THE Q-SYS™ ECOSYSTEM NOW SUPPORTS HIGH QUALITY NETWORK VIDEO DISTRIBUTION.

Q-SYS networks can now support high-quality (up to 4K60), low-latency video distribution through the NV-32-H Network Video Endpoint. This application guide will discuss ways to use this versatile piece of gear.

1. THE NETWORK VIDEO ENDPOINT

1. Power LED
2. ID LED — Blinks when the ID Button is pressed on the front panel or when its ID button is clicked in Q-SYS Designer Software.

The main AV interfaces utilized in this application guide are three HDMI inputs, two HDMI outputs, and a USB type B connection for audio and video bridging.

The Q-SYS™ Ecosystem
App Guide: Q-SYS NV Series, Network Video Endpoints for the Q-SYS Ecosystem
The NV-32-H as an encoder

As an encoder, the NV-32-H can route video from any of three local HDMI sources to anywhere on the local network, at resolutions as high as 4K60 4:4:4. In this setup, HDMI Out 1 feeds a courtesy monitor, and it can scale the video as needed.

The NV-32-H is able to stream all three local HDMI sources simultaneously at a maximum resolution of 1080p60 4:4:4 while providing a single courtesy monitor output as well.
The NV-32-H as a decoder

As a decoder, the NV-32-H can receive a single 4K60 AV stream from the network and deliver it to HDMI Out 1. As in the previous examples, the HDMI output will automatically scale to the resolution of the connected display.

If both HDMI Out 1 and HDMI Out 2 are enabled, the NV-32-H will automatically force all network AV streams wired to it to 1080p60 through EDID. Any two network streams may be routed to the HDMI outputs, which will scale the content to match the resolution of the connected displays.
With both outputs HDMI 1 and HDMI 2 enabled, the NV-32-H can select any two content sources from among network AV streams and the local HDMI inputs. It will scale the output content to match the resolution of the displays.
Setting up the NV-32-H Network Video Endpoint in a Q-SYS design

In Q-SYS Designer Software v8.1 and later, place a NV-32-H into the design as you would any other Q-SYS component. Find it in the Video category under Audio-Video I/O. Use Generic HDMI Display devices and/or Generic HDMI Sources with the NV-32-H.

Under Properties, configure the parameters as needed. In the examples portrayed in this application guide, the only configuration necessary in most cases is selecting Encoder or Decoder.

You can set up multiple NV-32-H devices in the design as needed to accommodate additional sources, displays, and locations.
2. USES AND APPLICATIONS

Introduction
This section of the guide describes operation and usage of the NV-32-H video endpoint device in a Q-SYS ecosystem.

Technical notes
The NV-32-H transmits video across the network with no more than two frames of latency end-to-end.

Switching among these is seamless:

- Multiple sources on the same encoder.
- Multiple sources on the same decoder.
- Sources on different encoders.
- Between an encoded source and a locally connected one.

Audio modes

**HDMI Link** — Audio and video stream across the network together from an encoder to a decoder. Audio passes along with video on the HDMI output to play through the loudspeakers on the connected display. The audio destination could also be an HDMI-enabled soundbar or AV receiver.

The number of audio channels sent by the source device—as defined in its Extended Display Identification Data (EDID)—is set in its property **Audio Channels**.

**Decoder to Core** — This mode is used for routing audio from the Q-SYS NV-32-H to your Q-SYS system. It inherently contains all the logic for audio-follows-video; the audio pins will play content from the active selected video source. This mode makes the most efficient use of networked audio channels while still harnessing the power of the Q-SYS platform for routing, processing and control.

Define the number of audio channels the decoder can send to the Q-SYS Core under its component properties in Q-SYS Designer Software.
**Source to Core** — This mode takes audio directly from the sources themselves and offers a system designer the greatest flexibility for routing or individual source processing. It uses the most networked audio channels, though.

**Core to HDMI Display** — To combine the convenience of an installed HDMI display with built-in loudspeakers (or some other HDMI audio device, for that matter) with the power and flexibility of the Q-SYS Ecosystem, simply route the audio—and not necessarily just program audio—directly to the HDMI output of the NV-32-H.

To do so, go to the **Audio Source** property of the Generic HDMI Display component and select **Audio Input Pins**. Then you can wire audio from a decoder or source component or any other Q-SYS audio pins directly to the Generic HDMI Display.
Single-Room Operational Modes

**Single Room—4K60 Mode; Video and Audio**

This example portrays a traditional conference / meeting space designed for audio-visual presentation.

**Room 1—Medium Conference Room**

At left are three devices (laptop computers) plugged into a single NV-32-H video endpoint configured as an encoder. At the right are two devices (a media player and a laptop computer) plugged into another NV-32-H configured as a decoder and on the same network. The HDMI output of the decoder connects to a display.

This configuration makes a 5 × 1 switching environment within the room: the display can show program content from any of the three laptops, from the media player, or from the desktop computer, depending on the control commands sent to the encoder and decoder by the Q-SYS system. Audio will also route from the selected source (i.e., audio-follow-video), and it can be broken out at the decoder for processing and routing by the Q-SYS Core Processor.
Single Room—4K60 Mode; Video and Audio with AV Bridging
This example also portrays a traditional meeting room design, but with a larger number of Q-SYS products and peripherals. This system not only has audio-visual presentation capability, but video / audio conferencing capability as well.

As in the previous example there are three devices (laptop computers) plugged into the NV-32-H encoder and a media player and desktop computer plugged into the decoder, which is connected to the HDMI display. The display can show program content from any of the five sources. In addition, a PTZ-IP camera can deliver its video feed via the Q-SYS network to both the encoder and the decoder. From the encoder and decoder, computers can receive the camera feed through USB connections.

To enable audio and video bridging on the NV-32-H, go into its device properties in the Q-SYS design.
Single Room—4K 60 Mode; With Multiple Devices
This next example shows how have two or more 4K60 displays or other devices in a meeting room.

This scenario requires multicast. Therefore, you would set the NV-32-H encoder’s AV IP Streaming property to either Multicast or Compiler Choice (the default setting).
To prevent HPD events that change video performance, the encoder can be configured so that all its sources are limited to 1080p60. This is done through the Encoder Mode setting in the Encoder HDMI I/O component.

Here is the above scenario set up in Q-SYS Designer Software with dynamic switching.
Single Room—Multiple Encoders and Single Decoder

Here, a display on a single decoder can select from several encoders, each fed from a laptop or other HDMI source offering up to 4K60 AV. Because each encoder refrains from putting streaming data on the network until the decoder sends it a request, streaming from source all the way to the display can be a full 4K60 all the time.

This arrangement could be used in such situations as: a large room that uses many HDMI inputs in various locations; a room with a number of HDMI sources at a table; or a room where the HDMI sources are in a rack location away from the decoder and display.

Below is the setup in a Q-SYS design, constructed in Q-SYS Designer Software.
**Single Room—1080p60 Dual Screens**

If you opt for a lower video resolution such as 1080p60 or lower, the Q-SYS AV endpoint hardware pieces can handle more simultaneous streams. In this scenario, the encoder handles three 1080p60 streams simultaneously. The decoder can decode two of the sources from the encoder or display two local sources and send them to two displays. Thus, the system is a $6 \times 2$ matrix.

In the Q-SYS design, the audio feeds to the two HDMI outputs can be mixed together or they can be controlled through a router (see below) so the audio follows the video.
Multi-Room Operational Modes
You can easily scale up AV capabilities for a larger system by adding multiple Q-SYS NV Series video endpoints and associating them with the same Q-SYS Core Processor in the same design.

Overflow Applications
Start with a simple design. Add one or more rooms as needed. This overflow system features 4K60 connectivity.
Facility-Wide Distribution

In this example there are three conference rooms with an equipment closet shared among them. Each room has local presentation capabilities. The rack of gear in the equipment closet can also provide feeds when any of the rooms are not in use.

The equipment rack in the closet has a courtesy monitor so that a technician could verify signals, select appropriate alternate program material, or navigate through guides or menus.

If the Q-SYS Core Processor is licensed to run scripts, the system could be scripted so that if nothing is plugged into a room’s encoder, the decoder would send digital signage, cable TV, or other material to the display instead. It could also be scripted to switch all the decoders to display a certain source if an emergency arises.