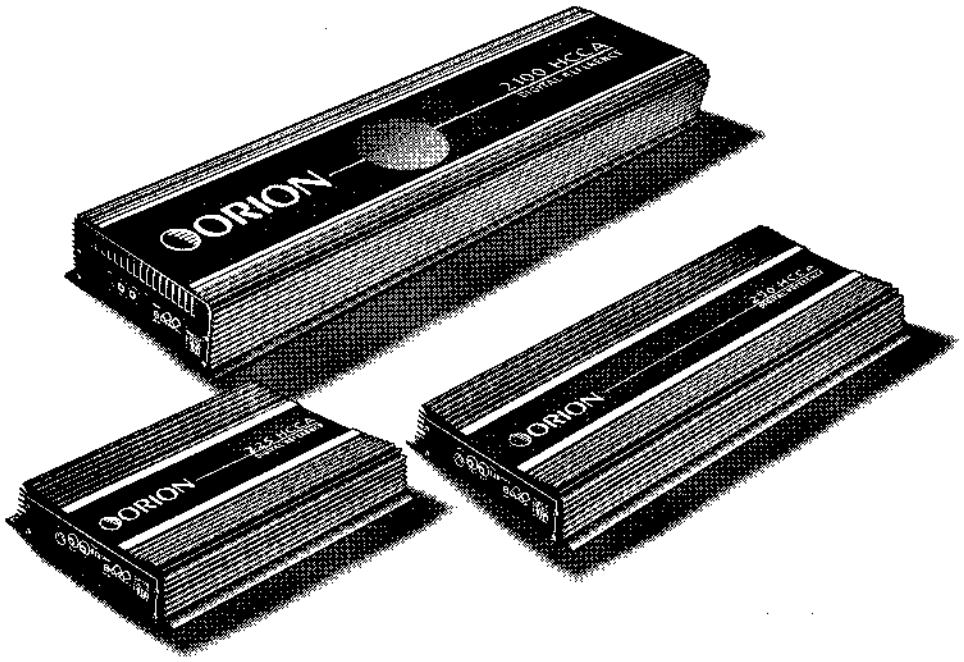
INSTALLATION MANUAL

Orion HCCA Series

POWER AMPLIFIERS



ORION

CONTENTS

INTRODUCTION

Congratulations! You have purchased the finest car audio power amplifier available on the market today. ORION power amplifiers are superbly crafted and precision calibrated, and they offer the utmost of ease in installation. Be assured that this superbly-built amplifier was thoroughly tested prior to you purchasing it, and it is ready for the most demanding of situations. This amplifier has passed an extensive five-step quality control inspection, culminating in a two hour "burn-in" under actual operating conditions. If it had failed, it would never have left our manufacturing facility.

To aid you in enjoying this premium product, please take a few moments to read through this manual before installing the amplifier in your new or existing system. Once the amplifier is carefully installed and you listen to it for the first time, you will be astonished at its sound quality and power.

All HCCA Series amplifiers contain the following built-in features:

- Full frequency, Bi-Polar, Class AB output for full, clean reproduction at all frequencies without any compromise.
- Localized feedback design for extremely fast transient response and reduction of harmonic and intermodulation distortion.
- Parallel RCA and DIN inputs provide considerable versatility for interconnections.
- Each amplifier contains a ±15 volt power supply which provides phantom power for ORION accessories. This ensures maximum dynamic performance from all accessories. Power supplies are protected against low voltage or excessive current.
- Bridging capabilities for mono and mixed mono installations.
- A single variable input sensitivity control with left and right channel peak indicators for precise level matching of head unit outputs to amplifier inputs.
- 6 Hz rumble filter to eliminate any inaudible DC offset.
- FET switched 40 dB audio attenuator to reduce turn-on/turn-off "thump".
- Optically isolated remote turn on circuit.
- Massive aluminum heatsink for efficient dissipation of heat.
- A wide variety of accessories are available for flexibility in designing overall audio systems.
- A built-in equalization circuit that can be switched on for an interior-optimized frequency response. The frequency contour is designed to accommodate most car interiors. The bass is boosted at 40 Hz by 15 dB, mid-bass boom is cut at 200 Hz by 4 dB, and high frequencies are boosted by 6 dB at 10 Khz to compensate for the car's sound-deadening upholstery, in order to produce a brighter sound.
- Left and right peak indicators. Used in conjunction with the input sensitivity control to match the amplifier's peak output to the peak coming from the head unit.

DESCRIPTIONS

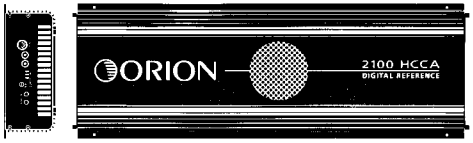
ORION 225 HCCA
STEREO POWER AMPLIFIER
50 WATTS RMS

The ORION 225 HCCA is a stereo power amplifier that provides 25 watts per channel. In customized systems, the 225 HCCA can be used to drive tweeters, mid-range, midbass and subwoofer speakers in multiple amplifier applications. It will deliver 100 watts into a 4 Ohm mono load, 200 watts into a 2 Ohm mono load, and 400 watts into a 1 Ohm mono load.

ORION 250 HCCA
STEREO POWER AMPLIFIER
100 WATTS RMS

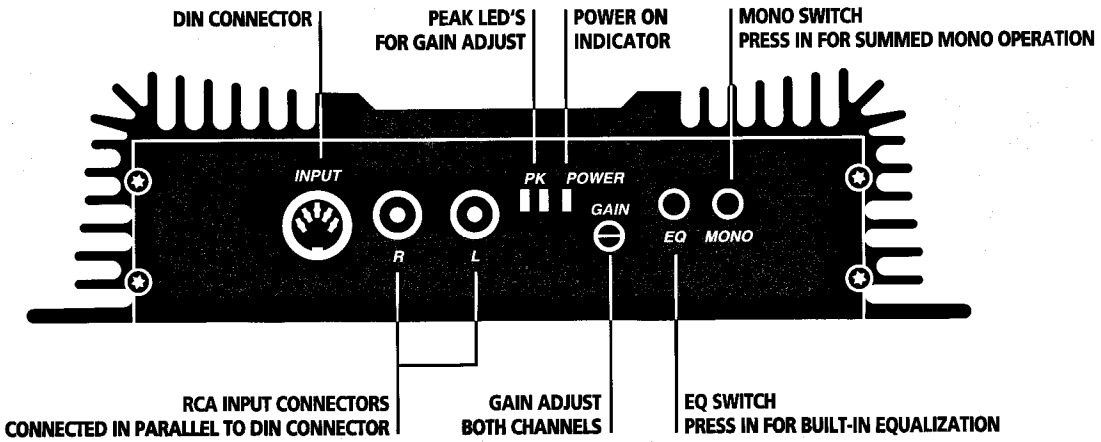
The ORION 250 HCCA is a stereo power amplifier that provides 50 watts per channel. It is an excellent choice for moderate listening systems where you want full range with smooth highs and rich, tight bass. This amplifier is also capable of operating in the mixed-mono three channel mode described on page 15. In larger high-end or competition systems, it can be used to run mono on a single 4 ohm subwoofer, or used in stereo for midbass, midrange or tweeters. The 250 HCCA will deliver 200 watts into a 4 Ohm mono load and 400 watts into a 2 Ohm mono load.

ORION 2100 HCCA
STEREO POWER AMPLIFIER
200 WATTS RMS



The ORION 2100 HCCA is a stereo power amplifier that provides100 watts per channel. It has been designed for only the most serious of audiophiles or competitors. This amplifier delivers an incredible 800 watts into 1 ohms in mono mode.

INPUT PLATE


DIN CONNECTOR
PEAK LED'S FOR GAIN ADJUST
POWER ON INDICATOR
MONO SWITCH PRESS IN FOR SUMMED MONO OPERATION
INPUT
PK
POWER
GAIN
EQ
MONO
R
L
RCA INPUT CONNECTORS CONNECTED IN PARALLEL TO DIN CONNECTOR
GAIN ADJUST BOTH CHANNELS
EQ SWITCH PRESS IN FOR BUILT-IN EQUALIZATION

INSTALLATION

This section details the mechanical and electrical procedures you'll need to perform the installation of your ORION amplifier. Take a moment to look over the list of precautions, tools and additional parts needed to successfully complete the job.

GENERAL PRECAUTIONS

Before installation, make sure you pick a location that will provide adequate ventilation around the amplifier. The ORION amplifier has massive heatsink fins to couple generated heat to surrounding air space via thermal conduction. However, if the amplifier is mounted in a tight space without any air movement, over time the amplifier can damage itself, in spite of its thermal protection circuits.

Therefore, we recommend that you mount the amplifier flat on the floor under the front seat or in the front of the car trunk (under the rear deck plate). Remember, heat travels up away from the heatsink fins. In addition, please observe these precautions:

CAUTION: THE EXTERIOR OF THE AMPLIFIER GETS HOT AND MAY BURN YOUR SKIN.

- Do not touch the amplifier during operation.
- Do not mount the amplifier on a plastic surface or other low combustion point material. The heat generated by the amplifier during operation will melt plastic and may scorch or even burn some materials.
- Do not place a glass or metal cover over the top of the amplifier unless you have a cooling fan at one end.
- Direct cool air along the length of the fins, rather than across them, for the most efficient cooling. Remember, any moving air will dissipate heat.

REQUIRED TOOLS

- Electric drill/drill bits
- Utility knife
- Phillips and flathead screwdrivers
- Pliers (standard and needle nose)
- Wire cutters/strippers
- Wire crimping tool
- Wire brush and emery sandpaper (for metal)
- Rubber grommets
- Heat shrink tubing
- Soldering iron and solder
- Nylon tie wraps
- Volt/Ohm meter (VOM or DVM)
- Felt-tip pen or spring loaded center punch tool

REQUIRED PARTS

The following parts are packed with the 225 HCCA, 250 HCCA:

- Female speaker plug pigtail harness
- External fuse pigtail assembly
- Fast blow fuse
- Butt splice
- 20 feet of Wired 10 Gauge Power Cable (red jacket)
  NOTE: The 250 HCCA gets 8 gauge
- 20 feet of Wired 18 Gauge (blue jacket) stranded copper wire
- Four metal, self tapping Phillips screws

The following parts are packed with the 2100 HCCA:

- Fused female speaker plug pigtail harness
- Circuit Breaker
- Two 2 ft. sections of Wired 4 Gauge Power Cable (red jacket)
- 2 feet of Wired Ground Cable
- 4 metal, self-tapping Phillips screws

OPTIONAL PARTS

Wired carries everything you need to complete your car audio system. Visit your ORION dealer and check out genuine Wired Installation Accessories.

- MBR 70 Multiple Battery Regulator
- Modular Power Distribution (POWER BLOCKS)
- Modular Fuse Holders (POWER BLOCKS)
- Speaker Cable
- Power Cable, Ground Cable
- Battery Terminals
- Audio Interlink Cables (RCA & DIN)
- Passive Crossovers
- Raw Crossover Components
- Automotive Carpet, Vinyl & Grill Cloth
- Damping Material
- Cosmetic Integration Accessories

AMPLIFIER WIRING

1. Disconnect the battery negative (-) lead before making any power connections.
2. Reinforce the ground: Ground the battery negative terminal to a metal member to ensure an adequate ground (see Detailed Power Connections).
3. Connect the power cable assembly directly to the positive (+) terminal on the battery. CAUTION: DO NOT connect amplifier to fuse box. Do not use a smaller gauge wire for the hot lead than the size coming out of your amplifier.
4. Use the supplied fuse within 18 inches of the battery.
5. Make sure that all connections are clean and properly secured. Failure to do so may result in damage to the components in the system.
6. Make sure wire enters the vehicle safely. **Always use a grommet when penetrating metal.**
7. Run wire through the vehicle in appropriate areas, try to avoid going near the fuse-box (it can radiate noise into your power wire). Never get power from the fuse box, this will cause a noise problem and in some cases cause electrical problems.
8. Once you have selected the mounting location, mount the amplifier using the four self-tapping screws provided. Tighten screws securely.

Note: The 2100 HCCA contains a cooling fan and air exhaust vents at each end. Do not block the vents or the fan inlet, or the amplifier will not receive adequate ventilation.

CAUTION: DO NOT DRILL INTO THE FUEL TANK, FUEL LINES OR THROUGH ELECTRICAL WIRING!

9. Connect power wire to the second fuse holder supplied with the amp (except 2100, it is internally fused).
10. Ground the amplifier, this is easily done with a #10 self-tapping screw, but only for the 225 and 250 (read section titled Detailed Power Connections on the next page).
11. Make speaker connections. Do not allow the speaker leads to come in contact with each other, or to ground when the amplifier is on. This will cause a noise problem, and may cause internal damage to the amplifier over time.
12. Connect the signal cables to the amplifier.
13. Connect turn-on lead. This wire needs to see 12 volts input to turn on the amplifier.
14. Make necessary gain adjustments (see section System Adjustments on page 10).
15. Make sure the car's electrical system can withstand the new demands you have just placed on it by following directions in the Power Section on page 12.

DETAILED POWER CONNECTIONS

225 HCCA

Battery Connections: Always connect the power cable assembly directly to the positive terminal on the battery. Do NOT connect to the car fuse panel. The 225 HCCA amplifier is provided with two fuses. The fuse at the battery is designed to prevent fire or damage to your car should there be a short. The second fuse protects the amplifier itself. Do not substitute fuses.

CAUTION: ALWAYS REPLACE WITH FUSES OF THE SAME FAST BLOW CURRENT RATING AS THOSE SUPPLIED WITH YOUR AMPLIFIER.

Amplifier Remote Control Lead: Connect the remote blue lead to the power antenna or the amp turn-on connection. Do not connect the remote blue lead directly to 12 volts, this will not allow the amplifier to turn off.

250 HCCA

Battery Connections: For most cars, the existing battery and charging system will handle a single 250 HCCA amplifier. If two or more amplifiers are used (or if the headlights dim when the amplifier is cranked up to full power), use two batteries connected with an MBR 70, as shown in Figure 3 on page 18. A heavy duty fuse-holder and fast blow 40 ampere fuse is provided with the amplifier. Install the fuse-holder at the battery positive terminal. Always connect the power cable assembly directly to the battery. Do not connect to the car fuse panel. Always replace the fuse with the same fast blow current rating as the one supplied with the amplifier.

Reinforce The Ground: Ground the battery negative terminal to a metal member to ensure an adequate ground. Install a separate grounding kit for the second battery.

Amplifier Ground Connection: The large black wire must be connected to a welded chassis member. Do not lengthen the ground wire. If more than one amplifier is used, do not use the same ground screw, but always connect both amplifiers to the same metal member as close together as possible. Failure to do this will introduce ground loops and result in a noisy system. It is a good idea to use a large carriage bolt instead of the #10 self-tapping screw. The carriage bolt will assure adequate grounding.

CAUTION: DO NOT EXTEND GROUND WIRE OR RUN GROUND TO THE BATTERY IN A SINGLE BATTERY SYSTEM.

NOTE: The ground connection is one of the most important parts of the installation. The better the ground, the better the amplifier will perform.

2100 HCCA

Battery Connections: Install a separate heavy duty premium battery to service the amplifier. Refer to the 2100 HCCA wiring diagram on the opposite page. Make battery connections as follows:

1. Refer to Detail "A" on this diagram and turn the amplifier upside down.
2. Remove the plastic caps from the setscrew access holes. You may have to rotate the plastic cap so that the notch in the cap permits removal.
3. Using the Allen wrench supplied with the mounting hardware package, loosen booth setscrews enough to permit insertion to the stripped and tinned ends of the black ground cable and red power cable. Insert the black ground cable into the "Battery – " hole and the red power cable into the "Battery +" as far as it will go. Tighten the setscrews just enough to hold the cables firmly.

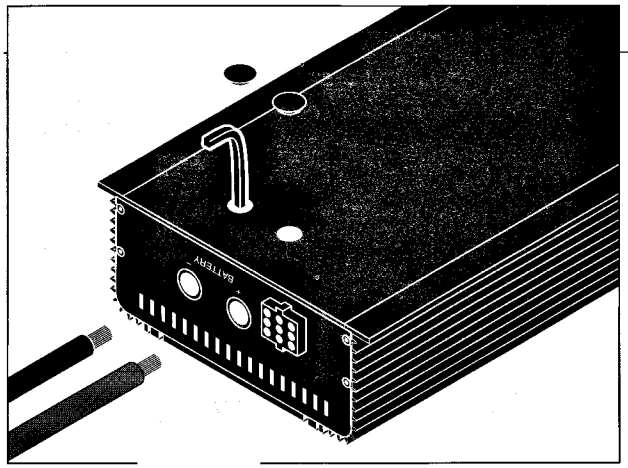
CAUTION: DO NOT OVER-TIGHTEN THE SCREWS. OVER-TIGHTENING MAY STRIP THE THREADS ON THE SCREWS.

4. Replace the plastic caps and turn the amplifier upright.
5. Mount the amplifier and connect the black ground cable to a metal member of the car frame.
6. Install the circuit breaker (supplied) so that the red power cable can be attached with a slight loop in the cable to prevent straining the connections. Connect the red power cable to the fuse-holder, and tighten the attaching screw securely.
7. Connect the small lug on the red battery cable to the fuse-holder and the large lug end to the positive battery terminal.
8. Connect the positive terminal of the rear battery to the engine compartment battery positive terminal. Install a 100 ampere circuit breaker in line as shown in this diagram.

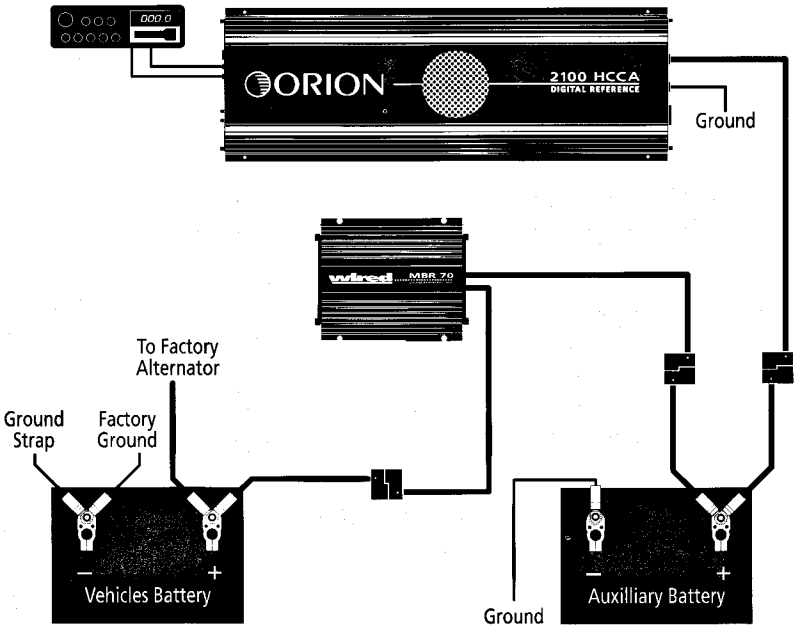
NOTE: Wired battery terminals are designed for this type of installation. Heavy-duty fuse-holders (called POWER BLOCKS) are also available from Wired.

9. At both batteries, connect the battery negative terminal to a metal member of the frame to ensure a good ground.
10. Connect the blue remote turn-on/off wire in the speaker cable assembly to the source units power antenna trigger wire.

NOTE: Amplifier On/Off Control: You may connect the remote blue lead to the power antenna or the remote turn-on connections, or install an on/off switch. Hooking the blue lead to constant 12 volts will not allow the amplifier to turn off.


BATTERY

DETAIL A


ORION
2100 HCCA
DIGITAL REFERENCE
Ground
wired
MBR 70
To Factory
Alternator
Ground
Strap
Factory
Ground
Vehicles Battery
Ground
Auxilliary Battery

SYSTEM ADJUSTMENTS

You will get less system noise if you keep the amplifier gain as low as possible. This can be accomplished best with a preamp, such as the 300 PRQ, 300 PHD or 300 PSW.

If there are no accessories (equalizers, crossovers, etc.) used in the system:

1. Turn off all power.
2. If the Bridging Mode is being used, press the Mono switch to the "In" position. If the Bridging Mode is NOT being used, make sure the Mono switch is in the "Out" position.
3. Set the Gain controls on all amplifiers to their minimum position.
4. Turn on the power to the amplifiers. Turn on the radio and set the Volume control to approximately 3/4 volume.
5. Adjust the Gain control on each amplifier until the PEAK indicators just flash on (clipping).
6. Set the Volume control on the radio for desired listening level.
7. If desired, press the EQ switch to the "In" position and re-adjust the Gain control.

If ORION accessories are being used:

1. Turn all power off.
2. Set the gain controls on all amplifiers to their minimum positions.
3. Set all frequency controls on the 300 PRQ Equalizer to flat response (dots in top center position). If a 300 PHD or 300 PSW is being used, set both frequency controls, and the boost/cut controls to the center position.
4. If a 300 PRQ, PHD or PSW is being used, set both input controls to minimum (fully counterclockwise) and the volume control to maximum (fully clockwise).
5. Turn on power to amplifiers. Turn on the radio and set the Volume control for approximately 3/4 volume.
6. If a pre-amp is being used, adjust each input gain control until the PEAK indicators on the amplifiers just start to flash (clipping). If the input gain controls on the pre-amp do not produce full volume, increase the gain setting of each amplifier as required to cause the PEAK indicators to flash. Decrease the setting of the Volume control on the 300 PRQ to desired listening level.

CAUTION: BE SURE TO TURN OFF THE POWER WHEN DISCONNECTING AND RE-CONNECTING CABLES.

7. If a 200 CRX Active Crossover is installed in the system, unplug the cable from the low output and adjust the HIGH FREQ. control to where the mid-range and highs sound best. Then plug in the low output cable and unplug the high output cable. Using the Low Frequency control, adjust the lows until it sounds good to you. Now plug in the high output and make minor adjustments to suit your taste.

If a 300 CRX 3-way Active Crossover is installed in the system, proceed as follows:

a. Unplug the cables from the Mid Out and High Out connectors and adjust the Low Pass control until the lows from the subwoofers sound good to you.

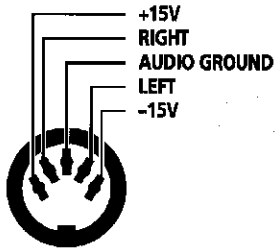
b. Unplug the cable from the Low Out connector and plug in the High Out cable. Adjust the High Pass control to where the highs from the tweeters sound best.

c. Unplug the cable from the High Out connector and plug in the Mid Out cable. Adjust Mid Pass controls until the instruments and voice sounds delivered by the mid-range speakers sound the fullest. Use the left-hand Mid Pass control to adjust the low end and the right-hand Mid Pass control to adjust the high end.

d. Now plug in the High Out and Low Out cables and make minor adjustments to suit your taste.

Note: Ideally, the Low Out should be adjusted to permit the subwoofers to reproduce all frequencies of 100 to 150 Hz and below. The High Out should be adjusted to permit the tweeters to reproduce only frequencies of about 4 kHz and above. The Mid Out should be adjusted to pass a band of frequencies of about 100 Hz to 4500 Hz. The response of various speakers greatly affects these adjustments, therefore, it is generally always better to trust your ears and simply adjust the various frequency outputs to where they sound best to you.

PHANTOM POWER (±15V) IS SUPPLIED TO ALL ORION ACCESSORIES BY THE AMPLIFIER THROUGH THE DIN CABLE.



POWER SECTION

Before installing your audio system, using a little common sense beforehand can save you a lot of time. Make sure that your car has enough power to service all of the car electrical components (engine, headlights, windshield wipers, air conditioning, etc.) and still provide the power required to supply your audio system at full output.

If you are installing a system containing two 225 HCCA amplifiers, your existing factory electrical system will probably handle your power requirements.

An existing system may handle a 250 HCCA amplifier just fine, but if you install two of these amplifiers, you probably won't be able to run the system at full power very often, especially at night with the headlights on. The best way to handle this problem would be to install a MBR 70 and auxiliary battery(s).

2100 HCCA amplifiers should never be operated on a one battery system. There just is not enough reserve capacity in one battery.

A good way to test your existing electrical system to see if you have enough current to operate your new audio system, is to turn on the dome light and turn your system up to higher levels. If the dome light tends to flicker with the music, you should add an extra battery or batteries.

CAUTION: IF YOU ATTEMPT TO OVERLOAD YOUR EXISTING SYSTEM, YOU WILL BURN OUT THE BRUSHES OR FIELD DIODES IN YOUR ALTERNATOR OR CAUSE DAMAGE TO THE VOLTAGE REGULATOR AND GREATLY REDUCE THE LIFE OF YOUR BATTERY.

GROUNDING AMPLIFIERS

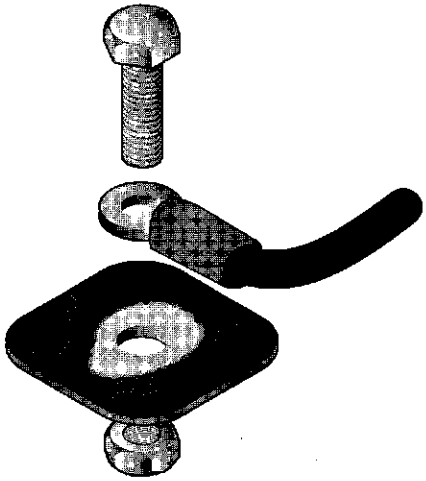
Ground is a term generally used to describe the common connections in an electrical or electronic circuit. The common connection is usually the same potential for all circuits in the system. In cars, the ground is almost always the metal chassis or body and originates at the negative (-) terminal of the battery.

Electromagnetic interference is a combination of electric and magnetic fields caused by alternating current (or frequencies) radiating from the wires and being picked up on the signal leads to and from your amplifier. This type of interference may show a popping, bursts of static, or random noise.

A ground connection should have the least possible resistance, which is why we emphasize that the ground wire for an amplifier should be as short as possible (18-inches long maximum). Longer wires add resistance and make the circuit susceptible to ground loops which can result in hum pickup and other electromagnetic interference.

For any audio system, you should install an additional ground from the battery negative terminal to the chassis. Leave the original ground strap connected to the engine. This is used to help eliminate ignition noise.

Ground Connection: The large black wire with the terminal lug must be connected directly to the car chassis not more than 18 inches from the amplifier.



Scrape any paint from the grounding point and clean with sandpaper just before attaching the ground lug. After the ground lug has been securely tightened, cover the bare metal area with paint, under-coating or grease to prevent rust. Do not lengthen the ground wire. If more than one amplifier is used, do not use the same grounding screw, but always connect both amplifiers to the same metal member as close together as possible. Failure to do this will introduce ground loops and result in a noisy system.

NOTE: The ground is every bit as important as the power lead. Many audio system troubles are the result of improper ground connections.

CAUTION: DO NOT GROUND THE AMPLIFIERS AT THE SAME POINT. USE A SEPARATE GROUNDING POINT FOR EACH AMPLIFIER.

SPEAKER CONNECTIONS

IMPEDANCE

The ORION HCCA Series Amplifiers are designed for stereo operation with a minimum load of 1 ohm (The 225 HCCA can be operated as low as 1 ohm mono). For best operation, we recommend using XTREME Series2 Loudspeakers.

SPEAKER CONNECTIONS

Never connect any speaker to the chassis ground. This will introduce ground loops that cause noise in the system.

Never use twisted wire connections. Always make connections using spade insulated butt connections, quick-disconnect connectors or solder connections. If quick-disconnect or solder connections are used, insulate the connections using shrink tubing. Do not use electrician's tape since the adhesive on such tape tends to deteriorate with time and will cause short circuits. Do not route the speaker wires next to any power wires.

Be sure to observe the speaker polarity shown in the figures on pages 16-18. Except as shown in those figures, the yellow wire is right positive and the yellow/black wire is right negative. Also, the orange wire is left positive and the orange/black is left negative.

SPEAKER WIRE

Use substantial wire for speaker connections. We recommend that you use Wired Speaker Cable, at least 16 AWG.

BRIDGING

All HCCA amplifiers bridge the same way. Each amplifier is capable of running in 1, 2, or 3 channel mode.

MONO MODE 1 CHANNEL

To run the amplifier into 1 channel to a subwoofer, push in the mono button. Wire the SOLID ORANGE wire to the positive side of the speaker, and the BLACK WITH A YELLOW STRIPE to the negative.

CAUTION: USE 2 OHM OR HIGHER LOAD (EXCEPT FOR THE 225 HCCA WHICH CAN OPERATE AT 1 OHM) WHEN THE AMPLIFIER IS USED IN THIS CONFIGURATION!!

MIXED-MONO 3 CHANNELS

It is possible to run a mono subwoofer and stereo mids and highs with only one amplifier. The subwoofer will wire exactly the same as listed above. In 3 channel mode the mono button should be in the out position, or disengaged. The stereo mids and highs will be wired in the normal fashion, as illustrated on page 16.

When running the amplifier in 3 channel mode, do not go below a 2 ohm load (except for the 225 HCCA which can operate at 1 ohm) on the sub woofer, and a 1 ohm load for the mids and highs. Also, be sure to use appropriate passive crossovers (see mixed-mono operation diagram on page 16).

CAUTION: IF INCORRECT, OR NO PASSIVE CROSSOVERS ARE USED, THE AMPLIFIER WILL SEE TOO LOW OF AN IMPEDANCE AND EVENTUALLY CAUSE INTERNAL DAMAGE.

SYSTEM LAYOUT

It's important that you decide what you're trying to achieve. Car audio systems can vary from merely upgrading your existing factory installation to multi-amplifier systems that include external equalizers, crossover modules, and a variety of loudspeakers. By studying these diagrams, you will see that you can start with a relatively simple system that can gradually grow by adding additional components as your needs change.

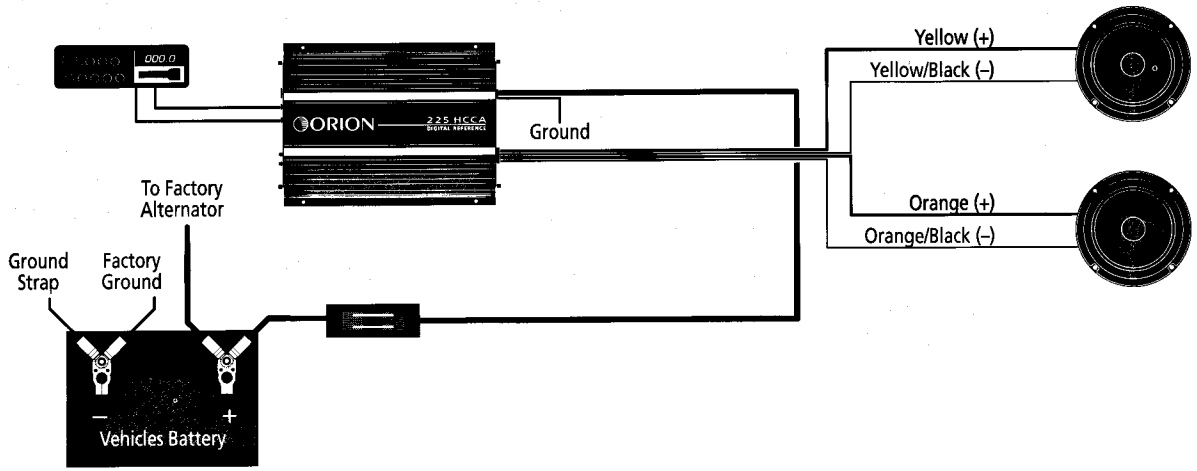


FIGURE 1 — USING EXISTING SPEAKERS
If you want a good performances systems without having to install special speakers in your car, a single 225 HCCA will do an excellent job for you. The built-in equalization should noticeably improve the overall sound. A basic single amplifier system is shown.

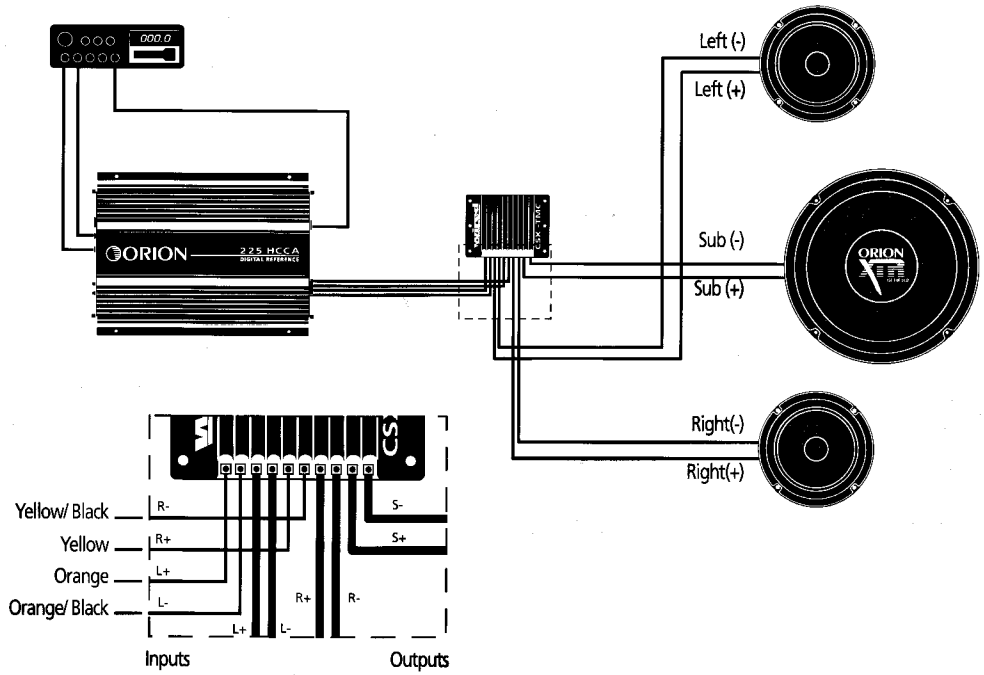


FIGURE 2 — ADDING A SUBWOOFER
For added low frequency impact, you can add a sub woofer to an existing system. An X-sub pre-fabricated sub enclosure with an XTR woofer(s) could be an excellent choice. This system is very easy to configure with the addition of the Wired CSX-TMC. The TMC is a stereo high pass crossover and mono sub woofer crossover all rolled up into one package. When using the CSX-TMC with an HCCA amplifier, simply wire the left and right amplifier outputs to the crossovers left and right inputs. Then wire the crossovers left and right outputs to the left and right speakers, and wire the sub output to the sub woofer. the CSX-TMC is designed to be used with a 4 ohm speaker. In a mixed-mono installation such as this, the mono sub woofer will receive 4 times the rated power of a single channel, while the mid and high frequency drivers will still receive the stereo rated power. This system works well with the built-in equalization engaged because it provides a +15 dB at 40 Hz to boost the bass and -4 dB attenuation at 200 Hz to take away the mid-bass boom.

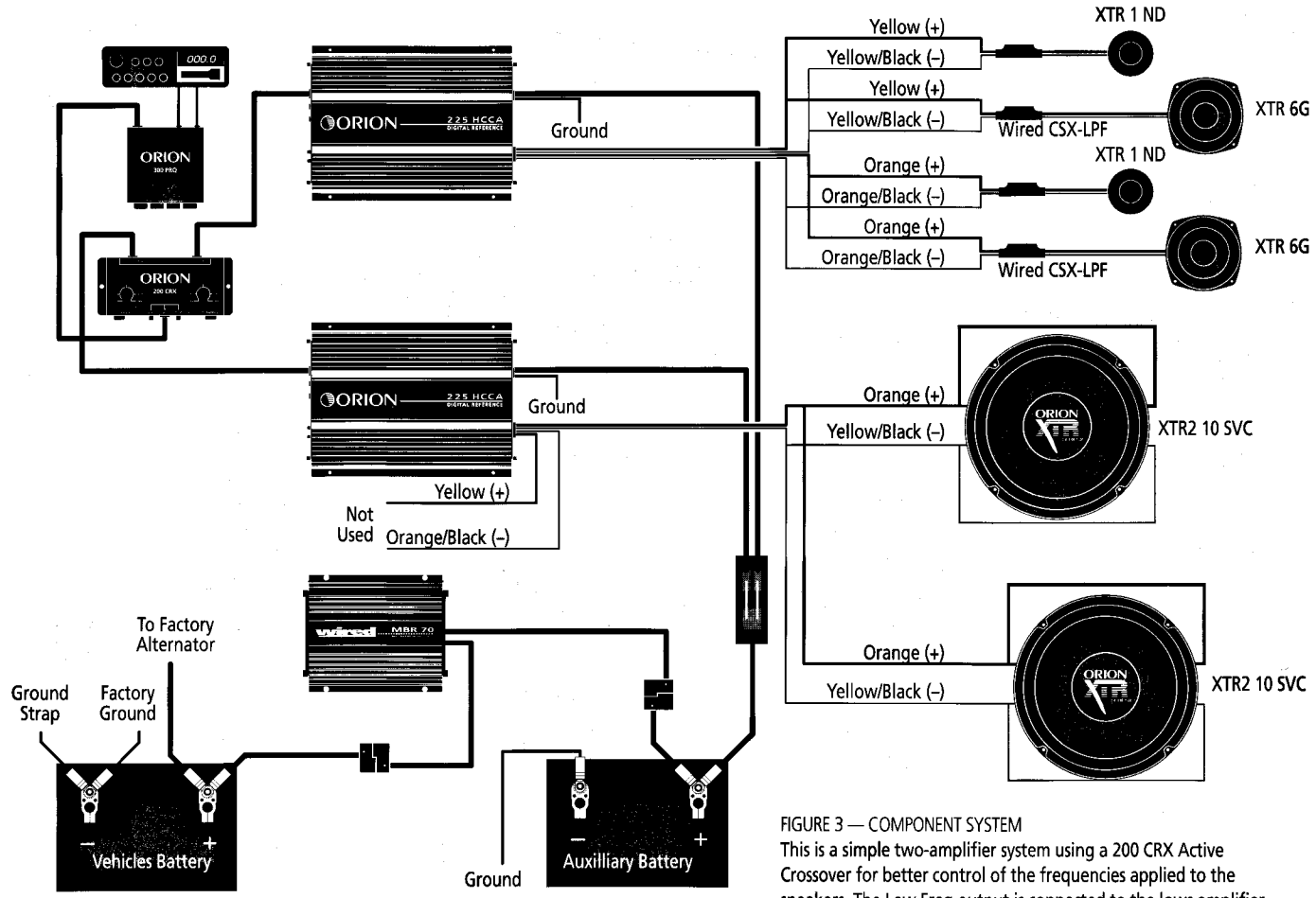


FIGURE 3 — COMPONENT SYSTEM

This is a simple two-amplifier system using a 200 CRX Active Crossover for better control of the frequencies applied to the speakers. The Low Freq output is connected to the lows amplifier to drive the subwoofer, and the High Freq output is connected to the highs amplifier for driving the midrange and highs speakers. This allows you to carefully balance the higher and midrange frequencies with the lows. In practice, overlapping the crossover point slightly results in smooth transitions of sounds delivered to the speakers. For example, the cutoff frequency for lows could be adjusted to 400 Hz. This would mean that all frequencies below 400 Hz would be passed to the lows amplifier at 100% power. The attenuation (reduction in power) is 12 dB which is a reduction in power of about 90%. An octave is a doubling of frequency so that a 800 Hz is only about 10% of the power that would go to the subwoofers. In this example, the high output would be adjusted to pass only frequencies above 300 Hz. This would give you about 100 Hz overlap. Then you could make slight adjustments to provide the sound that pleases you the most. In a system utilizing a lows amplifier to drive the subwoofer, you would probably always want to use the summed mono mode as shown here. Use of the built-in equalization or an ORION accessory equalizer depends on personal taste. If the bass is "boomy" whether or not you use an accessory equalizer, the built-in equalization at the lows amplifier will improve overall performance. This system was designed using two 225 HCCA's. For added power, you could choose a 250 HCCA for the mid/high speakers and a 2100 HCCA for the lows amplifier.

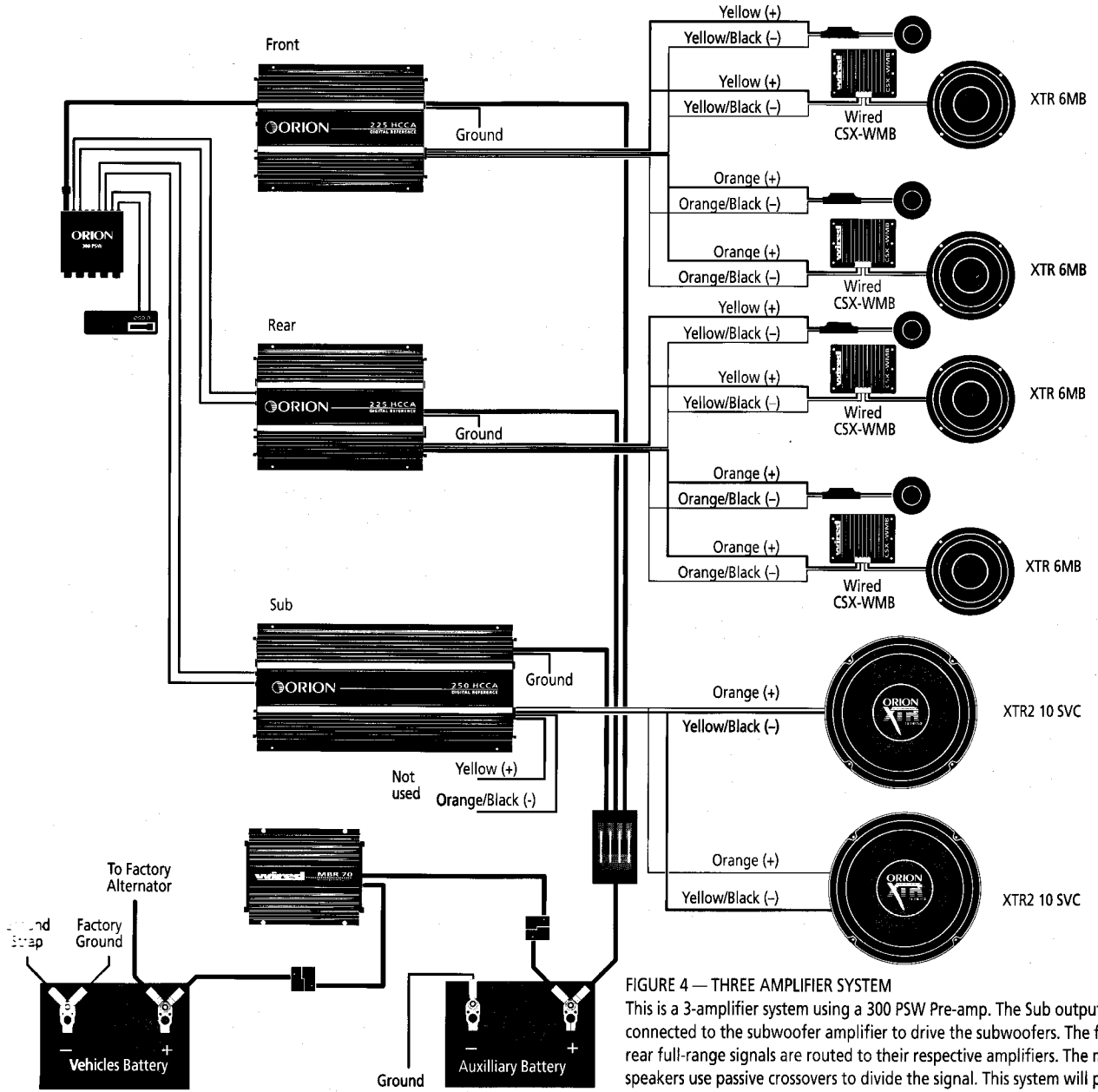


FIGURE 4 — THREE AMPLIFIER SYSTEM

This is a 3-amplifier system using a 300 PSW Pre-amp. The Sub output is connected to the subwoofer amplifier to drive the subwoofers. The front and rear full-range signals are routed to their respective amplifiers. The mid/high speakers use passive crossovers to divide the signal. This system will provide front to rear fading and user-adjustable sub-woofer output. The system as shown would be impressive as a competition system.

TROUBLESHOOTING GUIDE

This section provides you with a catalog of amplifier symptoms and their probable causes and solutions. Before you consult this listing, make sure the vehicle's electrical system is working properly by verifying that other electrical items (e.g. headlights, windows, etc.) still function correctly.

SYMPTOM	PROBABLE CAUSE	SOLUTION
No Audio	Low or no remote turn-on connections	Check remote turn-on voltage at amp and head unit
	Blown Fuse	Replace with new fast-blow fuse
	Power wires not connected	Check butt splices or solder joints; check Ground and Battery connections
	Blown speakers or not connected	Use VOM or DVM to measure speaker coil impedance; check speaker wiring connections
Audio cycles on and off	Thermal Protection Circuits are properly shutting amplifier off each time it gets too hot	Check location for adequate ventilation; check speaker wiring for a short to chassis
Distorted Audio	Input Sensitivity not set properly or damaged speaker cones	See Calibrating Input Sensitivity procedure and check each step; inspect each speaker for damage and repair or replace suspected component
	Low turn-on voltage	Refer to head unit owner's manual
Audio level low	Mute circuit is on	Check electrical system for low voltage; check ground connection
Audio lacks	Speakers wired with wrong polarity, causing cancellation of bass frequencies	Check polarity of wires from amplifiers to each speaker as defined by the system design
External fuse blowing	Incorrect wiring or short circuit	Refer to Electrical Installation and check each installation step
Whining noise on audio with engine running	Amplifier is picking up alternator noise	Install an in-line noise filter on the head units power wire; check alternator diodes or voltage regulator for proper operation; check ground connections
Ticking noise on audio with engine running	Amplifier is picking up radiated spark noise	Check RCA audio cables routes; install an in-line noise filter on the head units power wire; check ground connections

SPECIFICATIONS

Model	225 HCCA	250 HCCA	2100 HCCA
Output Power per channel, all channels driven into 4 Ω @12 V	25 x 2	50 x 2	100 x 2
Distortion maximum at 4 Ω, 20 to 20kHz	0.03%	0.03%	0.03%
Frequency Response ±0.5 dB	6Hz to 30 kHz	6Hz to 30 kHz	6Hz to 30 kHz
Dynamic Headroom	3dB	3dB	3dB
Signal to Noise	110dB	110dB	110dB
Input Sensitivity	150mV to 5 Volts	150mV to 5 Volts	150mV to 5 Volts
Output Load (stereo)	½ Ω to 16Ω	1Ω to 16Ω	1Ω to 16Ω
Idle Current	500mA	500mA	500mA
Current Draw	30 Amps to 35 Amps	35 Amps to 45 Amps	120 Amps
Damping Factor	Greater than 200	Greater than 200	Greater than 200
Slew Rate	30 Volts per µsec	30 Volts per µsec	30 Volts per µsec
Stereo Separation	80dB	80dB	80dB
Bridgeable	Internal Mixed & Summed	Internal Mixed & Summed	Internal Mixed & Summed
Built in Equalization	Yes	Yes	Yes
Size	11" x 8½" x 2¼"	17" x 8½" x 2¼"	23" x 8" x 3⅛"

WARRANTY & SERVICE

ORION Industries, Inc. (hereafter ORION) warrants this product to be free from defects in material and workmanship under the following terms:

PARTS and LABOR are warrantied for a period of 2 years from the date of the first consumer purchase from an Authorized ORION Dealer. Except as specified below, this warranty covers ALL defects in material and workmanship in this product. The following are NOT covered by this warranty:

1. Any product which is NOT purchased from an Authorized ORION Dealer. If you are uncertain as to whether your dealer is authorized, please contact ORION at (602) 730-8200. In countries other than the USA, each distributor warrantees the ORION products which it sells (If product is purchased from a non-authorized dealer, the warranty is 90-days form date of purchase).
2. Any product on which the serial number has been defaced, modified or removed.
3. Damage or malfunction resulting from;
   a. accident, misuse, abuse, unauthorized modification or failure to follow the instructions provided with the product
   b. repair by anyone NOT authorized by ORION
   c. damage due to shipping (these claims must be presented to the freight carrier)
   d. removal or installation of the product
   e. any failure that has NOT been caused by a defect in material or workmanship

This warranty is in effect for the original purchaser only. ORION will pay for labor and material expense for covered items. ORION does not cover removal or installation charges, payment of shipping charges to ORION, payment of OUT-OF-WARRANTY shipping charges, or damage to other property caused by any defects in this product.

For IN-WARRANTY service you must include a copy of the original, dated sales receipt, including serial number, from an Authorized ORION Dealer. Please also enclose your name, return street address (No P.O. Boxes) and a detailed description of the problem.

Exclusion

1. This warranty is in lieu of all other warranties expressed or implied.
2. In no event will ORION be liable for any consequential damages resulting from use of the products or any defect in the product.

This Warranty gives you specific legal rights and you may also have other rights which vary from state to state.

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