Automatic Sensor Zone Bypass:
Follow Steps 1 through 4 in the section for [Programming the 745i](#)³; at Step 4 the Valet Switch will be pressed and released five times. The system's response will be five siren chirps, and the Status Light flashing five times, pausing, then repeating. Within 10 seconds, press and release the transmitter's large upper button to turn the Automatic Sensor Zone Bypass feature on (the siren will chirp once) or the small lower button to turn this feature off (the siren will chirp twice).

Feature #6   ***Auxiliary Output #2 Also Disarms System***
                        (Factory Default Setting On)

This feature configures the Auxiliary Output #2 to automatically Disarm the system at the same when it is used.

Programming Auxiliary Channel #2 Disarms System:
Follow Steps 1 through 4 in the section for [Programming the 745i](#)³, at Step 4 the Valet Switch will be pressed and released six times. The system's response will be six siren chirps, and the Status Light flashing six times, pausing, then repeating. Within 10 seconds, press and release the transmitter's large upper button to have the system Disarm when Auxiliary Output #2 is used (the siren will chirp once) or the small lower button to have Auxiliary Output #2 not Disarm the system when it is used (the siren will chirp twice).

Feature #7   ***Last Door Arming***
                        (Factory Default Setting On)

This feature configures the system to automatically Arm itself 30 seconds after the vehicle's last door is closed.

Programming Last Door Arming:
Follow Steps 1 through 4 in the second for <u>Programming the 745i</u>³, at Step 4 the Valet Switch will be pressed and released seven times. The system's response will be seven siren chirps, and the Status Light flashing seven times, pausing, then repeating. Within 10 seconds, press and release the transmitter's large upper button to turn on Last Door Arming (the siren will chirp once) or the small lower button to turn off Last Door Arming (the siren will chirp twice).

Feature #8   ***Doors Lock with Last Door Arming***
                                              (Factory Default Setting Off)

This feature adds the automatic locking of the doors to the previous feature, Last Door Arming. If this feature is turned on, the doors will lock when the system becomes armed 30 seconds after closing the last door. Feature #7 must be turned on for this feature to operate.

Programming Door Locks with Last Door Arming:
Follow Steps 1 through 4 in the second for <u>Programming the 745i</u>³, at Step 4 the Valet Switch will be pressed and released eight times. The system's response will be eight siren chirps, and the Status Light flashing eight times, pausing, then repeating. Within 10 seconds, press and release the transmitter's large upper button to turn on the Door Locks with Last Door Arming feature (the siren will chirp once) or the small lower button to turn off the feature (the siren will chirp twice).

Feature #9   ***Parking Light Illumination Upon Disarm***
                                              (Factory Default Setting Off)

This feature configures the system to illuminate the vehicle's parking and dome lights for 30 seconds when it is Disarmed. Otherwise, if this feature is turned off, the lights will flash once upon Disarming the system.

Programming Parking Light Illumination Upon Disarm:
Follow Steps 1 through 4 in the second for <u>Programming the 745i</u>³, at Step 4 the Valet Switch will be pressed and released nine times. The system's response will be nine siren chirps, and the Status Light flashing nine times, pausing, then repeating. Within 10 seconds, press and release the transmitter's large upper button to have the parking lights turn on for 30 seconds when the system is Disarmed (the siren will chirp once) or the small lower button to have the parking lights only flash once when the system is Disarmed (the siren will chirp twice).

Feature #10   ***Starter Interrupt Operates in Valet Mode***
                                              (Factory Default Setting Off)

This feature configures the system to engage the starter interrupt circuit when the remote transmitter is used to lock the vehicle's doors while the system is in Valet Mode. When this is done, the transmitter must be used to unlock the doors or an Emergency Override must be performed to disengage the starter interrupt.

Programming Starter Interrupt Operates in Valet Mode
Follow Steps 1 through 4 in the second for <u>Programming the 745i</u>³, at Step 4 the <u>Valet Switch</u> will be pressed and released ten times. The system's response will be ten siren chirps, and the Status Light flashing ten times, pausing, then repeating. Within 10 seconds, press and release the transmitter's large upper button to turn this feature on (the siren will chirp once) or the small lower button to turn this feature off (the siren will chirp twice).

Feature #11   ***Door Lock/Unlock Pulse Duration***
                                              (Factory Default Setting .8 Second)

The feature offers the selection of a .8 second or a 3 second pulse duration of the system's door lock outputs. Certain vehicles have power door locking systems, which are vacuum operated, and thus requires a longer output pulse from the Crime Guard System. While use of this feature is determined by the type of vehicle the system is installed in, this feature does save the owners of such vehicles the added expense of a special adapter.

Programming Door Lock/Unlock Pulse Duration:
Follow Steps 1 through 4 in the second for <u>Programming the 745i</u>³, at Step 4 the <u>Valet Switch</u> will be pressed and released eleven times. The system's response will be eleven siren chirps, and the Status Light flashing eleven times, pausing, then repeating. Within 10 seconds, press and release the transmitter's large upper button to configure the door lock pulse for .8 second (the siren will chirp once) or the small lower button to configure the door lock pulse for 3 seconds (the siren will chirp twice).

Feature #12   ***Ignition Activated Vehicle Recovery***
                                       Factory Default Setting Off)

The Vehicle Recovery feature activates the system into an alarm condition automatically in the event that you are forced from your car. "Ignition Activated" Vehicle Recovery is one of three methods of activating this feature, which is explained in the Vehicle Recovery section of this manual.

Programming Ignition Activated Vehicle Recovery:
Follow Steps 1 through 4 in the second for <u>Programming the 745i</u>³, at Step 4 the Valet Switch will be pressed and released twelve times. The system's response will be twelve siren chirps, and the Status Light flashing twelve times, pausing, then repeating. Within 10 seconds, press and release the transmitter's large upper button to turn on Ignition Activated Vehicle Recovery (the siren will chirp once) or the small lower button to turn this feature off (the siren will chirp twice).

Feature #13   ***Door Activated Vehicle Recovery***
                                       (Factory Default Setting Off)

The Vehicle Recovery feature activates the system into an alarm condition automatically in the event that you are forced from your car. "Door Activated" Vehicle Recovery is one of three methods of activating this feature, which is explained in the Vehicle Recovery section earlier in this manual.

Programming Door Activated Vehicle Recovery:
Follow Steps 1 through 4 in the second for <u>Programming the 745i</u>³, at Step 4 the Valet Switch will be pressed and released thirteen times. The system's response will be thirteen siren chirps, and the Status Light flashing thirteen times, pausing, then repeating. Within 10 seconds, press and release the transmitter's large upper button to turn on the Door Activated Vehicle Recovery feature (the siren will chirp once) or the small lower button to turn this feature off (the siren will chirp twice).

Feature #14   ***Transmitter Activated Vehicle Recovery***
                                       (Factory Default Setting Off)

This form of the Vehicle Recovery feature gives you the option of activated the Vehicle Recovery operation from the transmitter in the event that you are forced from your car. "Transmitter Activated" Vehicle Recovery is one of three methods of activating this feature, which is explained in the Vehicle Recovery second found earlier in this manual.

Programming Transmitter Activated Anti Car-Jacking:
Follow Steps 1 through 4 in the second for <u>Programming the 745i</u>³, at Step 4 the Valet Switch will be pressed and released fourteen times. The system's response will be fourteen siren chirps, and the Status Light flashing fourteen times, pausing, then repeating. Within 10 seconds, press and release the transmitter's large upper button to turn on the Transmitter Activated Vehicle Recovery feature (the siren will chirp once) or the small button to turn this feature off (the siren will chirp twice).

Feature #15   ***Automatic Rearming***
                                       (Factory Default Setting On)

This feature prevents your system from being disarmed accidentally, configuring the system to automatically rearm itself 90 seconds after it has been Disarmed by the transmitter. The operation of the Automatic Rearming feature is explained in more detail in the Automatic Rearming Notes second earlier in this manual.

Programming Automatic Rearming:
Follow Steps 1 through 4 in the second for [Programming the 745i]³, at Step 4 the Valet Switch will be pressed and released fifteen times. The system's response will be fifteen siren chirps, and the Status Light flashing fifteen times, pausing, then repeating. Within 10 seconds, press and release the transmitter's large upper button to turn on the Automatic Rearming feature (the siren will chirp once) or the small lower button to turn the Automatic Rearming feature off (the siren will chirp twice).

Feature #16   *Doors Lock with Automatic Rearm*
                                          (Factory Default Setting On)

This feature adds the automatic locking of the doors to the previous feature, Automatic Rearming. If this feature is turned on, the doors will lock when the system rearms itself 90 seconds after being disarmed by the transmitter. Feature #15 must be turned on for this feature to operate.

Programming Door Locks with Automatic Rearming:
Follow Steps 1 through 4 in the second for [Programming the 745i]³, at Step 4 the Valet Switch will be pressed and released sixteen times. The system's response will be sixteen siren chirps, and the Status Light flashing sixteen times, pausing, then repeating. Within 10 seconds, press and release the transmitter's large upper button to turn this feature on (the siren will chirp once) or the small lower button to turn this feature off (the siren will chirp twice).

Feature #17   *3/45 Second Arming Delay*
                                          (Factory Default Setting 3 Second)

This feature determines how long after the Arming confirmation chirp that the system becomes fully med. The Arming Delay applies to the system Arming regardless if it occurs from using the transmitter, Last Door Arming or Automatic Rearming.

Programming 3/45 Second Arming Delay:
Follow Steps 1 through 4 in the second for [Programming the 745i]³, at Step 4 the Valet Switch will be pressed and released seventeen times. The system's response will be seventeen siren chirps, and the Status Light flashing seventeen times, pausing, then repeating. Within 10 seconds, press and release the transmitter's large upper button to configure the system with a 3 second Arming Delay (the siren will chirp once) or the small lower button to configure the system with a 45 second Arming Delay (the siren will chirp twice).

Feature #18   *Door Locks When Ignition Is Turned On*
                                          (Factory Default Setting On)

This feature configures the system to automatically lock the vehicle's doors every time that the ignition switch is turned on. An exception to this would be if feature #21 is turned on, and a door being open when the ignition switch is turned on. The two following features, #19 and #20 control the automatic unlocking operation.

Programming Door Locks When Ignition is Turned On:
Follow Steps 1 through 4 in the second for [Programming the 745i]³, at Step 4 the Valet Switch will be pressed and released eighteen times. The system's response will be eighteen siren chirps, and the Status Light flashing eighteen times, pausing, then repeating. Within 10 seconds, press and release the transmitter's large upper button to turn on "Door Locks When Ignition Turned On" (the siren will chirp once) or the small lower cotton to turn this feature off (the siren will chirp twice).

Feature #19   *Unlock #1 When Ignition is Turned Off*
                                          (Factory Default Setting On)

This feature configures the system to automatically unlock the vehicle's doors every time that the ignition switch is turned off. An exception to this would be if feature #21 is turned on, and a door being open when the ignition switch is turned off. If the system is installed without the Driver's Door Priority unlock interface, this feature unlocks all of the doors when the ignition switch is turned off. If Driver's

Door Priority is installed, this feature controls the driver's door only, and the following feature will control the automatic unlocking of the other doors.

Programming Unlock #1 When Ignition is Turned Off:
Follow Steps 1 through 4 in the second for Programming the 745i³, at Step 4 the Valet Switch will be pressed and released nineteen times. The system's response will be nineteen siren chirps, and the Status Light flashing nineteen times, pausing, then repeating. Within 10 seconds, press and release the transmitter's large upper button to turn on "Unlock #1 When Ignition Turned Off" (the siren will chirp once) or the small lower button to turn this feature off (the siren will chirp twice).

Feature #20   *Unlock #2 When Ignition is Turned Off*
                                                (Factory Default Setting Off)

As explained for the previous feature, this feature controls the automatic unlocking of all doors except the driver's door if Driver's Door Priority is installed.

Programming Unlock #2 When Ignition is Turned Off:
Follow Steps 1 through 4 in the second for Programming the 745i³, at Step 4 the Valet Switch will be pressed and released twenty times. The system's response will be twenty siren chirps, and the Status Light flashing twenty times, pausing, then repeating. Within 10 seconds, press and release the transmitter's large upper button to turn on "Unlock #2 When Ignition Turned Off" (the siren will chirp once) or the small lower button to turn this feature off (the siren will chirp twice).

Feature #21   *Open Door Bypass Of Ignition Locking*
                                                (Factory Default Setting On)

This feature cancels the automatic locking or unlocking of the vehicle's doors when the ignition switch is turned on or off if one of the doors is open. This feature can be useful, for example, for leaving others within a locked vehicle when only the driver exits the vehicle. Features #18, #19, or #20 must be turned on for this feature to operate.

Programming Open Door Bypass Of Ignition Locking:
Follow Steps 1 through 4 in the second for Programming the 745i³, at Step 4 the Valet Switch will be pressed and released twenty one times. The system's response will be twenty-one siren chirps, and the Status Light flashing twenty one times, pausing, then repeating. Within 10 seconds, press and release the transmitter's large upper button to turn on "Open Door Bypass Of Ignition Locking" (the siren will chirp once) or the small lower button to turn this feature off (the siren will chirp twice).

Feature #22   *1 or 2 Button Transmitter Operation*
                                                (Factory Default Setting 1 Button Operation)

This feature changes the configuration of how the transmitter operates the system. In the factory default setting of "1 Button Operation", a single transmitter button alternates Arming and Disarming the system with every press of the button. When this feature is programmed to the "2 Button Operation" one of the transmitter's buttons will only Arm the system, and a second button will only disarm the system. An optional transmitter with four buttons, Omega part number #105-05, is available from your Crime Guard dealer or directly from Omega Research and Development. The following pages will show the system's operation with either type of transmitter.

Programming Transmitter 1 or 2 Button Operation:
Follow Steps 1 through 4 in the second for Programming the 745i³, at Step 4 the Valet Switch will be pressed and released twenty two times. The system's response will be twenty-two siren chirps, and the Status Light flashing twenty two times, pausing, then repeating. Within 10 seconds, press and release the transmitter's large upper button to configure the system for "1 Button Operation" (the siren will chirp once) or the small lower button to configure the system for "2 Button Operation" (the siren will chirp twice).

1-2.4.19   Transmitter "2 Button" Operation

Programmable feature #22 changes the configuration of how the transmitter operates the system. In the factory default setting of "1 Button Operation", a single transmitter button alternates Arming and Disarming the system with every press of the button. When this feature is programmed to the "2 Button Operation" setting, one of the transmitter's buttons will only Arm the system, and a second button will only disarm the system. An optional transmitter with four buttons is available; an order form is available in your Manufacturer's Manual from Crime Guard that was provided with your motor home.

To Arm the System: (3 button transmitter)
Press and release the large upper button. The siren will chirp twice to confirm arming of system. The parking lights flash twice to confirm arming and the doors will lock, or Press and release the "Arm/Lock Button (optional 4 button transmitter).

To Disarm the System: (3 button transmitter)
Press and release the small center button. With Driver's Door Priority, again press and release the small center button to unlock the remaining doors. The siren will chirp once to confirm disarming, the parking lights will flash once to confirm disarming and the doors will unlock provided the door lock interface is installed. Or, press and release the "Disarm/Unlock" Button (4 button transmitter). With Driver's Door Priority, again press and release the "Disarm/Unlock" Button to unlock the remaining doors.

To Activate "Enhanced Panic": (3 button transmitter)
"Enhanced Panic" allows you to activate Remote Panic from either the Arming button or Disarming button; the former locks the doors and the latter unlocks the doors when Remote Panic is activated.

Press and hold for 3 seconds the large upper button or the small center button. The siren sounds and the parking lights will flash. The doors will lock or unlock provided the door lock interface is installed. Or, press and hold for 3 seconds the "Arm/Lock" Button or the "Disarm/Unlock" Button (optional 4 button transmitter).

To Deactivate Panic:
Press and release either button.

To Silently Arm and Disarm the System: (3 button transmitter)
Silent Arming and Silent Disarming are both operated by double-pressing the same transmitter button.

Press and release the small lower button twice. The parking lights will flash twice and the doors will unlock provided the door lock interface is installed. Or, press and release the "Auxiliary Output #2" Button twice (optional 4 button transmitter).

To Activate Auxiliary Output #2: (3 button transmitter)
Press and hold the small lower button for three seconds. If armed, the system will disarm, with 3 siren chirps. If the system is not armed, confirmation is one siren chirp. The doors will unlock if the door lock interface is installed. Or, press and hold the "Auxiliary Output #2" Button for three seconds. (optional 4 button transmitter).

To Activate Auxiliary Output #3: (3 button transmitter)
Press and hold the large upper and small lower buttons for three seconds. Or, press and hold the "Auxiliary Output #3" Button for three seconds, (optional 4 button transmitter).

To Activate Remote Sensor Bypass: (3 button transmitter)
Press and release the large upper button to arm, then press and release the small lower button. The siren will chirp twice to confirm arming. The siren then chirps once to confirm sensor bypass. The parking lights will flash to confirm arming. The doors will unlock upon arming providing you have installed the door lock interface. Or, press and release the "Arm/Lock" Button to Arm, then press and release the "Auxiliary Output #2" Button, (optional 4 button transmitter).

1-2.5 Entrance Door Air Lock

An air-operated lock is installed at the top of the entrance door for a tight seal. This lock engages automatically when the unit is put in drive after reaching 3 mph. This lock also disengages when unit drops below 3 mph. An override switch is located on the main dash panel. This keeps door locked all the time until the unlock switch is manually pushed.

2-1 Dash and Monitor Panels_____

2-1.1 Main Instrument Panel
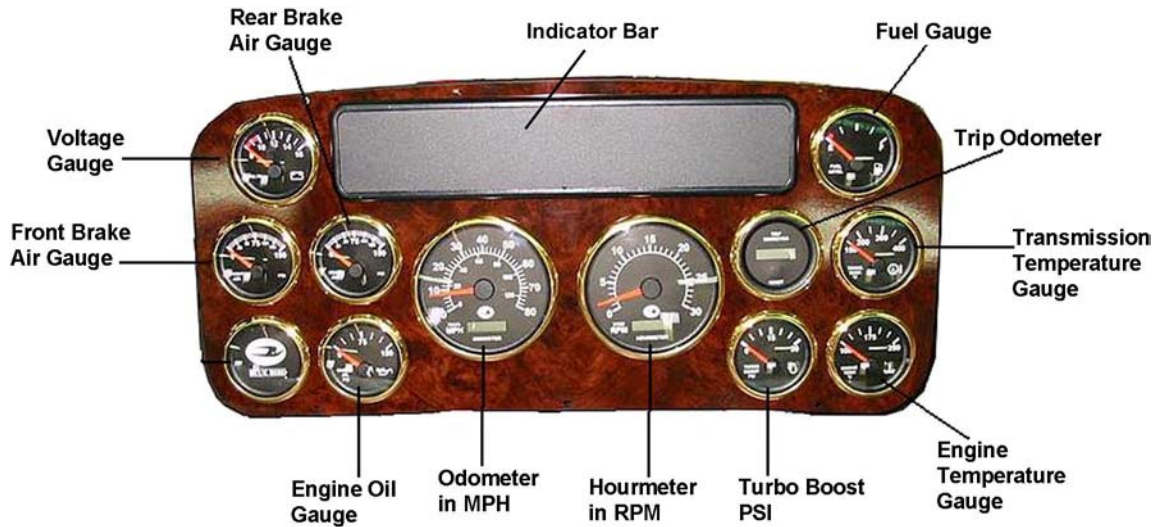
The main instrument panel of the motor home is very much like your instrument panel in your automobile. See figure below and corresponding definition of each feature of this panel.

FRONT/REAR BRAKE AIR GAUGE – Normal: 110 to 135 psi. The Dual Air Service Brake Pressure systems are engine-operated and supply independent brake system air pressure for front and rear service brakes and the parking brake. During normal operation, each air pressure gauge reading will build up to 110 psi to 135 psi shortly after the engine is started.

VOLTAGE GAUGE – Measures volts on alternator.

FUEL GAUGE – Indicates the amount of diesel fuel remaining in the tank.

TRIP ODOMETER – This is a resettable gauge that measures how many miles driven.

TRANSMISSION TEMPERATURE GAUGE – Indicates temperature of the transmission oil. If the WARNING LIGHT comes on, reduce speed or load.

ENGINE TEMPERATURE GAUGE – Monitors temperature of engine.

TURBO BOOST PSI – Registers the pressure of the Turbo Compressor outlet. This gauge should read an approximate maximum of 30 psi at maximum power.

HOURMETER IN RPM – Keeps track of how many actual hours engine has been used.

ODOMETER IN MPH – Measures miles per hour motor home is traveling.

ENGINE OIL GAUGE – Normal is 200°F. Gives constant reading of the engine oil in the supply line from the pump. If the temperature goes over 250 degrees, the engine may be low on oil or there is overheating of the cooling system.
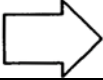
2-1.1.1Indicator Bar

The Indicator Bar shall contain the electronics necessary to interface to the vehicle system indicator inputs. The indicator bar shall have a maximum of 34 indicators, which shall be arranged with two rows of eleven indicators located on the top and bottom separated by a single center row of twelve indicators. The turn signals shall be housed in the center row, outer indicator locations. Refer to the following tables for indicator source information. When the Indicator Bar is first powered on and sees the ignition signal, it shall run a lamp check on all lamps for a two second sound delay.

See Table 1 for details on signal source, audible alarm requirements, symbol or nomenclature, color function, and location on indicator bar.

Table 1 - Indicator Definitions

LOCATION	INDICATOR LIGHTS	SIGNAL SOURCE	AUDIBLE ALARM	SYMBOL OR LETTERS	COLOR	FUNCTION
1	Spare	N/A	-	SPARE	RED	SPARE
2	Spare	N/A	-	SPARE	RED	SPARE
3	Low Fuel	INSTR. ECU	-		AMBER	TURNS ON IF < 1/8 TANK
4	Traction Control (ATC)	ABS	-	ATC	RED	TURNS ON FOR DIAGNOSTICS, AND WHEN IN TRACTION CONTROL MODE
5	Park Brake	VEH	-		RED	TURNS ON IF HI BEAM HEADLIGHTS ARE ON
6	Hi Beam	VEH	-		BLUE	TURNS ON IF ENGINE FAULT
7	Stop Engine	ENGINE	BUZZER (See note 4)	STOP ENGINE	RED	TURNS ON IF ENGINE FAULT
8	WAIT TO START (GRID HEATER)	ENGINE	-	WAIT TO START	RED	TURNS ON WHEN ENGINE IS TURNING ON THE GRID HEATERS
9	ENGINE MAINTENANCE	ENGINE	-	ENGINE MAINT	AMBER	TURNS ON IF ENGINE NEEDS MAINTENANCE
10	LOW COOLANT	VEH	BUZZER		AMBER	TURNS ON IF COOLANT IS LOW
11	Spare	N/A	-	SPARE	RED	SPARE
12	LH TURN INDICATOR ARROW	VEH	CLICK		GRN	TURNS ON IF LEFT TURN SIGNAL HAS BEEN ACTIVATED
13	Spare	N/A	-	SPARE	RED	SPARE
14	WATER IN FILTER (RACOR)	VEH	See Note 1	WATER IN FILTER	AMBER	TURNS ON IF WATER IN FUEL SENSOR DETECTS WATER
15	ABS	ABS	-		AMBER	TURNS ON IF ABS SYSTEM HAS A FAULT OR DIAGNOSTIC INFORMATION
16	LOW AIR	PRX1	See Note 2	LOW AIR	RED	TURNS ON IF AIR PRESSURE IS LESS THAN 62 PSI
17	ENGINE BRAKE	VEH	-	ENGINE BRAKE	RED	TURNS ON IF ENGINE BRAKE DASH SWITCH IS ON
18	ENGINE COMPARTMENT (Fire) ALARM	VEH	See Note 3		RED	TURNS ON IF ENGINE COMPT. FIRE SENSORS DETECT A FIRE
19	TRANSTEMP	TRANS	-	TRANS TEMP	RED	TURNS ON IF TRANSMISSION FAULT
20	CHECK ENGINE	ENGINE	BUZZER (See Note 4)	CHECK ENGINE	AMBER	TURNS ON IF ENGINE DETECTS A PROBLEM

21	HYDRAULIC OIL TEMP WARNING	VEH	BUZZER		AMBER	TURNS ON IF HYDRAULIC OIL TEMPERATURE IS EXCESSIVE (.200°F)
22	Spare	N/A	-	SPARE	RED	SPARE
23	RH TURN INDICATOR ARROW	VEH	CLICK		GRN	TURNS ON IF RIGHT TURN SIGNAL HAS BEEN ACTIVATED
24	DRL	VEH	-	DRL	GRN	TURNS ON IF DAYTIME RUNNING LIGHTS ARE ON
25	Spare	N/A	-	SPARE	RED	SPARE
26	Spare	N/A	-	SPARE	AMBER	SPARE
27	HEADLIGHT ALERT	VEH	BUZZER		AMBER	NOT ON 38 FOOT VEHICLES
28	LEVEL WARNING	VEH	BUZZER	LEVEL WARNING	RED	NOT ON 38 FOOT VEHICLES
29	SUSPENSION DUMP	VEH	BUZZER	SUSP DUMP	RED	TURNS ON AFTER SUSP IS DUMPED (2 SEC. ON DELAY) TURNS BACK OFF (AFTER 1 MINUTE) AFTER SUSP. PRESSURE BACK UP
30	TAG DUMP	VEH	-		RED	NOT ON 38 FOOT VEHICLES
31	CHECK TRANS	TRANS	-	CHECK TRANS	AMBER	TURNS ON IF TRANSMISSION FAULT
32	TV ANT/SAFELINE	VEH	BUZZER See Note 5		FLASHING AMBER	TURNS ON IF
33	Spare	N/A	-	SPARE	RED	SPARE
34	Spare	N/A	-	SPARE	GREEN	SPARE

Audible Outputs: The Indicator bar shall have two audio transducers to produce the sounds listed in the table above. These sounds are identified as being a buzzer, a click, and a chime.

Click: The click output is used to indicate that the turn signals are flashing. Every time a turn signal indicator is turned on, the Buzzer output will be turned on for 10 ms.

Single Chime: The single chime output is used to indicate a Next Stop Request. The Indicator Bar will output 1.0 kHz for 1000 ms (including 800 ms of decay) when the Next Stop Request function is first activated, with a minimum sound pressure level of 85dB at 10cm.

Double Chime: The double chime output is used to indicate a Wheel Chair Next Stop Request. The Indicator Bar will output 1.0 kHz for 1000 ms (including 800ms of decay), then output 1.0 kHz for 1000 ms (including 800 ms of decay) when the Wheel Chair Next Stop Request function is first activated, with a minimum sound pressure level of 85dB at 10cm.

Buzzer: The buzzer output is the primary audible output. The Indicator Bar output 3.6 kHz +/- 0.5 kHz for as long as a buzzer function is activated, with a minimum sound pressure level of 90 dB at 10cm with 12 Volts applied.

Buzzer Notes:
Note 1: Water in Filter Buzzer. The H4RE Water in Filter (L14) input will activate the Buzzer during initial startup for a duration of 30 seconds, if the corresponding input was at ground when power was first applied.

Note 2: Low Air Buzzer. The buzzer and Low Air Indicator shall come on if the air pressure in EITHER front OR rear system has decreased to ≤ 62 +2/-0 PSI. Once the air pressure in EITHER front OR rear system falls below 62 +2/-0 PSI, the buzzer and indicator light shall remain on until the air pressure in BOTH front AND rear systems has reached a minimum of 70 + 1/-1 PSI.

Note 3: Engine Compartment Fire Alarm Buzzer. The Engine Compartment (Fire) Alarm (L18) input will activate the Buzzer at the rate of 2.0 Hz with a 50% duty cycle when the corresponding input is at +12 Volts.

Note 4: Stop and Check Engine (engine warning) Buzzer. The buzzer shall be continuously energized when either the stop engine OR check engine lamps are commanded by the engine AND critical limits are exceeded on EITHER the oil pressure data OR the coolant temperature data received off the data link. These limits shall be programmable. Default values for Cummins are tabled below:

Table 2

ENGINE	COOLANT TEMP	OIL PRESSURE
Deleted	Deleted	Deleted
ISL	220	10

Note 5: TV/Safeline Buzzer. The TV/Safeline input will activate its indicator and the Buzzer at the rate of 1.0 Hz with a 50% duty cycle when the corresponding input is at ground.

Priority Buzzer: Priority shall be as follows with a priority 1 as the highest.

Table 3

BUZZER APPLICATION	PRIORITY
ENG COMPARTMENT FIRE ALARM	1
LOW AIR	2
ENGINE WARNING	3
TV / SAFELINE	4
WATER IN FILTER	5
TURN SIGNALS	7

Indicator Signal Source: See Table 4 for details on source for indicator light.

Table 4: H4RE Indicator Bar Signal Sources

FUNCTION	CUM	WT	BENDIX	PRX1	VEHICLE
LOW OIL PRES ALARM				GND	
HIGH COOL TEMP ALARM				GND	
TRANS TEMP		GND			
CHECK TRANS		GND			
STOP ENGINE	GND				
CHECK ENGINE	GND				
ENGINE MAINTENANCE	GND				
WAIT TO START	GND				
LOW AIR				GND	
ABS			GND		
TRACT CONTROL (ATC)			GND		
PARK BRAKE					GND
RH TURN IND ARROW					+12V
LH TURN IND ARROW					+12V
HIGH BEAM					+12V
HYD OIL TEMP WARNING					GND
LOW COOLANT					GND
DRL					GND
ENG COMP FIRE ALARM					+12V
ENGINE BRAKE					GND
LOW FUEL				GND	
WATER IN FUEL					GND
WATER IN FILTER					GND
SUSPENSION DUMP					+12V
TAG DUMP					GND
LEVEL WARNING					+12V
HEADLIGHT ALERT					+12V
SPARE					GND
SPARE					GND
TV/ANT SAFELINE					GND

Indicators that need to come on without Ignition On: RH indicator, LH indicator, High Beam indicator, Level Warning indicator, Headlight Alert indicator, and Engine Compartment (fire) alarm indicator.

Low Fuel Indicator: This indicator input shall come from the PRX1 module, which will have special requirements. See the section on the PRX module.

Power Up and Power Down Requirements: Upon start up the indicator lights will turn on for a two second delay.

Indicator Bar Pin Assignments

H4RE	
SIGNAL NAME	**Pin #**
Spare Indicator	B1
Spare Indicator	B4
Low Fuel SIGNAL	A1
Tract. Control (ATC)	A3
Park Brake	C4
High Beam	C15
Stop Engine	C7
Wait To Start	A8
Engine Maintenance	C16
Low Coolant	C9
Spare Indicator	B2
LH Turn Indicator	A18
Spare Indicator	B3
Water in Filter	B5
ABS	A2
Low Air	C1
Engine Brake	C3
Eng. Compartment (Fire) Alarm	C6
Trans Temp	C8
Check Engine	C17
Hydraulic Oil Temp Warning	C13
Spare Indicator	B9
RH Turn Indicator	C20
DRL	B8
Spare Indicator	C18
Spare Indicator	C19
Headlight Alert (not used)	B12
Level Warning (not used)	C2
Suspension Dump	C5
Tag Dump (not used)	C10
Check Trans	C11
TV Ant/Safeline	A4
Spare Indicator	C12
Spare Indicator	C14
Coolant Temp SIGNAL	A5
Oil Pressure SIGNAL	A6
Spare Buzzer 4	A16
Spare Buzzer 5	A17
Spare Buzzer 6	A15
Spare Buzzer 1	A14
Spare Buzzer 2	A12
Spare Buzzer 3	A13
Switched +12V	B6
Ground	B7
Spare Indicator	B10

Right Dash Panel Controls and Indicators

The Right Dash Panel Controls and Indicators are the controls found on the right hand side of the instrument panel on the main dash.
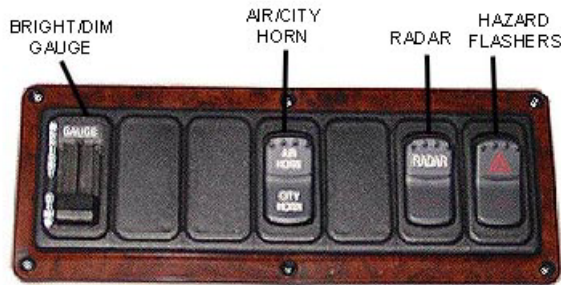
BRIGHT/DIM GAUGE – This gauge adjusts the dash gauges from bright to dim.

AIR/CITY HORN – Allows user to toggle between the air and city horns. It is recommended the air horn be used for highway travel, and the city horn be used in residential areas.

RADAR – Turns on power to the radar detector. The radar detector is a high-sensitivity super heterodyne microwave radar detector. This unit is designed to activate when transmissions are received from radar-type speed detection equipment.

NOTE: because some states have ruled radar detection equipment illegal, it is the responsibility of the driver or owner to obey the appropriate laws. (There are quick-disconnect features provided which allow for easy removal of the unit.)

HAZARD FLASHERS – Turns on emergency flashers. When the switch is used, both left and right turn signals will flash in unison.
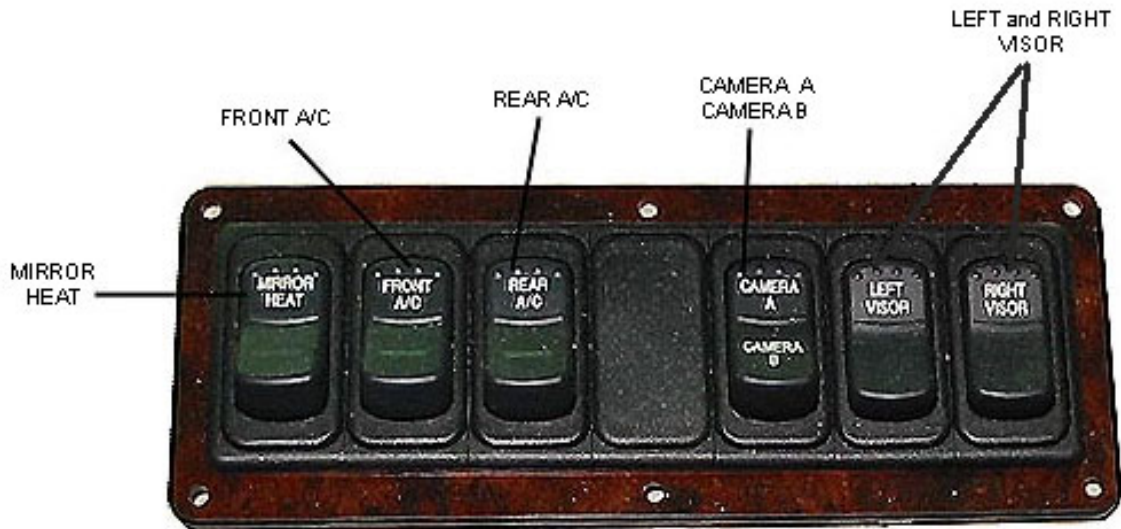
MIRROR HEAT – This switch turns on a thermostatically controlled heater in the right and left outside mirrors (convex mirrors excluded). With the switch ON, the mirror heaters will automatically come on to defog the mirrors.

FRONT A/C – Turns front air conditioning on and off.

REAR A/C – Turns rear air conditioning on and off.

CAMERA A/CAMERA B – Allows either camera to be selected.

RIGHT/LEFT VISOR – Use to raise/lower either right or left hand visor.
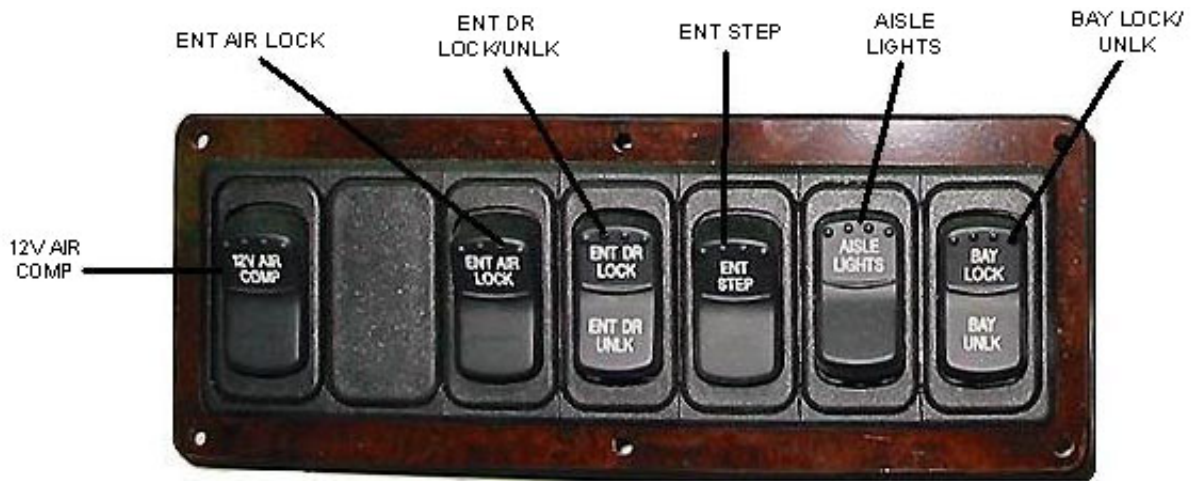
120V AIR COMP. – This switch operates the auxiliary air compressor (optional equipment), which is a 120 vac operated back up air compressor.

ENT AIR LOCK – Enables entrance air lock. Locks door and overrides 3mph speed sensor.

ENT DR. LOCK – Locks/Unlocks entrance door lock.

ENT STEP – When switch is selected step is set to the EXTENDED position, with the ignition off, activates a relay locking the outside entry step in the EXTENDED position. When the ignition is turned on, the entry step automatically extends when the door is opened and automatically retracts when the door is closed. The indicator reminds you that your switch is in the ON position.

AISLE LIGHTS – This switch allows you to turn the aisle lights on or off from the pilot's chair.

BAY LOCK/UNLOCK – Locks/unlocks bay area.

2-1.2 Left Dash Panel Controls and Indicators
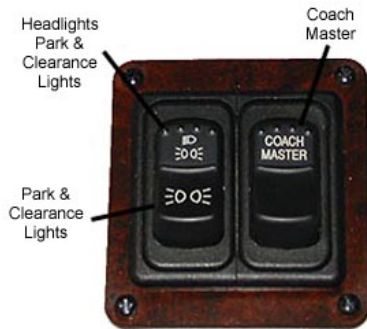
PARK AND CLEARANCE LIGHTS – Use this switch to select your park and clearance lights only.

HEADLIGHTS, PARK AND CLEARANCE LIGHTS – Use this switch to select headlights, park and clearance lights.

COACH MASTER – This will shut off all power to motor home accept the minimal systems such as memories for radios and ecms. Talk to electrical people to see what actually stays on when this switch is selected.

REAR LAND – Turns rear landing lights on/off.

LEFT LAND – Turns left landing lights on/off.

RIGHT LAND – Turns right landing lights on/off.

BACK UP – Turns back up lights on/off.

ENGINE HEAT – This is the hydronic engine block heater. This should be used when motor home is parked. This turns on the circulating pump from the hurricane heat system and sends hot water to the engine block to warm engine.
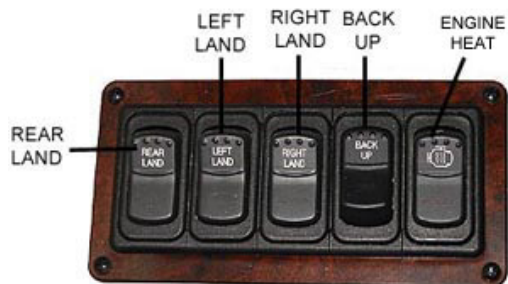
NOTE: When this switch is used it takes BTU's from system for motor home heat and hot water to allow engine to heat. This may cause hot water to be cooler and inside of motor home to be cooler.
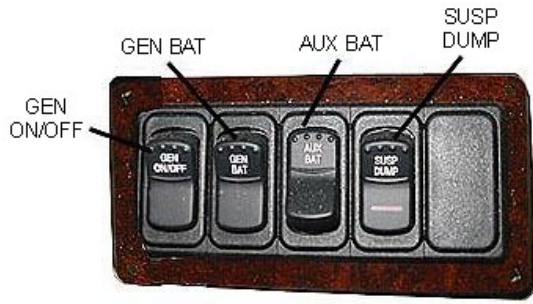
GEN ON/OFF – Turns Generator on and off.

GEN BAT. – Turns Generator battery on and off.

AUX. BAT. – A three-position switch. The top position is a full On position (maintained) and is used when the Ignition is Off to connect both chassis and house batteries together. The On position is required to charge the chassis batteries from the Inverter charger. The middle Off position disconnects house and chassis batteries from each other. (Chassis batteries will automatically disconnect if less than 12.5 volts to ensure enough cranking power to start the coach.)

In the event that the house batteries have discharged to an extremely low voltage, the Momentary On bottom position of the Auxiliary Battery Switch can be used to re-connect the preserved chassis batteries for approximately 8 seconds, to allow cranking of the engine.

SUSP. DUMP – Switch for main suspension air. See Air Suspension System for operation.

2-1.4 Left Side Driver's Armrest Panel Controls and Indicators
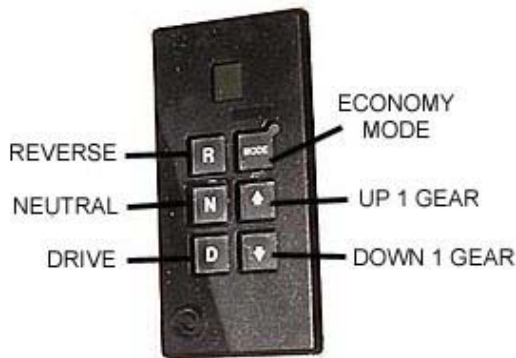
The first panel allows you to select the gears in your transmission.

REVERSE – Selects reverse gear.

NEUTRAL – Puts transmission in neutral.

DRIVE – Selects drive gear.

MODE – Puts transmission in economy mode. This shifts transmission from 2000 to 1800 rpm which will save on fuel.

ARROW UP – Allows driver to shift up one gear at a time. For instance from 4th to 5th gear.

ARROW DOWN – Allows driver to shift down one gear at a time. For instance shifts from 5th to 4th.

ARROW UP AND ARROW DOWN PUSHED TOGETHER – When these are pushed at the same time allows transmission to go into diagnostic mode. To use this feature the motor home has to have the engine running, transmission in normal operating temperature. This mode will check the transmission fluid level, transmission defect codes. If this mode is selected and you have not met the conditions stated the system will let you know.

CRUISE – Turns cruise control on and off.

NOTE: The motor home must be traveling at least 35 mph before the cruise control will operate properly.

CRUISE SET/RESUME – Locks the cruise control on the desired cruising speed. Press Resume when motor home was taken out of cruise momentarily, for example, to speed up to pass a vehicle, etc. This will restore cruise to what was originally set.

NOTE: The motor home should be at or above 35 mph before attempting the RESUME function. In addition, if the ignition switch has been turned off, the previous cruise speed will be erased from memory and the new cruise speed will be that speed when the RESUME switch was depressed.

CLEARANCE LIGHTS – Turns clearance lights on and off.

LEFT and RIGHT OUTSIDE MIRRORS – Use these controls to adjust outside mirrors as needed.
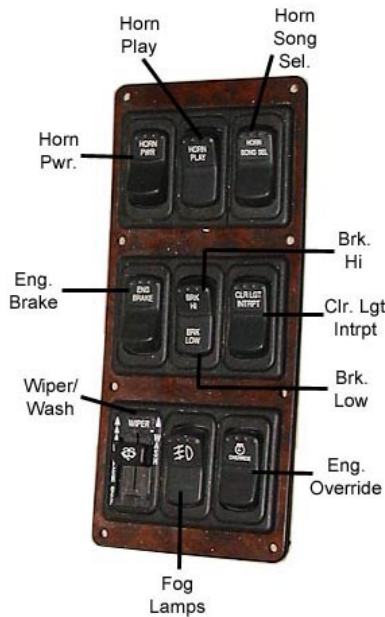
HORN PWR. – Select to turn power on to horn.

HORN PLAY – Select to play horn.

HORN SONG SEL. – This will allow user to select the song to play on the horn.

ENG. BRAKE – Enables the engine brake.

BRK HI/LOW – Selects HI or LOW if engine brake is engaged.

CLR. LGT. INTRPT – Trucker's salute

WIPER/WASH – This switch controls the windshield wipers and wash.

FOG LAMPS – Switches fog lamps on and off.

ENG. OVERRIDE – Allows driver to override engine shutting down for pulling over safely.

2-1.5 Passenger Panel Controls
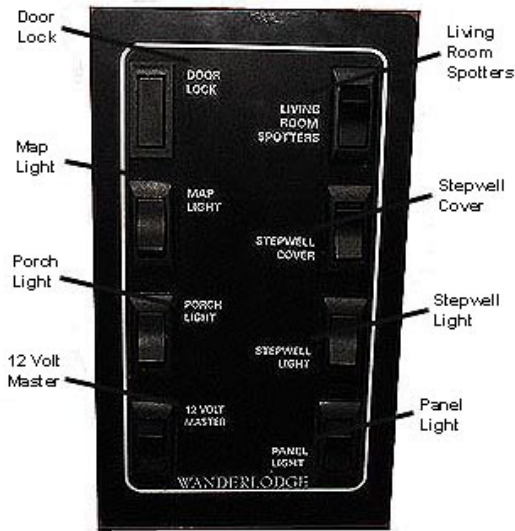
In the next five sections, most of these switches are self-explanatory, even so, refer to the definitions below for a brief explanation of what each switch does.

12 VOLT MASTER – Turns on/off house 12V power.

PORCH LIGHT – Turns on and off the porch light.

MAP LIGHT – Turns on and off the map light.

DOOR LOCK – Engages the door locks.

LIVING ROOM SPOTTERS – Turns on and off the living room spotlights.

STEPWELL COVER – Opens and closes stepwell cover.

STEPWELL LIGHT – Turns the light for the stepwell on and off.

PANEL LIGHT – Illuminates switch panel on and off.

2-1.6 Living/Dinette Panel Controls and Indicators
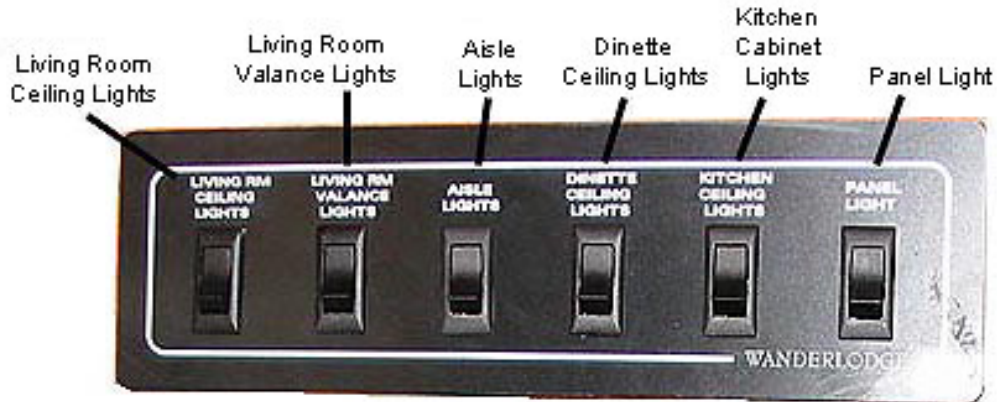
LIVING ROOM CEILING LIGHTS – Turns the living room ceiling lights on and off.

LIVING ROOM VALANCE LIGHTS – Turns the living room valance lights on and off.

AISLE LIGHTS – Controls the aisle lights.

DINETTE CEILING LIGHTS – Turns lights in dinette ceiling on and off.

KITCHEN CEILING LIGHTS – Turns lights in kitchen ceiling on and off.

PANEL LIGHT – Illuminates switch panel on and off.

2-1.7 Bathroom Panel Controls and Indicators
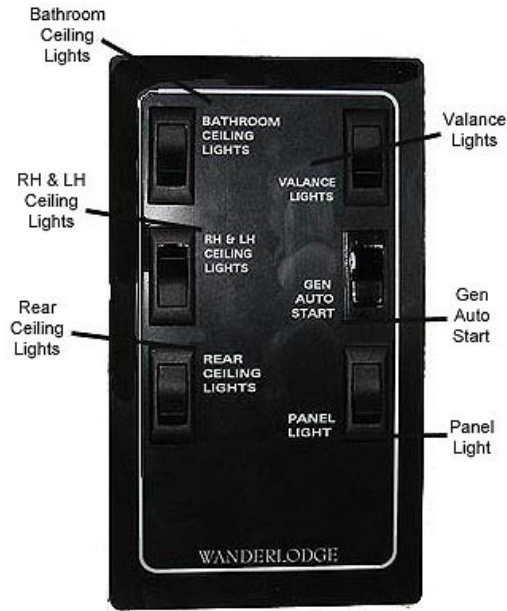
REAR CEILING LIGHTS – Controls the rear ceiling lights.

RH & LH CEILING LIGHTS – This controls the right hand and left hand side ceiling lights.

BATHROOM CEILING LIGHTS – Turns lights in bathroom ceiling on and off.

VALANCE LIGHTS – Turns valance lights on and off.

GEN AUTO START – Enables the Generator. Refer to **4.3.1 Generator Operation** for more detailed information.

PANEL LIGHT – Illuminates switch panel on and off.

2-2 Driver and Co-Pilots Area_____

2-2.1 CB Receiver Transmitter

Your motor home is equipped with a forty channel, CB receiver/transmitter installed in the lower left armrest with all controls in the hand held portion.

2-2.2 Closed Circuit Rear-Vision TV System

A color LCD rear view monitor is standard on the motor home. This allows you to see behind motor home. This is especially helpful when towing a vehicle, it allows driver to see behind and keep an eye on what is in tow. Some features of this are:

- Wide Viewing Area (6.4" Diagonal)
- High Resolution (640 x 480)
- High Brightness (300 nit)
- Slimline Housing (1" Deep)
- Flat Rear Housing for easy Surface Mounting
- Automatic Video Signal Sensing for Turn-On Surface
- Designed and Tested for Automative Use

Specifications:

Video Input System:	NTSC
Power Input:	12VDC; 850mA Current Draw
Video Input:	1V Peak to Peak Composite Video; 75 Ohm
Operating Temperature:	-10°C to 60°C
Storage Temperature:	-30°C to 80°C
Viewing Temperature:	6.4" Diagonal Measurement
Display Type:	Color TFT Active Matrix
Resolution:	640 x 480
Brightness:	300 nit
View Angle Range (Left-Right)	±60°
View Angle Range (Top):	15°
View Angle Range (Down):	35°
Contrast Ratio:	120:1
Overall Dimensions:	5.22"(H) x 6.66"(W) x 1" (D)
Weight:	16.0 oz.

2-2.3 Compass/Thermometer

The Compass/Thermometer is located in the center rear view mirror. There is also a thermometer located on the water tank monitor panel found in the pantry. Both thermometers measure outside ambient temperature in °F.

2-2.4 Remote Controlled, Heated Outside and Rear View Mirrors

Your motor home has two electronically adjustable heated mirrors. Each mirror has a flat mirror and a convex mirror. There are two switches, one that controls the left hand flat convex mirror and the other controls the right hand flat convex mirror. By flipping the switch from left to right this allows the driver to adjust the flat and convex mirrors separately.

Mirrors are electronically heated thermostatically controlled, designed not to overheat. Switches on the dash allow driver to turn heat on and off as desired.

2-2.5 Auto-Dimming Comp/Temp Mirror

The coach is supplied with a Gentex NVS® Auto-Dimming Comp/Temp Mirror. This mirror is equipped with the following features:

- Fully automatic electrochromic auto-dimming mirror
- Full range dimming - 75% to 6%
- Automatically disables dimming during daytime
- Digital compass with PathPoint™ continuous calibration software
- Outside temperature display
- Ice alert warning below 38°F
- Vacuum fluorescent display brightens and dims automatically

Auto-Dimming Switch Function
- Hold Temp switch for 15 seconds to disable Auto Dimming and Auto LED will go off. Repeat step to enable Auto Dimming and the Auto LED will come on.

Display Switch Functions
- Depress either the Comp or Temp switch to turn the display on/off.

Zone Variation
This compass must be set to compensate for the variation between true north and magnetic north. To set variation:
- Turn ignition on.
- Using the map at right to find your geographic location, note the zone that you are in.
- To select Zone, push in the Comp switch for 3 seconds until the Zone selected comes up. Release, then toggle until correct zone is found and release switch. After 5 seconds of no switch activity, display will return to normal temperature reading.
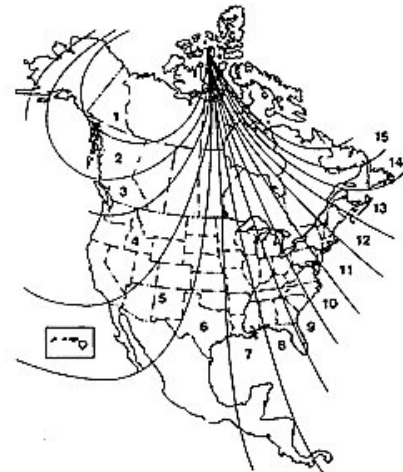
Compass Calibration
This compass automatically calibrates itself while the vehicle is driven as your route takes you in complete circles. Therefore no calibration should be required, though it may take up to an hour. A quicker method is listed below. If the vehicle's compass headings become inaccurate, the compass can be manually calibrated by:
- Turn ignition on.
- Zone variation needs to be changed to use in different areas of the country.

- For a different Zone selection, push in the Comp switch for 3 seconds until the Zone selection comes up. Release, then toggle until correct zone is found and release switch.
- To re-calibrate, hold the Comp switch for 6 seconds until CAL is displayed. Drive your vehicle in at least 3 circles, allowing 45 seconds to complete one circle.

Temperature Function
- Push Temp switch for 3 seconds until display blinks °F or °C. Release, then toggle Temp switch to select between °F and °C. After 5 seconds of no switch activity, display will return to normal temperature reading.

Ice Feature
Display will indicate "ICE" to alert driver of potential driving hazard when temperatures are below 38°F.

▲**WARNING: Do not locate a cellular antenna within 24" of the mirror.**

2-2.6 Entrance Door Electric Lock

The entrance door electric lock is operated by the right hand dash mounted switch that controls entry door locks.

2-2.7 Entrance Door Air Lock

The entrance door air lock is controlled by a signal generated by transmission which energizes the door air lock solenoid when motor home reaches 3 mph. There is also a switch located on the right hand dash panel which will override 3mph signal and lock the doors. When this switch is selected the motor home will not unlock automatically when it comes to a stop. Since this sound can be loud and annoying this feature will alleviate that problem when motor home is in stop-and-go traffic.

2-2.8 Six-Way Power Seats and Seat Belts

The seats in the motor home are Villa. They are mounted on a six way adjustable power and swivel base with electrically operated lumbar support. The seat is covered in Ultraleather.

2-2.9 RoadRelay™ 4

2-2.9.1   Introduction

The RoadRelay™ 4 vehicle monitoring system may be purchased for your coach as an option. The RoadRelay™ 4 is a vehicle monitoring system that helps drivers perform better and helps owners collect important information about the operation and performance of their coach.

Driver benefits include fuel economy feedback information (see *Leg Information* section), estimated time of arrival (see *Estimated Time of Arrival (ETA*) section), a built-in clock with alarm (see *Using the Clock and Using the Alarm* sections), driver coaching and driver information pop-ups (see *Pop-ups* section), and many other features.

For protection of the vehicle and the property it is carrying, the antitheft feature (see *Antitheft* section) can be used.

To help service the vehicle, information from the engine control module can be viewed (see *Vehicle Monitor* section). To help troubleshoot vehicle problems, fault information is displayed when a fault occurs and then stored for later access by service personnel (see *Fault Information* section). Maintenance is assisted by the use of periodic maintenance pop-ups and stored service information (see *Scheduled Maintenance and Service History* sections).

Additionally, if the fleet owner purchases INFORM™ or INSPEC™ software, many other types of stored information such as trip data, route data, fuel purchases, and much more can be extracted and presented in easy-to-read reports. RoadRelay 4 configurations and calibrations are changed with the office software.

2-2.9.2   Getting Started

When first using the RoadRelay 4, reading a few sections of this manual will allow you to start using the product quickly. The recommended sections are *Using the Keypad, Selecting a Language, Using the Clock, and Units of Measure*. Scan the rest of the sections to find other sections that explain features you wish to use.

2-2.9.3   Using the Keypad

Related sections: Leg Information - Automatic Leg Screens.

NOTE: All examples will start from an AUTO LEG screen. See the Leg Information section to view these screens. To reach an AUTO LEG screen, keep pressing 🔙 ***until the screen stays the same.***

The RoadRelay 4 has a backlit keypad that is used to move through the different screens and to enter data. A picture of each key and its name is shown below.

🎡	STEERING WHEEL	⬆️	UP ARROW
🚚	TRUCK	🛣️	ROAD
⬅️	BACKSPACE	🔧	WRENCH
🔢	CONFIGURATION	📄	PAGES
↵	ENTER	⬇️	DOWN ARROW
❓	HELP	⛽	FUEL PUMP
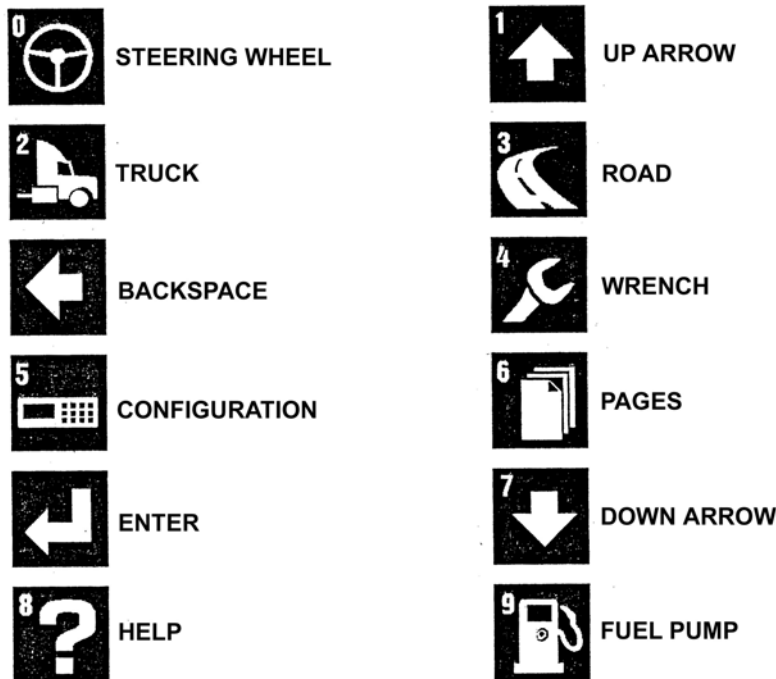
NOTE: The RoadRelay 4 will automatically power down 30 seconds after the keyswitch is turned off. The RoadRelay 4 may be powered by pressing the ENTER key. As long as any key is pressed within 30 seconds, the RoadRelay 4 will remain powered.

2-2.9.3.1 Menu Screens

Menu screens can be identified by the presence of a SELECTOR (<=) on the right side of the screen. When in a menu, use 🔼 and 🔽 to move the SELECTOR up or down in a list. 🔼 and 🔽 will automatically repeat if held down. If you reach the top or bottom of a menu, it will "wrap around" to the other end of the menu. To select an item, move the SELECTOR to the right side of the desired item and press ↵.

Example: To see a menu screen, press the ⬛ key. The SELECTOR is to the right of the item to be selected. Press ⬛ to return to the previous screen.

2-2.9.3.2 Entry Screens

Entry screens can be identified by the presence of a CURSOR (blinking rectangle) on the screen. Use ⬛, ⬛, ⬛, ⬛, ⬛, ⬛, ⬛, ⬛, ⬛, and ⬛ to enter numbers. The numbers appear in the upper left-hand corner of the key. When the first key is pressed, the old numbers will disappear and the new number will be updated as keys are pressed. *When you are finished entering all numbers, press* ⬛*. If you want to undo the last key-press, use* ⬛*. If you wish to leave a screen and not modify the number the number, keep pressing* ⬛ *until the screen is gone. When on an entry screen, you may not be able to "jump" between menus because the key is presently interpreted to be number entry. Use* ⬛ *to exit the screen, and normal functioning will return.*

Example: Press ⬛; move the SELECTOR until it is to the right of "Time." Press ⬛. You will see the present RoadRelay 4 time and a blinking CURSOR. Press any key with a number on it. The screen will now show the number you have presently selected. Press ⬛ several times to discard the change and return to the AUTO LEG screen.

2-2.9.3.3 Up/Down Entry Screens

Some screens use to move through a set of possible choices. The screen changes to show the new choice when ⬛ and ⬛ are pressed.

Example: Press ⬛; move the SELECTOR until it is to the right of "Time Format." Press ⬛. You will see the present time format. Press ⬛ and ⬛ to see the format switch between 12 and 24 hours. Press ⬛ several times to discard any change and return to the AUTO LEG screen.

2-2.9.3.4 Data Screens

Screens showing data, such as the leg or vehicle monitor, will update every second. If data is unavailable or invalid, the screen will have question marks in place of numerical data.

2-2.9.3.5 Changing Display Brightness from AUTO LEG

The RoadRelay 4 has five levels of brightness (including OFF). When in an AUTO LEG screen, pressing ⬛ will increase the display brightness; pressing ⬛ will decrease the brightness. When at the lowest level (OFF), any key press will turn the display on at the lowest brightness level. The RoadRelay 4 saves separate brightness settings - one if the headlights are OFF, you can adjust the setting for headlights being off. If the headlights are ON, you may adjust the setting for headlights being on.

2-2.9.4   Leg Information

Related sections: Driver ID, Using the Clock, Estimated Time of Arrival (ETA), Units of Measure, Trip Information.

A "leg" is data collected since the last time the leg information was reset. A leg has less information than a trip. Leg information can not be retrieved using office software. It is only used for driver feedback.

2-2.9.4.1 Automatic Leg Screens

The leg screens are the "top-level" screens. By repetitively pressing ⬅, you will eventually reach an AUTO LEG screen. When vehicle operation changes, the screen will automatically change between Idle, Driving, or PTO. The change will occur immediately or after 5 minutes, depending on whether "Short Stop Mode" is ON or OFF (Short Stop Mode can only be turned ON or OFF using INFORM™/INSPEC™ office software). An AUTO LEG screen is one of these three screens. All examples in this User's Guide start from an AUTO LEG screen.

2-2.9.4.2 Automatic Idle Display

```
125              3:44 PM
        Idle Time:
        4:12 (  7%) +++
NW    Shutdown:  43:22
```

```
125              3:44 PM
      Idle Time:
  – – 12:34  (14%)
NW              8.2 gal
```

The top line of the screen shows the present driver and the time. If the Driver ID feature is OFF, only time will be displayed.

The second line identifies this as the Idle screen.

The third line shows the amount of time the engine has been idling, the percentage of total leg time the engine has been idling, and performance versus a 20% goal. Plus (+) and minus (-) symbols indicate performance against this idle-time goal. Therefore, each "+" or "-" indicates a 2% difference in actual idle time versus the goal. A "-" indicates too much time is being spent idling; a "+" indictes better performance than the goal.

The last time shows heading (on GPS-equipped units) and the remaining time until the engine automatically shuts down, or how much fuel has been used while idling. This is determined by type of engine and how the engine is set up.

2-2.9.4.3 Automatic Driving Display

```
125             12:44 PM
ETA:   2:48 PM      0:12
NW            1234.4 mi
        6.7 mpg +
```

The top line of the screen shows the present driver and the time. If the Driver ID feature is OFF, only time will be displayed.

The second line shows Estimated Time of Arrival (ETA) information. This can be read a: "At your present speed, you will arrive at 2:45 PM, which is 12 minutes ahead of when you are scheduled to arrive."

The third line shows how many miles have been traveled on this leg.

The last line shows the average leg fuel economy, and performance versus this average fuel economy. Each + or - indicates a 10% change in the displayed fuel consumption rate. For example, ++ indicates a fuel rate that is presently 20% better (less than) the rate displayed.

2-2.9.4.4 Automatic PTO Display

The following screen will only be displayed if the Power Take-Off (PTO) is engaged, the vehicle is not moving, and displaying of PTO mode is ON. (This is set by the INFORM™/INSPEC™ software.)
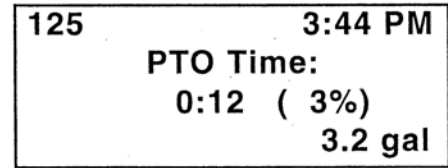
```
┌─────────────────────────┐
│ 125            3:44 PM   │
│      PTO Time:           │
│       0:12  ( 3%)        │
│               3.2 gal    │
└─────────────────────────┘
```

The top line of the screen shows the present driver and the time. If the Driver ID feature is OFF, only time will be displayed.

The second line identifies this as the PTO screen.

The third line shows how long the PTO was engaged while the vehicle was stationary, and percentage of total leg time the PTO was engaged with the vehicle stationary.

The last line shows the amount of fuel used while the PTO was engaged and the vehicle was stationary.

2-2.9.4.5 Manual Leg Screens

In addition to automatic leg screens, you can manually select one of the three engine mode displays (Drive, Idle, PTO). These screens do not automatically switch as the vehicle operation changes; you can use this feature to always show a particular leg screen. Manual leg screens are selected by pressing ▣ and then selecting an item from the menu. Use ▲ and ▼ to move between the screens.

NOTE: If the RoadRelay 4 is powered down or another menu is selected, you will first need to return to this menu to restore the manual leg screen.

2-2.9.4.6 Manual Driving Display

The Manual Driving display is identical to the Automatic Driving display except that this screen is always shown, regardless of vehicle operation. See *Automatic Driving* display description.

2-2.9.4.7 Manual Idle Display

The Manual Idle display is identical to the Automatic Idle display except that this screen is always shown, regardless of vehicle operation. See *Automatic Idle* display description.

2-2.9.4.8 Manual PTO Display

The Manual PTO display is identical to the Automatic PTO display except that this screen is always shown, regardless of vehicle operation. See *Automatic PTO* display description.

2-2.9.4.9 Leg Summary

```
┌─────────────────────────┐
│ 125         Summary     │
│            44.3  mph     │
│           351.6  gal     │
│           248.0  hp      │
└─────────────────────────┘
```
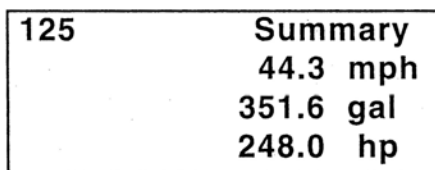
The top line of the screen shows the present driver and the screen title. If the Driver ID feature is OFF, the driver name will be blank.

The second line shows the average speed of the vehicle on this leg.

The third line shows the amount of fuel used on this leg.

The last line shows the average power on this leg.

2-2.9.4.10 Operating Hours

```
┌─────────────────────────┐
│    Operating Hours      │
│ Drive:   6:21    (92%)  │
│ Idle:    0:35    ( 8%)  │
│ PTO:     0:00    ( 0%)  │
└─────────────────────────┘
```

The top line of the screen shows the screen title.

The second line shows the amount of time and percentage of total time spent driving on this leg.

The third line shows the amount of time and percentage of total time spent idling on this leg.

The last line shows the amount of time and percentage of total time spent idling with PTO engaged on this leg.

2-2.9.4.11 Resetting Leg Data

```
┌─────────────────────────┐
│                         │
│     Reset Leg?          │
│       Yes               │
│                         │
└─────────────────────────┘
```
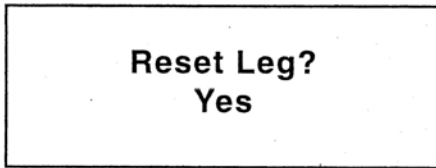
To erase the leg data and start over, hold ⏎ for 3 seconds while viewing the leg data. Or, press 📇 and select "Reset Leg" from the menu. Press ⏎ to reset; press ◀ to leave this screen and not reset leg.

2-2.9.5 Antitheft

Related sections: Keypad - Entry Screens, Units of Measure.

The antitheft feature deters vehicle theft by requiring the driver to enter a password, using the RoadRelay 4 keypad, before allowing the engine to start. Antitheft will work with Cummins CELECT™ Plus (revision 4 software and later), ISB, ISC, ISL, ISM, ISX, and Signature 600 engines.

NOTE: The engine control module determines whether this feature is ON or OFF. ALL Cummins engines leave the factory with Antitheft turned OFF. A customer desiring to use this feature must visit a distributorship or certified dealership and request to have INSITE™ (Cummins authorized service tool) turn the feature to ON. (There may be a fee.) In addition, while connected, it is VITAL that the customer choose their passwords (all numeric) and write them to the ECM at this time. The factory default passwords are all 000000s and can not be changed via the RoadRelay keypad initially. Once changed to some meaningful sequence, the user can work with their selection of password(s) or change them via the RoadRelay keypad. The above-described support for antitheft can also be accomplished with INSPEC™.

2-2.9.5.1   Selecting the Antitheft Mode

Antitheft modes affect how the engine is locked.

The four choices for the antitheft mode are:

- Off   The antitheft feature is OFF.
- Manual   The driver locks the engine by entering a password
- Semiautomatic   The driver locks the engine by selecting "Yes" when asked to "Arm Vehicle Security" at key-off.
- Automatic   The engine is automatically locked after the ignition key is turned OFF.

Read the *How to Lock the Engine* section for more details.

To select the antitheft mode, press ⬛ and select "Security Mode." Use ⬆ or ⬇ to show the mode you wish to use. Press ⬅ to select the mode. Press ⬅ to quit. If the RoadRelay 4 is in *"Fleet Mode," you will not be able to change this setting. (Fleet mode can only be turned ON or OFF using INFORM™/INSPEC™ office software.)*

```
Security Mode
Automatic
```
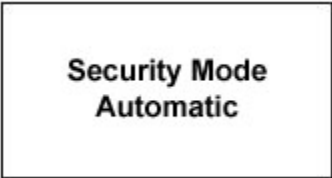
The user must enter the password.

```
Enter Password
??????
```

If the engine is a CELECT™ Plus and the previous mode was "Off," the user must confirm the new password.

```
Confirm Password
??????
```
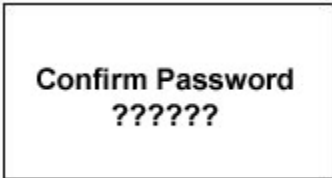
If confirmation fails, the mode is not changed and the following screen is shown:

```
Vehicle Security
Change Failed
```

2-2.9.5.2 How to Lock the Engine

How the engine gets locked depends on the antitheft mode (Off, Manual, Semiautomatic, Automatic). See the *Selecting the Antitheft Mode* section for more information.

2-2.9.5.3 Manual Mode

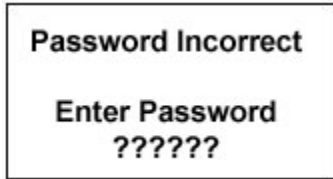At key-off you will see this screen:

```
Key On to Arm
Vehicle Security
```

Turn the key switch ON. Enter the password on the following screen:

```
To Arm
Vehicle Security
Enter Password
??????
```

If the password is right, this screen will be displayed, and the engine is locked:

```
Vehicle Security
Armed
```

Otherwise, you must try again.

```
Password Incorrect

Enter Password
??????
```

2-2.9.5.4 Semiautomatic Mode

At key-off you will see the following screen:

```
Key On to Arm
Vehicle Security
```

Turn the key switch ON. Press ⏎ to lock the vehicle. Press ⬅ to leave this screen and not lock the engine.

```
Arm
Vehicle Security?

Yes
```
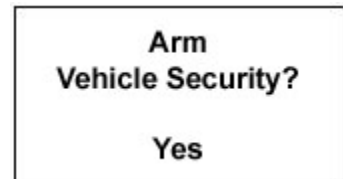
2-2.9.5.5 Automatic Mode

In automatic mode, the engine automatically locks 30 seconds after the ignition key is turned OFF. If the engine in the vehicle is a CELECT™ Plus, it will automatically lock 20 seconds after a key-off or stall.

### 2-2.9.5.6 How to Unlock the Engine

```
Vehicle Security
Armed
Enter Password
??????
```
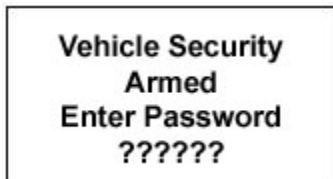
If the engine is locked, you must enter a six-number password. As the password is entered, each "?" will be replaced with "*." Press ⏎ when you have finished entering six numbers.
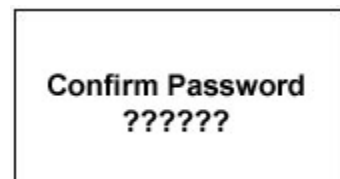
If the password is correct, this screen will be displayed, and the engine is now unlocked.

```
Vehicle Security
Disarmed
```
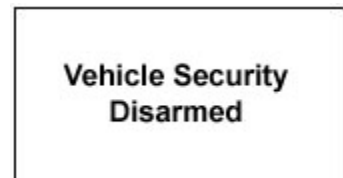
If the password is incorrect, the following screen will be displayed:

```
Password Incorrect

Enter Password
??????
```
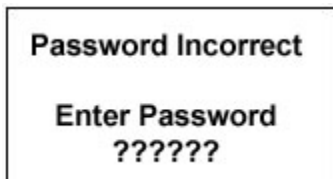
If you enter a correct password after an incorrect password, you must confirm the password by entering it again.

```
Confirm Password
??????
```

**Password Incorrect
Vehicle Secured**

If the units of measure are "US" or "Metric" and you fail to enter the password correctly after five attempts, you will be locked out for 10 minutes. If the units of measure are "UK" or "Europe" and you fail to enter the password correctly after three attempts, you will be locked out for 30 minutes. When this lockout occurs, this screen will be displayed.

NOTE: The ignition key must be ON to allow the lockout timers to operate for the required 10 or 30 minutes.

2-2.9.5.7 Changing the Password

Press ⬛. Select "Change Password." If the RoadRelay 4 is in "Fleet Mode," you will not be able to change this setting. (Fleet mode can only be turned ON or OFF using INFORM™/INSPEC™ office software.) The following screen will be displayed:

**Enter Existing
Password
??????**

**Enter New
Password
??????**

Once the existing password has been correctly entered, this screen is displayed and a new password can be entered.

You **MUST** confirm the new password on the following display. If this fails, the password is **NOT** changed.

**Confirm Password
??????**

Do not forget your password! When protected by the antitheft feature, the engine will **not** start without entering the password. Do not write your password where a thief can find it. Keep it someplace safe where you can find it easily.

Refer to the *Warranty* section for important antitheft warranty information.

2-2.9.5.8 Idle Lock

If the engine is a Cummins ISB, ISC, ISL, ISM, ISX, or Signature 600, it may be locked while idling. If locked while idling, it will ignore accelerator pedal changes until unlocked.

NOTE: This feature is not available if the units of measure are "UK" or "Europe."

To lock or unlock the engine, press ⊕ and select "Lock/Unlock Engine." Refer to the *How to Lock the Engine* section. The unlocking procedure can be seen in the *How to Unlock the Engine* section.
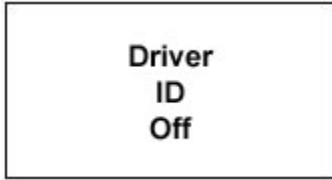
2-2.9.6 Driver ID

Related sections: Using the Keypad.

RoadRelay 4 can record separate information for up to four drivers using the Driver ID function. You can select up to three drivers. In addition, you can select the "Other" driver.

2-2.9.6.1 Turning Driver ID On or OFF

To turn Driver ID On or Off, press ⬛. Select "Driver ID."

```
Driver
ID
Off
```

Use the ⬆ or ⬇ to change between On and Off. Press ⏎ to save the selection. Press ⬅ to leave this screen and not update the choice. If the RoadRelay 4 is in "Fleet Mode," you will not be able to change this setting. (Fleet mode can only be turned ON or OFF using INFORM™/INSPEC™ office software.)

2-2.9.6.2 Choosing a Driver

If the Driver ID feature is ON, the following screen will be displayed at power on or by pressing ⬤, selecting "Driver ID," and pressing ⏎. If Driver ID is OFF, the "Driver ID" selection will not appear under the ⬤ menu.

The screen will be different if IDs have already been entered.

If your ID appears on the following screen, you may use ⬆ or ⬇ to select it. Pressing ⏎ will accept the selection.

```
Select Driver:
Driver:  (New)     <=
Driver:  (New)
Driver:  (New)
Other
```
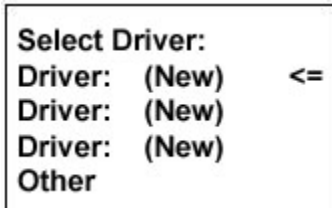
If you need to enter a new driver ID, select "Driver (New)." Press ⏎. Enter up to 10 numbers to create an ID, and press ⏎ when finished.

```
Enter Driver ID:
0000000000
```
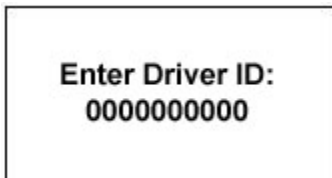
If you pressed ⬆ 🌙 🔧 ⬛ 🗑, for example, you would see the following screen:

```
Enter Driver ID:
123456
```
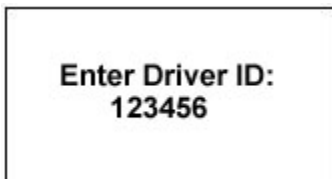
Press ⏎ and the driver menu will update with a new driver number.

```
Select Driver:
123456              <=
Driver: (New)
Driver: (New)
Other
```

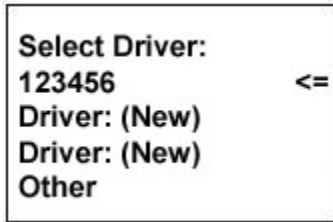*NOTE: A driver ID can only be cleared by extracting trip data with the INFORM™/INSPEC™ office software or resetting trip data using the "Reset Trip" menu item. This will clear all but the presently selected driver's ID.*

2-2.9.7 Estimated Time of Arrival (ETA)

Related sections: Leg Information - Automatic Leg Screens - Driving Display, Using the Clock, Units of Measure.

The ETA feature can be used by the driver to show how he or she is doing versus a scheduled arrival time. ETA information appears on the leg "Driving Screen."

2-2.9.7.1 Changing ETA Arrival Time and Distance

Press ⊕. Select "ETA Setup."

Use the number keys to enter your travel distance. Press ⏎ to accept the new distance and go to the next screen.

```
Distance to
Destination:
    0 mi
```
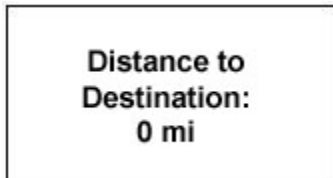
Use the number keys to enter your time. If using a 24-hour clock, press ⏎ to finish ETA setup. If using a 12-hour clock, press ⏎; then use ⬆ or ⬇ to toggle between AM and PM.

Press ⏎ to finish ETA setup.

```
Scheduled
Delivery
Time:
6:30 PM
```

2-2.9.7.2 Changing ETA Average Speed

Related sections: Units of Measure

Press 🔢. Select "ETA Speed."
Use the number keys to enter your speed. Press ⏎ to accept the new speed. Use ⬅ to quit.

```
Average ETA
Speed:
42.0 mph
```
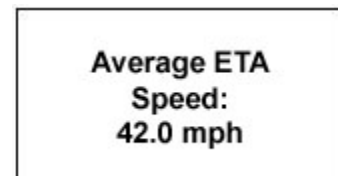
2-2.9.8 Using the Clock

Related sections: Using the Keypad.

2-2.9.8.1 Choosing a 12- or 24-Hour Clock

Use 12-Hour Clock
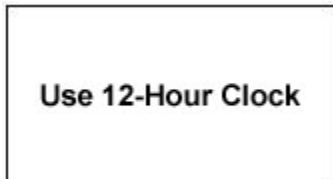
To change between a 12- or 24-hour clock, press 📟. Select "Time Format." Use 🔼 or 🔽 to toggle between 12 and 24 hours. Press ⏎ to finish.

2-2.9.8.2 Setting Clock Time

To set the clock time, press 📟. Select "Time." Use the keys with numbers to enter your time. If using a 24-hour clock, press ⏎ to finish. If using a 12-hour clock, press ⏎; then use 🔼 or 🔽 to toggle between AM and PM. Press ⏎ to finish.

Clock Time:
10:30 PM
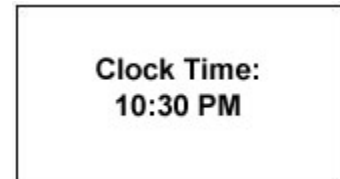
2-2.9.9 Using the Alarm

Related sections: Using the Keypad, Using the Clock.

2-2.9.9.1 Turning Alarm On or Off

To turn the alarm On or Off, press 📟. Select "Alarm Enable." Use 🔼 or 🔽 to toggle between On and Off. Press ⏎ to finish.

Alarm:
On

2-2.9.9.2 Setting the Alarm Time

To set alarm time, press 📟. Select "Alarm Time." Use the keys with numbers to enter your time. If using a 24-hour clock, press ⏎ to finish. If using a 12-hour clock, press ⏎; then use 🔼 or 🔽 to toggle between AM and PM. Press ⏎ to finish.

Alarm Time:
6:30 AM
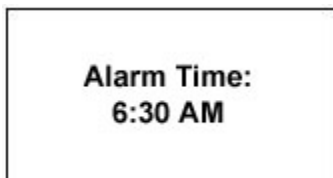
When the alarm goes off, the buzzer will sound and the alarm screen will appear:

Press any key to shut off the buzzer. If a key is not pressed, the alarm will shut off after 1 minute.

11/21/96   6:30 AM

Alarm!
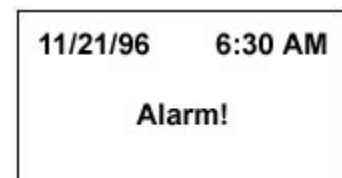
2-2.9.10 Setting the Date

Related sections: Using the Keypad.
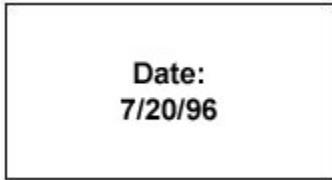
To set the date, press [icon]. Select "Date." Use the keys with numbers to enter the date. Press [icon] to finish. To leave without saving changes, keep pressing [icon].

```
Date:
7/20/96
```

2-2.9.11 Mark and Go To

Related sections: Estimated Time of Arrival (ETA) - Changing ETA Average Speed, Leg Information.

The RoadRelay 4 GPS system is optional: this feature will only be available if the RoadRelay 4 has this option. The Mark and Go To feature allows you to save the present location in the RoadRelay 4 memory by "marking" it. You may later select that location and see how far from the location you are and how long it will take to get there. It also will show the bearing (direction to go) of the location.

2-2.9.11.1 Marking a Location

Press [icon]. Select "New Location."

```
New Location       <=
AZ Truck Stop
Mercury Warehouse
Phil's Fish Fry
```

The RoadRelay 4 can save up to 20 locations. Selection of "New Location" will add a new location to the list. Selection of an existing location shall allow the old location to be changed. When you make a choice, the present GPS position is saved.

You will then be able to name the location on the following screen:
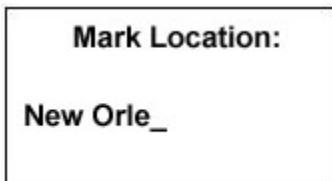
```
Mark Location:

New Orle_
```

Use [icon] and [icon] to move through the different letters and numbers. If the arrow keys are held down, they will repeat. To change the lowercase to uppercase, or vice versa, press [icon]. To get variants of the letters (such as 'e' to 'ë' or 'n' to 'ñ'), press [icon] until the correct variant is found. Special characters (%, -, etc.) are variants of spaces. Press [icon] to move to the next letter in the line. Press [icon] to move backward. You must fill one line with letters and spaces to finish the title.

NOTE: If the RoadRelay 4 does not have a valid GPS position, you will not be able to mark the location, and a screen showing "GPS Antenna Blocked" will be displayed.

2-2.9.11.2 Selecting a Go To Location

```
AZ Truck Stop      <=
Mercury Warehouse
New Orleans
Phil's Fish Fry
```

Press [icon]. Select "Go To Location." You will see an alphabetized list of all marked locations.

```
AZ Truck Stop
ETA: 12/20   12:55 PM
Heading NW 1123.2 mi
Bearing N
```
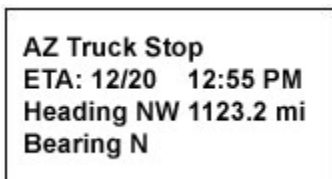
If you make a selection, a screen will be displayed showing information about that location.

The first line shows the location you are going toward. The second line shows the estimated time of arrival, assuming you are traveling in a straight line. (The ETA will also be shown on the Driving screen.) The third line shows your present heading and straight-line distance to the location. The last line shows the bearing (direction) of the selected location.

If the RoadRelay 4 does not have a valid GPS position, the distance to the location will be zero.

2-2.9.12   Route Recording

Related sections: *Keypad-Entry Screens, Units of Measure, Setting the Clock Time, 12- or 24-Hour Clock Time, Setting the Date, Printing to Hyperterminal, Printers and Printer Cables for RoadRelay 4.*

A route is the distance and time traveled since the last time a new route was started. This feature is used to create a record for each route. A route does not need to include any travel. It can be used to record time waiting to unload, time stuck in traffic, and so on.

2-2.9.12.1 Starting a New Route

To start a new route, press ![icon], and then select "Record Route." The following screen will appear and be displayed for 5 seconds. It indicates the previous route number, the distance traveled on the previous route, and the time this previous route began.

```
Route 1200
Recorded
                 667.2 mi
10/12/96     12:20 AM
```
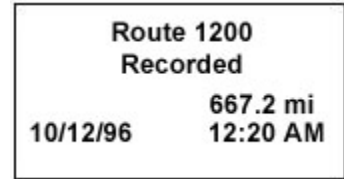
If this feature is OFF, the following screen will be displayed:

```
Route Recording
Off
```
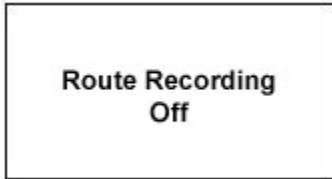
2-2.9.12.2 Entering the New Route Number

When the vehicle is stopped, the following screen will be displayed, asking for a route number.

```
Please Enter Route
Number:     0000
```
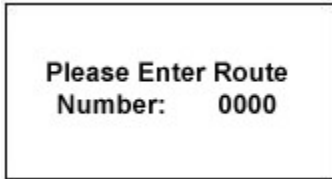
If the vehicle is moving when a new route is started, this screen will immediately appear if Vehicle-in-Motion Lockout is OFF. (Vehicle-in-Motion Lockout can only be turned ON or OFF using INFORM™/INSPEC™ office software.) A passenger may enter the new route number. For safety reasons, the driver should never enter data while driving.

If Vehicle-in-Motion Lockout is ON, this screen will be displayed, but not until after 5 minutes of "vehicle-idle" have passed, or a key on the RoadRelay 4 is pressed while idling.

If you leave without entering a route number, route numbers will be asked for when another route is started, at key-off, and at key-on.

If the entered route number matches a previously entered route number, the user will be asked if this is a new route (as opposed to a continued route).

```
Start New Route?
Yes
```
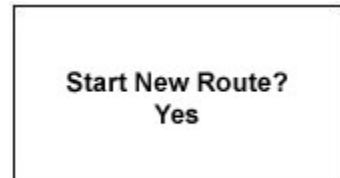
Use ![up] or ![down] to toggle between Yes and No. Press ![enter] to finish.

2-2.9.12.3 Reviewing Route Records

To review the route information saved in the RoadRelay 4, press ![icon]. Select "Review Routes."

Route 1200	12/20/99
Drive	22:12
Idle	2:34
1084.5 mi	157.2 gal

Use ![up] or ![down] to review the routes. To leave, press ![back]. The route information shown is the sum of all records in a route.

The top line shows the route number and date when the route started.

The second and third lines show the amount of time spent driving and idling.

The last line shows the total distance and fuel used on the indicated route.

2-2.9.12.4 Printing Route Records

Connect the printer to the RoadRelay 4. To print route information, press ![icon]. Select "Print Routes." Press ![enter] to print. To leave, press ![back]. The printed report will have a header section with the report title, time of printing, engine serial number, and odometer reading. It will then show all route information, with each route separated by a line of asterisks (*).
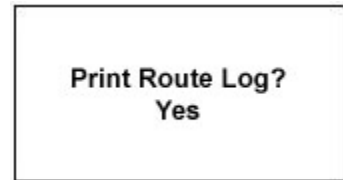
Print Route Log?
Yes

2-2.9.12.5 Resetting Route Records

Press ![icon]. Select "Reset Routes."

Reset Route?
Yes
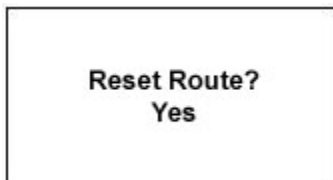
The following screen shows the Reset screen. Answering "Yes" to the prompt will erase all route information. Press ![enter] to reset. Press ![back] to leave this screen and not clear the route log. If the RoadRelay 4 is in "Fleet Mode," you will not be able to reset the information. (Fleet mode can only be turned ON or OFF using INFORM™/INSPEC™ office software.)

2-2.9.12.6 Turning Route Recording On or Off

Press ![icon]. Select "Route Enable."
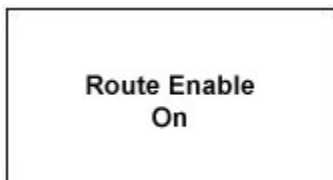
Route Enable
On

Use ![up] or ![down] to change between On and Off. Press ![enter] to save the selection. Press ![back] to leave this screen and not update the choice. If the RoadRelay 4 is in "Fleet Mode," you will not be able to change this setting. (Fleet mode can only be turned ON or OFF using INFORM™/INSPEC™ office software.)

2-2.9.13   Vehicle Monitor

Related sections: Units of Measure, Pop-up GPS Information. Vehicle monitor shows data presently being received by the RoadRelay 4 from the datalink.

Press ⬛. Select "Vehicle Monitor." Use ⬆ or ⬇ to move between the screens.

NOTE: Your screens may not show all the data. If the information is not available, either question marks will be shown or the entire line may be blank.

This screen shows engine rpm, boost pressure, present engine power, and instantaneous fuel economy. On some engines, "Power" may be replaced with "Load" and show percent of engine load.

RPM	1850.0 rpm
Boost Pres	32.3 psi
Power	540.0 hp
Inst Econ	8.2 mpg

This screen shows coolant temperature, oil pressure, oil temperature and battery voltage.

Cool Temp	130.0 F
Oil Pres	82.5 psi
Oil Temp	110.0 F
Battery	??.? V

*In this example, the battery voltage is **not** available from the vehicle and, therefore, is shown as question marks.*

The following screen shows road speed, fuel rate, outside air pressure, and outside air temperature.

Road Speed	70.0 mph
Fuel Rate	17.08 gph
Air Pres	30.1 "Hg
Air Temp	110.0 F

The following screen shows the gears selected and requested. The bottom line shows the temperature of the transmission fluid.

This screen can only be seen on vehicles with automatic transmissions that send this information to the RoadRelay 4. The gear values are sent by the transmission and the displayed gears will vary by transmission manufacturer.

Transmission	
Gear Actual	9
Gear Requested	10
Trans Fluid	105.7 F

The following screen shows the present driver reward level, road speed governor limit, and cruise control limit.

This screen can only be seen on vehicles with the Driver Reward feature on.

DRIVER REWARD STATUS	
Reward Level	2
RoadSpd Gov	68 mph
Cruise Limit	72 mph

The following screen shows the accumulated totals for distance traveled, fuel used, and hours of operation. "ECM" in the first column indicates the total is from the engine control module. "RR4" indicates total is from the RoadRelay 4.

ECM	132356.2 mi
RR4	132102.7 mi
RR4	22390.17 gal
RR4	3308:52 hrs

The RoadRelay 4 GPS system is optional; the following screen will only be shown if the RoadRelay 4 has this option.

```
* Lat:    39 N 12   6
Long:    85 W 58 13
Altitude        663 ft
Heading:  NW    IN
```

The first and second lines show the present latitude and longitude. The asterisk in front of latitude indicates that the RoadRelay 4 presently does not have a valid position fix. In normal operation, the asterisk should only be present when the RoadRelay 4 is first installed and has not had time to find all the satellites.

The third line shows the altitude of the antenna.

The last line shows the present vehicle heading. This heading includes direction and degrees.

NOTE: The heading will be blank until the vehicle has begun moving.

The present jurisdiction is displayed in the right-hand corner. It will show the two-digit postal abbreviation for North American states, provinces, Mexico, or XX if unknown.

2-2.9.14   Fault Information

Related sections: *Printing to Hyperterminal, Printers and Printer Cables for RoadRelay 4*.

2-2.9.14.1 Fault Pop-ups

When a fault occurs for the first time, a pop-up screen will be displayed, warning the driver that a fault condition exists.

Example of fault pop-ups:

```
Water in Fuel
Circuit Failure:
Service Soon.
```

If the engine is a late-model Cummins engine, it will contain fault information and advice on the seriousness of the fault.

If the engine is not a late-model Cummins, the following screen will be displayed:

```
Engine Controller
Water in Fuel indic.
Voltage > Normal
```

2-2.9.14.2 Fault Log

To view fault information, press 🖳, and select "Fault Table." If no faults have been received, you will see the following screen displayed:

```
No Faults
Recorded
```

Otherwise, faults will be listed in the order they occurred, starting with the most recent fault occurrence. Use ⬆ and ⬇ to move between the screens.

Fault code information is provided to help service personnel troubleshoot problems. The fault log will contain a short description of each fault.

Example of fault log screens:

Code 428   Active 1
Water in Fuel
Circuit Failure:
Service Soon.
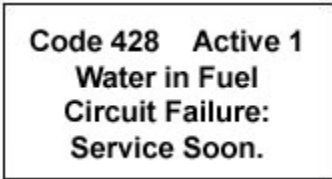
If the engine is a late-model Cummins engine, it will contain a fault code and advice on the seriousness of the fault.

If the engine is not a late-model Cummins, the following screen will be displayed:

PID 97 Active 1
Engine Controller
Water in Fuel indic.
Voltage > Normal
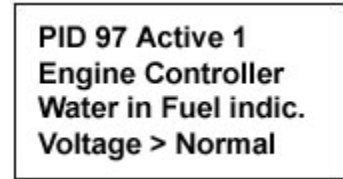
2-2.9.14.3 Resetting the Fault Log
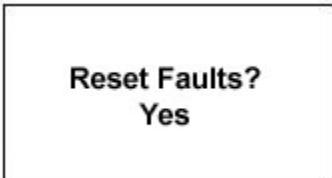
Reset Faults?
Yes

To clear all inactive faults, press [icon] and select "Reset Faults." Press [icon] to reset; press [icon] to leave this screen and not reset faults.

2-2.9.14.4 Printing the Fault Log

Connect the printer to the RoadRelay 4. To print the fault log, press [icon]. Select "Print Faults." Press [icon] to print. To leave this screen, press [icon].
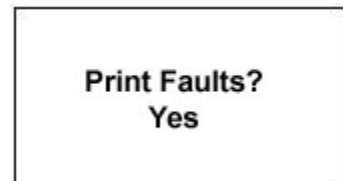
Print Faults?
Yes

The printed report will have a header section with the report title, time of printing, engine serial number, and odometer reading. It will also list all faults with each fault separated by a line of asterisks (*).

2-2.9.15   Preventative Maintenance

Related sections: Service History.

Preventative Maintenance is used to indicate when it is time to perform scheduled maintenance.

2-2.9.15.1 Viewing Preventative Maintenance Schedules

To view the Preventative Maintenance schedules, press [icon]. Select "PM Schedules." There are four schedules. Use [icon] or [icon] to move between the schedules.

PM Schedule 1
Oil Change
5000   of
6000   mi
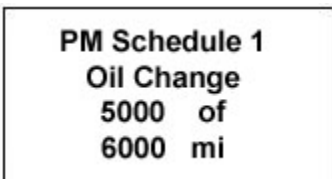
The following screen summarizes the schedule information:

The first line indicates that this schedule 1. An asterisk (*) at the end of the line indicates that the pop-up is ON.

No asterisk would indicate the pop-up is OFF.

The second line shows the schedule title (oil change).

The next two lines show that oil is changed every 6000 miles and 5000 miles have been driven since the last oil change.

If the third line of the display would read "5000 to go" (or similar), instead of "5000 of," that would indicate that there are 5000 miles remaining to be driven until the next oil change is due.

2-2.9.15.2 Preventative Maintenance Schedule Setup

Preventative maintenance schedules are used to alert the driver that it is time to have the vehicle serviced. The RoadRelay 4 has four maintenance schedules that may also be entered using INFORM™/INSPEC™ office software. A maintenance schedule has settings for pop-up on/off, title, duration, base count, and count direction.

PM1 (Oil Change)
PM2 (Tire Change)
PM3 (Brake Change)
PM4 (Fuel Filter)
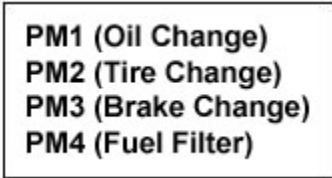
To set up a maintenance schedule, press [icon] and select "Preventative Config." Use [icon] or [icon] to select the schedule you would like to change. Press [icon] to continue. Press [icon] to leave this screen.

Use [icon] or [icon] to turn the pop-up on or off. Press [icon] to continue.

Maintenance
Schedule
Pop-up
On

Use [icon] or [icon] to see all of the preloaded maintenance titles. Press [icon] to select the item. If none of the preloaded titles are appropriate, you may create your own my selecting "Custom." This will put the RoadRelay 4 into a special entry mode for entering a title.

You must fill one line with letters and spaces to finish the title.
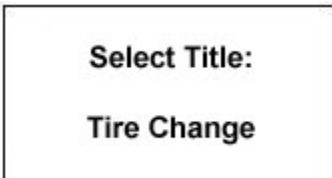
Select Title:

Tire Change

Use [icon] or [icon] to move through the different letters and numbers. If the arrow keys are held down, they will repeat. To change from lowercase to uppercase, or vice versa, press [icon]. To get variants of letters (such as 'e' to 'è' or 'n' to 'ñ'), press [icon] until the correct variant is found. Special characters (%, -, etc.) are variants of spaces.

Enter Title:

Grease Axl_
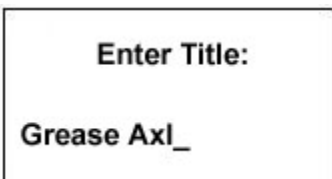
Press [icon] to move to the next letter in the line. Press [icon] to move backward.

You must fill one line with letters and spaces to finish the title.

Next, the interval information is selected. The cursor starts on the "Type" line. Use [icon] and [icon] to move through the different types of intervals. Press [icon] to make a selection. Next, use the numbered keys to enter a range. Press [icon] when finished. Finally, use [icon] and [icon] to select between counting up or down on the "PM Schedules" displayed under the [icon] key. Press [icon] to finish.

Interval
Type: Distance
Range: 3000 mi
Count: Up
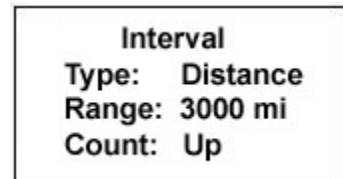
If a maintenance schedule is already running, the title and count direction may be changed without resetting the elapsed count. Changing the maintenance interval type and range will reset the schedule.

2-2.9.15.3 Preventative Maintenance Pop-ups

When a schedule reaches 90% (and every 5% of schedule thereafter), a preventative maintenance pop-up will occur to warn the operator that it is time to schedule maintenance.

```
PM Schedule 2      *
Oil Change
18000         of
20000         mi
```
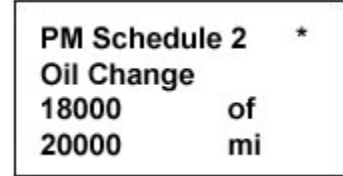
2-2.9.15.4 Resetting a Preventative Maintenance Schedule

To reset a Preventative Maintenance schedule, press ⚒. Select "PM Schedules." There are four schedules. Use ⬆ or ⬇ to move to the schedule to be reset. Press and hold ↵ until you hear a beep from the RoadRelay 4. Or, press ⚒, select "Reset PM Schedules," and select PM1, 2, 3, or 4. Press ↵ to reset.

Press ⬅ to leave this screen and not reset the maintenance schedule.

```
Reset PM?
Yes
```
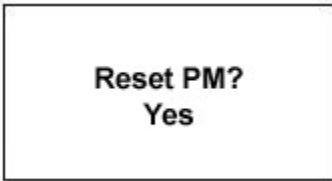
NOTE: Resetting the schedule will cause it to restart and create an entry in the Service History Log.

2-2.9.16   Service History Log

To view the Service History records, press ⚒. Select "Service History."

There can be up to six entries (two per screen).

Use ⬆ or ⬇ to move between the screens. Each record indicates the item serviced, date of service, and odometer reading when serviced. The odometer reading will be from the engine, if available; otherwise, it will be the RoadRelay 4 odometer reading.

```
Engine Oil
7/05/96    123010 mi
Fuel Filter
3/22/96     81729 mi
```
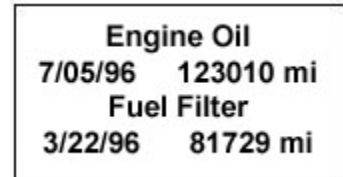
If no service history records are in the log, this screen will be displayed.

```
No Service History
Record
```

2-2.9.17   Parts Information

```
For Engine Parts
Information Call:
1-800-DIESELS
Engine SN: 12345678
```
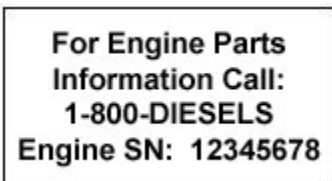
If your coach has a Cummins engine, the following screen can be seen by pressing ⚒, and selecting "Parts Information."

The last line shows the engine serial number.

2-2.9.18   Selecting a Language

Related sections: Using the Keypad.

The RoadRelay provides six languages: English, Spanish, French, Portuguese, Italian, and Finnish. To change the language, press 🔲. Select the language you prefer. After you press 🔲, you will be in the "Help" screens. Press 🔲 to review these screens. To leave, press 🔲.

```
Language:  English   <=
  Idioma:  Espanol
  Langue:  Francais
  Idioma:  Portugues
  Lingua:  Italiano
   Kieli:  Soumi
```

2-2.9.19   Units of Measure

Related sections: Using the Keypad.

The RoadRelay 4 allows the user to select the measurement system desired. Press 🔲 to reach the menu items for selecting units of measure. Most units can be changed to US, UK, Europe, or metric under the "Units" selection. Economy (mpg, mpG, kpl, and lpk) and volume (gallons, imperial gallons, and liters) must be selected separately because of the greater number of choices.

2-2.9.19.1 Units of Measure - US, UK, Europe, or Metric System

Press 🔲, and select "Units." Select desired choice.

```
Units:   US      <=
         UK
         Europe
         Metric
```

US units are miles (mi), miles per hour (mph), horsepower (hp), degrees Fahrenheit (F), and pounds per square inch (psi). US date format is month/day/year. The volume unit is gallons (gal). The economy unit is miles per gallon (mpg). The fuel rate is gallons per hour (gph). The unit for barometric pressure is inches of Mercury (in Hg). The clock is in 12-hour format.

UK units are miles (mi), miles per hour (mph), metric horsepower (PS), degrees Celsius (C), and kilopascals (kPa). UK date format is day/month/year. The volume unit is imperial gallons (Gal). The economy unit is miles per gallon (mpG). Units for barometric pressure is millibars (mb). The clock is in 24-hour format.

Europe units are kilometers (km), kilometers per hour (kph), metric horsepower (PS), degrees Celsius (C), and kilopascals (kPa). Metric date format is day/month/year. The volume unit is liters (lit). The economy unit is kilometers per liter (kpl). The fuel rate is liters per hour (lph). The unit for barometric pressure is inches of Mercury (in Hg). The clock is in 12-hour format.

2-2.9.19.2 Economy Units

Press 🔲, and select "Economy Units." Select desired choice. Choices are miles per gallon (mpg), miles per imperial gallon (mpG), kilometers per liter (kpl), and liters per 100 kilometers (lpk).

```
Economy:  mpg  <=
          mpG
          kpl
          lp100k
```

2-2.9.19.3 Volume Units
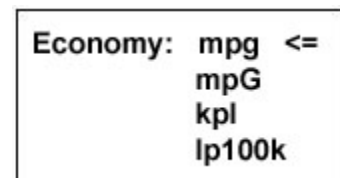
```
Volume:  Gallons  <=
         Liters
Imperial Gallons
```
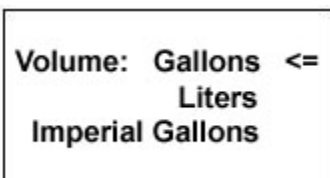
Press 🔲, and select "Volume Units." Select desired choice.

2-2.9.20 Software Version

Press ⬛; select "Software Version." The information on this screen may be useful if making a call to Cummins for support.

```
Software Version
   4.2L00B
   4.3L00A
```
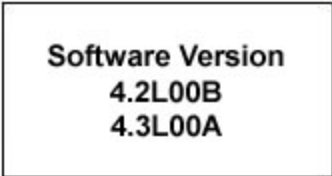
2-2.9.21 Trip Information

Related sections: Driver ID, Leg Information, Printing to Hyperterminal, Printers and Printer Cables for RoadRelay 4.

A "trip" is data collected since the last time the trip information was reset. A trip has more information than a leg. Trip information can be retrieved using INFORM™/INSPEC™ software and is used by managers for analysis.

To see trip information, press ⬛, and select "Trip Information." Trip information will be displayed for the driver currently selected. Use ⬆ or ⬇ to move between the screens. To leave, press ⬅.

```
Trip Information
     125
    1252.1  mi
     6.81   mpg
```

```
    110:23  hrs
    644.5   gal
     44.8   mph
    285.0   hp
```

```
Operation Hours
Drive:  55.25 (51%)
Idle:   54.58 (49%)
PTO:     0.00 ( 0%)
```

```
Operating Fuel gal
Drive:   40.3  (78%)
Idle:     5.1  (22%)
PTO:      0.00 ( 0%)
```

```
      SAFETY
Coast Out of Gear  3
Panic Stops        2
Service Brakes     17
```

```
   OVERSPEED 1
  12:25 (12%) hrs
          133.2 mi
           20.3 gal
```

OVERSPEED 2
10:49 (9%) hrs
123.4 mi
19.5 gal

SWEET SPOT
15:25 (17%) hrs
923.2 mi
20.3 gal

MAXIMUM VALUES
2890 rpm @ 12.0 mph
74.0 mph @ 2430 rpm

COAST
0:25 (2%) hrs
23.2 mi
7.3 gal

ENGINE WEAR
Hot Shutdowns: 2
Warm-up Wear: 0
Derate Time: 0:00

IDLE SHUTDOWNS
Shutdowns: 2
Overrides: 14

ROAD SPEED GOVERNOR
5:25 (2%) hrs
193.2 mi
20.3 gal

```
┌─────────────────────────────┐
│      CRUISE CONTROL         │
│   5:25  ( 2%)  hrs          │
│          923.2  mi          │
│           25.3  gal         │
└─────────────────────────────┘

┌─────────────────────────────┐
│        TOP GEAR             │
│  15:25  (22%)  hrs          │
│          923.2  mi          │
│           29.3  gal         │
└─────────────────────────────┘

┌─────────────────────────────┐
│     NEXT GEAR DOWN          │
│   9:25  (12%)  hrs          │
│          923.2   mi         │
│           13.7   gal        │
└─────────────────────────────┘

┌─────────────────────────────┐
│      SMART POWER            │
│  14:52  (21%)  hrs          │
│          923.2  mi          │
│           18.3  gal         │
└─────────────────────────────┘

┌─────────────────────────────┐
│     ENGINE BRAKES           │
│   1:05  ( 2%)  hrs          │
│           12.2   mi         │
│  Number:  1123              │
└─────────────────────────────┘

┌─────────────────────────────┐
│     SERVICE BRAKES          │
│   0:45  ( 2%)  hrs          │
│            3.2   mi         │
│  Number:  523               │
└─────────────────────────────┘

┌─────────────────────────────┐
│     DRIVER REWARD           │
│  11:25  (12%)  hrs          │
│          823.2  mi          │
│           14.3  gal         │
└─────────────────────────────┘
```

2-2.9.21.1 Resetting Trip Data

Press and hold [⏎] while looking at a trip screen until the RoadRelay 4 beeps, or press [🗔]; select "Reset Trip." Press [⏎] to reset; press [◀] to leave this screen and not reset trip.

If the RoadRelay 4 is in "Fleet Mode," you will not be able to reset the data. (Fleet mode can only be turned ON or OFF using INFORM™/INSPEC™ office software.)

Reset Trip?
Yes
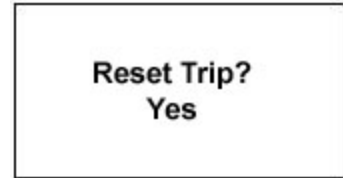
2-2.9.21.2 Printing a Trip Report

Connect the printer to the RoadRelay 4. To print a trip report, press [🗔]. Select "Print Report." Press [⏎] to print. To leave, press [◀].

The printed report will have a header section with the report title, time of printing, engine serial number, and odometer reading. It will show all trip-information screens, each separated by a line of asterisks (*).

Print Trip Report?
Yes

2-2.9.21.3 Driver Messages

No Driver
Messages

Driver messages are entered into the RoadRelay 4 using INFORM™/INSPEC™ office software. To see the messages, press [🗔] and select "Driver Messages."

If there are no messages, you will see the screen at left:

2-2.9.22   Help

Press [❓]. Select the language you prefer. After pressing [⏎], the first "Help" screen will be shown. Use [▲] and [▼] to review these screens. To leave, press [◀].

Language: English < =
Idioma: Espanol
Langue: Francais
Idioma: Portugues
Lingua: Italiano
Kieli: Soumi

ROADRELAY HELP
Press the Down
Arrow to review help
topics.

Steering Wheel (0)
Driver ID, ETA, and
Vehicle Security.

Up Arrow (1)
Menu control, data
selection, and
brightness control.
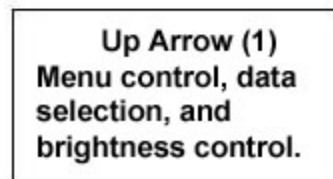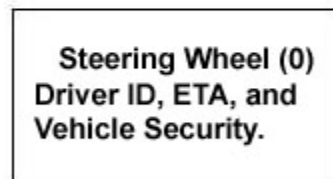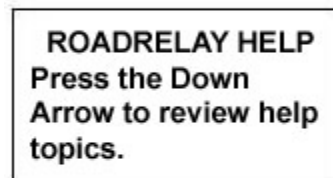
Truck Key (2)
Leg data menu.
Reset leg by holding
the Enter key.

Road Key (3)
Records route data.

Backspace Key
Backs out of screens
or corrects data
entry mistakes.

Wrench Key (4)
Aids in service and
maintenance of the
vehicle.

Configuration (5)
Configures the
RoadRelay.

Pages (6)
Displays trip
information and
driver messages.

Enter/Reset
Accepts data entry.
Hold three seconds
to reset.

```
┌─────────────────────────┐
│  Down Arrow (7)          │
│  Menu control, data      │
│  selection, and          │
│  brightness control.     │
└─────────────────────────┘

┌─────────────────────────┐
│  Question Mark (8)       │
│  Accesses help           │
│  information.            │
└─────────────────────────┘

┌─────────────────────────┐
│  Fuel Pump (9)           │
│  Records data by         │
│  state.                  │
└─────────────────────────┘

┌─────────────────────────┐
│  Numeric Entry           │
│  The numbers on the      │
│  keys are used for       │
│  numeric entry.          │
└─────────────────────────┘

┌─────────────────────────┐
│  For More                │
│  Information Call         │
│  1-800-433-9341          │
└─────────────────────────┘
```
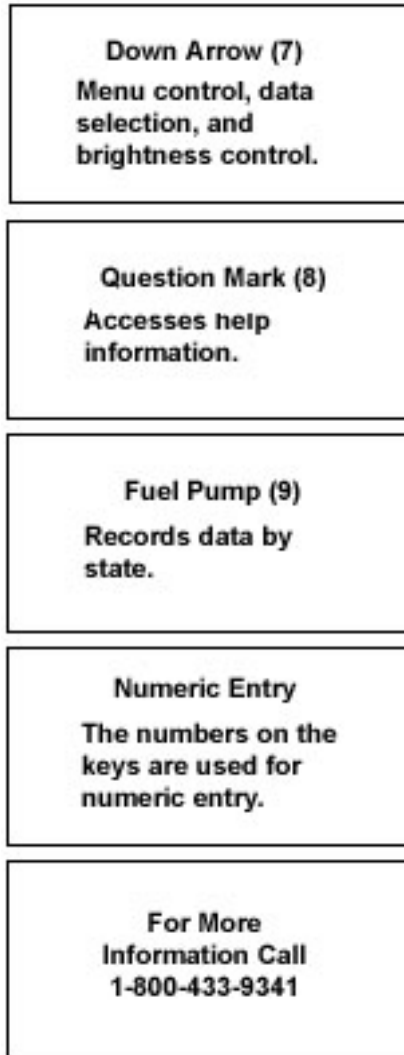
2-2.10 Fuel Tax Information

Related sections: Using the Keypad, Printing to Hyperterminal, Printers and Printer Cables for RoadRelay 4, Units of Measure.

A manual state-line-crossing feature is present in the RoadRelay 4. It can also save fuel purchase information. This information can be used to help with fuel tax records.

2-2.10.1 State Line Crossing

This feature is used to record state line crossings.

NOTE: This feature is not available if the units of measure are "UK" or "Europe."

2-2.10.1.1 Recording a State Line Crossing

To make it easier to calculate state fuel taxes, a manual state-line-crossing feature is present in the RoadRelay 4. When you cross a state line, you must press 🔳. If you are moving, the following screen will appear, displaying distance traveled since the last time 🔳 was pressed. If you are not moving, you may

```
┌──────────────────────────────┐
│       State Line             │
│       Crossing               │
│                              │
│                  267.3 mi.   │
│  Odom:       101303.6 mi     │
└──────────────────────────────┘
```
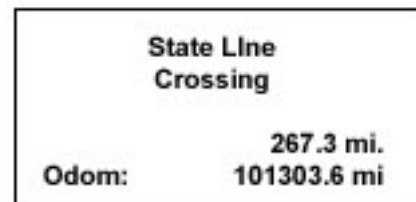
record a state line crossing by pressing [FN], and then selecting "State Line Crossing." This same screen will appear.

2-2.10.1.2 Recording New State Entered

If the vehicle is moving when [FN] is pressed, the following screen will immediately be displayed if Vehicle-in-Motion Lockout is OFF. (*Vehicle-in-Motion Lockout can **only** be turned ON or OFF using INFORM™/INSPEC™ office software*.) A passenger may enter the new state information into the RoadRelay unit.

NOTE: The driver should never enter data while driving.

If Vehicle-in-Motion Lockout is ON, the following screen will be displayed after 5 minutes of "vehicle-idle" have passed, or when a RoadRelay 4 key is pressed while idling. The screen will also be displayed at key-off. *If you do **not** select a jurisdiction at powerdown, you will **not** be asked to enter it again, and it will be marked as "unknown" in the records!*

```
Indiana to:
Indiana            <=
Illinois
Kentucky
Michigan
Ohio
Alabama
```
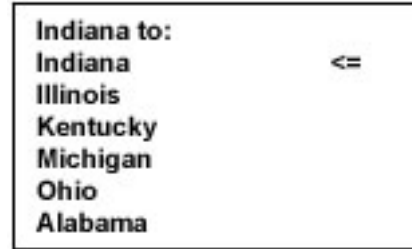
The first line shows the state you are leaving. Use [▲] and [▼] to move through the list of states, provinces, territories, and Mexico. The list has the current state first, followed by all the states next to this state. A full list of all states follows. Press [↵] when you have selected the state you want.

2-2.10.1.3 Reviewing State-Line-Crossing Information

```
Fuel by State            1
Indiana
               146.6 gal
Odom:    165303.6 mi
```
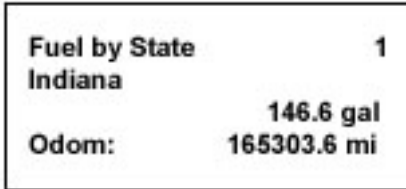
To review state-line-crossing information, press [FN], and select "Review Crossings." Use [▲] and [▼] to review these screens. To leave, press [←].

The top line indicates this is a review of fuel used by state and the record number. The oldest records have the lowest numbers.

The second line shows the jurisdiction for which the data was collected.

The third line shows the distance traveled in the jurisdiction.

The last line shows the odometer value at the time of the crossing.

2-2.10.2 Fuel Purchases

This feature is used to record fuel purchases.

2-2.10.2.1 Recording a Fuel Purchase

Press ▣ and select "Fuel Purchase." Use the keys with numbers to enter the amount of fuel purchased. Press ⏎ to finish.

```
10/12/96            12:20 AM
        Fuel Purchased:
                    000.0 gal
```
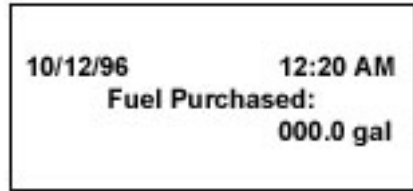
2-2.10.2.2 Recording the Fuel-Purchase State

```
Fuel Purchase In
Indiana              <=
Illinois
Kentucky
Michigan
Ohio
Alabama
```
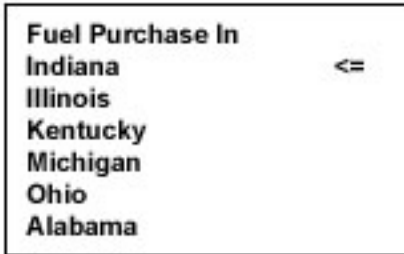
You will then be prompted to enter the state in which you purchased the fuel.

Use ⬆ and ⬇ to move through the list of states, provinces , territories, and Mexico. The list has the present state first, followed by all the states next to this state. A full list of states follows these. Press ⏎ when you have selected the state you want. If you leave this screen without entering anything, it will be marked as "unknown" in the records!

NOTE: This menu will not appear if the units of measure are "UK" or "Europe."

2-2.10.2.3 Reviewing Fuel-Purchase Information

To review fuel-purchase information, press ▣, and select "Review Purchases." Use ⬆ and ⬇ to review these screens. To leave, press ⏎.

```
Fuel Purchase          1
Indiana
                  58.4 gal
11/23/98          11:12 PM
```
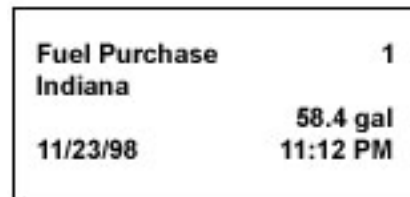
The top line indicates this is a review of fuel purchases and the record number. The oldest records have the lowest numbers.

The second line shows the jurisdiction for which the data was collected.

The third line shows the amount of fuel purchased in the jurisdiction.

The last line shows the time of the purchase.

2-2.10.3 Printing Fuel Tax Records

Connect the printer to RoadRelay 4. To print fuel tax information, press ▣. Select "Print Fuel Log." Press ⏎ to print. To leave, press ⏎.
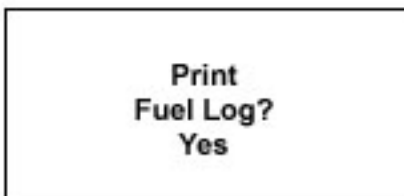
```
Print
Fuel Log?
Yes
```

The printed report will have a header section with the report title, time of printing, engine serial number, and odometer reading. It will then show all state-line-crossing information and fuel purchases, each separated by a line of asterisks(*).

2-2.10.4 Resetting Fuel Tax Records
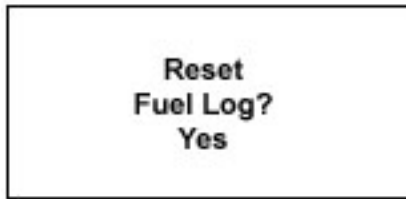
Press [icon]; select "Reset Fuel Log." This reset will erase all state-line-crossing and fuel-purchase information. Press [icon] to reset. To leave this screen and **not** clear the fuel log, press [icon]. *If the RoadRelay 4 is in "Fleet Mode," you will not be able to reset the information. (Fleet mode can only be turned ON or OFF using INFORM™/INSPEC™ office software.)*

2-2.10.5 Jurisdiction Crossing Reminder

The RoadRelay GPS system is optional. This feature will only be available if the RoadRelay 4 has this option. If you would like to be reminded when a jurisdiction crossing occurs, press [icon]. Select "Jurisdiction Pop-up." Use [icon] or [icon] to select ON or OFF. Press [icon] to finish.
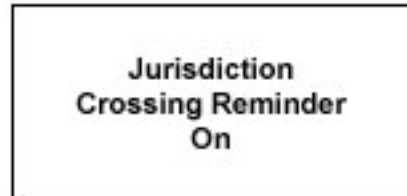
If the state jurisdiction reminder is on, the following pop-up screen will be shown when a jurisdiction crossing is detected. You will also hear a double beep from the RoadRelay 4.

2-2.11 Setting Transmission Type

Related sections: Coaching Pop-ups.

NOTE: This setting does not affect the transmission in any way; it tells the RoadRelay 4 what type of transmission is present. It also prevents coaching pop-ups for automatic transmissions. For TOP 2 transmissions, it prevents pop-ups while in the top two gears.

To select a transmission type, press [icon]. Select "Transmission Type." Use [icon] or [icon] to select "Manual," "Top 2," or "Automatic." Press [icon] to finish. To leave without saving changes, press [icon].

2-2.12 Road Speed Recorder

This feature is for the recording of accident data. To record the road speed, engine speed, brake activity, and clutch activity, press and hold the [icon] and [icon] keys at the same time, for three seconds.
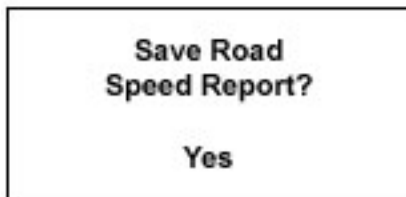
The following screen will appear, asking if you really want to record the information. Use [icon] or [icon] to select Yes or No. Press [icon] to finish.

If you select Yes and the vehicle is moving, the previous 60 seconds and the next 15 seconds of information are stored. If the vehicle is stopped, information is stored for the 60 seconds before stopping and for the 15 seconds after stopping the vehicle.

While the information is being stored, you will see the screen at right and hear a siren-like sound. The information can **only** be seen using INFORM™/INSPEC™ office software.
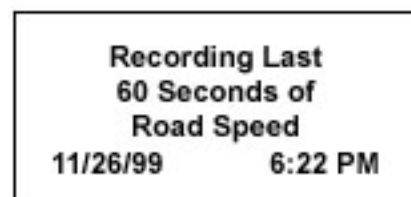
2-2.13 Pop-ups

Pop-ups are seen when the driver may need to be warned of certain events.

2-2.13.1 Coaching Pop-ups

Related sections: *Setting Transmission Type*.

Coaching pop-ups are used to help the driver operate the vehicle in a more economical and safe manner.

2-2.13.1.1 Shift Reminder

All engines have an rpm zone in which it gets the best fuel economy. Shift reminder can be used to remind the driver that it is time to shift up or down to remain in this range.

2-2.13.1.2 Setting Up Shift Reminder
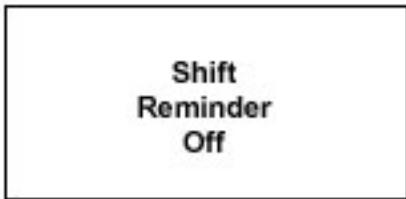
Press [icon]. Select "Shift Reminder." Use [icon] or [icon] to change between On and Off. Press [icon] to save the selection. Press [icon] to leave this screen and not update the choice.

If the RoadRelay 4 is in "Fleet Mode," you will not be able to change this coaching pop-up setup. (Fleet mode can only be turned ON or OFF using INFORM/INSPEC office software.)

Next, the engine rpm at which to shift down is entered. Use the keys with numbers to enter the desired shift-down rpm. Press [icon] to save the selection. Press [icon] to leave this screen and not update the shift reminder rpm.
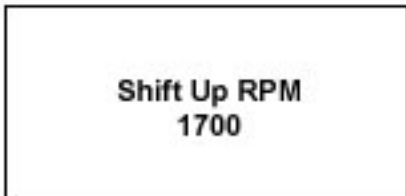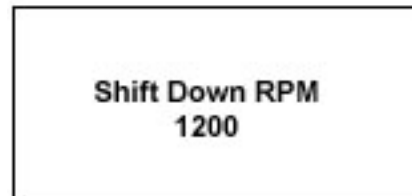
Use the keys with numbers to enter the desired shift-up rpm. Press [icon] to save the selection. Press [icon] to leave this screen and not update the shift reminder rpm.

2-2.13.1.3 Shift Reminder Pop-ups

After the shift reminder has been enabled and engine rpms have been entered, the following pop-ups may occur.

This pop-up appears when the engine is operating above the shift-down rpm. Staying below this rpm improves fuel economy.
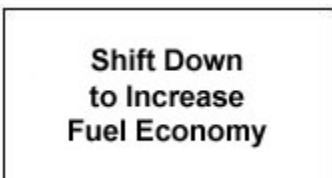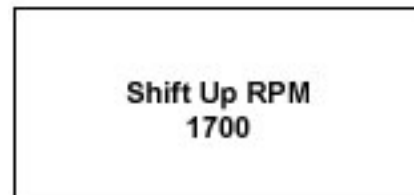
This pop-up appears when the engine is operating below the shift-down rpm. Staying above this rpm improves fuel economy.

2-2.13.2 Vehicle Over Speed

Vehicle over speed is used to warn the driver when the vehicle is moving too fast. Driving too fast may be an unsafe condition.

2-2.13.2.1 Setting Up Vehicle Over Speed

Press [⌨]. Select "Over Speed." Use [▲] or [▼] to change between On and Off. Press [⏎] to save the selection. Press [◀] to leave this screen and **not** update the choice.

> **Over Speed Indicator Off**

*Turning the pop-up OFF does not prevent an over speed occurrence from being recorded in trip data. If the RoadRelay 4 is in "Fleet Mode," you will **not** be able to change this coaching pop-up setup. (Fleet mode can **only** be turned ON or OFF using INFORM™/INSPEC™ office software.)*

Over speed 1 is the speed at which the warning pop-up occurs. Use the keys with numbers to enter the desired speed. Press [⏎] to save the selection. Press the [⏎] to leave this screen and **not** update the speed.

> **Over Speed 1 Threshold 62 mph**

> **Over Speed 2 Threshold 65 mph**
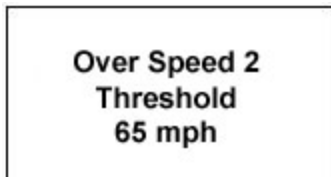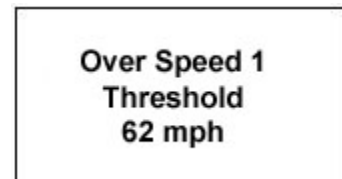
No pop-up occurs when this speed is reached. The time spent above this speed is part of the recorded trip information. Use the keys with numbers to enter the desired speed. Press [⏎] to save the selection. Press [⏎] to leave this screen and **not** update the speed.

2-2.13.2.2 Vehicle Over Speed Pop-Up

Press [⌨]. Select "Over RPM." This pop-up appears when the vehicle is moving faster than the over speed 1 setting.

> **Vehicle Speed Over 62 MPH**
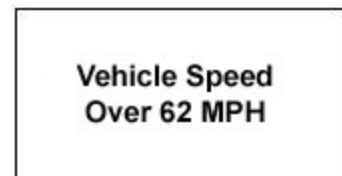
2-2.13.2.3 Engine Over RPM

The engine over rpm coaching pop-up is used to warn the driver when the engine is being run too fast. Over revving the engine can damage it.

2-2.13.2.4 Setting Up Engine Over RPM

Press [⌨]. Select "Over RPM." Use [▲] or [▼] to change between On and Off. Press [⏎] to save the selection. Press [◀] to leave this screen and **not** update the choice.

> **Over RPM Indicator Off**
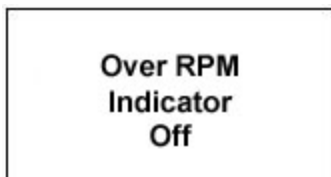
*Turning the pop-up OFF does not prevent an over rpm occurrence from being recorded in trip data. If the RoadRelay 4 is in "Fleet Mode," you will not be able to change this coaching pop-up setup. (Fleet mode can **only** be turned ON and OFF using INFORM™/INSPEC™ office software.)*

The entered number is the rpm at which the warning pop-up occurs. Use the keys with numbers to enter the desired speed. Press ⏎ to save the selection. Press ⬅ to leave this screen and not update the speed.

```
   Over RPM
     2400
```
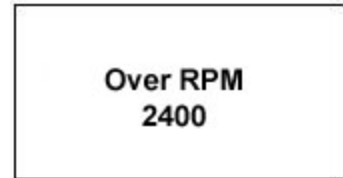
2-2.13.2.5 Engine Over RPM Pop-Up

```
  Engine Speed
 Over 2300 RPM
```
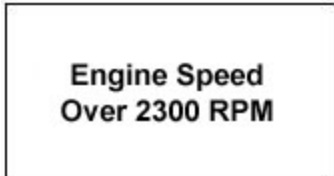
This pop-up appears when the engine is going faster than recommended.

2-2.13.2.6 Other Driver Coaching Pop-Ups

This pop-up screen will be displayed while the engine is too cold to be driven. When the engine has warmed, this screen will go away. Revving or loading the engine while it is cold may reduce its useful life.

```
 Engine Warming Up
    Please Wait
```

```
    Turn On
  Engine Brake
  to Increase
Service Brake Life
```
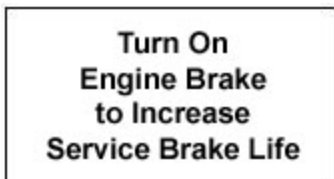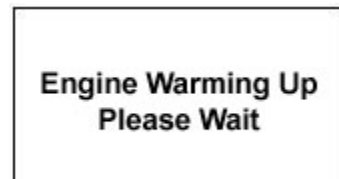
This pop-up is displayed when service brakes are applied on an engine-brake-equipped vehicle, and the engine brakes are currently **not** being used. The use of engine brake reduces the amount of wear on the service brakes.

2-2.13.3 Informational Pop-Ups

Informational pop-ups tell the driver when the engine is using Electronic Smart Power (ESP) or has changed the reward level.

2-2.13.3.1 Driver Reward

The driver reward feature seeks to modify driver behavior by rewarding desirable habits (low percentage of idle time, high percentage of top gear time, high mpg, etc.)

The rewards are in the form of an increase in the maximum allowable road speed and a decrease in the speed change required to cause ESP to transition to a high torque curve. These rewards may be applied individually or together, at the owner's discretion.

2-2.13.3.2 Turning Driver Reward Pop-Up On or Off

```
Driver Reward
  Indicator
     On
```

Press ⌨. Select "Driver Reward." Use ⬆ or ⬇ to change between On and Off. Press ⏎ to save the selection. Press ⬅ to leave this screen and **not** update the choice.

2-2.13.3.3 Driver Reward Pop-Up

This pop-up indicates that the reward level has changed.

Level 1 is the highest reward level. Level 4 is the lowest reward level.

```
 Driver Reward
     Level
       2
```
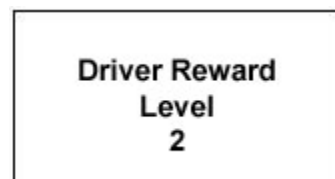
2-2.13.3.4 Electronic Smart Power (ESP)

ESP engine ratings were designed for improved drivability performance in hilly terrain. ESP ratings have a control logic that operates the engine at a base power rating while driving on near-level roads and switches to a high torque ESP mode when operating on steep grades. The improved drivability in hilly terrain results in more consistent road speed, faster trip times, less downshifting, and better driver satisfaction.

2-2.13.3.5 Turning ESP Pop-Up On or Off

Press ⌨. Select "ESP Pop-Up." Use ⬆ or ⬇ to change between On and Off. Press ⏎ to save the selection. Press ⬅ to leave this screen and not update the choice.

ESP
Indicator
On

2-2.13.3.6 ESP Pop-Up

Smart Power On
520 HP
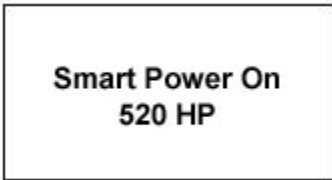
This pop-up indicates that ESP has been enabled.

2-2-13.4 Driver Alert Pop-Ups

Driver alert messages are displayed when the RoadRelay 4 receives a message on the datalink to display a driver alert pop-up. These messages are stored in the RoadRelay 4 and entered using INFORM™/INSPEC™ office software.

2-2.13.5 Cruise Set-Speed Pop-Ups

When the cruise control set-speed is changed, the following screen will be shown:

Cruise Set Speed
72 mph
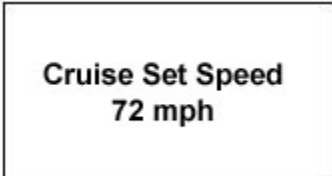
2-2.13.6 Other Pop-Ups
2-2.13.6.1 Memory Usage Pop-Ups

The following pop-up screens indicate that RoadRelay 4 information storage for the indicated feature is 90%, or more, full.

This is a warning that you **must** remove data soon or data can be lost.
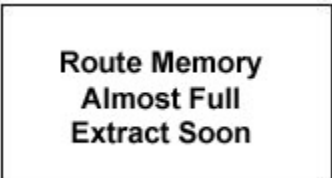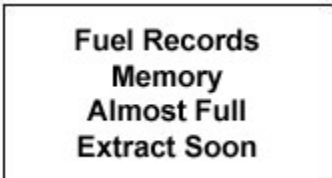
Fuel Records
Memory
Almost Full
Extract Soon

Route Memory
Almost Full
Extract Soon

The following pop-up screens indicate that RoadRelay 4 information storage for the indicated feature is full and some data has been lost.

Fuel Records
Memory Full
Data Lost

Route
Memory Full
Data Lost
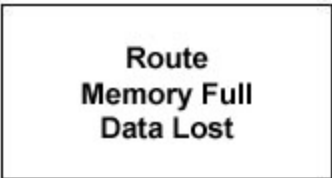
2-2.13.6.2 RoadRelay

This pop-up screen indicates a defect in the RoadRelay 4. Return the unit for repair.

RoadRelay
Failure

2-2.13.6.3 Datalink
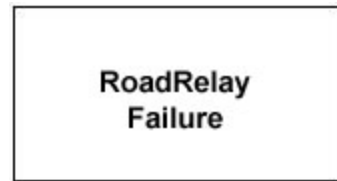
RoadRelay
Data Link Failure

This pop-up screen indicates that no data has been received by the RoadRelay 4 during the last 30 seconds from the engine. This failure indicates something is wrong with the engine electronics, wiring to the RoadRelay 4, or possibly the RoadRelay 4 itself. Verify that all wires are attached correctly and that the engine electronics have power.

This screen indicates a problem with the connection between the RoadRelay 4 and the engine. This failure indicates something is wrong with the engine electronics, wiring to the RoadRelay 4, or possibly the RoadRelay 4 itself. Verify that all wires are attached correctly.

Improper
Data Link
Connection

2-2.13.6.4 GPS Information

GPS
Antenna
Blocked
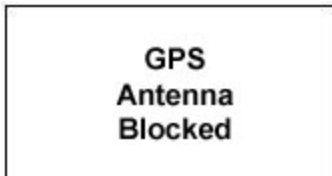
If the GPS has not been able to get a position fix during the last 15 miles, then this pop-up screen will be displayed. Verify that the antenna is clear and still attached to the RoadRelay 4.

When the GPS unit is able to get a position fix after having the antenna blocked, RoadRelay 4 will display the following pop-up screen. The GPS unit may need a few minutes to get a new fix after the antenna is no longer blocked.

GPS
Working
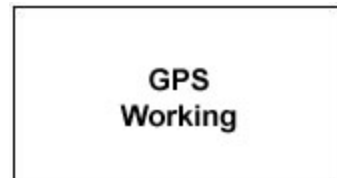
2-2.13.6.5 Backup Power Connection

No Power
From
Backup Battery
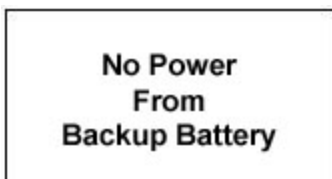
If this screen is displayed, the backup battery inside the RoadRelay 4 (which is not replaceable) is not connected or is dead. Verify that all wires are properly connected to the RoadRelay 4. All data is lost when this error occurs.

2-2.14 Printing to Hyperterminal

Hyperterminal is a program included with the Windows™ operating system. It is a communications program that will allow you to download the RoadRelay information to your PC using an extraction harness and serial cable. You can then generate printed reports of the RoadRelay 4 data using the downloaded electronic files.

To connect the RoadRelay 4 to the PC, you will need a RoadRelay extraction harness (Cummins Part Number 4003775) and a serial cable to connect to your PC. The extraction harness has a female, 9-pin DB connector. You **must** acquire the extraction harness and serial cable elsewhere. They are **not** included with the RoadRelay 4 unit.

To launch Hyperterminal:

1. Select Start|Programs|Accessories|Hyperterminal|HyperTerminal.
2. The program will ask for a name. Enter the desired file name.
3. You will then be asked to select a serial port to which to connect. Choose the appropriate port.
4. Then set the port settings as follows:
   9600 Bits per second; 8 Data bits, Parity None; Stop bits 1; and Flow control None.

After connecting the cables and starting Hyperterminal, you can copy the data from the RoadRelay 4 to your PC. The output will appear in the Hyperterminal window. Save the file by selecting File|Save As; then name the file appropriately to its contents; for example. "RR4data.txt."

2-2.15 Environmental Information

The RoadRelay 4 is designed to operate within a temperature range of -40° to 85°C [-40° to 185°F].

It will operate from a voltage supply of 7.5 to 40 VDC.

2-2.16 Cleaning the RoadRelay 4

*Do **not** use petroleum-based solvents or cleaners. Do **not** use abrasive cleansers or materials on the faceplate. They can cause scratches.*

Most standard household cleaners are suitable for use on the RoadRelay 4.

2-2.17 Troubleshooting and Technical Support

Related sections: [Software Version](#).

Always check all wiring to the RoadRelay 4 if you are having problems. ***Do not open the RoadRelay 4. Doing so will void any warranty you may have.*** The RoadRelay 4 has no user-serviceable parts.

If you believe the unit is properly wired and still not working, call Technical Support at 1-800-433-9341 in the USA and Canada, 0 800-286646 in the UK, +1-812-377-8136 for international calls.

To make your call go as smoothly as possible, please have the following information handy when you call:
- Make and model of the vehicle in which the RoadRelay 4 is installed.
- Engine type (for example, '91 Cummins N14)
- Software version of your RoadRelay 4
- Transmission type
- Any electronic systems on the vehicle (for example, ABS).

2-2.18 Warranty

2-2.18.1 COVERAGE

Products Warranted
This warranty applies to New RoadRelay™, INRANGE™, and INFORM™/INSPEC™ Products (Products) sold by Cummins Engine Company, Inc. (hereinafter 'Cummins') and delivered to the first user on or after October 23, 1998, anywhere in the world where Cummins-approved service is available*.

Base Warranty
The Base Warranty covers any failure of the Products that results, under normal use and service, from defects in material or workmanship (Warrantable Failure). This Coverage begins with the sale of the Product by Cummins and ends 1 (one) year from the date of delivery of the Products to the first user.

Consumer Products
This warranty on Consumer Products in the United States is a **LIMITED** warranty. **CUMMINS IS NOT RESPONSIBLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.** Any implied warranties applicable to Consumer Products in the United States terminate concurrently with the expiration of the express warranties applicable to such products. In the United States, some states do **not** allow the exclusion of incidental or consequential damages, or limitations on how long an implied warranty lasts, so the limitations or exclusions herein may **not** apply to you.

This warranty is made to the first Owner in the chain of distribution, and Coverage continues until the end of the period of Coverage.

2-2.18.2 Cummins Responsibilities

During the Base Warranty
Cummins will pay for all parts and labor needed to repair the damage to the Products resulting from a Warrantable Failure.

Cummins will pay for the Products including, but **not** limited to: Associated harnesses and installation materials, RoadRelay™, Lightbox, Scrolling Message Sign, Bravo Box, Reporgramming Tools, INRANGE™ Data Link and Trailer Tags, and INFORM™/INSPEC™ Dongle that are not reusable due to the Warrantable Failure.

Cummins warrants that the CD-ROM and disk containing the Licensed Software shall be free from defects in material or workmanship for a period of ninety (90) days from the date of delivery to Licensee. Cummins also warrants that the Licensed Software shall be delivered free of any rightful claim of infringement of any copyright, trademark, trade secret, or other proprietary right of any third party.

In the event the engine does not start because of a malfunction of the Cummins Antitheft feature anytime during the warranty period, Cummins will repair or replace the feature when the vehicle is brought to an authorized Cummins Repair Facility or a mechanic, authorized by Cummins, visits the vehicle. This is Cummins sole obligation and your sole remedy.

2-2.18.3 Owner Responsibilities

During the Base Warranty
Owner **must** deliver the Products to the repair location.

Owner is responsible for the cost of the Products provided during warranty repairs unless such items are **not** reusable due to the Warrantable Failure.

At the time when the parts are installed, Owner is responsible for the preparation of a written record containing the following:
1. The date of installation of the Product(s)
2. The engine serial number
3. The engine miles, kilometers, or hours of operation
4. The Product(s) installed
5. The location of the Product(s) in the application.

The purpose of this record is to protect Owner's interests and support any claim for a Warrantable Failure.

Owner is responsible for the operation and maintenance of the Products as specified in the applicable User's Guide. Owner is also responsible for providing proof that all recommended maintenance has been performed.

Before the expiration of the warranty, Owner must notify a Cummins Distributor, Authorized Dealer, or other repair location* approved by Cummins of any Warrantable Failure, and deliver the Products to such facility for repair.

Owner is responsible for communication expenses, meals, lodging, and similar costs incurred as a result of a Warrantable Failure.

Owner is responsible for non-Product repairs and for "downtime" expenses, passenger delays, cargo damage, fines, all applicable taxes, all business costs, and other losses resulting from a Warrantable Failure.

Owner is responsible for Antitheft Feature repairs due to incorrect passwords, including lack of RoadRelay™ display caused by use of the RoadRelay™ outside of specific operating temperatures.

LIMITATIONS
The Licensed Software and any and all updates thereto are licensed "As Is" with the exception of the warranties specifically provided herein. Cummins does not claim and does not warrant that the Licensed Software will run error-free. WITH THE EXCEPTION OF THE WARRANTIES PROVIDED HEREIN, CUMMINS DISCLAIMS ALL WARRANTIES, EITHER EXPRESS OR IMPLIED, REGARDING THE LICENSED SOFTWARE, ITS MERCHANTABILITY OR ITS FITNESS FOR ANY PARTICULAR PURPOSE, AND CUMMINS WILL NOT OTHERWISE BE LIABLE FOR INDIRECT, INCIDENTAL, OR INCONSEQUENTIAL DAMAGES RESULTING FROM LICENSEES USE OF THE LICENSED SOFTWARE INCLUDING WITHOUT LIMITATION, ANY DAMAGE TO ELECTRONIC CONTROL MODULES, COMPUTERS OR ASSOCIATED EQUIPMENT, OR FOR ANY ERROR OR DEFECT IN THE LICENSED SOFTWARE. CUMMINS SOLE AND EXCLUSIVE LIABILITY SHALL NOT EXCEED THE TOTAL AGGREGATE PAYMENTS BY LICENSEE TO CUMMINS WITH RESPECT TO THE LICENSED SOFTWARE.

Cummins is **not** responsible for radio frequency interference.

Cummins is **not** responsilble for failures or damage resulting from what Cummins determines to be abuse, neglect, including, but not limited to: incorrect operation and maintenance as stated in the appropriate user's guide and installation guide, use of cleaners other than a moist cloth to clean RoadRelay™ keypads, displays, and enclosures.

This warranty does **not** apply to Products that bear the name of another company.

The Product(s) and parts used to repair a Warrantable Failure may be new Cummins parts, Cummins-approved rebuilt parts, or repaired parts. Cummins is **not** responsible for failures resulting from the use of parts **not** approved by Cummins.

A new Cummins or Cummins-approved rebuilt part used to repair a Warrantable Failure assumes the identity of the part it replaced and is entitled to the remaining coverage hereunder.

For warranty purposes, parts used in a warrantable repair assume the identity of the parts they replace.

CUMMINS DOES NOT COVER WEAR OR WEAROUT OF COVERED PARTS.

CUMMINS IS NOT RESPONSBILE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

CUMMINS ENGINE COMPANY MAKES NO OTHER REPRESENTATION OR WARRANTY, EXPRESS OR IMPLIED, INCLUDING NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. UNDER NO CIRCUMSTANCES WILL CUMMINS ENGINE COMPANY BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL, OR PUNITIVE DAMAGES, INCLUDING WITHOUT LIMITATION LOST PROFITS OR INCOME, DAMAGE TO FREIGHT, AND LIVING OR TRAVEL EXPENSES, IN THE EVENT OF THEFT, OR IF THE ANTITHEFT FEATURE PREVENTS THE ENGINE FROM STARTING FOR ANY REASON, INCLUDING CUMMINS OWN NEGLIGENCE.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

In case of consumer sales, in some countries the Owner has statutory rights that cannot be affected or limited by the terms of this warranty.

Nothing in this warranty excludes or restricts any contractual rights the Owner may have against third parties.

*Locations in the United States and Canada are listed in the Cummins United States and Canada Sales and Service Directory; other locations are listed in the Cummins International Sales and Service Directory. You can also find service locations for the United States, Canada and Internationally by going to: ***http://www.cummins.com/service_locator/index.cfm***.

2-2.19 Printers and Printer Cables for RoadRelay 4

This section explains the cabling requirements for the small printers commonly used with heavy-duty electronic tools: The WeightTronix and MPSI Seiko printers.

To connect the RoadRelay 4 to a printer, you will need a RoadRelay extraction harness (Cummins Part Number 4003775) and a printer cable from the following table.

Change the dipswitch settings on the Seiko printer from the factory defaults to the following:

Switch#	1	2	3	4	5	6
Default	on	on	on	of	on	off
Set to:	on	on	on	off	off*	off

Switch#	1	2	3	4	5	6	7	8
Default	off	on	on	on	off	on	on	on
Set to:	off	off	on	on	on	off	on	on

*Turning this switch off changes the printer from 2400 to 9600 bps, which is the required RoadRelay interface.

(These settings are the same as specified by Echek™ and Compulink™.)

2-2.19.1 RoadRelay 4 Printer Cabling Specifications

Printer	Cable Options for Connection to RoadRelay 4
WeighTronix Part No. 3824120	Service Products Cable: DB 9-pin male to DB 25-pin female Part No. 3824650
Seiko/MPSI Pro-Link Part No. 3824787	Service Products Cable: DB 9-pin male to DB 25-pin female Part No. 3824707

Pin Out for Service Products Cable Part No. 3824707:

DB 9-pin male	Signal	DB 25-pin male
Pin 3	RR Receive	Pin 2
Pin 2	RR Transmit	Pin 3
Pin 5	Signal Ground	Pin 7

Pin Out for Service Products Cable Part No. 3824650:

DB 9-pin male	Signal	DB 25-pin female
Pin 3	RR Receive	Pin 2
Pin 2	RR Transmit	Pin 3
Pin 5	Signal Ground	Pin 7
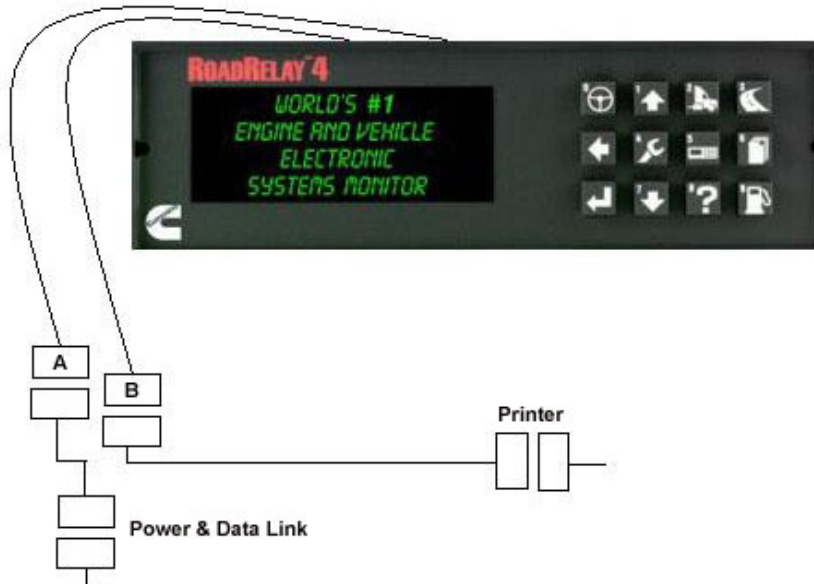
*3-1 Engine*_____

The M380 Motor Home is equipped with a Cummins ISL 400 HP @ 2000 RPM engine. This is a four cycle, in line turbo/air to air charger cooled engine. It has six cylinders and the stroke and bore is 4.49 x 5.69, with a displacement of 543 cubic inches (8.9 liters) and a compression ratio of 16.6:1.

For more specifications see below:

Maximum (net) BHP @ RPM – 400 HP (373KW)/2000

Maximum (net) Torque @ RPM – 1200 lb. ft. @ 1300

Maximum Governor RPM – Load 2200 RPM, No load 2330 RPM

Governor – Electronic

Crankcase Capacity – Dry 29 quarts

Cooling System Capacity – 72 quarts – includes:
- Engine
- Radiator
- Heater/Defroster
- Hurricane Heat System & all pipes

Water Pump Capacity @ Engine RPM – 83 gallons per minute @ 2200.

Air Filter – Dry type – FARR ECO-SM 99842-007, single storage, disposable canister.

Transmission – Allison 3000 MH electronic 6 speed World transmission.

Gears	Ratios
First	3.49
Second	1.86
Third	1.41
Fourth	1.00
Fifth	.75
Sixth	.65
Reverse	5.03
Torque Converter	TC – 421 – 1.77 stall ratio
Lubricant Capacity	29 qt. refill
Bell house size	SAE #2
Drive line	SPL 170 Spicer

Turning Radius

*Curb Radius – 29.7 ft.

**Wall Radius – 35 ft.

Curb radius is the minimum radius of turn to the outside edge of the front tire.
**Wall radius is the minimum radius of turn to the outside edge of the front bumper.*

3-1.1 Starting Engine

Cummins diesel engines will start at temperatures above 10 degrees Fahrenheit (-12 degrees Celsius) without using a starting aid. However, for cold temperatures it will be helpful to activate the engine block heater (120 volt AC-operated). A switch located in the kitchen base cabinet controls the ENGINE BLOCK HEATER. Remember to turn the switch OFF after starting. Refer to the engine's manual in your owner's kit for full starting instructions.

When outside temperature is below 35 degrees Fahrenheit (+2 degrees Celsius), turn on the ignition switch for a minimum of 10 minutes so that the Racor fuel filter heater element can warm the fuel before starting the engine.

1. As soon as the engine starts, reduce engine speed to low idle. After normal oil pressure is indicated, HIGH IDLE may be used to build up air pressure more rapidly.
2. Do not apply a load to the engine or increase engine speed until the oil pressure gauge indicates normal.
3. Operate the engine at low load until all systems reach operating temperatures. Check all gauges during warm-up period.

3-1.1.1   Remote Engine Starting

Because it may sometimes be necessary to start the diesel engine remotely, a separate switch is located on the right side of the engine compartment. Toggle switch must be down (REAR) to start from the engine compartment. Engine won't start from front with rear engine door open. Front ignition key must be on to start from rear.

3-1.1.2   Starting Engine Using Auxiliary Battery Switch on Dash

With the Ignition switch in the Off position, the chassis (cranking batteries) are automatically disconnected from chassis loads, when the battery voltage decreases to ≈ 12.5V. Headlights and landing lights will not work. To crank the engine in this situation, use the Momentary On switch located in the bottom position of the AUX. BAT switch. *See Section 2-1.4 AUX. BAT* *switch for more details*.

NOTE: The Chassis Battery Bank is disconnected from the House Battery Bank with a voltage sensing relay; the 12.5V ensures the engine batteries can still crank the engine.

Loads connected to the House battery bank can continue to function, however, if the House battery voltage is discharged to a level that the engine will not crank (≈ 8.0V) then use the following procedure:

1. Set the Ignition switch to the Off position.
2. Momentarily press the bottom position of the Auxiliary Battery Switch (AUX. BAT).
    This will close the voltage sensing relay contacts for eight (8) seconds.
3. Set the Ignition switch to the Crank position to start the engine.
4. If the engine does not start, repeat steps 1-3 above.

3-1.2 Stopping Engine

⚠ **CAUTION: Before stopping the engine, operate at low idle for a minimum of two minutes. This allows hot areas in the engine to cool gradually and extend engine life.**

3-1.3 Cruise Control

Cruise control is operated much the same as normal vehicle cruise control. A set of switches located on the driver's left-hand side under window operates the cruise control. Press the first one marked cruise to turn cruise control on, when you have engine at the speed desired press the button marked set. If you have to slow down or speed up simply press the resume button. *Refer to photo at right*.
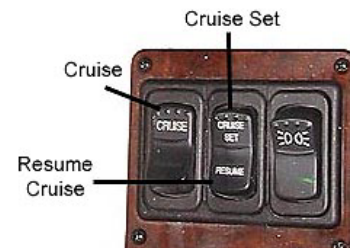
3-1.3.1 High Idle

When the engine is cold, the engine can be placed in the high idle state by turning on the cruise control and increasing the engine RPM to 1200 RPM.
This can also be achieved while you are sitting
with engine running but not in gear.

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*3-2 Towing*_____

3-2.1 Receiver Type Trailer Hitch

This is a 10,000 pounds rated capacity and 1,000 pounds tongue weight capacity receiver type hitch.

When using the rear hitch remember that the motor home is intended for towing light loads. The motor home is designed to be used primarily as a recreational vehicle, towing will affect durability and economy. Your safety and satisfaction require proper use. Avoid excessive loads or any other abuse. Do not use the motor home to tow anything until it has been driven 500 miles (800 kilometers). Weight pushing down on the rear hitch must not exceed 1,000 pounds. We recommend weighing the motor home, as it will be operated to be certain that there is proper weight distribution. When weighing the motor home be sure to take the passenger locations into consideration. Total weight of the motor home and any vehicle towed by it must not exceed the GCWR.

▲WARNING: Any trailer being towed by the motor home must have adequate brakes. Failure to follow these instructions will create a safety hazard and may result in an accident.

3-2.2 Trailer Draw Bar Hitch

Removable receiver type draw bar with a 2" diameter chrome hitch ball. The 2" ball provided is rated at 5,000 pounds.

3-2.3 Trailer Plug

The female receptacle is installed in the rear of the motor home and wired into the electrical system. The male portion is supplied loose in the motor home for installation by the owner on the tow with separate signals vehicle. The wiring is a five-wire system for turn signals and brakes with 4-wire adapter installed.

The tow harness wires are color-coded:
1. Brown, 12 gauge – tail lights
2. White, 12 gauge – ground
3. Black, 14 gauge – right turn signal
4. Yellow, 14 gauge – left turn signal
5. Black w/white stripes, 14 gauge – brake light.

3-2.4 Tow Hooks

Two tow eyes are located at the front of the motor home. Removable tow hooks are stored on generator tray in front of motor home. Insert hooks into receivers and secure with pins provided.

NOTE: If towing a vehicle from tow hooks generator door panel must be removed prior to towing.

3-2.5 Having Your Motor Home Towed

3-2.5.1   Towing Procedures

It is recommended that if a towing company is called make sure they use a stinger (an arm that goes under motor home and hooks to front cross member).

The towing company may need to locate the air nipple to release the air brakes. The air nipple is located in the outside roadside front electrical compartment and should only be used by towing personnel. If the motor home ever needs to be towed, use the following instructions:

- Secure any loose or protruding parts if the motor home is damaged.
- Inspect points of attachment on a disabled motor home. If attachment points are damaged, select other attachment points at a substantial frame structural member.
- Never allow anyone to go under a motor home while it is being lifted by towing equipment unless the disabled motor home is adequately supported by safety stands.
- Do not tow the motor home from the rear. Towing from the rear will cause the front tires and suspension to be seriously overloaded, possibly resulting in a tire or front suspension failure. Rear frame extensions are not designed to withstand loads imposed by lifting the rear of the motor home.
- If rear wheels are disabled, place the motor home on a flat bed trailer or use a heavy-duty dolly under the rear wheels and tow from the front of the motor home.
- The drive shaft must be removed to protect transmission.

▲WARNING: In the event the motor home requires towing ensure all precautions are followed. The driveline must be disconnected and the mud flap may need to be removed. Wanderlodge Motor home Corporation will not cover damage to the motor home from a towing company.

3-2.5.2   Disabling the Parking Brake

- Block wheels securely before attempting this procedure.
- Remove the plug from the center of rear brake can.
- Remove the caging tool from its holder on the rear brake can and insert it into the hole. Turn the tool clockwise to engage.
- Use a wrench to tighten the nut down, which compresses the internal spring, releasing the brake.
- Repeat for the other side.
- After towing, or when air pressure is again available, loosen the nut and remove the tool. Return the tool to its original location and replace plug.
- Repeat for the other side.

▲WARNING: Do not attempt to dissemble brake canisters without special tools and without having studies specific manufacturer's instructions. Canisters contain springs under very high tension. Improper handling could result in component damage or personal injury.

3-2.5.3   Towing Without a Stinger

Make sure the tow truck can safely pull the weight of the motor home. Give the towing company the weight of your motor home when you call them. If your motor home is going to be towed without a stinger do the following:

- Wrap chains around both A-arms or the front axle on each side.
- Pass the chains beneath the tow bar below the bumper.
- Position a 6" x 6" piece of lumber between the ends of main frame rails and the tow vehicle transfer plate to maintain clearance to body parts.
- Attach safety chains, which are completely independent of the primary lifting device, to the main frame rails.
- When the motor home is under tow allow enough room between the front of the motor home and the rear of the tow vehicle while turning corners.

*4-1 Interior Storage*_____

Your motor home comes equipped with the finest cabinets. There is storage located in cabinets, closets and under the bed, except for slide-out cross-island beds (see note below).

4-1.2 Cabinets

Cabinets in the motor home have positive latches. This keeps them closed when moving designed to keep things inside when in over-the-road-use. What this means is a little force needs to be used when opening them up.

4-1.2.1   Cleaning Cabinets

The motor home cabinets are finished with a high quality nitro-cellulose lacquer. Select a non-alcohol based cleaner for cleaning cabinets. Cleaners recommended for cleaning cabinets are Pledge, Endust, etc.

IMPORTANT: Do not use any alcohol based cleaners. They will dull and strip the finish of the wood.

4-1.3 Closets

At least one full-length hanging closet is standard in each floor plan. A 12 VDC light fixture in the ceiling of the closet is standard. Closet lighting is automatic when swinging doors are opened. Swinging doors provide access. Sliding doors in bedroom closets have manually switched lights.

4-1.4 Under Bed

The 38 ft. Wanderlodge M380 island bed provides storage underneath the bed. This storage is accessed with the assistance of gas cylinders. This area is carpeted with the floor carpet selected for the remainder of the bedroom.

NOTE: Slide-out cross-island beds do not have storage underneath due to the slide-out mechanism.

4-1.4.1   Accessing Under Bed Storage

Under bed storage area in island beds is accessed by a hinged bed board. Gas cylinders are installed on bed board for easy operation. Storage area is carpeted using floor carpet selected per each interior.

4-1.5 Overhead Cabinet

A full-length overhead cabinet is installed over the head of the bed.

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4-2 Exterior Storage_____

4-2.1 Cargo Bays

The motor home has exterior storage in the lower compartments called cargo bays (basement). There are four cargo bays located beneath the motor home. Two of these four can be used for storage and the other two are used to house various systems needed for the operation of the motor home.

Cargo Bay #1 - Curbside

Cargo Bay #1 houses the Hurricane heating system, phone and cable jacks on the roadside. On the curbside you have the inverter. Roadside refers to the driver's side of the motor home and curbside refers to the passenger's side of the motor home.
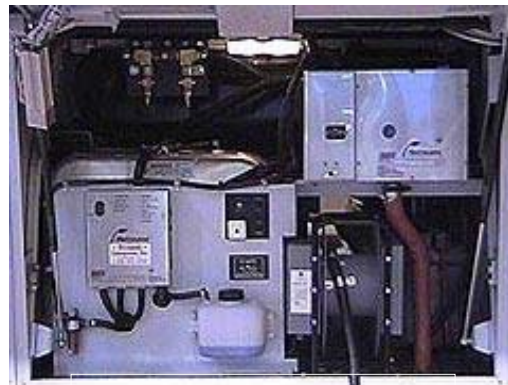
Cargo Bay #1 - Roadside

Cargo Bay #2 - Curbside

Cargo Bay #2 houses the Fresh water tank, controls for slide room and storage.

Cargo Bay #2 - Roadside

Cargo Bay #3 - Curbside

Cargo Bay #3 is used for storage as well as the water manifold that is responsible for generating all the fresh water throughout the motor home. There is also a 110-volt electrical outlet in this bay.
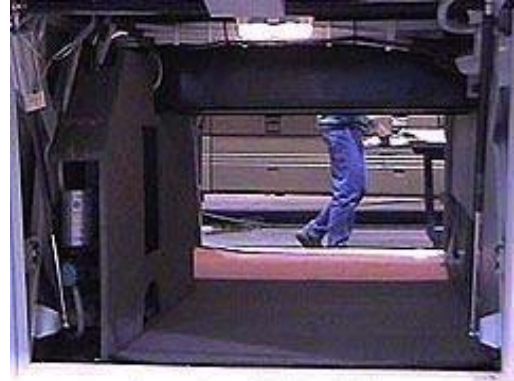
Cargo Bay #3 - Roadside

Cargo Bay #4 - Roadside

Cargo Bay #4 houses the gray and black tanks, water systems and the outside water and air hookups.

4-3 12-kW Generator_____

The motor home generator that is supplied is a Power Tech Ultimate brushless rotating field generator. It has a speed of 60HZ – 1800 rpm/50HZ – 1500 rpm. The maximum ambient temperature is 40°C Class F

NOTE: If the generator is operated at 1500 rpm, the voltage and kW rating will be 5/6 of the 1800-rpm rating. Consult the manufacture if a higher voltage or kW rating is required at 50 HZ (1500 rpm).

4-3.1 Generator Operation

The generator can be started and stopped from any of three locations within the motor home: at the left hand overhead dash inverter panel, at the left hand lower dash panel, or at the bedroom panel. In addition, the generator can also be operated from the controller box in the blower/radiator (front roadside) compartment.

To start the generator, push the Generator switch to the **START** position. Do not hold the switch on for longer than 5 seconds at a time! If the generator does not start the first time, wait a minute and try again. After starting, there will be a delay of approximately 25 seconds before the automatic change over switch will permit the generator to pick up the load. The generator may be stopped at any time by momentarily pushing the switch.

4.3.1.1 Safety Guidelines

To avoid personal injury and prevent damage to equipment, it is imperative that all safety precautions listed below are followed when operating this equipment.

Never Start the Generator with an Electrical Load Applied.

Protect Yourself Against Electrical Shock. Never operate the generator or handle any electrical equipment while wet, barefoot or while it is raining.

Maintain all Electrical Cords in Good Condition. Worn, frayed or bare wires will cause severe electrical shock.

Always Disconnect All Electrical Loads Before Working on the Generator.

Always Provide Adequate Ventilation. Engines consumer oxygen and give off deadly carbon monoxide gases.

4-3.2 Generator Exhaust

The generator exhausts behind the roadside front tire.

> ⚠ **CAUTION: The generator exhaust will be hot when the generator is running and for a time after the generator has been turned off. To avoid burn injuries, allow the generator exhaust to cool down before any contact with the pipe.**

4-3.3 Air Cleaner

4-3.3.1 Periodic Cleaning and Inspection:

Clean and inspect generator every 200 hours of normal operating time. If the generator is in a harsh environment clean and inspect it more frequently. If dirt and grease build up, the generator will run hotter and lose efficiency. This reduces the life of the generator.

4-3.3.2 Cleaning

Remove all dust, dirt, oil and grease build-up from external surfaces. Direct a low-pressure air hose (25 psi max) through fan opening to blow dirt and grease from internal components. Clean inside control box checking for loose or damaged lead wires and loose components.

NOTE: Do not remove internal generator parts or the warranty is void.

4-3.4 Spare Parts

Always include the name of the part, quantity of each part ordered and the serial and model numbers from the generator set when ordering parts or have any questions.

4-3.5 Resistance Chart

KW	7	8	10	12	MARKS	COLOR
MAIN STATOR	0.5	0.5	0.5	0.5	U1-V1 or U2-V2	BB
MAIN ROTOR	1.9	1.9	2	2.2	***	***
EXCITER STATOR	83.5	86.9	87.4	89	F1-F2	R-W
EXCITER ROTOR	33.8	33.8	33.8	34	***	***
AUX. PHASE	2.5	2.5	1.6	1.5	AW	Y-Y
BATT. CHARGE	0.5	0.5	0.5	0.5	CH W	W-W
SENSING WINDING	0.4	0.4	0.4	0.4	***	BLUE BROWN

NOTE: These values are resistance measurements in Ohms at 77°F; note the readings will vary depending on ambient temperature. None of these tests should ground at any time. Feel free to call Power Tech Service Dept. for any questions you may have. For faster service make sure you have your model and serial number upon calling.

4-3.6 Troubleshooting

4-3.6.1   Visual Examination

Inspect the generator visually. Look for obvious evidence such as burned areas, pinched wires and cracked insulation. All connections should be fastened securely. Check the operating speed, inspect the unit to be certain it was correctly assembled and connected upon installation.

4-3.6.1.1   Very Low Voltage Output or No Voltage Build-Up:

Cause: Loose or broken lead wires.
Solution: Check lead wires and connections; tighten securely.

Cause: Defective voltage regulator
Solution: *See Section 4-3.7 Bypass Regulator*

Cause: Exciter Stator opened or shorted.
Solution: Measure the resistance at 77°F (*See 4-3.5 Resistance Chart for OHM Ratings*).

Cause: Main Rotor opened or shorted.
Solution: Measure resistance between commutator rings (*See 4-3.5 Resistance Chart for OHM Ratings*).

Cause: Main Stator grounded or shorted.
Solution: Run the generator for 5 minutes. **(Stop immediately if there is smoke or a hot smell)**. If voltage does not build up and the generator is hot, there is a short circuit in the main stator windings. Be sure main breaker is **OFF** when checking voltage. Examine the main stator for burned insulation. **Do Not Remove** from frame. Disconnect leads at control box to measure main stator resistance; V-1 and U-1 and V-2 and U-2 each should have equal resistance. If one voltage reading is lower than another. The low voltage winding is shorted; replace main stator.

4-3.6.1.2   Full Voltage At No Load – Voltage Drops at Full Load:
Check Amp Draw at Genset

Cause: Defective voltage regulator.
Solution: *See Section 4-3.7 Bypass Regulator*.

Cause: Exciter Stator opened or shorted.
Solution: Measure resistance ratings (*See 4-3.5 Resistance Chart for OHM Ratings*).

Cause: Loose or broken lead wires.
Solution: Check lead wires and connections for broken wires and loose connections. Compare connections with the wiring diagram supplied with generator.

Cause: Main stator grounded or shorted.
Solution: Replace main stator.

4-3.6.1.3   Low Voltage:

Cause: Low engine speed.
Solution: Check engine speed and generator ratings 1800 RPM/60 HZ or 1500 RPM/50 HZ.

Cause: Defective voltage regulator or needs adjusted.
Solution: *See 4-3.7 Bypass Regulator*.

Cause: Defective circuit breaker.
Solution: Use an Ohmmeter at R1 Scale, you should have continuity when closed and no continuity when open, if reading differs, replace the circuit breaker.

4-3.6.1.4   Voltage Too High:

Cause: Fast engine speed.
Solution: Check generator ratings for proper rpm.

Cause: Defective voltage regulator or needs adjusted.
Solution: Replace.

4-3.6.1.5   Uncontrollable Voltage:

Cause: Defective voltage regulator.
Solution: *See 4-3.7 Bypass Regulator*

Cause: Incorrect engine adjustment.
Solution: Check engine operation, speed, fuel lines and injector.

4-3.6.1.6   Voltage Spikes Appearing in Sine Waves:
Check Amp Draw at Genset.

Cause: Defective voltage regulator.
Solution: Replace.

Cause: Incorrect engine adjustment, fuel line, or poor fuel.
Solution: Change fuel filter and check engine speed.

Cause: Loose Connections.
Solution: Inspect all connections.

Cause: Bad ground connection.
Solution: Inspect all ground connections.

4-3.7 Bypass Regulator

Inside your control box there is a six-wire plug that plugs into your voltage regulator. To bypass this regulator for trouble shooting: Unplug from voltage regulator, take the red wire and run to 12 volt positive, take the white wire run to a good ground, make sure the generator is under **NO LOAD**, (flip circuit breakers off). Start unit up and check voltage, with no regulator your voltage should range anywhere between 112 volts to 125 volts, if so replace voltage regulator. Adjust voltage higher or lower with adjustment screw on top regulator.

NOTE: It's very important that voltage remains within specifications of unit.

4-4 120 VAC Power Distribution System_____

The M380 120VAC Power Distribution System consists of two primary power sources and one secondary power source. The primary sources are the 120/240V, 100/50A, 1-Phase, 3-wire Shoreline Power input and the 120/240V, 100/50A, 1-phase, 3-wire, 12.5KW Generator input. The secondary power source is a 120V, 25A, 1-phase, 3KW Inverter that converts 12VDC battery energy to 120VAC power. An Auto-Transfer switch selects one of the two primary power sources and connects the power source to the 120/240V, 100/50A, 1-phase, 3-wire Load Center. The Load Center consists of a set of twelve circuit breakers, which distribute the power from the selected primary power source; and a set of twelve circuit breakers, which distribute power from the secondary power source.

The Inverter has its own internal transfer switch which selects the Inverter generated 120VAC power source or the pass through primary power source. In the event of an Inverter failure, the Inverter Bypass Breaker and the Inverter Bypass Switch isolate the Inverter from the 120V Power Distribution System, while providing the Inverter supplied loads with 120V from the selected power source.

Reference Documents:
0063859   Block Diagram, M380 120VAC Power Distribution System
0049560   Wiring Diagram, M380 120VAC Power Distribution

4-4.1 Description of Two Power Sources

The M380 120VAC Power Distribution System supplies the motor home from two sources of 120/240V, 100/50A, 1-phase, 3-wire, 12KW AC power: the Shoreline (Utility) connection and the onboard diesel Generator. A typical house has a 120/240V, 200/100A, 1-phase, 3-wire, 24KW main utility power connection. Since the motor home has half the available power as that of a typical house, the user must manage the number of 120V loads that are in use at one time; i.e. all 120V loads cannot be turned on at the same time. There are two 120V, 50A power lines that supply AC loads; i.e. each line can supply 50A to AC loads. The load current can be monitored on the ammeters located in the Entry Door Overhead Transition box.

The Shoreline and Generator are connected to the Automatic Transfer Switch inputs; the Transfer Switch line outputs are connected to the Load Center main terminal lugs. The Load Center has 24 pole spaces, which are separated into two groups - 12 poles for Shore/Generator circuit breakers and 12 poles for Inverter circuit breakers.

The Inverter has its own internal transfer switch, which selects the Inverter's 120V power inverted from the 12V House Battery Bank or the Shore/Generator power from the External Automatic Transfer Switch. If the Inverter is turned Off, the internal transfer switch defaults to the Shore/Generator power source. The Inverter can be isolated from the 120V power distribution system by opening the Inverter Bypass Breaker and moving the Inverter Bypass Switch to the OFF or BYPASS position.

The Auto Transfer Switch, Load Center, Inverter, Bypass Breaker, & Bypass Switch are located in Bay 1 and are accessible from the right side of the motor home.

4-4.1.1 Shoreline Power

The motor home is connected to Shoreline or Utility Power through the standard exterior 120/240V receptacle located at the left rear corner or through the optional 120/240V Power Cord Reel located in Bay 1-Left. The 120V Power System is designed to connect to 240V, 50A, 1-phase, 3-wire power pedestal typically provided by recreational vehicle parks. An adapter cable is provided to connect a park's 120V, 30A, 1-phase, 2-wire receptacle to the motor home's 120/240V, 3-wire power cord. The adapter connects the hot legs, L1 & L2, together so both lines split the available 30A current (3.6KW);

i.e. the available current is significantly reduced. In this situation, it is advisable to use the onboard generator.

Many recreational vehicle lots are equipped with 120V, 20A, 2.4KW or 120V, 30A, 3.6KW two wire receptacles. This greatly reduces the number of appliances that can be operated at one time.

When connecting to an unknown power pedestal, it is advisable to turn the Main circuit breakers, CB1-B and CB2-A, to the Off position to avoid damage to appliances and equipment connected to the motor home Power Distribution System. Check the Shoreline Reverse Polarity Panel to confirm the power pedestal is wired correctly. Then turn the Main circuit breakers to the on position

4-4.1.2 Shoreline Reverse Polarity Panel

The Shoreline Reverse Polarity Panel indicates when the Shoreline Power connection is correctly wired or if one of the hot lines is wired incorrectly to the neutral terminal at the recreational vehicle park receptacle. If the park receptacle is incorrectly wired, do **NOT** connect the motor home to the receptacle and notify the park management. The Shoreline Reverse Polarity Panel is located in Bay 1-Left.

4-4.1.3 Shoreline Safeline Alarm

The Shoreline Safeline Alarm indicates when the motor home's Shoreline power cord is connected to the recreational vehicle park receptacle and the ignition switch is turned to the On position. When this occurs, an alarm inside the motor home emits a beeping sound and a light on the dash.

4-4.1.4   Generator Power

The onboard generator provides two separate lines of 120V, 50A, 6KW per line of power. The load current on each line is displayed on the two AC ammeters located in the curbside (right) overhead transition box. The generator can be started from three interior locations: (1) the Inverter Remote Control panel, (2) the Generator Start switch in the lower front dash, and (3) the bedroom switch panel. The generator can also be started using the Start switch located at the generator control panel. Refer to **Section 4.3** for detailed generator operation instructions.

4-4.1.5   Automatic Transfer Switch

The Shoreline and Generator are connected to the inputs of the Automatic Transfer Switch. The Generator input take precedence over the Shoreline input; i.e. if the Generator is running while Shoreline voltage is present, the Transfer Switch selects the Generator input. If the Generator voltage is not present, then the Automatic Transfer Switch selects the Shoreline input. The transfer from the Shoreline to the Generator input is delayed 30-60 seconds. This delay allows the Generator to start and stabilize.

Note: the Generator starts only if the generator auto-start feature on the Inverter is set to detect loss of Shoreline power or manual start is initiated. The default state of the Transfer Switch is the Shoreline position. The Transfer Switch monitors the Generator voltage and selects the Generator position when it detects the Generator voltage.

4-4.1.6   AC Load Center

The AC Load Center is a 120/240V, 50A, 1-phase, 3-wire, split bus power distribution panel. The line outputs of the Automatic Transfer Switch are connected to the Load Center main 50A circuit breakers CB1-B & CB2-A. The Load Center split bus configuration separates the circuit breakers into two sets: (1) the Shoreline/Generator breakers, and (2) the Inverter breakers.

The loads connected to the circuit breakers CB3-A/B through CB6-A/B can only be operated when the Shoreline/Generator power is available. The loads connected to CB7-A, CB8-B, CB9-A/B through CB12-A/B can be operated when the Inverter is turned On and the House batteries are charged or when the Shoreline/Generator power is available.

The types of circuit breakers are tandem style - two breakers that occupy one pole space. Each pole space is designated by a number suffix with each tandem breaker designated with an "A" or "B" suffix; e.g. CB1-A & CB1-B. The Load Center has two separate power legs (lines): L1 and L2. Odd numbered breakers are attached to L1; even numbered breakers are attached to L2. The ammeters in the Entry Door Overhead Transition cabinet monitor the L1 & L2 currents and are used to load manage the appliances or lights that are turned On at one time. If the Shoreline power is 240V, 50A, 3-wire, then each line is limited to 50A. If the Generator is operating, then the line current is limited to 50A each.
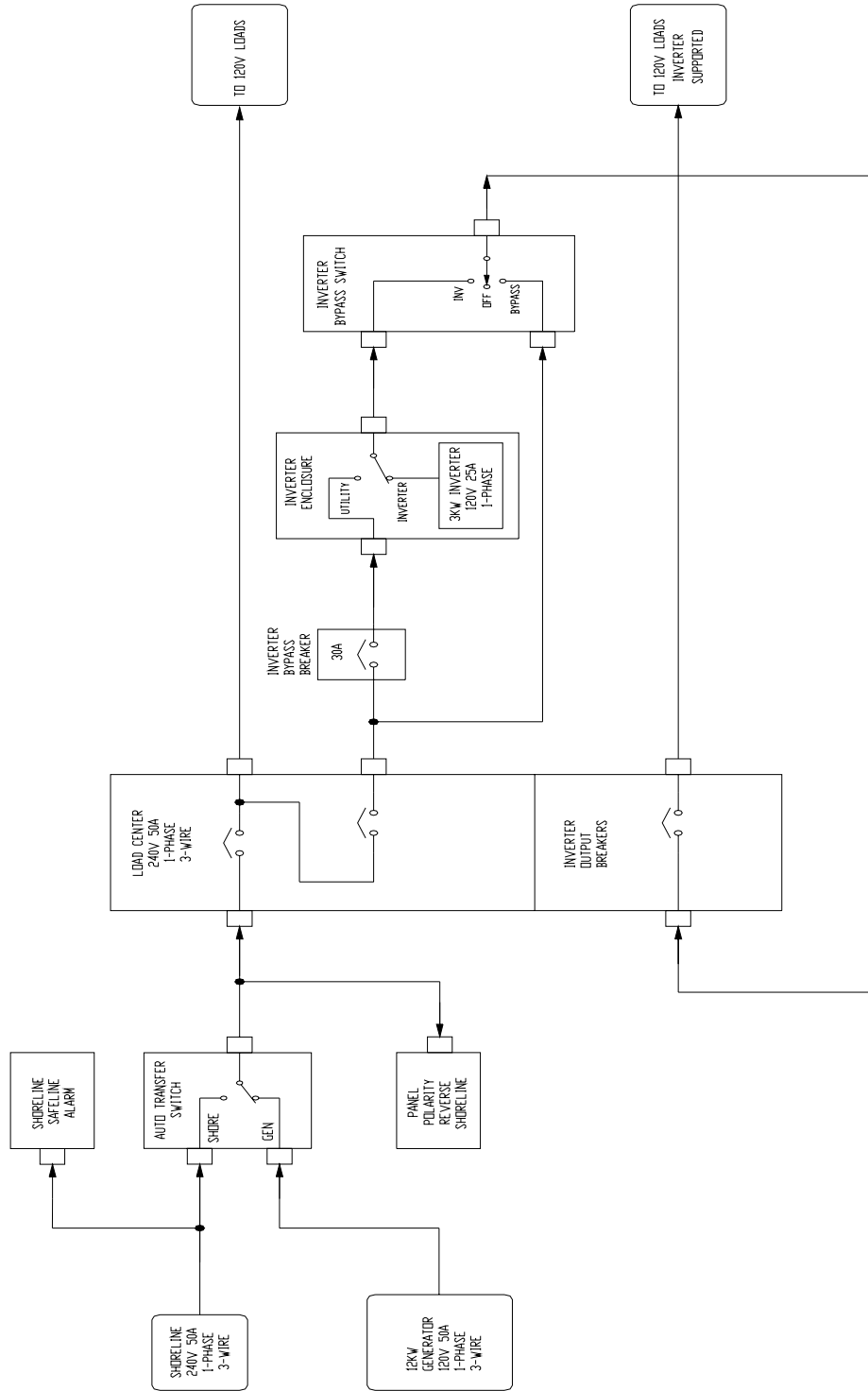
Fig. 1 – Block Diagram 120V Power Distribution

SHORELINE/GENERATOR BREAKERS

30A	50A	50A	30A	20A	20A	20A	20A	20A	20A	20A	20A
CB1-A	CB1-B	CB2-A	CB2-B	CB3-A	CB3-B	CB4-A	CB4-B	CB5-A	CB5-B	CB6-A	CB6-B
INV1 AC1 IN	MAIN	MAIN	INV1 AC2 IN	COOK-TOP	FWD A/C & VOLT-METER	REAR A/C & VOLT-METER	WATER HEATER	WASH-ER	KIT ELEC HEAT	BATH ELEC HEAT	BLOCK HEATER
CB1		CB2		CB3		CB4		CB5		CB6	

INVERTER BREAKERS

20A	30A	30A	20A	20A	20A	20A	20A	20A	20A	20A	20A
CB7-A	CB7-B	CB8-A	CB8-B	CB9-A	CB9-B	CB10-A	CB10-B	CB11-A	CB11-B	CB12-A	CB12-B
FWD A/V DINING LIGHT	INV1 AC2 OUT	INV1 AC2 OUT	LEFT MICRO-WAVE	PLC GFI RECPT	LEFT INSIDE RECPT	O/S GFI AUX AIR CMPRS	INSTA-HOT DIS-POSAL	SPARE	AWN-ING RIGHT RECPT	REFRIG-ERATOR	SPARE
CB7		CB8		CB9		CB10		CB11		CB12	

Fig. 2 – Load Center Breakers

ITEM	POLE	BREAKER	SPLIT BUS	BRANCH	LOADS
1		CB1-A	MAIN	INV1 AC1 IN	a. To Inverter Bypass Breaker. b. To Inverter Bypass Switch.
2	1	CB1-B	MAIN	MAIN 2	a. Line L2, back-fed circuit breaker. b. Line L2 Ammeter 2.
3		CB2-A	MAIN	MAIN 1	a. Line L1, back-fed circuit breaker. b. Line L1 Ammeter 1.
4	2	CB2-B	MAIN	INV1 AC2 IN	a. To Inverter Bypass Breaker. b. To Inverter Bypass Switch.
5		CB3-A	MAIN	COOKTOP	a. Hurricane Electric Water Heater 2. b. Receptacle 1, Kitchen Left Base Cabinet c. Cooktop Striker.
6	3	CB3-B	MAIN	FWD A/C & VOLTMETER 1	a. Front A/C. b. Line 2 Voltmeter 2
7	4	CB4-A	MAIN	REAR A/C & VOLTMETER 2	a. Rear A/C. b. Line 1 Voltmeter 2.
8		CB4-B	MAIN	WATER HEATER	a. Hurricane Electric Water Heater 1.
9	5	CB5-A	MAIN	WASHER	a. Receptacle 2, optional Washer.
10		CB5-B	MAIN	KIT ELEC HEAT	a. Dometic Master Thermostat. b. Kitchen Electric Heater.
11	6	CB6-A	MAIN	BATH ELEC HEAT	a. Dometic Thermostat. b. Bath area Electric Heater.
12		CB6-B	MAIN	BLOCK HEATER	a. Engine Block Heater.
13	7	CB7-A	INVERTER	FWD A/V DINING LIGHT	a. Dinette Table Dimmer. b. Dinette Light. c. Receptacle 3, Overhead Dash. d. Receptacle 4, Overhead Dash, Optional Satellite Dish Receiver. e. Receptacle 5.
14		CB7-B	INVERTER	INV1 AC1 OUT	a. From Inverter Bypass Switch.

ITEM	POLE	BREAKER	SPLIT BUS	BRANCH	LOADS
15		CB8-A	INVERTER	INV2 AC2 OUT	a. From Inverter Bypass Switch.
16	8	CB8-B	INVERTER	LEFT MICROWAVE	a. Receptacle 6, GFI, Kitchen Overhead Cabinet. b. Receptacle 7, GFI, Kitchen Overhead Cabinet. c. Receptacle 8, GFI, Kitchen Left. d. Microwave current sensor. e. Microwave.
17		CB9-A	INVERTER	PLC GFI RECPT	a. Receptacle 25, GFI, Bay 3-Left, Bedroom Slideout PLC Controller.
18	9	CB9-B	INVERTER	LEFT INSIDE RECPT	a. Receptacle 9, Bedroom Left Rear. b. Receptacle 10, Bedroom Left Front. c. Receptacle 11, Bedroom Left, TV. d. Receptacle 12, GFI, Private Bath Left. e. Receptacle 13, Living Room Left Front.
19		CB10-A	INVERTER	O/S GFI AUX AIR CMPSR	a. Receptacle 14, GFI, Bay 3 Right. b. Receptacle 15, GFI, Bay 3 Right. c. Auxiliary Air Compressor.
20	10	CB10-B	INVERTER	INSTA-HOT DISPOSAL	a. Receptacle 16, Kitchen Left. b. Insta-Hot Water Heater. c. Disposal.
21		CB11-A	INVERTER	SPARE	a. Spare.
22	11	CB11-B	INVERTER	AWNING RIGHT RECPT	a. Receptacle 17, Bedroom Right Rear. b. Receptacle 18, Bedroom Right Front. c. Receptacle 19, GFI, Medicine Cabinet. d. Receptacle 20, Dinette Right. e. Receptacle 21, Living Room Right. f. Receptacle 22, Living Room Right.
23	12	CB12-A	INVERTER	REFRIGERATOR	a. Vanity Base Dimmer. b. Vanity Light, Bathroom. c. Receptacle 23, GFI, Kitchen. d. Refrigerator. e. Receptacle 24, GFI, Outside TV, Bay 2-Right.
24		CB12-B	INVERTER	SPARE	a. Spare.

4-4.1.7   Inverter Power

The Inverter provides 120V, 25A, total for both lines L1 & L2; i.e. 12.5A per line if the loads are evenly balanced. The loads connected to the Inverter circuit breakers are intermittent loads such as wall receptacles, A/V equipment, microwave, or the refrigerator. If the Inverter is turned Off, then the internal transfer switch connects the Inverter line L1 & L2 circuit breakers to the Shoreline/Generator power lines L1 & L2. The Inverter L1 & L2 lines now are able to provide 120V, 30A to both L1 and L2, however, the total Load Center current on L1 and L2 must not exceed 50A per line.

4-4.1.8 Inverter Bypass Switch

The Inverter Bypass Switch is connected to the output of the Inverter, the Load Center Inverter AC In breakers, CB1-A and CB2-B, and the Load Center AC Out breakers, CB7-B and CB8-A. The Bypass Switch has three positions: (1) Inverter position connects the Inverter to the Load Center Inverter Output Breakers, (2) Off position disconnects the Inverter Output from the Load Center Inverter Output Breakers, and (3) Bypass position bypasses the Inverter and connects the Shoreline/Generator breakers to the Inverter Output Breakers.

4-4.1.9 Inverter Bypass Breaker

The Inverter Bypass Breaker provides Shoreline/Generator power to the Inverter. The purpose of this breaker is to disconnect the 120V Shoreline/Generator power from the Inverter input in the event of an Inverter failure or to service the Inverter.

4-4.1.10 Inverter Bypass Mode

In the event of an Inverter failure, the Inverter can be disconnected from the 120V Power Distribution System by placing the Inverter Bypass Breaker and the Inverter Bypass Switch to the Off positions. If power is wanted to the loads supplied by the Inverter, the Inverter Bypass Switch can be placed in the Bypass position.
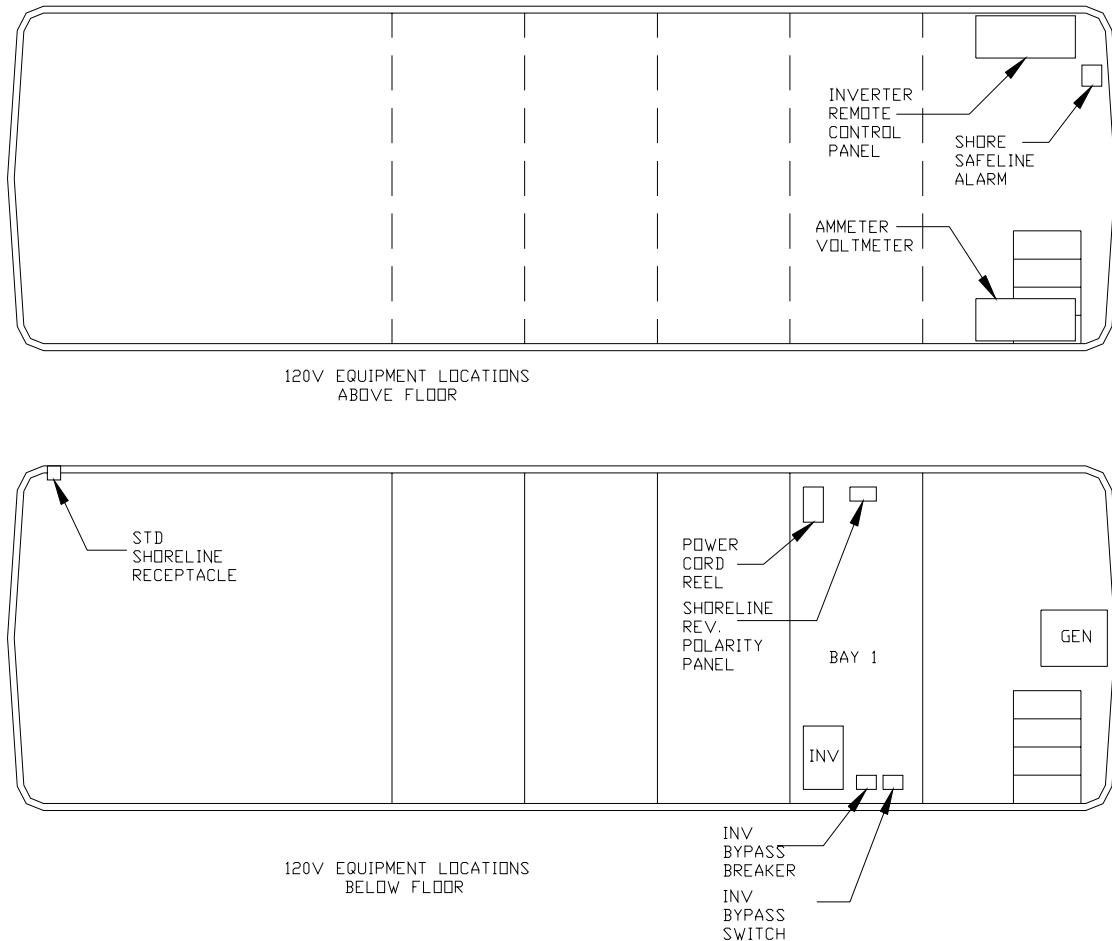
Fig. 3 – 120V Power Distribution Equipment Locations

4-4.1.11 DC Power Sources

The following illustrations show the various DC Decals that are on the coach with exploded views of the circuit breakers for easier readability.

Body Load Center Decal

IGN   MASTER

P331

P353

P332

			J364	J365
J359	J359	J360		
10A DOOR CTRL	7.5A W/S WASHER	10A BU LAMP	CLR LIGHTS MICRO RELAY	PARK LTS MICRO RELAY
10A HTD MIRR	15A W/S WIPER	10A COACH IGN	BACK UP MICRO RELAY	FOG LIGHTS MICRO RELAY
7.5A FRT DOOR LK	SPARE	7.5A DIR SW IGN	LH DIR MICRO RELAY	HI BEAM MICRO RELAY
7.5A REM MIRR	7.5A DRL IGN	30A HVAC (+)	RH DIR MICRO RELAY	DRIVERS LTS MICRO RELAY
SPARE	SPARE	SPARE		
SPARE	SPARE	SPARE	MIR ILUM MICRO RELAY	DOOR CTRL MICRO RELAY
10A RH UND LTS	15A HO/LTS	15A DRIVER LTS	LH WPR LOW/PK MICRO RELAY	FLASHER
10A LH UND LTS	15A PARK LTS/CLR LTS	15A HI BEAM PWR	LH WPR HI MICRO RELAY	
7.5A MASTER PWR	7.5A HAZZ SW PWR	7.5A LUGG LTS	RH WPR LOW/PK MICRO RELAY	ACC RELAY
15A SLIDE OUT PWR	20A FLASHER PWR	7.5A OPT HORN PWR	RH WPR HI MICRO RELAY	
SPARE	7.5A SUSP DUMP	SPARE		SPARE
SPARE	SPARE	SPARE	LO BEAM MICRO RELAY	
J361	J362	J363	J366	J367

DRL MODULE

CHASSIS HOT

CHASSIS GROUND

P333

P334

P335

DECAL BB#0059085

Exploded View of Circuit Breakers on Body Load Center Decal

J359	J359	J360	J364	J365
10A DOOR CTRL	7.5A W/S WASHER	10A B/U LAMP	CLR LIGHTS MICRO RELAY	PARK LTS MICRO RELAY
10A HTD MIRR	15A W/S WIPER	10A COACH IGN	BACK UP MICRO RELAY	FOG LIGHTS MICRO RELAY
7.5A FRT DOOR LK	SPARE	7.5A DIR SW IGN	LH DIR. MICRO RELAY	HI BEAM MICRO RELAY
7.5A REM MIRR	7.5A DRL IGN	30A HVAC (+)	RH DIR. MICRO RELAY	DRIVERS LTS MICRO RELAY
SPARE	SPARE	SPARE	MIR ILUM MICRO RELAY	DOOR CTRL MICRO RELAY
SPARE	SPARE	SPARE	LH WPR LOW/PK MICRO RELAY	FLASHER
10A RH LND LTS	15A HD/LTS	15A DRIVER LTS	LH WPR HI MICRO RELAY	
10A LH LND LTS	15A PARK LTS/CLR LTS	15A HI BEAM PWR	RH WPR LOW/PK MICRO RELAY	ACC RELAY
7.5A MASTER PWR	7.5A HAZZ SW PWR	7.5A LUGG LTS	RH WPR HI MICRO RELAY	
15A SLIDE OUT PWR	20A FLASHER PWR	7.5A OPT HORN PWR		SPARE
SPARE	7.5A SUSP DUMP	SPARE	LO BEAM MICRO RELAY	
SPARE	SPARE	SPARE		
J361	J362	J363	J366	J367

Chassis Load Center Decal

Exploded View of Circuit Breakers on Chassis Load Center Decal

ABS BRAKE SIGNAL	NEUTRAL	IGN DROPOUT	7.5A IGN	15A HORN	20A FUEL FLTR
SHIFT INHIBIT	PARK NEUTRAL	SPARE	7.5A GAUGES	20A IGN SWITCH	SPARE
SLIDEOUT PARK	AUXILIARY PDU	HORN	7.5A INTRLOCKS	15A SPARE BATTERY	SPARE
			7.5A AUXILIARY PDU	20A LUG LGT	10A AIR DRYER
HORN	CRUISE OVERRIDE	NEUTRAL START	7.5A ABS IGN	30A LUGGAGE LOCKS	15A DRL PWR
ENGINE BRAKE	BRAKE	DASH IGNITION	7.5A ABS BRAKE	10A TOOL PORT	30A HEAT DRN
LUGGAGE LOCKS	LUGGAGE LOCKS	7.5A HOUSE IGN	7.5A SHIFT INHIBIT	15A AC CMPR	7.5A IGN
		7.5A BODY SOL IGN	7.5A DASH LIGHTS	7.5A COACH BATTERY	10A IGN TRANS
IGNITION	IGN DROPOUT	• SPARE	7.5A SUSP DUMP MODULE	SPARE	7.5A IGN
		SPARE	7.5A STARTER SIGNAL	15A ACC	7.5A IGN
SPARE	SPARE	SPARE	15A ABS	7.5A DASH BAT.	7.5A TOP GAUGES
		SPARE	15A ABS	10A TRANS. BAT	7.5A DASH GAUGES

Front Load Center Decal

Top relay row (left to right): IGNITION RELAY · SPARE RELAY · SPARE RELAY · BURGLAR ALARM DOOR SWITCH · STEP DOOR SIGNAL

MASTER 5/BATTERY 5 (vertical, left to right):
MAS OPT 1 7.5A · MAS OPT 2 15A · MAS OPT 3 20A · BAT OPT 1 15A · BAT OPT 2 20A · SPARE

IGNITION 1	BATTERY 1	BATTERY 2	BATTERY 3	BATTERY 4	MASTER 1	MASTER 2	MASTER 3
BURGLAR/ALARM 7.5A	FRT RADIO MEMORY 7.5A	LANDING LIGHTS 20A	BURGLAR ALARM 15A	CIG LIGHTER 15A	KITCHEN CLG LTS 7.5A	LIVING ROOM CLG LTS 15A	DINETTE LTS 7.5A
DOOR STEP 7.5A	FURNACE THERMOSTATS 7.5A	AIR COMP RELAY 7.5A	LEVEL SYS 7.5A	AIR COND RELAYS 7.5A	AISLE LTS 7.5A	MAP LTS 7.5A	MUSICAL HORN 10A
IGN OPT 10A	WATER HEATER 20A	AIR COMP (12V) 20A	BURGLAR ALARM 20A	DOOR STEP 25A	LIVING ROOM SPOT LTS 7.5A	AIR COND 7.5A	VALENCE LTS 7.5A
LEVEL SYS 7.5A	DOOR SWITCH 10A	ELC TOILET OPT 15A	BURGLAR ALARM 15A	AUX POWER 15A	PORCH LT 7.5A	SPARE	BACK-UP MONITOR 15A
RADAR DET 7.5A	CO-PILOT SEAT 20A	MASTER SWITCH 7.5A	LANDING LIGHT RELAY 7.5A	DR STEP BURG ALARM RELAYS 7.5A	STEP COVER 15A	FRONT RADIO 15A	KITCHEN VENT/LT 10A
DOOR TOP LOCK 7.5A	HEATER DASH SWITCH 7.5A	BAY RECEPTACLE 15A	PILOT SEAT 20A	CELL PHONE 15A	DR LOCK MOTORS 10A	TV CIRCUITS 15A	AIR COND RELAYS 7.5A

Bottom relay row (left to right): ENTRANCE DOOR TOP LOCK · SPARE RELAY · SPARE RELAY · REAR LAND LIGHT (REVERSE) · REAR LAND LIGHT (NEUTRAL)

MASTER 4 (vertical, left to right):
REMOTE SPOT LT 10A · CB RADIO 15A · SPARE · SPARE · RR VIEW MIR 7.5A · VISORS 15A

REAR CIRCUIT BREAKERS

MASTER		BATTERY	
CB 1 30A	CB 7 30A	CB 13 30A	CB 19 20A
CB 2 30A	CB 8 30A	CB 14 30A	CB 20 30A
CB 3 30A	CB 9 30A	CB 15 30A	CB 21 30A
CB 4 30A	CB 10 30A	CB 16 30A	CB 22 30A
CB 5 30A	CB 11 30A	CB 17 30A	CB 23 30A
CB 6 30A	CB 12 30A	CB 18 30A	CB 24 30A

OPTION

MAS	MAS	MAS	BAT	BAT	IGN
1	2	3	4	5	6

Rear Load Center Decal

MASTERED 1	MASTERED 2	MASTERED 3	BATTERY 1	BATTERY 2	RELAY 1	BATTERY 3
BED RM CEIL LT 10A	BATH LTS 7.5A	KITCHEN/BATH HEATER RLY 7.5A	LP CIRCUITS 7.5A	CARBON MON DETECTOR 7.5A	IGNITION	STOVE STRIKER 7.5A
BATH RM CEIL LT 10A	BR READ LTS 7.5A	SPARE	CORD REEL 20A	WATER SHUTOFF 7.5A	WATER LEVEL AUTO SHUT OFF	REFRIGERATOR 7.5A
REAR CLG LTS 7.5A	PANTRY LTS 7.5A	SPARE	PORCH LT 7.5A	SPARE	WATER PUMP	SPARE
VAL LTS 7.5A	RADIO 15A	MAST OPT 1 20A	POWER CORD LT 7.5A	BAY THERMOSTATS 7.5A	FURNACE THERMO	BATT OPT 1 20A
SHOWER LT+FAN 7.5A	SPARE	MAST OPT 2 15A	RADIO 7.5A	TANK MONITOR 7.5A		BATT OPT 2 15A
CLOSET LTS 7.5A	BATH FAN 7.5A	MAST OPT 3 7.5A	WATER PUMP CIRCUITS 7.5A	WATER PUMP 20A	FURNACE THERMO	SPARE

REAR CIRCUIT BREAKERS

30A	30A	20A
30A	30A	30A
30A	30A	30A
30A	30A	30A
30A	30A	30A

OPTION

MAS	MAS	MAS	BAT	BAT	IGN
①	②	③	④	⑤	⑥

4-5 Inverter_____

The motor home is equipped with an Inverter manufactured by Trace Engineering. This is a very important system within the motor home. This system can pull power out of 12-volt batteries and convert it to 120 VAC to run appliances. It can also can pull 120 VAC power and convert it to 12 volt as needed to change the house batteries when connected to 120 VAC shore power or generator. Lights on the motor home use 12 volt and appliance use 120. This is useful when you are some place that does not have plug-ins or you cannot run generator for some reason. For example, maybe the park you are in has rules that state no running generator after a certain time; this is where your inverter would come in handy.

4-5.1 Remote Control Panel

The remote control panel is mounted above driver's seat over the right door panel. Some features of the remote control panel are listed below:

- Simple menu driven programming for full control of all inverter/charger functions.
- A three-level menu to prevent accidental setting changes.
- Meters to display voltage and current.
- RJ11 phone jack connection to inverter.
- Internal memory to retain inverter/charger menu settings even with a loss of power.
- An intelligent battery fuel gauge displaying percent of battery charge and the time left to run.
- Error message and informative information displays used to optimize system performance.
- Remote ON/OFF inverter operation.

4-5.1.1   On/Off Control

The inverter portion of the inverter/charger can be switched OFF or ON using the remote control. The standby charger in the inverter is automatic and always ready and available for charging whenever ac power is applied.

4-5.1.2   Meters

The RC7GS remotes feature several meters that monitor the operating conditions of the power center. These meters include: Average Shunt Amps, Battery Voltage, Inverter-Charger Current, AC Output Voltage, AC Input Amps, Battery Temperature, Transformer Temperature, FET Temperature, and Estimated Battery Capacity.

4-5.1.3   Controls

The RC7GS allow the inverter to be switched ON or OFF with the press of a push button on the remote. Both devices can be used to configure the inverter/charger to the specific system and preferences including Battery Capacity, Battery Type, Charger Rate, Low Battery Cutout, Shore Power Amps, External Shunt, Fuel gage Cutout, and Display Contrast. In addition, the RC7GS starts and stops of the genset automatically or manually, allows the setting of generator make and model, sets a "quiet time" during which the genset will not start automatically, and has manual overrides for auto gen start.

4-5.1.4   RC7GS Setup Menu

The RC7GS (Generator Start) features several additional setup menu selections related to automatic generator starting, stopping and generator quiet time. To access the setup menu hold the up and down arrows down together till you hear a chirp. You are now in the setup menu.

IMPORTANT NOTE: Your coach is delivered with specific, initial settings set up on your inverter. These were specifically designed for this coach and in the event of a loss of power these settings must be restored. See following chart as a guide for returning settings to their original setup.

Original Settings Delivered with Coach	
Menu Item	Restore To:
Search Sense	About 5W load
Auto LBCO	On
Battery Capacity	500 A-hrs
Battery Type	AGM
Charge Rate	90%
Set Shore Power	30 Amps
RC7 Setup	Last Key
LCD Contrast	Max Contrast
External Shunt	None
Fuel Gage Cutout	10.3VDC=0%SOC
Select Genset	Power Tech 2-Wire
Generator Start	Auto at 11.0 VDC
Generator Stop	Auto at 90% SOC
Begin Gen Quiet	21:00
End Gen Quiet	09:00

4-5.1.4.1 Set Clock

Some generator functions are based on the time of day. The clock must be properly set to ensure the programmed function will perform at the correct time. The clock uses 24-hour time and ranges from 00:00 to 23:59.

To access the Set Clk menu, scroll down past the generator menus by pressing the DOWN arrow. A flashing cursor appears below (and behind) the hour (H) or minute (M) characters in the display. Every eight seconds the cursor alternates positions. When the cursor is under the hour digit, press the Settings push button to increment the hours to the current hour (00 to 23). When the cursor is under the minute's digit, press the Settings push button to increment the minutes to the current minute (0 to 59). Press and hold the Settings push button to quickly increment the time, or press and release to increment the selected digit by one unit at a time.

4-5.1.4.2 Select Genset

After setting the clock, press the UP arrow once to access the Select Genset menu. Select the type and model of the generator (Powertech 12KW) by pressing the Settings push button (RIGHT arrow) until the genset's name and model is displayed in the LCD readout.

⚠️ **CAUTION: Other 30 through 80 are reserved for future use and must not be selected.**

4-5.1.4.3 Generator Auto Start

After setting the clock and selecting a generator, set the parameters for automatically starting the genset based upon a battery voltage or State-of-Charge (SOC). Press the UP arrow and scroll through the menus to access the Generator Auto Start menu. Press the Settings push button (RIGHT arrow) until the required setting is in the LCD display. The required setting should read battery voltage.

NOTE: The Auto Gen parameters cannot be set unless the clock is set-up first.

NOTE: The default Generator Start selection is Manual (Push On). This setting disables all automatic start functions. Any other selection from the Generator Start menu, enables the RC7GS to automatically start the generator based upon the battery's state-of-charge.

IMPORTANT NOTE: If Auto Gen Start is enabled the generator cannot be started from any remote starts in coach. Generator can be started by disabling Auto Gen Start or by manually starting from the RC7GS Remote Panel.

4-5.1.4.4 Generator Stop
The RC7GS can be configured to shut down the generator automatically when the batteries reach 90 to 99% SOC, or when the charger initiates the Absorption or the Float mode of charging. Refer to the inverter/charger's Operators manual for a detailed description on charging modes. The default is Manual (Push Off).

The generator can be stopped at any time by accessing the user menu until the "Gen Start/Stop: Press (On/Off)" menu is displayed. Press the ON/OFF push button on the RC7GS front panel until the generator stops.

NOTE: The generator will start immediately if the auto-start parameters are still met.

The generator can be started or stopped at any time by pressing the DOWN arrow push button (User Menu) until the Gen Start/Stop menu is displayed. Press and hold the On/Off push button on the RC7GS front panel until the generator starts or stops. Release the push button as soon as the generator starts. If the inverter/charger senses an ac supply while the remote control On/Off push button is pressed, it will shut down the generator.

NOTE: If the genset is manually started from the remote, a manual override is initiated and the generator will NOT stop automatically. Shut down the generator manually.

4-5.1.4.5 Begin Gen Quiet and End Gen Quiet
The period of time during which the generator is prevented from starting automatically can be defined using the RC7GS.

To specify the begin quiet time, scroll to the Begin Gen Quiet: 00:00 by using the UP and DOWN arrow push buttons. Set the Begin Gen Quiet start time. The selected digit for hours or minutes will be underlined and highlighted (refer to 4-5.1.4.1 Set Clock section for details on setting the time).

Press the DOWN arrow to access the End Gen Quiet 00:00 menu and select the appropriate end time.

NOTE: Setting begin and end time to 00:00 defeats the quiet time mode.

NOTE: If the generator is running at the begin quiet time, it will be shut down automatically. If the auto-start parameters are met during quiet time, the buzzer will sound and the LCD displays the message "Gen Quiet Fault." The generator will start automatically at the end of the quiet time.

4-5.1.4.6 Saving Setup Choices
Once the setup options are complete, press and hold both the UP and DOWN arrow push buttons until the display clears (approximately 5 seconds). The setup choices will be saved in nonvolatile memory 20 seconds after exiting the Setup menu. If no other actions are taken. These settings will be preserved until changed.

NOTE: The GenStart settings will not be saved if the RC7GS is disconnected or dc power is lost.

4-5.1.5   Status Monitoring

The RC7GS remote monitor operating conditions including: the ac supply, inverter operation, charger operation, battery condition, generator condition (RC7GS only), Time Left to Run, and Time Left to Charge.

4-5.1.6   Operation

Front Panel Indicators and Controls
The RC7GS front panel contains LEDs, LCD displays, and pushbuttons for viewing status and system setup. All operating power for the remote control is provided by the inverter/charger via the supplied cable.

Status LEDs – There are four LEDs on the front panel which light solid or flashing during operation, indicating the system's status. Upon initial power-up of the inverter, all LEDs will flash as the unit goes through a self-test. After the initial power-up test completes, the LEDs will indicate the current state of the inverter and charger. Use these LEDs along with the LCD display for detailed system status.

Inverter LED – The green Inverter LED indicates the inverter is switched ON and ready to provide backup power. If there is no ac power, the inverter LED will be ON solid, indicating that the inverter/charger is in the inverter (ON) mode.

Inverter LED	Other LEDs or Devices	Meaning
ON (solid)		Inverter ON
Flashing	Charge LED (flashing)	Inverter ready (charging)
Slow Flash		Load Sense Searching
Flashing	Error LED ON + Buzzer	Inverter Error
OFF		Inverter Switched OFF

Charge LED – The Charge LED indicates the current battery charge mode.

Charge LED	Other LEDs or Devices	Meaning
ON (solid)		Bulk Charging
Slow Flash		Absorption Charging
Fast Flash	Batt. Full LED ON	Float Charging
Very Fast Flash		Equalize Charging
OFF		Inverter Mode (no charging)
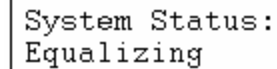
Batt. Full LED – The Batt. Full LED indicates the state of charge on the batteries. This LED will not illuminate until the batteries have charged up to at least 90%. The duration of the LED's ON time will increase until the batteries reach 100%, which at that time, the LED will be ON solid. In the inverter mode, the OFF time duration of the LED will increase until the batteries discharge to below 90% at which time the LED will extinguish.

Batt. Full LED	Other LEDs or Devices	Meaning
Solid		Battery Fully Charged (100%)
Flashing		Battery Charged 90% or higher
OFF		Battery Below 90% Charge

Error LED – The Error LED indicates that there is a problem with the inverter/charger or batteries. Check the LCD display to find and correct the nature of the problem.

Error	Other LEDs or Devices	Meaning
ON (solid)		Check System

LCD Display – The LCD display is a 16 x 2 lines (32 characters total) back lit, alphanumeric display, used for setting up the system operation as well as viewing current status or error messages. Scrolling through the display items is accomplished by using the push buttons below the **display.** *See fig. 4-5.3.*

System Status:
Equalizing

Fig. 4-5.3

Push buttons – There are four pressure-sensitive push buttons on the front panel of the RC7GS used to control the inverter and enter system operating parameters. *See fig. 4-5.4.*

Fig. 4-5.4

On/Off – The On/Off push button controls the inverter section of the inverter/charger. Press this button once to turn the inverter ON or OFF. The charger section of the inverter is not affected by this function and maintains the batteries whenever ac power is present. On RC7GS models, this push button also controls the generator. Refer to Generator Start/Stop. Use this control when you do not want the inverter to supply backup power in the event of an ac line failure. Ac output power is available only as long as the ac line is present.

NOTE: Pressing this push button disables the inverter function. AC backup power will NOT be available during a utility outage. The green INVERTER LED must be flashing (with ac utility applied), indicating the inverter is in a ready state. Pressing this push button while the green LED is ON solid (indicating backup mode), will cause the loss of the inverter output.

Setup/Menu Item Push button – The Setup/Menu Item push buttons accesses the system setup menus. Press and hold both push buttons for approximately 5 seconds or until the display clears, then release the buttons. Press the UP or DOWN arrow buttons to scroll through the menu items. To exit the Setup mode, press and hold both push buttons for approximately 5 seconds until the LCD display changes back to the System Status display.
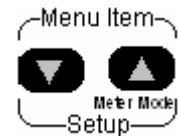
IMPORTANT NOTE: Should motor home lose battery power, system will revert to default setup settings. To restore to original settings motor home was delivered with, see Original Settings Delivered with Coach chart to assist you.

NOTE: Menu items are described later in this section.

Meter Mode Push button – The Meter Mode push button (above) accesses the various operating parameters such as output voltage, amperage, temperature, etc. To access the Meter Mode, press and hold the Meter Mode push button for approximately 5 seconds.

Settings Push button – The Settigns push button scrolls through the various menus. Press this button while in the Setup mode to move through the menu items one at a time. If the desired item or setting is passed, continue pressing the Settings push button until the item or setting reappears. This push button is also used to enable and disable the equalize charge mode.

▲**WARNING: Never attempt to change the presets on the setup mode of remote control panel. This will not allow the system to function properly.**

4-5.1.7   System Status Displays

The RC7GS remote control displays the operating mode and system status by lighting one or more LEDs located on the front panel and/or by displaying a message on the LCD display. The four LEDs reflect the same information as the single tricolor LED on the inverter/charger.

There are four types of system messages:
- AC source messages
- Inverter messages
- Charger messages
- Error messages

AC Source Messages – AC source messages appear when alternating current (shore power) is present. In addition, the RC7GS ac source messages describe the current activity, if any, of the generator.

1. Waiting for AC
    Anytime the inverter is OFF and ac is not present, the LCD screen displays "Waiting for AC."

System Status:
Waiting for AC

Fig. 4-5.5

Genset Status:
Pending Genstart
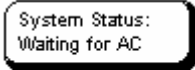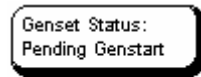
Fig. 4-5.6

2. Genset Status: Pending, Cranking and Genstart
    When the RC7GS is setup to start the generator for a specified condition (SOC (state-of-charge), or battery voltage) and that condition has been met, the LCD displays "Pending Genstart".

    When the initiating conditon (SOC (state-of-charge), or battery voltage) has occurred, the Pending Genstart message is displayed for approximately two minutes awaiting a change in the condition or a manual override. If neither condition occurs, the RC7GS attempts to start the generator and displays "Cranking Genset."

Genset Status:
Cranking Genset
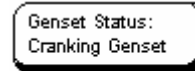
Fig. 4-5.7

    Once the generator starts, there is a brief delay to allow the genset to reach operating speed and for the inverter/charger to synchronize to the generator, at which point the LCD display shows that AC is again available.

Genset Status:
Starter Cooldown

Fig. 4-5.8

3. Starter Cooldown and Gen Start
    In the event the genset does not start within 30 seconds, a two-minute starter cooldown message is displayed after which another attempt to start the generator occurs. This cycle repeats itself three more times over a 12 mintue period.

Gen Set Error Messages
1. Gen Won't Start
    It he genset does not start after the four attempts, the RC7GS displays the message "Gen Won't Start" and the red Error LED on the front panel lights. No further attempts to start the genset will occur. Correct the starting problem and manually start the genset by setting the RC7GS to "Manual (Push On)" from the setup menu and then set it back to the previous auto-start menu, which resets the RC7GS.

Inverter ●
Charge ●
Batt. Full ●
Error ●

Genset Status:
Gen wont Start

Buzzer Sounds

Red Error LED lights and
error messge appears
in the LCD display
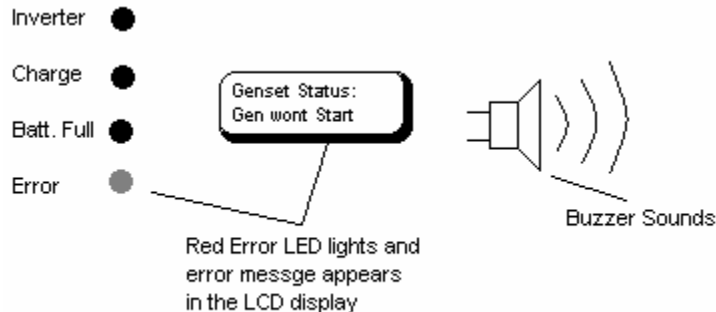
Fig. 4-5.9

NOTE: Press any arrow push button to cancel the buzzer.

2. Gen Quiet Fault
Whenever the RC7GS is configured to Auto Start the generator under a specified condition and the condition occurs during the gen queit period, the LCD will display the Gen Quiet Fault message and the red Error LED will light. The remote control also emits a series of beeping sounds for up to five minutes or until the error condition is corrected. The gen quiet period can be overridden by resetting the Gen Quiet Begin and End time to 00:00.

NOTE: The Gen Quiet feature will operate only if the clock is set on the actions panel.
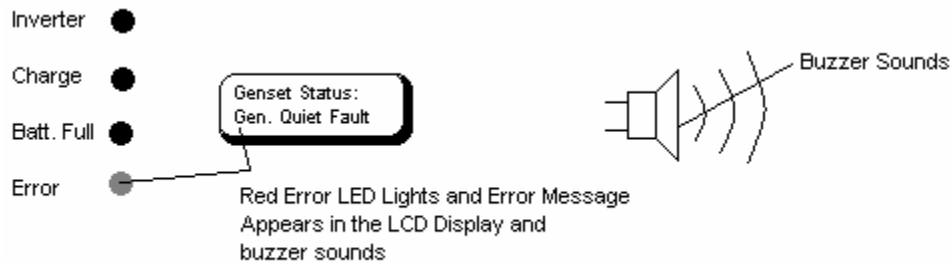
Fig. 4-5.10

NOTE: Press any arrow push button to cancel the buzzer.

Fig. 4-5.11

NOTE: If the genset is manually started from the RC7GS remote, a manual override is initiated and it will not shut down automatically. "Man Stop Only!!" will be displayed in the LCD. Shut down the genset manually as previously described.

NOTE: The Gen Quiet Fault error is not actually a system error or fault but rather an alert that the system has reached the selected auto-start parameter during the quit time selected.
The Gen Quiet Fault error is automatically reset at the end of the quiet time period if no other action is taken.

3. Low AC Input V
The Low AC Input V Fault error indicates the input ac voltage is below 45 V ac (B+ is present-Power Tech generators only). The red error LED is ON and the buzzer sounds. When the ac voltage is above 45 V ac, this error message will disappear.
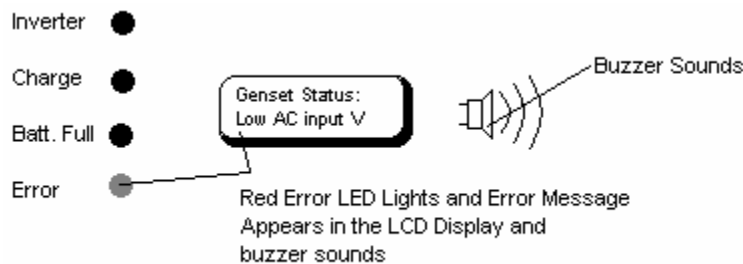
Fig. 4-5.12

NOTE: Press any arrow push button to cancel the buzzer.

Inverter Mode Messages
When the inverter is ON (no ac present), it is either inverting or measuring the ac output circuits for a load meeting the specifications set up in the Search Sense menu selection, *see figs. 4-5.13 and 4-5.14*, (if the Search Mode is selected). When the inverter is in the Search mode, "Searching" appears in the LCD display and the green inverter Led will slowly flash.

Inverter

Charge

Batt. Full

Error

System Status:
Searching

Green LED Slowly
Flashes and Searching
Appears in LCD

Fig. 4-5.13

Inverter

Charge

Batt. Full

Error

System Status:
Inverting

Green LED is on solid
and inverting appears
in the LCD
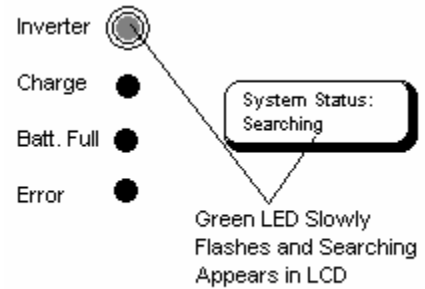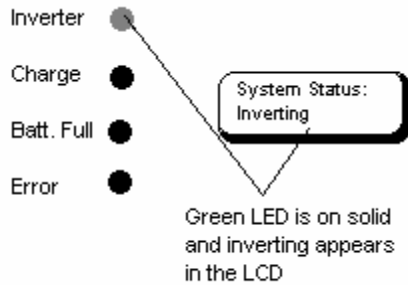
Fig. 4-5-14

When the inverter/charger is in the inverter mode (no ac available), "Inverting" appears in the LCD display and the green inverter LED is on solid.

NOTE: The Inverter LED will slowly flash during the charge mode if the inverter is switched ON and will be OFF if the inverter is switched OFF.

Charger Mode Messages
When ac (shore power) is available, the inverter/charger automatically switches to the charger mode. There are four separate charger modes: Bulk, Absorption, Float and Equalization. Refer to the Inverter/Charger Operator's Manual for details on charger modes.

1. Bulk Charging
When the charger is charging in the Bulk mode, the LCD display "Bulk Charging" and the charge LED will be on solid.

Inverter

Charge

Batt. Full

Error

System Status:
Bulk Charging

will

Yellow Charge LEDis on solid and Bulk Charging
appears in the LCD
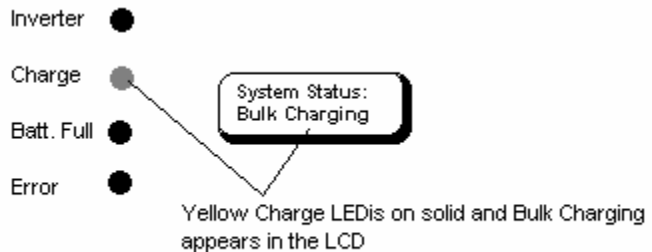
Fig. 4-5.15

2. Absorption Charging
When the charger is charging in the Absorption mode, the LCD displays "Absorption Chg" and the Charge LED slowly flashes. In addition, the Batt. Full LED will start to flash when the battery reaches 90% state-of-charge (SOC). The ON duration of this LED increases as they batteries SOC increases and is ON solid at 100% SOC.

Inverter

Charge

Batt. Full

Error

System Status:
Absorption Chg

Yellow Charge LED slowly flashes and Absorption Chg
appears in LCD Batt. Full LED flashes according to the SOC
(between 90-100%).
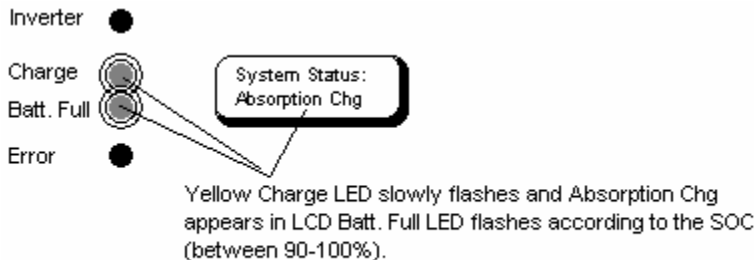
Fig. 4-5.16

3. Float Charging

When the charger is in the Float mode, the LCD displays "Float Charging" and the Charge LED will quickly flash. At this point the batteries are fully charged (100%) and the Batt. Full LED is ON solid.

Inverter ●

Charge ◎

System Status:
Float Charging

Batt. Full ●

Error ●

Yellow Charge LED fast flashes and Float Chg appears in LCD. Batt. Full LEd is ON solid.
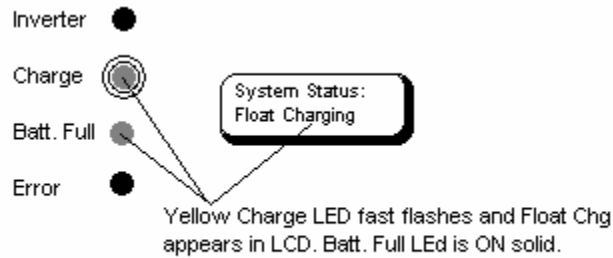
Fig. 4-5.17

4. Equalizing Charging (Liquid Lead Acid and AGM Batteries ONLY)

To activate the Equalize mode, press and hold the Settings push button (RIGHT arrow) until the LCD display clears land "Equalizing" appears (approximately 6 seconds). The Charge Led will increase its flashing rate to approximately eight flashes per second (flickering). The Equalize charge will continue for 3 hours and then automatically change back to Float.

NOTE: Equalizing the batteries should only be done with the batteries are fully charged (i.e. from Float mode) and only on liquid lead acid or AGM batteries. Vent caps on batteries (lead acid only) should be removed before running the Equalize mode. If the Equalization charge mode is cancelled, (by pressing and holding the Settings push button for approximately 6 seconds) the LCD display will indicate the System Status as Absorption chg for approximately 30 seconds before returning to Float charging.

⚠️**CAUTION: Only Liquid Lead Acid or AGM batteries should be equalize charged. Running an equalize charge on batteries other than liquid lead acid or AGM types could permanently damage them.**

⚠️**CAUTION: Do not attempt to remove vent caps on AGM batteries. Doing so may void the warranty.**

⚠️**CAUTION: All dc loads should be disconnected during the equalize charge period due to the higher voltage applied to the batteries (15+ volts dc). Refer to the inverter manual Equalize Charging section for details.**

NOTE: The equalizing mode is defeated if GEL cell is selected as the battery type.

Inverter ●

Charge ◎

System Status:
Equalizing

Batt. Full ●

Error ●

Yellow Charge LED quickly flashes (8/second), Equalizing appears in LCD, and Batt. Full LED is ON solid.
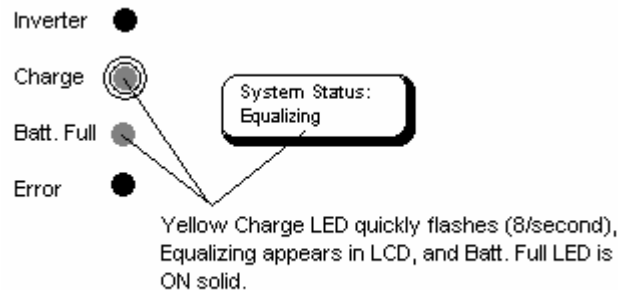
Fig. 4-5.18

Inverter Charger Error Messages

Error messages display when a fault is detected with either the inverter or charger. The red Error LED lights, and the buzzer sounds. Error message for the inverter/charger display the error condition as well as a suggested remedy.

1. Over Temperature

The "Otemp/Less Load" System Status message indicates the inverter/charger transformer and power components have exceeded a safe operating temperature. Reduce the load on the inverter. When the unit has cooled, it will automatically reset and resume operation. If these condition occurs often, make sure the inverter is in a cool location, has adequate ventilation and the cooling fan is operational.
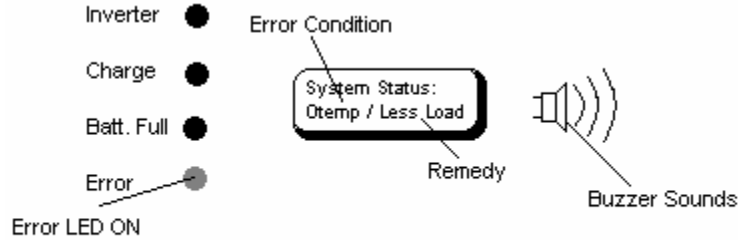
Fig. 4-5.19

NOTE: Press any arrow push button to cancel the buzzer.

2. Overload

The "Overload" System Status message is displayed when the load on the inverter/charger exceeds the maximum power rating of the unit. Reduce the load and restart the inverter/charger by pressing the ON/OFF push button on the RC7GS twice.
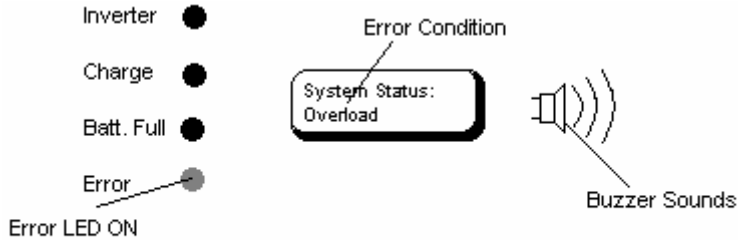
Fig. 4-5.20

NOTE: Press any arrow push button to cancel the buzzer.

3. High Battery Voltage

The "Hibat/Stop Chrg" System Status message is displayed when the battery voltage is too high. Switch off any other charging source to allow the voltage level to drop. The inverter automatically resets and resumes operation when the battery reaches a safe voltage level. This condition usually occurs only when an additional charging source is used to charge the battery bank.
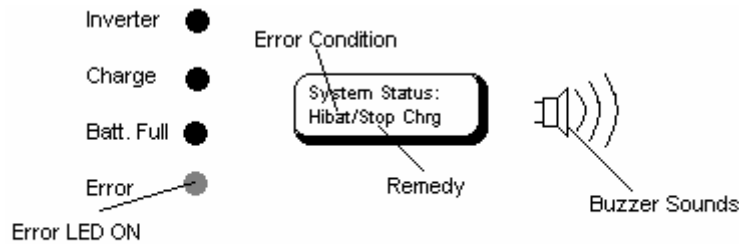
Fig. 4-5.21

NOTE: Press any arrow push button to cancel the buzzer.

4. Low Battery Voltage

The "Lobat/Start Chrg" System Status message is displayed when the battery voltage drops below a safe level. The red Error Led illuminates and the Buzzer sounds. The inverter shuts off to prevent damage to the batteries. Provide an ac supply (such as shore power or a generator) to the inverter/charger to automatically start charging the batteries.
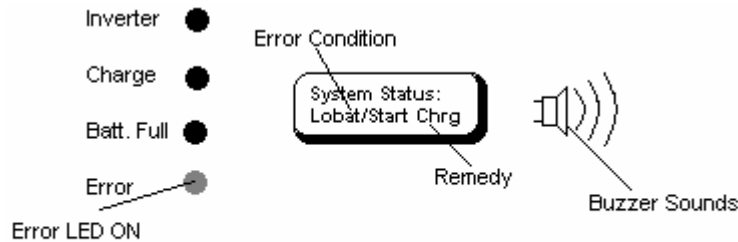
Fig. 4-5.22

NOTE: Press any arrow push button to cancel the buzzer.

5. DCLD Lockout Error

The "DCLD Lockout Err" System Status message is displayed when the +12 V dc supplied to the "DCLD" input wire of the inverter/charger is lost and the DCLD feature is activated. In addition, the red Error LED will light and the buzzer will sound for approximately four minutes.

The DCLD (DC Load Disconnect) feature can be used to shut off the inverter/charger whenever +12 V dc is not available on this terminal.

NOTE: Older units require a hardware modification to activate this feature. Refer to the instructions in the upgrade kit for DCLD.

NOTE: The DCLD is not an error or fault with the system. It is an alert, indicating that the inverter is not running.
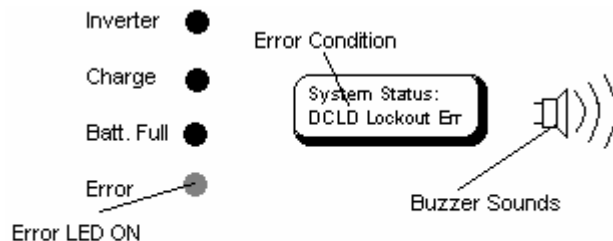
Fig. 4-5.23

NOTE: Press any arrow push button to cancel the buzzer.

6. Charger Fault

The "Charger Fault" System Status message is displayed when an internal error is detected in the inverter/charger during charging. In addition, the red Error LED is ON and the buzzer sounds. After 15 minutes, the charge relay disconnects and the inverter section is shut down. The LCD displays "System Status Overload."

This fault indicates there is a hardware failure in the charger circuitry of the inverter/charger. If this message appears, contact Trace Engineering or the nearest Service Center.
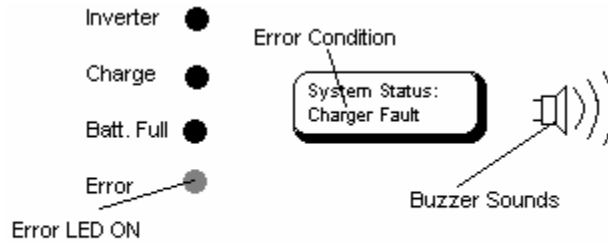
Fig. 4-5.24

NOTE: Press any arrow push button to cancel the buzzer.

Meters Display

The RC7GS have built-in meters that monitor inverter/charger activities. To view these meters, press and hold the Meter Mode push button (UP arrow) for five seconds until the display clears. Use the DOWN arrow push button to scroll through the meter displays. The information contained in these displays can be useful for troubleshooting the system.

1. Average Shunt Amps

This meter displays the averaged current flowing through the internal shunt (external shunt if more than one inverter/charger is used) to and from the batteries.
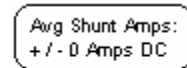
Fig. 4-5.25

2. Battery Voltage
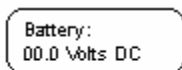
This meter displays the current battery voltage level. Use this meter to check the condition of the batteries or monitor the levels under load.

Fig. 4-5.26

3. Inverter/Charger Current

This meter displays the actual dc current supplied to the batteries when it is charging (+) and current drawn from the batteries when it is inverting (-)
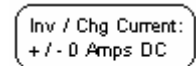
Fig. 4-5.27
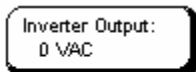
4. AC Output Voltage

This meter displays the actual inverter ac output voltage measured at the ac output. When in the charger mode, the meter will read "0 VAC." Search mode is indicated by "< 40 VAC" appearing in the display.

Fig. 4-5.28

5. AC Input Amps

This meter displays the actual ac current (in amps) flowing through the inverter's AC INPUT HOT 1 terminal.

AC Input:
1 Amps AC
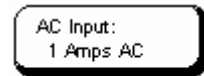
Fig. 4-5.29

6. Battery Temperature

This meter displays the external temperature of the battery bank when equipped with a Batter Temperature Sensor (BTS). The scale is divided into counts, which do not directly correspond to the Fahrenheit or Celsius temperature scale. A higher reading indicates a lower temperature. This meter is useful for service technicians.

Battery Temp:
000 Counts
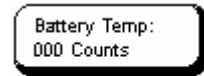
Fig. 4-5.30

7. Transformer Temperature

This meter displays the internal temperature of the inverter/charger's transformer. The scale is divided into counts, which do not directly correspond to the Fahrenheit or Celsius temperature scale. A higher reading indicates a lower temperature. This meter is useful for service technicians.

Xformer Temp:
000 Counts
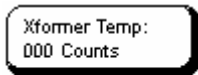
Fig. 4-5.31

8. FET Temperature

This meter displays the relative temperature of the Field Effect Transistors. The scale is divided into counts, which do not directly correspond to the Fahrenheit or Celsius temperature scale. A higher reading indicates a lower temperature. This meter is useful for service technicians.

FET Temp:
000 Counts
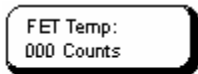
Fig. 4-5.32

9. Estimated Battery Capacity

This meter displays the estimated battery amp-hour capacity based upon the average amp-hours used and the rate and duration of the charging cycles. Multiply the reading by eight to arrive at the approximate battery capacity. This is only an approximation and becomes more accurate as the number of charge/discharge cycles increases (approximately 15-20 charge/discharge cycles).

Est. Bat. Cap:
00 Amp-hrs(x8)
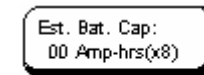
Fig. 4-5.33

NOTE: If battery power is removed from the inverter, the calculation process restarts. 15-20 charge/discharge cycles must complete to reach accurate battery capacity.

System Status Messages

After installing the RC7/RC7GS, the LCD screen displays operating system status messages, which is the default screen after exiting all other settings or meter functions. Operating parameters include: Battery State-of-Charge (SOC), Time Remaining to Run, Time Left to Charge and Set Shore Power. The Gen Start-Stop switch is also available from these displays (RC7GS only).

Press the DOWN arrow to scroll through each display. When the last menu item is reached, the display wraps back to the first menu item in a continuous loop.

1. Battery State of Charge

This meter displays the estimated state-of-charge (SOC) of the battery or battery bank. The SOC is based on the estimated battery capacity. Since discharging the batteries to less than one half of their amp-hour capacity may damage the batteries, the meter estimates the 0% SOC and protects the batteries from over discharge.

Batt State of Charge:
xx% Full

Batt State of Charge:
E 00000000000 F

Fig. 4-5.34

The display can be viewed as a percent-of-capacity or bar graph by pressing the right down arrow.

Fig. 4-5.35

2. Time Left to Run

This meter displays the estimated hours the batteries will support the load before requiring recharging. The meter is accurate to 1/10 of an hour (6 minutes).

3. Time Left to Charge

This meter displays the estimated hours required to charge the batteries to full capacity. The meter is accurate to 1/10 of an hour (6 minutes).
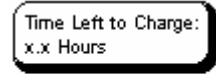
Fig. 4-5.36

4. Set Shore Power

This meter sets the shore power input (from 5-30 amps) so the total current draw from the charger does not exceed the circuit breaker rating, to provide the maximum current to the ac loads. Use the Settings push button (RIGHT arrow) to change this setting to match the circuit breaker rating of the ac power source.

Fig. 4-5.37

NOTE: The maximum current draw from the 3000-kVA unit's charger is 28 amps.

NOTE: This setting does not prevent the loads from exceeding the shore circuit breaker rating.
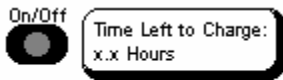
Fig. 4-5.38

5. Generator Start/Stop

The generator can be manually started or stopped from this display by pressing the On/Off push button on the RC7GS front panel.

NOTE: Starting the generator from this display overrides all auto-start/stop function and displays "Man/Stop Only!" on the User Status menu. Stopping the generator returns the auto start/stop functions.

The RC7GS Users Menu

System Status Messages

AC Source	Inverter Mode	Charger Mode	Error Mode
System Status: Waiting for AC	System Status: Searching	System Status: Bulk Charging	System Status: Otemp / Less Load
System Status: AC Available	System Status: Inverting	System Status: Absorption Chrg	System Status: Overload
		System Status: Float Charging	System Status: Hi Bat / Stop Chrg
		System Status: Equalizing	System Status: Lo Bat / Start Chrg
			System Status: DCLD Lockout Err
			System Status: Charger Fault

RC7GS Only

Genset Status: Pending Genstart	Genset Status: Man Stop Only!!	Genset Status: Gen wont Start
Genset Status: Cranking Genset		Genset Status: Low AC Input V
Genset Status: Starter Cooldown		Genset Status: Gen Quiet Fault

System Status Display

Batt State of Charge: xx% Full	Batt State of Charge: E 000000000000 F
Time Left to Run: x.x Hours	
Time Left to Charge: x.x Hours	
Set Shore Power: x.x Amps	
Gen Start / Stop: Press (ON / OFF)	

Meters Display

Avg Shunt Amps: +/- 0 Amps	Battery Temp: 000 Counts
Battery: 00.0 Volts DC	Xformer Temp: 000 Counts
Inv / Chg Current: +/- 0 Amps DC	FET Temp: 000 Counts
Inverter Output: VAC 0	Est. Bat. Cap: xx Amp-hrs (x8)
AC Input: 0 Amps AC	

Fig. 4-5.39

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*4-6 Battery Systems*_____

4-6.1 Chassis Batteries

Two 12-volt maintenance free 810 CCA batteries wired parallel produce power for starting the motor home engine.

4-6.2 Battery Charger

One 160-Amp battery charger (integral with the Trace 3000 inverter) operates when a source of 120 volts of AC is supplied from either shoreline or generator. The charger is connected to the motor home batteries. Enabling the auxiliary battery switch on the lower dash may also charge the engine batteries.

4-6.3 Generator Battery

A separate 12V rated at 530 CCA battery is installed for starting the generator.

4-6.4 House Batteries

The house battery system consists of three Lifeline 4D AGM batteries with an Amp-Hour rating of 210 alt each. With the Lifeline batteries you get:
- Aircraft class cell construction:
    - Lowers internal resistance for high repeated engine start current.
    - Withstands shock and vibration much better than standard flooded or gelled electrolyte designs.
- Twice as many discharge/charge cycles as the leading gel battery depending on depth of discharges.
- Faster recharge, no current limitations with voltage regulated recharging
- Much better charge retention than low cost, flooded cell types, even at high ambient temperature.
- Full recharge after 30 days storage in a full discharge condition (77°F rating).
- Less than 3% per month self discharge at 77°F (25°C); less at lower temperatures.
- Sealed construction with absorbed electrolyte-no shipment restrictions, submersible without damage; install in any position; no need for watering.
- Cell safety vent valves-pressure regulated, non-removable.
- Rugged, non-marring polypropylene (copolymer) case/cover.
- Safety-even during severe overcharge the Lifeline AGM battery produces less than 2% hydrogen gas (4.1% is required for flammability in air)

Deep Cycle Batteries Specifications

PART NUMBER	NOM VOLTS	OVERALL DIMENSIONS			UNIT WT Lbs. (Kgs)	CCA	CCA	CCA	CAPACITY AMPERE HOURS	MINUTES OF DISCHARGE@		
		L in (mm)	W in (mm)	H in (mm)		68°F	32°F	0°F	@20 HR. RATE	25 AMPS	15 AMPS	8 AMPS
GPL-U1T	12	7.71 (196)	5.18 (132)	6.89 (175)	24 (10.9)	325	275	215	33	50	93	185
GPL-24T	12	11.13 (283)	6.77 (172)	9.25 (235)	56 (25.5)	800	680	550	80	149	259	524
GPL-27T	12	13.09 (333)	6.77 (172)	9.25 (235)	65 (29.5)	845	715	575	100	186	324	655
GPL-31T	12	12.90 (328)	6.75 (172)	9.27 (236)	69 (31.4)	880	750	600	105	195	340	688
GPL-4DA	12	20.75 (528)	8.71 (222)	10.09 (257)	135 (61.2)	1595	1360	1100	210	390	680	1375
GPL-4DL	12	20.75 (527)	8.71 (222)	10.44 (266)	135 (61.2)	1595	1360	1100	210	390	680	1375
GPL-8DA	12	20.72 (527)	10.94 (278)	9.88 (251)	162 (73.6)	1975	1675	1350	255	475	825	1670
GPL-8DL	12	20.72 (526)	10.94 (278)	10.23 (260)	162 (73.6)	1975	1675	1350	255	475	825	1670
GPL-4C	6	10.27 (261)	7.12 (181)	11.54 (294)	66 (30.0)	1095	925	750	220	492	856	1692

Terminals: GPL-24T, GPL-27T & GPL-31T are heavy duty silicon-bronze Marine Terminals and the GPL-U1T is a 6mm copper alloy threaded insert. All "T" batteries supplied with brass bolts and washers. A=Automatic Post. L=L bladed terminal 8mm bolt hole and supplied with bolts and washers. **Handles:** "T" models-Handles are built into cover design. GPL-24T and GPL-27T also incorporate strap handles. Handles not available on part numbers GPL-4C and GPL-31T. Models GPL-4D & GPL-8D are equipped with rope handles. **Ratings:** Capacity ratings are stated at 77°F (25°C) to 1.75 volts per cell. **Drawings:** Product drawings for each model available upon request.

Starting Batteries Specifications

PART NUMBER	NOM VOLTS	OVERALL DIMENSIONS			UNIT WT Lbs. (Kgs)	CCA	CCA	CCA	CAPACITY AMPERE HOURS
		L in (mm)	W in (mm)	H in (mm)		68°F	32°F	0°F	@20 HR. RATE
*GPL-1400T	12	9.78 (249)	5.17 (132)	6.83 (174)	32 (14.5)	850	700	550	57
*GPL-2400T	12	11.13 (283)	6.77 (172)	9.25 (235)	53 (24.1)	870	790	650	75
*GPL-2700T	12	13.09 (333)	6.77 (172)	9.25 (235)	63 (28.6)	1020	900	745	95
*GPL-3100T	12	12.90 (328)	6.75 (172)	9.27 (236)	67 (30.4)	1120	950	810	100

Ratings: Capacity ratings are stated at 77°F (25°C) to 1.75 volts per cell.
Drawings: Product drawings for each model available upon request.
*NOTE: These are starting batteries only. SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

4-6.5 Split Battery Power System
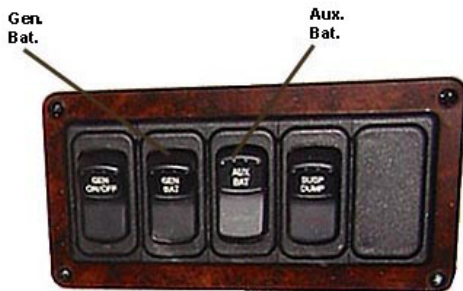
Battery switch panel, located to the left of the instrument panel, on the bottom.

Three separate systems above are provided. The house battery system supplies 12-volt power for all interior items and exterior lighting. The engine battery system provides power for the engine cranking and ignition. The two systems are tied together only by the auxiliary battery switch on the lower dash and when the ignition is on. The generator battery provides power for generator cranking and is charged by an alternator on the generator. A generator auxiliary battery switch is provided to permit cranking the generator in the event that the generator battery becomes discharged. This power is provided by the house battery system.

4-6.6 Battery Maintenance

Your motor home is equipped with separate engine and house battery systems for greater assurance that there will be sufficient voltage to crank the motor home engine.

Three engine batteries are located in the engine compartment on the curbside. The three house batteries are located in the first luggage bay.

The house and engine batteries are charged from either the alternator or the inverter battery charger. The auxiliary battery switch is in the ON position in order for the inverter battery charger to operate, either the generator must be running or the motor home must be connected to a shoreline supply.

To make sure that the batteries are always ready for use, periodically check and charge them as necessary.

A dirty battery may eventually dissipate its charge through conductive surface contamination. Clean the engine battery top surfaces with a damp cloth and dry thoroughly. Check that battery terminals and associated battery jumper terminals are tight and free of corrosion. To clean terminals, neutralize corrosive deposits with a solution of baking soda, rinse with clear water, and dry. Note that commercial type spray-on battery cleaners are available at automotive supply stores. Use as directed to keep the batteries clean. Spray-on cable and terminal protective coatings are also available, easy to use, and effective. The house batteries are located in a sealed, vented, battery box in Bay 1.

⚠ **CAUTION: Avoid sparking of any form in the vicinity of the batteries.**

⚠ **CAUTION: Do not wear metal rings, watches or jewelry when working on or near the batteries, cable, solenoids or chassis wiring. These can short out electrical wiring and cause injury.**

4-6.7 Battery Storage in Freezing Weather

Batteries that are not kept fully charged must be given protection against freezing. Partially charged batteries will freeze at low temperatures, so batteries must either be left charged or removed from the vehicle and stored in a warm location.

The motor home can be left connected to the shoreline AC supply and the inverter battery charger will keep the motor home batteries charged.

NOTE: The inverter must be turned on to charge the batteries.

NOTE: Even in a warm location it is advisable to keep the batteries charged to prevent deterioration. The engine batteries are the sealed type and require no electrolyte service.

Coat battery terminals with lubricant or protective coating.

4-6.8 Battery Terminals and Jump Starting

The proper procedure for jump-starting, using the Wanderlodge® engine batteries, is as follows:

1. Turn off all main battery-operated accessories in both vehicles such as the lights, radio, etc.
2. Connect one end of the positive-coded jumper cable to the positive (+) battery terminal, and the opposite end of the cable to the positive (+) terminal on the other battery.
3. Connect one end of the negative-coded jumper cable to the negative (-) terminal on the other battery and the opposite end of the cable to the Wanderlodge engine block.
4. Once the engine of the disable vehicle is started and brought up to idle, reverse the above procedure to remove the jumper cables. Always remove the jumper cable connected to the Wanderlodge engine block terminal first to prevent sparks at the other battery.

⚠ **CAUTION: Avoid sparks in the vicinity of a charging battery. The gas produced is explosive.**

*4-7 Leveling System*_____

Your motor home comes equipped with a "Big Foot" Hydraulic Leveling System from Quadra Manufacturing, Inc. The "BIG FOOT" Leveling System is the finest available in the industry today. Many of its features are not available on other systems. We take great pride in offering you a system which when operated and maintained properly, provides many years of trouble free use. The system is like anything mechanical; if you follow the basic operating procedures and keep the system properly maintained it will give you higher quality and more consistent performance.

4-7.1 Operating Instructions for Automatic Control Panel with Manual Option:

1. Turn Power Switch On

NOTE: Immediately upon power initialization the system will enter a 30-second self-diagnostic mode, indicated by the Directional LEDS and the Level Indicator flashing. Upon completion of this mode, one or two Directional LEDS will be lit with one flashing. A lit LED indicates the end and/or side of the vehicle that is low. If the vehicle is in a level position, only the Level Light will flash.

2. Select Auto or Manual Mode by pressing the corresponding touch pad.

Operate Air Dump by engaging Air Dump switch located on the dash panel.

If Auto Mode was selected, proceed to "Automatic Mode" Step 3.
If Manual Mode was selected, turn to "Extending Levelers Individually"

AUTOMATIC MODE:
3. WAIT WHILE WATCHING THE PANEL.
The system will lower both legs at the lowest end of the vehicle. When the first leg reaches the ground it will cause the system to sense motion and stop. Next, each leg will be lowered individually confirming ground contact by causing the system to sense motion. The system will then repeat the process for the other end of the vehicle.

4. WAIT WHILE WATCHING THE PANEL
The system will repeat Step 3 for the other end of the vehicle then level the vehicle in all other directions. Completion of this process is indicated by illumination of the Level Light.

4-7.1.1 Retracting Levelers while in Automatic Mode

IMPORTANT! After the levelers are retracted make a visual check to be sure all legs are retracted before moving the unit!

Determine if the power to the Control Panel was left on or turned off, and proceed as follows:

If the Control Panel Power Was Turned On: Press the Retract Pad and release. All legs will automatically retract and cause the All-Up LED to light.

If the Control Panel Power Was Turned Off: Turn power on and wait for the system to go through a 30-second self-diagnostic mode, indicated by the Directional LEDS and the Level Indicator flashing. Press the Retract Pad and hold in until all levelers are completely retracted as indicated by the All-Up LED being lit.

4-7.1.2   Manual Mode or Extending Levelers Individually
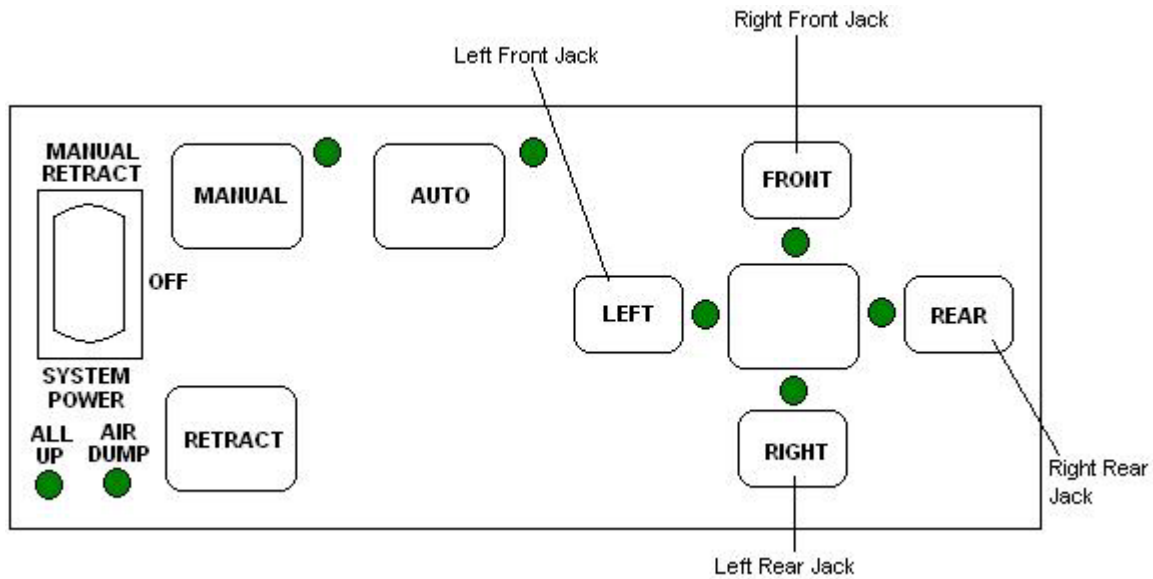
1. Push and hold manual button until indicator light is illuminated indicating system is in manual mode. (*See figure above*).
2. Press buttons on side panel four button panel individually to extend levelers.

NOTE: Make certain to run jacks in pairs by pushing either the front and left buttons together or the right and rear buttons together.

4-7.1.3   To Operate Manually

To level manually extend two levelers at a time by pushing jacks in pairs. For example, either by pushing the front and left together or the right and rear together.

4-7.2 Maintenance Guide

One advantage of owning a Big Foot Leveling System from Quadra Mfg. is that your system requires very little in the way of maintenance. Here is a guide to follow for years of carefree service.

NOTE: Maintenance related problems and maintenance service are not covered by warranty.

Check the fluid level at least once a year:
- Remove the red fill cap at each leveler and use a wire-tie as a dipstick (not provided) to check the fluid level. The correct level is ¾" from the top of the reservoir.
- If needed, fill with Dexron II or III transmission fluid. The standard reservoir holds 54 oz. And the deep reservoir holds 141 oz.

Under mild to normal weather conditions:
- Extend levelers and spray the rams of the hydraulic cylinders with silicone* spray twice a year. Let the spray dry and retract the levelers.

If you leave your levelers extended over a period of time:
- When camping or storing your vehicle for the winter, be sure to spray the rams of the hydraulic cylinders with silicone spray before retracting your levelers to avoid tearing the cylinder's seal.

Under severe weather conditions:
- The above procedure should be followed on a monthly basis if conditions exist that result in your levelers being exposed to high amounts of salt, dirt and wind.

Limit pins:
- Clean with brake cleaner and then spray with clear silicone twice a year.

Routinely check your footpads:
- The bolt should be tightened with a 15/16 socket on an impact wrench and a 1-1/8" narrow head wrench.
- Torque footpad to 120 lbs. Over time, vibration may work footpads loose.
  *Use ONLY silicone spray

4-7.3 Troubleshooting

PANEL:
Power On button is pushed but no indicators are lit on panel –
- Fuse on the back of the panel is blown.
- White wire on the four-wire pigtail is not getting constant power.
- Ground wire may not be getting a good ground.
- White or black wire on pigtail may be pushed back in the plug.

Vehicle is started and levelers are down but the warning alarm does not sound –
- Yellow wire is not getting power when the key is turned forward.
- Yellow wire may be pushed back in the plug.

Cylinders will not retract and the red indicator light is not lit –
- Limit pin on the cylinder may be stuck.
- Limit pin wire on the main wire harness may be pushed back in the plug.
- Limit switch ground wire on the tank assembly may not be grounding properly.

Cylinders will not extend or retract –
- The 120 amp breaker has been tripped.
- Wires on the tank solenoids have a break or are not making a good connection.

Air dump is pressed but air does not dump from one or more of the bags. (For systems equipped with air dumps supplied by Quadra Mfg. Inc. only) –
- The blue wire on the pigtail is not making a good connection with the blue wire on the main wire harness.
- One of the black wires on the air dump has not been connected to the blue wire on the main harness.
- The air dumps are not getting a good ground to the vehicle chassis.

CYLINDERS:
Cylinders do not fully extend or retract –
- Air trapped in the cylinder.
- Hydraulic lines are plumbed backwards.
- There is no fluid or low fluid in the tank reservoir.

Cylinder continues to run after the panel button has been released –
- Tank solenoids may be sticking.
- Panel switch may be sticking.

Cylinder will not lift or hold the weight of the motor home –
- Lines may be plumbed backwards.
- Back pressure circuit in hydraulic pump is bad
- Damaged piston seal inside cylinder

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*4-8 Awning Operation*_____

Your motor home comes equipped with three manual awnings, a patio awning, a slide-out awning and a window awning. Zip Dee, Inc manufactures all three. An optional power awning can be purchased for the patio awning, which is manufactured by Girard RV Products, Inc. See below for basic operation of these awnings.

4-8.1 Awning Operation with Clamp Wheels

4-8.1.1 Opening

1. Insert the pull rod behind the Z-Lock lever and pull downward (Fig. 1A). This releases the awning. Then turn the clamp wheel counterclockwise and swing the assembly toward the center to free the hardware) (Fig. 1B).

    NOTE: Leave Z-Lock open when awning is open to avoid damage.
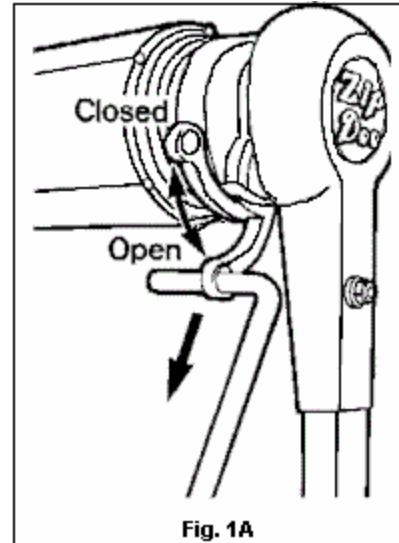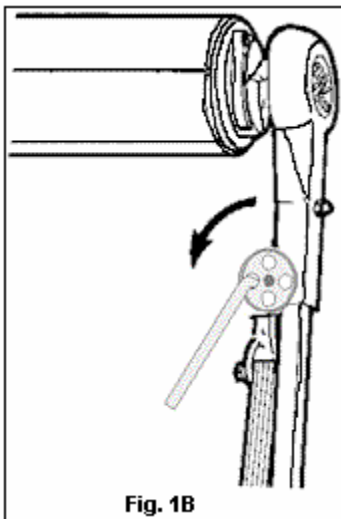
Fig. 1A

Fig. 1B

2. Insert the pull rod into the loop of the center control strap and unroll the awning by pulling it toward you (Fig. 2). Step under the awning and fold or roll the control strap toward the backside of the roller and tuck under restraining strap.

Fig. 2
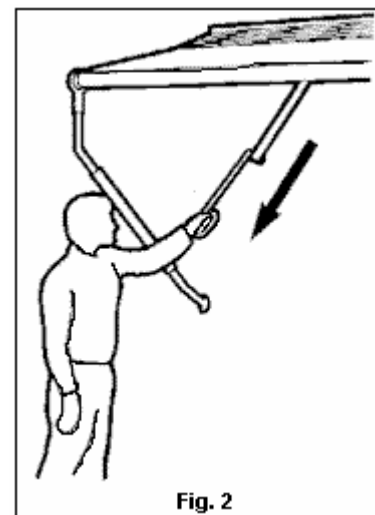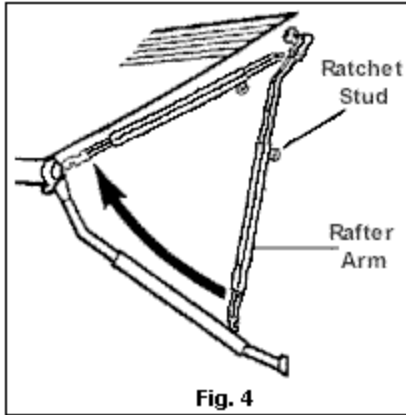
Fig. 4

3. Release the rafter arm by pulling outward on the cap of the ratchet stud located on the upper portion of the arm (Fig. 4). Extend the arm and place the claw over the shaft of the roller.

4. Set the spring tension of the rafter arm by grasping the outer tube and pushing briskly forward in the direction of the arrow as shown in Fig. 5 until a click is heard indicating the arm is locked. At this point the awning fabric will be taut.

NOTE: Leave Z-Lock open when awning is open to avoid damage.
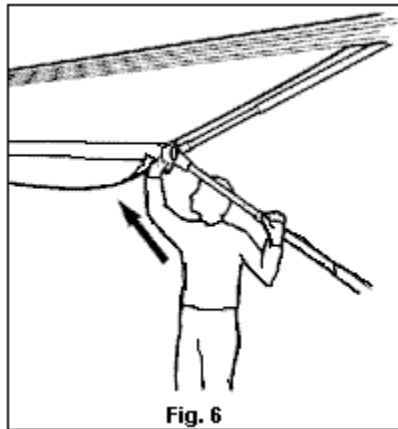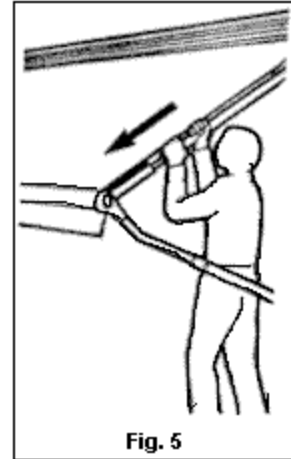
Fig. 5

Fig. 6

5. Raise the awning to the desired height by releasing the snap stud on the main arm and pushing up and outward on the roller assembly (Fig. 6).
REPEAT STEPS 3-6 FOR THE OTHER END OF THE AWNING.

Partial Extension or "Caravan" Position

1. Follow Steps 1 and 2 above.
2. Insert the pull rod in the loop of the center control strap and unroll the awning to the desired extension (Fig. 7).
3. To prevent billowing, hook the claw of the unextended rafter arm over the roller shaft (Fig. 4). This will require the awning be extended approximately four and one half feet.
4. Raise the awning to the desired height by following Step 6 above.

Fig. 7
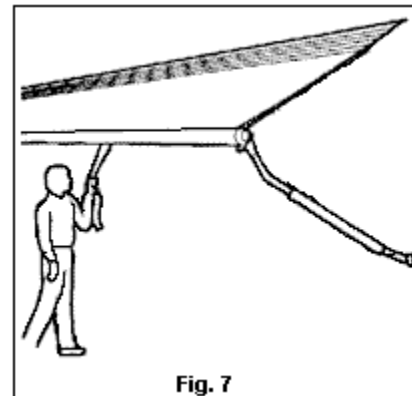
4-8.1.2 Closing

1. Release the snap stud of the main arm and lower the awning.
2. Release the ratchet stud on the rafter arm by pulling outward on the cap. Lift the claw from the roller shaft and place it on the height adjustment stud located on the inside of the main arm. This allows a "scissors-like" action that helps guide the arm upward.
3. Repeat steps 1 and 2 for the other end of the awning.
4. Face the awning and hold the end of the control strap firmly in one hand then push the roller up briskly with a rolling motion until you feel the spring take over. Control the speed by holding the control strap and let the awning roll freely the rest of the way. This additional force will help tighten the fabric around the roller for the tightest, neatest appearance.
5. Lock the awning in place by reversing Steps 1 and 2 of the opening procedure (Figs. 1A and 1B).

NOTE: If you don't have clamp wheels (Fig. 1B), see Universal Operation later in this manual.

4-8.2 Universal Awning Operation

4-8.2.1 Opening

1. Insert the pull rod into the Z-Lock lever and pull down (Fig. 8). This releases the awning.

   NOTE: Leave Z-Lock open when awning is open to avoid damage.
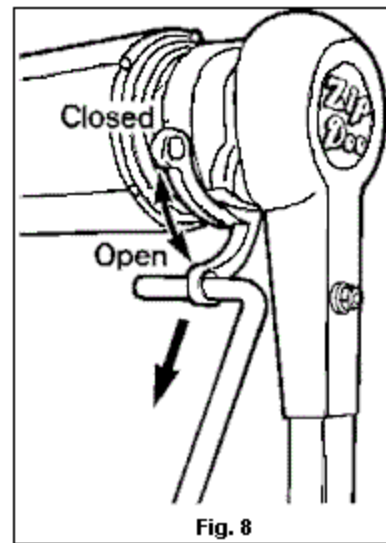
Fig. 8

2. Insert the pull rod into the loop of the center control strap and unroll the awning by pulling it toward you. (Fig. 9). Step under the awning and roll or fold the control strap toward the backside of the roller and tuck under the restraining strap.

Fig. 9
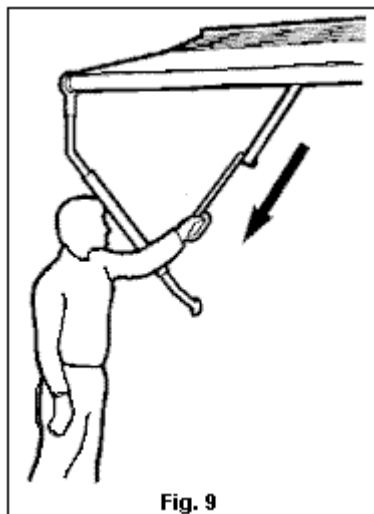
3. Release the rafter arm by pulling outward on the cap of the ratchet stud. Raise the arm upward toward the case (Fig. 10). Extend the arm and set the claw shaped end into the slot of the rafter lock (Fig. 11).

Fig. 11

Fig. 10
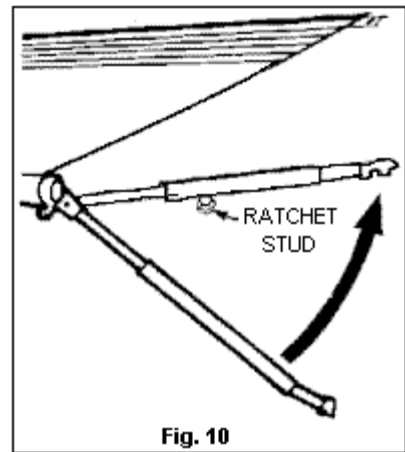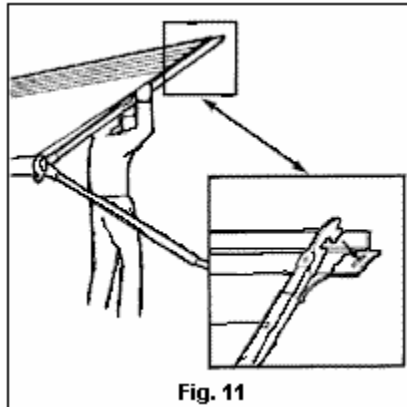
4. Lock the rafter arm in position by pressing down on the steel main arm bar (Fig. 12) until the ratchet stud clicks. At this point the fabric will be taut.
5. Raise the awning to the desired height by releasing the snap stud on the main arm and pushing up and out on the roller assembly (Fig. 13).

Fig. 13

Fig. 12
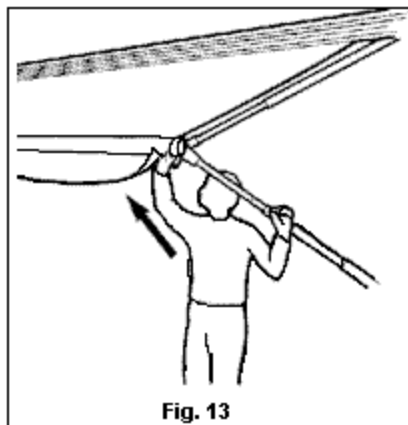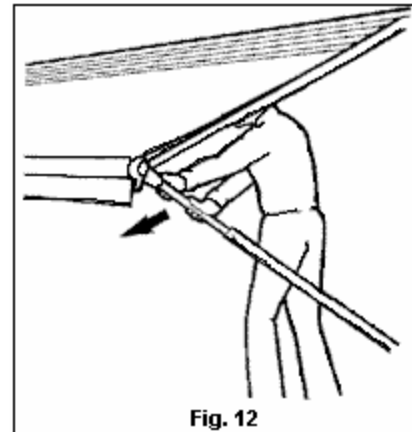
NOTE: Leave Z-Lock open when awning is open to avoid damage.

Partial Extension or "Caravan" Position

1. Follow Step 1 above.
2. Insert the pull rod in the loop of the center control strap and unroll the awning to the desired extension.
3. To prevent billowing, release and raise the rafter arm (Fig. 10) and hook the claw of the arm into the slot of the rafter lock (Fig. 14). This will require the awning to be extended approximately four and one half feet.
4. Raise the awning to the desired height by following Step 5 above.

Fig. 14
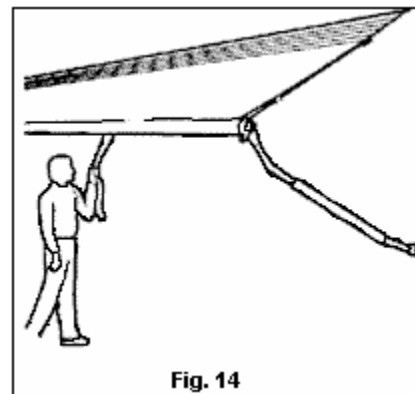
4-8.2.2 Closing

1. Release the snap stud of the main arm and lower the awning to its bottom most position.
2. Release the ratchet stud of the rafter arm and lift the claw out of the rafter hook.
3. Place the claw casting on the protruding height adjustment stud. To lock the assembly in a travel position, push the other tube downward until the ratchet stud snaps closed. Repeat Steps 1-3 for the other end of the awning.
4. Face the awning and hold the end of the control strap firmly in one hand. Push the roller briskly upward with a rolling motion until you feel the spring take over. Control the speed of closure by holding the control strap until all but 6 inches of the fabric has rolled up. Release the strap and let the awning roll freely the rest of the way. This extra force will help tighten the fabric around the roller to insure the tightest, neatest appearance.
5. Lock the awning in place by flipping the Z-lock lever into the "closed" position using the pull rod.

If Awning Rolls Up Uneven

Observe if the roll-up is even and in line with the clamps (if any). If not, then unroll the awning and give the roller a slight push towards the direction it should go. If you wish to have the awning roll up more in either direction, then spiral the pull strap in that direction.

NOTE: The strap must be spiraled around the roller. This prevents a loose roll and bunching of the fabric.

How to Adjust Spring Tension

There is only one spring, located at the rear end of the awning. The winding procedure uses the main arm bar as a lever, since the spring is connected to the bar through the roller shaft and head casting.

1. Open the Z-Lock lever/levers carefully and allow the awning to open.
2. Support awning roller with ladder or with help of assistant.
3. Disconnect rear main arm from main hinge. Pull outward on snap stud and slide tube portion off from bar (to shorten arm for winding.)
4. Stand at the rear of awning facing front of vehicle and grasp main arm bar. Adjust the spring by winding clockwise to increase tension or counter-clockwise to decrease tension so that the open awning will not start to roll up until given a rolling start by hand of about 12 inches. This will eliminate the need to lock the awning open.
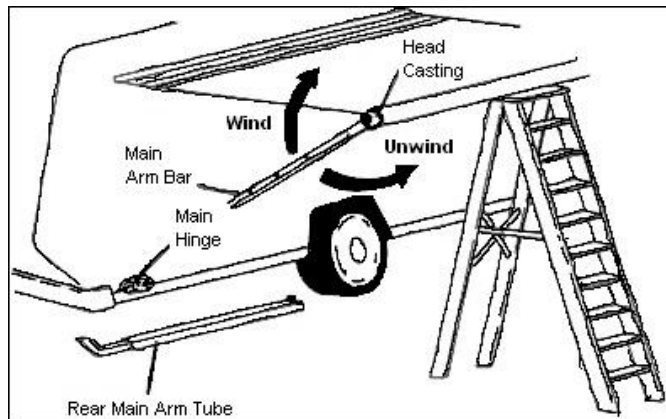
▲WARNING: The spring is under tension. Do not disconnect the bar from the head casting. The weight of the bar is enough to counterbalance the spring tension. Use of any other winding device could be dangerous if not controlled, resulting in personal injury or property damage.

5. After winding, slip the main arm tube back onto the bar and reconnect it to the main hinge on the vehicle and test the tension.

NOTE: Leave Z-Lock lever (both ends) OPEN when awning is open to avoid damage.
Rafter Arm Operation

For proper rafter arm operation the ratchet stud must be correctly installed.

The ratchet stud screws into the tube using a 7/16" wrench and the flat side of the stud should face the end of the rafter tube.

The off center pin can be pushed up or down using pliers so the cap (and the pin that's attached to it) can be re-positioned.

NOTE: The claw opening should face away from the motor home on "Universal Style hardware and TOWARDS the motor home on Contour Style hardware.

On contour hardware the ratchet stud should release easily from the counter sunk stop hole at the top of bar when opening awning.

How to Repair a Bowed Roller

NOTE: This can only be done if there is no crimp or kink in the 3" tube. If the tube is crimped, it is necessary to replace the tube.

1. Unroll the awning.
2. The awning should be supported and held at both ends on the shoulders of two (2) individuals, see Fig. At left. Also, the awning should be walked in toward the motor home approximately one (1) foot, to provide slack in the fabric.
3. Place the bow of the roller facing up.
4. A third person should hang on the tube at the center point of the bow. Doing this gradually will remove the bow.
5. To check for straightness, roll the awning up. If a wobble is present, further straightening is required.
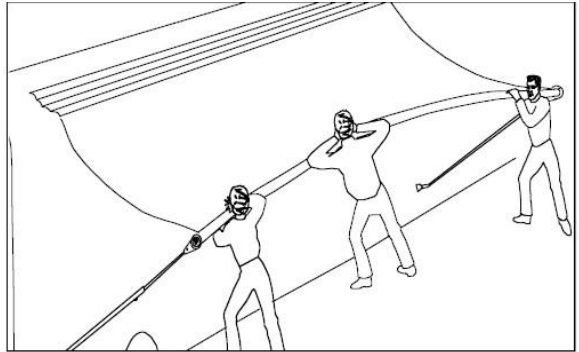
4-8.3 Hardware and Mechanism Maintenance

Although your Zip Dee awning requires less maintenance that any other awning, a little care (about the same amount that you give to your motor home) will keep the metal parts in top shape. The rafter arm assemblies, main arm tubes, and the awning case are anodized aluminum; the castings are high-strength aluminum allows. To keep these parts new looking they should be cleaned once a year with a good quality non-abrasive chrome or aluminum polish.

The main arm bar and all fasteners and stress bearing shafts are stainless steel. These need only be cleaned occasionally to remove accumulated grime that might hinder their operation.

At the end of each season:

- Tighten any loose bolts or screws (Replace missing parts only with factory authorized replacements).
- Clean accessible hardware with non-abrasive cleaner.
- Use a silicone lubricant only on the ½" round shafts that protrude from each end of the roller.
- Extend all telescoping arms as far as possible to wipe off accumulated sand and dirt that can clog and scratch the protective aluminum finish. No lubrication is required on those parts.

Replacement Parts

Use only genuine Zip Dee replacement parts when repairs are needed. Use of substitutes may damage your awning or void your warranty. Parts may be ordered through your local Zip Dee dealer. If you need help, we are as close as your telephone or post office. Use the number and description

found on the parts list in the Zip Dee booklet provided with your motor home when ordering parts and be sure to include the make, model and year of your vehicle. Warranty claims must include the damaged part. If you cannot remove the damaged parts with a replacement, you must purchase the part at full price and receive a refund (if the warranty applies) when we get the damaged part back. Take a moment to copy your hardware serial number and hardware code number from your front main arm tube here _____.

 All parts are sent COD unless your charge card number or check accompanies your order.

4-8.4 Optional Power Awning

If you purchased the optional power awning by Girard RV Products, Inc. below you will find the basic operation instructions for this awning.

4-8.4.1 Operating Instructions

The Girard G-2000 Lateral Arm Awning incorporates the very latest in technology and design. The box awning offers total protection in all weather and features the following advanced features:

- Convenient push button operation - optional remote control for the ultimate in state of the art convenience.
- Heavy duty, lateral arms eliminate clumsy, unattractive, side support arms. The angle of the arms is adjustable from 5 to 35 degrees for maximum comfort..
- Provides 25% more shade than traditional roll-up awnings. The 100% acrylic fabric is weatherproof, permeable to air, and resistant to mildew, rotting and fading.
- Equipped with a manual crank for operation in the event of power failures.
- Exclusive wind sensor system automatically retracts awning in the event of excessively high winds.

4-8.4.2 Crank Operation:

A hand crank is supplied with every awning and easily telescopes from 50 to 82 inches. Simply insert the end of the crank into the receiver, which is located at either the right or left side of the awning. Push up and rotate the handle one-quarter turn clockwise, then let the handle drop about a half-inch. You should then feel the handle lodge in the receiver. You are now ready to extend the awning.

To open the awning, rotate the handle in a counter clockwise direction. To close the awning, rotate in a clockwise direction. When extending awning to full extension, extend only until the elbowing arms "click" and lock themselves into place. Unrolling the awning further than this point will result in excessive slack in awning fabric. Additionally, when awning is rolled past full extension, the fabric can reverse from the bottom of the roller tube to the top of the tube. The fabric must always roll from the bottom. If this should happen, simply crank the awning all the way out until the roller tube is exposed and continue cranking in the same direction. The fabric should then be rolling onto the bottom of the roller tube.

When the awning is extended to the desired position, push up on the crank handle and turn counter clockwise on quarter turn, which will release the crank handle from the housing. The crank handle can then be stored in a convenient place.

4-8.4.3 Motorized Operation (without wind sensor)

The motorized operation is simplicity in itself. The 110-volt motor is housed in the roller tube where it is protected from the elements.

To extend the awning all the way, move the switch to the down position.

After depressing the switch, the awning will then extend to its full projection. To retract the awning, press the switch in the up position. There is no need to hold the switch once it has been activated. To stop the awning at any point in its projection or retraction, move the switch to the middle position. The switch should be left in the center position at all times when the awning is stationary.

The motor used in the Girard G-2000 will use approximately 300 watts and will draw approximately 3 amps of power.

▲WARNING: The motor in the Girard G-2000 is not designed for continuous use. In the event that the motor is used to excess, it will automatically shut off and be inoperative until the internal breaker cools down and resets. Run time is 4-5 minutes per hour. Reset time - 30 minutes to 1 hour depending on outside temperature.

4-8.4.4 Wind Sensor Option:

4-8.4.4.1 Wind Sensor V with Remote Control Summary

If your Girard G-2000 awning is fitted with a wind sensor, your awning is designed to retract automatically in the event of high winds. The Wind Sensor will operate as long as it has a 110 volt power supply and the wind has unrestricted access to the wind sensor cups on the roof of your coach.

To operate the awning, simply push the button, momentarily, to extend the awning. The awning will continue to open until is reaches its full extension. It will then stop automatically. Pressing the button after the awning is fully extended will retract the awning automatically. Once the awning is fully closed, it will stop automatically, and the motor will turn off. The awning can be stopped at any point, and in either direction, by pushing the button while the awning is in process of either extending or retracting.

The wind sensor is dominant and will override any manual commands in the event of excessive winds. When the wind sensor is activated, the awning will close completely. The awning will NOT re-open automatically. It must be re-opened by once again pressing the button on the wall mount switch. It is recommended, however, to use the warnings of the wind sensor and leave the awning IN until the winds subside.

4-8.4.4.2 Wind Sensor V Control

Description
The Wind Sensor V is a single motor control designed for use on the Girard G-2000 Automatic Awning. The unit features the wind sensor control box, the wind sensor anemometer, and an attractive indoor, push-button wall mount switch. The Wind Sensor V Remote includes the additional, hand-held remote control, which is electronically integrated with the control box.
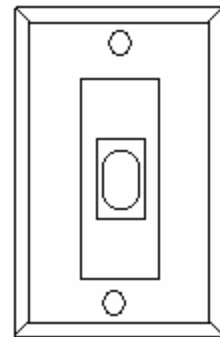
Operation
1. Always be sure that sufficient 110 Volt power is supplied to the awning system for correct functioning of all component parts (controller, anemometer, awning motor, etc.) i.e., be sure that either the inverter is on, the generator is functioning, or the vehicle is connected to shore power.
2. Turn the vehicle power ON and/or turn the circuit breakers to ON.
3. Push the button on the Wind Sensor V control switch to EXTEND the awning. The button can be released and the awning will continue to open until it reaches full extension. It will then stop automatically.
4. Push the button on the Wind Sensor V control switch to RETRACT the awning. The button can be released and the awning will continue to retract until it is fully closed. The awning motor will then turn off automatically.

5. Push the button during either the extend or retract mode to STOP the awning at any desired position. The button can also be used to change direction of the awning by pushing it twice.

NOTE: The motor supplied with your Girard G-2000 Awning is a high torque/low RPM motor, and has been carefully selected for its reliability and application compatibility. It is designed for intermittent use with a rating of 4 minutes/hour. If the motor's run-time exceeds this time period, a built-in circuit breaker will disable the motor from operation. This condition indicates normal operation of your awning system, and generally only occurs during excessive adjustment periods. If this condition should occur, please allow sufficient time (up to one hour, depending on the outside temperatures) for the motor to reset and use the manual override feature.

Wind Sensor Function

The Wind Sensor V Controller, and the Wind Sensor V Anemometer work together to continuously monitor the wind speeds, at any given minute, around your awning. If the actual wind speed becomes GREATER than the wind speed setting of your controller, a two (2) second delay occurs, and a signal is sent to the awning motor to retract the awning. THE AWNING WILL REMAIN IN THE RETRACTED POSITION UNTIL SUCH A TIME THAT IT IS ONCE AGAIN EXTENDED BY PRESSING THE BUTTON OF THE SWITCH PANEL.

Adjusting the Wind Speed Setting

The Wind Sensor V has been factory pre-set to a maximum wind speed of 22 MPH. Under no circumstances should this level be set at higher speeds. It is recommended, however, that you become familiar with the location of your Wind Sensor Control Box. It is usually located inside of an upper cabinet. In the event that you wish to reduce the pre-set wind speed, locate your control box and remove the four (4) Phillips screws that secure the cover. Remove the cover and notice the small dial located near the center of the box. This dial should be pointed at 22. The minimum setting will be approximately 12 MPH.

4-8.4.4.3 Remote Control Programming

Normally, your remote control will come pre-programmed. However, if it is not, follow this procedure:

1. On the Control Box
    - To put the receiver in its programming mode, press the PROGRAM button and hold, until the LED lights up and then release. The Programming Button is located on the PCB Board inside the control box.
    - The receiver is now ready to memorize any transmitter/channel for a period of one (1) minute.

2. On the Transmitter
    - Press the Programming Button on the back of the transmitter. After one (1) minute, or once the receiver is programmed, the LED goes off. The transmitter is now programmed.
    - To verify the program, press the DOWN button to make sure that the awning is extending. If it does not, repeat the instructions from number one (1) above.
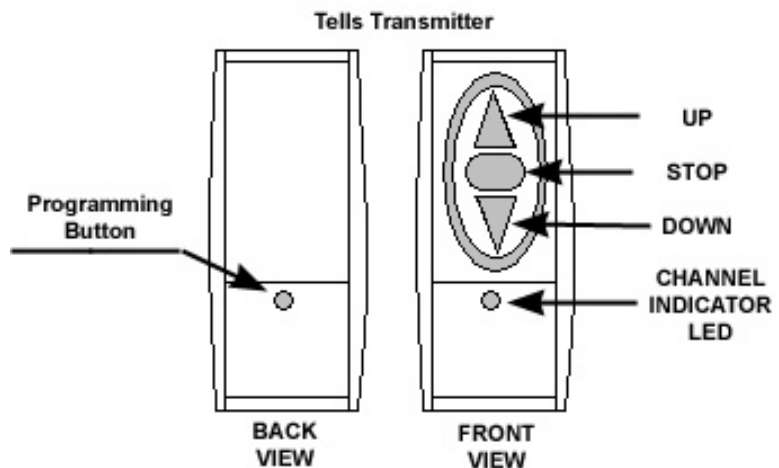
4-8.4.4.4 Remote Control Operation

Single channel transmitter:
- Press the UP, DOWN, or STOP button.
→The programmed RTS receivers are activated.

Four channels transmitter:
- Select the channel of the motor module you wish to control.
→The corresponding LED is blinking during 3 seconds (the channel is still memorized for 30s and then the transmitter returns to channel 1).
- Press the UP, DOWN or STOP button.
→The programmed RTS receivers are activated.

Battery Life
The transmitters are filled with a 3V battery (type 2430) which provides about three years operation assuming 4 operations per day. When the battery becomes discharged, the control LED no longer lights up when a command is sent, and the command is not carried out. The module has an integrated backup control under the programming button. It operates by successive presses: raising, stop, lowering, stop.

How to Change the Battery:
- Remove the back cover of the transmitter with a screwdriver.
- Slide the battery out of its housing by pushing it with a screwdriver.
- Insert the new battery

4-8.4.5 Setting Motor Limits

IF THE AWNING DOES NOT CLOSE COMPLETELY, and there is no apparent binding of any awning components, then the fabric has most likely stretched or shifted slightly over time. This can be easily corrected by adjusting the motor limits. This will allow the awning roller tube to run a split second longer to draw the awning fabric in tighter.

The Adjustment:
- The MO (manual override) motor has manual limit switches for both the OUT (extend) and the IN (retract).
- The limit switches are adjusted by inserting the black plastic key (supplied) or a 5/32" / 4mm Allen wrench into the appropriate hole on the underside of the motor.
- The motor is usually located at the front of the awning inside the roller tube. The limit switches can be accessed by opening the awning a few feet, and are located above, at the end of the roller tube in the exposed end of the motor. These switches will appear as (2) hex shaped holes. You will also see a double arrow with a (+) and (-) sign next to each switch.
- The IN limit is the switch located closest to the vehicle side. The Girard G-2000 provides an exclusive current limiting device (MS-1) which detects the current increase as the awning box closes, and then shuts off power to the motor. This device eliminates the need or frequency for future in-bound limit switch adjustments. If this adjustment is still required however, and the awning box does not close completely, then this switch should be adjusted. To make the awning close MORE, first turn your main awning wall switch or wind sensor switch to the IN (retract) position. Place the plastic adjustment tool or Allen wrench into the switch and turn toward the (+) direction. This action will create a tighter fit as the awning box closes. Listen carefully to the motor to assure that the current limiting device has shut power off to the motor.

- The OUT limit is the switch located in the outer most location. This switch is factory pre-set so that the motor stops turning at the precise moment that the arms reach full extension. If further adjustment is required however, and to make the awning extend more and to release more fabric, first, place the main awning wall switch or wind sensor switch to the OUT (extend) position and extend the awning until the motor stops. Place the plastic adjustment tool or Allen wrench into the limit switch and turn toward the (+) arrow. The awning will "follow" as you turn. Turn switch until awning reaches full extension and the arms "click" into their locked position. To make the awning extend LESS, turn switch toward the (-) arrow, bring the awning in a few inches, then re-extend to see the new stop location.

  - To adjust IN Limits: Use the INNER most switch (+) closes more (-) closes less

  - To adjust OUT Limits: Use the OUTER most switch. (+) extends more (-) extends less.

NOTE: If motor is mounted on LEFT end of the awning, the functions of the limit switches will be reversed.

4-8.4.6 Lead Rail Adjustments

4-8.4.6.1 Lateral Shifting of Lead Rail

Tools Required:
- 5mm (3/16") Allen Wrench
- Phillips Screwdriver
- Rubber Mallet
- 1/8" Drill Bit and Drill Motor

The Lead Rail has shifted toward the front or toward the rear of the awning casing, preventing the awning from closing properly.
1. Open the awning about 2 feet.
2. Locate the connection bracket at the forward most portion of the arm at the Lead Rail. (Item #43 of Exploded view). Using an Allen Wrench, loosen the center set screw on this bracket, by ¾ turn, which un-tightens this bracket from the Lead Rail. Repeat for all arms. Do NOT loosen the offset leveling screw found on the upper corner of the bracket assembly.
3. With a Phillips Head Screwdriver, remove the (2) fabric set screws (Item #50 of Exploded View) which secure the fabric to the Lead Rail.
4. Close the awning to about 4 inches and, using a rubber mallet, tap on the end of the Lead Rail, allowing it to shift relative to the fabric and arm attachments.
5. Close the awning to check for proper alignment.
6. Re-open the awning to about 2 feet and re-tighten set screws at each arm connection. Finish by replacing both fabric set screws.

NOTE: These screws should be located approx. ¾" from the edge of the fabric. If the adjustment process places either of these 2 screws further than this point, drill new holes (1/8" dia), and re-install fabric screws.

7. Close the awning completely to check for final fit.

G2000 EXPLODED VIEW

"IN" Adjustment of Lead Rail
Tools Required
- 5mm (3/16") Allen Wrench
- Rubber Mallet

This adjustment may be required if the Lead Rail remains out from the awning casing at one end. The Limit Switches may need to be adjusted. Please see that section entitled ADJUSTING MOTOR LIMIT SWITCHES. Otherwise, arms may need to be adjusted as follows:

1. Open the awning about 16 inches.
2. At the selected arm, locate the connection bracket at the forward most portion of the arm at the Lead Rail (Item #43 of Exploded View). Using a 5mm (3/16) Allen Wrench, loosen the center set screw on this bracket, by ¾ turn, which un-tightens this bracket from the Lead Rail. This bracket should now be free to slide. Do NOT loosen the offset leveling screw found on the upper corner of this bracket assembly.
3. Close awning completely and the arms will relocate themselves to the proper location. Re-open the awning just far enough to re-tighten the arm screws.

Pivotal Adjustment of Lead Rail
Tools Required:
- 5mm (3/16") Allen Wrench
- 17mm (11/16) Open End Wrench

This adjustment, not being available on earlier models, affects the pivotal angle of the Lead Rail and is seldom required, as, this angle is factory preset. However, if adjustments are required, the procedures are:
1. Open the awning about 16 inches.
2. Locate the connection bracket at the forward most portion of the left/rear arm, i.e., the arm furthest from the motor. (Item #43 of Exploded View)

3. The "pivoting" style connection bracket can be identified by having one set screw in the center of the bracket, in addition to a second set screw at the upper portion of the pivoting section of the bracket assembly. The non-pivoting style bracket has two set screws, in-line, in the center of the bracket.
4. If the pivoting style bracket is present, grasp the Lead Rail with one hand and manually pivot, up and down, the Lead Rail on this bracket. It should pivot freely. If it does not pivot freely, loosen slightly, the large lock nut on the end of the horizontal bolt that fastens these two pivoting brackets together. This should free the two brackets and allow a pivot between them. Repeat for each arm, if necessary.
5. Using the awning switch and motor, close the awning to about 3". Check the angle of the Lead Rail in relation to the awning casing. The Lead Rail should approach the awning casing with the TOP portion of the Lead Rail striking the casing FIRST. From the TOP of the Lead Rail, a 10 degree angle should occur as it angles away from the awning casing. If this angle is not present, again open the awning to about 18". Locate the UPPER set screw in the pivoting portion of the connection bracket. Using a 5mm (3/16") allen wrench, turn this set screw (counterclockwise) to achieve the desired 10 degree angle. Repeat this procedure for each of the arm connections, assuring that the proper angle and "free pivot" condition is maintained.

Height Adjustment of Arms (see [Exploded View - Item No. 37](#))

Tools Required:
*   19mm (3/4") Open End Wrench
*   10mm (3/8") Open End Wrench

This adjustment may be required if, as the awning Lead Rail closes into the awning casing, the "elbow" of one of the arms is hanging downward, hitting the bottom of the casing. This adjustment is usually required after an Arm replacement.

1. Open the awning about 18 inches.
2. At the selected turn, loosen the (2) Locknuts located at the side of the upper arm connection using a 19mm (3/4") Open End Wrench.
3. See [Item No. 92 in Exploded View](#). Locate the smaller adjustment bolt located directly under the rear Locknut that was just loosened. Place a 10mm (3/8") Open End Wrench around this bolt head, and rotate the wrench in a TIGHTEN direction to RAISE the arm. Slight rotation is all that is necessary. Likewise, LOOSENING the bolt will LOWER the arm. As this adjustment is being performed, keep in mind that after re-tightening the Locknuts, the arm will raise slightly further.
4. Tighten the (2) locknuts located on the side of the arm connection.
5. Close the awning completely, and check for proper fit.

PITCH ANGLE: The awning comes factory pre-set with a pitch angle of approximately 20°. This represents the minimum angle recommended for proper rain run-off. If it is desired to increase this angle, loosen the two (2) lock nuts located on the outside upper joint of each arm using a ¾" or 19 mm wrench (see fig. 2a). Adjust the arms downward by rotating the bolt head at the bottom of the arm connection in a counter clockwise direction (looking from the bottom up) (see fig. 2b). Likewise, rotating the bolt in a clockwise direction will raise the arm. After all arms are adjusted to an equal height, re-tighten lock nuts on the side of each arm (see fig. 2c).
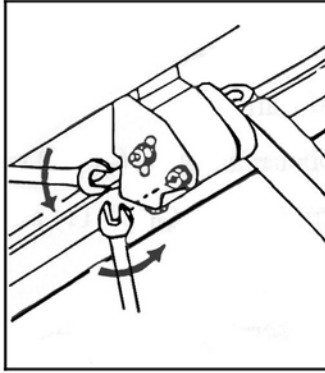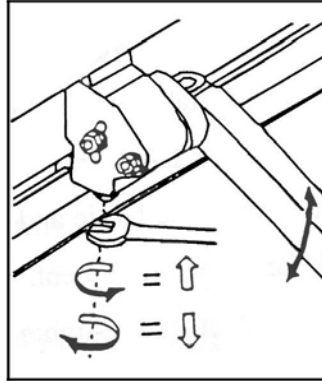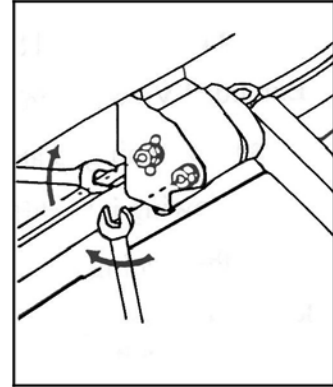
Figure 2a	Figure 2b	Figure 2c

4-8.4.7 Care and Cleaning of the Acrylic Fabric:

Acrylic fabric should be cleaned regularly before substances such as dirt, leaves, etc. are allowed to accumulate on, and become embedded in the fabric. The fabric can be cleaned without being removed from the awning casing. Simply brush off any loose dirt, leaves, etc. Hose down and clean with cloth and a mild solution of natural soap in lukewarm water. Rinse thoroughly to remove soap. **DO NOT USE DETERGENTS**. Allow to air dry, preferably on a warm sunny day. Should you have to retract the awning when the fabric is wet, it should be extended at the first opportunity to finish air drying.

A new acrylic fabric cleaner is now available at Girard Systems. This unique product has been specially formulated to clean all acrylic awning fabrics. Call (800) 382-8442 for ordering information.

Warranty: Girard Systems offers a five year warranty for its awnings to be free from defects in material and workmanship under normal and proper use. For the full warranty look in the black box material that was supplied with your coach or go to ***http://www.girardrv.com***

Please remember that the Girard G-2000 Awning is a high-technology, retractable structure, and is built with a high level of pride and workmanship. All steps have been taken to provide a product of the highest quality, performance, and weather protection, including wind and rain protection. As any other investment, it should be respected and protected. It is the owners responsibility to use good judgment and assert caution when using this product in heavy weather conditions. During heavy or unpredictable rain conditions, or during strong winds, the awning should be retracted.

4-8.4.8 Troubleshooting

NOTE: These troubleshooting tips are offered to you for informational purposes and it is recommended that the following adjustments be made by an authorized service center. This guide will, however, allow you to become more familiar with your awning and will provide you with adequate knowledge in the event of an emergency.

PROBLEM	SOLUTION
Lead Rail is binding on side of awning casing, i.e. is offset from awning casing.	Open awning about three (3) feet. Loosen both set screws on each arm at their point of connection to the lead rail. Remove both fabric set screws located at each end of the lead rail. The lead rail is now ready to be shifted. Close the awning to about four (4) inches and, using a rubber mallet, tap on the end of the lead rail to move the rail over. Check for proper alignment, retighten the set screws, and replace the fabric set screws. For more information see LATERAL SHIFTING OF LEAD RAIL.
One part of the box (opposite end from motor) does not close tightly. Motor end closes correctly.	See "IN AND OUT ADJUSTMENT OF LEAD RAIL."
After above adjustment, one end of box (opposite end from motor) STILL does not close tightly. Motor end closes correctly.	On later model awnings, a "pivotal" adjustment of the lead rail is available. This means that the lead rail is allowed to PIVOT on its connection bracket to the awning ARMS. First, check that this option is present. If so, check that the lead rail is free to pivot on its pivot bolt. If not, loosen the lock nut on the pivot bolt by 1/2 turn. Additionally, check that the privot angle is correct.
The motor will not operate.	Check that the GFI circuit breaker in the vehicle is turned on. Also, if the vehicle is equipped with an awning main power switch, located inside the cabinets, check that it is turned on. The 110V motor in the G-2000 awning is for intermittent use only (4 Min Per Hour) and is designed to "temporarily cut out" if it is used to the point of overheating. In this event, the motor must be allowed to cool, to provide time for its built-in circuit breaker to reset. Please allow up to one hour, depending on outside air temperature, for this cool down period. The manual crank can be used during this period.
The motor will not operate, or the motor will operate long enough for the awning to extend 10 to 12 inches and then stops.	The motor is not receiving enough amps, i.e., the inverter output is low. Check that a minimum of 10 amps is running. If not, turn on the generator or go to shore power.
The fabric is loose when the awning is fully extended, i.e., the roller keeps turning after the awning arms have locked open.	The motor "OUT" limits need to be re-set (see Setting Motor Limits section) to ensure that the motor stops when the arms are fully extended and locked.
The box does not close completely, i.e., the motor stops before the lead rail has retracted completely (on either end) into the awning casing. There is no apparent binding of the awning components.	Your awning is equipped with a MO (manual override) motor which has manual limit settings. The "IN" limit may need to be re-set to allow the box to close tighter. See "Setting Motor Limits" section.
As the awning is closing, the "elbow" of one or more of the arms is hanging downward, preventing the case from closing.	Open the awning about 18 inches. At the selected arm, loosen the two (2) large lock nuts located at the side of the upper arm connection. Locate the smaller adjustment bolt head directly under the REAR lock nut and rotate SLIGHTLY UPWARD to raise the arm. Retighten lock nuts. NOTE: After re-tightening lock nuts the arm will raise slightly further. See Height Adjustment of Arms.

4-8.4.9 Adjustments

4-8.4.9.1 Adjusting Motor Limit Switches

Tools Required
Black plastic key provided with awning or 4mm Allen Wrench

PROCEDURE
The limit switches are adjusted at the factory, prior to shipment, such that the awning motor stops at the EXACT moment the awning box closes. Likewise, the awning motor is set to stop at the EXACT moment that, while opening, the elbowing arms "click" into an outward locked position. Occasionally, after shipment and installation, the motor rotational limits "creep" out of adjustment. It is always wise to check the motor limits after installation to assure that the awning is opening and closing correctly. Additionally, over a period of time the awning fabric can stretch, causing the need for simple motor limit adjustments.

VERY IMPORTANT: Extreme care must be taken when setting the "IN" limits of the motor, such that the motor turns off EXACTLY the same time the box closes. Otherwise, the motor will continue to run, as it has not reached its limit. This condition, if not corrected, will substantially reduce motor life. Turn the awning switch OFF.

If adjustments are required, please follow these instructions:
1. The BMO (Manual Override) motor has limit settings for both the OUT direction (projection) and the IN direction (retraction).
2. Limit switches are adjusted using the black plastic key (provided) or a 4mm Allen Wrench.
3. Open the awning a few feet and locate the awning motor, installed standard at the right end of the awning (front end). It is a cylindrical motor mounted inside the awning roller tube. The limit switches are mounted inside the black casing at the exposed end of the motor. Notice at the limit switches a BLACK arrow and a RED arrow, both with a (+) plus and (-) sign. The actual limit switch is the recessed hole next to the corresponding arrow.
4. The IN limit is the BLACK arrow. To make the awning close MORE, first turn the main awning wall switch or Wind Sensor switch to the IN (retract) position. At the motor, insert the tool and turn the switch next to the BLACK arrow in the direction of the (+) sign. ¼ turn represents approximately 1" of the awning movement. This action will create a tighter fit as the awning box closes. To make it close LESS, turn in the direction of the (-) sign. See Fig. 1.

NOTE: If the awning motor is installed on the LEFT end of the awning, the actions of the red and black arrows will be reversed.)

FOR MOTORS WITH BLACK PLASTIC CASINGS ONLY
To adjust IN Limits: Use switch next to BLACK arrow (+) closes more (-) closes less

To adjust OUT Limits: Use switch next to RED arrow (+) extends more (-) extends less
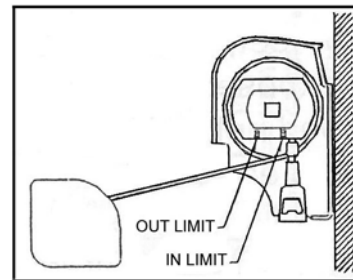
Fig. 1 - Motors with Black Plastic Casings

FOR MOTORS WITH SILVER ALUMINUM CASINGS:

To adjust IN Limits: Turn the switch located toward the REAR of the motor. (+) closes more (-) closes less.

To adjust OUT Limits: Turn the switch located toward the FRONT of the motor. (+) extends more (-) extends less.
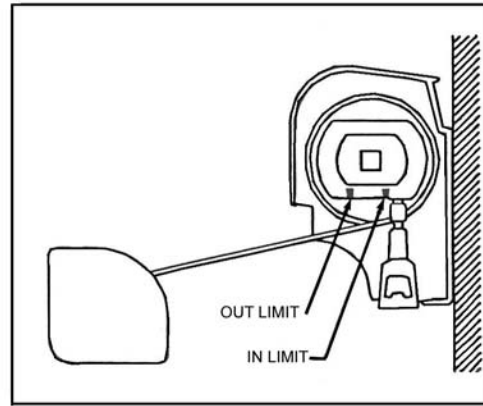
Fig 2 Motors with Silver Aluminum Casings

The OUT limit is the RED arrow. To make the awning extend MORE and release more fabric, first turn the main awning wall switch or the Wind Sensor switch to the OUT (extend) position and extend the awning to its maximum position. Proceed by turning the limit switch next to the RED arrow in the direction of the (+) sign. To make the awning extend LESS, turn the switch in the (-) direction. See Fig. 1.

NOTE: If the awning motor is installed on the LEFT end of the awning, the actions of the red and black arrows will be reversed.

NOTE: Never set outward limits such that slack fabric occurs after full extension of the arms. Adjust the limit switches such that the motor stops at the EXACT time that the elbowing arms "click" into a locked position.

4-8.4.9.2 Adjusting the Awning Pitch Angle

Tools Required:
19mm (3/4") Open End Wrench

The awning comes factory pre-set with a pitch angle of approximately 20 degrees. If it is desired to increase the angle, loosen the (2) lock nuts located on the outside upper joint of each arm using a 3/4" or 19mm wrench. See Fig. 2a. Adjust the arms DOWNWARD by rotating the bolt head at the bottom of the arm connection in a CLOCKWISE direction (looking from the bottom up). See Fig. 2b. Likewise, rotating the bolt in a COUNTER CLOCKWISE direction will RAISE the arm. After all arms are adjusted to the desired height, re-tighten lock nuts on the side of each arm. See Fig. 2c
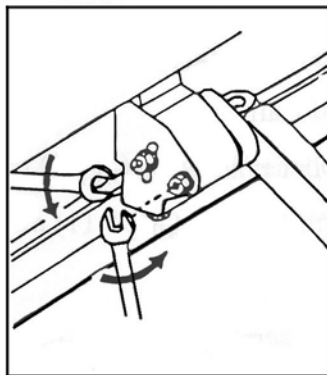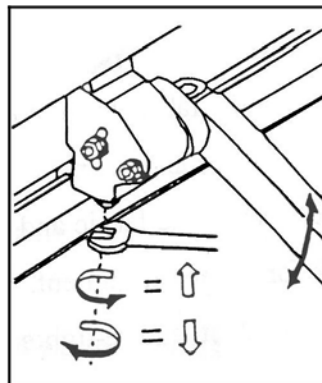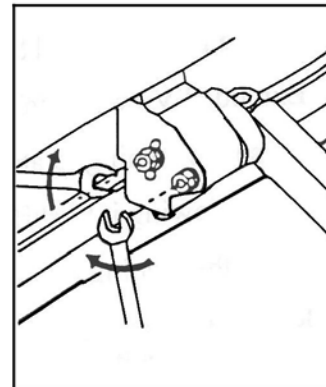

| **Fig. 2a** | **Fig. 2b** | **Fig. 2c** |

4-8.4.9.2 Lead Rail Adjustments

Lateral Shifting of Lead Rail
Tools Required:
- 5mm (3/16") Allen Wrench
- Phillips Screwdriver
- Rubber Mallet
- **1/8" Drill Bit and Drill Motor**

The Lead Rail has shifted toward the front or toward the rear of the awning casing, preventing the awning from closing properly.

1. Open the awning about 2 feet.
2. Locate the connection bracket at the forward most portion of the arm at the Lead Rail. (Item #43 of Exploded View). Using an Allen Wrench, loosen the center set screw on this bracket, by ¾ turn, which un-tightens this bracket from the Lead Rail. Repeat for all arms. Do NOT loosen the offset leveling screw found on the upper corner of the bracket assembly.
3. With a Phillips Head Screwdriver, remove the (2) fabric set screws (Item #50 of Exploded View) which secure the fabric to the Lead Rail.
4. Close the awning to about 4 inches and, using a rubber mallet, tap on the end of the Lead Rail, allowing it to shift relative to the fabric and arm attachments.
5. Close the awning to check for proper alignment.
6. Re-open the awning to about 2 feet, and re-tighten set screws at each arm connection. Finish by replacing both fabric set screws.

   NOTE: These screws should be located approx. ¾" from the edge of the fabric. If the adjustment process places either of these 2 screws further than this point, drill new holes (1/8" dia) and re-install fabric screws.

7. Close awning completely to check for final fit.

4-8.4.9.3 "IN" Adjustment of Lead Rail

Tools Required:
- 5mm (3/16") Allen Wrench
- Rubber Mallet

This adjustment may be required if the Lead Rail remains out from the awning casing at one end. The Limit Switches may need to be adjusted. Please see that section entitled ADJUSTING MOTOR LIMIT SWITCHES. Otherwise, arms may need to be adjusted as follows:

1. Open the awning about 16 inches.
2. At the selected arm, locate the connection bracket at the forward most portion of the arm at the Lead Rail (Item #43 of Exploded View). Using a 5mm (3/16) Allen Wrench, loosen the center set screw on this bracket, by ¾ turn, which un-tightens this bracket from the Lead Rail. This bracket should now be free to slide. Do NOT loosen the offset leveling screw found on the upper corner of this bracket assembly.
3. Close awning completely and the arms will relocate themselves to the proper location. Re-open the awning just far enough to re-tighten the arm screws.

4-8.4.9.4 Pivotal Adjustment of Lead Rail

Tools Required:
- 5mm (3/16") Allen Wrench
- 17mm (11/16) Open End Wrench

This adjustment, not being available on earlier models, affects the pivotal angle of the Lead Rail and is seldom required, as, this angle is factory preset. However, if adjustments are required, the procedures are:

1. Open the awning about 16 inches.
2. Locate the connection bracket at the forward most portion of the left/rear arm, i.e., the arm furthest from the motor. (Item #43 of Exploded View).
3. The "pivoting" style connection bracket can be identified by having one set screw in the center of the bracket, in addition to a second set screw at the upper portion of the pivoting section of the bracket assembly. The non-pivoting style bracket has two set screws, in-line, in the center of the bracket.
4. If the pivoting style bracket is present, grasp the Lead Rail with one hand and manually pivot, up and down, the Lead Rail on this bracket. It should pivot freely. If it does not pivot freely, loosen slightly, the large lock nut on the end of the horizontal bolt that fastens these two pivoting brackets together. This should free the two brackets and allow a pivot between them. Repeat for each arm, if necessary.
5. Using the awning switch and motor, close the awning to about 3". Check the angle of the Lead Rail in relation to the awning casing. The Lead Rail should approach the awning casing with the TOP portion of the Lead Rail striking the casing FIRST. From the TOP of the Lead Rail, a 10 degree angle should occur as it angles away from the awning casing. If this angle is not present, again open the awning to about 18". Locate the UPPER set screw in the pivoting portion of the connection bracket. Using a 5mm (3/16") Allen Wrench, turn this set screw (counterclockwise) to achieve the desired 10 degree angle. Repeat this procedure for each of the arm connections, assuring that the proper angle and "free pivot" condition is maintained.

4-8.4.9.5 Height Adjustment of Arms
(see Exploded View - Item No. 37)

Tools Required:
- 19mm (3/4") Open End Wrench
- 10mm (3/8") Open End Wrench

This adjustment may be required if, as the awning Lead Rail closes into the awning casing, the "elbow" of one of the arms is hanging downward, hitting the bottom of the casing. This adjustment is usually required after an Arm replacement.

1. Open the awning about 18 inches.
2. At the selected arm, loosen the (2) Locknuts located at the side of the upper arm connection using a 19mm (3/4") Open End Wrench.
3. See Exploded View Item #92. Locate the smaller adjustment bolt located directly under the rear Locknut that was just loosened. Place a 10mm (3/8") Open End Wrench around this bolt head, and rotate the wrench in a TIGHTEN direction to RAISE the arm. Slight rotation is all that is necessary. Likewise, LOOSENING the bolt will LOWER the arm. As this adjustment is being performed, keep in mind that after re-tightening the Locknuts, the arm will raise slightly further.
4. Tighten the (2) locknuts located on the side of the arm connection.
5. Close the awning completely, and check for proper fit.

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4-9 Slide-Out Operation_____

The M380 motor home from Wanderlodge comes with a slide-out room located in the Living Room/Galley area and an optional slide out room in the Bedroom area. Basic operation of both is explained below.

NOTE: Transmission shift is disabled if slide room is not fully retracted and locked.

4-9.1 Living Room/Galley Slide-Out with Air Seal

The living room/galley slide room is air actuated with a air seal around the room which deflates when the room is in motion and only re-inflates when the room is in the fully out position or the fully in and locked position.

4-9.1.2 Extending The Room:

1. Motor home air must be above 100p.s.i.
2. Parking Brake must be set.
3. Luggage bay doors located below the slide room must be closed.
4. Level motor home after dumping suspension.
5. Turn ignition switch to the ACC (Accessory) position.
   NOTE: 110V compressor or motor home must be running to operate slide room.
6. Key next to operator panel in pantry should be turned to the ON position. The display should read "Ok to Operate Room" If you do not see this message check to ensure the above steps have been met.

7. Push the F1 button to extend room. You must hold button down until room is fully extended. The room is extended when the display reads "Room is Extended". This will be followed by the message "Seal Inflating" then "Ok to Operate Room".
8. Turn keys off.

4-9.1.3   Retracting The Room:

1. Motor home air must be above 100p.s.i.
2. Parking Brake must be set.
3. Luggage bay doors located below the slide room must be closed.
4. Verify the motor home is still level.
5. Turn ignition switch to the ACC position.

NOTE: 110V compressor or motor home must be running to operate slide room.

6. Key next to operator panel in pantry should be turned to the ON position. The display should read "Ok to Operate Room" If you do not see this message check to ensure the above steps have been met.
7. Push the F2 button to retract room. You must hold button down until room is fully retracted. The room is retracted when you get a signal "Room is Retracted". This will be followed by "Seal Inflating" then "Ok to Operate Room".
8. Turn keys off.

NOTE: F3 and F4 buttons are for service use only. DO NOT USE.

4-9.1.4   Troubleshooting

Table 1 - Troubleshooting	
If Display Reads	**Problem and or Solution**
Display is blank	Controller has either low or no voltage or the cable is disconnected at controller.
PLC not in run mode	Switch on controller turned off or has low voltage.
Turn Accessory Switch On	Turn IGN switch to accessory position.
Please close the luggage doors	Close luggage doors below the slide room.
Room Extending	Room is going out.
Seal Inflating	Seal Inflating
Room Is Extended	Room is out.
Room Retracted	Room is in.
Room Retracting Please Wait	Room is coming in.
OK to operate room	The room is either all the way in or out and is ready to be operated.
Room Timed Out	The room is moving too slow or not at all, check for something that may be interfering with the room movement.
System disabled by key switch	Key located next to display turned off.
Manual override is on or Air Pressure Too Low	Air system pressure too low.
Room is not in travel position	The room is neither in nor out, Press F2 to get the room to start moving then press F1 if you want it to go out.
Room move is paused	The F1 or F2 button has been released prior to the room reaching either fully in or fully out position.

4-9.2 Bedroom Slide-Out with Air Seal

4-9.2.1 Overview

The Room Motion Switch panel is the user interface to control the bedroom slide out motion. There are two modes of operation: Normal mode & Service mode. The Normal mode consists of extending and retracting the room 16". The Service mode is for use by service technicians only.

The M380 Bedroom Slide out Controller is powered from a 120VAC/12VDC power supply, which is connected to a 120VAC inverter circuit breaker. This circuit breaker must be turned ON and the inverter must be operating or the Inverter Bypass switch must be in the Bypass position to allow either 120VAC Shore power or 120VAC generator power to provide to the Bedroom Slide out Controller power supply.

4-9.2.2 Room Motion Switch Panel

The Room Motion Switch panel is located in the curbside bedroom cabinet. It consists of eight LED indicators and two pushbutton motion switches. *See Figure 1 below*.

Room Motion Switch Panel - Figure 1
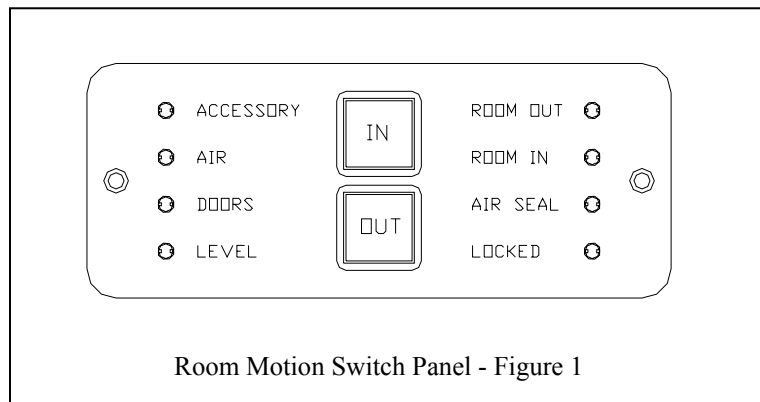
4-9.2.3 Motion Switches

The two Room Motion switches, IN and OUT, are momentary pushbutton switches that must be depressed to maintain motion; i.e. the OUT button must be depressed to move the room. If the Out button is released, then the room will stop moving. The Room Motion switches must be depressed until the Room In or Room Out LED is lighted. *Refer to Table 2*.

Table 2 - Room Motion Switches - Normal Operation			
ITEM	**SWITCH**	**DESCRIPTION**	**COMMENTS**
1	IN	The Room In switch moves the room 16" inward toward the bus center after the room has been extended 16".	The IN switch must be depressed until the Room In LED, the Air Seal LED, and the Locked LED are lighted. This indicates that the Room In operation is completed. The Service/Normal switch is in the Normal position.
2	OUT	The Room Out switch moves the room outward away from the bus center 16" from the Normal In position.	The OUT switch must be depressed until the Room Out LED and the Air Seal LED are lighted. This indicates that the Room Out operation is completed. The Service/Normal switch is in the Normal position.

4-9.2.4 LED Indicators

The four left LEDs provide external status and the four right LEDs provide room operation status. The LEDs are activated with negative True logic signals (0V). *Refer to Table 3* below.

ITEM	LED	DESCRIPTION	COMMENTS
Table 3 - LED Indicators			
1	Accessory	The Ignition switch must be in the Accessory position.	The Bedroom slide out will not operate without the Accessory LED lighted.
2	Air	This LED indicates that the system air pressure is greater than 80 psi.	This provides system air pressure status, but is not required to operate the Bedroom slide out.
3	Doors	This LED is not used for the Bedroom Slide out operation.	This LED is always lighted. There are no bay doors that interfere with the Bedroom Slide out room.
4	Level	This LED is not used for the Bedroom Slide out operation.	This LED is always lighted. This is for future use.
5	Room Out	This LED indicates the room is fully extended.	The fully extended position status is provided with a magnetic sensor located on the room actuator assembly.
6	Room In	This LED indicates the room has reached the Normal IN position.	The Normal IN position status is provided with a magnetic sensor located on the room actuator assembly.
7	Air Seal	This LED indicates the air seal is inflated.	The Air Seal is only inflated when the room is in the Normal IN and Normal OUT positions as indicated by the Room Out & Room In LEDs. When the room is in any other position, the seal is deflated and the Air Seal LED is not lighted.
8	Locked	This LED indicates the lock motor has engaged the lock arm.	The lock arm is only engaged when the room is in the Normal IN position. The Locked magnetic sensor indicates the lock arm has attained the Locked position. The Unlocked magnetic sensor indicates the lock arm has reached the Unlocked position. The room will not move unless the room has reached the Unlocked position.

4-9.2.5 Normal Operation Procedure:

**Table 4 - Room Motion – Extending Room**

STEP	CONDITION
1	Ensure the 120VAC circuit breaker, CB07, is turned On.
2	Ensure the 120VAC/12VDC power supply is active by viewing the Room Motion Switch panel to see if at least the Doors LED & Level LED are lighted.
3	Parking Brake must be set.
4	Ignition switch in the ACCESSORY position. Accessory LED must be lighted.
5	Air LED is a status indication that the system air pressure is at least 80 psi. The air seal requires at least 20 psi to inflate the air seal.
6	Doors & Level LEDs are always lighted. These status LEDs are not functional at this time.
7	Depress OUT pushbutton until the Room Out and Air Seal LEDs are lighted.

**Table 5 - Room Motion – Retracting Room**

STEP	CONDITION
1	Ensure the 120VAC circuit breaker, CB07, is turned On.
2	Ensure the 120VAC/12VDC power supply is active by viewing the Room Motion Switch panel to see if at least the Doors LED & Level LED are lighted.
3	Parking Brake must be set.
4	Ignition switch in the ACCESSORY position. Accessory LED must be lighted.
5	Air LED is a status indication that the system air pressure is at least 80 psi. The air seal requires at least 20 psi to inflate the air seal.
6	Doors & Level LEDs are always lighted. These status LEDs are not functional at this time.
7	Depress IN pushbutton until the Room In, Air Seal, and Locked LEDs are lighted.

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4-10 Heating Systems_____

The heating system used in your motor home is a Hurricane Heating system. It is housed underneath the motor home in Bay #1. The Hurricane heater is constructed of a stainless steel case which houses all the working components. The water jacket is made of copper and brass for efficient heat transfer and brazed together for durability and long life. The deluxe model includes a fully insulated water jacket, for minimum heat loss, and extends the stainless steel casing for a completely enclosed heater. The burner and combustion tube are made of a special high temperature stainless steel to prevent premature warping or burnout.

The Hurricane heater utilizes a low pressure fuel system. The built in fuel pump draws fuel from the fuel tank up to a zero pressure regulator where it stops. An air accumulator is installed inline between the fuel pump and the regulator to trap any air bubbles from passing through the nozzle valve. For continuous bleeding, a return line can be run back to the fuel tank. A small compressor delivers air to an air aspirating nozzle. This nozzle draws fuel from the zero pressure regulator, mixing it with air through a venturi. This process produces a very fine mist of fuel into the burner providing complete combustion and very low emissions. This low pressure system allows the use of a larger fuel orifice, less clogging, less wear and less maintenance. Ignition is accomplished by a low draw ignitor, approximately 2 amps, for thirty seconds. Combustion air is drawn from outside so the heater can be installed in an air tight compartment or in the engine room without the fear of starving the heater of air or back venting the heater with the engine running.

A main control panel times all the heater functions, monitors the operation of each component and provides a safety shutdown of the heater should anything go wrong. It provides for four space heating zones, a domestic water heating zone, and a thermostat hookup when using a water to water heat exchanger. A heat exchanger will give you the ability to transfer waste heat from your engine to your heating system. Conversely, you can keep your engine warm when your heating system is operating. Extra space-heating zones are available for individual cabin control.

A remote control panel is provided as standard equipment. The remote panel has an on/off reset switch and a LED digital readout, for indication of normal or fault operations respectively. A signal beeper on the remote panel serves as an audible indication of a fault causing a shutdown situation.

4-10.1   Features

Designed for the marine and RV environment, the Hurricane heater features unique, state of the art technology. Special features of the Hurricane heater include:

- Fuel efficient burner which burns all grades of diesel fuel, stove oil, furnace oil, and kerosene without any burner adjustments (not for use with gasoline.)
- Zero smoke, no carbon built-up, no fouling or smell.
- Copper and brass water jacket transfers more heat to the water and reduces the fuel consumption (three year warranty).
- High temperatures 310 stainless steel burner and marine stainless steel jacket.
- Quiet operation and low power consumption.
- All heaters are designed to operate on 10.5 to 15.0 V.D.C.
- All heaters are electric ignition, which draws 2 amps for 30 seconds on startup.
- Insulated enclosure for retaining heat and minimizing noise.
- Sealed combustion – 100% outside air is fan assisted to the combustion chamber and then exhausted outside, avoiding backpressure.

- Optional bottom exhaust – mostly used in motor homes.
- Includes four zone heating control for up to four thermostats.
- Completely modular and field serviceable (user friendly).
- Hookups and connections are easily accessible.
- Electronically controlled. Safety features include four-second shutdown in case of failure, LED digital readout on the electronic control panel for indicating faults, aquastats for monitoring water temperatures and a photodiode to monitor the flame.
- Complete with remote control panel with ON/OFF reset button, LED digital readout, and signal horn.
- Jumper for constant pump circulation (Automatic cycling when off).
- All heaters cycle at an operating temperature of 180°F (82°C) with overheat cutout set at 195°F (90.5°C).
- Air accumulator installed in the fuel line to collect air bubbles and prevent them from reaching the burner and causing nuisance shutdowns.

The Hurricane Hydronic Heating Systems have been tested to UL 307A "Liquid Fuel-Burning Appliance for Manufactured Homes and Recreational Vehicles" and is listed by Testing Engineers International Inc. – Listing Services (TEI-LS) for Recreational Vehicle and marine use.

4-10.2   Operation

4-10.2.1   Starting the Heater

The major steps in starting the heater are as follows:

1. Turn on the ON/OFF control switch, located on the remote indicator panel.
2. Turn up the zone thermostat to a setting higher than room temperature.
3. Start the heater by switching the service switch to ON. This switch is located on the side of the electronic control box located next to the unit in the bay.

4-10.2.2   Signs of Normal Operation

When the heater is operating normally:

- The ignitor will glow and the combustion air intake fan and the circulating pump begin to run. Whenever the pump is running, the green LED at the bottom of the LED display will be on.

- A few seconds later, the fuel pump starts delivering fuel to the regulator, the compressor turns ON, the fuel valve opens, and fuel is drawn to the air aspirating nozzle. The fuel is atomized and sprayed into the combustion chamber to start combustion.

After the ignition period (about 10 seconds), the ignitor shuts OFF, and the burner continues to operate. The heater will operate until all the zone thermostats are satisfied, or until the heater reaches its normal water operating temperature of 180°F. Once the normal operating temperature is reached, the burner itself will cycle off and the combustion fan will operate for an additional two minutes to purge the burner. If a zone thermostat, domestic water heater aquastat, or engine heat exchanger aquastat is not satisfied, the circulating pump will continue to operate. If a thermostat cannot be satisfied by the residual heat in the system, and the water temperature drops, the burner will restart and cycle until all thermostats are satisfied. Once all thermostats are satisfied, the heater will go through the two minute purge, and the circulating pump will ease. The circulating pump will operate if the remote switch and any zone thermostat or the domestic water aquastat are on. The circulating pump will be activated independently by the engine heat aquastat. After the heater has been running for a little while, the water outlet of the heater case should become warm. If the water hose leaving the outlet of the heater does not warm up immediately after the pump comes on, water is not circulating properly and air may be in the system. Turn the heater OFF immediately and check water circulation, refer to Section *4-10.6.11 Water Filling Procedure* later in this manual.

4-10.2.3 Main Control Board Operation

Once the heater is operating normally, you must check the operating safety functions of the main board. To make sure the safety functions work properly, place your hand over the air intake inlet to the compressor, this will snuff out the flame. If you continue to block the air intake inlet, the heater will try to restart two more times and failing to do so will shut it down, stopping the compressor and fuel pump. The board will display a code 7. Reset the fault and the heater will continue with normal operation.

4-10.2.3   Stopping the Heater (For Seasonal Purposes)

NEVER shut off the power to the heater using the circuit breaker or a master switch, or disconnect the battery while the heater is running. Doing so will cause serious damage to the heater, which will not be covered under warranty.

To turn the Heater OFF, turn OFF, the ON/OFF control switch, located on the remote indicator panel. The room thermostat or the remote indicator panel ON/OFF switch can be turned ON or OFF at any time, without harming the heater. The heater will automatically run through the purge cycle, which takes about two minutes.

4-10.2.4   Stopping the Heater (For Maintenance)

To shut down the heater totally, for maintenance purposes:

1. Turn OFF, the ON/OFF control switch, located on the remote indicator panel.
2. Turn OFF, the service switch on the electronic control box.
3. Wait until the heater has completed the purge cycle and turned itself OFF.
4. Disconnect the power supply.

4-10.2.5   Resetting the Fault

When a fault occurs and has been corrected, you can reset the fault by switching the service switch on the side of the main control box located next to the unit in the bay, or the remote control switch OFF, then ON again. This will reset the fault and the diagnostic code.

4-10.2.6   Stopping the Heaters (When coach is left for extended periods of time)

There are two heating systems supplied with the motor home. The Hydronic heat system has two thermostats located in the bathroom and the galley. The bay electric heater has a thermostat located in bay 2, right. If the Auto Gen-Start feature on the Inverter is Off and coach is unused for a period of time, (more than a day), be sure that all three thermostats are set to the full Off position (the thermostat Off state has a detent position at the end of the full counterclockwise rotation). If not turned to full Off position and motor home gets below 50°F, the hydronic heater pump turns On and the bay electric heaters turn On, thus draining the battery. To use the Auto Gen-Start function on the inverter, in the Inverter section of this manual.

4-10.3   Heat Exchanger Operation

If your motor home is equipped with a heat exchanger to pre-heat your engine and recycle waste engine heat, follow these procedures.

To pre-heat your engine: Turn on the heater by a manual switch or timer wired to the jumper W-W terminal, located in the control box. If the heat exchanger is mounted upright, close to and near the bottom of the engine, it will transfer heat to the engine's cooling system through gravity circulation. A more positive solution is to install a pump on the engine side of the heat exchanger wired to the A-A pump terminals located in the control box, on the main board in series with a master switch.

To use waste engine heat for space and domestic water heating:
1. Install a switch, and/or an aquastat (part #1027), on the engine supply line to the heat exchanger, and wire to the A-A terminals on the main control board.
2. Turn OFF, the ON/OFF control switch, located on the remote indicator panel. This will stop the burner from operating, but all other heater functions will operate normally.
3. Start your engine.
4. When the engine aquastat heats up to its preset temperatures, it will automatically switch on the circulating pump of the heating system. All other functions of the system will operate normally.
5. The circulating pump will continue to operate until the engine aquastat has cooled down. A manual switch can be wired in series with this aquastat to shut down the pump sooner if required.

4-10.4   Domestic Water Operation

If your water heater is connected to the Hurricane heating system and its controlling aquastat (part #1024) is wired to the W-W terminals on the main board, it will cycle the heater and the water pump. A manual switch can be wired in series with this aquastat to shut down the operation if desired. A bypass loop can be plumbed in for summer operation.

⚠️**CAUTION: Where there is a chance of contamination of your domestic water when using a heating system, use antifreeze specifically intended for hydronic heating systems. Inhibited propylene glycol is recommended. Do not use automotive, ethylene glycol, or any undiluted or petroleum based antifreeze as they can cause severe personal injury should antifreeze leak into your potable water supply. Double wall heat exchangers are available for potable water which will prevent contamination in the event of an internal leak.**

4-10.5   Troubleshooting

4-10.5.1   Overview

The electronic board consists of a flash micro controller programmed to monitor the timing and safety function of the heater. Each time the board is energized by a call for heat, it will check its own circuits for any problems. Should a problem exist, the board will shut down.

You can easily monitor your Hurricane heater's operation by checking the electronic control box. Any fault or problem will be immediately picked up by the control board and an LED diagnostic code indicator will light up to pinpoint the fault. Once the fault has been corrected, it can be reset by switching the service or remote switch OFF, then ON again. The diagnostic codes are described below.

4-10.5.2   Power On (Green)

The POWER ON indicator is lit whenever the service switch on the control box is ON and if the remote panel is switched ON, a small red LED near the lower right hand side of the digit on the remote panel will also glow. If this light does not come on, check to see if the service switch is ON.

If the power on light does NOT come on:

Check for a blown fuse.

4-10.5.3 Burner On

No diagnostic code will be displayed on the main board or the remote panel when the burner is ON and operating normally. A small red LED will glow near the right hand side of the digital readout on the main board located on the unit in the upper left hand corner, indicating it is ON.

4-10.5.4 ⊔ - Service Switch Off

The service switch is switched OFF.
- The burner will shut down if it has been running.
- The diagnostic code, ⊔ will be displayed.
- The control board will purge the system with the combustion fan and circulating pump for two minutes. At the end of the purge period, the system will power down and will go into a low power consumption mode (10mA max.). There will not be any display or LED's lit.

4-10.5.5 ☰ – Remote Switch Off

The remote panel is switched OFF.
- The burner will shut down.
- The diagnostic code, ☰ will be displayed.
- The control board will purge the system with the combustion fan and the circulating pump for two minutes.

If the remote switch is put in the ON position, the control board resumes operation and a small red LED glows near the lower right hand corner of the digit. If there is no diagnostic code displayed or small LED glowing:

1. Make sure the service switch is ON.
2. Make sure the remote switch cable is plugged into the control box and remote switch.
3. Make sure the remote rocker switch is working.
4. Check the cable continuity.

4-10.5.6 ⊏ – Heater Cycling (Normal Operation)

The operating aquastat installed on the water jacket has been satisfied.
- The burner will shut down.
- The diagnostic code, ⊏ will be displayed.
- The control board will purge the burner with the combustion fan for two minutes and then stop. The circulating pump will run until the last thermostat is satisfied, then will purge for two minutes and stop.
- To maintain the system temperature the operating aquastat will cycle the burner off at 185°F (85°C) and on again at 150°F (65°C).
- If the heater cools and fails to resume operation and the diagnostic code ⊏ continues to be displayed, the aquastat is faulty or has an open connection.

4-10.5.7 └─ – Thermostats Off (Normal Operation)

All thermostats and aquastats are satisfied.
- The burner will shut down.
- The diagnostic code, └─ will be displayed.
- The control board will purge the system with the combustion fan and the circulating pump for two minutes. When any thermostat or aquastat calls for heat, the heater will resume normal operation.
- If the heater fails to resume operations, check the thermostat and their connections.

4-10.5.8 0 – Voltage Low or High

The battery or power supply voltage is below 10.5Vdc or above 15.5Vdc.
- The burner will shut down.
- The diagnostic code, 0 will be displayed.
- The buzzer will sound for 10 seconds.
- The control board will purge the system with the combustion fan and circulating pump for two minutes while it is checking if the voltage fault is still present.

If the voltage fault has cleared, the control board resets the alarm and restarts the burner.

If the condition has not cleared by the end of the purge period, the diagnostic code 0 remains displayed. The control board continues to check the voltage every half hour until the voltage fault clears and then restarts the burner. To manually reset the fault, switch the service switch or the remote panel switch OFF then ON again.

4-10.5.9 1 – Overheat

The high temperature limit has been reached.
- The burner will shut down.
- The diagnostic code, 1 will be displayed.
- The buzzer will sound for 10 seconds.
- The control board will purge the system with the combustion fan and the circulating pump for two minutes while it is checking if the overheat condition exists. If the condition exists, the diagnostic code 1 will continue to be displayed.
- In order to restart the burner, first check the circulating pump, the level of the coolant, and the movement of the coolant while the circulating pump is running. Then reset the fault after the water has cooled down by switching the service switch or the remote panel switch OFF then ON again. If it does not reset, check for faulty aquastat and proper ground.

If a number 1 diagnostic code lights up and the heater is not in an overheat condition, check the ground from the heater to the battery. The ground should be a minimum 10 AWG and connected directly to the battery.

4-10.5.10 2 – Fuse Blown

One of the fuses on the control board has blown.
- The burner will shut down.
- The diagnostic code, 2 will be displayed.
- The buzzer will sound for 10 seconds.
- The control board will purge the system with the combustion fan and the circulating pump for two minutes while it is checking for a blown fuse.

If a blown fuse exists, the diagnostic code 2 will continue to be displayed.
- In order to restart the burner, replace any blown fuses with one of the proper size. Then reset the fault by switching the service switch or the remote panel switch OFF then ON again.

4-10.5.11   3 – Fuel Pump/Solenoid

The fuel pump or fuel solenoid has shorted.
- The burner will shut down.
- The diagnostic code, 3 will be displayed.
- The buzzer will sound for 10 seconds.
- The control board will purge the system with the combustion fan and the circulating pump for two minutes.
- In order to restart the burner, check the fuel pump and solenoid for a short circuit. Then reset the fault by switching the service switch OFF and ON again.
    The remote panel switch does not reset short circuit faults.

4-10.5.12   4 – Ignitor

The ignitor is open or shorted.
- The burner will shut down.
- The diagnostic code, 4 will be displayed.
- The buzzer will sound for 10 seconds.
- The control board will purge the system with the combustion fan and the circulating pump for two minutes.
- In order to restart the burner, check the ignitor and connections. Then reset the fault by switching the service switch or the remote panel switch OFF then ON again if the ignitor is open or by the service switch only if the ignitor is shorted.
    The remote panel switch does not reset a short circuit fault.

4-10.5.13   5 – Combustion Fan

The combustion fan is open or shorted.
- The burner will shut down.
- The diagnostic code, 5 will be displayed.
- The buzzer will sound for 10 seconds.
- The control board will purge, with the circulating pump for two minutes.
- In order to restart the burner, check the combustion fan. Then reset the fault by switching the service switch or the remote panel switch OFF then ON again if the combustion fan is open or by the service switch only if the combustion fan has shorted.
    The remote panel switch does not reset a short circuit fault.

4-10.5.14   ƃ – Water Pump

The water pump is shorted.
- The burner will shut down.
- The diagnostic code, ƃ will be displayed.
- The buzzer will sound for 10 seconds.
- The control board will purge with the combustion fan for two minutes.
- In order to restart the burner, check the water pump. Then reset the fault by switching the service switch OFF then ON again.

The remote panel switch does not reset a short circuit fault.

4-10.5.15   7 – Flame Out

The flame went out or did not ignite.
- The burner will shut down.
- The diagnostic code, 7 will be displayed.
- The control board will try to restart the burner two more times. After three unsuccessful ignition attempts, the buzzer will sound for 10 seconds.
- The control board will purge with the combustion fan and circulating pump for two minutes. The diagnostic code 7 will continue to be displayed.

The single most common reason for flame out faults is when air gets into the fuel system. This is normally caused by loose fittings or when your fuel supply is teed off a fuel line used by your engine or generator. As air accumulates and passes through the nozzle, it interrupts the fuel and shuts down the burner. When this happens, it may be necessary to reset the fault a few times to ensure all air has passed through the system. If the burner resumes normal operation, you must find the source of the air leak, otherwise, this fault will continue to occur. An Air Accumulator has been installed to collect the air before it reaches the nozzle. Check regularly and bleed if necessary. Air which is collected is an indication of a leak somewhere in the fuel system.

1. Check the fuel supply. The fuel pump will chatter if there is no fuel or when air is passing through the pump. Check the Air Accumulator for air and bleed if necessary. Check connections between the fuel tank and fuel pump and the regulator and nozzle for air leaks. Find source of air entry and repair. Make sure the nozzle or fuel filter is not clogged.
2. Check the air line hoses for any restriction of air flow through the compressor. Restrictions may be caused by a crimped hose, clogged air filter, or a loose or leaking air hose from the compressor outlet to the nozzle. Check the air filter inlet for any obstructions.
3. Make sure the air pressure of the compressor with the nozzle installed, is at 8 to 90 psig for CO-20/32 models and 10 to 12 psig for CO-45/65, and 14 to 16 psig for CO-85/105 models.
4. Check for negative pressure in the area around the heater. When the engine is running, it can draw air back through the heater's exhaust pipe. All intake air and exhaust connections must be tight.
5. Check for restrictions or leaks in the combustion air intake hose or exhaust pipe.
6. Check for open circuit on fuel pump/solenoid and compressor.
   - To restart the burner, check the fuel supply, check for air in the fuel line, and clean the nozzle. Then reset the fault by switching the service switch or the remote switch OFF then ON again.
7. If when reset, the board shuts down without trying to restart the burner the board is defective.

4-10.5.16 ☐ – Compressor

The air compressor has shorted.

- The burner will shut down
- The diagnostic code, ☐ will be displayed.
- The buzzer will sound for 10 seconds.
- The control board will purge the system with the combustion fan and the circulating pump for two minutes.
- In order to restart the burner, check the air compressor. Then reset the fault by switching the service switch OFF then ON again.

  The remote panel switch does not reset a short circuit fault.

4-10.5.17 ⅂ – Bypass Mode

The bypass mode is a service feature to be used by ***authorized service personnel only***. The bypass mode overrides the remote switch, voltage fault, fuse blown fault, flame out fault, open ignitor fault, open fan fault, and thermostats. All these safety devices will be bypassed for five minutes.

- While in the bypass mode, the diagnostic code, ⅂ will be displayed and the Power ON LED will flash rapidly.
- If the heater cycling aquastat is satisfied or the overheat limit is reached, the burner stops and purges for two minutes while displaying the diagnostic codes: C-heater cycling or 1-overheat, and the Power ON LED flashes slowly. You must wait for the heater to cool before continuing in the bypass mode. The bypass mode times out in five minutes. After the first three minutes running, it automatically purges for the last two minutes.

4-10.5.18 Water Pump On (Green)

The green light located directly under the LED digit on the main board turns on whenever the circulating water pump is energized.

4-10.5.19 Remote Panel

The remote panel consists of an ON/OFF reset switch, an LED diagnostic digit, and fault buzzer. The diagnostic digit matches the main control board which refers to the diagnostic codes as explained previously in this section. A small red LED glows when the switch is on, which also indicates that the service switch is ON. The small buzzer sounds for 10 seconds to alert you of a fault.

4-10.5.20 LCD Readout Remote Panel (Optional)

This panel displays the diagnostic explanation which matches up to the diagnostic code on the main board. A small buzzer sounds for 10 seconds to alert you of a fault.

4-10.5.21 Flame Sensor Module

The Flame Sensor consists of a sealed module with a photodiode aimed at the flame, a red LED indicator light and 3 wires, white (+), black (-), and green (signal) connected to the main board. Under normal operating conditions whenever the burner ignition begins, the red LED flashes once indicating the white and black wires are connected and the module is receiving power and working properly. Once the burner is ignited, the LED begins to flicker like a flame. If for any reason the flame is extinguished, the flickering stops and the board shuts down the heater. If the green (signal) wire is disconnected, the board shuts down. If all wires are properly connected with module flashing and the board still shuts down, diagnostic code ⅂ Flame Out, the board may be defective.

4-10.5.22   Reduced Output

The heater may run without faulting, but at a reduced output. If this is noticed, it could be caused by the following:

1. High altitude
2. Dirty nozzle
3. Defective regulator
4. Too small a nozzle
5. Poor water circulation
6. Ash deposit in combustion chamber

4-10.5.23   Smokey, Smelly Exhaust

The heater may run without faulting, but you may experience signs of soot, exhaust smoke and/or a pungent smell. This is usually caused by the wrong fuel to air mixture. This can be affected by the following:

1. Low voltage
2. High altitude
3. Dirty compressor air filter
4. Low compressor air output
5. Restricted combustion air flow (intake hose/exhaust hose/combustion chamber)
6. Low combustion fan output (defective motor/wrong rotation/dirty fan blade)
7. Partially clogged grooves in nozzle distributor.

4-10.5.24 Hot Water is Coming Out Cool

This may be a sign that the Mixing Valve is not set to the proper setting. Look through the 3/8" x 1" Inspection Slot on the front of the Hurricane Heat case, if setting is not at 4, it will need to be adjusted.

To adjust setting, remove cover from case and manually turn knob to highest setting (4), replace cover.

NOTE: If there is no slot on the Hurricane case then this is not the cause of the cool water. Unit may need to be serviced.

4-10.6 Maintenance

4-10.6.1 The First Few Weeks

About two weeks after your Hurricane heater has been running, you should conduct a general inspection of the entire system.
Check for any leaks in the exhaust, fuel, or water systems. Tighten all clamps.

4-10.6.2 Adding Antifreeze

Once the system has been filled with water and purged of all air during the installation procedure, you need to operate the heater at normal temperatures and then check for water leaks. If you do not find any, add antifreeze to lubricate the pump and prevent the water system from corroding or freezing in cold weather. To do this see Section *4-10.6.11 Water Filling Procedures* later in this manual.

⚠️**CAUTION: Where there is a chance of contamination of your domestic water when using a heating system, use antifreeze specifically intended for hydronic heating systems. Inhibited propylene glycol is recommended. Do not use automotive, ethylene glycol, or any undiluted or petroleum based antifreeze as they can cause severe personal injury.**

It is very important that you never use water only as a coolant.

We recommend that you add a mixture of 50% water and 50% antifreeze. NEVER use more than a 50/50 mixture, since the added viscosity of the antifreeze solution will cause circulation problems. Your antifreeze/water mixture should be changed every three years. Antifreeze does wear out and can become very acidic.

A coolant conditioner should be added to the water system, to keep the coolant alkaline and not acidic, see section *4-10.6.9 Protecting Hydronic Heating Systems* later in this manual. These inhibitors also prevent the coolant from forming calcium scales. Conditioners are available from diesel engine manufacturers to maintain water stability and prolong heater life. If a conditioner is not installed in your system, check the pH level yearly. The components inside the heater should not normally require maintenance, except for periodic checks for obvious problems, such as leaks or overheating.

4-10.6.3 Nozzle

Nozzle problems such as clogging results in a poor flame, small and blue. Carefully disassemble. Hold nozzle and turn stem counter clockwise. Clean distributor orifice and air slots of any debris using solvent and high pressure air. Check O-rings for nicks and replace if in doubt. A leaking O-ring allows air into the fuel causing popping of the flame.

4-10.6.4 Fuel Lines and Filter

You should check your filter every season to determine if it needs replacement. The frequency depends largely on the quality of fuel you've been using.

4-10.6.5 Combustion Chamber

The quality of the fuel varies and some ash is left in the chamber after combustion. The burner and combustion tube must be removed and the combustion chamber vacuumed clean ever 1000 hours. If this is neglected, the exhaust becomes restricted and causes the combustion chamber to burn out. The exhaust pipe should be checked and also be vacuumed, if required.

4-10.6.6 Checking Hoses and Tubes

Every so often, check all water hoses and tubes for leaks or weak points. Tighten all clamps and replace any sections of worn hose immediately.

⚠️ **CAUTION: Never let the water pump run dry. This causes irreparable damage to the pump and voids the warranty.**

4-10.6.7 Electrical System

The electronic control panel should not normally require servicing, except for the following:
- Make sure that all your connections are secure.
- Periodically, do a voltage test to ensure that you are getting 12 volts from the battery.
- Check for corrosion of wires.

4-10.6.8 Recommended Spare Parts

Like any piece of machinery, your Hurricane heater will need servicing from time to time. A suggested maintenance schedule can be found in Section 4-10.6.9 Maintenance Schedule below. The following is a list of parts recommended to have on hand.

Description	Part No.
Fuel filter cartridge	6021
Air filter	6018
Fuel nozzle (# for model CO 45)	14017
Fuel nozzle "O" ring	14025
Photocell (Board versions 5-10)	16002
Photodiode (Board version 11/12)	16003
Flame Sensor (Board verion 2000 and 2001)	16004

Over a period of time, operational parts of the heater will wear out and need replacing:

- Air compressor
- Fan Motor
- Ignitor
- Operating and High Limit Aquastat

4-10.6.9 Maintenance Schedule

Maintenance Item	Maintenance Frequency	Service Required
Fuel/WaterHoses	Seasonally	Inspect for leaks and weak points
Hose Clamps	Seasonally	Inspect for corrosion Tighten if Loose
Combustion Chamber and Exhaust	1000 Hours	Vacuum Clean
Fuel Filter	Seasonally	Inspect for Cleaning or Replacement
Nozzles, Distributor Orifice, Air Slots and O-Rings	Seasonally or 2000 Hours	Cleaning and Inspection for Wear and Damage
Exhaust System	Seasonally	Inspect for Leaks and Corrosion
Coolant Mixture	36 Months 12 Months	Replace pH Level for Acidity
Electronic Control Panel	Seasonally	Voltage Test/Inspect for Corroded Wires
Air Compressor, Fuel Pump, Combustion Fan, Motor	Seasonally	Inspect for Leaks, Corrosion and Wear

4-10.6.10 Protecting Hydronic Heating Systems

The advantage of closed hydronic heating systems is that as long as there are no leaks, (i.e., no need for constant make-up water), the fill neutralizes (that is, it reaches equilibrium). The long term result is minimal scale build-up and insignificant corrosion since after operating for a period of time, most oxygen has been "starved" out of the boiler fill water. While boiler fill water treatments have their place, leak prevention is the single most important preventative maintenance item.

Regular maintenance and prompt repair of leaks, combined with a one time application of appropriate inhibitors, can help you enjoy problem-free heating. Since it is difficult to guarantee that a hydronic heating system will never leak, corrosion inhibitors and scale inhibitors added to "fresh" boiler fill water can act as low cost "insurance" for hydronic systems.

Causes of Scale
Tap water is the most typical source selected for boiler fill water. Water contains dissolved solids such as magnesium and calcium which when heated becomes much less soluble and forms scale. Scale comes out of solution in the largest amounts where the temperature is highest in the system (i.e., the boiler heat exchanger). As the scale builds up, noise and cold spots develop since scales plug up water channels and acts as an insulator that impedes proper heater transfer.

Acidity and Corrosion
Corrosion is the result of metal oxidizing (that is, metals reacting with oxygen-rich boiler fill water). The acidity of any liquid (including water) is a good indicator of how much corrosion will actually take place. As a rule of thumb, boiler fill water should have a pH greater than 7 and less than 10.5. The key to preventing corrosion is to make sure that the heating system is free of leaks and there is no need to replace it with fresh, oxygen rich boiler fill water. Corrosion inside a hydronic heating system stops quite quickly as the fill water stabilizes and becomes oxygen-starved. The pH should be measured at least annually.

Since most hydronic heating systems are comprised of different metals (e.g., iron, copper, etc.) and since boiler fill water is an electrolyte (that is, it will conduct electrical current), electro-chemical reactions ("galvanic" reactions) can take place. As the fill water stabilizes, however, it becomes a very weak electrolyte, so galvanic corrosion rarely becomes a problem – as long as the system remains leak-free.

Preventative Treatments
Corrosion and scale inhibitors are relatively inexpensive. Ideally, they should be applied, once only, at the time of a new installation or whenever a system has been completely drained. Boiler water treatment specialists almost unanimously agree that the prevention of leaks and the elimination of the need for frequent boiler water make-up are top priorities for hydronic systems.

4-10.6.11 Water Filling Procedure

After your system has been completely installed, filled with straight water, purged of all air, and operating for a period of time at normal operating temperatures, you should now double check all connections for leaks. If no leaks are found, the system can be drained and filled with a 50/50 mixture of antifreeze and water.

⚠️ **CAUTION: Where there is a chance of contamination of your domestic water when using a heating system, use antifreeze specifically intended for hydronic heating systems. Inhibited propylene glycol is recommended. Do not use automotive, ethylene glycol, or any undiluted or petroleum based antifreeze as they can cause severe personal injury.**

To fill the system use a separate self priming pressure pump with a hose on the suction side. Put the hose into a 5 gallon container. Remove the systems hose from the outlet of the expansion tank, which is feeding the systems circulating pump and attach it to the outlet of the self priming pressure pump. Remove the hose from the inlet of the expansion tank and hang it into the 5 gallon container.

Make a final check to ensure all of the air vents and drains are closed. Pour a mixture of antifreeze and water into the container and start the pump. As the mixture is pumped out, slowly add more mixture keeping the level above the inlet of the suction hose until all air has been expelled and the mixture starts coming out of the return hose hanging in the container. This flushes the system of any debris and purges the lines of air. Continue to run the pump for about 15 minutes.

When no more air is being expelled, stop the pump and reconnect the lines to the expansion tank. Top off the expansion tank with the mixture and turn on the system's circulating pump with the jumper, located on the main control board just right of the pump fuse, marked "Circ. Pump Override". When the jumper is on, the pump will run continuously and the bottom LED will be lit.

Check for a good flow through the expansion tank and double check all joints for leaks. Open and close all air vents to eliminate any remaining air bubbles. Recheck the mixture level and circulation in the expansion tank.

> ⚠️**CAUTION: Make sure you have a good, quiet circulation of water through the heater. Check the pump to make sure it does not run dry. If the heater has air pockets trapped in the water jacket when it is turned on, it could overheat and damage the unit. None of this is covered by warranty.**

4-11 Air Conditioning/Heat Pumps_____

4-11.1 System Description

Air conditioners are located in the living room and bedroom areas. A wall mounted master thermostat is located in the dinette area to control all units. Remote temperature sensors are located in the kitchen/dinette area and bedroom. The air conditioners are operable from 120 VAC source (generator or shoreline power). Each air conditioning unit is also a heat pump.

Condensate Drains - Separate drain lines are provided for each air conditioning unit to route condensation from the roof to the ground through the body side walls.

4-11.2 Electric Heat

An electric forced air heater is located in the bath, controlled by remote thermostat. A second electric heater is located in the kitchen.

4-11.3 Automotive Air and Heat System

The dash heat and air system are a separate HVAC system designed to meet the latest refrigerant requirements. This unit provides the ability to mix heat and air to provide defrosting capability.

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*4-12 Fresh Water System*_____

4-12.1 Water Supply and Distribution System

The fresh water tank is approximately 100 gallons. The dual purpose Tank Water Fill/Municipal Water inlet connection is located in the road side holding tank compartment, in Bay 4, left. The Tank Fill On-Off switch, located in Bay 4, left, diverts the municipal water input to fill the pure water storage tank, which is located in Bay 2. System water pressure is provided by a water pump located in the roadside compartment, Bay 2, left. The fresh water tank is non-pressurized with the system water pressure developed by a demand pump when not connected to a municipal water system. The fresh water tank is equipped with a two inch drain. The tank also includes level indicators, located on the curbside end of the fresh water tank. All of the water supplied to the motor home is filtered through an activated carbon filter.

4-12.2 Municipal Water Hookup

When facilities are available, the Municipal Water hookup can be used to supply all motor home water system requirements. In this manner, the fresh water tank and pump system are automatically bypassed with the water pressure regulated by the municipal water system (approximately 40 psi).

4-12.3 Filling and Draining

To fill the fresh water tank, connect the water hose to the municipal water inlet, set the Tank Fill switch to ON, then turn on the water supply. When the tank is full, the level switch in the tank will close the tank fill solenoid. Set the Tank Fill switch to the OFF position, shut off the water supply and disconnect the hose. At this time, check that the Monitor panel readout indicates a full water tank. By pressing the Pure tank switch and observing that all, E through F indicator segments are lit.

NOTE: The Tank Fill switch should be ON only when the water tank is being filled. This switch must be in the OFF position at all other times.

4-12.3.1 Sanitizing

Water system sanitizing procedures should be followed before the system is used for the first time, after long idle periods where water may become stagnant, or after any suspected contamination of the water supply. Whenever possible, use a commercially approved tank sanitizer and follow the procedures on the product package. If it is not possible to use a commercial product, prepare your own mixture and sanitize the tank in accordance with the following procedures:

1. Empty the Fresh Water Tanks – To drain the tanks, open the 2-inch Cold Water Drain Valve located inside the opening below the fresh water tank on the roadside, Bay 2, left. Pull valve toward front of motor home. After the tank is completely drained, close the Cold Water Drain.
2. Prepare the Sanitizing solution – Each gallon of Sanitizing solution consists of ¼ cup of household bleach (sodium hypochlorite) solution and one gallon of water. This mixture results in a residual chlorine concentration of 50 ppm in the water system. Seven to eight gallons of

sanitizing solution will be adequate for the M380 fresh water tank. (Approximately 100 gallons).

3. Add sanitizing solution to water tank – Remove deck lid plug in the curbside close out panel. Remove 3/4 inch plug from the side of the tank in the curb side luggage compartment and pour the solution into the tank. Reinstall the plug in the tank.
4. Fill tank to capacity – Connect the hose to the municipal water inlet, turn on the Tank Fill Switch and fill the water tanks completely. Shut off the hose and turn off the Tank Fill switch. Turn on the water pumps. Open each faucet (hot and cold), and run the water until a distinct odor of chlorine can be detected. Shut off the water pump.
5. Allow the system to stand – Let stand for at least 4 hours when disinfecting with 50 ppm residual chlorine. If a shorter time period is desired, then a 100 ppm chlorine concentration should be permitted to stand in the system for at least one hour.
6. Drain tanks – Open the Cold Water Drain valve (as in Step 1), and allow the tank to drain completely.
7. Refill tanks – Close the Cold Water Drain valve and turn on the water supply to the municipal water inlet. Turn on the Tank Fill switch and fill the tank completely. When the tank is full, turn off the Tank Fill switch, shut off the water supply and disconnect the hose. Then replace the fill cap and turn on the water pump. When water flows from the opened faucets, close them and open the other faucets until water flows. This flushes the system, removing trapped air from piping and ensures that the fresh water supply is ready for use.

⚠️**CAUTION: Do not permit sanitizing or antifreeze solutions to enter water filter.**

8. Repeat steps 6 and 7 until the chlorine smell and taste is no longer present at the faucets.

4-12.3.2 Water Filter Replacement

Depending upon the condition of the municipal water used, the filter media will degrade with use. The only practical way to determine when replacement is required is to go by the sense of taste. It is recommended that the filter be changed after prolonged storage.

4-12.3.3 Water Heater

With the Hurricane system at operating temperature, the domestic water is automatically heated as it is being used. Open any hot water faucet and a continuous supply of domestic hot water will be present within a few seconds. This is accomplished by the Hurricane's domestic hot water zones, which are an integral part of the heating system. A mixer valve has been installed to ensure that excessively hot water does not flow to the faucets.

⚠️ **CAUTION: The mixer valve is not an anti-scald device. Always exercise reasonable caution when using hot water.**
⚠️ **CAUTION: Do not turn the Hurricane's unit off if the outside temperature is 32°F or lower when the potable water system is not drained.**

4-12.3.4 Water Pump

The water pump is located in the road side luggage compartment (bay 2, left). The pump employs state-of-the-art electronics to automatically control motor speed. The pump adjusts its speed as you open and close water fixtures. If the pump has been out of service for a period of time, it is advisable to open a faucet before turning them on. When water flows steadily from the opened faucet, close the faucet and observe that the pump shuts off when the system becomes pressurized. (It may also be necessary to bleed the air from the other faucets as well.) When the fresh water supply tank level is low or empty, shut the pump off to prevent possible damage to the pump motor. In addition to integral motor overload protection; the pump mechanism is also protected from damage by the presence of a filter at the water pump inlet. The filter should be cleaned periodically.

Under normal usage, the water pump should require no periodic maintenance other than ensuring that the input water supply is properly filtered of particles that could damage the pump mechanism.

Pump failures can generally be tied to the plumbing system or to electrical wiring. If a pump fails to operate properly, refer to the general troubleshooting guide.

Note that detailed pump repairs and overhaul should be performed by a qualified repair facility.

4-12.3.5 Water Pump Switch

The central control switch, labeled water pump, for the water pump is in the bathroom.

The associated indicator is lit whenever power is being supplied to the pump. Turning ON the switch pressurizes the water system, with the pump maintaining constant pressure. Continuous or erratic pump operation can indicate an empty water tank, system leakage or air lock in the water lines. Switches enabling the water pump are located in the bathroom, in the kitchen and in the roadside holding tank bay. These switches are labeled water pump.

4-12.3.6 Manifold

All cold and hot water is directed to the distribution manifold. Hot and cold water is distributed to each fixture via individual 3/8" I.D. lines. Individual shut-off valves are located on the manifold, and are used to shut off water to respective fixtures in the motor home. A 1/8" I.D. line is used for the refrigerator ice maker.

4-12.3.7 Water Pump Troubleshooting Guide

Symptom	Possible Cause	Corrective Action
Pump operates but no water flows through the faucet.	Low water level in the tank.	Add water.
	Suction lines or filters clogged.	Clear water lines and clean filters.
	Kink in the water suction hose.	Check water hose connections to tank and straighten or replace as necessary.
	Air leak in suction line.	Replace suction line.
	Defective water pump.	Rebuild or replace pump.
Pump cycles on and off when faucets are closed:	Water leak in plumbing.	Check for signs of leakage and tighten or replace fittings, pipe, etc.
	Defective toilet flush valve.	Repair flush valve.
	Defective water pump.	Rebuild or replace pump.
Pump operates roughly and has execessive noise and vibration:	Intake line is restricted, kink in suction hose or fittings are too small.	Check input hoses and straighten or replace, as necessary.
	Defective water pump.	Rebuild or replace pump.
Pump fails to start when faucet is opened:	Clogged pressure piping.	Blow out water lines with compressed air. Maximum pressure that can be used is 40 psi.
	No voltage to pump.	Check input wiring circuit breaker and switches.
	Defective water pump.	Rebuild or replace pump.
Pump gives low water pressure and flow:	Defective water pump.	Replace diaphragm or motor.
	Tank fill switch left on.	Turn off tank fill switch.

NOTE: Before blowing out water lines, be sure to remove both lines from pump to avoid blowing out towards pump. Procedure may be best performed by a certified technician.

4-12.4 Winterizing

If you are planning on storing your motor home in an unheated area during cold weather, it is necessary to winterize the water system to prevent damage from freezing conditions. Winterizing procedures are covered in the following paragraphs.

4-12.4.1   Draining and Winterizing the Fresh Water Supply System

The following procedures show the use of the various drain valves and controls to winterize the fresh water system.

1. Open the main circuit breaker box (located in bedroom) and turn off the Water Heater and Instant Hot circuit breakers.
2. Turn on Water Pump switch (located in bathroom) and open all faucets (galley sink, lavatory, shower, outside hose connection and toilet water valve – after depressing pedal insert block to maintain position). Note that the outside water faucet should always be left open when freezing temperatures are expected. Also, remove drain plugs at rear of toilet and at bottom of Instant Hot. Refer to the Icemaker and Toilet Manuals for winterizing these units.)
3. Open the Cold and Hot Water Drain valves located in roadside Bay 2 left, luggage compartment. Open 2" water tank drain valve in road side first luggage compartment, Bay 1 left.
4. Allow water to drain completely before proceeding to the next step.
5. Turn off water pump switch.
6. Unroll coiled hose under road side end of fresh water tank. Hose is connected to valve assembly under tank (Bay 2, left).
7. Feed open end of hose into container of RV antifreeze. Approximately 3 to 5 gallons required.
8. Close the valve on the suction line coming from the fresh water tank and open the valve from the RV antifreeze line.
9. Close all fresh water manifold valves. Except the top hot water valve.
10. Turn on fresh water pump. Make sure RV antifreeze is moving into pump and into the manifold. Be ready to close the cold water drain valve, under manifold exiting the floor, when antifreeze exits the line under motor home. Also close hot water drain at this time.
11. Continue to run pump to fill the water heater and the hot water side of the manifold until antifreeze exits the hot water valve left open in step 9.
12. Open the hot water drain valve, closed in step 10, and close it again when antifreeze exits the hot water drain line.
13. Turn pump off at this time and close the valve on the antifreeze line. Stow hose in original location.
14. Make sure all the interior and exterior faucets, as well as, the ice maker, toilet and clothes washer are open.
15. At this point, the only water remaining in the system is contained in the P traps beneath the lavatory sink, shower drain, and kitchen sink (clothes washer optional). To prevent this water from freezing and damaging traps, put one pint of RV system anti-freeze into each drain. See WASTE SYSTEM winterizing.

NOTE: When reactivating the system, make sure (optional) Instant Hot is full of water before switching on.

*4-13 Waste System*_____

Your motor home comes with a Traveler® Fine China Toilet. Some important information for the use and care of your toilet is as follows:

1. Do not use chlorine or caustic chemicals, such as laundry bleach or drain opening types, in the system. These products damage the seals in toilets and dump valves.
2. Do not permit foreign objects (paper towels, paper cups, diapers, sanitary napkins, etc.) to be flushed through the toilet.
3. Mechanical seal toilets, like SeaLand's Traveler unit, are designed to only discharge directly into a holding tank. Horizontal pipe runs as found in conventional residential or commercial plumbing systems cannot be accommodated.
4. Traveler toilet bowl and flush seals must be regularly cleaned and winterized according to "Proper Cleaning and Maintenance" and "Winterizing" procedures found later in this section, or your warranty coverage may be voided. See owner's manual for specifics.

4-13.1 How to Use

To prepare the Traveler toilet for use, check to be sure that water supply to the toilet is connected. Turn on water supply and check system for leaks. Flush toilet and check for leaks.

To properly use the Traveler toilet, follow these simple instructions:

1. **To add water to the toilet**, lift or raise the flush lever until desired water level is reached. Generally, more water is required only when flushing solids.
2. **To flush toilet**, push lever all the way down until contents leave toilet bowl. Water flow pressures vary at different locations, therefore holding the flush lever down for 4-8 seconds may be required. We require a minimum flow to the toilet or two gpm (7.6 lpm) for proper rim and bowl wash.
3. Release flush lever by allowing it to snap back, which permits positive sealing around the flush ball.
4. A small amount of water should remain in bowl.

   NOTE: Holding flush lever down longer than necessary results in excessive water usage.

4-13.2 Proper Cleaning and Maintenance

The Traveler toilet should be cleaned regularly for maximum sanitation and operational efficiency. You can clean it just as you would a household toilet. **Do not use caustic chemicals, such as drain opening types, as they will damage the seals.**

BOWL CLEANING: For stubborn stains, use Brilliance™ liquid toilet bowl cleaner. SeaLand manufactures this especially for use with Traveler toilets. In certain locations where water is hard, a build-up of lime may dull the toilet bowl finish. Restore the shine with Brilliance cleaner. If you cannot find Brilliance in your area, contact SeaLand for your nearest dealer. If Brilliance is not available, you can also use Barkeepers Friend® cleanser. It is not necessary to vigorously scrub with either product. Please follow label instructions.

SEAL CLEANING: After an extended time, mineral deposits from hard water can build up under the edge of the rubber bowl seal, resulting in a slow leak down of water from the bowl. To prevent this mineral build-up, periodically clean under the bowl seal with Brilliance cleanser.

1. Shut off water supply.
2. Apply cleanser onto a cleaning brush, open the flush ball by pressing on flush lever, and scrub under the seal. Make sure to push brush bristles between bottom of seal and top of flush ball surface to scrub all parts of seal that are exposed to flush ball.
3. Close ball and wait 2-3 minutes.

4. Open flush ball. Use brush and water to rinse away cleanser and loosened deposits.

4-13.3 Winterizing

At the end of each season, the Traveler toilet should be winterized for storage, by either draining or using potable water-safe antifreeze in the system.

To drain:
1. Thoroughly flush system with fresh water.
2. Empty holding tank.
3. Shut off water supply to toilet(s), and remove inlet waterline.
    Do not remove brass cap on bottom of valve.
4. Press flush lever until all water is drained from toilet(s)

To use antifreeze:
1. See steps 1-15 in the section **4-12.2.1 Draining and Winterizing the Fresh Water Supply System.**
2. Empty holding tank.

NOTE: Use nontoxic antifreeze designated for potable water systems.

⚠ **CAUTION: Never use automotive-type antifreeze in freshwater systems.**

4-13.4 Deodorants and Special Tissue

Your Traveler toilet requires the regular addition of a deodorant product to reduce malodors and to help break down holding tank contents. Several factors should be considered in selecting a deodorant product.

Liquid or Dry: Liquid products obviously work more quickly by readily going into solution. Dry power formulations, on the other hand, have the advantage of required less storage space and are less likely to leak if the package is inadvertently damaged.

Formaldehyde versus Non-Formaldehyde: SeaLand manufacturers both types of deodorants. Formaldehyde formulas (such as SeaLand® brand) control odor very effectively at all temperatures and with all degrees of water hardness. Secure® brand, which is formaldehyde free and manufactured by SeaLand, is similarly effective, but may cost a bit more.

How Much Deodorant and How to Add it: The deodorant is added directly into the toilet bowl, then flushed into the holding tank. Follow bottle or package instructions. Conditions of extremely warm weather, longer waste holding time and larger tank capacities may require more deodorant treatment. In addition, to maintain optimum efficiency in odor control, the waste holding tank should be cleaned thoroughly at least once or more each season depending on use.

Why Wouldn't You Use Household Toilet Paper in Your Traveler Toilet? Household tissues often contain adhesives, which bond together the paper fibers from which the tissue is made. The adhesive prevent the tissue from breaking apart, and their use in "ultra-low flow" systems can cause system clogging. SeaLand tissue is especially designed for use in low water toilet systems. Its rapid dissolving properties minimize the amount of residual paper in the holding tank and allow deodorizers to work more efficiently.

SeaLand versus Other Brands: SeaLand Technology constantly strives to provide our system owners with effective products that have minimal environmental impact and good value. Many deodorant products do not measure up to our standards of performance and value.

4-13.5 Finding SeaLand Products

If you are having trouble finding SeaLand products and have access to the Internet, you can find them at ***http://www.sealandtechnology.com***.

4-13.6 Service Tip

Checking for water leaks behind or under toilets or other appliances can make it difficult to locate the source. Dripping water at room temperature makes it difficult to feel wetness. Taking four or five sheets of toilet tissue and wiping all seams and waterline connections offers a simple means of locating the general area of the leakage. Start at the top of the unit since gravity will cause a leak to run downward. When the tissue meets the leaking water, it will immediately change its texture.

4-13.7 Troubleshooting Guide

Problem	Possible Cause	Service Instructions
1. Toilet emits odor (flush ball closed).	a. No water in overflow trap (evaporated).	a. Add water through overflow holes.
2. Toilet emits odor (flush ball open).	a. Odor emitting from base of toilet.	a. Use SeaLand brand deodorants.
	b. Plugged holding tank vent line.	b. Clear obstructions from vent line.
3. Water will not stay in bowl.	a. Loose camp ring.	a. Tighten clamp ring adjusting nut.
	b. Improper seal around flush ball due to dirt or debris or underside of Tef	b. Inspect flush ball and underside of Teflon® seal for foreign objects.
	c. Worn or damaged seal.	c. Replace seal.
	d. Worn or damaged flush ball.	d. Replace flush ball.
	e. Cracked half clamps.	e. Cracked half clamps.
4. Plastic flush ball will not close completely.	a. Clamp ring is over tightened, causing too much tension on seal and flush ball.	a. Loosen clamp ring.
	b. Weak or defective spring cartridge.	b. Check spring tension by letting up on flush lever suddenly. If lever does not snap back, replace spring cartridge.
	c. Worn or damaged flush ball or shaft.	c. If lever snaps back but flush ball does not close completely, replace the flush ball and shaft.
5. Water does not shut off in toilet (toilet overflows).	a. Dirt lodged in water valve seal.	a. Disassemble and clean water valve.
	b. Cam strap is bent down, holding water valve open.	b. Bend front of camp strap up about 1/16" (1.6mm).
	c. Worn or defective water valve.	c. Replace water valve assembly.
	d. Worn or defective spring cartridge.	d. Replace spring cartridge.
6. Hand spray unit leaks water when toilet is flushed.	a. Decorative metal sleeve on spray nozzle is too long to allow the valve to securely close.	a. Remove the plug in the center of the spray nozzle. Loosen screw under plug 1/4 turn and replace ring.
7. Water does not enter toilet bowl properly.	a. Low water pressure.	a. Check incoming water pressure.
	b. Water valve clogged.	b. Remove and clean filter screen located on inlet of water valve.
8. Water leaking from water valve.	a. Loose connection.	a. Tighten bottom cap, inlet fitting and outlet hose clamp.
	b. Worn or defective water valve.	b. Replace water valve.
	c. Water line connection not seated properly.	c. Remove water line and assembly correctly.
	d. Stripped threads.	d. Replace water valve.
	e. Seal is worn or missing.	e. Replace water valve.
	f. Valve body cracked.	f. Replace water valve..
9. Water leaking from bottom of toilet base.	a. Toilet loose.	a. Tighten toilet mounting bolts.
	b. Worn or defective toilet mounting floor seal.	b. Replace floor seal between floor flange and toilet base.
	c. Worn or defective base.	c. Replace base assembly.
	d. Worn or defective floor flange.	d. Replace floor flange.
10. Water leaking from rear of toilet bowl.	a. Loose hose connection.	a. Tighten hose connections.
	b. Loose vacuum breaker.	b. Tighten vacuum breaker to bowl connection.
	c. Worn or defective vacuum breaker.	c. Replace vacuum breaker.
	d. Cracked or defective toilet bowl.	d. Replace toilet bowl.
11. Flush ball does not open completely. Low profile units only.	a. Flush ball interferes with floor flange.	a. Loosen mounting bolts and center toilet over flange. Replace floor flange with one of the following: 345889 3" MPT 345892 3" Socket 343765 3" Spigot

14-13.8 Optional Air Flow Toilet

You may have elected to purchase as an option the Microphor Air Flow Toilet with your motor home. Basic operation and cleaning procedures for this toilet are as follows:

14-13.8.1 Basic Operation

1. In the normal rest position, pressurized air enters the Flush Activator and goes from Flush Activator Port 1 to Air/Water Sequence Valve Port 2, through Port 3 to Air Cylinder Port 4 holding the Flapper closed, sealing the water in the bowl and maintaining a proper water surface area.
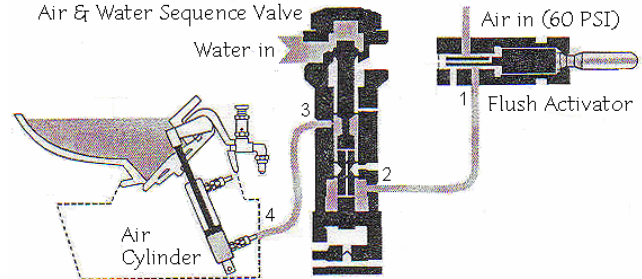
2. When the Flush Activator is pressed, air is shifted to Port 5 to A/W-Seq. Valve Port 6 and on to Air Cylinder Port 8. The air in the base of the Air Cylinder is bled off through Port 4 to Port 3 and out Vent 1, allowing the Air Cylinder to retract, opening the Flapper. Simultaneously, pressurized air in the spool assembly up to open the water passage, allowing water to enter and rinse the bowl. The air on the top of the piston is bled off through Port 1 and out Vent 2.
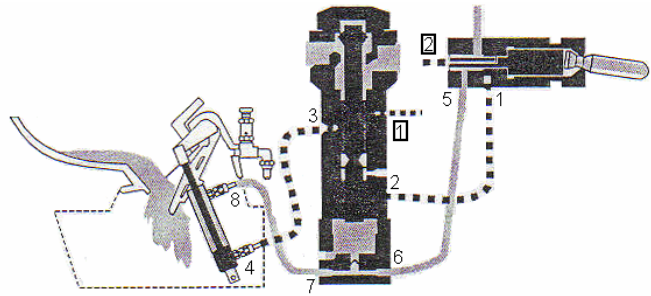
3. As the Flush Lever is released, the Flush Activator returns to the normal rest position redirecting pressurized air to Port 2, Port 3 and Port 4. The Bleed-Off Plug 12 bleeds off the air under the piston causing the spool to move downward, gradually closing the water passageway. The air having been bled off the top of the Air Cylinder Port 8 through the end of the Flush Activator Vent 2, allows the Air Cylinder to close the Flapper allowing water to accumulate in the bowl, restoring a proper water surface area.
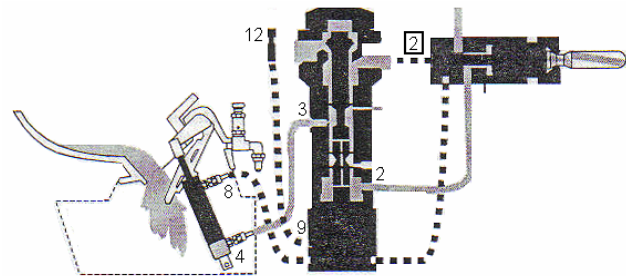
4. Near the bottom of the piston stroke, the air passageway from Port 10 to the Hopper Port 11 is unblocked for 4-5 seconds to pressurize the hopper and expel the waste contents over the trap and into the waste line.

5. As the A/W Seq. Spool reaches the bottom position, the water supply is shut off, completing the flush cycle. In the event of air supply failure, the spring in the Air/Water Sequence Valve maintains the valve in the closed position, blocking the water passageway. The flapper will open and allow water in the bowl to flow into the hopper forming a water seal.
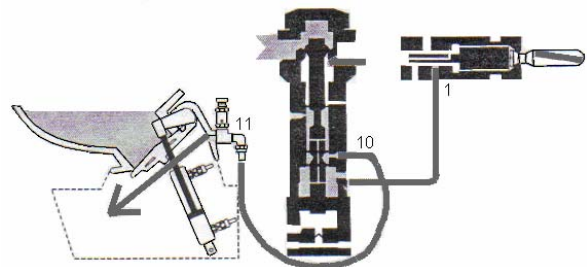
14-13.8.2 Cleaning

Use Micro-Clean Organic Cleaner, P/N 24542, or other common liquid toilet bowl cleaner for use with the Microflush toilet. Caustic drain openers or non-biodegradable cleaners should not be used.

1. While depressing the flush activator, turn off the water. Allow the bowl cleaner to flow into the lower chamber. Keep the flush activator pressed.
2. Insert bowl brush into lower chamber and agitate mixture.
3. Remove the bowl brush and release the flush activator.
4. Turn the water on and flush twice to rinse thoroughly. If used with a Microphor Biological Waste Treatment System, check manual for acceptable cleaners.

14-13.8.3 Clearing Plugged Toilet

Turn water off; press flush handle and hold to remove water from the bowl. The flapper in the bottom of the toilet will remain open until the flush handle is released. Check to see if the restriction can be removed from the hopper with a hooked wire, being careful not to damage the rubber seal on the flapper or the mating surface on the hopper. If obstruction cannot be picked out with a hook or tongs, use a plunger by pushing in slowly and pulling out quickly to pull object back into the hopper. If necessary, turn the air off and use a snake inserted through a 12" plastic pipe placed in hopper. The pipe will protect the flapper seal from damage. If the Air/Water Sequence Valve will not operate with the water turned off, hold the flush lever down and turn the water on and off quickly to free the valve action. When the passage becomes clear, turn the water on and press the flush handle to start the flush cycle.

14-13.8.4 Winterizing

Shut off water to toilet. Flush toilet three times or until water no longer flows into the bowl. Unhook water supply at angle stop. Empty water in line into receptacle. Shut off air supply to the toilet. The unit is now prepared for freezing temperatures. Open petcocks on drip legs and air receiver drain after shutting down air compressor and isolating air lines.
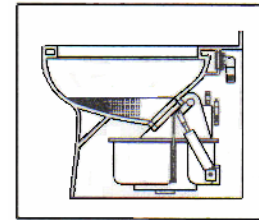
4-13.8.5 Cleaning Bleed Off Assembly

Standard Flush – Remove plug and clean with solvent; air blow dry.

Positive Flush – Remove plug and clean with solvent; air blow dry, remove and clean plug on Detent Valve.

NOTE: Use 5/32" (4mm) Allen wrench to remove plugs.

Bleed Off Assembly

Bleed-Off Plug
Detent Valve
Positive Flush
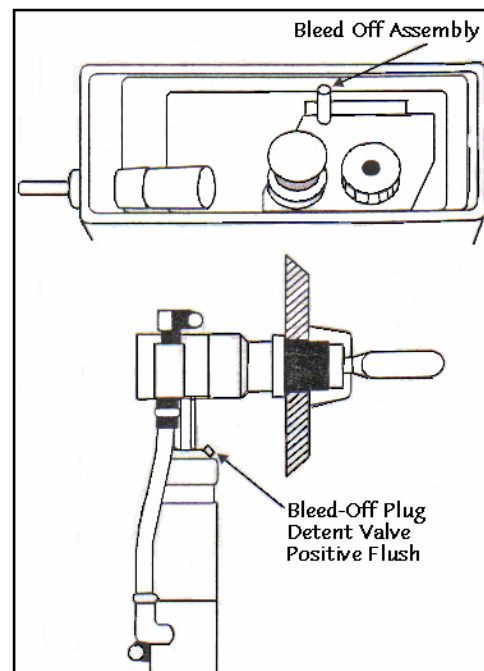
4-13.8.6 Air System Design

Filter-regulators are available in a variety of sizes and types. Their purpose is to remove water and foreign matter from the air line and to maintain a constant pressure of 60-65 psi to the toilet. The following steps must be observed to assure moisture will be removed from the air line.

1. Drain air compressor receiver regularly. Most water tends to accumulate at this point.
2. Install drip legs with condensate drains at all low points in air piping.
3. Whenever possible, grade all air lines back to the air receiver or drip leg assembly and drain regularly.
4. The air supply to the toilet must be taken from the top of the main or branch air line.

4-13.8.6 Troubleshooting

Your Microflush® toilet is designed to give you years of trouble-free operation. Please check the following before beginning any service or repair.

Water supply:	1. Is the water turned on? 2. Is the water pressure between 20 and 50 psi for pressure water system? 3. Is there 6 feet minimum of head for gravity systems? Fluctuating or high water pressure can cause intermittent problems with the toilet operation. Check the water pressure at different times of the day (i.e., early morning, noon, evening) to determine if you have fluctuating or high water pressure. A pressure-reducing valve installed on the incoming water line will assure you have even pressure. Make sure no check valve is installed before the Air/Water Sequence Valve.
Air system:	1. Is the air turned on? 2. Is the air pressure set at a constant 60-65 psi? 3. Do you have any air leaks or kinks in the air system? 4. Do you have water in the air system? This usually causes irregular timing. Drain the compressor tank and check the filter regulator and drip leg(s) for water. To check for water in Air/Water Seq. Valve, remove Bleed-Off Plug, put finger over screw opening and flush. If water is present, it will squirt out. If water is detected, then the air cylinder and airlines must also be drained.
Cycle time:	1. Is the flapper cycle time set correctly at 4-7 seconds? 2. Is the bleed off assembly plug blocked? Remove, clean and reinstall.

Trouble	Possible Causes	Correction
Flapper does not open. Water does not flow. Nothing happens.	1. No air supply to Microflush. 2. Water has accumulated in Air/Water Sequence Valve	1. Supply compressed air at 60-65 psi. 2. See Check Air System.
Flapper opens and closes 4-7 seconds after handle is released, but no water enters bowl.	1. No water supply to Microflush.	1. Supply water at 20-50 psi.
	2. Water turned off.	2. Open angle stop (shut-off valve).
Flapper opens when flushed, and closes immediately when activator is released.	1. Excessively high water pressure.	1. Install water pressure regulating valve, set at 20-50 psi.
	2. Debris in check valve at base of Air/Water Sequence Valve.	2. Clean Air/Water Seq. Valve.
Flapper opens and will not close.	Bleed-Off plug blocked.	Remove, clean or replace, reinstall.
Water continues to run when Microflush is not in use.	Foreign object is under water valve in Air/Water Sequence Valve.	Clean Air/Water Sequence Valve. Reference Service Kit P/N 95057.
Water splashes when flushed.	Water is too high in bowl.	Reduce incoming water via angle stop.
Flush cycle is too long.	Bleed-Off plug blocked.	Remove, clean or replace, reinstall.
Flush cycle is too short.	Bleed-Off plug hole too large or related air lines leaking.	Remove, replace, and check for air line leaks.

If other problems are encountered, please contact the factory: Toll Free 1-800-358-8280

4-13.8.6 Basic Repair Procedures

4-13.8.6.1 Hopper Components

A	00064	SS Mounting Screws (14 each)
B	27207	Gasket, flapper
C	27272	O-Ring Seal, Hopper Top to Bottom
D	37518	Pressure Relief Valve
E	37548	Bleed Valve
F	90042	Crank Arm Assy
G	90048	Flapper Assy
H	90012-3	Hopper Top with Crank and Flapper Assy
I	45060	Hopper Bottom Assy (not including P-trap)
J	96029	P-Trap Assy, Rear Discharge
K	95157	P-Trap Assy, Downward Discharge
	20137	Valve Mounting Bracket
	48718	Conduit Clamp
	10194	Retaining Ring, Air Cylinder
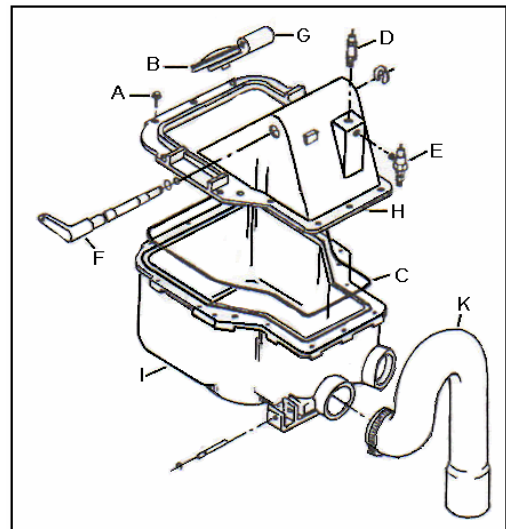
4-13.8.6.2 Hopper Replacement

⚠ **CAUTION: Read this entire procedure before beginning work!**

1. Remove toilet from floor. Place toilet upside down on a sheet of cardboard or other padded material.
2. Remove nuts from hopper supports on either side of hopper, lift hopper from bowl.
3. Remove o-ring between hopper and seal adapter. Check that o-ring is not damaged, replace if necessary.
4. Re-assemble in reverse order.
   Make sure J-bolts are tight, and pulled tight to china hopper mounting flange!
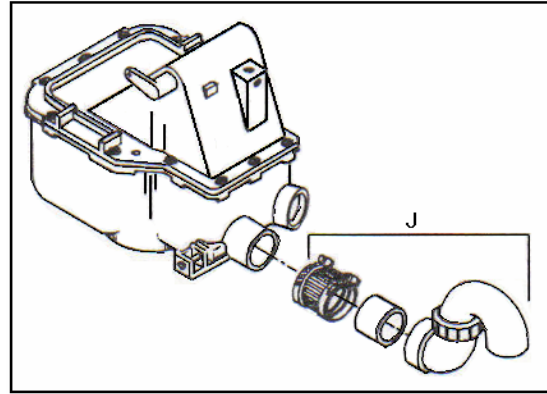
   NOTE: The air cylinder on the hopper sub-assembly should be cleaned, lubricated and checked for adjustment whenever the toilet assembly is removed for servicing.

China Hopper Horn

45 deg. J-Bolt Assy's (2), P/N 90899-5

Sealing Adapter (Glued to China Horn)

O-Ring, P/N 27282

Hopper

Air Cylinder

View of toilet upside down

Offset J-bolt
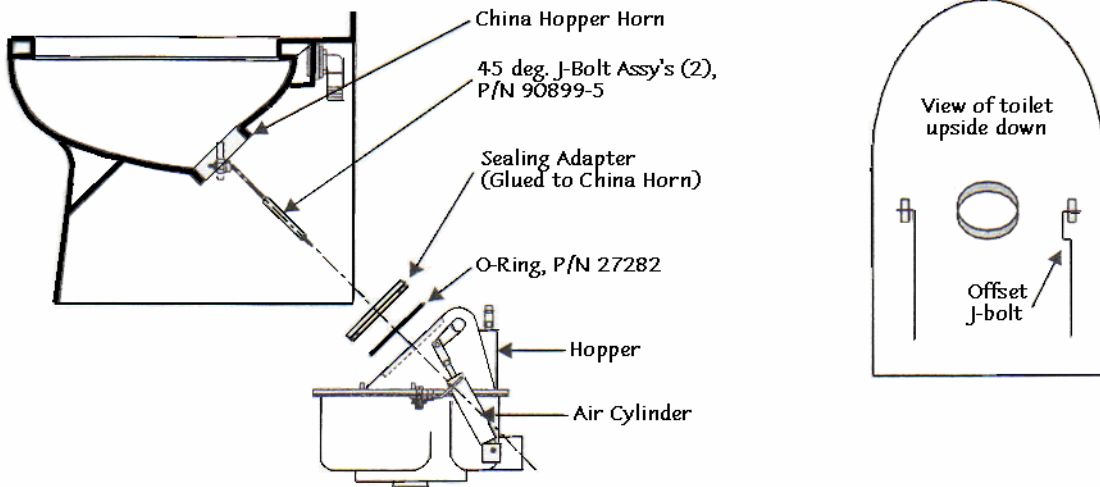
4-13.8.6.3 To Change Flapper Gasket:

1. Turn water and air off.
2. Reach behind flapper to grasp gasket tails.
3. Pull tails out of slots to remove old gasket.
4. Installation is the reverse of removal.
5. Tails must be pulled all the way through to insure smooth surface.

4-13.8.6.4 Air Cylinder Adjustment

1. Remove toilet from floor.
2. At hopper, remove upper and lower retaining rings and clevis pin.
3. Inspect the crank arm, clevis and clevis pin for wear. Replace if required.
4. Fully extend the air cylinder – it should measure
   7-1/4" between the centers of two mounting holes.
   Adjust as necessary:
   A. Fully extend the Air Cylinder.
   B. Protect the shaft with thick cloth or rubber and hold firmly with pliers.
   C. Place a screwdriver through the clevis mounting hole and turn: clockwise to shorten length; counterclockwise to extend length.
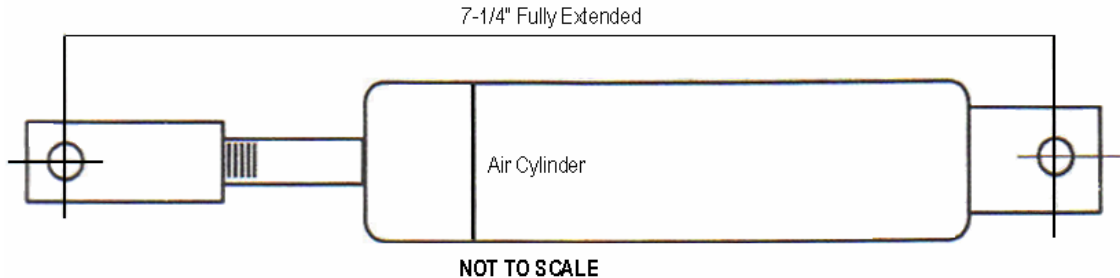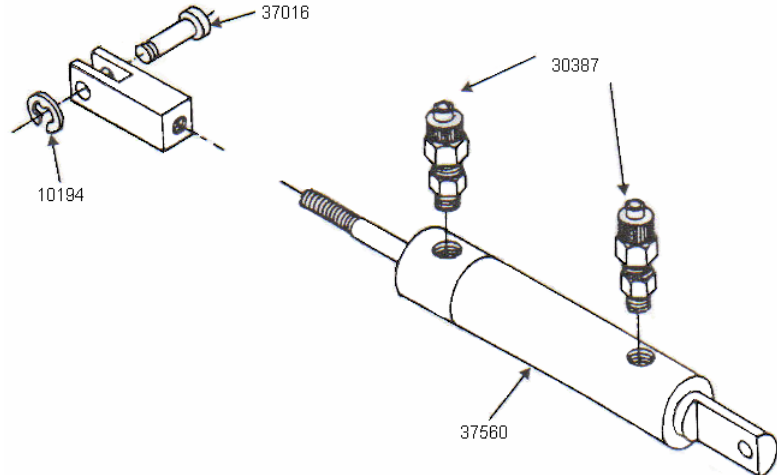
4-13.8.6.5 Customer Service

If you have any questions concerning your Microphor product, please contact us:

8:00 a.m.-5:00 p.m. PST Monday-Friday
Tel: (800) 358-8280 or (707) 459-5563
Fax: (707) 459-6617 24 hours
Website: *www.microphor.com*

> **IMPORTANT NOTE: Only do service procedures yourself if you have the knowledge and experience to do so. If unsure, contact a service center and have a professional perform the procedure.**

4-14 LPG System_____

The motor home is equipped with a permanently mounted 30 gallon (102 pounds of fuel-net) LP gas tank, which is the energy source for the cooktop (range) and an alternative source for the refrigerator.

4-14.1 LPG Tank and Controls

The LPG supply tank is located in an unlocked compartment behind the rear axle on the passenger side of the motor home. LPG system controls include a main gas service valve, solenoid shut-off valve, two stage pressure regulator, filler connection with Auto Stop (80%) fill valve, 20% vapor (stop filling when liquid appears) valve, and the pressure relief valve.

▲WARNING: When the motor home is to be stored in a confined area, turn off the LPG at the main tank shutoff valve. With the LPG leak detector, this may now be accomplished by turning off the LPG Master Switch on the galley panel.

LPG tank level can be monitored at the tank monitor panel located in the pantry.

4-14.1.1 Fuel Requirements

Liquefied petroleum gas is a material composed of various hydrocarbons such as propane, butane, or a mixture thereof. In its gaseous form (vaporized), it is colorless and has a garlic-scented additive to ensure detection. In addition to being highly inflammable, it is also dangerous to inhale. For ease of transportation and storage, LPG is compressed into a liquid state and stored in this form within the LPG tank. As fuel is used, vapor passes from the top of the tank into the two-stage pressure regulator and to the various gas appliances.

Appliances do not function if the LP gas does not vaporize. Butane does not vaporize below 32 degrees Fahrenheit (the freezing point of water), but propane continues to vaporize down to 44 degrees below zero. Propane has become the main type of LP gas used in RVs in recent years. Your LP supplier has the correct type or blend for your locale. If your travels take you into an area where climate differs, ask your LP dealer for his recommendations. The names of LP suppliers can be found in the yellow pages of the telephone directory under "Gas-Liquefied Petroleum-Bottled & Bulk." Many campgrounds now have LP gas fill facilities, as do some service stations.

Prevent condensation and possible regulator or line freeze-ups when filling the tank by requesting the dealer to add a small amount of methyl alcohol to the fill up. A common mixture is one ounce of methyl alcohol to each 20 pounds of LPG.

NOTE: Liquefied petroleum gas is heavier than air.

4-14.2 Filling the LP Gas Tank

When the tank is being filled, the service valve must be closed and the 80% liquid level valve (20% vapor valve) must be open. The 80% auto stop fill valve may close before liquid appears at the 80% liquid level valve, but if liquid does appear, stop filling immediately; the tank is filled to its LP capacity. Close the liquid level valve. Do not use a wrench to tighten this valve or the service valve; they are designed to be closed leak-tight by hand. If you cannot hand-tighten properly, the valve probably needs repair or replacement.

⚠**CAUTION: Be sure that the main LPG supply is shut off during refueling to prevent accidental ignition of gas fumes by appliance igniters.**

⚠**CAUTION: All gas appliances must be cut off before filling the LPG tank. Check gas lines and fittings periodically for tightness and leakage.**

4-14.2.1 Regulator

The two-stage pressure regulator regulates the pressure of the LPG supplied to the appliances. The regulator functions automatically and is factory-preset to provide the correct line pressure. Do not attempt to tamper with or reset the regulator! Even a small variation above the normal gas line pressure can be sufficient to create a dangerous situation and cause possible damage to individual appliance components. If there is any doubt about the regulator setting, it can be checked by your Wanderlodge dealer or LPG supplier. The correct setting is 11-14 inch water column.

4-14.2.2 Operation

To operate any LPG appliance, the main gas (Service) valve must be open. In addition, individual valves at each appliance must be opened prior to use. When first used, or after a refill, there may be some air in the gas lines, which escapes, when you open a range burner or similar LP gas valve. The air may extinguish your match or igniter the first time or two before you get ignition. Remember, too, that when you close the tank's service valve some of the gas will remain in the lines. To completely bleed the lines of gas, close the tank's service valve and light a range burner to use up the excess. When the flame burns out, turn the range burner off.

4-14.3 Checking for Leaks

Periodically check the LP system for possible leakage. Do not wait for an alarm condition to occur before correcting a leak! Although the entire system and associated appliances undergo extensive factory testing for leakage, road shocks and heavy vibrations may loosen or damage piping or fittings. Leaks will usually become noticeable by the characteristic odor of the garlic-scented gas additive. To check, turn off all burners and pilot lights. Open all doors and windows. Open LPG tank service valve and use an ammonia and chlorine free soap-bubble solution on all connections. Any bubbles are evidence of leakage.

NOTE: The gas leakage detectors may momentarily sound an alarm when the engine is initially started or when a heavy electrical load is placed on the system. Further, the ultra sensitive response of these units may also cause an alarm to be given in the presence of certain pressurized-can sprays or cleaning agents. Do not assume! Always determine the reason for this vital alarm being given!

4-14.4 LPG Consumption

Most gas appliances are intermittently operated; however, operation during cold weather conditions does cause heavy consumption. The amount of LPG consumption depends on the total use and the manner in which these appliances are used.

Note that each gallon (4 1/4 lb.) of LPG fuel produces approximately 91,500 BTUs of heat energy. The LPG tank used in your motor home will furnish over 2.1 million BTUs.

For your guidance in estimating your anticipated fuel consumption, the following is a listing of typical appliance consumption ratings when the appliance is operated for one hour:

Refrigerator: 1,500 BTUs
Cooktop Burners   5,200 BTUs each

4-14.5 LPG System Warnings

▲WARNING: LP gas containers are not be placed or stored inside the vehicle. LP gas containers are equipped with safety devices, which relieve excessive pressure by discharging gas to the atmosphere.

NOTE: The compartment the LPG tank is located in is NOT intended for storage – Do not place any items on, under or around the LPG tank.

▲WARNING: It is not safe to use cooking appliances for comfort heat.

This warning label has been located in the cooking area to remind you to provide an adequate supply of fresh air for combustion. Unlike homes, the amount of oxygen supply is limited due to the size of the recreational vehicle, and proper ventilation when using the cooking appliance(s) will avoid dangers of asphyxiation. It is especially important that cooking appliances not be used for comfort heating as the danger of asphyxiation is greater when the appliance is used for long periods of time.

Cooking appliances need fresh air for safe operation. Before operation:
1. Open overhead vent or turn on exhaust fan.
2. Open window.

A warning label has been located near the LP gas container. This label reads:

▲WARNING: Do not fill container(s) to more than 80 percent of capacity.

Overfilling the LP gas container can result in uncontrolled gas flow, which can cause fire or explosion. A properly filled container will contain approximately 80 percent of its volume as liquid LP gas.

▲WARNING: Portable fuel-burning equipment, including wood and charcoal grills and stoves, are not be used inside the recreational vehicle. The use of this equipment inside the recreational vehicle may cause fires or asphyxiation.

▲WARNING: Do not bring or store LP gas containers, gasoline or other flammable liquids inside the vehicle because a fire or explosion may result.

The following label has been placed in the vehicle near the range area:

IF YOU SMELL GAS
1. Extinguish any open flames, pilot lights and all smoking materials.
2. Do not touch electrical switches.
3. Shut off the gas supply at the tank valve(s) or gas supply connection.
4. Open doors and other ventilating openings.
5. Leave the area until odor clears.
6. Have the gas system checked and leakage source corrected before using again.

LP gas regulators must always be installed with the diaphragm vent facing downward. This minimizes any chances of vent blockage, which could result in excessive gas pressure causing fire or explosion.

▲WARNING: Never check for leaks with an open flame. Do not check copper plumbing lines for leaks using ammoniated or chlorinated household-type detergents. These can cause cracks to form on the line and brass fittings. If the leak cannot be located, take the unit to your Wanderlodge dealer or LPG supplier.

4-14.6 LPG Leak Detector System

The system has been developed to the point where it is unique; it shuts off the LP gas at the high-pressure source, yet holds the valve open to provide ample appliance flow with a minimum amount of current usage.

Three components make up the system:
1. **Gas Detection Control Unit:** mounted in toe kick of the kitchen base cabinet. This is the "brains" of the system and provides an electrical signal to the solenoid valve when LPG service is required.
2. **Solenoid Valve:** installed in the high pressure LPG line feeding the two-stage regulator. It is a "normally closed" solenoid valve and has a special winding of 22 ohms (approximate) resistance, so it uses very little current in the "hold open" position. In order to close the valve, it is only necessary to break the circuit. This provides a "fail-safe" feature in the event of loss of 12-volt power.
3. **LPG Master switch:** located on the galley panel.

The following events will result in an open/low voltage circuit and allow the solenoid valve to close and shut off the LPG supply:
1. Pushing the switch to "OFF" on the LPG MASTER switch or the Gas Detection Control Unit. Green light will go out.
2. The Gas Detection Control Unit senses the presence of LP gas (or can be triggered by a propane lighter or even hair spray!). Green light goes out, Red light comes on, along with audible signal.
3. The Electronic Master switch is turned off. Green light will go out.

NOTE: System is not Master Switch Activated.

In order to restore LP gas flow to the motor home, use the following procedures corresponding to the events above:
1. Push switch on the LPG MASTER and the Gas Detection Control Unit to "ON." Green light will come on.
2. Correct the cause of LP gas leak or determine if other fumes caused the shut down. Green light will come on.
3. Turn Electronic Master Switch on. Green light will come on.

NOTE: Because of the presence of an excess flow valve in the LPG tank outlet (safety feature); sometimes an appliance may not relight after a shutdown. In this circumstance, wait five (5) minutes for LPG pressures to equalize before relighting.

4-15 Air Pressure System_____

4-15.1 Description and Operation

An engine-driven compressor supplies the air pressure system on your motor home. It provides pneumatic power for brakes, suspension, and numerous accessories. This complex, but efficient system is not intended to be totally leak free. After overnight parking, you may notice a significant loss of pressure on the air pressure front/rear gauge, or in systems connected to auxiliary air. This condition is normal, and in fact, our air leakage tolerance is tighter than most manufacturers within the heavy-duty equipment industry. Once the engine is running, the engine-driven compressor will quickly build up the system to the correct pressure.

4-15.1.1 Air Brakes

Your motor home is equipped with dual service air brake systems for front and rear, with integral fail/safe operation; and manual/automatic rear spring (parking) brakes. The service brakes are completely independent systems, each including a reservoir and separate distribution lines and valves. The reservoirs are pressurized from a single compressor. Both service brake systems are brought into operation each time the brake treadle is depressed to slow or stop the motor home. Reservoir pressure for each service brake system is monitored by a respective pressure gauge on the front panel; system failure(s) are indicated by low-pressure readings, illumination of the Low Air failure lamp and sounding of buzzer.

4-15.1.2 Operation

When the motor home is parked, and the engine off, the rear spring brake will normally be set by operating the parking brake. The spring brakes cannot be fully released until the air pressure is above 65 psi. These brakes are in the released position when the control is pushed in. In the event that there is a loss of air pressure, the spring brakes will set automatically at the brake-applied position, and will not release until the air reserve has again built up to required value. Consequently, there will be a normal delay, after the motor home is first started, while the compressor builds up pressure before the brakes can be released and the motor home driven. When the brake treadle is depressed to slow or stop the motor home, reservoir air is applied simultaneously to both front and rear service brakes to effect the braking action. The spring brakes are held in a released position by the air pressure supplied from the associated reservoir tank.

⚠️ **CAUTION: Do not attempt to drive the motor home until system pressure is above 90 psi.**

4-15.1.3 Brake Failures

To compensate for normal lining wear, each brake system is individually self-adjusting.

Fail/safe features provide protection against brake system failures. If the front brakes fail, operating the brake treadle still activates the rear service brakes to provide stopping capability.

If a failure occurs in the rear, the front service brakes and rear spring brakes provide braking action.

In the unlikely event of a failure where both service-braking systems are disabled, the rear spring brakes will apply automatically and bring the vehicle to a stop. As a safety factory, the motor home should not be moved until any type of brake failure is corrected.

NOTE: With the front brake system service reservoir fully charged, enough air pressure is available to provide for four full releases of the rear spring brakes. This will allow the motor home to be brought to a safe position until repairs can be accomplished.

4-15.1.4 Anti-Lock Brakes

In addition to the above, a four-channel anti-lock brake system for the steer and drives axles are installed. In the event one of the wheels begins to lock up under severe braking conditions, the anti-lock system will detect this situation and gradually remove air pressure from the brake chamber until the wheel begins to turn. This will help assure smooth braking action and minimize wheel lockup.

4-15.1.5 Air Suspension System

Air suspension bags cushion the front and rear axles. Ride height is automatically maintained by height control valves. Dumping these air bags when the vehicle is parked allows the rubber bumpers to come together and eliminate vehicle springiness. A switch, located on the lower left side of the LOWER DASH PANEL, controls dumping and filling of air bags. The SUSP. DUMP switch controls the front and rear suspension.

NOTE: The accessory air tank must contain at least 65 psi pressure for the DUMP switch to function. The accessory air tank pressure does not register on the dash air pressure gauges.

Moving the SUSP. DUMP switch away from the UP position applies air pressure to air pilot-operated valves on the suspension system. The pilot air shifts the valves, cutting off the air supply to the air bags and allows the air in the bags to escape. After the suspension system has been dumped and the ignition is turned on, a buzzer and a warning pilot light is illuminated on the dash to warn the driver that the system is dumped and not to drive the vehicle until the SUSP. DUMP switch is set to the UP position.

Refer to the manual in your owner's kit for additional information and maintenance instructions.

4-15.1.6 Additional Air-Operated Equipment

Besides providing the compressed air supply for the motor home braking and suspension systems, the compressor also provides the air supply for the stepwell cover and entrance door lock, all via separately controlled solenoid switches operated from the dash, or at other locations throughout the motor home. (This compressed air source is furnished from the front right side reservoir.) A compressed air outlet fitting and air gun are contained in a rear storage compartment on the road side of the motor home, convenient for inflating tires, and so on. A Schrader valve (air connection) is available in the engine compartment to allow the air system to be pressurized from a "shop" source without the necessity of starting the engine.

4-15.1.7 Compressed Air System Air Dryer

The air dryer unit collects and removes moisture and contaminants from the compressor air output before the air reaches the reservoirs. This unit is different from a reservoir drain or an after cooler in that it provides dry air for the brake system by eliminating the possible accumulation of condensate in the system reservoirs. Note that each reservoir also has a drain cock on the bottom for draining accumulated moisture. This assures a long maintenance-free life for air brake system components due to the removal of system contaminants.

The air dryer is located between the compressor discharge (output) line and the compressed air reservoirs. A safety valve mounted in the air dryer housing assembly protects against excessive pressure buildup. The desiccant cartridge and pleated paper oil filters are easily removable and replaceable as a complete serviceable unit. The desiccant "Beads" which provide the drying action have a large capacity for absorption due to their combined surface area. In addition, an internal thermostatically controlled heating element prevents freeze ups on the purge rail valve when the unit is used during sub-freezing temperatures.

Purging of the dryer is automatic, exhausting combined oil and water residue to the atmosphere. At the same time that the contaminants are purged, the reverse airflow across the desiccant material removes the accumulated moisture and reactivates the desiccant. Refer to Bendix Air Dryer Service Data Manual for more detailed information.

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*4-16 Appliances*_____

4-16.1 Refrigerator

Your motor home comes equipped with a Dometic Refrigerator for LP-Gas and Electric Operation.

4-16.1.1   Start Up Instructions

• A continuous 12-volt DC supply must be available for the electric control to function.

• Press the main power ON/OFF button (1) to the DOWN position.

• Press the TEMPERATURE SELECTOR button (3) until the lamp at the desired setting is illuminated.

4-16.1.2 AES/Auto Mode

NOTE: AES is Dometic's term for Automatic Energy Selection Switch. What this does if this switch is turned on, the refrigerator will search for a 110 source first, if it doesn't find one, then it will go to gas. If the switch is turned off it will automatically go to gas and bypass the AES Mode.

1.   Press the AES/AUTO/GAS mode selector button (2) to turn ON the AES/AUTO lamp (B). If 120 volts is available, the AC mode indicator lamp (A) will illuminate indicating AC operation. If 120 volts AC is not available, the GAS indicator lamp (C) will illuminate, indicating the control has automatically switched to the GAS mode.

2.   If the CHECK indicator lamp (D) illuminates and the GAS mode indicator lamp (C) is off, the controls have failed to ignite the burner in the GAS mode. GAS operation may be reset by pressing the main power ON/OFF button (1) to the OFF then ON position. (See step 2 under GAS MODE).

3.   Press the TEMPERATURE SELECTOR button (3) until the lamp at the desired position is illuminated.

4-16.1.3 Gas Mode

1.   Press the AES/AUTO/GAS mode selector button (2) to turn OFF the AES/AUTO lamp (B). The GAS mode indicator lamp (C) will illuminate. Within 45 seconds the burner should be ignited and operating normally.

2.   On the initial refrigerator start-up, it may take longer than 45 seconds to allow air to be purged from the gas line. If the gas does not ignite within 45 seconds the CHECK indicator lamp (D) will illuminate and the GAS mode indicator lamp (C) will go off.

To reset when the CHECK indicator lamp (D) is illuminated, press the main power ON/OFF button (1) to the OFF and then ON position.

NOTE: Do not continue to reset Gas operation if the CHECK indicator lamp continues to be illuminated after several tries.

3.   Press the TEMPERATURE SELECTOR button (3) until the lamp at the desired position is illuminated.

4-16.1.4 Thermostat

The thermostat on the refrigerator controls both the gas and electric operation, thereby eliminating the necessity of resetting each time a different energy source is employed.

After the initial start-up, the thermostat should be moved from "COLDEST" to the desired temperature setting, usually at mid setting.

4-16.1.5   To Shut Off The Refrigerator

The refrigerator may be shut off while in any mode of operation by pressing the main power ON/OFF button to the UP (OFF) position. This shuts off all DC power to the refrigerator, including the interior light.

4-16.1.6   Description of Operating Modes

AES/AUTO Mode
When operating in the AES/AUTO mode, the AES/AUTO mode indicator lamp (B) will illuminate. The control system will automatically select between AC and GAS operation with AC having priority over GAS. Either the AC indicator lamp (A) or the GAS indicator lamp (C) will illuminate depending on the energy source selected by the control system. If the control system is operating with AC energy and it then becomes unavailable, the system will automatically switch to GAS. As soon as AC becomes available again the control will switch back to AC regardless of the status of GAS operation.

Gas Mode
When operating in the GAS mode the AES/AUTO mode indicator lamp (B) will be off and the GAS mode indicator lamp (C) will be illuminated.

This mode provides LP gas operation only. The control system will activate the ignition system and will attempt to light the burner for a period of approximately 45 seconds. If unsuccessful, the CHECK indicator lamp (D) will illuminate and the GAS mode indicator lamp (C) will turn off.

To restart GAS operation, press the main power ON/OFF button (1) to the OFF and then ON position. The control system will attempt a new 45 seconds ignition sequence.

If the refrigerator has not been used for a long time or the LP tanks have just been refilled, air may be trapped in the supply lines. To purge the air from the lines may require resetting the main power ON/OFF button (1) three or four times. If repeated attempts fail to start the LP gas operation, check to make sure that the LP gas supply tanks are not empty and all manual shutoff valves in the lines are open. If the problem is still not corrected, contact a service center for assistance.

If the control is switched to AC operation while the CHECK indicator lamp is on, it will function properly, but the CHECK indicator lamp will not go off until the main power ON/OFF button is pressed to the OFF then ON position.

Limp Mode of Operation
This control system contains a feature where it will continue to operate the cooling system in the event of a failure of a major operating component. Two different modes of operation can occur in this category.

If for some reason the display module becomes non-functional, the control system will revert to full automatic operation selecting the best energy source available with AC, GAS priority. The temperature of the refrigerator will be maintained at the MID position within normal temperature tolerances. The power module will continually attempt to reestablish operation of the display module.

The second limp mode of operation will execute when a failure of the temperature sensing device or associated electronic circuitry occurs. If this should occur, the control system will operate on

the energy source selected via the control panel. The cooling unit will run continuously on the selected energy source. The refrigerator will continue to operate in this mode indefinitely or until a new sensor is installed and the system is reset.

4-16.1.7 How to Use the Refrigerator

Food Storage Compartment
The food storage compartment is completely closed and unventilated, which is necessary to maintain the required low temperature for food storage. Consequently, foods having a strong odor or those that absorb odors easily should be covered. Vegetables, salads, etc. should be covered to retain their crispness. The coldest positions in the refrigerator are under the cooling fins and at the bottom of the refrigerator. The warmer areas are on the upper door shelves. This should be considered when placing different types of food in the refrigerator.

When the refrigerator is heavily loaded, it will take a longer time to lower the temperature; therefore, to get maximum efficiency the refrigerator and food items should be pre-cooled prior to loading. The shelves should not be covered with paper or plastic, and the food items should be arranged so air can circulate freely.

Two door shelves are equipped with fingers. The fingers are designed to prevent large containers (1/2 gallon milk or juice) from shifting or spilling while traveling.

Frozen Food Storage Compartment
Quick frozen soft fruits and ice cream should be placed in the coldest part of the compartment, which is on the top freezer shelf. Frozen vegetables, may be stored in any part of the compartment.

This compartment is not designed for deep or quick-freezing of food. Meat or fish, whether raw or prepared, can be stored in the frozen food storage compartment provided they are pre-cooled first in the refrigerator. They can be stored about three times longer in the frozen food compartment as compared to the fresh food compartment. To prevent food from drying out, keep it in covered dishes, containers, plastic bags or wrapped in aluminum foil.

Total Refrigerated Volume is 12 cu. ft.

Ice Making
Ice cubes can be made in the ice trays placed in the freezer compartment. The trays should be filled with water to within ¼" (5mm) from the top. For faster ice making, the trays should be placed in direct contact with the freezer shelves.

Ice will be made more rapidly if the thermostat is set at its highest position. It is a good idea to do this a few hours before the anticipated need for ice, but be sure to move the thermostat back to normal setting, usually about mid setting when the ice is formed. Food in the fresh food compartment may be frozen if the setting is left on "COLDEST" position.

Defrosting
Shut off the refrigerator by pressing the main power ON/OFF button to the UP (OFF) position.

Empty the refrigerator, leaving the drip tray under the finned evaporator, and the cabinet and freezer doors open. Filling the ice trays with hot water and placing them on the freezer shelves can reduce defrosting time. When all the frost has melted, dry the interior of the refrigerator and freezer with a clean cloth. Replace all food and set the thermostat to the COLDEST temperature setting for a few hours. Then reset the thermostat to the desired setting, usually at mid setting.

> ⚠ **CAUTION: DO NOT use a hot air blower. Permanent damage could result from warping the metal or plastic parts. DO NOT use a knife or an ice pick, or other sharp tools to remove frost from the freezer shelves. They can create a leak in the ammonia system.**

Cleaning

Cleaning the refrigerator is usually done after it is defrosted or put into storage. To clean the interior liner of the refrigerator, use lukewarm weak soda solution. Use only warm water to clean the finned evaporator, ice trays and shelves. NEVER use strong chemicals or abrasives to clean these parts, as the protective surfaces will be damaged. It is important to always keep the refrigerator clean.

Shut Off – Storage Procedure

Shut off the refrigerator by pressing the main power ON/OFF button to the UP (OFF) position.

If the refrigerator will not be in operation for a period of weeks, it should be emptied, defrosted, cleaned and the doors left ajar. The ice trays should also be dried and kept outside the cabinet.

▲WARNING: Do not store explosive substances in the refrigerator, such as cigarette lighter gas, petrol, ether or the like.

NOTE: Sodium chromate is used for corrosion protection (less than 2 weight % of the coolant).

Climate Control Heater

During the summer months of high temperatures and humidity, the metal frame between the freezer and fresh food compartments may have water droplets forming. The number of water droplets will increase if the vehicle isn't air conditioned during these months.

This refrigerator comes standard with a 12-volt (DC) climate control that will evaporate the water droplets when they form.

To have the climate control on, you position the switch (F) located beneath the top decoration panel that houses the control panel to ON. The climate control can be left on continuously or only used when temperatures require it.

NOTE: The climate control will draw 12 volts DC power continuously when in the ON position. It should be turned OFF when a charging source is not available.

Low Ambient Switch

All RV absorption refrigerators, while similar, operate a little differently than your home refrigerator. Dometic designers and engineers have equipped your refrigerator with an exclusive feature that allows for trouble-free operation in low ambient temperature (like below 50ºF) for extended periods of time. Simply turn on the low ambient switch located beneath the top decoration panel that houses the control panel. Once the outdoor temperature is above 50ºF, the low ambient switch should be turned off.

ELECTRIC EQUIPMENT
Cartridge Heater

An electric heater mounted in a pocket of the boiler system supplies the heat necessary for the operation of an absorption-cooling unit.

This model is equipped with two electrical heaters for 120 volt AC.

To replace the heater proceed as follows:
1. Disconnect the wall plug, and the 12-volt wires.
2. Remove the protection cover
3. Remove the power module cover
4. Disconnect the heater leads.
5. With a pair of pliers unfold the lug holding the lid of the boiler casing and open the lid.
6. Remove some insulation wool so that the heater is accessible.
7. Turn and lift the heater out of its pocket.
8. Fit the new heater into the pocket.

9. Connect the leads and put on the power module cover.
10. Reset the insulation and close the lid of the boiler.
11. Replace the protection cover.

Fuses
This model is equipped with two fuses, one for the refrigerator control system and one for the AC cartridge heater. (See table below).

To replace fuses proceed as follows:
1. Disconnect the wall plug, and the 12-volt wires.
2. Remove the power module cover.
3. Snap the fuse out of the fuse holder.
4. Fit a new fuse in to the fuse holder.
5. Replace the power module cover.

Control system	3 Amp
AC heater	5 Amp

4-16.1.8 Maintenance and Service

The user should be aware of service that must be done on a regular schedule to keep the refrigerator operating properly. A qualified technician who is familiar with LP gas systems and refrigerators should only perform the service.

Refrigerator Removal
Before working on the refrigerator, make sure the AC voltage and DC voltage leads are disconnected. Shut off the gas supply. Disconnect the gas supply line at the rear of the refrigerator. Always use a back up wrench when loosening and tightening this connection. Cap the gas supply line, loosen the screws anchoring the refrigerator to the enclosure and slide the refrigerator out of the compartment. When replacing the refrigerator make sure that the sealing strips are properly positioned. Replacement is the reverse of removal. Check all connections for gas leaks. Refer to the **Installation section** of the manufacturers manual.

Periodic Maintenance
To keep your Dometic refrigerator operating efficiently and safely, period inspection and cleaning of several components once or twice a year is recommended.

A. It is important to keep the area at the back of the refrigerator clean. Check the lower vent, upper vent and area between these openings for any obstructions such as bird/insect nests, spider webs, etc. Clean the coils on the back of the refrigerator. Use a soft bristled brush to dust off the coils.

It is important to keep the refrigerator area free from combustible material, gasoline and other flammable vapors or liquids.

NOTE: The following maintenance is required once or twice a year, but should only be done by a qualified serviceman who is familiar with LP gas systems and refrigerators.

B. Check all connectors in the LP gas system (at the back of the refrigerator) for gas leaks. The LP gas supply must be turned on. Apply a non-corrosive bubble solution to all LP gas connections. The appearance of bubbles indicates a leak and should be repaired immediately by a QUALIFIED SERVICEMAN WHO IS FAMILIAR WITH LP GAS SYSTEMS AND REFRIGERATORS.

▲WARNING: DO NOT use a flame to check for gas leaks.

C. Check the AES control system by connecting/disconnecting 120-volt AC power, start/stop the engine, etc. Compare the operation with the operation described in description of operating modes.

D. The LP gas pressure should be checked and the main regulator re-adjusted if pressure is incorrect. The correct operating pressure is 11 inches of water column. The correct place to take the LP gas pressure is at the test port just head of the burner jet.

E. Inspect the flue baffle. It should be reasonably clean and free of soot. Heavy soot formation indicates improper functioning of the burner. The flue and burner both require cleaning in the following manner:
   1. Unplug the refrigerator power cord from the 120-volt AC outlet.
   2. Disconnect or shut off the 12-volt power to the refrigerator.
   3. Turn manual shutoff valve to OFF.
   4. Remove cover from the burner housing.
   5. Disconnect the wire from the high voltage electrode.
   6. Remove the burner mounting screws and remove the burner assembly.
   7. Remove the wire and the flue baffle from the top of flue tube. Clean the flue from the top using a flue brush. Blowing compressed air into the flue will not properly clean soot and scale out of the flue tube. Replace the flue baffle.
   8. Clean burner tube with a brush. Blow out burner with compressed air.
   9. Before removing burner jet, clean burner area of soot and scale that fell out of the flue tube. Remove the burner jet. Soak the jet in wood alcohol and blow it out with compressed air. Re-install and tighten burner jet.

   NOTE: The color of the flame shall be clear blue over the slots of the burner.

▲WARNING: DO NOT use a wire or pin when cleaning the burner jet as damage can occur to the precision opening. This can cause damage to the refrigerator or create a fire hazard.

   10. Reinstall burner, being careful that the end of the burner fits into the slot on the burner bracket. Check to make sure slots are centered under the flue tube and the thermocouple is positioned properly (tip of thermocouple extends over two slots of burner).
   11. Be sure to reconnect the wire to high voltage electrode. Check the electrode for proper location and gap.
   12. Turn on manual gas shutoff valve and check all fittings for leaks.
   13. Connect 120-volt power cord to the outlet and reconnect or turn on the 12-volt DC power.
   14. Check LP gas safety shutoff.

TROUBLESHOOTING
The Refrigerator Does Not Cool Properly

A. Burner jet clogged.
   Clean. (See section Maintenance and Service, Item 2, Periodic Maintenance, paragraph E, items 1-14).
B. Check level of refrigerator.
C. Venting problem.
   Restriction in airflow across cooling unit.
D. Heavy frost buildup on evaporator fins.
   Defrost.
E. Flue baffle not inserted properly in flue tube.
F. Improperly set thermostat.
   See section 4-16.1.4 Thermostat.
G. Burner dirty.
   Clean. See section Maintenance and Service, Item 2, Periodic Maintenance, paragraph E, items 1-14.

     H. LP gas pressure low at burner.
        Set main regulator so pressure does not drop below 11 inches water column at pressure tap.
     I. Burner not located properly under flue tube. Relocate.
     J. Burner damaged. Replace.
     K. Odors from fumes.
          1. Dislocated burner.
          2. Damaged burner.
          3. Dirty flue tube.
     L. Fuses
          1. Refrigerator AC Supply.
          2. Control system. See Electric Equipment, Fuses.

NOTE: Avoid spraying water through the refrigerator vents while washing your RV.

All the above instructions are to be followed closely. The refrigerator is quality-guaranteed. However, we are not responsible for any failures caused by improper adjustments and unfavorable installation conditions. Contact service point or distributor service department for assistance.

4-16.2 Microwave

Your motor home is equipped with a Sharp Carousel Convection Microwave Oven. This allows you to bake and prepare food in the conventional way with the ease and speed of microwave cooking.

4-16.2.1   Some things you should know

Your oven comes with an operation manual and an Over-the-Range Convection Microwave Cookbook. Read them carefully and always save them for reference. This owner manual will give you a high level point of reference for things you should know and functions your microwave has. Should you need more detailed information, the manufacturer's manual will be a useful tool.

NOTE: NEVER use the oven without the turntable and support nor turn the turntable over so that a large dish could be placed in the oven. The turntable will turn both clockwise and counterclockwise.

NOTE: ALWAYS have food in the oven when it is on to absorb the microwave energy.

When using the oven at power levels below 100%, you may hear the magnetron cycling on and off.

The fan will automatically start when heat rises from range surface units or burners and when convection, high mix, low mix or the broil settings are used.

Condensation is a normal part of microwave cooking. Room humidity and the moisture in food will influence the amount of moisture that condenses in the oven. Generally, covered foods will not cause as much condensation as uncovered ones. Ventilation openings must not be blocked.

The oven is for food preparation only. It should not be used to dry clothes or newspapers.

The Sharp Carousel Convection Microwave Oven is rated at 850 watts using the IEC-705-1988 method. In using recipes or package directions, check food a minute or two before the minimum time and add time accordingly.

4-16.2.2 Some do's and don'ts

FOOD	DO	DON'T
Eggs, fruits, vegetables & sausages	• Puncture egg yolks before cooking to prevent "explosion" • Pierce skins of potatoes, apples, squash, hot dogs and sausages so that steam escapes.	• Cook eggs in shells. • Reheat whole eggs.
Popcorn	• Use specially bagged popcorn for the microwave oven. • Listen while popping corn for the popping to slow to 1 or 2 seconds or use POPCORN pad.	• Pop popcorn in regular brown bags or glass bowls. • Exceed maximum time on popcorn package.
Baby food	• Transfer baby food to small dish and heat carefully, stirring often. Check temperature before serving. • Put nipples on bottles after heating and shake thoroughly. "Wrist" test before feeding.	• Heat baby food in original jars. • Heat disposable bottles. • Heat bottles with nipples on.
General	• Cut baked goods with filling after heating to release steam and avoid burns. • Stir liquid briskly before and after heating to avoid "eruption." • Use deep bowl, when cooking liquid or cereal, to prevent boilovers.	• Heat or cook in closed glass jars or airtight containers. • Do any canning in the microwave, as harmful bacteria may not be destroyed. • Deep fat fry. • Dry wood, gourds, herbs or wet papers.

4-16.2.3 Utensils and Coverings

It is not necessary to buy all new cookware. Many pieces already in your kitchen can be used successfully in your new microwave convection oven. The chart below will help you decide what utensils and coverings should be used in each mode.

Utensils and Coverings	Microwave Only	Convection Broil, Slow Cook	High Mix/Roast Low Mix/Bake
Aluminum Foil	Yes, Small flat pieces of aluminum foil placed smoothly on food can be used to shield areas from cooking or defrosting too quickly. Keep foil at least 1 inch from walls of oven.	Yes For shielding	Yes For Shielding
Aluminum Containers	Yes Can be used if ¾ filled with food. Keep 1 inch away from walls and do not cover with foil.	Yes Broil-No cover.	Yes Can be used if ¾ filled with food. Keep 1 inch away from walls and do not cover with foil.
Browning dish	Yes, do not exceed recommended preheating time. Follow manufacturer's directions	No	No
Glass ceramic (Pyroceram®)	Yes	Yes	Yes
Glass, heat-resistant	Yes	Yes	Yes
Glass non-heat-resistant	No	No	No
Lids, glass	Yes	Yes Broil-No cover.	Yes
Lids, metal	No	Yes Broil-No-Cover	No
Metal cookware	No	Yes	Yes, Do not use metal coverings.
Metal, misc: dishes with metallic trim, etc. Metal twist-ties	No	No	No
Oven cooking bags	Yes Good for large meats or foods that need tenderizing. DO NOT use metal twist ties.	Yes Broil-No	Yes DO NOT use metal twist-ties.
Paper plates	Yes For reheating.	No	No
Paper towels	Yes To cover for reheating and cooking. Do not use recycled paper towels which may contain metal fillings.	No	No
Paper Ovenable	Yes	Yes For temperatures up to 400ºF. Do not use for broiling.	Yes For temperatures up to 400ºF.
Micowave-safe plastic containers	Yes Use for reheating and defrosting. Follow manufacturer's directions.	No	No
Plastic Thermoset®	Yes	Yes Are heat resistant up to 425ºF. Do not use for broiling.	Yes
Plastic wrap	Yes Use brands specially marked for microwave use. DO NOT allow plastic wrap to touch food. Vent so steam can escape.	No	No
Pottery, stoneware, porcelain	Yes Check manufacturer's recommendation for being microwave-safe.	Yes	Yes Must be microwave-safe and ovenable.
Sytrofoam	Yes For reheating.	No	No
Wax Paper	Yes Good covering for cooking and reheating.	No	No
Wicker, wood, straw	Yes May be used for short periods of time. Do not use with high fat or high sugar content foods. Could char.	No	No

DISH CHECK. If you wish to check if a dish is safe for microwaving, place the empty dish in the oven and microwave on HIGH for 30 seconds. If the dish becomes very hot, DO NOT use for microwaving.

4-16.2.4 To Set the Clock

Suppose you want to enter the correct time of day 12:30 (a.m. or p.m.)

1. Touch the **CLOCK** pad. You will see the display read **ENTER TIME**.
2. Enter the correct time of day by touching the numbers in sequence. For example, you would enter 1230.
3. Touch the **CLOCK** pad. Time should be set.

This is a 12-hour clock. If you attempt to enter an incorrect clock time, **ERROR** will appear in the display.
Touch the **STOP/CLEAR** pad and re-enter the time.

If the electrical power supply to your microwave oven should be interrupted, the display will intermittently show **SHARP SIMPLY THE BEST PRESS CLEAR AND PRESS CLOCK** after the power is reinstated. If this occurs during cooking, the program will be erased. The time of day will also be erased. Simply touch STOP/CLEAR pad and reset the clock for the correct time of day.

NOTE: Your oven can be programmed with the door open except for START/TOUCH ON, MINUTE PLUS, SENSOR REHEAT and POPCORN.

4-16.2.5 Stop/Clear

Touch the **STOP/CLEAR** pad to:
1. Erase if you make a mistake during programming.
2. Cancel kitchen timer.
3. Stop the oven temporarily during cooking.
4. Return the time of day to the display.
5. Cancel a program during cooking, touch twice.

4-16.2.6 Turntable On/Off

For most cooking, the turntable should be on; however, the turntable can be turned off so that it does not rotate when extra large dishes, such as the popular 13"x9"x2" glass utility casserole, are used. The casserole should be placed on the turntable so that it is level.

Supposes you want to cook lasagna in such a 13"x9"x2" casserole for 45 minutes on 40% power.

1. Touch **TURNTABLE ON/OFF** pad and note **TURNTABLE OFF** in the display.
2. Enter cooking time – 4500
3. Enter power level – 4
4. Touch **START/TOUCH ON** pad

NOTE: The door can be opened for checking food and the turntable will stay in the off position. After checking, close door and touch START/TOUCH ON to resume cooking.

The turntable will stay off for one minute after door is opened when time-of-day appears in the display. It is possible to reprogram the oven during that minute without touching the **TURNTABLE ON/OFF** pad. The display always indicates whether the turntable is off or on.

THE TURNTABLE SHOULD ALWAYS BE ON WHEN USING THE SPECIAL FEATURES. On/Off function can be used with manual cooking modes and Sensor Reheat. Turntable off condition will automatically change to on condition when you select auto cooking except Sensor Reheat and CompuBake.

When cooking large quantities of food, which cannot be stirred, it is best to use a lower power level such as 40 or 50%. You may speed cooking of large amounts by programming 5 to 10 minutes on 100% power (HIGH) followed by the desired time on lower power. You may wish to reverse a large casserole once during cooking; simple open door, reposition casserole, close door and touch **START/TOUCH ON**.

4-16.2.7 Multiple Sequence Cooking

The oven can be programmed for up to 4 automatic cooking sequences for the microwave mode and 3 automatic cooking sequences for convection mode, switching from one setting to another automatically.

Sometimes cooking directions tell you to start on one power level and then change to a different power level. Your oven can do this automatically.

Suppose you want to cook roast beef for 5 minutes at 90% and then continue to cook for 30 minutes at 50%.

1. Touch the **POWER LEVEL** pad once.
2. Touch **POWER LEVEL** number for 90% - 9.
3. Enter cooking time of 5 minutes – 500
4. Touch **POWER LEVEL** pad again.
5. Touch **POWER LEVEL** number for 50% - 5
6. Enter cooking time of 30 minutes – 3000
7. Touch **START/TOUCH ON** pad.

> ***NOTE: 1.   If POWER LEVEL pad is touched twice, HIGH will be displayed.***
> ***2. If 100% is selected as the final sequence, it is not necessary to touch the POWER LEVEL pad***
> ***3. If you wish to know the power level, simply touch the POWER LEVEL pad. As long as your finger is touching the POWER LEVEL pad, the power level will be displayed.***

4-16.2.8 Time Cooking-Microwave

Your oven can be programmed for 99 minutes 99 seconds (99:99). Always enter the seconds after the minutes, even if they are both zeros.

Suppose you want to cook for 5 minutes at 100%.

1. Enter cooking time. For example, 5 minutes would be 500.
2. Touch START pad. If no POWER LEVEL is selected from the POWER LEVEL pad then the microwave will default to 100%.

Suppose you want to defrost for 5 minutes at 30% with the turntable on.

1. Enter defrosting time of 5 minutes – 500.
2. Touch POWER LEVEL pad. Enter the power level of 30%, which would be 3.
3. Touch START pad.

4-16.2.9 Power Levels

There are eleven preset power levels. Using lower power levels increases the cooking time, which is recommended for foods such as cheese, milk and long slow cooking of meats. Consult cookbook or recipes for specific recommendations. Below is a table of available power levels.

Touch POWER LEVEL Pad, Once then Touch	Approximate Percentage of Power	Common Words for Power Levels
POWER LEVEL	100%	High
9	90%	
8	80%	
7	70%	Medium High
6	60%	
5	50%	Medium
4	40%	
3	30%	Med. Low/Defrost
2	20%	
1	10%	Low
0	0%	

4-16.2.10 Keep Warm

KEEP WARM can only be programmed with manual cooking or as a separate program.

Suppose you want to cook a baked potato for 4 minutes at 100% power and you want to keep it warm after cooking for 30 minutes.

1. Touch the desired cook time for 1 baked potato (4 minutes) – 400
2. Touch **KEEP WARM** pad.
3. Touch **START/TOUCH ON** pad

At the end of cook time, **KEEP WARM** is displayed warming food until end of 30 minutes.

To use **KEEP WARM** as a separate program, touch **KEEP WARM** pad within 1 minute after cooking, closing the door or touching the **STOP/CLEAR** pad.

4-16.2.11 CompuDefrost

CompuDefrost automatically defrosts ground meat, steaks and chicken pieces.

Suppose you want to defrost a 2.0-pound steak.

1. Touch **COMPU DEFROST** pad once. Then touch **COMPU DEFROST** pad two more times to select steak.
2. Enter weight by touching the number pads. A 2-pound steak would be 20.
3. Touch **START/TOUCH ON** pad
   The oven will stop and directions will be displayed. Follow the indicated message.
4. After the first stage, open the door. Turn steak over and shield any warm portions. Touch **START/TOUCH ON** pad.
5. After the second stage, open the door. Shield any warm portions. Close the door. Touch **START/TOUCH ON** pad.
6. After defrost cycle ends, cover and let stand as indicated in chart below.

NOTE: 1. The weight can be entered in increments of 0.1 lb. If you attempt to enter more or less than the allowed amount ERROR WEIGHT TOO SMALL *or* TOO LARGE *will appear in the display.*

2. CompuDefrost can be programmed with More/Less Time Adjustment.

3. To defrost other foods or foods above or below the weights allowed on CompuDefrost Chart, use time and 30% power. See Manual Defrost section of this manual.

4-16.2.12 CompuDefrost Chart

Touch CompuDefrost Pad*	Food	For Amount	Procedure
once	Ground meat	0.5-3.0 lbs. (0.3-1.3 kg.)	Remove any thawed pieces after each stage. Stand, covered 5-10 min.
twice	Steak (chops, fish)	0.5-4.0 lbs. (0.3-1.8 kg.)	After each stage of defrost cycle, rearrange and if there are warm or thawed portions, shield with small flat pieces of aluminum foil. Remove any meat or fish that is nearly defrosted. Stand, covered 10-20 minutes.
3 times	Chicken pieces	0.5-3.0 lbs. (0.3-1.3 kg.)	After each stage of defrost cycle, if there are warm or thawed portions, rearrange or remove. Stand, covered 10-20 minutes.
*Number of touches AFTER initial touch to access COMPU DEFROST.			

NOTE: Check foods when oven signals. After final stage, small sections may still be icy. Let stand to continue thawing. Do not defrost until all ice crystals are thawed.
Shielding prevents cooking from occurring before the center of the food is defrosted. Use small smooth strips of aluminum foil to over edges and thinner sections of the food.

4-16.2.13 Manual Defrost

If the food that you wish to defrost is not listed on the CompuDefrost Chart or is above or below the limits in the "Amount" column on the chart, you need to defrost manually.

You can defrost any frozen food, either raw or previously cooked, by using power level 3. Follow the exact 3-step procedure found under Time Cooking section of this manual. Estimate defrosting time and press 3 for 30% when you select the power level.

For either raw or previously cooked frozen food, the rule of thumb is approximately 5 minutes per pound. For example, defrost 5 minutes for 2-3 cups of casserole or 1 pound of frozen spaghetti sauce.

Always stop the oven periodically to remove or separate the portions that are defrosted. If food is not defrosted at the end of the estimated defrosting time, program the oven in 1-minute increments on power level 3 until totally defrosted.

When using plastic containers from the freezer, defrost only long enough to remove from the plastic in order to place food in a microwave-safe dish.

4-16.2.14 Sensor Cooking

Sharp's Sensor is a semi-conductor device that detects the vapor (moisture and humidity) emitted from the food as it heats. The Sensor adjusts the cooking times and power level for various foods and quantities. It takes the guesswork out of microwave cooking.

Using Sensor Settings:
1. Room temperature should not exceed 95ºF.
2. Be sure the exterior of the cooking container and the interior of the oven are dry. Wipe off any moisture with a dry cloth or paper towel.
3. Sensor cooking can only be entered within 1 minute after cooking, opening and closing the door or touching the STOP/CLEAR pad.
4. During the first part of sensor cooking, SENSOR, REHEAT FROZEN ENTRÉE POPCORN BAKED POTATO SOFT HARD FRESH VEG. FROZEN VEG. BACON FISH HOT DOGS will appear on display. Do not open the oven door or touch STOP/CLEAR during this part of the cooking cycle. The measurement of vapor will be interrupted. If this occurs, ERROR will appear and sensor cooking will be interrupted. To continue cooking, touch the STOP/CLEAR pad and select cooking time and power. When sensor detects the vapor emitted from the food, remainder of cooking time will appear. Door may be opened when remaining cooking time appears on display. At the time, you may stir or season food, as desired.
5. Check food for doneness after cooking with sensor settings. If additional time is needed, continue to cook with variable power and time.
6. If the sensor does not detect vapor, ERROR will appear and the oven will shut off.
7. At the end of any cycle, open oven door or touch STOP/CLEAR pad. The time of day will reappear on the display.
8. Any sensor setting can be programmed with More or Less Time Adjustment.

Selecting Foods:
1. The sensor works with foods at normal storage temperature. For example, foods for reheating would be at refrigerator temperature and potatoes for baking would be room temperature.
2. More or less food than the quantity listed in the charts should be cooked by time and variable power.

Covering Foods:
Some foods work best when covered. Use the cover recommended in the chart for these foods.

1. Casserole lid.
2. Plastic wrap: Use plastic wrap recommended for microwave cooking. Cover dish loosely; allow approximately ½ inch to remain uncovered to allow steam to escape. Plastic wrap should not touch food.
3. Paper towel: Use paper towels to absorb excess fat and moisture when cooking bacon and potatoes. Line the turntable when baking potatoes.
4. Wax paper: Cover dish completely; fold excess wrap under dish to secure. If dish is wider than paper, overlap two pieces at least one inch to cover.

4-16.2.15 Instant Sensors

Your oven has Instant Sensor Popcorn and Instant Sensor Reheat buttons. To use any of the Instant Sensors, simply touch the chosen pad. The oven will start automatically. Any sensor setting can be programmed with More/Less Time Adjustment. See More/Less Time Adjustment section in this manual.

4-16.2.16 Instant Sensor Reheat

Turntable on:
You can reheat many foods by touching just one pad. You don't need to calculate reheating time or power level. To reheat food with turntable on, simply touch the SENSOR REHEAT pad.

Turntable off:
You may reheat using an 11"x8"x2" or 13"x9"x2" casserole with the turntable off. First touch **TURNTABLE ON/OFF** and note indicator. Then touch **SENSOR REHEAT**. The display will indicate turntable off and oven will start automatically. After cooking, **LET STAND COVERED** will be displayed.

4-16.2.17 Instant Sensor Popcorn

To use the Instant Sensor POPCORN button. This sensor works well with most brands if microwave popcorn. You may wish to try several and choose your favorite. Pop only one bag at a time. Unfold the bag and place in oven according to directions.

Popcorn Chart

Touch POPCORN Pad		For Amount
once	3.0 and 3.5 oz.bag	Regular size
twice	1.5 and 1.75 oz. bag	Snack size

Instant Sensor Chart

Food	Amount	Procedure
Leftovers such as rice, potatoes, vegetables, casseroles	4-32 oz.	Place in dish or casserole slightly larger than amount to be reheated. Flatten, if possible.Cover with lid, plastic wrap or wax paper. Use covers such as plastic wrap or lids with larger quantities of more dense foods such as stews.
Soups	1-4 cups	After reheating, stir well, if possible. Foods should be very hot. If not, continue to heat with variable power and time. After stirring, recover and allow to stand 2 to 3 minutes.
Canned entrees and vegetables	4-16 oz.	Use Less Time Adjustment by touching POWER LEVEL pad twice for small quantities of canned vegetables.
Dinner Plate 1 plate	(3-6 oz. of meat plus vegetables and/or potatoes/rice)	Use this pad to reheat precooked foods from the refrigerator. Place meaty portions and bulky vegetables to outside of plate.Cut large items like baked potatoes in smaller pieces. Flatten foods such as mashed potatoes and other dense foods. Cover with wax paper or plastic wrap. ONE PLATE ONLY. After cooking, check that food is very hot throughout and that the bottom center of the plate is very hot. If not, continue heating using time and power level. Allow to stand, covered, 2 to 3 minutes.
Popcorn	Only 1 package at a time	Use only popcorn packaged for microwave oven use. Try several brands to decide which you like best. Do not try to pop unpopped kernels. More/Less Time Adjustment can be used to provide adjustment needed for older popcorn or individual tastes.

4-16.2.18 Sensor Cook

To use Sensor Cook feature refer to figures at right and below for step-by-step instructions on how this function works.

When finished, opening oven door or touching STOP/CLEAR pad will display the time of day.

3 Touch START/TOUCH ON pad
When sensor detects the vapor emitted from the food, the remainder of cooking time will appear.

LET
STAND
COVERED
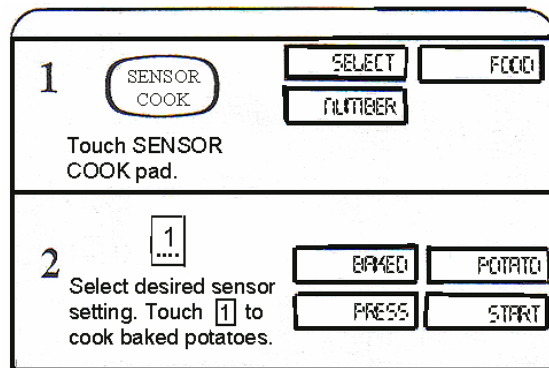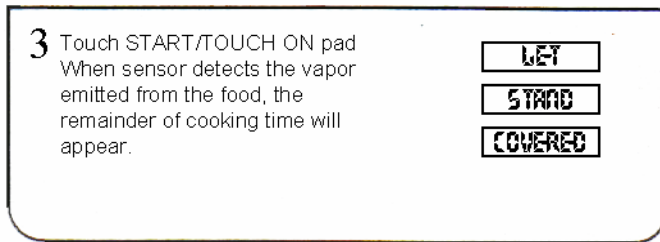
Sensor Cook Chart

Sensor Setting	Food	Amount	Procedure
1	Baked potatoes	1 to 6 medium	Pierce. Place on paper towel-line turntable. After cooking, remove from oven, wrap in aluminum foil and let stand 5 to 10 minutes.
2	Frozen vegetables	1 to 6 cups	Cover with lid or plastic wrap. After cooking, stir and let stand 3 minutes covered.
3	Fresh vegetables,		
	soft Broccoli	1/4 to 2 lbs.	
	Brussels sprouts	1/4 to 2 lbs.	
	Cabbage	1/4 to 2 lbs.	Wash and place in casserole. Add no water if vegetables have just been washed. Cover with lid for tender vegetables. Use plastic wrap for tender-crisp vegetables. Stir before standing if possible. After cooking, let stand, covered 2-5 minutes.
	Cauliflower (flowerets	1/4 to 2 lbs.	
	Cauliflower (whole)	1 medium	
	Spinach	1/4 to 1 lb.	
	Zucchini	1/4 to 2 lbs.	
	Baked apples	2 to 4 medium	
4	Fresh vegetables, hard		
	Carrots, sliced	1/4 to 1 1/2 lbs.	Place in casserole. Add 1-4 tbsp. water. Cover with lid for tender vegetables. Use plastic wrap cover for tender-crisp vegetables. Stir before standing, if possible. After cooking, let stand, covered 2-5 minutes.
	Corn on the cob	2 to 4 ears	
	Green beans	1/4 to 1 1/2 lbs.	
	Winter squash, diced	1/4 to 1 1/2 lbs.	
	halves	1 to 2	
5	Frozen entrees	6 to 17 oz.	Use for frozen convenience foods. It will give satisfactory results for most brands. You may wish to try several and choose your favorite. Remove package from outer wrapping and follow package directions for covering. After cooking, let stand, covered, for 1 to 3 minutes.
6	Hot Dogs	1 to 4 servings	Place hot dog in bun and wrap in paper towel or paper napkin.
7	Bacon	2 to 6 slices	Place bacon on paper plate, lined with paper towel. Bacon should not extend over the rim of plate. Cover with paper towel.
8	Fish, seafood	0.25 to 2.0 lbs.	Arrange in ring arouond shallow glass dish (roll fillet with edges underneath). Cover with plastic wrap. After cooking, let stand, covered 3 minutes.

4-16.2.19 Hood Light/Hood Fan

Your oven is equipped with a Hood Light and a Hood Fan, which can be used whether the door is open or closed.

To turn the Hood Light on, touch the LIGHT pad once. To turn the Hood Light off, touch the LIGHT pad again.

To turn the Hood Fan on, touch the FAN HI/LO pad once for high and twice for low and three times to turn the fan off.

4-16.2.20 Convection/Automatic Mix Cooking

This section of this manual gives you specific cooking instructions and procedures. Please consult your Sharp Carousel Convection Microwave Cookbook for helpful hints for convection and combination cooking.

The oven should not be used without the turntable in place, and it should never be restricted so that it cannot rotate. You may remove the turntable when preheating the oven and when preparing food to be cooked directly on the turntable.

Convection Cooking
During convection heating, hot air is circulated throughout the oven cavity to brown and crisp foods quickly and evenly. This oven can be programmed for ten different convection cooking temperatures for up to 99 minutes, 99 seconds.

4-16.2.21 To Cook with Convection

Suppose you want to cook at 350ºF, for 25 minutes.

1.   Touch CONVEC pad.
2.   Touch number pad for desired temperature (Ex. Pad 6 for 350ºF.)
3.   Enter cooking time. For 25 minutes, push 2500.
4.   Touch START/TOUCH ON pad.

4-16.2.22 To Preheat and Cook with Convection

Your oven can be programmed to combine preheating and convection cooking operations. You can preheat at the same temperature as the convection temperature or change it to a higher or lower temperature.

Suppose you want to preheat until 350ºF, and then cook 25 minutes at 375º F, convection.

1.   Touch **PREHEAT** pad.
2.   Touch number pad for desired temperature (Ex. Pad 6 for 350ºF).
3.   Touch **CONVEC** then touch number pad for temperature. (Ex. Pad 7 for 375ºF).
4.   Enter number pads for cooking time. For instance for 25 minutes press 2500.
5.   Touch **START/TOUCH ON** pad.

When the oven reaches the programmed temperature, it will automatically hold at the preheat temperature for 30 minutes and then the display will change to time of day. Whenever **STOP/CLEAR** pad is touched during this 30-minute period, **PRESS CONVEC** or **PRESS MIX** will be displayed and cooking mode and time can be entered.

NOTE: To preheat and cook with the same temperature, enter the same temperature in steps 2 and 3.

4-16.2.23 To Broil

In the **BROIL** setting, preheating is automatic. Just enter the actual broiling time and wait for preheat to be over before adding food. (Preset 450º F). Oven temperature cannot be changed.

Suppose you want to broil a ham steak for 15 minutes.

1.   Touch **BROIL** pad.
2.   Touch number pads to enter cooking time. For 15 minutes, enter 1500.
3.   Touch **START/TOUCH** On pad.

4-16.2.24 To Slow Cook

Slow Cook is a preset at 300ºF. Slow Cook is programmed for 4 hours. Oven temperature can be changed to temperatures below 300ºF. Simply touch the **SLOW COOK** pad and touch the desired numbered pad with temperature below 300ºF.

4-16.2.25 Automatic Mix Cooking

This oven has two pre-programmed settings that make it easy to cook with both convection heat and microwave automatically.

	Oven Temperature	Microwave Power
HIGH MIX	325ºF	30%
LOW MIX	325ºF	10%

With the exception of those foods that cook best by convection heating alone, most foods are well suited to mix cooking using either LOW MIX/BAKE or HIGH MIX/ROAST.

The marriage of these two cooking methods produces juicy meats, moist and tender cakes and fine textured breads, all with just the right amount of browning and crispness.

The temperatures can be changed, however, the microwave power cannot.

The oven temperature can be changed from 100ºF, to 450ºF. To change the temperature, first touch **HIGH MIX** or **LOW** MIX, then touch the same pad again. When the display says **SELECT TEMP** touch desired temperature pad. Example: **HIGH MIX, HIGH MIX**, pad **7** and **START**. The mix temperature will change automatically.

4-16.2.26 To Cook with Automatic Mix

Suppose you want to bake a cake at low mix for 20 minutes.

1. Touch LOW MIX BAKE pad
2. Touch number pads to select time. To select 20 minutes push 2000

At the end of the baking time, 1 long tone will sound and **END** will be displayed.

4-16.2.27 To Preheat and Cook with Automatic Mix

Your oven can be programmed to combine preheating and Automatic Mix cooking operations. You can preheat at the same temperature as the present combination temperature or change it to a different temperature.

Suppose you want to preheat until 350ºF, and then cook 25 minutes on 325ºF. Low Mix bake.

1. Touch PREHEAT pad
2. Touch number pad for desired temperature, for instance for 350ºF touch Pad 6.
3. Touch LOW MIX BAKE pad
4. Touch number pads to enter cooking time. Ex. 25 minutes would be 2500.
5. Touch START/TOUCH ON pad.

After cook cycle is completed, one long tone will sound and **END** will be displayed.

4-16.2.28 Special Features

This section of this manual offers instructions for preparing 12 popular foods using Compu-Broil, CompuRoast and CompuBake.

After selecting the desired feature, follow the directions indicated in the display.

For helpful hints, simply touch CUSTOM HELP anytime HELP is lighted in the display.

4-16.2.29 CompuRoast

CompuRoast automatically roasts chicken, turkey, turkey breast or pork.

Suppose you want to roast a 2.5-pound chicken.

1. Touch COMPU ROAST pad.
2. Touch number pad to select meat you are roasting. For instances, chicken would be Pad 1.
3. Touch number pad to enter the weight of the meat. Ex. A 2.5-pound chicken would be 25.
4. Touch START/TOUCH ON pad.

After COMPU ROAST cycle ends, a long tone will sound. LET STAND COVERED FOR 5-10 MIN. will be displayed.

NOTE:
1. **CompuRoast can be programmed with More/Less Time Adjustment. See More/Less Time section of this manual.**
2. **If you attempt to enter more or less than the allowed weight ERROR WEIGHT TOO LARGE PRESS CLEAR or ERROR WEIGHT TOO SMALL PRESS CLEAR will appear in the display.**
3. **To roast other food or foods above or below the weights allowed in the chart below, check the Sharp Carousel Convection Microwave Cookbook's Combination Roasting Chart.**

CompuRoast Chart

Setting	Food	Amount	Procedure
1	Hamburgers	1-8 pieces 1/4 lb. each	Use this setting to broil hamburger patties. Place on low rack.
2	Chicken pieces	0.5 to 3.0 lbs.	Arrange pieces on low rack. After cooking, let stand 3-5 minutes. Dark meat should be 180ºF, and white meat should be 170ºF.
3	Steaks	0.5 to 2.0 lbs.	Season as desired. Place on low rack. After the cycle ends, cover with foil and let stand 10 minutes. Internal temperature of white meat should be 170ºF.
4	Fish Steaks	0.5 to 2.0 lbs.	Boneless pork loin is recommended because it cooks evenly. Place on a low rack. After cooking, remove from oven, cover with foil and allow to stand 5-10 minutes. Internal temperature should be 160ºF.

4-16.2.30 CompuBake

CompuBake automatically bakes cakes, brownies, muffins and French fries.

Suppose you want to bake a 13"x9"x2" cake.

1. Touch COMPU BAKE pad.
   Note: Turntable function is automatically turned OFF.
2. Touch number pad. For instance for a cake touch Pad 1.
3. Touch STRAT/TOUCH ON pad.
   After CompuBake preheat cycle ends. Four tones will sound. The display will read PREHEAT OVER PLACE FOOD IN OVEN. Open door, place the cake pan inside.
4. Close door and touch START/TOUCH ON pad.
   After COMPU BAKE cycle ends, one long tone will sound. In addition, END will be displayed.

NOTE:
1. **ComuBake can be programmed with More/Less Time Adjustment. <u>See More/Less Time</u> in this manual.**
2. **To bake other food, see the Sharp Carousel Convection Microwave Cookbook's Baking Section.**

CompuBake Chart

Setting	Food	Pan Size/Qty	Rack	Procedure
1	Cake	13"x9"x2"	Low	Ideal for packaged cake mix or your own recipe for 13"x9"x2" pan. Prepare according to package or recipe directions and place in a greased and floured 13"x9"x2" baking pan. After the preheat is over, place pan in oven centerd on low rack. Cool before frosting and serving.
2	Brownies	13"x9"x2"	Low	Ideal for packaged brownie mix or your own recipe for 13"x9"x2" pan. Prepare according to package or recipe directions and place in a greased and floured 13"x9"x2" baking pan. After the preheat is over, place pan in oven centered on low rack. Cool before cutting into service pieces.
3	Muffins	12 cup	Low	Ideal for packaged muffin mix or your own recipe for 12 medium size muffins. Prepare according to package or recipe directions and place in one 12-cup muffin pan. After the preheat is over, place pan in oven centered on low rack.
4	French Fries	3 to 24 oz. Cookie sheet to hold	Low	Use frozen prepared French Fries. No preheat is required for the French Fries baking procedure. Place French Fries on cookie sheet on low rack. For shoestring potatoes, touch POWER LEVEL pad twice to enter less time before touching START pad.

4-16.2.31 CompuBroil

CompuBroil automatically broils hamburgers, chicken pieces, steaks and fish steaks.

Suppose you want to broil two hamburgers.
1. Touch **COMPU BROIL** pad.
2. Touch number pad. For instance for hamburgers touch **Pad 1**.
3. Touch number pad to enter quantity. Two hamburgers you would touch 2. Follow information on display for cooking information.
    For well-done or rare burgers, touch **POWER LEVEL** pad to select More for well done or Less for rare. See More/Less Time Adjustment in this manual.
4. Touch **START/TOUCH ON** pad.
    After broil preheat cycle ends, four long tones will sound. **PREHEAT OVER PLACE FOOD IN OVEN PRESS START** will be displayed repeatedly. Open the door and place hamburgers into oven. Close the door.
5. Touch **START/TOUCH ON** pad.
    After broil cycle ends, one long tone will sound and **END** will be displayed.

NOTE:
1. **CompuBroil can be programmed in More/Less Time Adjustment.**
2. **If you attempt to enter more or less than the allowed weight ERROR WEIGHT TOO LARGE PRESS CLEAR or ERROR WEIGHT TOO SMALL PRESS CLEAR will appear on the display. If you enter more or less than the allowed number ERROR 0 QTY PRESS CLEAR or ERROR TOO MANY will appear on the display.**
3. **To broil other foods above or below the weight or number allowed on the chart below, follow instructions in the Sharp Carousel Convection Microwave Cookbook. See Broiling Chart.**

CompuBroil Chart

Setting	Food	Amount	Procedure
1	Hamburgers	1-8 pieces 1/4 lb. each	Use this setting to broil hamburger patties. Place on low rack.
2	Chicken pieces	0.5 to 3.0 lbs.	Arrange pieces on low rack. After cooking, let stand 3-5 minutes. Dark meat should be 180ºF, and white meat should be 170ºF.
3	Steaks	0.5 to 2.0 lbs.	Use this setting to broil steaks from 3/4" to 1" thick. Individual boneless steaks broil evenly. Place steak on low rack. For well done, touch POWER LEVEL once; for rare, touch POWER LEVEL twice.
4	Fish Steaks	0.5 to 2.0 lbs.	Use this setting to broil fish steaks which are 3/4" to 1" thick. Place on low rack.

4-16.2.32 More/Less Time Adjustment

More

Should you discover that you like any of the **COMPU DEFROST**, **COMPU ROAST, COMPU BAKE, COMPU BROIL, SENSOR COOK** or **INSTANT SENSOR** settings slight more done, touch the **POWER LEVEL** pad once after touching your choice of pads. This will add a little more time to the cooking cycle making your food cook a little longer.

Less

Should you discover that you like any of the **COMPU DEFROST**, **COMPU ROAST, COMPU BAKE, COMPU BROIL, SENSOR COOK** or **INSTANT SENSOR** settings slightly less done, touch the **POWER LEVEL** pad twice after touching your choice of pads.

4-16.2.33 Kitchen Timer

Suppose you want to time a 3-minute long distance phone call.
1.   Touch KITCHEN TIMER pad.
2.   Enter time, for instance a 3 minute long phone call would be 300.
3.   Touch START pad

4-16.2.34 Minute Plus

Minute Plus allows you to cook for a minute at 100% by simply touching the **MINUTE PLUS** pad. You can also extend cooking time in multiples of 1 minute by repeatedly touching the **MINUTE PLUS** pad during manual cooking using microwave, convection, mix or broil.

Suppose you want to heat a cup of soup for one minute. Simply touch the **MINUTE PLUS** pad once.

NOTE:
Touch MINUTE PLUS pad within 1 minute after cooking, closing the door, touching the STOP/CLEAR pad or during cooking. Minute Plus cannot be used to start the oven if any program is on display.

Minute Plus cannot be used with **SPECIAL FEATURES**.

4-16.2.35 Touch On

Touch On allows you to cook at 100% power by touching the **START/TOUCH ON** continuously. Touch On is ideal for melting cheese, bring milk to just below boiling, etc. The maximum cooking time is 3 minutes.

Suppose you want to melt cheese on a piece of toast.

1.   Continuously touch START/TOUCH ON pad. The cooking time will begin counting up.
2.   When the cheese is melted to desired degree, remove finger from START/TOUCH ON pad. Oven stops immediately.

NOTE:
1.   *Note time it takes for frequently used foods and program that time in the future.*
2.   *Touch TOUCH ON pad within 1 minute after cooking, opening and closing the door or touching the STOP/CLEAR pad.*
3.   *Touch On can only be used 3 times in a row. If more times are needed, open and close door or touch STOP/CLEAR.*

NOTE: For all Special Features refer to the Manufacturer's Manual supplied with your microwave.

4-16.2.36 Cleaning and Care

Exterior
The outside surface is precoated metal and plastic. Clean the outside with mild soap and water; rinse and dry with a soft cloth. Do not use any type of household or abrasive cleaner.

Touch Control Panel
Care should be taken in cleaning the touch control panel. If the control panel becomes soiled, open the oven door to inactivate the control panel before cleaning. Wipe the panel with a cloth dampened slightly with water only. Dry with a soft cloth. Do not scrub or use any sort of chemical cleaners. Avoid the use of excess water. Close the door and touch **STOP/CLEAR**.

Interior – After microwave cooking

The oven walls, ceiling and floor are stainless steel. Cleaning after microwave cooking is easy because no heat is generated to the interior surfaces; therefore, there is no baking and setting of spills or splattering. To clean the interior surfaces, wipe with a soft cloth with warm water. DO NOT USE ABRASIVE OR HARSH CLEANERS OR SCOURING PADS. For heavier soil, use mile soap; rinse thoroughly with hot water.

Interior – After convection, mix or broil cooking

Spatters may occur because of moisture and grease. Wash immediately after use with hot, soapy water. Rinse and polish dry. Harder to remove spatters may occur if oven is not thoroughly cleaned or if there is long enough time/high temperature cooking. If so, you may wish to purchase an oven cleaner pad with liquid cleaner within it. Not a soap filled steel pad for use on stainless or porcelain surfaces. Follow manufacturer's directions carefully and be especially cautious not to get any of the liquid cleaner in the perforations on the wall or ceiling or any door surfaces. Rinse thoroughly and polish dry.

Wave Guide Cover

Carefully wash any food particles from the wave guide cover located on the ceiling in the oven cavity.

Odor Removal

Occasionally, a cooking odor may remain in the oven. To remove, combine 1 cup water, grated peel and juice of 1 lemon and several whole cloves in a 2-cup glass measuring cup. Boil for several minutes using 100% power. Allow to set in oven until cool. Wipe interior with a soft cloth.

Turntable/Turntable Support

The ceramic turntable and turntable support can be removed for easy cleaning. Wash them in mild, sudsy water, for stubborn stains use a mild cleanser and scouring sponge as described above. They are also dishwasher-safe using top rack.

Oven Racks

The high and low baking racks can be removed for easy cleaning and stored away from the microwave oven when racks are not needed. After each use, wash them in mild, sudsy water. For any stubborn stains, use a mild kitchen cleanser and scouring sponge as described above. They are dishwasher proof.

Grease Filters

1. Filters should be cleaned at least once a month. Never operate the fan or oven without the filters in place.
2. Pull the tab toward the front of the oven, down slightly and remove the filter. Repeat for the other filter.
3. Soak the filters in a sink or dish pan filled with hot water and detergent. DO NOT use ammonia or other alkali; they will react with the filter material and darken it.
4. Agitate and scrub with a brush to remove embedded dirt.
5. Rinse thoroughly and shake dry.
6. Replace by fitting the filter back into the opening.

Fan

The fan will automatically start when heat rises from range surface units or burners and when convection, high mix, low mix or the broil settings are used. This protects the microwave oven from excessive temperature rise. The fan will stay on until the temperature decreases. It cannot be turned off manually during this time.

PRECAUTIONS FOR PROPER USE:
1. DO NOT leave range unattended while using high temperatures. Automatic fan may start and provide excessive air to the surface units. This may cause spattering or boil over.
2. Avoid burning food.
3. Keep grease filters clean.

Light
1. To replace light bulbs, first disconnect power to the oven at the circuit breaker panel or by unplugging.
2. To release cover remove the screw on the light cover. See illustration.
3. Replace bulbs only with Sharp Part Number RLMPTA036WRE0 available from a Sharp Service Center or equivalent 30 watt bulb available at most hardware stores or lighting centers. DO NOT USE A BULB THAT IS LARGER THAN 30 WATTS.
4. Close light cover and secure with screw removed in Step 2.
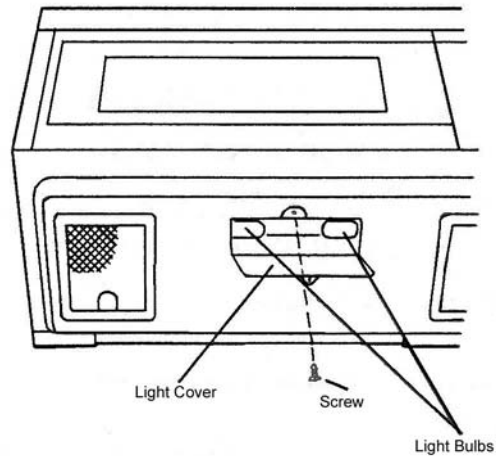
⚠️**CAUTION: Light cover may become very hot. Do not touch glass when light is on. Do not use light for long time use such as a night light.**

Charcoal Filter
Charcoal Filter, Sharp Part Number RK-220 is used for non-vented, recirculated installation. The filter should be changed every 6 to 12 months depending on use.

1. Disconnect power to the oven at the circuit breaker panel or by unplugging.
2. Remove screw from louver. (Top center)
3. Remove louver by inserting flat edge screwdriver over each tab depressing down the tab and moving louver away from unit.
4. Pull the louver away from the oven.
5. Slide Charcoal Filter into position on support tabs.
6. Push louver back into place and gently snap tabs into place by hand and replace the screw to secure louver.
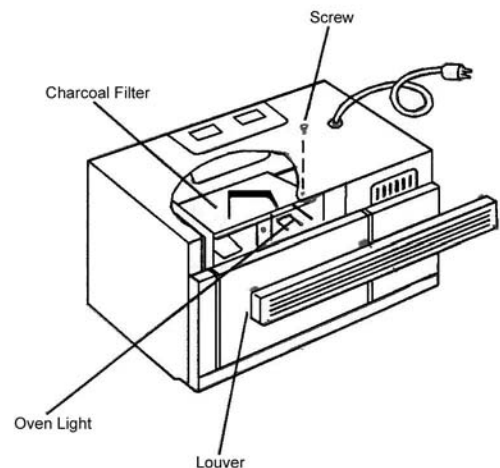
Oven Light
Remove the louver per instructions 1-4 above and charcoal filter, if used.

1. Slide the light cover forward and lift up.
2. Remove old light bulb and replace only with Sharp Part Number RLMPTA036WRE0 available from Sharp Service Center or equivalent 30-watt light bulb available from most hardware stores and lighting centers. DO NOT USE BULB LARGER THAN 30 WATTS.
3. Replace the oven light cover and charcoal filter, if used; push louver back in place and replace the louver mounting screw.

4-16.3 In-Sink-Erator

4-16.3.1 Konstant Hot Water Dispenser
Your motor home is equipped with an In-Sink-Erator Konstant Hot Water Dispenser. This will give you hot water as easy as turning on a faucet.

This is how your dispenser works
Water is electrically heated to near boiling (190ºF/88ºC) in a compact tank that mounts under the sink. A thermostat maintains it at this approximate temperature. When you turn the handle, cold water enters the tank and forces hot water out of the faucet. The system is vented so the tank is not pressurized.

NOTE: Due to the unique operation of your Instant Hot Water Dispenser, you may experience a slight delay in the dispensing of water after the handle is actuated. This assures maximum water temperature and is not indicative of a problem with the unit.

▲**WARNING: This product dispenses water at approximately 190ºF, which is hot enough to cause severe burns. Caution should be exercised when installing and using this product. Do not allow children to operate this appliance without adult supervision.**

⚠**CAUTION: Do not under any circumstances use bleach, abrasive liquids, powders or scouring pads to clean the faucet as doing so could void your warranty. Occasional cleaning with a soft cloth and warm soapy water is sufficient.**

4-16.3.2 Adjusting Temperature

The thermostat is factory pre-set at approximately 190ºF (88ºC). If the temperature needs to be adjusted, follow the steps outlined below.

1. Unplug or disconnect the unit from the electrical supply.
2. Remove the screw securing the access cover to the unit.
3. Insert a small flat blade screwdriver into the thermostat adjusting screw.
4. Turn the screw ½ dial marker clockwise to increase the temperature (1/2 dial marker counterclockwise to decrease water temperature.
5. Replace access cover and screw.
6. Reconnect the electrical supply.
7. Draw three (3) cups of water and allow the unit to reheat.
8. Check the water temperature and repeat the process if necessary.
   Do not allow the unit to boil.

4-16.3.3 Draining the Tank

1. Unplug or disconnect the unit from the electrical supply.
2. Allow water to run from the dispenser head until cool (approximately ½ gallon).
3. Shut off the supply of water to the dispenser.
4. Place a drain pan or other similar container underneath the tank.
5. Remove the drain cap located at the bottom of the tank and drain water (approximately ½ gallon).
6. Replace drain cap. Do not over tighten.
7. Reconnect water supply.
8. Actuate dispenser head handle until water flows from the dispenser head.
9. Reconnect the electrical supply.

4-16.3.4 Seasonal Storage

Seasonal storage of the unit is recommended if the unit is to be left unattended for long periods of time (typically more than two weeks) particularly if the unit could be exposed to freezing temperatures.

1. Unplug or disconnect the unit from the electrical supply.
2. Allow water to run from the dispenser head until cool (approximately ½ gallon).
3. Shut off the supply of water to the dispenser.
4. Place a drain pan or other similar container underneath the sink.
5. Remove the drain cap located on the bottom of the tank and drain water (approximately ½ gallon).
6. Replace drain cap. Do not over tighten.

⚠️**CAUTION: Remember – do not reconnect the electrical supply unless the tank is completely filled with water and water flows from the dispenser head.**

4-16.3.5 Cleaning

Use only a soft cloth and warm soapy water to clean the dispenser head and tank. The use of harsh cleaning agents containing acids, alkalines and organic solvents can destroy the dispenser head and tank finishes.

4-16.3.6   Troubleshooting Guide

4-16.4 Seaward Cook top

The M380 is supplied with the Seaward Cook top, Princess Model 2276 RV unit. Basic information concerning operating and maintaining your cook top are as follows:

4-16.4.1 What To Do if You Smell Gas

- Evacuate all persons from the vehicle.
- Shut off the gas supply at the gas container or source.
- Do not touch any electrical switch, or use any phone or radio in the vehicle.
- Do not start the vehicle's engine or electrical generator.
- Contact the nearest gas supplier or qualified service technician for repair.
- If you cannot reach a gas supplier or qualified service technician, contact nearest fire department.
- Do not turn on the gas supply until the gas leak(s) has been repaired.

4-16.4.2 Carbon Monoxide Poisoning

- Do not use any cooking appliance for space heating because of potential danger to occupants of the vehicle and damage to the cook top.
- A window or air vent should be open slightly while using any cooking appliance. Gas flame consumes oxygen which must be replaced to assure proper combustion and prevent carbon monoxide.

NOTE: Be sure you know where the main gas shut off valve is located so that you will know how and where to turn off the gas supply when necessary.

4-16.4.3 To Light the Burners

1. Push down the knob and turn counterclockwise to "IGNITE" position.
2. Hold the knob down fully until the spark ignites the gas and continue to hold the knob down for approximately 5 to 10 seconds. The thermocouple will be heated to activate the safety mechanism.
3. Release the knob and set to desired setting.
4. To turn off the burner flame, turn the knob clockwise to "OFF" position.

⚠️ **CAUTION**
- **Be sure your cook top is installed properly.**
- **Do not operate cook top if it is damaged or not working properly.**
- **Do not store flammable materials on or near the cook top.**
- **Never leave lit burners unattended. A boil over may result, causing smoke or fire.**
- **Do not use your cook top for warming or heating the room.**
- **The handle of utensil should be positioned so that it is turned inward but not extending over adjacent burner.**
- **To reduce the risk of burns and ignition of flammable materials, the burner flame should not extend beyond the edge of the cooking utensil.**
- **Grease is flammable. Never allow grease to collect around top burners or cook top surface. Wipe spillovers immediately.**
- **Only certain types of glass, glass/ceramic, earthware, or other glazed utensils are suitable for cook top use without breaking due to sudden change in temperature.**
- **Do not use water on grease fire. Smother the fire or flame or use baking soda, multipurpose dry chemical or foam type fire extinguisher.**

- **Children should not be left alone or unattended in area where cook top is in use. Children should never be allowed to sit or stand on any part of the cook top.**
- **Do not heat unopened containers. They could explode.**
- **Do not touch burners, grates or areas near cook top after use. Units may be hot even though it may not be obvious. Areas near burners and grates may become hot enough to cause burns. During and after use, do not touch, or let clothing or other flammable material contact cook top or areas near it until they have had sufficient time to cool.**

4-16.4.4 Care and Cleaning

Regular cleaning with a soft cloth and a warm detergent solution is generally enough to keep your cook top clean and beautiful. This is done when the cook top is cool. Use a dry cloth or paper towel to clean splatters and spills when surfaces are warm.

GLASS – We recommend the use of Hope's Cleaning Cream for care and maintenance of the glass surfaces. For more information about this product and a dealer near you, contact:
The Hope Company, Inc. – (800) 325-4026

4-16-5 Washer/Dryer Combo

The coach comes with a washer/drawer combo unit designed for space saving functionality. The unit is equipped with the following features:

- 1.6 cu. ft. drum capacity
- 1200 rpm max. spin speed
- Stainless steel tub and drum
- 9 Wash Programs
- 3 Dry Programs
- 7 Water Temperature Selections
- 4 Special Wash Options
- White Door Ring
- 1, 3, 9 or 12 hour delay start choices

The washer/dryer uses the latest in washing technology and needs less than half the water to get wash results that are twice as good! Energy Star® approved and rated in the highest CEE Residential Clothes Washer Initiative Tiers, 3A and 3B, your Splendide uses just 9-16 on average gallons of water and minimum electricity to effectively wash and rinse all your fabrics.

4-16.5.1 Where's the load size selector?
Your Splendide has a built-in Automatic Consumption Control feature. It automatically adjusts the water used for the size and fabric type of your load. No guesswork, perfect every time!

4-16.5.2 No lint filter to empty
The revolutionary new pump system eliminates the need for you to clean a filter! The only reason you should ever need to enter the pump pre-chamber (behind the toe-kick) is if items like keys or coins accidentally make their way into your wash load. The fact is, your Splendide is so gentle on fabrics that very little lint is produced. The small amount of lint that accumulates is safely expelled through the drain (and out the vent).

4-16.5.3 What kind of detergent should be used?

Use only detergents that are "low-sudsing" to prevent excess foam from building up and spilling out over the floor. These detergents are sometimes called HE or "High Efficiency" power detergents. You only need to use 1 to 2 tablespoons of powder to get your laundry spotlessly clean. Using liquid detergents is not recommended because they produce too much foam. But, if you prefer to use a liquid detergent, do not use more than 1 tablespoon.

Splendide recommends you use their washing powder available at http://www.splendide.com/accessories.htm So advantages to using this powder are:

- 100% Natural
- Super-concentrated
- RV/Marine Septic & Gray Water Safe
- Low Sudsing, Quick Dissolving
- Safe for Sensitive Skin
- Protects Your Machine

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4-17 Fans Vent and Exhaust_____

4-17.1   Fantastic Fan

12 VDC exhaust fan located in the bathroom.

4-17.1.1   Operation

1. Open the damper from the control located on the face of the vanity.
2. Turn on the fan from the control located on the fan. Set the desired speed. The switch on fan may be left on in order for the vanity (remote) switch to operate all functions.

4-17.2 6" 12 VDC Pop-Up Fan

12 VDC six-inch exhaust fan is located in the private toilet area of motor homes that are so equipped.

4-17.2.1 Operation

1. Push handle up to open the vent.
2. Turn on the fan from the control located on the bottom of medicine cabinet.

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4-18 Video and Audio Equipment _____

Each motor home comes equipped with a Kenwood Sirrius Satellite Ready Radio and a Bose 3-2-1 Home Entertainment System.

4-18.1   Bose 3-2-1 Home Entertainment System

Your motor home also comes equipped with a Bose 3-2-1 CD, DVD & Radio with surround sound. This has 2 speakers and 1 sub-woofer.

4-18.1.1 Basic Operation

The Bose® 3-2-1 home entertainment system offers superb sound, elegance, and simplicity in an advanced home audio setup. Using Bose proprietary signal processing technology, the 3-2-1 system provides improved spaciousness from stereo recordings, and bold movie effects from surround-encoded materials. Yet its few parts require little labor to set up, so you can enjoy your new system's performance right away.

Your system includes:
- Integrated AM/FM tuner and DVD/CD player in a small console
- Small, easy-to-place shelf speakers and an attractive floor-standing Acoustimass® module
- Easy-to-use infrared remote control
- Console input jacks for connecting other source components (such as a VCR, DSS, CD changer, or tape deck)

Picking out discs – The DVD/CD player built into the 3-2-1 media center can play the following types of discs identified by the corresponding logo:

- Video DVDs
- Audio CDs
- CD-R and CD-R/Ws
- MP3 on CD

NOTE: For complete connection directions and for directions on connecting additional equipment to your system refer to the Bose Manual in your owner kit.

Check for region code compatibility
For any DVD player and DVD disc to be compatible, their region code numbers must match. These numbers are allocated according to where the player and disc are sold.

Check the region code number on the bottom of the media center. Then be sure to choose only DVD discs that show the same region number on the disc label or front cover. For example, a Region 1 DVD player should display the following mark

4-18.1.2 Using your 3-2-1 System

Press the **On/Off** button on the remote control to turn the media center on. There is a similar Power button located on the top of the media center.

NOTE: To turn on components connected to the media center, use the remote for that specific component or its power switch. Neither the Model 3-2-1 remote nor the media center can turn components, such as the TV or a VCR, on or off. However, you do have the option of using a universal remote (new enough to include codes for the Bose Model 3-2-1 System) or a programmable "learning" remote to control this system.

The Remote Control
Buttons on the remote control are grouped according to function. Other buttons on the media center provide some of the same controls as described below.

Power and Mute Controls

Turns the system on and off.

Mutes/unmutes the system volume.

4-18.1.3   Source Controls

Selects the built-in CD/DVD player and turns the system on
Unmutes the system volume.

Selects AUX as the sound source and turns the system on.
Unmutes the system volume.

Selects Video 1 as the sound source and turns the system on.
Unmutes the system volume.

Selects Video 2 as the sound source and turns the system on.
Unmutes the system volume.

Selects the built-in tuner and turns the system on to the previously-selected AM station.
Unmutes the system volume.

Selects the built-in tuner and turns the system on to the previously-elected FM station.
Unmutes the system volume.

4-18.1.4   Source and Menu Controls
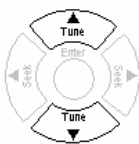
Tunes the AM/FM radio up/down to the next higher/lower
frequency.

In an on-screen menu, selects the next item, up or down.
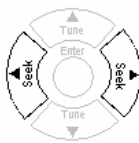
Seeks forward/backward to the next strongest radio station.
In an on-screen menu, changes the setting of a selected menu item.
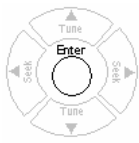
Enters submenus. Also submits custom settings, choices, or
entries in conjunction with other buttons.

Displays or exits the menu of the DVD disc currently loaded in the
tray, as the particular DVD allows.

Settings
Displays or exits the Bose 3-2-1 system on-screen menus.

Track ▲
Preset
Chapter ▼
Skips to the next/previous DVD chapter, radio station preset, or CD track.

+ Volume −
Raises or lowers the system volume.
+ Unmutes the system volume. Raises the volume.
- Lowers the system volume while it is muted.

① ② ③
④ ⑤ ⑥
⑦ ⑧ ⑨
⓪
Each button gives you access to a similarly numbered DVD chapter, CD track, or radio station preset.
When selecting numbers 1 through 9, entering a zero before the number ensures the fastest response.

4-18.1.5 Playback Controls

Stop ■
Stops the disc player and, *for DVDs only*, temporarily holds the place where the disc stopped. Press Stop again and the player moves to the beginning of the disc.

Pause ❚❚
Pauses the disc player in place. After 20 minutes, switches to Stop.

Play ▶
Starts the disc player.
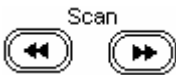
Scan ◀◀ ▶▶
Scans back or forward for DVD chapters, CD tracks, or the next strongest radio station.

Shuffle
Plays audio CD tracks (not DVD chapters) in varied order.
Press again to cancel this mode.

Repeat
Repeats a CD, CD track, DVD chapter, or DVD title until the button is pressed again.

4-18.1.6 The media center
The media center has a control panel on the top, a display
area on the front that indicates the current status of the system, and a DVD/CD tray that opens
on the front of the console.

Control panel and buttons
The media center has eight buttons located on the top control panel. Their functions are provided, also, through use of the remote control. *See fig. 2 below.*
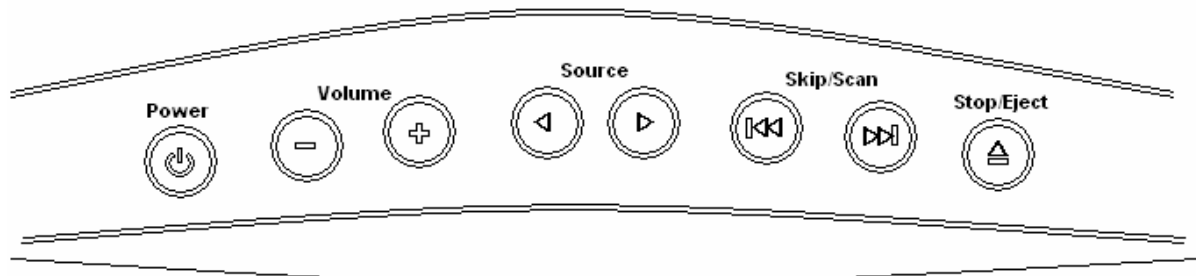
Fig. 2

Turns the system on or off.

Raises/lowers the volume of the system. Pressing + unmutes the system if muted.

Moves from one source selection to the next.

Selects the previous/next DVD chapter or CD track or scans to previous/next strongest radio station.

In AM or FM mode: tap or seek a radio station; hold down to tune to a station.

In CD/DVD mode: tap to skip tracks or chapters; hold down to scan them.

Open/closes the disc tray.

4-18.1.7 Display Indicators
With the system turned on, the music center display lights up to show the current system status. Not all of the possible choices shown below will light up at once. *See figure 3*. The display changes with each adjustment or selection you make.
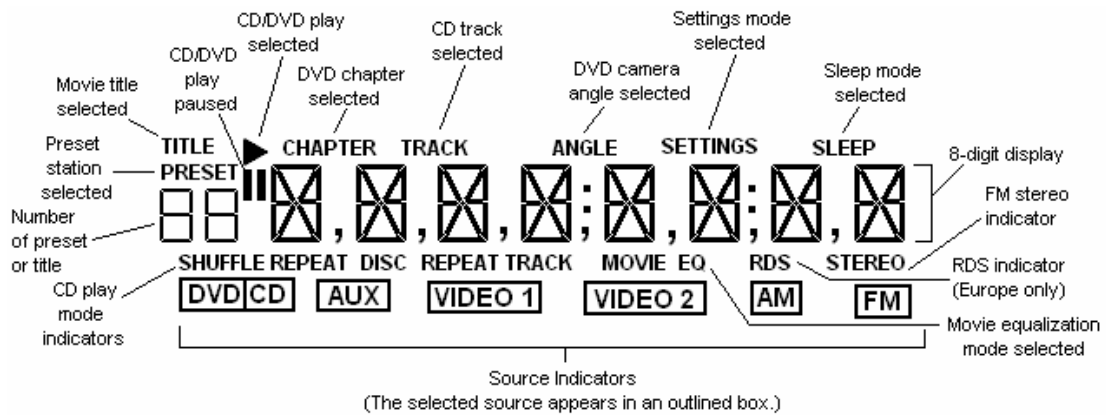
Fig. 3

TV On-Screen Menus
With both the TV and the Model 3-2-1 system turned on, you can use menus that appear on the TV screen to choose among options for audio and video performance.

To Enter the Settings Menu
Press the **Settings** button. The displayed menu will contain items related to the currently selected source. For example, if you press the **Settings** button while watching a DVD, you will see a menu similar to the one in *Fig. 4*

Title bar - Shows the name of the menu or submenu you are using (the currently selected source is in parentheses).

Menu Items - Source-related settings and submenus appear in this space

Selected menu item - Menu items are selected (highlighted) with the **Tune** up/down keys.

Settings (DVD)

DVD Play Options — Enter ○
Sleep Timer   Off
DVD Status:
Audio Setup   Enter ○
System Setup   Enter ○

Submenu - This symbol indicates that there is a submenu of items for this selection. Press the **Enter** button to enter the submenu.

Lists options for how to play and view the current DVD.

▲/▼ select item   Enter ○ goes to submenu   *BOSE*

Menu item description - Describes the selected menu item.

Navigation controls - Identifies which remote control buttons to use within the displayed menu.

Status display area - Displays status information when a status item is selected.

Fig. 4

To Select a Menu Item

Use the remote control Tune ▲ or ▼, Seek ◄ or ►, and Enter $\overset{\text{Enter}}{\bigcirc}$ buttons to move through these menus and make selections, as those offered in *Figures 5 and 6.*

To Change a Setting

DVD Play Options (1 of 2)

Title:	1 of 3
Chapter:	
Title Time:	0:23:02
Time Display:	Elapsed
Motion Control:	Play 1x
Audio Track:	English ⅅⅠⅭ 3/5.1
Camera Angle:	1 of 1
More. . .	

Chooses an audio track for the current DVD.

▲/▼ select item ◄ ► change setting *BOSE*

Fig. 5

To Check the System Status

Settings (DVD)

DVD Play Options	Enter ◯	DVD
		Playing
Sleep Timer	Off	The Movie Title
		Title 1 of 13
DVD Status:		Chapter 1 of 5
		Title Total 0:00:00
Audio Setup	Enter ◯	Audio English ⅅⅠⅭ 3/5.1
		Subtitle Off
System Setup	Enter ◯	Ratings Limit: 8
		Region Code: 1

Displays information about the curent source.

▲/▼ select item *BOSE*

Fig. 6

4-18.1.8   Turning Your System On and Off

You can turn your system on and off using the On/Off button ((On/Off)) on the

remote control or the power button (⏻) on top of the media   center.
When you turn it on with either button, the source that was played last is
automatically selected.

You can also press any source button on the remote to turn the system on and
select the source at the same time.

4-18.1.9   Before You Play Your First DVD

Before you play the first DVD, make sure:

- That you are familiar with how the system remote control operates (as explained in previous sections).
- The region codes for the DVD player and disc match, as explained earlier.
- The TV is properly set up for video input from the DVD player.

Before you select some system features, you also may want to confirm that the disc is encoded
for that feature. For example, in order to display subtitles while watching a movie, the disc must
contain subtitle information.

4-18.1.10   Loading and Playing a DVD

1. Turn your television and Model 3-2-1 system on.

2. On the remote, press the **CD/DVD** ⬭ button.

3. On the media center control panel, press the **Stop/Eject** ⏏ button.

4. Insert the DVD disc into the open media center tray.

5. Press the **Stop/Eject** ⏏ button again to close the tray.

The DVD disc begins to play automatically. If it does not, press **Play** ▶ on the remote.

4-18.1.11   Basic DVD Operations

If you want to:	*Use the remote to do this:*
Pause a DVD movie. . .	Press **Pause** ⏸
Stop a DVD movie. . .	Press **Stop** ⏹
Skip to the next/previous chapter. . . up/down.	Press **Chapter**
Repeat a chapter. . .	Press **Repeat** while playing the chapter.
Search through the movie Backward or forward. . .	Press and hold **Scan** ⏪ or ⏩

4-18.1.12   Using the Parental Control Feature to Restrict Future Play

You can restrict playback of DVD movies by setting the level of Parental Control.

The levels match ratings on each DVD that are equivalent in many cases to standard movie ratings provided by the Motion Picture Association of America (MPAA). These levels range from 1 (allows the least freedom) to 8 (allows the most freedom). By storing a password in the system, you can prevent any changes to the Parental Control setting or the viewing of movies rated above the control level without use of the password.

For information on where to find and how to use the Parental Control option, refer to *Getting the System Settings* section later on in this manual.

4-18.1.13   DVD-Specific Behavior

When you select features from any options menu while watching a movie, that movie may stop, skip forward, or skip back. This behavior is determined by the DVD you are playing and does not indicate a problem with the system.

4-18.1.14   DVD Play Options
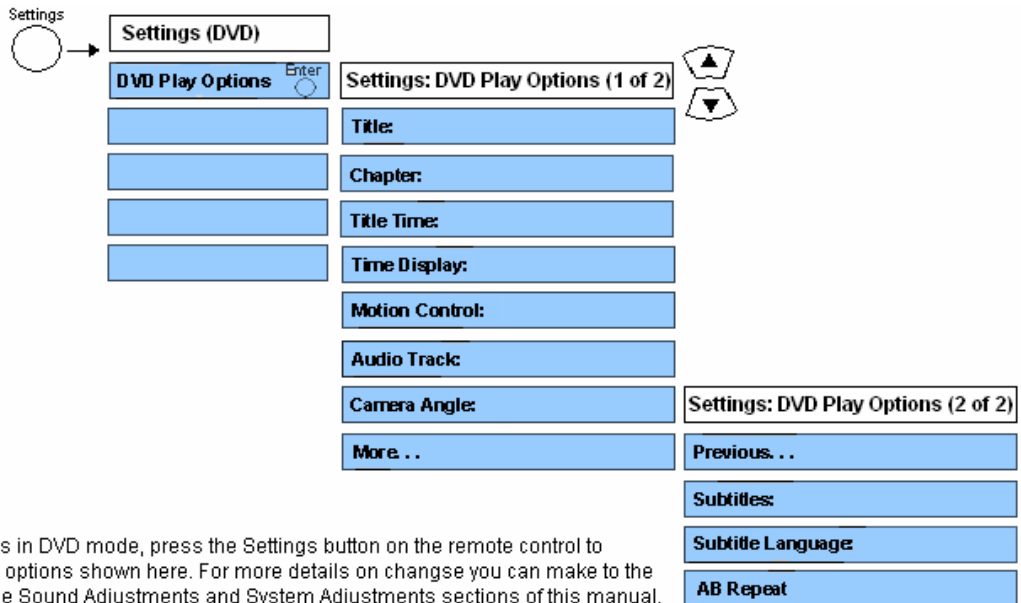
While the system is in DVD mode, press the Settings button on the remote control to gain access to the options shown here. For more details on changse you can make to the settings, refer to the Sound Adjustments and System Adjustments sections of this manual.

Fig. 7

Selection:	DVD setting options:	What the setting affects:
Title:	1 of n	Chooses the movie title through use of the number keys.
Chapter:	1 of n	Chooses the movie chapter through use of the number keys.
Title Time:	h:mm:ss	Moves to that time/place in the movie.
Time Display:	Elapsed	Shows how much time the movie has played in the on-screen DVD status and on the media center display.
	Remaining	Shows how much time the movie has left to play in the on-screen DVD status and on the media center display.
Motion Control:	<<Scan/ <<4x/ <<2x/ Pause/ Play 1x/ 2x>>/ 4x>>/ Scan>>/	Chooses forward or backward direction and speed for DVD playback while the Settings menu is displayed.
Audio Track:	1 English ▮▮ 5.1 2 Lang2 3 etc.	Chooses from the available soundtracks on the DVD. Additional soundtracks may contain different langauges or alternate audio formats.
Camera Angle:	1 of max.	Chooses one of the available camera angles on the DVD.
More…	selection	Displays remaining menu items.
Previous…	selection	Displays initial menu items.
Subtitle:	On	Displays subtitles, if available, along the lower screen edge.
	Off	Hides subtitles.
Subtitle Language:	Lang1/ Lang2/ etc.	Chooses one of the available langues for display of subtitles
AB Repeat	selection	Repeats a specified section of a movie after prompting you to: •Press Enter at the beginning of the section you want to repeat. •Move forward or back to another point in the film •Press Enter again. Replay ends when you press Enter, Play or Stop.

4-18.1.15 Loading and Playing a CD

1. On the remote, press the **CD/DVD** button.

2. At the media center, press the **Stop/Eject** (⏏) button.

3. Insert the audio CD into the open tray.

4. Press the **Stop/Eject** (⏏) button to close the disc tray.
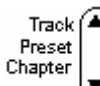
The CD will start to play automatically. If it does not, press **Play** (▶ Play) .

While playing a CD, the display window on the media center indicates:

- Track number
- Track time
- Repeat or Shuffle mode

4-18.1.16 Basic CD Operations

If you want to: *Use the remote to do this:*

Pause a CD. . .   Press **Pause**

Resume play of paused CD. . .   Press **Pause** again or **Play**

Stop a CD. . .   Press **Stop**

Go to next track. . .   Press **Track** up
Go to beginning of current track. . .   After track has played for several seconds,

                                          press **Track** down.
Go to a previous track. . .   If track has played for several seconds,

                                          press **Track** down twice. If not, press once.
Scan a CD backward/forward. . .   Press and hold **Scan**

Randomly play CD tracks. . .   Press **Shuffle** *a*fter loading a CD.

Cancel random play. . .   Press **Shuffle** again, while in that mode.

4-18.1.17 Changing CD Settings

While the system is in CD mode, press the Settings button on the remote control to gain access to the options shown here. For more details on changes you can make to the settings, refer to the Sound Adjustments and System Adjustments sections of this manual.

Selection:	CD setting options:	What the setting affects:
Sleep Timer:	Off	Timer not set.
	mm:ss	Set to turn system off (not the components) when time (01:00 to 90:00 minutes) expires.
Track:	1 of n	Chooses the CD track by number.
Track Time:	h:mm:ss	Moves to that time/place in the track.
CD Status:	selection	Displays information about the CD source.
Audio Setup:	selection	See Sound Adjustments
System Setup:	selection	See System Adjustments

4-18.1.18 Using the Sleep Timer

Your system includes a sleep timer which can be set to turn your system off automatically after 1 to 90 minutes of listening to any source. This timer can be accessed through the settings menu. See Getting to the System Settings further in this manual.

NOTE: Remember that system controls, like the sleep timer, will not turn the TV or other sound source components off.

4-18.1.19 Using the Radio

Press ○ AM or ○ FM on the remote to select the radio tuner. If the system is off, this will turn it on to the most recently selected station in that band.

Tuning
You can tune to a radio station in the following ways:

If you want to:	*Do this:*
Switch bands	Press ○ AM or ○ FM on the remote for the band you want.
Seek the strongest stations	Press and hold **Seek** ◄ or ► on the remote until the radio begins seeking. Release to stop at the next strongest station. To stop sooner, briefly press **Seek** ◄ or ► again as soon as the first seek operation stops.
Manually tune to a station	Press **Tune** ▲ or ▼ on the remote.
Select a preset station	Press **Preset** or Press that number on the keypad. Track / Preset / Chapter ▲▼

While the system is in the AM or FM mode, you can press the Settings button on the remote control to gain access to the options available for that band. Your TV should be one, also. For more details on changes you can make to the settings, refer to the *Sound Adjustments* and *System Adjustments* sections of this manual.

4-18.1.20 Stored Preferred Stations as Preset Selections

For radio stations that you listen to regularly, you can assign a Preset number (1-25 in the AM band and 1-25 in FM) to tune to them quickly.

To store a particular station:

1. Tune to that station using the Tune, Seek or Scan buttons on the remote.
2. Press and hold Enter until the media center display blinks and displays a preset number.
   - To accept that number assignment for the station, press Enter.
   - Select a different number using Track / Preset / Chapter ▲▼ to assign it to the station. Then press Enter.

NOTE: If you want to change the station assigned to a particular preset number, you must first delete the station already assigned to it.

To erase the station assigned to a particular preset number:
1. Tune to the station and press **Enter**.
2. When **ERASE?** appears on the media center display, press **Play** or **Enter.**
   The preset number should now be available for storing a different station.

Selecting a preset station
You can select preset stations using the remote control or the on-screen settings menu.

To select a preset with the remote control:
- Using the numbered keys on the remote control, press the number(s) for the preset station you want to hear.
- Press **Preset** up or down to change the preset number.

To select a preset using the settings menu:

1. Press ⌀ (AM) or ⌀ (FM) on the remote to select the FM or AM source.

2. Press ⌀ (Settings) . (Make sure your TV is on.)

3. Press ▼ and select **Preset** .

4. Press ◄ / ► to step through the preset stations.

Changing FM Settings

Selection:	FM setting options:	What the setting affects:
Sleep Timer:	Off	Timer not set.
	mm:ss	Sets timer to turn off when time (01:00 to 90:00 minutes) expires.
Station:	-----	Tunes to that station frequency.
Preset:	1 of 25	Tunes to the stored preset station.
FM Status:	selection	Displays information about the FM source.
RDS Info: (Europe only)		Makes RDS information appear in media center display (in Europe only).
		Makes RDS information unavailable on media center display (in Europe only).
Output mode: Stereo		Always plays the FM broadcast in stereo.
Mono		Always plays the FM broadcast in mono.
Audio Setup: selection		See Sound Adjustments
System Setup: selection		See System Adjustments

Changing AM Settings

Selection:	AM setting options:	What the setting affects:
Sleep Timer:	Off	Timer not set.
	mm:ss	Sets timer to turn off when time (01:00 to 90:00 minutes) expires.
Station:	-----	Tunes to that station frequency.
Preset:	1 of 25	Tunes to the stored preset station.
	Available only if presets include an AM station	
AM Status:	selection	Displays information about the AM source.
Audio Setup: selection		See Sound Adjustments
System Setup: selection		See System Adjustments

Playing Other Sources

Turn on any component connected to the media center by using the remote for that component or controls on the component front panel.

Pressing **AUX**, **Video 1** or **Video 2** on the 3-2-1 system remote turns on the system and selects the audio for that component. Be sure a tape or disc is loaded, as needed.

Use the **Volume ▲** or ▼ buttons on the 3-2-1 remote control or media center to raise or lower the volume of the system.

To control all other functions of that source, use its remote or front-panel controls. For details on what changes you can make, refer to the owner's manual that came with the component.

To record to a connected tape deck, play the built-in or connected source (AM/FM, CD or AUX) you want to tape. Listen to the speakers to be sure you have selected the audio you want to tape. Set the tape deck to Record.

Changing Settings For the Other Sources

Selection:	Setting options:	What the setting affects:
Sleep Timer:	Off	Timer not set.
	mm:ss	Sets timer to turn off when time (01:00 to 90:00 minutes) expires.
VID 1, VID 2, AUX Status:	selection	Displays information about the connected source.
Audio Setup:	selection	See Sound Adjustments
System Setup:	selection	See System Adjustments

4-18.1.21 Sound Adjustments

Getting the Audio Setup

1. Press the **Settings** button. A menu of the available settings for the current source will be displayed on your TV screen.
2. Using the **Tune ▼ down** button, scroll down and list and select (highlight)   Audio Setup
3. Press the Enter button and the audio settings will be displayed for the current source.
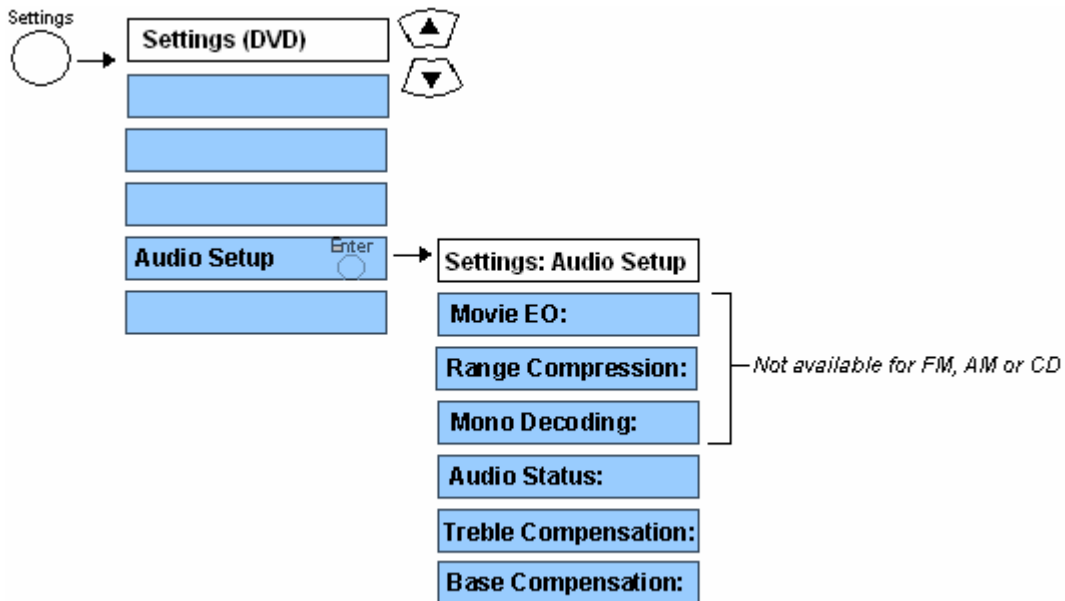
Fig. 8

Changing the Audio Settings

Selection:	Setting options:	What the setting affects:
Movie EQ:	On	Sets proper equalization for this particular movie.
Range Compression:	On	Automatically adjusts the volume so you can hear soft sounds (particularly dialogue) and are not overwhelmed by loud special effects, like an explosion. This feature is normally engaged when you turn the system on to DVD, VIDEO 1, VIDEO 2, or AUX.
	Off	Range Compression not active.
▮◀▶▮ 1 + 1	1 of n	Not shown above. Indicates that a Dolby 1+1 audio track is playing.
Mono Decoding	On	
		Automatically engages Bose® Videostage® decoding circuitry when a Dolby Digital bitstream indictes that it contains a mono program. This feature can process a one-channel program in multi-speaker sound, directing the signals so that dialogue remains locked on-screen, while music and ambient effects fill the room.
	Off	Mono decoding not active.
Audio Status:	selection	Displays system audio information. The example in Fig. 8 Shows the DVD audio status.
Treble Compensation	(-15 to +15)	Decreases (-) or increases (+) the treble sound. Rooms with too few sound-absorbing furnishings, especially those with bare floors and walls, may sound overly shrill or "bright". Lowering this setting to a negative value (-1 to -15) decreases the treble sound. Rooms with a lot of sound-absorbing furnishings, such as upholstered furniture, wall-to-wall carpet, or heavy drapes, may reduce the treble sound of your system. Moving speakers farther away from soft furnishings increases treble. You can also increase the treble sound by raising this setting to a positive value (+1 to +15).
Bass Compensation	(-15 to +15)	Decreases (-) or increases (+) the base sound. Placement of the Acoustimass® module affects the amount of bass you hear. Placing the module closer to the corner of the room will increase the bass. Moving the module away from the corner will decrease the bass. You can also decrease the bass sound by lowering this setting to a negative value (-15 to -15). To increase the bass, raise this setting to a positive value (+1 to +15).
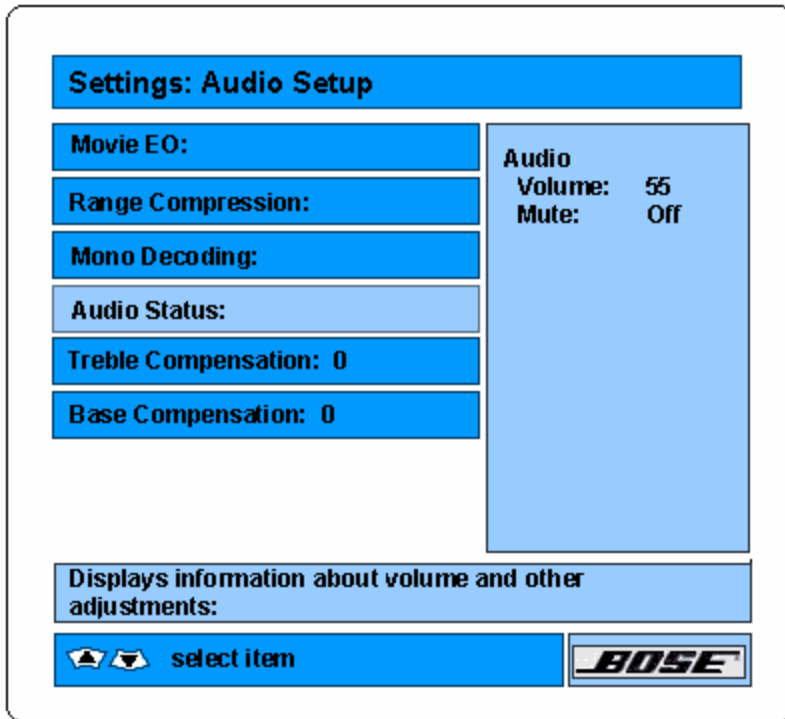
Fig. 9

Getting to the System Settings
Press the **Settings** button. A menu of the available settings for the current source will be displayed on your TV screen.
Using the **Tune ▼ down** button, scroll down the list and select (highlight) System Setup.
Press the Enter button and the system Setup will be displayed.

System setup menu
The system setup menu lists options for how to set up the entire system.

Selection:	Setting options:	What the setting affects:
Display Language:	English/French/Spanish/etc.	Presents on-screen display menus in the selected language.
DVD Setup	selection	Provides a selection of options, including Parental Control for the DVD.
Video Format:	NTSC	Sets video format to the USA standard.
	PAL	Sets video format to the European standard.
Video Black Level:	Normal	Sets black level required for most TVs.
	Extended	Sets black level that may be appropriate for DVD playback.

DVD Setup Submenu

The DVD setup submenu lists options for how the DVD player should operate,
including Parental Control.

Selection:	Setting options:	What the setting affects:
Auto Select Audio Track:	On	System automatically plays 5.1 channel audio track when available on a DVD.
	Off	Audio track must be selected manually.
Auto Subtitle:	On	Subtitles, if available on the particular DVD, are automatically displayed when the audio is muted.
	Off	DVD subtitles are not displayed automatically.
DVD Autoplay:	On	DVD starts to play automatically when it is loaded in the DVD player.
	Off	DVD is not started automatically when loaded.
Aspect Ratio:	4:3	Provides the DVD aspect ratio for standard (4:3) TVs.
	16:9	Provides the DVD aspect ratio for widescreen (16:9) TVs.
Image Format:	Pan & Scan	Images are sized to fit a standard TV, if the particular DVD allows it.
	Letterbox	Images are presented in Letterbox format if the partuclar DVD allows it (with black bars at the top and bottom of the screen).
		If **Aspect Ratio** is 16:9, **Image Format** is not applicableand the setting is automatically shown as "==".
Parental Control Setup	selection	Provides access to the Parental Control submenu.
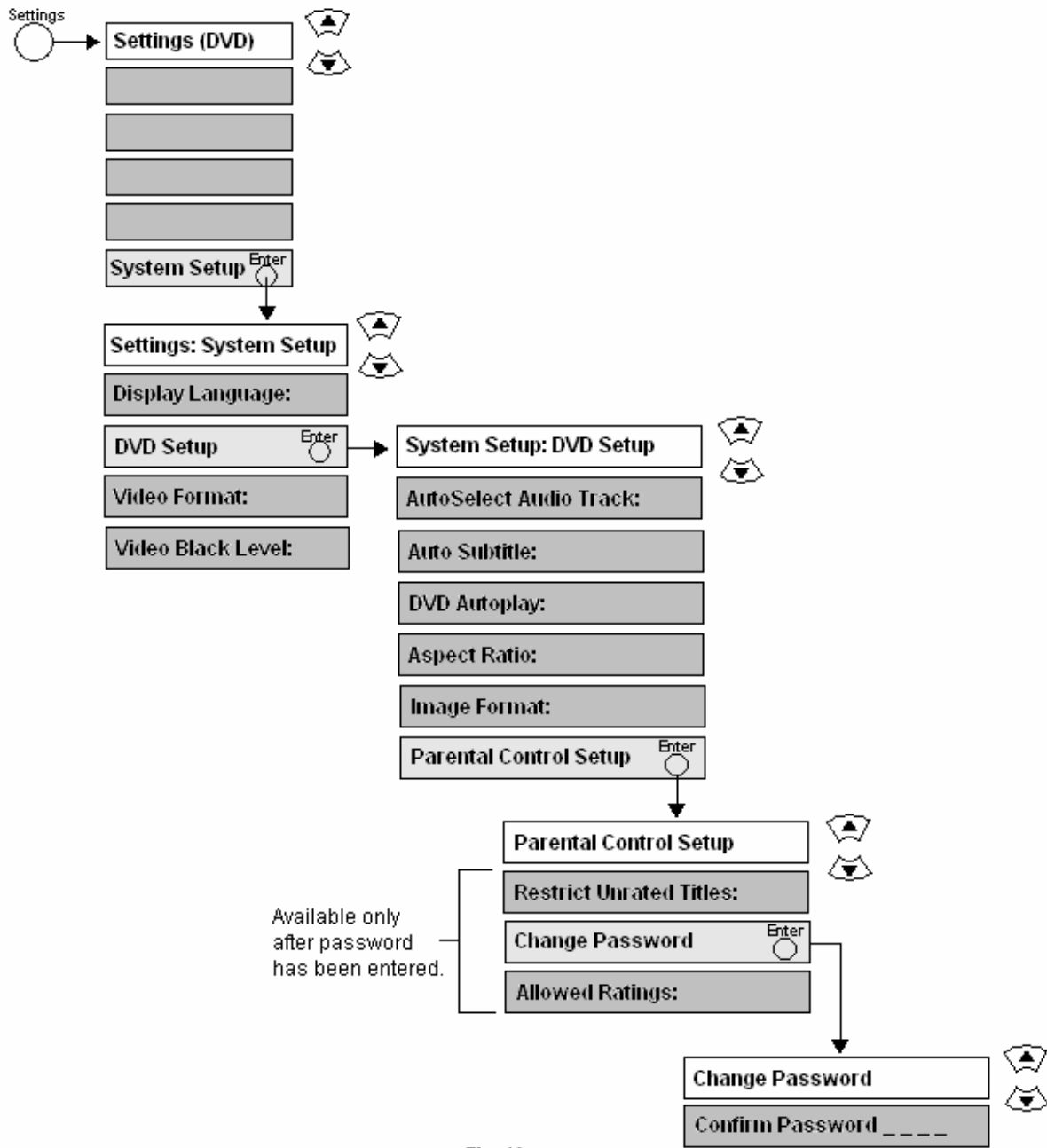
Fig. 10

Parental Control Submenu
The parental control submenu provides options for restricting access to certain DVDs.

Selection:	Setting options:	What the setting affects:
Restrict Unrated Titles:	On	Prevents viewing of unrated titles when password is set.
	Off	Allows unrated titles to play.
Change Password:	_ _ _ _	Lists options for how to create a new password or to change a current password. Passwords cannot be deleted.
Allowed Ratings:	1 to 8*	Blocks access to DVDs rated higher than the limit. Rating 8 means no restriction.

DVD Rating	General Description of Rating	MPAA Rating
*8	Unrated (generally most restricted)	
7	Adult Audiences	NC-17
6	Mature Audiences	R
5	Mature Teenage Audiences	
4	Teenage Audiences	PG-13
3	Mature Young Audiences	PG
2	Most Audiences	
1	General (unrestricted audiences)	G

4-18.1.22 Taking Care of Your 3-2-1 Home Entertainment System

Caring for your system may include cleaning the system's enclosures, cleaning your discs, and replacing the remote control batteries.

Cleaning the Media Center
- Use only a soft dry cloth to clean the outside surfaces of the media center.
- Do not use any sprays near the system. Do not use any solvents, chemicals, or cleaning solutions containing alcohol, ammonia, or abrasives.
- Do not allow any liquids to spill into any openings.

Cleaning the Speakers
- Clean the surface of your speakers with a soft, damp cloth. You can use an ammonia-free window cleaner on a soft cloth to maintain the finish.
- Do not use any sprays near the speakers. Do not use any solvents, chemicals, or cleaning solutions containing alcohol, ammonia, or abrasives.
- Do not allow liquids to spill into any openings.
- The speaker grilles require no special care, although you may vacuum them carefully, if necessary.

Cleaning Discs
- Handle discs by their edges to prevent fingerprints and starches.
- To remove stains or fingerprints from the surface of a disc, use a soft and dry lint-free, cloth. Wipe in straight movements from the center of the disc to the outside. Do not use any chemical products; they can damage the disc.
- Do not use a circular motion to clean.
- Do not write on or attach labels to the surface of the disc.
- To minimize exposure to dust and dirt, return discs to their cases after use. Store each disc in its case, away from direct sunlight, high temperatures, and humidity.

Replacing the Remote Batteries
- Slide open the battery compartment.
- Notice the polarity markings (+ and -) inside the compartment and install the batteries accordingly. Slide the battery compartment cover back into place.

Troubleshooting

Problem	What to do
System doesn't do anything	•Make sure the unit is turned on. •Make sure the power cord is inserted securely into the Acoustimass® module and plugged firmly into an operating AC wall outlet. •Be sure to select a source (CD/DVD, AM/FM, etc.) •Unplug the Acoustimass module power cord from the outlet for a minute, then reconnectit. This allows the unit to reset itself.
No sound	•Increase the volume. •Check to see if MUTE is lit on the display. If it is, press the Mute button on the remote control to unmute the sound. •Make sure the module cable and speaker cable are firmly seated in the media center jacks and the multi-pin connector on the other end is firmly seated in the Acoustimass module jack. •Check speaker connections. •Turn the media center off for 10 seconds, then on again, to restore communication between the media center and the speakers. •Check the connections for any external components. Make sure to select the correct source for the desired input. •Be sure the disc is placed correctly, label-side up, in the CD tray. •Connect the FM and AM antennas. •Unplug the Acoustimass® module power cord from the outlet for a minute, then reconnect it. This allows the unit to reset itself.
Remote control is inconsistent or does not work	•Check batteries and their polarity (+ and -). See "Replacing the remote batteries" earlier in this section. •Point the remote control at the media center.
Radio does not work or has poor reception	•Make sure antennas are connected properly. •Move AM antenna atleast 20 inches (50 cm) from the media center. •Adjust antenna position to improve reception. •AM antenna must be upright. •Move antennas farther from TV or other electronic equipment. •You may be in an area of weak signal coverage.
DVD or CD does not play	•Check to see if the play symbol in the display is lit. •After pressing the CD/DVD button, wait a few seconds before pressing Play. •Make sure the disc is properly inserted (label side up). •Eject the disc and try loading it again. •There may be dirt or dust on the disc. Clean the disc. See "Cleaning discs" earlier in this section. •The disc may be defective. Try another disc. •Make sure Region codes for both the DVD and player match. See "Check for region code compatibility earlier in this manual.
FM sound is distorted	•Adjust antenna position to reduce interference.
Sound is distorted	•Make sure speaker cables are not damaged and the connections are secure. •Reduce the output level from any external components connected to the music center.

Customer Service

For additional help in solving problems, contact Bose® Customer Service at
1-800-WWW-BOSE available Mon.-Fri. 8:30 a.m.-9:00 p.m. EST and
Saturday 9:00 a.m.-5:00 p.m. EST. or online at http://www.bose.com.

4-18.2   The Kenwood Sirius Satellite Ready Radio

This system is mounted in the driver area and is satellite ready. There is an optional receiver owner can purchase to pick up satellite radio stations. This is a AM/FM/Single Play CD/Cassette radio and a four-channel amplifier with a total power output of 200 watts driving two satellite speakers located in the living/kitchen areas. The stereo television is also coupled into this system.

This unit can play MP3 (MPEG1, 2, 2.5 Audio Layer 3). Note, however, that the MP3 recording media and formats acceptable are limited. When writing MP3, pay attention to the following restrictions.

4-18.2.1   General Information

Acceptable Media
The MP3 recording media acceptable to this unit are CD-ROM, CD-R, and CD-RW.

When using CD-RW, do full format not quick format to prevent malfunction.

Acceptable Medium Formats
The following formats are available for the media used in this unit. The maximum number of characters used for file name including the delimiter (".") and three-character extension are indicated in parentheses.
- ISO 9660 Level 1 (12 characters)
- ISO 9660 Level 2 (31 characters)
- Joliet (64 characters)
- Romeo (128 characters)

Up to 200 characters can be displayed in the long file name format. For a list of available characters see the instruction manual of the writing software and the section **Entering file and folder names** below. The media reproducible on this unit has the following limitations:
- Maximum number of directory levels: 8
- Maximum number of files per folder: 255
- Maximum number of characters for folder name: 64
- Maximum number of folders: 50

MP3 written in the formats other than the above may not be successfully played and their file names or folder names are not properly displayed.

Settings For Your MP3 Encoder and CD Writer
Do the following setting when compressing audio data in MP3 data with the MP3 encoder.

- Transfer bit rate: 8-320 kbps
- Sampling frequency: 8, 11.025, 12, 16, 22.05, 24, 32, 44.1, 48 kHz

When you use your CD writer to record MP3 up to the maximum disc capacity, disable additional writing. For recording on an empty disc up to the maximum capacity at once, check Disc at Once.

Entering ID3 Tag

The Displayable ID3 tag is ID3 version 1:x.
For the character code, refer to the List of codes in *fig. 11*.

Entering File and Folder Names

The code list characters are the only file names and folder names that can be entered and displayed.

If you use any other character for entry, the file and folder names are not displayed correctly. They may neither be displayed correctly depending on the CD writer used. The unit recognizes and plays only those MP3 which have the MP3 extension (.MP3).

NOTE: A file with a name entered with characters not on the code list may not play correctly.

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P		p			―	°	À	Ð	à	đ
1			!	1	A	Q	a	q			¡	±	Á	Ñ	á	ň
2			"	2	B	R	b	r			¢	²	Â	Ò	â	ò
3			#	3	C	S	c	s			£	³	Ã	Ó	ã	ó
4			$	4	D	T	d	t			¤	´	Ä	Ô	ä	ô
5			%	5	E	U	e	u			¥	µ	Å	Õ	å	õ
6			&	6	F	V	f	v			¦	¶	Æ	Ö	æ	ö
7			`	7	G	W	g	w			§	·	Ç	×	ç	÷
8			(	8	H	X	h	x			♪	†	È	Ø	è	ø
9			)	9	I	Y	i	y			©	¹	É	Ù	é	ù
A			*	:	J	Z	j	z			ª	º	Ê	Ú	ê	ú
B			+	;	K	[	k	{			«	»	Ë	Û	ë	û
C			,	<	L	\	l	|			¬	¼	Ì	Ü	ì	ü
D			-	=	M	]	m	}			Ⓟ	½	Í	Ý	í	ý
E			.	>	N	^	n	~			®	¾	Î	Þ	î	þ
F			/	?	O	_	o	■			―	¿	Ï	ß	ï	ÿ

Fig. 11

Writing Files Into a Medium

When a medium containing MP3 data is loaded, the unit checks all the data on the medium. If the medium contains a lot of folders or non-MP3 files, therefore, it takes a long time until the unit starts playing MP3.

In addition, it may take time for the unit to move to the next MP3 file or a Track Search or Album Search may not be performed smoothly.

⚠ Loading such a medium may produce loud noise to damage the speakers.
- Do not attempt to play a medium containing a non-MP3 file with the MP3 extension.
  The unit mistakes non-MP3 files for MP3 data as long as they have the MP3 extension.
- Do not attempt to play a medium containing non MP3.

MP3 Playing Order

When selected for play, Album Search, Track Search, or for Album Select, files and folders are accessed in the order in which they were written by the CD writer.

Because of this, the order in which they are expected to be played may not match the order in which they are actually played. You may be able to set the order in which MP3 are to be played by writing them onto a medium such as a CD-R with their file names beginning with play sequence numbers such as "01" to "99", depending on your CD writer.

For example, a medium with the following folder/file hierarchy is subject to Album Search, Track Search, or Album Select as shown in *Fig. 12*.
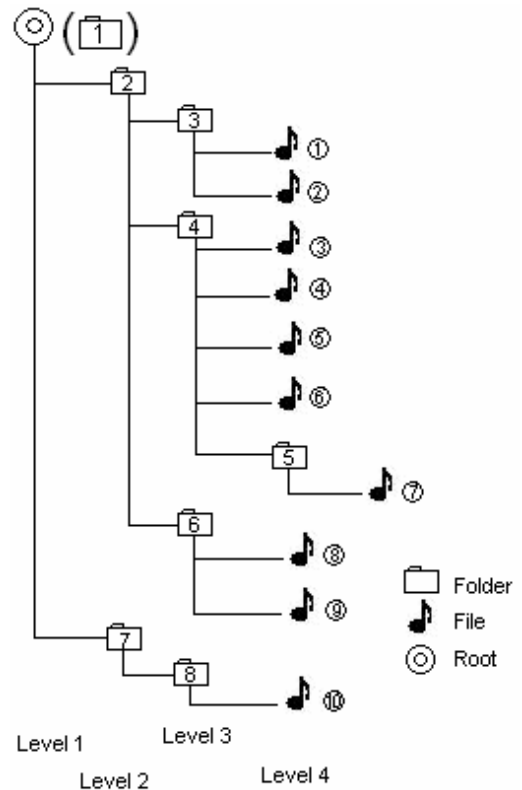
Fig. 12

When a File Search is executed with file ♪④ being played. . .

Current file number	Operation of the button	
	I◀◀ Button	▶▶I Button
♪④	Beginning of file ♪④ -> ♪③	♪⑤ --> ♪⑥

When an Folder Search is executed with file ♪④ being played. . .

Current folder number	Operation of the button	
	AM Button	FM Button
🗀4	🗀3 → 🗀2 → 🗀1 → 🗀8 •••	🗀5 → 🗀6 → 🗀7 → 🗀8 → 🗀1 •••

When Folder Select is selected with file ♪④ being played to move from folder to folder. . .

Current folder number	Operation of the button			
	I◀◀ Button	▶▶I Button	AM Button	FM Buttom
🗀4	🗀3	🗀6	🗀2	🗀5

Handling CDs

- Don't touch the recording surface of the CD.
- CD-R and CD-RW are easier to damage than a normal music CD. Use a CD-R or a CD-RW after reading the caution items on the package, etc.
- Don't stick tape on the CD. Also don't use a CD with tape stuck on it.

When Using a New CD

If the CD center hole or outside rim has burrs, use it after removing them with a ball pen.

CD Accessories
Don't use disc type accessories.

CD Cleaning
Clean from the center of the disc and move outward.

Removing CDs
When removing CDs from this unit pull them out horizontally.

CDs That Can't Be Used
- CDs that aren't round can't be used.
- CDs with coloring on the recording surface or that are dirty can't be used.
- This unit can only play the CDs with the following logos.

It may not correctly play discs which do not have one of these marks.

- A CD-R or CD-RW that hasn't been finalized can't be played. (For the finalization process refer to your CD-R/CD-RW writing software, and your CD-R/CD-RW recorder instruction manual.)

CD Storage
- Don't place them in direct sunlight (On the seat or dashboard etc.) and where the temperature is high.
- Store CDs in their cases.

4-18.2.2 Basic Operation

4-18.2.2.1 Power

Turning On the Power
Press the [SRC] button.
When the power is ON, the <Security Code> is displayed as "CODE ON" or
"CODE OFF"

Turning OFF the Power
Press the [SRC] button for at least 1 second.

4-18.2.2.2 Selecting the Source
Press the [SRC] button.

Source required	Display
Tuner	"TUNER"
CD	"COMPACT DISC"/CD"
External disc (Optional accessory)	"DISC-CH"/"DISC"
Auxiliary input	"AUX"
Standby (illumination only mode)	"ALL OFF"

4-18.2.2.3 Volume
Increasing Volume
Turn the [VOL] knob clockwise.

Decreasing Volume
Turn the [VOL] knob counterclockwise

4-18.2.2.4   System Q
You can recall the best sound setting preset for different types of music.

1. **Select the source to set.**
   Press the [SRC] button.

2. **Select the Sound type**
   Press the [System Q] button.
   Each time the button is pressed the sound setting switches.

Source setting	Display
Flat	"Flat"/"FLAT"
User memory	"User"/"USER"
Rock	"Rock"/"ROCK"
Pops	"Pops"/"POPS"
Easy	"Easy"/"EASY"
Top 40	"Top 40"/"TOP 40"
Jazz	"Jazz"/"JAZZ"

NOTE: • User memory: The values set on the <Audio Control>
*   • Each setting value is changed with the <Speaker Setting> First select the speaker*
*   type with the Speaker setting.*

4-18.2.2.5   Audio Control

1. **Select the source for adjustment**
   Press the [SRC] button.

2. **Enter Audio Control mode**
   Press the [AUD] button for at least 1 second.

3. **Select the Audio item for adjustment**
   Press the [FM] or [AM] button.
   Each time the button is pressed the items that can be adjusted switch as
   shown below.

4. **Adjust the Audio Item**
   Press the [|◀◀] or [▶▶|] button.

Adjustment Item	Display	Range
Bass Center Frequency	"Bass F"	60/70/80/100 or 150 Hz
Bass Level	"Bass"/"BAS"	-8 - +8
Bass Q Factor*	"Bass Q"	1.00/1.25/1.50/2.00
Bass Extend*	"Bass EXT"	ON/OFF
Middle Center Frequency*	"MID F"	0.5/1.0/1.5/2.0 kHz
Middle Level	"Middle"/"MID"	-8 - +8
Middle Q Factor	"Middle Q"	1.0/2.0
Treble Center Frequency*	"TRE F"	10.0/12.5/15.0/17.5 kHz
Treble Level	"Treble"/"TRE"	-8 - +8
Balance	"Balance"/"BAL"	Left 15 - Right 15
Fader	"Fader"/"FAD"	Rear 15 - Front 15
Non-Fading Level*	"NF Level"	-15 - +15
Front High Pass Filter*	"HPF F"	Through/40/60/80/100/120/ 150/180/220 Hz
Rear High Pass Filter*	"HPF R"	Through/40/60/80/100/120/ 150/180/220 Hz
Front/Rear High Pass Filter***	"HPF"	Through/200 Hz
Non-Fading Low Pass Filter**	"LPF NF"	50/80/120/Through Hz
"V-Offset"/"V-OFF"	"V-Offset"/"V-OFF"	-8 - ± 0
Loudness	"LOUD"	ON/OFF

NOTE: • *According to the Bass Q Factor setting value, the frequencies that can be set in Bass Center Frequency change as shown below.*

Bass Q Factor	Bass Center Frequency
1.00/1.25/1.50	60/70/80/100
2.00	60/70/80/150

- *When the bass extend is set to ON, low frequency response is extended by 20%.*
- *Volume offset: Each source's volume can be set as a difference from the basic volume.*
- *Loudness: Compensating for low and high tones during low volume.*
- **Function of the KDC-X569/X469*

**Function of the KDC-X569/MP522/MPV622/MPV6022/X469/422/4022
***Function of the KDC-MP522/MPV622/MPV6022/422/4022

5. **Exit Audio Control Mode**
   Press the [AUD] button.

4-18.2.2.6 Speaker Setting
Fine-tuning so that the System Q value is optimal when setting the speaker type.

1. **Enter Standby**
   Press the [SRC] button.
   Select the "ALL OFF" display

2. **Enter Speaker Setting Mode**
   Press the [System Q] button.

3. **Select the Speaker type**
   Press the [| ◀◀] or [▶▶ |] button.
   Each time the button is pressed the setting switches as shown below.

In Speaker Setting Mode

Speaker type	Display
OFF	"SP OFF"
For 5 & 4 in. speaker	"SP 5/4 inch"/"SP 5/4"
For 6 & 6x9 in. speaker	"SP6*9/6inch"/"SP 6*9/6"
For the OEM speaker	"SP O.E.M."/"SP OEM"

4. **Exit Speaker Setting mode**
   Press the [System Q] button.

Function of the KDC-X569/MP522/MPV622/MPV6022/469/422/4022
4-18.2.2.7   Non-Fading Output
Turning the Non-fading output ON or OFF.

Press the [NF] button for at least 1 second.
Each time the button is pressed Non-fading output switches ON or OFF.
When it's ON, "NF ON" is displayed.

4-18.2.2.8   Switching Display
Switching the information displayed.

Press the [DISP] button.
Each time the button is pressed the display switches as shown below.

In Tuner source

Information	Display
Station name	"SNPS"
Frequency	"BAND+FREQ"/"BAND+F"
Clock	

In CD & External disc source
KDC-X569/MP522/MPV622/MPV6022/X469/422/4022:

Information	Display
Track Time	"P-Time"
Disc Name	"DNPS"
Disc Title	"DISC-TITLE"
Track Title	"TRACK-TITLE"

KDC-3022/322:

Information	Display
Disc title (in External disc source)	"D-TITLE"
Track title (In External disc source)	"T-TITLE"
Track number & Play time	"P-TIME"
Disc name	"DNPS"

In MP3 source

Information	Display
Song title & Artist name	"TITLE"
Album name & Artist name	"ALBUM"
Folder name	"FOLDER NAME"
File name	"FILE NAME"
Track number & Play time	"P-Time"
Disc name	"DNPS"
Clock	

In Auxiliary input source

Information	
Auxiliary input name	
Clock	

NOTE: If the Disc title, Track title, Song title & Artist name, or Album name & Artist name is selected when the disc which does not have Disc title, Track title, Song title, Album name, or Artist name is played, track number and play time are displayed.

4-18.2.2.9   Station/Disc Naming (SNPS/DNPS)
Attaching a title to a Station or CD.

1. **Receive/play the station/disc you want to attach a title to**

NOTE: A title can't be attached to a MD.
        Refer to the <Switching Display> and select either "DNPS" or "SNPS"

2. **Enter name set mode**
   Press the [NAME.S] button for at least 2 seconds.
   "NAME SET" is displayed.

3. **Move the cursor to the enter character position**
   Press the [|◀◀] or [▶▶|] button.

4. **Select the character type (KDC-X569/MP522/MPV622/MPV6022/X469/422/4022 only)**
   Press the [▶||] button
   Each time the button is pressed the character type switches as shown below.

Character type
Alphabet upper case
Alphabet lower case
Numbers and symbols
Special characters (Accent characters)

5. **Select the characters**
   Press the [FM] or [AM] button.
   NOTE: Characters can be entered by using a remote with a number buttons.
   Example: If "DANCE" is entered.

Character	Button	Times pressed
"D"	[3]	1
"A"	[2]	1
"N"	[6]	2
"C"	[2]	3
"E"	[3]	2

6. **Repeat steps 3 through 5 and enter the name.**

7. **Exit name set mode**
   Press the [NAME.S] button.

   NOTE: • When operation stops for 10 seconds the name at the time is registered and Name Set mode closes.
   • Memory numbers
   * - External CD changer/player: Varies according to the CD changer/player. Refer to the CD changer/player manual.*
   KDC-X569/X469/MP522/MPV622/MPV6022/4022/422:
   * - FM: 32 stations*
   * - AM: 16 stations*
   * - Internal CD player: 30 discs*
   KDC-3022/322:
   * - FM: 28 stations*
   * - AM: 10 stations*
   * - Internal CD player: 10 discs*
   • The title of station/CD can be changed by the same operation used to name it.

4-18.2.2.10 Auxiliary Input Display Setting

Selecting the display when this device is switched to Auxiliary input source.

1. **Select Auxiliary Input Source**
   Press the [SRC] button.
   Select the "AUX"/"AUX1" display.

2. **Select Auxiliary Input Display Setting Mode**
   Press the [DISP] button for at least 2 seconds.
   This presently selected AUX Name is blinks.

3. **Select the Auxiliary Input Display**
   Press the [◀◀] or [▶▶] button.
   Each time the button is pressed the display switches as shown below.
   • "AUX"/"AUX1"   • "GAME"
   • "TV"   • "PORTABLE"
   • "VIDEO"   • "DVD"

4. **Exit Auxiliary Input Display Setting Mode**
   Press the [DISP] button.

   NOTE: When operation stops for 10 seconds, the name at that time is selected, and Auxiliary input display setting mode closes.

4-18.2.2.11 Theft Deterrent Faceplate
The faceplate of the unit can be detected and taken with you helping to deter theft.

Removing the Faceplate
1. Press the Release button. Drop open the faceplate.
2. Drawing the faceplate to left side pull it to the front and remove it.

⚠️**CAUTION:**
•**The faceplate is a precision piece of equipment and can be damaged by shocks or jolts. For that reason, keep the faceplate in its special storage case while detached.**
• **Do not expose the faceplate or its storage case to direct sunlight or excessive heat or humidity. Also avoid places with too much dust or the possibility of water splashing.**

Reattaching the Faceplate
1. Align the shaft on the unit with the depression on the faceplate.
2. Push the faceplate in until it clicks.
    The faceplate is locked in place, allowing you to use the unit.

4-18.2.2.12 Tuning Mode
Choose the tuning mode.

Press the [AUTO] button.
Each time the button is pressed the Tuning mode switches as shown below.

Auto seek	"Auto1"/ "AUTO 1"	Automatic search for a station.
Preset station seek	"Auto2"/ "AUTO 2"	Search in order of the stations in the Preset memory.
Manual	"MANUAL"	Normal manual tuning control.

4-18.2.2.13 Tuning
Selecting the station.

1. **Select Tuner Source**
    Press the [SRC] button.
    Select the "TUNER" display.

2. **Select the Band**
    Press the [FM] or [AM] button
    Each time the [FM] button is pressed it switches between the FM1, FM2, and FM3 bands.

3. **Tune Up or Down Band**
    Press the [|◄◄] or [►►|] button.
    NOTE: During reception of stereo stations the "ST" indicator is ON.

4-18.2.2.14 Direct Access Tuning (Function of Remote)
Entering the frequency and tuning.

1. **Select the Band**
    Press the [FM] or [AM] button.

2. **Enter Direct Access Tuning Mode**
    Press the [DIRECT] button on the remote.
    "- - - -" is displayed.

3. Enter the Frequency
Press the number buttons on the remote.
Example:

Desired frequency	Press button
92.1 MHz (FM)	[0], [9], [2], [1]
810 kHz (AM)	[0], [8], [1], [0]

Canceling Direct Access Tuning
Press the [DIRECT] button on the remote.

4-18.2.2.15 Station Preset Memory
Putting the station in the memory.

1. Select the Band
Press the [FM] or [AM] button.

2. Select the Frequency to Put in the Memory
Press the [|◂◂] or [▸▸|] button.

3. Put the Frequency in the Memory
Press the desired [1] - [6] button for at least 2 seconds.
The preset number display blinks 1 time.
On each band, 1 station can be put in the memory on each [1]-[6] button.

4-18.2.2.16 Auto Memory Entry
Putting a station with good reception in the memory automatically.

1. Select the band for Auto Memory Entry
Press the [FM] or [AM] button.

2. Open Auto Memory Entry
Press the [AME] button for at least 2 seconds.
When 6 stations that can be received are put in the memory Auto Memory Entry closes.

4-18.2.2.17 Preset Tuning
Calling up the stations in the memory.

1. Select the Band
Press the [FM] or [AM] button.

2. Call Up the Station
Press the desired [FM] or [AM] button

4-18.2.2.18 Playing CD & MP3

When there is no disc inserted

1. Drop open the faceplate
Press the Release button.

2. Insert a Disc.

3. Press the faceplate on the left side, and return it to its former position.

⚠️**CAUTION: When the faceplate has been dropped open, it might interfere with the shift lever or something else. If this happens, pay attention to safety and move the shift lever or take an appropriate action, then operate the unit.**

Do not use the unit with the faceplate in the open condition. If it's used in the open position dust can enter the inside part and cause damage.

NOTE: • *The models that can play MP3 are as follows:*
KDC-X569/MP522/MPV622/MPV6022.
• *When a disc is inserted the "IN" indicator is ON.*

When a Disc is Inserted
Press the [SRC] button.
Select the "CD" display.

Pause and Play
Press the [▶II] button.
Each time the button is pressed it pauses and plays.

Eject the Disc

1. **Drop open the faceplate**
   Press the Release button.

2. **Eject the disc**
   Press the [▲] button.

3. **Press the faceplate on the left side, and return it to its former position.**

⚠️ **CAUTION: 3 in. (8cm) disc can't be played. Using an adapter and inserting them into this unit can cause damage.**

NOTE: The MP3 media that this unit can play are CD-ROM, CD-R, and CD-RW.
The medium formats must be ISO 9660 Level 1, Level 2, Joliet, or Romeo. The methods and precautions to be followed for writing MP3 data are covered in <Notes on playing MP3> found earlier in this manual. Check that section before creating your MP3 media.

4-18.2.2.19 Playing External Disc
Playing discs set in the optional accessory disc player connected to this unit.

Press the [SRC] Button.
Select the display for the disc player you want.
Display examples:

Display	Disc player
"CD2"	CD player
"DISC-CH"	CD changer/MD changer

Pause and Play
Press the [▶II] button.
Each time the button is pressed it pauses and plays.

NOTE: Disc 10 is displayed as "0"
The functions that can be used and the information that can be displayed will differ depending on the external disc players being connected.

4-18.2.2.20 Fast Forwarding and Reversing

Fast Forwarding
Hold down on the [▶▶I] button.
Release your finger to play the disc at that point.

Reversing
Hold down on the [I◀◀] button.
Release your finger to play the disc at that point.

4-18.2.2.21 Track/File Search
Searching for a song on the disc or in the MP3 folder.

Press the [I◀◀] or [▶▶I] button.

4-18.2.2.22 Disc/Folder Search
Disc Search (Function of disc changer)
Folder Search (Function of MP3)

Selecting the disc set in the Disc changer or the folder recorded on the MP3 media.

Press the [DISC-] or [DISC+] button.

4-18.2.2.23 Direct Track/File Search *(Function of Remote)*
(Direct File Search: Function of MP3)

Doing Track/File Search by entering the track/file number.

1. **Enter the track/file number**
   Press the number buttons on the remote.

2. **Do Track/File Search**
   Press the [I◀◀] or [▶▶I] button.

Canceling Direct Track/File Search
Press the [▶II] button.

4-18.2.2.24 Direct Disc Search *(Function of Disc Changers with Remote)*
Doing Disc Search by entering the disc number.

1. **Enter the Disc Number**
   Press the number buttons on the remote.

2. **Do Disc Search**
   Press the [DISC+] or [DISC-] button.

Canceling Direct Disc Search
Press the [▶II] button.
NOTE: Input "0" to select disc 10.

4-18.2.2.25 Track/File/Disc/Folder Repeat
Replaying the song, disc in the Disc changer or MP3 folder you're listening to.

Press the [REP] button.
Each time the button is pressed the Repeat Play switches as shown below.

In CD & External disc source

Repeat play	Display
Track Repeat	"(T-)Repeat ON"/"(T)-REP ON"
Disc Repeat (In Disc Changer)	"D-Repeat ON"/"D-REP ON"
OFF	"Repeat OFF"/"REP OFF"

In MP3 source

Repeat play	Display
File Repeat	"File REP ON"
Folder Repeat	"FOLD REP ON"
OFF	"Repeat OFF"

4-18.2.2.26 Scan Play
Playing the first part of each song on the disc or MP3 folder you are listening to and searching for the song you want to listen to.

1. **Start Scan Play**
   Press the [SCAN] button.
   "Scan ON"/"SCAN ON" is displayed.

2. **Release It When the Song You Want To Listen To is Played.**
   Press the [SCAN] button.

4-18.2.2.27 Random Play
Play all the songs on the disc or MP3 folder in random order.

   Press the [RDM] button.
   Each time the button is pressed Random Play turns ON or OFF.
   When it's ON, "Random ON"/"RDM ON" is displayed.

   NOTE: When the [▶II] button is pressed, the next song select starts.

4-18.2.2.28 Magazine Random Play *(Function of Disc Changer)*
Play the songs on all the discs on the disc changer in random order.

   Press the [M.RDM] button.
   Each time the button is pressed the Magazine Random Play turns ON or OFF.
   When it's ON, "M-Random ON"/"MRDM ON" is displayed.

   NOTE: When The [▶▶II] button is pressed, the next song select starts.

Function of the KDC-X569/KDC-MP522/KDC-MPV622/KDC-MPV6022
4-18.2.2.29 Folder Select (Function of MP3)
Quickly selecting the folder you want to listen to.

1. **Enter Folder Select mode**
   Press the [F.SEL] button.
   "F" is displayed.
   During Select mode the folder information is displayed as shown below.

<Folder name display>
Displays the current folder name.

2. **Select the Folder Level**
   Press the [FM] or [AM] button.
   With the [FM] button you move 1 level down and with the [AM] button 1 level up.

   Selecting a Folder in the Same Level.
   Press the [◄◄] or [▶▶] button.
   With the [◄◄] button you move to the previous folder, and with the [▶▶] button to the next folder.

Returning To the Top Level
Press the [3] button.

3. **Decide the Folder To Play**
Press the [▶II] button.
The Folder Select mode releases, and the MP3 in the folder being
displayed is played.

*NOTE: The methods for moving to other folders in the folder select mode are different
from those in the folder search mode. See <Notes on playing MP3> for more details.*

Canceling the Folder Select Mode
Press the [F.SEL] button.

4-18.2.2.30 Text/Title Scroll
Scrolling the displayed CD text, MP3 text, or MD title.

Press the [DISP] button for at least 1 second.

4-18.2.2.31 DNPP (Disc Name Preset Play) *(Function of Disc Changers with Remote)*
Selecting the CD displayed in the DNPS of the CDs set in the Disc changer.

1. **Enter DNPP Mode**
Press the [DNPP] button on the remote.
When "DNPP" is displayed the DNPS display in order.

Forward/Reverse Display
Press the [DISC-] or [DISC+] button.

2. **When the Disc You Want is Displayed**
Press the [OK] button on the remote.
The disc being displayed is played.

Canceling the DNPP Mode
Press the [DNPP] button on the remote.

4-18.2.2.32 Menu System
Setting during operation beep sound etc. functions. The Menu system basic
operation method is explained here. The reference for the Menu items and their
setting content is after this operation explanation.

1. **Enter Menu Mode**
Press the [MENU] button for at least 1 second.
"MENU" is displayed.

2. **Select the Menu Item**
Press the [FM] or [AM] button.
Example: When you want to set the beep sound select the "Beep"/"BEEP" display.

3. **Set the Menu Item**
Press the [I◀◀] or [▶▶I] button.
Example: When "Beep"/"BEEP" is selected, each time the button is pressed it switches
"Beep ON"/"BEEP ON" or "Beep OFF"/"BEEP OFF". Select 1 of them as the setting.
You can continue by returning to step 2 and setting other items.

4. **Exit Menu Mode**
Press the [MENU] button.

> *NOTE: When other items that are applicable to the basic operation method above are displayed afterwards their setting content chart is entered. (Normally the uppermost setting in the chart is the original setting.)*
> *Also, the explanation for items that aren't applicable (<Manual Clock Adjustments> etc.) are entered step by step.*

4-18.2.2.33 Security Code *<In Standby mode>*
Because authorization by the Security Code is required when it's removed from the vehicle, personalizing this unit is by using the Security Code is a help in prevent theft.

NOTE: When the Security Code function is activated, the code can't be changed and the function can't be released.
Note, the Security Code can be set as the 4 digit number of your choice.

1. **Enter Standby**
   Press the [SRC] button
   Select the "ALL OFF" display.

2. **Enter Menu Mode**
   Press the [MENU] button for at least 1 second.
   When "MENU" is displayed, "Security"/"SECURITY" is displayed.

3. **Enter Security Code Mode**
   Press the [◄◄] or [►►] button for at least 1 second.
   When "ENTER" is displayed, "CODE" is displayed.

4. **Select the Digits to Enter**
   Press the [◄◄] or [►►] button.

5. **Select the Security Code Numbers**
   Press the [FM] or [AM] button.

6. Repeat steps 4 and 5, and complete the Security Code.

7. **Confirm the Security Code**
   Press the [►►] button for at least 3 seconds.
   When "RE-ENTER" is displayed, "CODE" is displayed.

8. Do the step 4 through 7 operation, and reenter the Security Code.
   "APPROVED" is displayed.
   The Security Code function activates.

   NOTE: When the wrong Code is entered in steps 4 through 6, repeat from step 4.

Press the Reset button and when it's removed from the battery power source

1. Turn the power ON.

2. Do the step 4 through 7 operation, and enter the Security Code. "APPROVED" is displayed.
   The unit can be used.

4-18.2.2.34 Touch Sensor Tone
Setting the operation check sound (beep sound) ON/OFF.

Display	Setting
"Beep ON"/"BEEP ON"	Beep is heard.
"Beep OFF"/"BEEP OFF"	Beep is canceled.

4-18.2.2.35 Manual Clock Adjustment

1. **Select Clock Adjustment Mode**
    Press the [FM] or [AM] button.
    Select the "Clock Adjust"/"CLK ADJ" display.

2. **Enter Clock Adjust Mode**
    Press the [◄◄] or [►►|] button for at least 1 second.
    The clock display blinks.

3. **Adjust the Hours**
    Press the [FM] or [AM] button.

    Adjust the Minutes
    Press the [◄◄] or [►►|] button.

4. **Exit Clock Adjustment Mode**
    Press the [MENU] button.

4-18.2.2.36 DSI *(Disabled System Indicator)*

A red indicator will blink on the unit after the faceplate is removed, warning potential thieves.

Display	Setting
"DSI ON"	LED flashes
"DSI OFF"	LED OFF.

Function of the KDC-X569/KDC-MP522/KDC-MPV622/KDC-MPV6022

4-18.2.2.37 Selectable Illumination

Selecting the button illumination color as green or red.

Display	Setting
"Button Red"/"KEY RED"	The illumination color is red.
"Button Green"/"KEY GRN"	The illumination color is green.

4-18.2.2.37 Switching Display Type

Setting the Display type.

Display	Setting
"Display C"/"DISP C"	Demonstration
"Display A"/"DISP A"	Normal display type.
"Display B"/"DISP B"	Silent display type.

4-18.2.2.38 Illumination Color Setting

You can set the display to a desired color.

1. **Select Illumination Color Setting Mode**
    Press the [FM] or [AM] button.
    Select the "COL" display.

2. **The color continues to change gradually**
    Hold down on the [◄◄] [►►|] button.
    Release your finger at the color you want.

    NOTE: Colors adjusted using either [◄◄] or [►►|] will be stored automatically, and they can be called by pressing [5] button.

Quick call up the preset color

Press the desired [1] - [4] button.

Button	Color
[1]	Silky White
[2]	Red
[3]	Blue
[4]	Blue Green

Selecting the Color mode

Press the [6] button.

Each time the button is pressed the Color mode switches as shown below.

Display	Color mode
"Scan"	The color changes in sequence.
"SRC"	The color changes according to the selected source.
"Time"	The color changes every 6 hours.
	Keeps the presently set color.

Blue fine adjustment

1. Press the [3] button for at least 2 seconds.
2. Press the [◄◄] or [►►] button.
   When the blue fine adjustment is completed, press the [3] button.

4-18.2.2.39 Contrast Adjustment

Adjusting the display contrast.

Display and Setting
"Contrast 0"/"CONT 0"
:
.
"Contrast 10"/"CONT 7"

Function of the KDC-X569/MP522/MPV62/MPV6022/X469/422/4022

4-18.2.2.40 Dimmer

Dimming this unit's display automatically when the vehicle light switch is turned ON.

Display	Setting
"Dimmer ON"	The display dims.
"Dimmer OFF"	The display doesn't dim.

Function of the KDC-X569/KDC-X469

4-18.2.2.41 System Q Setting

Setting display/don't display for the System Q factors (Bass center frequency, Bass Q factor, Bass extend, Middle center frequency, Middle Q factor, and Treble center frequency) in Audio control.

Display	Setting
"System Q ON"	The System Q factors are displayed.
"System Q OFF"	The System Q factors aren't displayed.

Function of the KDC-MP522/MPV622/MPV6022/422/4022
4-18.2.2.42 Switching Preout
Switching the preout between the rear and non-fading. (In non-fading it outputs without effect from the fader control.)

Display	Setting
"SWPRE Rear"	Rear preout
"SWPRE N-Fad"	Non-fading preout

Function of the KDC-X569/KDC-X469
4-18.2.2.43 Built-in Amp Mute Setting
<In Standby Mode>
Toggles ON or OFF the mute control on the built-in amplifier. Turning ON this control enhances the preout quality.

Display	Setting
"AMP Mute Off"	The built-in amplifier activates.
"AMP Mute On"	The built-in amplifier deactivates.

4-18.2.2.44 Dual Zone System *<In Sirius Tuner, External disc, or Auxiliary Input Source>*
Makes the sound different for the front channel and rear channel.

Display	Setting
"Zone 2 OFF"	The front and rear are the same source sound.
"Zone 2 ON"	The front and rear are the different source sound.

NOTE: *• When the Dual Zone System is ON, there is only sound effect including Audio control for internal source..*
• When you set the Dual zone system to ON while the non-fading preout is switched ON, the sound of the non-fading preout isn't output.

Function of the KDC-X569/MPV6022/X469/4022
4-18.2.2.45 Dual Zone System Setting *<When the Dual Zone System is OFF>*
Setting the Front channel and Rear channel sound in the Dual Zone System.

Display	Setting
"Zone 2 Rear"	The front is the unit's internal source, and the rear is selected source sound.
"Zone 2 Front"	The rear is the unit's internal source, and the front is selected source sound.

Function of the KDC-X569/KDC-X469
4-18.2.2.46 B.M.S. (Bass Management System)
Adjust the bass boost level of the external amplifier using the main unit.

Display	Setting
"AMP BASS FLT"	Bass boost level is flat.
"AMP BASS +6"	Bass boost level is low (+6dB).
"AMP BASS +12"	Bass boost level is mid (+12dB).
"AMP BASS +18"	Bass boost level is high (+18dB).

NOTE: *• Refer to the catalog or instruction manual for power amplifiers that can be controlled from this unit.*
• For amplifiers there are the model that can be set from Flat to +18 dB, and the model that can be set from Flat to +12 dB. When an amplifier that can only be set to +12 is connected to the unit, "AMP BASS +18" won't work correctly even if it's selected.

Function of the KDC-X569/KDC-X469
4-18.2.2.47 B.M.S. Frequency Offset
Setting the central frequency boosted by B.M.S.

Display	Setting
"AMP Freq NML"	Boost with the normal central frequency
"AMP Freq Low"	Drop the normal central frequency 20%

4-18.2.2.48 CRSC (Clean Reception System Circuit) *<In FM Reception>*
Temporarily have reception switched from stereo to mono to reduce multi-path noise when listening to the FM station.

Display	Setting
"CRSC ON"	The CRSC is ON.
"CRSC OFF"	The CRSC is OFF.

NOTE: Strong electrical fields (such as from power lines) may cause unstable sound quality when CRSC is turned ON. In such a situation, turn it OFF.

4-18.2.2.49 Text Scroll
Setting the displayed text scroll.

Display	Setting
"Scroll Auto"/"SCL AUTO"	Repeats scroll.
"Scroll MANU"/"SCL MANU"	Scrolls when the display changes.

NOTE: The text scrolled is shown below.
- *CD text*　　　　　　　　　　　　*• MD title*
- *Folder name/ File name/ Song title/Artist name/Album*

Function of the KDC-MPV6022
4-18.2.2.50 Built-in Auxiliary input Setting
Set the Built-in Auxiliary Input function.

Display	Setting
"AUX OFF"	When selecting the source there's no Auxiliary input.
"AUX ON"	When selecting the source there's Auxiliary input.

Function of the KDC-X569/KDC-MP522/KDC-MPV622/KDC-MPV6022
4-18-.2.2.51 CD Rear Setting
<In Standby Mode>
When there is a problem playing a CD with special format, this setting plays the CD by force.

Display	Setting
"CD READ 1"	Play CD and MP3.
"CD READ 2"	Play CD by force.

4-18.2.3　Remote Control

4-18.2.3.1　Loading and Replacing the Battery
Use two "AA"-size batteries.
Slide the cover while pressing downwards to remove the battery cover.
Insert the batteries with the + and - poles aligned properly, following the illustration inside the case.

▲WARNING: Store unused batteries out of the reach of children. Contact a doctor immediately if the battery is accidentally swallowed.

⚠️ **CAUTION: Do not set the remote on hot places such as above the dashboard.**

4-18.2.3.2 Basic Operations

[VOL.] Buttons
> Adjusts the volume.

[SRC] Button
> Each time the button is pressed the source switches.
> For the source switching order refer to **<Selecting the Source>**

[ATT] Button
> Turning the volume down quickly.
> When it is pressed again it returns to the previous level.

4-18.2.3.3 Basic Operations in Tuner Source

[FM]/ [AM] Buttons
> Selects the band.
> Each time the [FM] button is pressed it switches between the FM1, FM2, and FM3 bands.

[◄◄] or [►►] Buttons
> Tunes up or down band.

[0] – [9] Buttons
> Press buttons [1] – [8] to recall preset stations.

[DIRECT] Button
> Enters and cancels the <Direct Access Tuning> mode.

4-18.2.3.4 Basic Operations in Disc Source

[◄◄] or [►►] Buttons
> Doing track/file forward and backward

[DISC+]/ [DISC-] Buttons
> Doing disc/folder forward and backward

[►II] Button
> Each time the button is pressed the song pauses and plays.

[DNPP]/ [OK] Button
> Enters and cancels the <DNPP (Disc Name Preset Play)> mode.

[0] – [9] Buttons
> When in <Direct Track/File Search> and <Direct Disc Search>, enter the track/file/disc number.

4-18.2.4 Troubleshooting Guide

What might seem to be a malfunction in your unit may just be the result of slight misoperation or miswiring. Before calling service, first check the following table for possible problems and solutions.

Problem	Possible Cause	Possible Solution
The power does not turn ON.	The fuse has blown.	After checking for short circuits in the wires, replace the fuse with one with the same rating.
There's a source you can't switch.	There's no media inserted.	Set the media you want to listen to. If there's no media in this unit, you can't switch to each source.
	The Disc changer isn't connected.	Connect the Disc changer. If the Disc changer isn't connected to it's input terminal, you can't switch to an external disc source.
The memory is erased when the ignition is turned OFF.	The ignition and battery wire are incorrectly connected.	Connect the wire correctly, referring to the section on **<Connecting Wires to Terminals>** in your system owner guide that came with the unit.
There's no loudness effect.	You're using Non-fading preout.	Loudness has no effect in Non-fading preout.
The Non-Fading output can't be turned ON or OFF.	The <Switching Preout> is set on Rear preout.	Change it to Non-fading preout.
Even if Loudness is turned ON, high-pitched tone isn't compensated for.	Tuner source is selected.	High-pitched tone isn't compensated for when in Tuner source.
The Bass center frequency, Bass quality factor, Bass extend, Middle center frequency, Middle quality factor, and Treble center frequency can't be adjusted.	The **<System Q setting>** is set OFF.	Set it ON.
No sound can be heard, or the volume is low.	The fader or balance settings are set all the way to one side.	Center the fader and balance settings.
	The input/output wires or wiring harness are connected incorrectly.	Reconnect the input/output wires or the wiring harness correctly, refer to the section on **<Connecting Wires to Terminals>** in your system owner guide that came with the unit.
	The values of Volume offset are low.	Increase the values of Volume offset.
	The **<Built-in Amp Mute Setting>** is ON.	Turn it OFF.

Problem	Possible Cause	Possible Solution
The sound quality is poor or distorted.	One of the speaker wires is being pinched by a screw in the car.	Check the speaker wiring.
	The speakers are not wired correctly.	Reconnect the speaker wires so that each output terminal is connected to a different speaker.
Non-fading output, Non-fading Low Pass Filter and Non-fading setting can't be done.	The <Switching preout> is set on Rear preout.	Set it on Non-fading preout.
	The <Non-fading output> is OFF.	Turn it ON.
	The <Dual zone system> is ON.	Turn it OFF.
There's no Front High Pass Filter and Rear High Pass Filter effect.	The Non-fading preout is being used.	There's no effect in Non-fading preout.
The Security Code item isn't displayed in the Menu System.	The Security Code function is already activated.	When the Security Code function is activated it isn't displayed in the menu items.
The Touch Sensor Tone doesn't sound.	The preout jack is being used.	The Touch Sensor Tone can't be output from the preout jack.
The Dimmer function doesn't work.	The Dimmer wire isn't connected correctly.	Check the Dimmer wire connection.
The display color changes subtly.	This is because the temperature is different than the temperature when the setting was done.	The display color condition changes subtly according to the ambient temperature.

Tuner Source

Problem	Possible Cause	Possible Solution
Radio reception is poor.	The car antenna is not extended.	Pull the antenna out all the way.
	The antenna control wire is not connected.	Connect the wire correctly referring to the section on <Connecting Wires to Terminals> in the manufacturers manual.
The desired frequency can't be entered with the Direct Access Tuning.	A station that can't be received is being entered.	Enter a station that can be received.
	You're trying to enter a frequency with a 0.01 MHz unit.	What can be designated in the FM band is to 0.1 MHz.

Disc Source

Problem	Possible Cause	Possible Solution
"AUX1" is displayed without achieving External disc control mode.	Unsupported disc changer is connected.	Make sure a valid disc changer is installed.
The specified disc does not play, but another one plays instead.	The specified CD is quite dirty.	Clean the CD.
	The disc is loaded in a different slot from that specified.	Eject the disc magazine and check the number for the specified disc.
	The disc is severely scratched.	Try another disc instead.
A CD ejects as soon as it is loaded.	The CD is quite dirty.	Clean the CD.
Can't remove disc.	The causeis that more than 10 minutes has elapsed since the vehicle ACC switch was turned OFF.	The disc can only be removed within 10 minutes of the ACC switch being turned OFF. If more than 10 minutes has elapsed, turn the ACC switch ON again and press the Eject button.
The disc won't insert.	There's already another disc inserted.	Press the [▲] button and remove the disc.
Direct Search can't be done.	Another function is ON.	Turn Random Play or other functions OFF.
Track Search can't be done.	For the discs/folders first or last song.	For each disc/folder, Track Search can't be done in the backward direction for the first song or in the forward direction for the last song.

MP3 Source

Problem	Possible Cause	Possible Solution
Cannot play an MP3.	The media is scratched or dirty.	Clean the media, referring to the section on **<CD Cleaning>**.
The sound skips when an MP3 is being played.	The media is scratched or dirty.	Clean the media, referring to the secion on **<CD cleaning>**.
	The recording condition is bad.	Record the media again or use another media.
The MP3 track time isn't displayed correctly.		There are times when it isn't displayed correctly according to the MP3 recording conditions.

In the following situations, consult your nearest service center:
- Even though the disc changer is connected, the Disc Changer source is not ON, with "AUX1" showing in the display during the Changer Mode.

The message shown below displays your systems condition.

Message Displayed	Possible Cause	Possible Solution
Eject/EJECT	No disc magazine has been loaded in the changer. The disc magazine is not completely loaded.	Load the disc magazine properly.
	No CD in the unit.	Insert the CD.
No Disc/NO DISC	No disc has been loaded in the disc magazine.	Load a disc into the disc magazine.
TOC Error/TOC ER	No disc has been loaded in the disc magazine.	Load a disc into the disc magazine.
	The CD is quite dirty. The CD is upside-down. The CD is scratched a lot.	Clean the CD and load it correctly.
E-05	The CD is upsdie down.	Load the CD correctly
Blank Disc/BLANK	Nothing has been recorded on the MD.	
No Track/NO TRACK	No tracks are recorded on the MD, although it has a title.	
E-15	Media was played that doesn't have data recorded that the unit can play.	Use media that has data recorded that the unit can play.
No Panel/NO PANEL	The faceplate of the slave unit being connected to this unit has been removed.	Replace it.
E-77	The unit is malfunctioning for some reason.	Press the reset button on the unit. If the "E-77" code does not disappear, consult your nearest service center.
Mecha Error/MECHA ER	Something is wrong with the disc magazine. Or the unit is malfunctioning for some reason.	Check the disc magazine. And then press the reset button on the unit. If the "Mecha Error"/"MECHA ER" code does not disappear, consult your nearest service center.
Hold Error/HOLD ER	The protective circuit in the unit activates when the temperature inside the automatic disc changer exceeds 60°C (140°F), stopping all operation.	Cool down the unit by opening the windows or turning on the air conditioner. As the temperature falls below 60°C (140°F), the disc will start playing again.
NO NAME	Attempted to display DNPS during the CD play having no disc names preset.	
Load/LOAD	Discs are being exchanged in the Disc changer.	
Reading	The unit is reading the data on the disc.	
NO ACCESS	After setting it in the Disc Changer, DNPP was done without having it been played at least 1 time.	
IN (Blink)	The CD player section is not operating properly	Reinsert the CD. If the CD cannot be ejected or the display continues to flash even when the CD has been properly reinserted, please switch off the power and consult your nearest service center.

4-18.3 Television, Bedroom _____

Your motor home comes with 2, 20" Sony Trinitron® Color TVs mounted in the
motor home.

4-18.3.1 Features
Some of the features you will enjoy include:
- **Flat CRT** – new technologically advanced screen for optimal picture quality.
- **Parental Control** – A tool for parents to help monitor what their children watch on TV by establishing rating limits.
- **Favorite Channel** – Instant access to your favorite channels with the touch of a button.
- **Universal Remote Control** – Program your remote control to operate your connected cable box, VCR, digital satellite receiver, or DVD player.
- **Energy Star®** - a recognized symbol of energy efficiency.
- **S Video** – A video input that offers enhanced picture quality.
- **Direct MTS** – Allows direct access to changing your Multi-Channel TV Sound: Stereo, Mono, or Auto-SAP (Second Audio Program) with the touch of a button.
- **Trilingual Menus** – Choose between English, French or Spanish menus.
- **Front Pad Controls** – Allows access to the on-screen menus without the use of a remote control.
- **Front A/V Inputs** – A quick connection for video games, camcorders, stereo/mono equipment, or headphones.

IMPORTANT NOTE: When using two remotes with two receivers you must program second remote to a different address.

To program 2nd remote:
1. Press MENU
2. Go into System Setup
   Preferences
   Receiver I.D.
   Hold down the SAT & MUTE keys at the same time for 2 minutes.
   Enter 005 and press SAT key (this will lock address in remote)
   Press Select key and this will lock address in receiver.
   This will change receiver I.D. from 01 to 05
   Exit out of MENU
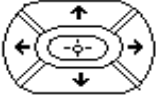
NOTE: Second remote should be already programmed in the coach upon delivery. If however, programming is lost or if you are still experiencing interference with the second remote, you can program remote to a different frequency such as 006 or higher to alleviate problem. Follow same steps as above replacing 005 with 006. This will change receiver I.D. from 01 to 06 or whatever number you program in. Do not program second remote any lower than 005, you will still encounter interference.

If you need customer assistance call Hughes Consumer Center at 800-274-8995 for help.

4-18.3.2   Remote Control

This section shows you how to use the more advanced buttons on the remote control and how to use the on-screen menus.

NOTE: If you should lose your remote see "Troubleshooting" later on in this section.

Button	Description
MUTING	Instantly turns off the sound. Press again or press VOL to restore sound.
SYSTEM OFF	Powers off all Sony equipment at once, (may not work with older equipment)
TV/VTR	Press when you are finished using a VCR and you want to switch to the TV input. Your VCR power will remain on.
PICTURE MODE	Cycles through the available Video Mode settings.
SLEEP	Turns the TV off automatically in approximately 15, 30, 45, 60, 90, or 120 minutes. Cancel by pressing until SLEEP OFF appears.
JUMP	Alternates between the last two channels selected with the ⓪-⑨
TV/SAT	Cycles through available Steady Sound settings.
RESET	Press to return to factory settings while in an on-screen menu.
VOL (volume)	Press when you want to adjust the volume.
CODE SET	Use to program your remote control to operate connected video equipment.
POWER	Press when you want to turn connected equipment on and off.
FUNCTION	Press when you want to control connected equipment on and off.
VCR/DVD (operating)	Operates VCR or DVD. Use when you want to operate connected VCR or DVD with your remote control.
TV/VIDEO	Cycles through available video inputs.
DISPLAY	Press once to show current time, (if set) and channel number. Press again to turn DISPLAY off.
MTS/SAP	Cycles through the Multi-Channel TV Sound (MTS) options: stereo, mono, and auto-SAP (Second Audio Programming).
⓪-⑨ AND ENTER	Change channels directly, and enter numerical values in on-screen displays.
GUIDE	Brings up the custom guide of your satellite receiver.
(arrow pad)	Moves the cursor in the on-screen menus. Press the arrow buttons to move the cursor. Press the center button to select or access an option.
MENU	Displays the on-screen menu. Press again to exit the menu at any time.
CH (channel)	Press when you want to change channels.

4-18.3.3 Setting Up the TV Automatically

After you have finished connecting your TV, you can perform Auto Program to set up your channels.

1. Press ⓟ (POWER TV) to turn on the TV. The Initial Setup screen appears. See *fig. 11* below.

```
Auto Programm    [CH+]
Exit             [CH-]

First please connect
cable/antenna
```
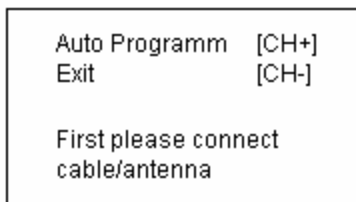**Fig. 11**

2. Press the TV FUNCTION button.

3. Press ⊕ (CH +) on the remote control or in the TV front panel to perform

Auto Program or press ⊖ (CH -) to exit.

NOTE: The Initial Setup screen appears each time you turn on the TV until you perform Auto Program.

To Perform Auto Program Again

1. Press .

2. Press → to highlight Setup ( ).

3. Press ↓ to highlight Options. Press ⊕ to select.

4. Press ↓ to select Cable. Press ⊕ to select.

5. Press ↑ or ↓ to select ON or OFF according to how you connected your TV. Press ⊕ .

6. Press ↓ to highlight Auto Program. Press ⊕ to search for channels.

NOTE: After performing Auto Program, Press ⊂⊃ to exit.

4-18.3.4 Using Your On-Screen Menus

There are six on-screen menus for you to use. They are the **Video, Audio, Channel Setup, Parental Control, Timer** and **Setup** menus. To access these menus follow the basic 5 steps below.

To access a menu

1. Press ⊂⊃ to display the on-screen menu.

2. Use the ← or → buttons to highlight the desired menu, then press ⊕ .

3. Use the ↑ or ↓ buttons to highlight the desired option, then press ⊕ .

4. Press ⊕ to complete the adjustment.

5. Press ⊂⊃ to exit the menu.

4-18.3.5 Video Menu

Allows you to make adjustments to your picture settings. The Mode menu lets you customize your picture viewing. **Vivid** – select this for enhanced picture contrast and sharpness. **Movie** - select for a finely detailed picture. **Sports** – select for a bright picture. **Standard** – select for a standard picture. **Picture Controls** allows you to fine tune the picture to your liking. Using the ←and → you can control the picture, brightness, color, hue and sharpness. **VM (Velocity Modulation)** - Sharpens picture definition to give objects a sharp, clean edge. Use the ↑ or ↓ buttons to select from one of the following options: OFF, High, Low.

NOTE: When you change the Mode setting the VM setting may also change automatically.

4-18.3.6 Audio Menu

Allows you to make adjustments to the sound quality of your TV. Using the ← or → allows you to make adjustments to the Treble, Bass and Balance of your system. Steady Sound – This stabilizes volume. Press ↑or ↓ to select one of the following options: ON: Select to stabilize the volume when changing channels. OFF: Select to turn Steady Sound off.

NOTE: Press ♪‿ *TV/SAT for direct Steady Sound settings.*
Effect: Press ↑ or ↓ to select one of the following options:
        SRS: Produces a dynamic three dimension sound for stereo audio signals,
        (KV-24FV12 only).
        Simulated: Simulates theater quality sound for stereo programs, (KV-24FV12 only).
        Surround: Add a surround-like effect to mono programs, (KV-20FV12 only).
        Off: Normal stereo or mono reception.

The Video Menu has 3 options to select from: **MTS, Speaker** and **Audio Out.**

        MTS Multi-Channel Sound: Press ↑ or ↓ to select one of the following options:
        Stereo: Select when viewing a broadcast in stereo.
        Mono: Select to reduce noise in areas of poor reception.
        Auto-SAP: Select to have the TV automatically to a Second Audio Program
        (SAP) when a signal is received.

        Speaker (Custom selection of audio output source): ON: Select to listen to the sound from the
        TV speakers with or without a separate stereo system. OFF: Select to turn off the TV speakers
        and listen to the TV's sound only through external audio system speakers.

        Audio Out (use to control the TV's volume through a stereo): Audio Out can only be set when
        speakers are set to OFF.
        Variable: Adjust the volume through your TV.
        Fixed: Adjust the TV volume through a connected stereo.

*NOTE: If your TV is set to Auto-SAP, some programs may be muted or distorted. If your TV does
not output sound, change your Audio setting to Stereo or Mono.*

NOTE: Press MTS/SAP‿ *for direct MTS settings (Stereo, Mono, Auto-SAP).*

NOTE: Audio Out can only be set when Speaker is set to OFF.

4-18.3.7   Channel Setup Menu

Allows you to customize your channel settings.
Favorite Channel (Quick access to favorite channels) – With the Favorite Channel
menu open:
                1. Press ⊕ to select.
                2. Use the ↑ or ↓ buttons to select Auto or Manual (selecting Auto will display in gray
                    the last five channels accessed by the ⓪-⑨ buttons).
                3. When in Manual, press ← then ↓ to select the position (1-5) where you want to set
                    a favorite channel. Then press ⊕ .
                4. Using the ↑ or ↓ buttons, select the desired channel.
                5. Press ⊕ then MENU‿ , the TV will change to the channel entered.

*NOTE: To use Favorite Channel: Exit all menus and press ⊕ . Press ↑ or ↓ to move the cursor to
the desired channel number and press ⊕ .*

        Channel Fix –
                2-6: Select when you want to control all channel selection through a cable box or
                VCR. Select the appropriate channel (usually 3 or 4) and use the cable box's or
                VCR's remote control for channel selection.
                Video: Select from available video inputs when you have connected video
                Equipment (e.g. satellite receiver) and you want your TV fixed to it.
                OFF: Channel Fix is not set.

Channel Skip/Add – Use this feature after you run Auto Program to skip unwanted channels or add new ones.

1. Use the ⓪-⑨ buttons or the [CH +/-] button to select the channel, then press ⊕ .
2. Press ⊕ to Skip or Add (only one option will be available).

Channel Label (Label up to 40 channels with their call letters) – With the Channel Label window open:

1. Press ⊕ , then press ↑ or ↓ until you reach the desired channel number.
2. Press ⊕ to activate the channel.
3. Press ↑ or ↓ to display the first call letter or number of the caption and press ⊕ to select it. When finished, press ⊕ to activate.

NOTE: Favorite Channel, Channel Ski/Add, and Channel Label cannot be used when Channel Fix is set.

4-18.3.8   Parental Control

The Parental Control feature is designed to help parents monitor what their children watch on television. This section shows you the different rating systems available and how to set your TV's rating limit.

Overview of the Ratings – Once you have become familiar with these rating systems, you should be ready to set your TV's rating limit.

TV Ratings – The TV ratings are divided into two groups: age-based and content-based. *See fig. 12*.
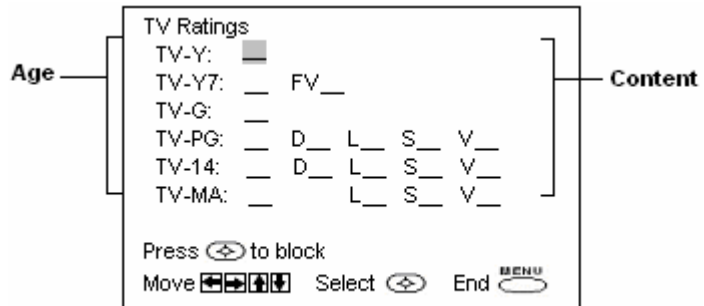
Fig. 12

TV-Y	All Children	**FV**	Fantasy Violence
TV-Y7	Directed to older children	**D**	Suggestive dialogue
TV-G	General Audience		
TV-PG	Parental Guidance suggested	**L**	Strong language
		S	Sexual situations
TV-14	Parents cautioned	**V**	Violence
TV-MA	Mature Audience only		

NOTE: The content ratings will increase depending on the level of the age-based rating. For example, a program with a TV-PG V (Violence) rating may contain moderate violence, while a TV-14 V (Violence) rating may contain intense violence.

Movie Ratings (U.S. models only) – This system defines the rating levels of movies shown in theaters and on prime cable channels. *See fig. 13*.

Rating	Defined as
G	General Audiences
PG	Parental Guidance suggested
PG-13	Parents strongly cautioned
R	Restricted
NC-17	No one 17 under admitted
X	Adult audience only
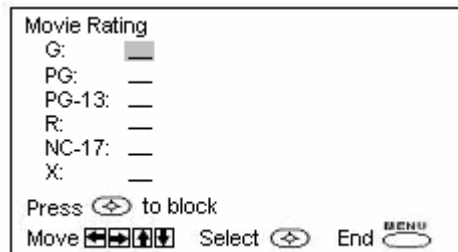
Fig. 13

Unrated (U.S. models only) – You have the option of blocking TV programs or movies that are not rated. *See fig. 14*.

View all	Allows all unrated programs
Block All	Blocks all unrated programming
Block TV	Blocks all unrated TV Programs
Block Movies	Blocks all unrated movies
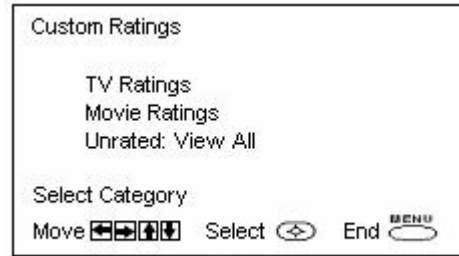
Fig. 14

English Ratings (Canadian models only) – These ratings are for Canadian programs that are broadcast in English. *See fig. 15*.

Rating	Defined as
C	Children
C8+	Children 8 years and older
G	General programming
PG	Parental Guidance
14+	Viewers 14 and older
18+	Adult programming
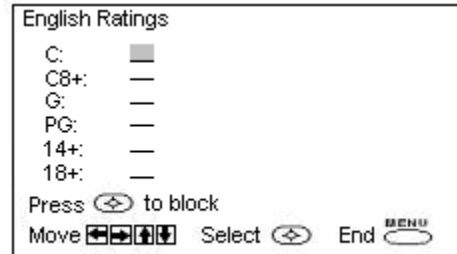
Fig. 15

French Ratings (Canadian models only) – These ratings are for Canadian programs that are broadcast in French. *See fig. 16*.

Rating	Defined as
G	General
8 ans+	Not recommended for younger children
13 ans+	Not recommended for children under age 13
16 ans+	Not recommended for ages under 16
18 ans+	This program is restricted to adults
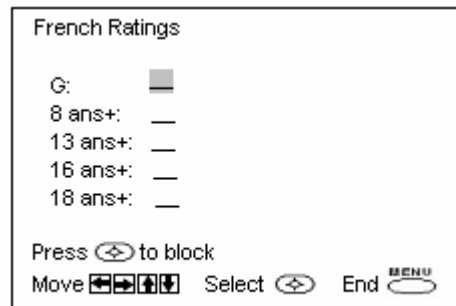
Fig. 16

U.S.A. Ratings (Canadian models only) – For programs from the United States. Please see "TV Ratings" found earlier in this section.

4-18.3.9   Setting Up Your Password

In the Parental Control Menu, you will be asked to set a 4-digit password for any further access into Parental Control. To do this simply:

1. Press ⊕, then use the ⓪-⑨ buttons to enter a 4-digit password.

   NOTE: Keep this manual in a safe place. If you forget your password see Troubleshooting section.

2. Confirm your password by entering it again.
   Once your password is set correctly, the next Parental Control menu appears.

4-18.3.10   Setting the Rating

You can change the Rating by selecting one of the Lock options.

1. Move the cursor to Lock and press ⊕.
    If you are not familiar with the Parental Guidelines rating system, use one of the following preselected categories to simplify the rating selections, Child, Youth, Young Adult.

2. Use the ↑or ↓ buttons to select the desired rating and press ⊕.

Rating	TV will allow a maximum rating of:
Child	TV-Y, TV-G, G (U.S. models only), G (Canadian models only)
Youth	TV-PG, PG (U.S. models only), PG (Canadian models only)
Young Adult	TV-14, PG-13 (U.S. models only), 14+ (Canadian models only)
Custom	Select to set more restrictive ratings (see next section)
OFF	No rating limit

4-18.3.11   Using the Custom Menu

Before setting Custom ratings, see the **"Overview of the Ratings"** section earlier in this manual for a description of the available rating systems.

Follow the instructions on the screen to make your custom ratings.

NOTE: Once you have blocked a rating or content, all higher ratings or content will be automatically blocked.

4-18.3.12   Changing Your Password

1. Use the ↑ or ↓ buttons to move the cursor to Change Password and press ⊕.

2. Follow steps 1 and 2 for "Setting Up Your Password" on previous page.

Information for Parents - To view a program that exceeds the TV rating

Press $\overset{\text{ENTER}}{\bigcirc}$, then use the ⓪-⑨ buttons to enter your password.

NOTE: Entering your password to view a blocked program will temporarily turn Lock to OFF. To reactivate your Lock settings, turn the TV off and then back on. The TV will return to the settings that you have selected.

4-18.3.13   Using the Timer Menu

This allows you to set the clock on your TV and program scheduled viewing using Timer 1 and Timer 2.

Current Time

1. Press ↑ or ↓ to select the current time, the press ⊕. (If you are in Daylight Savings Time, be sure to set the Daylight Saving mode in "Yes").
2. Press ↑ or ↓ to enter the correct time, then press ⊕.

3. Press MENU ⬭ to exit the menu.

Timer 1 and Timer 2 (Scheduled viewing) – With the menu open, set cursor on Timer 1 or Timer 2:

1. Press ↑ or ↓ to select Timer 1 or Timer 2, then press ⊕.
2. Press ↑ or ↓ to enter your time and channel of preference, then press ⊕.
3. Press MENU ⬭ to exit the menu.

NOTE: You must set the Current Time before you can use Timer 1 and Timer 2.

NOTE: You can set the Timer to ON, OFF, or Set. Once the timer is set, you can turn it on or off without having to go through the settings.

4-18.3.14   Daylight Savings

YES: Select in spring to compensate for Daylight Saving.
NO: Select in fall at the end of Daylight Saving.

NOTE: When you perform Auto Program, all Timer 1 and Timer 2 settings will be cleared.

NOTE: Any loss of power will cause Current Time, Timer 1 and Timer 2 settings to be cleared.

4-18.3.15   Using the Setup Menu

Allows you to program your channels, label video inputs, select menu languages, or run a demo of the menus.

Caption Vision (Closed Captioning) – Allows you to select from three closed caption modes (for programs that are broadcast with closed caption).

Press ↑ or ↓ to select one of the following options:
CC1, 2, 3, 4: Displays printed dialogue and sound effects of a program.
TXT1, 2, 3, 4: Displays network/station information.
XDS (Extended Data Services): Displays information about the network and current program, if available.
OFF: Caption vision is not activated.

Video Label (Label connected equipment) – With the Video Label window open:

1. Press ↑ or ↓ to access the input you want to label and press ⊕.
2. Press ↑ or ↓ to choose a label and press ⊕.

Language – Display all menus in your language of choice.

Use the ↑ or ↓ buttons to select desired language and press ⊕.

Demo – Press ⊕ to run a demonstration of the on-screen menus.

4-18.3.16   Options Menu

The Options menu offers other setup options.

Cable
ON: Select if you are receiving cable channels with a CATV cable.
OFF: Select if you are using a TV antenna.

NOTE: After changing your cable settings, you will need to perform Auto Program.

Auto Program – Perform Auto Program whenever setting up your TV. It will cycle through all available channels and program receivable channels.

Tilt Correction – Press ↑ or ↓ to correct any tilt of the picture from -5 to +5, and then press ⊗ to activate.

4-18.3.17   Programming the Remote Control

You can use the supplied remote control to operate Sony or non-Sony video equipment.

CODESET
1. Press ⬭ .

VTR/DVD   SAT/CABLE
2. Press ⬭ or ⬭ (FUNCTION).

3. Use the ⓪-⑨ buttons to key in the code number from the following chart.

ENTER
4. Press ◯ .

VCR Codes

Admiral (M. Ward)	327	NEC	314, 336, 337
Aiwa	338, 344	Olympic	309, 308
Audio Dynamic	314, 337	Optimus	327
Broksonic	319, 317	Panasonic	308, 309, 306, 307
Canon	319, 317	Pentax	305, 304
Citizen	332	Philco	308, 309
Craig	302, 332	Philips	308, 309, 310
Criterion	315	Pioneer	308
Curtis Mathis	304, 338, 309	Quasar	308, 309, 306
Daewoo	341, 312, 309	RCA/PROSCAN	304, 305, 308, 309, 311, 312, 313, 310, 329
DBX	314, 336, 337	Realistic	309, 330, 328, 335, 324, 338
Dimensia	304	Sansui	314
Emerson	319, 320, 316, 317, 318, 341	Samsung	322, 313, 321
Fisher	330, 335	Sanyo	330, 335
Funai	338	Scott	312, 313, 321, 335, 323, 324, 325, 326
General Electric	329, 304, 309	Sharp	327, 328
Go Video	322, 339, 340	Shintom	315
Goldstar	332	Signature 2000 (M. Ward)	338, 327
Hitachi	306, 304, 305, 338	Sony	301, 302, 303
Instant Replay	309, 308	SV2000	338
JCPenney	309, 305, 304, 330, 314, 336, 337	Sylviania	308, 309, 338, 310
JVC	314, 336, 337, 345, 346, 347	Symphonic	338
Kenwood	314, 336, 337, 345, 346, 347	Tashiro	332
LXI (Sears)	332, 305, 330, 335, 338	Tatung	314, 336, 337
Magnavox	308, 309, 310	Teac	314, 336, 338, 337
Marantz	314, 336, 337	Technics	308, 309
Marta	332	Toshiba	312, 311
Memorex	309, 335	Wards	327, 328, 335, 331, 332
Minolta	305, 304	Yamaha	314, 330, 336, 337
Mitsubishi/MGA	323, 324, 325, 326	Zenith	331
Multitech	325, 338, 321		

Cable Box Codes

Hamlin/Regal	222, 223, 224, 225, 226
Jerrold/G.I.	201, 202, 203, 204, 205, 206, 207, 208, 218
Oak	227, 228, 229
Panasonic	219, 220, 221
Pioneer	214, 215
Scientific Atlanta	209, 210, 211
Tocom	216, 217
Zenith	212, 213

Satellite Receiver Codes

Sony	801
General Electtric	802
Hitachi	805
Hughes	804
Panasonic	803
RCA/PROSCAN	802, 808
Toshiba	806, 807

Laser Disc Player Codes

Sony	701
Panasonic	704, 710
Pioneer	702

DVD Codes

Sony	751
Panasonic	753
Pioneer	752
RCA	755
Toshiba	754

NOTE: If more than one code number is listed, try entering them one by one until you come to the correct code for your equipment.

NOTE: Whenever you remove the batteries the code numbers may revert to the factory setting and must be reset.

NOTE: In some rare cases, you may not be able to operate your equipment with the supplied remote control. In this case, use the equipment's supplied remote control.

Operating a VCR

Press	To
VTR/DVD	Power on the VCR
⓪-⑨	Select channels directly
CH⊕ CH⊖	Change channels
▶	Play video tape
■	Stop
◀◀ or ▶▶	Search forward or backward
❚❚	Pause
● and ▶ at the same time	Record
TV/VTR +○	Change between VCR and TV inputs

Operating a DVD

Press	To
VTR/DVD	Power on the DVD
⓪-⑨	Select chapters directly
CH⊕ CH⊖	Search chapters forward or backward
▶	Play DVD
■	Stop
❚❚	Pause
⬆,⬇,⬅,➡	Move the cursor in the menu
MENU	Display the DVD menu

Operating a Laser Disc

Press	To
VTR/DVD	Power on the laser disc
CH⊕ CH⊖	Search chapters forward or backward
▶	Play disc
■	Stop
❚❚	Pause

4-18.3.18   Troubleshooting

If you are having a problem with your TV, try the suggestions below. If the problem persists, contact your nearest Sony dealer.

No picture, no sound	❑ Make sure the power cord is plugged in.
	❑ If a red light is flashing on the front of your TV for more than a few minutes, disconnect and reconnect the power cord to restore the TV. If the problem continues, call your local service center.
	❑ Check the TV/VIDEO settings when watching TV, set to TV; when watching video equipment, set to VIDEO.
	❑ Make sure the batteries have been inserted correctly into the remote control.
	❑ Try another channel, it could be station trouble.
Poor or no picture, good sound	❑ Adjust Picture in the Video menu.
	❑ Adjust Brightness in the Video menu.
	❑ Check the antenna and/or cable connections.
Good picture, no sound	❑ Press ⏺MUTING so that MUTING disappears from the screen.
	❑ Check your Audio settings. Your TV may be set to Auto-SAP.
No color	❑ Adjust Color in the Video menu.
Only snow appears on the screen	❑ Check the Cable setting in the Options menu under Setup.
	❑ Check the antenna and/or cable connections.
	❑ Make sure the channel selected is currently broadcasting.
Dotted lines or stripes	❑ Adjust the antenna.
	❑ Move the TV away from other electronic equipment. Some electronic equipment can create electrical noise, which can interfere with TV reception.
Double images or ghosts	❑ Check your outdoor antenna or call your cable service.
Cannot receive higher number channels (UHF) when using an antenna	❑ Make sure Cable is set to OFF in the Options menu under Setup.
	❑ Perform Auto Program to add channels that are not presently in the memory.
Cable stations don't seem to work	❑ Make sure Cable is set to ON in the Options menu under Setup
	❑ Perform Auto Program to add channels that are not presently in the memory.
Remote control does not operate	❑ Batteries could be weak. Replace them.
	❑ Move the TV 3-4 or more feet away from fluorescent lights.
The TV needs to be cleaned	❑ Clean the TV with a soft dry cloth.Never use strong solvents such as thinner or benzine, which might damage the finish of the cabinet.
Lost password for Parental Control	❑ In the password screen, enter the following master password: 4357. After using the master password, you must create a new password, it cannot be used to unlock currently blocked channels.
You lost your remote control	You can use the front Audio/Video panel controls to access the menu. Press ⏺MENU to open the menu. Use the ⏶ and ⏷ buttons on the front Audio/Video panel instead of the ⏶and⏷ buttons on the remote control.
	❑ Use the ⊕ button on the front Audio/Video panel instead of the ⇦,⇨, and ⊕ buttons on the remote control. Press ⏺MENU again when the setting or adjustment is complete. Contact your nearest Sony dealer to order a replacement.

If, after reading these Operating Instructions, you have additional questions related to the use of your Sony television, please call our Direct Response Center at 1-800-222-SONY (7669) (U.S. residents only) or (416) 499-SONY (7669) (Canadian residents only).

4-18.4 Television, Front Overhead

The coach comes equipped with a 37" Panasonic Wide Plasma Display television set with remote control mounted in the pilot/co-pilot area.

Remote control uses two AA batteries. For best results use Alkaline batteries for longer life.

4-18.4.1 Power On/Off

Connecting the Plug To the Wall Outlet
Push the POWER switch on the Plasma Display to turn the set on POWER-ON. *See Fig. 17*.

> Power Indicator: Green

When the POWER is turned on for the first time, the LANGUAGE selection screen is displayed.

From the second time on, language selection can be done from the setup menu.

Main Power On/Off Switch

Power Indicator
The Power Indicator will light.
- Power-OFF. . .Indicator not illuminated (The unit will still consume some power as long as the power cord is still inserted into the wall outlet.)
- Stand-by ⏻ . . .Red
- Power-ON . . . Green

Input Button
(Video (S Video)/Component, RGB/PC Mode Selection)
Push the "INPUT" button to select VIDEO (S VIDEO)/COMPONENT or RGB/PC input signal modes sequentially.

Volume Adjsutment
Push the Volume Up "+" or Down "--" button to increase or decrease the sound volume level.

Fig. 17

See Setting the On-Screen Menu Language section later in this manual.

Select the desired language using the ▲ and ▼ keys and press the ACTION button.

Press the ⏻ button on the remote control to turn the Plasma Display off.

> Power Indicator: Red (standby)

Press the ⏻ button on the remote control to turn the Plasma Display on

> Power Indicator: Green

To turn the power for the Plasma Display off, press the ⏻ switch on the Plasma Display, when the Plasma Display is on or in standby mode.

4-18.4.2 Selecting the Input Signal
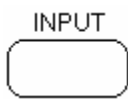
INPUT

Press the INPUT button to select the input video signal desired from equipment such as a VCR which has been connected to the Plasma Display.
Input signals will change as follows:

For COMPONENT INPUT see Component/RGB in Select section later in this manual.
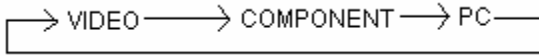
For RGB INPUT see Component/RGB in Select section later in this manual.
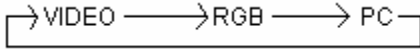
4-18.4.3 Selecting the On-Screen Menu Language
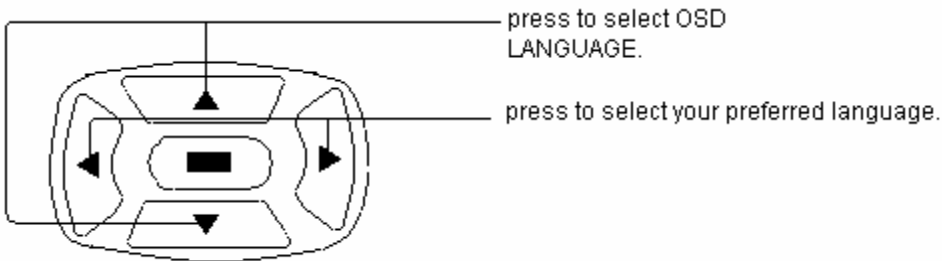
Fig. 18

To select desired language press one of the two OSD LANGUAGE arrows and then press one of the other two arrows to select language. You can choose from English (UK), Deutsch, Français, Italiano, Español, ENGLISH (US) or Chinese.

4-18.4.4 ASPECT Controls

The Plasma Display will allow you to enjoy viewing the picture at its maximum size, including wide screen cinema format picture.
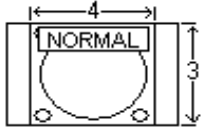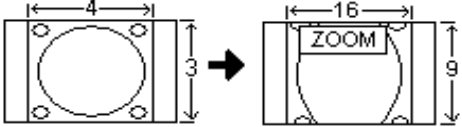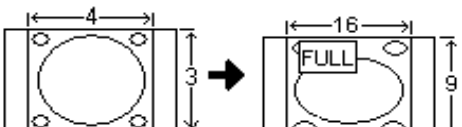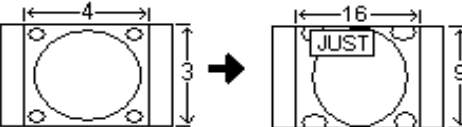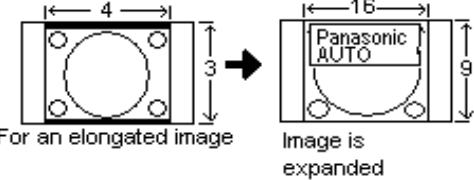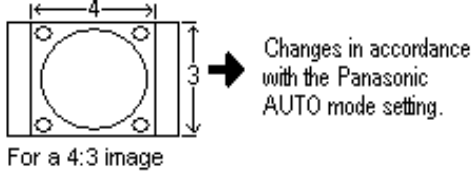
ASPECT Button
The aspect mode changes each time the ASPECT button is pressed.
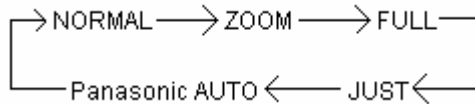
NOTES:
1. **During RGB and PC input signal modes, the mode switches between "NORMAL", "ZOOM" and "FULL" only.**
2. **For a 525p (480p) signal input during "COMPONENT" input signal mode, the mode switches between "ZOOM" and 'FULL" only.**
3. **For a 1125i (1080i), 750p (720p) signal input during "COMPONENT" input signal mode, the mode is set to "FULL" MODE" and switching is not possible. For a 525i (480i), 625i (576i) signal input during "COMPONENT" input signal mode,"Panasonic Auto" can not be selected.**
4. **The aspect mode is memorized separately for each input terminal (VIDEO, COMPONENT, RGB and PC).**

Mode	Picture	Explanation
NORMAL		NORMAL will display a 4:3 picture at its standard 4:3 size.
ZOOM		ZOOM mode magnifies the central section of the picture.
FULL		FULL will display the picture at its maximum size but with slight elongation.
JUST		JUST mode will display a 4:3 picture at its maximum size but with aspect correction applied to the center of the screen so that elongation is only apparent at the left and right edges of the screen. The size of the picture will depend on the original signal.
Panasonic AUTO	For an elongated image / Image is expanded / For a 4:3 image / Changes in accordance with the Panasonic AUTO mode setting.	The display will automatically become enlarged (depending on the picture source), allowing you to view the picture at its maximum size. **Note:** Panasonic AUTO mode is designed to automatically adjust the aspect ratio to handle a mix of 16:9 and 4:3 program material. Certain 4:3 program material, such as stock market data screens, may occasionally cause the image size to change unexpectedly. When viewing such programs, it is recommended that the ASPECT be set to NORMAL.

NOTES:
1. **Do not allow 4:3 mode to be displayed for an extended period, as this can cause a permanent after image to remain on the Plasma Display Panel.**
2. **The S VIDEO terminal on this set can detect specially encoded signals that are compatible with a wide screen monitor. When a full range from the S VIDEO terminal of specially encoded video is detected by the set, the screen size is automatically set to FULL mode.**

4-18.4.5 Adjusting PICTURE POS./SIZE

See figs. 19-22

1

PICTURE POS. / SIZE

Press to display the PICTURE POS./ SIZE menu

Fig. 19

2

Press to select H-POS/H-SIZE/V-POS/ V-SIZE/CLOCK PHASE
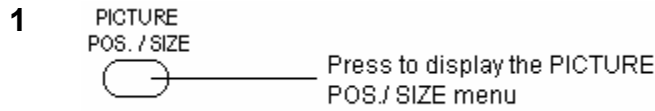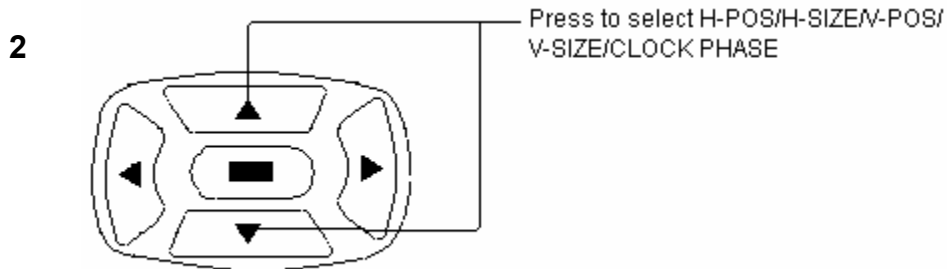
Fig. 20

During "VIDEO" and "COMPONENT" input signals choose V-POS. During "RGB" and "PC" input signal modes choose H-SIZE.

3

Press to adjust POS./SIZE.

Fig. 21

R

Press to exit from adjust mode.
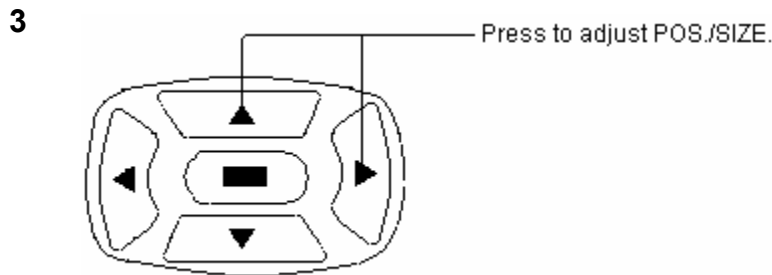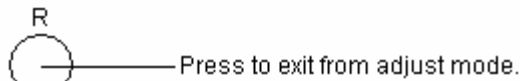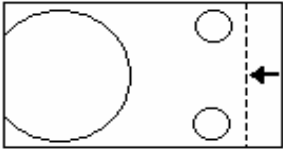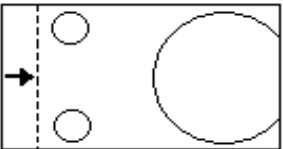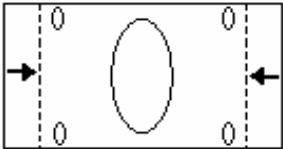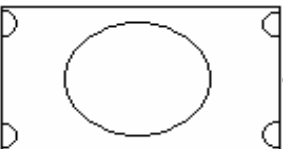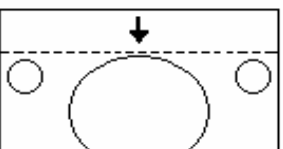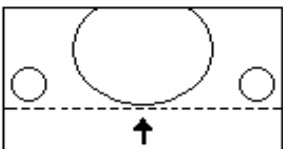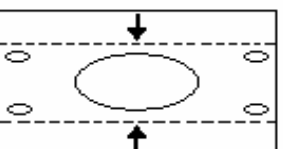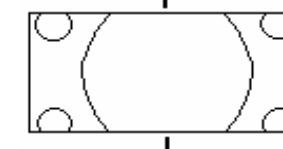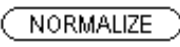
Fig. 22

NOTES:
1. **Adjustment details are memorized separately for different input signal formats (Adjustments for component signals are memorized for 525i (480i), 625i (576i), 525p (480p), 1125i (1080i) and 625p (576p), 750p (720p) each, and RGB/PC signals are memorized for each frequency.)**
2. **If a "Cue" or "Rew" signal from a VCR or DVD player is received, the picture position will shift up or down. This picture position movement cannot be controlled by the PICTURE POS./SIZE function.**

H-POS	When the Position Left"◄" button is pressed	When the Position Right "►" button is pressed
H-SIZE	When the Position Left "◄" button is pressed	When the Position Right "►" button is pressed
V-POS	When the Position Left "◄" button is pressed	When the Position Right "►" button is pressed
V-SIZE	When the Position Left "◄" button is pressed	When the Position Right "►" button is pressed
CLOCK PHASE (RGB/PC in Mode)	Flickering and distortion can be eliminated by using the Position Left "◄" or Right "►" button to carry out adjustment.	

Helpful Hint (ⓝ **/** (NORMALIZE) **Normalization)**

While the PICTURE POS./SIZE display is active, if either the ⓝ
button) on the remote control is pressed at any time or the

(ACTION button) is pressed during "NORMALIZE", then all
adjustment values are returned to the factory settings.

4-18-4.6 Sound Adjustment

1

Fig. 23

2   Select to adjust each item.

Fig. 24
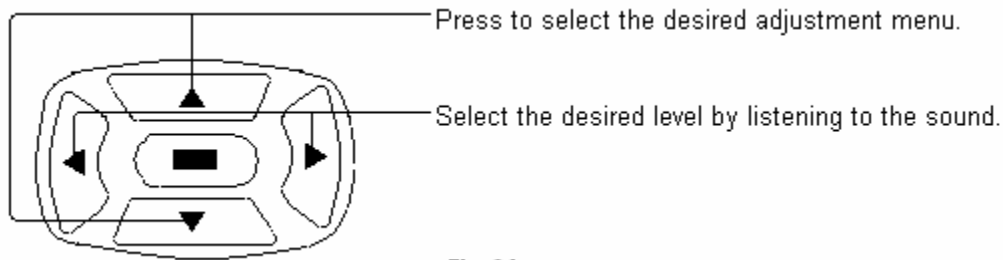
BASS – Adjusts low sounds.

TREBLE – Adjusts high sounds.

BALANCE – Adjusts left and right volumes.
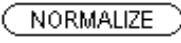
SURROUND – (See Surround Controls Section later in this manual) Select ON or OFF.

 Press the R button to end adjustments.

STANDARD   Emits the original sound.

AUTO   Automatically controls proper volume level.

NOTE: Press the SURROUND button to directly turn the surround effect ON and OFF.

 Helpful Hint (**/** NORMALIZE   **Normalization)**

While the "SOUND" menu is displayed, if either the (N button) on the remote control is pressed at any time or the (ACTION

button) is pressed during "NORMALIZE", then all adjustment values are returned to the factory settings.

4-18.4.7   Mute

Useful when answering the phone or receiving unexpected visitors.

Press this button to mute the sound.
Press again to restore sound. Sound is also restored
when power is turned off or volume level is changed.

4-18.4.8   Surround Controls

SURROUND Button
The benefits of surround sound are enormous. You can be completely enveloped in sound; just as if you were at a concert hall or cinema.

The surround setting switches on and off each time the SURROUND button is pressed
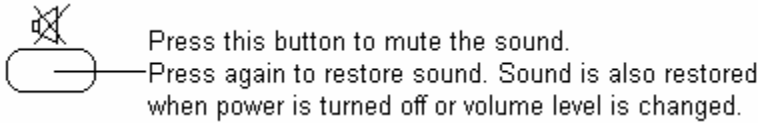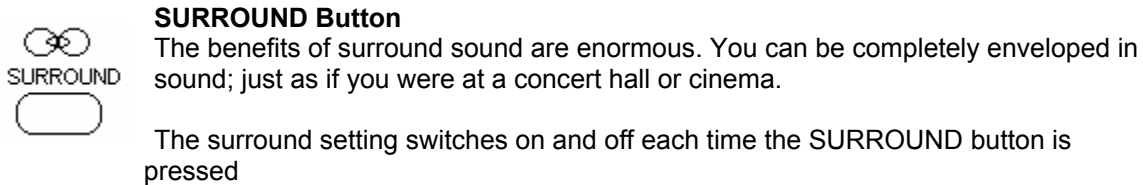
NOTE: The surround settings are memorized separately for each SOUND mode (AUTO, STANDARD).

4-18.4.9   Picture Adjustments

1   Select to adjust each item.

Press the PICTURE button on the Remote Control
to display the PICTURE menu.

Fig. 25

Included in the picture menu are controls to adjust picture, brightness, color, tint, sharpness, color temp and advanced settings.

2   Select to adjust each item.

Press to select the menu to adjust.

Select the desired level by looking at the picture behind the menu.
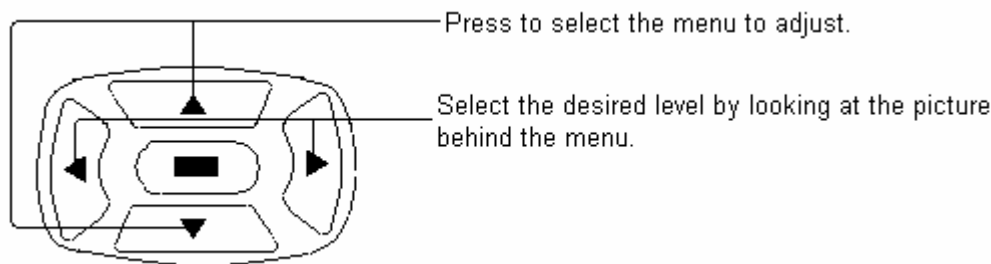
Fig. 26

To select between the different options for the PICTURE MENU press the left ◄ or right ► button to switch between modes.
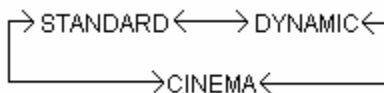
STANDARD – For viewing in standard (evening lighting) environments. This menu selects the normal levels of BRIGHTNESS and PICTURE.
DYNAMIC – For viewing in brighter environments. This menu selects higher than normal levels of BRIGHTNESS and PICTURE.

CINEMA – Ideal for movies. ● Can be selected for VIDEO/COMPONENT.
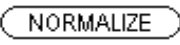
NOTE: If you would like to change the picture and color of the selected PICTURE menu to something else, adjust using the items in the PICTURE menu.

To select between the different options for the COLOR TEMP press the left ◄ or right ► button to switch between modes.

→ NORMAL ⟷ COOL ⟷ WARM←
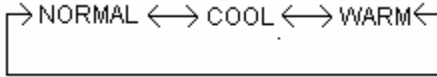
To select between the different options for the ADVANCED SETTINGS press the left ◄ or right ► button to select "ON". Press the down ▼ button to enter ADVANCED SETTINGS mode. ADVANCED SETTINGS ON Enables fine picture adjustment at a professional level. ADVANCED SETTINGS OFF Displays images with settings of the PICTURE menu.

Helpful Hint ($\overset{N}{\circ}$ / NORMALIZE   Normalization)

While the "PICTURE" menu is displayed, if either the $\overset{N}{\circ}$ | button) on the remote control is pressed at any time or the ▭ TION

button) is pressed during "NORMALIZE", then all adjustment values are returned to the factory settings.

Item	Effect		Adjustments
PICTURE	◄ Less	► More	Selects the proper brightness and density for the room.
BRIGHTNESS	◄ Darker	► Brighter	Adjusts for easier viewing of dark pictures such as night scenes and black hair.
COLOR	◄ Less	► More	Adjusts slightly to a lighter color.
TNT (NTSC only)	◄ Reddish	► Greenish	Adjusts for nice skin color.
SHARPNESS	◄ Less	► More	Displays a sharp image.

Notes:
(1) "COLOR", "TINT" and "SHARPNESS" settings cannot be adjusted for "RGB" and "PC" input signal modes.
(2) You can change the level of each function (PICTURE, BRIGHTNESS, COLOR, TINT, SHARPNESS) for each PICTURE menu.
(3) The setting details for normal, dynamic and cinema respectively are memorized separately for each input mode (VIDEO, COMPONENT, RGB).
(4) The "TNT" setting can be adjusted for NTSC signal only.

NOTE: There is little change when PICTURE is increased with a bright picture or reduced with a dark picture.

4-18.4.10 Advanced Settings

Item	Effect		Details
BLACK EXTENSION	◄ Less	► More	Adjusts the dark shades of the image in gradiation.
W/B HIGH R	◄ Less	► More	Adjusts the white balance for light red areas.
W/B HIGH B	◄ Less	► More	Adjusts the white balance for light blue areas.
W/B LOW R	◄ Less	► More	Adjusts the white balance for dark red areas.
W/B LOW B	◄ Less	► More	Adjusts the white balance for dark blue areas.
GAMMA	◄ Down	► Up	2.0 $\longleftrightarrow$ 2.2 $\longleftrightarrow$ 2.5

Notes:

(1) Carry out "W/B" adjustment as follows.

Ⓐ Adjust the white balance of the bright sections using the "W/B HIGH R" AND "W/B HIGH B" SETTINGS

Ⓑ Adjust the white balance of the dark sections using the 'W/B LOW R" AND "W/B LOW B" settings.

Ⓒ Repeat steps Ⓐ and Ⓑ to adjust.

Steps Ⓐ and Ⓑ affect each others settings, so repeat each step in turn to make the adjustment.

(2) The adjustment values are memorized separately for each input mode (VIDEO, COMPONENT, RGB and PC).

(3) The adjustment range values should be used as an adjustment reference.

Helpful Hint (Ⓝ / NORMALIZE   Normalization)

On the remote control unit, while the "Advanced Settings" menu is displayed, if either the Ⓝ N button is pressed at any time or the ▣ (Access button) is pressed during "Normalize", then all adjustment values are returned to the factory settings.

4-18.4.11 Setup for MULTI DISPLAY

1. By lining up Plasma Display in groups of 4 or 9 as illustrated below, an enlarged picture may be displayed across all screens.
2. For this mode of operation, each plasma display has to be set up with a DISPLAY number to determine its location.

Group of 4 (2x2)   Group of 9 (3x3)
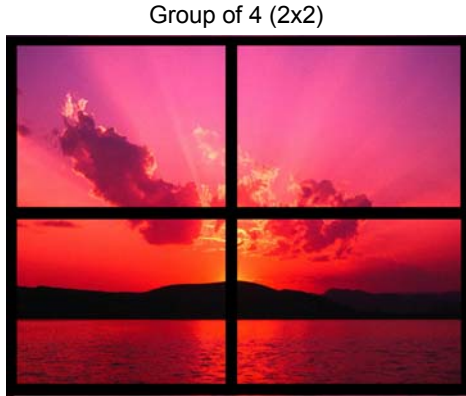
Fig. 27
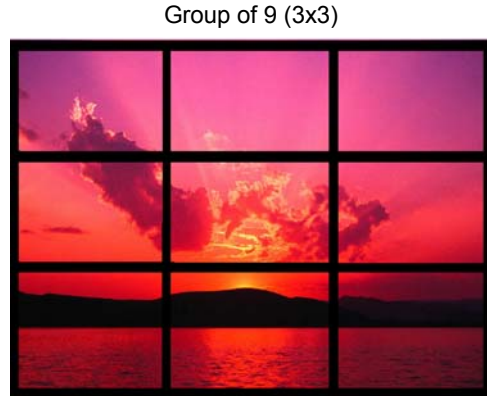
Fig. 28

How to Setup MULTI DISPLAY

1

Press to display the SETUP menu screen.

Fig. 29

2
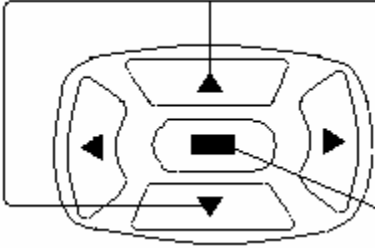
Press to select the MULTI DISPLAY SETUP.

Press to the "MULTI DISPLAY SETUP" menu.

Fig. 30

3
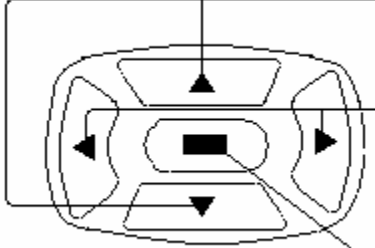
Press to select the MULTI DISPLAY SETUP.

Press to turn "ON" or "OFF".

Press to store the above setup.

Fig. 31

How to set the Display location number for each Plasma Display

4

Press to select ARRANGEMENT (2nd step).

Press to select "2x2", "3x3".

Fig. 32

5

Press to select LOCATION.

Press to select the required arrangement number. (A1-C3: Refer to following chart)
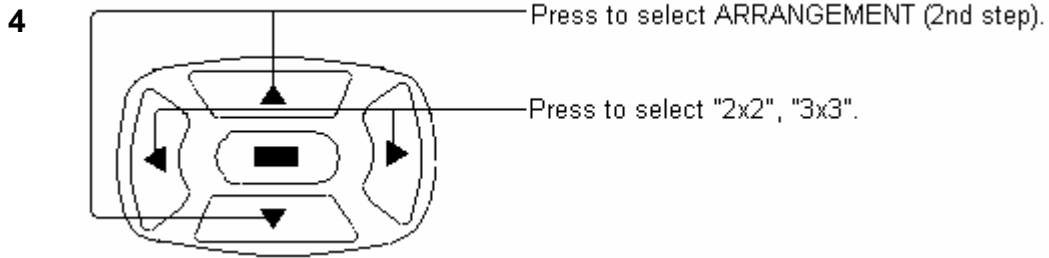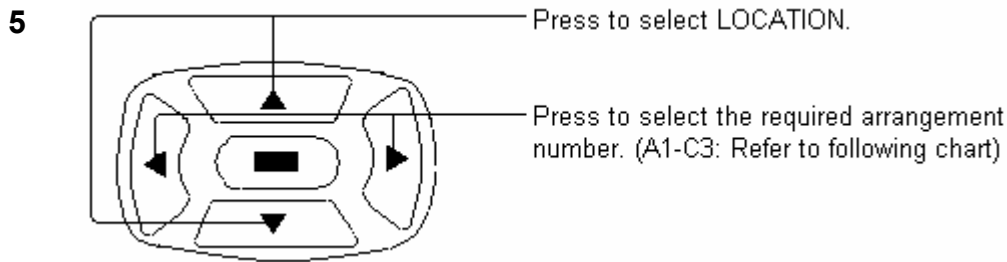
Fig. 33

DISPLAY NUMBER locations for each arrangement

(2x2)

A1	A2
B1	B2

(3x3)

A1	A2	A3
B1	B2	B3
C1	C2	C3

Fig. 34

6

R

Press twice to exit from SETUP.
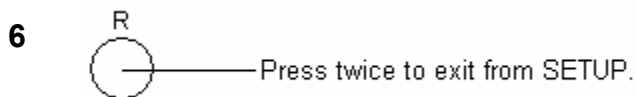
Fig. 35

NOTES:
- *For PC or RGB input signals, normal multi-display magnification is only available at the VGA resolution.*
- *The multi-display capability is not functional for component signals.*

4-18.4.12 Setting Up Timer

The timer can switch the Plasma Display ON or OFF.

Before attempting Timer Set, confirm the PRESENT TIME OF DAY and adjust if necessary. Then set POWER ON TIME/POWER OFF TIME.

Display the SET UP TIMER screen

1

Fig. 36

2

Fig. 37

4-18.4.13 Present Time of Day Set

To set up PRESENT TIME, follow the procedure described below.

1

Fig. 38

2

Fig. 39

4-18.4.14 Timer Set

1

Press to select
POWER ON TIME/
POWER OFF TIME.

Press to display the POWER ON SET UP/
POWER OFF SET UP screen.

Fig. 40

2

Press to select HOURS ADJUSTMENT/
MINUTES ADJUSTMENT.

Press to adjust each time.

Press to complete POWER ON TIME/
POWER OFF TIME, and return to
the SET UP TIMER screen.

Fig. 41

3

Press to select POWER ON FUNCTION/
POWER OFF FUNCTION.

Press to select ON.

Press to store setting.

Fig. 42

4

R

Press twice to exit from SETUP.
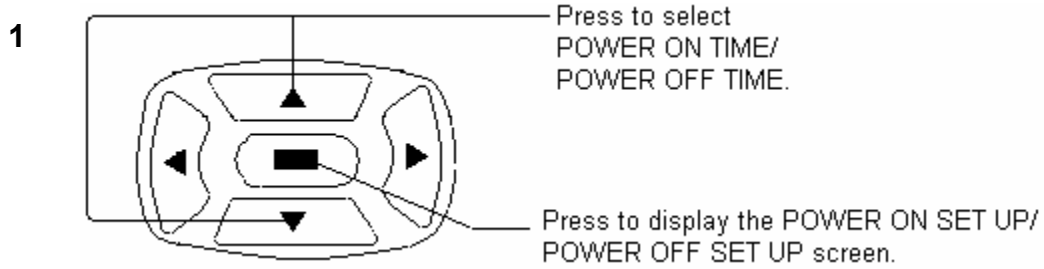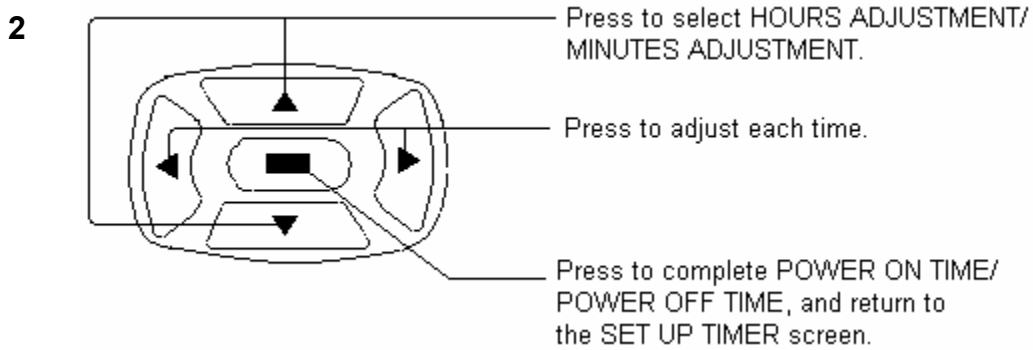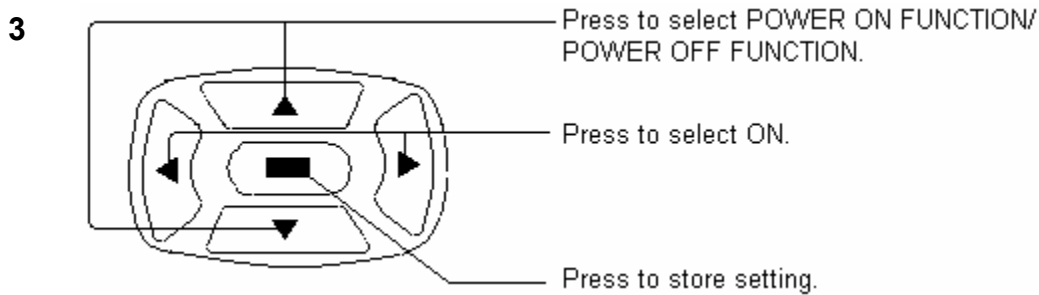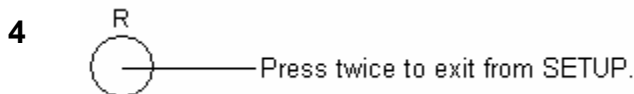
Fig. 43

NOTE: Timer function will not work unless "PRESENT TIME OF DAY ADJUSTMENT" is set.

4-18.4.15 Screensaver (For preventing after-images)

Do not display a still picture, especially in 4:3 mode, for any length of time. If the display must remain on, a SCREENSAVER should be used.

1
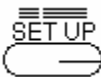
SET UP

——Press to display the SETUP menu screen.

Fig. 44

2
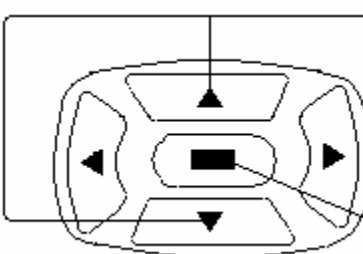
——Press to select the SCREENSAVER.

——Press to select the SCREENSAVER screen.

Fig. 45

Negative/Scroll Selection

3
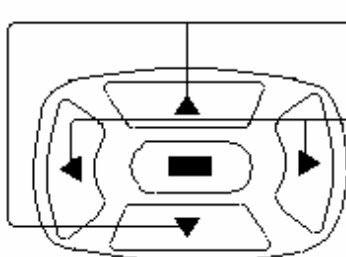
——Press to select the FUNCTION.

——Press to select the desired function.

NEGATIVE ⟷ WHITE BAR SCROLL

NEGATIVE : Negative image will be displayed on the screen.
WHITE BAR SCROLL : The white bar will scroll from left to right.

Fig. 46

Mode Selection
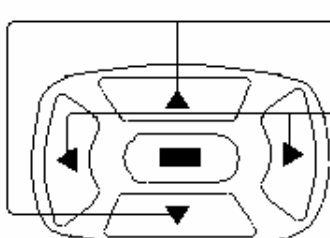
4

——Press to select the MODE.

——Press to select each mode items.

OFF

INTERVAL: Operates when SHOW DURATION and SAVER DURATIONE are set up and those times arrive.

TIME OF DAY: Operates when START TIME and FINISH TIME are set up and those times arrive.

ON: Operates when the ■ (ACTION) is pressed.

To stop the SCREENSAVER under ON, press the Ⓡ button.

Fig. 47

If the MODE is at ON, the menu screen will disappear and the SCREENSAVER will be activated.

After selecting TIME OF DAY or INTERVAL, the relevant SET UP TIME will become available for selection and the OPERATING TIME may be set.

Setup of Screensaver Time

5

Press to select START TIME/FINISH TIME
(When TIME OF DAY is selected).
Press to select SHOW DURATION/SAVER
DURATION (When INTERVAL is selected).

Press to select each time adjustment screeen.

Fig. 48

6

Press to select HOURS ADJUSTMENT/
MINUTES ADJUSTMENT.

Press to set up Hours or Minutes
▶ button: Forward
◀ button: Back

Press to store settings.
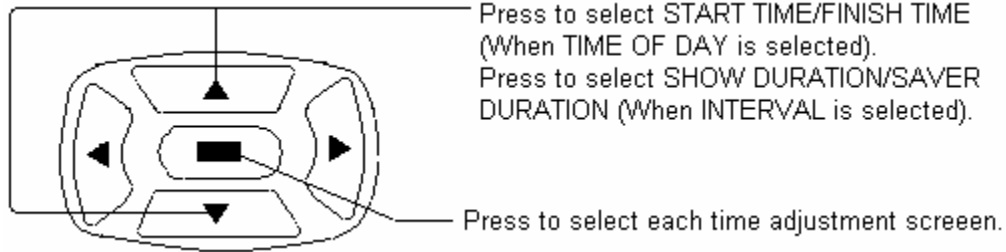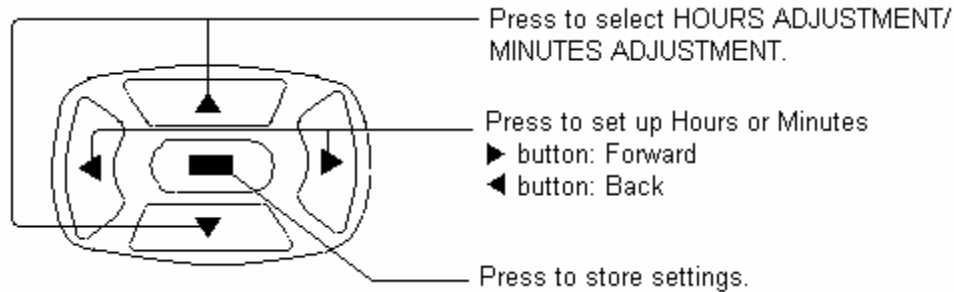
Fig. 49

NOTE: Timer function will not work unless "PRESENT TIME OF DAY ADJUSTMENT" is set.

4-18.4.16 Side Bar Adjust

Do not display a picture in 4:3 mode for an extended period, as this can cause an after-image to remain on the side bars either side of the display field.

To prevent the appearance of such an after-image, illuminate the side bars.

side bar

4:3
Screen Display

1   To display the SCREENSAVER screen.
(Refer to *SCREENSAVER* section earlier in this manual)

after-images

Fig. 50

2

Press to select the
SIDE BAR ADJUST.

Press to select
DARK, MID, BRIGHT.

OFF ⟷ DARK ⟷ MID ⟷ BRIGHT ⟵

Fig. 51

3

R

Press to exit from SCREENSAVER.
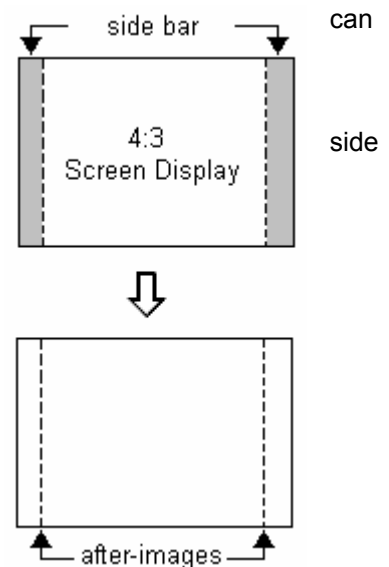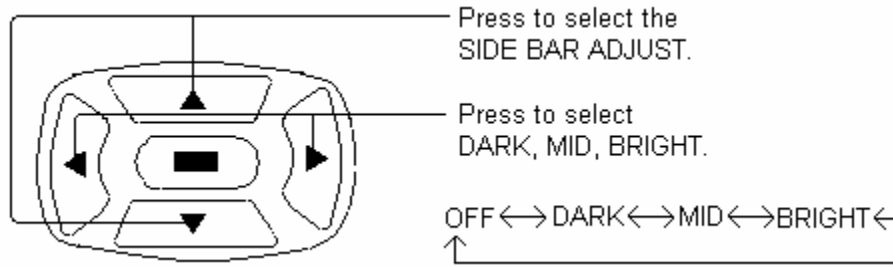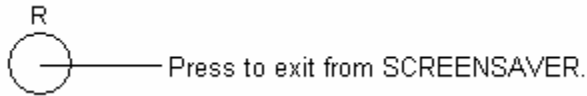
Fig. 52

NOTES:
- *Setting the side bar to bright mode for an extended period may result in occurrence of after-images.*
- *The side bar may flash (alternate black/white) depending on the picture being shown on the screen. In such an occurrence, use the Cinema mode.*

4-18.4.17 Set Up for Input Signals

Component/RGB In Select

Select to match the signals from the source connected to the COMPONENT/RGB input terminals. Y, P_B, P_R signals → "COMPONENT"
R, G, B, HD, VD signals → "RGB"

1

SET UP

Press to display the SETUP menu screen.

Fig. 53

2

Press to select the "COMPONENT/RGB IN SELECT".

Press to select the desired mode.

COMPONENT ⟷ RGB

R

Press to exit from adjust mode.
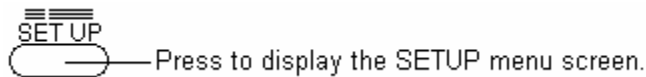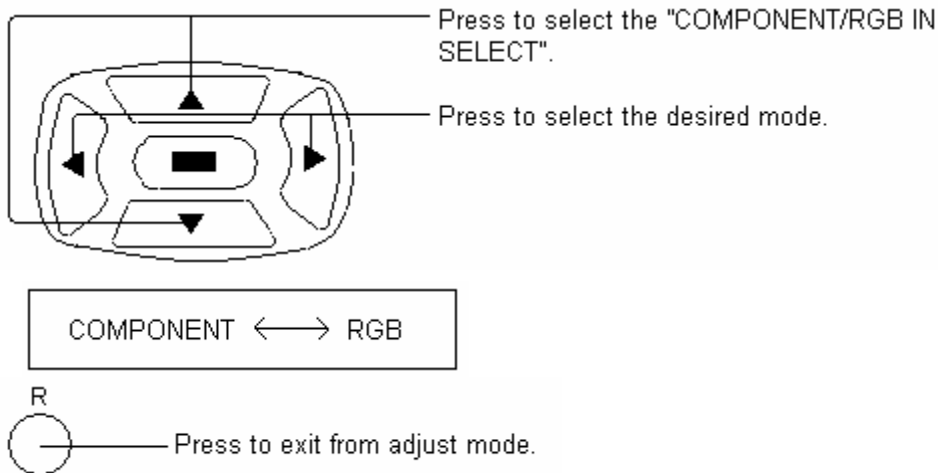
Fig. 54

4-18.4.18   3D Y/C Filter – For NTSC Video Images

Select "SIGNAL" from the "SET UP" menu during VIDEO input signal mode.
("SIGNAL [VIDEO]" menu is displayed.)

Press to select the "3D Y/C FILTER (NTSC)"

Press to set ON/OFF.

Fig. 55

Press to exit from adjust mode.
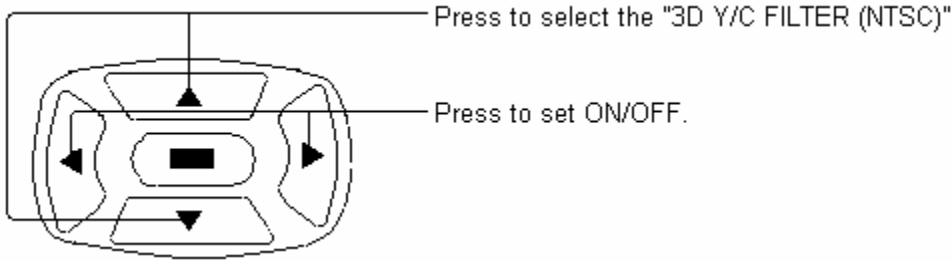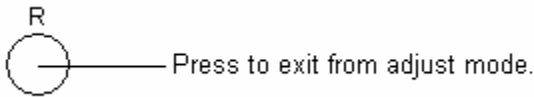
Fig. 56

NOTE: When on, this setting only affects NTSC input signals.

4-18.4.19 Color System/Panasonic AUTO

Select SIGNAL from the "SET UP" menu during VIDEO (S VIDEO) input
Signal mode. ("SIGNAL [VIDEO]" menu is displayed.)

Press to select the "COLOR SYSTEM" or
"Panasonic AUTO"

Press to select each functions.
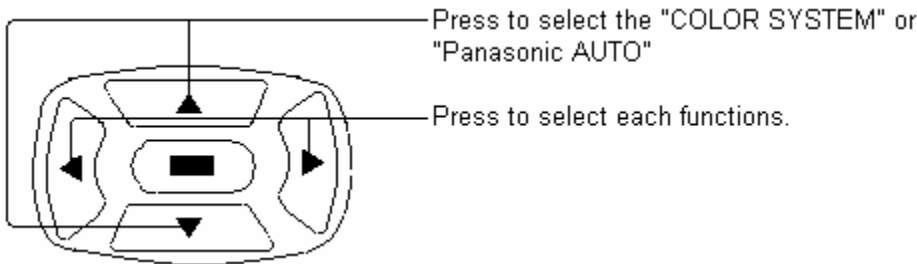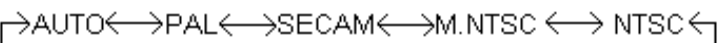
↓ Press (ACTION) button

Fig. 57

If the picture image becomes unstable:
With the system set on Auto, under conditions of
low level or noisy input signals the image may in
rare cases become unstable. Should this occur,
set the system to match the format of the input signal.

Mode	Function
Color system	Set the color system to match the input signal. If set to "AUTO", the color system is determined automatically. →AUTO←→PAL←→SECAM←→M.NTSC ←→ NTSC←
Panasonic AUTO (4:3)	Set to "NORMAL" to view 4:3 images in an unchanged format when Panasonic AUTO is selected. If you would like to view 4:3 images in "Just" format, set to "JUST".

Select SIGNAL from the "SET UP" menu during RGB or PC input signal mode.
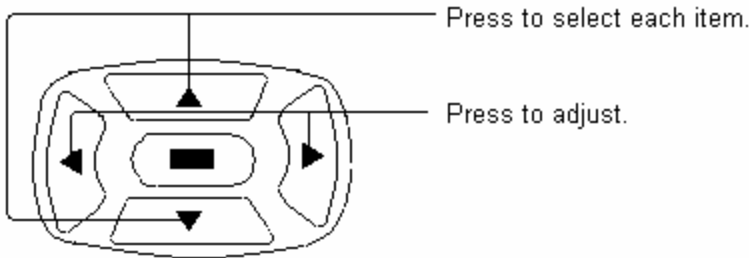
Fig. 58

The following operation methods are the same for both the SIGNAL [RGB] and SIGNAL [PC].

4-18.4.20 Sync

Setting RGB sync signal

Confirm that the input is set to RGB INPUT (this setting is valid only for RGB INPUT).

H & V	The H and V sync signals are input from the HD/VD connector.
ON G:	Uses a synchronized signal on the Video G signal, which is Input from the G connector.
ON VIDEO:	Compatible with the scart plug (Europe) The composite video signal input from the VIDEO input terminal Is used by dividing the sync signals.
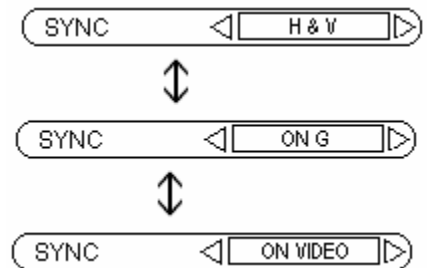
Fig. 59

Setting the PC Sync Signal

Confirm that the input is set to PC UNIT (this setting is valid only for PC INPUT).
    H&V: The H and V sync signals are input from the HD/VD connector.
    ON G: Uses a synchronized signal on the Video G signal, which is input from the G connector.

4-18.4.21 Pull In Range

Sets the width for different frequencies.

(This setting is the same for both SIGNAL [RGB] and SIGNAL [PC].)
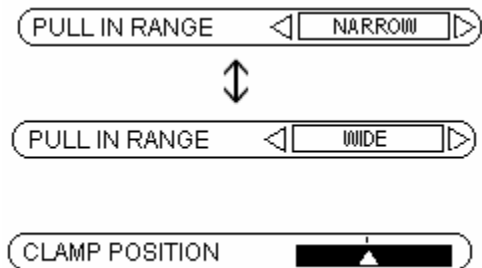
4-18.4.22 Clamp Position

Fig. 60

Adjusting the Clamp Position.

The following operation methods are the same for "SIGNAL" menu during COMPONENT, RGB and PC input signal mode.
Normally, these adjustments are set to appropriate levels and, therefore, do not need to be altered.

4-18.4.23 H-FREQ (kHz)/V-FREQ (Hz)

Displaying the H (Horizontal)/V (Vertical) frequencies.

This display is valid only for RGB input and PC input.
Display range:
    Horizontal 15.5 – 110 kHz
    Vertical 48 – 120 Hz

H-FREQ.	31.5	kHz
V-FREQ.	60.0	Hz
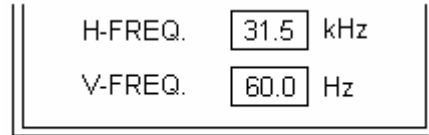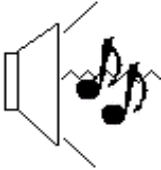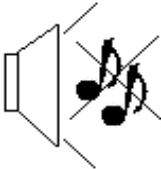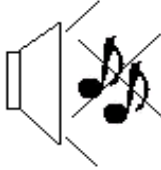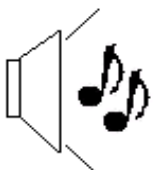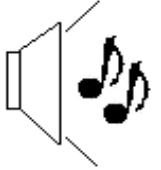
Fig. 61

4-18.4.24 Troubleshooting

Before you call for service, determine the symptoms and make a few simple checks as shown below.

Symptoms		Checks
Picture	**Sound**	
Interface	Noisy Sound	Electrical Appliances Cars/Motorcycles Fluorescent Light
Normal Picture	No Sound	Volume (Check whether the mute function has been activated on the remote control.)
No Picture	No Sound	Not plugged into AC outlet, Not switched on, PICTURE and BRIGHTNESS/Volume setting (Check by pushing the power switch or stand-by button on the remote control.)
No Picture	Normal Sound	If a signal with a non-applicable color system format, or frequency is input, only the input terminal indication is displayed.
No Color	Normal Sound	Color controls set at a minute level. See color system in manual.

Plasma Display Panel

Symptoms	Check
Some parts of the screen do not light up	The plasma display panel is manufactured using an extremely high level of precision technology, however, sometimes some parts of the screen may be missing picture elements or have luminous spots. This is not a malfunction.
Panasonic After-images appear	Do not allow a still picture to be displayed for an extended period, as this can cause a permanent after-image to remain on the Plasma Display. Examples of still pictures include logos, video games, computer images, teletext and images displayed in 4:3 mode. **Note:** The permanent after-image on the Plasma Display resulting from fixed image use is not an operating defect and as such is not covered by the Warranty. This product is not designed to display fixed images for extended periods of time.
Whirring sounds can be heard from the display unit.	The display unit is fitted with a cooling fan to dissipate heat generated during normal use. The whirring sound is caused by rotation of the fan and is not a malfunction.

4-18.5 Video Selector Box

The video selector box is mounted in the front overhead cabinet. This allows the independent switching of two VCRs, TV, TV cable, and TV game to the two standard TVs in the motor home.

4-18.6 Direct TV Digital Satellite Receiver

A DIRECT TV Digital Satellite Receiver is installed in your coach. In most cases if this receiver is setup for you ahead of time. The following setup instructions are provided if you need to, for some reason, setup your system after delivery of your coach.

4-18.7.1 Setup Overview

Before you begin make sure that the following steps have been performed:
- The DIRECT TV satellite antenna is mounted and pointed in the general direction of the satellite.
- Antenna is grounded as described in your antenna installation instructions
- Attach a RG-6 coaxial cable(s) to the antenna LNB connector(s)
- Routed the other end of the antenna cable to the back of your DIRECT TV Receiver.
- Placed the DIRECT TV Receiver accessible to a telephone modular jack.

Once these procedures have been performed continue to the next section to begin installing your DIRECT TV Receiver.

4-18.7.2 Attaching the Antenna Cable

You can configure your system several ways, depending on what additional components (such as a VCR, DVD player, or A/V receiver) you select. For now, however, use the simplest configuration to check your antenna and cabling.
Ensure that the DIRECT TV Receiver is not plugged into an electrical outlet
Attach the RG-6 coaxial antenna cable to the SATELLITE IN connector on the back of the DIRECT TV Receiver. Refer to the appropriate figure below for assistance.
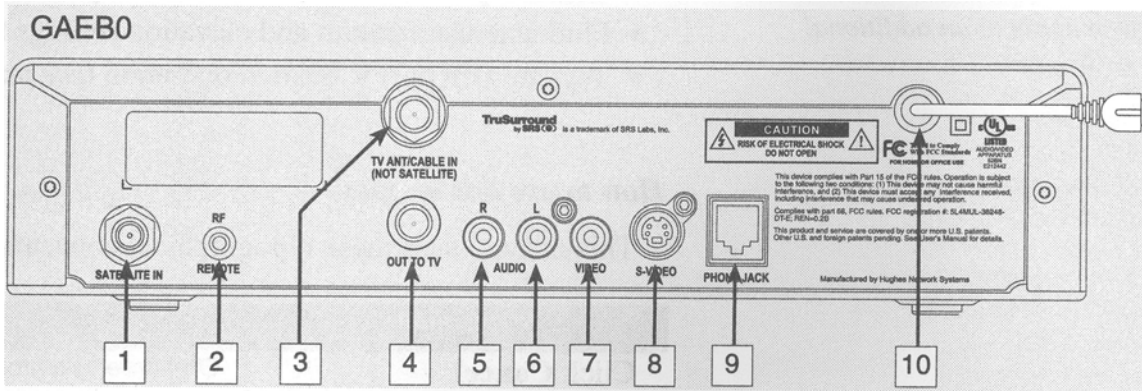
Table 1: Rear panel connections - DIRECT TV Receiver model GAEB0

1	SATELLITE IN connector	6	AUDIO OUTPUT (L) jack
2	RF REMOTE antenna jack	7	VIDEO OUTPUT jack
3	TV ANTENNA/CABLE IN connect	8	S-VIDEO jack
4	OUT TO TV connector	9	TELEPHONE JACK
5	AUDIO OUTPUT (R) jack	10	AC POWER CORD
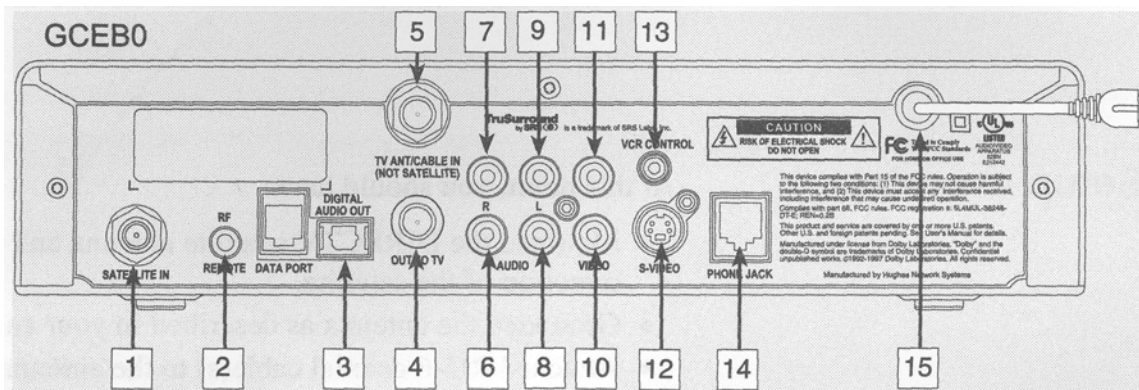
1	SATELLITE IN connector	9	AUDIO OUTPUT (L) jack
2	RF REMOTE antenna jack	10	VIDEO OUTPUT jack
3	DIGITAL AUDIO OUTPUT optical jack	11	VIDEO OUTPUT jack
4	OUT TO TV connector	12	S-VIDEO jack
5	TV ANTENNA/CABLE IN connector	13	VCR CONTROL cable jack
6	AUDIO OUTPUT (R) jack	14	TELEPHONE JACK
7	AUDIO OUTPUT (R) jack	15	AC POWER CORD
8	AUDIO OUTPUT (L) jack		

4-18.7.3 Connecting Your TV

Depending on your TV, you can connect it to the receiver in one of three ways:
- S-Video cable *(best picture quality)* or
- Video cable *(very good picture quality)* or
- Coaxial cable *(good picture quality)*

In addition to your video connection, use a set of audio cables (L/R) to provide stereo sound. If your TV does not have audio jacks, you will hear monophonic audio. This is acceptable for the procedures described in the next section.

To connect your TV to the DIRECT TV Receiver:

1. Select the appropriate connection:
   If your TV has an S-Video jack -
   - Use an S-Video cable (not supplied) to connect the DIRECT TV
     Receiver's S-VIDEO jack to the TV's S-VIDEO jack.
   - Use audio cables to connect the DIRECT TV Receiver's AUDIO jacks to
     the TV's AUDIO IN jacks.

   If your TV has RCA-type A/V connectors -
   - Connector the DIRECT TV Receiver's AUDIO and VIDEO jacks to the
     TV's A/V IN jacks.
   - If your TV has only one AUDIO IN jack, connect the receiver's AUDIO L
     jack to the TV AUDIO IN jack.

   If your TV only has an RF (coaxial) connector -
   - Connect the DIRECT TV Receiver's OUT TO TV connector to the TV's
     VHF/UHF IN or RF IN jack.

2. Connect one end of the telephone line cord provided into the DIRECT TV
   Receiver's PHONE JACK.
3. Connect the other end into a module telephone outlet.
4. Plug the TV into an electrical outlet.
5. Plug the DIRECT TV Receiver power cord into an electrical outlet. If the
   front panel Power indicator does not illuminate, press the POWER button.

Onscreen Menu Icons

These icons appear in onscreen menus and are used throughout this manual:

Toggle or Step -   Press SELECT to toggle (switch) a setting from "ON" to OFF" or step
through the available choices each time you press SELECT.

List of Options -   Menu button will display a list of choices in a pop-up menu when you
press SELECT.

Series of Boxes -   Multiple screens will appear in a series requesting you to enter numbers
and/or letters for the particular feature when you press SELECT.

Determine Antenna Angles

This section explains how to determine the proper antenna position. This is expressed in degrees of *azimuth* (horizontal) and *elevation* (vertical). Use the receiver front panel controls shown below to complete this procedure.
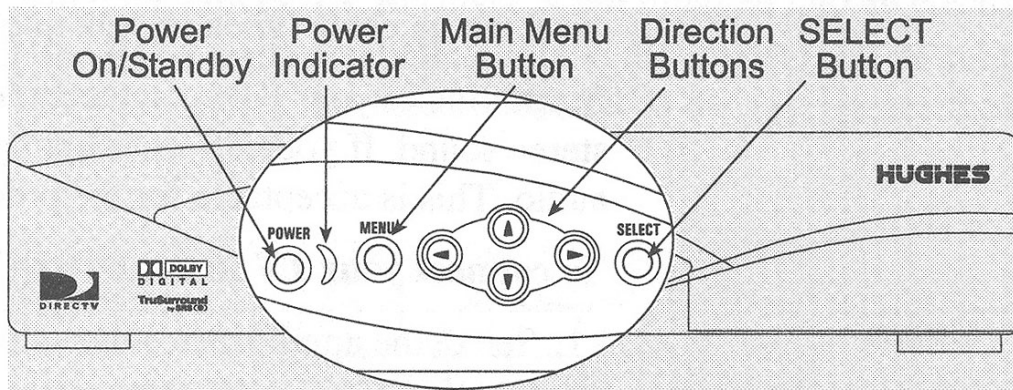
1. Press the front panel MENU button to display the MAIN MENU below.
2. Use the ▼ button to highlight the System Setup tab.
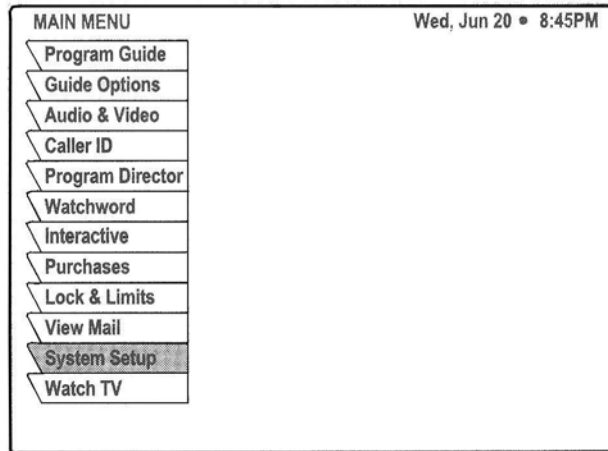
Main Menu Tabs

3. Press the front panel SELECT button.
4. the INSTALL menu allows you to determine the correct antenna position using your 5-digit ZIP code. Enter your ZIP code and press SELECT. The correct azimuth and elevation angles appear as shown below.
5. Use these values to properly align your dish antenna.
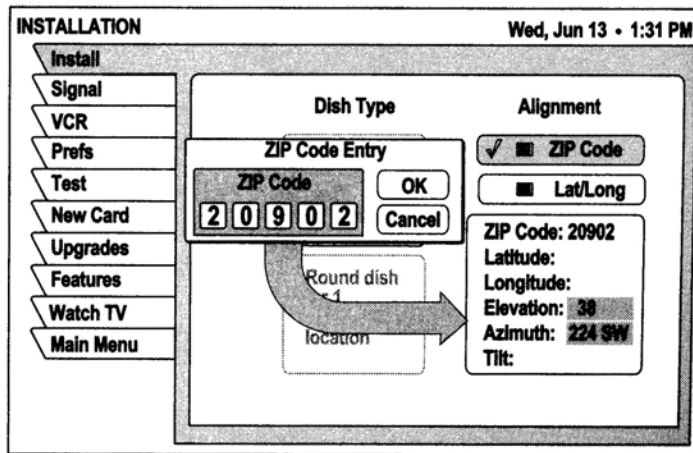
Finding antenna settings based on ZIP code

NOTE: Tilt angle also appears if you have select an Oval Antenna from the Dish Type menu.
Testing Your System

When you have aligned your dish antenna to the azimuth and elevation angles shown on the **install** pane:

1. Highlight the **Signal** tab.
2. Use the ► button to highlight the *Source* pull-down menu
3. Signal quality is indicated by a scale at the bottom of the pane and with an audible indication. The frequency and tempo of the tone increase with signal strength.
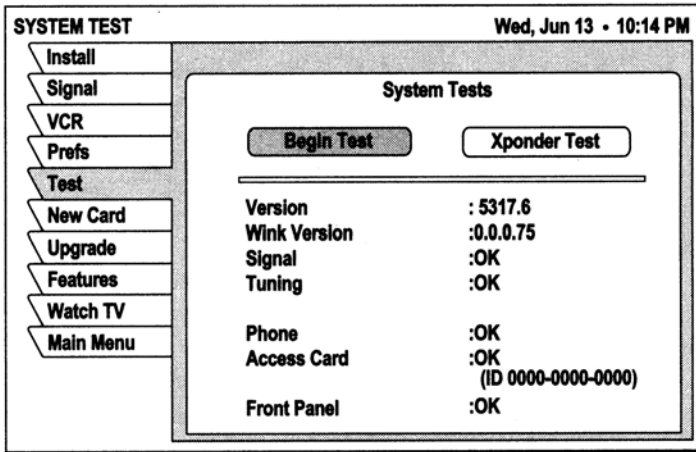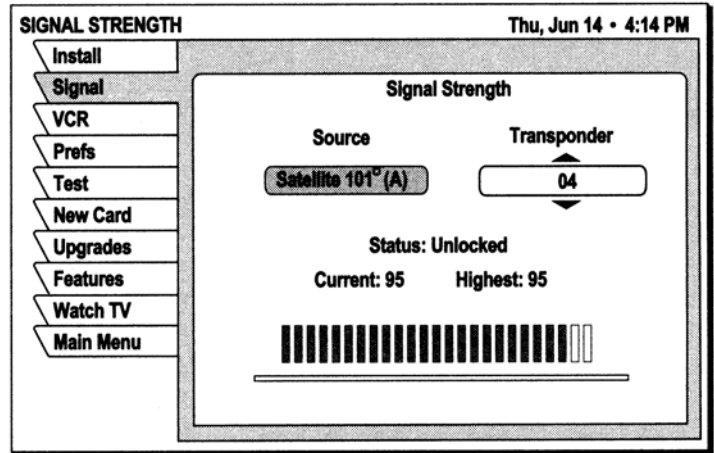
4. Highlight the ***Transponder*** pull-down menu.
5. You may need to select another transponder to achieve the highest signal indication.
6. Select the transponder providing the best signal.
7. Use the ▼ button to highlight the Test tab.
8. Highlight Begin Test and press the SELECT button.

Results appear within a few seconds and should resemble those in the figure. If your test results are much different from those shown in the figures, or you receive no signal indication, refer to the next section *Transponder Test*.

To perform the Transponder Test:

1. Move the highlight to the Xponder Test pull-down menu.
2. Press the SELECT button.
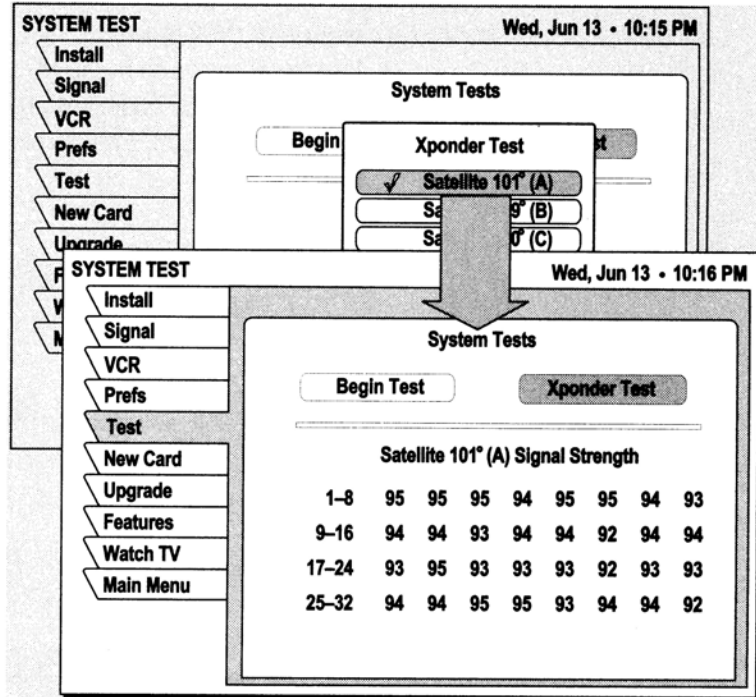
Your results will differ slightly from those shown, depending on your geographic location and specific installation. However, if your results are very different from these examples (i.e. rows of zeros or single-digit numbers):

- Highlight the install tab on the INSTALLATION menu. Verify your settings.
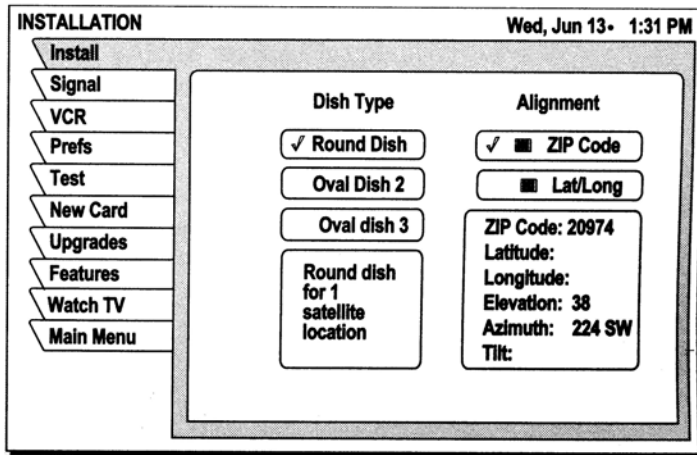
Installation pane

- Re-enter your ZIP code if necessary to verify you have used the correct antenna pointing parameters for your location.
- Check your cable connections.
- Ensure the DIRECT TV Receiver is connected to a modular telephone jack.

Once you have successfully obtained a signal and your test results resemble those shown in the figures, call DIRECT TV (or your subscription service provider) to activate service if you have not done so already.

4-18.7.4 Adding System Components

You can configure your DIRECT TV Receiver several ways depending on the additional audio/video components you want to use.

This section explains how to:
- Connect a terrestrial (broadcast) TV antenna.
- Connect the optional RF remote control antenna.
- Connect and set-up a VCR.
- Integrate the DIRECT TV Receiver into your existing audio or A/V system.

4-18.7.4.1 Connecting Components

At this point, you should have:

- Verified that your system is operating properly.
- Connected your DIRECT TV Receiver to your TV.
- Unplugged all components from electrical outlets.

Connect a Terrestrial Antenna

You can connect a terrestrial (broadcast) TV antenna to your DIRECT TV Receiver by connecting it to the DIRECT TV Receiver's TV ANT/CABLE IN jack (see figure in Attach the Antenna Jack section). The remote control INPUT button allows you to switch between DIRECT TV® programming and input from the terrestrial antenna.

Connect the RF Remote Control Antenna

The DIRECT TV Receiver uses an optional RF (radio frequency) remote control antenna that allows you to control your receiver from other rooms in your house.

1. Slide the antenna into the base as shown. No tools are required.
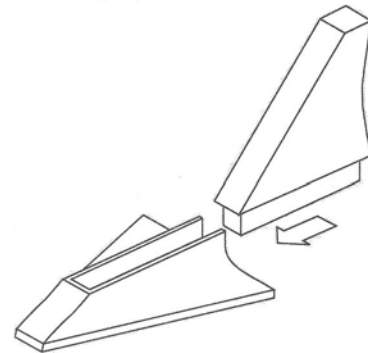
Assembling the optional RF antenna

2. Plug the RF remote control cable into the RF REMOTE connector on the DIRECT TV Receiver rear panel (refer to figure under Attach the Antenna Jack section).

3. Extend the cable and place the antenna in the desired location.

To achieve the best operating range from the remote control, position the antenna as high and as far away from metal objects as possible.

4-18.7.4.2 Connecting a VCR

Follow these instructions to connect your TV and VCR to the DIRECT TV Receiver. Connect the satellite antenna RG-6 coaxial cable to the DIRECT TV Receiver's SATELLITE IN jack (refer to figure under Attach the Antenna Jack section).

1. Depending on your VCR, select the appropriate connection to the DIRECT TV receiver:
   If your VCR has A/V connectors -
   - Connect the DIRECT TV Receiver's AUDIO and VIDEO jacks to the VCR's A/V IN jacks.
   If your VCR only has an RF (coaxial) connector -
   - Connect the DIRECT TV Receiver's OUT to TV connector to the VCR's VHF/UHF In or RF IN jack.
   - If your VCR has only one AUDIO IN jack, connect the receiver's lower (mono) AUDIO L jack to the VCR's AUDIO IN jack.
2. Depending on your TV and VCR, select the appropriate method to the connect the VCR to the TV:
   If your TV and VCR have A/V connector -
   - Connect the DIRECT TV Receiver's AUDIO and VIDEO jacks to the TV's A/V IN jacks.
   If your TV or VCR only has an RF (coaxial) jack -
   - Connect the VCR's VHF/UHF OUT jack to the TV's VHF/UHF IN jack.
3. Plug the TV, VCR, and DIRECT TV Receiver power cords into an electrical outlet.

4-18.7.4.3 Connect the VCR Control Cable

(Model GCEB0 only) The DIRECT TV Receiver can control your VCR for unattended recording, using the VCR Control Cable provided

1. Plug the VCR control cable into the rear panel VCR CONTROL jack.
2. Temporarily position the other end over the VCR's remote control sensor (normally a small dark plastic window on the VCR front panel).

The remote control sensor may be labeled or identified in your VCR manual. If it is not identified, scan the front of the VCR with your VCR remote control:

3. Hold the VCR remote control about ½ inch (1.3 cm) from the front left side.
4. Slowly move the remote control to the right as shown in the figure below.
5. Repeatedly press the remote control's power key on and off.
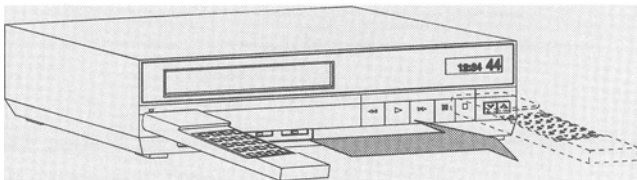
Scanning for the VCR remote control sensor

6. When your VCR responds to your pressing the remote control power, note the position. Temporarily tape the emitter to the position you marked until you verify that it works properly.
7. Test the VCR control feature as described in the Section Test the VCR later in this manual.
8. Remove the temporary mounting tape. Attach the emitter permanently with peel-and-stick backing. This will not interfere with normal VCR operation. The **VCR SETUP** menu provides the settings to allow the DIRECT TV Receiver to communicate with your VCR.
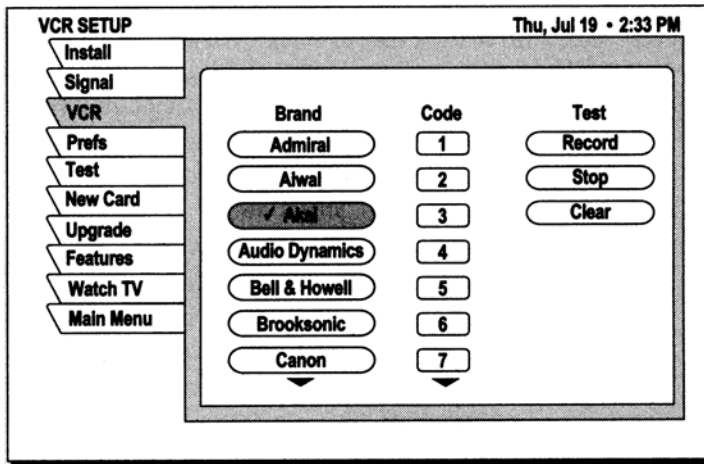
VCR SETUP menu pane

9. Scroll through the VCR brands using the ⊕ joystick ▲ and ▼ buttons. If you cannot find the correct code listed for your brand of VCR, try codes from related brands, because your VCR may respond to multiple codes.
10. Use the remote control SELECT button to try each code.
11. Alternate between this procedure and testing the code.

4-18.7.4.4 Test the VCR (Record/Stop)

This Record/Stop test verifies the specified brand and code controls your VCR. Before starting this test:

- Turn the VCR power on.
- Verify the VCR Control Cable is properly connected.
- Insert a recordable videotape into the VCR.

Use the DIRECT TV Receiver *front panel* controls, rather than the remote control, to test the codes.

Test the VCR **record** and **stop** commands. If either command does not function, try other codes shown for your VCR brand. If you are unsuccessful after trying *all* available codes, recheck your VCR Control Cable connections and IR emitter placement.

NOTE: Signals coming from the remote control at the same time as signals coming from the VCR Control cable may provide unreliable test results.

4-18.7.4.5 Connecting a Home Entertainment System

NOTE: The A/V receiver must be turned on in order to send the video signal to your TV.

You can integrate the DIRECT TV Receiver into your entertainment system to take advantage of enhanced audio and video capability. Follow these instructions to connect your DIRECT TV Receiver.

- To connect the DIRECT TV Receiver to your audio system, use A/V cables to connect the satellite receiver to the audio receiver's AUDIO IN jacks.
- Dolby Digital - With the GCEB0 model, you can enjoy programs that contain a Dolby Digital sound track. We recommend that you listen in surround sound for maximum enjoyment of these programs. You can connect the stereo outputs of the GCEB0 to a receiver that contains a Dolby Surround Pro Logic decoder. This will provide you with three audio channels in the front and a mono surround channel.
- To take full advantage of Dolby Digital programming, connect the GCEB0 digital audio output to an external 5.1-channel Dolby Digital decoder or receiver. This provides you with three front channels, two independent surround channels, and a sub-woofer channel.

1. Connect the satellite antenna RG-6 coaxial cable to the DIRECT TV Receiver's SATELLITE IN jack.
2. Connect the DIRECT TV Receiver's A/V jacks to the VCR and A/V receiver's A/V jacks.
3. AUX, optical connection, and digital output connections - If your audio receiver has coaxial or optical digital connectors, connect the appropriate type of cable to the DIRECT TV Receiver's DIGTAL AUDIO OUT for two-channel digital stereo. If your A/V receiver is also capable of decoding Dolby Digital, use this connection in order to listen in full 5.1-channel surround sound. Additional audio information begins in the Adjusting Audio and Video section later in this manual.
4. Connect the VCR's A/V OUT jacks to a pair of the A/V receiver's A/V In jacks.
5. Connect the A/V receiver's MONITOR OUT jack to the TV's VIDEO IN jack.
6. Plug the components into an electrical outlet.

NOTE: If you have connected a VCR to your entertainment system in a way that routes the satellite receiver's signal to your VCR before it reaches the TV. You may see a distorted picture if you try to record a copy-protected program. A Can't Tape symbol in the screen banner identifies these programs. If this occurs, simply stop recording and the picture will automatically correct itself.

4-18.7.5 Using the Remote Control

This section explains how to:

* Use the HMRC-8 and HMRC-9 remote control functions.
* Install and replace the remote control batteries.
* Program the remote to work with your system components.
* Access interactive programming features.

HRMC-9 Remote Control Function Quick Reference

Power
Turns satellite receiver power on/off (standby)
Turns selected component power on/off

Component control
Selects the component that you want to control
Buttons illuminate to indicate the component
that the remote control is set to operate.

Receiver control group
Most frequently used functions
are grouped together (see below)

Channel (CH) up/down
Moves to the next or previous channel during viewing.
Display next program guide page (Grid guide only).

Previous channel
Toggle between the current channel and
the last channel watched.

Director group
One-touch navigation to setup menus for audio, video
program guide and WatchWord searches.

Numeric keypad

Reserved for future upgrade

Input
Change video input source
(CATV, terrestrial antenna, or other video device).

VCR control
Performs VCR control functions

Program guide
View the list of available programming

Interactive guide
Access interactive
features

TurboTune
View the TurboTune guide

Favorites
View listings of your preferred programming

Main menu
View the Main Menu

Clear
Cancel the on-screen function
and return to previous activity

Information
View information
about a program

Select/Move/OneLine guide
Press to select an on-screen option,
Press the arrows to move the screen highlight,
Press to view the One Line Guide (if no menu option)

HMRC-8 Remote Control Function Quick Reference

The DIRECT TV Receiver front panel buttons can provide the basic controls needed to access major DIRECT TV System features. However, using the remote control simplifies accessing the basic system functions, enhances your system's capabilities, and provides convenient shortcuts to extended features. Additionally, most remote control buttons can also control other home entertainment system components.

4-8.7.5.1 Remote Control Functions

The joystick is the most versatile (and most used) remote control feature. Using only the joystick, you can perform virtually all on-screen functions including:

- Selecting a highlighted screen menu item.
- Moving the screen highlight (or cursor) up, down, left and right.
- Jumping directly to the OneLine™ Guide.
- Changing channels using the OneLine Guide.

Use the joystick to move up, down, left or right through the on-screen displays. This ⊕ icon appears throughout this manual to instruct you to use the joystick to navigate through on-screen menus and guides. SELECT means press the joystick in the center to activate or choose a highlighted menu option.

Press the joystick up or down to display the OneLine guide while you are watching a program. When the OneLine guide appears, press the joystick up or down to step to the next higher - or lower-numbered channel.

Press the GUIDE button to display the current program guide. Press it a second time (while a program title is highlighted) to display the **Guide Options** menu.

Press the INFO button to display a brief description about the program you are viewing. For more details, press it again to display the *Information Banner*. The INFO button provides scheduling information (and pay per view purchase information) about the program highlighted in the program guide. See Section *Using Program Guides* later in manual for more information.

Use the CHANNEL (CH) button to move up or down to the next available channel in the OneLine Guide or scroll through a page of program guide selection.

Press the CLEAR button to exit from any on-screen guide, remove banners, or terminate an action.

The INPUT button allows you to select programming from additional program sources connected to the satellite receiver such as a DVD player, VCRs, or a terrestrial TV antenna signal. Repeatedly press INPUT to cycle through each available input source in your system.

Press the SAT component select button to control the DIRECT TV Receiver. The other component select buttons indicate the devices they control. You can program the AUX button to control another digital device such as an audio CD player.

The DIRECTOR buttons provide convenient shortcuts to find programming and adjust system features to suit your personal preferences.

4-8.7.5.2 Installing Remote Control Batteries

To install or replace the remote control batteries:

1. Locate the battery compartment on the back of the remote control.
2. Remove the battery compartment cover.
3. Insert two "AAA" size batteries as shown, observing the correct polarity.
4. Replace the battery compartment cover.
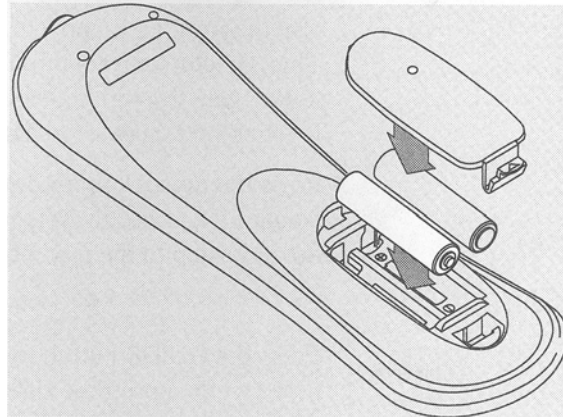
Installing batteries in the remote control

4-8.7.5.3 Programming the Remote Control

You can operate your TV, VCR, and Audio/Video receiver using your HRMC-8 or HMRC-9 remote control. Use the Code Scanning or Code Entry method to program the remote control. Code scanning may be more time-consuming, but you don't need to know manufacturer's control codes. Using the Code entry method may be quicker, but you'll need to know the correct manufacturer's control codes for each component you want to operate.

1. Aim your remote control at the component you want to use.
2. Hold down the desired device button (TV, for example).
3. Press the MUTE button for one second.
4. Release both buttons together.
5. The device button (in this example, the TV button) glows and remains lit. If the button does not light, repeat the previous steps.
6. Use one of the two programming methods described above.
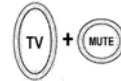
Code Scanning
To use this method:
1. Repeatedly tap the top part of the CHANNEL (CH) button.
2. Continue to step through the codes until the component turns off, indicating you have found the correct component code. If you accidentally pass a code that responds or realize you may not have been aiming the remote control at the component, tap the lower part of the CHANNEL (CH) button to step backward through the codes.
3. Press the remote control POWER button to verify the proper code by turning the device on and off.
4. Press the device button (in this example, TV) again to lock in the code.
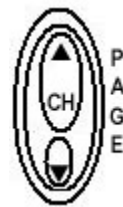
Code Entry
To use this method:
1. Find the three-digit code or codes for the type and brand of the component you want to control (in this example, TV). Refer to *Appendix B of Manufacturers Device Control Codes* found later in this manual.
2. If several codes are not listed, you may have to try some or all of them. After entering a code, press the remote control's POWER button to test it. The correct code turns the device on and off.
3. Press the device (DVD, VCR, AUX, TV, SAT) button again to lock the code.

4-8.7.5.4 Using DIRECT TV INTERACTIVE™
powered by Wink Communications®

DIRECT TV INTERACTIVE™ powered by Wink Communications® is a free, easy-to-use service that allows you to interact with the television shows and advertisements. When the blinking symbol appears in the upper left part of your screen, you know that the program you're watching has been enhanced with DIRECT TV INTERACTIVE™.

Simply press the ⬩ button on your remote control. You can use your remote control to access up-to-the-minute sports scores, news and weather, get program trivia, respond to offers during commercials, and purchase products, all while watching TV.

```
┌──────────────────────────────────────────────┐
│ DIRECT TV INTERACTIVE        The, Jun 12 ● 11:32 PM │
│ ┌─────────┐                                    │
│ │Interact │                                    │
│ ├─────────┐ ┌──────────────────────────────┐  │
│ │Watch TV │ │  ┌──────┐                     │  │
│ ├─────────┐ │  │ wink.│  DIRECT TV INTERACTIVE│  │
│ │Main Menu│ │  └──────┘                     │  │
│ └─────────┘ │                               │  │
│             │  Check your local weather, see the latest│
│             │  sports scores, interact with popular│
│             │  shows and shop from your couch. It is│
│             │  FREE, easy to use and lots of fun!│
│             │                               │  │
│             │  Go to the DIRECTV INTERACTIVE Center│
│             │         to get started        │  │
│             │                               │  │
│             │  ┌────────────────────────────┐│  │
│             │  │ DIRECT TV INTERACTIVE Center ││  │
│             │  └────────────────────────────┘│  │
│             └──────────────────────────────┘  │
└──────────────────────────────────────────────┘
```
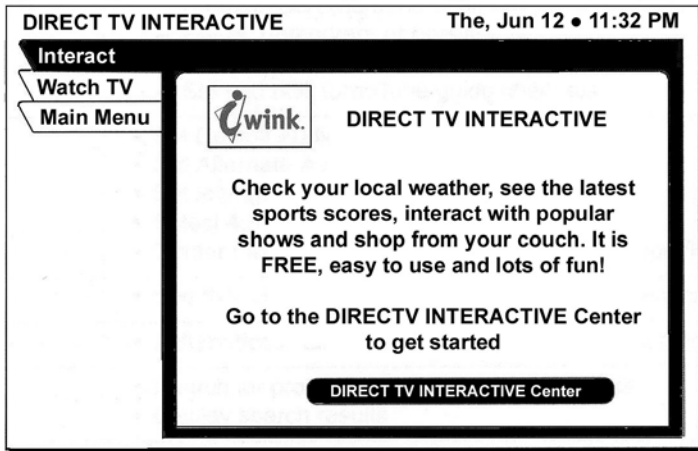
Select the ***DIRECT TV INTERACTIVE***™ ***Center*** menu bar, then follow the simple directions provided on the subsequent screens.

4-8.7.6 Using the Menus

This section describes:
- How to find the menus you need to perform common tasks.
- Using the Program Director
- How to purchase pay per view events.
- How to set and modify preferences.

The table below lists the MAIN MENU tabs, their submenus, and what they do.

Menu Function Overview

Main Menu Tab	Screens	If you want to:
Program Guide	Program Guide	• View and modify the program guide.
Guide Options	Theme	• Change the name of a program list.
	Times	• Change the period of time shown in the program guide
	Favorites List	• Create/edit up to four channel lists (Fav. A, Fav. B, Fav. C, Family)
	Favorites Setup	• Create a program listing that contains selected channels
	Set Options	• Guide Options:
	Set Turbo	- Guide style (grid or Logo)
		- Picture in guide, zoom (on or off)
		- Multi-Color guide (on or off)
		- Channel Sort (numeric or alpha)
		- Filters, (temporary or persistent)
		- Reset options to the default selections
		- Set and edit TurboTune guide channels
Audio & Video	Audio Adjustment	• Set Default Audio Language
	Video Adjustment	• Set Alternate Audio Language
		• Set left/right audio balance
		• Select 4:3 or 16:9 screen ratio
		• Center menus on your monitor (up/down and right/left)
Caller ID	Caller ID	• See the names and telephone numbers of recent callers
Program Director	Schedule	• Automatically tune to programs for viewing or taping
WatchWord	Setup	• Search for programming using specific words
	Results	• Display search results
Interactive	DIRECT TV INTERACTIVE™	• Access interactive programming features
Purchases	Upcoming & Past Purchases	• View a list of scheduled pay per view events
		• Display recently purchased pay per view events
Lock & Limits	Lock	• Lock and unlock the system
	Fav Setup	• Set viewing times and maximum viewing hours
	Rating	• Create/edit up to four channel lists (Fav. A, Fav. B, Fav. C, Family)
	Limits	• Set maximum program rating allowed for viewing
		• Select programming content to be shown in the program guide
View Mall	Mail	• Read messages from DIRECT TV
System Setup	Install	• Determine proper antenna azimuth and elevation setting
	Signal	• Test signal reception
	VCR	• Setup VCR for unattended recording
	Prefs	• Test system operation
	Test	• Prepare a new access card
	New Card	• Display upgrade status and history
	Upgrade	• Display current receiver features
	Features	

4-8.7.6.1 Purchasing Pay Per View

Select the **Purchases** menu tab to display lists of recently viewed and advance purchased pay per view events. You can choose **PAST PURCHASES** and **UPCOMING PURCHASES**. The event channel, title, start date and time, and cost is shown for each purchase.

PAST PURCHASES		Thu, Jul 19 • 2:54 PM
Upcoming		
Past	Purchase History	
Watch TV		
Main Menu		

Recently viewed event			
1/12	9:00PM	102	$2.99

Previously viewed event			
2/12	8:00PM	140	$29.99

Pay Per View Purchase List

The **PAST PURCHASES** pane shows recent pay per view events charged to your account. You cannot remove listed events. The list does **not** show:

- Events purchased, but later canceled
- Purchased, cancelable events to which the DIRCT TV Receiver never tuned.
- Events ordered by calling DIRECT TV.

The UPCOMING PURCHASES pane displays:

- PPV events you have purchased but not yet viewed
- PPV events purchased but never viewed.

Events ordered by calling DIRECT TV do **not** appear on the list. For additional information about a specific event, highlight the event and press the INFO key.

To purchase a Pay Per View event:

1. Highlight the Buy menu pane option
2. Press SELECT
3. Press SELECT again to confirm your purchase.

NOTE: If you are not authorized for purchases using your DIRECT TV Receiver, contact DIRECT TV for assistance.

4-8.7.6.2 Canceling Purchases

You may cancel some events after purchasing them. You can usually cancel unviewed purchases, however some events cannot be canceled. If the Cancel Purchase button appears, you can clear the purchase. If this button is unavailable, part of the event has probably already been viewed, and you must accept the purchase.

To cancel a Pay Per View event:

1. Highlight the event you want to cancel.
2. Press CLEAR on the remote control.
3. Use the pop-up menu panel to cancel the purchase.

4-8.7.6.3 Viewing Mail

DIRECT TV uses the **MAIL** feature to send you important information, inform you of special events, and tell you about special offers. When you receive a new message, a New Mail icon appears at the top of all menus until you read the message. Highlight and SELECT the **View Mail** tab from the **MAIN MENU**.
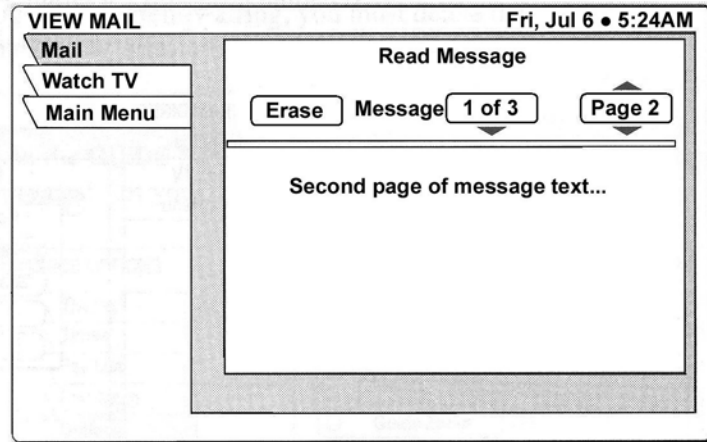
VIEW MAIL menu pane

Message - Cycle through multiple messages. SELECT the ***Messages*** button. Use the ⬙ joystick to navigate messages.

Page - Use the CHANNEL (CH) button to cycle through multi-page messages.

Erase - Permanently remove a message. Messages are automatically deleted as they become outdated or if space is needed for newer incoming messages.

4-8.7.6.4 Using Caller ID

Your DIRECT TV Receiver shows you the name, time, and telephone number of recent calls on your TV as shown in the figure below.
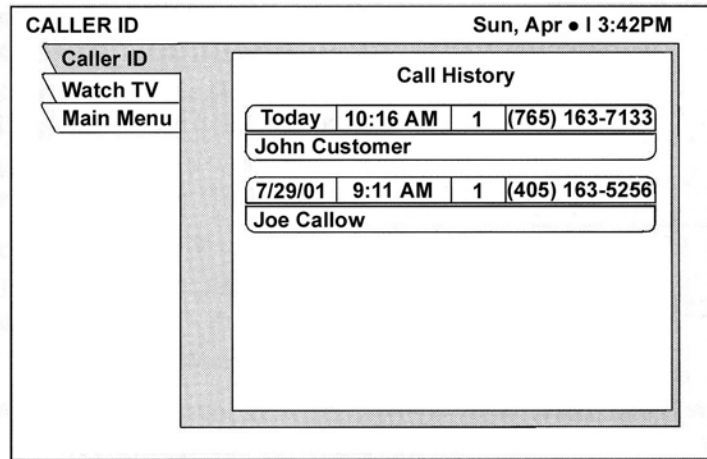
Call history screen

NOTE: You must subscribe to Caller ID from your local telephone company to use this feature.

4-8.7.6.5 Using the Program Director

You can program up to 32 events in advance for viewing or unattended recording. The PROGRAM DIRECTOR will tune to a program at a specific date and time, or tune on a repeating basis. As shown below, you can:

- Schedule programs for viewing (✓)
- Schedule programs for taping (▭)
- Select Cancel from the menu if you decide not to schedule anything.
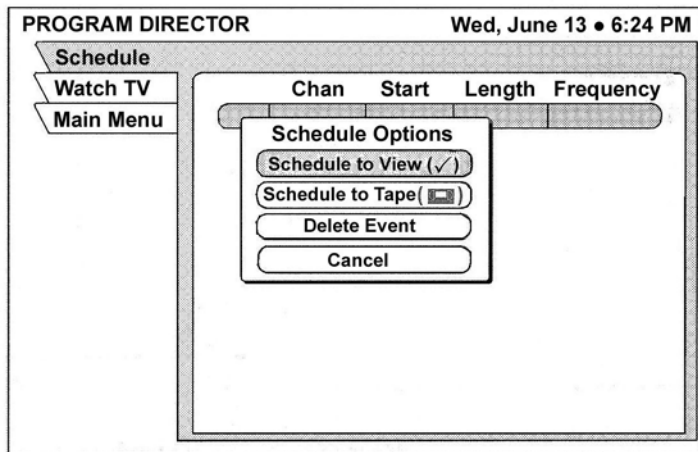
The PROGRAM DIRECTOR Schedule pane popup menu

To Schedule or Edit an Event

The **Schedule** pane displays up to seven previously scheduled events at a time. If more than seven events are already scheduled, use the ⊕ joystick to scroll down to view the additional events. Small arrows at the top or bottom of the list indicate that there are additional events.

To schedule a program:

NOTE: You can schedule events up to eleven months in advance.

1. Highlight an upcoming program in the program guide and press SELECT.
   Press SELECT again to cycle through the next available option.
   If you choose a scheduling option, the DIRECT TV Receiver will turn on (if necessary) and tune to the specified channel at the chosen date and time.
2. If you chose Schedule to Tape and you have set up your VCR the DIRECT TV Receiver will record the event. For unattended recording:
   - Attach the VCR Control Cable and set up your VCR.
   - Set your VCR for the correct DIRECT TV Receiver output: RF (channel ¾) or A/V (phono or S-Video).
   - Insert a blank videotape and leave the VCR turned on.
3. Use the ⊕ joystick to specify AM or PM (or N for noon, or M for midnight).
4. Using the same procedure set the program Length in hours and minutes.
5. Use the ⊕ joystick to advance to the Frequency column.
6. Specify when, or how often, the even occurs: Today, Tomorrow, Every Mon, Every Tue, Every Wed, Every Thur, Every Fri, Every Sat, Every Sun, Everyday, Mon-Fri, or "/" (specify a date).

NOTE: If you specify a date, use the month/day format. The year is set automatically.

7. After setting the Frequency, use the joystick ⊕ to advance.
8. Review your settings and choose OK, or choose Cancel to delete the edits.

To cancel a program scheduled for viewing or taping:
Find the upcoming program in the program guide you wish to cancel and press SELECT until the check mark (✓) or videotape icon (▭) disappears.

If the program is currently airing, you must delete the event from the Schedule menu pane accessed from the PROGRAM DIRECTOR.

4-8.7.6.6 Setting Guide Preferences

Options on the **GUIDE PREFERENCES** menu permits you to customize operation to best suit your needs.

```
GUIDE OPTIONS                          Wed, Jul 4 • 12:25AM
  Theme
  Times            ┌──────────────────────────────────────┐
  Fav List         │   ┌───────────────┐                   │
  Fav Setup        │   │ ○ Guide Style │ Grid              │
  Options          │   ├───────────────┤                   │
  Set Turbo        │   │ ○ Picture in Guide │ On           │
  Watch TV         │   ├───────────────┤                   │
  Main Menu        │   │ ○ Guide Zoom  │ On                │
                   │   ├───────────────┤                   │
                   │   │ ○ Multi-Color │ On                │
                   │   ├───────────────┤                   │
                   │   │ ○ Channel Sort │ Numeric          │
                   │   ├───────────────┤                   │
                   │   │ ○ Filters     │ Temporary         │
                   │   │                                   │
                   │   │ ┌─────────────┐                   │
                   │   │ │ Reset Options │                 │
                   │   └───────────────┘                   │
                   └──────────────────────────────────────┘
```
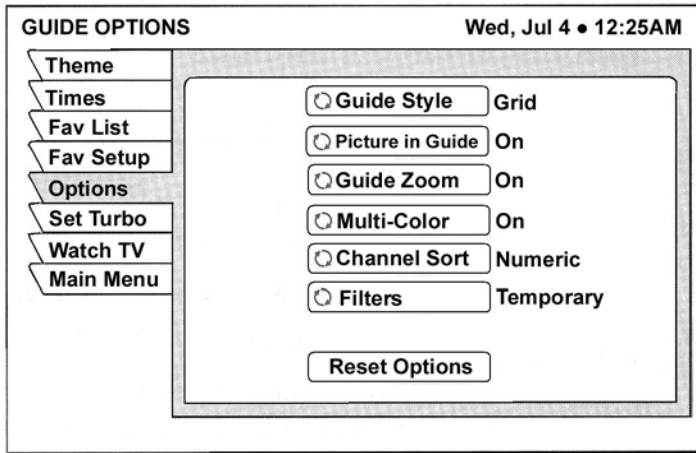
Selecting Guide Options

Adjusting Audio and Video

From the **MAIN MENU**, highlight and SELECT the **Audio & Video** tab. From the **AUDIO ADJUSTMENT** menu pane, you can change:

- Default Audio and Alternate Audio
- Audio Left/Right Balance
- TruSurround® Audio Processing
- Dolby Digital Output
- Output Optimization

```
AUDIO ADJUSTMENT                       Fri, Jul 13 • 11:15AM
  Audio
  Video            ┌──────────────────────────────────────┐
  Watch TV         │   ┌───────────────┐                   │
  Main Menu        │   │ ▤ Default Audio │ English         │
                   │   ├───────────────┤                   │
                   │   │ ▤ Alternate Audio │ English       │
                   │   ├───────────────┤                   │
                   │   │ ▤ Audio Balance │ 0,0             │
                   │   ├───────────────┤                   │
                   │   │ ○ SRS TruSurround │ On            │
                   │   ├───────────────┤                   │
                   │   │ ○ Digital Output │ Dolby Digital  │
                   │   ├───────────────┤                   │
                   │   │ ○ Optimize    │ Stereo           │
                   │   │                                   │
                   │   │ ┌────────────────┐                │
                   │   │ │ Factory Defaults │              │
                   │   └───────────────┘                   │
                   └──────────────────────────────────────┘
```
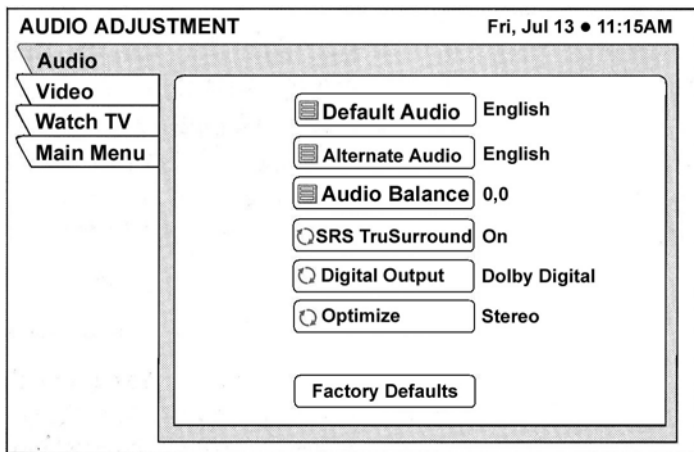
Setting Default and Alternate Audio

Your DIRECT TV Receiver supports alternate audio services. Icons below the date and time in the Information Banner or program guide to indicate if these services are available for a particular program.

```
AUDIO ADJUSTMENT                    Fri, Jul 13 • 11:15AM
 Audio
 Video                      Default Audio
 Watch TV                                        ) English
 Main Menu              English              ) English
                        Spanish
                        French               ) 0,0
                        German
                        Italian              ) On
                        Japanese
                        Korean               ) Dolby Digital
                        Chinese
                                             ) Stereo

                        Factory Defaults
```
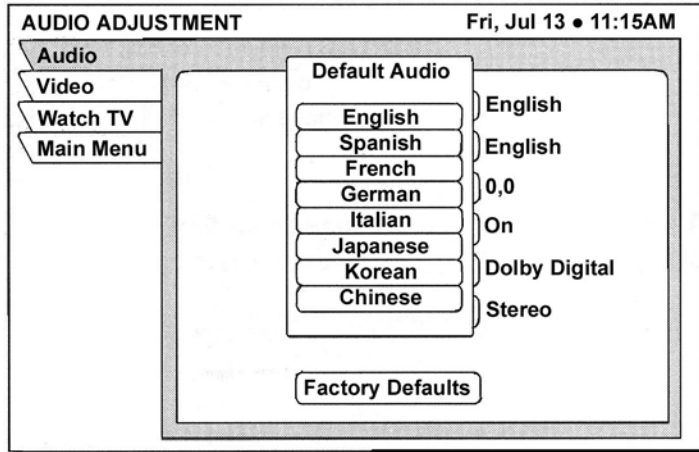
Setting the Default Audio Language

1. Press the remote control INPUT button to access these services.
2. Highlight the desired language.
3. Press SELECT.

Occasionally, an audio track may be offered that is not being broadcast, in which case the audio will not change or you will not hear any audio. Change channels to restore the audio track to the one specified on the **AUDIO ADJUSTMENT** menu.

Using Dolby Digital Audio
(model GCEB0 only)

Select the Dolby Digital audio, then use the CHANNEL (CH) button to step through the audio tracks for the current program. For programs that are offered in Dolby Digital, the double-D symbol (⧄) appears with the audio track title.

Using the Optimize Setting

The *Optimize* selection allows you to select the preferred audio optimization based on the receiver-to-TV connection used.

Set Optimize to Stereo to provide highest quality audio when using the AUDIO OUTPUT (L) and (R), and/or DIGITAL OUTPUT connection.
Use the Optimize Mono setting to provide the highest-quality audio when using the OUT TO TV coaxial connection.

Adjusting Audio Balance

To adjust the left/right audio balance, highlight and SELECT *Audio Balance*.
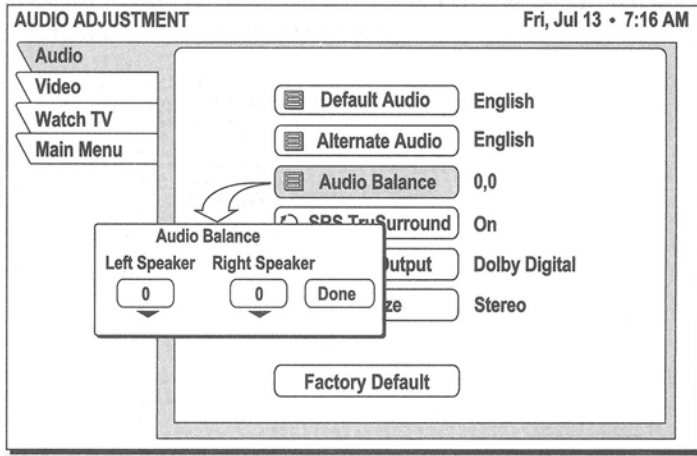
Setting Left/Right Speaker Balance

Use the ⊕ joystick to increase or decrease the Audio Balance settings in the pop-up menu.

Adjusting the Screen Image

Adjust video display brightness, contrast, and saturation for the best image.
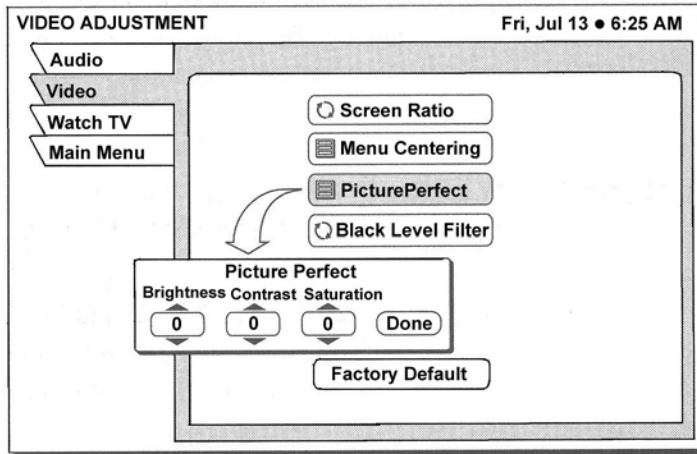
Adjusting screen image controls

1. Highlight the **Audio & Video** tab from the **MAIN MENU**.
2. Press SELECT.
3. Highlight the *PicturePerfect* menu pane button.
4. Press SELECT.
5. Use the ⊕ joystick to increase/decrease the screen Brightness, Contrast, and image Saturation settings in the pop-up menu (as shown below).

Using WatchWord™

Use WatchWord to search for specific words used in titles or descriptions. Press the remote control SEARCH button to access the setup pane shown below.

You can specify up to eight words to identify programming of interest to you. While the DIRECT TV Receiver is in standby mode, it searches program titles and guide descriptions. Programs with matching words appear in the Result pane.
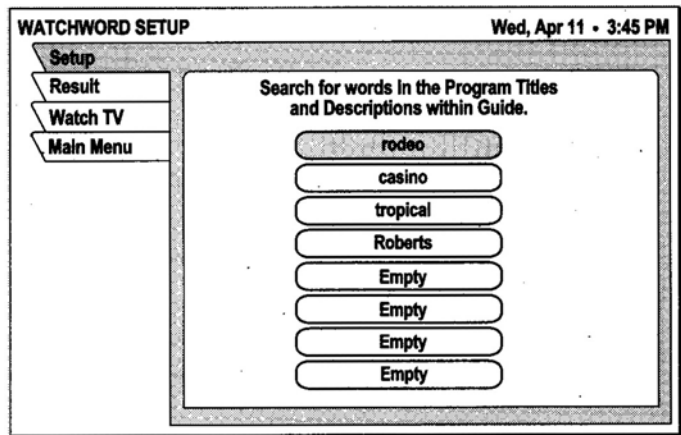
Search Word Entry List

NOTE: For WatchWord to have the opportunity to find programs with matching words, your DIRECT TV Receiver must be in standby mode (Off). Allow the system to look for your words while you sleep or while you are at work. The DIRECT TV Receiver cannot search for words while it is turned on.

Highlight one of the eight choices and press SELECT. A pop-up panel appears where you can enter a search word. If you entered "ALIEN," WatchWord might find the movie "Aliens" as well as any program which includes the word "alien" in the description. You may also use partial words.
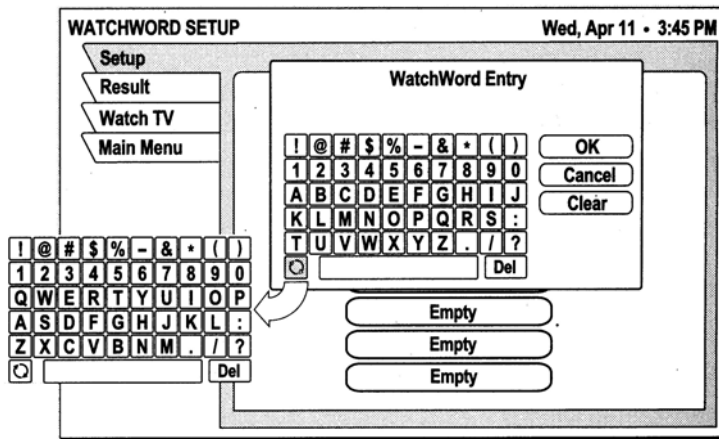
Using the Toggle Key to Switch Button Board Layout

Use the pop-up button board to enter search words. You can highlight and SELECT the toggle icon [icon] on the default button board (see figure at left) to change it to a standard keyboard layout, if you desire. Highlight the desired letter using the ⊕ joystick. Press SELECT to enter the letter. Select *OK* when you are finished entering the desired search words.

4-8.7.7 Using Program Guides

This section describes:

- The different program guide styles.
- Common program guide and menu features
- How to use the OneLine™ Guide.
- How to set-up and use the TurboTune™ Guide.

4-8.7.7.1 Selecting a Program Guide Style

Personalize the program guide to show program listings that interest you. You determine how your choices appear onscreen by your guide selection. Available guide styles are:

- **Grid** with Picture-in-Guide or description
- **Logo** with Picture-in-Guide or description

Grid Guide
- Easy to see what programs are available at a particular time.
- Shows two hours of programming divided into 30-minute blocks.
- Picture-in-Guide displays the current program in the upper right corner.
- Four channels of programming are displayed using Picture-in-Guide.
- Programs appear in a row with the channel on which they are broadcast.

NOTE: Cells with arrows indicate the program started at an earlier time or continues later than can be shown in the selected 2-hour period.
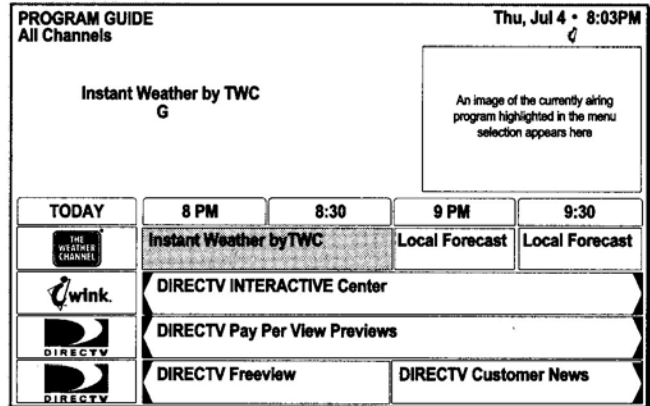
You can browse **five** channels by turning the Picture-in-Guide off.

NOTE: If a program title cannot entirely fit in the space provided, an ellipsis (…) indicates that a portion of the title is not shown.
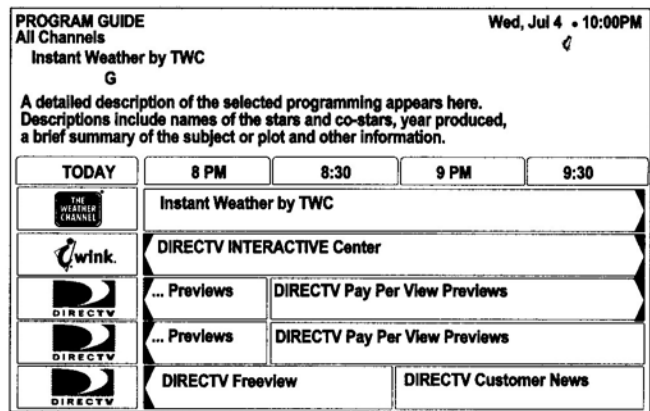
Browse up or down one channel at a time with the ⊕ joystick when the highlight is in the grid.
Use the remote control CHANNEL (CH) button to scroll through a full page of guide entries at a time.
Move the highlight to the right to show later time periods.

Turn off the Picture-In-Guide:
1. Press the remote control GUIDE button.
2. Press the GUIDE button again to access the Options menu tab.
3. Highlight the Picture-in-Guide menu button.
4. Press SELECT to toggle the feature off.

NOTE: Press the remote control GUIDE button while the program guide appears on-screen to display the Guide Options menu.

Logo Guide

- Select channels, rather than specific programs.
- The current program title appears above the logo grid as you highlight each channel. Only current programming is available in the Logo Guide.
- Video of the current program appears in the Picture-in-Guide window as you highlight each channel.
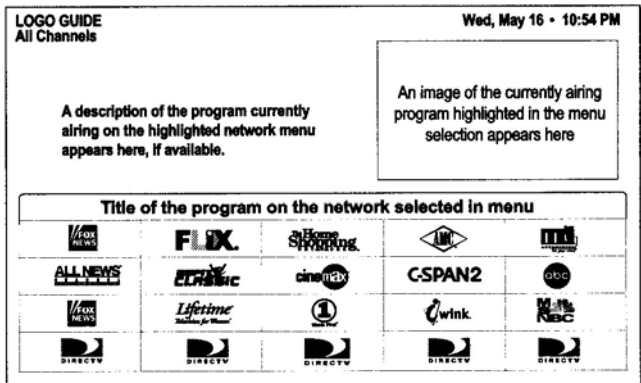
Logo guide with Picture-In-Guide active

Use the Channel (CH) button to scroll through the guide entries a full page at a time, or use the ⬥ joystick to scroll through the guide entries one at a time.

You can display the most channels per screen () by turning off the Picture-In-Guide feature, using the description-only mode.
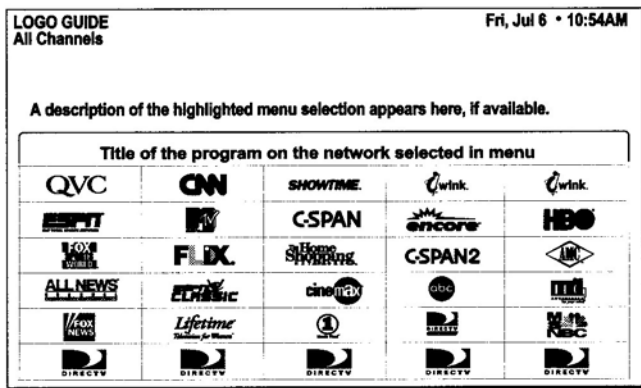
Logo Guide with Picture-In-Guide disabled (description only mode)

Selecting a guide style
1. Press the remote control MENU button.
2. Use the ⬥ joystick to highlight and SELECT the Guide Options menu tab.
3. From the Options menu tab, highlight your selection and press SELECT.
4. Highlight and SELECT the WatchTV tab to return to the program you were viewing.

4-8.7.7.2 Program Guide and Menu Features

The on-screen guides and menus provide a logical and convenient way to access system features and settings. Every guide and menu contain these elements:

- The guide or menu title.
- The day of the week, date, and time appear in the upper right corner
- Menu pane selection tabs
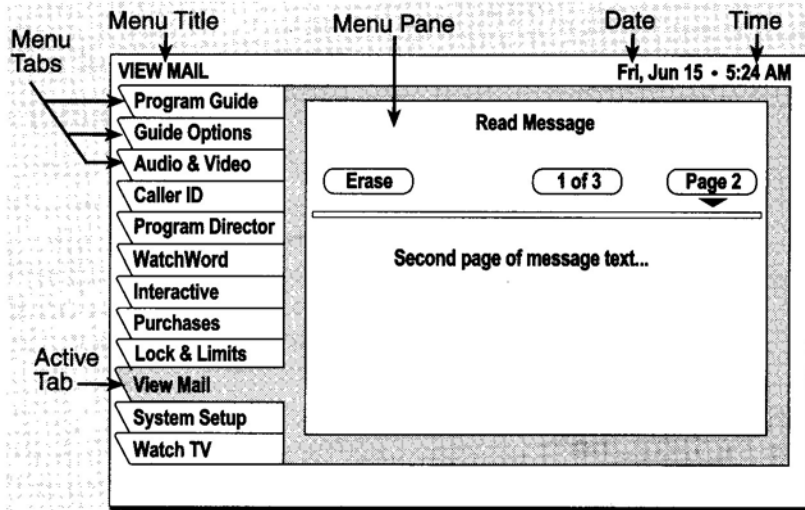
Common Menu Features

- Use the ⊕ joystick to move the highlight from tabs into menu panes.
- Any sub-filters appear under the guide title. The label left of the bullet shows the current class filter. The channel list appears right of the bullet.
- Below the date and time, small icons indicating the status of the system or details about the currently highlighted program title may appear. These icons also appear in the Channel Banner as shown in the figure below.

Icon	$	*i*	◻◻	ⓒⓒ	NEW MAIL	🔒	🔓	CAN'T TAPE	ALT. AUDIO	DATA SVCS.
Meaning	Pay per view	Interactive programming available	Dolby Digital audio available	Closed caption available	Unread mail	Limits enforced	Limits over-ride	Taping not allowed	Other audio available	Data available
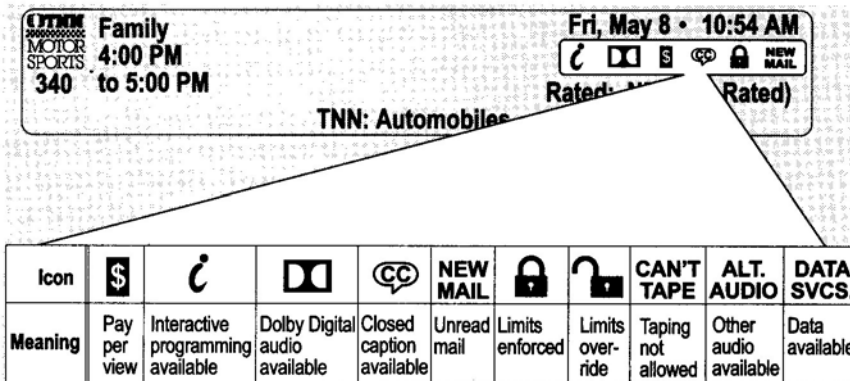
Channel Banner Icons

The Channel Banner appears at the top of the screen whenever you use the CHANNEL (CH) button to change channels. Press the remote control INFO button to change channels. Press the remote control INFO button to display the banner at any time.

More detailed information appears in the Info Banner beneath the Channel Banner if you press the INFO button a second time. Banners disappear from the screen after a few seconds, but you can remove them from the screen instantly by pressing the CLEAR button on the remote control.

4-8.7.7.3 The OneLine™ Guide

The OneLine™ Guide appears at the bottom of the screen when you press ⊕ the joystick up or down while watching TV. You will see the channel call sign and number, titles, and program start and end times. Use the ⊕ joystick to move up or down while using the OneLine Guide to see the next or previous available channel. Press SELECT to tune to the channel.

360	10:30	11 AM	11:30	NOON
FOX	Family Classics	The O'Reilly Factor		TheStreet.com
FNC	PROGRAM GUIDE • Family			

OneLine Guide

You can also enter a channel number using the numeric keypad to display the OneLine Guide for that channel. OneLine Guide content varies according to **FAV LIST** menu selections and other filters. Press the CLEAR button on the remote control to instantly remove the guide.

4-8.7.7.4 Using TurboTune™

The TurboTune™ feature is a quick access guide to nine of your favorite channels. Press the TURBO button on the remote control to show the TurboTune panel. Use the ⊕ joystick to highlight the desired channel. The header area of the panel displays the title of the program currently airing on the highlighted channel. Press SELECT to tune to that channel.

Specify these channels using the Set Turbo menu tab after selecting Guide Options from the MAIN MENU, or highlight and SELECT the Setup pane below the TurboTune Menu. Highlight an unassigned channel box and press SELECT. Enter the desired channel using the ⊕ joystick, numeric remote control buttons, or the CHANNEL (CH) button.

DIRECTV Pay Per View Prev		
QVC	HBO	SHOWTIME
cinemax	DIRECTV	ESPN
CNN	abc	HGTV
Setup		

TurboTune Menu

4-8.7.8 Setting Favorites and Filters

This section explains:
- How to create a channel list
- Renaming a channel list
- Using Auto Set, Add All, and Del All functions
- How to filter the program guide
- How to change guide times

4-8.7.8.1 Using Favorite Channel Lists

Channel Lists are provided to help you organize the hundreds of available channels into groupings suitable for your family. Each list can contain as many or as few channels as you wish. You can customize these groups several ways. For example, *Fav. A* could be Dad's favorite channels, *Fab. B* could be Mom's favorites, *Fav. C* could be the kids' channels, and *Family* could be all channels that Mom and Dad have deemed appropriate for the entire family.

Creating a Channel List
1. Press the remote control MENU button.
2. Select the **Guide Options** from the **MAIN MENU**.
3. Use the ⊕ joystick to highlight the **Fav Setup** tab.
4. Press SELECT to open the **FAVORITE LIST SETUP** pane shown below.
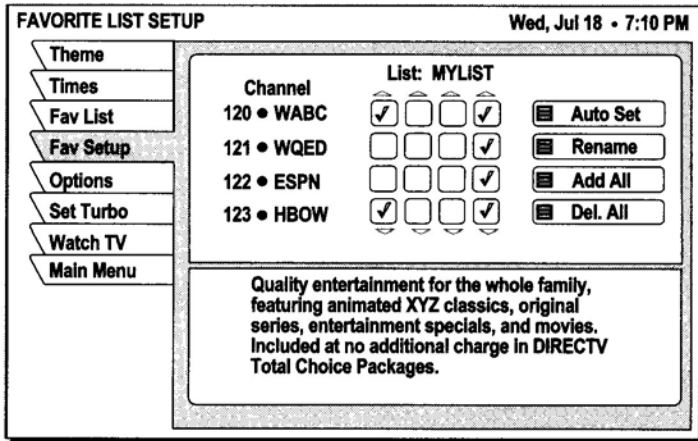
The four columns of small boxes on the right hand side of the pane are the Tag Boxes. The first three columns are the *Fav. A, Fav. B*, and *Fav. C* channel lists. The farthest right hand column is the *Family* list.

NOTE: If the receive is locked, only existing Family list channels are accessible. If the Family list has not had channels added to it, no channels can be viewed without first unlocking the receiver. To avoid this inconvenience, create the Family list before locking the receiver. See Section Using Access Controls for additional details about controlling system access.

5. Use the ⊕ joystick to highlight the tag box that corresponds to the channel number and list that you wish to create or change.
6. Press SELECT to add or remove the check mark, which indicates that the channel in that row is included in the list shown at the top of the column.

To help you decide whether to include or exclude a certain channel, the title of the program currently airing on that channel appears at the top of the screen.

7. Scroll up or down to view channels and descriptions. Press SELECT to add channels to your list.
8. When you have added all of the channels you want to your list, use the ⊕ joystick to highlight and SELECT the **Watch TV** tab to resume viewing.

Once you have created your lists, use the remote control FAV button to cycle through them quickly and easily. Each press cycles to next channel list. You can also select a list by highlighting the **Fav List** tab.
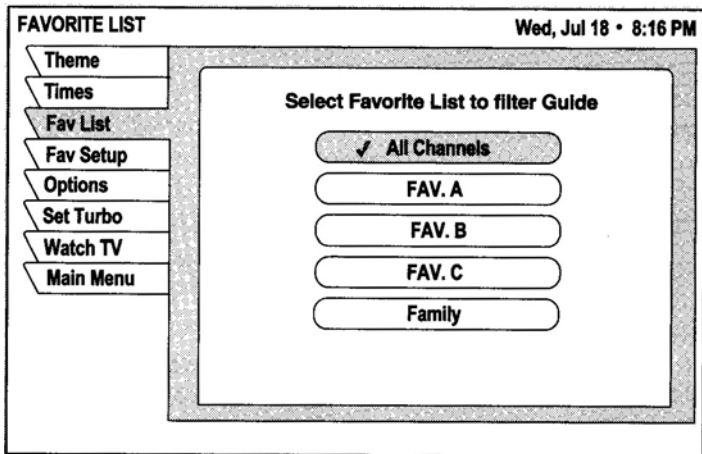
Renaming a Channel List
1. Highlight the Rename button and press SELECT.
   A Rename List pop-up menu appears. You can rename the first three lists.
   You cannot rename the All and Family lists
2. Highlight the list you wish to rename and press SELECT. A button board pop-up panel appears.
3. Highlight the desired letter using the ⊕ joystick.
4. Press SELECT to enter the letter.
5. When finished, Select OK.

Creating an Auto Set List
1. SELECT the *Auto Set* button. A pop-up menu appears showing each of the channel lists.
2. Highlight and SELECT a channel list to be programmed.
   Once selected, the **Auto Set Progress** pop-up status panel appears. It may take several minutes for the receiver to scan through all of the channels and determine which ones you are authorized to receive. The results of this scan will be stored in the designated channel list.

NOTE: Auto Set may exclude some channels such as the Music Choice channels or include some pay per view channels. This does not mean that the receiver is faulty. These channels were excluded or included due to the DIRECT TV Receiver's analysis process. You can manually edit the lists to correct these oversights.

Adding and Removing All Channels
Selecting the Del All menu button clears all channels from the list you have chosen. Add All has the opposite effect, creating a list of all the channels you are authorized to receive.

4-8.7.8.2 Filtering the Program Guide

Press the remote control GUIDE button while in a guide. A pop-up menu provides filtering tools and ways to access other guide styles. By combining each of these filter options, you can quickly narrow down channels to those that match your viewing interests.

Using Theme Filters
From the **MAIN MENU**, SELECT the **GUIDE OPTIONS** tab. The **CATEGORY FILTER** menu appears, listing all available program category groups.
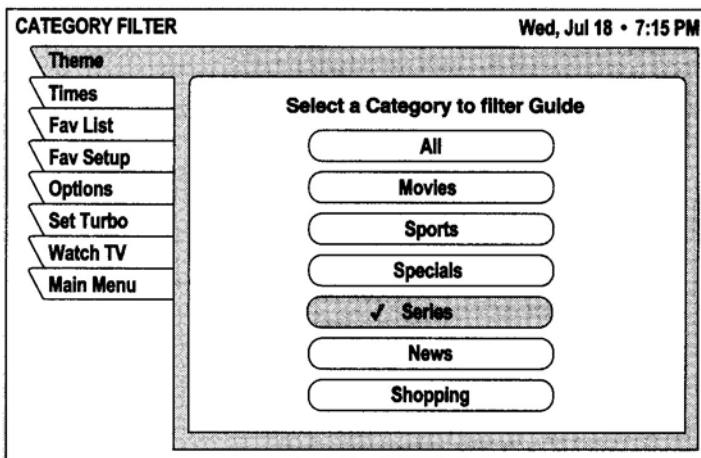
After choosing a category (other than *All*), the drop-down menu is replaced by the *Types* pop-up menu. This menu allows you to further refine a chosen theme. In addition to *All*, you can select popular categories that can be quickly selected using the remote control GUIDE button.

For example, if you choose *Series* for the category, you can now choose a type of movie such as *Children, Comedy, Cultural Arts, Drama*, and others. Refer to the *following figure* for reference.
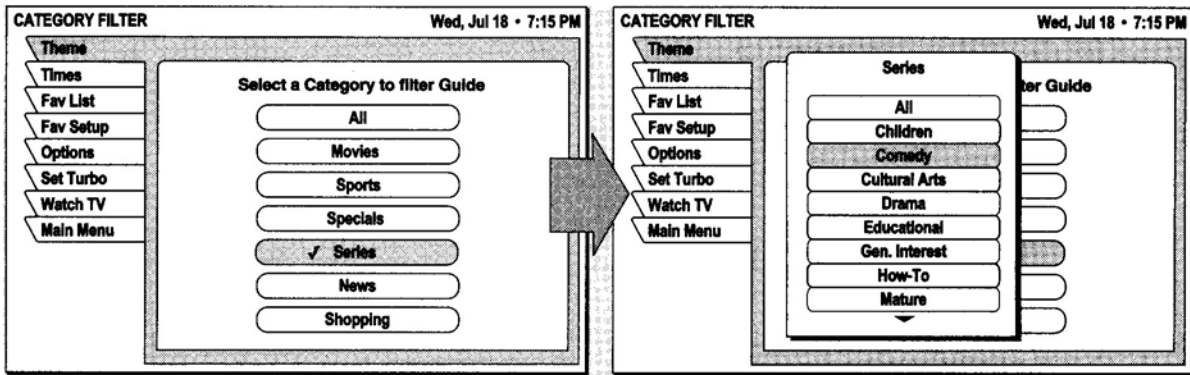
After selecting one of these, the guide will be further filtered to show only those channels offering programs of the selected category and type.

Selecting Guide Times
Highlight the **Times** menu tab. The **GUIDE TIMES** menu shown below provides easy access to future programming information. Simply select the time you want the guide to begin. After a few seconds, the selected guide appears.
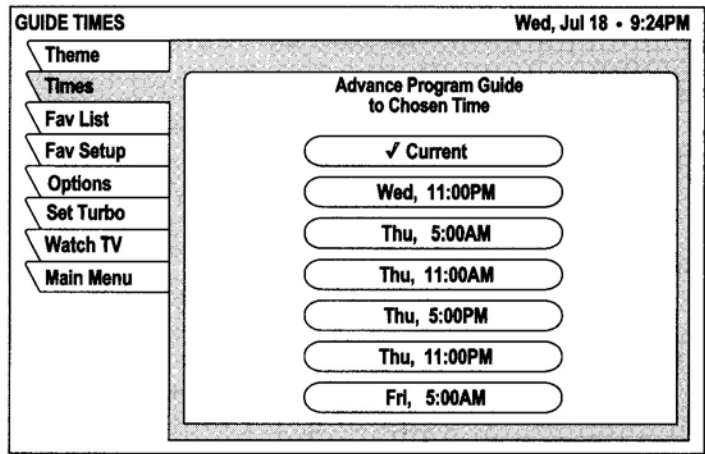
4-8.7.9 Using Access Controls

This section explains:
- How to lock and unlock the system.
- How to set a maximum ratings limit
- Setting maximum spending and time limits.

Locks & Limits provides settings to help you control the viewing restrictions of DIRECT TV® programming. When accompanied by the channel lists, these limits provide a great degree of control. The DIRECT TV Receiver must be locked for the TV Timer, Rating and Spending limits to be enforced.

4-8.7.9.1 Locking & Unlocking the System

When you first receive your satellite system, it will be unlocked; (i.e., no limits or restrictions are in effect). You must lock the system to enforce the limits (spending, ratings, TV timer, and "Family" favorite list).

NOTE: Once the DIRECT TV Receiver is locked, only existing Family list channels will be accessible. If the Family list does not contain any channels, no channels can be viewed without first unlocking the receiver. To avoid this, verify the contents of the Family list before locking the receiver.

How to Lock the System
When you SELECT the Lock button, the LOCK SYSTEM pop-up panel appears.
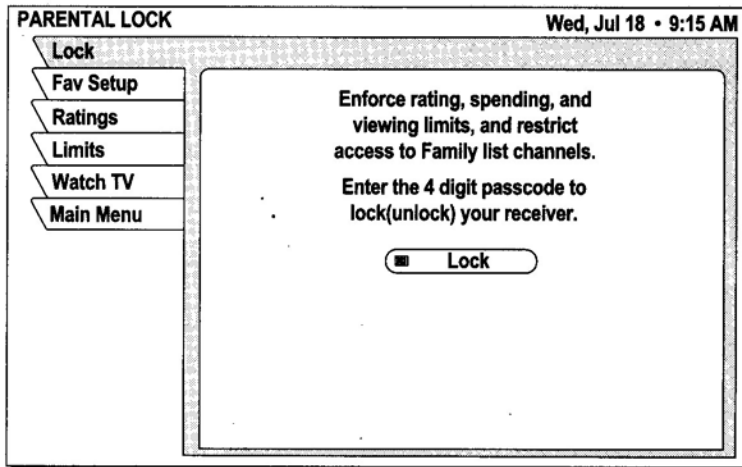
1. Enter a four-digit passcode using the remote control.
2. Highlight and SELECT *OK*.
3. Enter the code again to confirm.
4. Highlight and SELECT *OK*.

Once you select *OK*, the satellite receiver is locked. You must enter the passcode to unlock it. A lock symbol icon appears at the top of every menu screen to remind you that the system is locked.

NOTE: If you forget your four-digit code, you must call DIRECT TV. It is advised that you write down your passcode somewhere and store it in a secure place.

NOTE: If you need to cancel the locking process at any time during steps 1-4 (before you SELECT OK) you can press Cancel to clear the locking process.
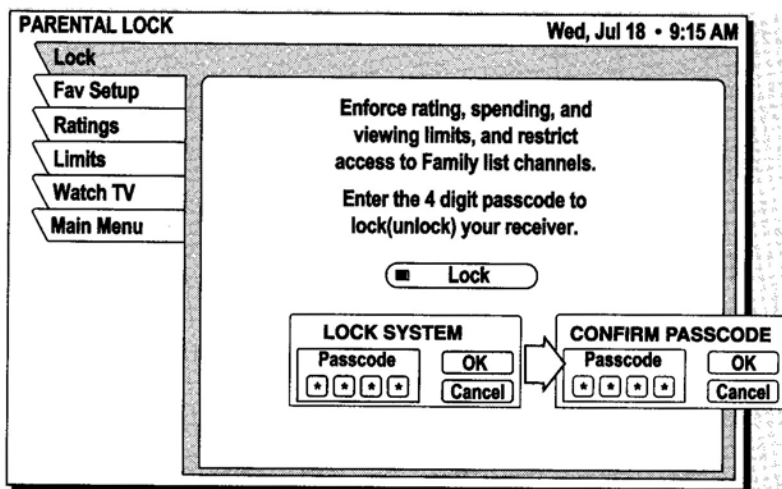
Unlocking the System
To remove the lock and its restrictions:
1. Highlight the **Locks & Limits** tab from the **MAIN MENU**.
2. SELECT the *Unlock* menu button.
3. Enter the code you entered to lock the system.

Once the system is unlocked, **all limits and restrictions are removed!** Choose *Cancel* to keep the lock in effect.

NOTE: The button that is used to lock the system is also used to unlock the system.

Setting Ratings Limits
Program ratings indicate the suitability of a program's content for a give audience.

Highlight the Max Ratings tab. Highlight and SELECT the highest rating you wish to allow. The chosen rating will be checked as shown in the figure below.
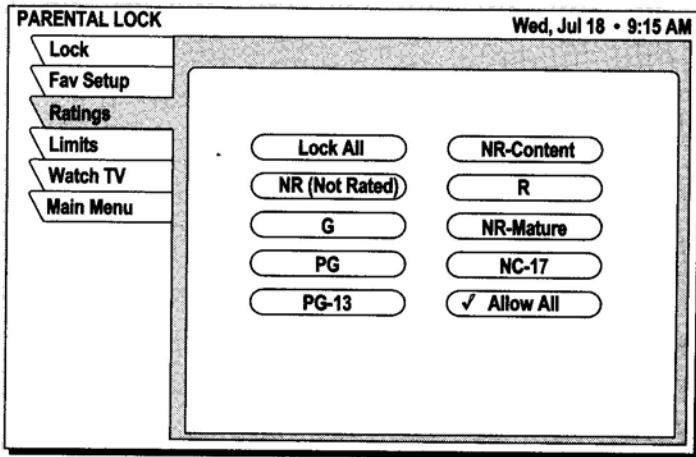
You may choose to **Lock All** or **Allow All** instead of setting a specific limit.

Setting Spending and Time Limits
Highlight the **Limits** tab to set the maximum spending limit. You can set the maximum purchase price on a per-event basis.

To change the displayed limit:
1. Highlight the **Max Spending** button
2. Press SELECT to display the **SPENDING LIMIT** pop-up panel.
Use this menu to set the specific hours and maximum hours the satellite receiver can be used for viewing.
3. Use the number buttons on the remote control to set the limit or use the joystick to increase or decrease each digit.
4. Use the joystick to highlight the digit that you want to change. The maximum limit is $655 per event.
5. Highlight **OK** and press SELECT to confirm the entered amount.
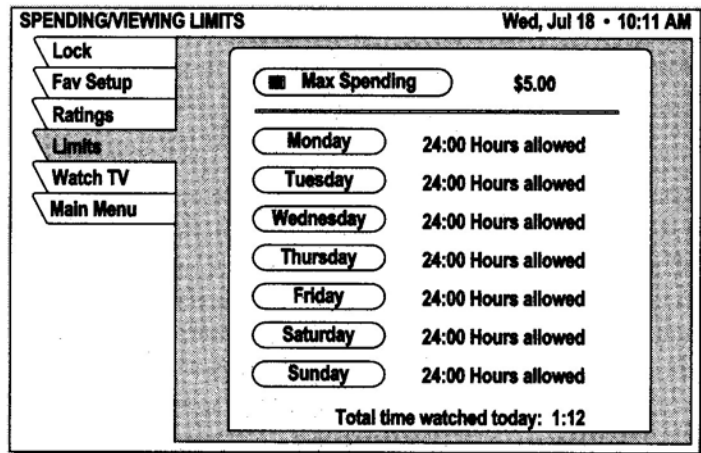
4-8.7.10 Frequently Asked Questions

Questions? Did we forget to tell you something? We have compiled some of the most common questions and their answers here.

Q *I had a signal but now I am getting a message "Searching for satellite signal. To access related utilities, press SELECT." What happened?*

A Rain clouds and snow can affect the satellite signal reception. This loss of signal is temporary. Also check for new growth on trees and bushes that could be blocking the signal. One other possibility is that the wind or someone has moved the satellite dish antenna.

Q *Why can't I control my TV?*

A Before you can control your TV, VCR, or any other device besides your satellite receiver, you must program your remote control to match your different devices. See Section Using the Remote Control in this manual for specific instructions. If you have already successfully programmed your remote control, try pressing the appropriate device key to put your remote in the proper mode. Then try controlling that device. For example if you are trying to control the VCR press the VCR button on the remote and then try controlling the VCR. Also, make sure that the batteries in the remote control are good.

Q *My satellite receiver does not respond when I press keys. What's wrong?*

A Most likely, if the front panel keys work but the remote control doesn't work, try pressing the SAT button before trying to control the digital satellite receiver. If that doesn't work, press the SAT and MUTE buttons together and try again. If that doesn't work, or if the front panel buttons don't work either, unplug your digital satellite receiver for 30 seconds, then plug it back in. Your satellite receiver is a computing device. It is susceptible to erratic changes in power and/or signal, just as any other computer, and these sudden changes can cause it to become "confushed."

Q *Some channels look good, while others freeze or indicate that no signal is available. What's wrong?*

A The most common cause for this behavior relate to an improperly grounded satellite cable. Check the cable between your digital satellite receiver and the satellite dish antenna. Confirm that RG-6 (not RG-59) cable is used and does not exceed 100 feet in length. Longer cable runs require amplification. This special amplifier is available from your dealer.

Q *How can I watch one channel while recording another?*

A With only one digital satellite receiver, unfortunately, you can't. Each receiver can only decode one channel at a time.

Q *I'm getting a message to call some extension. Why?*

A There are many different reasons for this. If you want to watch the channel that is displaying the message, call DIRECT TV at 1-800-531-5000.

Q *Why don't I have an on-screen offer to purchase pay per view programs?*

A There are three possibilities; your digital satellite receiver must be connected to a phone line and it is not, or DIRECT TV doesn't realize that your phone line is connected or has disabled your ability to make on-screen purchases. Call DIRECT TV at 1-800-531-5000 for assistance.

Q *Can I receive my local TV programs through my digital satellite receiver?*

A There are three ways to receive local programming:
1. If you are in an area where local programming is available via satellite and have the proper satellite dish antenna, contact DIRECT TV to arrange for the necessary subscription package.
2. Install a traditional antenna (i.e., roof mounted, rabbit ears).
3. Arrange for basic or "lifeline" cable TV service from your local cable company.

If you select item 1 above, your local programming appears in the program guide like any other channel. For options 2 or 3, connect the local signal to the IN FROM ANTENNA jack on the back of your digital satellite receiver. Use the INPUT key to switch between DIRECT TV® programming and local programming provided on the OUT TO TV connector.

Q *If I have questions about my satellite system or need to have it serviced, who should I call?*

A For issues regarding your equipment, contact Hughes Consumer Care Center directly at 1-800-274-8995, or if you prefer, call your dealer first. They are most familiar with your installation and needs. Also, they are likely to be local to you.

If you need assistance with your subscription, such as adding channels, contact DIRECT TV at 1-800-531-5000.

Q *I think I set an event to record on my VCR, but when I played the tape back nothing was there. What could be wrong?*

A There are several possible reasons for this. First, check that the VCR was programmed correctly and left turned on and the input matches the output from your digital satellite receiver. Confirm that you were authorized to tape the chosen program.

Q *Why do I need to connect the satellite receiver to a telephone line?*

A The telephone connection is used by the satellite receiver to report purchase activity to DIRECT TV.

Q *I picked up my telephone and it was making a hissing and squealing sound. Why?*

A Your digital satellite receiver was reporting any pay per view activity that may have occurred. This rarely happens and only lasts for a minute or so.

Q *What if my question isn't listed here?*

A Call your dealer or Hughes Consumer Care Center at 1-800-274-8995. We will do our very best to answer your questions.

4-8.7.11 Manufacturers Device Control Codes
Use these codes to program your remote control to operate your system components.

4-8.7.11.1 VCR Brands and Remote Control Codes

BRAND	CODE NUMBER
Aiwa	034
Akai	016, 043, 046, 124, 125, 142, 146
Ampro	072
Anam	031
Audio Dynamics	012, 023, 039, 043
Broksonic	035, 037, 044, 129, 152
Canon	028, 031
Capehart	108
Craig	003, 040, 135
Curtis Mathes	031, 041, 156
Daewoo	117, 119, 005, 116, 007, 010, 065, 108, 110, 112
Daytron	108
Dimensia	156
DBX	012, 023, 039, 043
Dynatech	034, 053
Electrohome	059
Emerson	006, 029, 035, 025, 027, 034, 036, 037, 046, 101, 129, 131, 138, 017, 031, 044, 152, 157, 153
Fisher	003, 008, 009, 010
Funai	034
GE	031, 072, 144, 147, 063, 151, 107, 109, 156, 126
Go Video	040, 132, 136
Goldstar	101, 123, 012, 001, 114
Harman Kardon	012, 045
Hughes	001
Hitachi	001, 026, 034, 063, 137, 150, 156
Instantreplay	031
JCL	031
JCPenney	001, 012, 040, 101, 156, 066
Jensen	043
JVC	048, 050, 043, 130, 060, 012, 031, 150, 055, 158
Kenwood	014, 034, 047, 048, 023
Lloyd	034
LXI	034, 003, 009, 017
Magin	040
Magnavox	067, 031, 034, 041, 068, 154, 160, 064
Marantz	067, 069, 031, 067, 012, 023
Marta	101
Matsui	027, 030
MEI	031

BRAND	CODE NUMBER
Memorex	102, 101, 003, 010, 014, 031, 034, 053, 072, 139, 134
MGA	045, 046, 059
Minolta	001, 156
Mitsubishi	001, 059, 061, 046, 051, 142, 045, 162
MTC	034, 040
Multitech	023, 034
NEC	012, 023, 043, 048, 039
Nordmende	043
Optonica	053, 054
Panasonic	070, 133, 031, 066, 160, 161
Pentax	001, 013, 063, 156
Philco	031, 034, 067
Philips	031, 034, 067
Pilot	101
Pioneer	021, 013, 048
Portland	108
Quartz	002, 014
Quasar	070, 133, 160, 161, 031, 066
Radio Shack	123
RCA	031, 072, 144, 147, 063, 151, 107, 109, 156, 126
Realistic	003, 008, 010, 014, 031, 034, 040, 053, 054, 101
Rico	058, 078
Salora	014
Samsung	102, 040, 032, 104, 107, 109, 112, 113, 115, 120, 122, 125, 159
Sansui	043, 048, 135, 022
Sanyo	003, 010, 102, 007, 014, 134
Scott	017, 037, 044, 129, 131, 112, 159
Sears	001, 003, 008, 009, 010, 014, 017, 081, 101
Sharp	031, 054, 053
Shintom	024
Signature	034
Sony	003, 031, 052, 056, 057, 058, 149, 155
Soundesign	034
STS	001
Sylvania	031, 059, 034, 067
Symphonic	034
Tandy	010, 034
Tatung	039, 043, 023
Teac	034, 039, 043, 023

VCR Codes Cont.

BRAND	CODE NUMBER
Technics	031, 070
Teknica	031, 019, 034, 101
TMK	006
Toshiba	112, 008, 131, 047, 059, 082, 001, 042
Totevision	040, 101
Unitech	040
Vector Research	012
Video Concepts	012, 046, 034, 141
Videosonic	040
Wards	003, 001, 024, 031, 034, 040, 053, 054, 017, 131
Yamaha	012, 043, 034, 039
Zenith	072, 080, 056, 048, 034, 101, 058

4-8.7.11.2 Television Brands and Remote Control Codes

BRAND	CODE NUMBER	BRAND	CODE NUMBER
Admiral	072, 081, 160, 161	Fisher	007, 057
A Mark	112, 143	Fujitsu	198
Akai	070, 146	Funal	028, 043
Amstrad	052	Futuretech	043
Anam	043, 054, 056, 080, 112	GE	160, 165, 161, 070, 008, 009, 034, 056, 073, 074, 130, 155, 167, 004, 145
AOC	070, 004, 058, 112		
Audiovox	076, 120		
Blaupunkt	088	Goldstar/LG	004, 106, 110, 112, 119, 127, 143, 193
Cairn	206		
Candle	070, 002, 003, 004	Gradiente	004, 038, 106
Capehart	058	Hall Mark	004
CCE	001, 004, 024	Hitachi	007, 011, 004, 009, 010, 012, 023, 072, 075, 143, 158
Cetronic	043		
Citizen	070, 002, 003, 004, 043, 101, 103, 143	Infinity	164
		JBL	164
Classic	043	JCPenney	070, 004, 008, 009, 024, 030, 065, 101, 160, 143, 156
Concerto	004		
Contec	043, 054, 191		
Coronado	143	Jensen	013
Craig	043, 054, 191	JVC	001, 034, 038, 083, 199
Crown	043, 143	KEC	043
Curtis Mathes	070, 101, 143, 004	Kenwood	070, 001
CXC	043	Kloss	002, 059
Daewoo	076, 103, 004, 016, 043, 114, 120, 127, 143, 128, 136, 192, 044	KMC	143
		KTV	043, 143, 154, 070
Daytron	004, 143	Lodgenet	072
Dynasty	043	Logik	072
Dynatech	062	Luxman	004
Electrohome	024, 076, 120, 143	LXI	007, 015, 052, 081, 160
Emerson	004, 005, 028, 043, 047, 048, 050, 051, 076, 120, 143, 151, 153, 154, 155, 070, 096, 191	Magnavox	003, 004, 022, 059, 060, 061, 063, 064, 070, 094, 127, 160, 164
		Marantz	070, 164
		Matsui	164

TV Codes Cont.

BRAND	CODE NUMBER
Memorex	004, 007, 072
Metz	088
MGA	024, 070, 004, 024, 028, 042
Minerva	088
Mitsubishi	004, 024, 040, 042, 028, 146
MTC	070, 004, 062, 101
NAD	015, 025
NEC	070, 040, 016, 056, 024, 130, 134, 019, 004
Nikei	043
Onking	043
Onwa	043
Optonica	019, 081
Orion	201, 202, 203, 204, 205
Panasonic	034, 080, 056, 164
Philco	070, 003, 059, 060, 064, 004, 056, 063, 024, 164
Philips	164, 093, 038, 005, 059, 127, 070, 003, 004
Pioneer	025, 070, 004, 018, 023, 190
Portland	004, 143, 065
Proscan	160, 161, 167, 145, 065
Proton	004, 058, 112, 143, 171, 173
Quasar	034, 056, 080, 164
Radio Shack	004, 019, 043, 129, 143
RCA	160, 161, 156, 165, 065, 070, 004, 023, 024, 056, 074, 152, 167, 145
Realistic	007, 019, 043, 047
Runco	072, 130
Sampo	004, 070, 058, 207
Samsung	101, 004, 050, 089, 105, 160, 127, 143, 133
Sanyo	007, 020, 053, 057, 082
Scott	004, 028, 043, 048, 143
Sears	015, 030, 028, 094, 004, 007, 057, 082, 143, 160, 167
Seleco	200

BRAND	CODE NUMBER
Sharp	081, 004, 014, 019, 022, 028, 143
Siemens	088
Signature	072
Sony	001, 085, 126, 166, 079
Soundesign	028, 003, 004, 043
Spectricon	112
SSS	004, 043
Supre Macy	002
Sylvania	003, 044, 059, 060, 063, 064, 070, 127, 160, 164
Symphonics	194, 052
Tandy	081
Tatung	056, 062
Technics	034, 080
Techwood	004
Teknika	002, 003, 004, 024, 028, 043, 072, 101, 143
Telerent	072
Tera	173
TMK	004
Toshiba	015, 030, 007, 040, 062, 101
Universal	008, 009
Video Concepts	146
Vidtech	004
Wards	004, 019, 064, 008, 009, 028, 060, 061, 063, 072, 074, 143, 164, 165
Westinghouse	076, 120
Yamaha	004, 070
York	004
Yupiteru	043
Zenith	072, 073, 095, 103
Zonda	112

4-8.7.11.3 Aux Audio Brands and Remote Control Codes

BRAND	CODE NUMBER
Adcom	146, 149, 227, 244
AMC	083, 084
Arcam	100
Audio File	093, 098
Audio Techinica	221
Aiwa	111, 114, 117, 156, 170, 199, 203, 219, 231, 241, 254
Akal	181, 233
Anam	180
Bose	064, 137, 219
B & K	150, 152
Carver	013, 098, 107, 126, 129, 160, 163, 220, 245, 249
Clarion	151, 169
Denon	101, 133, 191, 202, 208, 246, 247
Englightened Audio	078, 153
Fisher	107, 129, 157, 163, 176
Fosgate Audionic	228, 248
GE	216, 123
Harmon Kardon	073, 195, 248, 249
Haitai	119
Hitachi	088
JCPenney	109, 154, 178
Jesen	099
Jerrold	141
JVC	112, 198, 252
Kenwood	096, 104, 119, 125, 148, 151, 163, 171, 173, 242
Krell	223
Lexicon	215, 250
Luxman	066, 120, 205, 229
LXI	127, 177
Magnavox	126, 162, 185, 186, 224, 228
Marantz	074, 105, 126, 128, 139, 155, 162, 186, 232
McIntosh	251
Mondial	069, 225

BRAND	CODE NUMBER
MCS	108, 178
Mitsubishi	253
Meridian	013, 067
NAD	128
Nakamichi	072, 212, 234, 235
Niles	236
Onkyo	094, 115, 116, 209, 211, 255
Optimus	121, 125, 140, 181
Panasonic	131, 144, 187, 200
Parasound	085, 086, 090
Philips	136, 186, 126, 197
Pioneer	093, 132, 138, 210, 165, 189, 195, 201, 081, 230
Quasar	131, 187
RCA	109, 213, 166
Realistic	103, 122, 123, 124, 172, 174, 177, 179, 180, 194
Rotel	204, 218, 239
Sansui	196, 214, 126, 139, 075, 197
Sanyo	157, 129
Samsung	068
Scott	180, 190
Sharp	096, 125, 151, 161, 169, 182, 193
Sherwood	089, 127
Sony	097, 117, 147, 183, 200, 253, 237, 238, 188, 192
Soundstream	197
Starcom	141
Symphonic	124
Teac	102, 159, 180, 062
Technics	131, 184, 187, 200, 202, 208, 165
Toshiba	175
Wards	163
Yamaha	092, 120, 166, 240, 125, 169, 216
Zenith	222, 061

4-8.7.11.4 Aux-CATV Brands and Remote Control Codes

BRAND	CODE NUMBER
Hamlin	015, 017, 022
Jerrold/G.I.	010, 021, 025
Oak	008, 016, 023
Pioneer	007, 026, 027

BRAND	CODE NUMBER
Scientific Atlanta	002, 006, 013
TOCOM	003
Zenith	004

4-8.7.11.5 DVD Player Brands and Remote Control Codes

BRAND	CODE NUMBER
Alpine	009
Apex Digital	076
Denon	030, 226
GE	035, 036
Goldstar, LG	028, 041
Harmon Kardon	217
Hitachi	011
JVCt	031
Magnavox	038, 042, 008
Marantz	006, 007
Mitsubishi	032
NAD	077

BRAND	CODE NUMBER
Onkyo	207
Panasonic	003, 039
Philips	038, 042, 006, 007
Pioneer	034, 005, 010
Proscan	035, 036
RCA	035, 036
Samsung	029, 040
Sharp	004
Sony	037
Toshiba	038, 001
Yamaha	039, 079
Zenith	028, 041

4-8.7.11.6 DVD-Laser Disc Player Brands and Remote Control Codes

BRAND	CODE NUMBER
California Audio	047
Denon	043, 044
Fisher	047
Kenwood	060
Magnavox	048, 057
Mitsubishi	057
NAD	057
Optimus	049
Panasonic	047, 051, 054
Philips	048
Pioneer	048

BRAND	CODE NUMBER
Quasar	047
Radio Shack	056
RCA	046
Realistic	049
Runco	058
Sanyo	052
Sharp	060
Sony	050, 053
Technics	047, 051, 054
Toshiba	060
Yamaha	045, 059

DIRECTV® HD RECEIVER USER GUIDE

Great TV viewing is in your hands!

A good way to begin learning about your DIRECTV® HD System is to familiarize yourself with the remote control. You'll find further details throughout the User Guide relating to specific functions.

Navigating 101

You'll find you can get around nearly all on-screen menus the same simple way.

▸ **Highlight…** a menu or button by using the ARROW keys (up, down, left and right).

▸ **Choose it…** by pressing SELECT while the item is highlighted.

Note: Don't worry about getting stuck in any menu or on any item. You can always press EXIT or BACK.

TV INPUT
Selects which piece of equipment displays the video picture on your TV — TV (Satellite), VCR, DVD or AUX

FORMAT
Cycles the resolution and screen formats that are set in Settings. Each time you press the key, it cycles to the next available format and resolution.

STOP

Keys in this shaded area can be programmed to function with your VCR, DVD player or stand-alone DVR unit.

REPLAY

REWIND

PAUSE

ACTIVE
For future use.

GUIDE
Displays the on-screen programming guide

SELECT
Chooses or activates any highlighted item

MENU
Brings up a helpful menu of settings and services

BACK
Takes you to the screen you visited previously

RED
Function changes with context — for example, on the left-most tab, press to jump to the right-most tab

GREEN
Function changes with context — for example, on the right-most tab, press to jump to the left-most tab

VOLUME
Raises or lowers volume

MUTE
Temporarily turns off sound volume

MODE SWITCH
Changes remote to control other equipment, i.e., a VCR

POWER
Turns equipment on and off, based on the position of the MODE SWITCH

TV POWER/ON/OFF
Turns your TV and DIRECTV HD Receiver on and off, when MODE SWITCH is set to DIRECTV

ADVANCE

PLAY

FFWD

RECORD

LIST
Displays your To Do List of programs

EXIT
Exits any menu and returns to last channel viewed

ARROWS
Move highlight to items in whatever direction needed

INFO
Displays information on a highlighted program or item

BLUE
Function changes with context. In live TV, displays a one line mini-guide.

YELLOW
Cycles through alternate audio tracks, when available

CHAN/PAGE
In live TV, changes channel up or down; in a menu, such as the Guide, moves entire page up or down

PREV
Tunes to the last channel viewed

NUMBER KEYS & DASH
Tunes to a channel directly; also used to input numbers and letters when needed in on-screen menus

ENTER
Activates number entries more quickly; also, sets a highlighted program for AUTOTUNE

Welcome to DIRECTV

Table of Contents

Introduction

Chapter 1

Welcome

Congratulations on choosing the best entertainment experience around!

With its astounding variety of channels and choices and unbeatable high-definition technology… DIRECTV® HD service offers everything you'd want in your television experience. You can expect more than ever before, with access to over 225 channels including our awesome HD selections and over 30 premium movie channels, with something sure to please everyone in the family. DIRECTV Pay Per View offers a handy choice in recent hit movies, plus exciting live sports, concerts and specials. There are exclusive sports subscriptions for every taste and team. Even access to 36 commercial-free music channels!

To deliver this unique programming and enhance your entertainment experience, the DIRECTV® HD Receiver has been designed to be simple and user-friendly. You'll find that most features are self-explanatory, with on-screen directions to lead you through them.

So, welcome to the family. You're sure to discover that using and watching TV is more exciting and enjoyable than ever.

About Your User Guide

Before you can start enjoying your new DIRECTV HD System and service, you'll need to know more about getting everything up and running, as well as learn all about how to use our great features.

This User Guide will walk you through how to connect your equipment and other Audio/Video (A/V) components, show how to customize your setup, and explain how to activate your programming. You'll find full details on all of our easy-to-follow system features. Plus, there's important safety, troubleshooting and warranty information.

For some quick references for using and setting up your system, check out handy info on:

‣ the remote control… inside front cover

‣ helpful equipment definitions… on page 18.

‣ glossary of icons… inside back cover

‣ important phone numbers & resources… back cover

If you're having your system professionally installed, be sure to thoroughly check out the **Safety & Care** portion of the next section, then you may want to go ahead and skip to **Guided Setup & Activation** on page 32.

Ready to get started? Just turn the page!

look here for
chapter title

look here for
section title

look here for
page # and chapter #

look here for
page # and
section title
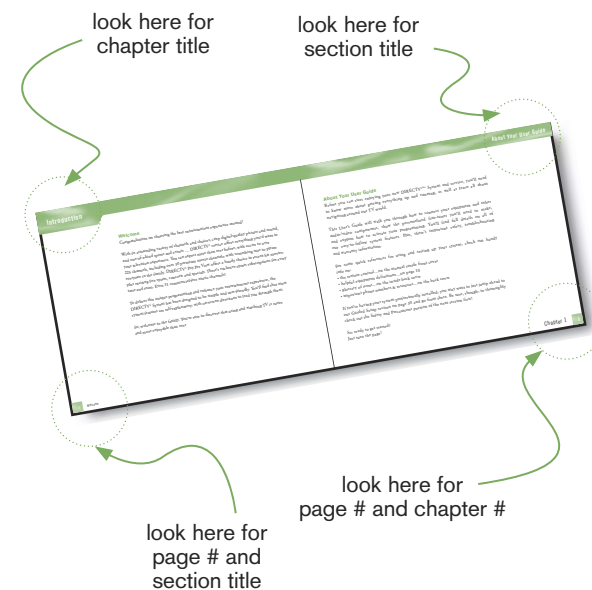
Defining High-Definition

What is HD, and how does it differ from regular TV? To learn more, here's some helpful information about high-definition and your DIRECTV HD Receiver.

Types of TV Broadcasts

Analog TV is the type of TV broadcast you may be most familiar with. If you get your broadcasts via a standard off-air antenna, it's the type you receive, and most broadcasts from local cable companies are analog as well.

Digital TV is a newer system for broadcasting TV signals delivering higher quality audio and video. "Digital TV" refers to a television that can receive and display digital images.

▸ **SDTV** (standard definition TV) is digital TV that offers a high picture quality that is better than older analog televisions. An SDTV can display an image at a resolution of 480i.

▸ **EDTV** (enhanced definition TV) is digital TV that can display a higher resolution picture than SDTV. An EDTV can display at 480i or 480p.

▸ **HDTV** (high definition TV) is digital TV that can provide the highest quality picture, at resolutions 1080i, 720p, 480p, or 480i.

See "Resolutions and Interlacing" on page 6, for an explanation of display resolutions.

Equipment You'll Need

To view HD programming, you'll need, in addition to your DIRECTV HD Receiver:

‣ A high-definition TV set (or HDTV monitor)
‣ A triple LNB 18" x 20" DIRECTV Multi-Satellite dish antenna

To enjoy select HD programming available on off-air local channels, you will also need an off-air antenna (sold separately) connected to your DIRECTV HD Receiver. This is possible only in cities where local broadcast stations make digital TV programs, such as high-definition, available; reception may vary based on your geographic location.

What You Can Watch

With the DIRECTV HD Receiver, you have access to all types of televised programming, including:

‣ DIRECTV high-definition and standard-definition digital programming via satellite, including local channels if offered in your area (DIRECTV service subscription required).
‣ Local digital TV channels, including any local HD broadcasts shown in your area, available via an off-air antenna.

Resolution & Interlacing

Two elements that determine the quality of a TV picture are:

Resolution
For TV equipment and broadcasts, resolution is defined by the number of horizontal lines displayed to make up each frame of a video image. The more lines of resolution used to compose each frame, the more detailed and sharp the picture. Standard TV resolution uses 480 horizontal lines to make up each video frame; HDTV uses either 720 or 1080 lines to compose each frame.

Interlaced & Progressive
If you've ever looked very closely at your TV, you have noticed the picture is actually made up of many lines scanning across the screen. The set of lines that make up a complete image are called a "frame." Like a child's flipbook where the image seems to move as the pages change, your TV displays video by changing these frames at a rate 60 frames per second.

The term "interlacing" refers to whether each of those frames contains all of the lines of image, or every other line. Interlaced signals take every other line from 2 frames, each lasting 1/60th of a second, and combine them into one frame lasting 1/30th of a second. In this way, interlacing tricks the eye into thinking it's seeing twice the resolution that's actually being displayed. In non-interlaced video, referred to as "progressive scan" video, frames are displayed every 1/60th of a second containing all of the lines of video information.

The specifications for video resolution are usually stated by giving the number of horizontal lines (480, 720 or 1080, as described above) followed by either the letter "i" (for interlaced) or "p" (for progressive scan). Most standard TV broadcasts are 480i; some DVDs and non-HDTV digital broadcasts use 480p. Specification for HDTV broadcasts and equipment requires either 1080i or 720p. While there's some debate as to whether it's preferred to have more lines interlaced or fewer lines progressively scanned, it's generally accepted that 1080i is the highest quality video format.

Aspect Ratio

In addition to resolution and interlacing, a television picture is also defined by the aspect ratio of its broadcasts—referring to the shape of the screen as defined by the ratio of the screen's width to its height.

For analog TV, the aspect ratio is 4 units wide by 3 units high (usually written 4:3). This is the familiar shape of conventional TVs—slightly wider than they are tall. SDTV and EDTV can be either 4:3 or 16:9. For HDTV broadcasts, the aspect ratio is 16:9—nearly twice as wide as it is tall. This is, not coincidentally, more like the shape of movies shown in theaters, which makes HD an ideal format for viewing movies on TV.

Screen Formats

What if you're watching a nearly square-shaped 4:3 broadcast on a 16:9 TV, or vice versa? The DIRECTV HD Receiver lets you choose from a variety of screen formats to deal with those scenarios. You can set up your preferences for format during guided setup. You can change these settings at any time.

4:3 TVs showing 16:9 programs

For a standard 4:3 TV showing a wide screen program, the program is too wide to fit on the screen. To alleviate this, choose:

Letterbox

With this format, the 16:9 image is shrunk until the entire width of the program fits on your TV. Since the aspect ratio of the program is maintained, the image is no longer tall enough to fill your screen, so gray or black bars are seen at the top and bottom of the screen. To change the bar color, access the HDTV screen in System Setup as described above, then select the desired bar color option under the TV Ratio tab. See your TV owner manual for information on the best color for your set.

Full

In the Full setting, 16:9 images are stretched to fit the height of the screen. But, instead of adding bars to the top and bottom, the 16:9 program image is stretched vertically until it's tall enough to fill the screen. Your entire screen will be full, but the program images are stretched to compensate.

Zoom

This format crops (cuts off) the left and right portions of the 16:9 frame so it fits the 4:3 screen.

If your display is a 4:3 format TV or Monitor, your format options include these:	
For 4:3 program signals:	Fills TV Screen
For 16:9 program signals:	Letter Box Full Zoom

16:9 TVs showing 4:3 programs

For a wide screen 16:9 TV showing a standard 4:3 TV program, the program is too tall to fit the screen. Your choices here include:

Pillar box
The 4:3 aspect ratio is maintained, the image is no longer wide enough to fill the screen, so gray or black bars are seen at the left and right edges. To change the bar color, access the HDTV screen in System Setup as described above, then select the desired bar color option under the TV Ratio tab.

Full
In this setting, instead of adding bars to the sides, the 4:3 program image is stretched horizontally until it's wide enough to fill the screen. Your entire screen will be full, but the images are a little stretched to compensate.

Zoom
This format crops (cuts off) the top and bottom of a 4:3 frame, keeping the 4:3 ratio intact.

If your display is a 16:9 format TV or Monitor, your format options include these:	
For 4:3 program signals:	Pillar Box Full Zoom
For 16:9 program signals:	Fills TV Screen

Dolby® Digital 5.1

The recommended audio format for HDTV is Dolby® Digital 5.1.

This format offers five discrete channels of mid- and high-range digital audio, plus one channel of low-frequency (subwoofer) audio for use by A/V receivers capable of decoding the 5.1 channel signal. The audio signals are broken into left-front, center, right-front, left-rear, right-rear and low-frequency. The result, when your DIRECTV HD Receiver is connected to a compatible Dolby Digital 5.1 channel A/V receiver and speaker setup, is an experience that gives you much of the dynamic range, 360-degree imaging and sonic excitement of a real theater.

Not all TV programs are broadcast using Dolby Digital 5.1. For DIRECTV programming, shows broadcast using this high-quality audio standard are indicated by the words Dolby Digital in the Channel Banner (see page 41) and Program Guide (see page 43).

If you are using the Digital Audio Output (Optical, Coax or HDMI) from your DIRECTV HD Receiver to a digital audio (A/V) receiver or TV, you can set your preference by going here:

1) While in Live TV press MENU.
2) From the *Quick Menu*, SELECT *Settings*.
3) Scroll down to *Setup* and press SELECT.
4) Scroll down to *Audio*, and press SELECT.
5) Scroll up to the tabs and scroll over to *Digital Audio* and press SELECT.
6) Scroll to *Dolby Digital* and SELECT *On* or *Off*. If you set this to "Off", then the audio on the Digital Outputs will always be in PCM (L/R Stereo).
7) If you set the *Dolby Digital* to "On", then you should also setup the Digital Output.
8) Scroll to *Digital Output* and presse SELECT:
    – *Dolby Digital*: if you want programs to be heard in Dolby Digital when available
    – PCM if you want programs (with and without Dolby Digital) to be heard in L/R stereo only.

Getting Connected

Chapter 2

Getting Connected

Making the Right Connections

Ready to connect your DIRECTV® HD Receiver and your other components?

Whether you're having your system professionally installed or handling it yourself, be sure to read over the following few pages to familiarize yourself with some important tips for safety and care.

Before you begin

Your satellite dish antenna must be installed before you can begin following the procedures in this User Guide. (Professional installation is highly recommended.) Your dish needs to be mounted in a position where it has access to the satellite signals, and RG-6 coaxial cables must be run into the room(s) where your receiver(s) will be located. If you choose to install the dish yourself, see the separate instruction manual that came with your satellite dish antenna.

Package Contents

The following items are included with your DIRECTV HD Receiver:

- ‣ A/V cables (RCA type)
- ‣ S-Video cable
- ‣ Phone cord
- ‣ Power cord

- ‣ Access card
- ‣ User Guide
- ‣ RF/IR Remote with 2 batteries
- ‣ Component Video cables (YPbPr)
- ‣ RF Remote antenna

Safety & Care

Your DIRECTV HD System has been designed and manufactured to stringent quality and safety standards. You should, however, be aware of the following important precautions for safe and optimal use of the equipment.

Be sure to…

1) **Read and follow** all installation and operating instructions.

2) **Keep instructions** for future reference.

3) **Heed all warnings** on the equipment and in the instructions for your protection.

Cautions…

4) **Avoid moisture** to reduce the risk of fire or electric shock. The DIRECTV HD Receiver should not be used near water (i.e., kitchen sink, bathtub, pool, damp basement). Also, never spill liquid on the receiver, and do not place vases or other vessels containing liquid on top of it.

5) **CAUTION: Electric Shock** – never attempt to disassemble the DIRECTV HD Receiver yourself; always take it to a qualified service person when repair is required. Opening/ removing covers may expose dangerous voltage or other risks, and incorrect reassembly can cause shock when receiver is subsequently used. Attempted self-repair may also void your warranty.

TIP

We highly recommend plugging the DIRECTV HD Receiver into a surge protector to prevent damage from fluctuations in your power supply.
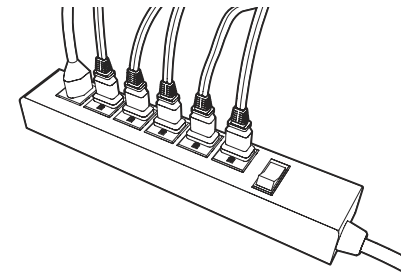
6) **Have your DIRECTV HD Receiver professionally serviced** (do not attempt to service it yourself) if:

‣ The power supply cord or plug is damaged or frayed

‣ Liquid has spilled into the product or it has been exposed to water

‣ The receiver has been dropped or damaged

‣ The receiver exhibits a distinct change in performance

‣ The receiver does not operate normally when you follow operating instructions as described in this manual and its Troubleshooting section.

7) **Protect your components from power surges** by connecting all the components before plugging any power cords into the wall outlet. Use of a surge protector is also recommended.

8) **Don't overload power outlets** or extension cords, which can result in the risk of fire or shock. It's also important to use only the type of power source indicated on the marking label or in this manual.

9) **Always unplug** the DIRECTV HD Receiver, TV and other equipment before you connect or disconnect any cables.

10) **Always unplug** your DIRECTV HD Receiver before moving it. Also, unplug it during lightning storms or when unused for long periods of time.

11) **Protect power cords** by routing them so they will not be walked on or pinched in any way.

12) **Avoid audio hum or interference** by inserting all cable plugs firmly into their jacks. Also, place Audio/Video (A/V) cables to the sides of the TV back panel rather than down the middle once connected. Try not to coil any twin-lead cables and keep them away from A/V cables as much as possible.

Note to Satellite Dish Installer

This reminder is provided to call your attention to articles 810 and 820 of the 2002 National Electrical Code. Refer to article 810, in particular 810-1 and 810-15, for required grounding of the metal structure of the dish antenna. Refer also to the 810-2 which, by reference to article 820, requires that the satellite dish coaxial cable shield be connected to the grounding system of the building as close to the point of cable entry as practical.

13) **Do not drop your DIRECTV HD Receiver** and always move it with care.

14) **Place it on a flat, hard surface** – do not operate the DIRECTV HD Receiver on a carpet or other padded surface. Ensure that the rack or cabinet the receiver is placed on is stable, and not subject to being tipped over.

15) **Ensure proper ventilation** – the slots on top of the DIRECTV HD Receiver must be left uncovered to allow proper airflow to the unit. Blocking the airflow to the unit could impair performance or damage your receiver and other components.

16) **Do not stack** electronic components or other objects on top of the DIRECTV HD Receiver. Also, do not stack the receiver on top of a "hot component" such as an audio power amplifier.

17) **Avoid heat** – do not place the DIRECTV HD Receiver near heat sources such as radiators, heat registers, stoves or other appliances.

18) **Never insert objects** of any kind into any openings in the DIRECTV HD Receiver (other than the DIRECTV Access Card as detailed in next pages).

19) **Clean your receiver** with a soft cloth or the dusting attachment of your vacuum cleaner, removing dust from the ventilation holes on the top and bottom. Avoid alcohol or oil-based furniture solvents – a non-abrasive, anti-static cleaner/polisher is recommended.

20) **Use only manufacturer** authorized accessories and parts.

IMPORTANT: Be sure not to place your DIRECTV HD Receiver near anything WET or HOT!
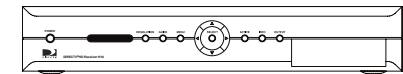
Important

This device incorporates an anticopy process technology that is protected by U.S. patents and other intellectual property rights. The anticopy process is licensed for non-commercial, home use only. Reverse engineering or disassembly is prohibited. FCC Regulations state that unauthorized changes or modifications to this equipment may void the user's authority to operate it.
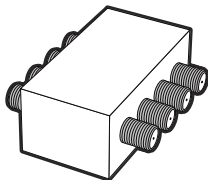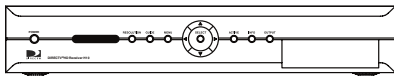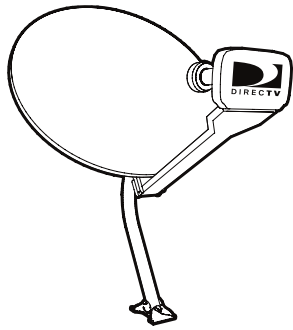
Helpful Hardware References

General

Satellite Dish Antenna
This is your "dish" and related hardware, affixed to your roof or other surface, which picks up the broadcast signals from our satellites.

DIRECTV HD Receiver (or Satellite Receiver)
Your DIRECTV HD Receiver picks up the signal from your satellite dish antenna and translates it into viewable TV programming (plus the remote control).

DIRECTV System
Refers to the combination of the above components.

Access Card
Contains information about your DIRECTV® service. It must be properly inserted for your receiver to work and to activate your programming.

Multi-switch
A multi-switch takes the signal from a satellite dish and allows multiple DIRECTV HD Receivers to utilize it so that you can watch different programming on multiple TVs. If your antenna doesn't accommodate the number of DIRECTV HD Receivers you're installing, you may need this optional device. Note: Cable TV splitter will not work in this same way.

Off-Air Digital Antenna
This antenna attaches to the back of your DIRECTV HD Receiver and is used to receive local "off-air" digital broadcasts (not included).

Digital Cables & Connections

HDMI Jack and Cable

HDMI stands for High-Definition Multimedia Interface. It offers a high-quality connection that combines the video and audio signal into a single cable.

The HDMI jack uses HDCP content protection to allow you to view HD programming that has been encoded using the HDCP protection system. For the best access to HD programming at the highest available resolution, connect this to an HDTV that supports HDCP technology.

DVI (Digital Video Interface) is an older digital connection standard that has been replaced by HDMI and is compatible with HDMI. DVI carries video only. You can also use an HDMI to DVI converter (not included), which also carries video only, so must be used with audio cables to receive the audio signal.

Component Video Output (YPbPr)

The component connector provides high-quality video for your HDTV system. Component video is also referred to as " YPbPr." It uses three separate cables–with connectors colored green, red and blue–one for each component of the HD video signal.
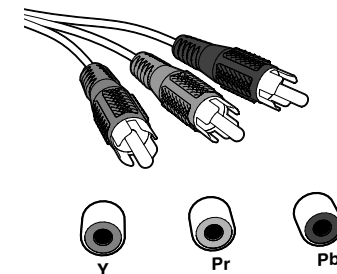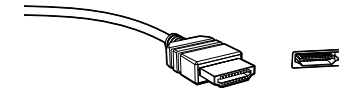
Note that not all cables come with your digital satellite receiver; you may need to purchase additional cables depending on your setup. HDMI cable not included.

Digital Audio Outputs (Optical Jack and Cable)

The Digital Audio Optical cable provides the best quality audio. The jack and cable use light to send digital audio data to A/V receivers equipped to receive and interpret it. The jack and cable (cable not included) must be aligned before plugging in, and may be covered by protective caps, which must be removed before making connections.

Digital Audio Outputs (Coaxial Jack and Cable)

Coaxial digital audio jacks and cables (cable not included) send digital audio data to A/V receivers equipped with coaxial digital audio input jacks. Coaxial cable provides a high quality audio signal over copper wire.

Standard Cables and Connections

Note that use of any of the connections listed below will not deliver an HDTV picture. If you use the following connections, you will see a standard-definition TV picture.

S-Video Jack and Cable

S-Video jacks and cables provide the best picture quality among standard connections. You will still need to connect the left and right audio cables to the TV because the S-Video cable only carries the picture signal, not sound.

Audio/Video (A/V) Jack and Cable

Audio/Video (A/V) cables provide excellent picture quality and stereo sound, and should be used if your TV does not have S-video jacks. The DIRECTV HD Receiver's A/V jacks are color coded (yellow for video, red for right audio and white for left audio). If your TV has only one input for audio (mono), connect it to the left (white) audio jack on the DIRECTV HD Receiver.
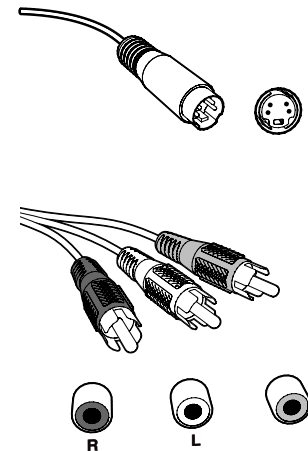
Other Connections
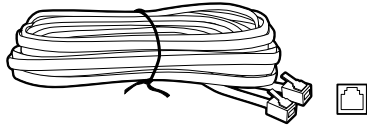
Telephone Jack and Cord

The telephone line cord is required to connect your DIRECTV HD Receiver to a land-based telephone line if you choose to subscribe to DIRECTV programming. The phone line connection is used to periodically call DIRECTV. You will need an RJ11-type modulator jack (the most common type of phone jack). Note: Do not connect your receiver to a digital PBX phone system – doing so may permanently damage your equipment and void your warranty.

Line Splitter

The line splitter lets you plug both a telephone and your DIRECTV HD Receiver into the same wall jack if necessary. (Not included with your DIRECTV HD Receiver.)
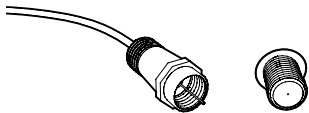
RF REMOTE Antenna Jack and Cable

Used to operate the DIRECTV HD Receiver when installed in a cabinet or from another room in your house via an RF remote control. Use this jack and cable to connect an RF antenna to the RF REMOTE ANTENNA jack of your DIRECTV HD Receiver. Then configure the remote control included with your receiver to work with the RF antenna.
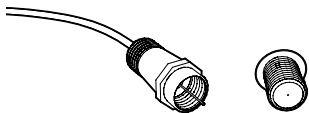
Satellite In and Off-Air In

Coaxial cables are used to connect to your TV and satellite dish and/or off-air antenna. The RF jacks on the receiver are labeled SATELLITE IN, OFF AIR IN. Note: Be sure to use RG-6 coaxial cable when connecting from the satellite dish to the DIRECTV HD Receiver.

Optional Audio/Video and Electronics

Switch Box
A small box that lets you connect multiple devices to your TV, allowing you to switch easily between your DIRECTV programming, VCR, DVD player, game system, etc.

A/V Receiver
More sophisticated than a switch box, it provides all the same advantages, and may offer additional features such as the ability to hook up to multiple speakers.

Surge Protector
Devices that protect electronic equipment from power fluctuations. Highly recommended to prevent damage to your DIRECTV HD System.

Dolby® Digital (AC-3) Audio
Recorded on six separate channels which can be heard on six different speakers. To enjoy Dolby® Digital audio, you'll need to connect your receiver (via an optical audio cable) to an A/V receiver capable of supporting it.

Dolby® Surround Sound/Dolby Pro Logic
Recorded on two channels which can be heard on two or more speakers. You will also need to connect your DIRECTV HD Receiver to a Dolby® Surround Sound supporting A/V receiver (using R and L audio cables or an optical audio cable).

Getting Familiar

DIRECTV HD Receiver Front Panel
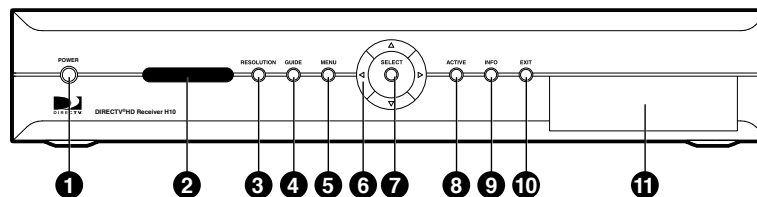
Your equipment may not look exactly like the model illustrated.

1) **POWER** – Turns your DIRECTV HD Receiver on or off. Most people leave the power to the DIRECTV HD Receiver on at all times, then just use the remote to turn on their TV set to view programming. Your DIRECTV HD Receiver still receives messages and other necessary information when power is turned off.

2) **REMOTE SENSOR/RESOLUTION INDICATOR** – The infrared sensor picks up commands from the remote control. This window also includes LED's that indicate the current resolution setting.

3) **RESOLUTION –** Switches the output resolution of the HD receiver to match the resolution supported by your TV. Each time you press the key, it cycles to the next available resolution: 1080i, 720p, 480p/i, and Native.

4) **GUIDE** – Displays the guide sort screen, so you can sort the Guide to display only channels of a particular kind such as sports channels or movie channels. Then displays the on-screen programming guide.

5) **MENU** – Brings up the helpful Quick Menu of settings and services

6) **ARROWS** – Move the on-screen highlight up, down, left or right

7) **SELECT** – Chooses the item highlighted

8) **ACTIVE** – For future use

9) **INFO** – Displays channel banner for full screen TV or other relevant information for a highlighted item

10) **EXIT** – Exits any menu and returns to last channel viewed.

11) **DOOR PANEL** – The access card slot and reset button are located behind the door panel.

Insert your DIRECTV Access Card

Locate the access card that came packed with your DIRECTV HD Receiver materials and insert the card, facing upward, fully into the slot.
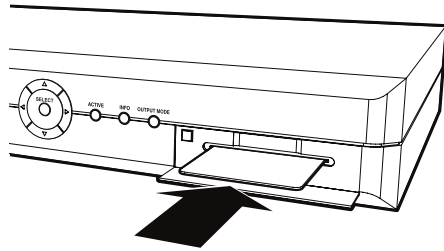
Receiver Rear Panel
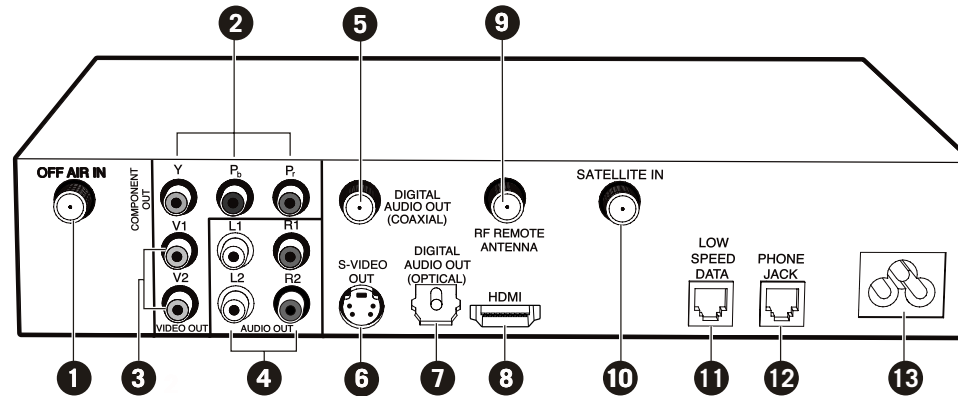
Your equipment may not look exactly like the model illustrated.

1) **OFF-AIR IN** – Used to receive local, off-air digital broadcast channels.

2) **YPbPr/COMPONENT VIDEO (Green, Red, Blue)** – Provides good picture quality. YPbPr carries only picture information, not sound; use it along with a digital audio connection or Audio Out (L/R red/white) jacks.

3) **VIDEO** – Connect the second RCA-type composite VIDEO jack to another device, such as a VCR. You must also connect the AUDIO cables when using the VIDEO connection.

4) **AUDIO (R and L)** – Connect a second set of audio cables to another component, such as a VCR or stereo.

5) **DIGITAL AUDIO COAXIAL** – Provides a high quality digital audio signal. Use it if your TV does not have Digital Audio optical.

6) **S-VIDEO** – Provides the best non-digital picture quality, better than VIDEO RCA-type or RF coaxial jacks. If your TV has an S-Video jack, use it along with the audio jacks (S-Video only carries picture information, not sound) to connect to your TV.

7) **DIGITAL AUDIO OPTICAL** – Provides the best digital-quality audio signal.

8) **HDMI** – Provides a higher quality HD picture than YPbPr/component video.

9) **RF REMOTE ANTENNA** – Used to receive the signal from your remote when it's being used as an RF remote.

10) **SATELLITE IN** – Use to connect the DIRECTV HD Receiver to the satellite dish antenna.

11) **LOW SPEED DATA** – You can connect your receiver to future services and accessories as they become available. Additional hardware may be required.

12) **PHONE** – Connects the DIRECTV HD Receiver to a telephone line. The DIRECTV HD Receiver requires a land-based telephone line connection to communicate periodically with your program provider.

13) **AC POWER INLET** – Use to connect the power cord for your DIRECTV HD Receiver.

Choose the Setup That Suits You

There are several ways to connect your receiver to match your particular equipment setup and to gain optimum signal quality. The following pages illustrate some of the most common setups. Keep in mind that the back panels of your TV and other equipment may not exactly match those illustrated.

Connecting Your DIRECTV HD Receiver to a TV with an HDMI Input

1) **Connect your satellite dish antenna to the DIRECTV HD Receiver.** Connect the RG-6 coaxial cable from your satellite dish to the jack labeled SATELLITE IN on the DIRECTV HD Receiver.

2) **Connect the off-air antenna to the DIRECTV HD Receiver (optional).** Connect the off-air antenna to the jack labeled OFF-AIR IN on your receiver. When you run the Guided Setup, be sure to select the Satellite & Antenna button when you reach the Satellite Dish & Off-Air Antenna screen.

3) **Connect the video from the DIRECTV HD Receiver to your TV.** Connect the HDMI cables to the HDMI jacks on the receiver and your TV. Note: HDMI cable is not included with HD Receiver.

4) **Connect the audio from the HD Receiver to your TV.** Connect the white (L) and red (R) RCA-type cables from the DIRECTV HD Receiver to your TV. Note: you can also connect either optical or coaxial audio cable from your receiver to your audio equipment if they support those formats.

5) **Connect the DIRECTV HD Receiver to a land-based phone line.** Plug one end of the telephone cord into a phone jack on your wall (or into a phone splitter that is plugged into a phone jack) and the other end into the PHONE JACK on the back of the DIRECTV HD Receiver.

6) **Connect the RF remote antenna to the DIRECTV HD Receiver (optional).** If you want to use your remote without having to point it at the receiver, such as from another room, or in a setup where objects are likely to block the beam from your remote to your DIRECTV HD Receiver (such as the receiver is in a cabinet with a door), then plug the RF remote antenna into the RF REMOTE ANTENNA jack on your receiver. Your receiver defaults to IR functionality. To activate RF functionality go to the System Setup screen, choose REMOTE in the left menu. Select *IR/RF Setup* button and follow the on screen instructions.

7) **Plug all power cords into electrical outlets**.

Television

DIRECTV® HD Receiver
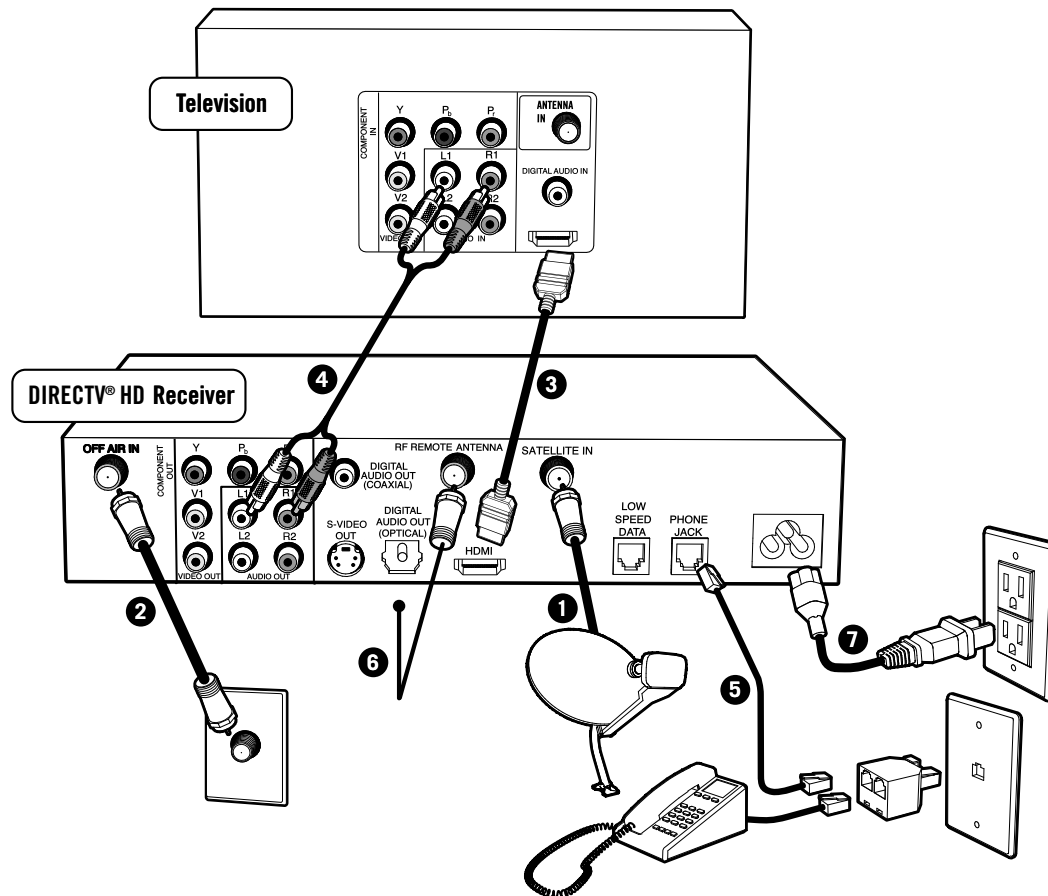
HIGH QUALITY CONNECTION
The back panels of your equipment may not look exactly like those illustrated.

> **Note**
>
> COPYRIGHT LIMITATIONS: Copyright restrictions on some HD programming may prevent you from viewing high definition programming in HD format with your DIRECTV HD Receiver. It is recommended that you connect both HD and standard definition connections to your TV so you can view these programs in regular format if HD is restricted due to program copyright.

Connecting your DIRECTV HD Receiver to an HDTV with YPbPr Component Video and Digital Audio Inputs

1) **Connect your satellite dish antenna to the DIRECTV HD Receiver.** Connect the RG-6 coaxial cable from your satellite dish to the jack labeled SATELLITE IN on the DIRECTV HD Receiver.

2) **Connect the off-air antenna to the DIRECTV HD Receiver (optional).** Connect the antenna to the jack labeled OFF-AIR IN on your receiver. When you run the Guided Setup, be sure to select the Satellite & Antenna button when you reach the Satellite Dish & Off-Air Antenna screen.

3) **Connect the DIRECTV HD Receiver to your TV** (video). Connect one end of the Component video cables to the COMPONENT OUT video jacks on the DIRECTV HD Receiver. Connect the other end of the component video cable to the component input on your TV, making sure to correctly match the red, green and blue connectors.

4) **Connect the audio from the HD Receiver to your TV.** Connect the white (L) and red (R) RCA-type cables from the DIRECTV HD Receiver to your TV. Note: you can also connect either optical or coaxial audio cable from your receiver to your audio equipment if they support those formats.

5) **Connect the DIRECTV HD Receiver to a land-based phone line.** Plug one end of a telephone cord into a phone jack on your wall (or into a phone splitter that is plugged into a phone jack) and the other end into the PHONE JACK on the back of the DIRECTV HD Receiver.

6) **Connect the RF remote antenna to the DIRECTV HD Receiver** (optional). If you want to use your remote without having to point it at the receiver, such as from another room, or in a setup where objects are likely to block the beam from your remote to your DIRECTV HD Receiver (such as the receiver is in a cabinet with a door), then plug the RF remote antenna into the RF REMOTE ANTENNA jack on your receiver. Your receiver defaults to IR functionality. To activate RF functionality go to the System Setup screen, choose REMOTE in the menu on the left. Select IR/RF setup button and follow the on screen instructions.

7) **Plug all power cords into electrical outlets**.

Note

COPYRIGHT LIMITATIONS: Copyright restrictions on some HD programming may prevent you from viewing high definition programming in HD format with your DIRECTV HD Receiver. It is recommended that you connect both HD and standard definition connections to your TV so you can view these programs in regular format if HD is restricted due to program copyright.
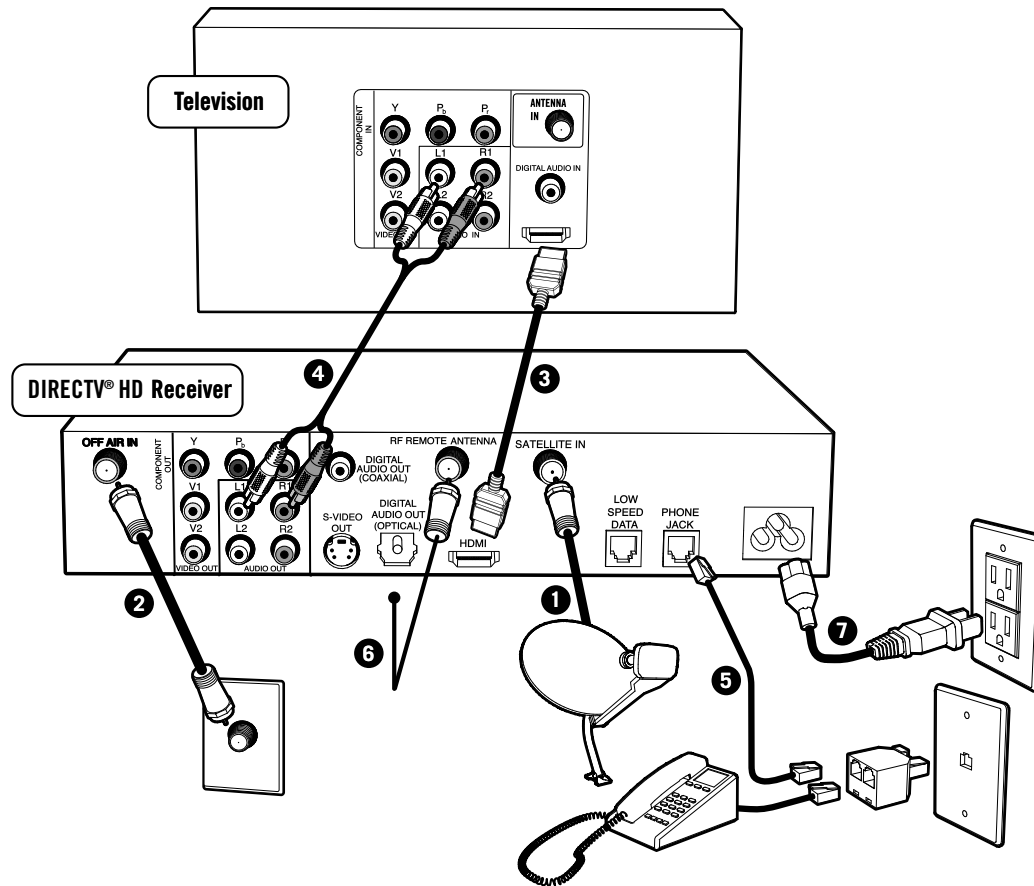
GOOD QUALITY CONNECTION
The back panels of your equipment may not look exactly like those illustrated.

Guided Setup and Activation

Now that your receiver and equipment are all hooked up and plugged in, you're ready to finish all the details to begin receiving your DIRECTV service.

1) Make sure the MODE SWITCH on the remote control is set to DIRECTV.

2) Press TV POWER ON. The DIRECTV HD Receiver will turn on (after you program the remote for your TV, the TV will also turn on when you press this button while the MODE SWITCH is set to DIRECTV).

3) Turn on your TV.

4) You should see the Display Language screen. This begins Guided Setup which will walk you through the steps necessary to finish setting up your equipment.

HDTV settings in Guided Setup

Several screens in the Guided Setup process are related to HDTV. These are some things to note about them.

▸ TV Ratio Screen: the Screen Format setting offers the options defined on page 7. This setting can be changed easily while watching TV by using the FORMAT button on the remote (this is explained further on the following page).

▸ Resolution Screen: the TV Resolution setting should be set to display resolutions that your TV can support. By including in this setting resolutions your TV does not support, it will be possible to lose video and audio when adjusting your receiver to optimize reception quality while watching TV. If your TV supports 1080i, 720p, 480i and 480p resolutions, you can set TV Resolution to All. With this setting, you will be able to turn on Native which lets the receiver automatically adjust resolution to match the resolution of individual TV programs as they are tuned.

▸ Primary Local Network: If you've chosen to set up both your Satellite Dish and Off-Air Antenna, you will see this screen near the end of Guided Setup. The receiver will use the ZIP code you enter on this screen to determine what locally broadcast digital stations are available to you. Setting up a Secondary Local Network is optional; it can be useful if you

are located between two network areas and intend to receive programming from both via your off-air antenna.

▸ Guided Setup Complete: the final screen in the Guided Setup process. If you're setting up both your dish and antenna, the receiver will need to reset at this point in order to receive program guide information for the digital off-air channels in your area. After the reset, many of these channels will appear in the guide. If you need to remove some of the channels from the guide or there are channels you expect to receive locally that are missing, you can make adjustments for these channels in System Setup. Press MENU on the remote, select *Settings*, then *Setup*, then *Sat & Ant* in the left menu option on the left side. Follow the instructions on screen.

Options For Changing Video Output

In order to optimize the display of programs on your television, you may occasionally need to change the resolution and/or screen format. There are two buttons that can be used to make changes: the FORMAT button on the remote control and the RESOLUTION button on the front panel of the receiver.

FORMAT Button on your remote
Pressing this button will cycle the resolutions that you've indicated in System Setup as being supported by your TV. In addition, it will cycle the three available screen formats in conjunction with each individual resolution. Available screen formats are based on the TV Aspect Ratio you set in System Setup. With each press, a small on screen message will let you know what the current resolution/format setting is. For example, if you indicated that your TV supports only 1080i and 480i/p and it is a 16:9 television, the cycle of settings for the FORMAT key are as follows:

1st press: 480i/p/Full	5th press: 1080i/Zoom
2nd press: 480i/p/Zoom	6th press: 480i/p/Pillar Box
3rd press: 1080i/Pillar Box	7th press: repeat cycle
4th press: 1080i/Full	

If you've indicated that your TV supports All (1080i, 720p, and 480i/p), then your cycle would also include 720p (and Native if you turned the Native feature ON). The FORMAT button allows you or other guests using your system to easily cycle all resolution and format settings with a single key until the picture displays the way they like it. Navigating menus to modify settings is not necessary.

If pressing this button causes a loss of video and audio, continue to press it until the picture returns. This can happen if you're settings include a resolution that your TV doesn't support. To correct this, you'll need to change your resolution setting. Press MENU, select *Settings*, then *Setup*, then *HDTV* in the left side menu. Press SELECT on the Resolution tab and change the TV Resolution option to display only the resolutions supported by your television.

RESOLUTION button on the front panel of the receiver
This button is used to cycle all available resolutions on your DIRECTV HD Receiver. It does not cycle format settings. If video and audio are not appearing, it may be because the current resolution setting is not supported by your television. By pressing this button, you can check all available resolutions to see if that solves the problem. The LEDs on the left portion of the front panel will light below the current resolution that the receiver is set to and will change with each button press. When pressed this button cycles to native, all LEDs will light briefly then a single LED will light to indicate the resolution of the currently tuned program. The LED will change to match programs as they are broadcast.

> **Note**
>
> If you connect your TV to one of the composite video out jacks (VIDEO OUT, S-VIDEO OUT), and you view an HD program with the DIRECTV HD Receiver's RESOLUTION key set to either 720p or 1080i, the picture will be slightly cropped at the top and bottom. To avoid this, set the RESOLUTION key to the 480p/i position.

The DIRECTV® HD Receiver provides several display formats as shown in the following table. It also shows the formats available at each output terminal.

SETTINGS		Front Panel			Remote Control Unit
Resolution	**Native**	**Resolution Indicators**			**FORMAT Key Cycle**
		480i/p	720p	1080i	4:3
All	Off	ON	ON	ON	480i/p/Letter, 480ip/Full, 480ip/Zoom, 720p/Letter, 720p/Full, 720p/Zoom, 1080i/Letter, 1080i/Full, 1080i/Zoom
	On	Auto (IRD determines the resolution LED)			Native/Letter, Native/Full, Native/Zoom
480i/p	N/A	ON	OFF	OFF	480ip/Letter, 480ip/Full, 480ip/Zoom
720p		OFF	ON	OFF	720p/Letter, 720p/Full, 720p/Zoom
1080i		OFF	OFF	ON	1080i/Letter, 1080i/Full, 1080i/Zoom
480i/720p		ON	ON	OFF	480ip/Letter, 480ip/Full, 480ip/Zoom, 720p/Letter, 720p/Full, 720p/Zoom
480ip/1080i		ON	OFF	ON	480ip/Letter, 480ip/Full, 480ip/Zoom, 1080i/Letter, 1080i/Full, 1080i/Zoom
720p/1080i		OFF	ON	ON	720p/Letter, 720p/Full, 720p/Zoom 1080i/Letter, 1080i/Full, 1080i/Zoom

In case of TV ratio 16:9, "Pillar" box will be displayed instead of "Letter".

Default Value is 480ip and 4:3/Letterbox
Front Panel LED can change when cycling using FORMAT key on the remote.
LED can change in response to a change in the Resolution setting in System Setup.

Output Connection	Available Formats
YPbPr	1080i/720p/480p/i/Native
HDMI	1080i/720p/480p/i/Native
S-Video	480i
Video (RCA Type/Yellow)	480i

Using Your IR/RF Remote to Control Your DIRECTV HD Receiver

The remote control included with your DIRECTV HD Receiver works in either IR (infrared) or RF (radio frequency). IR is the "typical" type of remote you are already familiar with from other remotes you may have – the remote must be pointed at the device for it to respond. RF allows you to operate the DIRECTV HD Receiver without having to point your remote directly at it, such as when the receiver is installed in a cabinet, or you use the remote from another room in your house. The operating range of the remote is up to 200 feet, with some possible decrease due to weak batteries or obstacles such as walls in your house. Your RF will be addressed to only one receiver, so will not affect other receivers in your home.

To setup your remote for RF, press the MENU key, press SELECT on *Settings*, then select *Remote* from the left menu. Press SELECT on the *IR/RF Setup* button. Follow the onscreen instructions to configure your remote.

Receiving Local "Off-Air" Broadcast Channels

The DIRECTV HD Receiver can tune to both satellite and locally transmitted, off-air broadcast HD channels, and will display these local channels in the Guide. In order to receive off-air channels, attach an off-air antenna to the OFF-AIR IN as instructed in the "Getting Connected" section (page 28). During the Guided Setup process, be sure to select the Satellite & Antenna button when you reach the Satellite Dish & Off-Air Antenna screen and follow the on-screen instructions.

If you didn't setup an off-air antenna during the guided setup, you must enter your location into the receiver using the Local Network Area screens in order to receive Program Guide information for local off-air broadcast channels. When you enter your ZIP code, if there is more than one network area available, your receiver will show your options. Pick the one closest to you as your primary network area. In some cases, there may be more than two cities displayed. You may decide to also enter a secondary local network if more than one is available to you, but this is optional.

To scan for off-air channels and set up the local network areas after Guided Setup, do the following:

1. Press MENU.
2. Press SELECT on *Settings* in the Quick Menu.
3. Select *Setup* in the Quick Menu.
4. Select *Sat & Ant* from the options on the left menu.
5. Press SELECT on the *Antenna Setup* button. If you have not selected your local networks yet, select the *Local Networks* button and follow the instructions until you are done.
6. Select the *Scan for Channels* button to have the receiver scan local off-air frequencies.

When the receiver has finished scanning for channels, you are given the chance to edit local off-air channels to remove channels from the Guide that you don't watch, or those that have poor reception.

Don't Wait, Activate!

Once all the setup processes are complete, all that's left to do is activate your DIRECTV service. Before you make the call, be sure to:

▸ Tune to Channel 100 and be sure you're picking up a satellite signal (DIRECTV channel).
▸ Have on hand your service address, social security number and a valid major credit card.
▸ Note your access card and receiver ID numbers (find these by pressing MENU, then go to *Settings* and press SELECT. Then go to *Setup* and press SELECT).

All ready? Just call **1-800-DIRECTV** (1-800-347-3288) and pick the programming package that's right for you. Easy!

What's On

Chapter 3

Watching TV

Now that everything's set up, you're ready to grab your remote and get clicking!

With the MODE SWITCH to the left (under the DIRECTV logo), press TV POWER ON. To access the channel of your choice, simply key in its numbers on your remote (the channel will appear in a few seconds, or press ENTER after the numbers and it will appear right away). You can also navigate to different channels through the Guide, covered in detail starting on page 43. Keep in mind, either way, you'll only be able to access those channels in your chosen DIRECTV® programming package.

Use the black keys on the left side of your remote control to adjust volume up or down (VOL) or mute the sound (MUTE). The black keys on the right side can take you to the next channel numerically up or down (CHAN), or jump to the previous channel you watched (PREV).

⚲ TIP

Use your handy Channel Lineup (included in your Welcome package) to find the numbers of all the channels.

The Channel Banner

Any time you tune to a channel, you'll see the channel banner appear across the top of the screen. This banner holds all sorts of useful information and options:

1) **Current date & time**
   Displays the day, date and current time.

2) **DIRECTV Channel**
   The logo, number and call letters of the station you're currently viewing.

3) **Program**
   The title, start and stop times and rating of the current program.

4) **Current Favorites**
   Identifies Favorite Channels List currently in use. (See Favorite Channels on page 61 for complete details.)

5) **Audio options**
   Displays brightly if alternate audio options are available. (See Icons on the inside back page and Audio Options on page 55 for more details.)

6) **Messages**
   Displays brightly if there are new messages in Caller ID & Messages. (See Icons on the inside back page and Caller ID & Messages on page 63 for details.)

7) **Parental Controls**
   Indicates the overall lock status of the receiver. It's either locked, unlocked, or temporarily unlocked. (See complete details on Parental Controls on page 65.).

The channel banner gives you information on the channel and show you are currently watching. The banner depicted here displays during channel tuning by either pressing CHAN or PREV or by entering the channel number.

To see program details, at any time press INFO on your remote (press a second time to clear). Select Get More Info button to see additional program information.

To remove the channel banner from the screen, you can always press EXIT. The banner will disappear on its own – or time out – after a few seconds.

You can also view the channel banner for a program you're watching or that you've highlighted by pressing INFO. For more detailed information, SELECT *Get More Info* button to check out additional showings, purchase pay per view or set up an Autotune (Autotune described on page 45.)

Music Channels

You'll find, as part of your great DIRECTV programming, dozens of enjoyable, continuous, commercial-free music channels with something for every taste. Tune to these just as you would to any channel. You'll see a special Channel Banner on these that initially displays its channel description (i.e., "Alternative," "Today's Country"). As information is received, current song information will appear in the banner, including song title, artist and record company. Click on *More Info* for additional details.

The Guide

Overview of the DIRECTV Advanced Program Guide®

The Guide is your helpful tool that displays listings of current and upcoming programs. Find out what's on (now or later), change the channel, find and purchase a pay per view movie or event, even do a special search for a program you're interested in. You'll find program information for the current time slot and forward for a total of 90 minutes displayed – and information for up to the next seven days.

The Guide displays most of the channel banner items, plus:

1) Picture In Graphic (PIG)
2) Time slots (with half-hour headings)
3) Channel number and call letters
4) Program listings

Getting Around in the Guide

1) Press the GUIDE key on your remote.
2) You can choose how you want to sort the Guide. Select all channels, or only those in a specific category by using the up and down arrow keys on the remote to highlight your choice.
3) Press SELECT to view current listings.

TIP

When you display the Guide – or when performing other tasks – you'll see a small video picture, the Picture In Graphic (PIG), of the last channel you were watching in the upper right-hand corner of the screen. So, no matter what you're doing, you don't miss a thing!
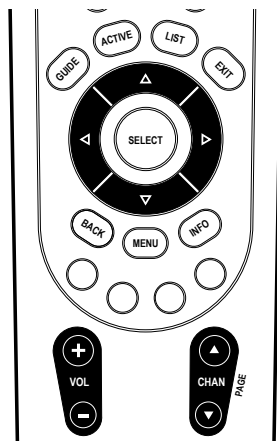
Highlight an item by using the arrow keys to scroll LEFT, RIGHT, UP or DOWN. Press SELECT to access the information or channel.

Info Screen

4) Navigating through the Guide is simple:

‣ The UP, DOWN, LEFT and RIGHT arrow keys move you through the listings and time slots. Highlighting a program will show you its description.

‣ Use the CHAN key up or down to move through channels, a full page up or down.

‣ Press the RED or GREEN keys to move horizontally through the time slots a full screen forward or back.

5) To tune to a program that is on now, highlight the program and press SELECT. Selecting a future program displays the info screen for that program. Selecting a channel tab tunes the PIG to that channel. Pressing INFO on it will display an INFO screen for that channel.

Like more information on a program? You can always press INFO when you've highlighted a show in the Guide to view a more in-depth description – pressing SELECT on a future program will get you there, too. This screen also gives you the choice to see what other showings of the program there may be, even set your receiver to automatically tune in (see *Autotune* on page 45).

Autotune

A great way to catch all your favorites

Is there a favorite show you keep missing, or a movie you've been meaning to watch? Like to make sure you don't miss the big game? You'll want to try the *Autotune* feature – and let your TV tune itself in to the programs you choose.

Set your DIRECTV® HD Receiver to autotune to any show on a channel you receive within the Guide grid's timeframe, and it will automatically turn on and tune in when the time comes.

Here's how it works.

1) While in the Guide, highlight a program that interests you.

2) Find what you want, then press INFO. The full description of that show will be displayed, plus you'll see the Autotune option on the left side of the screen.

3) Highlight and select *Autotune*.

4) Set the options to your liking, then select the *Set Autotune* button, then *OK* on the confirmation screen.

TIP

Try one-touch convenience with *One-Touch Autotune*. Just highlight a program in the Guide and press ENTER on your remote. You'll see the autotune icon ( ) appear next to the title. Press ENTER a second time to cancel the autotune. Keep in mind – you won't be able to customize your autotuning the one-touch way.

Like to record a program you've autotuned? Make sure you've connected your VCR properly to your DIRECTV® HD Receiver, then set up your VCR to record at the same time and you're set!

Whenever you've set up a program to autotune, a related icon will appear on the listing. Any time you'd like to view the programs you've set to autotune, press LIST on your remote to access the *To Do List*. Here, you can also view and alter your autotuned programs through the *Scheduler* which you'll find under *Settings* in the Quick Menu (see page 51 or more info).

Note

If you turn your receiver off at any time, any scheduled autotunes will cause it to turn on for the duration of the program being autotuned.

Pay Per View

You don't have to go out for the best and biggest movies and special events! Recent hits and events like sports, comedy and more are available 24 hours a day for a one-time purchase price on DIRECTV Pay Per View. You'll find them listed in the Guide just like other showings, starting at channel 100.

Scroll through your choices, and press SELECT or INFO to view the options. As long as your receiver has been connected to a land-based phone line, you can place your order though your remote (purchase charges will appear on your next bill). You'll get a reminder on-screen that your pay per view purchase is about to air shortly before air time. But, just to make sure you don't miss it, why not set up an autotune? Choose the *Autotune* option and follow the prompts.

If you need to cancel your pay per view order for any reason, you may, as long as you haven't yet viewed any of the program. Highlight the show again and press INFO and you'll be given the opportunity to cancel. You can also cancel, as well as see an overview of your pay per view purchases, through the *Scheduler*, part of the Quick Menu (see page 50) you can access by pressing the MENU key on your remote, then select *Settings*.

Keep in mind, too, if ever a pay per view program exceeds spending or rating limits you've set with *Parental Controls*, your password will be required to purchase it.

TIP

You can also order DIRECTV Pay Per View movies or events over the phone or at DIRECTV.com. Keep in mind, though, there is an ordering fee for those purchases placed over the phone. Also, you will be charged for the program even if you don't watch it.

The Quick Menu

Chapter 4
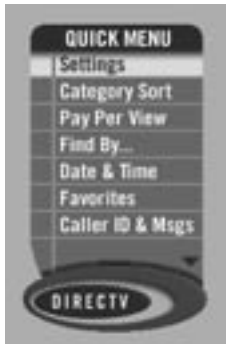
What's on the MENU?

All sorts of great things!

With the MENU key on your remote, accessing useful information and many handy features is a snap with the Quick Menu. Some of the items you'll see depend on which screen is currently displayed. For instance, if you access the Quick Menu while viewing the Guide, you'll find an option to filter programs by category. Other options, such as *Settings*, appear anytime you bring up the Quick Menu, regardless of your current screen. Whenever you access the Quick Menu, the header across the top of the Quick Menu will read "Quick Menu."

To remove the Quick Menu from the screen at any time, simply press EXIT to return to live TV, or press the MENU key again to go back to where you were.

So, let's start with some of the most commonly used features – ones you'll use to enhance your viewing experience.

Settings

Want to have things just your way? From the Quick Menu SELECT *Settings*, here, you'll find all kinds of ways to customize, adjust and keep track of your DIRECTV® viewing experience.

Setup

When you first enter *Setup*, your *System Setup* status screen will be displayed. To view all the different settings that are currently in force, hit the RIGHT arrow and PAGE down through the screen. You can make changes from the menu options on the left side of your screen.

Info & Test
SELECT Info & Test will allow you to choose 2 options:

‣ *System Info* screen lets you view the current system information.

‣ Arrow and SELECT *System Test* to run tests of the tuner, access card, receiver ID, LNB output and phone lines.

Sat & Ant
This option is useful if your box has lost signal strength, or you need to realign your satellite dish. Here you can access the dish setup (including latitude and longitude screens, if you're using DIRECTV service from an RV or boat or other circumstance where you don't have a ZIP code). You'll also find options for setting up your off-air antenna to receive locally transmitted, off-air broadcast HD channels.

Remote
You can also find instruction for programming the remote for other equipment, like DVD players, VCRs, Stereo equipment and TVs. You can also choose to set up a remote for RF (omni-directional use as opposed to pointing it at the receiver).

Audio

This screen allows you to make changes to your language audio setting. The default audio language for your system is English. Press SELECT on the language options to find and choose a new one. Audio language settings only affect programs with a Secondary Audio Program (SAP) in the language you've selected. The setting does not alter the language used on-screen. SELECT the tabs by scrolling up to the top of the screen. Select the Digital Audio tab to set preferences for Dolby Digital. See page 12 for setting instructions.

Display

Display lets you customize certain viewing aspects. By selecting the Interface tab, you can adjust the timeout of the on-screen channel banner, as well as choose menu language preferences and Time Zone and Daylight Savings Time settings. Select Captioning to adjust display preferences for closed captioning. *You can turn captioning on or off, as well as select the language and font size, style, color and background color for captioning.*

HDTV

Here you'll have the opportunity to adjust some of your HD settings. Choose the TV Ratio tab to set the aspect ratio of your TV or change screen format and bar color. (See page 7 for details.) Select Resolution to adjust your system to display only those resolutions your TV supports. Centering allows you to move placement of video and menus on screen.

Access Card

Follow the on-screen directions here to replace your access card. You will need your old and new access cards to complete this procedure.

Reset

This screen offers directions for restarting the receiver, resetting all settings to factory defaults, or resetting everything, which clears all data from the receiver and restarts to Guided Setup. Certain safety measures are included so changes can't be made accidentally. You should only perform a reset if instructed by a DIRECTV Customer Service Representative.

Scheduler

This feature gives you an overview of and access to all the programs you've set to autotune or purchase. From the Quick Menu SELECT *Scheduler,* and you'll see the current status screen. You can choose other options from the menu item to the left.

To Do List
Selecting the To Do List will display all of the upcoming programs you have set to Autotune, including all pay per view showings. If you did not set an Autotune for a PPV, then it will not appear here. Highlight program and press SELECT to access its Info screen and make changes. You can also access the To Do List from your remote by pressing the LIST key.

Schedule History
Displays the past programs (up to 45) you have autotuned or purchased, in reverse chronological order for easy reference. It also lists items that were cancelled or not tuned because of conflicts.

Purchases
Here you'll find a listing of past and future pay per view purchase items. Select an item to display its Info screen.

Manual
Here you can manually set up an autotune without regard for the program Guide. For example, you can set your receiver to Autotune to a specific channel at 8 PM Monday regardless of what's on. This is useful when recording to a VCR.
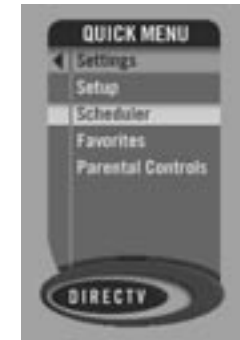
Favorites

Check the current status of your *Favorites* list(s) by clicking here, and make changes if you like. See page 61 for more details.

Parental Controls

Check the current restrictions of your *Parental Controls* by clicking here, and make any adjustments. See page 65 for more details.

Audio Options

Some programs have alternate audio available (such as other language tracks or Dolby Digital). You can set the default so that when ever a program has alternate audio available, it automatically plays this audio, or you can change the alternate audio temporarily for the program you are watching.

To change the default audio:

1) While in Live TV press MENU.

2) From the Quick Menu, SELECT *Settings*

3) Scroll down to *Setup* and press SELECT

4) Scroll down to *Audio*, and press SELECT

5) Pressing SELECT on the Default Audio option. Scroll down and SELECT the audio language that you want as a default.

To temporarily change the audio:

1) While in Live TV press MENU

2) From the Quick Menu , scroll down to *Audio Options* and press SELECT

3) Scroll to the audio track you prefer and press SELECT.

This will temporarily change the audio. Once the program is over or you change the channel the audio will change back to the default settings.

NOTE: You may also cycle through all available audio tracks for a tuned program by pressing the yellow key on the remote.

Category Sort

This handy tool lets you temporarily arrange the Guide to view only programs in a particular category such as Movies, Sports or News.

1) While in the Guide, press MENU

2) Arrow to *Category Sort* and press SELECT

3) Select the genre you want, and you'll be able to further narrow your choices by subcategories (i.e., Movies, Comedy). The Guide fitting the description will appear.

4) Simply scroll through to find a program you like. Programs with a left arrow to the left of the title are presently playing. SELECT a presently playing show to tune to it or SELECT a future program, and you'll see its related info screen and have the opportunity to autotune it or see other showings.

Just press GUIDE to return to the regular Guide, or EXIT to return to live TV.

Pay Per View

This option enables you to check out DIRECTV® Pay Per View listings by category.

1) While in the Guide, press MENU.
2) Arrow down to *Pay Per View* and press SELECT.
3) You will see three choices for sorting the listings. Choose *All* to display all current options. *Movies* will give you listings of all current movies available. Pick *Special Events* to see available events such as sports, comedy specials and more.
4) A list of PPV will appear. Select a current program to tune to it, or select a future program and you will be presented with other options (*Buy*, set an *Autotune* or list other *Showings*).

TIP

Want to find your program quicker?
Narrow your search by selecting
subcategories – just follow the prompts.

TIP

Keep in mind, when you search with
Find by, only those programs slated to
air within the Guide's number of days
of programming supported by your
receiver will appear on your list.

Find By

Would you like to locate a particular program, movie or sports event you want to see – even shows starring a favorite actor, or games with your favorite team? *Find by* offers some easy ways to spot just what you want.

1) Press MENU.
2) Scroll down to *Find by* and press SELECT. You'll see options to direct your search.
3) You can find a program by *Title, Person, Keyword* or *Channel*.

‣ Choose *Title* if you know the name of the program you're looking for. Just scroll through and select the letters of the alphabet that spell the name until you see it appear in the list.

‣ Choose the *Person* search option if you're looking for any programs that feature a particular actor/actress or director. Select the letters of his or her last name until you see the name appear. Select the name. You can narrow the search for programs by selecting categories.

‣ If you don't know the name of a program, but know one of the words of a title… or, if you're looking for a certain subject matter… try *Keyword*. Spell out the name of the word or words you want, following the prompts (i.e., "Chicago Cubs" if you're searching for ballgames).

‣ Select *Channel* to find a particular channel by the call letters (i.e., HBO®) then select the channel to see the full programming listing.

4) Once you've found a program you're after, all you have to do is highlight and select the title to display when the program is on.

5) If the program listed is currently on, then selecting it will tune to it. If the program is upcoming, the selecting it will bring you to the info screen. Here, you'll have the opportunity to set an autotune for the program.

Recent Finds

If you'd like to view all of the programs you've recently searched. You can always go back to repeat a search for a found item for any new listings available – just select the item to try again. You can also easily mark and delete any *Finds* you no longer want.

Date & Time

Here's a convenient way to look several days ahead in the Guide, without having to scroll through pages of programs.

You can quickly see what's on during a specific day or time.

1) While the Guide press MENU.
2) Then scroll down to *Date & Time* and press SELECT.
3) You'll find the current day and next seven days listed. Choose the date you're interested in.
4) Scroll through and select the hour you want. The Guide will now display programs for the date and time you selected.

If you find something you like, press ENTER for a one-touch autotune or INFO to view and set autotune options.

Favorites

Wouldn't it be nice to have all the channels you like best, right-at-hand? Or a grouping of family channels just for the kids?

Favorites allows you to set up special, customized List of Channels that shows only those channels you choose both in the Guide and while channel surfing Live TV.

1) Press MENU to get to the Quick Menu.
2) Select *Settings*, then *Favorites*.
3) SELECT a custom list on the left side of the screen.
▸ Select the box next to the channel you want on a custom list (press SELECT again to delete it).
▸ Use *Add All* or *Remove All* to save time when choosing a lot of channels.
▸ Scroll through the channels, or key them in directly using NUMBERS on the remote to access what you're looking for. Once you've decided on the channels for your list, select the Name Tab.

4) To name your custom list, arrow over to the *Name List* tab and press SELECT
▸ Use the onscreen keypad to name your custom list – "Kids" or "Joe" or whatever you like.
▸ When you are done, go to *Update Name* and press SELECT.

When you're using a Favorites list, the Guide will only display those channels you've chosen – and you'll also only see those channels when you use CHAN UP/DOWN on your remote.

Keep in mind, no matter what Favorites list you're currently using, you can still always access any channel you receive by keying in its channel number on your remote. You can also edit or delete a list at any time.

TIP

The normal, or default, setting for the channels you can view in the Guide is All Channels, or all available channels on DIRECTV service — whether or not you receive them in your programming package. You may choose to use your current favorites list by selecting Current Item in the left menu of the favorites screen. Or you may choose another favorite item in the Quick Menu.

Previous Channels

While watching live TV, you can easily surf between your four most recent channels when you select *Previous Channels* from the Quick Menu – perfect for keeping up with different games, or tracking breaking news.

Select *Previous Channels,* and a list will appear showing up to the last four channels viewed. Just highlight and select any channel from the list to tune to it, or press INFO while a channel is highlighted to see further details.

Don't forget – you can always tune to the prior channel you were watching just by pressing PREV on your remote!

Caller ID & Messages

Here you'll be able to access communications from DIRECTV. If you have Caller ID service*, you can also view phone calls you've received.

Caller ID

Here you can turn Caller ID on and off, set the number of calls kept in your log and view past calls

To turn Caller ID on and off:
1) Press MENU to get to the Quick Menu.
2) Go to *Calls & Msgs* and press SELECT.
3) SELECT the *Turn On/Off Notice* to toggle Caller ID on and off.

To access the other CALLER ID Call Log settings:
1) Press MENU to get to the Quick Menu.
2) Go to *Calls & Msgs* and press SELECT.
3) Next SELECT *Caller ID* then *Go There*.
4) Select *Caller ID* in the left menu.

*You must subscribe to this service through your local telephone company.

▸ Choose the *Service* tab. Here you can choose to turn Caller ID on or off, set the number of calls to keep in your log, and turn notification on or off.

▸ The *Call Log* tab displays your recent incoming calls. Highlight and select a name, and you have the opportunity to call the number or delete that listing from your log. If you call the number, you will have to pick up your phone to speak.

Unless you've turned off the *Notification* option, you'll see a notice on your TV screen whenever a call comes in.

Messages

You'll be able to view a listing of titles of any current messages waiting for you.

1) Press MENU to get to the Quick Menu.
2) Go to *Calls & Msgs* and press SELECT.
3) Next SELECT *Go There*.
4) Select Messages in the left menu.
5) Simply highlight a message and press SELECT to read, then you'll have the choice to save or delete them.

Parental Controls

Would you like to set some limits on your children's viewing habits? *Parental Controls* enables one or more "keepers of the passcode" to place certain restrictions on just who's watching what. Whether it's for mature content or spending amounts, you're always able to keep limitations where you want them for the whole family.

From the Quick Menu, SELECT *Parental Controls,* then *Edit Settings.* You'll see the current status showing any restrictions. The system default is "unlocked" for all categories, and the "spending" control has a default $10 limit. Here's how you can set limits for:

Ratings

Here you can set rating limits for Movies and TV, allowing you to block certain ratings unless the proper passcode is entered

1) Press MENU to get to the Quick Menu
2) Go to *Parental Controls* then *Edit Settings*
3) SELECT *Ratings*

‣ *Movies*

From the *Movies* tab select the overall rating limit you wish to impose. Brief descriptions of the ratings appear for your guidance. Allowing a rating allows all ratings below that level; blocking one blocks any higher ratings also.

‣ *TV programs*

Choose the *TV* tab, then highlight and select the TV rating you desire. You can also choose ratings for particular content (i.e., Sexual Content, Violence, Dialogue), each of which is described as you scroll through.

TIP

For ratings limits and channel blocks, as well as most other checkbox-type items, pressing SELECT toggles the item on and off.

▶ *Other shows*

To block programming that has no rating – such as news and sports and shows with a rating of "None" – select the *Other* tab.

5)   If you are done setting your Parental Controls, don't forget to lock the receiver. Press SELECT on *Lock Now.*

Channel Blocks

You can limit viewing of a certain channel or channels from this menu.

1)   Press MENU to get to the Quick Menu
2)   Go to *Parental Controls* then *Edit Settings*
3)   SELECT *Chan Blocks*
4)   Scroll down the channel list to SELECT those you wish to block, or key in the channel numbers for quicker access. Use Block All or Allow All to save time if you wish to affect a large number of channels.

Spending

From the menu on the left, choose *Spending* and then set your preferred spending limit for any single pay per view purchase. Simply key in the amount using the numbers on your remote.

Hours

This feature allows you to set a range of allowable viewing hours for different days of the week. Just select your preferences to set up any limits.

Now, lock it

Once you've decided on the restrictions you want, choose *Lock Now.* You'll be directed to create a passcode (which you'll want to make easy enough to remember, but hard enough that the little ones won't guess it!). This passcode will be your entry to unlocking and recreating limitations in the future.

An on-screen message will appear whenever anyone tries to tune to a channel or program that has been restricted, or attempts to spend or watch beyond limitations set. He or she will not be allowed to proceed... without the passcode. Using your passcode, you can easily override the limits.

Locked states: Locked, Unlocked, Temporarily Unlocked

Locked: All settings activated. Box is locked.

Unlocked: No setting activated.

Temporarily Unlocked: Box can be unlocked on a single program or all settings can be unlocked for four hours. At the end of the program or after four hours, the box will re-lock itself. Placing the box in STANDBY also re-locks. The box can also be re-locked by going to the QUICK MENU, selecting Parental Controls, then Lock Now.

💡 TIP

The Parental Controls icon in the Channel Banner will tell you if your receiver is locked, temporarily unlocked, or unlocked.

Locked   Unlocked   Temporarily Unlocked

Let me in…!

Don't worry – temporarily or permanently unlocking is easy. To temporarily unlock a particular program:

1) When any controls are currently activated, a message with the option to *Unlock Now* will appear if you try to tune to a restricted program.

2) SELECT *Unlock Now* and enter the password.

For more unlock options:

1) Go to the MENU.

2) Then SELECT *Parental Controls*.

3) Various options for unlocking temporarily or permanently will appear. SELECT one and enter your password.

Note: If you have Parental Controls set and temporarily unlocked, turning the receiver power off will relock the box.

You can change your passcode, at any time.

1) Go to the MENU.

2) Then SELECT *Parental Controls*.

3) Then SELECT *Edit Settings*.

4) Scroll down to *Passcode* and SELECT.

5) You will need to enter you old passcode before creating a new one.

Other Information

Chapter 5

Perform a Code Search on Your Remote Control

If you were not able to find a code for your brand of TV or component, then you can try a code search. This process may take up to 30 minutes.

1) First turn on the TV or component.

2) Move the slide switch near the top of the remote control to the appropriate position.

3) Point the remote away from your DIRECTV® HD Receiver and components. Press and hold MUTE and SELECT buttons at the same time until the light above the Mode Switch at the top of the remote flashes twice (about 5 seconds).

4) Enter one of the following 4 digits

   TV: 9 9 1 1
   VCR or DVD: 9 9 1 2
   Stereo: 9 9 1 3

5) Press the PWR key on the remote control.

6) Point the remote to the TV or component and press CHAN UP. Repeatedly press the CHAN UP until the TV or component turns off.

7) When the TV or component turns off, the press SELECT.

Note: If the light flashes 3 times before the TV or component responds, then you've cycled all codes and, unfortunately, the code you need is not available. You must then use the remote that came with your TV or component.

Troubleshooting

Many problems can be corrected by performing a simple reset of the DIRECTV HD Receiver. If you experience the following:

‣ Image freezes
‣ Audio freezes
‣ Blank screen
‣ Won't respond to front panel button or remote control

Try one of these:

‣ Press the red RESET button behind the access panel door on the front of the DIRECTV HD Receiver, then wait for program guide information to be acquired.
‣ If the problems persist, try unplugging the power cord of the DIRECTV HD Receiver for 15 seconds to 2 minutes, then plug it in again.
‣ Running the System Test (later in this section) can also help you diagnose and solve many common problems.

System Upgrades
Your DIRECTV HD Receiver is able to receive upgrades or modifications to some of its features and functions. These modifications will occur automatically, usually at times when the receiver would likely be turned off. If your receiver is on when an upgrade or modification is sent, you may experience a disruption in reception for a minute or two. Your reception should return to normal after the modification is complete. Your receiver must be plugged in to receive any upgrades. Do not unplug your receiver while an upgrade is in progress. Please consult the Upgrade Menu to find a schedule of upgrades or modifications planned by DIRECTV.

Note

If you prefer, we can provide you with the name of an Authorized Service Representative who will visit your home for a fee to set up your digital satellite receiver and instruct you on its operation. For details about this service, call 1-800-DIRECTV or visit DIRECTV.com.

DIRECTV HD Receiver Problems

Progress bar freezes during Satellite Data Acquisition

This is normal. The progress bar times out after two minutes. If your screen is still blank for two minutes after the progress bar times out, follow these steps to restart your receiver:

1) Press the red RESET button behind the access panel door on the front of the DIRECTV HD Receiver.

2) Wait for program guide information to be acquired.

Wrong picture, blue screen, snow, scrambled picture or black/blank picture

The DIRECTV HD Receiver and most TVs and VCRs let you toggle between video sources. If you don't see the signal you think you should be seeing, try using these keys to toggle between the signals.

▸ Press the TV/VCR key on the VCR remote or on the VCR's front panel.

▸ Press the TV INPUT key on the remote control.

Any of the above actions switches the source of the video signal from satellite signals to the antenna or cable signal, and vice versa. If problems persist, turn off all equipment that is connected to your TV, wait a few minutes, then turn the DIRECTV HD Receiver back on.

It is also possible your DIRECTV HD Receiver is not configured properly for your HDTV. Press the FORMAT key on your remote or the RESOLUTION key on the receiver front panel to cycle through the available resolutions. The RESOLUTION key cycles through all resolutions, including Native. The FORMAT key cycles only through resolutions you've set in the Settings screen, and it also cycles through screen formats (letterbox, pillar box, zoom, etc.) based upon the Aspect Ratio you set in the Settings screen (4:3 or 16:9).

Problems with Caller ID

▸ **You must subscribe to Caller ID service through your local phone company.**
Also, check to be sure your Caller ID feature is turned on (see page 63).

▸ If you are plugging your receiver to a wireless phone jack, note that it typically does not transmit Caller ID information and you may need a special wireless phone jack to use with Caller ID service. See the user's manual that came with the wireless phone jack to see if it transmits Caller ID information. If it doesn't, either connect the phone line directly to a standard wall-mount phone jack or install a wireless phone jack that transmits Caller ID information.

DIRECTV HD Receiver will not turn on

▸ Check to make sure the power cord is plugged into the DIRECTV HD Receiver and the wall outlet.

▸ Check the wall receptacle (or extension cord) to make sure it is "live" by plugging in something else.

▸ Make sure the remote control is on DIRECTV mode, and press TV POWER ON.

▸ Press TV POWER ON, then press it a second time.

▸ Check batteries in remote control.

▸ Be sure remote control is pointed at remote sensor, and the front of the receiver is not blocked.

▸ Unplug the receiver. Wait five minutes. Plug it in again.

Turns off while playing

▸ Electronic protection circuit may have been activated because of a power surge. Wait 30 seconds, then turn on again.

▸ Unplug DIRECTV HD Receiver for a few minutes, then plug back in. If this happens frequently, the voltage in your house may be abnormally high or low.

▸ Consider using a surge protector or line conditioner.

▸ If your TV turns off while playing, *and other lights/appliances in your house do too,* you may have blown a circuit breaker or be experiencing a power outage.

▸ Consult an electrician if the problem is frequent or severe, especially if other household appliances or electronics are affected.

DIRECTV HD Receiver turns on or changes channels unexpectedly

An autotune may have been activated. See page 45.

Top and bottom of program image is cut off

If you connect your TV to one of the composite video out jacks (Video Out, S-Video Out or TV Out), and you view a high-definition program with the DIRECTV HD Receiver's RESOLUTION button set to either 720p or 1080i, the picture will be slightly cropped at the top and bottom. To avoid this problem, set the RESOLUTION button to the 480p/i position by pressing the RESOLUTION key on the front panel of your DIRECTV HD Receiver.

The message "(Due to) Copyright restrictions…" appears on-screen

This means that the program you're trying to watch may not be viewable on some outputs. Use a different connection from the DIRECTV HD Receiver to your TV (see page 28 for details).

Closed caption displays overlap

If you turn on closed captions on both your DIRECTV HD Receiver and your TV, you may see overlapping closed captions. To avoid this, turn on closed captions on only one or the other, not both.

Left/right side of screen doesn't match with TV in HDMI/Component mode

Your particular brand of TV may use a different screen offset. Press the MENU key, then press SELECT on Settings. Select the HDTV item in the left menu, then select the Centering tab on the HDTV screen. Follow the onscreen instructions to adjust the left/right side of the screen.

Audio, no video

Video mode set to 720p, TV only supports 1080i. Also, if your receiver is set to Native mode, some programs are in 720p and might not show video when viewed. To fix this problem, change the output mode to 480p or 1080i only. Change the output mode in System Setup as follows:

‣ Press MENU.
‣ Press SELECT on *Settings* in the Quick Menu.
‣ Select *Setup* in the Quick Menu.
‣ Select *HDTV* from the left menu.
‣ Select the *Resolution* tab.
‣ Select a TV resolution option that shows the resolutions supported by your TV.
‣ You can also change the Native option on this screen.

Loss of local, off-air (ATSC) channels

The following conditions may cause loss of local, off-air channels:

Your local broadcast time may have changed.

Many digital broadcasts are not aired 24 hours per day.

The signal strength for your local station may not be strong enough due to atmospheric conditions, obstructions, or antenna location. If you are using a directional antenna for local stations, try orienting your antenna differently or placing it in a different location. The HD antenna included with your receiver is omnidirectional and does not need to be oriented, however, if your receiver is in a stereo cabinet or other enclosure, it may weaken the signal.

To check the off-air signal strength, do the following:.

▸ Press MENU.
▸ Press SELECT on *Settings* in the Quick Menu.
▸ Select *Setup* in the Quick Menu.
▸ Select *Sat & Ant* from the left menu.
▸ Press SELECT on the Antenna Setup.
▸ Press SELECT on the Antenna Signal meter.

If the signal strength for the desired channel or channels is low, try relocating or re-orienting your antenna. You may also try selecting a different primary or secondary network area.

No program information on some off-air channels

Not all program information is available for all areas. See your local newspaper or a printed TV schedule for listings.

Aspect ratio problems. Why do I see black bars and gray bars?

Your aspect ratio and screen format may be set improperly for your TV or the program you are watching. Press the FORMAT key on your remote to cycle through the available settings. You may have to change the display settings in System Setup as follows:

‣ Press MENU on the remote.
‣ Press SELECT on Settings,
‣ Select Setup.
‣ Select HDTV.

Then,

If watching a 4:3 program on a 16:9 screen, the picture will be too tall to fit the screen. Choose one of the following:

‣ "Pillar box" shrinks the picture until the height of the program fits the screen. The picture is no longer wide enough to fit the screen, so black/gray bars are on the left and right of the screen.
‣ "Full" or "Pan/Scan" stretches the picture horizontally until it's wide enough to fit the screen. There are no black/gray bars, but the picture is distorted.
‣ "Zoom" magnifies the picture, keeping the 4:3 aspect ratio, until the screen is full. There is no distortion, but the top and bottom of the picture are cut off.

If watching a 16:9 program on a 4:3 screen, the picture will be too wide to fit the screen. Choose one of these settings:

‣ "Letterbox" shrinks the height of the picture. This results in black/gray bars at the top and bottom of the screen.
‣ "Full" or "Pan/Scan" shrinks the width of the picture, so the picture is stretched vertically until it fits the screen. There are no black/gray bars, but picture is distorted.
‣ "Zoom" magnifies the picture, keeping the 16:3 aspect ratio, until the screen is full. There is no distortion, but the left and right side of picture are cut off.

Cannot change black bars.

Many broadcasters transmit black bars as part of the video for a program. Only black bars generated by the receiver can be changed.

Color looks wrong (dark areas, everything is red, green, or blue, or skin tones are washed out)

‣ If the dark areas are bars at the edges of the screen, it is probably due to the aspect ratio setting. (See page 7).

‣ Make sure component video cables are connected properly. The component cables (YPbPr) deliver color. The three YPbPr jacks are usually color-coded green, blue, and red. The red, blue and green cables could be mixed. If using these cables, make sure they haven't come loose.

‣ Try new YPbPr cables.

‣ Reset your receiver by pressing the red reset button.

‣ If reset doesn't fix the problem, this is a TV calibration problem. Refer to your TV's User Guide, troubleshooting manual or customer service for help.

Blank screen

‣ Check that all components connected to the input jacks are turned on.

‣ Try another channel.

‣ Your DIRECTV HD Receiver may be hooked incorrectly to the TV. Press the INFO button on the front panel of the DIRECTV HD Receiver to see if the channel banner appears. If it does not, check the *Setup and Connections* section for instructions about connecting your satellite receiver. If the DIRECTV HD Receiver is connected to the RF input of your TV makes sure that the TV channel matches the 3/4 RF switch on the back panel.

‣ Press the TV INPUT key on the remote to make sure your TV input is set to the TV input your DIRECTV HD Receiver is connected to.

‣ Press the POWER button on the front of the DIRECTV HD Receiver.

‣ Press the red RESET button behind the door on the front panel of the DIRECTV HD Receiver.

Temporary loss of the satellite signal or Searching for Satellite Signal message
‣ Your satellite system may be experiencing rain fade, a temporary loss of the satellite signal due to unusually heavy rain clouds or rainfall. Rain fade is usually brief, lasting only as long as the heavy rain cloud condition persists.

‣ Your dish may be blocked. Check that something is not blocking the dish.

Partial programming loss/channels missing from the Guide/channel is in the Guide but can't be tuned
‣ Your satellite dish antenna may be incorrectly configured. Check the dish type set in your receiver's preferences and change if necessary. Press the MENU key on the remote control, then select *Settings* then *Setup*. In the next menu, select *Sat & Ant*, then *Repeat Satellite Dish Setup*. Follow the steps. From the *Satellite Dish Type* screen, make sure the proper dish type is selected (round, oval with a dual LNB or oval with a triple LNB).

‣ The channels might be excluded from the *Favorites* list currently in use. Press MENU on the remote, select *Favorites*, then *All Channels*.

Remote Control Problems

Problems with the remote control

▸ Check that nothing is between the remote control and the remote sensor.

▸ Make sure the remote control is in DIRECTV mode. Slide the mode switch to the DIRECTV position so the remote will control the DIRECTV HD Receiver.

▸ Check the batteries in the remote control. They may be weak, dead or installed incorrectly. Try replacing batteries. IMPORTANT: Don't press any remote control keys while replacing the batteries unless you are resetting the remote! If you press a remote control key while replacing the batteries, you may need to reprogram the remote to operate other devices. Reprogramming may also be required if dead or weak batteries have been allowed to remain in the remote.

▸ If you're entering a channel number that is less than four digits long, the receiver might wait two seconds before tuning to the channel. Press ENTER after entering a channel number to tune immediately.

▸ If you are trying to operate a device other than the DIRECTV HD Receiver that you have programmed the remote to control, make sure you first move the slide switch to the corresponding position for that device (AV1 or AV2). The indicator light for the component you're trying to control should light up when you press a valid key for that component. If it doesn't, make sure the input switch is clicked into the correct position.

▸ The remote may need to be reset. Press and hold MUTE and SELECT until the light flashes twice. Enter 9-8-1 using the number on the remote. The light will flash twice. If necessary, reprogram the remote.

Your remote and DIRECTV Receiver must both be in the same mode, IR or RF. To ensure both are set correctly do the following. Using the buttons on the front of your receiver, press the MENU button, then go to *System Setup*, then go to *Remote*, then to *IR/RF Setup*. Choose either IR or RF and follow the directions.

A remote control indicator light starts flashing
The batteries in the remote control are running low and should be replaced soon. (Note that when you replace the batteries, you may have to reprogram your remote to control other devices.)

TV Problems

Blank screen

▸ Check that the components connected to the input jacks are turned on.

▸ Try another channel.

▸ See "Wrong picture, bluescreen..." and Receiver will not turn on" on page 72.

TV turns on or changes channels unexpectedly

▸ An Autotune may have been activated.

▸ Your TV's timer may have been activated.

▸ Check your TV owner's manual.

No video with TV connected to HMDI jack

If your TV has an HMDI input jack but is not HDCP compatible, you may not be able to view video from your DIRECTV HD Receiver's HDMI OUT jack. Connect your TV using another video output jack on the receiver.

Note

If your TV is connected with just coaxial cables, you only need to tune to Channel 3 or 4.

Running the System Test

The System Test allows you to run a basic diagnostics check on your DIRECTV HD Receiver. If you are experiencing any trouble with your receiver, run the system test. It will also allow you to get your access card and receiver ID numbers or to initiate diagnostic procedures on your digital satellite receiver.

First make sure that:
‣ All connections – jacks, cables, etc. – are in place correctly (see Chapter Two, *Getting Connected*, for more information)
‣ There are batteries in the remote control, and they are working correctly
‣ The access card is installed in the DIRECTV HD Receiver.

Follow these steps to run the diagnostics system test on your DIRECTV HD Receiver.

1) Turn on your TV and the DIRECTV HD Receiver.

2) Slide the mode switch to the DIRECTV position to put the remote control in satellite receiver-controlling mode, then press MENU to bring up the Quick Menu.

3) Select *Settings*.

4) Select *Setup,* then *Info & Test*.

5) Use arrow keys to highlight the *System Test* tab, then press SELECT on *Run Test*.

6) If your system does not pass the system test, check any of these potential trouble areas: cabling, pointing the satellite dish, phone connection and access card.

7) If you continue to have problems, call DIRECTV Customer Service at 1-800-DIRECTV.

You should run a system test several times before concluding that there is a problem. Occasional fluctuations in the phone line or satellite signal can give temporary false readings.

Fine-Tuning the Signal

If you self-installed your satellite dish antenna, you may have already used *Guided Setup* to find the dish-pointing coordinates, acquire and fine-tune the signal and run a system test. If you need to run *Guided Setup* again, select *Settings* from the Quick Menu, then select *Guided Setup.* Next, press SELECT on *Sat & Ant,* then select *Repeat Satellite Setup.*

LIMITED 90 DAY WARRANTY

DIRECTV warrants your DIRECTV HD Receiver (Model Number: H10) and any included accessories against defects in material or workmanship for a period of ninety (90) days after the date of purchase.

WHO IS COVERED?

You must have proof of purchase to receive warranty service. A sales receipt or other document showing that you purchased the product is considered proof of purchase. THIS LIMITED WARRANTY EXTENDS ONLY TO THE ORIGINAL CONSUMER PURCHASER OR ANY PERSON RECEIVING THE DIRECTV HD Receiver AS A GIFT FROM THE ORIGINAL CONSUMER PURCHASER AND TO NO OTHER PURCHASER OR TRANSFEREE. THIS WARRANTY DOES NOT EXTEND TO COMMERCIAL USERS. THIS PRODUCT IS NOT AUTHORIZED FOR USE OUTSIDE THE UNITED STATES AND ANY SUCH USE VOIDS THIS WARRANTY.

WHAT IS COVERED?

Warranty coverage begins the day you purchase the product. For ninety (90) days from the purchase date, at the option of DIRECTV, the DIRECTV HD Receiver will be repaired or replaced with a new, repaired, refurbished or comparable product (whichever is deemed necessary) if it becomes defective or inoperative. This exchange is done without charge to you for parts and labor. You will be responsible for the cost of shipping to and from the location designated by DIRECTV. If DIRECTV cannot reasonably repair or replace the Receiver then DIRECTV may, at its sole discretion, refund the price you paid for the product or the current retail price of the product.

All products, including replacement products, are covered only for the original warranty period. When the warranty on the original product expires, the warranty on the replacement product also expires. After ninety (90) days from the date of purchase, you pay for the replacement of all parts, and for all labor charges.

SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU. WHAT IS EXCLUDED?

Your warranty does NOT cover:

▸ Labor charges for installation or setup of the product.

▸ Installation, performance of, or repair of: audio/video cabling, telephone line, or accessory attachments used with the product.

▸ Product replacement because of misuse, accident, lightning damage, unauthorized repair, or other cause not within the control of DIRECTV.

▸ Incidental or consequential damages resulting from the product. SOME STATES DO NOT ALLOW THE EXCLUSION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE EXCLUSION MAY NOT APPLY TO YOU.

▸ Any modifications or other changes to the product, including but not limited to software or hardware modification in any way other than as expressly authorized by DIRECTV will void this limited warranty. Except in the case of hardware or software provided by DIRECTV, installing software modifications, "hacks" or utilizing service access or "back doors" will void this limited warranty.

▸ Reception transmission problems caused by signal conditions, telephone line, or cable or antenna systems outside the unit.

▸ A product that has been modified or adapted to enable it to operate in any country other than the country for which it was designed, manufactured, approved and/or authorized, or repair of products damaged by these modifications.

▸ A product used for commercial or institutional purposes.

▸ DIRECTV makes no warranty that the access connection will be a local (not long distance) phone call.

▸ The continued provisioning of any of the programming and other services delivered through the Receiver including but not limited to television programming, show information, program guide data, and scheduling information.

MAKE SURE YOU KEEP...

Please keep your sales receipt or other document showing proof of purchase. Attach it to this User Guide and keep both nearby. Also keep the original box and packing material in case you need to return your product.

BEFORE REQUESTING REPAIR SERVICE...

Please check the troubleshooting section of this guide. This may save you a call to DIRECTV Customer Care.

TO GET WARRANTY SERVICE...

Warranty service will be provided by DIRECTV. If you believe you need service for your Receiver, contact DIRECTV at 1-800-DIRECTV. A representative will go through a diagnostic checklist with you. If it is determined that the product needs to be returned for service or exchanged, you will receive a return authorization number. The representative will give you complete shipping details.

TO GET OUT-OF-WARRANTY SERVICE...

To obtain out-of-warranty service contact DIRECTV at 1-800-DIRECTV for information on the possibility of and any costs for repair or replacement of out-of-warranty products.

ALL WARRANTIES IMPLIED BY LAW, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY LIMITED TO THE DURATION OF THIS EXPRESS LIMITED WARRANTY.

WITH THE EXCEPTION OF ANY WARRANTIES IMPLIED BY THE LAW OF ANY STATE OF THE U.S.A., THIS EXPRESS LIMITED WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, GUARANTEES, AGREEMENTS AND SIMILAR OBLIGATIONS OF DIRECTV. REPAIR OR REPLACEMENT AS PROVIDED IN THIS LIMITED WARRANTY IS THE EXCLUSIVE REMEDY UNDER THIS LIMITED WARRANTY. IN NO EVENT WILL DIRECTV BE LIABLE FOR ANY AMOUNT GREATER THAN THE RETAIL PRICE OF THE DIRECTV HD Receiver. DIRECTV SHALL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR BREACH OF ANY EXPRESS OR IMPLIED WARRANTY ON THE DIRECTV HD Receiver.

SOME STATES DO NOT ALLOW LIMITATIONS ON WARRANTIES, SO THE ABOVE LIMITATIONS MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS. YOU MAY HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE.

DIRECTV, Inc.
2230 E. Imperial Hwy
El Segundo, CA 90245
1-800-DIRECTV

DIRECTV PROTECTION PLAN

DIRECTV PROTECTION PLAN

Protect your DIRECTV® System with the DIRECTV PROTECTION PLAN. For a low monthly fee, the DIRECTV PROTECTION PLAN covers the components of your DIRECTV System, giving you peace of mind and comprehensive support to ensure that you and your family enjoy nonstop DIRECTV® entertainment.

DIRECTV PROTECTION PLAN BENEFITS

Your DIRECTV Limited Warranty provides certain remedies for this receiver during the stated coverage term. The DIRECTV PROTECTION PLAN provides comprehensive coverage for your entire DIRECTV System, including:

- In home service calls when needed
- Power surge related repairs
- Cables, switches, and associated wiring throughout home
- Dish antenna realignments
- Replacement of defective equipment (if problem can not be resolved over the phone)*
- Defective remote control replacements
- 24-hour Technical Support
- All parts and labor for repair

Note

*A fee of $49 for standard receiver equipment, $249 for DIRECTV DVR or Ultimate TV equipment, or $400 for HD equipment will be charged to your DIRECTV bill if the defective equipment that we are replacing for you is not returned within 30 calendar days. The plan will provide a return box for the defective equipment and even pick up the shipping costs. You'll receive replacement equipment in about 72 hours.

Get ALL THAT FOR JUST $5.99 a month for accounts with standard DIRECTV Receivers and only $7.99 a month for accounts with DIRECTV® DVR, DIRECTV HD Receivers, or DIRECTV Receivers with UltimateTV Service. This one low monthly fee covers every DIRECTV component and receiver on your account.

SIGN UP FOR THE DIRECTV PROTECTION PLAN TODAY

If you have standard DIRECTV HD Receiver(s), visit DIRECTV.com and SIGN IN using the simple steps below or call 1-800-DIRECTV.

1. **SIGN IN** with your user name and password, or click on the "Register now" link and go through the easy steps, then continue with Step 2.
2. **SELECT** Option B, and then click the "Next" button at the bottom of the page.
3. **SCROLL** down to Step 3 (Add Additional Services) and SELECT "DIRECTV PROTECTION PLAN," then CLICK on the "Next" button.
4. **REVIEW** your change and CLICK on the "Accept These Changes" button.

If you have a DIRECTV® DVR, DIRECTV HD Receiver, DIRECTV Receiver with UltimateTV Service, please call 1-800-DIRECTV to sign up.

The DIRECTV PROTECTION PLAN is offered by AIG Warranty Guard and underwritten by New Hampshire Insurance Company on behalf of DIRECTV where authorized by law. Certain limitations apply. Pricing, terms and conditions of the DIRECTV PROTECTION PLAN are subject to change. Full terms and conditions will be mailed to you prior to service billing and are available at DIRECTV.com. (Note: Annual payment option no longer available.)

FCC Information Declaration of Conformity—Standards to which Conformity is declared: FCC Part 15

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Responsible Party:

> DIRECTV, Inc.
> 2230 E. Imperial Hwy
> El Segundo, CA 90245
> 1-800-DIRECTV

‣ Trade Name: DIRECTV
‣ Type of Equipment: HD Satellite Receiver
‣ Model Number: H10

Federal Communications Commission (FCC): This equipment complies with both Part 15 and Part 68 of the FCC rules.

Your DIRECTV HD Receiver complies with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by removing and applying power to the equipment, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving satellite dish antenna.
- Increase the separation between the equipment and the DIRECTV HD Receiver.
- Connect the equipment into an outlet on a circuit different from that to which the DIRECTV HD Receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

The user may find the following booklet, prepared by the Federal Communications Commission, helpful: "How to Identify and Resolve Radio and TV Interference Problems." This booklet is available from the U.S. Government Printing Office, Washington, DC. To meet FCC requirement, only peripherals (computer input/output devices, terminals, printers, etc.) certified to comply with Class B limits may be attached to this device. Operation with non-certified peripherals is likely to result in interference to radio and TV reception. To meet FCC requirements, shielded cables are required to connect the device to a personal computer, peripheral, or other Class B certified device.

This equipment complies with Part 68 of the FCC Rules and the requirements adopted by ACTA. On the back of this equipment is a label that contains a product identifier in the format US:AAAEQ##TXXXX. If requested, this information must be provided to your telephone company. A plug and jack used to connect this equipment to the premises wiring and telephone network must comply with the applicable FCC Part 68 rules and requirements adopted by ACTA. A compliant telephone cord and modular plug is provided with this product. It is designed to be connected to a compatible modular jack that is also compliant. See installation instructions for details.

The REN is used to determine the number of devices that may connect to a telephone line. Excessive RENs on a telephone line may result in the devices not ringing in response to an incoming call. In most but not all areas, the sum of the RENs should not exceed five (5.0)

To be certain of the number of devices that may be connected to a line, as determined by the total RENs, contact your local telephone company. The REN for this product is part of the product identifier that has the format US:AAAEQ##TXXXX. The digits represented by ## are the REN without the decimal point (e.g., 03 is a REN of 0.3).

If this DIRECTV HD Receiver causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice isn't practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the proper functioning of your equipment. If they do, you will be notified in advance in order for you to make necessary modifications to maintain uninterrupted service.

If trouble is experienced with this unit, for repair or warranty information, please contact DIRECTV Customer Care at the address and phone number listed below. If the equipment is causing harm to the network, the telephone company may request that you disconnect the equipment until the problem is resolved.

DIRECTV, Inc.
2230 E. Imperial Hwy
El Segundo, CA 90245
1-800-DIRECTV

DO NOT DISASSEMBLE THIS EQUIPMENT. It does not contain any user-serviceable components.

We recommend the installation of an AC surge arrester in the AC outlet to which this equipment is connected. Telephone companies report that electrical surges, typically lightning transients, are very destructive to customer terminal equipment connected to AC power sources.

Registration Information

Product Registration

Please fill out the product registration card (packed separately) and return it immediately, or register online at DIRECTV.com. Returning the card allows us to contact you if needed.

Product Information

Keep your sales receipt to obtain warranty parts and service and for proof of purchase. Attach it here and record the serial and model numbers in case you need them. These numbers are located on the product.

Model No. _____

Serial No. _____

Purchase Date: _____

Dealer/Address/Phone: _____

Access Card: _____

Receiver ID: _____

Index

Icon Reference

Those Arrow thingies

< >   Indicate that a show's start or end time is earlier or later than is visible in the Guide program cell.

◁ ▷   LEFT and RIGHT arrows on the remote offer special functionality.

▼ ▲   Objects are scrollable above or below the visible window.

▽ △   UP and DOWN arrows on the receiver front panel offer special functionality.

Scheduler stuff

    Shows an Autotune has been set for a future program, or a present program is Autotuned.

    Indicates an Autotune has been set for all episodes of an ongoing program.

    Indicates an Autotune set for a present or future program conflicts with another scheduled program.

    Shows an Autotune has been set for matching programs in a "*Find by.*"

    Indicates a present or future pay per view program has been scheduled for purchase.

And the rest

    Denotes one or more alternate audio tracks available for a program.

    Denotes that no alternate audio tracks available.

    Indicates one or more new messages are in the Inbox.

    Indicates no new messages are in the Inbox.

    Shows that Parental Control limits are currently "locked."

    Shows that limits are temporarily unlocked.

    Shows that there are no current limits imposed.

    Indicates a rating level or channel that is blocked via Parental Controls.

    Indicates a pay per view program is available as an All Day Ticket replay.

LB   Indicates program shown in letterbox format.

    Denotes an error condition has occurred.

HD   Indicates current program is a high definition broadcast (HDTV).

Dolby Digital   Denotes a program includes Dolby Digital audio.

We're always here to help!

DIRECTV is firmly committed to offering the highest quality in customer service and support. Please let us know if you have any questions or concerns.

When you call DIRECTV, you'll need to provide your receiver's access card number and model number and your DIRECTV account number.

If you've already checked the Troubleshooting section and need assistance with:

▸ Connecting your receiver to your TV or other equipment

▸ Guided setup

▸ A receiver that is not functioning properly even after restarting

▸ Other questions regarding the receiver or remote control

▸ Activating or using a feature of DIRECTV programming

▸ Understanding an on-screen message regarding your service

  call 1-800-DIRECTV.

Also find information about DIRECTV products and services at DIRECTV.com.

*4-19 Electronic Step*_____

4-19.1 Description and Operation

The motor home is equipped with a single electronic step that automatically extends when motor home door is open and also has a switch just inside the door that enables the step as well.

The control unit is essentially a current sensor as well as a switching device. When the motor assembly moves the step tread to its extended position, or stops moving because of an obstruction such as a curb or the binding of a damaged or bent step frame, the motor draws a larger amount of current. The control unit "senses" the larger current draw and shuts off power to the motor.

All control units are equipped with an "ignition override system". This system is designed so that the vehicle will not be driven with the step in the extended position. When the step is locked in the extended position, the door is closed, and the ignition is turned on, the ignition override system will engage and then the step will automatically retract.

The "Last Out" feature is another safety feature designed to extend the step when the door is opened for the first time after the vehicle ignition is turned off, even if the power switch is turned off. When the ignition is switched on, the function of the power switch is disabled and the step will always extend when the door is opened and retract when the door is closed.

NOTE: Follow the instructions in this manual carefully. Failure to do so may result in damage to the step control, the motor and/or the vehicle wiring. Such damage may also result in voiding the warranty.

4-19.1.1 Operating the Step

1. After the installation is complete and with the entrance door open, turn the power switch on.

NOTE: Some steps are not equipped with a power switch. They are activated only with a door switch.

2. Close the door. The step should retract and lock in the "up" position.
3. Open the door. The step should extend and lock in the "down" position with the understep light on.

NOTE: The understep light is not available on all step models.

4. If your step is equipped with a power switch, turn it off. The step should remain in the extended position with the understep light off when the door is closed. Turning off the power with the step retracted will hold the step in a retracted position as well.
5. With the power switch off, the step extended, and the entrance door closed, turn on the vehicle ignition. The ignition override system will go into effect and the step will automatically retract.

NOTE: If the yellow wire from the four-way connector is not connected to an ignition power source, the ignition safety system will be inoperative and the step will remain in the extended position. In this case, the power switch must be turned on for the step to retract.

▲**WARNING: If the vehicle is driven with the step in the extended position, there is the possibility of causing major damage to both the step and the vehicle.**

6. Turn the vehicle ignition off and open the door. The step will extend and lock in the "down" position. This is the "Last Out" feature.

7. The "Last Out" feature is only operative the first time the door is opened after the vehicle ignition is turned off.

When the vehicle ignition is on, the step will always activate with the door movement, regardless of the power switch position.

NOTE: If the yellow wire from the four-way connector is not connected to an ignition power source, the "Last Out" feature will not operate.

BE SAFE. ALWAYS LOOK BEFORE YOU STEP OUT OF YOUR VEHICLE.

4-19.2 Maintenance and Lubrication

Clean all must, salt, and road grime from the step before lubricating. Lubricate all moving parts (bearings, pivot points, slides, clevis pin, and drive linkage ball) every 30 days with a good quality moisture and heat resistant penetrating grease. KwikLube™ Spray Grease is specially formulated to lubricate Kwikee Electric Steps and is recommended for lubricating all moving parts. Refer to the figures below for lubrication locations.

NOTE: Silicone lubricants and WD-40 are not recommended as they have a tendency to evaporate and dry the mating surfaces, which leave them vulnerable to the elements.

Figure 1
Figure 2
Figure 3
Figure 4
Figure 5
Figure 6
Figure 7
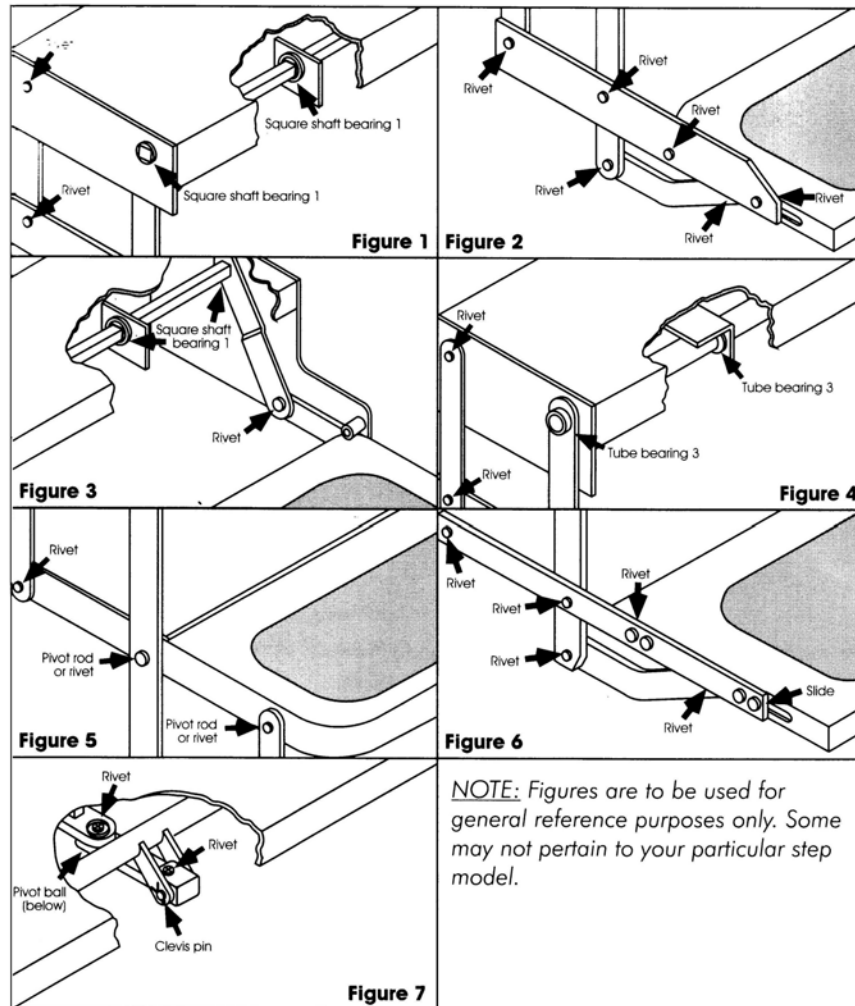
NOTE: Figures are to be used for general reference purposes only. Some may not pertain to your particular step model.

1. Figures 1 & 3 – square shaft bearing – lubricate around outside and under head of bearing.
2. Figure 4 – on step models equipped with plastic cover, this cover will have to be removed to lubricate center bearings. Lubricate bearings under cover every 90 days.
3. Figure 4 – Lubricate around the bushing-in-bushings.
4. Maintain clean, dry electrical connections at the two-way and four-way connectors and any butt connections leading from the four-connector to the vehicle. A small dab of di-electric grease at the connections and replacing corroded butt connections with heat shrink type crimp style automotive connectors will help maintain a good electrical source for the step.

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5-1 Engine, Transmission and Chassis_____

5-1.1 General Inspection

To ensure safety and convenience and to minimize operating costs, the Operator should establish a routine inspection regimen. Any suspected malfunctions or defects should be reported to maintenance personnel and corrected before further operation of the vehicle.

Daily Inspection
- Check fuel level.
- Drain air tanks (cold weather).
- Check engine oil level.
- Check coolant level.
- Check automatic transmission fluid level.

Outside the motor home:
- Clean the windshield, mirrors, front windows, headlights, taillights, directional lights, and stop lights.
- Check that the exhaust tailpipe is not obstructed.
- Check tire pressure and treads.
- Check for missing wheel lug nuts.
- Ensure that area under the motor home is clear.
- Inspect the general outside appearance for cleanliness. Identifying markings (license plate, motor home number, etc.) must be clean and clear.
- Ensure that exterior mirrors are clean and properly adjusted.

Inside the motor home:
- Inspect for general cleanliness of seats and floors.
- Make sure steps and aisles are dry and unobstructed.
- Verify that all emergency exits open and close properly.
- Check emergency equipment and first aid kit.
- Make sure that fire extinguisher is in place and properly charged.
- Clean windows and windshield around driver's area.
- Ensure that exterior mirrors and clean and properly adjusted.

Starting the engine:
1. Be sure parking brakes are on.
2. Put transmission in neutral.
3. With key switched on, check fuel gauge. Check brake warning buzzer or light, and neutral safety switch.
4. Start engine. Look and listen for trouble signs; check gauges.

With the engine running, check (from driver's seat):
- Mirrors, interior and stepwell lights, and service door seal.
- Watch for any unusual feeling or sound from steering, brakes, and other controls. See that brake pedal has normal height and feel and that the brake gauge is reading correctly.
- Check Parking Brake operation by releasing and resetting it.
- Check horn, defroster and heater blowers, and windshield wiper operation.
- Check signals and lights for proper operation before driving away:
    - Right and left turn signals in front and rear.
    - Flasher warning lights in front and rear.
    - Headlight high and low beams.
    - Stoplights and taillights.
    - Hazard flasher.

Final check while the motor home is starting to move:
- Check that seatbelt is secure.
- Check that brake action feels sure and positive; not spongy.
- Watch for any unusual feeling, behavior, or noises in steering and check that the bus is generally under control and tracking straight.
- Brake to a stop and check all gauges.

REMEMBER: Safety on the road depends on you. Observe weather and road conditions and drive accordingly. Be physically and mentally alert. When backing up near pedestrians or in congested areas, use outside monitor or director. Look around before driving away from where you are parked and observe all traffic rules and regulations.

Weekly Inspection:
- Adjust brakes.
- Drain air tanks (warm weather).
- Check tire tread and inflation pressure.
- Inspect seat belts and buckles.
- Inspect outside lights for proper operation.

5-1.2 Maintenance Schedule

Monthly or 1,000 Miles

- Inspect all emergency equipment and mounting fasteners. Inspect fire extinguisher to see if fully charged, and check contents of first aid kit(s) for freshness, sterility, full supply, and expiration dates.
- Inspect tires for correct pressure, and check for signs of wear. Torque outer wheel nuts to 450-500 foot-pounds (610-675 N•m).
- Inspect window latches and slides for proper operation and secure closure.
- Inspect seat frames for secure attachment to the floor and wall.

Monthly or 3,000 Miles

- Check fuel system (Drain fuel and contaminants, if required).
- Check battery water level.
- Inspect brake chambers.

3 Months or 5,000 Miles

- Lubricate all hinges and window latches for ease of operation.
- Lubricate all window channels with silicone or graphite.
- Change main heater air filter (depending on operating conditions).
- Lubricate hinge and latch mechanisms on access doors.
- Inspect heater valves to verify proper function.
- Change engine oil and oil filter.
- Inspect fuel cap, tank, and fuel lines.
- Inspect engine fuel tank vents.
- Inspect engine air filter, replace if required.
- Inspect driveshaft.
- Lubricate universal joint and slip joint.
- Lubricate brake camshaft, king pins, tie rod ends, and slack adjusters.

3 Months or 24,000 Miles

- Inspect Bendix air dryer.
- Check for loose or disconnected electrical connections and damaged wiring.
- Check the vehicle brake warning system.
- 6 Months or 6,000 Miles
- Check lubricant level in rear axle.
- Inspect rear axle vent.
- Clean and/or replace air compressor filters.
- Check power steering fluid level.
- Lubricate steering drag rod.
- Check single and double check valves.
- Lubricate spring pin.
- Inspect alternator.
- Clean battery posts.
- Disassemble and clean the air compressor governor and repair, as required.
- Clean and lube treadle valve.
- Change engine fuel filter.
- Clean and lubricate accelerator treadle valve.

12 Months or 12,000 Miles

- Complete Quarterly Maintenance Checklist.
- Bleed all air from heaters.
- Tighten all heater hose clamps.
- Check heater hoses, motor wheels, and fans on heaters.
- Clean heater core.
- Inspect power steering pump.
- Inspect steering gear.
- Lubricate steering column.
- Check front and rear suspension bolt torque.
- Inspect suspension system and components.
- Inspect radiator hoses.
- Pressure-test engine cooling system.
- Check heater panels and housing.

12 Months or 24,000 Miles

- Check air tank pop-off valves.
- Change automatic transmission filter.
- Change internal automatic transmission filter.
- Inspect automatic transmission vent.
- Change power steering reservoir filter.
- Change lubricant in rear axle.

24 Months or 24,000 Miles

- Clean radiator.
- Change thermostat.
- Clean relay valves, spring brake valves, parking brake valves, and quick release valves.
- Clean pressure protection valves.

These checklists are suggested. They do not replace or supersede local or state required driver inspection procedure.

5-1.3 Engine Quick Reference Guide

5-1.3.1   Cooling

Routine Maintenance Recommendations
- Check every 18,000 miles/6 months
- Change coolant filter every 18,000 miles/6 months
- Drain and flush system every 72,000 miles/2 years and refille with heavy-duty coolant. Use a 50/50 mix of water and antifreeze.

NOTE: Always use antifreeze. In addition to freeze protection, antifreeze is essential for overheat and corrosion protection.

The supplemental coolant additive (SCA) is required with the ISL Engine.

Definition of Heavy-Duty Coolant
A combination of 50/50 water and low silicate antifreeze (ethylene glycol or propylene glycol are acceptable).
Protects to -34°F. Freeze protection decreases above 68% antifreeze. Antifreeze must meet ASTM D4985 (GM6038M) specs.

How to Test Coolant Concentration
Refractometer Fleetguard #C2800 is recommended vs. floating ball due to accuracy.

Water Quality Requirements

Calcium/Magnesium	Max. 170ppm as $CaC0_3+MgCO_3$
Chloride	Max. 40ppm as Cl
Sulfur	Max. 100ppm as SO_4

A conservative approach to cooling system maintenance would include an analysis of your home base tap water supply. Your Cummins distributor can provide this service as well as sample bottles and other coolant test devices. Consider using pre-formulated antifreeze when on the road or when water quality is unknown. The use of distilled water is also acceptable.

Pre-formulated Antifreeze and Supplemental Coolant Additives (SCA)
Pre-formulated antifreeze, such as Fleetguard Compleat, offers a vehicle owner the convenience of a pre-mixed antifreeze solution containing high quality water and the correct chemical balance of antifreeze and SCA.

5-1.3.2   Lubricating Oil

Routine Maintenance Recommendations

Oil Drain Interval	Fleetguard Filter
18,000 miles/1 year	LF 9009

Replace oil filter at EVERY oil drain interval.

Multigrade vs. Straight Weight
High quality 15W40 oil API CG-4 or CH-4 is recommended.
Why multigrade?
- Reduced deposit formation
- Improved cranking in low ambient temperatures.
- Shortens time-to-block pressure in low ambients.
- Improved lubrication during high temperature operation.

Synthetic Oil
May be used in ISL engines provided they meet performance and chemical requirements.

Recommended for use in ambient temperatures consistently below -13°F (-25°C) for improved engine cranking and flowability. Should NOT BE USED to extend oil drain intervals.

Engine Break-In Oil
Special break-in oil should not be used. If synthetic or synthetic blend oil has been used prior to an engine rebuild, petroleum-based oil should be used for the first oil change interval, after which use of synthetic oil can be resumed.

Supplemental Oil Additives
Supplemental oil additives such as friction-reducers and graphitizers should not be used unless the oil supplier can provide evidence of satisfactory performance. If there is any doubt about suitability of an oil, consult the oil manufacturer for a definitive recommendation, or data to establish that the oil has performed satisfactorily in Cummins engines.

Oil Analysis
Oil Analysis, as a method to extend drain intervals, is NOT recommended. Different methods of measuring soot, lack of correlation among testing labs, and differing driving patterns and idle time are the basis of the recommendation.

5-1.3.3   Fuel

Routine Maintenance Recommendations
Fuel filter should be changed at EVERY oil change.
Fleetguard fuel filter:
    Spin-on Filter   #FS 1022#
    Cummins P/N   3944269
*Denotes to transfer water sensor to new filter.

Low Sulfur Fuel and Fuel Lubricity
Fuel additives for lubricity are NOT required by Cummins when using commercially available low sulfur #2 diesel fuel or #1/#2 winter blend diesel fuels.

Biocide Treatment
A biocide or fungicide can help when fuels are prone to contamination with bacteria or fungus (black slime).

Other Fuel Additives
Any fuel additive product should be accompanied with performance data supporting its performance and benefit. Engine failures caused by incorrect fuel are NOT covered under warranty. It is not the policy of Cummins to test, approve or endorse any product not manufactured or sold by Cummins.

5-1.3.4   Extended Shutdown Start Procedure

When starting an engine that has been setting idle for more than 30 days:

1. Engine oil pressure must be indicated on gauge within 15 seconds after starting. If oil pressure does NOT register within 15 seconds after starting, shut off engine immediately and follow the instructions in the chart below.
2. Idle engine three to five minutes before operating under load.

Cause	Correction	Cause	Correction
Engine angularity during operation exceeds specification	Refer to the Engine Specifications in this manual.	Lubricating oil leak (external)	Inspect the engine for external oil leaks. Tighten the capscrews, pipe plugs, and fittings. Replace gaskets if necessary. Refer to manual for specifications.
OK		OK	
Lubricating oil does not meet specifications for operating conditions	Change the oil and filters. Refer to manual. Use the oil type recommended in Manual.	Lubricating oil level is above or below specification	Check the oil level. Add or drain oil if necessary. Refer to the manual. Check the dipstick calibration.
OK		OK	
Lubricating oil filter is plugged	Change the oil and filter. Refer to the manual. Review the oil change interval.	Lubricating oil pressure switch, gauge, or sensor is malfunctioning or is not in the correct location	Check the oil pressure switch, gauge, or sensor for correct operation and location.
OK		OK	
Lubricating oil is contaminated with coolant or fuel	Contact a Cummins Authorized Repair Facility.	Electronic fault codes are active	Refer to Diagnostic Fault Codes later in this section for instructions on how to read active fault codes. If fault codes are active, contact a Cummins Authorized Repair Location.
OK		OK	
		Contact a Cummins Authorized Repair Facility	

5-1.3.5   Ether

Ether MUST NOT be used for ISL engines. The ISL comes equipped from the factory with an integrated grid heater for cold starting.

5-1.3.6   Component Maintenance

Valve Adjustment Interval
   No adjustment required. Check at 150,000 miles. See chart below.

Valve Lash Acceptable Range			
	mm		**in**
Intake	0.152	MIN	0.006
	0.559	MAX	0.022
Exhaust	0.381	MIN	0.015
	0.813	MAX	0.032

Air Filter and Intake System
Follow RV manufacturer's recommended filter change interval. Visually inspect intake air components at each oil change for cracks or loose connections.

Charge Air Cooler
The long-term integrity of the CAC (Charge Air Cooler) system is the responsibility of the vehicle and component manufacturers. However, CAC diagnostics can be performed at your Cummins distributor.

Vibration Damper
Inspection required at 72,000 miles/2 years which includes visual inspection for deformation.

Inspect

⚠️**CAUTION: The silicone fluid in the vibration damper will become solid after extended service and will make the damper inoperative. An inoperative vibration damper can cause major engine or drivetrain failures.**

Check the vibration damper for evidence of fluid loss, dents, and wobble. Inspect the vibration damper thickness for any deformation or raising of the damper cover plate.

If any variations or deformations are detected, contact a Cummins distributor for details.

Fan Idler Pulley, Hub and Belt Tension
Inspection required at 36,000 miles/1 year which includes visual inspection of all components.

Fan Hub, Belt Driven
Maintenance Check
Remove the drive belt.

NOTE: The fan hub must rotate without any wobble or excessive end play.

Check the fan hub bearing.

Fan Hub End Play		
mm		**in**
0.15	MAX	0.006

Belt Tensioner, Automatic
Maintenance Check
Every 36,000 miles, 1000 hours, or 1 year, whichever occurs first, inspect the automatic belt tensioner.

With the engine turned off, check that neither the top nor the bottom tensioner arm stop is touching the cast boss on the tensioner body. If either of the stops is touching a boss, the alternator belt must be replaced. Check to make sure that the correct belt part number is being used if either condition exists.

Visually check the tensioner pulley and body for cracks. If any cracks are noticed, the tensioner must be replaced. Refer to a Cummins Authorized Repair Facility. Check the tensioner for dirt buildup. If this condition exists, the tensioner must be removed and steam-cleaned.

Check that the bottom tensioner arm stop is in contrast with the bottom tensioner arm stop boss on the tensioner body. If these two are not touching, the tensioner must be replaced.

Inspect the tensioner for evidence of the pivoting tensioner arm contacting the stationary circular base. If there is evidence of these two areas touching, the pivot tube bushing has failed, and the tensioner must be replaced.

A worn tensioner that has play in it or a belt that "walks" off its pulley possibly indicates pulley misalignment.

This measurement can be taken with a straightedge and an inclinometer.

Install the belt.

5-1.3.7   Idle/Warm-up/Cooldown

Excessive Idle

This should be avoided whenever possible. Excessive Idle will result in reduced fuel economy and increased engine wear. An automatic shutdown feature is available. Contact a Cummins distributor for details.

Engine Warm-Up

Do not operate at full speed/load until coolant temperature reaches normal operating range. Do not operate above low idle until oil pressure is indicated.

Engine Cool Down

Prior to shutdown, an engine should be idled 3-5 minutes after extended full throttle or high power operation. However, under normal driving conditions, such as exiting a highway, engine operation is generally lighter in nature and thereby, the 3-5 minute cooldown is not necessary.

5-1.3.8   Diagnostic Fault Codes

The ISL control system can show and record operation anomalies that present themselves as fault codes. These codes will make troubleshooting easier. The fault codes are recorded in the ECM. They can be read using the fault lamps in the dash or with the INSITE™ service tool.

NOTE: Not all ISL control system anomalies are shown as fault codes.

There are three types of system codes:
- Engine electronic control system fault codes
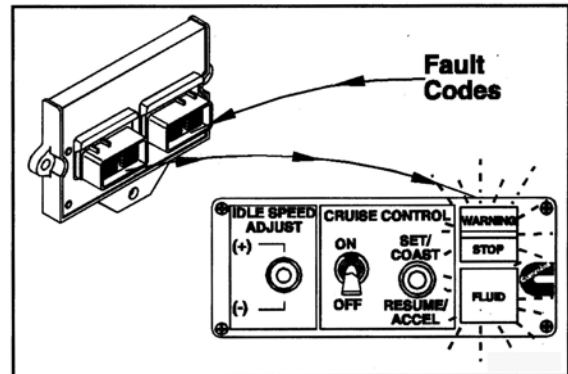
- Engine protection system fault codes
- Engine maintenance indicator codes

All fault codes recorded will be either active (fault code is currently active on the engine) or inactive (fault code was active at some time, but at the moment is **not** active).
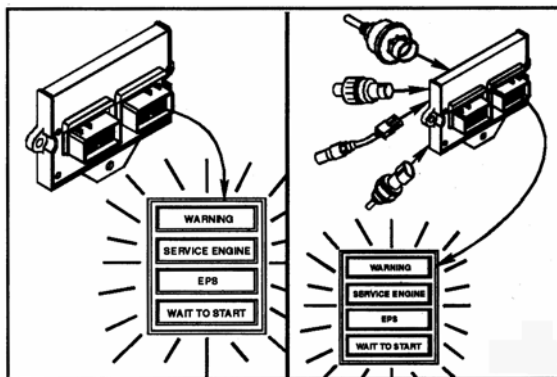
Most, but **not** all, of the electronic fault codes will light a lamp when they are active. There are three possible lamps that can be illuminated when a fault code is active:

The WARNING or CHECK ENGINE lamp is yellow and indicates the need to repair the fault at the first available opportunity.

The STOP or STOP ENGINE lamp is red and indicates the need to stop the engine as soon as it can be safely done. It is recommended that the engine remains shut down until the fault can be repaired.

The MAINTENANCE lamp will illuminate when an engine maintenance function needs to be performed.

Some vehicles will also have a WAIT TO START lamp and a WATER IN FUEL lamp. The WAIT TO START lamp is illuminated during the preheat time that takes place at key-on during cold-weather starting. To minimize cranking time during cold-weather starting, the engine can **not** be cranked until the WAIT TO START lamp has been extinguished.

The WATER IN FUEL lamp indicates that the engine's fuel-water separator needs to be drained. This task will be performed as soon as possible whenever this lamp is illuminated. Some vehicle OEMs will combine the functions of the MAINTENANCE and WATER IN FUEL lamps. In these cases, the MAINTENANCE lamp indicates a WATER IN FUEL warning, in addition to other maintenance indicators.

To check for active engine electronic system fault codes and maintenance indicator codes, turn the keyswitch to the OFF position, and move the diagnostic switch to the ON position, or connect the shorting plug into the diagnostic connector.

Turn the vehicle keyswitch to the ON position.

If no active fault codes are recorded, both the WARNING and STOP lamps will illuminate and stay on.

If active fault codes are recorded, both the WARNING and STOP lamps will illuminate momentarily, then begin to flash the codes of the recorded faults.

Example Fault Code Sequences
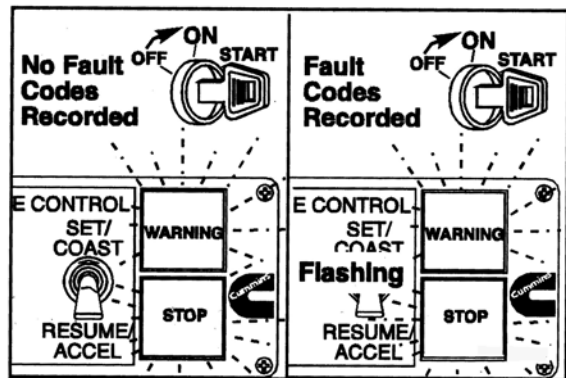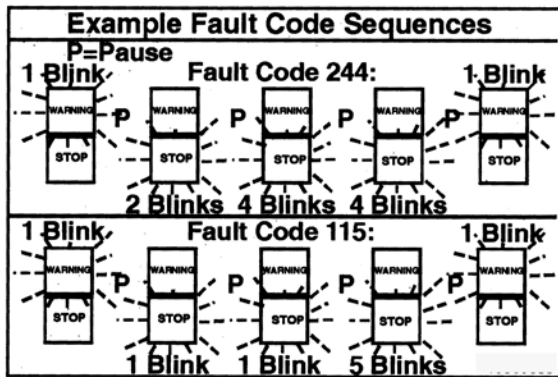
The fault code will flash in the following sequence:
1. A yellow WARNING lamp will flash.
2. There is a short 1- or 2-second pause.
3. The fault code will flash on the red STOP lamp.
4. There is a short 1- or 2-second pause between each number.

When the number has finished flashing in red, a yellow WARNING lamp will appear again. The fault code will repeat the sequence.

Each fault code will flash two times before advancing to the next code. To skip to the next fault code, move the IDLE SPEED ADJUST switch (if equipped) momentarily to the (+) position. Go back to the previous fault code by momentarily moving the IDLE SPEED ADJUST switch (if equipped) to the (-) position. If only one active fault code is recorded, the ISL control system will continuously display the same fault code, with either the (+) or (-) selected.
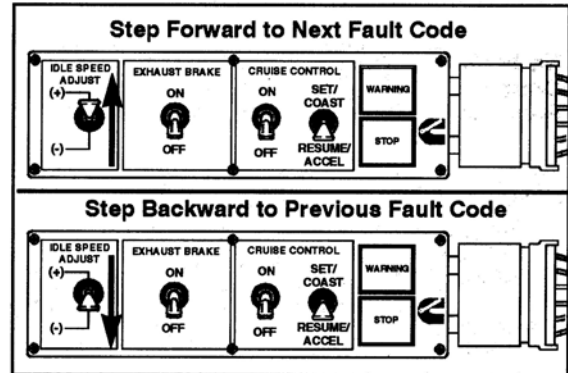
When **not** using the diagnostic system, turn OFF the Diagnostic Switch, or remove the Shorting Plug. If the Diagnostic Switch is left ON or the Shorting Plug left in, the electronic control module (ECM) will **not** log some fault codes.
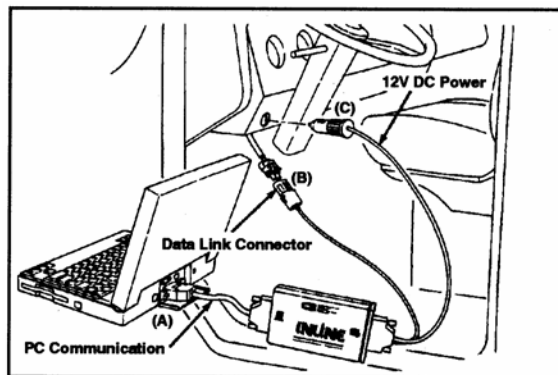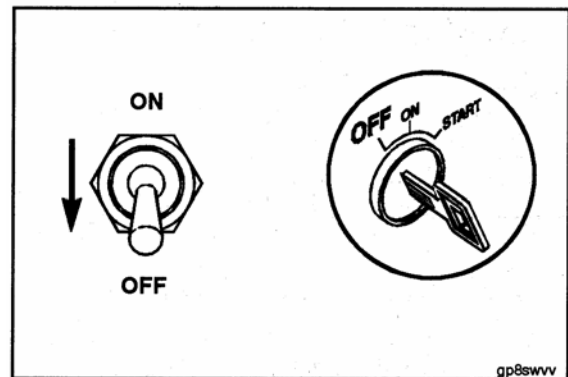
Fault Code Snapshot Data
This additional fault code information can be obtained by using the INSITE™ service tool. The snapshot data records the value or state of the control system sensors and switches at the time a fault code occurred. Either set of data is stored for the first occurrence of the fault, since it was last cleared, and for the most recent occurrence. This data can be very valuable when trying to re-create or determine engine operating conditions at the time of a fault.

Trip Information
The Trip Information System records fuel consumption, distance, and time information for the engine during normal operation and in certain operating modes such as PTO and idle. This data can be displayed using the INSITE™ service tool. Some data can **not** be reset and reflects the performance of the engine over its lifetime. Other data, such as trip data, can be reset using the INSITE™ service tool.

Engine Time Offset
This feature is part of the Trip Information System. The value entered here will be added to the total ECM time to equal the total engine time. This allows the time on the engine to be entered when the ECM is replaced.

Engine Distance Offset
This feature is part of the Trip Information System. The value entered here will be added to the total ECM distance to equal the total engine distance. This allows the distance on the engine to be entered when the ECM is replaced.
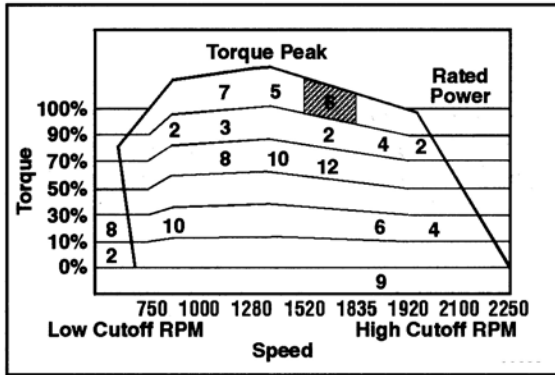
Duty Cycle Monitor
With this feature, the ECM tracks engine load and speed. This data is stored in the ECM until the INSITE™ service tool is used to display it. The INSITE™ service tool displays a duty cycle "map" that shows the whole engine operating range in terms of speed and load. This "map" is divided into 50 regions. The percent of engine operating time spent in each region is shown on the display.

The ECM contains duty cycle data for the whole life of the engine and for two 500-hour operating periods. The two 500-hour maps can be reset with the INSITE™ service tool.

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5-2 Generator_____

Your motor home is equipped with a Powertech Generator system. For maintenance and service procedures for this system refer to the following sections.

5-2.1 Generator Maintenance/Service Procedures

⚠️**CAUTION:**

To avoid personal injury:

- **Be sure to conduct daily checks, periodic maintenance, refueling or cleaning on a level surface with the engine shut off and remove the key.**
- **Before allowing other people to use your engine, explain how to operate, and have them read these instructions before operation.**
- **When cleaning any parts, do not use gasoline but use regular cleanser.**
- **Always use proper tools that are in good condition. Make sure you understand how to use them, before performing any service work.**
- **When installing, be sure to tighten all the bolts by the specified torque.**
- **Do not put any tools on the battery, or battery terminals may short out. Severe burns or fire could result. Detach the battery from the engine before maintenance.**
- **Do not touch muffler or exhaust pipes while they are hot; severe burns could result.**

5-2.1.1 Service Intervals

Observe the following for service and maintenance. The lubricating oil change intervals listed in the table below are for Classes CF, CE and CD lubricating oils of API classification with a low-sulfur fuel in use. If the CF-4 or CG-4 lubricating oil is used with a high-sulfur fuel, change the lubricating oil at shorter intervals than recommended in the table below depending on the operating condition.

Interval	Item
Every 50 hours	Check of fuel pipes and clamp bands
See NOTE:	Change of engine oil
Every 100 hours	Cleaning of air cleaner element
	Check of battery electrolyte level
	Check of fan belt tightness
Every 200 hours	Check of radiator hoses and clamp bands
	Check of intake air line
Every 400 hours	Replacement of oil filter cartridge
	Replacement of fuel filter cartridge
Every 500 hours	Removal of sediment in fuel tank
	Cleaning of water jacket (radiator interior)
	Replacement of fan belt
Every year	Replacement of air cleaner element
	Check of damage in electric wiring and loose connections
Every 800 hours	Check of valve clearance
Every 1500 hours	Check of fuel injection nozzle injection pressure
Every 3000 hours	Check of turbo charger
	Check of injection pump
	Check of fuel injection timer
Every two years	Change of radiator coolant (L.L.C.)
	Replacement of battery
	Replacement of radiator hoses and clamp bands
	Replacement of fuel pipes and clamp bands
	Replacement of intake air line

IMPORTANT:
- **Air cleaner should be cleaned more often in dusty conditions than in normal conditions.**
- **After 6 times of cleaning.**
- **Consult your local KUBOTA Dealer for this service.**
- **Replace only if necessary.**
- **The items listed above (@ marked) are registered as emission related critical parts by KUBOTA in the U.S. EPA nonroad emission regulation. As the engine owner, you are responsible for the performance of the required maintenance on the engine according to the above instruction.**
- **Please see the Warranty Statement in detail**.

NOTE: Lubrication Oil - With the emission control now in effect, the CF-4 and CG-4 lubricating oils have been developed for use of a low-sulfur fuel on on-road vehicle engines. When an off-road vehicle engine runs on a high-sulfur fuel, it is advisable to employ the CF, CD or CE lubricating oil with a high total base number. If the CF-4 or CG-4 lubricating oil is used with a high-sulfur fuel, change the lubricating oil at shorter intervals.

- **Lubricating oil recommended when a low-sulfur or high-sulfur fuel is employed.**

Lubricating Oil Class	Fuel		
	Low sulfur	High sulfur	Remarks
CF	O	O	TBN ≧ 10
CF-4	O	X	
CG-4	O	X	

5-2.2 Periodic Service

5-2.2.1 Fuel

Fuel is flammable and can be dangerous. You should handle fuel with care.

⚠️ **CAUTION: To avoid personal injury:**
- **Do not mix gasoline or alcohol with diesel fuel. This mixture can cause an explosion.**
- **Be careful not to spill fuel during refueling. If fuel should spill, wipe it off at once, or it may cause a fire.**
- **Do not fail to stop the engine before refueling. Keep the engine away from the fire.**
- **Be sure to stop the engine while refueling or bleeding and when cleaning or changing fuel filter or fuel pipes. Do not smoke when working around the battery or when refueling.**
- **Check the above fuel systems at a well-ventilated and wide place.**
- **When fuel and lubricant are spilled, refuel after letting the engine cool off.**
- **Always keep spilled fuel and lubricant away from engine.**

5-2.2.2 Fuel Level Check and Refueling

Check to see that the fuel level is above the lower limit of the fuel level gauge.
If the fuel is too low, add fuel to the upper limit. Do not overfill.

No. 2-D is a distillate fuel oil of lower volatility for engines in industrial and heavy mobile service. (SAE J313 JUN87)

Grade of Diesel Fuel Oil According to ASTM D975

Flash Point, °C (°F)	Water and Sediment, Volume %	Carbon Residue on 10% Residuum, %	Ash. Weight %
Min.	Max.	Max.	Max.
52 (125)	0.05	0.35	0.01

Distillation Temperatures, °C (°F) 90% Point		Viscosity Kinematic cSt or mm 2/s at 40 °C		Viscosity Sayboit, SUS at 100 °F		Sulfur, weight %	Copper strip Corrosion	Cetane Number
Min	Max	Min	Max	Min	Max	Max	Max	Min
282 (540)	338 (640)	1.9	4.1	32.6	40.1	0.50	No. 3	40

The cetane number is required not to be less than 45.

IMPORTANT:
- **Be sure to use a strainer when filling the fuel tank, or dirt or sand in the fuel may cause trouble in the fuel injection pump.**
- **For fuel, always use diesel fuel. You are required not to use alternative fuel, because its quality is unknown or it may be inferior in quality. Kerosene, which is very low in cetane rating, adversely affects the engine. Diesel fuel differs in grades depending on the temperature.**
- **Be careful not to let the fuel tank become empty, or air can enter the fuel system, necessitating bleeding before next engine start.**

5-2.2.3 Air Bleeding the Fuel System

⚠️ **CAUTION: To avoid personal injury:**
Do not bleed a hot engine as this could cause fuel to split onto a hot exhaust manifold creating a danger of fire.

Air bleeding of the fuel system is required if:
- The fuel filter and pipes have been detached and refitted.
- The fuel tank has become empty; or
- Using engine after a long storage.

Procedure for Air Bleeding the Fuel System (gravity feed fuel tanks)
1. Fill the fuel tank to the fullest extent. Open the fuel filter level.
2. Loosen air vent plug of the fuel filter a few turns.
3. Screw back the plug when bubbles do not come up any more.
4. Open the air vent plug on top of the fuel injection pump.
5. Retighten the plug when bubbles do not come up any more
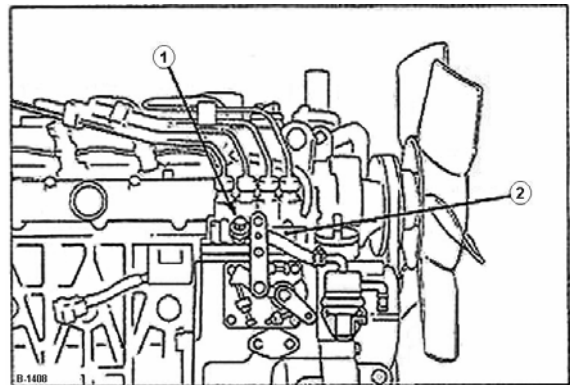
(1) Air vent plug
(2) Injection pump

5-2.2.4 Checking the Fuel Pipes

⚠️ **CAUTION: To avoid personal injury:**
Check or replace the fuel pipes after stopping the engine. Broken fuel pipes can cause fires.

Check the fuel pipes every 50 hours of operation.

When/If:
1. The clamp band is loose, apply oil to the screw of the band, and tighten the band securely.
2. The fuel pipes, made of rubber, become worn out; replace them and the clamp bands every two years.
3. The fuel pipes and clamp bands are found worn or damaged before two years' time replace or repair them at once.

NOTE: After replacement of the pipes and bands, air-bleed the fuel system.

IMPORTANT: When the fuel pipes are not installed, plug them at both ends with clean cloth or paper to prevent dirt from entering. Dirt in the pipes can cause fuel injection pump malfunction.

5-2.2.5 Fuel Filter Cartridge Replacement

1. Replace the fuel filter cartridge with a new one every 400 operating hours.
2. Apply fuel oil thinly over the gasket and tighten the cartridge into position by hand tightening only.
3. Finally, vent the air.

IMPORTANT: Replace the fuel filter cartridge periodically to prevent wear of the fuel injection pump plunger or the injection nozzle, due to dirt in the fuel.
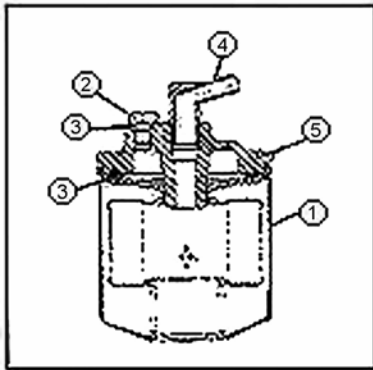
(1)   Fuel filter cartridge
(2)   Air vent plug
(3)   O ring
(4)   Pipe joint
(5)   Cover

5-2.3 Engine Oil

⚠️ **CAUTION: To avoid personal injury:**
- **Be sure to stop the engine before checking and changing the engine oil and the oil filter cartridge.**
- **Do not touch muffler or exhaust pipes while they are hot; severe burns could result. Always stop the engine and allow it to cool before conducting inspections, maintenance, or for a cleaning procedure.**
- **Contact with engine oil can damage your skin.**
- **Put on gloves when using engine oil. If you come in contact with engine oil, wash it off immediately.**

NOTE: Be sure to inspect the engine, locating it on a level place. If placed on gradients accurately, oil quantity may not be measured.

5-2.3.1 Checking Oil Level and Adding Engine Oil

1. Check the engine oil level before starting or more than 5 minutes after stopping the engine.
2. Remote the oil level gauge, wipe it clean and reinstall it.
3. Take the oil level gauge out again, and check the oil level.
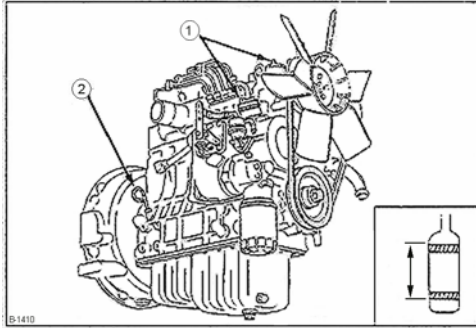
(1) Oil filter plug   (Lower end of oil level gauge)
(2) Oil level gauge   (A) Engine oil level within this range
                              is proper

4. If the oil level is too low, remove the oil filler plug, and add new oil to the prescribed level.
5. After adding oil, wait more than 5 minutes and check the oil level again. It takes some time for the oil to drain down to the oil pan.
6. If the engine is operated with the oil level nearing the lower limit, however, oil may deteriorate quickly; keeping the oil level near the upper limit is thus recommended.

Engine oil quantity

Model	Quantity
D905-EBG, D1005-EBG, D1105-EBG	5.1L (1.35 U.S. gals.)
V1205-EBG, V1305-EBG, V1505-EBG	6.0L (1.59 U.S. gals.)
V1505-T-EBG	6.7L (1.77 U.S. gals.)

Oil quantities shown are for standard oil pans.

IMPORTANT: Engine oil should be MIL-L-2104C or have properties of API classification CD grades or higher.
Change the type of engine oil according to the ambient temperature.

above 25°C (77°F)	SAE30	or	SAE10W-30
			SAE10W-40
0 to 25°C (32 to 77°F)	SAE20	or	SAE10W-30
			SAE10W-40
below 0°C (32°F)	SAE10W	or	SAE10W-30
			SAE10W-40

When using oil of different brands from the previous one, be sure to drain all the previous oil before adding the new engine oil.

5-2.3.2 Changing Engine Oil

⚠️ **CAUTION: To avoid personal injury:**
- **Be sure to stop the engine before draining engine oil.**
- **When draining engine oil, place a container underneath the engine and dispose of old oil according to local regulations.**
- **Do not drain oil after running the engine. Allow the engine to cool down sufficiently.**

1. Change oil after the initial 50 hours of operation and every 200 hours thereafter

2. Remove the drain plug at the bottom of the engine, and drain all the old oil. Oil will drain easier when the oil is warm.
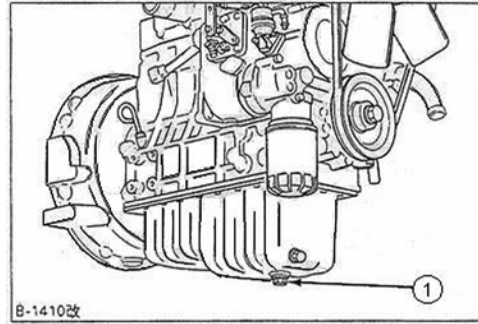
(1) Oil drain plug

3. Add new engine oil up to the upper limit of the oil level gauge.

5-2.3.3 Replacing the Oil Filter Cartridge

⚠ **CAUTION: To avoid personal injury:**
- **Be sure to stop the engine before changing the oil filter cartridge.**
- **Allow engine to cool down sufficiently. Oil can be hot and cause burns.**

1. Replace the oil filter cartridge every 400 hours of operation.
2. Remove the old oil filter cartridge with a filter wrench.
3. Apply a film of oil to the gasket for the new cartridge.
4. Screw in the cartridge by hand. When the gasket contacts the seal surface, tighten the cartridge enough by hand. Because, if you tighten the cartridge with a wrench, it will be tightened too much.
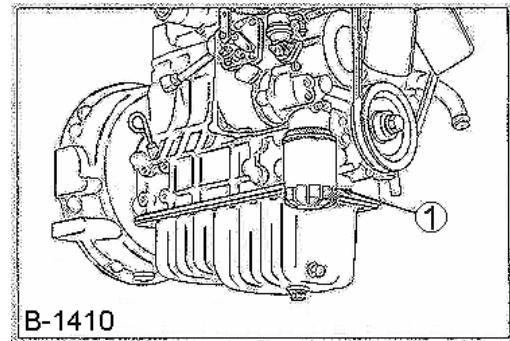
(1) Oil filter cartridge
Remove with a filter wrench (Tighten with your hand)

5. After the new cartridge has been replaced, the engine oil level normally decreases a little. Thus, run the engine for a while and check for oil leaks through the seal before checking the engine oil level. Add oil if necessary.

NOTE: Wipe off any oil sticking to the machine completely.

5-2.3.4 Radiator

Coolant will last for one day's work if filled all the way up before operation. Make it a rule to check the coolant level before every operation.

▲**WARNING: To avoid personal injury:**
- **Do not stop the engine suddenly; stop it after about 5 minutes of unloaded idling.**
- **Work only after letting the engine and radiator cool off completely (more than 30 minutes after it has been stopped).**
- **Do not remove the radiator cap while coolant is hot. When cool to the touch, rotate cap to the first stop to allow excess pressure to escape. Then remove cap completely.**
If overheats should occur, steam may gush out from the radiator or reserve tank; Severe burns could result.

5-2.3.5 Checking Coolant Level, Adding Coolant

1. Remove the radiator cap after the engine has completely cooled, and check to see that coolant reaches the supply port.
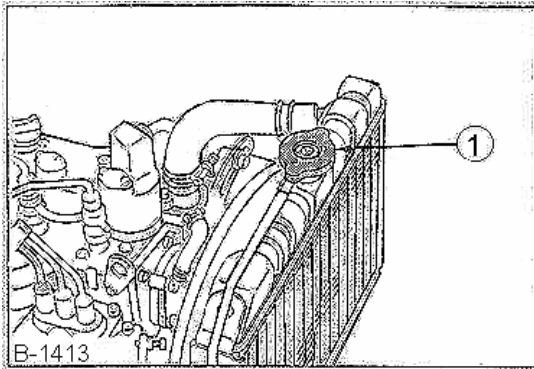
(1)   Radiator pressure cap

2. If the radiator is provided with a reserve tank, check the coolant level of the reserve tank. When it is between the "FULL" and "LOW" marks, the coolant will last for one day's work.
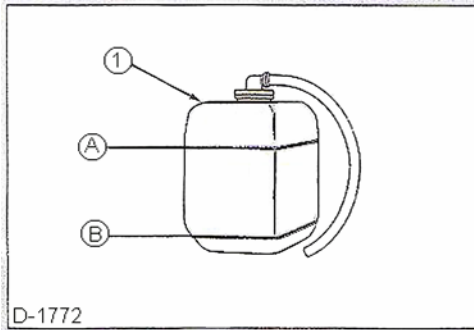
(1) Reserve tank   (A) "FULL"
*   (B) "LOW"*

3. When the coolant level drops due to evaporation, add water only up the full level.
4. Check to see that two drain cocks; one is at the crankcase side and the other is at the lower part of the radiator as figure below.
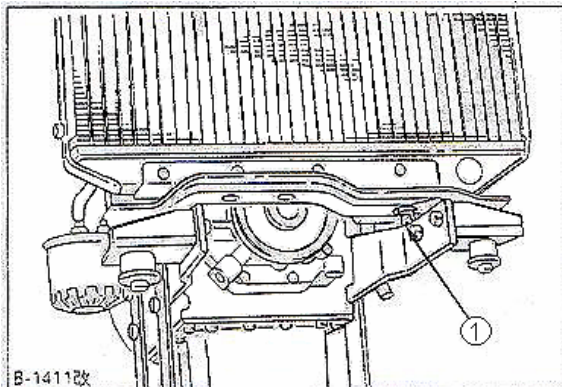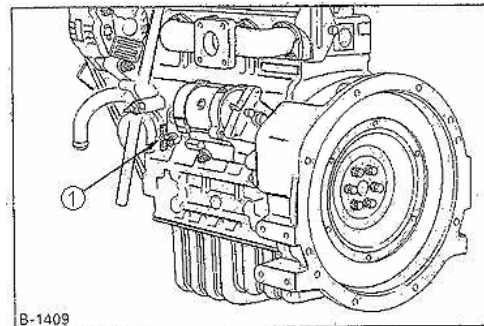
(1) Coolant drain cock

IMPORTANT:

- **If the radiator cap has to be removed, follow the caution and securely retighten the cap.**
- **If coolant should be leaking, consult your local KUBOTA dealer.**
- **Make sure that muddy or seawater does not enter the radiator.**
- **Use clean, fresh water and 50% anti-freeze to fill the recovery tank.**
- **Do not refill reserve tank with coolant over the "FULL" level mark.**
- **Be sure to close the radiator cap securely. If the cap is loose or improperly closed, coolant may leak out and decrease quickly.**
- **When coolant is added, coolant level drops the first time the engine is started. Stop the engine, and add more coolant.**

5-2.3.6 Changing Coolant

1. To drain coolant, always open both drain cocks and simultaneously open the radiator cap as well. With the radiator cap kept closed, a complete drain of water is impossible.
2. Remove the overflow pipe of the radiator pressure cap to drain the reserve tank.
3. Prescribed coolant volume (U.S. Gallons)

Models	Quantity
D905-EBG, D1005-EBG, D1105-EBG	3.1L (0.82 U.S. gals.)
V1205-EBG, V1305-EBG, V1505-EBG	4.0L (1.06 U.S. gals.)
V1505-T-EBG	5.0L (1.32 U.S. gals.)

NOTE: Coolant quantities shown are for standard radiators.

4. An improperly tightened radiator cap or a gap between the cap and the seal quickens loss of coolant.
5. Coolant (Radiator cleaner and anti-freeze)

Season	Coolant
Summer	Pure water and radiator cleaner
Winter (When temperature drops below 0°C (32°F)) or all season	Pure water and anti-freeze (See "Anti-freeze" in RADIATOR section)

5-2.3.7 Remedies for Quick Decrease of Coolant

1. Check any dust and dirt between the radiator fins and tube. If any, remove them from the fins and the tube.
2. Check the tightness of the fan belt. If loose, tighten it securely.
3. Check the internal blockage in the radiator hose. If scale forms in the hose, clean with the scale inhibitor or its equivalent.

5-2.3.8 Checking Radiator Hoses and Clamp

⚠️ **CAUTION: To avoid personal injury:**

- **Be sure to check radiator hoses and hose clamps periodically. If radiator hose is damaged or coolant leaks, overheats or severe burns could occur.**

Check to see if radiator hoses are properly fixed every 200 hours of operation or 6 months, whichever comes first.

1. If those clamps are loose or water leaks, tighten hose clamps securely.
2. Replace hoses and tighten hose clamps securely, if radiator hoses are swollen, hardened or cracked.

Replace hoses and hose clamps every 2 years, or earlier, if checked and found that hoses are swollen, hardened or cracked.

5-2.3.9 Precaution at Overheating

Take the following actions in the event the coolant temperature is reaching or exceeding the boiling point, this is called "Overheating". Take these actions if the engine's alarm buzzer sounds or the alarm lamp lights up.

1. Stop the engine operation in a safe place and keep the engine unloaded idling.
2. Do not stop the engine suddenly. Stop it after about 5 minutes of unloaded idling.
3. If the engine stalls within 5 minutes of running, under no load, immediately leave and keep away from the machine. Do not open the hood or any other part.
4. Keep yourself and others well away from the engine for another 10 minutes or while the steam finishes blowing out.
5. Check and make sure that there is no danger, such as burning, get rid of the causes of overheating according to the manual, see "TROUBLESHOOTING" Section. And then, start the engine again.

5-2.3.10 Cleaning Radiator Core (Outside)

If dust is between the fin and tube, wash it away with running water.

5-2.3.11 Cleaning the Radiator

Clean the cooling system every 500 hours. In addition, clean it before adding anti-freeze and before changing from anti-freeze to water, such as in the warmer months.

IMPORTANT: Do not clean radiator with firm tools such as spatulas or screwdrivers. They may damage specified fin or tube. This can cause coolant leaks or decrease cooling performance.

5-2.3.12 Anti-freeze

⚠ **CAUTION: To avoid personal injury:**
- **When using anti-freeze, put on some protection such as rubber gloves.**
- **If you or anyone else should drink anti-freeze, throw up at once and seek medical attention.**
- **When anti-freeze comes in contact with the skin or clothing, wash it off immediately.**
- **Do not mix different types of anti-freeze.**
- **Keep fire and children away from anti-freeze.**
- **Be mindful of the environment and ecology. Before draining any fluids, find out the correct way of disposing by checking with local codes.**
- **Also, observe the relevant environment protection regulating when disposing of oil, fuel, coolant, brake fluid, filters and batteries.**

If it freezes, coolant can damage the cylinders and radiator. It is necessary, if the ambient temperature falls below 0°C (32°F), to remove coolant after operating or to add anti-freeze to it.
1. There are two types of anti-freeze available; use the permanent type (PT) for this engine.
2. Before adding anti-freeze for the first time, clean the radiator and engine interior by pouring fresh water, and draining it a few times.
3. The procedure for the mixing of water and anti-freeze differs according to the make of the anti-freeze and the ambient temperature. Refer to SAE J1034 standard, more specifically, also to SAE J814c.
4. Mix the anti-freeze with water, and then fill into the radiator.

IMPORTANT: When the anti-freeze is mixed with water, the anti-freeze mixing ratio must be less than 50%.

Vol % Anti-freeze	Freezing Point		Boiling Point**	
	°C	°F	°C	°F
40	-24	-12	106	222
50	-37	-34	108	226

**At 1.013×10^5 Pa (760mmHg) pressure (atmospheric). A higher boiling point is obtained by using a radiator pressure cap, which permits the development of pressure within the cooling system.

NOTE:
- *The above data represents industry standards that necessitate a minimum glycol content in the concentrated anti-freeze.*
- *When the coolant level drops due to evaporation, add water only to keep the anti-freeze mixing ratio less than 50%. In case of leakage, add anti-freeze and water in the specified mixing ratio before filling into the radiator.*
- *Anti-freeze absorbs moisture. Keep unused anti-freeze in a tightly sealed container.*
- *Do not use radiator-cleaning agents when anti-freeze has been added to the coolant. (Anti-freeze contains an anti-corrosive agent, which will react with the radiator cleaning agent forming sludge, which will affect the engine parts.)*

5-2.3.13 Radiator Cement

As the radiator is solidly constructed, there is little possibility of water leakage. Should this happen, however, radiator cement can easily fix it. If leakage is serious, contact your local KUBOTA dealer.

5-2.3.14 Air Cleaner

Since the air cleaner employed on this engine is a dry type, never apply oil to it.
1. Open the evacuator valve once a week under ordinary conditions – or daily when used in a dusty place. This will get rid of large particles of dust and dirt.
2. Wipe the inside air cleaner clean with cloth if it is dirty or wet.
3. Avoid touching the element except when cleaning.
4. When dry dust adheres to the element, blow compressed air from the inside turning the element. Pressure of compressed air must be under 686kPa (7kg/f/cm^2, 99psi).
5. When carbon or oil adheres to the element, soak the element in detergent for 15 minutes, then wash it several times in water, rinse with clean water and dry it naturally.
6. After the element is fully dried, inspect the inside of the element with a light, and check if it is damaged or not. (Refer to the instructions on the label attached to the element.)
7. Replace the element every year or every 6 cleanings.
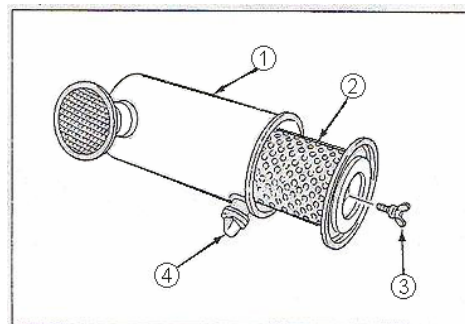
(1)	*Air cleaner body*	
(2)	*Element*	
(3)	*Wing bolt*	
(4)	*Evacuator valve*	

IMPORTANT:
- **Make sure the wing bolt for the element is tight enough. If it is loose, dust and dirt may be sucked in, wearing down the cylinder liner and piston ring earlier, and thereby resulting in poor power output.**
- **Do not over service the air cleaner element. Over servicing may cause dirt to enter the engine causing premature wear. Use the dust indicator as a guide on when to service.**

5-2.3.15 Dust Indicator (optional)

If the red signal on the dust indicator attached to the air cleaner is visible, the air cleaner has reached the service level.

Clean the element immediately, and reset the signal with the "RESET" button.
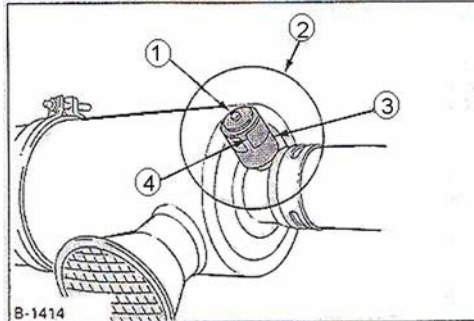
(1) "RESET" button
(2) Dust indicator
(3) Service level
(4) Signal

5-2.3.16 Battery

Mishandling of the battery shortens the service life and adds to maintenance costs. Obtain the maximum performance and the longest life of the battery by handling properly and with care.

⚠ **CAUTION: To avoid personal injury:**
- **Be careful not to let the battery electrolyte contact your body or clothing.**
- **Wear eye protection and rubber gloves, since the diluted sulfuric acid solution burns skin and eats holes in clothing. Should this occur, immediately wash it off with running water and get medical attention.**

Engine starting will be more difficult if the battery charge is low. Be careful to recharge it at an early occasion before it is too late.

5-2.3.17 Battery Charging

⚠ **CAUTION: To avoid personal injury:**
- **When the battery is being activated, hydrogen and oxygen gases in the battery are extremely explosive. Keep open sparks and flames away from the battery at all times, especially when charging the battery.**
- **When charging the battery, remove the battery vent plugs.**
- **When disconnecting the cable from the battery, start with the negative terminal, and when connecting them, start with the positive terminal first.**
- **DO NOT check the battery charge by placing a metal object across the terminals. Use a voltmeter or hydrometer.**

1. Make sure each electrolyte level is to the bottom of vent wells, if necessary; add only distilled water in a well-ventilated place.
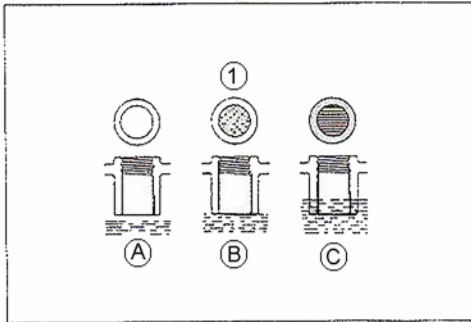
(1) Battery electrolyte level   *(A) "TOO LOW"*
                                         (B) "PROPER"
                                         (C) "TOO HIGH"

2. To slow charge the battery, connect the charger positive terminal to the battery positive terminal, and the negative to the negative, then recharge in the standard fashion.
3. Quick recharging charges the battery at a high rate in a short time. This is only for emergencies.
4. Recharge the battery as early as possible, or battery life will be extremely shortened.
5. When exchanging an old battery for a new one, use a battery of equal specifications.

D-1763
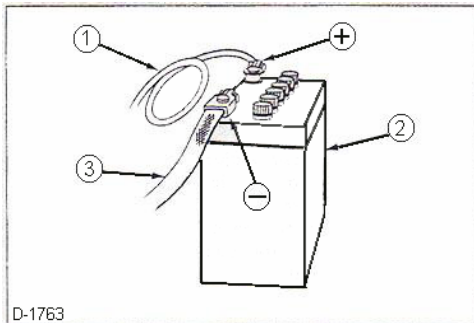
(1) Thick cable red (+)
(2) Battery case
(3) Earth cable black (-)

F-5709
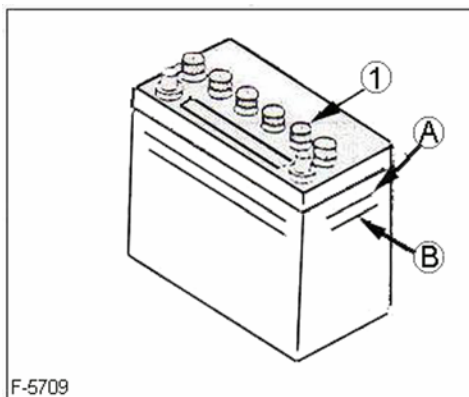
    (1) Plug   *(A) "HIGHEST LEVEL"*
                             (B) "LOWEST LEVEL"

IMPORTANT:
- **Connect the charger positive terminal to the battery positive terminal, and negative to the negative.**
- **When disconnecting the cable from the battery, start with the negative terminal first.**
- **When connecting the cable to the battery, start with the positive terminal first.**
  If reversed, the contact of tools on the battery may cause a short.

5-2.3.18 Direction for Long Term Storage

1. When storing the engine for long periods of time, remove the battery, adjust the electrolyte to the proper level, and store in a dry and dark place.

2. The battery naturally discharges while it is stored. Recharge it once a month in summer, and every 2 months in winter.

5-2.4 Electric Wiring

⚠️ **CAUTION: To avoid personal injury**
Shorting of electrical cable or wiring may cause a fire.
- **Check to see if electric cables and wiring are swollen, hardened or cracked.**
- **Keep dust and water away from all power connections.**
  Loose wiring terminal parts, make bad connections. Be sure to repair them before starting the engine.

Damaged wiring reduces the capacity of electrical parts. Charge or repair damaged wiring immediately.

5-2.5 Fan Belt

5-2.5.1 Adjusting Fan Belt Tension

⚠️ **CAUTION: To avoid personal injury**
- **Be sure to stop the engine and remove the key before checking the belt tension.**
- **Be sure to reinstall the detached safety shield after maintenance or checking.**

Proper fan belt tension	A deflection of between 7 to 9mm (0.28 to 0.35 in.) when the belt is pressed in the middle of the span.

1. Stop the engine and remove the key.
2. Apply moderate thumb pressure to belt between pulleys.
3. If tension is incorrect, loosen the alternator mounting bolts and, using a lever placed between the alternator and the engine block, pull the alternator out until the deflection of the belt falls within acceptable limits.
4. Replace fan belt if it is damaged.

IMPORTANT: If belt is loose or damaged and the fan is damaged, it could result in overheats or insufficient charging. Repair or replace belt.
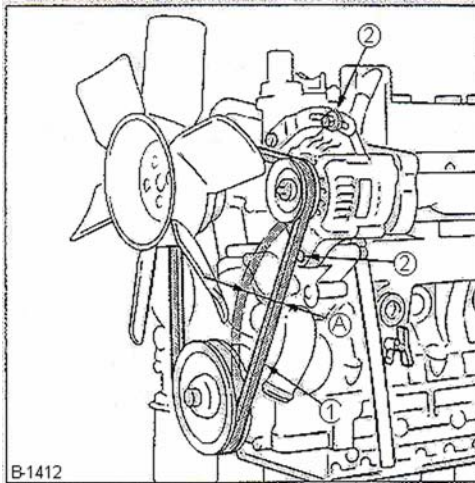
(1) Fan belt	*(A) 7 to 9mm (0.28 to 0.35 in.)*
(2) Bolt and nut	*(under load of 10 kgf (22.1 lbs.)*

5-2.6 Troubleshooting

If the engine does not function properly, use the following chart to identify and correct the cause.

5-2.6.1 When it is difficult to start the engine.

Cause	Possible Solution
Fuel is thick and doesn't flow.	Check the fuel tank and fuel filter. Remove water, dirt and other impurities. As all fuel will be filtered by the filter, if there should be water or other foreign matters on the filter, clean the filter with kerosene.
Air or water mixed in fuel system.	If air is in the fuel filter or injection lines, the fuel pump will not work properly. To attain proper fuel injection pressure, check carefully for loosened fuel line coupling, loose cap nut, etc. Loosen joint bolt atop fuel filter and air vent screws of fuel injection pump to eliminate all the air in the fuel system.
Thick carbon deposits on orifice of injection nozzle.	This is caused when water or dirt is mixed in the fuel. Clean the nozzle injection piece, being careful not to damage the orifice. Check to see if nozzle is working properly or not. If not, install a new nozzle.
Valve clearance is wrong.	Adjust valve clearance to 0.145 to 0.185mm (0.0057 to 0.0072 in.) when the engine is cold.
Leaking valves	Grind valves.
Fuel injection timing is wrong.	Adjust injection timing. The injection timing 16.5 ᵒefore top dead center.
Engine oil becomes thick in cold weather and engine cranks slow.	Change grade of oil according to the weather (temperature).
Low compression	Bad vale or excessive wear of rings, pistons and liners cause insufficient compression. Replace with new parts.
Battery is discharged and the engine will not crank.	Charge battery. In winter, always remove battery from machine, charge fully and keep indoors. Install in machine at time of use.

5-2.6.2 When output is insufficient

Cause	Possible Solution
Carbon stuck around orifice of nozzle piece	Clean orifice and needle valve, being very careful not to damage the nozzle orifice. Check nozzle to see if good. If not, replace with new parts.
Compression is insufficient. Leaking valves.	Bad valve and excessive wear of rings, pistons and liners cause insufficient compression. Replace with new parts. Grind valves.
Fuel is insufficient.	Check fuel system.
Overheating of moving parts	Check lubricating oil system. Check to see if lubricating oil filter is working properly. Filter element deposited with impurities would cause poor lubrication. Change element. Check the clearance of bearing are within factory specs. Check injection timing.
Valve clearance is wrong.	Adjust to proper valve clearance of 0.145 to 0.185mm (0.0057 to 0.0072 in.) with engine cold.
Air cleaner is dirty	Clean the element every 100 hours of operation.
Fuel injection pressure is wrong.	Adjust to proper pressure. 13.7 Mpa (140kgf/cm^2, 1991psi)
Injection pump wear	Do not use poor quality fuel as it will cause wear of the pump. Only use no. 2-D diesel fuel. Check the fuel injection pump element and delivery valve assembly and replace as necessary.

5-2.6.3 When engine suddenly stops

Cause	Possible Solution
Lack of fuel	Check the fuel tank and refill the fuel, if necessary. also check the fuel system for air or leaks.
Bad nozzle	If necessary, replace with a new nozzle.
Moving parts are overheated due to shortage of lubrication oil or improper lubrication.	Check amount of engine oil with oil level gauge. Check lubricating oil system. At every other oil change, oil filter cartridge should be replaced. Check to see if the engine bearing clearance is within factory specs.

 NOTE: When the engine has suddenly stopped, decompress the engine by the decomp and turn the engine lightly by pulling on the fan belt. If the engine turns easily without abnormalities, the cause of the trouble is usually lack of fuel or bad nozzle.

5-2.6.4 When color of exhaust is especially bad

Cause	Possible Solution
Fuel governing device bad	Contact dealer for repairs.
Fuel is of extremely poor quality.	Select good quality fuel. Use No. 2-D diesel fuel only.
Nozzle is bad.	If necessary, replace with new nozzle.
Combustion is incomplete.	Cause is poor atomization, improper injection timing, etc. Because of trouble in injection system or in poor valve adjustment, or compression leakage, poor compression, etc. Check for the cause.

5-2.6.5 When engine must be stopped immediately

Cause	Possible Solution
Engine revolution suddenly decreases or increases.	Check the adjustments, injection timing and the fuel system.
Unusual sound is heard suddenly.	Check all moving parts carefully.
Color of exhaust suddenly turns dark.	Check the fuel injection system, especially the fuel injection nozzle.
Bearing parts are overheated.	Check the lubricating system.
Oil lamp lights up during operation.	Check lubricating system. Check if the engine bearing clearances are within factory specs. Check the function of the relieve valve in the lubricating system. Check pressure switch. Check filter base gasket.

5-2.6.6 When Engine Overheats

Cause	Possible Solution
Engine oil insufficient	Check oil level. Replenish oil as required.
Fan belt broken or elongated	Change belt or adjust belt tension.
Coolant insufficient	Replenish coolant.
Excessive concentration of antifreeze	Add water only or change to coolant with the specified mixing ratio.
Radiator net or radiatior fin clogged with dust	Clean net or fin carefully.
Inside of radiator or coolant flow route corroded.	Clean or replace radiator and parts.
Fan or radiator or radiator cap defective	Replace defective part
Thermostat defective	Check thermostat and replace if necessary.
Temperature gauge or sensor defective	Check temperature with thermometer and replace if necessary.
Overload running	Reduce load
Head gasket defective or water leakage	Replace parts.
Incorrect injection timing	Adjust to proper timing.
Unsuitable fuel used	Use the specified fuel.

*6-1 Normal Maintenance Replacement Parts*_____

Below is a list of parts that in the course of normal maintenance need replacing. When available the corresponding part numbers have been provided. If the part number you are looking for is not provided call Blue Bird Customer Service at (800) 992-6337 or locally (478) 822-2356 for assistance.

6-1.1 Filters

Normal Replacement Parts	
Air Filter for Engine	1895044
Fuel Filter	3944269
Oil Filter	
Generator Parts	
Fuel Filter Cartridge	
Hurricane Parts	
Air Filter	6018
Fuel Filter Cartridge	54287
Fresh Water System	
Water Filter	25005

6-1.2 Bulbs

Normal Replacement Parts	
Aisle Light Bulbs	
Amber Clearance Light	1280601
Backup Lights Bulbs	
Bulb 1156	2255651
Bulb 12 Volt/10 Watt	0011167
Bulb 12V/12 Watt 2005	0011061
Bulb 12V/5 Watt 6418	0011062
Bulb 193	0002120
Bulb 53	2277721
Bulb 67	2255735
Bulb fe8t9-cw Main Roof Running	0001252
Bulb Fluorescent 13 Watt Parcel Rack	0009173
Bulb GE 168	0002123
Dinette Ceiling Bulbs	4558011
Driving Light GE h9411	4580379
Driving Light Hella Clear	3959079
Fog Lamps Bulbs	
Headlight Bulbs - Low	29203
High Mount LED Brake Light	1888804
Kitchen Ceiling Bulbs	
Landing Lights Bulbs	
Living Room Spotters Bulbs	4558011
Living Room Valance Bulbs	4558011
Map Light Bulb	
Park/Clearance Light Bulbs	
Porch Light	42312
Rear, RH, LH, Bathroom Bulbs	
Red Clearance Light	1281369
Single Halogen Headlamp	1949510
Spotlight Bulbs	
Stepwell Light Bulb	2277721

6-1.3 Fuses

6-1-3

Fuses	
Backup Lights Fuse	
Landing Lights Fuse	
Headlight Fuse	
Fog Lamp Fuse	
Park/Clearance Light Fuse	
Spotlight Fuse	
Map Light Fuse	
Auto 50 Amp	0015990
100 Amp - Mega	0041531
125 Amp - Mega	0006151
200 Amp - Mega	1864362
300 Amp - Mega	1864362

6-1.4 Miscellaneous Parts

Normal Replacement Parts	
AC Belts 1/2x47 Gates	9002-2046
Battery - Chassis	
Battery - House	
Belts for Engine	
Carbon Monoxide Detector Assy.	0041748
Compressor, Air 120 Vac Junair	0034356
Engine Door Gas Spring (locking)	1983766
Engine Door Gas Spring (non-locking)	1328616
Fresh Water Pump 5.3 GPM @ 65 PSI	0045486
LPG 12V Detector Assy.	0042879
Main Surpentine Belt	3926856
Spline Grease	0029995
Switch Auto Changeover	0037721
T-Bulb 2-Pin base	0011061
Tow Hooks	
Trailer Draw Bar Hitch	
Trailer Hitch	
Trailer Plug	
Windshield Wipers	1974070
Generator Parts	
Air Cleaner	
Air Vent Plug	
Battery	
Evacuator Valve	
Fan Belt	
Fan Belt Bolt	
Fan Belt Nut	
O-ring	
Radiator Hoses	
Wing Bolt	
Hurricane Parts	
Flame Sensor (Board Versions 2000 & 2001)	16004
Fuel Nozzle (# for model C045)	14017
Fuel Nozzle O-ring	14025
Fuel Pump	
Heat Fuse	
Hoses	
Photocell (Board Versions 5-10)	16002
Photodiode (Board Versions 11-12)	16003
Solenoid	
Water Pump	

*6-2 Chassis*_____

6-2.1 Lubrication Points
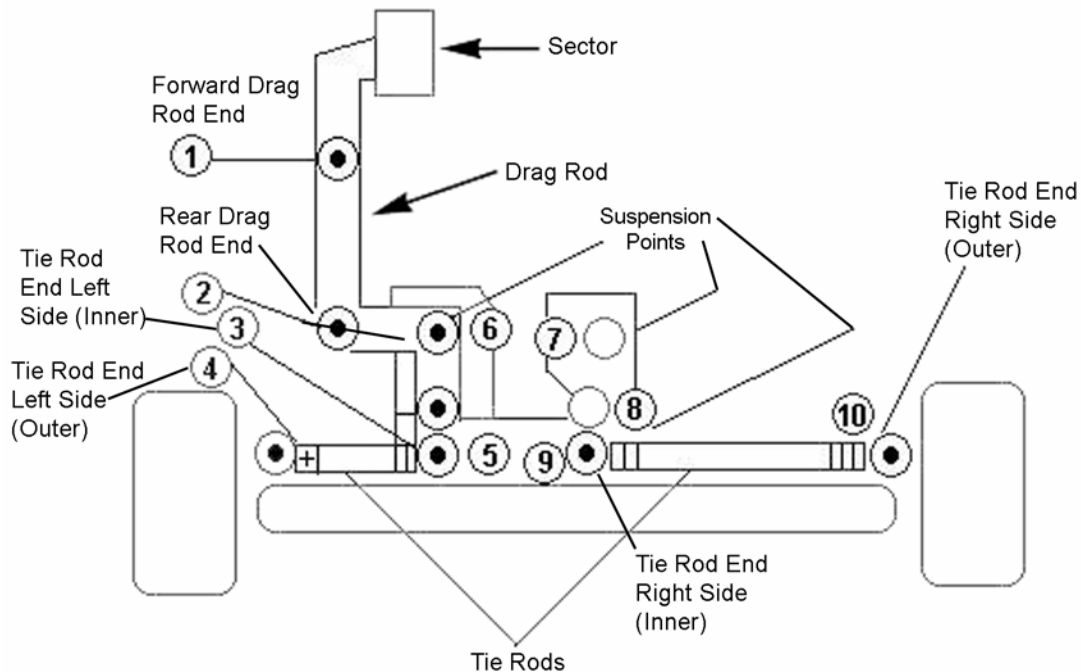
NOTE: There are also two universal joints on drive shaft to include in Lubrication Points.

6-2.2 Tire/Wheel Change Procedure

The wheel/tire assemblies used on your motor home are heavy-duty truck-type. They are heavy and may be difficult to handle. If at all possible, changes should be accomplished by a service station equipped to handle truck equipment. However, if a situation arises where no service facilities are available, the following procedures may be used.

⚠ **CAUTION: Severe injury or death may result. DO NOT use the leveling system for changing tires or working under the vehicle. Keep the rear wheels in firm contact with the ground with the parking brake set. With the leveling jacks extended, there is a possibility the vehicle may move either toward the front or the rear.**

NOTE: Jack and lug wrench are not furnished with your motor home. An outside drive axle wheel may be used to replace front or rear wheel until permanent replacement can be made. Road speed must not exceed 40 mph.

6-2.2.1 Front Axle Wheels

1. Drive motor home out of traffic lane onto a level service capable of supporting jack.
2. Turn on hazard flasher and apply parking brakes before leaving motor home.
3. Turn off ignition and set transmission selector to Neutral (N) position.
4. Remove white plastic wheel saver from road side rear luggage compartment.
5. Place wheel chocks against front and rear of tires on opposite side.
6. Place jack under axle and raise slightly until securely in place.

⚠ **CAUTION: Bumpers are not designed for lifting and/or towing of the vehicle.**

7. Pull off lug nut covers.
8. Install wheel saver.

NOTE: It is recommended that the wheel saver be used when loosening or torquing lug nuts.

9. Loosen lug nuts slightly, then jack up motor home until tire is clear of ground. Solidly support the vehicle under the main frame rails with jack stands or blocks before working under or around the motor home.

NOTE: Lug nuts on right side of motor home are right hand threaded (turn counter-clockwise to loosen, clockwise to tighten); lug nuts on driver's side of motor home are left hand threaded (turn clockwise to loosen, counter-clockwise to tighten).

10. Remove lug nuts and wheel assembly.
11. Install spare and replace lug nuts. Tighten progressively in the sequence shown on lug nut tightening sequence diagram, starting with #1 and proceeding to #10. Final torque will be 450 to 500 foot-pounds. Wheel must be on the ground for final torque.
12. Snap front hub cover into front wheel opening after front lug nuts have been properly torqued.
13. Place lug nut covers on all lug nuts. Make certain that these nut covers fit snugly. This is accomplished by squeezing the dimpled sides together before installing.
14. Lower motor home to ground and remove jack and handle.
15. Replace wheel saver, lug wrench, jack and handles in storage compartment and tie down to prevent road noise. Return damaged wheel/tire assembly to holder and have it repaired as soon as possible.
16. Remove and stow wheel chocks.
17. Turn off hazard flasher before returning to traffic.

6-2.2.2 Drive Axle Dual Wheels

1. Repeat steps 1 through 10, Front Axle Wheels.
2. Loosen inner lug nuts (studs with square heads), if inner wheel is to be replaced.
3. Remove outer lug nuts from the (5) studs which have lock rings and slide hub cover over remaining lug nuts.
4. Remove the (5) remaining lug nuts and wheel.
5. Remove inner lug nuts and inner wheel, if inner wheel is to be replaced.
6. Install replacement wheel and inner lug nuts. Tighten progressively, in the sequence shown on lug nut tightening diagram, starting with #1 and proceeding with #10. Final torque should be between 450 and 500 foot-pounds.
7. Install outer wheel (or replacement wheel) and lug nuts over inner lug nuts marked 1, 3, 7, 9 and 6. Torque nuts in the following sequence, 1, 7, 6, 3 and 9 to between 450 and 500 foot pounds.
8. Install hub cover over the (5) lug nuts holding wheel to hub. Place lock rings and lug nuts on remaining inner lug nuts 10, 5, 2, 4 and 8.
9. Replace wheel saver.
10. Torque nuts in the following sequence 10, 2, 8, 5 and 4 to between 450 and 500 foot-pounds. Wheel must be on the ground for final torque.
11. Return to step 13 of Front Axle Wheels and continue.

NOTE: When checking torque on dual wheels loosen all outside lug nuts. Check torque on inner lug nuts (studs with square heads) for torque value shown above, then torque outer lug nuts to value shown above.

6-2.3 Tire Inflation – Towing – Trailer

6-2.3.1 Tire Inflation

Under-inflation causes needless tire wear and promotes excessive fuel consumption. Check tire pressures on a regular basis.

The Federal Certification Label shows the cold tire inflation pressures necessary to support the Gross Axle Weight Ratings.
These pressures can be reduced to greatly improve the ride quality after the actual axle weights have been determined (see Vehicle Loading in the Introduction section).

The chart below is taken from the Michelin Tire Data Book and shows the recommended tire inflation pressures for various axle weights. If any axle weight is on the borderline, always use the higher pressure. Be sure weight is distributed evenly side to side.

<table>
<tr><td colspan="11">LOADS PER AXLE (lbs.) AT DIFFERENT PRESSURES
2 TIRES: SINGLE (S) 4 TIRES: DUAL (D)
INFLATIONS PRESSURE (psi)</td></tr>
<tr><td></td><td colspan="5">MICHELIN SIZE - 12r-22.5</td><td colspan="5">MAX. SPEED - 65 MPH</td></tr>
<tr><td></td><td>psi</td><td>70</td><td>75</td><td>80</td><td>85</td><td>90</td><td>95</td><td>100</td><td>105</td><td>110</td><td>115</td></tr>
<tr><td rowspan="2">lbs.</td><td>S</td><td>9,410</td><td>9,980</td><td>10,560</td><td>11,140</td><td>11,740</td><td>12,310</td><td>12,910</td><td>13,480</td><td>14,060</td><td>14,780</td></tr>
<tr><td>D</td><td>16,840</td><td>17,860</td><td>18,960</td><td>20,030</td><td>21,130</td><td>22,190</td><td>23,220</td><td>24,220</td><td>25,220</td><td>26,440</td></tr>
</table>

In addition, a tire inflation information plate is located inside the road side luggage compartment near the air gauge and hose. These are normal pressures as long as the axle weights are not in excess of those shown.

6-2.3.2 Towing

Two towing eyes are provided behind the upper part of the generator door. Remove generator panel for access.

⚠ **CAUTION: Do not tow a vehicle equipped with Allison automatic transmission unless the drive shaft has been removed, or the rear wheels raised from the ground. Do not attempt to tow unit by front axle or crossmember. Damage to wiring and/or air lines can result because of proximity of these items to front crossmember. Do not tow with generator tray extended. Do not tow by the bumpers. Air pressure is required to release brakes.**

6-2-3.3 Trailer Hitch Capacity

The Receiver Type Hitch and Drawbar are rated for a 10,000 lb. maximum towing capacity and a 1,000 lb. maximum tongue weight capacity.

Standard equipment includes a 2" hitch ball with a 1" shank rated for a 5,000 lb. maximum towing capacity and 500 lb. maximum tongue weight. Hitch ball nut must be torqued to 200 ft. lb.

NOTE: For more towing capacity, we offer an optional 2 5/16" hitch ball with a 1 1/4" shank rated for a 10,000 lb. maximum towing capacity and a 1,000 lb. maximum tongue weight. Hitch ball nut must be torqued to 200 ft. lb.

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*7-1 Interior/Exterior Care*_____

7-1.1 Cabinets

The M380 Motor Home comes with several cabinets. These are finished with a high quality nitro-cellulose lacquer. Select a non-alcohol based cleaner for cleaning cabinets. Cleaners recommended for cleaning cabinets are Pledge, Endust, etc.

IMPORTANT: Do not use any alcohol based cleaners. They will dull and strip the finish of the wood.

7-1.2 Countertops

7-1.2.1   Kitchen Countertops

The countertops are made of Centura solid surfacing material with decorative bullnose edge. Bottom row of bullnose edge is an accent color. Use cleaning agents recommended for Centura or Corian countertops.

7-1.2.2 Bathroom Vanity

The vanity top and bowl are a molded one-piece Thermolite material. A combination chrome/brass single level faucet is standard. This countertop can be cleaned with any non-abrasive cleaner designed for this type of vanity.

7-1.3 Carpet

Carpet is standard for all areas of the motor home except the bathroom and kitchen. In addition loose carpet mats are included to be used on the stops. Bathroom and kitchen areas have a laminated wood or tile look floor with acoustical padding. Carpets can be cleaned with any standard carpet cleaners.

7-1.4 Wood Floors

Use any cleaner recommended for cleaning of wood laminate floors.

7-1.5 Sofa

A 78" Villa sleeper sofa is standard. Sofa is covered in fabric. Includes two throw pillows and two arm covers. Sofa can be cleaned with any standard sofa cleaner such as Woolite, etc.

7-1.6 Tables

Living room tables are oak wood with Centura material on the counter top to match those throughout the motor home. Clean wood area with any standard furniture polish and the counter tops may be cleaned with the same material that is used to clean the kitchen countertops.

7-1.7 Window Shades

Shades should be kept in the closed or up position when not in use to maintain pleat retention and minimize dirt and soil build-up. Do not store shades in the down position. This may cause some loss of pleat retention if the shades are not operated on a consistent basis.

Shades can be easily cared for by simply dusting or using a vacuum cleaner attachment. Do not use spot remover, household cleaners or detergents to remove soiled spots, as these may cause damage or fading to the fabric.

NOTE: If you store your coach for an extended period of time, store shades in the up position and cover your windows with additional protection such as cardboard.

7-1.8 Exterior Paint

The exterior of the motor home can be cleaned with the same non-abrasive cleaners used to clean your automobile.

7-1.9 Polished Wheels

The polished wheels can be cleaned with any cleaner designed to clean automotive polished aluminum wheels.

7-1.10 Glass

Use standard glass cleaner for cleaning windows on the motor home.

7-1.11 Awnings

There are two kinds of awnings supplied with your motor home. A automatic awning manufactured by Girard R.V. Products and a manual type manufactured by Zip Dee. Both awnings supplied with your motor home are constructed of 100% acrylic fabric that is weatherproof, permeable to air and resistant to mildew, rotting and fading.

Acrylic fabric should be cleaned regularly before substances such as dirt, leaves, etc. are allowed to accumulate on, and become embedded in the fabric. The fabric can be cleaned without being removed from the awning. Simply brush off any loose dirt, leaves, etc. Hose down and clean with cloth and mild solution of natural soap in lukewarm water. Rinse thoroughly to remove soap. DO NOT USE DETERGENTS. Allow to air dry, preferably on a warm sunny day. Should you have to retract the awning when the fabric is wet, it should be extended at the first opportunity to finish air drying.

8-1 Chassis Specifications_____

8-1.1 Engine

Make – Cummins ISL 400 HP @ 2000 RPM
Type – Four cycle, in line Turbo/air to air charger
       cooled.
Number of Cylinders – Six
Stroke and Bore (inches) – 4.49 x 5.69
Displacement – 540 cubic inches (8.9 liters)
Compression Ratio – 16.6:1
Maximum (net) BHP @ RPM – 400 HP
       (373KW)/2000 RPM
Maximum (net) Torque @ RPM – 1200 lb. ft. @
       1300
Maximum Governor RPM – Load 2200 RPM; No
       load 2330 RPM
Governor – Electronic
Crankcase Capacity – Dry 29 quarts
Cooling System Capacity – 72 quarts – includes:
- Engine
- Radiator
- Heater/Defroster
- Hurricane system and all pipes

Water Pump Capacity @ Engine RPM – 83 gallons per minute @ 2200
Air Filter – Dry type, FARR ECO-SM 99842-007, single storage, disposable canister
Transmission – Allison 3000 MH electronic 6 speed World transmission

Gears	Ratios
First	3.49
Second	1.86
Third	1.41
Fourth	1.00
Fifth	.75
Sixth	.65
Reverse	5.03
Torque Converter	TC 0 421 – 1.77 stall ratio
Lubricant Cap.	29 qt. refill
Bell house size	SAE #2
Drive line	SPL 170 Spicer

Turning Radius – *Curb Radius – 29.7'
              **Wall Radius – 35'

 *Curb radius is the minimum radius of turn to the outside edge of the front tire.
**Wall radius is the minimum radius of turn to the outside edge of the front bumper.

8-1.2 Generator

The generator is driven by a 4-cylinder water cooled diesel engine and is located in an enclosed quiet box between the chassis frame rails at the front of the motor home. The engine/generator set is mounted on a motorized roll out carriage using vibration isolators with a telescoping exhaust system.

The carriage is powered in and out of the compartment for service by a 12-volt electromechanical liner actuator. Starting/stopping of the generator may be controlled from one outside or two inside locations.

1. From the dash.
2. From the bedroom switch.

Remote gauges are included in the pilot overhead area to monitor the generator operation.

The generator has an alternator and 12-volt battery for cranking the generator. There is also an auxiliary generator battery switch on the dash that will permit starting the generator in the event that the generator battery becomes discharged. This cranking power is obtained from the house battery system.

8-1.3 Vehicle Dimensions

The motor home measures 37'7" long by 102" wide. The wheelbase is 248" centerline front axle to centerline rear axle.

8-1.4 Wheels and Tires

8-1.4.1 Tires

Tubeless 12R-22.5 16-ply rating Load range H Michelin steel cord radial single front and dual drive.

8-1.4.2 Wheels

10-stud hub-piloted disc with 22.5x8.25 rims, polished aluminum, single front, dual drive, turned to the outside.

*8-3 Capacities*_____

8-3.1 Engine Capacities

Crankcase Capacity – Dry 25 quarts
Cooling System Capacity – 42 quarts includes:
- Heater/defroster
- Hydronic Heat System and all pipes

Water Pump Capacity at Engine RPM – 83 gallons per minute at 2200.

8-3.2 Generator Capacities/Specifications

Dimensions mm(in.) (length x width x height)	549.3 x 398 x 608.7 (21.63 x 15.67 x 23.96)
Dry Weight	110 (242.5)
Starting Motor	12 V, 1.0 kW
Charging Generator	12 V, 360 W
Oil	6.0 L (1.59 U.S. gals.)
Coolant	4.0 L (1.06 U.S. gals.)
Battery	12 V, 65 AH, equivalent
Fuel	Diesel Fuel No. 2-D (ASTM D975)
Lubricant (API classification)	above CD grade
No. of Cylinders	3
Bore and Stroke mm(in.)	78 x 78.4 (3.07 x 3.09)
Total Displacement L(cu. in.)	1.498 (91.41)
Injection Pressure	140 kgf / cm^2 (13.73 Mpa, 1991 psi)
Injection Timing (Before T.D.C.)	16.5^0
Compression Ratio	22 : 1

8-3.3 Vehicle Systems Capacities

Fuel Tank	150 gallons
Fresh Water Tank	100 gallons
Black Waste Tank	60 gallons
Gray Waste Tank	60 gallons
LP Tank	30 gallons

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9-1 Checklists_____

9-1.1 Checklists

On the next 3 Pages you will find helpful checklists that you can xerox and use over and over again to aid you in one safe and enjoyable trip after another.

Pre-Trip Checklist - For Residence	Trip				
	1	2	3	4	5
Store Valuables in a Safe Place					
Arrange for Pet Care					
Cover All Food to Keep Out Rodents and Insects					
Store Oil, Gasoline, Matches, etc., properly					
Suspend Deliveries such as newspapers, magazines, etc.					
Contact Post Office to Hold Mail					
Lock Windows and Doors Securely					
Leave Key with Neighbor or Relative and Advise them of Your Itinerary					
Connect Timers to Several Outside and Inside Lights					
Arrange for Lawn Care					
Things to Take Along with You on Your Trip					
Supply of Prescription and Non-Prescription Medicines, (sunscreen, aspirin, etc.)					
Camera and Film Supply					
Heating Pads, Ice Bags, First Aid Materials, etc.					
Stationery, Envelopes and Stamps					
Telephone Number List					
Special Pet Supplies					
Reading Material					
Extra Toilet Chemicals and Toilet Articles.					
Spare Belts for Engine-Operated Equipment.					
Spare Parts for Generator; Suggested Spares include oil filter, fuel pump, air filter, solenoid.					
Five quarts of approved motor oil.					
A professional-type double-action tire pressure gauge. (included in coach)					
The following Emergency Equipment is advised to have on hand:					
First-aid kit					
Emergency Highway Flares					
Flashlight or lantern (with extra batteries)					
Tool kit					
Replacement lamp assortment					
Replacement fuse and breaker assortment					
Trouble light with a long cord					

CHECKLISTS

Pre-Trip Checklist - For Coach - Outside	Trip				
	1	2	3	4	5
Disconnect and Stow: Electrical Cord					
Sewer Hose (flush out)					
Water Hose					
Check exterior lights for proper operation					
Check wheel lug nuts for tightness *(See Tire/Wheel Change Procedures)*					
Check tires for correct pressure *(See Tire Inflation)*					
Check that all external compartments and filler openings are properly closed and/or locked					
Check that items stored on exterior coach are secured. (Be sure these items present no clearance problems)					
Check that there are no obstacles to avoid above or below coach. Be sure that there is sufficient clearance front and rear.					
Automotive Systems					
Check Fluid Levels are Normal (oil, power steering, engine coolant, windshield washers, transmissions, etc.)					
Check generator oil level, coolant level, battery condition					
Check turn signals, emergency flasher, brakelights and backup lights					
Check headlights, (high and low beam) operate properly					
Check horn					
Start engine and check gauges for signs of trouble					
Check that brakes (foot and parking) are working properly					
Note: If the trip you are planning will take the coach well past suggested maintenance intervals, it is advisable to perform these procedures before leaving. This may avoid unscheduled stops or interruptions during your trip.					

CHECKLISTS

Pre-Trip Checklist - For Coach - Inside	Trip				
	1	2	3	4	5
Close windows and vents					
Check that cabinet doors and drawers are secured					
Check that refrigerator door latch is in locked position					
Check that no heavy item is stored in an overhead cabinet					
Store large items in base cabinets					
Check that all doors are secured and latched					
Check that countertops, range top, table tops and shelves are clear of unsecured items.					
Check that the shower latch is locked					
Turn off interior lights, check that entrance step is retracted. Secure and lock the entrance door.					
Adjust exterior mirrors					
WARNING: Mirrors provide needed additional driver visibility. To be effectively used, mirrors must be properly adjusted for each driver and the driver must be aware of the limitations on viewing area that exists even when mirrors are properly used.					
And Before Driving Away. . .					
Check operation of appliances and special equipment					
Check that fire extinguishers are fully charged.					
Check operation of interior and exterior lighting.					
Start generator and check 120 VAC system and wall outlets.					
Adjust driver's seat so that all controls are within easy reach.					
Make sure that seat is locked in position. Do not adjust driver's seat swivel or fore/aft mechanism while vehicle is moving or the seat could move unexpectedly, causing a loss of control.					
Check that front passenger's seat is locked in position.					
Fasten seat belts. Belts should be placed as low as possible around the hips. This places the load of the body on the strong hip bone structure instead of around the soft abdominal area and prevents sliding in case of accident.					
CAUTION: Child restraint systems are designed to be secured in vehicle seats by lap belts or the lap belt portion of a lap-shoulder belt. Children could be endangered in a crash if their child restraints are not properly secured in the vehicle.					
Check that warning lights are lit when the ignition key is turned to the ON or START position.					

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*10-1 Authorized Service Centers*_____

Authorized Blue Bird Wanderlodge Dealers and Service Centers

Blue Bird Wanderlodge
One Wanderlodge Way • P.O. Box 1259
Fort Valley, GA 31030
478-822-2400

Factory Sales – 478-822-2407 – Ronnie Lamb
Factory Service – 800-992-6337 – Mike Burkett and Kenny Rodgers
Product Technical Support – 800-992-6337 – Russell Borders and Bennie Collier
Factory Parts Sales – 800-495-7787 – Earl Davis and Ray Horne

Sales and Service

JOHN BLEAKLEY MOTORHOMES	HOLLAND MOTOR HOMES
www.bleakleyrv.com	www.holland-motorhomes.com
4411 Bankhead Highway	670 East 16th Street
Douglasville, GA 31034	Holland, MI 49423
(877) BIRDLXI (247-3594) Phone	(800) 221-7197 Phone
(770) 577-4949 Fax	(616) 396-1391 Fax
Owner: John Bleakley	GM / Sales Mgr.: John Dykstra
Sales Mgr.: Mike Martinkus	Service Mgr.: Mike Meulenberg
Service Mgr.: Dean Woodruff	
JOHN BLEAKLEY MOTORHOMES	HOLLAND MOTOR HOMES
www.bleakleyrv.com	www.holland-motorhomes.com
445 Bleakley Blvd.	7490 Copley Park Place
Unadilla, GA 31091	San Diego, CA 92111
(877) 456-3700 Phone	(800) 961-4464 Phone
(478) 627-3111 Fax	(858) 874-8484 Fax
Owner: John Bleakley	GM / Sales Mgr.: Mike Dykstra
Sales Mgr.: Bill Hamilton	Service Mgr.: Loren Swartz
Service Mgr.: Glenn McCormick	
DE MARTINI RV SALES	NORTH TRAIL RV CENTER
www.demartinirv.com	www.northtrailrvcenter.com
1305 E. Main Street	5270 Orange River Blvd.
Grass Valley, CA 95945	Fort Myers, FL 33905
(800) 576-1921 Phone	(800) 741-4383 Phone
(530) 272-9413 Fax	(941) 693-7229 Fax
Owner: Tim DeMartini	Owner: Albert Erp
Sales Mgr.: Jon DeMartini	Sales Mgr.: George Grimm
Service Mgr.: Brad Heward	Service Mgr.: Steve Graham
MARTY'S USRV (M380 Only)	SHOREWOOD RV. CENTER
www.martysusrv.com	www.shorewoodrv.com
71 County Street	8390 Highway 10 NW
Corner Route 140 & 79	Anoka, MN 55303
Berkley, MA 02779	(800) 784-2505 Phone
(800) 723-(USRV) 8778 Phone	(763) 506-0415 Fax
(508) 823-7583 Fax	Sales Mgr.: Tim Paulson
Owner: Marty Hanoud	Service Mgr.: Terry Morical
Sales Mgr.: Fernando Oliveira	
Service Mgr.: Ray Noriega	

Authorized Blue Bird Wanderlodge Service Centers

Full Service and Parts Only

Miller's RV
12912 Florida Boulevard ● Baton Rouge, LA 70815
(504) 275-2940 ● Fax: (504) 275-6807
Service – Doug Miller
_____

Authorized Blue Bird Wanderlodge Service Centers
Detroit Diesel – Allison
And Associate DD-A Distributors

Chassis Service and Chassis Parts Only

ALABAMA
Birmingham
William Detroit Diesel -
Allison Southeast, Inc.
1160 Bankhead Hwy., West
P.O. Box 12566
Birmingham, AL 35202
Phone: 800-365-3780

ALASKA
Anchorage
Pacific Detroit Diesel -
Allison Co.
8001 Petersburg Street
Anchorage, AK 99507
Phone: 907-522-3434

ARIZONA
Phoenix
Williams Detroit Diesel -
Allison Southwest, Inc.
2602 S. 19th Ave.
(Zip 85009)
P.O. Box 3618
Phoenix, AZ 85030
Phone: 800-944-7375

Tucson
Williams Detroit Diesel -
Allison Southwest, Inc.
1375 W. Glenn
Tucson, AZ 85705
Phone: 800-624-8331

ARKANSAS
Little Rock
United Engines, Inc.
9401 I-30 (Zip 72209)
P.O. Box 192720
Little Rock, AR 72219
Phone: 501-562-5565

CALIFORNIA
Bakersfield
Valley Detroit Diesel -
Allison, Inc.
4000 Rosedale Hwy.
(Zip 93308)
P.O. Box 1848
Bakersfield, CA 93303
Phone: 805-325-9001

City of Industry
Valley Detroit Diesel -
Allison, Inc.
13644 E. Nelson Ave.
City of Industry, CA 91746
Phone: 818-333-1243

Fresno
Valley Detroit Diesel -
Allison, Inc.
2935 S. Orange Ave.
Fresno, CA 93725
Phone: 209-486-6900

Mira Loma
Valley Detroit Diesel -
Allison, Inc.
11300 Inland Avenue
Mira Loma, CA 91752
Phone: 909-681-9283

San Diego
Valley Detroit Diesel -
Allison, Inc.
5725 Eastgate Drive
San Diego, CA 92121
Phone: 619-447-2492

San Leandro
Sierra Detroit Diesel -
Allison, Inc.
1755 Adams Avenue
San Leandro, CA 94577
Phone: 510-635-8991

West Sacramento
Sierra Detroit Diesel -
Allison, Inc.
855 Stillwater Road
West Sacramento,
CA 95691
Phone: 916-372-5078

COLORADO
Commerce City
Stewart & Stevenson
Power, Inc.
5840 Dahlia Street (Denver)
P.O. Box 220
Commerce City, CO 80022
Phone: 303-287-7441

CONNECTICUT
Middletown
Atlantic Detroit Diesel -
Allison, Inc.
300 Smith Street
P.O. Box 2781
Middletown, CT 06457
Phone: 203-632-0218

CONNECTICUT cont.
Noank
Atlantic Detroit Diesel -
Allison, Inc.
Noank Shipyard
Pearl Street
Noank, CT 06340
Phone: 203-536-6726

FLORIDA
Ft. Myers
Florida Detroit Diesel -
Allison, Inc.
2305 Rockfille Road
Ft. Myers, FL 33916
Phone: 813-332-3100

Ft. Pierce
Florida Detroit Diesel -
Allison, Inc.
3885 Selvitz Road
Ft. Pierce, FL 34954
Phone: 407-464-6006

Jacksonville
Florida Detroit Diesel -
Allison North, Inc.
5040 University Blvd. West
(Zip 32216)
Jacksonville, FL 32245-6595
Phone: 904-737-7330

Miami
Florida Detroit Diesel -
Allison, Inc.
2277 N.W. 14th Street
(Zip: 33125)
P.O. Box 350010
Miami, FL 33195
Phone: 305-638-5300

Ocala
Florida Detroit Diesel -
Allison North Inc.
224 S. W. 52nd Ave.
Ocala, FL 32674
Phone: 904-237-7977

Orlando
Florida Detroit Diesel -
Allison North, Inc.
6850 Presidents Drive
Orlando, FL 32809
Phone: 407-888-1700

Tampa
Florida Detroit Diesel -
Allison North, Inc.
8411 Adamo Drive
Tampa, FL 33619
Phone: 813-621-5651

GEORGIA
Albany
Williams Detroit Diesel -
Allison Southeast, Inc.
1803 West Oakridge Drive
Albany, GA 31707
Phone: 800-736-1952

Atlanta
Williams Detroit Diesel -
Allison Southeast, Inc.
2849 Moreland Ave. S.E.
P.O. Box 12537
Atlanta, GA 30315
Phone: 800-545-7116

Ringgold
Covington Detroit Diesel
102 Gateway Avenue
P.O. Box 1088
Ringgold, GA 30736
Phone: 706-965-7000

Savannah
Williams Detroit Diesel -
Allison Southeast, Inc.
14 West Gate Blvd.
P.O. Box 23209
Savannah, GA 31405
Phone: 800-283-9332

IDAHO
Boise
Smith Detroit Diesel -
Allison, Inc.
4045 Transport Street
P.O. Box 5715
Boise, ID 83705
Phone: 208-345-1500

ILLINOIS
Addison
Inland Detroit Diesel -
Allison, Inc.
500 S. Lombard Road
(Chicago)
Addison, IL 60101
Phone: 708-620-2000

Rock Island
Interstate Detroit Diesel, Inc.
3806 78th Ave., West
Rock Island, IL 61201
Phone: 309-787-4601

INDIANA
Fort Wayne
Clarke Detroit Diesel -
Allison, Inc.
2610 Independence Drive
Fort Wayne, IN 46825
Phone: 219-482-9185

Gary
Inland Detroit Diesel -
Allison, Inc.
2601 E. 15th Street
Gary, IN 46401
Phone: 219-882-0421

Indianapolis
Clarke Detroit Diesel -
Allison, Inc.
1340 Terminal Road
Indianapolis, IN 46217
Phone: 317-783-6651

IOWA
Des Moines
Interstate Detroit Diesel, Inc.
Interstate Hwys. 80 & 35 at
2nd Avenue
P.O. Box 4007
Des Moines, IA 50333
Phone: 515-286-4800

KANSAS
Colby
Central Detroit Diesel -
Allison, Inc.
1920 Thielen Ave.
P.O. Box 445
Colby, KS 67701
Phone: 913-462-8211

Great Bend
Central Detroit Diesel -
Allison, Inc.
625 E. 10th Street
P.O. Box 691
Great Bend, KS 67530
Phone: 316-792-1361

Liberal
Central Detroit Diesel -
Allison, Inc.
East Hwy. 54
P.O. Box 177
Liberal, KS 67901
Phone: 316-624-7274

Salina
Central Detroit Diesel -
Allison, Inc.
1944-B N. 9th Street
P.O. Box 1271
Salina, KS 67401
Phone: 913-825-8291

KANSAS cont.
Wichita
Central Detroit Diesel -
Allison, Inc.
4501 W. Irving
Wichita, KS 67201
Phone: 316-943-1231

KENTUCKY
Henderson
Clarke Detroit Diesel -
Allison, Inc.
751 U.S. 41 South
Henderson, KY 42420
Phone: 502-827-4600

Lost Creek
Western Brance Diesel, Inc.
14701 Highway 15 South
Lost Creek, KY 41348
Phone: 606-666-4981

Louisville
Clarke Detroit Diesel -
Allison, Inc.
2697 Gassland Avenue
Louisville, KY 40299
Phone: 502-491-2021

LOUISIANA
Harvey
Stewart & Stevenson
Services, Inc.
1401 Destrehan Ave.
P.O. Box 8
Harvey, LA 70059
Phone: 504-347-4326

Shreveport
United Engines, Inc.
7255 Greenwood Road
P.O. Box 37270
Shreveport, LA 71133
Phone: 318-635-8022

MAINE
Portland
New England Detroit
Diesel - Allison, Inc.
432 Warren Avenue
Portland, ME 04103
Phone: 207-797-5950
Fax: 207-797-5953

MARYLAND
Baltimore
Johnson & Towers, Inc.
500 Wilson Point Road
Baltimore, MD 21220
Phone: 410-687-0500

Beltsville
Johnson & Towers, Inc.
6861 Distribution Drive
Beltsville, MD 20705
Phone: 301-937-8700

MASSACHUSETTS
Wakefield
New England Detroit Diesel
Allison, Inc.
90 Bay State Road
(Boston)
Wakefield, MA 01880
Phone: 617-246-1810

MICHIGAN
Dearborn
Williams Detroit Diesel -
Allison Midwest, Inc.
4000 Stecker Avenue
Dearborn, MI 48126-6150
Phone: 313-584-6150
(24 Hr.)

Grand Rapids
Williams Detroit Diesel -
Allison Midwest, Inc.
2940 Clydon Ave. S.W.
Grand Rapids, MI 49509
Phone: 800-701-9993

Iron Mountain
Inland Diesel, Inc.
600 Industrial Park Drive
Iron Mountain, MI 49801
Phone: 906-774-9707

Saginaw
Williams Detroit Diesel -
Allison Midwest, Inc.
715 S. Outer Drive
Saginaw, MI 48601
Phone: 800-906-4235

MINNESOTA
Minneapolis
Interstate Detroit Diesel, Inc.
2501 E. 80th Street
Minneapolis, MN 55425
Phone: 612-854-5511

Virginia
Interstate Dietroit Diesel, Inc.
1921 16th Ave., West
Virginia, MN 55792
Phone: 218-749-4484

MISSISSIPPI
Jackson
Clarke Detroit Diesel -
Allison
620 Hwy. 49 South
(Zip: 39218)
P.O. Box 6274
Jackson, MS 39288
Phone: 601-932-2424

MISSOURI
Liberty
Central Detroit Diesel -
Allison, Inc.
9200 Liberty Drive
P.O. Box 490
Liberty, MO 64068
Phone: 816-781-8070

St. Louis
Clarke Detroit Diesel -
Allison, Inc.
1424 Ashby Road
P.O. Box 21593
St. Louis, MO 83132
Phone: 314-429-2131

MONTANA
Billings
Interstate Detroit Diesel, Inc.
1140 Main
P.O. Box 30518
Billings, MT 59107
Phone: 406-252-4191

Missoula
Interstate Detroit Diesel, Inc.
3757 N. Reserve Street
P.O. Box 8125
Missoula, MT 59807
Phone: 406-728-7600

NEBRASKA
Omaha
Interstate Detroit Diesel, Inc.
6969 S. 107th Street
Omaha, NE 68128
Phone: 402-331-4104

NEVADA
Battle Mountain
Smith Detroit Diesel -
Allison, Inc.
680 W. Front Street
P.O. Box 1288
Battle Mountain, NV 89820
Phone: 702-635-5477

Elko
Smith Detroit Diesel -
Allison, Inc.
4900 E. Idaho
Elko, NV 89801
Phone: 702-738-7154

North Las Vegas
Williams Detroit Diesel -
Allison Southwest, Inc.
2680 Losee Road
North Las Vegas, NV 89030
Phone: 702-399-1890

Sparks
Smith Detroit Diesel -
Allison, Inc.
8 Glendale Avenue
P.O. Box 1167
Sparks, NV 89431
Phone: 702-359-1713

NEW JERSEY
Lodi
Atlantic Detroit Diesel -
180 Route 17 South
P.O. Box 950
Lodi, NJ 07644
Phone: 201-489-5800 NJ
Phone: 212-665-1500 NY

Mount Laurel
Johnson & Towers, Inc.
2021 Briggs Road
P.O. Box 4000
Mount Laurel, NJ 08054
Phone: 609-234-6990

Piscataway
Atlantic Detroit Diesel -
Allison, Inc.
169 Old New Brunswick Rd.
Piscataway, NJ 08854
Phone: 908-752-7100

Pleasantville
Johnson & Towers, Inc.
740 Delilah Road
(Rear Bldg.)
Pleasantville, NJ 08232
Phone: 609-272-1415

NEW MEXICO
Albuquerque
Stewart & Stevenson
Power, Inc.
2929 Vassar Drive N.E.
Albuquerque, NM 87107
Phone: 505-881-3511

Farmington
Stewart & Stevenson
Power,Inc.
1515 West Murray Drive
Farmington, NM 87401
Phone: 505-325-5071

NEW YORK
Albany
Atlantic Detroit Diesel -
Allison, Inc.
17 Commercial Avenue
Albany, NY 12205
Phone: 518-438-5961

Buffalo
Penn Detroit Diesel -
Allison, Inc.
350 Bailey Avenue
Buffalo, NY 14210
Phone: 716-823-7242

Ronkonkoma, Long Island
Atlantic Detroit Diesel -
Allison, Inc.
3025 Veterans Memorial Hwy.
Ronkonkoma, Long Island,
NY 11779
Phone: 516-981-5800

Syracuse
Penn Detroit Diesel -
Allison, Inc.
7044 Interstate Island Rd.
Syracuse, NY 13209
Phone: 315-451-3840

NORTH CAROLINA
Charlotte
Covington Detroit Diesel -
1815 Starita Road
P.O. Box 26653
Charlotte, NC 28213
Phone: 704-596-8000

Greensboro
Covington Detroit Diesel -
6200 Swiggett Road
P.O. Box 18949
Greensboro, NC 27419-8949
Phone: 910-292-9240

Morehead City
Covington Detroit Diesel -
210 Arendell Street
Morehead City, NC 28557
Phone: 919-726-9881

New Bern
Covington Detroit Diesel -
U.S. Hwy. 17 South
P.O. Box 12626
New Bern, NC 28560
Phone: 919-638-3161

Wilmington
Covington Detroit Diesel
6725 Netherlands Drive
Wilmington, NC 28405
Phone: 919-392-7220

NORTH DAKOTA
Bismarck
Interstate Detroit Diesel, Inc.
3801 Commerce Drive
Bismarck, ND 58501
Phone: 701-258-2303

Fargo
Interstate Detroit Diesel, Inc.
3902 12th Ave. North
Fargo, ND 58102
Phone: 701-282-6558

Grand Forks
Interstate Detroit Diesel, Inc.
1003 South 48th St.
Grand Forks, ND 58201
Phone: 701-746-0354

Williston
Interstate Detroit Diesel, Inc.
3805 4th Avenue West
P.O. Box 880
Williston, ND 58801
Phone: 701-572-2000

OHIO

Akron
Williams Detroit Diesel -
Allison Midwest, Inc.
1395 Triplett Blvd.
Akron, OH 44306
Phone: 216-794-1535

Brunswick
Williams Detroit Diesel -
Allison Midwest, Inc.
1176 Industrial Pwky. N
Brunswick, OH 44212-2342
Phone: 216-225-7751

Canton
Western Branch Diesel, Inc.
1616 Metric Ave., S.W.
Canton, OH 44706
Phone: 216-454-8800

Cincinnati
Clarke Detroit Diesel -
Allison, Inc.
3133 E. Kemper Rd.
(Sharonville)
Cincinnati, OH 45241
Phone: 513-771-2200

Hubbard
Williams Detroit Diesel -
Allison Midwest, Inc.
7125 Masury Rd. Southeast
(Youngstown)
P.O. Box 71
Hubbard, OH 44425
Phone: 216-534-1161

Lemoyne
Williams Detroit Diesel -
Allison Midwest, Inc.
3325 Libby Road (Toledo)
P.O. Box 427
Lemoyne, OH 43441
Phone: 419-837-5067

Wintersville
Western Branch Diesel, Inc.
286 Luray Drive
(Steubenville)
P.O. Box 2069
Wintersville, OH 43952
Phone: 614-264-7121

OKLAHOMA

Oklahoma City
United Engines, Inc.
5555 W. Reno Street
(Zip 73127)
P.O. Box 75079
Oklahoma City, OK 73147
Phone: 405-947-3321

Tulsa
United Engines, Inc.
7454 E. 41st Street
Tulsa, OK 74145
Phone: 918-627-8080

Woodward
Central Detroit Diesel -
Allison, Inc.
U.S. Hwy. 270 N.W.
P.O. Box 1145
Woodward, OK 73802
Phone: 405-256-6014

OREGON

Medford
Pacific Detroit Diesel -
Allison Co.
1493 Kingsley Drive
Medford, OR 97504
Phone: 503-779-4622

Portland
Pacific Detroit Diesel -
Allison Co.
5061 N. Lagoon Ave.
Swan Island
Portland, OR 97217-7694
Phone: 503-283-0505

Springfield
Pacific Detroit Diesel -
Allison Co.
3436 Olympic Street
Springfield, OR 97477
Phone: 503-746-1661

PENNSYLVANIA

Bedford
Penn Detroit Diesel -
Allison, Inc.
Route 220 North
P.O. Box 147
Bedford, PA 15522
Phone: 814-623-6171

Fleetwood
Penn Detroit Diesel -
Allison, Inc.
Route 222
P.O. Box 187
Fleetwood, PA 19522
Phone: 215-944-0451

Philadelphia
Penn Detroit Diesel -
Allison, Inc.
8330 State Road
Philadelphia, PA 19136-2996
Phone: 215-335-0500

York Haven
Penn Detroit Diesel -
Allison, Inc.
Sipe Rd., R.D. 1
(Exit 13 - I-83)
York Haven, PA 17370
Phone: 717-938-5141

Zelienople
Penn Detroit Diesel -
Allison, Inc.
11 Progress Road
(U.S. Hwy. 19th North)
(Pittsburgh)
Zelienople, PA 16063
Phone: 412-776-3237

SOUTH CAROLINA

Greer
Williams Detroit Diesel -
Allison Southeast, Inc.
1835 S. Highway 101
Greer, SC 29651
Phone: 803-877-0935

West Columbia
Williams Detroit Diesel -
Allison Southeast, Inc.
2610 Augusta Hwy.
(U.S. 1 7 I-26)
West Columbia, SC 29169
Phone: 800-452-8479

SOUTH DAKOTA

Rapid City
Interstate Detroit Diesel, Inc.
1947 Deadwood Ave.
P.O. Box 508
Rapid City, SD 57709
Phone: 605-348-0374

TENNESSEE

Kingsport
Covington Detroit Diesel
Hwy. 137 & Rock
Springs Rd.
P.O. Box 5417
Kingsport, TN 37663
Phone: 615-349-6141

Knoxville
Covington Detroit Diesel
1500 Breda Drive
(Zip 37918)
P.O. Box 18560
Knoxville, TN 37928
Phone: 615-689-3722

TENNESSEE cont.
Memphis
Clarke Detroit Diesel -
Allison
3070 Sandbrook St.
(Zip 38116)
P.O. Box 16260
Memphis, TN 38186-0260
Phone: 901-396-7320

Nashville
Covington Detroit Diesel
80 Cleveland Street
Nashville, TN 37210
Phone: 615-262-4141

TEXAS
Amarillo
Stewart & Stevenson
Power, Inc.
I-10 at Pullman Road
P.O. box 31986
Amarillo, TX 79120-1986
Phone: 806-335-2828

Beaumont
Stewart & Stevenson
Services. Inc.
U.S. Hwy. 69 South
& Beauxart Garden Rd.
Route 4, Box 89
Beaumont, TX 77705
Phone: 409-727-1436
(24 Hr.)

Corpus Christi
Stewart & Stevenson
Services, Inc.
6530 Agnes St.
P.O. Box 4975
Corpus Christi, TX 78469-
4975
Phone: 512-289-5350
(24 Hr.)

Dallas
Stewart & Stevenson
Services, Inc.
3919 Irving Blvd.
P.O. Box 560343
Dallas, TX 75356-0343
Phone: 214-631-5370
(24 Hr.)

Houston
Stewart & Stevenson
Services, Inc.
2707 N. Loop West
P.O. Box 1637
Houston, TX 77251-1637
Phone: 713-868-7700

Houston
Stewart & Stevenson
Services, Inc.
8631 E. Freeway
Houston TX 77029
Phone: 713-671-6220

Lubbock
Stewart & Stevenson
Power, Inc.
2000 Station Hwy.
P.O. Box 2529
Lubbock, TX 79408
Phone: 806-745-4224

Odessa
Stewart & Stevenson
Power, Inc.
11120 W. Hwy. 80 East
(Zip 79765)
P.O. Box 2848
Odessa, TX 79760
Phone: 915-563-4800

San Antonio
Stewart & Stevenson
Services, Inc.
5717 I-10 East
P.O. Box 201330
San Antonio, TX 78220-8330
Phone: 210-662-1000

Wichita Falls
Stewart & Stevenson
Services, Inc.
2301 Central Freeway East
(Zip 76302)
P.O. Box 839
Wichita Falls, TX 76307-0839
Phone: 817-322-5227

UTAH
Salt Lake City
Smith Detroit Diesel -
Allison, Inc.
250 W. 3900 S.
(Zip 84107)
P.O. Box 27527
Salt Lake City, UT 84127
Phone: 801-262-2831

Vernal
Smith Detroit Diesel -
Allison, Inc.
U.S. Hwy. 40 East
P.O. Box 1122
Vernal, UT 84078
Phone: 801-789-1860

VIRGINIA
Portsmouth
Western Branch Diesel, Inc.
3504 Shipwright Street
(Zip 23703)
P.O. Box 7788
Portsmouth, VA 23707-0788
Phone: 804-484-6230

Richmond
Western Branch Diesel, Inc.
(I-95 North at Atlee Road)
(Ashland, VA 23005)
P.O. Box 9730
Richmond, VA 23228
Phone: 804-550-2816

Roanoke
Western Branch Diesel, Inc.
4546 Thirlane Road,
Northwest
Roanoke, VA 24019
Phone: 703-362-1608

Springfield
Western Branch Diesel, Inc.
8102 Alban Road
Springfield, VA 22150
Phone: 703-569-5650

WASHINGTON
Kent
Pacific Detroit Diesel -
Allison, Co.
7215 S. 228th Street
Kent, WA 98032
Phone: 206-854-0505

Pasco
Spokane Detroit Diesel
Allison
1810 E. James
Pasco, WA 99301
Phone: 509-547-1611

Spokane
Spokane Detroit Diesel
Allison
6615 E. Mallon Street
(Zip 99212)
P.O. Box 3167
Terminal Annex
Spokane, WA 99220
Phone: 509-535-3663

WEST VIRGINIA
South Charleston
Western Branch Diesel, Inc.
3100 MacCorkle Ave., SW
P.O. Box 8245
South Charleston, WV
25303-8245
Phone: 304-744-1511
(24 Hr.)

WISCONSIN
Butler
Inland Diesel, Inc.
13015 W. Custer Avenue
(Milwaukee)
P.O. Box 916
Butler, WI 53007-0916
Phone: 414-781-7100

WYOMING
Casper
Stewart & Associates
Power, Inc.
1850 East "F" Street
Casper, WY 82601
Phone: 307-234-6975

Gillette
Interstate Detroit Diesel, Inc.
210 Limestone Avenue
P.O. Box 1355
Gillette, WY 82716
Phone: 307-682-8596

Rock Springs
Smith Detroit Diesel -
Allison, Inc.
20 Bowker Road
(Zip 82901)
P.O. Box 1868
Rock Springs, WY 82902
Phone: 307-382-4330

Authorized Blue Bird Wanderlodge
Service Centers

Chassis Service Only

Prèvost Car Inc., FL
6391 Business Park Blvd.
N. Jacksonville, FL 32256
800-874-7740
904-886-4555
FAX: 904-886-0092
Parts FAX: 904-886-0093

Prèvost Car Inc., TN
529 Hickory Hill Blvd.
Whites Creek, TN 37189
877-299-8881
615-299-8881
FAX: 615-299-8865

Prèvost Car Inc., TX
15200 Frye Road
Fort Worth, TX 76155
866-773-7678
817-685-0475
FAX: 817-685-0460

Service Only

Holiday on Wheels, Inc.
50 John Barrett Road
Patterson, NY 12563
800-416-0544
845-878-9400
FAX: 845-878-3647

Miller's RV
12912 Florida Blvd.
Baton Rouge, LA 70815
225-275-2940
FAX: 225-275-6807

Coach Index Wiring Schematic   Blue Bird Part No. 0067005
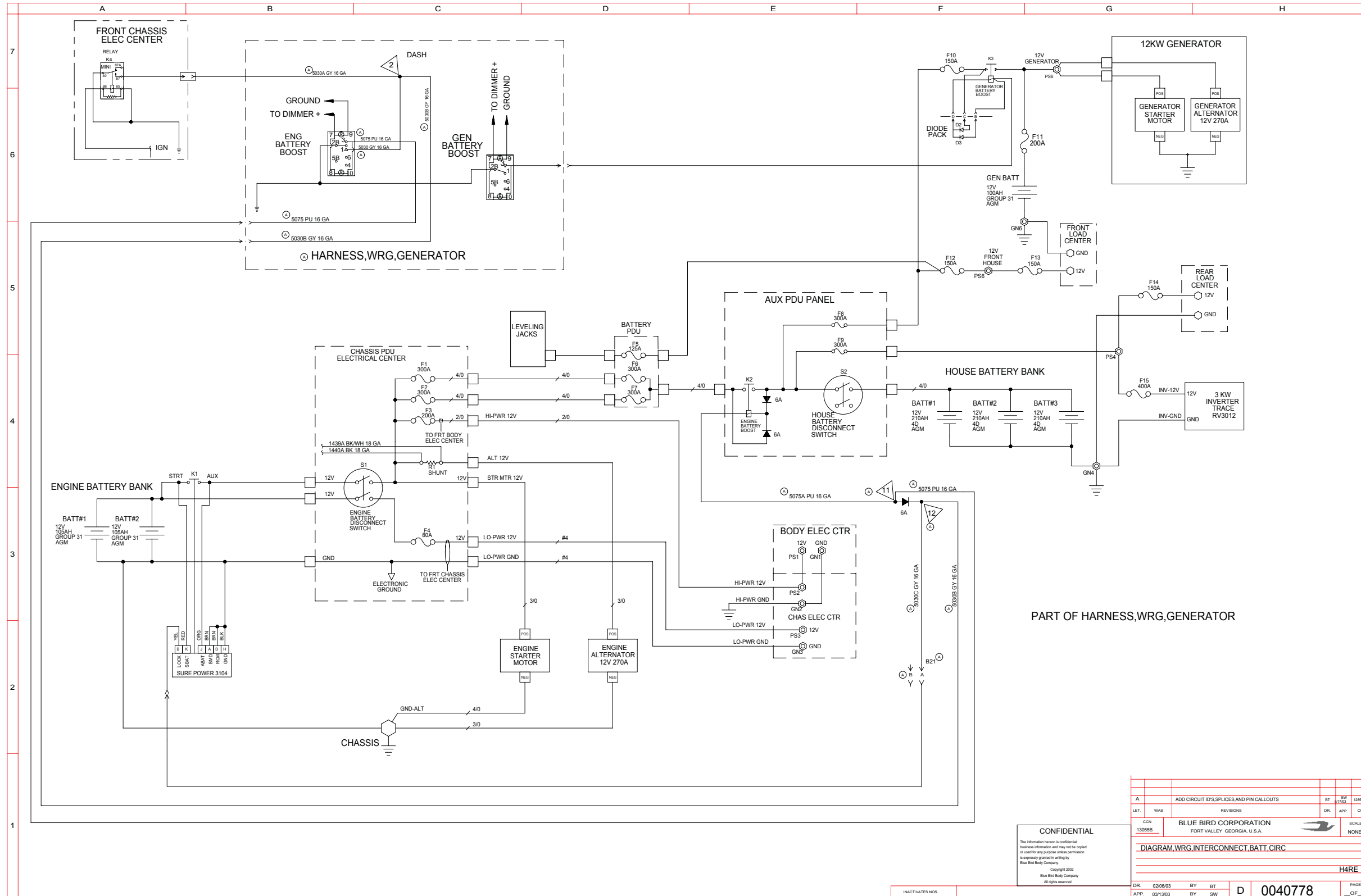
38FT H4RE

DESCRIPTION	BB PART #
SCHEMATIC,WRG,INDEX,COACH 38H4RE	0067005
SCHEMATIC,WRG,INTERCONNECT,BATT CIRC 38H4RE	0040778
SCHEMATIC,WRG,LOAD CENTER,FRONT 38H4RE	0065349
SCHEMATIC,WRG,LOAD CENTER,REAR	0065254
SCHEMATIC,WRG,SWITCH PNL,A/RST,AR-A 38H4RE	0041527
SCHEMATIC,WRG,SWITCH PNL,A/RST,AR-B 38H4RE	0041529
SCHEMATIC,WRG,SWITCH PNL,LH DASH,A-A 38H4RE	0041530
SCHEMATIC,WRG,SWITCH PNL,LH DASH,A-B 38H4RE	0041531
SCHEMATIC,WRG,SWITCH PNL,LH DASH,A-C 38H4RE	0041532
SCHEMATIC,WRG,SWITCH PNL,RH DASH,B-A 38H4RE	0041533
SCHEMATIC,WRG,SWITCH PNL,RH DASH,B-B 38H4RE	0041534
SCHEMATIC,WRG,SWITCH PNL,RH DASH,B-C 38H4RE	0041535
SCHEMATIC,WRG,A/C CTRL,FRT & RR,COACH H4RE	0066363
SCHEMATIC,WRG,DETECTORS,LP GAS/CO 38H4	0066713
SCHEMATIC,WRG,GENERATOR,SWITCHES 38H4	0066774
SCHEMATIC,WRG,MONITOR,TANK,WATER 38H4	0066715
SCHEMATIC,WRG,SEN/VLV,SHUT-OFF,WATER 38H4	0066714
SCHEMATIC,WRG,SEATS,PILOT/CO-PILOT 38H4	0066303
SCHEMATIC,WRG,COMPRESSOR,AIR 38H4	0066298
SCHEMATIC,WRG,LANDING LIGHTS 38H4	0065866
SCHEMATIC,WRG,HEAT,HYDRONIC 38H4	0066335
SCHEMATIC,WRG,MIRROR,REAR VIEW 38H4	0066301
SCHEMATIC,WRG,VISOR,POWER,WINDSHIELD 38H4	0066296
SCHEMATIC,WRG,GENERATOR,KSI	0064774
SCHEMATIC,WRG,MUSICAL HORN	0066302
SCHEMATIC,WRG,BAY HEATERS	0066909
SCHEMATIC,WRG,AUDIO VIDEO 38H4	0067296

LEGEND
WIRING COLOR

BK - BLACK	PU - PURPLE
BN - BROWN	DK GN - DARK GREEN
RD - RED	LT GN - LIGHT GREEN
OR - ORANGE	LT BL - LIGHT BLUE
YL - YELLOW	DK BL - DARK BLUE
WH - WHITE	GY - GRAY
TN - TAN	/ - STRIPE
PK - PINK	

⬡ COMPONENT LOCATION

FCP FRONT CAP	DN DINETTE	LR LIVING ROOM
ARA ARM REST A PANEL	DNSP DINETTE SWITCH PANEL	LRSP LIVING ROOM SW PANEL
ARB ARM REST B PANEL	FC FRONT CHASSIS	OHC OVERHD COMSOLE
BAR BATH ROOM	FLC FRONT LOAD CENTER	PNT PANTRY
BR BED ROOM	HBC HOUSE BATTERY COMP	PSP PANTRY SWITCH PANEL
BRSP BED ROOM SW PANEL	KP KITCHEN PANTRY	RB1 RIGHT BAY 1
CP COCKPIT	KT KITCHEN	RB2 RIGHT BAY 2
DAA DASH A-A PANEL	LB1 LEFT BAY 1	RB3 RIGHT BAY 3
DAB DASH A-B PANEL	LB2 LEFT BAY 2	RCH REAR CHASSIS
DAC DASH A-C PANEL	LB3 LEFT BAY 3	RLC REAR LOAD CENTER
DBA DASH B-A PANEL	LFC LEFT FORWARD COMP	TMP TANK MONITOR PANEL
DBB DASH B-B PANEL	LPC LP GAS FILL COMP	SEF SHOWER EXHAUST FAN
DBC DASH B-C PANEL	LPFC LP FILL COMPARTMENT	

◯ HARNESS

HH1 A/C CONTROL,FRT & RR	HH10 DASH SWITCH PANEL A-A	HH19 REAR LOAD CENTER
HH2 HEAT,HYD	HH11 DASH SWITCH PANEL A-B	HH20 CO2/SMOKE DETECTORS
HH3 MIRROR,REAR VIEW	HH12 DASH SWITCH PANEL A-C	HH21 AIR/CITY HORN
HH4 REAR HOUSE LIGHTING	HH13 DASH SW PANEL B-A	HH22 AUTO WATER SHUT OFF
HH5 FRONT HOUSE LIGHTING	HH14 DASH SW PANEL B-B	HH23 REAR LANDING LIGHTS
HH6 LIVING ROOM SWITCH PANEL	HH15 DASH SW PANEL B-C	HH24 HOLDING TANK SENSORS
HH7 DINNETTE SWITCH PANEL	HH16 A/RST SW PANEL AR-A	HH25 AIR COMP
HH8 BEDROOM SWITCH PANEL	HH17 A/RST SW PANEL AR-B	HH26 GEN CONTROLS
HH9 BATH SWITCH PANEL	HH18 FRONT LOAD CENTER	HH27 PILOT/CO-PILOT SEATS
		HH28 POWER VISORS

- ⏚ CHASSIS GROUND
- ↓ ELECTRONIC GROUND
- → P - PINS
- ≻ J - SOCKETS
- K - RELAY
- CB - CIRCUIT BREAKER
- F - FUSE

CCN 128576	BLUE BIRD CORPORATION	SCALE NONE
	FORT VALLEY, GEORGIA, U.S.A.	

SCHEMATIC,WRG,INDEX,COACH

		38H4RE	
LET	WAS	REVISIONS	DR	APP	CCN
INACTIVATES NOS.		0042247	DR 06/03/03 BY SS	D 0067005	PAGE
			APP 06/13/03 BY SW		__OF__

Battery Circ. Interconnect Wiring Schematic   Blue Bird Part No. 0040778

Switch Panel Arm Rest Wiring Schematic   Blue Bird Part No. 0059047

A-A, LH Dash Switch Panel Wiring Schematic   Blue Bird Part No. 0043496

	A	B	C	D	E	F	G	H

1301B DK GN/BK 16 GA
1301A DK GN/BK 16 GA
1208A WH 18 GA
1333 LT BL 18 GA

P310

TO INSTRUMENT PANEL
(BLOCK 12)

1315B BN 16 GA
1315A BN 16 GA
1101A RD 14 GA

1101A RD 14 GA   < 1 <
1208A WH 18 GA   < 2 <
1301A DK GN/BK 16 GA   < 3 <
1315C BN 16 GA   < 4 <
1301B DK GN/BK 16 GA   < 5 <
1333 LT BL 18 GA   < 6 <

HD LGT/
PK LGT
(BLOCK 1)

J300

BLUE BIRD CORPORATION
FORT VALLEY, GEORGIA, U.S.A.

DIAGRAM,WRG,SW PNL,LH DASH,A-A

38H4

D   0043496

A-B, LH Dash Switch Panel Wiring Schematic   Blue Bird Part No. 0043497

A-C, LH Dash Switch Panel Wiring Schematic   Blue Bird Part No. 0043498

1145 BK 18 GA Ⓐ
1208G WH 18 GA
1333E LT BL 18 GA
1808A RD 18 GA

SUSPENSION
DUMP
(BLOCK 5)

J304

J312

TO INSTRUMENT PANEL
(BLOCK 16)

Ⓐ 1145 BK 18 GA < 1 < SUSP DUMP SUP Ⓐ
1808A RD 18 GA < 2 < SUSP DUMP RET Ⓐ
1208G WH 18 GA < 3 < GRD Ⓐ
1333E LT BL 18 GA < 4 < ILLUM Ⓐ
< 5 <
< 6 <

BLUE BIRD CORPORATION
FORT VALLEY, GEORGIA, U.S.A.

DIAGRAM,WRG,SW PNL,LH DASH,A-C

38H4

D   0043498

B-A, RH Dash Switch Panel Wiring Schematic   Blue Bird Part No. 0043461

PANEL DIMMER
SWITCH   J309
(BLOCK 10)

BLACK >A> 1315D BN 16 GA
BLACK >B> 1208Y WH 16 GA
LOAD   YELLOW >C> 1333G LT BL 18 GA
+ LED BLUE >D> 1315E BN 16 GA
OPEN   >E>
- LED BLACK >F> 1208Z WH 16 GA

1208H WH 18 GA
1333F LT BL 18 GA

J305

7 9
2B
1332A DK GN/BK 18 GA
5B   6
4
8   10

HAZZARD
WARNING
(BLOCK 6)

P313

TO INSTRUMENT PANEL
(BLOCK 18)

1101B BK 18 GA   < 1 <
1332A DK GN/BK   < 2 <
1208X WH 16 GA   < 3 <
1315F BN 16 GA   < 4 <
< 5 <
1333H LT BL 18 GA   < 6 <

CCN
12857G   BLUE BIRD CORPORATION   SCALE
          FORT VALLEY, GEORGIA, U.S.A.   —

DIAGRAM,WRG.SW PNL.RH DASH.B-A

38H4

D   0043461

Harness   Component Location

DR 08/16/01   BY AL
APP 11/02/01 BY KF

INACTIVATES NOS.

B-B, RH Dash Switch Panel Wiring Schematic   Blue Bird Part No. 0060902

	A	B	C	D	E	F	G	H

1208J WH 18 GA
1333J LT BL 18 GA

J306

1183E BK 18 GA
2612B PU 18 GA

1183F BK 18 GA
2610B GY 18 GA

LUGGAGE LOCKS
(BLOCK 7)

1333L LT BL 18 GA
1208L WH 18 GA

J307

1102H PK/BK 18 GA   1532C LT BL 18 GA

J314

TO INSTRUMENT PANEL
(BLOCK 20)

DOOR AIR LOCK OVERRIDE
(BLOCK 8)

2610B GY 18 GA	UNLOCK LUGGAGE BAY
2612B PU 18 GA	LOCK LUGGAGE BAY
1183D BK 18 GA	+12 BATTERY
1208U WH 18 GA	GROUND
1333S LT BL 18 GA	ILLUMINATION
1532C LT BL 18 GA	DOOR AIR LOCK SOL
1102H PK/BK 18 GA	DOOR AIR LOCK IGNITION

CCN 13032W

BLUE BIRD CORPORATION
FORT VALLEY, GEORGIA, U.S.A.

SCALE
NONE

A	-	RELOCATED CIRCUITS 1102H & TLOC 1208L & 1333L AT 2307	OS	SW ADMIN	3032H
0	-	----- "NO REVISION" -----	-	-	
LET.	WAS	REVISIONS	DR.	APP.	CCN

DIAGRAM,WRG,SW PNL RH DASH,B-B

38H4

Harness   Component Location

INACTIVATES NOS.   0043463

DR. 11/18/02   BY DTS
APP. 11/18/02   BY SW

D   0060902

B-C, RH Dash Switch Panel Wiring Schematic   Blue Bird Part No. 0043495

	A	B	C	D	E	F	G	H	

P315

TO INSTRUMENT PANEL
(BLOCK 22)

2103A PK/BK 16 GA   2103A PK/BK 16 GA   < 1 <
1333M LT BL 18 GA   2103B RD 16 GA   < 2 <
1208M WH 18 GA   1208M WH 18 GA   < 3 <
                           1333M LT BL 18 GA   < 4 <
                                               < 5 <
J308   < 6 <

2103B RD 16 GA

HEATED
MIRROR
(BLOCK 9)

BLUE BIRD CORPORATION
FORT VALLEY, GEORGIA, U.S.A.

A	-	SWAPPED LOCATIONS OF 1333M & 1208M AT J308		
0	---	---"NO REVISION"---		
LET.	WAS	REVISIONS	DR.	APP.	CCN

DIAGRAM,WRG.SW PNL,RH DASH,B-C

38H4

DR. 08/19/01 BY AL
APP. 11/02/01 BY KF

D   0043495

Harness   Component Location

Instrument Panel Wiring Schematic   Blue Bird Part No. 0059060

J190 DIODES (INSTR IGN)

A B C D

TO IGN SWITCH
(BLOCK 31)
J323

	BAT	1	1158 BK 14 GA
ST	2	1108 PU 16 GA
IG 1	3	1102G PK/BK 16 GA
ACC1	4	1106 BK/YL 16 GA

TO DIMMER AND HAZARD SWITCHES
TO RH DASH PNL B-A
(BLOCK 17)
J313

HAZ SW SUP 1 1101D BK 18 GA
HAZ SW RET 2 1332B DK GN/BK 18 GA
GROUND 3 1208T WH 18 GA
DIMMER INPUT + 4 1315H BN 16 GA
SPARE 5
ILLUMINATION 6 1333R LT BL 14 GA

TO RH DASH PNL B-B
(BLOCK 19)
P314

UNLOCK LUGGAGE BAY 1 2610B GY 18 GA
LOCK LUGGAGE BAY 2 2612B PU 18 GA
LUG LK SUP + 3 1183D BK 18 GA
GROUND 4 1208U WH 18 GA
ILLUMINATION 5 1333S LT BL 18 GA
DOOR AIR LK SOL 6 1532C LT BL 18 GA
DOOR AIR LK IGNITION 8 1102H PK/BK 18 GA
SPARE 9

TO RH DASH PNL B-C
(BLOCK 21)
J315

HEATED MIRROR SUP 1 2103C PK/BK 16 GA
HEATED MIRROR RET 2 2103D RD 16 GA
GROUND 3 1208V WH 18 GA
ILLUMINATION 4 1333T LT BL 18 GA
SPARE 5
SPARE 6

TO SPEEDOMETER
(BLOCK 32)
J324

INSTRUMENT IGN 1 1102E PK/BK 16 GA
INSTR BATT (ELEC) 2 1136 BK 18 GA
ELECTRONIC GROUND 3 1206C WH 18 GA
ILLUMINATION 4 1333V LT BL 18 GA
J1587 + 5 16142 YL 18 GA
J1587 - 6 16151 LT BL 18 GA

TO GEN SW HARN
P191

GEN IGN SIG 1 3210C RD/WH 18 GA

TO DASH SW PNL JUMPER HARNESS
P192

1102F PK/BK 16 GA 1 HOUSE IGN CTRL
1333M LT BL 16 GA 2 ILLUMINATION

TO LH DASH PNL A-A
(BLOCK 11)
J310

1101C RD 14 GA 1 HEAD LT SUP
1208N WH 16 GA 2 GROUND
1301C DK GN/BK 16 GA 3 PARK LT SUP
1315G BN 16 GA 4 PARK LT RET
1301B DK GN/BK 16 GA 5 HEAD LT RET
1333 LT BL 18 GA 6 ILLUMINATION

TO LH DASH PNL A-B
(BLOCK 13)
J311

1329J DK GN/WH 14 GA 1 LH LND LT RET
1329K DK GN/WH 14 GA 2 LH LND LT SUP
1329L DK GN/WH 14 GA 3 RH LND LT RET
1329M DK GN/WH 14 GA 4 RH LND LT SUP
1322C LT BL 16 GA 5 BACK UP ALARM
1322D LT BL 16 GA 6 BACK UP ALARM
1208P WH 18 GA 7 GROUND
1333N LT BL 18 GA 8 ILLUMINATION
9 SPARE

TO LH DASH PNL A-C
(BLOCK 15)
P312

1145 BK 18 GA 1 SUSP DUMP SUP
1808A RD 18 GA 2 SUSP DUMP RET
1208S WH 18 GA 3 GROUND
1333P LT BL 18 GA 4 ILLUMINATION
5 SPARE
6 SPARE

TO LH OVERHEAD GAUGE HARNESS
TO RH OVERHEAD GAUGE HARNESS
T2 T1

J316 J317 J318

BLUE BIRD CORPORATION
FORT VALLEY, GEORGIA, U.S.A.

DIAGRAM.WRG.PANEL.INSTRUMENT

0059060

Luggage Bay 1 Wiring Schematic   Blue Bird Part No. 0044245

P600
MERCURY
SWITCH

J80

LUGGAGE DR SIG (-)   A   2611 DK GN/BK 16 GA
COMPT LOCK   B   2610A GY 14 GA
COMPT LOCK   C   2612A PU 14 GA
COMPT LIGHT   D   1165A BK 14 GA
CHASSIS GND   E   1208A WH 14 GA
F
G
H
J
K

J602

2610B GY 14 GA   A   DRIVERS SIDE
2612B PU 14 GA   B   COMPT LOCK

J601

2610C GY 14 GA   A   PASSENGER SIDE
2612C PU 14 GA   B   COMPT LOCK

1208B WH 18 GA
1208D WH 16 GA
1165C BK 14 GA

1165D BK 14 GA

P610 MERCURY
SWITCH

1208C WH 16 GA

P611

1165G BK 14 GA

1165E BK 14 GA

A B   J603
DRIVERS SIDE
LUGGAGE LIGHT

A B   J604
PASSENGER SIDE
LUGGAGE LIGHT

BLUE BIRD CORPORATION
FORT VALLEY, GEORGIA, U.S.A.

12857B

DIAGRAM,WRG,LUGGAGE BAY 1

H4RE

Harness   Component Location

INACTIVATES NO1.

DR   10/16/01   BY   OS
APP   10/16/01   BY   KLFRYE

D   0044245

Luggage Bay 2 Wiring Schematic   Blue Bird Part No. 0044719

MERCURY
SWITCH

P607

J99

AQUA HOT > 1 > 81A RD 6 GA
CHAS GND > 3 > 1208A WH 18 GA
CMPT LT > 4 > 1165A BK 14 GA
LUGG DR SIG (-) > 5 > 2611 DK GN/BK 16 GA
CMPT LOCK > 6 > 2612A PU 14 GA
CMPT LOCK > 7 > 2610A GY 14 GA

1208B WH 18 GA

J612

J613

1165C BK 14 GA

1165B BK 14 GA

2612B PU 14 GA
2610B GY 14 GA

2612C PU 14 GA
2610C GY 14 GA

J608 A B

J609 A B

PASS SIDE
CMPT LOCK

DRIVER SIDE
COMPT LOCK

1208C WH 16 GA
1165D BK 16 GA

1208 WH 16 GA
1165E BK 16 GA

J606 B A

J605

PASS SIDE
CMPT LIGHT

DRIVER SIDE
CMPT LIGHT

CCN
12857B
BLUE BIRD CORPORATION
FORT VALLEY, GEORGIA, U.S.A.
SCALE

DIAGRAM.WRG.LUGGAGE BAY 2

H4RF

LET. WAS REVISIONS DR. APP CCN

Harness   Component Location

INACTIVATES NOS.

DR. 10/16/01 BY OS
APP. 10/16/01 BY KLFRYE

D 0044719

PAGE
__ OF __

Luggage Bay 3 Wiring Schematic   Blue Bird Part No. 0043893

P614

SHORE LINE SENSOR

J615

2610B GY 14 GA   < A <   DRIVERS SIDE
2612B PU 14 GA   < B <   CMPT LOCK

J100

J616

2610C GY 14 GA   < A <   PASSENGER SIDE
2612C PU 14 GA   < B <   CMPT LOCK

CHASSIS GND   > A >   1208A WH 14 GA
SHORELINE SENSOR   > B >   2042 PK/BK 14 GA
CMPT LOCK   > C >   2610A GY 14 GA
CMPT LOCK   > D >   2612A PU 14 GA
                   > E >

P619

MERCURY SWITCH

J617

CMPT LIGHT   > F >   1165A BK 14 GA   1165B BK 14 GA   1165D BK 14 GA   < A <   PASSENGER SIDE
CHASSIS GND   > G >   1208F WH 14 GA   1208E WH 14 GA   < B <   COMPT LIGHT
LH LND LIGHT   > H >
RH LND LIGHT   > J >
                   > K >

P620

MERCURY SWITCH

J618

1165C BK 14 GA   1165E BK 14 GA   < A <   DRIVERS SIDE
                   1208D WH 14 GA   < B <   COMPT LIGHT

J622   J621

1329A DK GN/WH 14 GA   1329B DK GN/WH 14 GA
1208B WH 14 GA   1208C WH 14 GA

A B   A B

DRIVERS SIDE   PASSENGER SIDE
LANDING LIGHT   LANDING LIGHT

BLUE BIRD CORPORATION
FORT VALLEY, GEORGIA, U.S.A.

CCN
128578

SCALE

LET.   WAS   REVISIONS   DR.   APP.   CCN

DIAGRAM,WRG,LUGGAGE BAY 3

H4RE

Harness   Component Location

DR.   10/16/01   BY   OS   D   0043893   _OF_
APP. 10/16/01   BY   KLFRYE

INACTIVATES NOS.

Rear Cummins PDU Wiring Schematic   Blue Bird Part No. 0059051
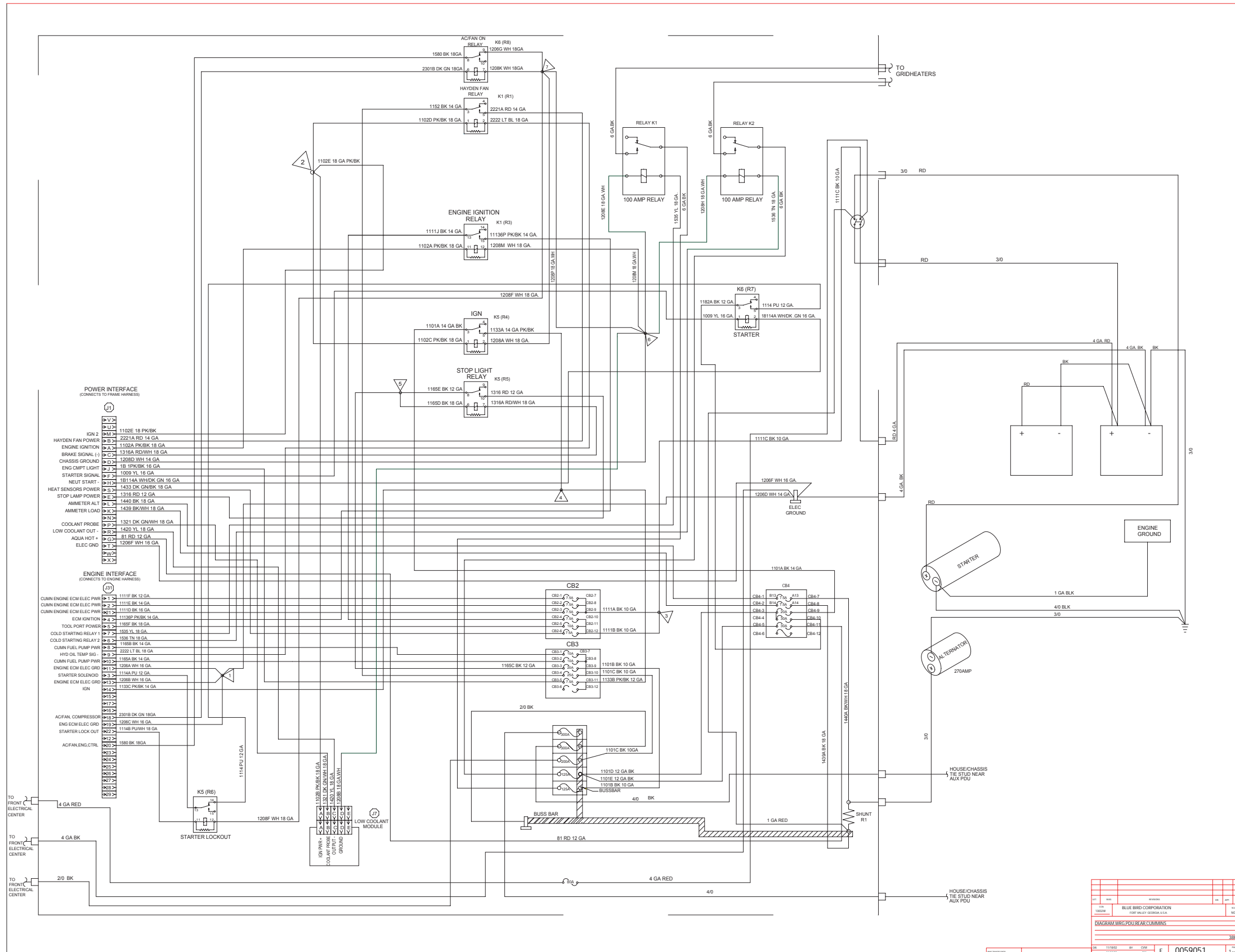
Body Electrical Center Wiring Schematic   Blue Bird Part No. 0059052

Body Wiring Schematic   Blue Bird Part No. 0059053

Front Interface Wiring Schematic Blue Bird Part No. 0059054

CEC Trans ABS Wiring Schematic Blue Bird Part No. 0059056-1

P1 ECU CONNECTOR "T" (BLUE)

P15 ECU CONNECTOR "S" (BLACK)

P16 ECU CONNECTOR "V" (GRAY)

J1939 DATA LINK

P3 ABS NODE P4 TRANS NODE P13 J1939 P14 J1939 TO FRONT INTERFACE

ENGINE SPEED HI
OUTPUT SPEED LO
SP1
SP2
SP3
SOLENOID SUPPLY
F SOLENOID LOW
C-3 PRESSURE SWITCH INPUT
SENSOR INPUT
TRANSMISSION IDENTIFICATION
ANALOG GROUND
OIL LEVEL SENSOR INPUT
A SOLENOID LOW
B SOLENOID LOW
SOLENOID SUPPLY (B,E)
C SOLENOID LOW
D SOLENOID LOW
SOLENOID SUPPLY (A,D,J)
E SOLENOID LOW
SOLENOID SUPPLY (C,G)
SUMP TEMP SENSOR INPUT
H.N SOL POWER (H,N-HI)
H SOLENOID LOW
N SOLENOID LOW
RETARDER TEMP SENSOR
ENGINE SPEED LO
OUTPUT SPEED LO
TURBINE SPEED LO
TURBINE SPEED HI

P12 TO TRANSMISSION BULKHEAD

PRIM SHIFT SELECTOR, DATA BIT 1
PRIM SHIFT SELECTOR, DATA BIT 2
PRIM SHIFT SELECTOR, DATA BIT 4
PRIM SHIFT SELECTOR, DATA BIT 8
PRIM SHIFT SELECTOR, PARITY

P2 TO SHIFTER

GENERAL PURPOSE OUTPUT (-)
SHIFT SELECTOR MODE INPUT
SENSOR POWER
BATTERY GROUND
ELECTRONIC POWER
SHIFT SELECTOR DISPLAY
GROUND
ILLUMINATION
GROUND
GROUND

INSTRUMENT LIGHT
GROUND

P9 TO SHIFTER LIGHT

TRANS ELECTRONIC POWER
TRANS ELECTRONIC GROUND
NEUTRAL (START) (+)
RETARDER INDICATOR (-)
IGNITION (ALLISON)
ANALOG GROUND
RETARDER MOD REQUEST
SENSOR POWER
RETARDER ENABLE
SHIFT INHIBIT
NEUT -
SERVICE BRAKE
CHECK TRANSMISSION LIGHT(-)
SUMP TEMPERATURE
SERIAL COMM INTERFACE, LO
SERIAL COMM INTERFACE, HI
REVERSE SIGNAL

P6 TO TRANS ECU TO CEC

P21 TRANS SPEED

L/R MODULATOR EXHAUST
L/R MODULATOR HOLD
L/R MODULATOR COMMON
ATC VALVE
ATC VALVE
R/R MODULATOR HOLD
R/R MODULATOR EXHAUST
R/R MODULATOR COMMON
R/F MODULATOR HOLD
R/F MODULATOR EXHAUST
L/F MODULATOR EXHAUST
L/F MODULATOR COMMON
L/F MODULATOR HOLD
L/R SPEED SENSOR
L/R SPEED SENSOR
R/R SPEED SENSOR
R/R SPEED SENSOR
R/F SPEED SENSOR
R/F SPEED SENSOR
L/F SPEED SENSOR
L/F SPEED SENSOR

P10 TO ABS BULKHEAD SENSORS/MODULATORS

J1587 -
J1587 +
ABS OFF ROAD SWITCH
ABS LAMP
ATC LAMP
MUD AND SNOW SWITCH
ABS IGN
ABS POWER
ABS POWER
GND
BRAKE LIGHT INPUT
MPH SIGNAL

P11 TO FRONT ELECT CENTER

ABS ECU CONNECTOR E   P17 ABS ECU CONNECTOR D   P18 ABS ECU CONNECTOR C   P19 ABS ECU CONNECTOR B   P20 ABS ECU CONNECTOR A

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BLUE BIRD CORPORATION
FORT VALLEY, GEORGIA, U.S.A.

DIAGRAM,WRG,CEC,TRANS/ABS

0059056

CEC Trans ABS 2 Wiring Schematic   Blue Bird Part No. 0059056-2

TRANSMISSION BULKHEAD

ABS BULKHEAD
SENSORS/MODULATORS

ENGINE SPEED SENSOR (P3)
> B >
> A >

OUTPUT SPEED SENSOR (P4)
> B >
> A >

CONNECTS WITH P12 (SEE PAGE 1)

ATC VALVE

ALLISON TRANSMISSION

BLOCK 7
31-PIN TRANSMISSION CONNECTOR

BLOCK 8

18148 LT GN
18141 TN
18150 OR
18139 YL

1736 DK GN 16 GA
1735 LT GN 16 GA
(P6)

1	2

18150 OR >28> ENGINE SPEED LO
18141 TN > 2 > ENGINE SPEED HI
18148 LT GN > 3 > OUTPUT SPEED LO
18139 YL >29> OUTPUT SPEED HI

MD/B 300 B 400 ONLY   TURBINE SPEED
> U < 18140 LT BL 18140 LT BL >30> TURBINE SPEED LO
> V < 18149 OR 18149 OR >31> TURBINE SPEED HI

OIL LEVEL SENSOR
E SOL
> E < 18107 LT GN 18107 LT GN > 7 > SOLENOID SUPPLY
> F < 18110 WH 18110 WH > 8 > F SOLENOID,LOW
C3 PS
> X < 18162 WH 18162 WH > 9 > C-3 PRESSURE SWITCH INPUT
> D < 18124 PK 18124 PK >10> SENSOR POWER
TRANS ID > W < 18195 YL 18195 YL >11> TRANSMISSION IDENTIFICATION
> N < 18135A LT GN 18135 LT GN >12> ANALOG GROUND
> Y < 18165 LT BL 18165 LT BL >13> OIL LEVEL SENSOR INPUT

A SOL > G < 18120 WH 18120 WH >14> A SOLENOID,LOW
B SOL > J < 18128 OR 18128 OR >15> B SOLENOID,LOW
> H < 18121 TN 18121 TN >16> SOLENOID SUPPLY (B,E)
C SOL > B < 18103 LT GN 18103 LT GN >17> C SOLENOID,LOW
> M < 18131 LT BL 18131 LT BL >18> D SOLENOID,LOW
E SOL > K < 18102 OR 18102 OR >19> SOLENOID SUPPLY (A,D,J)
> K < 18129 TN 18129 TN 18 GA >20> E SOLENOID,LOW
> C < 18130 YL 18130 YL 18 GA >21> SOLENOID SUPPLY (C,G)
G SOL > C < 18104 WH 18104 WH 18 GA >22> G SOLENOID,LOW
SUMP TEMP > P < 18147 TN 18147 TN 18 GA >23> SUMP TEMP SENSOR INPUT
> Q < > 1 > J SOLENOID,LOW
> R <
> S <
> T <
> Z <
> a <
18116 YL >24> H,N SOL POWER (H,N-HI)
> b < 18127 WH/DK GN >25> H SOLENOID LOW
18101 LT BL >26> N SOLENOID,LOW
18138 OR >27> RETARDER TEMP SENSOR LEVER RETARDER MOD. REQUEST

7 SPEED ONLY
J SOL
N SOL
> d <
> f <
> g < 18116A

18101A LB

CONNECTS WITH P10 (SEE PAGE 1)

(P7)
> 1 < 1719 PU 16 GA
> 2 < 1718 LT GN 16 GA   LEFT REAR MODULATOR (P15)
> 3 < 1717 LT GN/BK 16 GA
> 4 < 1736 DK GN 16 GA
| < 1 |
| < 3 |
| < 2 |

> 15 < 1721 BN 18 GA   LEFT/REAR SENSOR EXT. (P3)
> 16 < 1720 BK 18 GA
> 5 < 1735 LT GN 16 GA
| < A |
| < B |

> 17 < 1713 BN 18 GA   RIGHT/REAR SENSOR EXT. (P13)
> 18 < 1712 BK 18 GA
| < A |
| < B |

> 6 < 1716 TN/OR 16 GA   RIGHT REAR MODULATOR (P14)
> 7 < 1715 DK GN/BK 16 GA
> 8 < 1714 PK 16 GA
| < 1 |
| < 3 |
| < 2 |

> 23 <
> 24 <
> 25 <
> 26 <
> 27 <
> 28 <
> 29 <
> 30 <
> 31 <

> 19 < 1702 BN 18 GA   RIGHT/FRONT SENSOR EXT. (P1)
> 20 < 1722 BK 18 GA
| < A |
| < B |

> 9 < 1705 GY 16 GA   RIGHT FRONT MODULATOR (P2)
> 10 < 1704 BK 16 GA
> 11 < 1703 BK/WH 16 GA
| < 1 |
| < 3 |
| < 2 |

SP 1 LT BL   SP1 LT BL 18 GA > 4 >
SPARE WIRE SP 2 RD   SP2 RD 18 GA > 5 >
SP 3 YL   SP3 YL 18 GA > 6 >

> 12 < 1708 BN/OR 16 GA   LEFT FRONT MODULATOR (P4)
> 13 < 1707 BN 16 GA
> 14 < 1706 OR 16 GA
| < 1 |
| < 3 |
| < 2 |

> 21 < 1711 BN 18 GA   LEFT/FRONT SENSOR EXT. (P5)
> 22 < 1709 BK 18 GA
| < A |
| < B |

RETARDER TEMP SENSOR (P7)
> B > 18135B LT GN
> A > 18138 OR

H-SOLENOID (P8)
> B > 18116B YL
> A > 18127 WH/DK GN

ACCUMULATOR CONNECTOR (P6)
> B > 18116C YL
> A > 18101B LT BL

DASHED LINES INDICATE CIRCUITS THAT ARE NOT USED ON H4RE.

NOTES: ALL WIRES ARE 18 AWG EXCEPT WHERE NOTED.

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LET	WAS	REVISIONS	BY	DR.	APP.
A		ADD CIRCUIT 18157 FROM P16 TO P21			CCN

CCN 13032W

BLUE BIRD CORPORATION
FORT VALLEY, GEORGIA, U.S.A.

SCALE NONE

DIAGRAM,WRG,CEC,TRANS/ABS

H4RE

DR. 12/04/02 BY MattP
APP. 12/04/02 BY SWolfe

D 0059056

PAGE 2 OF 2

Engine Compartment Wiring Schematic   Blue Bird Part No. 0059057

	A	B	C	D

3

HEAT SENSOR PWR
ENGINE CMPT LT +
HEAT SENSOR RET

A — 1433A DK GN/BK 18 GA
C — 1321A OR 18 GA
B — 1433G DK GN 18 GA

J88

1433D DK GN/BK 18 GA   1433E DK GN 18 GA

HEAT SENSORS

1

2

1321B OR 18 GA

A

J277

ENGINE COMPARTMENT LIGHTS

1433B DK GN/BK 18 GA

1433C DK GN/BK 18 GA

2

1433H DK GN 18 GA

HEAT SENSORS

3

J280

1321C OR 18 GA

A

ENGINE COMPARTMENT LIGHTS

1

1433J DK GN 18 GA

HEAT SENSORS

LET.	WAS	REVISIONS	DR.	APP.	CCN

INACTIVATES NOS.   0039291

CCN	BLUE BIRD CORPORATION	SCALE
13032W	FORT VALLEY GEORGIA, U.S.A.	NONE

DIAGRAM,WRG,ENGINE COMPARTMENT

38H4

DR.	10/08/02	BY	PN		B	0059057	PAGE
APP.	10/08/02	BY	SW				1 OF 1

Rear Control Box Wiring Schematic   Blue Bird Part No. 0059058

ENGINE
COMPARTMENT
LIGHTS

181 BK 16 GA — T1 — ENG COMP, LGT
181A PK/BK 14 GA — T2 — ENG COMP, LGT PWR

P3

1001 YL 14 GA — F — STARTER
1009 YL 16 GA — E — STARTER SWITCH, FRONT
1102A PK/BK 14 GA — B — IGNITION SWITCH, FRONT
1102 PK/BK 18 GA — A — IGNITION, ENG
1102E PK/BK 16 GA — C — IGNITION SWITCH, REAR
— D

FRT / OFF / REAR
FRT / OFF / REAR

FRAME
CONNECTOR

P1

5 1 1102D PK/BK 16 GA — T4 — IGNITION
1008C PU 16 GA — T3 — REMOTE START

REAR
START

P6

FRONT START CMD — A — 1009 YL 16 GA
FROM FRONT ST — B — 1001 YL 14 GA
IGNITION, ENG — C — 1102 PK/BK 18 GA
IGNITION SW, FRONT — D — 1102A PK/BK 14 GA
REMOTE START — M — 1008C PU 16 GA
ENG. COMP LGT — F — 181 BK 16 GA
IGN 2 — G — 1102B PK/BK 14 GA
ELEC GND — H — 1206 WH 18 GA
J1587 (+) — J — 16142 YL 18 GA
J1587 (-) — K — 16151 LT BL 18 GA
ENG COMP. LGT PWR — E — 181A PK/BK 14 GA
IGN, OUT — L — 1102C PK/BK 16 GA

P5

REAR GAUGE
DRIVER MODULE

1102B PK/BK 14 GA — E — IGNITION
1206 WH 18 GA — A — GROUND
16142 YL 18 GA — C — J1587 DATA (+)
16151 LT BL 18 GA — D — J1587 DATA (-)
— B — GROUND GAUGE CONTROLLER
— F — 12V PWR GAUGE CONTROLLER
— H — DATA LINK GAUGE CONTROLLER
— G — NO CONNECTION

1102G BK 18 GA — 1
1490A LT BL 18 GA — 2   OIL PSI
1206B WH 18 GA — 3

P7

1102H BK 18 GA — 1
1490B LT BL 18 GA — 2   HOUR MTR
1206C WH 18 GA — 3

P8

1102F BK 18 GA — 1102J BK 18 GA — 1
1490 LT BL 18 GA — 1490C LT BL 18 GA — 2   WATER TEMP
1206A WH 18 GA — 1206D WH 18 GA — 3

2   3   4

SEE: #0059035 FOR HRS DIMENSION

LET | WAS | REVISIONS | DR. | APP. | CCN

CCN
13032W

BLUE BIRD CORPORATION
FORT VALLEY GEORGIA, U.S.A.

SCALE
NONE

DIAGRAM,WRG,BOX,CONTROL,REAR

C4RE/H4RE

INACTIVATES NOS.   0043904

DR. 11/4/02 BY CM
APP. 11/4/02 BY SW   C   0059058

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Frame ISL03 Wiring Schematic   Blue Bird Part No. 0066179

KSI Generator Wiring Schematic   Blue Bird Part No. 0064774

Rear Load Center Wiring Schematic

Blue Bird Part No. 0065254

Front Load Center Wiring Schematic   Blue Bird Part No. 0065349-1

Front Load Center Wiring Schematic   Blue Bird Part No. 0065349-2

BLUE BIRD CORPORATION
FORT VALLEY, GEORGIA, U.S.A.

SCHEMATIC,WRG,LOAD CENTER,FRONT

D   0065349

Landing Lights Wiring Schematic   Blue Bird Part No. 0065866

DASH SWITCH PANEL A-B

DIMMER
B6

1299 WH 16 GA
1332 LB 16 GA

2 GND
1 ILLUMINATION

DAB

B4

J153

RLS

REAR
LANDING
LIGHTS
SWITCH

3001 BK 16 GA
3001A YL 16 GA

B3

1257B WH 12 GA
3200C PU 12 GA

REAR LH
LANDING
LIGHT

RLHL

3200B PU 12 GA

RCH

1257C WH 12 GA

1257A WH 12 GA
3200D PU 12 GA

REAR RH
LANDING
LIGHT

RRHL

B1

TO FRONT INTERFACE

18113B WH/GN 16 GA
18114C WH/GN 16 GA

REVERSE
NEUTRAL

B7

HH23

FLC

B5
B17

B5
B17

B5
B17

SPARES

HH18

B2

REAR LOAD CENTER

3001 BK 16 GA
3001A YL 16 GA

3200B PU 12 GA

3200 PU 12 GA

3200A PU 12 GA

18113B WH/GN 16 GA
18114C WH/GN 16 GA

GROUND
STUD 2

3001 BK 16 GA

BATTERY 2

20A   3000 BK 12 GA

3000A BK 12 GA

3001B YL 16 GA

MICRO

REVERSE

MICRO

NEUTRAL

BATTERY 3

3000B BK 12 GA

7.5A   3001 BK 16 GA

3001C YL 16 GA

FRONT LOAD CENTER

(LANDING LIGHTS)

CCN
12857M

BLUE BIRD CORPORATION
FORT VALLEY GEORGIA, U.S.A.

SCALE

SCHEMATIC,WRG,LANDING LIGHTS,REAR

38RE

LET   WAS   REVISIONS   DR   APP   CCN

Harness   Component Location

INACTIVATES NOS.   0042999

DR.   05/17/03   BY   SS
APP.   06/13/03   BY   SW

D   0065866

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Power Windshield Visor Wiring Schematic   Blue Bird Part No. 0066296

DIMMER
BLOCK 6

1332A LT BL 16 GA   1332B LT BL 16 GA
1299A WH 16 GA   1299B WH 16 GA

DBC   LVS   B3

2900B RD 14 GA   2904B PK 14 GA   LH VISOR MOTOR
2903B PU 14 GA   B5   B4
1266A WH 14 GA   2903C PU 14 GA   2904A PK 14 GA   OHC
2904C PK 14 GA   2903A PU 14 GA

LVMT

LH W/S VISOR SWITCH

1332C LT BL 16 GA
1299C WH 16 GA

DBC   RVS   B2

2900A RD 14 GA   2902B LT BL 14 GA   RH VISOR MOTOR
2901B DK BL 14 GA   B7   B8
1266B WH 14 GA   2901C DK BL 14 GA   2902A LT BL 14 GA   OHC
2902C LT BL 14 GA   2901A DK BL 14 GA

RVMT

RH W/S VISOR SWITCH

HH28

(BLOCK 1)

HH19

(BLOCK 12)

MASTER 4

MASTER

15A   2900

1266G WH 14 GA

GROUND STUD
(BLOCK 12A)

FRONT LOAD CENTER

BLUE BIRD CORPORATION
FORT VALLEY, GEORGIA, U.S.A.

CCN
12857M

SCHEMATIC,WRG,VISOR,POWER,WINDSHIELD

38H4

Harness   Component Location

LET   WAS   REVISIONS   DR   APP   CCN

INACTIVATES NOS   0043092

DR   05/12/03   BY   SS
APP   06/13/03   BY   SW

D   0066296

Air Compressor Wiring Schematic   Blue Bird Part No. 0066298
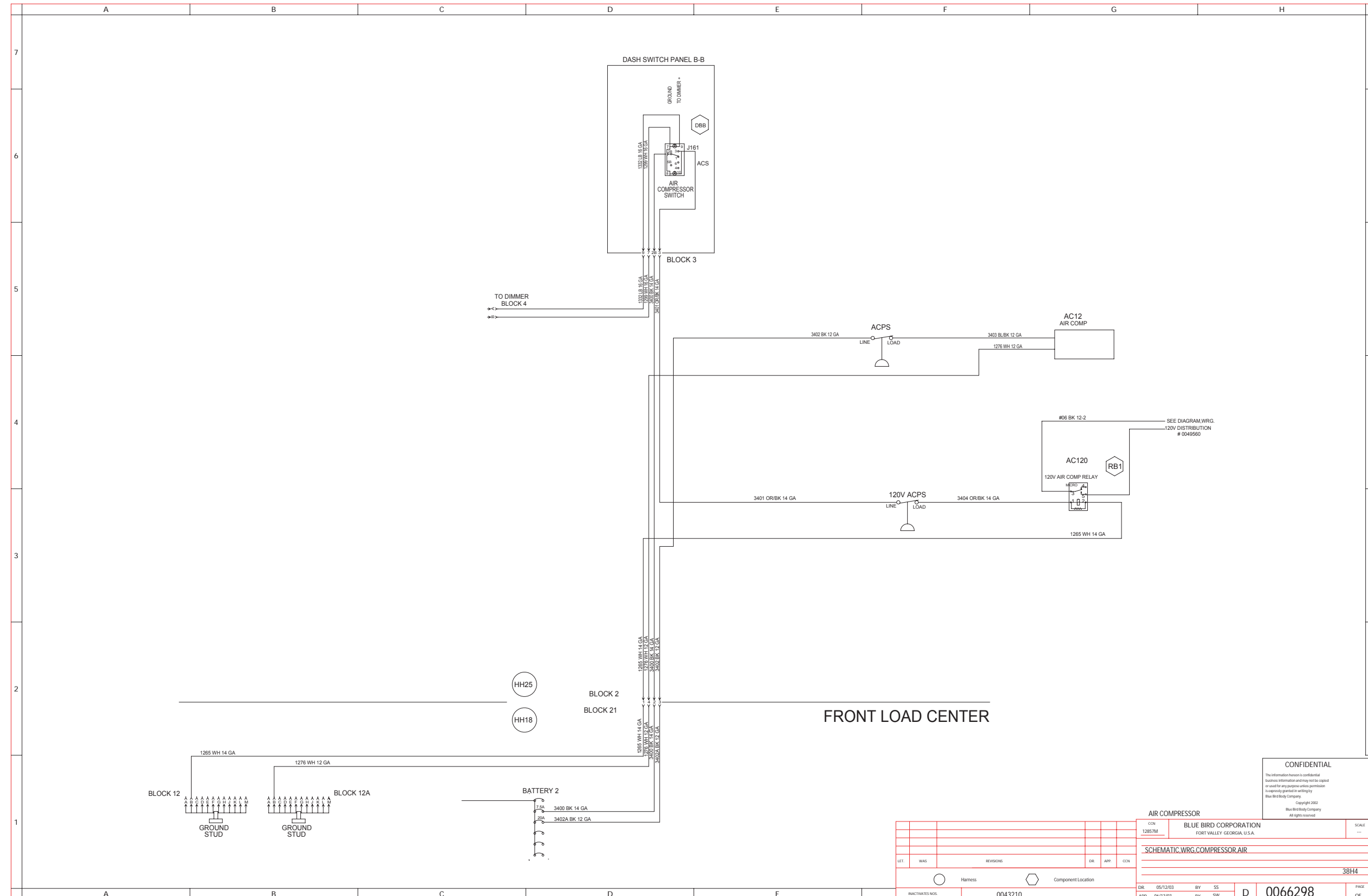
Rear View Mirror Wiring Schematic   Blue Bird Part No. 0066301

| | A | B | C | D | E | F | G | H | |

CHC

RVM   J146,B2

REARVIEW
MIRROR

1123 RD 16 GA
1249 WH 16 GA

2600 BK/RD 18 GA
2601 BK/WH 18 GA

FC

J147,B1

2600 BK/RD 18 GA   A
2601 BK/WH 18 GA   B

MTP

1249 WH 16 GA
1123 RD 16 GA

HH3

BLOCK 3

BLOCK 15

HH18

1123 RD 16 GA

MASTER 4

FRONT LOAD CENTER

1249 WH 16 GA

BLOCK 12

7.5A   1123

GROUND
STUD
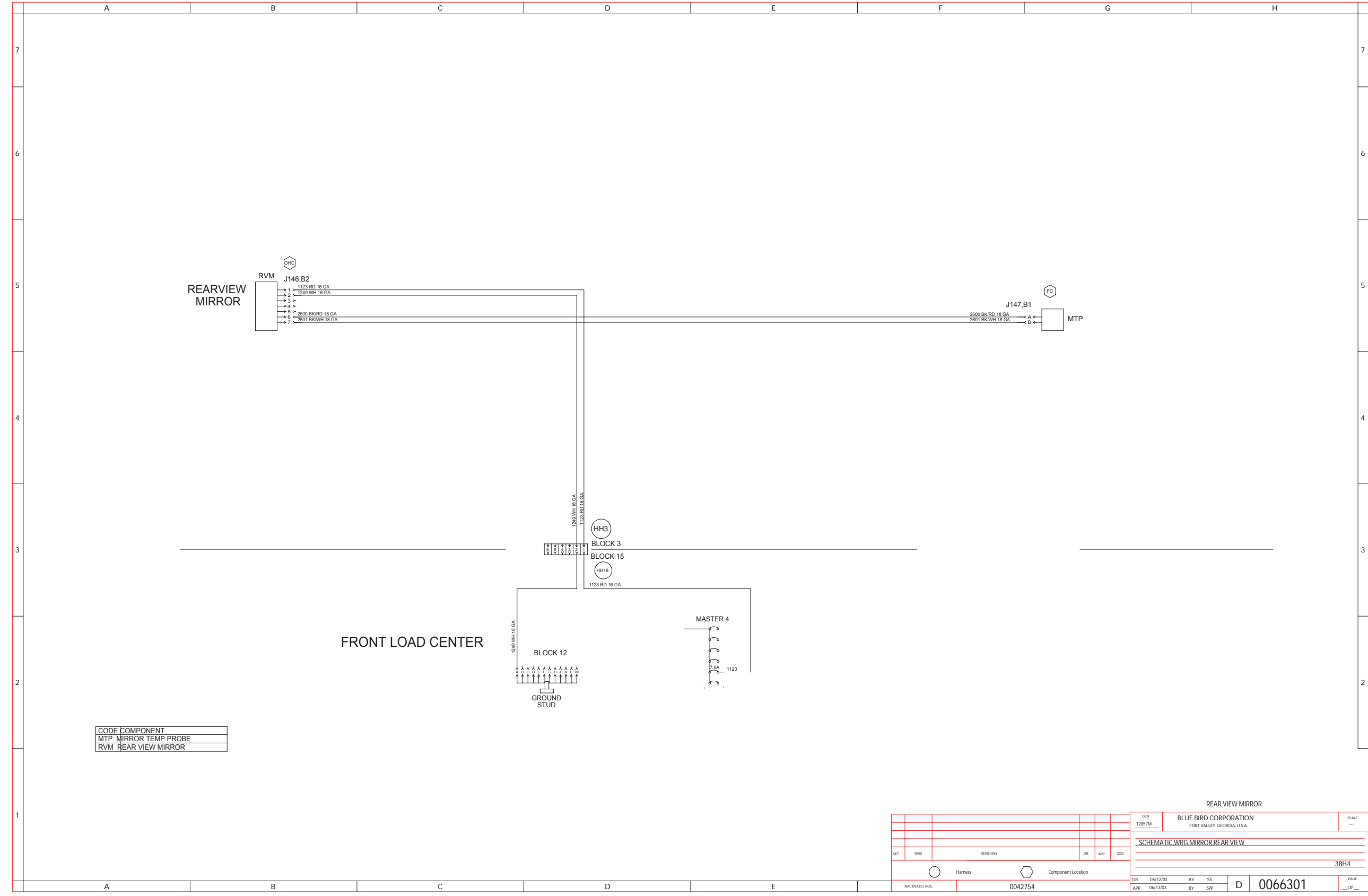
CODE	COMPONENT
MTP	MIRROR TEMP PROBE
RVM	REAR VIEW MIRROR

REAR VIEW MIRROR

| CCN | BLUE BIRD CORPORATION | SCALE |
| 12857M | FORT VALLEY, GEORGIA, U.S.A. | — |

SCHEMATIC,WRG,MIRROR,REAR VIEW

38H4

| LET. | WAS | REVISIONS | DR. | APP. | CCN |

Harness   Component Location

| DR. | 05/12/03 | BY | SS | | | |
| APP. | 06/13/03 | BY | SW | D | 0066301 | _OF_ |

INACTIVATES NOS.   0042754

Musical Horn Wiring Schematic   Blue Bird Part No. 0066302

DRIVER'S LH OVERHEAD

MHD

DIGITAL DISPLAY ASSY

7'BLUE RIBBON CBL (VENDOR SUPPLIED)

HMH

MUSICAL HORN MODULE

LH SPEAKER

RH SPEAKER

P165

LH CH+	BN	3501 BN 14 GA
LH CH-	GN/WH	3502 WH/LT GN 14 GA
+12VDC	RD	3500A RD/BK 14 GA
GRD	WH	1278A WH 14 GA
RH CH-	WH/YL	3503 WH/YL 14 GA
RH CH+	YL	3504 YL 14 GA
LED READOUT DIMMER	OR	1333ZZ LT BL 16 GA

100000µF 16V
C1
T1 T2

1278 WH 14 GA
3500 RD/BK 14 GA

HH177

HH18

P167

FRONT LOAD CENTER

ON — HORN PWR SW FEED — OFF — PLAY SW FEED — PLAY — UP — SELECT SW FEED — DN

RD — WH — RD — WH — DK BL — PU — WH — GN

J166

3506 RD 14 GA
3505 WH 14 GA
3507 RD 14 GA
3508 WH 14 GA
3509 DK BL 14 GA
3511 PU 14 GA
3510 WH 14 GA
3512 DK GN 14 GA

1278 WH 14 GA

3500 RD 14 GA

GROUND STUD   BLOCK 12A

MASTER 3

MASTER POWER

10A   3500

TO GROUND   1208TT WH 16 GA
TO DIMMER   1333TT LT BL 16 GA

1333WW LT BL 18 GA
1208WW WH 18 GA

1208YY WH 18 GA

1333YY LT BL 18 GA

1333ZZ LT BL 16 GA

J162
MUSICAL HORN POWER SWITCH MHPS

J163
MUSICAL HORN PLAY SWITCH MHPL

J164
MUSICAL HORN SONG SELECT SWITCH MHSS

NOTE: SWITCHES LOCATED IN ARMREST SWITCH PANEL.

LET	WAS	REVISIONS	DR	APP	CCN

CCN 12857M

BLUE BIRD CORPORATION
FORT VALLEY, GEORGIA, U.S.A.

SCALE

SCHEMATIC,WRG,HORN,MUSICAL

38H4

INACTIVATES NOS.   0049118

DR   06/12/03   BY   SS
APP 06/13/03   BY   SW

D   0066302

PAGE ___OF___

Pilot/Co-Pilot Seats Wiring Schematic   Blue Bird Part No. 0066303

PS
PILOT
SEAT   CP

3300C BK 12 GA   B1
1264C WH 12 GA   2

COPS
CO-PILOT
SEAT   CP

3395 BK 12 GA   B2
1295 WH 12 GA

1284C WH 12 GA

3300C BK 12 GA

HH27   B3
HH18   B18

B3
B18

B3
B18

3 4   5 6

SPARES

1264 WH 12 GA

B12   J

3300 BK 12 GA

1295 WH 12 GA
3395 BK 12 GA

BATTERY 3
BATT

20A

B12A   G

FRONT LOAD CENTER

BATTERY 1
BATT   20A   3395 BK 12 GA

PILOT/CO-PILOT SEATS

CCN
1285?M   BLUE BIRD CORPORATION
FORT VALLEY GEORGIA, U.S.A.   SCALE
—

SCHEMATIC,WRG,SEATS,PILOT/CO-PILOT

38H4

LET   WAS   REVISIONS   DR   APP   CCN

Harness   Component Location

INACTIVATES NOL   0043192

DR   05/13/03   BY   SS
APP   06/13/03   BY   SW   D   0066303   PAGE
__OF__

Hydronic Heat Wiring Schematic   Blue Bird Part No. 0066335

HYDRONIC HEAT SYSTEM

BLUE BIRD CORPORATION
FORT VALLEY, GEORGIA, U.S.A.

SCHEMATIC,WRG,HEAT,HYDRONIC,HURICANE

0066335

FRONT LOAD CENTER

Coach Front and Rear A/C Control Wiring Schematic   Blue Bird Part No. 0066363
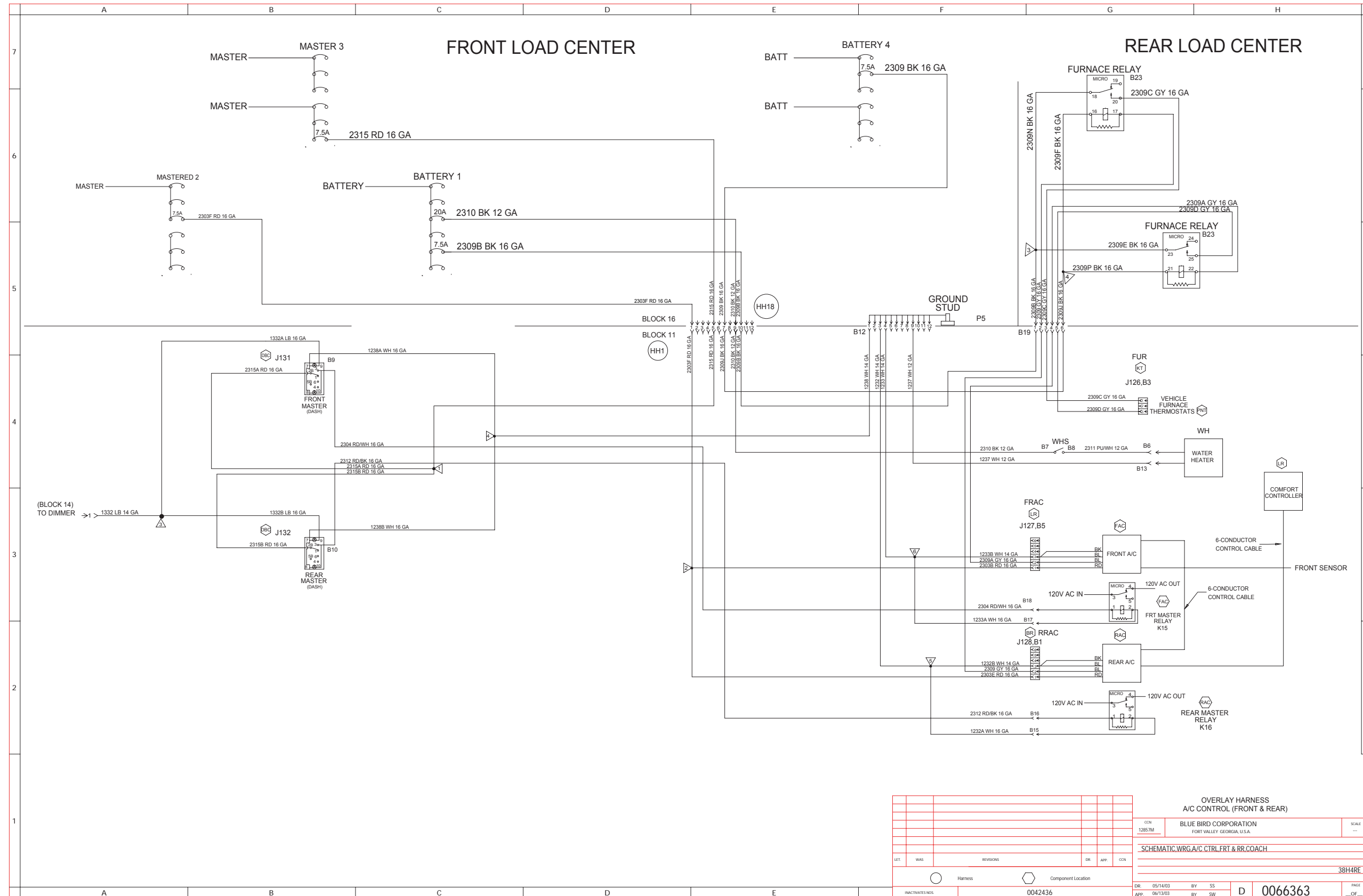
OVERLAY HARNESS
A/C CONTROL (FRONT & REAR)

BLUE BIRD CORPORATION
FORT VALLEY, GEORGIA, U.S.A.

SCHEMATIC,WRG,A/C CTRL FRT & RR.COACH

38H4RE

D 0066363

LP Gas/CO Detectors Wiring Schematic   Blue Bird Part No. 0066713

Water Shut-Off Sen/VLV Wiring Schematic   Blue Bird Part No. 0066714

Water Tank Monitor Wiring Schematic   Blue Bird Part No. 0066715

Generator Switches Wiring   Blue Bird Part No. 0066774
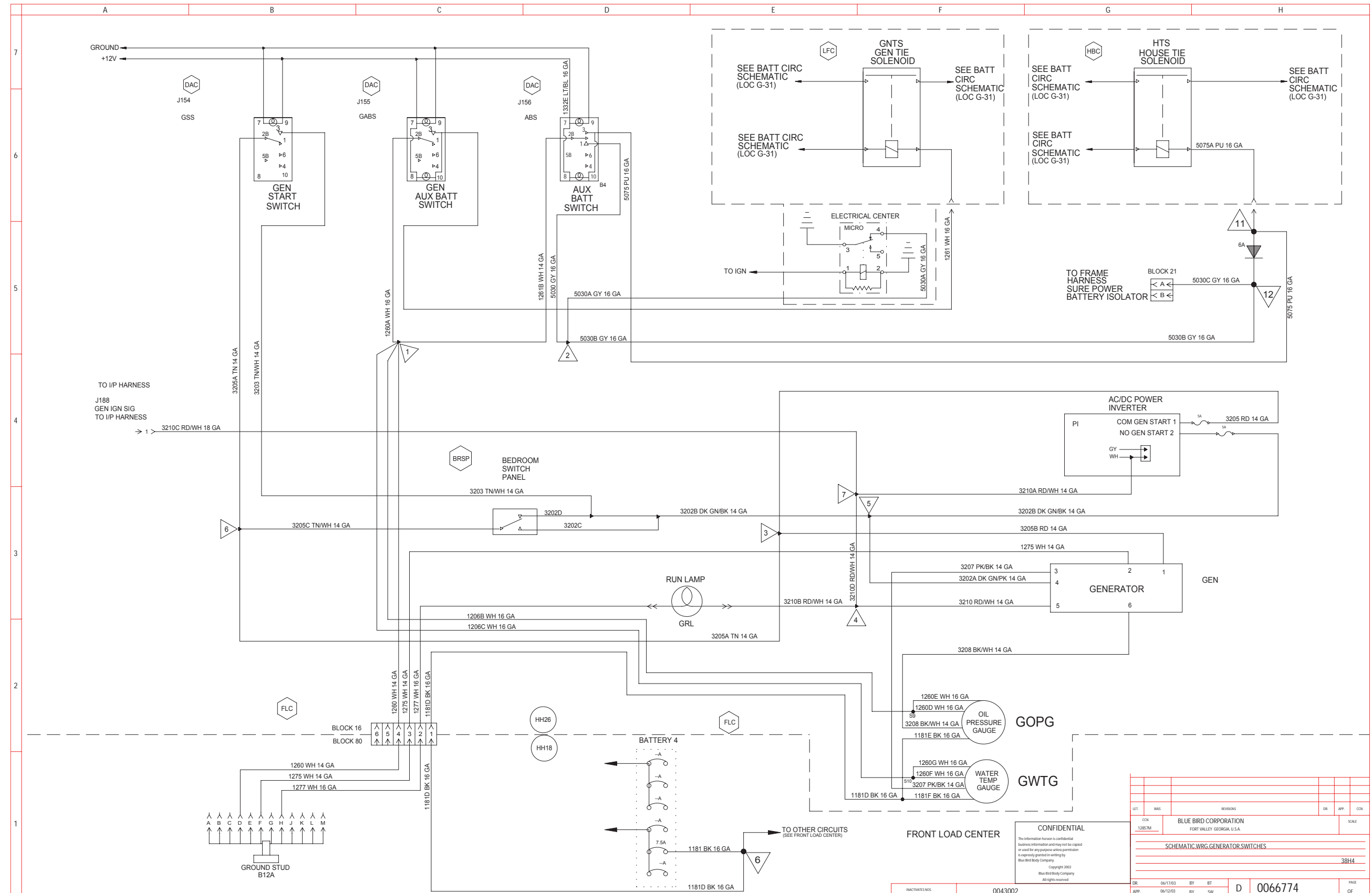
Bay Heaters Wiring Schematic   Blue Bird Part No. 0066909

SCHEMATIC, WRG, BAY HEATERS

BLUE BIRD CORPORATION
FORT VALLEY GEORGIA, U.S.A.

38H4

D   0066909

Audio Video Wiring Schematic   Blue Bird Part No. 0067396

Audio Video Wiring Schematic   Blue Bird Part No. 0067396   **Exploded View A**

ADD IF OPT 38112-11 SPECIFIED

NOTE 3

DIGITAL
SATELLITE
RECEIVER
0053996

TV ANT IN
SAT ANT IN
OUT TO TV
PHONE JACK
A/V OUT
120VAC

KVH
SATELLITE
DISH 0039398

DISH
POSITIONER

4517033 RG-6

4517033 RG-6

0041533 6FT S-VIDEO

PHONE
JACK
3881869

4018198

RE-ROUTE CABLES TO A/V IN
ON PLASMA TV AND USE 0041533 CABLE.
(OPT 38105-10)

FRONT
TV
IN FROM ANT

4517033 RG-6

0041533 6FT S-VIDEO

A6

PANASONIC 37" PLASMA DISPLAY
TH-37PWD4UZ

0052425

120VAC, 2.46A
295W

RS-232
9-PIN

PC VIDEO IN
15-PIN
PC AUDIO IN

V/G PCB PCR HD VD

COMPONENT
& RGB IN

AUDIO IN

S-VIDEO
VIDEO
AUDIO

A/V IN

LEFT SPKR
RGT SPKR

OPTION 38105-10 PLASMA TV

A5

SIMA
4X2
SELECTOR
SVS-4D
0052415

GAME PORT
OR OTHER
A/V DEVICE

IN-4

IN-3

IN-2

IN-1

OUT-A

OUT-B

0041533 6FT S-VIDEO

0041533 6FT S-VIDEO

0041532 3FT S-VIDEO

0041533 6FT S-VIDEO

120VAC, 63mA
15VDC, 500mA

RCA PLUG TO JACKS
#0067317

A3

PANASONIC
VCR
PVS4821
0052439

IN FROM ANT
VHF/UHF
OUT TO TV

A/V IN

A/V OUT

120VAC

4517033 RG-6

4517033 RG-6

0041532 3FT S-VIDEO

0041532 3FT S-VIDEO

A1

WINEGARD
RG-6 SWITCH
0067295

+12V
GND
FROM SAT
FROM ANT
FROM CABLE
FROM VCR
FROM AUX

TO MAIN TV
TO VCR
TO TV 2
(BEDROOM)
TO EXTERIOR TV
(BAY TV JACK)

FROM DVD   DVD OUTPUT
V L R   V L R

AMP
3982956

TV
ANT
0081595

ANTENNA
POSITIONER

4517033 RG-6

4517033 RG-6

CABLE TV
CONNECTION

4517033 RG-6

PHONE JACK
CONNECTION

4018198

4018198

6 FT A/V CABLE
#0067320

50 FT A/V CABLE
#0067318(SINGLE SLIDE)
75 FT A/V CABLE
#0067319(DOUBLE SLIDE)

4517033 RG-6

4517033 RG-6

A4

BOSE
SURROUND SOUND
RECEIVER
AV3-2-1 0051590

BOSE
AM
ANTENNA

AM-IN

OPTICAL

VIDEO
1

AUDIO 0067320

BOSE
FM

RCA PLUG TO JACKS
#0067317

RE-ROUTE RG-6 CABLE
TO SATELLITE RECV.
WHEN OPT 38112-29 IS USED.

4517033 RG-6

VCR/DVD COMBO
PVDD4742
0051338

OUT TO TV
VHF/UHF OUT
IN FROM ANT

A/V IN

A/V OUT

120VAC

4517033 RG-6

50 FT A/V CABLE
#0067318(SINGLE SLIDE)
75 FT A/V CABLE
#0067319(DOUBLE SLIDE)
(FROM FRONT)

DO NOT CONNECT
A/V CABLE IF OPTION
38112-29 IS SPECIFIED
NOTE: DO NOT USE AUDIO
WYE ADAPTORS AT SIMA
AUDIO OUTPUT B

0041533 6FT S-VIDEO

BEDROOM
TV
IN FROM ANT

IN

0041533 6FT S-VIDEO

Audio Video Wiring Schematic   Blue Bird Part No. 0067396   **Exploded View B**

BOSE FM ANTENNA

FM-IN

AUDIO INPUT

1
VIDEO 2
AUX

AUDIO 0067320

AUDIO OUTPUT B

VIDEO INPUT

VIDEO OUTPUT

AUDIO OUTPUT

0041533 6FT S-VIDEO

SPEAKERS

LEFT FRONT

SURROUND SPEAKERS

RIGHT FRONT

ACOUSTIMASS MODULE
120VAC, 2A
240W

A/V WIRING DIAGRAM FOR
OPTIONS 38112-29

NOTE 3

SATELLITE RECEIVER
0053996

TV ANT/ CABLE IN

SA ANT IN

OUT TO TV

PHONE OUT JACK

A/V OUT

120VAC

SIMA
4X2
SELECTOR
SVS-4D
0052415

IN-4

IN-3

IN-2

IN-1

120VAC, 63mA
19VDC, 500mA

OUT-A

OUT-B

0041533 6FT S-VIDEO

0041533 6FT S-VIDEO

0041533 6FT S-VIDEO

BEDROOM TV

IN

4517033 RG-6

VHF/UHF INPUT

4517033 RG-6

4517033 RG-6

LEGEND:
S: S-VIDEO
V: COMPOSITE VIDEO
L: LEFT AUDIO
R: RIGHT AUDIO

SUBWOOFER

PHONE JACK
3881869

4018198

VCR/DVD COMBO
PVDD4742
00524142

VHF/UHF IN

VHF/UHF OUT

A/V OUT

0041533 6FT S-VIDEO

A/V IN

0041533 6FT S-VIDEO

120VAC

BAY TV JACK

4517033 RG-6

4517033 RG-6

4517033 RG-6

NOTE 1:   SIMA 4x2 SOURCE SELECTOR HAS S-VIDEO, COMPOSITE VIDEO, AND LEFT
           & RIGHT AUDIO INPUTS AND OUTPUTS FOR EACH CHANNEL. THIS SELECTOR
           SENSES VIDEO INPUT SOURCE SIGNAL AND AUTOMATICALLY SWITCHES TO THE
           MOST RECENT INPUT SIGNAL. AUTOMATICALLY ADJUSTS SOUND LEVEL. UNIT
           CAN BE CONTROLLED WITH IR REMOTE CONTROLLER.

NOTE 2:   S-VIDEO CONNECTOR-INCREASE CONNECTOR RETENTION FORCE BY PINCHING
           CONNECTOR SHIELD.

NOTE 3:   PROGRAM FRONT SATELLITE RECEIVER REMOTE TO OPERATE ON
           AND THE REAR RECEIVER REMOTE TO OPERATE ON

BLUE BIRD CORPORATION
FORT VALLEY GEORGIA, U.S.A.

SCHEMTIC,WRG AUDIO/VIDEO

SCALE   NONE

H4RE

REVISIONS

DR. 06/09/03 BY BT
APP. 07/21/53 BY SW

E   0067296

INACTIVATES NOS.   0051798

Fuel Compartment ISL03 Wiring Schematic   Blue Bird Part No. 0067837