Warranty

LIMITED TWO YEAR CONSUMER WARRANTY:

Directed Electronics promises to the original purchaser, to replace this product should it prove to be defective in workmanship or material under normal use, for a period of two years from the date of purchase by the dealer as indicated by the date code marking of the product **PROVIDED** the product was installed by an authorized Directed dealer. During this two year period, there will be no charge for this replacement **PROVIDED** the unit is returned to Directed, shipping pre-paid. If the unit is installed by anyone other than an authorized Directed dealer, the warranty period will be 1 year from date of purchase by the dealer as indicated by the date code marking of the product. During this 1 year period, there will be no charge for this replacement **PROVIDED** the unit is returned to Directed, shipping pre-paid. This warranty is non-transferable and does not apply to any unit that has been modified or used in a manner contrary to its intended purpose, and does not cover damage to the unit caused by installation or removal of the unit. This warranty is void if the product has been damaged by accident or unreasonable use, neglect, improper service or other causes not arising out of defects in materials or construction. **ALL WARRANTIES INCLUDING BUT NOT LIMITED TO EXPRESS WARRANTY, IMPLIED WARRANTY, WARRANTY OF MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSE, AND WARRANTY OF NON-INFRINGEMENT OF INTELLECTUAL PROPERTY ARE EXPRESSLY EXCLUDED TO THE MAXIMUM EXTENT ALLOWED BY LAW, AND DIRECTED NEITHER ASSUMES NOR AUTHORIZES ANY PERSON TO ASSUME FOR IT ANY LIABILITY IN CONNECTION WITH THE SALE OF THE PRODUCT. DIRECTED HAS ABSOLUTELY NO LIABILITY FOR ANY AND ALL ACTS OF THIRD PARTIES INCLUDING ITS AUTHORIZED DEALERS OR INSTALLERS.** Unit must be returned to Directed, postage pre-paid, with: consumer's name, telephone number, and address, authorized dealer's name and address, and product description. **IN ORDER FOR THIS WARRANTY TO BE VALID, YOUR UNIT MUST BE SHIPPED WITH PROOF OF INSTALLATION BY AN AUTHORIZED DIRECTED DEALER. ALL UNITS RECEIVED BY DIRECTED FOR WARRANTY REPAIR WITHOUT PROOF OF DIRECTED DEALER INSTALLATION WILL BE COVERED BY THE LIMITED 1 YEAR PARTS AND LABOR WARRANTY.** Note: This warranty does not cover labor costs for the removal and reinstallation of the unit.

BY PURCHASING THIS PRODUCT, THE CONSUMER AGREES AND CONSENTS THAT ALL DISPUTES BETWEEN THE CONSUMER AND DIRECTED SHALL BE RESOLVED IN ACCORDANCE WITH CALIFORNIA LAWS IN SAN DIEGO COUNTY, CALIFORNIA.

DEI is a proud member of IASCA

ISO 9001

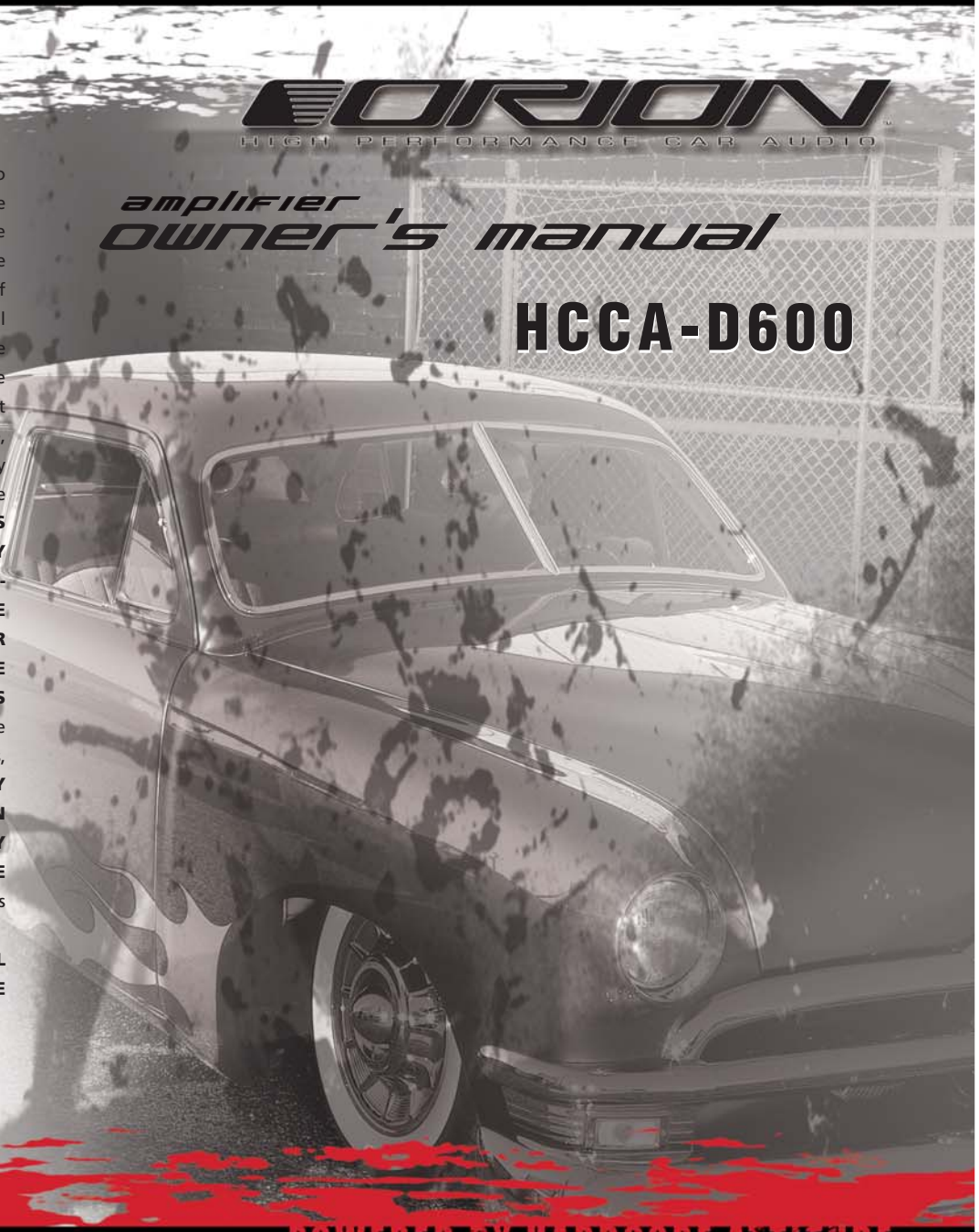
Directed Electronics is an ISO 9001 registered company

Designed and Engineered in the USA by: Directed ELECTRONICS

ORION HIGH PERFORMANCE CAR AUDIO

amplifier owner's manual

HCCA-D600



POWERED BY HARDCORE ATTITUDE

CONTENTS

INTRODUCTION

Thank you for your purchase of Orion's HCCA-D600 power amplifier. Each Orion amplifier is designed to be the leader in its class offering the most power, advanced features, and extreme ease of use. In high-end sound systems or high SPL systems, Orion amplifiers will give you years of trouble-free performance.

- **HCCA-D600 -** 600 Watt single-channel Class D amplifier with built-in fully variable high-pass, low-pass, or band-pass crossover with INTELLi BASS. Equipped with optional remote gain, the 600D is capable of one-channel operation with a maximum power of 600 Watts into 1Ω.

The installation of all Orion components will determine the overall performance result. Improper installation will not only limit the performance of your Orion system but also potentially compromise the reliability of this amplifier. To ensure proper sonic results and component reliability, please refer to your authorized Orion dealer for installation assistance or advice. If you decide to perform the installation yourself, be sure to read the entire manual before beginning the installation.

What's in the Box

- (1) Amplifier
- (1) Spare fuse
- (1) Allen wrench 4mm
- (1) Allen wrench 3mm
- (1) Hardware pack (screws and washers)
- (1) Amplifier installation and operation manual
- (1) Orion vinyl window sticker

PRACTICE SAFE SOUND™

Continuous exposure to sound pressure levels over 100dB may cause permanent hearing loss. High power automotive sound systems can generate sound pressure levels in excess of 130dB. When playing your system at high levels, please use hearing protection and avoid long term exposure.

RECORD YOUR SERIAL NUMBER AND DATE

To ensure your warranty (see back cover), please record the following information regarding your new amplifier.

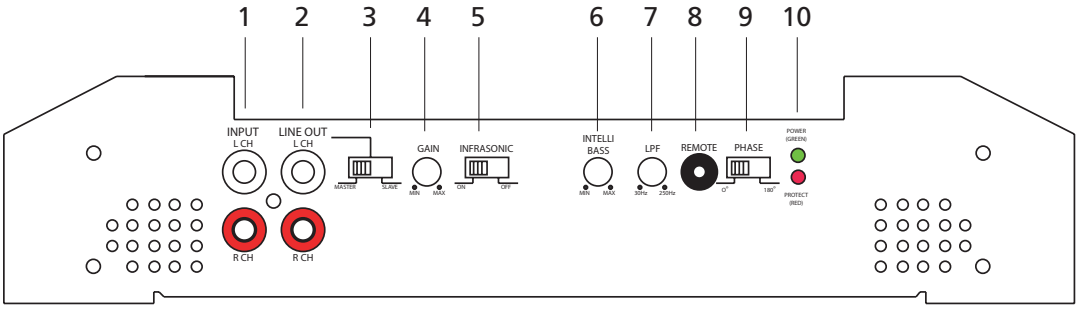
Model: _____

Serial Number: _____

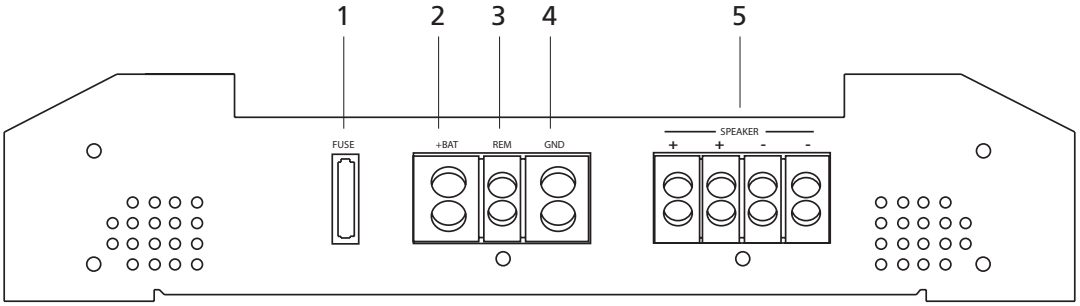
Date of Purchase: _____

Purchased from: _____

END PANEL LAYOUTS



1. **RCA Input -** accepts RCA input from a head unit, preamplifier, or equalizer.
2. **RCA Line Output -** provides easy connection to additional amplifiers.
3. **Master/Slave Switch -** controls whether the amplifier is a slave or master when connected in combined amplifier configurations. (Refer to the *Line Output Configurations* section of this guide.)
4. **Gain Control -** continuous adjustment for full power output.
5. **Infrasonic Switch -** when On cuts off extremely low bass frequencies (below the range of human hearing, that speakers cannot effectively reproduce). Improves efficiency of the amplifier's power supply, improves sound reproductive performance, and reduces chances of damaging the subwoofers.
6. **Intelli-Bass -** adjusts the bass for up to 18dB of boost equalization.
7. **LPF -** this filter attenuates high frequencies and sets the high frequency limit of the subwoofer channel (adjustable from 30 to 250 Hz).
8. **Remote Bass Input -** connects optional HP-RB1 remote bass control to control the bass level from the driver's seat.
9. **Phase Control Switch** - provides either 0 or 180 degree phase shift of the amplified output (speaker) with respect to the input signal to facilitate bridging of amplifiers.
10. **Power LED -** when illuminated (green) indicates that the amplifier is on.
11. **Protect LED -** when illuminated (red) indicates that the amplifier protective circuitry has been activated due to thermal, output short, supply undervoltage or supply overvoltage.



1. **1 ATC Fuse -** this 40A fuse protects the amplifier against internal electrical damage and is meant to protect the amplifier only. All other power connections should be fused at the source.
2. **+BAT -** connect this terminal through a FUSE or CIRCUIT BREAKER to the positive terminal of the vehicle battery or the positive terminal of an isolated audio sys-

tem battery.

WARNING: Always protect this power wire by installing a fuse or circuit breaker of the appropriate size within 12 inches of the battery terminal connection.

3. **REM -** this terminal turns on the amplifier when (+) 12 volt is applied. Connect it to the remote turn on lead of the head unit or signal source. If a (+) 12 volt remote turn lead is not available, a Remote Power Adapter (P/N #55000) can be used to supply a remote turn on signal. DO NOT connect this terminal to constant (+) 12 volt.
4. **GND -** power return connection. Connect this terminal directly to the sheet metal chassis of the vehicle, using the shortest wire necessary to make this connection. Always use wire of the same gauge or larger than the (+) 12 volt power wire. The chassis connection point should be scraped free of paint and dirt. Use only quality crimped and/or soldered connectors at both ends of this wire. DO NOT connect this terminal directly to the vehicle battery ground terminal or any other factory ground points.
5. **Speaker -** connect the speakers to these terminals. (refer to the Speaker Connection section of this guide.)

NOTE: Make all connections to power, ground, speakers, and remote terminals before final positioning and installation of the amplifier in the vehicle.

CEA SPECIFICATIONS

HCCA-D600

Power Output: 150 Watts RMS x 1 at 4 ohms and ≤ 1% THD+N
Signal to Noise Ratio: -60 dBA (reference 1 Watt into 4 ohms)

Additional Power Output: 300 Watts RMS x 1 at 1 ohm at 14.4 Supply ≤1% THD+N

SPECIFICATIONS

Amplifier Section	HCCA-D600
Power Output 4Ω (Watts)$_{note\ 1}$	150 x 1
Power Output 2Ω (Watts)$_{note\ 2}$	200 x 1
Power Output 1Ω (Watts)	300 x 1
Amplifier Efficiency	> 70% into 1Ω load at max. power
Externally Bridgeable	yes
Remote Bass Function	yes (optional HP-RB1 not supplied)
Distortion at Rated Power	< 1.0% THD+N
Frequency Response	20Hz to 250Hz ±2.5dB
Linear Bandwidth	10Hz to 500Hz ±3dB
Damping Factor	> 200
Input Sensitivity	150mV to 5V rms
Supply Voltage Range	9 to 16V
Protection	thermal, DC offset, reverse polarity, short protection, under-voltage, over-voltage
Terminal Wire Gauge	Power 0/1 AWG, Remote 12 AWG, Ground 0/1AWG, Speaker 12 AWG
Input Impedance	20kΩ
Fuse Type	(1) 40 Amp ATC
Dimensions	13"x10.5"x2.3"
Weight	8 lbs.
Crossover Section	
Low Pass Crossover	Continuously variable (30-250Hz)
Infrasonic Filter	Selectable On/Off 24dB/Octave -6dB at 20Hz
Intelli-Bass	0–18dB boost

1. Continuous 4Ω load 20Hz to 250Hz, < 1% THD, with input voltage at 14.4VDC.
2. Continuous 1Ω load 20Hz to 250Hz, < 1% THD, with input voltage at 14.4VDC.

AMPLIFIER SETTINGS

Signal Input and Output Configurations

The input section of the amplifier consists of a phase switch that sets the output configuration, gain controls, and RCA inputs. The input section makes it easy to adapt this amplifier to most system configurations.

Input Gain

The Orion HCCA D600 amplifier has a level adjustment to allow for easy integration with any source unit. The input sensitivity can be adjusted from 150mV to 5V. Refer to *Testing the System* and *Adjusting the Sound of the System* sections of this guide for detailed instructions on setting the gain.

Phase Switches

- **0° -** leaves output unaffected. The output signal is in phase with the input signal.
- **180° -** inverts the output. The channel is 180° output of phase. This configuration is useful for inverting the phase of subwoofers to improve staging in a vehicle. This is also used when bridging two amplifiers into one speaker.

Line Output Configurations (System Expansion)

NOTE: When expanding your system by adding additional Orion amplifiers in the signal chain use only the same model(s) as the first amplier in the chain.

The line outputs on Orion amplifiers offer easy, unlimited system expansion. Routing signal from a source unit, pre-amplifier, or equalizer is a matter of connecting RCAs to the RCA Inputs of the first Orion amplifier and then the RCA line outputs to the next Orion amplifier's RCA line inputs in the signal chain. Then the Master/Slave switch on each of the amplifiers is set as follows:

The first amplifier in the signal chain will have its Master/Slave switch set to the MASTER position. In effect this first amplifier will set the gain for the remainder of the amplifiers in the signal chain.

The remaining amplifiers following in the signal chain will have their Master/Slave switch set to the SLAVE position. This allows the signal to be input directly, bypassing the subsequent amplifiers gain control. The audio level is set and supplied by the output of the master amplifier at its gain setting.

Internal Crossover Configurations

The crossover section of the Orion HCCA D600 amplifier is continuously variable and extremely flexible.

When using Orion loudspeakers, minor deviations from the recommended frequency ranges can provide superior results depending on your speaker locations and your vehicle acoustics. Setting crossover frequencies higher than recommended will not cause damage and may provide superior sonic results depending on your system's performance goals. Refer to your loudspeaker owner's manual for assistance in choosing the proper crossover frequencies for your system.

WARNING! DO NOT set crossover frequencies lower than the speakers recommended

operating range. This can cause driver failure that is not covered by the manufacturer's warranty.

Low-Pass Crossover

The low-pass crossover adjusts the upper crossover of the filter and is continuously variable from 30Hz to 250Hz.

Fine Tuning the Crossovers

The low-pass and high-pass crossover sections are each marked at four frequency points for ease of system adjustment. The low-pass crossover section is marked at 30Hz, 50Hz, 150Hz, and 250Hz. The high-pass crossover section is marked at 20Hz, 33Hz, 90Hz and 150Hz. Specific crossover points can be chosen based on the recommended operational bandwidth of your speakers.

Adjusting INTELLi-Bass

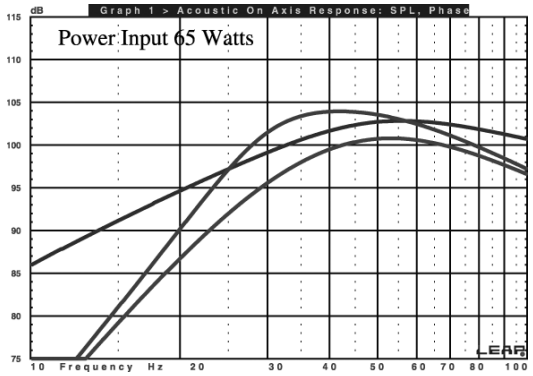
INTELLi-Bass on the rear channels maximizes the performance of a subwoofer and allows for continuous adjustment of low frequency boost on the rear channels. INTELLi-Bass can be adjusted from 0dB to 18dB of boost centered at 45Hz. Initially the Q is very low (wide). As INTELLi-Bass is added, the Q rises (narrows). This allows the amplifier to overcome acoustic deficiencies in your vehicle. The type of enclosure used, the sub-woofer's excursion capability, personal preference, and attitude determine acceptable boost levels.

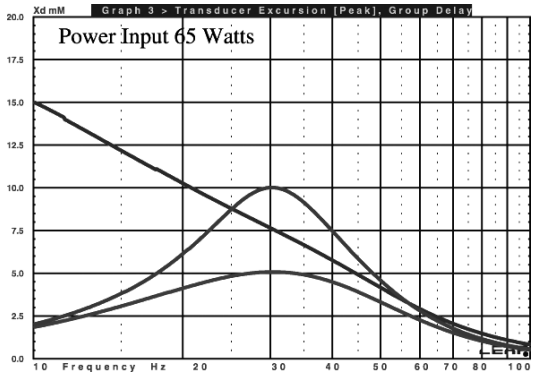
WARNING! Exercise caution when setting INTELLi-Bass. Maximum boost can potentially cause woofer damage due to overexcursion.

Enclosure Type	**Boost Levels**			
	0dB	+3dB	+6dB	+10dB
Infinite Baffle	Tune above Fs of woofer	High X-Max Drivers--Tune above Fs of woofer	Not Recommended	Not Recommended
Sealed	Tune above Fs of woofer	Tune above Fs of woofer	High X-Max Drivers--Tune above Fs of woofer	Not Recommended
Vented	Tune to port frequency	Tune to port frequency	Tune to port frequency	High X-Max Drivers--Tune to port frequency
Sealed Band-pass	Tune above Fs of woofer	Tune above Fs of woofer	High X-Max Drivers--Tune above Fs of woofer	Not Recommended
Vented Band-pass	Tune to port frequency	Tune to port frequency	Tune to port frequency	High X-Max Drivers--Tune to port frequency
Aperiodic	Set crossover to Fs of woofer	Set crossover to Fs of woofer	Set crossover to Fs of woofer	Not Recommended

Infinite Baffle Example High-Pass Set at 30Hz

By removing low frequency signal that the woofer cannot produce, the woofer can play its capable range louder. The first example is an infinite baffle situation. The left graph displays the frequency response of a 12-inch woofer in an infinite baffle application without the high-pass filter, with the filter and with the filter and the INTELLi Q set to +3dB. As you can see, with +3dB of boost and the high pass filter set to 30Hz, the woofer has more output down to 25Hz and less overall excursion when compared to the non-high-pass response. Maximum physical excursion capability of the woofer is 15mm.

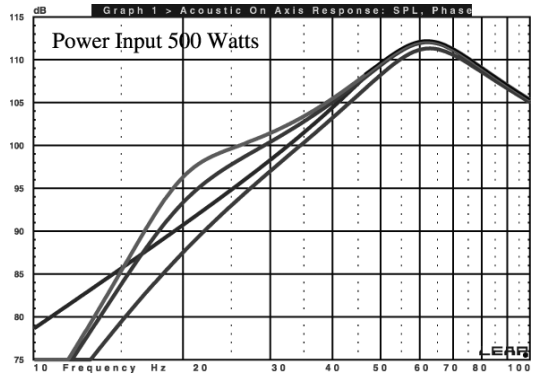


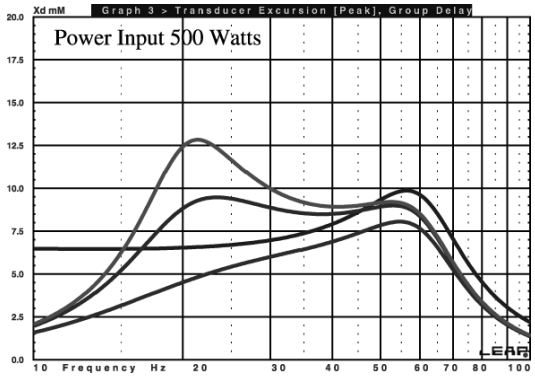


NOTE: The left graph is the response; the right graph is the driver excursion. These designations apply to the following graphs as well.

Sealed Example High-Pass Set at 20Hz

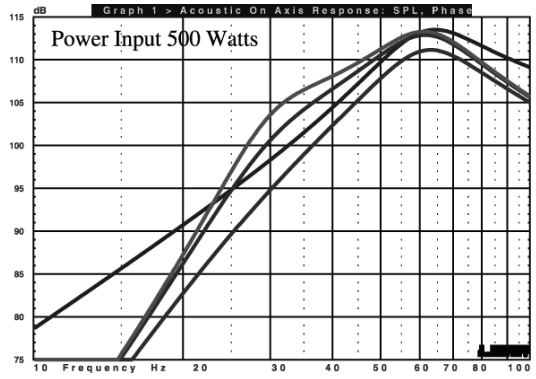
This sealed example is the same 12-inch woofer in the recommended sealed enclosure. Up to 6 dB of boost is capable if 20 Hz was used. With +6dB of boost, the woofer has more output down to 15 Hz.

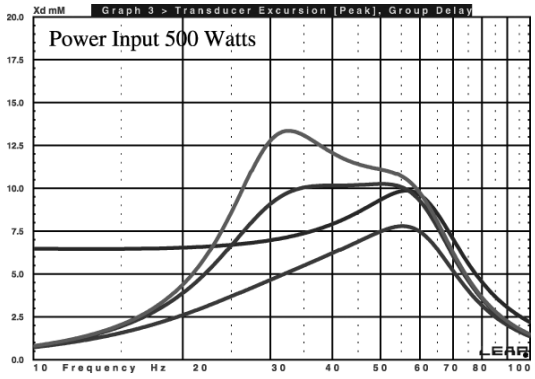




Sealed Example High-Pass Set at 30Hz

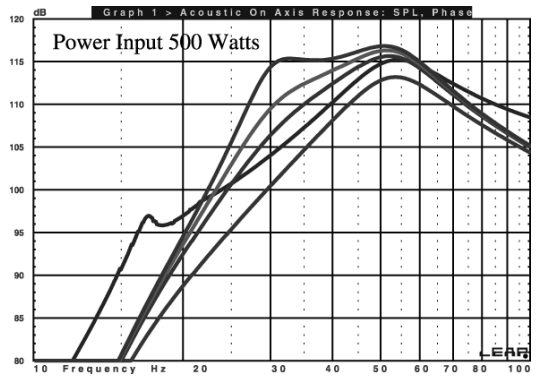
In this example, the frequency has been increased to 30 Hz. Up to 6 dB of boost is capable at this frequency. With +6dB of boost, the woofer has more output down to 23 Hz. The overall usable output is increased.

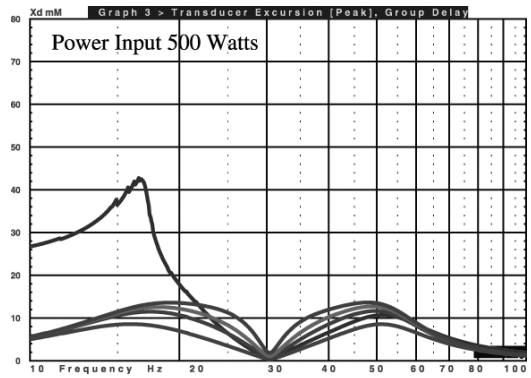




Vented Example High-Pass Set at 30Hz

Vented enclosures benefit most from the INTELLi Q. Up to 10 dB of boost is capable at the box tuning frequency of 30 Hz. With +10dB of boost, the woofer has more output down to 22 Hz. The excursion below the tuning frequency has been greatly reduced.





Remote Gain Operation

NOTE: Do not use the Remote Gain control when you have an expanded system installed (see *Line Ouput Configurations*). The Slave amplifier(s) gain will not be controlled.

The remote gain port provides easy remote access to the internal gain structure of the HCCA power amplifier. The RGC-1 plugs into the amplifier via the 1/8" mini jack plug. The RGC-1 can be installed in the front of the vehicle to control the amplifier gain level. The RGC-1 can be used as a bass level control when used on an amplifier dedicated to subwoofers.

AMPLIFIER WIRING

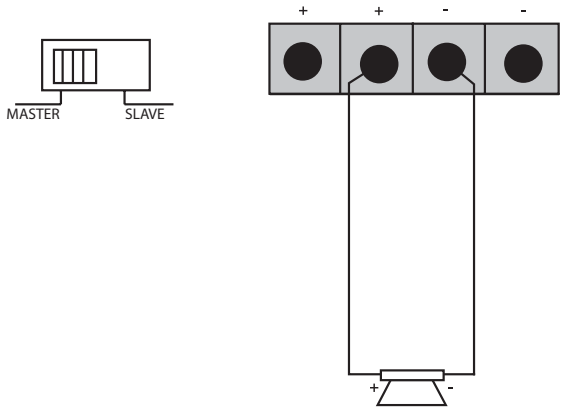
Power Connections for the HCCA-D600

- Orion Fuse Size: 1 x 30 AMP ATC
- Power connections accept up to 0 AWG wire.
- 0/1 AWG power and ground wire recommended for optimal performance.
- Connect 12V+ to the battery through a fuse holder. This connection provides +12V main power to the amplifier.
- Power wire must be fused no more than 18" from battery.
- Ground amplifier to a good chassis ground as close as possible to the amplifier.
- Connect REM terminal to remote turn-on lead from source unit. This connection provides +12V power to turn-on the amplifier.
- Add extra ground wire between the negative terminal of the battery and the chassis.

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

Speaker Connections

The Orion HCCA-600D amplifier offer two positive and two negative output terminals for ease of connecting the speakers to the amplifier. Since this is a mono amplifier, the speaker connectors are paralleled internally. The amplifier is stable to 1Ω.

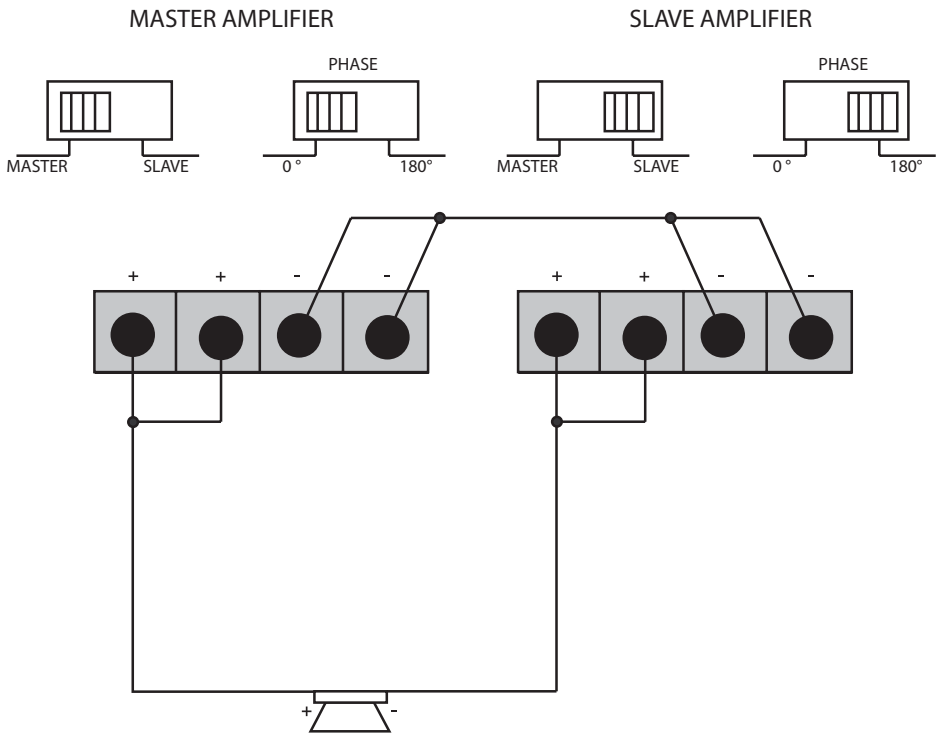


Bridging (strapping)

For bridging into a single speaker load, this amplifier has the ability to be bridged with another amplifier (must be the same model). To do this you must utilize the MASTER/SLAVE and PHASE switch settings. On the master amplifier, set the switch setting to MASTER. The signal is then routed through RCA Line Out to the RCA Line In on the other (slave) amplifier. The slave amplifier must have the MASTER/SLAVE switch set to the SLAVE position. On the master amplifier make sure the PHASE swtich is set to the 0 position (factory default). On the slave amplifier set the PHASE switch to 180, exactly opposite of the master amp. Refer to the *Phase Switches* section of this guide.

On the slave amplifier be sure to turn the Intelli-Bass control to 0 (zero). For the speaker connections, connect the positive (+) speaker lead from the speaker to the positive (+) speaker terminal of the master amplifier. On the negative (-) speaker connection, take the negative (-) speaker terminal of the master amplifier and connect it directly to the negative (-) speaker terminal of the (slave) amplifier. The remaining positive (+) speaker terminal of the (slave) amplifier must be connected to the negative (-) speaker lead from the speaker. The impedance of the speaker must not exceed 1Ω.

NOTE: For best results, connect both negative speaker terminals on the master amp to both negative terminals on the slave amp using at least 12 AWG cable.



AMPLIFIER INSTALLATION

Choosing Mounting Locations

The location of your amplifier will depend on several important issues. Due to the low profile size of the Orion amplifiers, there are many possible installation locations that will yield satisfactory amplifier performance. Always mount the amplifier in a place that protects the amplifier from the elements. In addition, mount the amplifier on a stable, flat surface.

NOTE: The wiring connections to the power, remote and speaker terminals should be accomplished before the amplifier is mounted.

NOTE: Mounting amplifiers upside down is not recommended and may cause premature thermal shutdown.

WARNING! Do not mount any amplifier in the engine compartment. Amplifiers are not designed to endure the harsh environment of the exterior elements.

Passenger Compartment

If you are going to mount the amplifier in the passenger compartment, make sure you have adequate room for ventilation. The amplifiers have been designed to make under-seat mounting possible. When mounting your amplifier under a seat or similar area, keep a minimum of 1" of clearance around the amplifier for adequate cooling.

Trunk Compartment

Mounting your amplifier in the trunk provides excellent performance as long as you do not restrict the airflow around the heatsink of the amplifier. For optimal results, mount the amplifier with as much clearance as possible. This type of mounting will yield the best cooling due to the convection effect of the amplifier chassis.

General Precautions and Installation Tips

WARNING! Be careful not to cut or drill into gas tanks, fuel lines, brake lines, hydraulic lines, vacuum lines, or electrical wiring when working on your vehicle.

Disconnect the vehicle's ground wire at the battery before making or breaking connections to the audio system's power supply terminals.

WARNING! Do not use this amplifier unmounted. Failing to securely mount the amplifier can result in damage or injury, particularly in the event of an accident. An unmounted amplifier becomes a dangerous projectile in the event of a crash. Never mount the amplifier where it might get wet. Mount the amplifier so the wire connections will not be pulled. Route the wires where they will not be scraped, pinched or damaged in any fashion.

The +12V power supply wire must be fused as close as possible to the battery terminal, ideally within 12". Use the recommended fuse size or circuit breaker listed in the *Power Connections* section of this manual.

If you need to replace the fuse plugged into the side of the amplifier, replace the fuse with the same size ATC type fuse that came with the amplifier. If you are not sure as to the correct value, refer to the *Power Connections* section of this manual for details. Using a higher current fuse may result in damage to the amplifier that is not covered under warranty.

NOTE: Make sure all the equipment in the system is turned off when making or breaking connections to the input RCAs or speaker terminals. Turn on the system and slowly turn up the volume control only after double checking all wire connections.

Power for systems with a single amplifier can be supplied by most automotive electrical systems. Systems with multiple amplifiers may require a higher capacity battery, alternator or the use of a storage capacitor. We strongly recommend the use of a Directed Audio Essentials power capacitor with an extra battery in larger stereo systems.

Orion amplifiers generate a certain amount of heat as part of normal operation. Be sure the area around the amplifier is unobstructed to allow adequate air circulation. Remember, beach blankets, last week's laundry, school books and homework papers located on top of the amplifier do not improve air flow and may become damaged.

Tools of the Trade

Listed below are the majority of the tools required to perform an installation. Having the proper tools will make the installation that much easier. Some of these tools are necessities; some will just make the job easier.

- Allen Wrenches (2.5mm and 3mm) supplied
- DMM or VOM
- Electric drill with assorted drill bits
- Grommets
- Heat shrink tubing
- Marking pen
- Nylon tie straps
- Phillips and flat blade screw drivers
- Pliers (standard and needle nose)
- Reference CD with 1 kHz Sine Wave at 0dB level (all bits high)
- RTA (real time analyzer)
- Soldering iron and solder
- Utility knife
- Wire brush or sandpaper for chassis grounding
- Wire crimper
- Wire cutters
- Wire strippers

Step By Step Installation-amplifier

Step 1 Determine the location for the amplifier. Refer to the *Choosing Mounting Locations* section of this guide for detailed information.

Step 2 Decide on the system configuration for your amplifier. For system suggestions, refer to the *Speaker Connections* section of this guide.

Step 3 Run all the wires from the amplifier location to the speakers, source unit, and battery. Do not connect the battery at this time. Be sure to run RCAs and power and speaker wires away from factory electrical wires and system as they pose a great potential for induced system noise.

Step 4 Pre-drill amplifier mounting holes. Be sure to "think before you drill." Gas tanks, fuel lines, and other obstructions have a nasty way of hiding themselves. For best results use a marking pen to mark the mounting holes and pre-drill these holes with a standard 1/8" drill bit.

Step 5 Turn the vehicle's key switch to the off position.

Step 6 Disconnect the vehicle's battery ground terminal.

Step 7 Connect power wires to the amplifier (ground first, then 12 V(+) and REM).

Step 8 Connect the RCA and speaker wires to the amplifier. Check the quality of your speakers and signal connections. This will determine the ultimate performance of your Orion amplifier. Refer to the *Signal Input and Output Level*

Controls and *Speaker Connections* sections of this guide for correct wiring instructions.

Step 9 Mount the amplifier. Make sure the amplifier is mounted on a flat surface. If this is not possible, do not over tighten the screws so that the chassis of the amplifier is twisted or bent.

Step 10 Reconnect the ground terminal to the battery after power, speaker, and RCA connections are completed.

Step 11 Set LPF crossover. Refer to the *Internal Crossover Configuration* section of this manual for detailed instructions.

Step 12 Once satisfied that all connections and settings are correct, install the fuse located near the vehicle's battery and proceed to either mounting the remote bass control section or proceed to the *Testing the System* section of this manual.

WARNING! Never exceed the recommended fuse size of this amplifier. Failure to do so will result in the voiding of your warranty and possible damage to the amplifier.

Step By Step Installation-remote gain control (RGC-1)—option

Step 1 Locate a convient location (under the dashboard on the driver's side) for mounting the RGC-1.

Step 2 Plug the remote bass cable into the amplifer.

Step 3 Run the remote bass cable from the amplifier location to the RGC-1. Do not plug into the rear of the RGC-1 at this time.

Step 4 Pre-drill RGC-1 mounting holes. Be sure to "think before you drill." Electrical lines, and other obstructions have a nasty way of hiding themselves. For best results use a marking pen to mark the mounting holes and pre-drill these holes with a standard 1/8" drill bit.

Step 5 Mount the RGC-1 with the provided screws.

Step 6 Set the bass control on the RGC-1 to minimum.

Step 7 Connect the remote bass cable to the jack on the rear of the RGC-1.

SET UP AND TROUBLESHOOTING

Testing the System

After you have completed the installation, you need to test the system. This will help ensure years of trouble-free operation. Please refer to the listed steps below when testing the sound of your Orion system.

Step 1 Check all the wiring connections to be sure they are correct and secure.

Step 2 Turn the signal source volume control all the way down. Set any tone controls to their flat or defeated positions. This includes the loudness control.

Step 3 Turn the level controls of the amplifier to their minimum positions.

Step 4 Turn the source unit on. Check to see if the power LED located on the connection side of the amplifier is on. If not, please refer to the *Power Connections* and the *Troubleshooting Tips* sections of this manual for instructions.

Step 5 If using an aftermarket source unit, turn the level controls of the amplifier about one quarter of a turn. Slowly increase the volume level of the source unit to so that you can hear the output of the system. If no sound is heard or if the output is distorted, turn the system off immediately. Refer to the *Power*

Connections and the *Troubleshooting Tips* sections of this manual to solve your installation problems.

Step 6 Check to make sure the output for each channel is correct. If the active crossovers are used, check to make sure that each output is correct from the amplifier. When using active crossovers on midrange and tweeters, do not use crossover frequencies lower than recommended. If the system is not configured properly, refer to the *Internal Crossover Configuration* section of this manual and take corrective action.

Step 7 If the output is clear and undistorted, continue to the *Adjusting the Sound of the System* section of this manual.

Adjusting the Sound of the System

Once you have checked the system's operation, adjust the sound of the system. Adjusting the sound of the system is accomplished by setting the level controls and adjusting the internal crossovers.

Step 1 Turn the signal source volume control all the way down. Set any tone controls to their flat or defeated positions. This includes the loudness control.

Step 2 Turn the level controls of the amplifier to their minimum positions.

Step 3 Choose music with high dynamic content that you like, with which you are familiar, and will be used most often in the system.

Step 4 Turn the source unit's volume control up to its highest undistorted output level. If you lack test equipment, this point occurs between 3/4 to full volume depending on the quality of your source unit. Listen for any audible distortion. If any distortion is audible, reduce the volume of the source unit until you have an undistorted output. Leave the volume control at this position during your system tuning.

Step 5 While listening to your chosen dynamic music, turn up the level control corresponding to the midrange output until you hear slight distortion and turn the level control back slightly for an undistorted output. Depending on your system, the midrange and tweeter output may be on the same output channels.

Step 6 Turn up the level control corresponding to the tweeter output until you hear slight distortion and turn back the level control slightly for an undistorted output. Depending on your system the midrange and tweeter output may be on the same output channels.

Step 7 Fine-tune the output level between midrange and tweeters. Refer to the *Internal Crossover Configuration* section of this manual for detailed instructions.

Step 8 Repeat Steps 5-7 for the rear speakers. If you do not have rear speakers continue to Step 10.

Step 9 Set levels between the front and rear midrange and tweeters for optimum front/rear balance.

Step 10 Turn up the level control corresponding to the woofer output until you hear slight distortion and turn back the level control slightly for an undistorted output.

Step 11 Fine-tune the output level between satellite speakers and the woofers. Refer to the *Internal Crossover Configuration* section of this manual for detailed instructions. If using an RGC-1, adjust the level to the output of the woofer to match the sonic requirements of the system.

Step 12 Enjoy your awesome Orion sound system.

Troubleshooting Tips

Symptom	Probable Cause	Action To Take
No output		
	Low or no remote turn-on	Check remote turn-on voltage at voltage amplifier and repair as needed.
	Fuse blown	Check power wire's integrity and check for speaker shorts. Fix as needed and replace fuse.
	Power wires not connected	Check power wire and ground connections and repair or replace as needed.
	Audio input not connected	Check RCA connections and repair or replace as needed.
	Speaker wires not connected	Check speaker wires and repair or replace as needed.
	Speakers are blown	Check system with known work ing speaker and repair or replace speakers as needed.
Audio cycles on and off		
	Thermal protection engages when amplifier heat sink temperature exceeds 90°C (190°F)	Make sure there is proper venti lation for amplifier and improve ventilation as needed.
	Loose or poor audio input	Check RCA connections and repair or replace as needed.
	Loose power connections	Check power wire and ground connections and repair or replace as needed.
Distorted output		
	Amplifier level sensitivity set too high exceeding maximum capability of amplifier	Readjust gain. Refer to the *Adjusting the Sound of the System* section of this manual for detailed instructions.
	Impedance load to amplifier too low	Check speaker impedance load, if below 1Ω, rewire the speakers to achieve higher impedance.
	Shorted speaker wires	Check speaker wire connections and fix or replace as needed.
	Speaker not connected to amplifier properly	Check speaker wiring and repair or replace as needed. Refer to the *Speaker Connections* section of this guide for detailed instructions.

Symptom	Probable Cause	Action To Take
Distorted output		
	Internal crossover not set properly for speakers	Readjust crossovers. Refer to the *Internal Crossover Configuration* section of this guide for detailed instructions.
	Speakers are blown	Check system with known work ing speakers and fix or replace as needed.
Poor bass response		
	Speakers wired with wrong polarity causing cancellation at low frequencies	Check speaker polarity and fix as needed.
	Crossover set incorrectly	Reset crossovers. Refer to the *Internal Crossover Configuration* section of this guide for detailed instructions.
	Impedance load at amplifier is too low	Check speaker impedance load, if below 1Ω, rewire speakers to achieve higher impedance.
Battery fuse blowing		
	Short in power wire or incorrect wiring	Check power and ground con- nections and replace or repair as needed.
	Fuse used is smaller than recommended	Replace with proper fuse size.
	Actual current exceeds fuse rating	Check speaker impedance load. If below 1Ω, rewire speakers to achieve higher impedance.
Amplifier fuse blowing		
	Fuse used is smaller than recommended	Replace with proper fuse size.
	Impedance load at amplifier too low	Check speaker impedance load. If below 1Ω, rewire speakers to achieve higher impedance.
	Speaker is blown with shorted outputs	Check system with known work ing speakers and fix or replace as needed.
	Actual current exceeds fuse rating	Check speaker impedance load. If below 1Ω, rewire speakers to achieve higher impedance.

NOTES