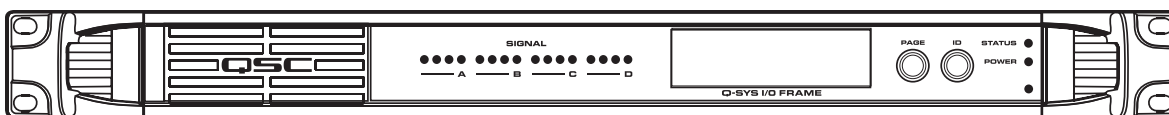
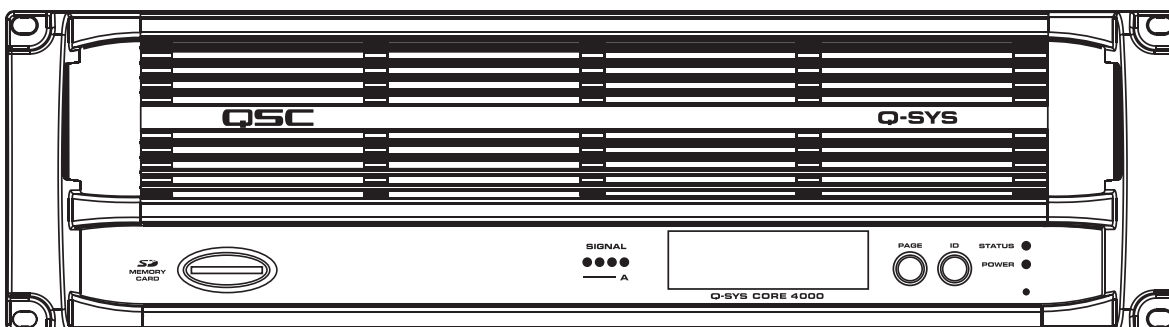
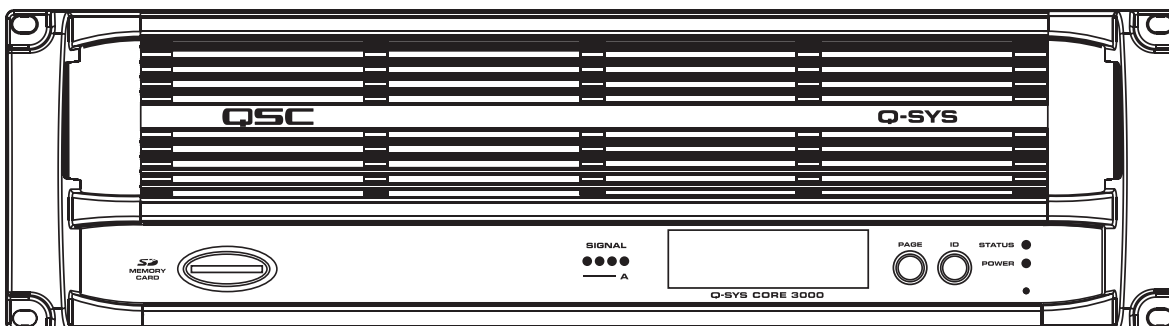
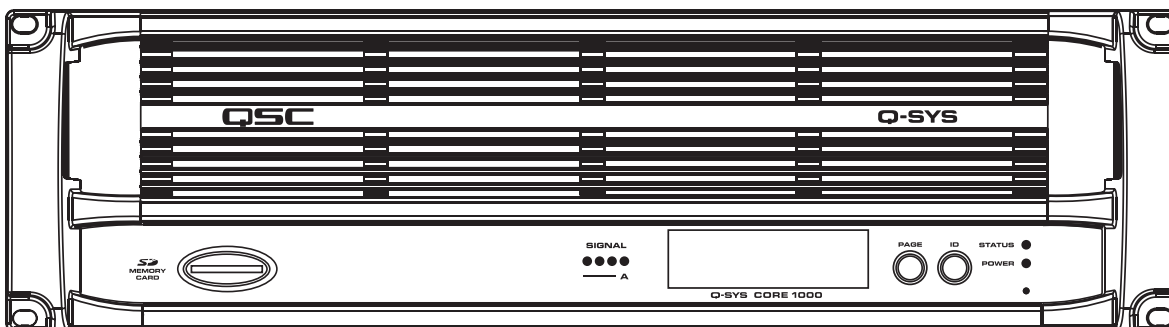


Core 1000 – Centralized audio and control processor


Core 3000 – Centralized audio and control processor


Core 4000 – Centralized audio and control processor

I/O Frame – Networked audio and control input and output device



IMPORTANT SAFETY PRECAUTIONS AND EXPLANATION OF SYMBOLS

 The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated “dangerous” voltage within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to humans.

 The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in this manual.

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.

CAUTION: To reduce the risk of electric shock, do not remove the cover. No user-serviceable parts inside. Refer servicing to qualified service personnel.

WARNING: To prevent fire or electric shock, do not expose this equipment to rain or moisture.

1. Maximum operating ambient temperature is 50°C (122°F).
2. Never restrict airflow through the device fan or vents. Please insure that the air intake and exhaust vents are unobstructed.
3. When installing equipment into rack, distribute the units evenly. Otherwise, hazardous conditions could be created by an uneven weight distribution.
4. Connect the unit only to a properly rated supply circuit. The Q-Sys™ Core 1000, Core 3000, Core 4000 and I/O Frame are suitable for connection to 100 – 240 VAC. The Q-Sys Core 1000, Core 3000, Core 4000 and I/O Frame are suitable for 50 – 60 Hz, with no special considerations other than the appropriate IEC power cord.
5. Reliable Earthing (Grounding) of rack-mounted equipment should be maintained.

Lithium Battery Warning

THE Q-SYS CORE 1000, CORE 3000 AND CORE 4000 EQUIPMENT 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.

Warranty (USA only; other countries, see your dealer or distributor)

Disclaimer

QSC Audio Products, LLC (“QSC”) is not liable for any damage to amplifiers, loudspeakers, or any other equipment that is caused by negligence or improper installation and/or use of this signal processing product. While QSC has endeavored to develop and produce the most dependable and robust network audio product for your use, due to the myriad of network situations and equipment that may be encountered in its implementation, QSC cannot be held responsible for network conflicts and associated consequences that may result. For this reason, QSC strongly recommends that the network used for implementation of Q-Sys products be completely separate from all other networks, data or otherwise. As such, should you elect to integrate Q-Sys products with your existing network system, all risks attendant to such integration of Q-Sys products with your existing network or network systems are assumed by you. While QSC strives to provide the highest quality technical solutions for networked audio products, in no event will QSC or its suppliers be held liable for any damages, consequential, incidental or otherwise, including any claims for lost profits and/or savings resulting from any attempted integration of Q-Sys products with your networking systems. No agent, employee or representative of QSC has any authority to alter or modify in any manner, the disclosures and recommendations set forth herein.

QSC Audio Products 3-Year Limited Warranty

QSC Audio Products, LLC guarantees its products to be free from defective material and/or workmanship for a period of three (3) years from the date of sale and will replace defective parts and repair malfunctioning products under this warranty when the defect occurs under normal installation and use – provided the unit is returned to our factory or one of our authorized service stations via prepaid transportation with a copy of proof of purchase (i.e., sales receipt). This warranty provides that the examination of the returned product must indicate, in our judgement, a manufacturing defect. This warranty does not extend to any product which has been subjected to misuse, neglect, accident, improper installation, or where the date code

has been removed or defaced. QSC shall not be liable for incidental and/or consequential damages. This warranty gives you specific legal rights. This limited warranty is freely transferable during the term of the warranty period.

Q-Sys™ I/O Frames and Cores contain removable I/O cards. Changing these cards should be attempted only by those who are skilled and experienced with the internal mechanics of digital electronic devices. Proper tools and procedures must be used. Failure to carefully follow the instructions detailed in the Q-Sys User Manual may result in mechanical or electrical damage. Failures that are, in the judgment of QSC caused by improper removal or installation of I/O cards are not covered under the QSC Limited Warranty.

Customer may have additional rights, which vary from state to state.

In the event that this product was manufactured for export and sale outside of the United States or its territories, then this limited warranty shall not apply. Removal of the serial number on this product, or purchase of this product from an unauthorized dealer will void this limited warranty. Periodically, this warranty is updated. To obtain the most recent version of QSC’s warranty statement, please visit www.qscaudio.com.

Contact us at 800-854-4079 or visit our website at www.qscaudio.com.

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.

© 2009, QSC Audio Products, LLC.

USA and foreign patents pending.

QSC is a registered trademark of QSC Audio Products, LLC.

“QSC” and the QSC logo are registered with the U.S. Patent and Trademark Office.

All trademarks are the property of their respective owners.

RoHS Statement

The following chart is provided for product use in China.

Q-Sys™ Core 系列, Q-Sys I/O Frame						
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	O	O	O	O	O
机壳装配件 (Chassis Assemblies)	O	O	X	O	O	O

O: 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。
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.
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。
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.

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™ product carton:

- Q-Sys Core 1000, Core 3000, Core 4000 or Q-Sys I/O Frame product
- Rubber feet
- Hardware Manual
- Q-Sys Designer software CD (Core 1000, Core 3000 and Core 4000 products only)
- IEC power cord and cord lock wire
- Connector plug kit appropriate for the optional Q-Sys Audio Card(s) ordered

Mounting

Q-Sys products can be used in or out of an equipment rack. Rack mounting is optional. Adhesive rubber feet are included for non-rack mount installations (table or shelf top installations). Use the feet to prevent the unit from scratching or marring the support surface.

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 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.

Elevated Operating Ambient - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Consideration should be given to ensure that the maximum operating temperature (50°C) 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.

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

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 overcurrent protection and supply wiring.

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).

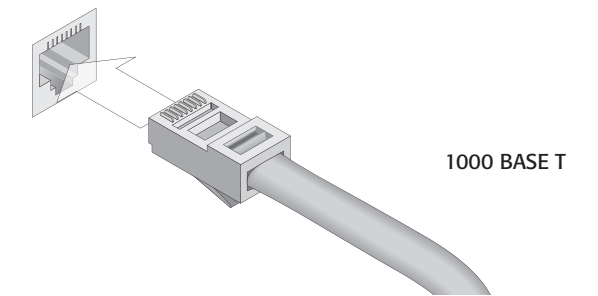
Connections

AC Power Cord

Insert the molded receptacle of the AC power cord into the AC power inlet on the back of the Q-Sys product. Plug the AC line connector into an AC outlet. The power supply on the Q-Sys Core 1000, Core 3000, Core 4000 and I/O frame will accept from 100 – 240V, 50 – 60 Hz. If a different type of IEC power cord is required than that supplied with the product, consult QSC's Technical Services Group.

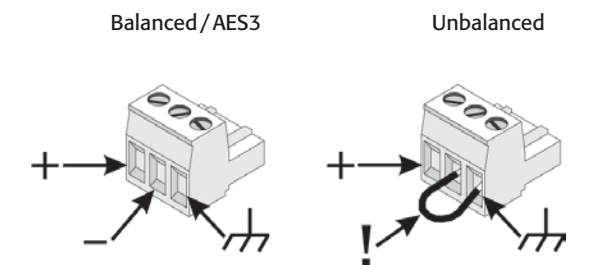
Q-Sys™ Network

Connect one end of a data communications cable (CAT-6 rating or better) terminated with an RJ45 plug into the LAN A (and optionally the LAN B) receptacle on the rear panel of the Q-Sys product. Ensure that the lock tab on the cable engages with the RJ45 receptacle on the rear panel connector.



Mic/Line Inputs, Line Outputs, AES3 I/O

Several of the optional Q-Sys Audio I/O Cards accept Euro style (a.k.a. Phoenix) 3-terminal plugs. When these cards are ordered in the product configuration a shop kit containing the mating plugs is included in the carton contents. Plug the Euro terminal block plug into the appropriate input or output receptacle on the Q-Sys Audio I/O Card's panel face. The connection pinout is printed on the Q-Sys Audio I/O Card mounting bracket. Refer to the illustrations in the right-hand column of this page for balanced and unbalanced connections (analog connections only – AES3 connections always require all three conductors).

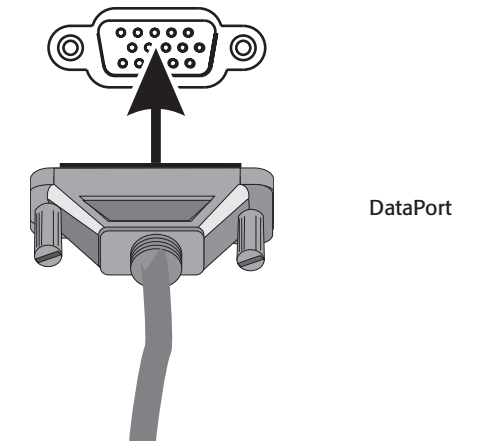


DataPorts

The Q-Sys DataPort I/O Card is intended to interface to QSC amplifiers with v1 DataPorts. This is the all-capable version 1 DataPort specification, which is supported on CX, DCA, PowerLight™, PL2, and PL3 Series amplifiers. All DataPorts use the HD15 connector format and connect to QSC amplifiers via data communications having male HD15 connectors.

These appear to be common VGA cables but they are not. Many off-the-shelf VGA cables MIGHT work with satisfactory results, however it is also quite possible off-the-shelf cables will give less-than-satisfactory results, and could even cause damage to QSC amplifiers! The QSC DataPort specification requires that all conductors be present, as well as shielding over those conductor pairs used for the audio channels to the amplifier. Therefore, QSC recommends the use of QSC DataPort cables exclusively, which are available in a variety of lengths from QSC. Use of any non-QSC DataPort cable may void the warranty.

To connect a DataPort cable between a Q-Sys DataPort I/O Card and an amplifier DataPort, attach the cable's male connectors to the HD15 ports and finger tighten the thumb screws on the connector.



Minimum System Requirements for Q-Sys™ Designer

Q-Sys Designer is the software with which you create the designs for a Q-Sys system. After the system is designed, tested and deployed on the Core, Q-Sys designer is not required for that system to operate. Q-Sys Designer runs in a PC environment with the following minimum requirements.

Software

- Microsoft® Windows® Vista® SP1
- Microsoft® Windows® XP® Professional Version 2002 SP3
- Microsoft® .NET Framework 3.5 SP1

PC Hardware Requirements for Windows Vista Home Premium / Business / Ultimate

- 1 GHz 32-bit (x86) or 64-bit (x64) processor
- 1 GB of system memory
- 40 GB hard drive with at least 15 GB of available space
- Support for DirectX 9 graphics with:
 - » WDDM Driver
 - » 128 MB of graphics memory (minimum)
 - » Pixel Shader 2.0 in hardware
 - » 32 bits per pixel
- CD-ROM or DVD drive
- Keyboard and Microsoft® Mouse or compatible pointing device

PC Hardware Requirements for Windows XP Professional

- PC with 300 megahertz or higher processor clock speed recommended; 233 MHz minimum required (single or dual processor system); Intel® Pentium®/Celeron® family, or AMD K6®/AMD Athlon®/AMD Duron® family, or compatible processor recommended.
- 128 megabytes (MB) of RAM or higher recommended (64 MB minimum supported; may limit performance and some features)
- 1.5 gigabytes (GB) of available hard disk space
- Super VGA (800 x 600) or higher-resolution video adapter and monitor
- CD-ROM or DVD drive
- Keyboard and Microsoft® Mouse or compatible pointing device

Installing Q-Sys Designer

1. Start your PC.
2. Close any running applications.
3. If you have an internet connection, you can download the latest software at www.qscaudio.com/products/software/QSys or place the Q-Sys Designer CD into your CD-ROM/DVD drive.
4. The software should auto-run. If not, select *run* from the *start* menu. Browse to the file named *setup.exe* on your CD-ROM/DVD drive
5. Click the *Install Q-Sys Designer* button.
6. Follow the on-screen prompts/instructions.

Quick Start Guide

This is intended to give a high-level procedure for getting a simple Q-Sys system connected, running a Q-Sys design, and passing audio. The following procedure assumes that you have a Q-Sys Designer file with components properly connected, but not necessarily configured.

1. Set up network. For more information about Network Requirements see Help File Networking Topic; for a list of qualified switches see Page 12.
2. Connect PC, Core and I/O Frame to the network.
3. Connect DataPort amplifiers and loudspeakers.
4. Power up the equipment.
5. On the PC:
 - A. Open Internet Explorer.
 - B. Start Apple® Bonjour™. The Q-Sys Core and I/O Frame should be listed in Bonjour.
 - C. In the Bonjour list, double-click the Q-Sys Core. The Web Management Interface opens to the Core's home page.
 - D. Review/configure the Core's network settings.
 - » A new Core is shipped with both LANs enabled, and the addressing set to Automatic.
 - » DHCP Server - If there is a DHCP server on the network, the IP Address is automatically assigned.
 - » Link-Local address – if there is not a DHCP server on the network, the address is automatically assigned in this range: 169.254.0.0 – 169.254.255.255.
 - » Static IP Address – you assign a static IP Address, Mask and Default Gateway.
 - E. The Core is shipped with a default Name, rename the I/O Frame to match the name in your design.
 - F. In the Bonjour list, double-click the Q-Sys I/O Frame. The Web Management Interface opens to the I/O Frame's home page.
 - » A new I/O Frame is shipped with both LANs enabled, and the addressing set to Automatic.
 - » DHCP Server - If there is a DHCP server on the network, the IP Address is automatically assigned.
 - » Link-Local address – if there is not a DHCP server on the network, the address is automatically assigned in this range: 169.254.0.0 – 169.254.255.255.
 - » Static IP Address - you can assign a static IP Address, Mask and Default Gateway.
 - G. The I/O Frame is shipped with a default Name, rename the I/O Frame to match the name in your design.
 - H. Start Q-Sys Designer.
 - 1) Open your design file.
 - 2) Select the Core in the Inventory list, and verify the configuration.
 - 3) Ensure that the Core's Name in your design matches the Name in Bonjour.
 - 4) Select the I/O Frame in the Inventory list, and verify the configuration.
 - 5) Ensure that the I/O Frame's Name in your design matches the Name in Bonjour.
 - 6) Ensure that the amplifiers are properly connected in the design and configured correctly. The connections and configuration should match the physical connections.
 - 7) Ensure that the loudspeakers are properly connected to the amplifiers in the design, and configured correctly. The connections and configuration should match the physical connections.
 - 8) There are many ways to pass audio through the Q-Sys system, your design should contain one or more ways to do this. If not, refer to the Online Help and add one of the components that would allow you to pass audio.
 - 9) Save the design to the Core and connect (Press F5).
 - 10) If the Core's firmware does not match that of Q-Sys Designer on your PC, you are prompted to update the firmware. Note: To download the latest Q-Sys Designer software and firmware, go to <http://www.qscaudio.com/products/software/QSys>.
 - I. Test the system.
 - » Before trying to pass audio, place the System Mute component in your design, Run the design (F5), and click the Mute button. When you attempt to pass audio for the first time, you can un-mute the system and the output will ramp up to the level of the settings in your design. If the system begins to get too loud, you can press the mute button again and make necessary adjustments.

Introduction

Overview

Q-Sys™ is an integrated system audio solution. The DSP is centralized to allow faster development and deployment of new features, and requires fewer hardware changes as well. Q-Sys has been designed around four major criteria: Sonic Quality, Reliability, Power and Flexibility.

Components

Q-Sys is comprised of the following dedicated components:

- **Q-Sys Core** (Required) – The Core is the central processing unit of Q-Sys. The Core processes and routes all audio, controls peripheral devices, manages firmware updates to the peripheral devices, all via a gigabit Ethernet network. The Core has one slot available to add one of the I/O cards listed under Q-Sys I/O Frame below.
- **Q-Sys I/O Frame** (Recommended) – The I/O Frame is the link between the input/output devices and the Core. The I/O Frame converts analog input signals to digital and passes them over the network to the Core. It also receives the processed digital audio signal from the Core, converts it to analog and sends it to the output devices. The I/O Frame houses one or more of the following:
 - » DataPort Card (Optional) – provides the audio, telemetry, and control interface between Q-Sys and QSC DataPort amplifiers and QSC loudspeakers.
 - » Mic/Line Input Card (Optional) – provides the interface between input devices (microphones, CD/DVD players, mixing consoles, etc.) and Q-Sys.
 - » Line Out Card (Optional) – provides the interface between third-party amplifiers, recording devices, etc. and Q-Sys.
 - » AES Card (Optional) – provides the interface between digital devices such as mixing consoles, recording devices, etc. and Q-Sys.
 - » Blank Card (Optional) – fills card slot when no card is needed.
- **Q-Sys Designer Software** (Required for designing, not required for operation) – Q-Sys Designer is the design software application that creates the design file that is loaded onto a Q-Sys Core. The design file contains all the virtual components, their connections and initial DSP settings. The design is initially created on a PC running Q-Sys Designer. When the design is complete, it is loaded on the Core and tested, and adjustments made. When all adjustments are finalized, the design is saved to the Core. Q-Sys Designer is not required to operate the Q-Sys system. Q-Sys Designer requires a Windows-based PC running Windows XP or Windows Vista.
- **Gigabit Ethernet Network** (Required) – The Q-Sys solution is designed around a high performance network implementation called Q-LAN that offers gigabit data rates, device and network redundancy, 32-bit floating point audio data transfers, end node discovery and low-latency support on local area network deployments. Additionally, Q-LAN offers long-haul IP streaming of audio over wide area network deployments. Accurate synchronization of end nodes and high-quality clock distribution are built-in to the solution using the IEEE-1588 Precision Time Protocol. All devices are connected to a managed 1000 Mbps Ethernet switch with appropriate QoS (Quality of Service) enabled suitable for a high-performance gigabit network. For switch recommendations see Page 12.
 - » 1 Gigabit Ethernet
 - » Latency – 0.66 ms across network
 - » 32-bit floating point format
 - » Redundancy (Optional)
 - » 1 to 16 channels per audio stream (managed by the Core)
 - » 1.65 to 3.31 Mb bandwidth per channel (dependent on the number of channels per stream)
- **Q-Sys DataPort Amplifier Backup Panel • DAB-801** (Optional) – Provides N+1 Amplifier redundancy
- **Q-Sys Touch Screen Controller** (Optional) – Provides End-User wall mounted control
 - » Power over Ethernet
 - » Touch-Panel Interface
 - » Design Control Pages in Q-Sys Designer
 - » Core is the server for the saved Control Pages
 - » Built-in Navigation and Security

Integrated System

Q-Sys is an integrated system designed to work with QSC DataPort amplifiers and QSC loudspeakers and other QSC products to provide system-level telemetry and control. Q-Sys can also be configured with generic amplifiers and/or generic loudspeakers, but there is a loss of functionality when not using QSC compatible hardware.

QSC DataPort Amplifiers

QSC DataPort amplifiers (PowerLight™, CX, PL2, DCA, and PL3) can be used in a Q-Sys system to communicate with the Q-Sys DataPort card and provides critical telemetry information and protection for both the amplifier and any QSC loudspeaker. Generic amplifiers can be used in a Q-Sys system by connecting the amplifier to a Line Out connection; however, there is no telemetry or control of either the amplifier or loudspeakers (even QSC loudspeakers) if Line Out cards are used.

Loudspeakers

Q-Sys, QSC DataPort amplifiers, and QSC loudspeakers work together to form an integrated system that provides specific loudspeaker processing (Intrinsic Correction™), telemetry, and protection for the loudspeaker. You can use generic loudspeakers in a Q-Sys system, however there is no Intrinsic Correction provided.

Redundancy

Q-Sys is capable of several redundant configurations to ensure a high level of overall system reliability.

- **2N Core redundancy** – Two Cores, primary and redundant, communicating with each other and peripherals to verify system health, and to synchronize control settings.
- **2N Network redundancy** – Two separate networks - In this configuration, you can have each Q-Sys Core and/or I/O Frame connected to both networks.
- **2N I/O redundancy** – For each I/O Frame, you can have a backup I/O Frame.
- **N+1 Amplifier redundancy** – One amplifier can back up from one to eight amplifiers with the Q-Sys DAB-801 (DataPort Amplifier Backup) panel.

Network Redundancy

Both the Core and the I/O Frame have two network ports, LAN A (primary), and LAN B (backup). The LAN B port on I/O Frame becomes active when it is configured in Q-Sys Designer as “Is Network Redundant” and connected. Because the I/O Frame is configured in the design file, the Core recognizes it as being on LAN B as well as LAN A. During operation, the Core routes audio and control signals to both ports, so if LAN A, or a part of LAN A fails, the Core switches to LAN B with no failover time.

Q-Sys Hardware Redundancy

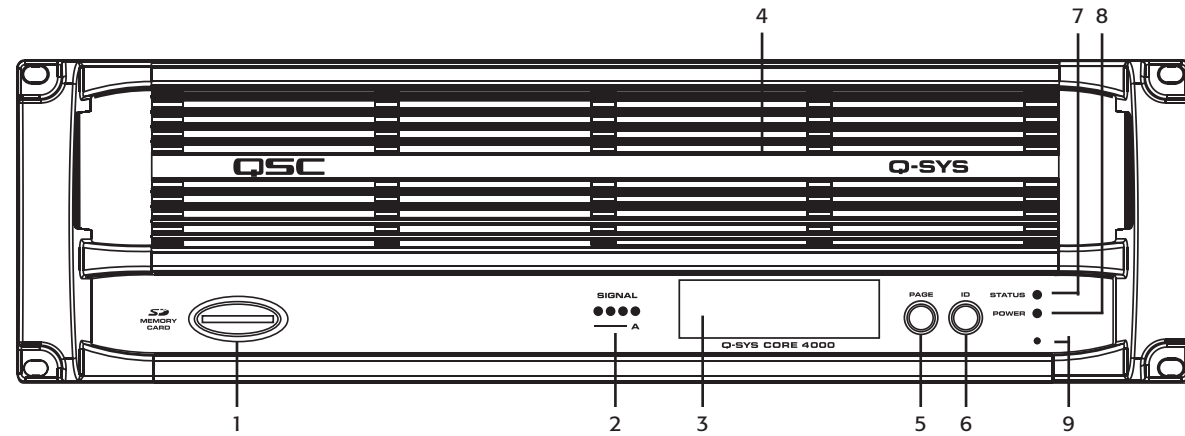
The Core and I/O Frame can have backups connected to the network. Both are identified in Q-Sys Designer as being redundant. The backup Core communicates with the primary to ensure it is up to date with any changes made on the primary, and to monitor the primary Core’s health. The Core monitors the I/O Frames, if there is a problem detected with the primary I/O Frame, the Core switches to the backup. The audio inputs and outputs of the primary and backup I/O Frames are wired in parallel, meaning that the audio source drives two inputs. The audio outputs of an offline I/O Frame are disconnected by relays, so only the active I/O Frame, in a redundant pair, drives the outputs.

Q-Sys™ Core 1000 | Core 3000 | Core 4000 Panel Features

The image below shows the Q-Sys Core 1000, Core 3000 and Core 4000 front panel features for a product having a sample configuration of one blank I/O Card.

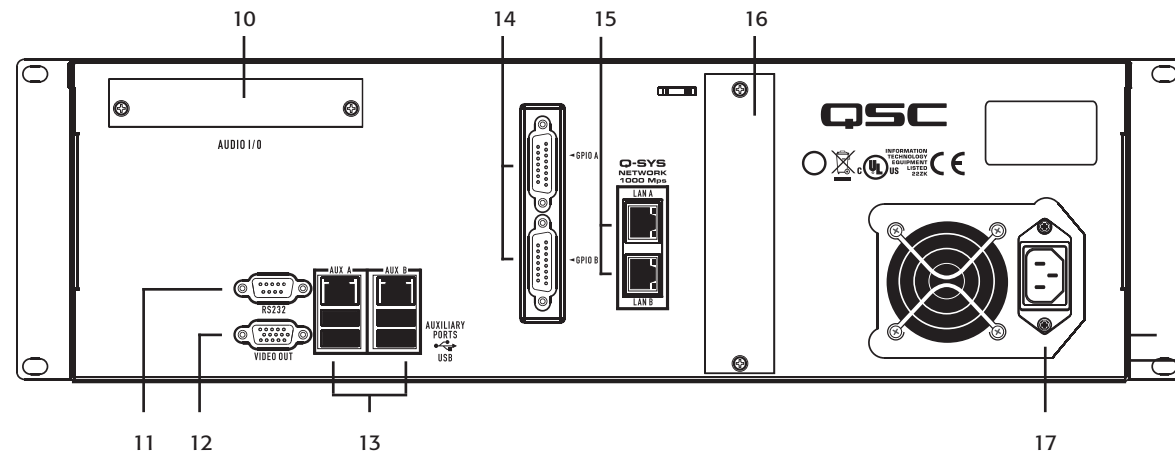
Note that the Q-Sys hardware products are configured at the QSC factory per the customer's order. At the time of order, the customer specifies the type of Q-Sys Audio I/O Card to be populated in rear panel audio I/O bay on the Q-Sys Core 1000, Core 3000 and Core 4000 products.

In addition, Q-Sys Audio I/O Card Kits are available for field installation by qualified service personnel.



Front Panel

1. SD Card Reader Socket
2. Audio I/O Signal and Card Present Indicators
3. 240 x 64 Monochrome Graphics LCD
4. Exhaust Vents
5. Next Page Navigation Button
6. Device ID Button (locates device in Q-Sys Designer GUI)
7. Status LED (reports network health, ID and firmware update status)
8. Power On LED
9. Clear Settings Paperclip Button (resets network properties)



Rear Panel

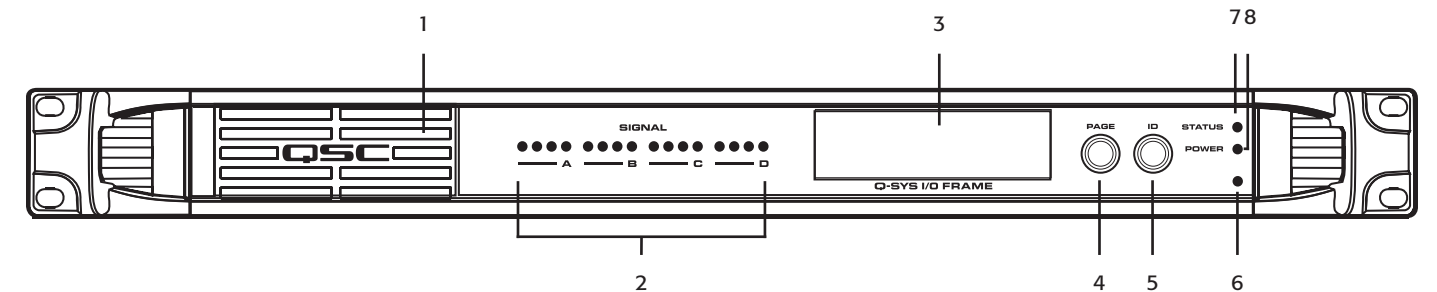
10. Audio I/O Bay – accepts optional Q-Sys audio I/O cards
11. RS-232 – DE-9 male connector for serial communications
12. Video Out – HD-15 female connector accepts diagnostic VGA monitor
13. Auxiliary Ports
 - AUX A Set – USB host connector x2, RJ45 10/100/1000 Mbps Ethernet
 - AUX B Set – USB host connector x2, RJ45 10/100/1000 Mbps Ethernet
14. GPIO A and GPIO B – female DA-15 connectors for Q-Sys control I/O
15. Q-Sys Network Port
 - LAN A – 1000 Mbps only, primary connection to Q-Sys gigabit network
 - LAN B – 1000 Mbps only, backup connection to Q-Sys gigabit network
16. Reserved for Future Use
17. AC Main Inlet – IEC male connector

Q-Sys™ I/O Frame Panel Features

The images below show the Q-Sys I/O Frame front and rear panel features for a product having a sample configuration of two Mic/ Line Input Cards and two DataPort I/O Cards.

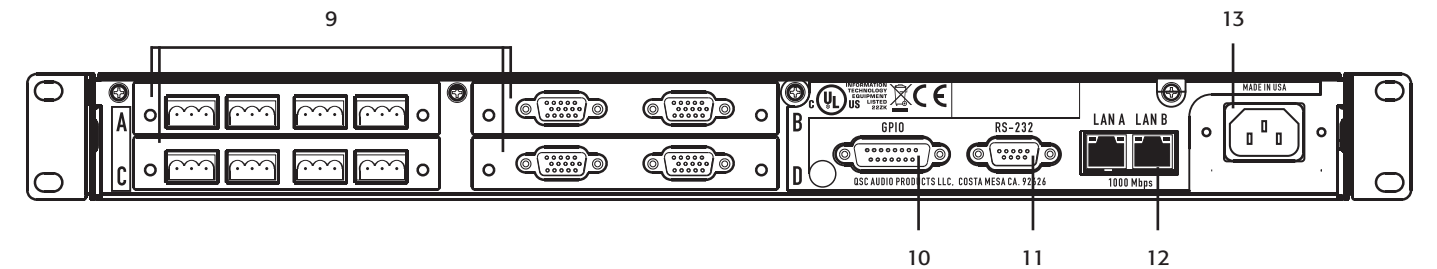
Note that the Q-Sys hardware products are configured at the QSC factory per the customer's order. At the time of order, the customer specifies the type of Q-Sys Audio I/O Card to be populated in each of the four rear panel audio I/O bays on the Q-Sys I/O Frame.

In addition, Q-Sys Audio I/O Card Kits are available for field installation by qualified service personnel.



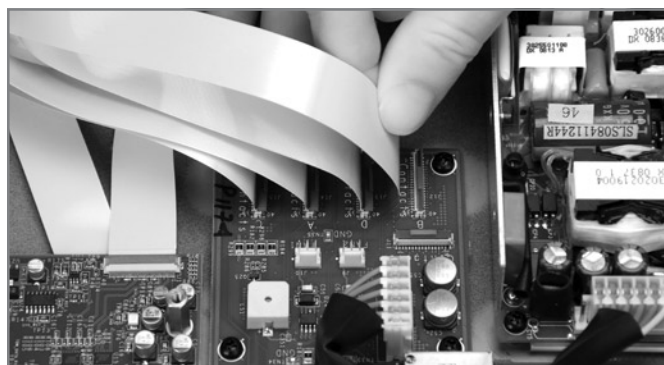
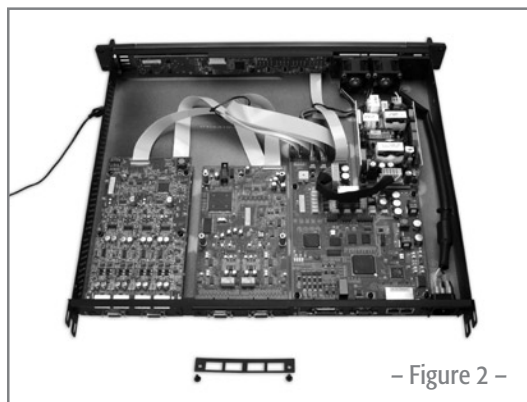
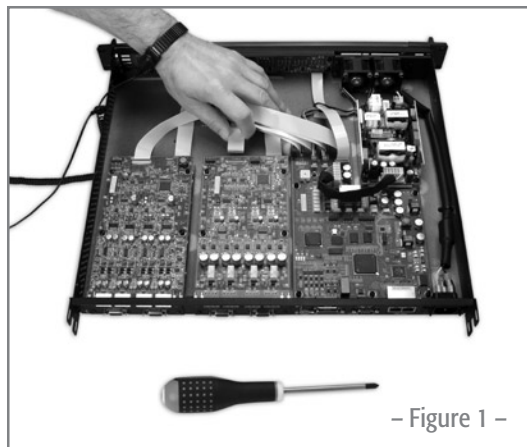
Front Panel

1. Fan Exhaust Vents
2. Audio I/O Signal and Card Present Indicators
3. 240 x 64 Monochrome Graphics LCD
4. Next Page Navigation Button
5. Device ID Button (locates device in GUI)
6. Reset Network Properties Paperclip Button
7. Status LED (reports network health, ID and firmware update status)
8. Power On LED



Rear Panel

9. Configurable Audio I/O Bays
10. GPIO Interface (control I/O) (see Page 12)
11. RS-232 Serial Control Interface
12. Dual Gigabit Network Interfaces for Q-Sys LANs
13. AC Main Inlet – IEC male connector



Q-Sys™ I/O Card Install/Uninstall Procedure

Card installation should only be done by a trained and qualified technician.

Tools needed: Phillips screwdriver | ESD wrist strap (ground strap)

1. An ESD wrist strap must be worn throughout the install/uninstall procedure. The end of the wrist strap should be connected to an unpainted surface on the product chassis such as the ground stud.
2. Disconnect the AC mains power cord.
3. Remove the sheet metal screws securing the lid to the Q-Sys I/O Frame chassis. Remove the lid by lifting it approximately 1" at the rear of the chassis and sliding it back from the front.
4. Locate the Q-Sys I/O Card to be replaced. Remove the ribbon cable from the card by gently lifting up on the plastic ribbon cable locking tab on the connector at the edge of the card. Ensure that the cable edge does not get damaged. (Figure 1)
5. Remove the two screws securing the Q-Sys I/O Card mounting bracket to the rear of the chassis. Remove the bracket. (Figure 2) Note: in order to remove an I/O Card in position C or D, first uninstall the appropriate card above in position A or B.
6. For Q-Sys I/O Cards in positions A or B, remove the four Phillips head screws securing the card and remove the card. For cards in positions C or D, remove the card above, then remove the four hex standoffs and remove the card to be replaced.
7. Install the new Q-Sys I/O Card by reversing steps 4 through 6. Be sure to align and secure the rear panel mounting bracket before the hex standoffs or card-securing screws are completely tightened.
8. Reattach the ribbon cable to the Q-Sys I/O Card. Make sure that the edge of the ribbon cable is properly aligned with the connector mating surface. The blue band on the ribbon cable should be facing upward. Engage the ribbon cable locking tab on the connector by gently pressing down on the locking tab.
9. If replacing a blank Q-Sys I/O Card with an audio I/O Card, the ribbon cable in step 8 must also be connected to the Q-Sys I/O Frame main circuit board. To do this, locate the connector corresponding to the appropriate I/O Card position (connector labels on the main board match the I/O Card positions printed on the product rear panel). Insert the ribbon cable into the main board connector by first lifting the plastic ribbon cable locking tab on the connector. Then align the ribbon cable with the connector contacts and insert the edge of the ribbon cable into the connector slot. (Figure 3) The blue band on the ribbon cable should face the system power supply. Make sure the ribbon cable locking tab on the connector is engaged by holding the ribbon cable in place and gently pressing down on both sides of the locking tab simultaneously until the tab locks in place. (Figure 4)
10. Replace the Q-Sys I/O Frame lid and secure the sheet metal screws.

– Figure 3 –

– Figure 4 –

Qualified Ethernet Switches

Q-Sys uses layer 3 (DSCP) QoS. This type of QoS is deployed differently on different networks and therefore requires user intervention to set up properly. Because of this complexity, unmanaged switches are not acceptable for Q-Sys. For more details about network setup, refer to the Help File in Q-Sys Designer. For more details about the following switches, refer to the manufacturers' website.

The following switches have been tested and qualify for use with a Q-Sys™ network.

Linksys®

- SLM2008
- SLM2024
- SRW2008
- SRW2008P/MP
- SRW2024

HP® ProCurve™

- 3500 Series
- 3500ly-24G-PWR
- 3500ly-48G-PWR

Cisco®

- Catalyst 3560E Series
- Catalyst 3560E-24TD
- Catalyst 3560E-48TD
- Catalyst 3560E-12D

Q-Sys™ GPIO Signal Specifications

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

Specifications, Relay Pins

- Maximum Voltage, relative to Ground: 30 V
- Maximum Current through Relay: 1 Amp

Specifications, Power Pins

- Output Voltage: 11V min, 13V max
- Maximum Output Current: 400 mA

Specifications, Normal 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 Input, High: 2.4 V minimum, 3.3 V maximum

Specifications, 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 Input, High: 2.4 V minimum, 3.3 V maximum
- Digital Output Impedance: 1k 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

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

Specifications

System Hardware	Core 1000 Core 3000 Core 4000	I/O Frame
Description	System processor and control engine	System audio input and output device
Front Panel Controls	LCD page forward momentary switch Unit ID button momentary switch Clear settings momentary switch	LCD page forward momentary switch Unit ID button momentary switch Clear settings momentary switch
Front Panel Card Receptacle	SD (secure digital) standard size media	–
Front Panel Indicators	Power On: Blue LED Device Status: Tri-color LED Audio Signal: Five tri-color LEDs 240 x 64 monochrome LCD graphics display	Power On: Blue LED Device Status: Tri-color LED Audio Signal: Five tri-color LEDs/per I/O card slot 240 x 64 monochrome LCD graphics display
Rear Panel Connectors	RS-232: DE-9 (male 9-pin D shell connector) Video Out: HD-15 (female 15-pin D shell connector) Aux ports AUX A set: USB host x2, RJ45 10/100/1000 MBps Aux ports AUX B set: USB host x2, RJ45 10/100/1000 MBps GPIO A: DA-15 (female 15-pin D shell connector) GPIO B: DA-15 (female 15-pin D shell connector) Q-Sys Network LAN A: RJ45 1000 MBps only Q-Sys Network LAN B: RJ45 1000 MBps only	RS-232: DE-9 (male 9-pin D shell connector) GPIO A: DA-15 (female 15-pin D shell connector) Q-Sys Network LAN A: RJ45 1000 MBps only Q-Sys Network LAN B: RJ45 1000 MBps only
Capacity		
Network Audio Channels In	64	128
Network Audio Channels Out	64	128
Maximum Channels Out ²	1024	2048
End Node Capacity	128	256
Processing (Channels of 32-bit audio)	128	256
I/O Capacity	Up to 4 channels. Requires purchase of I/O cards	Up to 16 channels ² . Requires purchase of I/O cards.
Line Voltage Requirements	100 VAC – 240 VAC, 50 – 60 Hz	100 VAC – 240 VAC, 50 – 60 Hz
Dimensions (HWD)	5.25" x 19" x 15" (133.35 mm x 482.6 mm x 381 mm)	1.75" x 19" x 15" (44.45 mm x 482.6 mm x 381 mm)
Accessories Included	6 ft UL/CSA/IEC line cord • User Manual • Software CD • Optional audio I/O ship kit	6 ft UL/CSA/IEC line cord • User Manual • Optional audio I/O ship kit

1) Up to 512 network audio channels when sending 8 or more channels per network audio stream.

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.

Specifications subject to change without notice.

I/O Cards	Mic/Line Input CIML4	High-Performance Mic/Line Input CIML4-HP	Line Output COL4	DataPort Output CODP4	AES-3 Input/Output CAES4
Description	Four channels of microphone / line-level analog audio input with 48V phantom power	Four channels of microphone / line-level analog audio input with 48V phantom power and high performance pre-amplifiers and A/D converters	Four channels of balanced, line-level analog output	Four audio output channels (2 DataPorts) for connection to DataPort equipped QSC amplifiers	Four input and four output channels of AES-3 digital audio
Performance					
Dynamic Range Unweighted	> 105 dB	> 112 dB	> 112 dB	> 114 dB	–
Dynamic Range A-weighted	> 108 dB	> 115 dB	> 115 dB	> 117 dB	–
Distortion 20 Hz – 20 kHz +4 dBu (nominal input)	< 0.009% THD+N	< 0.004% THD+N	–	–	–
Distortion 20 Hz – 20 kHz 2 dB below clip (max)	< 0.08% THD+N	< 0.06% THD+N	< 0.004% THD+N	< 0.004% THD+N	–
Crosstalk 20 Hz – 20 kHz					
Inter-channel (max)	> 100 dB	> 110 dB	> 100 dB	> 95 dB	–
Inter-channel (typ)	> 110 dB	> 110 dB	> 110 dB	> 100 dB	–
Intra-channel (max)	> 100 dB	> 110 dB	> 100 dB	> 100 dB	–
Intra-channel (typ)	> 110 dB	> 110 dB	> 110 dB	> 110 dB	–
Frequency Response 20 Hz – 20 kHz (max)	± 0.5 dB	± 0.5 dB	± 0.5 dB	± 0.5 dB	–
Frequency Response 20 Hz – 20 kHz (typ)	± 0.2 dB	± 0.2 dB	± 0.2 dB	± 0.2 dB	± 0.2 dB
Input Impedance					
Balanced (nominal)	10 k ohms	10 k ohms	–	–	–
Unbalanced (nominal)	10 k ohms	10 k ohms	–	–	–
Common Mode Rejection 20 Hz – 20 kHz (max)	> 45 dB	> 45 dB	–	–	–
Common Mode Rejection 20 Hz – 20 kHz (typ)	> 50 dB	> 50 dB	–	–	–
Max Input Level	0.123, 2.25, 8.70, 17.35 Vrms -16, 10, 21, 27 dBu -18.2, 7.04, 18.8, 24.78 dBv (4 selections)	1.23 to 17.35 Vrms -56 to 27 dBu -58.2 to 24.8 dBv (continuously variable)	–	–	–
Mute	Infinite attenuation (via digital mute)	Infinite attenuation (via digital mute)	Infinite attenuation (via electro-mechanical relays)	Infinite attenuation (via electro-mechanical relays)	Infinite attenuation (via digital mute)
Audio Converters					
Analog to Digital Conversion (ADCs)	24-bit delta-sigma at 48 or 96 kHz sample rate	24-bit delta-sigma at 48 or 96 kHz sample rate	–	–	–
Digital to Analog Conversion (DACs)	–	–	24-bit delta-sigma at 48 or 96 kHz sample rate	24-bit delta-sigma at 48 or 96 kHz sample rate	–
Group Delay	< 13 FS (≈ 271 μs) at 48 kHz	< 13 FS (≈ 271 μs) at 48 kHz	< 10 FS (≈ 196 μs) at 48 kHz	< 13 FS (≈ 271 μs) at 48 kHz	< 37 FS (≈ 760 μs) at 48 kHz*
Connectors	Four 3-terminal Euro-style detachable terminal blocks	Four 3-terminal Euro-style detachable terminal blocks	Four 3-terminal Euro-style detachable terminal blocks	Two 15-pin HD15 connectors	Four 3-terminal Euro-style detachable terminal blocks
User-configurable Options (software enabled)					
Phantom Power	+48 V phantom power (meets IEC 1938 [1996] spec)	+48 V phantom power (meets IEC 1938 [1996] spec)	–	–	–
Output Trim					
Vrms (max)	–	–	8.7V	–	–
dBu (max)	–	–	21 dBu	–	–
dBv (max)	–	–	18.8 dBv	–	–
Amplifier Standby	–	–	–	Set or clear amplifier in standby mode	–
Mute	–	–	–	Set or clear individual channel mutes	–
Enable Meters	–	–	–	Enable data collection of meters for each channel	–
Audio Output Levels	–	–	–	Adjust individual audio channel levels	–
Amplifier Model Support	–	–	–	CX, PowerLight™ 3 Series, DCA, and legacy V1 models	–

*Group Delay assumes that the sample rate converter is enabled.



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