

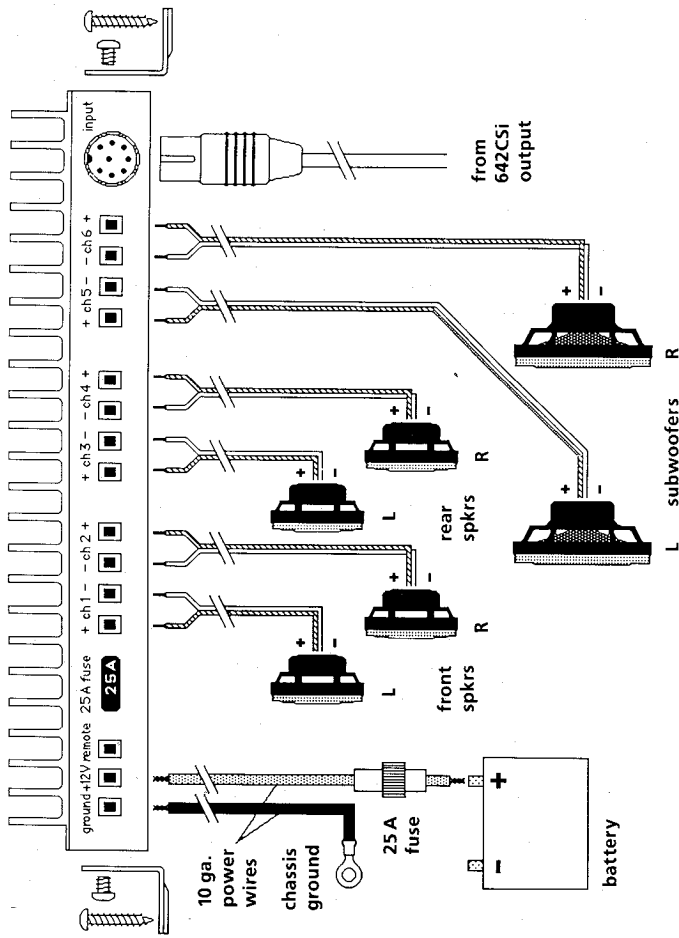
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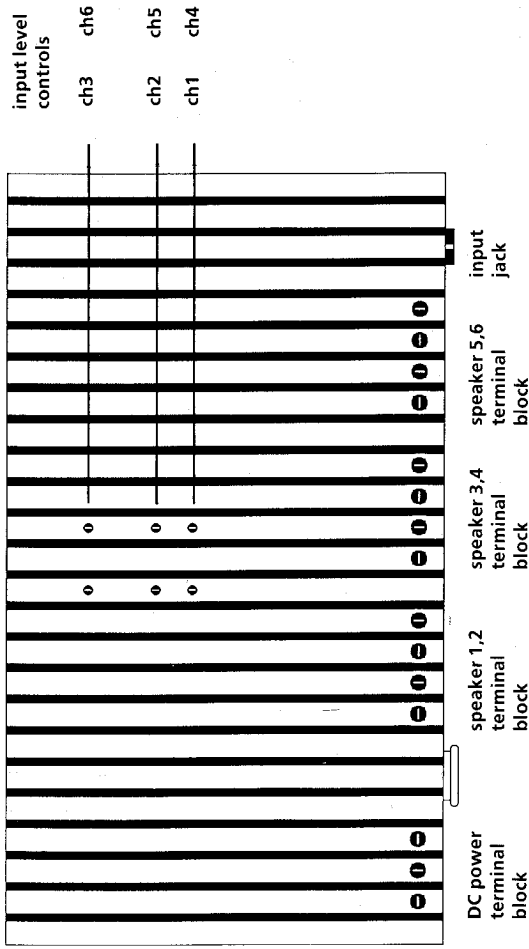
a/d/s/ analog and
digital systems

Six channel automotive
power amplifier

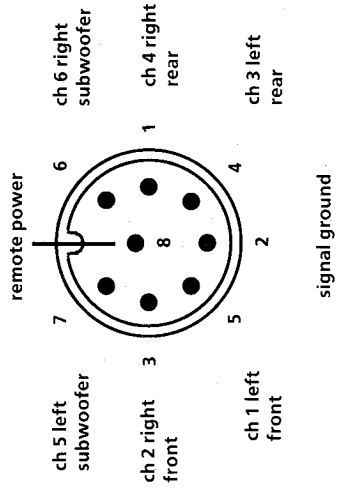
Six channel, four speaker, two subwoofer wiring



Top view



8-pin DIN input jack pin locations viewed from the front of the jack



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Introduction

Thank you for purchasing the a/d/s/ PH12. The PH12's discrete six channel, full-bridge design gives it unusually high power output and exceptional reproduction fidelity in a compact chassis. Its six amplifiers can be used to drive four separate full-range or satellite speaker systems and two subwoofers. Used with the a/d/s/642CSI, the PH12 results in a system of moderate cost yet extremely high performance.

This manual provides information on the connection and use of your PH12. Please read it thoroughly. We suggest you save this manual and the PH12 packing materials for future use.

Thank you,
Analog and Digital Systems, Inc.

About this manual

Correctly installing an automotive stereo system often requires special knowledge and experience. We strongly recommend that you seek professional services for the installation of your PH12 and other system components.

This manual contains information about the typical connection, use and maintenance of the PH12. 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, equalizer, 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.

ground terminal connects the ground wire to the PH12. The ground wire runs between the PH12 and a connection point on the chassis of the automobile.

+12V terminal connects the power supply wire which runs between the PH12 and the positive terminal of the battery.

remote terminal connects the control wire which provides remote power turn-on of the PH12 by the head unit or a dash-mounted switch.

25A fuse protects both the PH12 and the automobile's electrical system from fault conditions. The fuse is a standard automotive plug-in type ATO.

ch 1, ch 2 speaker terminal block connects the wires of two speaker systems to the PH12. 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 speaker terminal block connects the wires of two more

speaker systems to the PH12 in the same way as the ch 1, ch 2 terminal block.

ch 5, ch 6 speaker terminal block connects the wires of the two remaining speaker systems to the PH12 in the same way as the ch 1, ch 2 terminal block.

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 642C5i. The **remote** pin connection at this jack is in parallel with the **remote** power terminal on the PH12. Pin-out information is in the connection diagrams and in the **Specifications** section of this manual.

Input level controls adjust the gain of each amplifier channel for balancing and for matching the output level of the signal source. The controls are screwdriver adjustable using a narrow-blade (2mm) jeweler's screwdriver. The controls are accessible through holes in the top of the chassis between the heatsink fins.

Extruded aluminum chassis with integral heatsink makes the PH12 mechanically strong and physically small. It provides excellent cooling for the power supply and amplifier circuitry.

Hardware kit for the PH12 contains:
2 ea. mounting brackets.
4 ea. Phillips-head machine screws to attach the mounting brackets to the PH12.
4 ea. Phillips-head sheet metal screws to attach the mounting brackets and the PH12 to the vehicle.
1 ea. screwdriver to tighten power and speaker wire terminal clamp screws.

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 PH12 unmounted. Attach the PH12 securely to the vehicle to prevent damage to either the PH12 or the vehicle and its contents, particularly in the event of an accident.

Keep the PH12 away from locations subject to leakage or immersion in water.

Do not mount the PH12 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 wire must be fused at the battery positive terminal connection. Use a fuse of the same current rating as the fuse in the PH12. Disconnect the +12V wire at the battery end before making or breaking power connections at the PH12's power terminals.

If you need to replace the PH12 power fuse, replace it only with a fuse identical to that supplied with the PH12. Use of a higher rating fuse may result in damage to the PH12, which is not covered by the warranty.

Make sure your head unit and/or other equipment is turned off while connecting to the PH12 input jacks and speaker terminals. Turn on the various components and slowly advance the volume control only after checking and double-checking all connections.

The PH12 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 PH12. a/d/s/ automotive loudspeaker systems are particularly well suited for use with the PH12, thanks to their broad frequency response, low distortion and wide dynamic range. Consult your a/d/s/ dealer for information.

The PH12 works best in a system that includes the a/d/s/ 642C5i signal processing unit. The 642C5i combines the functions of input signal conditioner, electronic crossover and constant-bass control unit. If the 642C5i is not a part of your new system, please consult with your a/d/s/ dealer.

Installation notes

The PH12 generates heat in normal operation. Be sure that the cooling fins of the PH12 are in free air 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.

Make all speaker connections with 16 AWG or larger wire.

The PH12 can receive input signals either from low level sources (the pre-amp outputs on the head unit or the outputs from an electronic crossover such as the 642CSi used in a subwoofer/satellite system) or from high level sources such as the speaker outputs of a head unit. The PH12's **input** 8-pin DIN jack is used for either type of source. The adjustment range of the PH12's input level controls lets it work with either type of source. See **Operation**, following, for information on setting levels.

A multi-conductor cable with DIN plugs connects the 642CSi to the PH12. 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 PH12. Alternatively, an a/d/s/ female phono jack-to-male DIN plug adapter can be used to mate standard stereo connecting cables to the PH12.

Be careful to correctly match head unit output channels to PH12 amplifier channels and speakers so that the head unit's balance and fader controls work on the correct speakers. See the pin-out information in the connection diagrams and **Specifications** section of this manual.

System configuration

Your system will probably be like the typical configuration shown in the connection diagrams found inside the front and rear covers of the manual. This system is a six channel design using four full-range or satellite speakers and two subwoofers.

Six channel, two subwoofer/four satellite speaker stereo In the subwoofer/satellite system, the head unit's outputs are fed through the 642CSi to the PH12, so that the Front outputs drive the satellite speakers in the front, the Rear outputs drive the satellite speakers in the rear and low frequency information is fed to the subwoofers. This wiring lets you use the head unit's Front/Rear fader to adjust the relative balance of the pairs of satellites.

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" the two outputs to split them into four and feed them to the four inputs of the a/d/s/ 642CSi. See the 642CSi Owner's manual for details.

The PH12 makes other configurations possible — for example, a PH12 can be used to make a powerful system with two biamplified main speakers and two subwoofers. However, such configurations are not discussed in this manual.

Input level adjustment and operation

Operation of the PH12 consists of correctly adjusting the input level controls and avoiding use conditions which result in distortion and poor sound quality.

Consult the 642CSi Owner's manual for information about its control settings. Normally, its input level controls are set fully clockwise (fully up).

Trying the system Once you have checked that all connections to the PH12 are secure and correct, you may try the system. Initially set the PH12's input level controls to mid-rotation (halfway up). Center all head unit controls and turn the volume control fully off. Turn on the power to your head unit, and then if the PH12 is separately switched, turn on the remote switch for the PH12. Leave the volume control on the head unit turned down for a moment to allow the PH12 to power up. You may hear a mild "pip" through the speakers when the PH12 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 dealer or service technician.

Before following the procedure for adjusting input levels, **be sure** your speakers are rated for the maximum power output capability of the PH12.

Head unit maximum volume control setting Set the PH12's input level controls fully counter-clockwise (fully off). Set the tone, balance and fader controls of the head unit to their middle positions (all flat and balanced). Set the head unit's volume control to maximum (fully on).

Each of the PH12's level controls adjusts a single channel. Adjust the PH12's level controls clockwise until the sound is at a comfortable level for you and the 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 down until the sound is clear. If you don't initially hear distortion, leave the head unit's volume control fully on. In either case the resulting head unit volume control setting is the maximum for undistorted output from the unit. You may want to mark this setting.

PH12 maximum input level control settings For this step we suggest that you adjust the PH12's amplifier channels in pairs. Leave the head unit's volume control at the maximum setting found in the step above. Adjust the head unit's fader so that only the front pair of speakers is on. Turn the PH12's **ch 1** and **ch 2** input level controls for the front speakers further clockwise until the sound is distorted (limited by either the amplifier or the speakers). The sound level will likely be very loud, so when the levels are reached where distortion occurs, quickly turn down the head unit's volume control.

Now set the head unit's fader so that only the rear speakers are on. Adjust the head unit's volume control to the maximum setting determined in the **Head unit maximum volume** section, as before. Turn the PH12's **ch 3** and **ch 4** input level controls for the rear speakers further clockwise until the sound is distorted (limited by either the amplifier or the speakers). Again, turn down the head unit's volume as soon as the adjustments are complete.

Now center the head unit's fader control, adjust the volume for a comfortable level and slightly adjust the PH12's **ch 1** through **ch 4** input level controls so that the levels from each speaker are balanced.

Set the 642CSi's remote bass control to mid rotation for the next step. Adjust the PH12's **ch 5** and **ch 6** input level controls for the subwoofers so that the level of the bass output matches the level of the four front and rear speakers, and so that the resulting sound is balanced and natural. The PH12 input level control settings are complete.

The above procedures maximize 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.

Note: 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 PH12's input level controls to be sure that all provide maximum undistorted output.

The most common difficulties are noise and/or distortion, and thermal cycling. A blown PH12 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 PH12. 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 PH12 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 PH12 resumes automatically when the heatsink cools down.

The PH12 may run excessively hot when:

- cooling air to the heatsink is blocked
- the ambient temperature of the air around the PH12 is very high
- more than one speaker system is used with a single PH12 amplifier channel (the load on the amplifier channel is less than 2 Ohms)

Remove anything which blocks the flow of air over the PH12.

Maintenance

Loss of sound A blown PH12 fuse is unusual and may result from problems within the PH12. Use only a replacement fuse of the exact type and rating specified for the PH12.

The power fuse plugs into a fuse block in the PH12's connector panel. If a replacement fuse blows immediately, take the PH12 to your a/d/s/ dealer or authorized service agency for assistance.

Occasionally, the protection circuits of the PH12 which detect power output beyond the safe capabilities of the amplifier may turn the PH12 off momentarily. When this occurs, reduce the volume level of the system. 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.

The PH12 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 PH12's chassis. Dust and dirt can be removed with a dry cloth or soft brush.

Specifications

Power output (Watts), all channels driven, continuous

FTC rated, 20Hz to 20kHz, $\leq 0.3\%$ THD:

4 Ohm 6 x 20

2 Ohm (0.5% THD) 6 x 35

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

4 Ohm 6 x 22

2 Ohm 6 x 38

IHF dynamic headroom > 0.8 dB

Damping factor > 50 into 4 Ohms

Frequency response 10Hz to 40kHz, ± 1 dB

Signal to noise ratio > 100 dB/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 1.8A

Average 7A

Maximum output 25A

Remote 0.01 A

Power fuse Type ATO, 25 Amp

8-pin DIN input jack connections

pin 1 ch 4 input

pin 2 Audio signal ground

pin 3 ch 2 input

pin 4 ch 3 input

pin 5 ch 1 input

pin 6 ch 6 input

pin 7 ch 5 input

pin 8 remote power control

Dimensions 250mm/9 $\frac{7}{8}$ " w. by 50mm/2" h. by 200mm/7 $\frac{7}{8}$ " d.

Weight 3.6kg/8 lbs.

Head unit and 642CSI connections

642CSI

Six, four and two channel systems
Constant bass • Signal processor • Interface adapter

