



System Installation Manual for Type Approval Applications

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Important Product and Safety information

Please check all individual component instruction manuals for the following 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 SAFETY INSTRUCTIONS



WARNING! TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE. Elevated Operating Ambient – If installed in a closed or multi-unit rack assembly, the ambient operating temperature of the rack environment may be greater than room ambient. Consideration should be given to ensure that the maximum operating temperature range -10°C to 50°C (14°F to 122°F) is not exceeded. Reduced Air Flow – Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.

Maintenance and Repair



WARNING! Advanced technology, e.g., the use of modern materials and powerful electronics, requires specially adapted maintenance and repair methods. To avoid a danger of subsequent damage to the apparatus, injuries to persons and/or the creation of additional safety hazards, all maintenance or repair work on the apparatus should be performed only by a QSC authorized service station or an authorized QSC International Distributor. QSC is not responsible for any injury, harm or related damages arising from any failure of the customer, owner or user of the apparatus to facilitate those repairs. In the event of malfunction, contact QSC Customer Support for assistance.

Additional Product Warnings

Heed all warnings, specifically:

- Do not block and keep ventilation openings free of dust or other matter
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus that product heat
- To reduce the risk of electrical shock, the power cord of the Amplifiers and Core processors shall be connected to a mains socket outlet with a protective earth connection; For the Page Stations power must be supplied to the unit from an IEEE 802.3af compliant power sourcing equipment (PSE) using data communications cabling having a rating of category 5e or greater (CAT-5e).
- Disconnect all power before any servicing
- Do not defeat the safety purpose of the polarized or grounding-type plug used for the Amplifiers and Core processors. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cords and other cabling from being walked on or pinched particularly at plugs, convenience receptacles, and the points where they exit from the apparatus
- Only use attachments/accessories specified in the individual component manuals provided with the system
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to moisture, does not operate normally, or has been dropped.
- The appliance coupler, or the AC Mains plug, of the Amplifiers and Core processors are considered the AC mains disconnect devices and shall remain readily operable after installation
- Consult a licensed, professional engineer when any doubt or questions arise regarding a physical equipment installation
- Do not use any aerosol spray, (liquid-) cleaner, disinfectant or fumigant on, near or into any of the apparatus. Clean only with a dry cloth
- Do not unplug any of the units by pulling on a cord, use the plugs where applicable
- Dangerous voltage possible on output terminals. Disconnect AC Mains from the Amplifiers and Core processors before connecting or disconnecting

CX-Q Amplifier:

- Follow the steps for installation in the recommended installation order
- After connecting the outputs to the loudspeakers, you may turn the amplifier on; Make sure the output gain settings for all audio-source devices (CD Players, Mixers, Instruments, etc.) are at the lowest output (max attenuation)
- For specifications of circuits please refer to the Amplifier manual

Core Processor:

- The Processor can be used in or out of an equipment rack. Rack mounting is optional. Rear rack ears are an available accessory if needed.

Rack Mount Instructions

Rack mount the Q-SYS product by supporting it from underneath while aligning the front panel mounting holes (in the rack ears) with the threaded screw holes in the rack rails. Install all four front mounting screws and washers and tighten securely. All Q-SYS products come with rear rack support ears. Ensure that these rear mounting points are securely fastened to rear rack rails or side walls.



WARNING! **Reliable Earthing** – Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

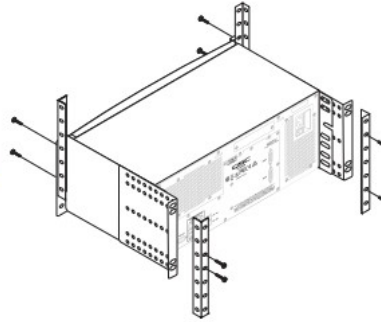
Mechanical Loading – Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven or unstable mechanical loading.



CAUTION! **Elevated Operating Ambient** - If installed in a closed or multi-unit rack assembly, the ambient operating temperature of the rack environment may be greater than room ambient. Consideration should be given to ensure that the maximum operating temperature range (0°C to 50°C (32°F to 122°F)) is not exceeded.

Reduced Air Flow – Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.

Circuit Overloading – Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on over-current protection and supply wiring.



– Figure 1 –

- Follow the steps for installation in the recommended installation order (AC Power and Q-Sys Network)
- **LITHIUM BATTERY WARNING**
THIS EQUIPMENT MAY CONTAIN A NON-RECHARGEABLE LITHIUM BATTERY. LITHIUM IS A CHEMICAL KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER OR BIRTH DEFECTS. THE NON-RECHARGEABLE LITHIUM BATTERY CONTAINED IN THIS EQUIPMENT MAY EXPLODE IF IT IS EXPOSED TO FIRE OR EXTREME HEAT. DO NOT SHORT CIRCUIT THE BATTERY. DO NOT ATTEMPT TO RECHARGE THE NON-RECHARGEABLE LITHIUM BATTERY.

Page Stations:

- **Wall-mounting the page station:** Q-Sys Page Stations are designed to be mounted on a wall or podium with an appropriate cutout and cavity to allow all cables and power sources to connect to the Page Station rear panel with adequate stress relief. The included Mounting Bracket is designed to mate with a standard triple-gang U.S. electrical box, but does not need one to be mounted. Using an electrical box provides contractors with the option of pre-wiring, then installing the Page Station at a later time; if an electrical box is used, its dimensions should meet the NEMA standards. The Mounting Bracket should be firmly attached to the wall using the electrical box (if installed) for alignment only

Document Revision History

Release date	Version	Details
04/11/22	A	Initial Release
04/25/22	B	Added guidance to include external light source for page stations.

System Introduction and Benefits

The QSC system detailed in this document is part of the QSC Q-SYS Ecosystem. This environment is an integrated audio, video and control platform that's built on standard off-the-shelf IT hardware/network infrastructure, allowing it to easily integrate with other IT platforms.

The flexible software foundation of the Q-SYS Ecosystem scales simply and cost effectively, reducing the need for dedicated hardware and eliminating complex integration workarounds that are common to traditional AV&C solutions.

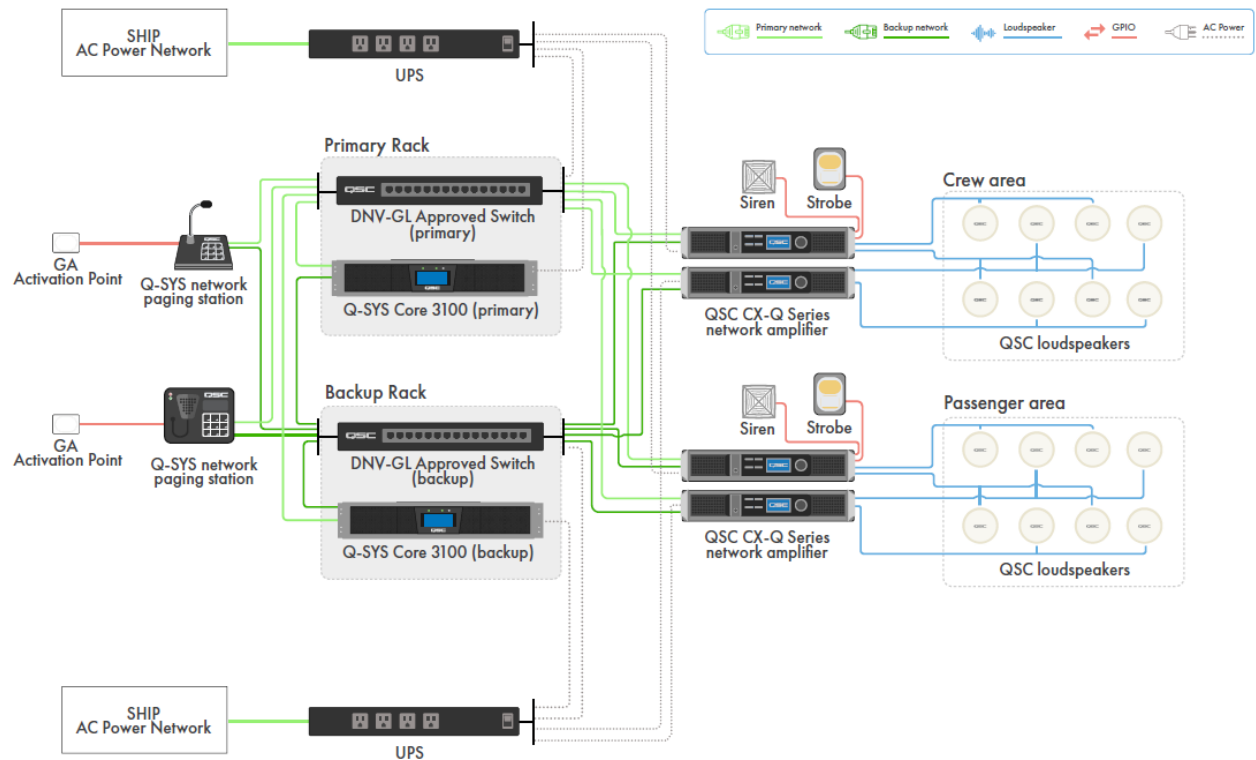
The Q-SYS Ecosystem lets system designers take full advantage of its software-based architecture, native devices and drag-and-drop control programming to enable a smoother, expedited installation process. This also eliminates additional costs and effort required to tie disparate components together. Native Q-SYS Ecosystem components work flawlessly together, which provides tighter integration and reduces possible points of failure.

Q-SYS also offers remote monitoring and management of every native Q-SYS device and connected third-party peripheral. This will equip your AV/IT staff with the tools to diagnose system issues while ultimately increasing AV system uptime.

QSC engineers design components across the signal chain that draw the very best performance from each other, creating a synergy that makes a QSC system far more than the sum of its parts. Said more plainly, when a Q-SYS Core processor and page station are paired with a Q-SYS network amplifier and QSC loudspeaker, the system can deliver more value with less effort and a uniquely optimized user experience.

For more information on Q-SYS, please visit: www.qsc.com

Representative System Diagram



QSC Product listing covered under Type Approval

Item	Certified Models	Description
QSC Q-SYS Network Paging Stations	PS-1600G	Page station with command keypad and gooseneck microphone
	PS-1600H	Page station with command keypad and handheld microphone
Q-SYS Core	Core3100*	Q-SYS Core 3100 Enterprise Core processor*
	Core1100*	Q-SYS Core 1100 Enterprise Core processor*
QSC CX-Q Amplifiers	CX-Q 8K8	Eight-channel Network Amplifier, max power up to 8000W
	CX-Q 8K4	Four-channel Network Amplifier, max power up to 8000W
	CX-Q 4K8	Eight-channel Network Amplifier, max power up to 4000W
	CX-Q 4K4	Four-channel Network Amplifier, max power up to 4000W
	CX-Q 2K4	Four-channel Network Amplifier, max power up to 2000W
Software	Q-SYS Designer	Must be Q-SYS Designer v9.4.1 or later (see www.QSC.com)

* Must include SOLAS AC Filter Enhancement (SAFE)

Additional Equipment (to be supplied by Installer)

- Activation switches with protective cover
- Uninterruptible power supplies
- SOLAS AC Filter Enhancement devices
- Type Approval-certified network switches
- Sirens (may already be installed on vessel)
- Strobes (may already be installed on vessel)
- Network cabling
- Electrical wiring for activation switches
- PoE injectors if the Ethernet switch(s) do not provide adequate PoE power for the Page Stations or other Q-SYS devices
- Speakers (may already be installed on vessel)
- Equipment racks

System configuration

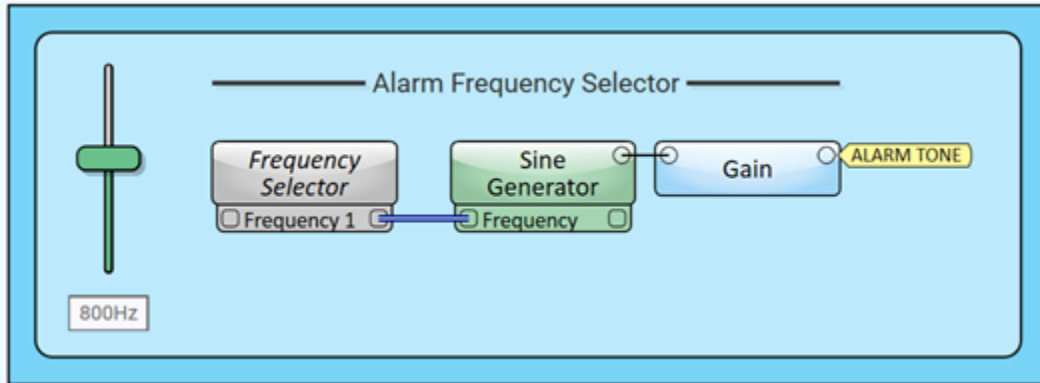
The QSC family of Q-SYS connected appliances is incredibly flexible with almost limitless possible configurations. This includes expansion beyond the PAGA system to create a robust entertainment system in the same environment. However, for Type Approval PAGA applications, installers should be mindful of these key characteristics or aspects of system design to ensure proper operation, system redundancy, and compliance with the Type Approval requirements:

- The QSC equipment specified in this manual is to be installed in protected environments, such as control rooms, accommodations, and vessel bridges. These locations are characterized by a temperature rise of < 5°C. The equipment is not suitable for use in machinery spaces, exposed decks, or other extreme environments.
- There should be at least two paging stations, one for each GA activation point in the system, and each must be marked and protected. In order to meet IEC 60945 EMC requirements and to avoid interfering with vessel navigation, paging stations should be placed at a distance greater than 62cm from any ship compass. Also, to meet this standard, page station expanders (QSC PS-X) cannot be included in the system configuration.
- Each page station installation point should include an external illumination source to allow for use in low light conditions.
- At least two physically separate manual GA activation points are installed and each is marked and has a safety cover.
- The network switches selected for the installation must be Type Approval certified. Consult with DNV's Approval Finder tool to verify equipment status.
(<https://www.dnv.com/maritime/approval-finder.html>)
- Ensure the network switch is configured correctly. Please refer to the Network Switch Requirements section of this manual for more information.

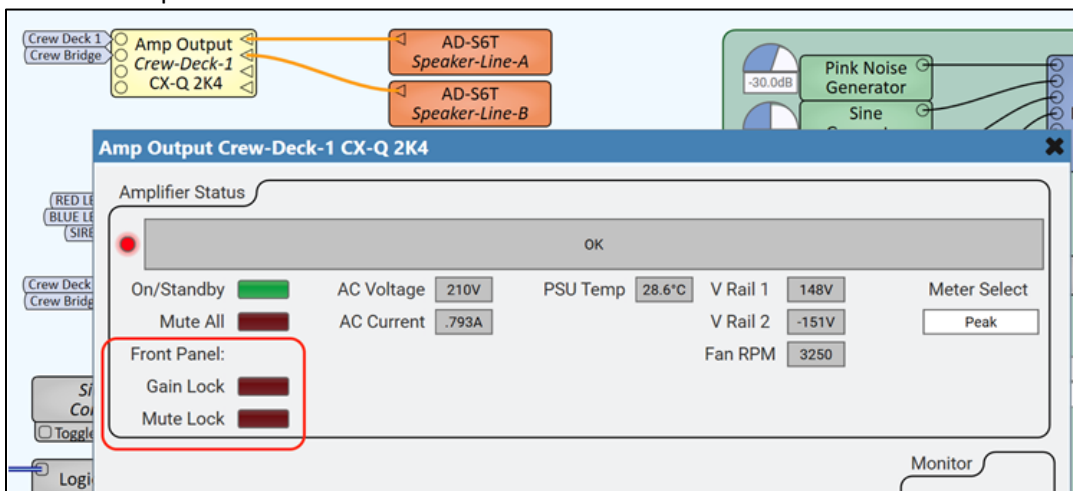
- Redundant networks are required as seen in the diagram, implemented using primary and backup racks.
- The entire system should be supported by the installed uninterruptible power supplies (UPS) appropriate to the equipment ratings and configured in such a way to prevent a single point of failure. For example, in the above diagram, the primary and backup racks are connected to different UPS's. A common practice is to add the VA of all the equipment and multiply by 1.2.
- AC line filters must be used on the input power for QSC Core processors. See the section on SOLAS AC FILTER ENHANCEMENT (SAFE) in this document.
- The Core processor in the backup rack must be set as the redundant backup Core processor in the Q-SYS design file. See the software help file (<https://q-syshelp.qsc.com/>) for more information on configuring for redundancy. Note: When a Core processor is initiated or loses power abruptly, it is normal to hear several beeps from the unit.
- QSC recommends not using the IEEE 1588 PTP clocks generated by the PAGA Core processors to clock the Entertainment Systems on the ship. Instead, it is best practice to convert outgoing pages to analog signals or to use another device with sample rate converters to create a point of demarcation between the two audio systems. Separating the IEEE 1588 PTP clocks allows for the Entertainment Systems to be serviced or upgraded without affecting the working state of the PAGA system.
- Each Core 3100 is limited to a maximum of 512 end points.
- In the representative system diagram above, note that each page station, Core processor, and amplifier is plugged into both network switches.
- Speaker zones are also wired to ensure no zone ever completely fails should one amplifier fail and are organized into crew zones and passenger zones. In this diagram, every other speaker is connected to one of the two amplifiers in its zone. In this way, at least half of the speakers in a zone should be operational.
- The system must be capable of triggering strobes, particularly in noisy areas, and sirens to signal alarms.
- Although not obvious from the diagram, the strobes are set active low so they should signal in the event of an amplifier failure.
- Installers should follow good equipment separation principles to mitigate the risk of a physical event from taking down the entire network. This is typically done by placing equipment in different fire zones on the vessel.

Q-SYS Designer Suggestions

- The system design can take advantage of Q-SYS's flexibility to specify the required frequency of a siren. In the screenshot below, the slider on the left allows for adjustability of the signal frequency, from 200Hz to 2500Hz, for the generated alarm tone.



- GA has the highest priority with regards to other alarms or signals:
 - Ensure PAGA takes priority over entertainment systems when activated. The system designer should provide a means to mute any external entertainment system via Ethernet control or GPIO and to ensure that capability will function when either Core processor or network is active. In the representative example above, the activation switch uses GPIO to activate the paging station and mutes the entertainment system.
 - Ensure emergency paging takes priority over alarm when used and that the alarm resumes when the emergency paging ends.
 - Ensure the fire alarm mutes when the general alarm sounds.
- Q-SYS design should enable the dynamic notch filter that detects and cuts feedback frequency for the page stations.
- Should the installer wish to disable the Mute and Gain controls on the front panel of each amplifier to prevent unwanted adjustment, this can be done in Q-SYS via the Gain Lockout and Mute Lockout functions accessible in the Amplifier Properties menu or in the Amplifier details when the amplifier icon is double-clicked:



Network Switch Requirements

Observe these requirements when selecting and manually configuring network switches for compatibility with Q-SYS.

Required for all Real-time Q-SYS Audio and Video Distribution

1 Gbps Bandwidth

Must have non-blocking wire-speed Gigabit Ethernet and no dropped packets because of internal bandwidth constraints.

Control-only devices such as the TSC-80-G2 Touch Screen Controller can operate on a 100 Mbps link, but a Gigabit infrastructure is generally recommended.

Recommended for Mixed Media Data Types or Large Amounts of Data

Quality of Service (QoS)

Must support DiffServ (DSCP) packet classification. (Auto-QoS does not result in proper configuration for Q-LAN.)

Priority Traffic

Must be able to recognize and prioritize at least two high-priority traffic classes by their DSCP values or other means, in addition to best-effort traffic.

Egress Queues

Must have at least four egress queues per port.

Egress Buffering

Each switch port carrying audio or video traffic must have at least 40 KB egress buffering memory. This includes any uplink ports which carry Q-LAN traffic.

Egress buffering memory is sometimes referred to as Packet Buffer Memory. In many fixed-port switches, this value is automatically divided evenly across all ports. For example:

- $512 \text{ KB Packet Buffer Memory} \div 24 \text{ Ports} = 21.33 \text{ KB/port}$, which is $< 40 \text{ KB/port}$ = Not Acceptable
- $1.5 \text{ MB Packet Buffer Memory} \div 24 \text{ Ports} = 62.5 \text{ KB/port}$, which is $\geq 40 \text{ KB/port}$ = Acceptable

Strict Priority Queuing

Must support Strict Priority queuing (SP). Weighted round-robin (WRR), weighted fair queuing (WFQ), or other selection methods do not guarantee the latency performance required by real-time media systems such as Q-LAN.

Notes:

- Some switch platforms only support a single strict priority queue. Placing both PTPv2 and time-sensitive audio (Q-LAN, AES67) into the same queue may be a consideration with this limitation; however, a proof of concept is recommended to understand if the results are satisfactory for the deployment.
- Installers must enable QoS (not Auto-QoS) on a Q-LAN network to protect against unexpected data traffic from sources that might be added after the system is installed and commissioned. See below for example Q-LAN Class Map for a Cisco switch:

```
class-map match-any IEEE-1588
match ip dscp ef
class-map match-any Q-LAN
match ip dscp af41
class-map match-any Q-Video
match ip dscp af31
policy-map Q-Sys
class IEEE-1588
priority level 1 percent 5
class Q-LAN
priority level 2 percent 90
class Q-Video
bandwidth percent 5
service-policy output Q-Sys
```

Note: Apply the service-policy to all switchports and uplinks that carry clock, audio and video packets.

- Q-SYS PTPv2 is assigned a per-hop behavior (PHB) of EF (46) and must be classified into the highest-priority queue with Strict Priority queuing. Q-LAN audio data has PHB AF41 (34) and must be classified into the queue with the second-highest priority with Strict Priority queuing. Q-SYS video data has AF31 (26) and must be classified into the queue with the third-highest priority (Strict Priority queuing is not required for video data).
- Traffic that is prioritized and queued "equal to" or "greater than" PTPv2 (EF) and/or Q-LAN audio (AF41) may cause problems if it travels through the same switch interface as the Q-SYS traffic, such as on an uplink.

Performance Requirements

These networking features and settings affect performance with Q-SYS.

Layer 3 Networking

On a Layer-3 network, routers (or Layer-3 switches) replace some or all Layer-2 network switches. Therefore, Layer-3 network devices must have the same performance (or better) and minimum features as the Layer-2 switches they replace.

Layer-3 IP networks have advantages in manageability, scalability, security, and convergence over their LAN counterparts. If yours is a large, critical, and shared network, it is likely your application will benefit greatly from layer-3 networking. Layer-3 networks handle QoS and multicast routing in a more engineered manner.

Reducing Latency, Jitter, and Error Counts

- Interfaces carrying Q-SYS traffic must be 1 Gb/s or higher because of the strict network requirements regarding latency and jitter.
- Q-SYS uses IEEE-1588-2008 PTPv2 protocol, which is sensitive to latency, jitter, and packet loss. Q-SYS audio relies on PTPv2 for accurate timing. To prevent timing problems, PTPv2 packet arrival jitter must not exceed $\pm 30 \mu\text{s}$ (microseconds) and PTPv2 latency between end points must not exceed 280 μs (microseconds).
- Error counts in network interfaces must be at or near zero.
- Forwarding Decision Time that exceeds 10 μs could cause late packet arrival and ultimately degrade media performance.

Network Infrastructure and Traffic

- Q-SYS does not support passing real-time traffic (PTPv2, Q-LAN audio or video) through firewalls, MPLS, or WiFi.
- Running Fibre Channel over Ethernet (FCoE) and Q-SYS traffic on the same switch interfaces or backplane queuing resources may cause problems.
- Q-SYS does not allow use of Passive Optical Network (PON/GPON) as well as Fabric Extender Technology (FEX).
- Media converters (copper to fiber) supporting multiple LAN speeds (10/100/1000) are not supported with Q-SYS networks. For compatibility with Q-SYS, a media converter must be a true physical layer (Layer 1) converter.
- If your network scenario requires IGMP snooping/querying or PIM-Sparse Mode (PIM-SM, for forwarding multicast across routers), they must be configured properly to maintain network performance.
- Be careful with single-mode optical fiber runs of less than 1000 ft (305 m) because the received light levels might be too high. Measure the light level and if necessary, use in-line attenuators to reduce the light signal to a usable level.
- It is not strictly necessary to isolate Q-LAN, Dante, and AES67 from any other multicast traffic into their own respective VLANs, but it may reduce problems in complex network environments.

Layer 2 Functions

Configure the following L2 functions for any switch ports that carry Q-SYS traffic:

- Disable jumbo frames or jumbo packets to avoid latency and jitter problems. This is set by individual port on some switches and is set globally on others.
- Disable Spanning Tree Protocol (STP) on interfaces where Q-SYS devices connect. STP may cause PTPv2 clock and/or audio packet problems.
- Enable intelligent Link Layer Discovery Protocol (LLDP) to avoid discovery issues with Q-SYS devices.

VLAN Tagging

Q-SYS can use VLAN tags for Session Initiation Protocol (SIP) connections. Enter the following link into a web browser to configure SIP VLAN tagging on the Core processor: http://<Core IP Address>/qtel_vlan/.

Flow Control & Bandwidth Throttling

- Enabling Flow Control improves Q-SYS TSC touch screen performance and is recommended.
- Do not enable bandwidth throttling (Traffic Shaping / Policing) on ports connected to Q-SYS Core processors, peripherals, or on any uplinks passing Q-LAN traffic.

Port Forwarding

Q-LAN protocols are not compatible with NAT or PAT gateways (a.k.a. Port Forwarding).

Energy-Efficient Ethernet (EEE)

QSC recommends that you disable Energy Efficient Ethernet (IEEE 802.3az) on switches that offer this feature. Some switch manufacturers offer their own version of a power saving mode or energy optimization mode, but the concepts are generally the same as those for the IEEE standard. These mechanisms attempt to reduce the drive current or wake time for a given LAN port by detecting the strength of the link partner, the length of the attached network cable, or the rest or idle periods between packet deliveries and placing the port into sleep or quiescent mode.

Cabling

- 1000Base-T gigabit Ethernet over Category 5e cable
- 8P8C modular connectors (RJ45)
- ANSI/TIA-568-B.2 wiring pin-out

Hop Count and Network Diameter

Three or fewer hop counts are recommended with up to 100 meters between switches. Hop count is defined as how many switches there are between two system nodes. Network diameter is the measurement between the two nodes with the longest physical path in the network. When possible, position the Q-SYS Core processors towards the center of the network to minimize switch hop count.

Note: You can use 10 Gigabit in place of 1 Gigabit while following the 1 Gigabit design rules.

Backbone Bandwidth

Audio Streams

- 1-Gigabit backbone bandwidth for systems
- 1-Gigabit backbone bandwidth on each network for installations using separate networks for redundancy.
- 2-Gigabit backbone bandwidth required for installations using redundant connections to a single audio network.

Amplifier Maximum Power Levels

The following table can be used in CX-Q amplifier selection.

Configuration		Loads	4 Channel Models						8 Channel Models			
			2K4		4K4		8K4		4K		8K	
			Max Power (w/FlexAmp single channel)	Continuous Power	Max Power (w/FlexAmp single channel)	Continuous Power	Max Power (w/FlexAmp single channel)	Continuous Power	Max Power (w/FlexAmp single channel)	Continuous Power	Max Power (w/FlexAmp single channel)	Continuous Power
Independent Channels (SE) A, B, C, D		100V	700	350	1000	550	1250	1150	1000	300	1250	600
		70V	700	400	1000	625	1250	1150	1000	300	1250	600
		16-Ohm	350	200	500	313	625	625	500	150	625	300
		8-Ohm	700	400	1000	625	1250	1250	1000	300	1250	600
		4-Ohm	800	400	1500	625	2400	1250	1000	300	1500	600
		2-Ohm	600	300	800	400	2750	1250	800	300	1000	300
Parallel Channels (x2) AB or CD or EF or GH Doubles Current Best for high power 70V & 100V		100V	1400	700	2000	1150	2400	2000	1500	600	2000	1100
		70V	1400	750	2000	1150	2400	2000	1500	600	2000	1200
		8-Ohm	800	400	1000	625	1250	1250	1000	600	1250	1100
		4-Ohm	1250	750	2000	1250	2400	2250	1250	600	2400	1200
		2-Ohm	1500	650	2500	1250	4000	2100	1500	600	2500	600
Parallel Channels (x3) ABC, DEF Triples Current		8-Ohm	800	400	1000	1000	1250	1250	1000	900	1250	1100
		4-Ohm	1250	800	2000	2000	2400	2400	1500	900	2000	1800
		2-Ohm	1500	1100	3000	2500	4500	3000	1500	900	2500	1800
BTL/Bridged Channels (x2) A+B or C+D or E+F or G+H Doubles Voltage Do NOT use for 70V or 100V		200V	1500	700	2000	1250	2400	2000	1500	600	2000	1200
		140V	1500	700	2000	1250	2400	2000	1500	600	2000	1200
		8-Ohm	1500	700	3000	1250	4000	2250	1500	600	3000	1200
		4-Ohm	1400	600	1700	1150	5000	2500	1400	400	1700	600
		2-Ohm	NR*		NR*		3000	2000	NR*		NR*	
BTL/Bridged & Paralleled Channels (x4) AB+CD, EF+GH Doubles Current and Voltage		8-Ohm	2500	1500	3500	2500	4200	4200	2500	1200	4000	2400
		4-Ohm	3000	1600	4000	2500	7000	4500	3000	1200	5000	2400
		2-Ohm	NR*		NR*		8000	4000	NR*		NR*	
Parallel Channels (x4) ABCD, EFGH Quadruples Current		8-Ohm	800	400	1000	1000	1250	1250	1000	1000	1200	1200
		4-Ohm	1250	800	2000	1600	2500	2400	2000	1200	2400	2200
		2-Ohm	1700	1600	4000	2500	5000	4500	2500	1200	4000	2400
		1-Ohm	2500	1500	4000	2000	7000	4500	3000	1200	4000	2400

NR* = Not Recommended
N/A = Not Available

Note:

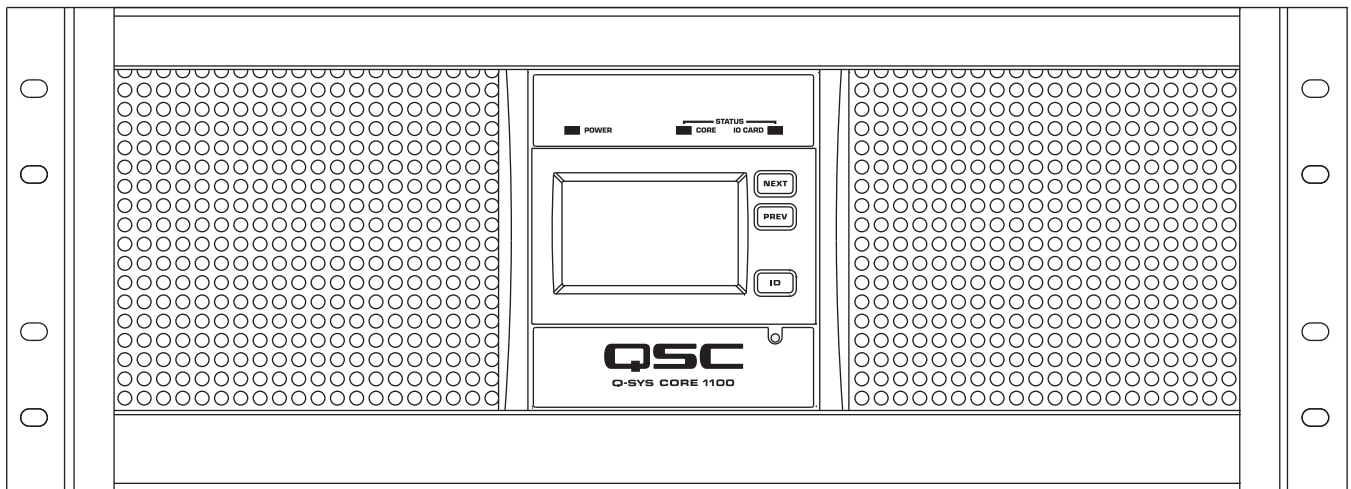
Max Power data is based on the most potential any single amplifier channel can deliver. This data is most useful for asymmetrical loading of amplifier channel and maximizing power utilization of the amplifier. When utilizing FlexAmp™ power requirements, be sure to take into consideration the power capabilities of the channel AND the capabilities of the Power Supply.

Continuous Power indicates amplifier output capabilities with all channels driven with the same load without exceeding the capabilities of the power supply.

Power Spec is based on 1kHz sine wave, 20msec

Core 1100 – Centralized Audio and Control Processor

Core 3100 – Centralized Audio and Control Processor



TD-000455-00-A



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.

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

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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 SAFETY INSTRUCTIONS



WARNING!: TO PREVENT FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE.

- Maximum ambient operating temperature is 50°C (122°F).
- Power requirements are: 100 – 240 VAC, 50 – 60 Hz, and the proper IEC power cord.
- Ensure reliable earth grounding is maintained.
- Distribute the units evenly when installing in a rack. Hazardous conditions can be created by uneven weight distribution.

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Do not submerge the apparatus in water or liquids.
7. Do not use any aerosol spray, cleaner, disinfectant or fumigant on, near or into the apparatus.
8. Clean only with a dry cloth.
9. Do not block any ventilation opening. Install in accordance with the manufacturer's instructions.
10. Keep ventilation opening free of dust or other matter.
11. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
12. To reduce the risk of electrical shock, the power cord shall be connected to a mains socket outlet with a protective earthing connection.
13. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
14. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
15. Do not unplug the unit by pulling on the cord, use the plug.
16. Only use attachments/accessories specified by the manufacturer.
17. Unplug this apparatus during lightning storms or when unused for long periods of time.
18. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
19. The appliance coupler, or the AC Mains plug, is the AC mains disconnect device and shall remain readily operable after installation.
20. Adhere to all applicable, local codes.
21. Consult a licensed, professional engineer when any doubt or questions arise regarding a physical equipment installation.

Maintenance and Repair



WARNING!: Advanced technology, e.g., the use of modern materials and powerful electronics, requires specially adapted maintenance and repair methods. To avoid a danger of subsequent damage to the apparatus, injuries to persons and/or the creation of additional safety hazards, all maintenance or repair work on the apparatus should be performed only by a QSC authorized service station or an authorized QSC International Distributor. QSC is not responsible for any injury, harm or related damages arising from any failure of the customer, owner or user of the apparatus to facilitate those repairs.

LITHIUM BATTERY WARNING

THIS EQUIPMENT MAY CONTAIN A NON-RECHARGEABLE LITHIUM BATTERY. LITHIUM IS A CHEMICAL KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER OR BIRTH DEFECTS. THE NON-RECHARGEABLE LITHIUM BATTERY CONTAINED IN THIS EQUIPMENT MAY EXPLODE IF IT IS EXPOSED TO FIRE OR EXTREME HEAT. DO NOT SHORT CIRCUIT THE BATTERY. DO NOT ATTEMPT TO RECHARGE THE NON-RECHARGEABLE LITHIUM BATTERY.

FCC Statement



NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

RoHS STATEMENT

The QSC Core 1100 and Core 3100 are in compliance with European Directive 2011/65/EU – Restriction of Hazardous Substances (RoHS2).

The QSC Core 1100 and Core 3100 are in compliance with “China RoHS” directives. The following chart is provided for product use in China and its territories:

	Q-SYS Core 1100 and and Core 3100					
部件名称 (Part Name)	有害物质 (Hazardous Substances)					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(vi))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
电路板组件 (PCB Assemblies)	X	O	O	O	O	O
机壳装配件 (Chassis Assemblies)	X	O	O	O	O	O

本表格依据 SJ/T 11364 的规定编制。

O: 表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 规定的限量要求以下。

X: 表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 规定的限量要求。

(目前由于技术或经济的原因暂时无法实现替代或减量化。)

This table is prepared following the requirement of SJ/T 11364.

O: Indicates that the concentration of the substance in all homogeneous materials of the part is below the relevant threshold specified in GB/T 26572.

X: Indicates that the concentration of the substance in at least one of all homogeneous materials of the part is above the relevant threshold specified in GB/T 26572.

(Replacement and reduction of content cannot be achieved currently because of the technical or economic reason.)

Warranty

For a copy of the QSC Limited Warranty, visit the QSC website at www.qsc.com

Unpacking

There are no special unpacking precautions. However, it is recommended that you keep the original packing materials for reuse in the rare event that service is required. If service is required and the original packing material is not available, ensure that the unit is adequately protected for shipment (use a strong box of appropriate size, sufficient packing/padding material to prevent load shifting or impact damage) or call QSC's Technical Services Group for replacement packing material and a carton.

What is included in your Q-SYS™ Core product carton:

- Q-SYS Core 1100 or Core 3100
- Quick Start Guide TD-000470
- QSC Limited Warranty
- IEC power cord
- Connector plug kit (provided with optional Q-SYS Audio I/O Cards requiring the kit.)

Mounting

Q-SYS products can be used in or out of an equipment rack. Rack mounting is optional. Rear rack ears are an available accessory if needed.

Rack Mount Instructions

Rack mount the Q-SYS product by supporting it from underneath while aligning the front panel mounting holes (in the rack ears) with the threaded screw holes in the rack rails. Install all four front mounting screws and washers and tighten securely. All Q-SYS products come with rear rack support ears. Ensure that these rear mounting points are securely fastened to rear rack rails or side walls.



WARNING!: Reliable Earthing – Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

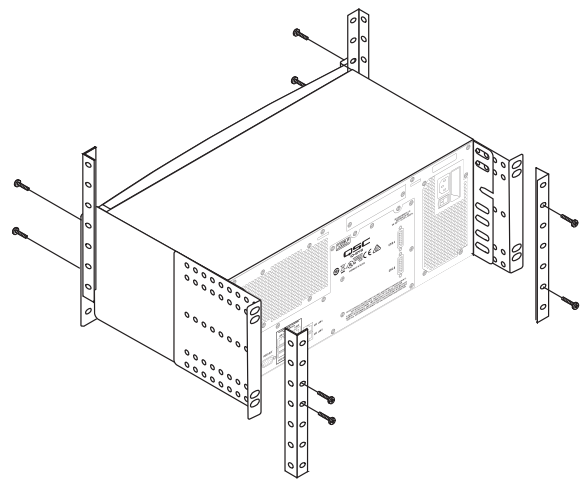
Mechanical Loading – Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven or unstable mechanical loading.



CAUTION!: Elevated Operating Ambient – If installed in a closed or multi-unit rack assembly, the ambient operating temperature of the rack environment may be greater than room ambient. Consideration should be given to ensure that the maximum operating temperature range (0°C to 50°C (32°F to 122°F)) is not exceeded.

Reduced Air Flow – Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.

Circuit Overloading – Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on over-current protection and supply wiring.



– Figure 1 –

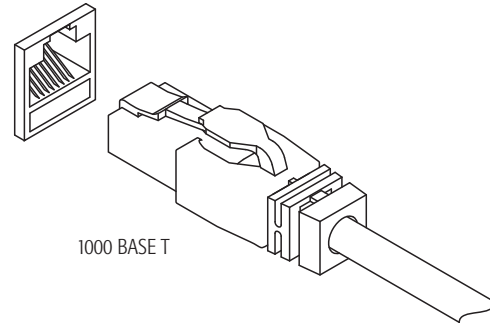
Connections

AC Power Cord

Insert the AC power cord into the AC power inlet on the back of the Q-SYS product. Plug the other end into a 100 – 240V, 50 – 60 Hz AC outlet. If a different type of IEC power cord is required than that supplied with the product, contact QSC's Technical Services Group.

Q-SYS™ Network (Q-LAN)

Connect one end of a data communications cable (CAT-5e rating or better) terminated with an RJ45 plug into the LAN A (and optionally LAN B) receptacle on the rear panel of the Q-SYS Core. Ensure that the lock tab on the cable engages with the RJ45 receptacle. (Figure 2)



– Figure 2 –



IMPORTANT: For detailed information about setting up the Q-LAN Network and Q-SYS Designer, refer to the Q-SYS Designer online help.

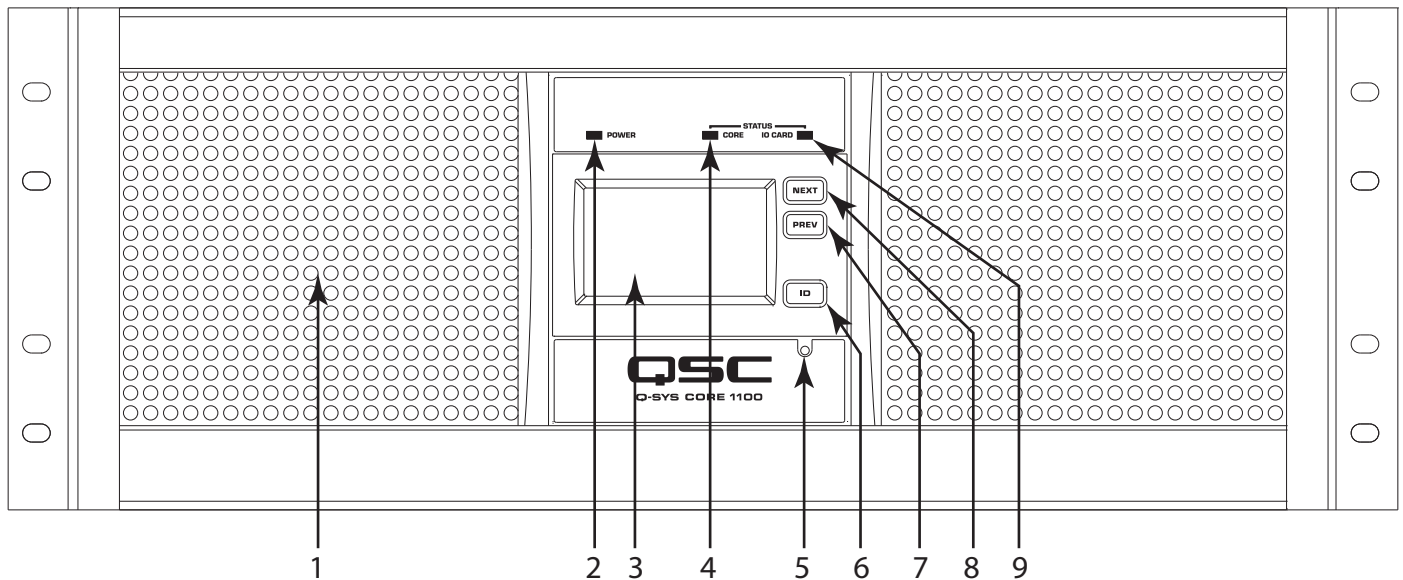
Q-SYS™ Core 1100 | Core 3100 Panel Features

Figure 3 and Figure 4 show the Q-SYS Core front and rear panel features for a product having a simple configuration of one blank I/O Card slot.



NOTE: The Q-SYS hardware products are configured at the QSC factory per your order. At the time of order, you specify the type of Q-SYS Audio I/O Card to be installed in the Audio I/O bay on the Q-SYS Core.

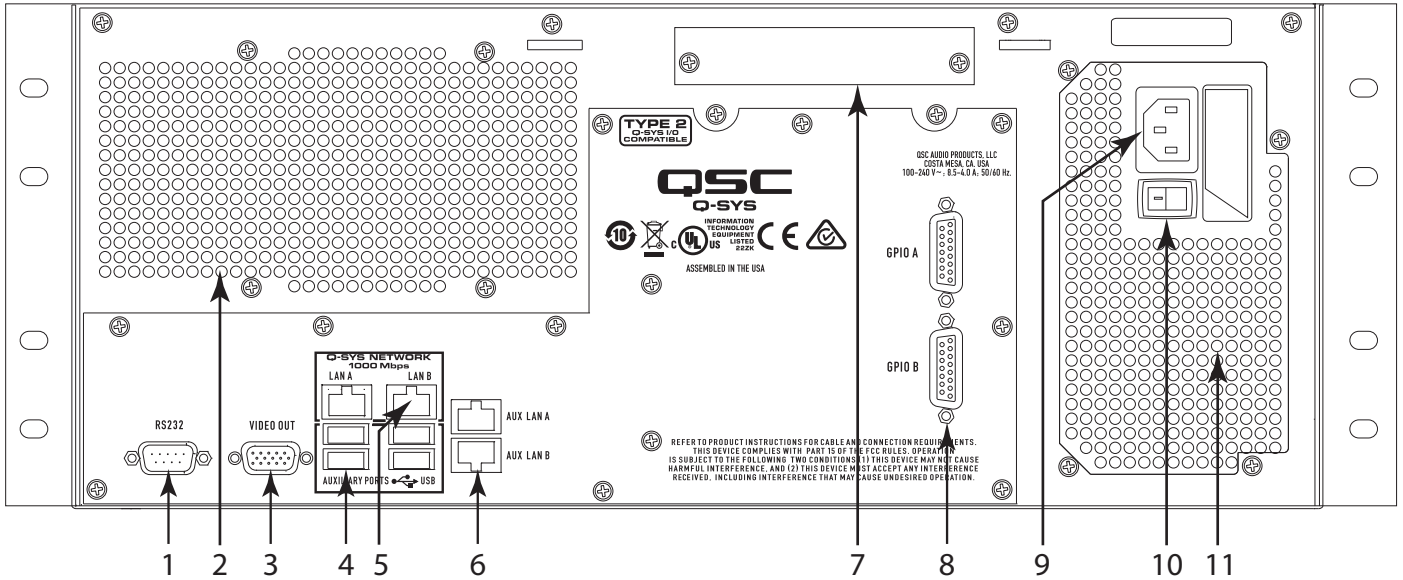
Front Panel



– Figure 3 –

- | | |
|--|--|
| 1. Air Intake Vents | 6. ID Button (Identifies Core in Q-Sys Designer GUI) |
| 2. Power-on LED | 7. LCD Previous Page Navigation Button |
| 3. 480 x 240 Color Graphics LCD | 8. LCD Next Page Navigation Button |
| 4. Core Status LED | 9. I/O Card Status LED |
| 5. Clear Settings Paperclip Button (resets network properties) | |

Rear Panel



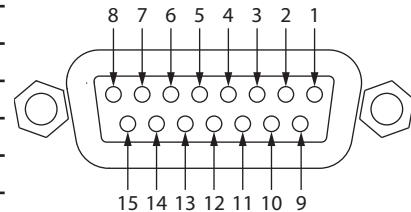
– Figure 4 –

1. RS-232 – DE-9 Male Connector for Serial Communications
2. Core Exhaust Vents
3. Video Out – HD-15 Female Connector Accepts Diagnostic VGA Monitor
4. Auxiliary Port - USB Host Connectors (Type A) x 4
5. Q-Sys Gigabit Network Ports (Q-LAN) - LAN A Primary, LAN B Backup
6. Auxiliary LAN Ports 10/100/1000 Mbps
7. Audio I/O Bay - Accepts Optional Q-Sys Audio I/O Card
8. GPIO A and GPIO B - Female DA15 Connectors for Q-Sys Control I/O
9. AC Mains Inlet - IEC Male Connector
10. Power Switch
11. Power Supply Exhaust Vents

Q-SYS™ GPIO Signal Specifications

GPIO Pin Assignments

DB15 Pin	Signal Name	Signal Type	Description
1	RNO	Relay Contact	Relay - normally open
2	RNC	Relay Contact	Relay - normally closed
3	GPIO1	Normal Current	GPIO pin
4	GPIO3	Normal Current	GPIO pin
5	POWER	Power	+12 V DC
6	GPIO5	High Current	GPIO pin - high current capable
7	GPIO7	High Current	GPIO pin - high current capable
8	GND	Ground	Ground
9	RC	Relay Contact	Relay - common
10	GND	Ground	Ground
11	GPIO2	Normal Current	GPIO pin
12	GPIO4	Normal Current	GPIO pin
13	POWER	Power	+12 V DC
14	GPIO6	High Current	GPIO pin - high current capable
15	GPIO8	High Current	GPIO pin - high current capable



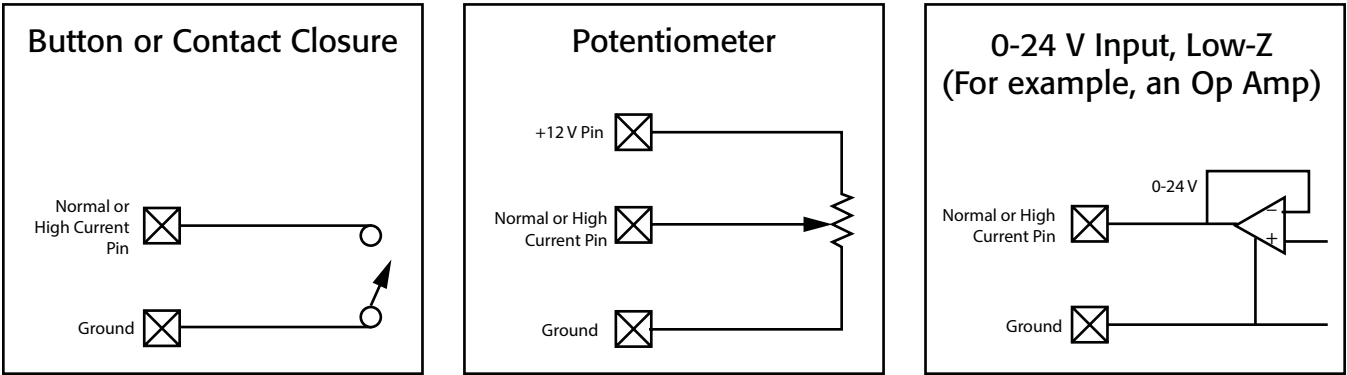
– Figure 5 –

GPIO Specifications

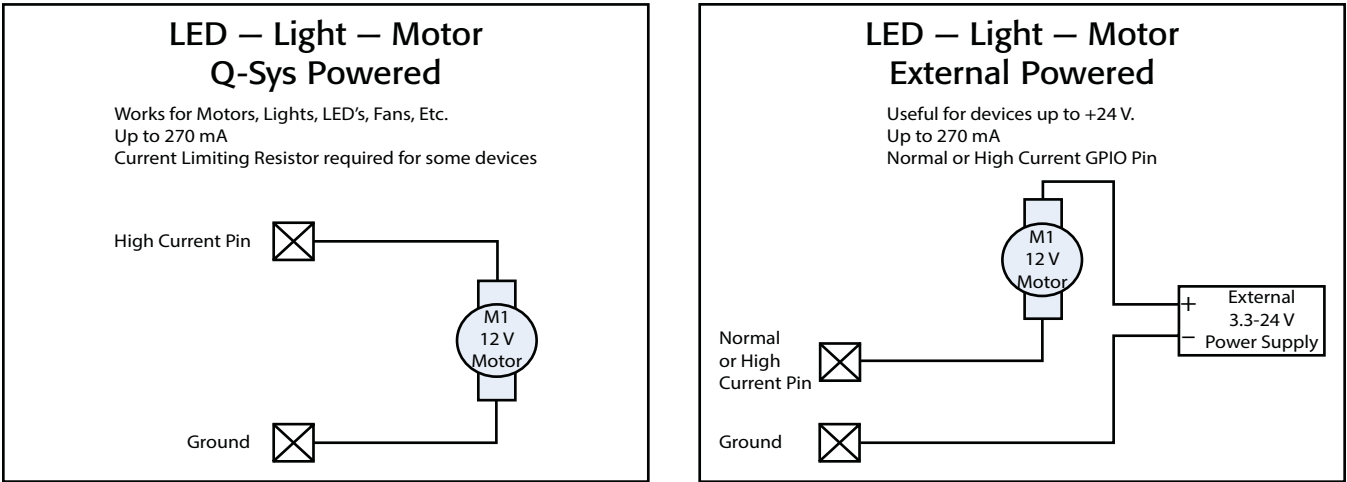
Relay Pins	Maximum Voltage, relative to Ground	30 V
	Maximum Current through Relay	1 Amp
Power Pins	Output Voltage	11 V min, 13 V max
	Maximum Output Current	400 mA
High Current Pins	Maximum Input Range	0 V to 32 V
	Analog Input Range:	0 V to 24 V
	Digital Input, Low	0.8 V maximum
	Digital Input, High	2.0 V minimum
	Digital Output, Low	0.4 V maximum
	Digital Output, High	2.4 V minimum, 3.3 V maximum
	Digital Output Impedance	1 k ohm
	High Current Output, Low	0.4 V maximum
	High Current Output, High	11 V minimum, 13 V maximum
	High Current Output, sink or source	280 mA
All Power and High Current pins combined	Maximum Source Current	400 mA
All GPIO Pins 1 through 8 combined	Maximum Sink Current	1 A using 1 GND pin
		2 A using 2 GND pins

 **NOTE:** The maximum current sourced by one GPIO connector (including both High Current and Power Pins) is 400 mA.

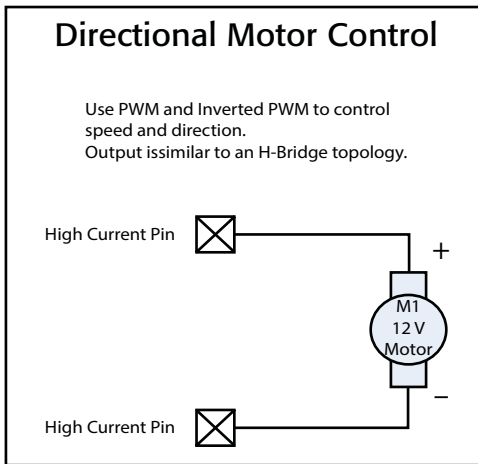
GPIO Examples



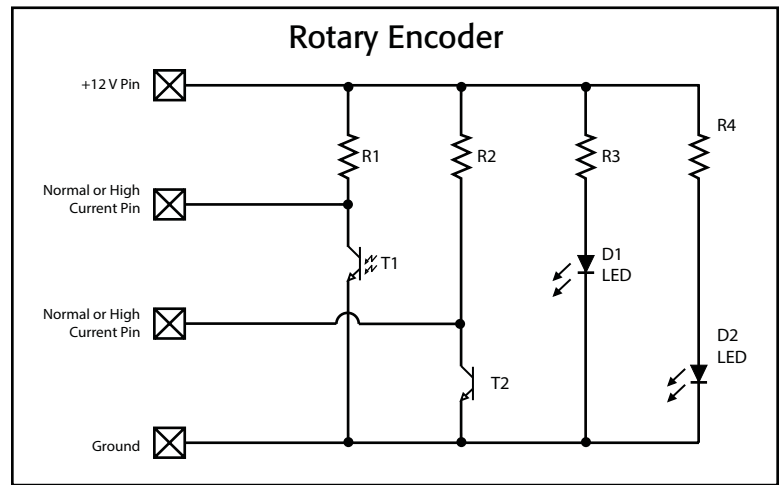
– Figure 6 –



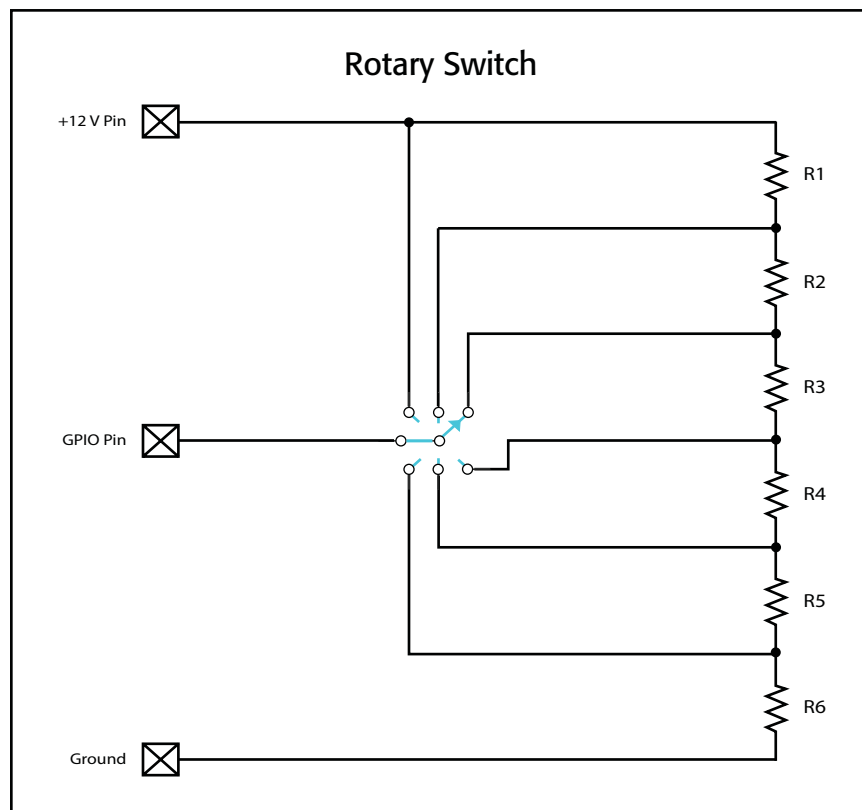
– Figure 7 –



– Figure 8 –



– Figure 9 –



– Figure 10 –

Rotary Switch All resistors should have the same value. The total resistance should be about 10K Ohms. The individual resistor value should be 10,000 divided by the number of resistors. The schematic is an example only, and could easily be modified to have more switch positions or use multiple momentary buttons instead of a rotary switch.

Specifications

	Core 1100	Core 3100
Description	System processor and control engine	
Front Panel Controls	LCD Next and Prev momentary button Unit ID momentary button Clear settings momentary switch (use a paperclip or similar tool)	
Front Panel Indicators	Power On: Green LED Status: Core: Tri-color LED IO Card: Tri-color LED 480 x 240 Color Graphics LCD	
Rear Panel Connectors	RS-232: DE-9 (male 9-pin D shell connector) Video Out: HD-15 (female 15-pin D shell connector) Auxiliary ports AUX LAN A / AUX LAN B: RJ45 10/100/1000 MBps Auxiliary USB host x4 GPIO A / GPIO B: DA-15 (female 15-pin D shell connector) Q-SYS Network LAN A / LAN B: RJ45 1000 Mbps only	
Maximum Ambient Operating Temperature	0°C to 50°C (32°F to 122°F)	0°C to 50°C (32°F to 122°F).
Capacity		
Local I/O ¹	64 x 64	64 x 64
Network Audio Channels In/Out	256 x 256	512 x 512
Network Audio Streams In/Out	256 x 256	256 x 256
AEC (100 ms tail length)	144	288
Core to Core Streaming	256 x 256	512 x 512
End Nodes	256 Destinations 256 Sources	256 Destinations 256 Sources
Thermal – BTU / hour (typical)	1100	1400
Line Voltage Requirements	100 VAC – 240 VAC, 50 – 60 Hz	100 VAC – 240 VAC, 50 – 60 Hz
AC current draw (maximum)	8.5 A @ 100 VAC	8.5 A @ 100 VAC
AC current draw (typical)	3.8 A @ 100 VAC	4.4 A @ 100 VAC
Dimensions (HWD)	7" x 19" x 17.875" (177.8 mm x 482.6 mm x 454 mm)	
Net Weight (including I/O card)	41 lb (18.6 kg)	
Accessories Included	6 ft UL/CSA/IEC line cord • Hardware Information Document • Warranty • Optional audio I/O ship kit	

¹ One I/O-card slot. Depends on I/O card purchased.

² Using maximum fan-out with 16-channel unidirectional I/O Frames.

³ The CAES4 card (AES-3 input/output) doubles the audio channel count of any slot in which it is used.



NOTE: Specifications subject to change without notice.

**Mailing Address:**

QSC, LLC
1675 MacArthur Boulevard
Costa Mesa, CA 92626-1468 U.S.
Main Number: (714) 754-6175
World Wide Web: www.qsc.com

Sales & Marketing:

Voice: (714) 957-7100 or toll free (U.S. only) (800) 854-4079
FAX: (714) 754-6174
E-mail: info@qscaudio.com

Q-SYS™ Customer Support**Application Engineering and Technical Services**

Monday - Friday 7 AM to 5 PM PST (Excludes Holidays)
Tel. 800-772-2834 (U.S. only)
Tel. +1 (714) 957-7150

Q-SYS 24/7 Emergency Support*

Tel: +1-888-252-4836 (U.S./Canada)
Tel: +1-949-791-7722 (non-U.S.)



Q-Sys™ Customer Support

*Q-SYS 24/7 Support is for Emergency assistance with Q-SYS systems only. 24/7 support guarantees a call back within 30 min after a message is left. Please include, Name, Company, Call Back Number and description of the Q-SYS emergency for prompt call back. If calling during business hours please use the standard support numbers above.

Q-SYS Support Email

qsyssupport@qsc.com
(Immediate email response times not guaranteed)

QSC

Technical Services
1675 MacArthur Blvd.
Costa Mesa, CA 92626 U.S.
Tel: 800-772-2834 (U.S. only)
Tel: +1 (714) 957-7150
FAX: +1 (714) 754-6173

Hardware User Manual

CX-Q Series Network Amplifiers

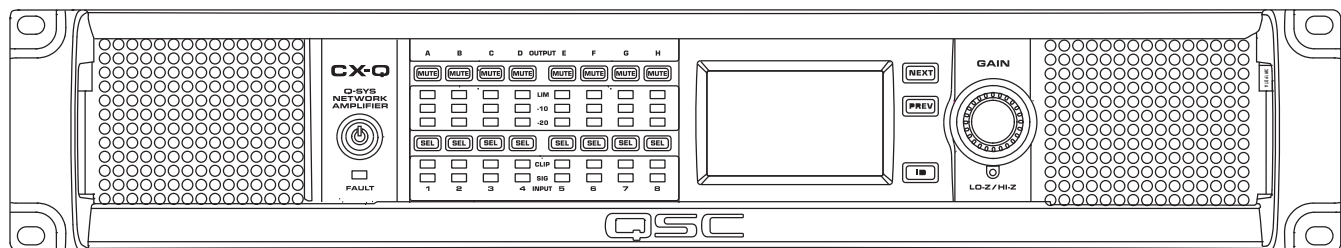
CX-Q 2K4 — 4 Channel, 2000 W Network Amplifier with Mic/Line Inputs

CX-Q 4K4 — 4 Channel, 4000 W Network Amplifier with Mic/Line Inputs

CX-Q 8K4 — 4 Channel, 8000 W Network Amplifier with Mic/Line Inputs

CX-Q 4K8 — 8 Channel, 4000 W Network Amplifier with Mic/Line Inputs

CX-Q 8K8 — 8 Channel, 8000 W Network Amplifier with Mic/Line Inputs



TD-001661-01-A



TD-001662-01-B

EXPLANATION OF 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 SAFETY INSTRUCTIONS



WARNING! TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE. Elevated Operating Ambient – If installed in a closed or multi-unit rack assembly, the ambient operating temperature of the rack environment may be greater than room ambient. Consideration should be given to ensure that the maximum operating temperature is not exceeded – refer to the Environmental section. Reduced Air Flow – Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with a dry cloth.
7. Do not block any ventilation opening. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus that produce heat.
9. To reduce the risk of electrical shock, the power cord shall be connected to a mains socket outlet with a protective earthing connection.
10. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
11. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
12. Only use attachments/accessories specified by the manufacturer.
13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
15. The appliance coupler, or the AC Mains plug, is the AC mains disconnect device and shall remain readily operable after installation.
16. Adhere to all applicable, local codes.
17. Consult a licensed, professional engineer when any doubt or questions arise regarding a physical equipment installation.
18. Do not use any aerosol spray, cleaner, disinfectant or fumigant on, near or into the apparatus. Clean only with a dry cloth.
19. Do not unplug the unit by pulling on the cord, use the plug.
20. Do not submerge the apparatus in water or liquids.
21. Keep ventilation opening free of dust or other matter.

Maintenance and Repair



WARNING! Advanced technology, e.g., the use of modern materials and powerful electronics, requires specially adapted maintenance and repair methods. To avoid a danger of subsequent damage to the apparatus, injuries to persons and/or the creation of additional safety hazards, all maintenance or repair work on the apparatus should be performed only by a QSC authorized service station or an authorized QSC International Distributor. QSC is not responsible for any injury, harm or related damages arising from any failure of the customer, owner or user of the apparatus to facilitate those repairs. In the event of malfunction, contact QSC Customer Support for assistance.

FCC Statement



NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Environmental

- Life Cycle: 10 years
- Service Life: 10 years
- Storage Conditions: Temperature from -20 ° C to + 70 ° C, humidity 5% - 85% RH.
- Maximum Operating Conditions: -10 ° C to +50 ° C, humidity 5% - 85% RH.



NOTE: Performance may be reduced above 40 ° C.



CAUTION! Environmental Contamination: amplifiers must be installed in an environment where they are provided adequate supply of fresh cooling air that is free from excessive amounts of chemical and/or solid particulate matter contaminants. Excess contamination buildup from environmental factors may cause adverse performance due to high internal voltages experience during operation.



If you wish to discard electronic equipment, please contact your dealer or supplier for further information.

RoHS Statement

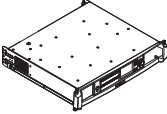
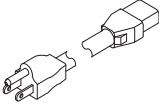
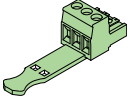
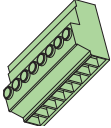
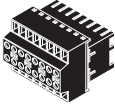
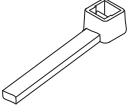



The QSC CX-Q Series Amplifiers are in compliance with “China RoHS” directives. The following chart is provided for product use in China and its territories:

	QSC CX-Q Series Amplifiers					
	有毒有害物质或元素 (Toxic or hazardous Substances and Elements)					
部件名称 (Part Name)	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(vi))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
电路板组件 (PCB Assemblies)	X	0	0	0	0	0
机壳装配件 (Chassis Assemblies)	X	0	0	0	0	0
0: 表明这些有毒或有害物质在部件使用的同类材料中的含量是在 SJ/T11363_2006 极限的要求之下。 (0: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in SJ/T11363_2006.) X: 表明这些有毒或有害物质在部件使用的同类材料中至少有一种含量是在 SJ/T11363_2006 极限的要求之上。 (X: Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in SJ/T11363_2006.)						

海拔和热带条件

	仅适用于海拔2000m 以下地区安全使用	Only suitable for safe use in areas below 2000m above sea level
	仅适用于非热带气候条件下地区安全使用	Only suitable for safe use in non-tropical climates

What's in the Box

 (1x) Amplifier	 (1x) AC Cord	 (8x or 4x) Inputs (3-Pins)	 (2x or 1x) Outputs (8-Pins)	 (1x) GPIO (16-pins)
 (16x or 8x) Cable Tie	 (1x) Warranty	 (1x) Safety Information	 (1x) Quick Start Guide	

Features

Amplifier Front Panel

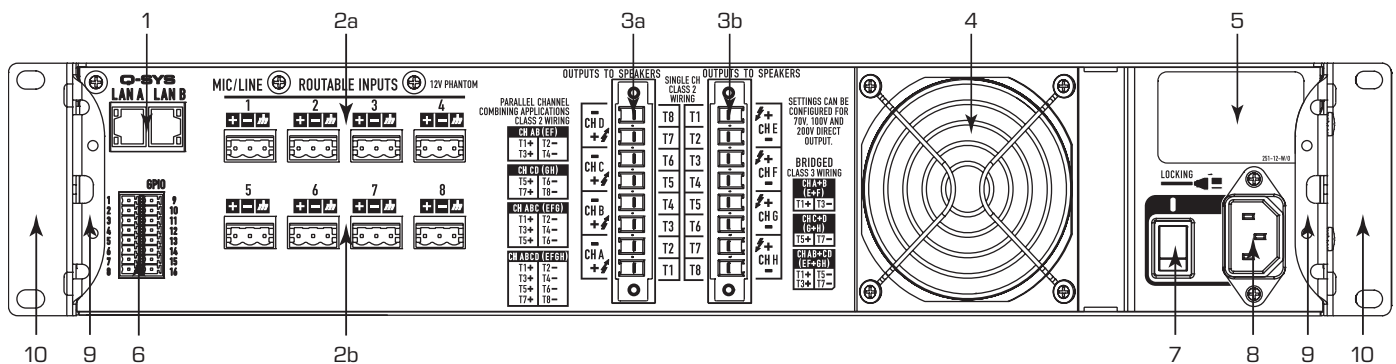
Refer to "Amplifier Controls and Indicators" on page 11.

Amplifier Rear Panel

Refer to Figure 1.



WARNING! Dangerous voltage possible on output terminals. Disconnect AC Mains before connecting or disconnecting output wiring.



— Figure 1 — 8-Channel Model Shown

- RJ-45 – Q-SYS Q-LAN A / B
- Analog Inputs – Mic or Line level, 12V Phantom power, 3-pin Euro-style Connectors
 - Inputs 1-4 All CX-Q Models
 - Inputs 5-8 for 8-Channel Models only
- Outputs – Loudspeaker Connector, 8-pin Euro-style
 - Outputs A–D All Models
 - Outputs E–H 8-Channel Models only
- Cooling fan inlet (do not block)
- Product information:
 - Serial Number with manufacturer date code: Refer to Figure 7
 - Country of origin, "Product of China".
- GPIO Euro-style Connector, 16-pin
- AC Power Switch
- Locking IEC Power Connection
- Rear Rack-mount Brackets
- Front Rack-mount Brackets

Installation

The following steps are written in the recommended installation order.

Rack-Mount the Amplifier

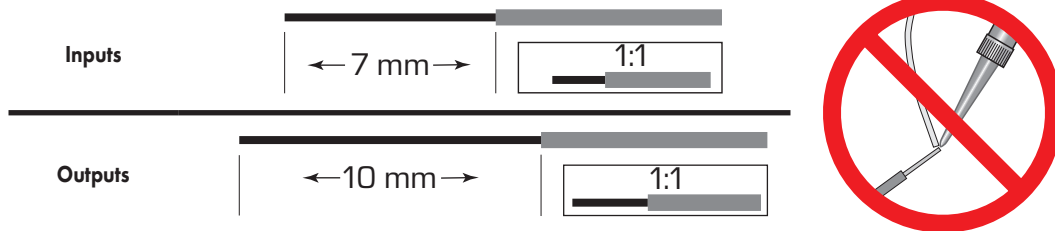
The amplifiers are designed only for mounting in a standard rack-mount unit. Abnormal mounting positions (e.g., vertical, face-up, face-down) are not supported. The amplifiers are 2RU high, and 381 mm (15 in) deep.

Secure the amplifier in the rack with eight screws (not supplied), four in front, four in back. For complete instructions, refer to TD-000050 "Rear Rack Ears Installation Guide" which can be found on the QSC Website (www.qsc.com).



CAUTION! Be sure that nothing is blocking the front or rear ventilation openings, and that each side has a minimum of 2 cm clearance.

Wire Preparation

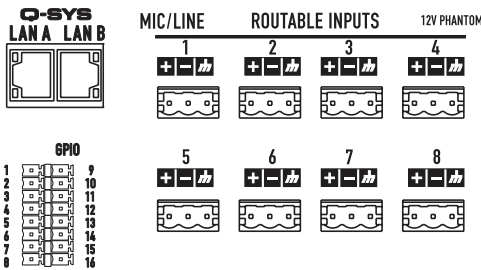


— Figure 2 —

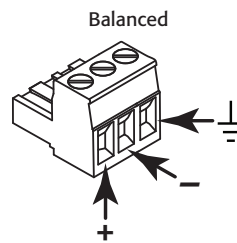
Use an appropriate wire-stripping tool to remove 7 mm of insulation from Input wiring and 10 mm of insulation from the Output wiring. Do not tin the stripped wire ends.

Inputs

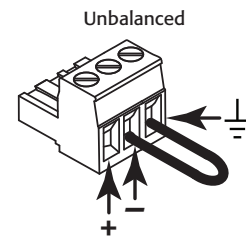
Q-SYS – Connect the amplifier LAN A, and if available, LAN B, to the Q-LAN network (Figure 3). Refer to the [Q-SYS Help](#) for network requirements.



— Figure 3 —



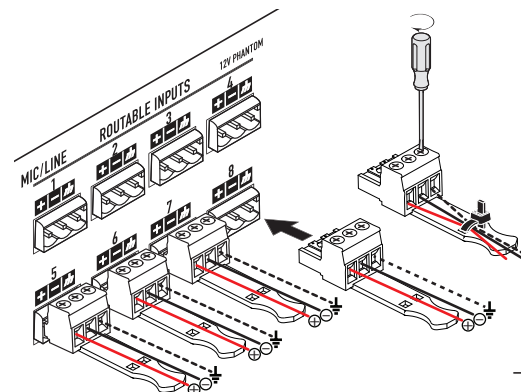
— Figure 4 —



— Figure 5 —

Analog Inputs are converted to digital audio in the amplifiers then routed to the Q-SYS Core over the Q-LAN network. The digital signals show up in Q-SYS Designer at the input component where they can be routed as needed. Refer to the Q-SYS documentation.

1. Make sure your audio source devices are powered off.
2. Wire the audio mic- or line-level source to up to eight (8-Channel amplifiers) or four (4-Channel amplifiers) Euro-style connectors (supplied). You can use either balanced inputs (Figure 4) or unbalanced inputs (Figure 5).
3. Plug the connectors into the appropriate receptacles (Routable Inputs 1, 2, 3, 4, 5, 6, 7, 8) Figure 4 and Figure 6.



— Figure 6 —

GPI0

Refer to ["GPI0" on page 17](#) for details about the GPI0 feature.

Outputs and Output Configuration

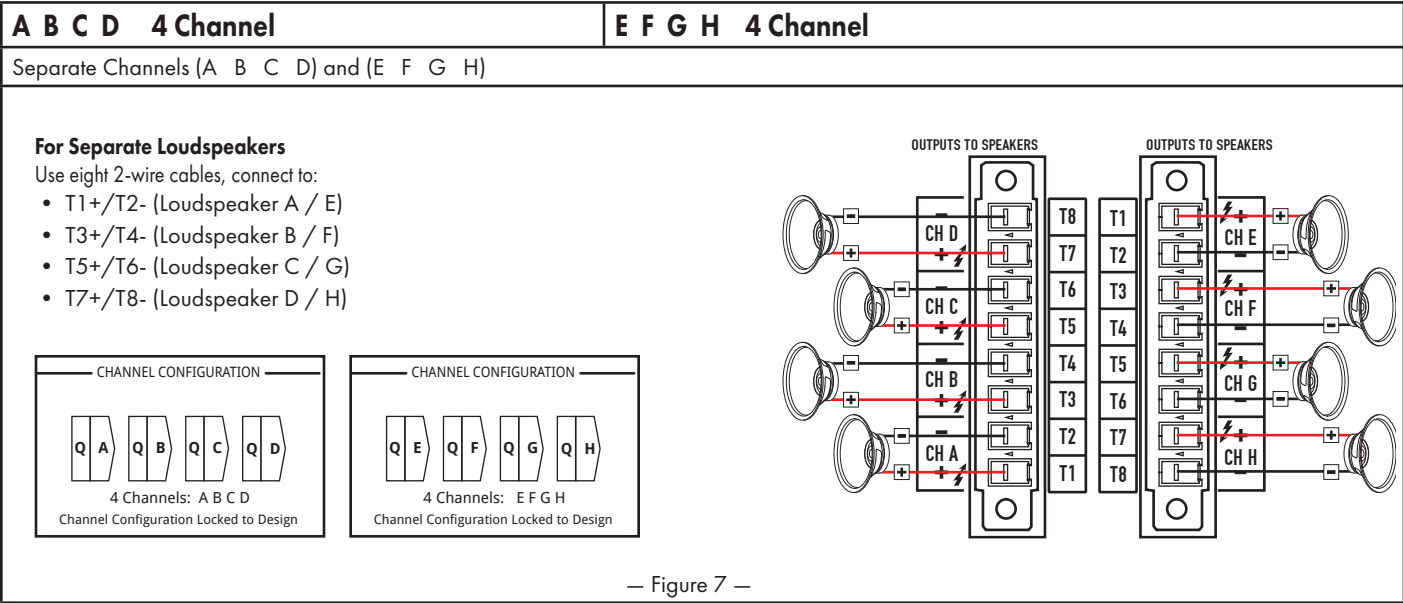
The amplifiers have one or two sets of four-channel outputs that are configured independently. The configuration of the amplifier is defined in Q-SYS designer software and is "pushed" into the physical amplifier when the Name and Type of amplifier in the design matches the Name and Type of physical amplifier. Flexible Amplifier Summing Technology (FAST) allows users to power a variety of loads through combining amplifier channels in various ways. Amplifier channels can be combined in BTL Bridged mode for higher voltage needs or Parallel Mode for higher current needs. Figure 7 thru Figure 10 are examples of how the 4 channel amplifier blocks can be combined to drive higher power requirements under different loads. Please reference the power output ratings for more information.

NOTE: The output connector is capable of handling up to 8 AWG for stranded wire.

Use the diagrams shown in Figure 7 thru Figure 10 as a reference for planning your loudspeaker configuration. Refer to Figure 11 for how to connect the wiring based on your configuration.

CAUTION! Before turning the amplifier on, double check your output connections to be sure they are connected properly based on the output configuration specified in Q-SYS Designer. If you change the output configuration of the amplifier you must change the loudspeaker connections before applying power to the amplifier! After a change of the output configuration, the amplifier re-boots and all outputs are muted. You must press the Mute All button in the Q-SYS Amp Output component, Press The Amplifier Mode Button on the front panel of the amplifier.

Figure 7 through Figure 10 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. The following diagrams show the 8-Channel models. 4-Channel models have outputs A through D only.



A+B C D 3 Channel, A B Bridged**E F G H 4 Channel**

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

For A+B (Bridged) One Loudspeaker

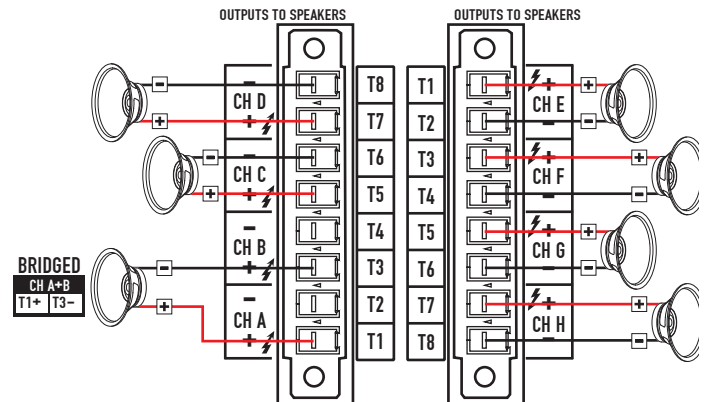
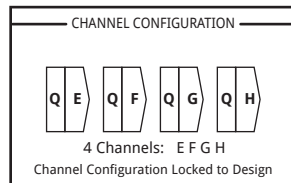
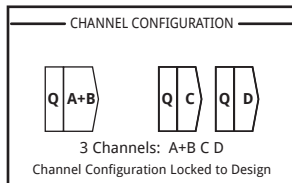
Use one 2-wire cable connect to:

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

For C D (E F G H) (Separate) Two and 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 8 —

AB CD 2 Channel, AB Parallel CD Parallel**EF + GH 1 Channel, EF Parallel Bridged with GH Parallel**

Two Pair of Parallel Channels (AB CD) and two Pair of Parallel Channels Bridged (EF + GH)

AB (Parallel) CD (Parallel) For Two Loudspeakers

Use two 2-wire cables, connect to:

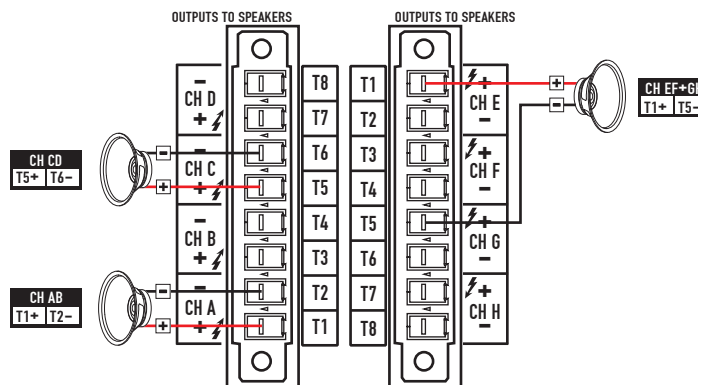
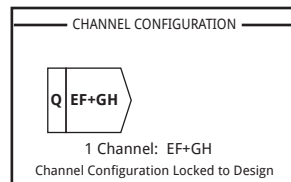
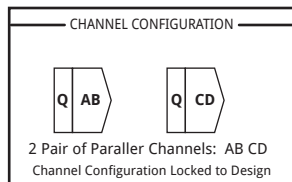
- T1+/T2- (Loudspeaker AB)
- T5+/T6- (Loudspeaker CD)

EF (Parallel) Bridged with GH (Parallel) For One Loudspeaker

Full power to one loudspeaker

Use one 2-wire cable, connect to:

- T1+/T5- (Loudspeaker EF+GH)



— Figure 9 —

ABCD 1 Channel, ABCD Parallel**EFGH 1 Channel, EFGH Parallel**

Parallel Channels (ABCD) and (EFGH)

For One Loudspeaker

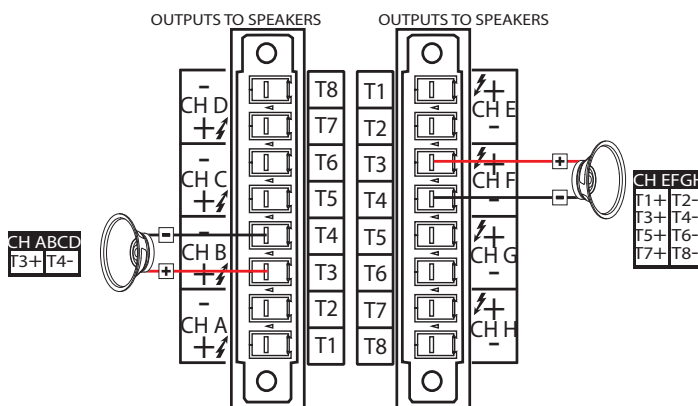
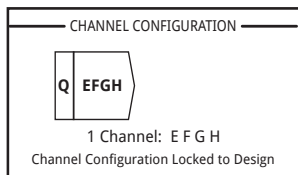
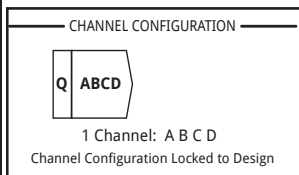
Full power to one loudspeaker; Use one 2-wire cable, connect to:

- T3+/T4- (Loudspeaker ABCD)

For Multiple Loudspeakers

For multiple loudspeaker connections, power is available at all output connectors. Connect the loudspeakers as follows:

- 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 10 —

Possible Combinations

The table below lists the options available in Q-SYS Designer.

Outputs	Configuration / Channels	Outputs	Configuration / Channels
A B C D	4 Channel	E F G H	4 Channel
A+B C D	3 Channel, A B Bridged	E+F G H	3 Channel, E F Bridged
A+B C+D	2 Channel, A B Bridged C D Bridged	E+F G+H	2 Channel, E F Bridged G H Bridged
A B C D	3 Channel, A B Parallel	E F G H	3 Channel, E F Parallel
A B C+D	2 Channel, A B Parallel C D Bridged	E F G+H	2 Channel, E F Parallel G H Bridged
A B C D	2 Channel, A B Parallel C D Parallel	E F G H	2 Channel E F Parallel G H Parallel
A B+CD	1 Channel, A B Parallel Bridged with C D Parallel	E F+GH	1 Channel, E F Parallel Bridged with G H Parallel
A B C D	2 Channel, A B C Parallel	E F G H	2 Channel E F G Parallel
A B C D	1 Channel A B C D Parallel	E F G H	1 Channel E F G H Parallel

A B = Individual Channels, AB = Parallel Channels, A+B = Bridged Channels

Connect the Loudspeakers

WARNING! There is a potential of having dangerous voltage at the output terminals on the rear of the amplifier. Use caution not to touch these contacts. Make sure the Power switch is off prior to making any connections.



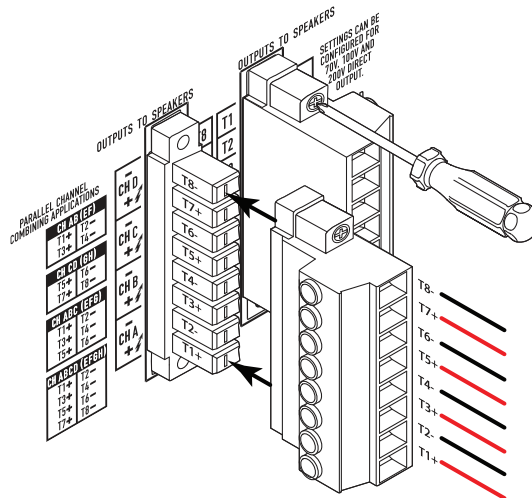
NOTE: The output connector is capable of handling up to 8 AWG for stranded wire.

1. Connect the loudspeaker wiring to the 8-pin Euro-style connector as needed for your amplifier's configuration.
2. Install the female 8-pin Euro-style connector onto the male connector on the rear of the amplifier as shown in Figure 11.
3. Use a Phillips screwdriver to secure the connector.



IMPORTANT! The CX-Q series of audio power amplifiers are high power amplifiers designed for installation use in both Lo-Z and Hi-Z applications. Proper wiring class/size is required to ensure safe operation. Based on operating mode, these amplifiers are designed for use with the following speaker wiring:

- FAST Channel Configuration Mode: Single Channel & Parallel = Class 2 wiring
- FAST Channel Configuration Mode: BTL (140 V or 200 V modes) = Class 3 wiring

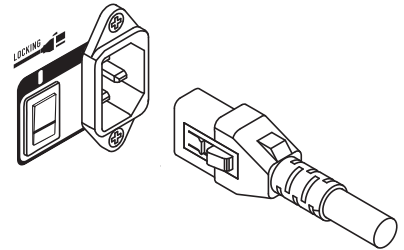


— Figure 11 —

AC Mains



WARNING! When the AC Power is on, there is a potential of having dangerous voltage at the output terminals on the rear of the amplifier. Use caution not to touch these contacts. Turn off the Power switch prior to making any connections.



— Figure 12 —

1. Make sure the Power switch on the rear of the amplifier is off.
2. Connect the IEC power cord to the AC receptacle. (Figure 12)

AC Power On

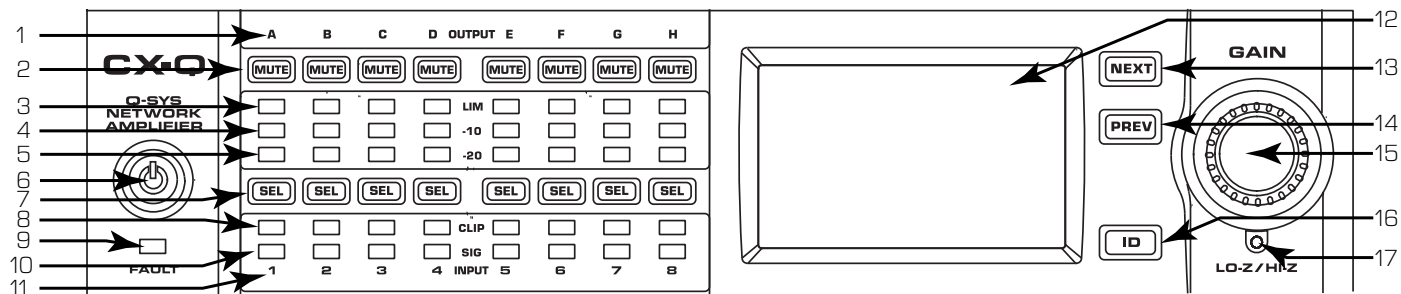
After connecting the outputs to the loudspeakers, you may turn the amplifier on.

1. Make sure the output gain settings for all audio-source devices (CD Players, Mixers, Instruments, etc.) are at the lowest output (max attenuation).
2. Turn on all audio sources.
3. Turn the power switch, on the back of the amplifier, to ON. The amplifier starts in the state it was in when power was removed. If the amplifier is in Standby or Mute All mode (Amplifier Mode button LED solid red or blinking), press the Amplifier Mode button to change the amplifier to Run mode. Refer to ["Amplifier Modes" on page 11](#) for information on Modes.
4. You can now bring up the outputs of your audio sources.



NOTE: When the amplifier is not connected to the Q-SYS Core processor, it is in a Fault mode and not operational unless previously configured for failover or standalone mode as part of a Q-SYS design.

Amplifier Controls and Indicators



— Figure 13 — CX-Q 8-Channel Shown

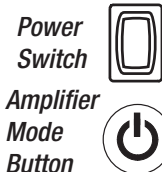
- | | | |
|--|--|-------------------|
| 1. Output Channel labels A to H | 6. Amplifier Mode button (Green/Red) | 13. NEXT button |
| 2. Output Channel Mute buttons / LEDs (Red) | 7. Output Channel Select buttons / LEDs (Blue) | 14. PREV button |
| 3. Output Channel Limiter LEDs (Red) | 8. Input Channel Clip LEDs (Red) | 15. GAIN Knob |
| 4. Output Channel -10 dB below maximum amplifier output (Blue) | 9. FAULT LED (Amber) | 16. ID button |
| 5. Output Channel -20 dB below maximum amplifier output (Blue) | 10. Input Channel Signal-Present LEDs (Blue) | 17. Pinhole Reset |
| 11. Input Channel labels 1 to 8 | | |

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.

Amplifier Modes

Off Mode

- Rear-panel power switch is off, the amplifier is not operable.
- The Amplifier Mode button (6) 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.



Run Mode

- From Standby or Mute All mode, press and release the Amplifier Mode button on the front panel. The amplifier is in Run Mode.
- The Amplifier Mode button (6) is illuminated green.
- The amplifier is fully operable; audio can pass.



Standby Mode

- From Mute All or Run mode, press and hold the Amplifier Mode button (6) on the front panel for approximately four seconds.
- The Amplifier Mode 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 Amplifier Mode button (6).
- The Amplifier Mode button flashes red, all output Mute buttons (2) are red.
- The amplifier output is disabled, but the front panel is fully operable.



Controls

SEL Buttons (7)

- Output 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 (13) and PREV (14) Buttons

- Navigates forward and backwards through the screens.



GAIN Knob (15)

- Adjusts the Gain for the selected output channel or channels. At least one channel must be selected.
- When one or more channels are selected, turn the Gain knob to jump to the Output Gains 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.



ID Button (16)

- 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.



Pinhole Reset (17)

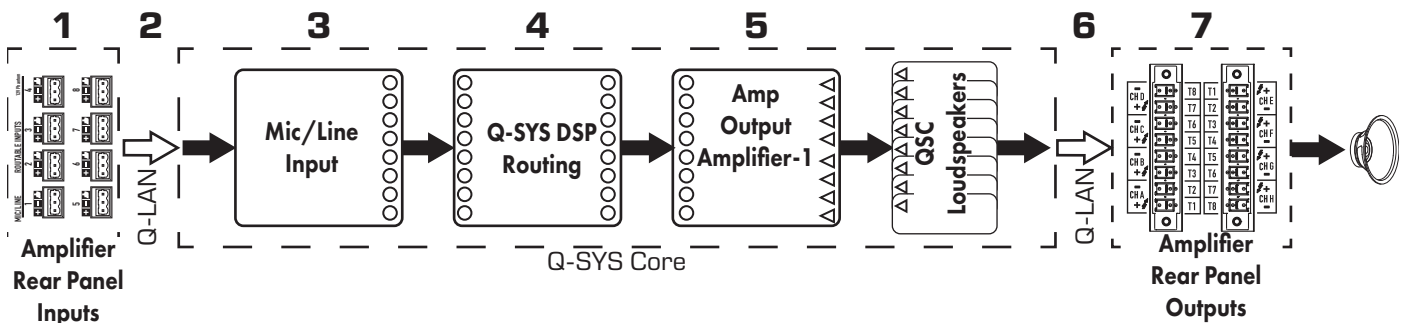
- Resets the amplifier to its factory default settings.
1. Insert a paper clip or similar tool into the pinhole
 2. Press and hold for 3 seconds.
 3. Press the ID button to confirm and reset the amplifier.
- Items reset include:
- Network settings set to Auto,
 - Amplifier name set to default,
 - Password deleted, and
 - Log file deleted.



Input and Output Signal Flow

The amplifier's inputs and outputs are not physically (or electrically) connected in the amplifier 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.

1. The analog inputs are converted to digital audio in the amplifier
2. The converted audio is then routed to the Q-SYS Core via Q-LAN (LAN A, LAN B).
3. The digital signals are brought into the design via the amplifier's Mic/Line Input component.
4. From the Mic/Line Input component the signals can be sent for processing and can be sent anywhere within the Q-SYS system.
5. In the Q-SYS Core digital audio signals (not necessarily from the amp's inputs) are sent to the Q-SYS Amp Output component.
6. The digital audio is then sent from the Q-SYS Core via Q-LAN to the amplifier.
7. Digital signals are converted to analog, amplified and sent to outputs of the amplifier.



— Figure 14 — 8-Channel Model Shown

The Q-SYS Amp Output component can have one to eight inputs/outputs depending on the amplifier model and its configuration in Q-SYS Designer Software. The desired configuration is selected in the Q-SYS Designer Properties menu for the amplifier. When the amplifier's configuration is changed, all of the outputs are placed in a "mute all" state. You can un-mute all by clicking the Mute All button in Q-SYS Designer's Amp Output component or press and release the Amplifier Mode button on the amplifier's front panel.

Amplifier Sensitivity

Amplifier sensitivity is set to provide full output voltage swing for the rated power (@8 Ohms), with a 0dBFS PEAK input. This means that MAX DAC Out = MAX AMP Out, with a SINE WAVE (0dBFS = -3dBFS RMS for a sine wave).

- 0dBFS pk Input on 8k4 = Amp Output of 141Vpk/100Vrms = 1250Wrms @ 8 Ohms
- 0dBFS pk Input on a 4k4 = Amp Output of 100Vpk/70Vrms = 625Wrms @ 8 Ohms
- 0dBFS pk Input on a 2k4 = Amp Output of 80Vpk/56Vrms = 400Wrms @ 8 Ohms

For 70V/100Vrms systems, there are required gain adjustments for full output that occur in the High-Z Speaker component. This happens when the Amp Output component is wired to a High-Z Speaker component. In addition, there is an HPF that is automatically applied at 50Hz to avoid transformer saturation. The HPF is user adjustable in the Generic Speaker component.

Limiters

There are several limiters within the CX-Q output:

- Speaker Component Limiters – These have controls exposed to the end user. Attack and Release Times in the Peak limiter are hard-coded. All other limiters are set by QSC. Speaker-related limiters are not indicated within the Amp Output block or front panel.
- Amp Protection Limiters – These are not adjustable and are meant only to protect the amplifier from unsafe conditions. Amp protection limiters are slow-moving that adjust over longer periods of time. Indicators for this limiter can be found on the individual amplifier channel or the front of the amplifier.
- DAC Limiters – These limiters engage approximately 1dB before clipping. It is normal to have some level of DAC clipping during operation. There are no controls over this limiter.

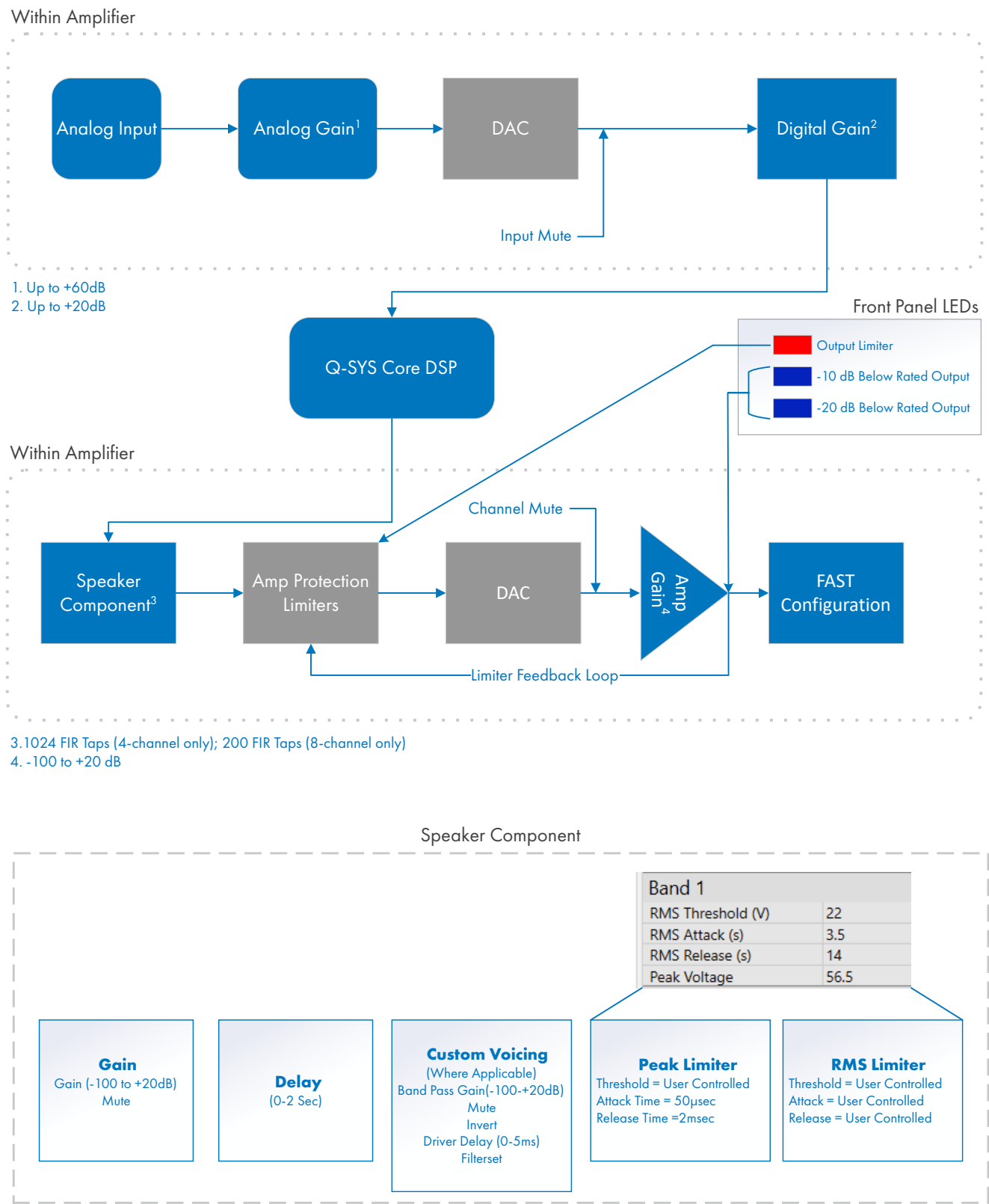
Mutes

- Channel Output Mutes are located within each channel strip of the amplifier panel. Activating this button will turn off the output signal of the DAC.
- Mute All function, found at the top of the amplifier output panel, will turn off the amplifier switching for all channels.

Gain

There are multiple places within Q-SYS to add gain to your system. Within the amplifier, it is critical to understand that the gain within the Speaker component should typically not be above +10dB. This is due to the dynamic nature of music and the stress that this can put on the output of the amplifier. Speaker component gain above +10dB could trigger the Amp Protection Limiters or DAC Limiters.

Figure 15 shows where gain, muting, and limiting are applied within the signal flow.



— Figure 15 —

Screens

STATUS Screen

Refer to Figure 16

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.
 - **OK** – green – amplifier is operating normally.
 - **Compromised** – orange – audio is passing; however, there may be a non-critical problem. Left unresolved, a compromised state could lead to a fault mode. Examples of Compromised can include issues related to network, output load, AC voltage, 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 cannot pass.
4. **FIRMWARE** – the Q-SYS Designer firmware version installed on the amplifier.



NOTE: The CX-Q 4- and 8-channel amplifiers require Version 8.1.0 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 17

1. **IP ADDRESS** – the default IP address is set to AUTO at 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.

HEALTH Screen

Refer to Figure 18

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** – AC mains current drawn by the amplifier.
5. Voltage Rails
 - **V RAIL 1** = +147VDC +/- 5V typical
 - **V RAIL 2** = -147VDC +/- 5V typical

STATUS	
1 → DEVICE:	CX-Q 8CH-1234
2 → DESIGN:	My Design Filename
3 → STATUS:	OK
4 → FIRMWARE:	8.1.0

— Figure 16 —

LAN A (AUTO)	
1 → IP ADDRESS:	192.168.xxx.xxx
2 → NETMASK:	255.255.0.0
3 → GATEWAY:	
LAN B (AUTO, NO LINK)	
4 → IP ADDRESS:	
NETMASK:	
GATEWAY:	

— Figure 17 —

HEALTH	
1 → FAN RPM:	2443
2 → PSU TEMP:	30.0°C
3 → AC VOLTAGE:	114V
4 → AC CURRENT:	1.58A
5 → V RAIL 1:	149V
V RAIL 2:	-149V

— Figure 18 —

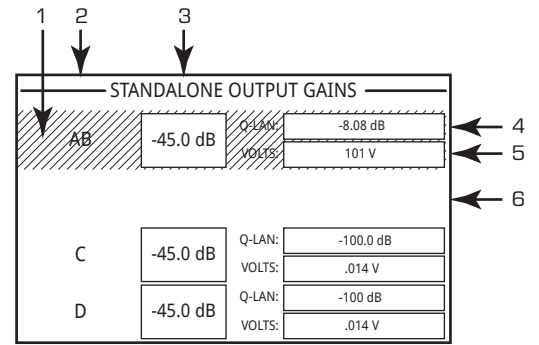
STANDALONE OUTPUT GAINS Screen

Refer to Figure 19

The STANDALONE OUTPUT GAINS screens provide a quick overview of all outputs. In addition, when this screen is displayed, you can make gain adjustments from 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.

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 CX-Q Output component is the connection to the output section of the amplifier.
5. **VOLTS** – the voltage applied to that output.
6. In the example Output B is combined with Output A – (AB or A+B), the slot for Output B is blank.



— Figure 19 —

To Make Gain Adjustments:

- a. Use the SEL button to select one or more output channels. You can select any or all channels.
- b. Use the GAIN knob to make adjustments to 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.



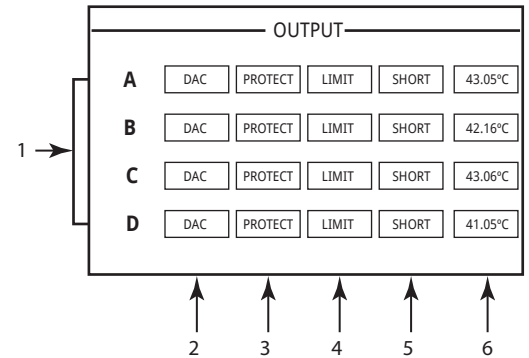
NOTE: If you press one or more of the SEL buttons, and do not make any GAIN adjustments, this screen remains visible for a short time then returns to the previous screen.

OUTPUT Screens

Each block of four outputs has a dedicated screen. Figure 20 is an example of Outputs A – D.

1. Output channel identifiers **A – D** and **E – H** (not shown).
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.
3. **PROTECT** – when illuminated, this indicates that the amplifier is in Protect Mode. Conditions can include over current, excessive long term average power output, impedance too low.
4. **LIMIT** – when illuminated, this indicates the amplifier limiter is active. There are five conditions that could cause the LIMIT condition:
 - Power
 - Current
 - Voltage
 - Temperature
 - Loudspeaker Protection is active.
5. **SHORT** – when illuminated, this indicates the output is shorted.
 - Short circuit detection operates once the desired amplifier output exceeds approximately 30W (varies per mode).
 - If the amplifier detects excessive current versus the target output voltage for sustained periods, a warning is activated.
 - The affected amplifier channel output signal is then muted for a brief period of time.
 - The affected amplifier channel automatically attempts to resume normal operation up to five times in case the short circuit was due to a temporary connection error.
 - If the short circuit remains after five tries, the amplifier mutes that channel until the user manually changes amplifier operational modes (e.g., places the amp into a mute all or standby) or power cycles the amplifier.

NOTE: Loads that result in a "near short circuit" condition may activate low impedance warnings.

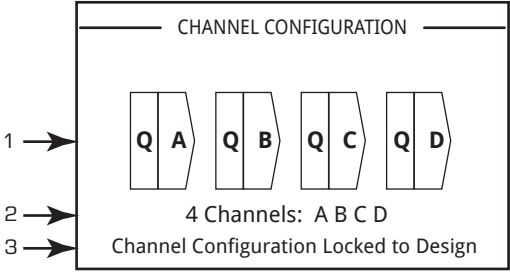


— Figure 20 —

6. Displays the temperature, in Centigrade, of the associated channel.

CHANNEL CONFIGURATION Screens

1. Figure 21 is a graphic representation of the amplifier's output CHANNEL CONFIGURATION. Inputs (Q) are from Q-SYS, outputs A–D (E–H not shown) represent the amplifier output channels and their configuration.
2. Text indicating how many channels, and the output configuration. For possible configurations refer to ["Possible Combinations" on page 9](#) or, 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.

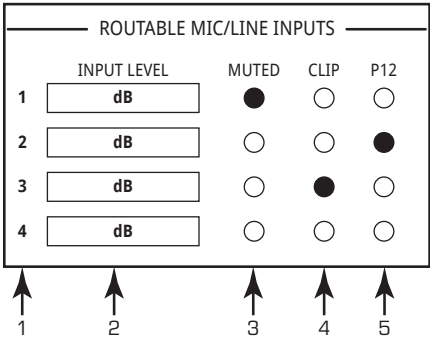


— Figure 21 —

ROUTABLE MIC/LINE INPUTS

Figure 22 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.

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.
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 power. You can turn the phantom power on/off in the Mic/Line Input component in Q-SYS Designer.



— Figure 22 —

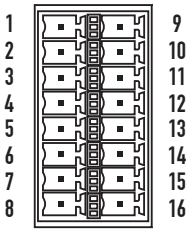
GPIO

There are 16 General Purpose Input Output pins for use in various applications. Figure 23 shows the pin configuration for the connector on the rear of the amplifier. — Table 2 shows the connector pin-out. Figure 24 gives some simple GPIO applications.

— Table 1 —

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

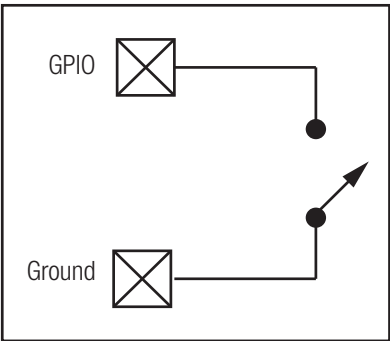
¹ Nominal switching capacity is 30 VDC at 2 A for a total of 60 W maximum. The maximum voltage is 220 VDC if the current is limited to observe the maximum power rating (60 W).



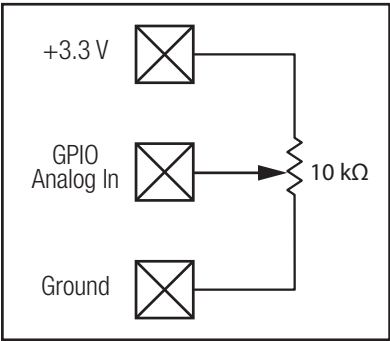
— Figure 23 —

Examples

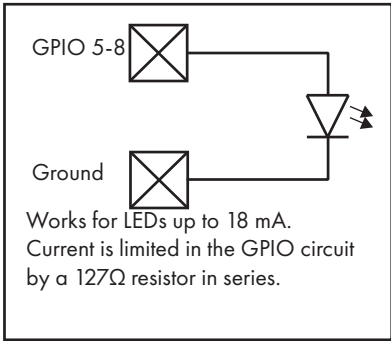
Button or Contact Closure



Potentiometer



Q-SYS-Powered LED



Works for LEDs up to 18 mA.
Current is limited in the GPIO circuit
by a 127Ω resistor in series.

— Figure 24 —

Specifications ¹

Power Specifications – 4-Channel Models

Configuration	Loads	CX-Q 2K4		CX-Q 4K4		CX-Q 8K4	
		Max Power ²	Continuous Power	Max Power ²	Continuous Power	Max Power ²	Continuous Power
Independent Channels (SE) A, B, C, D	100 V	700	350	1000	550	1250	1150
	70 V	700	400	1000	625	1250	1150
	16 Ω	350	200	500	313	625	625
	8 Ω	700	400	1000	625	1250	1250
	4 Ω	800	400	1500	625	2400	1250
	2 Ω	600	300	800	400	2750	1250
2 channels combined in Parallel AB or CD Doubles current Best for high power 70 V & 100 V	100 V	1400	700	2000	1150	2400	2000
	70 V	1400	750	2000	1150	2400	2000
	8 Ω	800	400	1000	625	1250	1250
	4 Ω	1250	750	2000	1250	2400	2250
	2 Ω	1500	650	2500	1250	4000	2100
	8 Ω	800	400	1000	1000	1250	1250
3 channels combined in Parallel ABC Triples current	4 Ω	1250	800	2000	2000	2400	2400
	2 Ω	1500	1100	3000	2500	4500	3000
	8 Ω	800	400	1000	1000	1250	1250
2 channels combined in BTL Bridged A+B or C+D Doubles voltage Do NOT use for 70 V or 100 V	200 V	1500	700	2000	1250	2400	2000
	140 V	1500	700	2000	1250	2400	2000
	8 Ω	1500	700	3000	1250	4000	2250
	4 Ω	1400	600	1700	1150	5000	2500
	2 Ω	N/R ³		N/R ³		3000	2000
4 channels combined in Bridged/Parallel AB+CD, Doubles current & voltage	8 Ω	2500	1500	3500	2500	4200	4200
	4 Ω	3000	1600	4000	2500	7000	4500
	2 Ω	N/R ³		N/R ³		8000	4000
4 channels combined in Parallel ABCD Quadruples current	8 Ω	800	400	1000	1000	1250	1250
	4 Ω	1250	800	2000	1600	2500	2400
	2 Ω	1700	1600	4000	2500	5000	4500
	1 Ω	2500	1500	4000	2000	7000	4500

¹ Specifications are subject to change without notice.

² Max Power

» Max Power data is based on the most potential any single amplifier channel can deliver. This data is most useful for asymmetrical loading of amplifier channel and maximizing power utilization of the amplifier. When utilizing FlexAmp™ power requirements, be sure to take into consideration the power capabilities of the channel AND the capabilities of the Power Supply.

» Continuous Power indicates amplifier output capabilities with all channels driven with the same load without exceeding the capabilities of the power supply.

» Power Spec is based on 1 kHz, 20 msec

³ N/R = Not Recommended

Power Specifications ¹ – 8-Channel Models

Configuration	Loads	CX-Q 4K8		CX-Q 8K8	
		Max Power ²	Continuous Power	Max Power ²	Continuous Power
4 or 8 Independent Channels A, B, C, D, E, F, G, H	100 V	1000	300	1250	600
	70 V	1000	300	1250	600
	16 Ω	500	150	625	300
	8 Ω	1000	300	1250	600
	4 Ω	1000	300	1500	600
	2 Ω	800	300	1000	300
Parallel Channels (x2) AB or CD or EF or GH Doubles Current Best for high power 70V & 100V	100 V	1500	600	2000	1100
	70 V	1500	600	2000	1200
	8 Ω	1000	600	1250	1100
	4 Ω	1250	600	2400	1200
	2 Ω	1500	600	2500	600
Parallel Channels (x3) ABC, DEF Triples Current	8 Ω	1000	900	1250	1100
	4 Ω	1500	900	2000	1800
	2 Ω	1500	900	2500	1800
BTL/Bridged Channels (x2) A+B or C+D or E+F or G+H Doubles Voltage Do NOT use for 70V or 100V	200 V	1500	600	2000	1200
	140 V	1500	600	2000	1200
	8 Ω	1500	600	3000	1200
	4 Ω	1400	400	1700	600
	2 Ω	N/R ³		N/R ³	
BTL/Bridged & Paralleled Channels (x4) AB+CD, EF+GH Doubles Current and Voltage	8 Ω	2500	1200	4000	2400
	4 Ω	3000	1200	5000	2400
	2 Ω	N/R ³		N/R ³	
Parallel Channels (x4) ABCD, EFGH Quadruples Current	8 Ω	1000	1000	1200	1200
	4 Ω	2000	1200	2400	2200
	2 Ω	2500	1200	4000	2400
	1 Ω	3000	1200	4000	2400

¹ Specifications are subject to change without notice.

² Max Power

» Max Power data is based on the most potential any single amplifier channel can deliver. This data is most useful for asymmetrical loading of amplifier channel and maximizing power utilization of the amplifier. When utilizing FlexAmp™ power requirements, be sure to take into consideration the power capabilities of the channel AND the capabilities of the Power Supply.

» Continuous Power indicates amplifier output capabilities with all channels driven with the same load without exceeding the capabilities of the power supply.

» Power Spec is based on 1 kHz, 20 msec

³ N/R = Not Recommended

Peak Voltage Specifications – 4-Channel Models

Configuration	Loads	CX-Q 2K4		CX-Q 4K4		CX-Q 8K4	
		Max Peak Voltage	Max Peak Current	Max Peak Voltage	Max Peak Current	Max Peak Voltage	Max Peak Current
Independent Channels (SE) A, B, C, D	16 Ω	N/A	N/A	N/A	N/A	N/A	N/A
	8 Ω	106	13.2	126	15.8	141	17.6
	4 Ω	80	20.0	110	27.4	139	34.6
	2 Ω	49	24.0	57	28.3	105	52.4
Parallel Channels (x2) AB or CD Doubles Current Best for high power 70 V & 100 V	8 Ω	N/A	N/A	N/A	N/A	N/A	N/A
	4 Ω	N/A	N/A	N/A	N/A	N/A	N/A
	2 Ω	N/A	N/A	N/A	N/A	N/A	N/A
BTL/Bridged Channels (x2) A+B or C+D Doubles Voltage Do NOT use for 70 V or 100 V	200 V	N/A	N/A	N/A	N/A	N/A	N/A
	140 V	N/A	N/A	N/A	N/A	N/A	N/A
	8 Ω	155	19.4	179	22.4	253	31.6
	4 Ω	106	26.5	117	29.2	200	50
	2 Ω	N/R		N/R		110	54.8

N/R = Not Recommended

N/A = Not Available

Gray cells = mode or rating n/a

NOTE: Data indicates the maximum voltage and current potential for any amplifier single amplifier channel. The data in the table above has been measured for these specific conditions. N/A indicates data is not available. NR indicates that this configuration is not recommended.

Peak Voltage Specifications – 8-Channel Models

Configuration	Loads	CX-Q 4K8		CX-Q 8K8	
		Max Peak Voltage	Max Peak Current	Max Peak Voltage	Max Peak Current
Independent Channels (SE) A, B, C, D	16 Ω	N/A	N/A	N/A	N/A
	8 Ω	126	11.2	141	12.5
	4 Ω	89	15.8	110	19.4
	2 Ω	57	20	63	22.4
Parallel Channels (x2) AB or CD Doubles Current (Best for high power 70 V & 100 V)	8 Ω	126	11.2	141	12.5
	4 Ω	100	17.7	139	24.5
	2 Ω	77	27.4	100	35.4
BTL/Bridged Channels (x2) A+B or C+D Doubles Voltage (Do NOT use for 70 V or 100 V)	200 V	283	7.5	283	10
	140 V	100	10.6	200	14.1
	8 Ω	155	13.7	219	22.4
	4 Ω	106	18.7	117	20.6
	2 Ω	N/R		N/R	

N/R = Not Recommended

N/A = Not Available

Gray cells = mode or rating n/a

NOTE: Data indicates the maximum voltage and current potential for any amplifier single amplifier channel. The data in the table above has been measured for these specific conditions. N/A indicates data is not available. NR indicates that this configuration is not recommended.

Operating Specifications

	CX-Q 2K4	CX-Q 4K4	CX-Q 8K4	CX-Q 4K8	CX-Q 8K8
Typical Distortion					
8Ω	0.02 - 0.05%	0.02 - 0.05%	0.02 - 0.05%	0.02 - 0.05%	0.02 - 0.05%
4Ω	0.04 - 0.1%	0.04 - 0.1%	0.04 - 0.1%	0.04 - 0.1%	0.04 - 0.1%
Maximum Distortion					
4 Ω - 8 Ω	1.0%	1.0%	1.0%	1.0%	1.0%
Frequency Response (8 Ω)	20 Hz - 20 kHz +0.2 dB / -0.7 dB	20 Hz - 20 kHz +0.2 dB / -0.7 dB	20 Hz - 20 kHz +0.2 dB / -0.7 dB	20 Hz - 20 kHz +0.2 dB / -0.7 dB	20 Hz - 20 kHz +0.2 dB / -0.7 dB
Noise					
Unweighted output unmuted	>102 dB	>102 dB	>102 dB	>101 dB	>101 dB
Weighted output muted	>106 dB	>106 dB	>106 dB	>104 dB	>104 dB
Gain (1.2 V setting)	33 dB	35 dB	38 dB	35 dB	38 dB
Damping factor	>100	>100	>150	>100	>100
Input impedance	>8k balanced and >4k unbalanced	>8k balanced and >4k unbalanced	>8k balanced and >4k unbalanced	>8k balanced and >4k unbalanced	>8k balanced and >4k unbalanced
Input Sensitivity					
Continuously variable:					
Vrms	1.23 mV to 17.35 V	1.23 mV to 17.35 V	1.23 mV to 17.35 V	1.23 mV to 17.35 V	1.23 mV to 17.35 V
dBu	-56 to 27	-56 to 27	-56 to 27	-56 to 27	-56 to 27
dBv	-58.2 to 24.8	-58.2 to 24.8	-58.2 to 24.8	-58.2 to 24.8	-58.2 to 24.8
Controls and indicators (front)	Power Mode • Channel MUTE buttons • Channel SELECT buttons • Channel Input Signal and CLIP LED Indicators Channel Output and LIMIT LED meters • NEXT, PREV, ID buttons • Control knob • Color Display • Fault Indicator • Pinhole Reset				
Controls and indicators (rear)	AC Power Disconnect (Locking IEC C-14) AC Power Switch				
Input connectors	3-pin Euro (green) and Q-LAN Network connectivity Q-LAN Network connectivity				
Output connectors	8-pin Euro (green)				
GPIO	GPIO 1-8 = configurable digital/analog, input/output Relay max = 30 VDC at 1 A (30W maximum). Max voltage 220 VDC at 136 mA. 3.3 V 100 mA max (power cycle to reset) GPIO 1-4 max = 5 mA in/out, 3.3 V, 127 Ω series resistor GPIO 5-8 max = 18 mA in/out, 3.3V, 127 Ω series resistor				
Cooling					
Type	Forced air cooling, thermally regulated fan speed, side/rear-to-front airflow				
Operating temperature range	Maximum: -10° - 50° C, recommended: 0° - 35° C, performance may be reduced above 40° C				
Amplifier and load protection	Short circuit, open circuit, over current, over voltage, thermal, RF, DC fault shutdown, active inrush limiting, on/off muting				
AC power input	Universal power supply 100 - 240 VAC, 50 - 60 Hz with Active PFC				
AC power input (China Only) 交流电源输入 (仅限中国)	100 - 240 VAC 50 / 60 Hz		220 - 240 VAC 50 / 60 Hz	100 - 240 VAC 50 / 60 Hz	220 - 240 VAC 50 / 60 Hz
Dimensions (HWD)	3.5 in x 19 in x 16 in (89 mm x 483 mm x 406 mm)				
Weight,					
Net	23 lb (10.4 kg)	25 lb (11.3 kg)	26 lb (11.8 kg)	25 lb (11.3 kg)	26 lb (11.8 kg)
Shipping	27 lb (12.2 kg)	29 lb (13.2 kg)	30 lb (13.6 kg)	29 lb (13.2 kg)	30 lb (13.6 kg)
Agency approvals	UL, CE, RoHS/WEEE compliant, FCC Class B (conducted and radiated emissions)				
Carton contents	IEC power cord (locking), Quick Start Guide, Euro connectors, amplifier				

Heat Loss and Current-Draw Charts

Heat losses are the thermal emissions from an amplifier while it is operating. It comes from dissipated waste power—i.e., real AC power in minus audio power out. Measurements are provided for various loads at idle, 1/8 of average full power, 1/3 of average full power, and full power, with all channels driven simultaneously. For typical usage, use the idle and 1/8 power figures. This data is measured from representative samples; due to production tolerances, actual heat emissions may vary slightly from one unit to another. Bridged into 8 Ω is equivalent to 4 Ω per channel; into 4 Ω is equivalent to 2 Ω per channel.

Idle

Thermal loss at idle or with very low signal level.

1/8 Power

Thermal loss at 1/8 of full power is measured with a pink noise signal. It approximates operating with music or voice with light clipping and represents the amplifier's typical "clean" maximum level, without audible clipping. Use these figures for typical maximum level operation.

1/3 Power

Thermal loss at 1/3 of full power is measured with 1 kHz sine. It approximates operating with music or voice with very heavy clipping and a very compressed dynamic range.

Full Power

Thermal loss at full power is measured with a 1 kHz sine wave. However, it does not represent any real-world operating condition.

Current Draw

The amount of AC current an amplifier demands while it is operating. Measurements are provided for various loads at idle, 1/8 of average full power, 1/3 of average full power, and full power, with all channels driven simultaneously. The data shown in the following tables is listed for 100 VAC, 120 VAC and 230 VAC operation. For typical usage, use the idle and 1/8 power data.

Current Consumption



NOTE: Thermal Dissipation minimally varies between 100 and 240 VAC. This data is based on all operating voltages (100-240 VAC). High power applications will see benefits in efficiency, power output, and reduced power consumption when operated from 208, 230, 240 VAC mains.

CX-Q 2K4

			120 VAC Mains		230 VAC Mains		Thermal Dissipation	
Output Level	Load	100 VAC Current	AC Current (Amps)	Losses (Watts)	AC Current (Amps)	Losses (Watts)	BTU/h	kcal/h
Standby		0.5	0.5	44	0.4	40	150	38
Mute All		0.8	0.7	31	0.5	35	106	27
Idle		1.1	0.9	101	0.6	98	345	87
1/8 Rated Power (Pink Noise)	100 V / Channel	4.1	3.44	181	1.85	182	618	156
	70 V / Channel	4.1	3.41	179	1.81	178	611	154
	8 Ω / Channel	4.1	3.44	180	1.98	170	614	155
	4 Ω / Channel	3.9	3.25	158	1.97	193	539	136
	2 Ω / Channel	4.9	4.09	247	2.27	247	843	212
1/3 Rated Power (1kHz Sine Wave)	100 V / Channel	7.5	6.26	200	3.26	180	683	172
	70 V / Channel	7.6	6.36	225	3.31	205	768	194
	8 Ω / Channel	7.9	6.6	252	3.44	233	860	217
	4 Ω / Channel	8.7	7.24	316	3.75	293	1079	272
	2 Ω / Channel	9.6	7.97	405	4.11	379	1382	348

CX-Q 4K4

			120 VAC Mains		230 VAC Mains		Thermal Dissipation	
Output Level	Load	100 VAC Current	AC Current (Amps)	Losses (Watts)	AC Current (Amps)	Losses (Watts)	BTU/h	kcal/hr
Standby		0.6	0.5	45	0.4	45	154	39
Mute All		0.8	0.7	32	0.5	36	109	28
Idle		1.1	0.9	102	0.6	100	348	88
1/8 Rated Power (Pink Noise)	100 V / Channel	5.2	4.4	196	2.3	217	669	169
	70 V / Channel	5.3	4.4	199	2.4	191	679	171
	8 Ω / Channel	5.3	4.4	199	2.4	191	679	171
	4 Ω / Channel	5.6	4.7	231	2.5	220	788	199
	2 Ω / Channel	6.1	5.1	288	2.7	258	983	248
1/3 Rated Power (1kHz Sine Wave)	100 V / Channel	10.7	9	256	4.6	216	874	220
	70 V / Channel	11.1	9.3	291	4.8	261	993	250
	8 Ω / Channel	11.1	9.3	291	4.8	261	993	250
	4 Ω / Channel	11.7	9.7	350	5	320	1195	301
	2 Ω / Channel	12.8	10.7	473	5.5	443	1614	407

CX-Q 8K4

Output Level	Load	100 VAC Current	120 VAC Mains		230 VAC Mains		Thermal Dissipation	
			AC Current (Amps)	Losses (Watts)	AC Current (Amps)	Losses (Watts)	BTU/h	kcal/hr
Standby		0.8	0.7	79	0.5	83	270	68
Mute All		0.9	0.8	36	0.6	42	123	31
Idle		1.9	1.6	173	0.9	166	590	149
1/8 Rated Power (Pink Noise)	100 V / Channel	10.4	8.7	370	4.6	340	1263	318
	70 V / Channel	10.6	8.9	382	4.8	360	1304	329
	8 Ω / Channel	10.4	8.7	370	4.6	340	1263	318
	4 Ω / Channel	10.6	8.9	382	4.8	360	1304	329
	2 Ω / Channel	11.6	9.7	472	5.3	452	1611	406
1/3 Rated Power (1kHz Sine Wave)	100 V / Channel	21.6	18	533	9.2	453	1819	458
	70 V / Channel	22.9	19.1	623	9.7	553	2126	536
	8 Ω / Channel	21.6	18.0	533	9.2	453	1819	458
	4 Ω / Channel	22.9	19.1	623	9.7	553	2126	536
	2 Ω / Channel	24.8	20.7	828	10.5	738	2826	712

CX-Q 4K8

Output Level	Load	100 VAC Current	120 VAC Mains		230 VAC Mains		Thermal Dissipation	
			AC Current (Amps)	Losses (Watts)	AC Current (Amps)	Losses (Watts)	BTU/h	kcal/h
Standby		1.0	0.8	44	0.5	42	150	38
Mute All		1.1	0.9	45	0.7	49	153	39
Idle		1.9	1.6	182	0.9	184	621	157
1/8 Rated Power (Pink Noise)	100 V / Channel	4.8	4.0	150	2.1	123	512	129
	70 V / Channel	5.0	4.2	172	2.2	138	587	148
	8 Ω / Channel	5.4	4.5	155	2.2	121	529	133
	4 Ω / Channel	6.2	5.2	236	2.5	195	805	203
	2 Ω / Channel	7.4	6.2	354	3.2	253	1208	304
1/3 Rated Power (1kHz Sine Wave)	100 V / Channel	10.9	9.1	244	4.5	188	833	210
	70 V / Channel	11.6	9.7	316	4.8	247	1079	272
	8 Ω / Channel	11.5	9.6	247	4.5	195	843	212
	4 Ω / Channel	12.6	10.5	423	5.0	259	1444	364
	2 Ω / Channel	15.7	13.1	723	6.0	530	2468	622

CX-Q 8K8

			120 VAC Mains		230 VAC Mains		Thermal Dissipation	
Output Level	Load	100 VAC Current	AC Current (Amps)	Losses (Watts)	AC Current (Amps)	Losses (Watts)	BTU/h	kcal/h
Standby		1.0	0.9	46	0.6	45	157	40
Mute All		1.1	1.0	49	0.7	54	166	42
Idle		2.1	1.7	197	1.0	194	672	169
1/8 Rated Power (Pink Noise)	100 V / Channel	10.3	8.6	347	4.5	317	1184	298
	70 V / Channel	10.6	8.8	378	4.6	327	1290	325
	8 Ω / Channel	10.4	8.6	360	4.5	313	1229	310
	4 Ω / Channel	12.8	10.7	536	5.1	395	1829	461
	2 Ω / Channel	7.4	6.2	346	3.2	254	1181	298
1/3 Rated Power (1kHz Sine Wave)	100 V / Channel	21.5	17.9	474	9.2	386	1618	408
	70 V / Channel	21.9	18.2	521	9.2	416	1778	448
	8 Ω / Channel	21.8	18.2	478	9.1	376	1631	411
	4 Ω / Channel	26.9	22.4	858	9.9	498	2928	738
	2 Ω / Channel	16.2	13.5	742	6.5	594	2532	638



QSC Self Help Portal

Read knowledge base articles and discussions, download software and firmware, view product documents and training videos, and create support cases.

<https://qscprod.force.com/selfhelpportal/s/>

Customer Support

Refer to the Contact Us page on the QSC website for Technical Support and Customer Care, including their phone numbers and hours of operation.

<https://www.qsc.com/contact-us/>

Warranty

For a copy of the QSC Limited Warranty, visit the QSC website at www.qsc.com

Q-SYS™ Page Stations

Networked Page Station User Manual

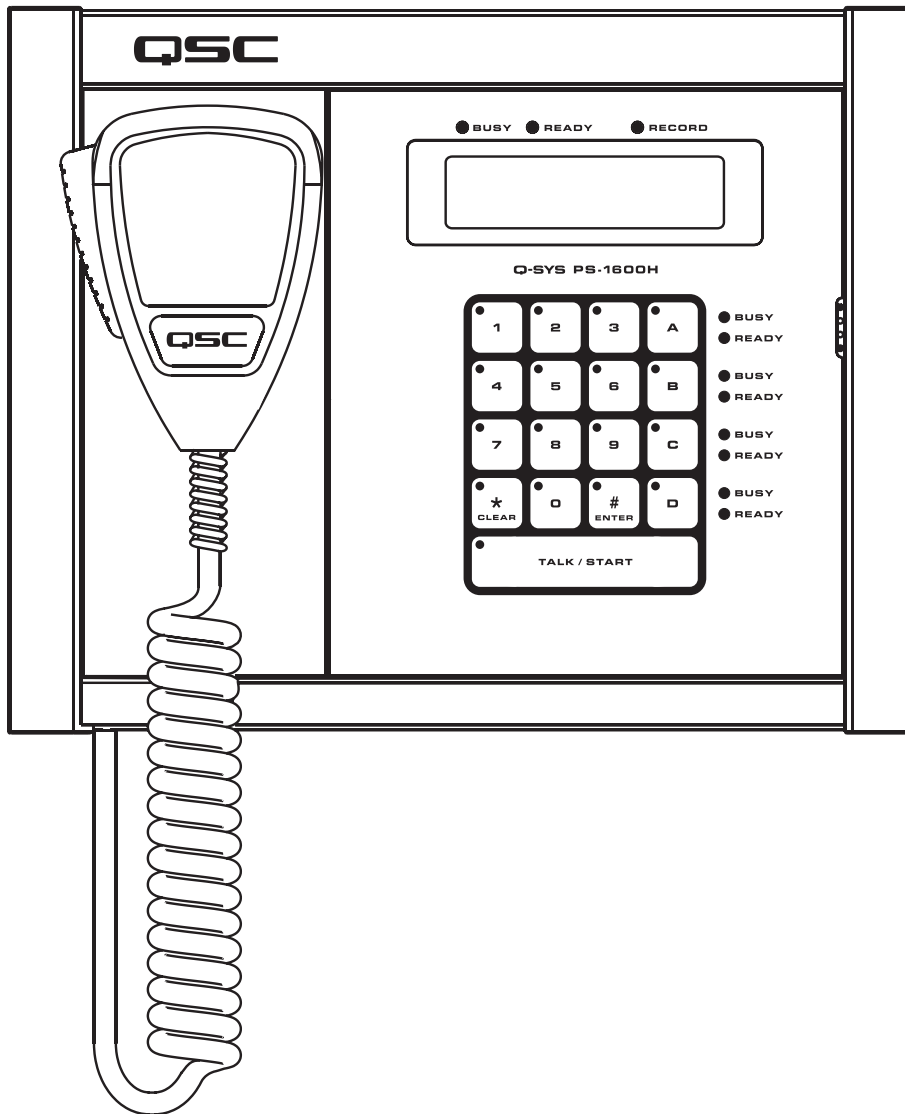
QSC™

PS-1600(H/G) – Sixteen-Button Page Station

PS-1650(H/G) – Sixteen Command-Button Page Station

PS-800(H/G) – Eight Command-Button Page Station

PS-400(H/G) – Four Command-Button Page Station



TD-000324-00-A



TD-001662-01-B

IMPORTANT SAFETY PRECAUTIONS AND EXPLANATION OF SYMBOLS



WARNING!



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



CAUTION!: 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.

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

NOTE: The term NOTE is used to indicate additional useful information.



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.



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.

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Safeguards

Electrical energy can perform many useful functions. This unit has been engineered and manufactured to assure your personal safety. Improper use can result in potential electrical shock or fire hazards. In order not to defeat the safeguards, observe the following instructions for its installation, use and servicing.



WARNING



1. To reduce the risk of electric shock, do not remove the cover. No user-serviceable parts inside. Refer servicing to qualified service personnel.
2. Disconnect all power before servicing.
3. To prevent fire or electric shock, do not expose this equipment to rain or moisture.
4. Maximum operating ambient temperature is 50°C (122°F).
5. Power must be supplied to the unit from an IEEE 802.3af compliant power sourcing equipment (PSE) using data communications cabling having a rating of category 5e or greater (CAT-5e) or from the optional +24 VDC/500 mA power supply.
6. Do not use any liquid cleaners on the Page Station. Use only static-free electronic cleaning cloths.

RoHS STATEMENT

The Q-Sys Page Station products are in compliance with European Directive 2002/95/EC – Restriction of Hazardous Substances (RoHS).

The Q-Sys Page Station products are in compliance with “China RoHS” directives. The following chart is provided for product use in China and its territories:

	Q-Sys Page Station 系列					
部件名称 (Part Name)	有毒有害物质或元素 (Toxic or hazardous Substances and Elements)					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(vi))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
电路板组件 (PCB Assemblies)	X	0	0	0	0	0
机壳装配件 (Chassis Assemblies)	X	0	0	0	0	0
<div><div>0: 表明这些有毒或有害物质在部件使用的同类材料中的含量是在 SJ/T11363_2006极限的要求之下。</div><div>O: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in SJ/T11363-2006.</div><div>X: 表明这些有毒或有害物质在部件使用的同类材料中至少有一种而含量是在SJ/T11363_2006极限的要求之上。</div><div>X: Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in SJ/T11363-2006.</div></div>						

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Unpacking

Package Contents

- Q-Sys Page Station
- Hardware User Manual
- Connector ship kit
 - One 6-pin Euro plug
 - Two 3-pin Euro plugs
 - One 2-pin Euro plug
 - Four gangbox screws
 - Microphone strain-relief clamp
 - Hand-held microphone (H models)
 - Gooseneck microphone (G models)
- Microphone ship kit "H" Models
 - One handheld microphone
 - One microphone strain-relief clamp
 - one strain-relief clamp screw
- Microphone ship kit "G" Models
 - One gooseneck microphone
- Warranty card

Introduction

Q-Sys is a platform of software and hardware products providing system designers and operators with the tools necessary to design, configure, and manage medium to large scale audio systems. In addition to the primary signal processing and system management components that make up a Q-Sys audio system, the Q-Sys solution includes peripheral components that offer services such as remote management and paging. This manual addresses the features and specifications related to the hardware components of the Q-Sys networked page station peripherals.

The Q-Sys Page Stations are network devices that provide paging services for a Q-Sys audio system. Like all Q-Sys system components, functionality of the Page Stations are defined and configured by the audio system designer using Q-Sys Designer. Q-Sys Designer is Windows-based software used to design, and manage, a Q-Sys system. (For information about configuring the Page Station, refer to the Q-Sys Designer Online Help.) Once a Q-Sys design file has been created, it is then deployed to a Q-Sys Core over the Q-LAN network. The Q-Sys Core is the centralized processing entity for the Q-Sys system. And as such, the Q-Sys Core pushes all necessary design and configuration information to each end node in the system including Page Station peripherals.

The Page Stations connect to a Q-Sys system by joining the Q-LAN network. Once connected to the network, a Q-Sys Core can automatically discover the Page Station, assimilate it into the Q-Sys system and push the appropriate configuration to the Page Station, as defined in the Q-Sys Designer design file. Once assimilated into the Q-Sys system, the Page Station can be operated entirely via its front panel user interface (UI) and microphone without further need of a design computer in the system.

Page Station Description

The Q-Sys Page Station is a networked page station that connects to a Q-Sys system via Q-LAN. All audio deliveries to and from the Page Station use the Q-LAN network. The Page Station provides two Q-LAN network interfaces for connecting to the Q-Sys system. This allows Page Stations to connect to two switch ports or to be deployed on two separate networks to support a variety of redundant operation modes for mission critical applications.

The Q-Sys Page Station comes in four different models: PS-400, PS-800, PS-1600, and PS-1650. Each of these models has a handheld microphone version (indicated by an "H" in the Model number), and a gooseneck microphone version (indicated by a "G" in the Model number). The differences are indicated in the table below.

Model	Total Buttons	Command Buttons	Keypad Commands	Security
PS-400	4	Four Buttons	No	No
PS-800	8	Eight Buttons	No	No
PS-1600	16	Four Buttons	Yes	Yes
PS-1650	16	Sixteen Buttons	No	No

- Command Buttons - Assigns Commands to the available buttons.
- Keypad Commands - Has a numeric keypad; you can specify the Commands that can be entered using the keypad.
- Security - Sets Automatic logoff timeout, logon requirements, and restricts Users. A Page Station must have a keypad to have security requirements.

Power

In addition to audio and data deliveries via Q-LAN, the Page Station is designed to receive its power from the Q-LAN network via IEEE 802.3af compliant power sourcing equipment (PSE). This technology is better known as PoE (Power over Ethernet). A PSE node can be an appropriate PoE enabled switch port or a PoE enabled power injecting device. When both Q-LAN ports on the Page Station are connected to PoE enabled sources, the Page Station enters a load sharing mode that balances the power draw from each source to supply the page station. Should a port failure event occur, the page station draws the full power load required from the remaining healthy PoE enabled source. The Page Station can also be operated from a separate +24 VDC power supply in applications where PoE power is unavailable or undesirable.

User Interface

The Q-Sys Page Stations provide a front-panel user interface that includes a 16-, 8-, or 4-button capacitive-touch keypad. The keypad offers visible feedback and tactile cues, yet there are no buttons or membranes to wear out. Paging status, operational detail and alerts are also reported via illuminated status indicators and the station's 240x64 monochrome graphics LCD.

Microphones

For Page Stations with the letter H in the model number, voice input is provided through a push-to-talk, dynamic paging microphone. A unique magnetic docking system and cable strain relief allow flexibility in microphone placement when not in use. The letter G in the model number indicates a dynamic gooseneck microphone.

Inputs and Outputs

The rear panel of the Page Station offers a variety of auxiliary audio I/O interfaces and GPIO for expanding its capability. The auxiliary audio inputs can accommodate accessories such as a secondary microphone or an MP3 audio source. The Page Station auxiliary output can drive an amplifier input, powered loudspeaker or other destination device. And the Page Station GPIO interface can be configured to use external events to affect paging operation or to be the source of events to affect external control systems.

The Q-Sys Q-LAN Network

The Q-Sys solution is designed to be deployed on QSC's high performance Q-LAN network (Figure 1). Q-LAN is a proprietary time-sensitive gigabit Ethernet network implementation that bundles several industry standard protocols into a data transport solution appropriate for live performance multimedia environments.

Q-LAN offers gigabit data rates, device and network redundancy, 32-bit floating point audio data transfers, and low-latency support on local area network deployments. Accurate synchronization of end nodes and high-quality clock distribution are built into the Q-LAN solution using the IEEE-1588 Precision Time Protocol. Discovery of end nodes and auto-configuration of end nodes are all included in the solution using industry standard protocols over a standards-based IP network implementation that utilizes off-the-shelf hardware components.

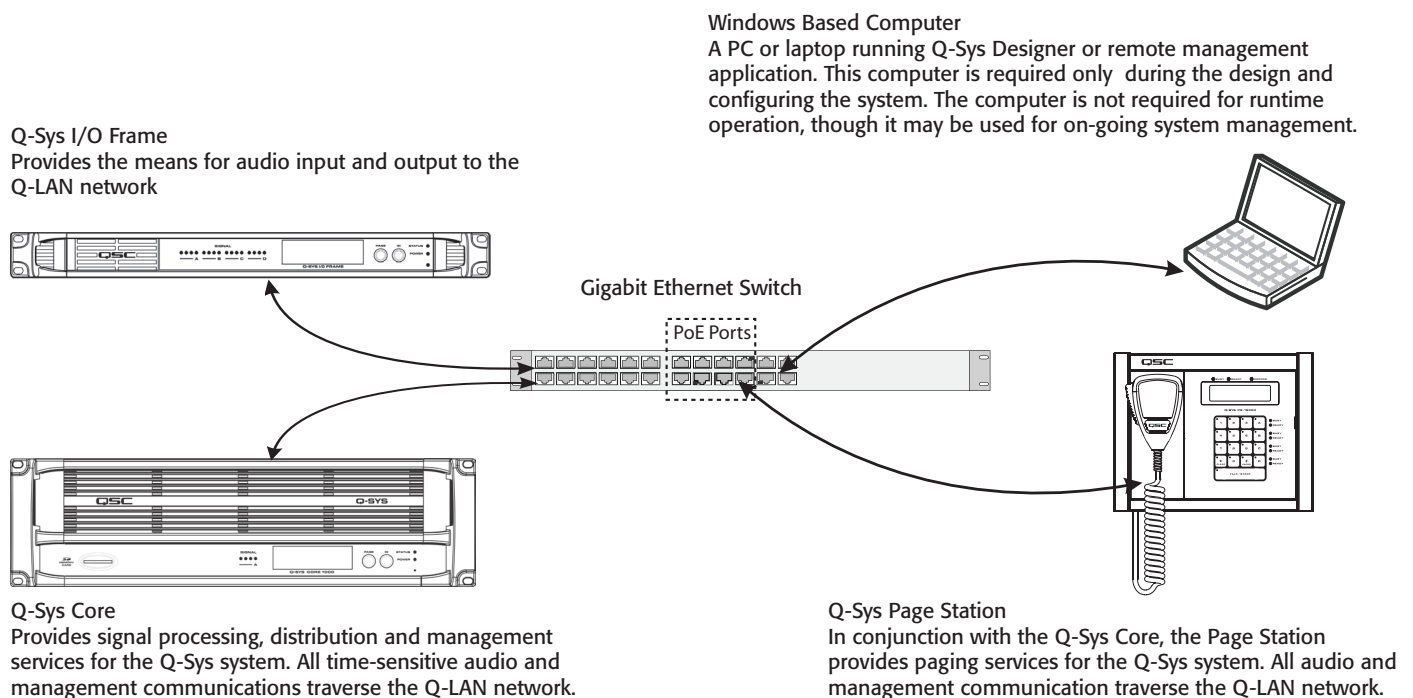
Figure 1 shows a very simple Q-LAN network implementation with a Q-Sys Core, a Q-Sys I/O Frame, Ethernet switch, and a Q-Sys Page Station.

All devices are connected to a managed Gigabit Ethernet switch that includes the appropriate QoS (Quality of Service) suitable for a high-performance gigabit network to support multimedia applications. The network switch is also a PSE device, offering a number of PoE ports to power the Q-Sys Page Station devices.

The Page Stations can be configured via Q-Sys Designer to source page announcements or prerecorded audio streams to the Q-Sys Core. The Q-Sys Core can then redistribute these announcements or audio streams throughout the facility by forwarding them (with or without additional signal processing) to Q-Sys I/O Frames. The Q-Sys I/O Frames can then drive the inputs of QSC amplifiers or powered loudspeakers.

Note that a PC or laptop is only required during initial configuration of the system or when a PC is the preferred means for providing on-going management services to the system designer or operator.

There are no special unpacking precautions. However, it is recommended that you keep the original packing materials for reuse in the rare event that service is required. If service is required and the original packing material is not available, ensure that the unit is adequately protected for shipment (use a strong box of appropriate size, sufficient packing/padding material to prevent load shifting or impact damage) or call QSC's Technical Services Group for replacement packing material and a carton.

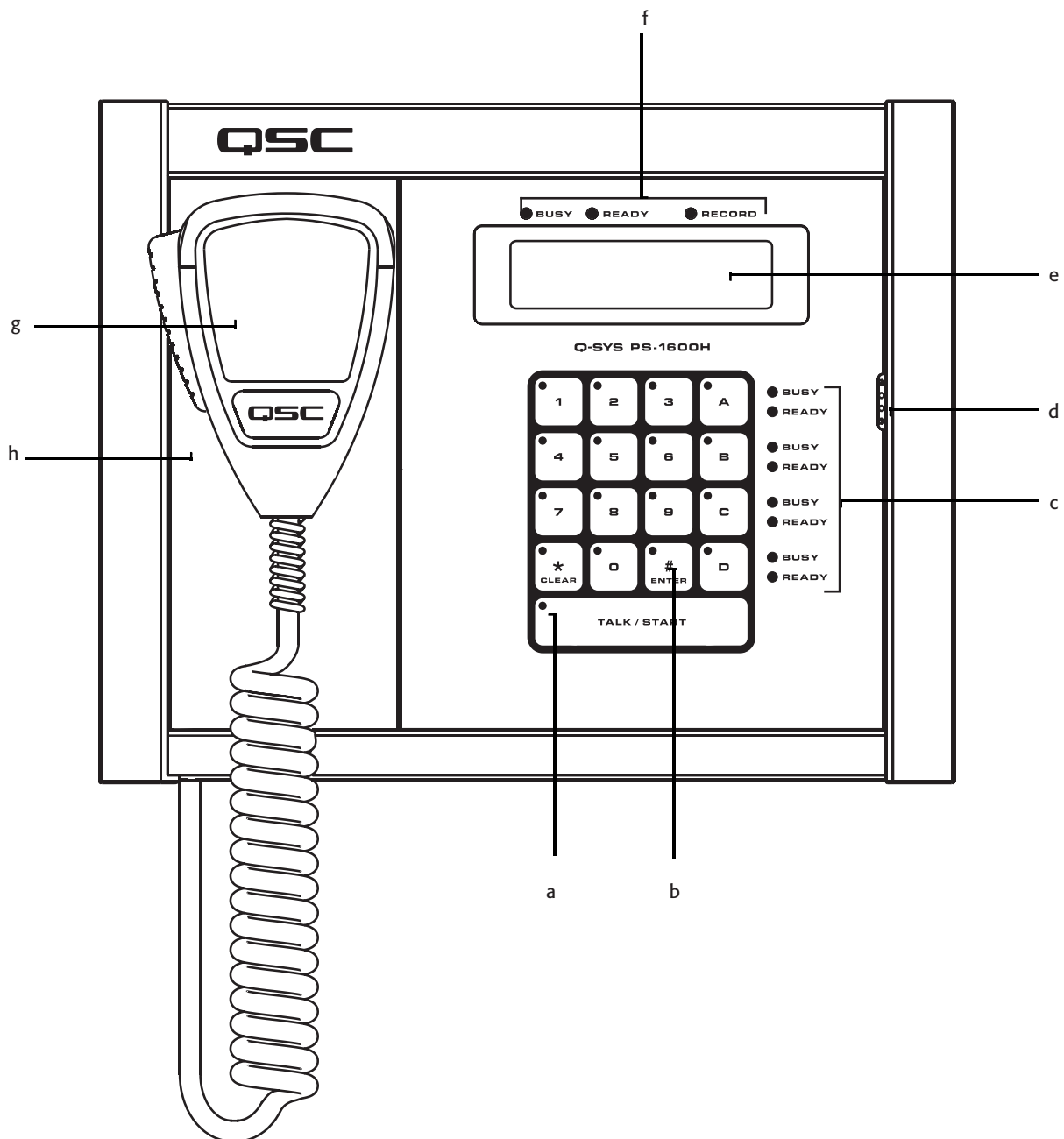


— Figure 1 —

Features

Q-Sys PS-1600H Front Panel

Refer to Figure 2. To see the keypad configurations of Page Station models PS-1650, PS-800, and PS-400 , see page 15.



– Figure 2 –

- a. LED touch indicators
- b. Capacitive Touch Keypad
- c. Busy and Ready Indicators for Command Buttons
- d. Button Monitor Speaker
- e. LCD – 240 x 64 Monochrome Graphics Display
- f. Global Busy, Ready and Record Indicators
- g. Dynamic Push-to-talk Microphone (PS-XX00H only) Gooseneck models use the Talk/Start button to make the page.
- h. Magnetic Microphone Docking Plate (PS-XX00H only)

LED Touch Indicators

When a key is pressed, the LED on that key illuminates to indicate that it was pressed.

Capacitive Touch Keypad

- Command buttons can be assigned one of several different types of Commands using the Q-Sys Designer Administration Interface. Once assigned, you just have to press the appropriate Command button to initiate the action.
- Use the number keys to enter Command Codes to initiate PA System actions (PS-1600 only)
- Use the number keys to enter the User PIN (if the Page Station requires user logon) (PS-1600 only)
- Press Clear (*) to clear keyed-in Codes prior to pressing Enter (#). (PS-1600 only)
- Press Clear (*) twice to log off of the Page Station. (PS-1600 only)
- Press Enter (#) to begin a page once the Code is entered. (PS-1600 only)
- Press Enter (#) to logon once the User PIN is entered. (PS-1600 only)

Talk/Start Button

- Tap the Talk/Start button one time to begin a page (tap-on). Tap the button a second time to end the page (tap-off). If you tap-off during the page, the page is logged as completed successfully. If you tap-off during the preamble, the page is logged as cancelled.
- Press and hold the Talk/Start button to begin a page. Release the button to end the page. If you release the button during the page, the page is logged as completed successfully. If you release the button during the preamble, the page is logged as canceled.
- Double-tap the Talk/Start button to clear an entry. (equal to pressing the Clear (*) button)

Busy and Ready Indicators for Command Buttons

- The red Busy LED indicates that the Command is in use by another Page Station.
- The green Ready LED indicates that you can initiate that Command.

Button Monitor Speaker

Produces a "beep" when a button is pressed.

LCD – 240 x 64 Monochrome Graphics Display

The LCD displays various messages including user instructions, the status of the Page Station, status of pages, and so on. The information displayed varies between models.

Global Busy, Ready, and Record Indicators

- Busy (red) illuminates when the selected Command has a queuing mode of Live, and one or more of the PA Zones associated with the Command is in use by another station.
- Ready (green) illuminates when the selected Command has a queuing mode of Live, and all of the PA Zones associated with your Command are available for use. If the queuing mode of the Command is Automatic, the Ready LED is illuminated at all times because the page is recorded if the zones are not available. In Delayed queuing mode the Ready LED is illuminated at all times because the page is recorded regardless of zone status.
- Record (red) illuminated indicates that the page you are making is being recorded. The Queuing method for your page must be Automatic, and one or more of the PA Zones associated with the page must be in use, or the queuing mode of the Command is Delayed. The message will be played once all associated PA Zones are free.

Microphone

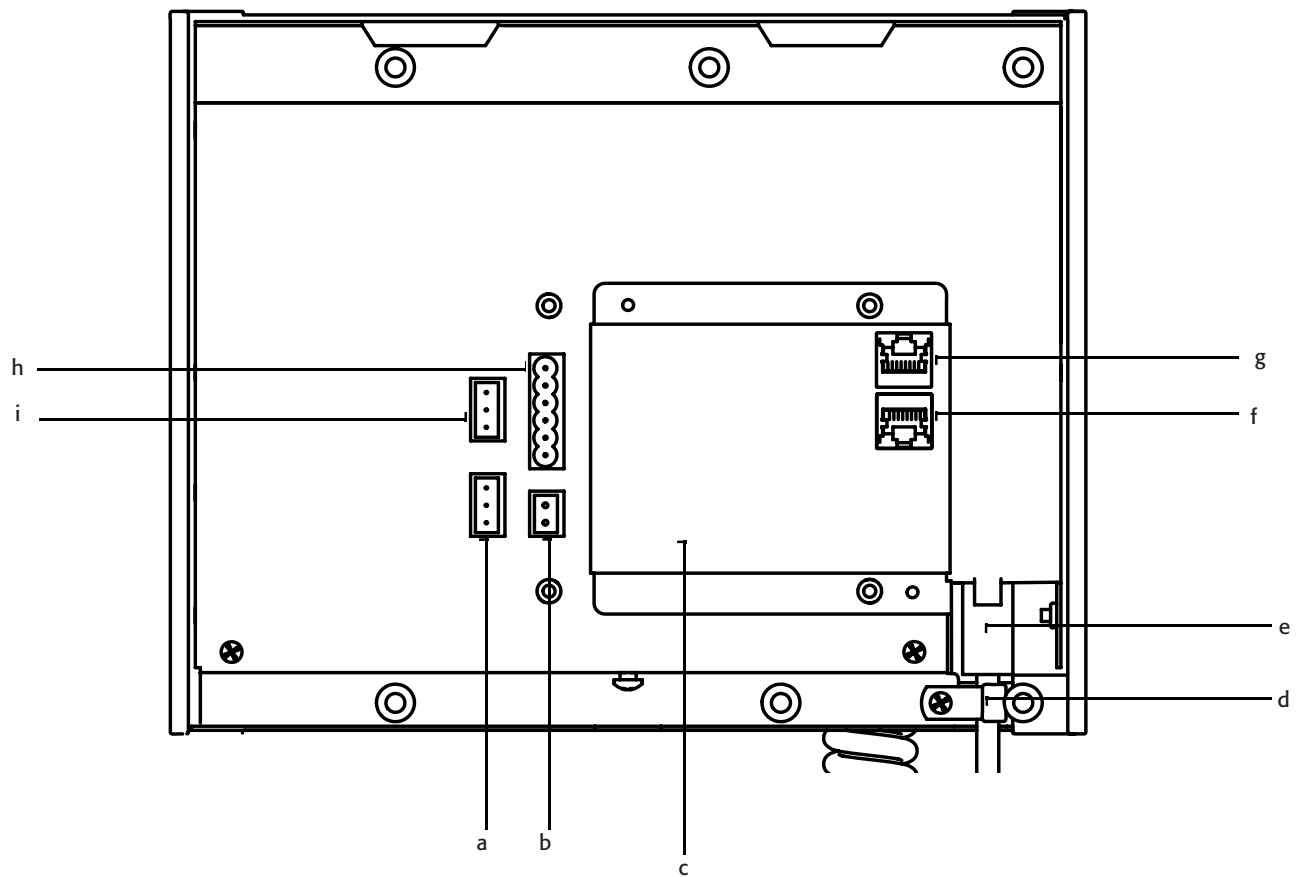
A Dynamic Push-to-Talk microphone is available with handheld model Page Stations only. The handheld models are designated by the letter H in the model number. Gooseneck microphone models must use the TALK/START button to make the page. Gooseneck models are designated by the letter G in the model number.

Magnetic Microphone Docking Plate

The Q-Sys Page Station uses a magnetic docking plate to hold the handheld microphone. Just place the back of the microphone up against the plate and let it go! Available with handheld microphone models only.

Q-Sys Page Station Rear Panel

Refer to Figure 3.

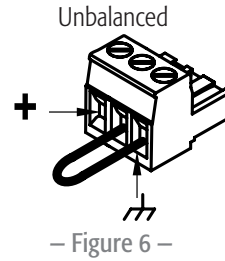
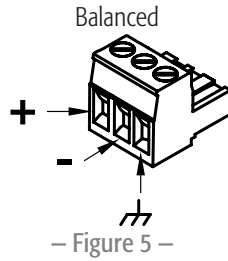
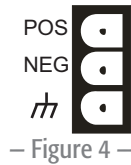


– Figure 3 –

- | | |
|--|--|
| a. MIC LINE (In) (three-pin Euro connector) | f. Q-Sys LAN B (RJ45 connector) |
| b. AUX POWER (two-pin Euro connector) | g. Q-Sys LAN A (RJ45 connector) |
| c. Connector labels | h. GPIO connector (six-pin Euro connector) |
| d. Strain Relief (Handheld only) | i. LINE OUT (three-pin Euro connector) |
| e. Microphone Connector – RJ45 (Handheld only) | |

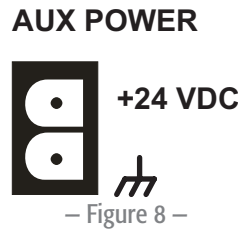
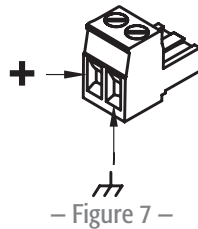
MIC/LINE In

The Page Station rear panel includes an auxiliary MIC/LINE input for support of a secondary microphone or other audio source. The MIC/LINE accepts a Euro style (Phoenix) three-terminal plug, included in the Page Station package. Follow the Page Station rear panel pin-out labels (Figure 4) for wiring. Figure 5 and Figure 6 indicate appropriate termination practices for balanced and unbalanced applications.



AUX POWER

The Page Station rear panel includes a receptacle for connecting a +24 VDC/500 mA power source. This is an optional supply source to power the Page Station, and can be used as the only power source or as a backup power source should PoE fail. The power receptacle on the rear panel of the Page Station accepts a Euro style (Phoenix) two-terminal plug (Figure 7), included in the Page Station package. Follow the Page Station rear panel pin-out label (Figure 8) when connecting to this receptacle.



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CAUTION!: The power supply used to provide 24 VDC power to the unit shall be a UL Listed ITE power supply, marked LPS, or a UL Listed direct plug-in power unit, marked Class 2, with a rated output of 24 VDC/500 mA.

Microphone Connector

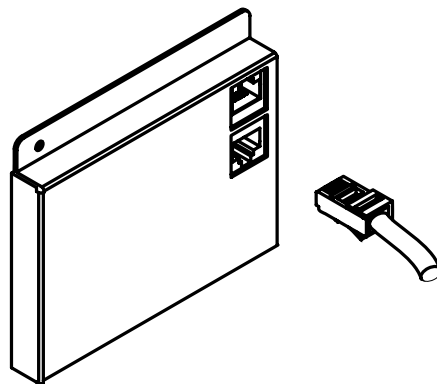
- RJ45 connector for hand-held microphone models.
- XLR connector for gooseneck microphone models.

Strain relief

Secures the cord of the handheld microphones to remove any stress to the RJ45 connector.

Q-LAN Network

Connect one end of a data communications cable (CAT-5e rating or better) terminated with an RJ45 connector into the LAN A (and optionally the LAN B) connector on the rear panel of the Q-Sys Page Station (Figure 9). Ensure that the lock tab on the cable's connector engages with the RJ45 connector on the rear panel. Ensure that the mating network switch port offers IEEE 802.3af compliant power if powering the Page Station via PoE. Refer to the Q-Sys online help for Networking details.

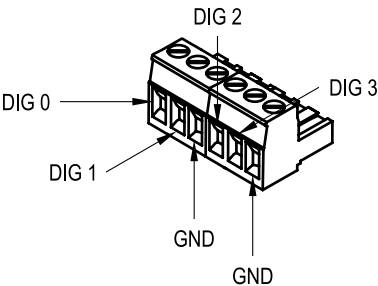


GPIO Connector

The Page Station rear panel includes a six-terminal receptacle (Figure 10, and Figure 12) that provides various GPIO (General Purpose Inputs and Outputs) that allows the Page Station to control or be controlled by a variety of external products. The Page Station GPIO receptacle accepts Euro style (Phoenix) two, three or six-terminal plugs. A six-terminal plug is included in the Page Station ship kit. Follow the Page Station rear panel pin out labels (Table 1) when connecting to the GPIO receptacle. Refer to the Q-Sys online help for GPIO details.



– Figure 10 –



– Figure 11 –

Signal Name	Description
Dig 0	Digital pin
Dig 1	Digital pin
GND	Ground
Dig 2	Digital pin
Dig 3	Digital pin
GND	Ground

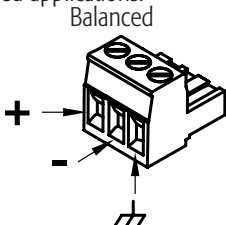
– Table 1 –

LINE OUT

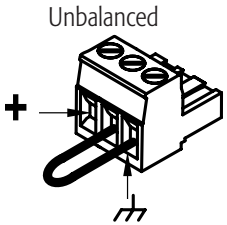
The Page Station rear panel includes an auxiliary Line Output receptacle to drive an amplifier or console input directly. The Line Output may be used for mission critical or alternative event applications. The receptacle accept a Euro style (Phoenix) three-terminal plug, which are included in the Page Station package. Follow the Page Station rear panel pin-out labels (Figure 12) when connecting to the receptacle. Figure 13 and Figure 14 indicate appropriate termination practices for balanced and unbalanced applications.



– Figure 12 –



– Figure 13 –



– Figure 14 –

Page Station Configuration and Setup

Q-Sys Designer is the software application required to configure your paging system. Refer to the Q-Sys Designer online help for details.

This section covers connecting the hardware to the Q-LAN network, powering up, and re-setting the Page Station to the factory defaults.

Optional Connections

The following are optional, and should be connected prior to powering up the Page Station.

- MIC/LINE (3-Pin Euro)
- LINE OUT (3-Pin Euro)
- GPIO
- AUX POWER (If you make this connection and plan to use PoE, do not turn the auxiliary power supply on until you have made the network connection with PoE turned on. See About PoE and AUX POWER, page 11)

Required Connections

- LAN-A – Connect one end of a CAT-5e cable with an RJ45 connector to the LAN-A connector on the Page Station. Connect the other end of the cable to the Q-LAN network.
- Connect LAN-B in the same way if you are going to be using LAN-B.

When power is supplied to the Page Station it may take several minutes to boot fully. The message "Q-Sys not configured" displays. This message remains until the network details are configured for the Page Station and it is included in a valid paging design.

About PoE and AUX POWER

There is no On/Off switch for the Page Station, making the order in which the power is connected important. The following information describes the events when power is lost based on which power is supplied to the Page Station first.

- If AUX POWER is supplied first:
 - The Page Station boots using AUX POWER.
 - If PoE is then connected, it is not used.
 - If AUX POWER fails, power to the Page Station is lost, the Page Station re-boots using PoE.
 - If PoE fails with AUX POWER still available, there is no effect - PoE was not being used.
- If PoE is supplied first:
 - The Page Station boots using PoE.
 - If AUX POWER is then connected, it is not used.
 - If PoE fails, the Page Station switches to AUX POWER. There is no re-boot.
 - If AUX POWER fails with PoE still available, there is no effect AUX POWER was not being used.
 - If PoE returns, the Page Station remains on AUX POWER.

Using the Page Station Menu

To access the menu, when the "Q-Sys not configured" message is displayed, press and hold the Talk/Start button until the first item in the menu is displayed. Press the Talk/Start button to sequence through the menu pages. The following list shows the six pages with factory default settings. The factory settings are slightly different for each Page Station, below is an example.

- Q-Sys Page Station
 - Model PS-1600H
- Name:
 - Page Station 40ab
- LAN A
 - IP Addr 169.254.36.146
 - Netmask 255.255.0.0
- LAN B
 - IP Addr 169.254.55.4
 - Netmask 255.255.0.0
- Firmware Version
 - 2.0.111
- Copyright (C) 2010
 - QSC Audio Products, LLC.

Reset the Page Station to Factory Defaults

1. If the Page Station is part of a running design, do the following:
 - a. In Q-Sys Designer, from the main menu, select **File > Load from Core and Connect**. Select the design containing the Page Station you wish to reset.
 - b. From the main menu, select **Tools > Configurator...**
 - c. Select the Page Station you wish to reset.
 - d. Change the hostname of the Page Station. "Q-Sys not configured" displays on the Page Station LCD.
2. Follow the procedure "Using the Page Station Menu" on page 11 to access the menu.
3. Press the Talk/Start button to access the Name, LAN-A, or LAN-B menu page.

4. Insert a reset tool (a paperclip works) into the small hole on the right side of the Page Station to press the reset button. "Clear settings in 10, 9, ..." displays on the Page Station LCD.
5. Hold the reset button until the count down gets to 0.
6. Release the reset button. The Page Station is reset to factory default settings.

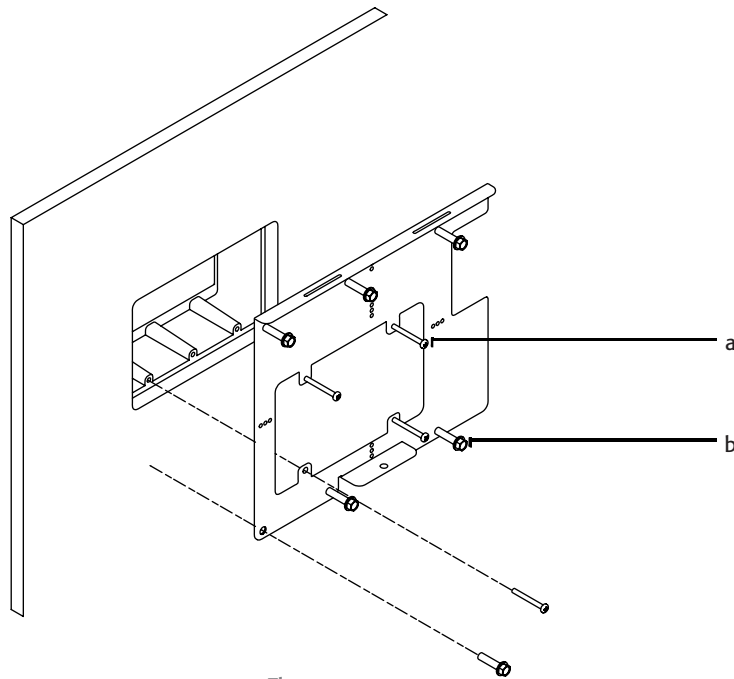
Wall-mounting the Page Station

NOTE: The product shall be installed in accordance with the applicable code requirements.

Q-Sys Page Stations are designed to be mounted on a wall or podium with an appropriate cutout and cavity to allow all cables and power sources to connect to the Page Station rear panel with adequate stress relief. The included Mounting Bracket is designed to mate with a standard triple-gang U.S. electrical box, but does not need one to be mounted. Using an electrical box provides contractors with the option of pre-wiring, then installing the Page Station at a later time; if an electrical box is used, its dimensions should meet the NEMA standards. The Mounting Bracket should be firmly attached to the wall using the electrical box (if installed) for alignment only.

1. Remove the Mounting Bracket from the Page Station. It is secured by one screw on the bottom of the Page Station. Set the screw aside for later use.
2. Route all Page Station wiring and connectors through the center of the Mounting Bracket.

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– Figure 15 –

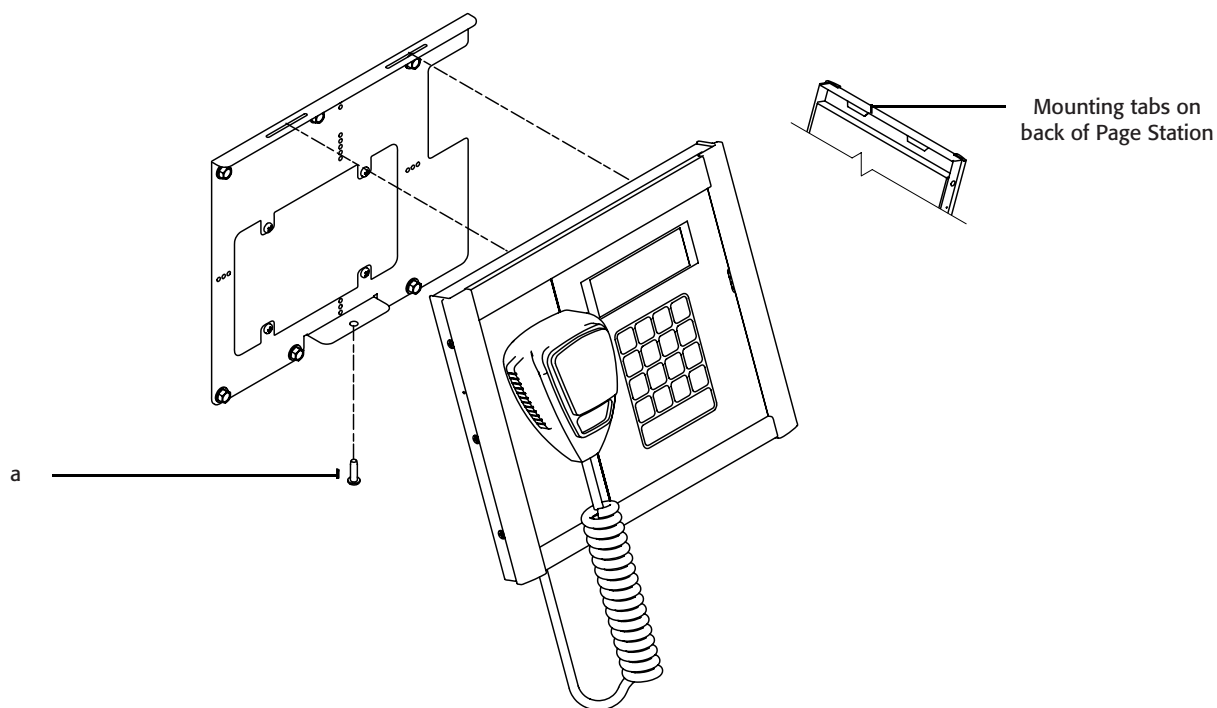
a. Four included screws for aligning the Mounting Bracket to the triple-gang box.

b. Six user-supplied screws, appropriate for mounting surface

3. Use four (included) (Figure 15 a) to align and mount the Mounting Bracket to the triple-gang electrical box if you are using one.
4. Use six screws (not included) (Figure 15 b) to secure the Mounting Bracket to the wall. The six screws shall be appropriate for the surface to which the Page Station is mounted.

IMPORTANT!: These six screws are required, even when using the triple-gang electrical box.

5. Connect all Page Station wiring to the proper connectors on the Page Station. Refer to "Q-Sys Page Station Rear Panel" on page 8.



– Figure 16 –

6. Tilt the top of the Page Station back and install the Page Station onto the Mounting Plate by aligning the two tabs on the Page Station with the two slots on the Mounting Plate. Refer to **Figure 16**.
7. With the Page Station still tilted, carefully bundle the wiring back into the wall (or triple-gang electrical box).
8. Push the bottom of the Page Station to the wall.
9. Install and tighten the screw (**Figure 16a**) removed in step 1, through the Mounting Bracket up into the Page Station.

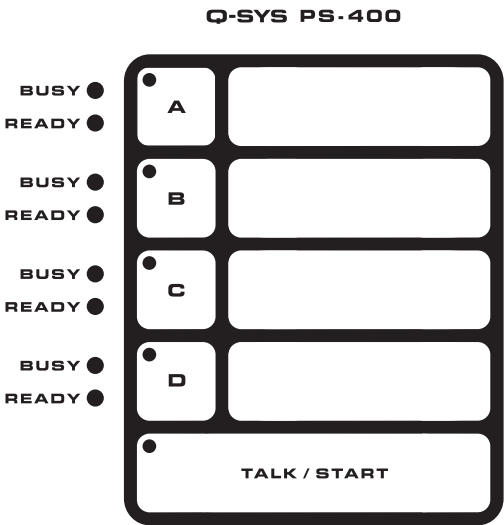
Specifications

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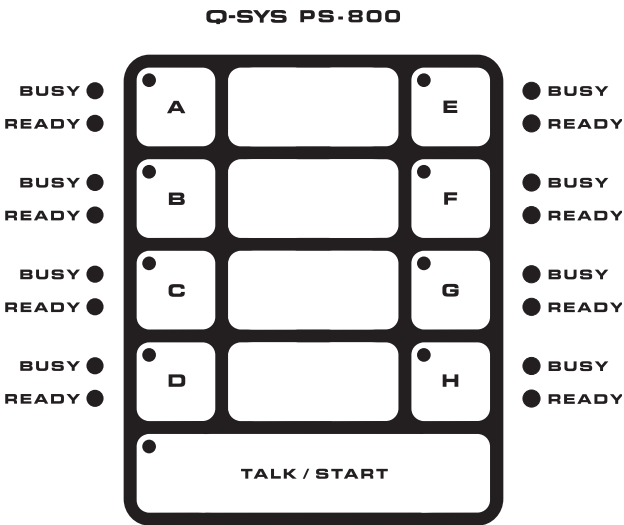
Hardware	
Dimensions (H/W/D)	10.37" x 8.3" x 1.5" (263.4 mm x 210.8 mm x 38.1 mm)
Line voltage requirements	IEEE 802.3af power or +24 VDC/500 mA
Accessories included	Hardware User Manual, Accessory ship kit, Warranty card
Audio Channel Capacity	
Line Inputs	2
Line Outputs	1
Front Panel Controls	
Paging keypad	Capacitive touch keypad, PTT momentary button
Microphone	PTT momentary switch (Handheld models only)
Front Panel Connectors	
Gooseneck microphone	XLR (Gooseneck models only)
Front Panel Indicators	
Talk, Ready, Busy	Bi-color LEDs (red/green)
Keypad button activity	Green LEDs
LCD	240x64 monochrome graphics display
Rear Panel Connectors	
Hand-held microphone	RJ45
Q-LAN Network LAN A	RJ45 1000 Mbps only
Q-LAN Network LAN B	RJ45 1000 Mbps only
DC power +24 VDC inlet	2-pin Euro receptacle
Line Input	3-pin Euro receptacle
Line Output	3-pin Euro receptacle
GPIO	6-pin Euro receptacle
Line Input	
Dynamic range	
Unweighted	>115 dB
A-weighted	>118 dB
Distortion (20 Hz – 20 kHz, all sensitivities)	
+4 dBu (max)	<0.009% THD+N
2 dB below clip (max)	<0.009% THD+N
Crosstalk (20 Hz – 20 kHz)	
Inter-channel (max)	>75 dB
Inter-channel (typ)	>90 dB
Intra-channel (max)	>85 dB
Intra-channel (typ)	>100 dB
Frequency response	
20 Hz – 20 kHz (max)	± 0.5 dB
20 Hz – 20 kHz (typ)	± 0.2 dB
Input impedance	
Balanced (nominal)	10k ohms
Unbalanced (nominal)	10k ohms
Common mode rejection:	
20 Hz – 20 kHz (min)	>54 dB
20 Hz – 20 kHz (typ)	>60 dB
Input sensitivities:	
Vrms	1.5, 3, 9, 18
dBu	5.7, 11.8, 21.3, 27.3
dBv	3.5, 9.5, 19.1, 25.1
Line Output	
Dynamic range	
Unweighted	>112 dB
A-weighted	>115 dB
Crosstalk (20 Hz – 20 kHz)	
Inter-channel (max)	>75 dB
Inter-channel (typ)	>90 dB
Intra-channel (max)	>85 dB
Intra-channel (typ)	>100 dB
Mute	Infinite attenuation

– Table 2 –

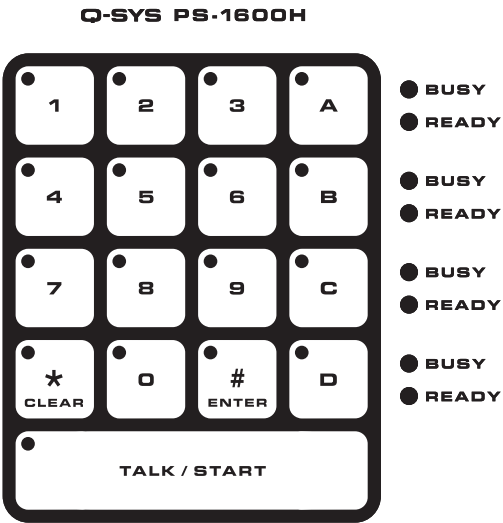
Keypad Configurations



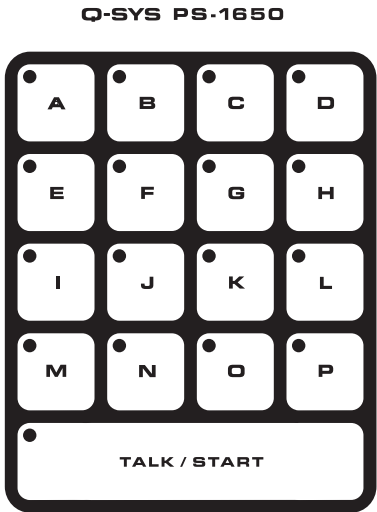
– Figure 17 –



– Figure 18 –



– Figure 19 –



– Figure 20 –

EN

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Installation 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.

The SOLAS AC FILTER ENHANCEMENT (SAFE) is for use in "Safety of Life at Sea" applications that use QSC CX Amplifiers and Q-Sys Core 1000, 1100, 3000, 3100, and 4000 devices. The SAFE provides a noise filter for the AC input to the QSC Cores and CX Amplifiers.

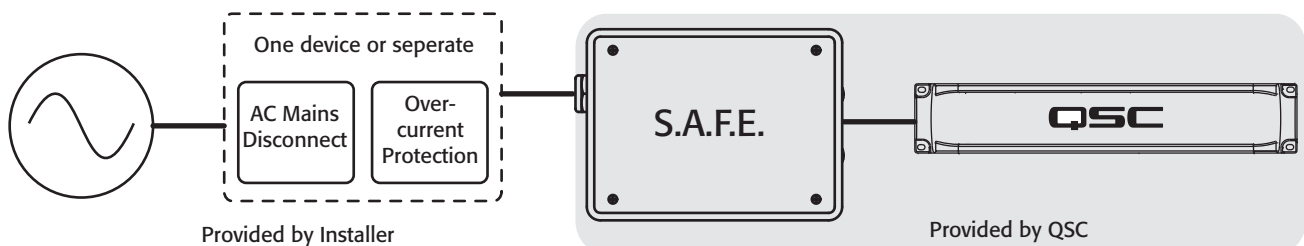
Packing List

Provided by QSC

1. Filter Assembly
2. M4 Ring Terminal, 16-14 AWG (3)
3. 35mm DIN Rail Clip, M4 X 0.7mm (2)
4. M4 Panhead Screw (2)
5. Retainer Clip
6. IEC AC Power Cable

Provided by Installer

1. AC Mains Disconnect device / Over-current Protection device
 - a. 240 V actuated at 8 A
 - b. 120 V actuated at 15 A).
2. Three-conductor cable
 - a. 240 V / minimum cross-sectional area of 1.25 mm² (16 AWG)
 - b. 120 V / minimum cross-sectional area of 1.5 mm² (14 AWG)



— Figure 1 —

TD-000428-00-B



TD-001662-01-B

Installation



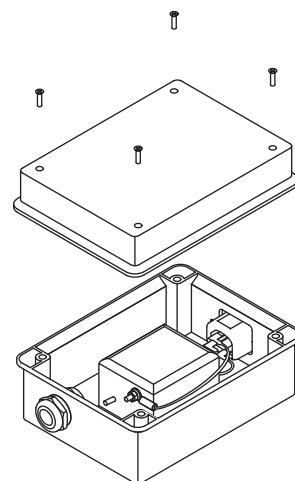
WARNING!: Do not connect any of the components to the AC source until installation is complete.

Mount the SAFE Device

You can mount the SAFE device vertically or horizontally, to a DIN rail or other surface. This procedure covers mounting with a DIN rail.

Figure 3 shows the box in the horizontal orientation. If you want to mount the box vertically, you must remove the two Phillips screws (2) and the IEC connector (1) to gain access to one of the holes.

1. Remove the four Phillips screws holding the top on the SAFE device, (Figure 2)
2. Use a punch to open two holes (vertical or horizontal) in the bottom of the box.

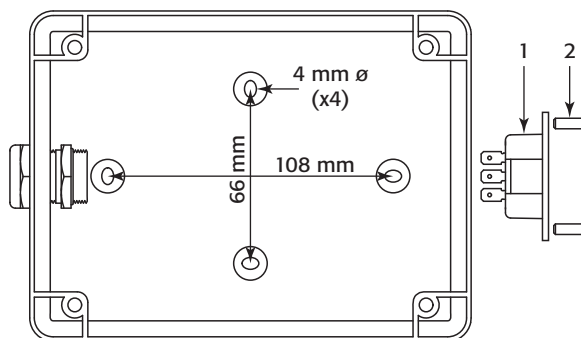


– Figure 2 –



NOTE: The box (2) in Figure 4 is not shown to proportion.

3. Insert one M4 panhead screw (1) through the bottom of the box (2) and into the screw hole of the DIN clip (3). Tighten the screw.
4. Repeat the operation for the second DIN clip. Make sure both clips are oriented the same way.
5. Tilt the box (2) slightly and place one end of the clip (3) onto one side of the DIN rail (4). Make sure both clips are engaged with the DIN rail.
6. Press the box down so that both clips snap into place on the DIN rail.

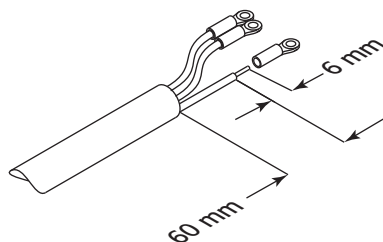


– Figure 3 –

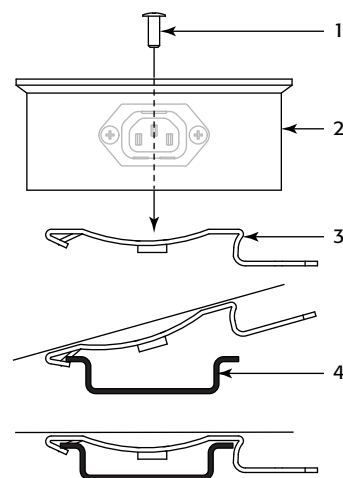
Prepare the Cable

Refer to Figure 5

1. The connecting cables shall be a three-conductor, flexible cable with a minimum cross-sectional area of 1.25 mm² (16 AWG) for 240 VAC, and a minimum cross-sectional area of 1.5 mm² (14 AWG) for 120 AC.
2. Trim the outer insulation of the cable back from the end approximately 60 mm.
3. Trim the individual conductors back from the end approximately 6 mm.
4. Crimp one terminal lug onto each of the three conductor wires. Make sure the crimp is tight.



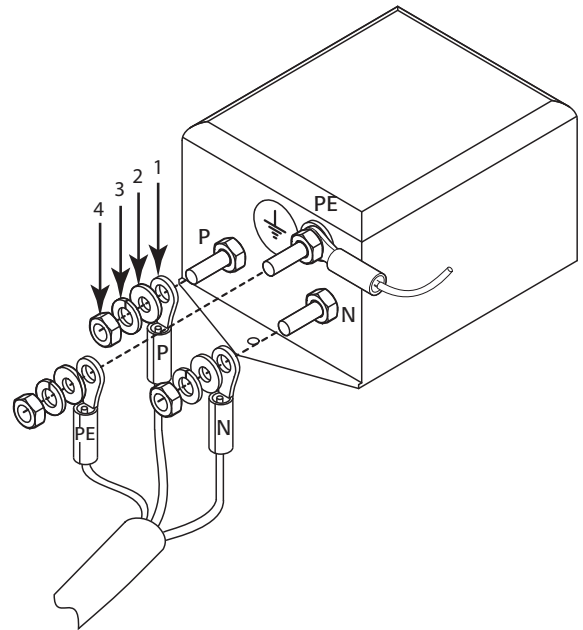
– Figure 5 –



– Figure 4 –

Connect the Cable/Conductors to the SAFE

1. Insert the terminal lugs and the cable through the locking strain-relief so that a small amount of outer insulation is seen inside the box.
2. Tighten the outside strain-relief nut.
3. Install the three terminal lugs (1) onto the studs on the filter. (Figure 6) The studs are labeled on the top of the filter unit.
 - a. P = Line
 - b. N = Neutral
 - c. PE = Earth Ground
4. Install one flat washer (2) onto each stud.
5. Install one lock washer (3) onto each stud.
6. Install one nut (4) onto each stud. Tighten with a 7 mm wrench.
7. If necessary, loosen the outside strain-relief nut and adjust the strain relief so there is no strain on the conductor wires and studs. Retighten the nut.
8. Connect the other end of the three-conductor cable to the AC Mains Disconnect/Over-current Protection device as required by the device(s).

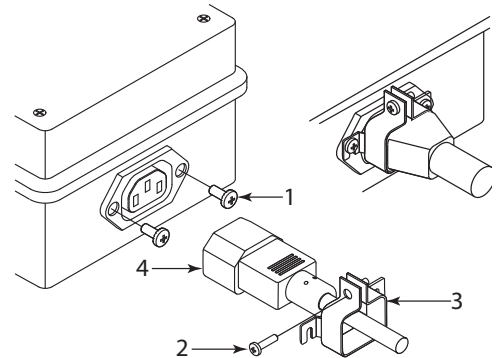


– Figure 6 –

Install Retainer Clip and AC Cord

Refer to Figure 7.

1. Remove the two Phillips screws (1) that secure the AC receptacle to the SAFE box.
2. Remove the Phillips screw (2) on the top of the Retainer Clip (3).
3. Slip the Retainer Clip around the AC Power cord (4) and slide it down the cord to the male IEC connector.
4. Plug the male end of the AC Power cord into the AC receptacle on the the SAFE box.
5. Reinstall and tighten the two Phillips screws (1) that secure the AC receptacle to the SAFE box.
6. Reinstall and tighten the Phillips screw (2) on the top of the Retainer Clip. Make sure the power cord is held securely by the Retainer Clip.



– Figure 7 –

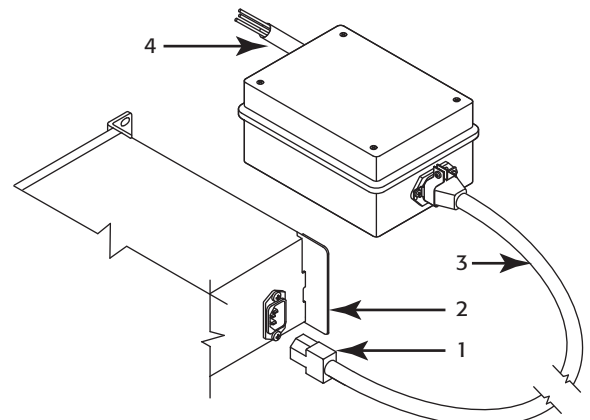
Refer to Figure 8

7. Connect the female end of the AC Power cord (1) to the QSC Core or QSC Amplifier (2).
8. Make sure there is no stress on the AC Power cord (3) or the three-conductor cable going to the Over-current Protection/AC Mains Disconnect device.
9. Secure the cables as needed.

Apply AC Power

The SAFE and Q-Sys Core do not have power switches.

The QSC CX Amplifier has a power switch. Make sure it is turned on.



– Figure 8 –



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