

Owner's manual
300 watt amplifier
six channel
PH15.2

a/d/s/

a/d/s/

Analog and Digital Systems
One Progress Way
Wilmington, MA 01887
USA

Introduction

Thank you for purchasing the a/d/s/ PH15. The PH15's bridgeable, six channel design gives it unusual flexibility. It can be used as a six channel amplifier to drive two subwoofers and four satellite speakers, or as a five, four or three channel high-power amplifier to drive various combinations of speaker systems.

This manual provides information on the connection and use of your PH15. Please read it thoroughly. We suggest you save this manual and the PH15 packing materials for future use.

Thank you,

Analog and Digital Systems, Inc.

About this manual

Because of the PH15's high power output capability and the wide choice of system configurations the PH15 allows, we strongly recommend that you seek professional installation services.

This manual contains information about the typical connection, use and maintenance of the PH15. Diagrams show the connections for typical systems. These diagrams provide sufficient information to guide the skilled technician in installation. Basic information about installation, such as the importance of wiring polarity or techniques for solving grounding problems, is not provided here. Please consult your a/d/s/ dealer or a qualified technician for details not covered here.

Controls and features

About names: Signal sources and processors for the car have many names—radio, head unit, compact disc player, radio/CD player, and so on. We call all signal sources *head units*.

DC power terminal block provides connections for the 12VDC power wires. The wires are clamped securely in the terminals by screws accessible through holes in the top of the chassis directly above the terminals, between the heatsink fins.

Due to its unusually high power output capability, the PH15 uses two separate sets of + 12V and ground wires, with a fuse for each + 12V line.

ground terminals connect the ground wires to the PH15. The ground wires run between the PH15 and a connection point on the chassis of the automobile.

+ 12V terminals connect the power supply wires which run between the PH15 and the positive terminal of the battery.

remote terminal connects the control wire which provides remote power turn-on of the PH15 by the head unit or a dash-mounted switch. This connection is in parallel with pin 8 of the input DIN jack.

30A fuses protect both the PH15 and the automobile's electrical system from fault conditions. The fuses are standard automotive plug-in type ATO.

ch 1, ch 2, bridge 1-2 speaker terminal block connects the wires of two speaker systems in stereo mode, or one speaker system in bridge mode, to the PH15. The wires are clamped securely in the terminals by screws accessible through holes in the top of the chassis directly above the terminals, between the heatsink fins.

ch 3, ch 4, bridge 3-4 speaker terminal block connects the wires of one or two more speaker systems to the PH15 in the same way as the ch 1, ch 2 terminal block.

ch 5, ch 6, bridge 5-6 speaker terminal block connects the wires of one or two subwoofers or other speaker systems to the PH15 in the same way as the ch 1, ch 2 terminal block.

stereo 1-2/bridge 1-2 switch sets the PH15 for proper operation with either one speaker system connected to each channel when in the left hand, stereo position, or a single speaker system driven from both channels when in the right hand, **bridge** position.

stereo 3-4/bridge 3-4 switch works the same as the stereo 1-2 switch but for channels 3 and 4.

stereo 5-6/bridge 5-6 switch works the same as the stereo 1-2 switch but for channels 5 and 6.

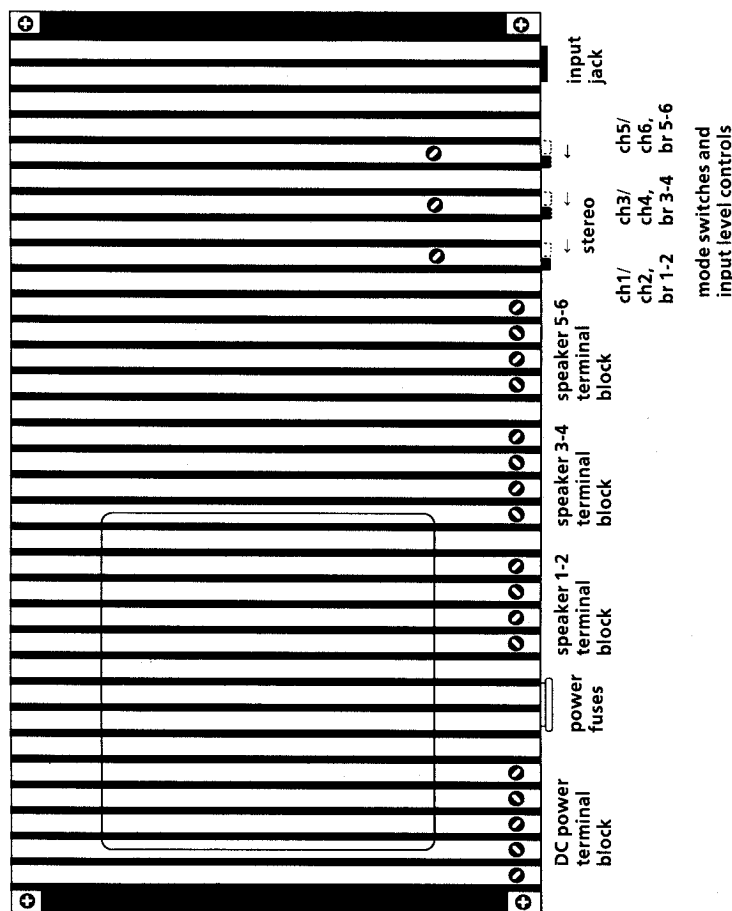
input 8-pin DIN jack provides all input signal and remote power switch connections in a single jack. This jack offers quick and accurate hook-up to a/d/s/ signal processing units, such as the 642CSI. Pin 8 of this jack is in parallel with the remote power terminal on the PH15. Pin-out information is in the **Specifications** section of this manual and in the connection diagram.

ch 1/ch 2/bridge 1-2, ch 3/ch 4/bridge 3-4, ch 5/ch 6/bridge 5-6

input level controls adjust the gains of pairs of channels for balancing and for matching the output level of the signal source. Each of the PH15's level controls adjusts two channels simultaneously in stereo mode, and each adjusts the level of a bridged pair of channels in bridge mode. The controls (one adjustment for both channels 1 and 2, one for both channels 3 and 4, and one for both channels 5 and 6) are screwdriver adjustable. The controls are accessible through holes in the top of the chassis between the heatsink fins, directly behind their respective mode switches.

Cast aluminum chassis with integral heatsink makes the PH15 mechanically strong and physically small. It provides excellent cooling for the power supply and amplifier circuitry.

Top view



Warnings

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

Do not use the PH15 unmounted. Attach the PH15 securely to the vehicle to prevent damage to either the PH15 or the vehicle and its contents, particularly in the event of an accident.

Keep the PH15 away from locations subject to leakage or immersion in water.

Do not mount the PH15 so that the wire connections are unprotected or are subject to pinching or damage from nearby objects or people's feet.

The +12V power supply wires must be individually fused at the battery positive terminal connection. Use fuses of the same current rating as the fuses in the PH15. Disconnect the +12V wires at the battery end before making or breaking power connections at the PH15's power terminals.

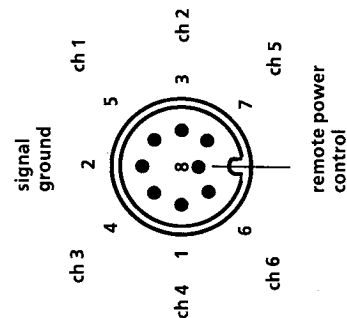
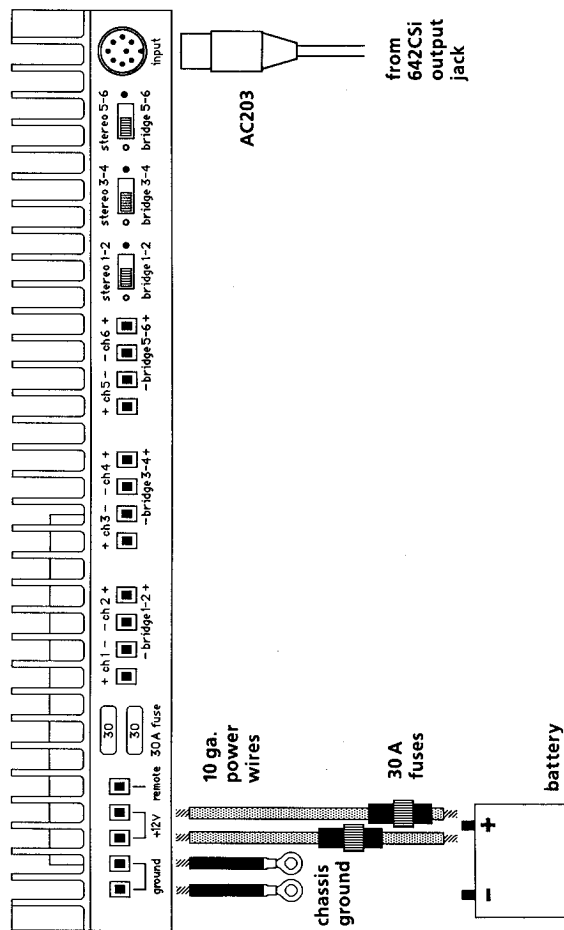
If you need to replace a PH15 power fuse, replace it only with a fuse identical to that supplied with the PH15. Use of a higher rating fuse may result in damage to the PH15 which is not covered by the warranty.

Make sure the stereo/bridge switches for each pair of channels are correctly set for your particular installation.

Do not connect a speaker load of less than 4 Ohms to any bridged pair of PH15 amplifier channels.

Make sure your head unit and/or other equipment is turned off while connecting to the PH15 input jacks and speaker terminals. Turn on the various components and slowly advance the volume control only after checking and double-checking all connections.

PH15 connections



Associated equipment

The PH15 will work well with many different types of signal sources and speakers, but the final result depends on your choice of equipment. Your a/d/s/ dealer can help you select components to complement the high performance of the PH15. a/d/s/ automotive loudspeaker systems are particularly well suited for use with the PH15, thanks to their broad frequency response, low distortion and wide dynamic range. Consult your a/d/s/ dealer for information.

The PH15 works best in a system that includes the a/d/s/ 642CSi signal processing unit. The 642CSi combines the functions of input signal conditioner, electronic crossover and constant-bass control unit. If the 642CSi is not a part of your new system, please consult with your a/d/s/ dealer.

Installation notes

The PH15 generates heat in normal operation. Be sure that the cooling fins of the PH15 are in free air, not covered over, and are not against a panel or other surface.

The + 12V and ground wires must be 10 AWG stranded copper wire with heavy insulation. Smaller gauge wire will cause increased power losses and can lead to dangerous overheating conditions.

The remote wire can be relatively light wire; 18 AWG is recommended. Keep the length of all wires as short as possible. In most systems, the remote power control connection is made at the 642CSi and is relayed to the PH15 through the DIN connecting cable.

Make all speaker connections with 16 AWG or larger wire.

The PH15 can receive input signals either from low level sources (the pre-amp outputs on the head unit or the outputs from an electronic crossover used in a subwoofer/satellite system) or from high level sources such as the speaker outputs of a head unit. The PH15's input jack is used for either type of source. The adjustment range of the PH15's input level controls lets it work with either type of source. See **Operation**, following, for information on setting levels.

System configurations

Your system will probably be, or be like, one of the following three typical configurations:

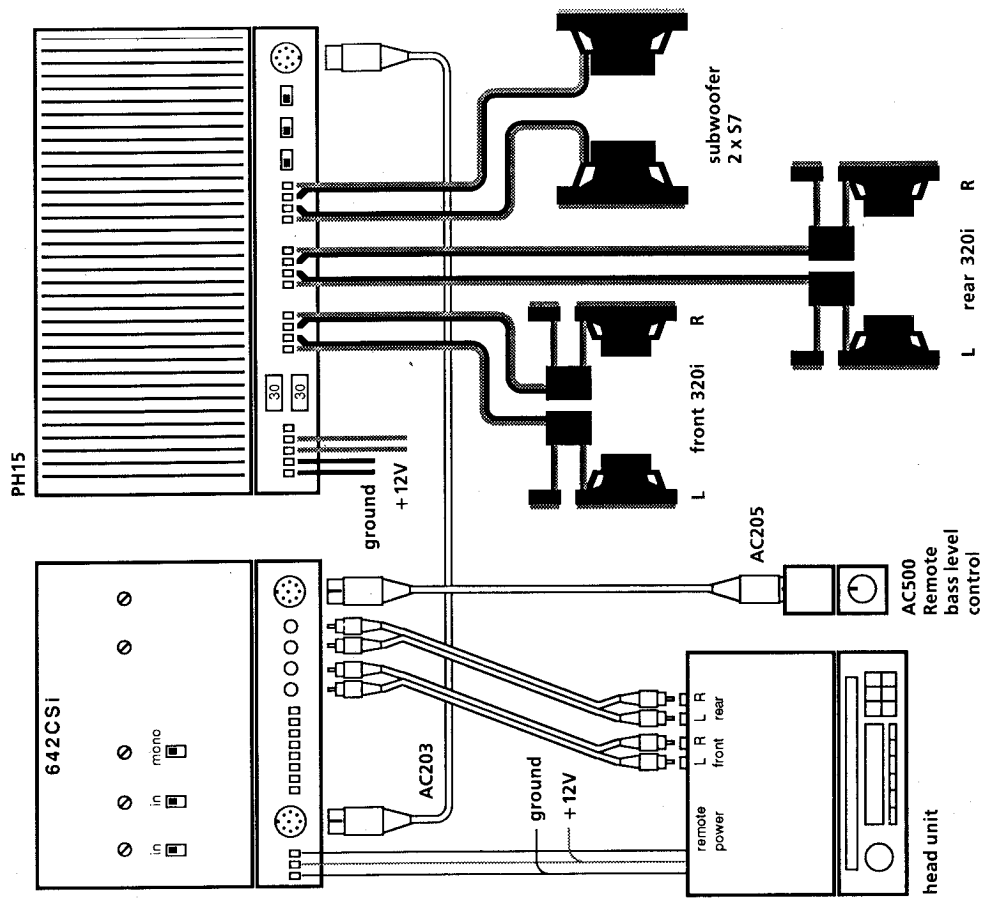
- A** Six channel, six speaker system with two subwoofer and four satellite speakers.
- B** Four channel, four full-range speaker system.
- C** Three channel, single subwoofer/two satellite speaker system.

A multi-conductor cable with DIN plugs connects the 642CSi to the PH15. In systems which don't include the 642CSi, shielded cables from the head unit can be soldered to a mating DIN plug for connection to the PH15. Alternatively, an a/d/s/ AC202 phono jack-to-DIN plug adapter can be used to mate standard stereo connecting cables to the PH15. See **Specifications** for a list of accessories.

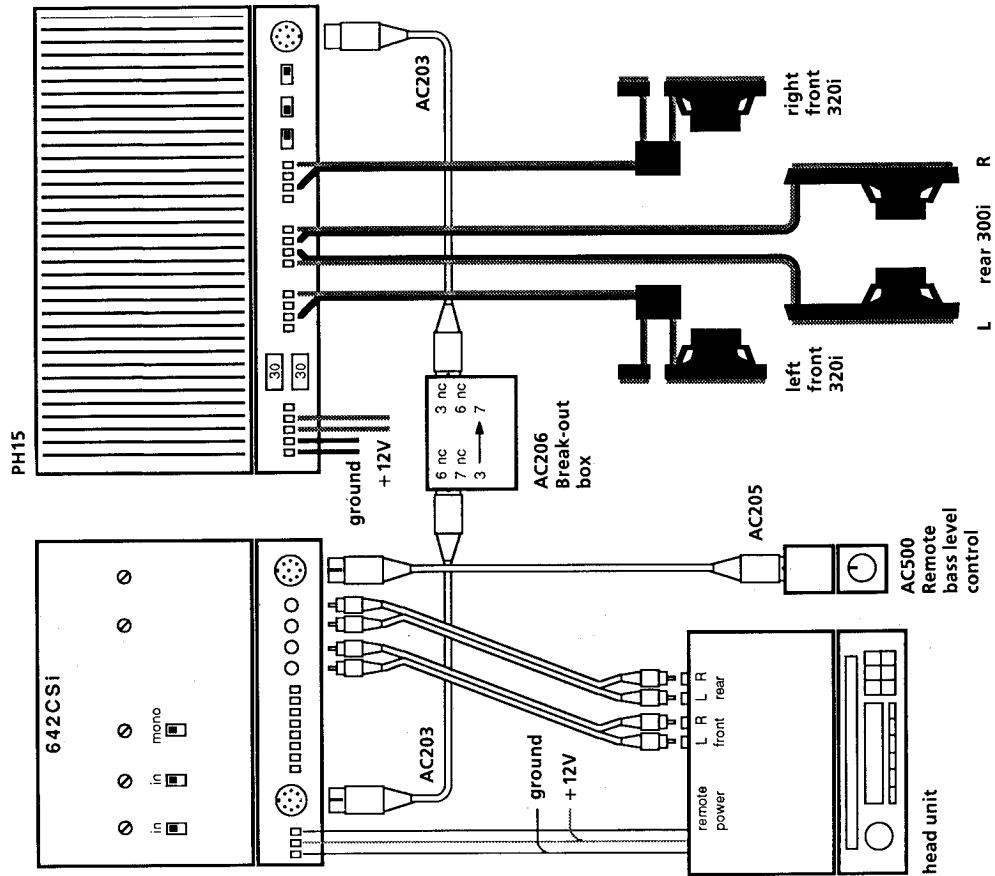
Be careful to correctly match head unit output channels to PH15 amplifier channels and speakers so that the head unit's balance and fader controls work correctly. See the pin-out information in the connection diagram and **Specifications** section of this manual. Some system configurations require that connections between the DIN jacks of the 642CSi and the PH15 be reassigned. The a/d/s/ AC206 Break-out box makes pin reassignment simple.

Power for systems using a single PH15 can be supplied by any typical automotive electrical system. Systems using two or more PH15's may require a heavy-duty alternator and a larger battery.

A Six channel,
two subwoofer/four satellite speaker system



B Four channel,
four full-range speaker system



Typical configurations

A

Six channel, two subwoofer/four satellite speaker system In the six speaker subwoofer/satellite system, the head unit's outputs are fed through the 642CSi to the PH15, and then to the PH15. Set PH15 amplifier channels 1 and 2 to bridge mode, to drive the left front speaker using the 642CSi's Left Front output. Set PH15 channels 5 and 6 to bridge mode, to drive the right front speaker with the 642CSi's Right Front output. Set PH15 channels 3 and 4 each to stereo mode, to drive the left rear and right rear speakers using the 642CSi's Left Rear and Right Rear outputs, respectively. Add constant bass signal to all channels. The AC206 lets you easily disconnect unused 642CSi output pins 6 and 7, and connect 642CSi output pin 3 to PH15 input pin 7.

This system is well suited to any vehicle because of its high acoustic output and straightforward connection.

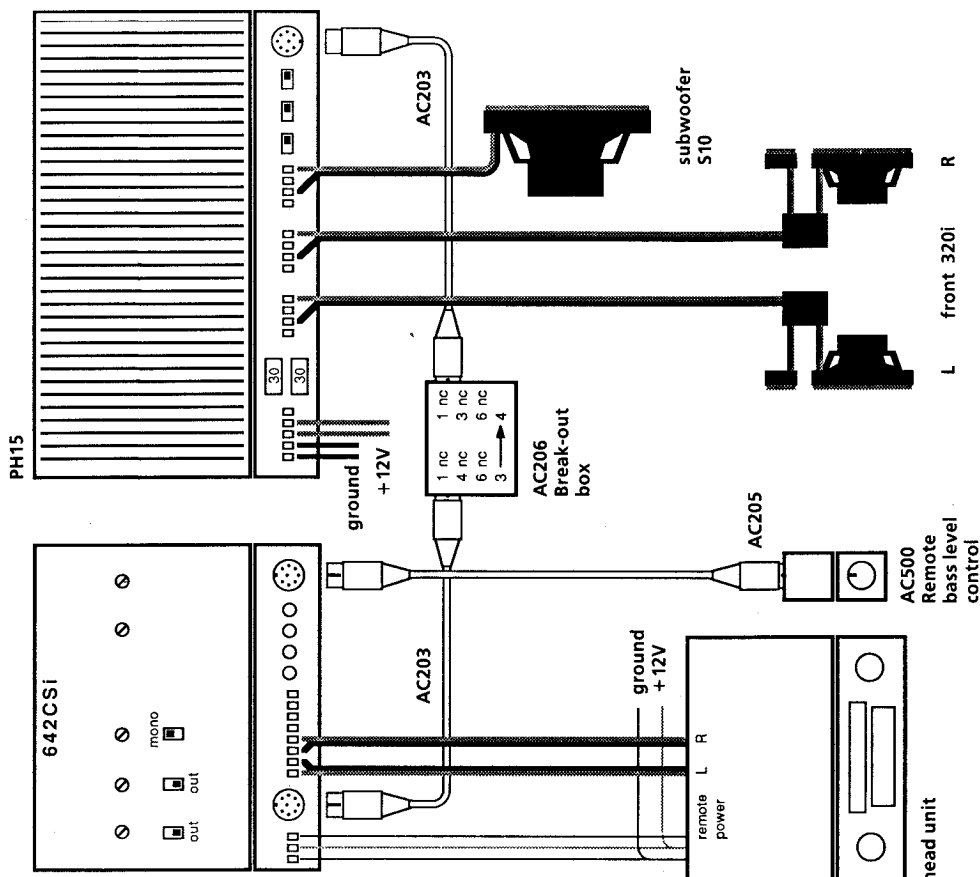
The 642CSi can receive high-level speaker outputs or low-level preamp outputs from the head unit, or a combination of the two, making it adaptable to any type of head unit. When the head unit has only two outputs (Left and Right), "Y" each of the two outputs to split it into two and feed the two to the front and rear inputs of the left and the right channels of the 642CSi.

B

Four channel, four full-range speaker system In this system, the head unit's outputs are fed through the 642CSi to the AC206, and then to the PH15. Set PH15 amplifier channels 1 and 2 to bridge mode, to drive the left front speaker using the 642CSi's Left Front output. Set PH15 channels 5 and 6 to bridge mode, to drive the right front speaker with the 642CSi's Right Front output. Set PH15 channels 3 and 4 each to stereo mode, to drive the left rear and right rear speakers using the 642CSi's Left Rear and Right Rear outputs, respectively. Add constant bass signal to all channels. The AC206 lets you easily disconnect unused 642CSi output pins 6 and 7, and connect 642CSi output pin 3 to PH15 input pin 7.

This system is well suited to smaller vehicles since it requires little space, yet provides high acoustic output with good bass. The higher power bridged channels drive the primary speakers in the front for correct "stage" and image. The rear speakers provide excellent bass support and also good stereo for rear seat passengers. The head unit's Front/Rear fader and other controls work normally to adjust the relative balance of the two pairs of speakers.

C Three channel, single subwoofer/two satellite speaker system



Operation

C Three channel, single subwoofer/two satellite speaker stereo In this high power system, bridge PH15 channels 5 and 6 to drive the subwoofer using the 642Csi's mono Left Subwoofer output. Bridge PH15 channels 1 and 2 to drive the left front speaker with the 642Csi's Left Front output, and bridge PH15 channels 3 and 4 to drive the right front speaker with the 642Csi's Right Front output. Connect only the head unit's Front outputs to the 642Csi. Connect the 642Csi to the PH15 through the AC206 to reassign connections to the bridged PH15 channels. Do not add constant bass to the front speakers. The AC206 lets you easily disconnect unused 642Csi output pins 1, 4 and 6, and connect 642Csi output pin 3 to PH15 input pin 4.

This system is particularly suited to trucks and 4WD vehicles that have room for a large subwoofer. In larger vehicles and vans, this system is easily expanded to five channels by reconfiguring and adding a pair of rear speakers.

Other configurations The PH15 makes other configurations possible—for example, a PH15 can be used to make a powerful system with two biamplified main speakers and two subwoofers. However, most will be variations of the basic configurations shown here and such configurations are not discussed in this manual.

Operation of the PH15 consists of correctly setting the stereo/bridge switches, adjusting the input level controls, and avoiding use conditions which result in distortion and poor sound quality.

Setting the stereo/bridge switches

When you are using the PH15 as a six channel amplifier with six speaker systems connected, set all the stereo/bridge switches to their left-hand, **stereo** positions. When you are using the PH15 as a high-power, three channel bridged amplifier driving three speaker systems, set all the switches to their right-hand, **bridge** positions. When you are using the PH15 as a five or four channel amplifier, set the switch(es) of the two amplifier channels you are bridging to the **bridge** position, and set the other switch(es) to the **stereo** position.

If your system includes an a/d/s/642Csi, follow the instructions in its manual for setting its controls and for adjusting the PH15's input level controls.

Trying the system Once you have checked that all connections to the PH15 are secure and correct, you may try the system. Initially set the PH15's input level controls to full counter-clockwise rotation (fully down). Turn on the power to your head unit, and then, if the PH15 is separately switched, turn on the remote switch for the PH15. Leave the volume control on the head unit turned down for a moment to allow the PH15 to power up. You may hear a mild 'pip' through the speakers when the PH15 turns on.

Select a program source on the head unit and slowly turn up the volume control. If no sound or distorted sound is heard, immediately turn off the system, check fuses and check all power and signal wiring for correct and secure connections. If the problem persists, consult with your a/d/s/dealer or service technician.

Input level adjustment Before following the procedure for adjusting input levels, **be sure** your speakers are rated for the maximum power output capability of the PH15.

Be certain that the PH15's input level controls are fully counter-clockwise (fully down) and set the tone, balance and fader controls of the head unit to mid-rotation. Set the head unit's volume control to full clockwise rotation (fully on).

Each of the PH15's level controls adjusts two channels simultaneously in stereo mode, and each adjusts the level of a bridged pair in bridge mode. Be sure that the stereo/bridge switches are in the correct positions **before** adjusting the PH15's input level controls.

Head unit volume control maximum setting Adjust the PH15's level controls clockwise until the sound is at a comfortable level and the pairs of channels are balanced. Now listen for clarity and freedom from distortion in the sound. If you hear distortion, slowly turn the head unit's volume control down until the sound is clear and mark the setting. If you don't initially hear distortion, leave the head unit's volume control at full rotation. In either case the resulting volume control setting is the maximum for undistorted output from the head unit.

Input level control maximum settings Set the head unit's volume control to the maximum setting and turn the PH15's input level controls up, one at a time, until the sound is distorted (limited by either the amplifier or the speakers). Note the setting for the control, then turn it down. When you have found the maximum setting for all three controls, turn down the head unit's volume control and set the PH15's input level controls to the settings you found. This procedure maximizes the system signal-to-noise ratio and its overall reliability. These settings of the input level controls should result in a satisfactory range of sound levels from very soft to full output.

In some head units, the output levels from the radio and from cassette tapes or compact discs may be substantially different. Check all sources when setting the PH15's input level controls and use the source which is loudest for a given volume setting.

Maintenance

The PH15 requires little routine maintenance. Keep the chassis free from dust and dirt, and check the quality of the various connections every few months, with the power off.

Do not use solvents or liquid cleaners of any kind on the PH15's chassis. Dust and dirt can be removed with a dry cloth or soft brush.

In case of difficulty

The most common difficulties are noise and/or distortion, and thermal cycling. A blown PH15 fuse is an unusual occurrence. If you want to talk to us about any problems, call:

a/d/s/ Customer Service
617-729-1140, between 9AM and 5PM, Eastern time.

System noise and distortion The background noise level of the system will vary widely with different equipment and the choices of individual component grounding points. This noise usually consists of "alternator whine," a buzzing sound which changes in pitch as the engine RPM changes.

Do not confuse this noise with the normal background "hiss" which occurs when playing tapes at high levels, or the various "static" noises which normally occur with AM and FM radio reception. The tape hiss and static noises are either normal or the result of problems with the head unit and have nothing to do with the PH15. Most noise problems resulting from grounding problems are audible even when the volume control of the head unit is turned fully down.

Noise in the system may be normal, depending on its source. Tape "hiss" and radio "static" are common and sometimes unavoidable noises in the system; review Input level adjustment, preceding, to minimize these noises. Engine speed related noises, especially those heard at low volumes, usually are solvable.

Distortion, especially when it occurs at high volume, may simply be the result of overdriving the amplifier or the speakers or both. Overcoming the noise resulting from driving at highway speeds with the windows down, for example, will tax the abilities of any automotive sound system. The obvious cure is to reduce the volume level of the system.

A defective loudspeaker can also cause distortion. Fuzzy or raspy sound, especially at loud levels, is a sign of loudspeaker failure. Listen to each driver of each loudspeaker system in turn to determine which speaker is defective, and replace it.

Thermal cycling The PH15 is protected from excessive temperatures by a thermal cutoff which turns off the power converter when the heatsink temperature exceeds approximately 80°C. Normal operation of the PH15 resumes automatically when the heatsink cools down.

The PH15 may run excessively hot when:

- cooling air to the heatsink is blocked
- the ambient temperature of the air around the PH15 is very high
- more than one speaker system is used with a pair of PH15 amplifier channels in bridge mode (the load is less than 4 Ohms)

Check the setting of the **stereo/bridge** switches, and remove anything which blocks the flow of air over the PH15.

Loss of sound A blown PH15 fuse is unusual and may result from problems within the PH15. Use only a replacement fuse of the exact type and rating specified for the PH15. The power fuses plug into fuse blocks in the PH15's connector panel. If a replacement fuse blows immediately, take the PH15 to your a/d/s/ dealer or authorized service agency for assistance.

Occasionally, the protection circuits of the PH15 which detect power output beyond the safe capabilities of the amplifier may turn the PH15 off momentarily. When this occurs, reduce the volume level of the system and check the position of the stereo/bridge switches. A defective loudspeaker also may trigger this condition. Listen for distortion from the speakers at medium volume levels; if you hear distortion, try to determine which speaker is defective and replace it.

Specifications

Power output (Watts), all channels driven, continuous

FTC rated, 20Hz to 20kHz, $\leq 0.05\%$ THD:

4 Ohm, 6 channel	6 x 50
4 Ohm, 5 channel	1 x 100 + 4 x 50
4 Ohm, 4 channel	2 x 100 + 2 x 50
4 Ohm, 3 channel	3 x 100
2 Ohm, 6 channel ($\leq 0.5\%$ THD)	6 x 55

Typical midband, 1kHz, $< 1\%$ THD:

4 Ohm, 6 channel	6 x 55
4 Ohm, 5 channel	1 x 110 + 4 x 55
4 Ohm, 4 channel	2 x 110 + 2 x 55
4 Ohm, 3 channel	3 x 110
2 Ohm, 6 channel	6 x 60

IHF slew factor

≥ 5

IHF dynamic headroom

$\geq 1.2\text{dB}$

Damping factor

> 100 into 4 Ohms

Frequency response

10Hz to 40kHz, $\pm 1\text{dB}$

Signal to noise ratio

$> 105\text{dB}$ A re full power, 20kHz bandwidth

Input sensitivity

45mV-1.2V for 1 Watt output

Input impedance

50kOhms

Input DC power supply current over

10 to 16VDC operating range:

No signal	2 A
Average	15 A
Maximum output	60 A
Remote	0.01 A

Power fuses

2, Type ATO, 30 Amp

8-pin DIN input jack connections

pin 1	ch 4 input, Right Rear
2	Audio signal ground
3	ch 2 input, Right Front
4	ch 3/br 3-4 input, Left Rear
5	ch 1/br 1-2 input, Left Front
6	ch 6 input, Right Subwoofer
7	ch 5/br 5-6 input, Left Subwoofer
8	remote power control

Dimensions

360mm/14 $\frac{1}{8}$ " w by 60mm/2 $\frac{3}{8}$ " h by
210mm/8 $\frac{1}{4}$ " d

Weight

5 kg/11 lbs

Optional accessories

AC201 Cable adapter, 8-pin DIN jack (female) to 6 ea. phono plug (male)
AC202 Chassis adapter, 8-pin DIN plug (male) to 6 ea. phono jack (female)
AC203 1 foot cable, 8-pin DIN plug (male) each end
AC204 4 foot cable, 8-pin DIN plug (male) each end
AC205 15 foot cable, 8-pin DIN plug (male) each end
AC206 Break-out box, 1 DIN jack in-2 DIN jack out, for pin reassignments