ORION™

HIGH PERFORMANCE CAR AUDIO

COBALT ELITE

CEA650.1D

CEA400.4D CEA900.1D CEA1000.5D

CEA600.4D CEA1200.1D

CEA1600.1D

COBALT ELITE CLASS D AMPLIFIERS

proud to be LOUD!

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Thank you for purchasing this Orion product. Orion products are specifically engineered and designed for the mobile audio environment. This manual contains important information about installation, set-up procedures and integrating your new Orion product into your vehicle. With proper care and installation, your new product will provide you with many years of high performance listening enjoyment. We recommend having an Authorized Orion Dealer install your new product for optimal performance. Before installing your new product, please read through the manual to fully understand the application.

Before making any electrical connections, make sure that you disconnect the battery's ground cable to prevent the possibility of short circuits or damage to your electronic equipment. If your vehicle's stereo (head unit) comes with an Anti-theft code, DO NOT disconnect the battery. If you have the access code for the stereo (head unit), please refer to the vehicle's owner's manual.

ATTENTION

FOR ANY QUESTIONS, ISSUES, RETURNS OR WARRANTY

DO NOT contact the retailer, we recommend that you contact our service department for any and all assistance at support@orioncaraudio.com. We will do our best to resolve any problem in a professional and timely manner.

WARNING: This product can expose you to chemicals including DEHP which is known to the State of California to cause cancer, birth defects or other reproduction harm. For more information go to www.P65warnings.ca.gov.

WHAT'S IN THE BOX

1 x Cobalt Elite Amplifier

1 x Remote Gain Control with Cable (Mono & 5-Channel Amps Only)

4 x Mounting Screws

1 x Window Sticker

1 x Owners Manual

1-CHANNEL

CLASS-D AMPLIFIER		CEA650.1D	CEA900.1D
POWER	1-ohm	650W	900W
	2-ohm	500W	650W
	4-ohm	300W	400W
Gain Control		200mV ~ 12V	
Bass-Boost		0dB ~ 12dB	
Frequency Response		15Hz - 250Hz	
LOW PASS FILTER		50Hz ~ 250Hz	
Remote Gain Control		Yes	
S/N Ratio		>-92dB	
T.H.D		0.05%	
Subsonic		15Hz - 40Hz	
Supply Voltage		10v - 16v	
Dimensions (inches)		7.87 x 5.71 x 2.13	8.66 x 5.71 x 2.13

4-CHANNEL FULL-RANGE

ORION CLASS-D AMPLIFIER		CEA400.4D	CEA600.4D
POWER	2-ohm	4CH x 100W	4CH x 150W
	4-ohm	4CH x 60W	4CH x 100W
	4-ohm BRIDGE	2CH x 200W	2CH x 300W
Gain Control		200mV ~ 12V	
Bass-Boost		0dB ~ 12dB	
Frequency Response		11Hz - 30kHz	
HIGH PASS FILTER		50Hz ~ 250Hz	
LOW PASS FILTER		50Hz ~ 250Hz	
Remote Gain Control		No	
S/N Ratio		>-98dB	
T.H.D		0.05%	
Supply Voltage		10V - 16V	10V - 16V
Dimensions (inches)		7.87 x 5.71 x 2.13	8.66 x 5.71 x 2.13

SPECIFICATIONS

1-CHANNEL

CLASS-D AMPLIFIER		CEA1200.1D	CEA1600.1D
POWER	1-ohm	1200W	1600W
	2-ohm	850W	1100W
	4-ohm	500W	650W
Gain Control		200mV ~ 12V	
Bass-Boost		0dB ~ 12dB	
Frequency Response		15Hz - 250Hz	
LOW PASS FILTER		50Hz ~ 250Hz	
Remote Gain Control		Yes	
S/N		>-92dB	
T.H.D		0.05%	
Subsonic		15Hz - 40Hz	
Supply Voltage		10v - 16v	
Dimensions (inches)		9.45 x 5.71 x 2.13	11.02 x 5.71 x 2.13

5-CHANNEL FULL-RANGE

ORION CLASS-D AMPLIFIER		CEA1000.5D	
POWER	1-ohm	Not Supported	1CH x 650W
	2-ohm	4CH x 120W	1CH x 400W
	4-ohm	4CH x 80W	1CH x 250W
	4-ohm BRIDGE	2CH x 240W	Not Supported
Gain Control		200mV ~ 12V	
Bass-Boost		0dB ~ 12dB	
Frequency Response		40Hz - 30kHz	15Hz - 250Hz
HIGH PASS FILTER		50Hz ~ 250Hz	
LOW PASS FILTER		50Hz ~ 250Hz	
Remote Gain Control		Yes	
S/N Ratio		>-95dB	
T.H.D		0.05%	
Subsonic		15Hz - 40Hz	
Supply Voltage		10V - 16V	
Dimensions (inches)		12.17 x 5.71 x 2.13	

CONNECTION OVERVIEW

CEA650.1D

CEA900.1D

CEA1200.1D

CEA1600.1D

CONNECTION OVERVIEW

CEA650.1D

CEA900.1D

CEA1200.1D

CEA1600.1D

CONNECTION OVERVIEW

CEA400.4D

CEA600.4D

CEA1000.5D

CONNECTION OVERVIEW

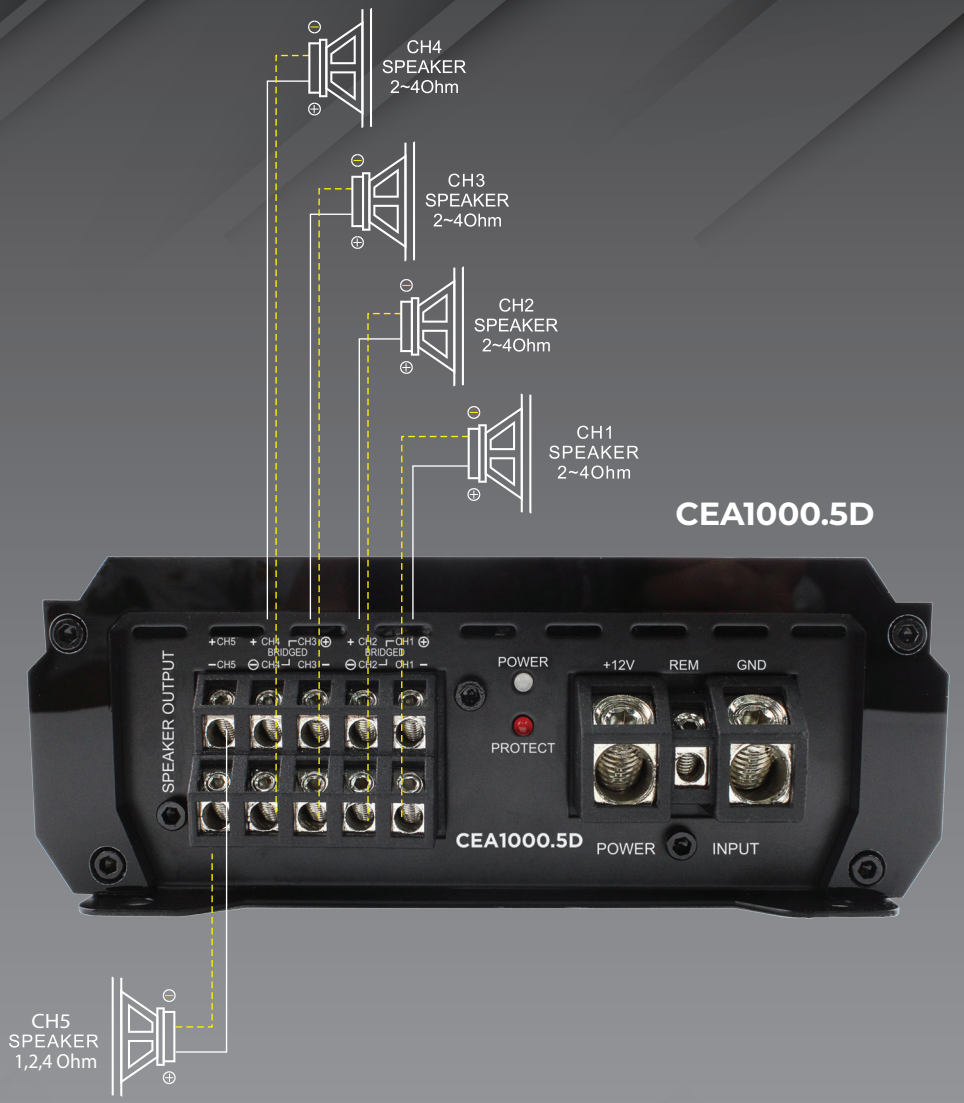
CEA400.4D

CEA600.4D

CEA1000.5D


CH1
SPEAKER
2~4Ohm
CH2
SPEAKER
2~4Ohm
CEA400.4D
BRIDGED
CH1 +
CH2 +
POWER
PROTECT
+12V
REM
GND
SPEAKER OUTPUT
CEA400.4D
CH3 +
CH4 +
POWER
INPUT
CH3
SPEAKER
2~4Ohm
CH4
SPEAKER
2~4Ohm


CH1
SPEAKER
2~4Ohm
CH2
SPEAKER
2~4Ohm
CEA600.4D
BRIDGED
CH1 +
CH2 +
POWER
PROTECT
+12V
REM
GND
SPEAKER OUTPUT
CEA600.4D
CH3 +
CH4 +
POWER
INPUT
CH3
SPEAKER
2~4Ohm
CH4
SPEAKER
2~4Ohm


CH4
SPEAKER
2~4Ohm
CH3
SPEAKER
2~4Ohm
CH2
SPEAKER
2~4Ohm
CH1
SPEAKER
2~4Ohm
CEA1000.5D
+CH5
+ CH4
BRIDGED
+CH3
+ CH2
BRIDGED
+CH1
−CH5
CH4 −
CH3 −
CH2 −
CH1 −
POWER
PROTECT
+12V
REM
GND
SPEAKER OUTPUT
CEA1000.5D
POWER
INPUT
CH5
SPEAKER
1,2,4 Ohm

SPEAKER CONNECTIONS

BRIDGE MODE

CHARGING SYSTEM:
Audio systems with a single amplifier can be supplied by most vehicles electrical systems. Systems with multiple amplifiers or a amplifier that draws extensive amount of current require a higher capacity, battery, alternator or the use of a storage capacitor. We strongly recommend researching the capabilities of the charging system of the vehicle.

This unit is designed for 12VDC operation only. Use speakers with an impedance of 2 or 4-Ohms (1-4 0hms Class-D amps)
Avoid installing the unit where:

- It would be subject to high temperatures, such as from direct sun light or hot air from the heater.
- It would be exposed to rain or moisture.
- It would be subject to dust or dirt.
- If your car is parked in direct sunlight and there is a considerable rise in temperature inside the car, allow the unit to cool off before operation.
- When installing the unit horizontally, be sure not to cover the heatsink fins with the floor carpet.
- If this unit is placed too close to the car radio, interference may occur. In this case, separate the amplifier from the car radio.
- This power amplifier employs a protection circuit to protect the transistors and speakers if the amplifier malfunctions. Do not attempt to test the protection circuits by covering the heatsink or connecting improper loads.
- Do not use the unit with a weak auto battery as its optimum performance depends on a normal battery supply voltage.
- For safety reasons, keep the volume of your car audio system moderate so that you can still hear your surroundings.

If the fuse blows, check the power connection and replace the fuse. If the fuse blows again after replacing it, there may be an internal malfunction. In this case, consult your dealer.

PROTECTION CIRCUIT:
This amplifier is provided with a protection circuit which operates in the following cases when:
The unit is overheated.
The speaker terminals are short circuited.

All cables create interference. The power cable and RCA cable are very prone to interference; the remote cables are less prone. There is often interference caused by the alternator or other car electronic parts. Most of these problems can be eliminated by correct and careful cabling. In doing so, here are some following tips:

- Use only shielded audio cable for the wiring between source unit to amplifier.
- Lay the RCA, speaker and power cables separately from other cables with enough distance from one another. If this is not possible, you can lay the power and remote cable together. RCA and speaker cables should be as far away from power cables as possible.
- Avoid ground loops by laying the ground wiring of all components to a center point in a star-like way. You can find the best central point by measuring the voltage directly at the battery. Now compare this voltage value with the chosen ground point and the (+) terminal of the amplifier. If measured voltage is only slightly different, you've found a good ground point. Otherwise you have to look for another point.
- If there are humming noises, use thicker ground cables or add further ground cables to the chassis.
- To reduce contact resistance and loose contacts please solder the cable ends or use spade terminals that are free of corrosion and have the lowest contact resistance.

NOTE: The addition of a ground wire from the battery to the chassis of the vehicle improves the performance of the power supplied to the amplifier. This is recommended because the current delivery of the factory electrical system was designed only to accommodate electronics supplied by the manufacturer.

WARNING!

* Use the specified amperage fuse. Use of a higher amperage fuse may cause serious damage.
* Using the correct gauge power wire is imperative to the performance of the amplifier. Using power wire that CAN NOT deliver enough current can cause the amplifier to go into protection mode or damage the amplifier or vehicle.
* DO NOT attempt to connect a loudspeaker below the ohm load rated on the amplifier. Damage may occur to the amplifier or loudspeaker.

Before beginning the installation, consider the following:
If you plan to expand your system by adding other components sometime in the future, ensure the adequate space is left, and cooling requirement are met.

Are your components matched? The peak power rating of your speakers must be equal or greater than the amplifier. They also must be 2-8 Ohms impedance for the multi-channel Class A/B or Class H amplifiers and 1-8 ohms impedance for the Class-D Mono-Block amplifier's.

Mounting Your Amplifier
The mounting position of your amplifier will have a greater affect on its ability to dissipate the heat generated during normal operation. This amplifier has ample heat sink dissipation, and is designed with a thermal shutdown circuit (for heat protection). DO NOT enclose the amplifier in a small box or cover it so that air is not able to circulate freely.

Temperature in car trunks have been measured as high as 155 F in the summer time. As the thermal shut down point for the amplifier is 185 F, it is easy to see that it must be mounted in an area that provides for maximum cooling capability. To achieve maximum advantage of convection air flow in an enclosed trunk, mount the amplifier in a horizontal position.

Cooling requirements are considerably relaxed when mounting inside the passenger compartment since the passenger compartment will not allow temperatures to reach a critical point. Floor mounting under the seat is usually satisfactory as long as there is at least one inch of clearance above the amplifier's heat sink for ventilation.

1. Select a suitable location that is convenient for mounting, is accessible for wiring, and has ample room for air circulation and cooling.
2. Use the amplifier as a template to mark the mounting holes. remove the amplifier and drill holes. Remove the amplifier and drill holes. Use extreme caution, inspect underneath surface before drilling.
3. Mount the amplifier using the screws provided.

Caution: Before connecting any wires to the amplifier, disconnect the ground lead from the battery. Leave the ground lead disconnected until you are done wiring the amplifier

POWER & PROTECTION INDICATORS - Provide instant information on status of amplifier, including short-circuit and thermal overload alerts.

RCA INPUT - Accepts Low Level RCA Inputs(200mV-6V) form a head unit, pre amplifier, or equalizer.

RCA OUTPUT - Provides easy connection to additional amplifiers. Note that some OEM stereo head units may sense the attached load and may turn off their speaker outputs if expected load conditions aren't achieved.

POWER CONNECTION - The battery terminal (BATT) must be connected directly to the positive terminal of the vehicle's battery to provide an adequate voltage source and minimize noise. Connecting the battery terminal lead to any other point (such as the fuse block) will reduce the power output and may cause noise and distortion. Use only 10 gauge or thicker wire for this lead and connect it to the terminal of the battery after all other wiring is completed.(A fuse should be connected in-front of the battery no longer then 18" from terminal ring to fuse, for safety precaution).

GROUND CONNECTION - The ground terminal (GND) connection is also critical to the correct operation of the amplifier. Use a wire of the same gauge as the power connection (10 gauge or thicker) and connect it between the ground terminal(GND) of the amplifier and a metal part of the vehicle close to the mounting location. (Ground wire should be no longer then 24" from the amplifier). This wire should be as short as possible and any paint or rust at the grounding point should be scraped away to provide a clean metal surface to which the end of the ground wire can be screwed or bolted down.

REMOTE TURN-ON CONNECTION - The amplifier is turned on by applying +12VDC to the remote turn-on terminal (REM). The wire lead to this terminal should be connected to the "Auto-Antenna" or "Turn-On" lead from the car stereo which will provide the +12V only when the car stereo is turned on (some radio's need a relay to boost the turn-on signal). If the car stereo does not provide an Auto-Antenna" lead, the remote turn-on lead may be wired to an "Accessory" or "Radio"terminal in the car's fuse block. This will turn the amplifier on and off with the ignition key, regardless of whether the car stereo is on or off. The remote turn-on lead does not carry large currents. So 18 gauge wire can be used for this application.

SPEAKER CONNECTIONS - Depending on the type and number of speakers used with the amplifier, wire them to the speaker terminals as per the appropriate wiring diagram. For most applications 18 gauge wire should be used for the speaker leads but in no case thinner than 18 gauge. For leads in excess of 10 feet; 16 gauge is recommended. When wiring the speakers, pay careful attention to the polarity of the terminals on the speakers and make certain they correspond polarity of the corresponding terminals on the amplifier. Do not ground any speaker leads to the chassis of the vehicle.

After the amplifier has been installed and all connections have been made carefully and securely, turn the radio on to check if the amplifier powers up. Now turn up the volume slowly from the source unit. If there is no sound or sound is distorted, turn-off the system immediately and check if all connections have been made correctly and is secured.

GAIN = INPUT LEVEL CONTROL - To adjust the level control, playback a soundtrack that you know very well. When adjusting the gain of the amplifier, turn the volume of your car radio to 2/3 of the maximum volume. Now turn the gain control of the amplifier from “Min” to “Max” direction until you can hear distortions. Then turn the level control a little back to “Min”. The gain control adjustment has now been completed.

Recommendation:
If you are using more then two channels, the adjustments has to be made separately. To accomplish this unplug the RCA inputs for the channels that are not being adjusted at this time while the system is off.

ATTENTION! If you use 2 Ohm speakers in stereo mode. Tri-mode or 4 Ohm speakers in bridge mode and the overload protection is triggered, turn the gain counter clockwise until the operation is playing normally.

X-OVER FREQUENCY CONTROL

Low Pass Filter - When the crossover control is in the Low Pass position, this control becomes active allowing you to select your crossover point.

Example:
If you select 40Hz the amplifier will operate below 40Hz, If you select 300Hz the amplifier will operate below 300Hz.

High Pass Filter - When the crossover control is in the High-Pass position, this control becomes active allowing you to select your crossover point.
1 x (Push button in OUT position) 40Hz-1.25kHz
10 x (Push button in the IN position) 400Hz-12.5kHz

Example:
If you select 40Hz the amplifier will operate above 40Hz, If you select 1.25kHz the amplifier will operate above 1.25kHz.

CROSSOVER SWITCH

- Full: Full range frequency.
- Lowpass: Higher frequency above settings will be cut-off.
- High pass: Lower frequency below settings will be cut-off.

SUB SONIC SWITCH - When on cuts off extremely low bass frequencies (below the range of human hearing, that cannot effectively be reproduced). The high pass filter is engaged when the subsonic switch is On. This improves efficiency of the amplifier’s power supply, improves sound reproductive performance, and reduces chances of damaging the subwoofers.

BASS BOOST CONTROLS - Continuously adjusts from 0 to 18dB of boost centered at 45Hz.

OPERATIONS

PHASE SHIFT CONTROL

- 0 Degree - Leaves output unaffected. The output signal is in phase with the input signal.
- 180 Degree - Inverts the output. The channel is 180 degrees output of phase. This configuration is useful for inverting the phase of subwoofers to improve staging in a vehicle.

BRIDGED MODE
Controls whether the amplifier is a Slave or Master when connected in combined amplifier configurations.
(Refer to the Amplifier Wiring section of this manual)

FUSE
Do not use a fuse with a higher value and never bridge the fuse over, as this may lead to irreparable damage so that any claim for warranty is denied.

GND(-)=GROUND CONNECTION
Connect the GND terminal to the chassis ground of your car and take care of electrical and mechanical contacts. In doing so, drill a hole into the car chassis near the amplifier then remove paint, dirt or any other substance from the ground point. There after fasten the cable end with adding a ring terminal by using a screw or bolt. Ensure that the ground connection is as short as possible (no longer then 24”) and that the cable diameter is sufficient (min 10awg.). Route the ground cables from the radio and all other equipment parts, like equalizer, active crossover network or other amplifiers, to the same ground point.

+12V = POWER SUPPLY
Connect the BATT terminal to the positive pole of the battery with a lead cable and add a fuse into the power cable in a distance of no more than 18” from the battery. The lead cable’s diameter should be at least 10awg for a length of 6ft. and 8awg. for a length of more then 6ft..

REM(ON/OFF) REMOTE CONTROL
Connect the REM terminal to the radio’s connector that gives +12V when on. Now when turning on and off your car radio. the amplifier automatically switches ON and OFF. If using the radio antenna signal, make sure that the signal does not turn off when in another mode.

SPEAKERS
Connect the speakers to these terminals.

ATTENTION! Some remote turn on signals may be to weak to turn on the amplifier, if this is the case you will need to use a relay to increase the remote turn on signal.

Investigate the layout of your vehicle thoroughly before drilling or cutting. Take care when you work near the gas tank, gas lines, hydraulic lines, electrical components and electrical wiring. Do not use the equipment unmounted. Attach this system securely to prevent damage, particularly in the event of an accident or aggressive driving. Do not mount the system so that wire connections are unprotected or are subjected to pinching or damage from nearby objects. Before connecting or disconnecting power connections at the system power terminals, disconnect the +12V DC wire at the battery end. Confirm that your source unit and other equipment are turned off while connecting the input terminals. If you need to replace the power fuse, replace it only with a fuse identical to the amperage recommended. Using a fuse of different type or rating may result in damage to the system, which is not covered by the manufacturer's warranty. Do not install any product where it may be subjected to excessive heat, moisture and dust or where it may be repeatedly kicked, brushed or bumped. Make absolutely sure that the terminals for the products are connected to the proper inputs and outputs from the music source. Never run the wiring on the outside of the vehicle or under it where it can be damaged by road hazards or any moving parts of the vehicle. Use existing wire channels, sills, panels and molding strips inside the vehicle to hide the wiring for safety and a neat appearance.

DISCLAIMER

IMPORTANT: Never cut any metal that is an integral part of the vehicle's safety or structural support system. If you are unsure, it is best to have the product professionally installed by an Authorized ORION Dealer. Never sacrifice your safety for sound.

Power LED:
This LED lights up green when the amplifier is turned on.

Protection LED:
This LED lights up red if the amplifier goes into protection. Below is a description of reasons the amplifier could trigger the protection circuit. The protection indicator will self reset once the condition has been fixed.

- Short: Speaker wires pinched, shorted together or grounded.
- Overcurrent: Check for possible speaker issue(s) or speaker wiring pinched in a door or other metal. Make sure speaker(s) load is not below the minimum impedance load.
- DC Offset: This can happen if the installation inadvertently connects the power wire to the speaker input(s). This can also happen if the amplifier has an internal problem.
- Under Voltage: Vehicle charging system is not supplying enough voltage to the amplifier. This can also occur if you use inadequate gauge wire or the terminals connected to the amplifier to the electrical system are dirty or corroded.
- Overvoltage: Vehicle charging system is suppling too much voltage or over the amplifiers rated DC input. Usually this occurs when there is a problem with the electrical system. Turn off the source unit when jump-starting the vehicle.
- Reverse Polarity: Any instance when the battery polarity or wires from the battery to the amplifier are reversed.

Thermal LED:
This LED lights up red if the amplifier goes into protection.

- Speaker loads lower than the amplifier minimum ohm load will cause the amplifier to draw more current and may result in overheating. This can be avoided by using speakers or wiring methods that result in an ohm load greater than the amplifiers minimum ohm load input.
- The amplifier can also overheat if it is not receiving proper ventilation, when mounting a amplifier make sure it has room for air to circulate and keep it cool.

TROUBLESHOOTING

SYMPTOMS	CHECK	REMEDY
NO SOUND	Is the power LED illuminated? (NO)	Check all fuses to amplifier. Be sure Turn-on lead is connected. Check signal leads. Check gain control. Check source unit. Clean contacts or fuse holder.
	Is the Diagnostic LED illuminated (YES)	Check for speaker short or amplifier overheating
AMPLIFIER NOT SWITCHING ON	No power to power wire	Repair power wire or connections
	No power to remote wire with receiver on	Check connections to source unit
	Burnt or broken fuse	Replace fuse
NO SOUND IN ONE CHANNEL	Check Speaker Lead	Inspect for short circuit or an open connection
	Check Audio Leads	Reverse Left Right RCA inputs to determine if the problem is occurring before the amp.
AMPLIFIER TURNING OFF WHEN PLAYING MEDIUM/HIGH VOLUME	Check Speaker Load Impedance	Be sure proper speaker load impedance recommenda-tions are observed. (If you use an ohm meter that DC resistance and AC impedance may not be the same).
PROTECTION LAMP ON	Shut down	Turn radio down, wait for amplifier to cool down
	Speaker wires shorted	Separate speaker wire and insulate

WARRANTY

Orion, warrants this product against all defects in material and workmanship for a period of one (1) year from the date of original purchase provided it was purchased from an Authorized Orion Dealer.
The conditions of this warranty and the extent of the responsibility of Orion, under this warranty are as follows:

1. DATED PROOF OF PURCHASE IS REQUIRED FOR WARRANTY SERVICE OF THIS PRODUCT. Information about Orion authorized warranty service may also be obtained at www.orioncaraudio.com or by emailing Orion at support@orioncaraudio.com.
2. This warranty will become void if service is performed by anyone other than an approved Orion Warranty Service Center.
3. This warranty does not apply to any product which has been subjected to misuse, neglect or accident, or which has had the warranty seal broken, serial number altered, defaced or removed, or which has been connected, installed adjusted or repaired other than in accordance with the instructions furnished by Orion.
4. This warranty does not cover car static, electrical interference, adjustments or labor costs for the removal or reinstallation of the unit for repair.
5. The sole responsibility of Orion under this warranty shall be limited to the repair or replacement thereof, at the sole discretion of Orion.
6. If it becomes necessary to send the product or any defective part to Orion or an authorized service station, the product must be shipped in its original or equivalent carton, fully insured, with shipping charges prepaid. Orion will not assume any responsibility for any loss or damage incurred in shipping.
7. This warranty is not transferable and protects the original purchaser provided they reside and made their purchase in the United States. International consumers may contact their local retailer or distributor for warranty information.
8. ALL IMPLIED WARRANTIES, EXCEPT TO THE EXTENT PROHIBITED BY APPLICABLE LAW, SHALL HAVE NO GREATER DURATION THAN THE WARRANTY PERIOD SET FORTH ABOVE. UNDER NO CIRCUMSTANCES SHALL ORION BE LIABLE FOR ANY LOSS OR DAMAGE, DIRECT OR CONSEQUENTIAL, ARISING OUT OF THE USE OR INABILITY TO USE THE PRODUCT. BECAUSE SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS OR EXCLUSIONS OR LIMITATIONS OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, THE ABOVE LIMITATIONS OR EXCLUSIONS MAY NOT APPLY TO YOU.
9. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS THAT VARY FROM STATE TO STATE.
10. Should you have any difficulties with the performance of this product during warranty or with any Orion authorized service center, you may contact Orion by emailing us at support@orioncaraudio.com.

ORION

3130 WEST 15TH AVENUE HIALEAH, FLORIDA 33012

TEL: 786.464.0247 EMAIL: SUPPORT@ORIONCARAUDIO.COM ORIONCARAUDIO.COM

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