

Q-SYS™

A comprehensive integrated solution that will change your thinking about audio system design.



Rethink everything... We did.



Q-SYS™

Q-Sys™ is a complete, integrated platform for audio system routing, control, processing, monitoring, and configuration. Built on state-of-the-art technology, Q-Sys is optimized for the rigorous demands of large-scale applications, efficiently and reliably addressing every aspect of a facility's audio needs. From inputs to loudspeakers, Q-Sys maintains the top-notch sound quality for which QSC is renowned while providing user-friendly management of complex audio requirements. Wherever audio systems are installed, Q-Sys is the ideal solution for powerful system-wide control.

Components

The primary elements of a Q-Sys system are the Core, the I/O Frame, Q-Sys Designer software, and the Q-LAN network. The Core is the brain of the system; performing all audio routing, processing, and control functions. I/O Frames provide the interfacing capability that gets audio and other data into and out of the system. Q-Sys Designer provides the interface for system design, configuration, and control. And Q-LAN connects the system into an integrated whole. Additional application-specific functionality may be added with

optional hardware components such as the Q-Sys Page Station and the TSC-8 Touch Screen Controller.

Q-Sys™ Core

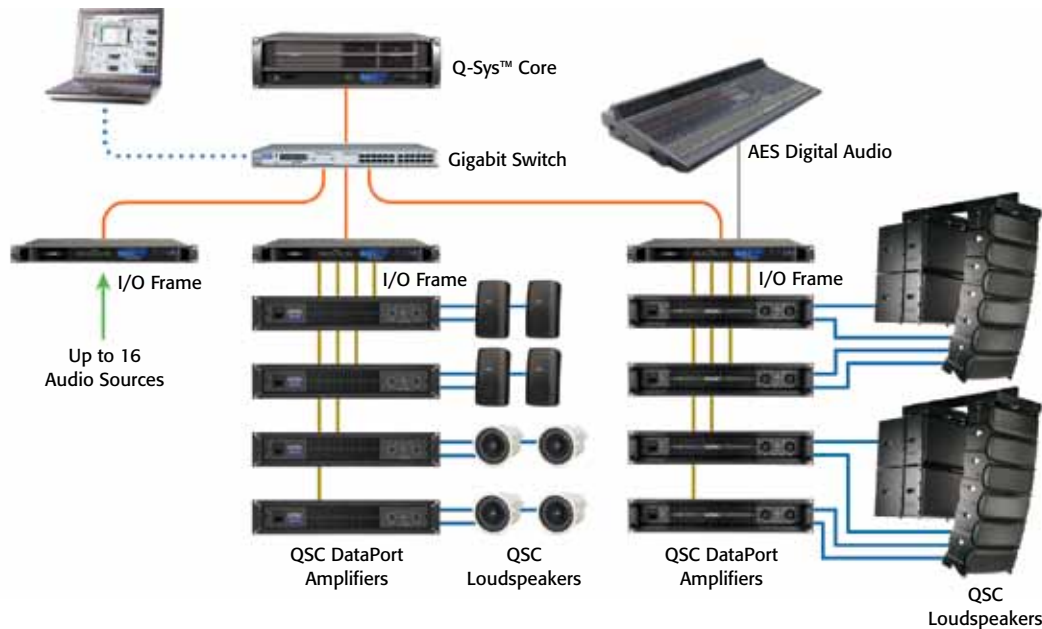
With a centralized processing architecture based on mainstream server and workstation technology, the Q-Sys Core has several distinct advantages over competing systems. Because the Core isn't locked into a narrow, proprietary platform, Q-Sys hardware and software will always be able to keep pace with the latest developments in the overall IT industry. And our centralized approach to



I/O Frames



Core



processing allows the system's full power to be flexibly allocated as needed, without the capacity chokepoints inherent in distributed processing. That vastly simplifies the job of audio system design, allowing any input to be routed to any output without convoluted, variable-latency signal paths. And it also keeps system redundancy very straightforward.

Centralized architecture also enables more efficient networking. Because the Core handles all control and monitoring, fewer control connections are needed for remote devices. Less traffic takes up less bandwidth, leaving greater overall system capacity.

The Q-Sys Core is available in three sizes tailored to the varying requirements of different facilities: Core 1000, Core 3000, and Core 4000.

	Maximum Input Channels	Maximum Output Channels
Core 1000	64	64
Core 3000	128	128
Core 4000	128-512*	128-512*

* Up to 512 network audio channels when an average of 8 or more channels per network audio stream are used.

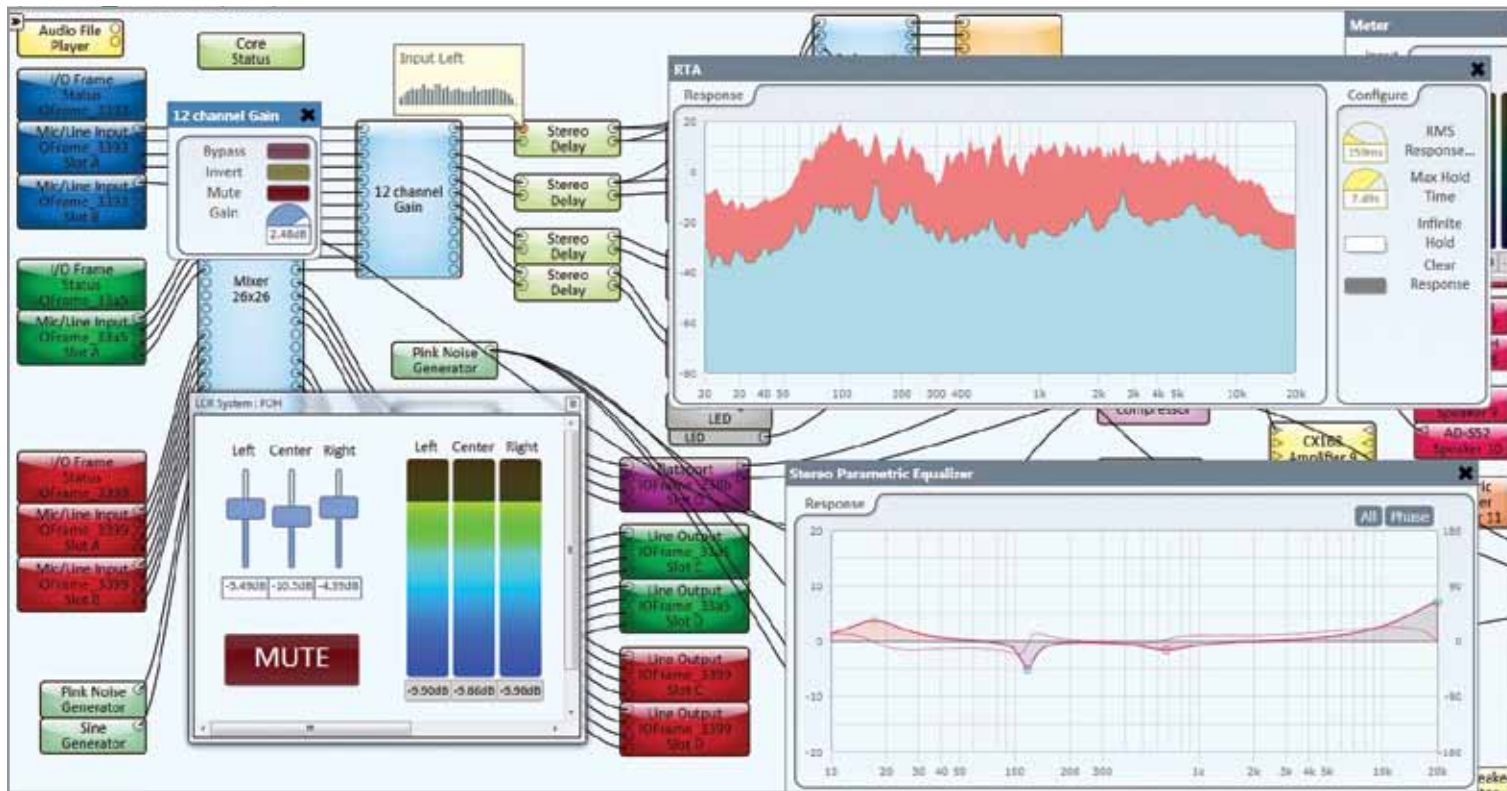
I/O Frame

Physically located near audio sources and destinations, I/O Frames provide the points of connection used to interface Q-Sys with other components of the audio system, such as mixers and power amplifiers. Each I/O Frame enables up to 16 channels of input and/or output by housing up to four of the following I/O cards, which may be mixed and matched in a single unit:

- **Mic/Line Input card** — Four channels of switchable mic/line-level analog audio input with 48V phantom power (available with standard or premium pre-amps and A/D converters).
- **Line Output card** — Four channels of balanced, line-level analog output.
- **DataPort Output card** — Four audio output channels (2 DataPorts) for connection to DataPort equipped QSC amplifiers.
- **AES Input/Output card** — Four input and four output channels of AES-3 digital audio.
- **CobraNet Input/Output card** — Up to 32 input and 32 output channels available when used in a core, 16 x 16 in an I/O Frame.

Additional cards are under development; check the QSC website for the latest information.

Q-Sys™ employs a 64-bit processing engine, low latency 32-bit floating point distribution, and high performance A/D and D/A converters to provide audiophile quality.



Screenshot: All system elements are brought under one intuitive GUI in Q-Sys™ Designer.

Q-Sys™ Designer Software

Your audio system may be complex, but designing and controlling it should be simple. That's why we made the Q-Sys Designer environment so intuitive and easy to use, giving you powerful tools without clutter or complication. Drop in components from easy-to-access inventories, click to set properties, and drag to connect. As you build your design graphically in the Schematic window, Q-Sys automatically handles all the network configuration details behind the scenes. Within minutes, you'll be able to create not only a clear overall picture of your system but a fully-operational configuration that's ready to use on the Q-Sys Core.

With Q-Sys Designer's Design and Emulate modes, you can work on system designs

even when you're not connected to a Q-Sys Core. As you work, the Design Inspector automatically checks your current configuration, looking for orphaned controls or unterminated signals that could cause potential issues. Once your Q-Sys Designer configuration is complete you can connect to a Core — locally or via the Internet — and deploy the design in Run mode.

Unlike many competing systems, designs are compiled and ready to run in just seconds. With no barrier to trying different options, you can rapidly refine your designs for the best results while still saving time during system set-up and commissioning. And with Designer's User Control Interface tools, you'll also be able to quickly create custom interfaces allowing any or all aspects of the system to be operated from any PC on the network.

While Q-Sys Designer's interface is straightforward, the system's capabilities are deep and powerful. A complete range of DSP processing covers not only standards like EQ, dynamics, and delays, but also a library of ready-made loudspeaker-specific optimizations. You can mix and route any signal, insert meters anywhere, and monitor amplifier performance. You can measure and troubleshoot using built-in tools such as a test probe that provides an RTA display of the signal. And with a measurement microphone you can even perform on-site acoustical measurements using FFT-based real-time analysis and impulse response tools. In short, Q-Sys Designer provides everything you need to configure, operate, and maintain your audio system at the highest level of performance.

Q-Sys™ Capabilities

More than just the sum of its parts, Q-Sys is a complete solution that brings together all the capabilities needed to enable unprecedented control of your audio system. Our DSP engine gives you unrivalled processing breadth and depth. Flexible and powerful controllers give you a multitude of ways to tailor the system to your specific needs. Redundancy-friendly design makes it easy to protect critical functions against downtime. And built-in integration with QSC amplifiers and loudspeakers lets you control and monitor every aspect of system performance.

Q-Sys™ Processing

Q-Sys is designed from the ground up to bring nearly unlimited DSP resources to bear for processing. Even in the smallest Core (Core 1000), 64-bit internal processing ensures high performance and incredible headroom. Most processing functions are capable of providing up to 256 channels simultaneously, and mixers can provide up to 512 input and output channels. This DSP power can be applied across a huge array of functions covering every aspect of enhancement, monitoring, testing, and control.

Crossovers

- Up to 6-way
- Butterworth, Linkwitz-Riley, Bessel-Thompson, and Chebyshev Topologies

Delay

- Up to 512 taps of up to 60 sec. each

Dynamics

- Ambient Noise Compensator
- Automatic Gain Control
- Compressor
- Expander
- Noise Gate
- Peak Limiter
- Priority Ducker

Meters

- RMS/Peak Bar Meter
- Signal Presence Meter

Filters & Equalizers

- All-Pass Filter
- Band-Pass Filter
- High-Pass Filter
- Low-Pass Filter
- Notch Filter
- Dual-Shelf Equalizer
- Graphic Equalizer
- High-Shelf Equalizer
- Low-Shelf Equalizer
- Parametric Equalizer
- FIR Custom Filter
- FIR High-Pass Filter
- FIR Low-Pass Filter

Mixers & Routers

- Gain-Sharing Automatic Mixer
- Gated Automatic Mixer
- Matrix Mixer
- Room Combining Mixer
- Router
- Delay Matrix

Test & Measurement

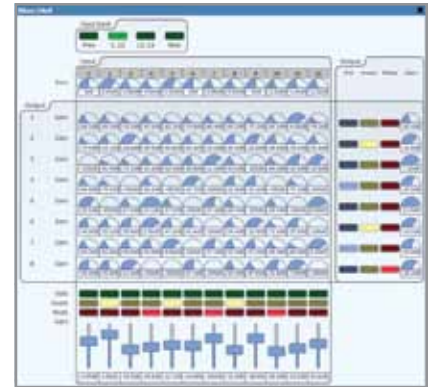
- DC Generator
- Pink Noise Generator
- White Noise Generator
- Sine Wave Generator
- Signal Injector (insert signal anywhere in the audio path)
- Signal Probe (insert probe anywhere in the audio path)
- Real Time Analyzer
- Responsalyzer 2-channel FFT measurement (Magnitude, Phase, Impulse Response, and Real Time Analysis)

Other

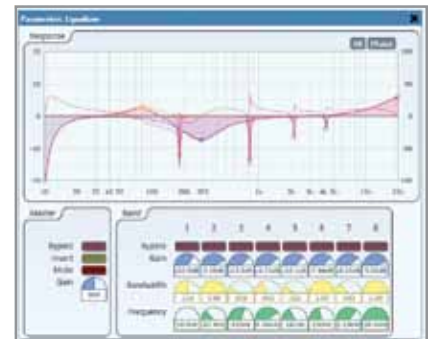
- Amplifier Load Monitoring
- Audio File Player for .wav and .mp3 files (direct from Core)
- Loudspeaker Supervision
- Emergency System Mute



Peak Limiter



24 x 8 Mixer



Parametric Equalizer



Auto Gain Control



Real Time Analyzer

TSC-8 Touch Screen Controller

Whether you're recalling a few simple snapshots or using faders, knobs, and buttons to manipulate multiple parameters, touch screens provide an ideal user interface for system control. With capacitive touch technology and a bright 800 x 600 full-color LCD, the dual-port TSC-8 makes the perfect networked controller, not only for Q-Sys parameters and functions but also for managing a wide variety of equipment via the Q-Sys Core's General Purpose I/O (GPIO) and TCP/IP instruction sets. Multiple TSC-8s, each using a different interface created in Q-Sys Designer, may be attached to the network simultaneously, with each unit's display updated automatically as changes are made with other units.



TSC-8 Touchscreen Controller

Q-LAN

Q-LAN is a blazing-fast Gigabit Ethernet implementation that delivers audio from any end-node to the Q-Sys Core in less than 1/3 millisecond. Q-LAN's speed and capacity allow Q-Sys to deliver overall system latency — including core processing and both A/D and D/A conversions — of less than 2.5 milliseconds from any input to any output with up to seven network switch hops.

In addition to low-latency distribution, Q-LAN supports much higher channel capacity than competing systems — up to 512 bidirectional channels — and greatly simplifies implementation of full system redundancy. Q-Sys also supports long-haul IP streaming of audio over Wide Area Networks (WAN) as well as auto-discovery and configuration of end nodes.

Since specialty semi-conductors and non-standard hardware can lead to dependence on obsolete technologies, Q-LAN is based instead on standards and protocols from the IT industry, where a huge market guarantees ongoing support and development. Q-LAN uses widely available off-the-shelf Gigabit switches. And Q-LAN's use of Layer 3 (TCP/IP) protocol allows transmission of Q-Sys audio with other IT traffic, eliminating the need for facilities to run a dedicated audio network. The result is a system that takes maximum advantage of the capabilities of standards-based IP networking, achieving outstanding performance while maximizing network compatibility.

While Q-LAN is the ideal network for a fully-integrated Q-Sys environment, QSC also offers a CobraNet card for interfacing with legacy systems. At the same time, the Q-Sys architecture is designed to allow future compatibility with alternative protocols such as AVB if and when they achieve widespread adoption.



Page Station

Q-Sys™ Page Station

Enabling live paging to selected zones, the Q-Sys Page Station extends Q-Sys functionality in transportation, hospitality, medical, and other similar applications. Available with either gooseneck or handheld microphone (push to talk), Q-Sys Page Station is a dual-port network device that is fully configurable from Q-Sys Designer. A front panel user interface includes a capacitive touchpad that offers visible feedback and audible cues. Paging status, alerts, and operational details are also reported via illuminated status indicators and a built-in LCD display.



Q-Sys™ Control

In addition to powerful processing, Q-Sys offers extensive system control capabilities that can be as simple or sophisticated as the application requires. Nearly every audio processing parameter can be a command source or destination, as can switch closures or potentiometers via on-board GPIO. Control-specific operators like Boolean Logic or Arithmetic functions can be applied to enhance management capabilities based on operator or system control input. And snapshots of any or all functions can be created and recalled using the Snapshot tool.

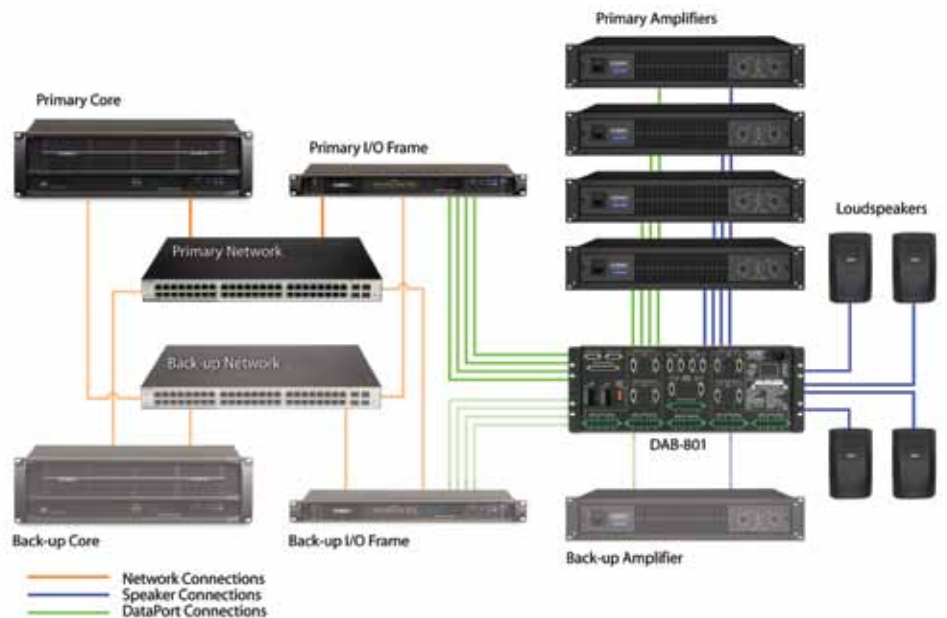
Q-Sys also includes several additional tools addressing specific aspects of system control:

- **User Control Interface tool** — Q-Sys Designer's UCI tool lets you create custom control panels that may be viewed and operated by an end-user from any computer on the network, or Wi-Fi connected iPad or iPhone. Allowing a unique look and feel, these controls may be built from scratch using the provided templates, by pulling in elements directly from the system schematic.



Custom control panel served on an iPhone.

- **Administration Interface** — Designed for configuration and maintenance of a deployed Q-Sys system, the powerful Administration Interface covers areas such as setting priority modes and levels, creating and scheduling commands, defining access levels for different users, managing PA zones, scheduling playback of core-hosted audio files, and logging of events. Every aspect of efficient system-wide operation has been considered and addressed.



Q-Sys™ Redundancy

While QSC products are renowned for their reliability, redundancy is the best insurance against failure for mission-critical components. Q-Sys facilitates multiple levels of redundancy.

- **Network redundancy** may be implemented by simply adding additional network switches and cabling. In the event of a network failure, the Q-Sys components switch over instantly to the back-up network.
- **Core redundancy** allows a second Core to be connected to the network. Should the primary Core fail, the secondary Core takes over.

- **I/O Frame redundancy** gives the designer the option of adding redundant I/O Frames for high-priority areas.
- **Amplifier redundancy** is made possible with the QSC DAB-801 (DataPort Amplifier Backup panel), which configures five 2-channel QSC DataPort amplifiers so that the fifth amp automatically kicks in if a problem is detected with any of the other four (4 + 1 redundancy). A second DAB-801 may be added to implement 8 + 1 redundancy.





Q-Sys™ Integration

Q-Sys provides enormous advantages regardless of an audio system's amplifiers or loudspeakers. But the powerful potential of Q-Sys is most fully realized when the system includes QSC loudspeakers and QSC DataPort amplifiers.

- **Amplifier integration** – When connected to QSC's PowerLight™, PL2, PL3, CX, or DCA amplifiers, the Q-Sys DataPort output card enables complete end-to-end system-level telemetry and supervision. Amplifier status, channel status, channel metering, and channel monitoring are all available for display via any Q-Sys control panel.
- **Loudspeaker integration** – Using QSC loudspeakers provides the ultimate in control and reliability by enabling functions such as driver excursion limiting and speaker fault detection. And it allows Q-Sys



Integration of QSC DataPort-equipped amplifiers is elegantly simple. Amplifier parameters may be monitored and controlled in real-time over the network using the Q-Sys™ user interface.

to maximize the sonic performance of your system. For example, when a QSC line array powered by DataPort amplifiers is connected to the Q-Sys DataPort card, you need only specify the number of cabinets and the coverage angle of the array. Q-Sys handles the rest, automatically applying the proper Intrinsic Correction™ tuning to optimize the array's acoustic performance.

Q-Sys™ is the Solution

Q-Sys is a powerful, complete platform for audio routing, processing, and control. Far more than a collection of individual parts, Q-Sys is designed from the outset to work as an integrated whole. With a single supplier responsible for all hardware and software, deployment is smooth and performance is optimized for fast, flawless operation. And like all QSC products, Q-Sys is backed by the unrivaled support that has earned us our rock-solid reputation. Scalable, flexible, and field-proven, Q-Sys is ideal for a huge variety of applications. Whatever sort of facility you are designing – theme park or attraction, airport or transportation hub, hotel, casino, convention center, sports facility, church, corporate or educational campus, legislative or judicial chamber, or theater – Q-Sys is the integrated audio solution for you.

QSC™

Passionate About Sound

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