AP4-CH42

Advanced Amplifier Interface for
Chrysler / Dodge / Jeep / RAM
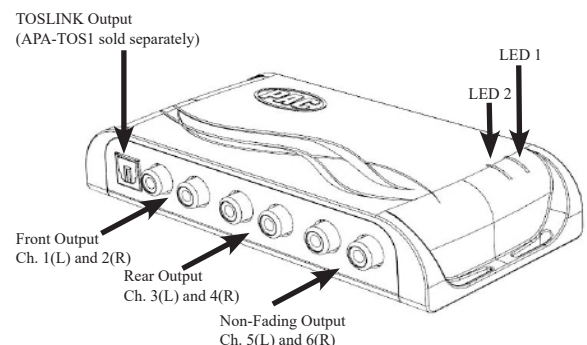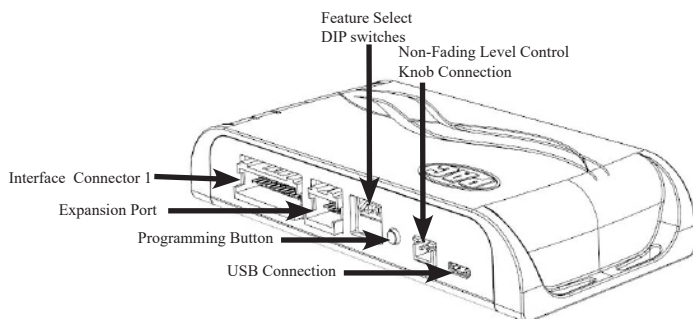
Introduction and Features

The AP4-CH42 provides a 6-channel pre-amp output for use with aftermarket audio equipment. Using the full range, fixed level head unit output, in conjunction with CAN messages, the AP4-CH42 delivers a variable 5v RMS pre-amp output with fading, balance, equalization, and level control capabilities. The module also retains all audio from other vehicle features such as factory navigation prompts, Bluetooth, uConnect, and parking sensor chimes. A data controlled remote amplifier turn on wire is also provided by the AP4-CH42. When used in conjunction with the APA-TOS1 (sold separately), the module can provide a variable 2-channel fiber optic digital audio output (TOSLINK).

Important Notes

1. Compatible with both amplified and non-amplified factory systems.
   - **Amplified Vehicles**
     - Compatible with all data-bus controlled amplified systems, no matter the screen size (including the 12" screen). To identify these systems, look for logos on door speakers, tweeters, dash speakers or the subwoofer to confirm if the vehicle has an amplified system (Alpine & Harmon Kardon). Some vehicles may not always have branded systems. Unbranded amplified systems are generally identified by locating a center channel speaker or subwoofer
   - **Non-Amplified Vehicles**
     - **Jeep Wrangler:** Compatible with all screen sizes (5", 7" and 8.4").
     - **All other models:** Only compatible in vehicles equipped with the 7" or 8.4" screen. Vehicles equipped with the 5" screen are not compatible.
     - If you are installing the AmpPRO in a vehicle that is not equipped with a factory amplifier, you must add an amplifier to the vehicle's speakers, as the factory radio will no longer have a 4 channel variable output after it has been re-configured by the AmpPRO. For example, you can not add only a subwoofer to a non-amplified vehicle, as the radio will no longer power the cabin speakers properly.
     - Non-amplified vehicles equipped with an Active Noise Cancellation (ANC) system require the ANC module to be bypassed. This can be done manually or with the ANC bypass harness ANC-CH01. See page 2 Step 6d to re-configure the factory radio.
2. If a factory amplifier is present, it must remain connected and in the vehicle after the AmpPRO has been installed.
3. The remote output is rated at 2A of current. If more current is needed an external relay must be used.
4. Channels 5 and 6 are non-fading outputs. The output level of channels 5 and 6 can be controlled using the supplied level control knob.
5. The chime volume and minimum volume levels are set to 0 dB by default. If you are happy with this level in your particular application, additional adjustment is not required. Please refer to the Setup and Configuration section on page 2 for more details.
6. The level control knob must be connected in order to manually adjust the chime volume and minimum volume settings.
7. The factory radio's speed controlled volume and surround sound mode are not supported by the AP4 outputs.
8. When using the TOSLINK output (APA-TOS1 sold separately), DIP switch 1 must be on in order for all warning chimes to be heard through the sound system (see page 2 Step 6a for details).
9. No adjustments can be made manually using the programming button, or the factory SWC when the module is connected to a PC.
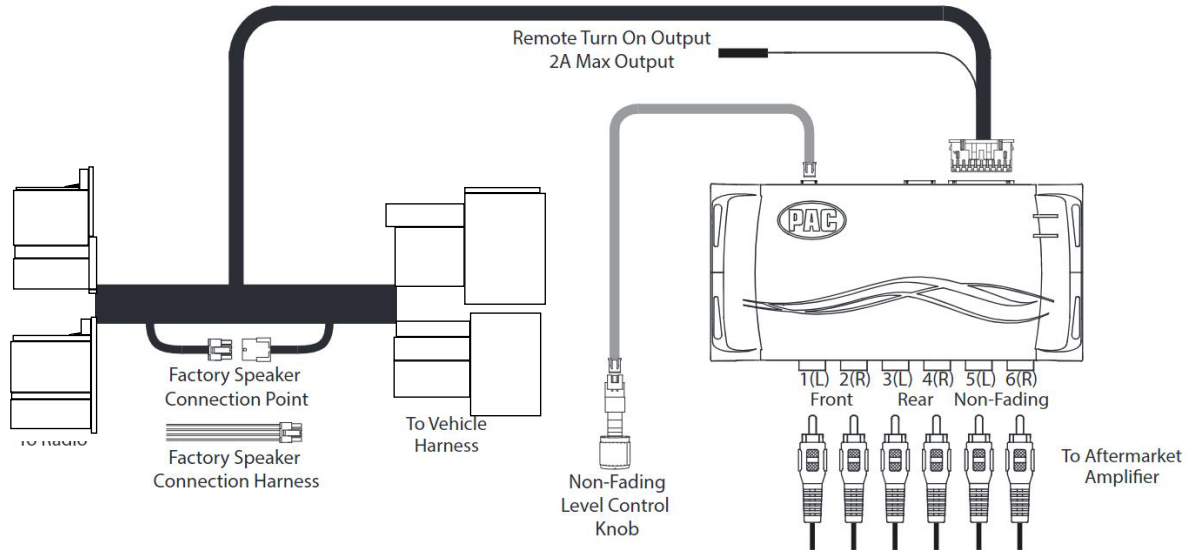
Module Layout

Feature Select DIP switches
Non-Fading Level Control Knob Connection
Interface Connector 1
Expansion Port
Programming Button
USB Connection

TOSLINK Output (APA-TOS1 sold separately)
LED 1
LED 2
Front Output Ch. 1(L) and 2(R)
Rear Output Ch. 3(L) and 4(R)
Non-Fading Output Ch. 5(L) and 6(R)

Wiring Connection Chart

Remote Turn On Output
2A Max Output

Factory Speaker Connection Point

To Radio

Factory Speaker Connection Harness

To Vehicle Harness

Non-Fading Level Control Knob

1(L) 2(R) 3(L) 4(R) 5(L) 6(R)
Front   Rear   Non-Fading

To Aftermarket Amplifier

Installation
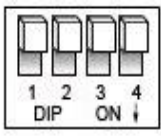
Set DIP switches to the ON position to activate the corresponding features.
Set DIP switches to the OFF position for any features that are not desired.

DIPSWITCH ON = DOWN

Two Channel Mode	5v / 4v Preout	No Function	Non-Amplified Vehicles
1	2	3	4

1. Remove factory radio.
2. Disconnect the main 32 & 12-Pin factory harness from radio.
3. Connect AmpPRO harness to vehicle harness.
4. Connect AmpPRO harness to factory radio.
5. If you are using the AmpPRO in a vehicle with a factory amplifier, leave the "Factory Speaker Connection Point" connectors plugged into each other. If the vehicle has no factory amplifier, connect the aftermarket amplifier's speaker outputs to the provided "Factory Speaker Connection Harness" and connect to the "Factory Speaker Connection Point."
6. Set any feature DIP switches that apply to your install.
   a. Set DIP switch 1 on (down) to activate two channel mode. In this mode, both the TOSLINK and front RCA outputs (1 and 2) become non-fading outputs. All rear chimes will also be routed through these outputs in two channel mode
   b. Set DIP switch 2 on (down) to lower the RCA output voltage to 4v. Leave DIP switch 2 off (up) to keep the RCA output voltage at 5v. See troubleshooting section on page 6 for more details.
   c. DIP switch 3 is not used.
   d. DIP switch 4 is for vehicles without a factory amplifier. Set DIP switch 4 on (down) to reconfigure the radio for proper communication with the AmpPRO.
7. If you are using the APA-TOS1 (sold separately) refer to the instructions included with that product for its installation
8. Connect the AmpPRO harness to the module.
9. Connect the level control knob to the module and install in an accessible location.
10. Connect the signal cables and remote input from the aftermarket amplifier.
11. Complete the "Radio Reset Procedure." (see page 5 for more information)
    a. Make sure the radio is fully booted and LED 1 is on. Press and hold the "Programming Button" until the LEDs alternate flashing amber, then release.
    b. The LEDs will alternate flashing green and the radio will re-boot
12. Turn the vehicle off, close the doors and let the vehicle sit for 5 minutes.

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Setup and Configuration

1. Turn the ignition on. LED 1 on the interface will turn on and the +12v remote output will turn on.
2. Set the amp gain(s) to the desired level. We recommend using an oscilliscope and test tones to set the amp gain(s). Please refer to the MECP Advanced study guide (p. 360) if you are unfamiliar with this process.
3. Check volume, balance, fade and EQ settings.
4. If you would like to adjust the chime volume or minimum volume, do so using one of the methods outlined below. If you are happy with the default levels, no adjustments are necessary.

PLEASE NOTE: Knob must be connected to module for Minimum Volume or Chime adjustments.

Manually Setting the Chime Volume
You can manually set the level of the factory chime using either the programming button on the side of the interface or the factory SWC. If you would like to set the chime volume using the AmpPRO PC app please proceed to the AmpPRO PC app section.

Setting the chime volume using the programming button
1. Start with the level control knob turned all the way down (counter-clockwise).
2. Press the programming button on the side of the interface.
3. LED 1 will turn green and the chimes will begin continuously sounding.
4. Turn the level control knob clockwise until the desired chime level is reached.
5. You can now either press the programming button twice or wait ten seconds to exit the settings.

Setting the chime volume using the factory SWC
1. Start with the level control knob turned all the way down.
2. Press and hold the track down button on the factory SWC (Back left of steering wheel) for approximately ten seconds.
   PLEASE NOTE: The radio will respond to the SWC commands during this process, this is normal and has no effect on the AP4 operation.
3. LED 1 will turn green and the chimes will begin continuously sounding.
4. Turn the level control knob clockwise until the desired chime level is reached.
5. You can now either press the programming button twice or wait ten seconds to exit the settings.

Manually Setting the Minimum Volume
If the minimum volume of the radio (factory radio volume level 1) is too loud, you can manually set the level of the minimum volume using either the programming button on the side of the interface or the factory SWC. If you would like to set the minimum volume using the AmpPRO PC app, please proceed to the AmpPRO PC app section.

Setting the minimum volume using the programming button
1. Start with the level control knob turned all the way down (counter-clockwise).
2. Set the amp gains to the desired level.
3. Set the volume on the factory radio to 1.
4. Press the programming button on the side of the interface twice.
5. LED 1 will turn amber and the chimes will begin sounding every five seconds.
6. Turn the level control knob clockwise until the desired minimum volume level is reached.
7. You can now either press the programming button once or wait ten seconds to exit the settings.

Setting the minimum volume using the factory SWC
1. Start with the level control knob turned all the way down (counter-clockwise).
2. Set the amp gains to the desired level.
3. Set the volume on the factory radio to 1.
4. Press and hold the track up button on the factory SWC (Back left of steering wheel) for approximately ten seconds.
   PLEASE NOTE: The radio will respond to the SWC commands during this process, this is normal and has no effect on the AP4 operation.
5. LED 1 will turn amber and the chimes will begin sounding every five seconds.
6. Turn the level control knob clockwise until the desired minimum volume level is reached.
7. You can now either press the programming button once or wait ten seconds to exit the settings.

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Use of the AmpPRO PC App allows you to do the following:

- Configure User Interface Options such as:
  - Minimum Volume Level
  - Chime Volume Level
  - Enable / Disable AP4 Chimes
  - Enable / Disable factory EQ
  - Set Bass / Mid / Treble center frequencies and Q factor
- Update Product Firmware
- Read Firmware / Hardware Versions
- You can download the AmpPRO app at :
  https://pac-audio.com/app-downloads/
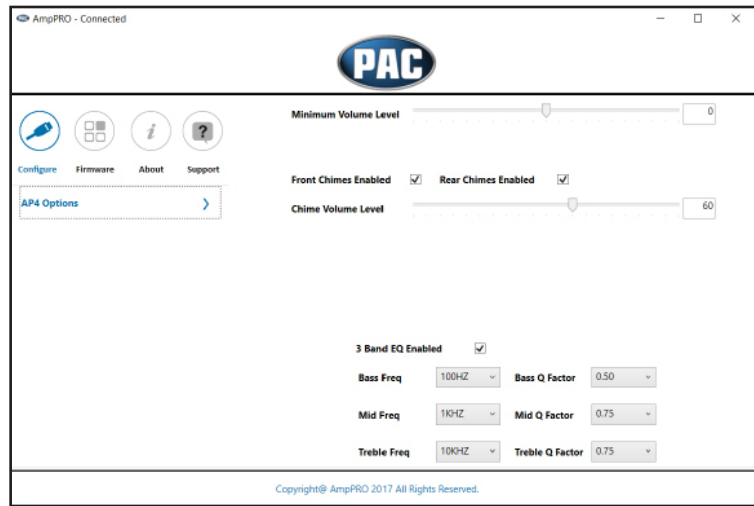
PLEASE NOTE: These settings can be adjusted with the module installed in the vehicle, or on the bench. However, it is recommended to make the adjustments with the module installed, and the factory radio on, so that the changes can be heard.

Minimum Volume Level - This allows you to set the minimum volume level of the factory radio (factory radio volume level 1).

Chime Volume Level - This allows you to set the volume of the AP4 chimes (ie: park sensors).

Front / Rear Chimes Enabled - This allows you to enable / disable AP4 chimes (ie: park sensors). This is used when mixing factory and aftermarket speakers.

3 Band EQ Enabled - This allows you to enable / disable the 3 band factory EQ.

Bass / Mid / Treble Freq / Q Factor - This allows you to set the center frequency that will be adjusted when setting the 3 band factory EQ, as well as the Q Factor for each frequency. The Q Factor determines how many of the adjacent frequencies will be affected when adjusting the selected frequency. The lower the Q Factor, the more frequencies will be affected. See below for available frequencies and Q Factors.

| Available Frequencies and Q Factors					
Bass Frequency	60HZ	Mid Frequency	500HZ	Treble Frequency	7.5KHZ
	80HZ		1KHZ		10KHZ
	100HZ		1.5KHZ		12.5KHZ
	120HZ		2.5KHZ		15KHZ
Bass Q Factor	0.50	Mid Q Factor	0.75	Treble Q Factor	0.75
	1.00		1.00		
	1.50		1.25		1.25
	2.00		1.50		

AmpPRO PC App (cont.)

Firmware Updates

The AmpPRO app will also allow you to update the interface with new firmware as it becomes available. Please visit www.pac-audio.com or contact our tech support department to see if there is a firmware update for your interface.

Connect the interface to your PC and select "Firmware", then "Update Firmware". Now select "Select File". Finally, browse to the place where you saved the file and select it. This will begin the updating process. Once finished, disconnect the interface from the PC and resume normal operation.
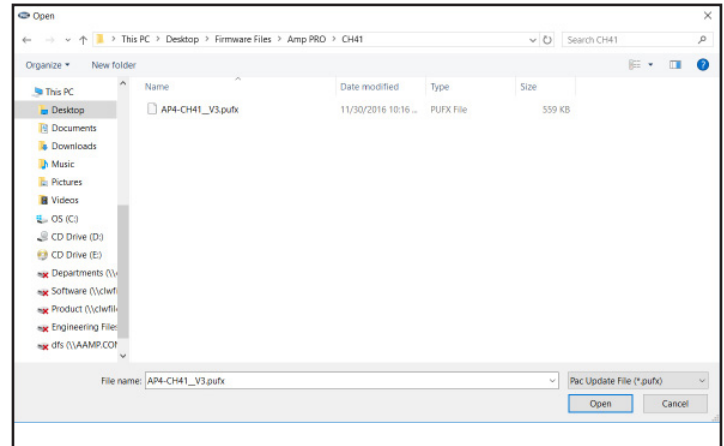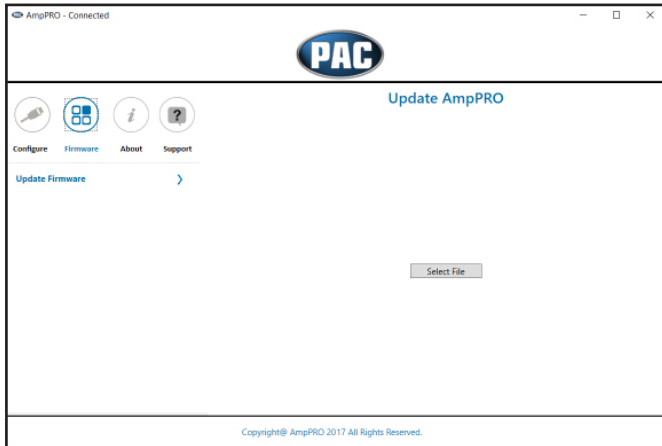
Radio Reset Procedure

The Radio Reset Procedure is used to speed up the installation process when re-configuring the radio for non-amplified vehicles or when OEM features are lost after installation. We recommend doing this procedure during the AmpPRO installation.

1. With the radio on (LED 1 red), press and hold the programming button until the LEDs are alternating flashing amber.
2. Release the programming button (you have 5 seconds before it moves to the next function)
3. The LEDs will start alternating flashing green and the radio will visibly restart.

In vehicles that do not support this reset, the LEDs will not flash amber. You will instead need to complete the "Sleep Cycle Procedure" outlined below.

Sleep Cycle Procedure

The Sleep Cycle Procedure is used if the "Radio Reset Procedure" is unsuccessful in re-configuring a non-amplified system, restoring lost OEM radio features or graphics, or restoring the factory system after AmpPRO removal.

1. Turn the vehicle ignition off
2. Exit the vehicle and close all doors, trunk and/or tailgate
3. Lock the vehicle with the keyfob and move the keyfob at least 25 feet away from the vehicle
4. Let it sit for 10 minutes
5. Unlock the doors, turn the igniton on and wait for the radio to boot up.
6. Repeat steps 1-5 for the second sleep cycle

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Restoring Factory Settings

Interface Reset

You can restore the interface to factory default settings by pressing and holding the programming button on the side of the module until the status LEDs start blinking red. Once the LEDs start blinking red, release the button.

This reset will restore the following settings to their factory defaults:

- Chime volume level
- Enable / Disable Factory Chimes
- Minimum volume level

- Enable / Disable factory EQ
- Factory EQ frequency
- Factory EQ Q factor

Restore Radio to Non-Amplified

If the AP4-CH42 was installed to a factory non-amplified vehicle, the radio was programmed to output a pre-amplified audio signal to the AP4. To restore the radio back to non-amplified programming, follow the steps below.

1. Remove the AP4-CH42 module and harness and re-connect the OEM radio connections back to factory.
2. Do 2 full sleep cycles (See page 5, "Sleep Cycle Procedure")
3. Test the radio to verify the vehicle was successfully restored.
   a. Test that you have audio signals coming through both the front and rear channels.
   b. Test the audio is variable with the radio's volume knob
   c. If the audio is still only on the rear channels and does not change with the volume knob, repeat the sleep cycle process

Troubleshooting

1. Hiss at high amp gain - Set feature DIP switch 2 to the on (down) position to lower the output voltage of the AP4 to 4v. If you still hear the hiss, lower your amp gains until the hiss is gone.
2. Cannot hear uConnect or nav voice - Use the volume knob while either of these voice prompts are active to adjust voice volume.
3. Cannot hear chimes - Set chime volume using process outlined in Setup and Configuration, or using the AmpPRO app. If you still do not hear chimes, be sure that you are using the remote output from the AP4 to turn on your aftermarket amplifier.
4. Low volume setting on radio is too loud - Set minimum volume using process outlined in Setup and Configuration, or using the AmpPRO PC app.
5. If for any reason the AmpPRO module becomes unresponsive, or will not power up with the key on, you can always reset the interface by turning the key to the ignition position, then pressing and holding the Volume Down button on the factory SWC for 12 seconds until a tone is heard.
6. LED 1 is lit up red, but there is no audio - You have installed the AmpPRO into a non-amplified vehicle. You must have DIP switch 4 on for this scenario
7. Audio is only playing out of the rear speakers and the volume knob does not work - You have re-configured the radio in a non-amplified vehicle and still have the cabin speakers connected to the factory radio. Aftermarket amplification on the cabin speakers must be used in this scenario.

LED Legend		
	Action / Color	During Normal Operation
LED 1	Solid Red	Module Active
	Solid Green	Chime Volume Adjustment Mode
	Solid Amber	Minimum Volume Adjustment Mode
	Rapid Blink Any Color	DSP Activity
LED 2	Blink Amber	USB Connection Detected
Both LEDs	Alternate Blinking Red	Programming button Being Held: Performing EPROM Reset
		No Action From User: Vehicle Data-BUS Going to Sleep
	Alternate Blinking Amber	Programming Button Being Held: Entering Radio Reset
	Alternate Blinking Green	Performing Radio Reset