QSC

Application **Guide**

Q-SYS Core 110f VoIP Conference System

AET Application Engineering Team

Q-SYS DESIGNER COMES WITH SAMPLE DESIGNS.

Q-SYS Designer 5.0 and higher software automatically installs sample designs. This design is for a conference room utilizing a Core 110f, with eight tabletop mic inputs, two sets of stereo audio inputs, a USB I/O for using a PC as a soft codec for web conferencing, two zones of ceiling loudspeakers, and a Softphone VoIP (Voice over IP) connection for voice teleconferencing.

This design depicts a thorough set of best practices for developing a Q-SYS system. Use the design as-is, if it fits your needs, or alter it as needed. Or use it as a learning piece to see how Q-SYS components are configured and linked together in a design.

Where to find it

In most cases the Q-SYS Designer Installer program will copy it into the folder **//Users/Public Documents/qsc audio/**, but if you have used another version of Designer before and have a different folder for your Q-SYS designs, you might find the file there. Select **File > Open**, or press **Ctrl + O**, and select the design file **Conf-System-VoIP-v[x.x].qsys**. The design will look largely like the one in Figure 1. This design could be for a conference room like the one shown in Figure 2.
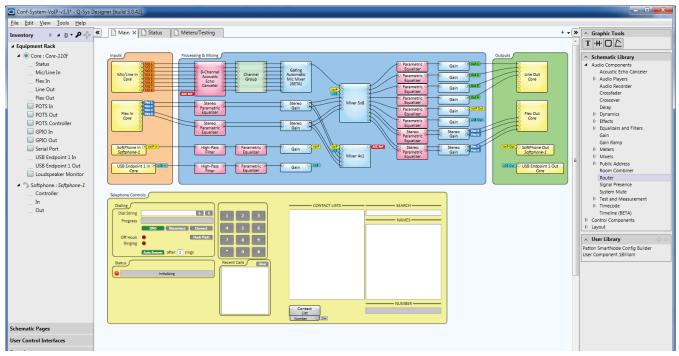

Figure 1.

Ins and Outs

The conference room media system design is composed of these inputs and outputs:

- 8 tabletop mics
- 2 pairs of stereo flex ins from stereo media player and Blu-ray player
- 1 VoIP connection (telephone over Ethernet)
- 1 USB speakerphone in/out (through PC)
- 4 line outs (to SPA-60 four-channel amplifier, powering four QSC AC-C6T ceiling loudspeakers)
- 2 pairs stereo flex outs

The Core 110f uses pluggable Euro-style connectors for signal inputs and outputs, which are balanced. The connectors are color coded to help installation:

- Mic/Line Inputs: orange
- Flex Inputs/Outputs: blue
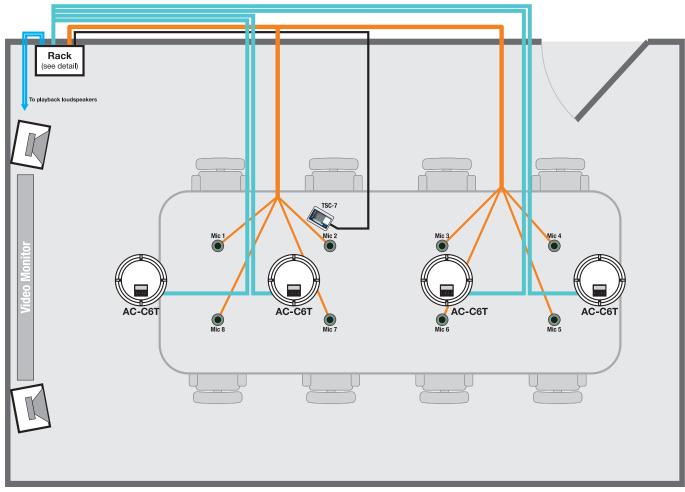- Line Outputs: green
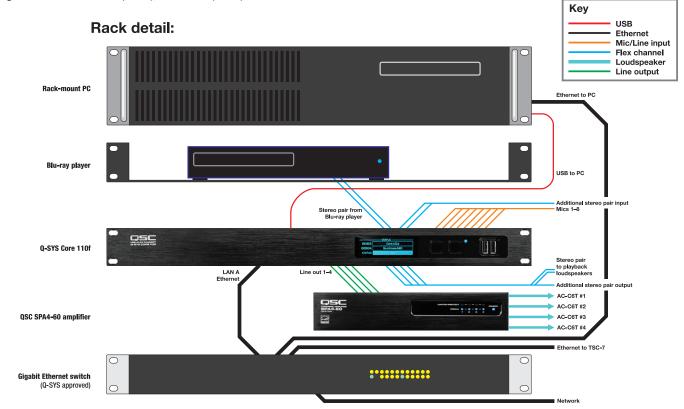- GPIO Inputs and Outputs: black

Figure 2. Conference room (above); Rack detail (below)

Video Monitor

Rack
(see detail)

To playback loudspeakers

TSC-7

Mic 1　Mic 2　Mic 3　Mic 4

AC-C6T　AC-C6T　AC-C6T　AC-C6T

Mic 8　Mic 7　Mic 6　Mic 5

Rack detail:

Key
──	USB
──	Ethernet
──	Mic/Line input
──	Flex channel
──	Loudspeaker
──	Line output

Rack-mount PC

Ethernet to PC

Blu-ray player

USB to PC

Additional stereo pair input
Mics 1–8

Stereo pair from
Blu-ray player

Q-SYS Core 110f

DEVICE: Core-c32a
DESIGN: Boardroom-6405
STATUS

Stereo pair
to playback
loudspeakers

LAN A
Ethernet

Line out 1–4

Additional stereo pair output

QSC SPA4-60 amplifier

AC-C6T #1
AC-C6T #2
AC-C6T #3
AC-C6T #4

Ethernet to TSC-7

Gigabit Ethernet switch
(Q-SYS approved)

Network

Connecting the Mic/Line inputs

Each Mic/Line input uses three pins, for + (non-inverting), - (inverting), and ground or shield. Provided with the Core 110f are eight orange three-pin plugs—one for each input. Connect them to the Core 110f as depicted in Figure 3. In this design, each input is wired to an individual tabletop mic.
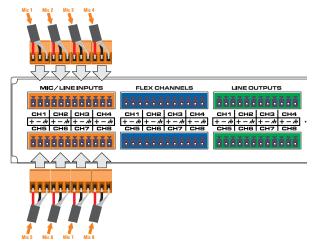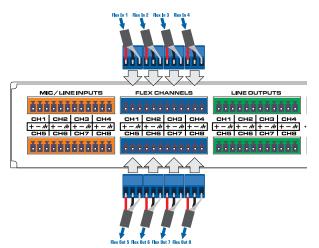

Figure 3. Connecting the Mic/Line inputs.

Connecting the Flex input/outputs

The Flex channels are the first of their kind in DSP products: each three-pin connection can be used as an input or as an output, as defined by its software configuration in the Q-SYS design.

The Flex connectors are blue, and there is one per channel. Connect them as depicted in Figure 4.

In this design, Flex channels 1 through 4 are configured as inputs, and 5 through 8 are outputs. The inputs are stereo pairs from media playback sources, such as DVD or Blu-ray players. The outputs send signal to pairs of stereo loudspeakers for media playback.

Any Flex channel can be easily reconfigured into an input or an output by changing its settings in Q-SYS Designer.

Figure 4. Connecting the Flex inputs and outputs.

Connecting the Line outputs

Like the others, each line output uses three pins, for + (non-inverting), - (inverting), and ground or shield. Provided with the Core 110f are eight green three-pin plugs—one for each output. Connect them to the Core 110 f as depicted in Figure 5.

This design uses four line outputs, and in a conference room like the one depicted, they might typically provide audio signal to a power amplifier that drives the ceiling loudspeakers.
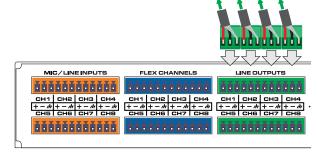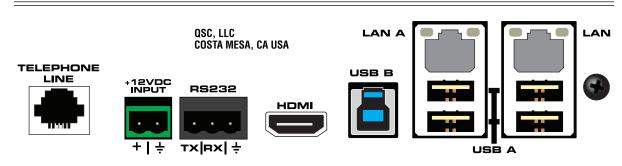

Figure 5. Connecting the line outputs

Figure 6. The assortment of connections on the Core 110f.

Connecting VoIP

In this design, the Core 110f connects via the LAN to a VoIP system through a Softphone. There is a SoftPhone In block near the left edge of the design. Near the right edge is a SoftPhone Out block. "In" means audio coming in from the far end of a call, while "out" is where audio that originates in the conference room is sent out through the SoftPhone to the far end.

A User Control Interface (UCI) created for a TSC-7 touchscreen controller contains the phone dialer, volune, and other controls, making them readily accessible on the tabletop. The TSC-7 connects to the core through the local area network (LAN), which is described below.

For more information about connecting the Core 110f to a VoIP system, see the QSC Technical Note *Interfacing VoIP with a Conference room via Core 110f.*

Connecting the Network

Two RJ45 Gigabit Ethernet jacks provide connectivity to the primary LAN, and if required, to a redundant or auxiliary one. The primary network is labeled LAN A and the redundant one is LAN B. LAN B can also be configured as an auxiliary LAN for use on a control or corporate network.

The LAN conducts all communication between the core and other network devices, such as any TSC touchscreen controllers.

Connecting the USB Type B Port

In this design the Core 110f is configured with one USB endpoint serving as a speakerphone. This feature allows you to operate a teleconferencing session using software such as Skype, GoToMeeting, Lync, Google Hangouts, etc., on the PC connected via the USB port.

For more information about using the Core 110f with a PC via USB, see the QSC Technical Note *USB Endpoint functions in Core 110f: Soundcard or Speakerphone.*

Features in Q-SYS Designer

Channel Group

A Channel Group (Figure 7) is an efficient and convenient way to draw and apply one or more processing steps simultaneously to two or more parallel channels of audio.

Double click on the Channel Group to open it; we see that in this design it applies high-pass filtering and parametric EQ to each channel (Figure 8).

You may configure these eight channels separately, or you may configure some or all them simultaneously; use the selection buttons (1 through 8, plus Prev, Next, Exclusive, Select All, and Select None) to choose which ones to configure.
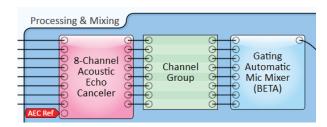

Figure 7.

The high-pass filter and parametric EQ blocks can be opened to allow configuration. The settings you configure will apply to the selected channels.
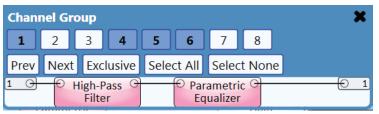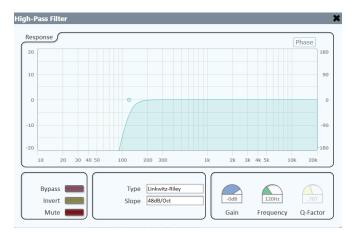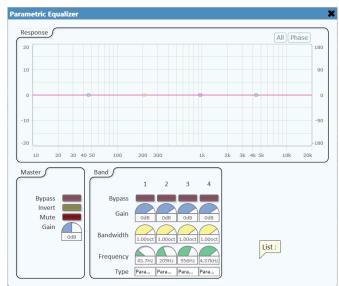

Figure 8.

Figure 9. High-pass filter configuration above, and parametric EQ at right.

Gating Automatic Mic Mixer

As the name suggests, The Gating Automatic Mic Mixer is a multi-channel mixer that has adjustable noise gating on each channel. The one in the default design is configured for eight input channels and one output. It is especially suitable for teleconferencing use because it can take out possibly distracting background noise and improve intelligibility.

Figure 10 shows the component opened up for configuration. Like a conventional mixer, it combines multiple audio signals together, but it additionally adds noise gating with a maximum number of open mics, along with adjustable attenuation and threshold parameters. The "Last Mic On" feature leaves the last active mic ungated even when no one is speaking, allowing some background noise to come through and prevent the illusion on the far end that the connection has been lost.
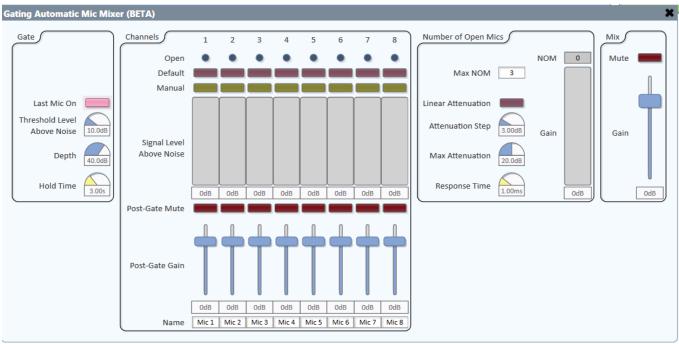

Figure 10. The Gating Automatic Mic Mixer.

VIDEO TRAINING SERIES
An engaging, self-guided video tutorial series

▶ **qsctraining.com/education/courses/qsys**

QSC

qsc.com

AET | Application
Engineering
Team

(800) 854-4079 or (714) 957-7100
Outside the U.S. +1 (714) 754-6175
Fax: +1 (714) 754-6174

QSC, LLC
1675 MacArthur Boulevard
Costa Mesa, CA 92626 USA