CXD-Q
8-Channel Amplifier

Quick Start Guide

EXPLANATION OF TERMS AND SYMBOLS

The term "***WARNING!***" indicates instructions regarding personal safety. If the instructions are not followed the result may be bodily injury or death.

The term "***CAUTION!***" indicates instructions regarding possible damage to physical equipment. If these instructions are not followed, it may result in damage to the equipment that may not be covered under the warranty.

The term "***IMPORTANT!***" indicates instructions or information that are vital to the successful completion of the procedure.

The term "***NOTE***" is used to indicate additional useful information.

The intent of the lightning flash with arrowhead symbol in a triangle is to alert the user to the presence of un-insulated "dangerous" voltage within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to humans.

The intent of the exclamation point within an equilateral triangle is to alert the user to the presence of important safety, and operating and maintenance instructions in this manual.

IMPORTANT!: Read the safety instructions, TD-000420-20, included in the amplifier's package.

About this Document

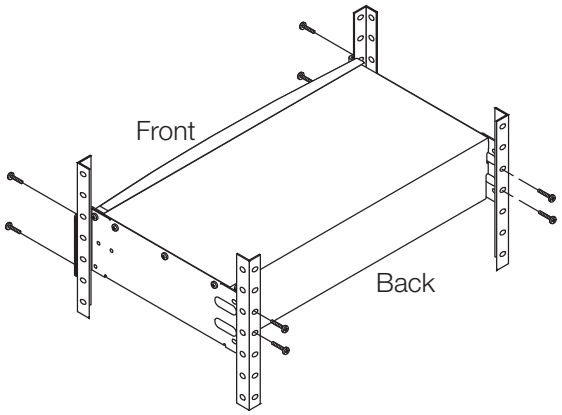
NOTE: This Quick Start Guide is based on the basic configuration as the amplifier comes from the factory. For detailed instructions for custom configurations refer to the CXD-Q User Guide (TD-001522).

This document covers the basic instructions to get your amplifier connected to the Q-SYS system and operational.

There are four different amplifiers covered by this document. The common name for all four amplifiers is CXD-Q. The individual names are: CXD8.4Q, CXD8.4Qn, CXD8.8Q, and CXD8.8Qn.

Rack-Mount the Amplifier

1. Secure the amplifier in the rack with eight screws (not supplied), four in front, four in back.

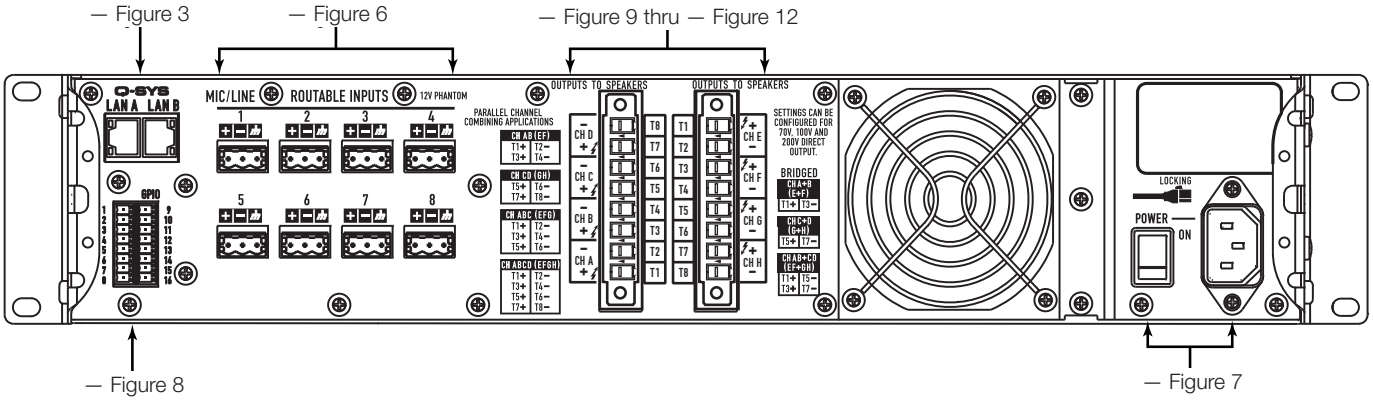


— Figure 1 —

TD-000476-01-A

Connections

The following connectors are on the rear panel of the amplifier. Refer to — Figure 2 for location of the connections discussed in this section.



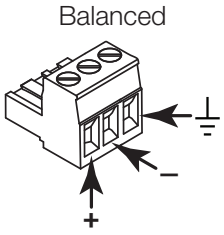
— Figure 2 —

Q-SYS Q-LAN Connection

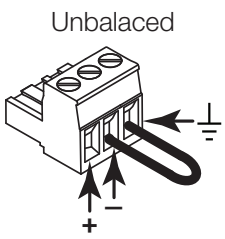
— Figure 3 —

Connect the amplifier LAN A and, if a redundant network is available, LAN B, to the Q-LAN network. (— Figure 3) Refer to your Q-SYS documentation for network requirements and connection detail.

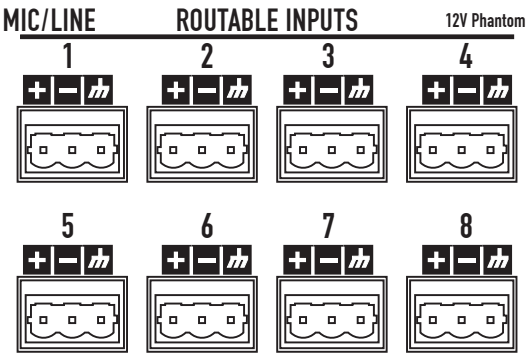
Inputs



— Figure 4 —



— Figure 5 —



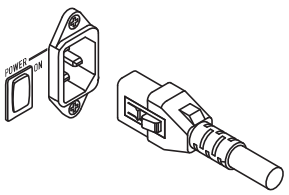
— Figure 6 —

The Qn models do not have analog inputs, they get their audio input exclusively over the Q-LAN Network.

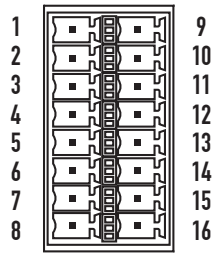
1. Wire the audio line-level source to each Euro-style connector (supplied) required by your design. You may use either balanced inputs (— Figure 4) or unbalanced inputs (— Figure 5).
2. Plug the connectors into the appropriate receptacles (Routable Inputs 1 through 8) — Figure 6.

WARNING!: Do not apply AC power to the amplifier at this time.

3. Make sure the Power Switch is in the off (down position) before proceeding. (— Figure 7)
4. Connect the IEC power cord to the AC receptacle on the rear of the amplifier. (— Figure 7)



— Figure 7 —



— Figure 8 —

GPIO

Refer to "GPIO" on page 10 for details about using the GPIO.

Outputs and Output Configuration

The CXD-Q amplifiers have two sets of four-channel outputs that are configured independently. The configuration of the amplifier is defined in Q-SYS designer software and is "pushed" into the physical amplifier when the Name and Type of amplifier in the design matches the Name and Type of physical amplifier. When the output configuration of the amplifier changes, the Outputs to the loudspeakers change accordingly.

Use the diagrams shown in — Figure 9 thru — Figure 11 as a reference for planning your loudspeaker configuration. Refer to — Figure 12 for how to connect the wiring based on your configuration. After connecting the loudspeakers to the outputs, you may turn the amplifier on.

CAUTION!: If you change the output configuration of the amplifier you must change the loudspeaker connections before applying power to the amplifier!

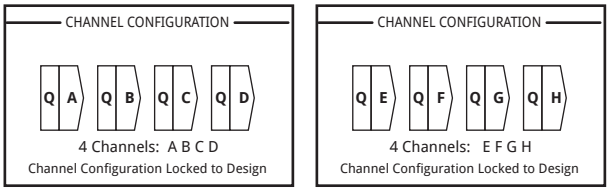
— Figure 9 through — Figure 11 are examples of the three types of output configurations: Separate, Bridged and Parallel. The tables to the right and left of the loudspeaker connections (rear panel of the amplifier) give all the possible configurations and their connections.

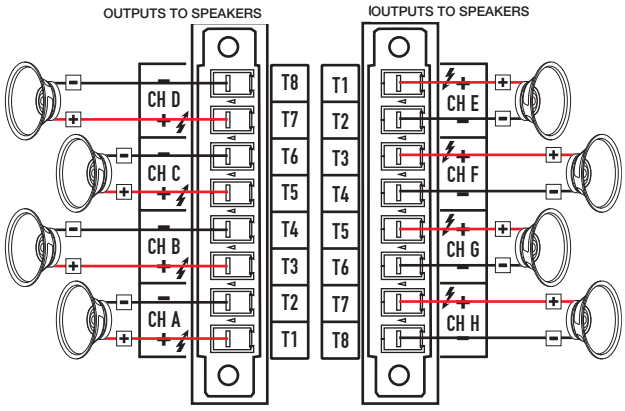
Separate Channels (A B C D) and / or (E F G H)

For Separate Loudspeakers

Use eight 2-wire cables, connect to:

- T1+/T2- (Loudspeaker A / E)
- T3+/T4- (Loudspeaker B / F)
- T5+/T6- (Loudspeaker C / G)
- T7+/T8- (Loudspeaker D / H)





— Figure 9 —

Bridged (A+B) and Separate (C D) (E F G H) Channels

For A+B (Bridged) One Loudspeaker

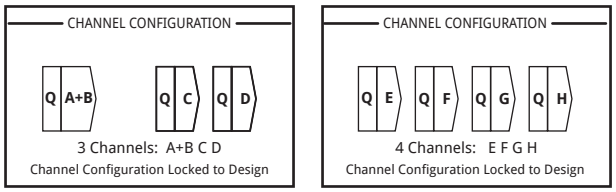
Use one 2-wire cable connect to:

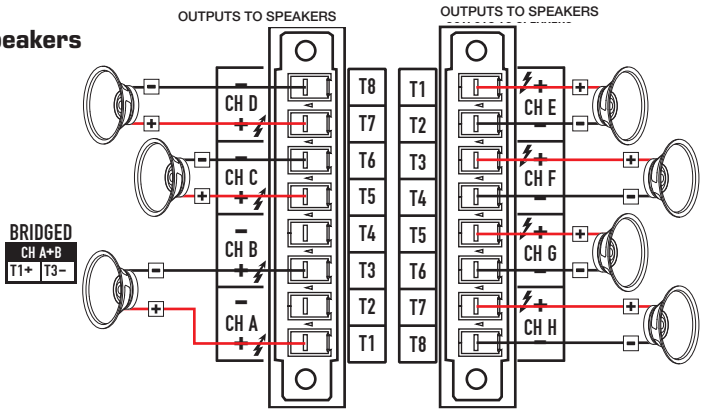
- T1+/T3-(Loudspeaker A+B)

For C & D (E F G H) (Separate) Two and/or Four Loudspeakers

Use six 2-wire cables, connect to:

- T1+/T2- (Loudspeaker E)
- T3+/T4- (Loudspeaker F)
- T5+/T6- (Loudspeaker C / G)
- T7+/T8- (Loudspeaker D / H)





— Figure 10 —

Parallel Channels (ABCD)

For One Loudspeaker

Full power to one loudspeaker

Use one 2-wire cable, connect to:

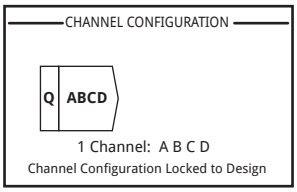
- T3+/T4- (Loudspeaker A B C D)

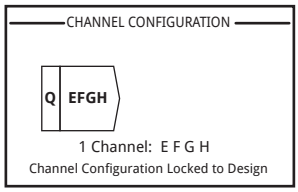
For Multiple Loudspeakers

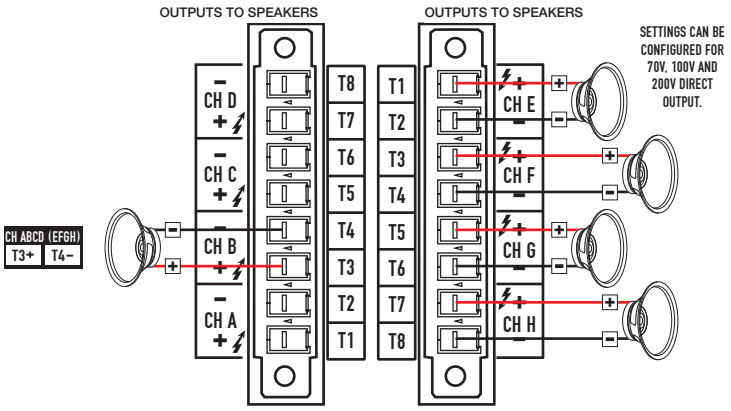
Full power for multiple loudspeakers in parallel

Use up to four 2-wire cables, connect to:

- T1+/T2-(Loudspeaker E)
- T3+/T4-(Loudspeaker F)
- T5+/T6-(Loudspeaker G)
- T7+/T8-(Loudspeaker H)







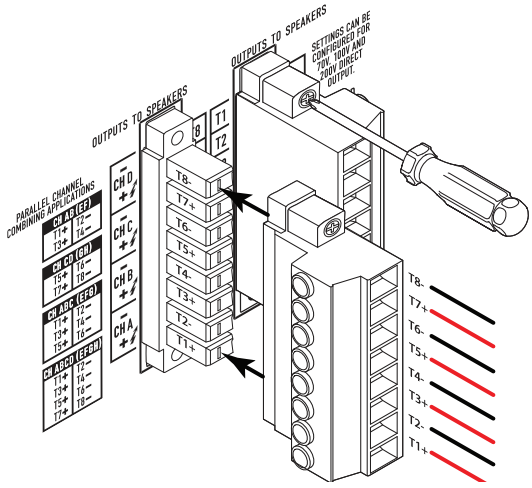
In 4-1 Parallel (ABCD or EFGH) only
T1+, T3+, T5+, and T7+ are electrically the same point
T2-, T4-, T6-, and T8- are electrically the same point

— Figure 11 —

Connect the Loudspeakers (rear panel)

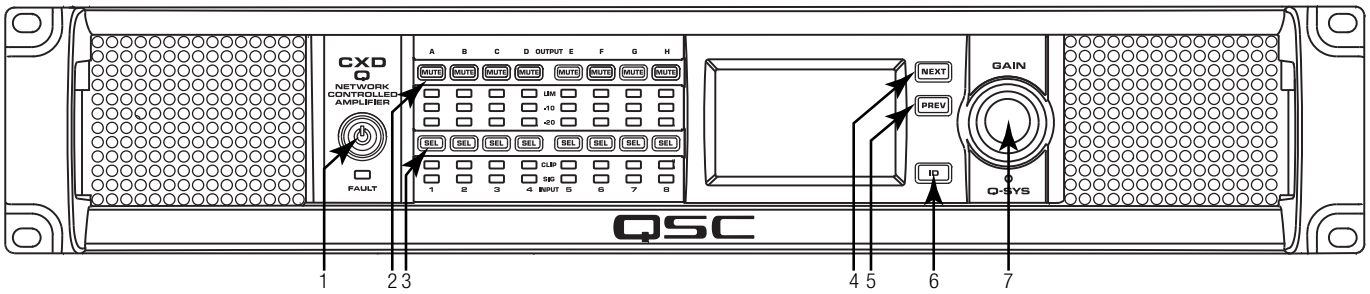
Refer to — Figure 12.

1. Connect the loudspeaker wiring to the 8-pin Euro-style connectors as needed for your amplifier's configuration.
2. Install the female 8-pin Euro-style connectors onto the male connector on the rear of the amplifier as shown. Notice that the Euro-style connectors are facing in opposite directions.
3. Use a Phillips or a flat tip screwdriver to secure the connector.



— Figure 12 —

Amplifier Control



— Figure 13 —

NOTE: The following scenarios assume that the amplifier is connected to the Q-SYS Core via Q-LAN. **When the amplifier is not connected to the Q-SYS Core, it is in a Fault mode, and not operational unless previously configured for fail-over or standalone mode as part of a Q-SYS design.** With the exception of the Power Switch, found on the rear panel, all of the following controls are on the front panel.

Refer to — Figure 13 for location of front-panel controls.

Off Mode

- Rear-panel power switch is off, the amplifier is not operable. **The power switch is the AC Mains disconnect.**
- The front-panel power button (1) is not illuminated.
- Turn the power switch to ON. The amplifier enters the mode in which it was when power was removed – Run, Mute All, or Standby.

Power Switch

Power Button

Run Mode

- From Standby or Mute All mode, press and release the power button on the front panel. The amplifier is in Run Mode.
- The power button (1) is illuminated green.
- The amplifier is fully operable; audio can pass.

Standby Mode

- From Mute All or Run mode, press and hold the power button (1) on the front panel for approximately four seconds.
- The power button illuminates solid red.
- The amplifier is not operable; audio will not pass.

Mute All Mode

- From the Run Mode, quickly press and release the power button (1).
- The power button flashes red, all output Mute buttons (2) are red.
- The amplifier output is disabled, but the front panel is fully operable.

SEL Buttons (3)

SEL

- Channel gain can be adjusted from the Q-SYS Designer software or from the front panel of the amplifier.
- Use the SEL button to select one or more than one channel to change gain settings. All selected channels will change at the same time.
- If two or more outputs are bridged or in parallel, pressing one button in the group selects all channels in that bridged or parallel group.

NEXT (4) and PREV (5) Buttons

NEXT PREV

- Navigates forward and backwards through the screens.

ID Button (6)

ID

- Press this button to display a screen with the amplifier's network name. In addition, the ID buttons on the associated Q-SYS Amplifier component and the associated Q-SYS Configurator item flashes. Press again, or click one of the other ID buttons, to stop the flashing and exit the screen.
- When prompted, press this button to change the amplifier configuration to match the configuration of the associated Q-SYS design.

Master Control Knob (7)

- Adjusts the Gain for the selected channel or channels. At least one channel must be selected.
- When one or more channels are selected, turn the Master Control knob to jump to the Gain screen. After a few seconds with no activity, it returns to the earlier screen.
- If there is more than one channel selected, and the gains for those channels are different, the difference is maintained unless the gain is raised or lowered to the limits for both channels.

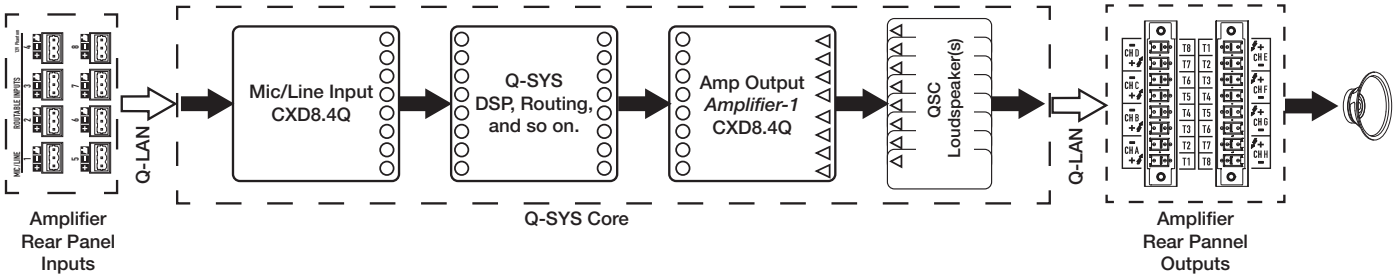
Signal Flow

CXD8.4Q and CXD8.8Q

The CXD8.4Q and CXD8.8Q amplifiers have eight MIC/LINE Inputs and eight amplified Outputs on the rear of the amplifier. The Inputs and Outputs are not physically (or electrically) connected internally giving you the flexibility to use any available source in Q-SYS for the amplified outputs, and to route the inputs to any output. The inputs and outputs can be connected in your Q-SYS design as shown in — Figure 14.

The analog inputs are converted to digital audio in the amplifiers and then routed to the Q-SYS Core via Q-LAN (LAN A, LAN B). The digital signals are brought into the design via the amplifier's Mic/Line Input component. From the Mic/Line Input component the signals can be sent anywhere within the Q-SYS system.

In the Q-SYS Core digital signals are sent to the amplifier's Output component and fed from the Q-SYS Core via Q-LAN to the analog amplified outputs of the amplifier. The Output component can have two to eight outputs depending on the configuration of the amplifier in Q-SYS Designer. The desired configuration is selected in the Properties menu for that amplifier. When the amplifier's configuration is changed, all of the outputs are placed in a "mute all" state. You must un-mute all in the Amp Output component's control panel or on the amplifier's front panel.



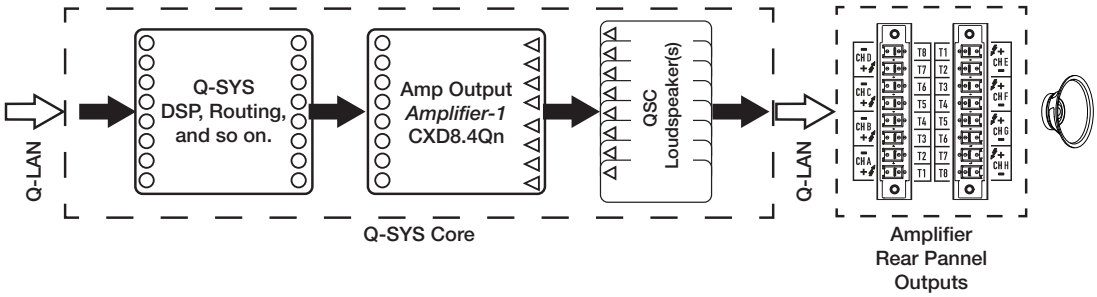
— Figure 14 —

CXD8.4Qn and CXD8.8Qn

Refer to — Figure 15

The Qn model amplifiers have no analog inputs. The input signal utilized to drive the amplifier channels must be virtually wired in Q-SYS Designer. The Qn models have eight amplified Outputs on the rear of the amplifier.

In the Q-SYS Core digital signals are sent to the amplifier's Output component and fed from the Q-SYS Core via Q-LAN to the analog amplified outputs of the amplifier. The Output component can have two to eight outputs depending on the configuration of the amplifier in Q-SYS Designer. The desired configuration is selected in the Properties menu for that amplifier. When the amplifier's configuration is changed, all of the outputs are placed in a "mute all" state. You must un-mute all in the Amp Output component's control panel or on the amplifier's front panel.

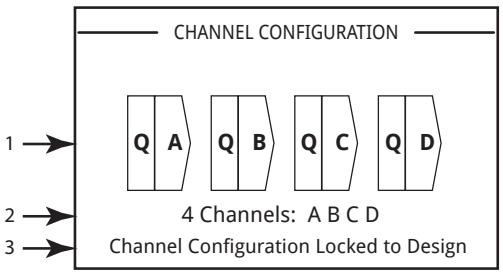


— Figure 15 —

Screens

Channel Configuration Screens

1. — Figure 16 is a graphic representations of the amplifier's output CHANNEL CONFIGURATION. Inputs (Q) are from Q-SYS, outputs A–D (E–H not shown) show the amplifier channels and their configuration.
2. Text indicating how many channels, and the output configuration. For possible configurations refer to the Q-SYS help for the amplifier components.
3. Status of the amplifier and Q-SYS design indicating the design and amp are in sync.

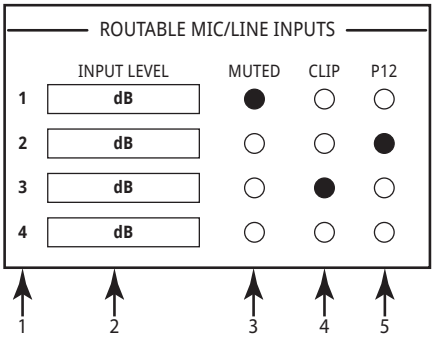


— Figure 16 —

Routable MIC/LINE Inputs

— Figure 17 shows the Routable MIC/LINE INPUTS screen for channels 1–4, (channels 5–8 not shown) which displays the status of the physical MIC/LINE INPUTS for the Q models. *This screen is not available on the Qn model amplifiers.*

1. Input channels are identified numerically, 1–4 (and 5–8 not shown)
2. **Input Level** – is the Peak Input Level (dBFS) and is the same as displayed in the Q-SYS Mic/Line Input component.
3. **Muted** – when illuminated indicates that the Input is muted for the associated channel. This is controlled by the Mute button on the Q-SYS Designer Mic/Line Input component. *Input channels cannot be muted from the amplifier interface.*



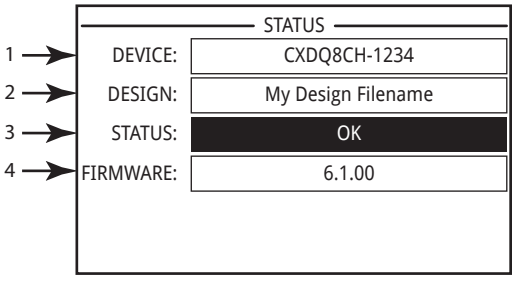
— Figure 17 —

4. **Clip** – indicators illuminate when the input to the Mic/Line Input component is too high. Adjust the Preamp Gain on the Mic/Line Input component in Q-SYS Designer.
5. **P12** – phantom power (+12V) is available for microphones (condenser) requiring the power. You can turn the phantom power on/off in the Mic/Line Input component in Q-SYS Designer.

Status Screen

Refer to — Figure 18

1. **DEVICE** – the hostname (network name) of the amplifier. A default name is given at the factory, similar to the example. You may change the name in the Q-SYS Configurator.
2. **DESIGN** – the name of the Q-SYS design currently running on the amplifier. The amplifier must be contained in a running design to operate.
3. **STATUS** – displays the current status of the amplifier both in text and color. The following is a list of possible status colors, and some example conditions.



— Figure 18 —

- **OK** – green – audio is good, hardware is good.
- **Compromised** – orange – audio is good but a redundancy mechanism is active (one LAN down but the other is still up) or a non-fatal hardware problem exists (fan speed, high temperature, low AC voltage, output load, amplifier is in Protect mode, etc.)
- **Fault** – red – audio is not passing, or hardware is malfunctioning or mis-configured (amplifier power off, audio streams broken, amplifier fault, loudspeaker short circuit, etc.)
- **Initializing** – blue – In the process of initialization, and design start. Audio is not passed.

4. **FIRMWARE** – the Q-SYS Designer firmware version installed on the amplifier.

NOTE: The CXD-Q 8-channel amplifiers require Version 6.1 or later of Q-SYS Designer.

To Update the Amplifier Firmware:

a. Install the version of Q-SYS Designer you want to use on your PC.

b. The amplifier must be connected to Q-LAN and turned on.

c. Open the Q-SYS design containing the amplifier in the Designer version you just installed.

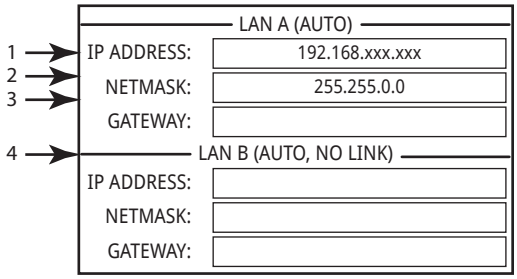
d. Select "Save to Core and Run" from the File menu.

e. The amplifier and any other Q-SYS peripherals in the design are automatically updated.

LAN A / LAN B Screen

Refer to — Figure 19

1. **IP ADDRESS** – a default address is assigned in the factory. You can change this and the other parameters in Q-SYS Configurator. LAN A is required, and cannot be turned off.
2. **NETMASK** – must be the same as the Core's Netmask.
3. **GATEWAY** – must be the same as the Core's Gateway.
4. LAN B is not required. When connected, the same type of information as LAN A is displayed.

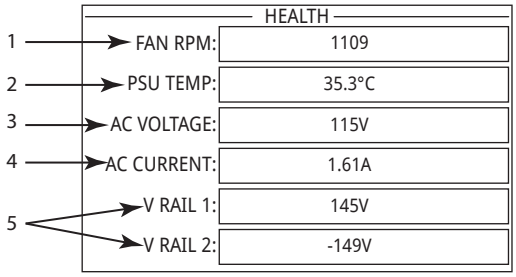


— Figure 19 —

Health Screen

Refer to — Figure 20

1. **FAN RPM** – varies depending on the temperature.
2. **PSU TEMP** – varies depending on operating conditions. PSU Temp is monitored and can automatically put the amp into limiting or shutdown if safe operating temperatures are exceeded.
3. **AC VOLTAGE** – AC Mains voltage
4. **AC CURRENT** – current drawn on the AC Mains, by the amplifier.
5. Voltage Rails
   - **V RAIL 1** = +147VDC +/- 5V typical
   - **V RAIL 2** = -147VDC +/- 5V typical



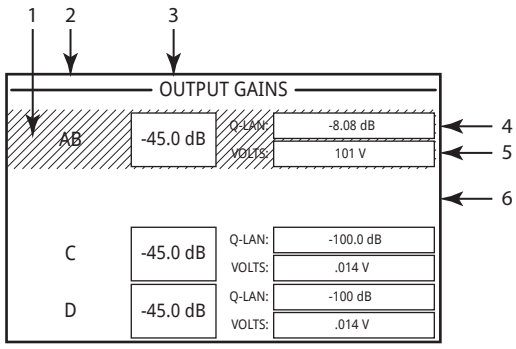
— Figure 20 —

OUTPUT GAINS Screen

Refer to — Figure 21

The Output Gain screens provides a quick overview of all outputs. In addition, when this screen is displayed, you can make GAIN adjustments on the amplifier's front panel. There is one screen for channels A–D and one for channels E–H.

Use the NEXT or PREV buttons to access these screens or, press one or more of the SEL buttons to access the screen.



— Figure 21 —

1. The highlighted background indicates that the Channel is selected by the SEL button.
2. **Channel** – the channels display according to the configuration of the amplifier.
3. **Output Gain** – the output gain can be controlled in two places: the GAIN knob on the amplifier front panel and with the Gain control in the amplifier's Output component in the Q-SYS design.
4. **Q-LAN** Input Level – the level of the audio signal applied to the Output component in the Q-SYS design. The CXD-Q Output component is the connection to the output section of the amplifier.
5. **VOLTS** – the voltage applied to that output.
6. Output B is combined with Output A – (AB or A+B), the slot for Output B is blank.

To Make GAIN Adjustments:

a. Use the SEL button to select one or more channels. You can select any or all channels.

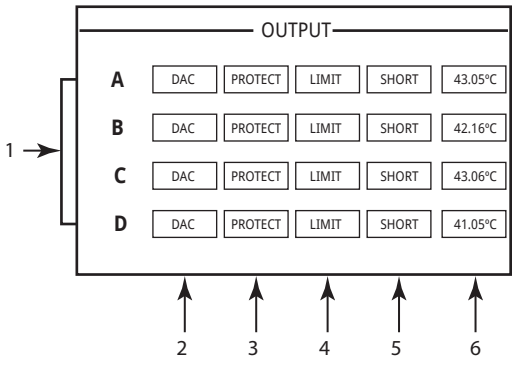
b. Use the GAIN knob to make adjustments on the output gain of the selected channels.

NOTE: If the gains were the same when you select multiple channels the gains remain equal as you adjust them. If the gains are different, they keep their relative separation until one reaches a limit. At this point the other channel(s) continue to change until they reach the limit.

NOTE: If you press one or more of the SEL buttons, and do not make any GAIN adjustments, this screen remains visible for a short time then returns to the previous screen.

Output Screens

Each group of outputs has a dedicated screen. — Figure 22 is an example of Outputs A – D.

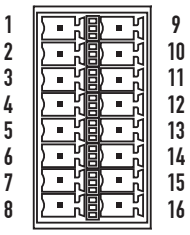


— Figure 22 —

1. Output channel identifiers **A** – **D**.
2. **DAC** – when illuminated, this indicates that the signal to the D to A Converter is larger than can be reproduced and a limiter has been engaged to prevent clipping. This is an indication that the gain structure is not correct.
3. **PROTECT** – when illuminated, this indicates that the channel is in Protect Mode. Usually due to driving too low of an impedance for too long.
4. **LIMIT** – when illuminated, this indicates the amplifier limiter is active. This occurs if the signal is driving the power, current, or voltage above the amplifier rated values or due to thermal limiting.
5. **SHORT** – when illuminated, this indicates the output is shorted. A short can be triggered by either of the following:
   a. Output impedance is below ¼ Ohm for more than 1 second.
   b. Output voltage is less than 50% of what the DSP was expecting for more than 1 second.
6. Displays the temperature, in Centigrade, of the associated channel.

GPIO

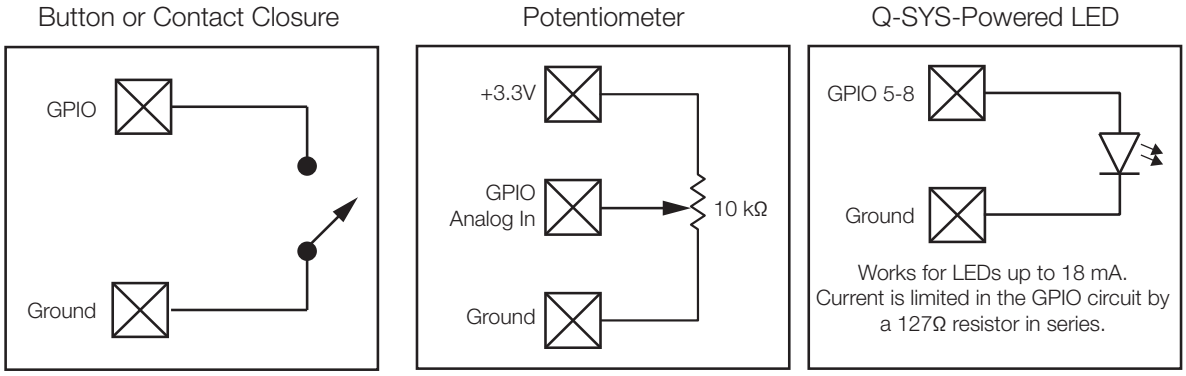
Connector Pin (see — Figure 23)	GPIO # and Function	Specifications
1	3.3 V	100 mA max (power cycle to reset current limiting IC)
2	GPIO 1	5mA in/out, 3.3V max, 127 Ohm resistor in series
3	GPIO 2	5mA in/out, 3.3V max, 127 Ohm resistor in series
4	GND	Ground
5	GPIO 3	5mA in/out, 3.3V max, 127 Ohm resistor in series
6	GPIO 4	5mA in/out, 3.3V max, 127 Ohm resistor in series
7	GND	Ground
8	GPIO 5	18mA in/out max, 3.3V max, 127 Ohm resistor in series
9	RELAY NO	Relay Normally Open
10	RELAY COM	Relay Common
11	RELAY NC	Relay Normally Closed
12	GND	Ground
13	GPIO 6	18mA in/out max, 3.3V max, 127 Ohm resistor in series
14	GPIO 7	18mA in/out max, 3.3V max, 127 Ohm resistor in series
15	GND	Ground
16	GPIO 8	18mA in/out max, 3.3V max, 127 Ohm resistor in series



— Figure 23 —

Examples

Refer to — Figure 19



— Figure 24 —

Contact

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Support

Q-SYS™ Customer Support

24/7 Support

QSC offers 24/7 support on Q-SYS™ Networked Audio Systems only.

Full Support for all QSC Products

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Tel: +1-888-252-4836 (U.S./Canada)

Tel: +1-949-791-7722 (non-U.S.)

1 *After hours calls are guaranteed a 30 minute response time from a Q-SYS Support Team member. For Q-SYS ONLY!*

E-mail

qsyssupport@qsc.com

An immediate e-mail response is not guaranteed. For URGENT issues use the phone numbers above.

Please visit the QSC website at www.qsc.com for an electronic copy of this manual.