

VISIONARY
NETWORK AUDIO VIDEO

5 Series & 4 Series

Q-SYS v5 Plugins User Manual v1.0

Visionary PacketAV Plugins for Q-SYS Designer

VERSIONS 5.0.0.X

User Guide

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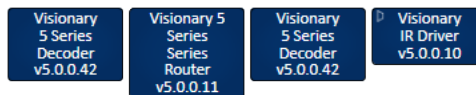
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Plugin Collection Overview

A new generation of Visionary plugins for Q-SYS

This collection of Visionary plugins is a reimagining of what can be done from the Q-SYS ecosystem to make interfacing with Visionary Solutions endpoints easy and flexible. Since originally adding plugins to the Q-SYS Asset Manager, Visionary has introduced the next generation of AVoIP endpoints (5 Series). Rather than attempt to maintain two separate sets of plugins, these updated plugins continue support for existing 4 Series deployments by allowing the plugins to adapt to either 4 or 5 Series devices, seamlessly. Simply change the “PacketAV Series” property to ‘4 Series’ to work with those units.

In addition to updating the Encoder, Decoder and Router plugins, new features have been added along with a brand-new plugin for the collection, the IR Driver.

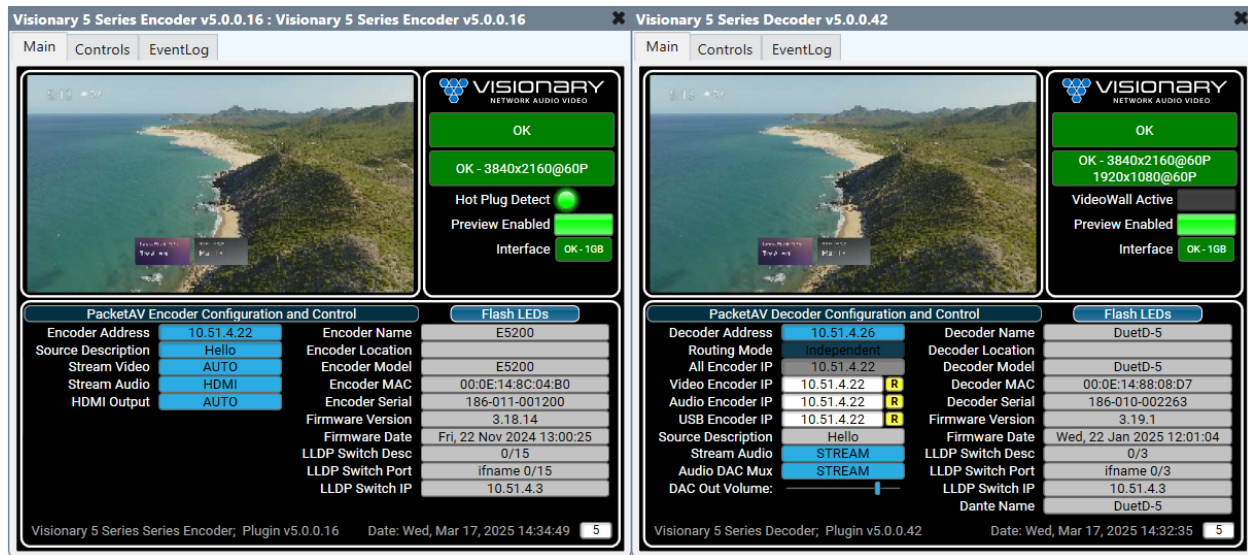


A note on documentation style

When this document refers to physical Visionary AV over IP devices, they will be referred to with lowercase ‘encoder’ or ‘decoder.’ When referring to the Q-SYS plugins meant to represent these devices within a Q-SYS Designer file, the actual plugin name will be used as it appears in the Plugins area of the Schematic Elements panel of Designer. “Encoder” and “Decoder” (Camel-casing; along with “Router” and “IR Driver”) will refer to the plugins while “encoder” or “decoder” generically refer to the devices.

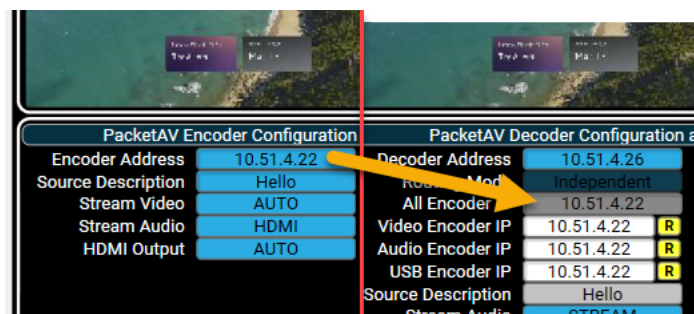
When referring to a Q-SYS component/plugin property or control name, single quotes will be used. When referring to a property setting or a combo box choice, double quotes will be used to specify the setting name.

Plugin Overview



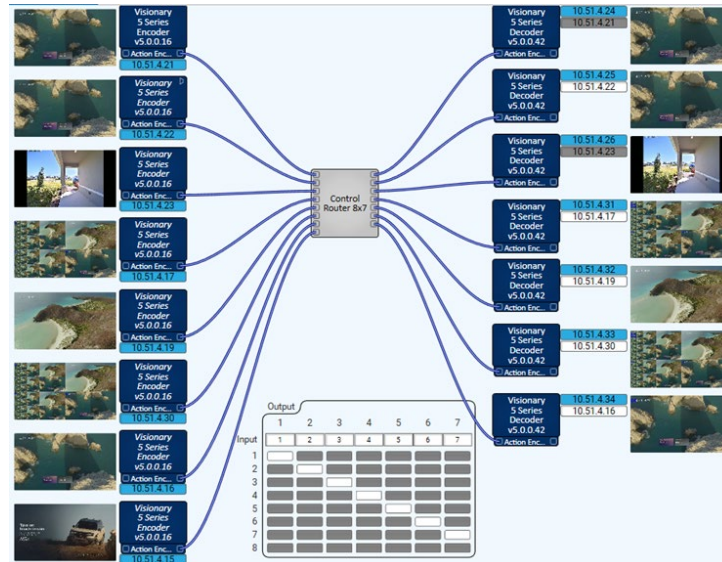
Visionary Solutions' PacketAV system consists of encoders and decoders. PacketAV encoders are responsible for converting HDMI sources (or USB-C on some models) into an IPv4 multicast stream. PacketAV decoders are instructed to receive these streams, as needed, via a control system, such as Q-SYS. While it is possible to have an encoder statically assigned on each decoder, flexibility is achieved by using the plugins to represent those physical devices within the familiar Q-SYS environment.

Both the Decoder and Encoder plugins support displaying a convenient thumbnail image within the main page. In addition, useful information such as the model, MAC address and serial number are displayed. For advanced control, commissioning convenience and troubleshooting, basic LLDP information is also shown, so locating the connecting network switch port and management IP is readily available. On Duet models, the Dante device name is displayed, which helps to locate the device within Dante Controller or in Q-SYS Dante RX blocks.



Visionary's API assigns an Encoder's IP address to the respective decoders, where the desired stream is being transmitted. All stream negotiation and IGMP requests are handled in the background, by the devices, without extra effort.

In the simplest possible configuration, a Control Router component could be used to link IP address pins of multiple Encoder and Decoder plugins. The Control Router determines which Encoder IP address string is sent to each Decoder plugin's Encoder IP control. When a Decoder plugin's Encoder IP changes, the plugin sends the physical decoder the appropriate API command to make the change. In this scenario, each row of the Control Router represents one encoder source, while each column represents one decoder destination (or group of decoders if using control wiring fan-out).



Using a Control Router, while effective, is just scratching the surface of the options which could be presented to end users. Some advanced Q-SYS programmers may choose to control the decoder plugins using Block Controller or Text Controller scripts. However, this may be more advanced than some Q-SYS designers are comfortable implementing. To provide more UI options, this collection provides a dedicated Visionary Router plugin.

The Router plugin essentially provides a way to obfuscate the updating of encoder IP addresses behind the innovative use of the thumbnail preview buttons in both the Encoder and Decoder plugins. When using the Router plugin, you can create UCIs where users can visually select the desired sources, and then click Decoder thumbnails to assign that source to those destinations.

A secondary mode of the Router presents encoder thumbnails as a crosspoint matrix, like the Control Router component—except using thumbnail preview buttons. As with the Control Router method, columns represent source choices for a single decoder.



New Features

In addition to the features Visionary users have come to expect, new capabilities have been added. These features are detailed within each plugin's respective section.

- One set of plugins for use with both 4 Series and 5 Series Visionary devices
- Reflect-enabled Encoder and Decoder plugins
- Independent Routing of video, audio, and USB services (5 Series)
- Former True/False combo box controls updated to Boolean (Toggle Buttons or LEDs)
- A 'Source Description' text field on Encoders allows Decoder plugins to display that description when tuned to that Encoder's stream. This feature is also used on the Router plugin, when in Thumbnail mode.
- Separate main 'Status' control and 'Stream Status' in compliance with Reflect requirements
- Additional info fields display LLDP information about switch connections and Dante name (for Duet models)
- Virtual Q-SYS serial port option to allow existing serial plugins and scripts to use Visionary RS-232 ports (pass-through)
- IR Pin allows easier use of Infrared features on certain models with IR library (when paired with Visionary IR Driver plugin)

Compatibility between Visionary Series

While the 5.x.x.x Visionary plugins can support either 5 Series devices or 4 Series, it is important to keep in mind that the encoders from one series are not cross-compatible with decoders from the opposite series. However, a 5 Series system can coexist on the same VLAN as a 4 Series and within the same Q-SYS design. They should just be treated as independent systems.

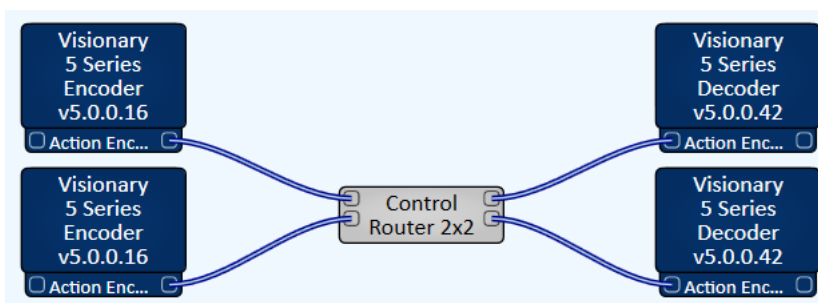
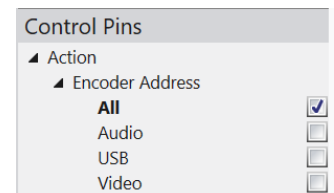
Additional Note for Using Plugins in Emulation

Due to a limitation in Q-SYS Designer, when emulating a design, there is a limit to the number of network interfaces the Q-SYS Network.GetInterfaces() method returns (maximum of 5, including the 127.0.0.1 loopback address). If your PC contains multiple physical or virtual NICs, the Discovery Interface selection list (in 'Discovery' mode) may not contain the IP address of the NIC connected to the Visionary VLAN. Because of this limitation, the Discovery Interfaces combo box can only display the first 4 non-loopback addresses found. If the correct interface IP is not shown while it is currently active, the only two options are either to disable some NICs, then completely shut down and restart Q-SYS Designer to recognize the updated NIC list; or to switch to Manual mode to enter unit IP Addresses manually. Assuming Visionary devices are configured to use static IP addresses or have static DHCP assignments, once a plugin has been assigned to a physical device by IP address, the manual or discovery features are no longer needed.

Quick Setup Steps

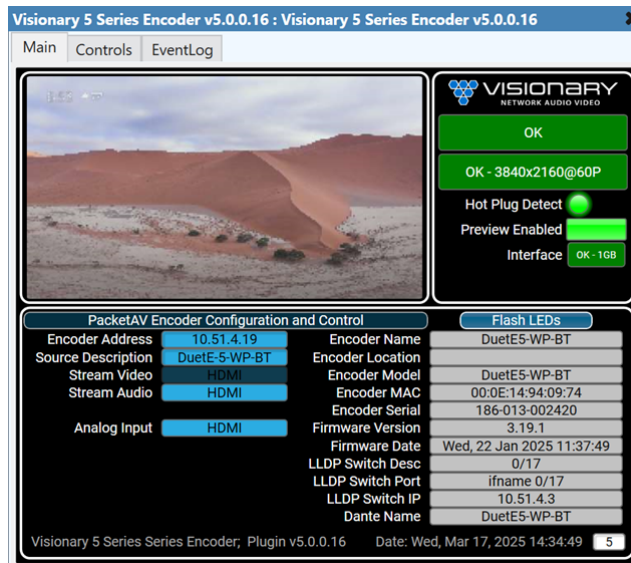
This is a quick start guide to getting plugins set up with the Control Router. More sophisticated control is achieved using the Visionary Router plugin. However, using the Control Router helps to establish a basic understanding of the encoder to decoder switching concepts. More in-depth coverage of each plugin is available in a later section.

1. Open a new or existing Q-SYS design.
2. From the Schematic Elements panel on the right-hand side, navigate to Plugins → Visionary.
3. Click on the Encoder plugin and drag it into the center of the design area.
4. Click once on the plugin block and its properties will appear on the upper right of the Q-SYS window.
5. In the Control Pins section, click to expand the 'Action' section and place a checkbox for the 'Encoder IP Address' pin.
6. Click on the Visionary 5 Series Encoder's block, then press CTRL-D to duplicate the plugin and place a copy below the first.
7. You should now have 2 copies of the Encoder plugin with the same pin exposed.
8. From the components Panel on the lower right-hand side again navigate to Plugins → User → Visionary, then click on the Decoder plugin and drag it to the center in the design area, to the right of the Encoder plugins you added earlier.
9. Click once on the new plugin block and you will see its properties appear on the upper half of the right side of the screen.
10. In the Control Pins section, click to expand the Action section and expand the Encoder Address sub-section.
11. Then click on the "All" checkbox to add the control pins to the Decoder.
12. Click on the Visionary 5 Series Decoder Plugin block and press CTRL-D to duplicate the plugin. Place the copy below the first Decoder.
13. There should now be 2 copies of the Decoder plugin with the same pins exposed.
14. From the Components Panel within the Schematic Elements section on the lower right-hand side, navigate to 'Control Components' then drag a 'Control Router' into the design between the two Encoder plugins and the two Decoder plugins.
15. Click on the 'Control Router' block to see the Properties in the upper right-hand corner.
16. Change both the 'Input Count' and 'Output Count' values to 2, resulting in a 2x2 router.
17. Click on the exposed Pin 'Action Encoder IP Address' on the first Encoder block and drag it to the first input pin on the left side of the Control Router.
18. Click on the exposed Pin 'Action Encoder IP Address' on the second Encoder block and drag it to the second input on the left side of the Control Router.
19. Click on the first output pin of the Control Router and drag it to the exposed 'Action Encoder IP Address' of the first Decoder.



At this point, the base components, and connections have been configured for a two source and two destination design. The next step will be to perform a 'Save to Core and Run' (F5) or 'Emulate' (F6). If saving to a Core, you will need to set a Core name and type before deploying the design to the Core.

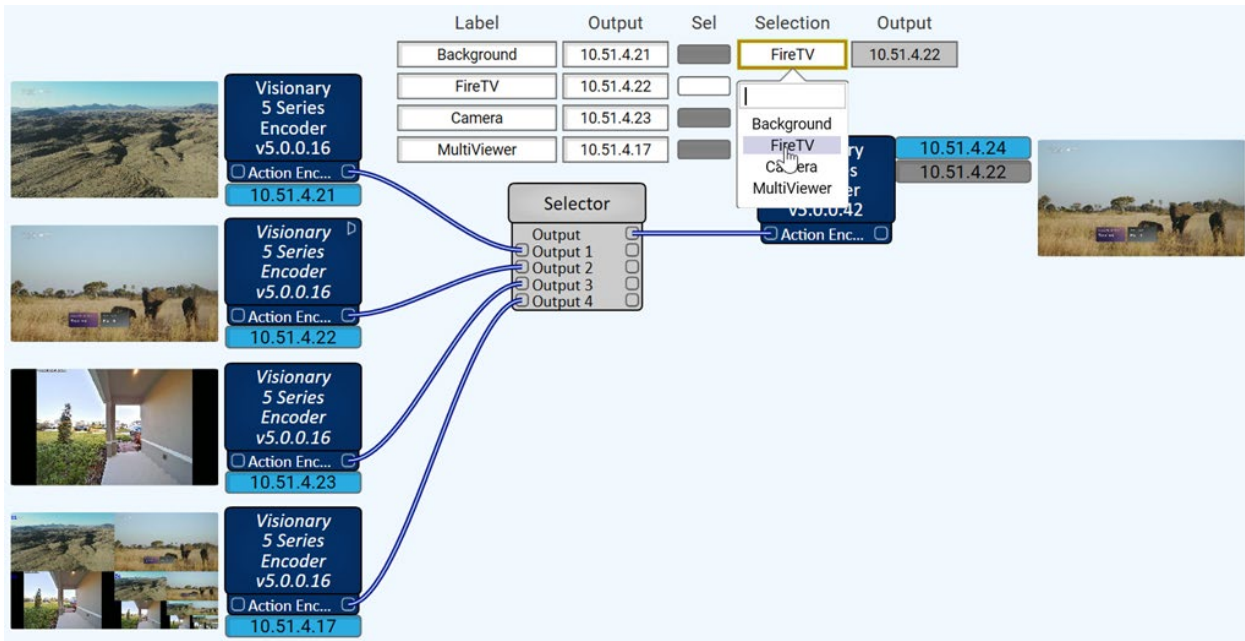
1. Once the design is running, double-click on each Encoder block to display their interface.
2. There are two methods to assign a physical encoder to a plugin:
 - a. Automatic (default)
 - i. Click on the Discovery Interface combo box and select the IP address of the network interface which will be used to locate the encoder. On a Core, this will be the IP address of LAN A, LAN B or an AUX NIC. When emulating, only the first 4 NIC IP addresses can be shown (see NOTE above).
 - ii. The Interfaces combo box and the Discover button will become disabled for 5 seconds, while the plugin is performing the discovery process. There is no need to press the Discover button unless more Visionary devices are added to the network after this first scan.
 - iii. Click on the Encoder Address combo box to select one of the discovered encoder IP addresses. The plugin will initialize with the current details of the encoder.
 - b. Manual (changed via the 'Discovery' property while disconnected)
 - i. Enter an IPv4 IP address into the Encoder Address text field.
 - ii. If the IP address matches a reachable encoder's IP address, the plugin will initialize with the current details of the encoder.



3. Double-click on each Decoder plugin to repeat the same procedure as above for linking the plugins to physical decoders. Just as in the Encoder plugin, the Discovery property can be set to 'Automatic' or 'Manual,' depending on how IP addresses will be set.
4. Assuming that encoder and decoder IP addresses were correct, the Status control (the status control immediately below the Visionary logo) should show OK and the gray information fields should be mostly populated.
5. Underneath the main Status control is the Stream Status control, which displays information about the incoming source video (Encoders) or output video (Decoders) along with resolution information. On Decoder plugins, the incoming stream resolution is displayed on the top line, while the scaler's output resolution is displayed on the second line.
6. The Preview Enabled toggle button determines whether the large button in the upper left displays the thumbnail preview images (updated once per second)
7. The Interface Status shows the health of the device's network interface. The normal state should be "OK – 1GB."

8. From this point, you can change which sources are routed to each decoder by manipulating the Control Router's crosspoint buttons. Each decoder is represented by a single column, while each encoder is represented by a single row.

Using this understanding of how control of decoders is achieved by changing the Encoder IP string, much more sophisticated designs are achievable. Many users like to use the 'Selector' component to create friendly aliases as a combo box or list box to send the respective encoder IP addresses to the Decoder plugin.



Plugin Usage Details

The following sections cover more details on how to use the plugin collection for various use-cases.

The plugins will dynamically change their control capabilities based on unit model type, so when an Encoder or Decoder plugin detects a device's model, features will be displayed, while others may be hidden. This control showing or hiding behavior is meant to avoid confusion when a design is controlling Visionary AVoIP encoders and decoders. When a design file is not running, all controls will be visible.

If a plugin is manually addressed to connect to the wrong device type ("encoder" versus "decoder") or PacketAV Series ("4 Series" when set to "5 Series"), the Status control will present an error: "Invalid Type or Series". This error allows the programmer to quickly to correct any mistake and try again.

Encoder and Decoder Plugin Introduction

The main components of a Visionary system are one or more encoders and one or more decoders. The Q-SYS counterparts are no different. The basic expectation is that one Encoder plugin is added to a Q-SYS Design per physical encoder and one Decoder plugin per physical Decoder. Once a design is saved to the Core or emulated, you can either pair the plugins to the physical units using the Discovery feature or by manual IP entry. Once a plugin is linked to a physical unit, there is no further need for the Discovery button or interfaces list (not present in 'Manual' mode).

At the simplest level, if a valid signal is being received by an encoder, all that needs to be done to create a route, is to enter the Encoder IP address into the 'All Encoder IP' field of the intended receiving Decoder plugin (or 'Encoder IP' when in "4 Series" mode). Behind the scenes, the decoder obtains the information to begin receiving that encoder's stream(s).

In the 5 Series of PacketAV, Visionary introduced the concept of Independent Routing. This means that the Video, Audio and USB data are transmitted and received as separate streams. While the "All Encoder IP" field (in '5 Series' mode) or "Encoder IP" (in '4 Series' mode) both achieve the same result, in 5 Series, this action routes all component streams to change at once. Alternately, in '5 Series' mode, a decoder can have individual streams routed without affecting the other component streams. Very often, the Audio and Video Encoder IP assignments may need to change without changing the USB route.

Given that the main setting which changes, when reassigning encoders to decoders, is the 'Encoder IP' address in the Decoder plugins, many Q-SYS programmers choose to use the Control Router or the Selector component to change the IP address each decoder "tunes" to. Many systems have been deployed using this approach. However, to facilitate more visual UCI designs, Visionary has included a companion "Router" plugin.

Common features between both Encoder and Decoder plugins

Properties

- **PacketAV Series** – This setting allows the plugin to adapt to discovering, controlling and monitoring Visionary PacketAV decoders from either "5 Series" or "4 Series." Some features are only available for 5 Series devices or function differently, so slight UI changes will occur with each setting. The default setting is "5 Series." To connect to "4 Series" devices, this setting must first be changed prior to Emulating or Saving to the Core.
- **Discovery** – The default setting is "Automatic," which allows the plugin to discover compatible devices on a network segment. Setting this property to 'Manual' allows direct entry of a physical endpoint's IP address. Note that once a plugin has been linked to a device, the Discovery mode setting should not matter.
- **Serial Port** – Setting this property to "Yes" will expose a virtual serial pin on the upper right of the plugin block. See the ['Encoder/Decoder Plugin Serial Pin Capability'](#) section for more details. Hovering over this pin will show, "Serial Port."
- **IR Pin** – Setting this property to "Yes" will expose a special serial pin on the upper right of the plugin block. Hovering on the pin will show, "IR Control." See the ['IR Driver Plugin'](#) section for more details.

Main Page

- **Thumbnail preview button** – a trigger button which optionally displays thumbnail preview updates on its face.
- **Status** – The primary Status control reflecting the health of the device or connection of the plugin to the device. Important settings or connectivity issues are shown here. An "OK" state does not mean that the device is receiving valid video but does mean that the device is correctly responding to requests and that the PacketAV Series ("5 Series" or "4 Series") and device type, whether an encoder or decoder, match the plugin.
- **Stream Status** – This control pertains to the video being received on both encoders or decoders. On Decoder plugins, this control also displays the scaler's output resolution on a second line. If an HDMI/USB-C source is not present on an Encoder or a Decoder is not receiving a valid stream from an Encoder, this status control will change to "COMPROMISED" to highlight the issue. However, a compromised video input does not necessarily indicate a failed unit. This contextual separation is necessary for compliance with Core Manager and Reflect monitoring.
- **Preview Enabled** – This toggle button controls whether the plugin will update the Thumbnail preview control with live video previews at a 1 frame-per-second rate.
- **Interface Status** – This status control showcases the endpoint's own network status. If the external interface (or LAN 1 port on certain models) is running at 1GB link-speeds, this control will show, "OK – 1G." If this port is reported to be 100MB due to switch misconfiguration or cabling faults, the control will show "FAULT – 100MB." Also, if the device fails to respond, such as in a timeout, this control will show that fault, along with other status controls.

- **Discovery Interface** – When the ‘Discovery’ property is set to “Automatic,” this combo box will display a list of the first four non-localhost NIC IP addresses available on the device. When initially linking an Encoder or Decoder plugin to a physical endpoint, set this interface to the IP address of the NIC located on the same VLAN as the devices. On a Core, these will be the active LAN A, LAN B, AUX [A or B] ports. When emulating, the IP addresses will be those of the physical and/or virtual NICs of the PC or virtual machine.
 - When emulating, there is a possibility that the NIC IP on the Visionary VLAN is not listed. See the note above “Additional Note for Using Plugins in Emulation” for more information.
 - Once a device has been assigned by its IP address, this control (and the Discover button) is no longer needed.
 - When changing the selected interface, a discovery sequence is automatically started. Therefore, the two controls will appear disabled for 5 seconds. When they re-enable, you can check the Encoder/Decoder Address combo box for the IP address of the desired unit.
- **Discover** – A trigger button which initiates a 5 second discovery sequence for locating Visionary devices on the selected discovery interface. A list of discovered (and compatible devices) are added to the Encoder Address / Decoder Address combo box for selection. If more Visionary PacketAV devices come online after the discovery sequence, you can press the Discover button again to locate them.
- **Encoder Address / Decoder Address** – This control contains the IPv4 address where the linked Visionary endpoint can be reached by the plugin.
 - When the ‘Discovery’ property is set to “Automatic,” this field is a combo box. When a discover sequence has ended, the list of IP addresses presented represent those units which responded and match the appropriate encoder/decoder type and PacketAV series.
 - When the ‘Discovery’ property is set to “Manual,” this field becomes a text edit field which allows direct entry of an IPv4 address.
 - In either Discovery mode, when a valid IP address is selected or entered, the plugin will populate the appropriate controls, matching the device’s feature set.
 - If a model is detected from the opposite PacketAV Series or is a decoder, when the plugin is for an encoder (or the opposite), polling stops, and a helpful error message is presented.
- **Flash LEDs** – This trigger button starts a 10 second LED flash sequence on the connected device. It is intended to help locate the specific device if multiple physical devices are located together. The control will disable during the 10 second interval and re-enable when the flashing period has ended. The flashing function does not disrupt the other operations of the unit.
- **Info Query Poll Rate** – (default value = 5) An integer text knob which determines the relative timing (in seconds) of various polling operations to the assigned Visionary endpoint. Setting the value to 0 disables polling and should only be done to silence network traffic from the plugin (troubleshooting). Setting this to higher integers can lower network traffic in cases where there are hundreds of endpoints. This setting does not affect the rate at which thumbnail images are polled.
- **Encoder/Decoder Name** – corresponds to UNIT.ID (in API and WebUI) (read-only)
- **Encoder/Decoder Location** – corresponds to UNIT.LOCATION (read-only)
- **Encoder/Decoder Model** – corresponds to UNIT.MODEL (read-only)
- **Encoder/Decoder MAC** – corresponds to UNIT.MAC_ADDRESS (read-only)
- **Encoder/Decoder Serial** – corresponds to UNIT.SERIAL (read-only)
- **Firmware Version** – corresponds to UNIT.FIRMWARE (read-only)
- **Firmware Date** – corresponds to UNIT.FIRMWARE_DATE (read-only)
- **LLDP Switch Desc** – displays received LLDP ‘PortDescr’ information (read-only)
- **LLDP Switch Port** – displays received LLDP ‘PortID’ information (read-only)
- **LLDP Switch IP** – if enabled on the switch, this field displays LLDP Chassis ‘MgmtIP’ information (usually switch management IP address) (read-only)

Controls Page

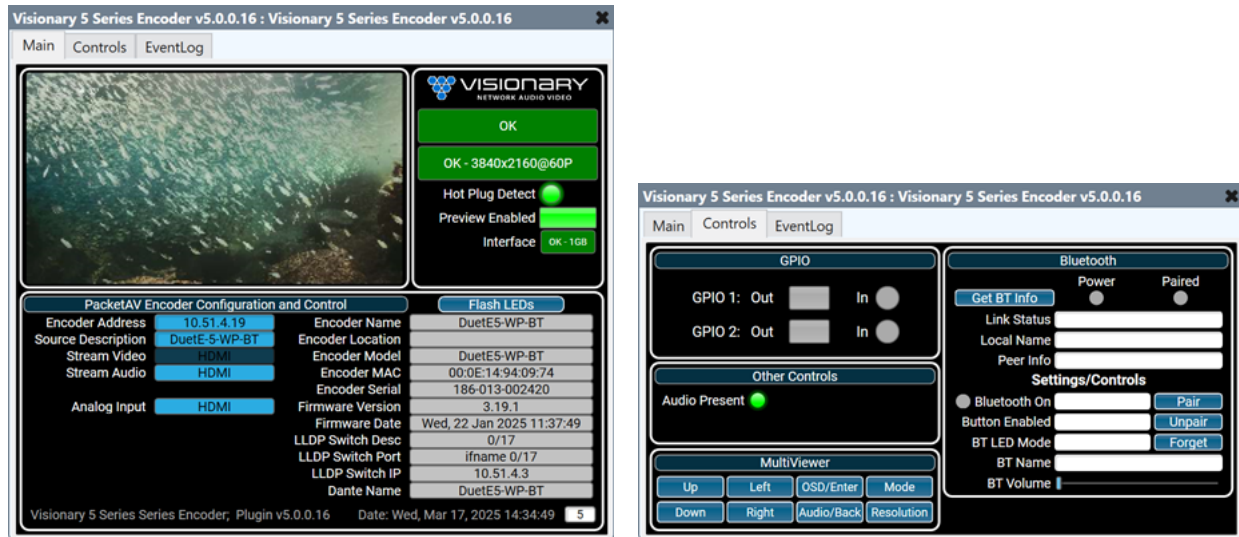
- **GPIO** section (only appears for GPIO-capable models with GPIO enabled)
 - **GPIO1: Out** – Toggle button which controls state of Output 1
 - **GPIO1: In** – LED which represents the state of Input 1 (read-only)
 - **GPIO2: Out** – Toggle button which controls state of Output 2 on two GPIO units
 - **GPIO2: In** – LED which represents the state of Input 2 on two GPIO units (read-only)
 - NOTE: On IR-capable units, if IR is enabled, GPIO 2 disappears and is replaced by the 'IR Connect' row in the 'Other Controls' section.
- **Serial** section (appears if 'Serial Pin' is set to "Yes" in the plugin properties)
 - See details of this feature in the 'Encoder/Decoder Serial Pin Capability' section below.

EventLog Page

The EventLog page shows a running local event log of significant events related to the plugin and connected endpoint. When a plugin is configured to a new device IP address, an event is appended to the log. If a change in certain settings on the device is detected by the plugin, log entries are added to reflect the change. By default, the log retains the last 24 lines of logging. However, this can be extended to 100 if more historical data is necessary (troubleshooting). Copying this text control to somewhere else in the design to enlarge the size or change the font size will make the extra rows more accessible. 24 lines was chosen to fit the size of the text block in the EventLog page.

There is also a Reboot button, which causes a connected endpoint to reboot. Note that this reboot does not save the current settings as the new default. Saving from the WebUI is how the current settings can be set to the new boot defaults.

Encoder Plugin



5 Series supported models: E5100, E5200, DuetE-5, DuetE5-WP, DuetE5-WP-BT, DuetE5-WP-H, E5-WP, E5-WP-H, E5-WP-BT, and MV5E (the encoder module of the MV5 MultiViewer)

4 Series supported models: E4000, E4100, E4200, DuetE, DuetE-WP, DuetE-WP-BT, DuetE-WP-H, DuetE-2, E-WP, E-WP-H, E-WP-BT, and MV4E (the encoder module of the MV4 MultiViewer)

The Encoder plugin is meant to control and monitor Visionary PacketAV encoders, which are responsible for converting HDMI or USB-C source video into network streams. The Encoder plugin is a Q-SYS user interface for simplifying the control and monitoring of physical encoder devices. As there are many encoder models with varying features, some controls on the Main and Controls page will adapt, depending upon the features of the detected model.

Properties

For details on other properties, see [Common Properties](#) above.

- **Audio Signal Present** – This property sets the behavior of the Audio Present LED and its associated output pin. In either mode, the appearance of the LED will be on when audio is present, even if inverted.
 - Normal – When audio is present on the Encoder, the LED state and pin will be TRUE, otherwise FALSE.
 - Inverted – When audio is present on the Encoder, the LED state and pin will be FALSE, otherwise TRUE.

Main Page

Underneath the Stream Status control (upper right), there is a 'Hot Plug Detect' control. This Boolean LED tracks whether there is valid source video being streamed. It is a simplified version of the Stream Status immediately above it. This could be used to drive logic which shuts down a room after Hot Plug Detect remains off (false) for a certain amount of time. On 4 Series encoders, the Info → Hot Plug Detect pin can directly direct a Q-SYS Media Stream Receiver's Enable button, so that the MSR is disabled when there is no RTP audio being transmitted. (This example is not applicable to 5 Series as it uses AES67 on non-Duet models to send audio to Q-SYS)

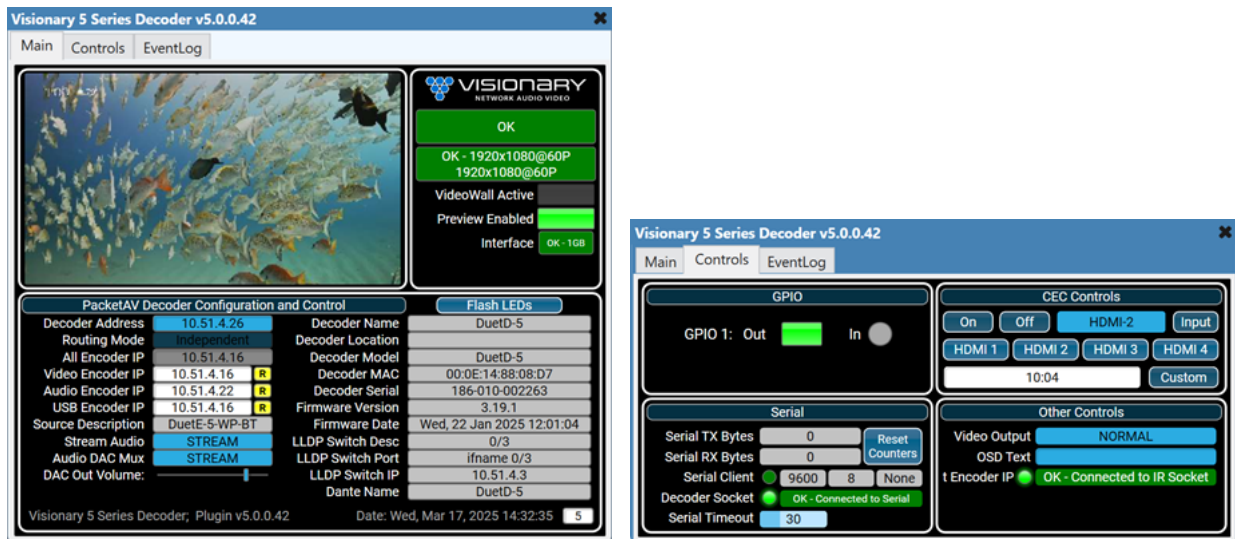
On the left of the Encoder plugin are several text/combo box controls and one horizontal fader. The visibility and labeling of these controls is subject to change if connected to another device if that device is a different model.

- **Encoder Address** – covered in the commonalities section above
- **Source Description** – This editable text field allows a descriptive or contextual name to be assigned to the stream transmitted by the encoder. When a Decoder plugin is assigned to receive the stream from this encoder (by its IP address), its read-only 'Source Description' text is updated to match. The default text reads, "Enter Description" and in this state, the Decoder will display "n/a" in its 'Source Description' field. This same Source Description text is also used with the Router plugin, when in "Thumbnail" mode.
- **Stream Video** – This combo box has various combinations of options, depending upon the model detected. On units with a single source input, this field is disabled. On units with multiple source inputs, this could be set to "AUTO" or a specific input. On MV4 and MV5 encoders, the choices change to represent individual decoder inputs or QUAD, POP, or PIP modes.
- **Stream Audio** – This combo box determines where the source of the audio portion of the transmitted stream should originate. Choices vary by model type. Analog, Bluetooth and/or Dante are options on certain models, while on MultiViewer encoders, the audio can be sourced from any of the four decoder inputs.
- **HDMI Output** – This option is visible on models with greater than a single video source input. Choices are generally between HDMI1, HDMI2 or USB-C. This setting does not affect which video source is configured in 'Stream Video.'
- **Analog In Volume** – Sets the Level of audio coming into the analog input

Controls Page

- **GPIO** – Covered in commonalities section above
- **Serial** – Briefly covered in commonalities section above and in the "Encoder/Decoder Serial Pin Capability" below.
- **MultiViewer** – This section replicates the 8 front-panel buttons on a physical MV5 or MV4 device. The labeling and functionality of the controls change slightly, depending upon the PacketAV Series set in properties. These controls will be hidden while a design is running if the detected model is anything other than the MV5E or MV4E as they serve no purpose.
- **Bluetooth** – These controls are available on any Bluetooth-enabled wall plates

Decoder Plugin



5 Series supported models: D5100, D5200, DuetD-5, and MV5D (the decoder modules of the MV5 MultiViewer)

4 Series supported models: D4000, D4100, D4200, DuetD, DuetD-2, and MV4E (the decoder modules of the MV4 MultiViewer)

The Decoder plugin is meant to control and monitor the PacketAV devices responsible for converting PacketAV network streams into either HDMI or USB-C (UVC) video. The Decoder plugin is a Q-SYS user interface for simplifying the control and monitoring of physical decoder devices. As there are many decoder models with varying features, some controls on the Main and Controls page will adapt, depending upon the features of the detected model.

Properties

For details on other properties, see [Common Properties](#) above.

- **CEC Mode** – This property sets the behavior of the CEC Off button to accommodate requirements of certain display models. More information of on these options can be found in the details of the [CEC Off button](#).

Main Page

Underneath the Stream Status control (upper right), there is a 'VideoWall Active' toggle button. This button controls whether the decoder is scaling output video to correspond with a configured role within an array of decoders in one video wall composite group. For this button to become enabled, a decoder must have its VW.ENABLED state set to TRUE (with checkbox) on the Configuration page of the WebUI. If any of these VideoWall settings are changed, click the 'Save Required' button at the top of the page and allow the decoder to reboot and come online again. At this point, the 'VideoWall Active' button will enable, allowing toggling control of whether the scaler shows the scaled input video representing a portion of the overall "wall" (button on) or full-frame, un-cropped video (button off). To adjust the scaling setting when VideoWall is active, make these changes on the WebUI's Configuration page.

The controls along the lower left of the Main page of the Decoder plugin differ from those in the Encoder plugin. The Decoder Address is meant to link the plugin instance to a physical decoder's IP address. The controls below are detailed here:

- **Routing Mode** – This is a read-only control, which reveals whether the STREAM.HOST_LINKED property from the WebUI is true or false.

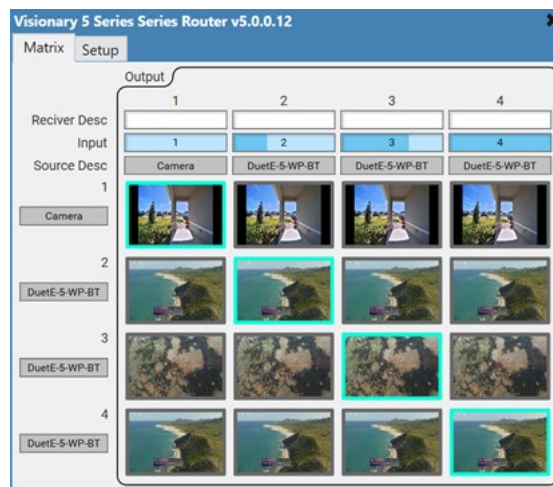


- When STREAM.HOST_LINKED = TRUE, 'Routing Mode' shows "Linked"
 - When STREAM.HOST_LINKED = FALSE, 'Routing Mode' shows "Independent"
- **All Encoder IP** – An IP address of a Visionary encoder endpoint should be entered here. Changing the IP address in this field will change the Video, Audio, and USB streams (if USB is enabled) at one time. If the Routing Mode is set to Linked, this field will appear white. Otherwise, it is gray. The control may be used in either Routing Mode.
- **Video Encoder IP** – An IP address of a Visionary encoder endpoint should be entered here. Changing the IP address in this field will change only the Video stream the decoder endpoint will stream to its output ports. If Routing Mode is set to Independent, this field will appear white. Otherwise, it is gray. The Control may be used in either Routing Mode.
- **Audio Encoder IP** – An IP address of a Visionary encoder endpoint should be entered here. Changing the IP address in this field will change only the Audio stream the decoder endpoint will stream to its output ports. If Routing Mode is set to Independent, this field will appear white. Otherwise, it is gray. The Control may be used in either Routing Mode.
- **USB Encoder IP** – An IP address of a Visionary encoder endpoint should be entered here. Changing the IP address in this field will change only the USB stream and the decoder endpoint will stream to its output ports (only if USB is enabled). If Routing Mode is set to Independent, this field will appear white. Otherwise, it is gray. The Control may be used in either Routing Mode.
- There are three small 'R' buttons to the right of the Video / Audio / USB Encoder IP text fields. These toggle buttons determine which streams should be switched when the Decoder and Encoder plugins are paired with the Router plugin in "Magic Mode." When the Router sends a command to decoders via "Magic Mode" only the streams represented by rows where the 'R' button is enabled (yellow), will be switched. Streams with the 'R' button disabled (gray) will be remain at their current setting. These buttons have no other functionality. More coverage of this functionality is detailed in the Router plugin overview below.
- **Source Description** – This read-only control is the counterpart to the 'Source Description' text field in the Encoder plugin. When a decoder is receiving a video stream from an encoder whose Encoder plugin has a custom 'Source Description' text string, that string will appear here. If the Encoder still has the default text, "Enter Description" the resulting text in this field will appear as, "n/a". This feature is meant to add context to the received video when an IP address or thumbnail image might not suffice. Use of the Source Description feature is optional and will not affect stream functionality.
- **Stream Audio** – This combo box allows the option to choose the output HDMI or USB-C audio source. Only on Duet decoders, the options are HDMI or DANTE. On other models, this field is disabled as HDMI is the only choice.
- **Audio DAC Mux** – This combo box appears on models featuring an analog output. On Duet decoder models, there is a choice of STREAM or DANTE. On other models, the only option is STREAM, so the field is disabled.
- **Analog Out Volume / DAC Out Volume** – This fader adjusts the output level of the analog output on a scale of 0 – 100. The label nomenclature changes between models.

Controls Page

- **GPIO** – Covered in commonalities section above
- **Serial** – Briefly covered in commonalities section above and in the “Encoder/Decoder Serial Pin Capability” below.
- **CEC Controls** – Most models support HDMI-CEC functionality of displays (not available on MultiViewer models)
 - **On** – Sends the CEC On command
 - **Off** – Sends the CEC Off command
 - **Note:** There is a Decoder plugin property labelled, ‘CEC mode,’ which applies specifically to this button. The reason for the alternate modes is because some displays (i.e. Samsung) require first specifying an input along with the Off command. Choose the Samsung mode, depending upon which HDMI input the Visionary decoder is attached, or the desired input the display should power on to. If connected to HDMI input 1, set the property to “Samsung HDMI 1.” For non-Samsung displays, the default “Standard” setting should be correct.
 - **Input** (combo box) – This control allows a pre-selection of HDMI input before pressing the ‘Input’ trigger button.
 - **Input** (button) – clicking this trigger button will send the Input change command selected in the combo box to the left.
 - **HDMI 1, HDMI 2, HDMI 3, HDMI 4** – These four trigger buttons will send the CEC input command immediately when clicked.
 - **Custom CEC text and ‘Custom’ button** – If a custom CEC command should be sent, enter the command as hexadecimal bytes, separated with colons. For examples, try <https://www.cec-o-matic.com/>. Once the CEC command has been entered, pressing the ‘Custom’ trigger button will transmit the command via the HDMI output. Note that CEC has no effect on USB-C video output.

Router Plugin



The Visionary Router plugin is an optional means of simplifying the control of which encoder streams are assigned to any number of decoders. There are currently three modes of the Router. The 'Router Type' choice will depend on the functionality that the Q-SYS user interface needs.

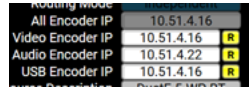
The "Magic Mode" and "Wired" modes operate similarly when the design is running, but the setup process is different. In both "Magic Mode" and "Thumbnail," the linkages to Encoder and Decoder plugins relies upon setting unique "Script Access" name (formerly called, "Named Components" access prior to Q-SYS v9.5). All participating Encoder and Decoder plugins must have Script Access set to either "Script Only" or "All" for these modes to work properly. It is not necessary to add Script Access to the Router plugin itself unless another script needs to control the Router plugin.

"Wired" mode (formerly "Manual" mode) is a way to use the same functionality as "Magic Mode," but the relationship between the Router plugin and Encoders and Decoders is established using control wiring, rather than wirelessly using Script Access.

"Magic Mode" and "Wired"

In these two modes, User Interfaces may be created which allow the pre-selection of a specific Encoder by clicking (or pressing) its thumbnail button (copied from the Encoder plugin), then pressing the thumbnail button copied from the Decoder plugin, corresponding to the output room or display where the encoder source should be sent. Upon pressing the thumbnail of the target Decoder plugin, the Router sends the pre-selected Encoder IP address to the Decoder.

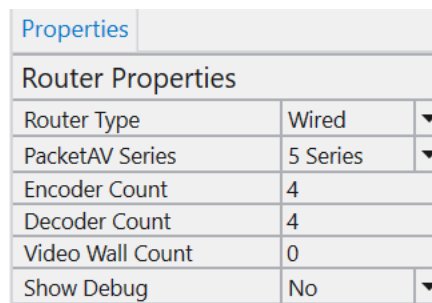
In the individual Decoder plugins, when PacketAV Series is set to “5 Series,” there are three yellow/gray toggle buttons (with the legend ‘R’) to the right of the Video Encoder IP text fields. When any of these buttons are enabled (yellow), the Router will send the pre-selected IP address string to the fields corresponding to those buttons. Any Encoder IP address rows with disabled ‘R’ buttons will be ignored.



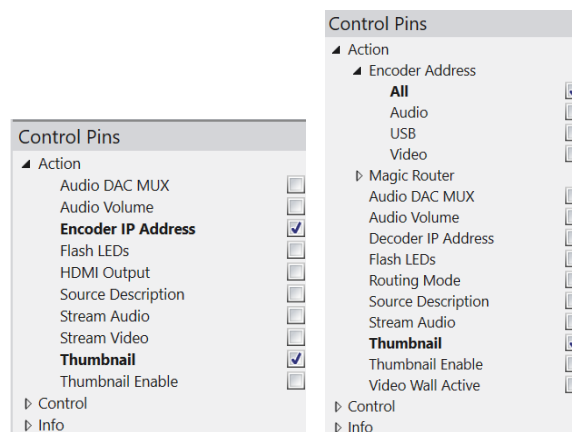
NOTE: Decoder plugins set to “4 Series” for the ‘PacketAV Series’ property will not have these rows and Router changes will always apply to the ‘Encoder IP’ field.

Wired Mode

1. Set the number of encoders and decoders using the Properties window.

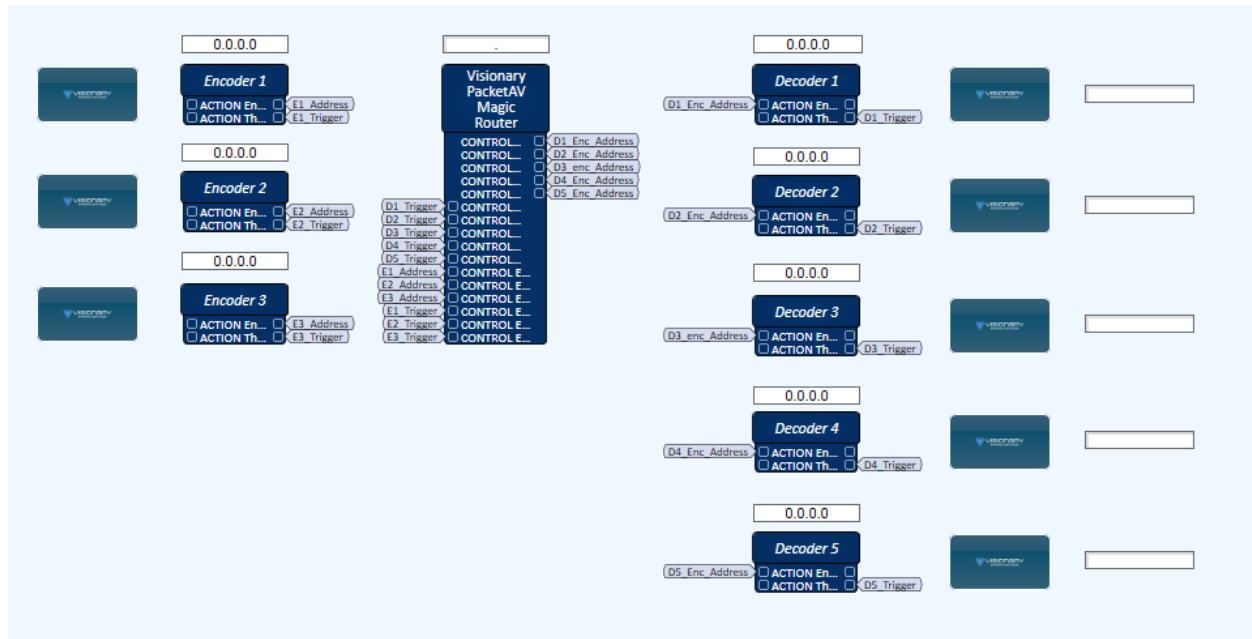


2. Expose the ‘Thumbnail’ and ‘Encoder IP Address’ pins for Encoder Plugins.
3. For 5 Series Decoder plugins, expose the ‘Thumbnail’ and ‘Encoder Address All’ pins.
4. For 4 Series Decoder plugins, expose the ‘Thumbnail’ and ‘Encoder Address’ pins.



5. Wire the ‘Encoder IP Address’ output pins from the Encoder plugins to the Router ‘Encoder x Address’ input pins on the Router.
6. Wire the ‘Thumbnail’ output pins from the Encoder plugins to the Router’s ‘Encoder x Thumbnail’ input pins.
7. Wire the Router ‘DecEnc x Address’ output pins to the Decoder’s ‘Encoder Address All’ or ‘Encoder Address’ input pins.

8. Wire the 'Thumbnail' output pins from the Decoder plugins to the Router's 'Decoder x Thumbnail' input pins. It might be desirable to use a signal name to make the connection(s) neater.



9. 'Save to Core & Run' or 'Emulate' to start the design.
10. Open the Visionary Router.
11. Select an encoder by clicking the "ENC #x" button.
 - a. The thumbnail preview of an Encoder plugin may also be used to select the encoder. The thumbnail preview is also a trigger button.
12. Select a decoder by clicking the "DEC #x" button.
 - a. This will tune the decoder to the previously selected encoder.
 - b. The thumbnail preview of a Decoder plugin may also be used to select the decoder. The thumbnail preview is also a trigger button.
13. Select 'All' button to tune all decoders to selected encoder.
14. 'Update All on Enc Select' (below the 'All' button) has a default value of 0. If you change this to 1 it will tune all connected decoders to an encoder when you select an 'ENC #x' button.
15. Select 'Clear' to clear the selected encoder address from the Router.



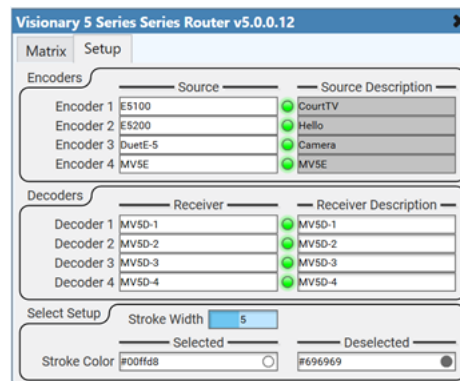
Magic Mode Note

There must only be one Visionary Router plugin per design when running in Magic Mode. Because the Router uses the 'Code Name' (9.5+) or block label (pre-9.5) of the Encoder and Decoder plugins, it allows any Encoder of a design to be sent to any Decoder in the design. If separate control is needed for different groups of encoders and decoders, you may use multiple Router plugins using "Wired" as the 'Router Mode.' When Magic Mode is enabled, simply select the thumbnail preview of any Encoder, and then select the preview of a Decoder you would like tuned to that Encoder. The Clear, All, and Update All Sources buttons function the same in both "Magic Mode" and "Wired" modes.

Thumbnail Mode

By changing the Router's 'Router Type' property to "Thumbnail," the interface changes to a crosspoint-style array of large buttons. This mode is inspired by the native Q-SYS Control Router component. Many users like the concept of rows representing encoder sources and columns representing specific decoder outputs. But they lament that the handy thumbnail functionality is lost. The Router "Thumbnail" mode is meant to address this.

As in the Wired mode of the Router, you must choose the quantity of Encoders and Decoders which the Thumbnail Router will reference. The quantity entered is not required to be all Encoders or all Decoders within the Q-SYS design. If different groups of Encoders and Decoders exist within one Q-SYS design for different areas, multiple Router plugins in "Thumbnail" mode can exist.



Once the Quantity of Encoders and Decoders has been set in Properties and the design started, go to the Router's Setup page to assign the 'Code Names' previously set for all Encoders and Decoders to specific Router Sources and Receivers. Each Source combo box will have a list of available Encoders to choose from and each Receiver combo box will contain a list of available Decoders to choose from. The Source and Receiver Description text is copied to rows and column headers on the Matrix page.

For the Source Description, these read-only fields are taken from the Source Description text field in the respective Encoder plugin. Since there is no such description feature for Decoders, a free-text scribble field is added here.

If a linked Encoder or Decoder plugin had a Code Name change or has been removed when the design is started again (in other words, it is missing), the corresponding LED will change from Green to Red as a warning that it cannot be found. Make necessary changes until the LED changes to green.

The preview images on the thumbnail buttons themselves are populated from the thumbnail images in the respective Encoder plugins themselves and do not consume any network resources. Thumbnail Preview must be enabled on all participating Encoder plugins for the Router plugin to obtain their preview images.

Since setting a thumbnail onto a button face removes the surrounding button “chrome,” so it isn’t as easy to determine whether a toggle button is in the ON or OFF state, a surrounding border has been added to the thumbnail images shown. To differentiate between ON or OFF, and to adapt to UCI site color-schemes, there is the ability to set WebHex colors representing the two button states.

Also, to account for varying button sizes when placed and scaled on UCI screens, a border width integer text-knob is provided. For smaller thumbnails, a wider border width may be more perceptible, while larger thumbnails may need a thinner border. It is possible to change the thumbnail image update frequency by adjusting the ‘Thumbnail Poll (s)’ property. This is variable from 1 to 10 seconds.

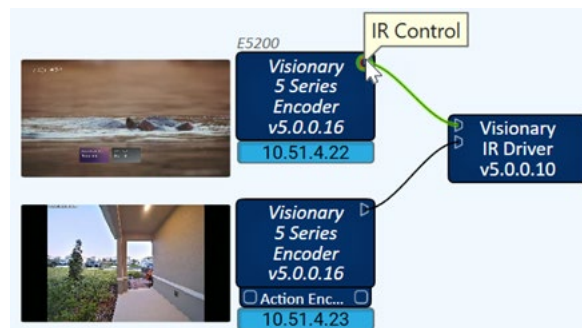
On the Matrix page, for each column (representing a single Decoder plugin’s choices), There is a copy of each Receiver Description control (editable), the integer equivalent of the current selection (Value), The current read-only Source Description and the selection toggle buttons. Pressing any of the Selection buttons will send the appropriate Encoder’s IP address to the linked Decoder’s [All] Encoder Address field. Changes are also possible by changing the integer in the Input value field.

IR Driver Plugin

Several Visionary PacketAV models have the capability to transmit Infrared signals via GPIO output #2 or a 3.5mm IR jack. While it has been possible to send Pronto-style IR commands through API commands to these units, dealing with the verbose command syntax can be challenging.

Visionary’s answer to simplifying the process of setting up infrared codesets and controls for UCIs or sequences with Visionary IR-capable devices is the new ‘IR Driver’ plugin.

The ‘IR Driver’ plugin connects to a variable number of Encoder and/or Decoder plugins via a Serial wire (enabled via the “IR Pin” Boolean property). The goal of the IR Driver is to allow use of IR codesets obtained from the Control Tower plugin (available in Q-SYS Asset Manager). Once a codeset has been added to the IR Driver plugin, it can be configured to send single or looping IR codes (press-to-hold), to the Encoder or Decoder devices’ connected IR emitter.



Each Encoder or Decoder plugin has a property entitled ‘IR Pin.’ If set to ‘Yes,’ a serial pin will appear called “IR Control.” This pin is meant only for wiring to the left ‘IR Control <n>’ pins of the IR Driver plugin. A single IR Driver can expand to handle IR codesets for up to 100 Visionary endpoints. However, navigating that many IR Pin pages in the plugin UI may be inconvenient.

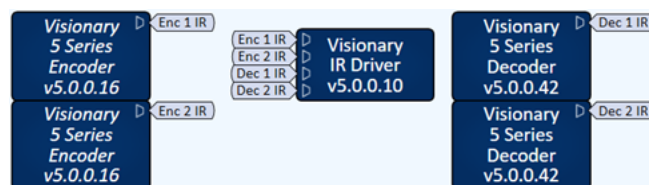
The benefit of supporting multiple endpoints within one IR Driver plugin instance is that a single IR database can be shared amongst all connected Visionary endpoint plugins.

Notes for using the IR Driver Plugin

- These settings must be enabled in the Configuration page of the WebUI, followed by clicking the Save Required button (and allowing the device to reboot) before the Encoder or Decoder plugin will be able to send any IR codes to the device:
 - GPIO.ENABLED = TRUE (checked)
 - IR.ENABLED = TRUE (checked)
 - **Note:** If the devices WebUI doesn't show both of these settings, it means the device is not capable of IR control.
 - A Xantech-style infrared LED emitter (sold separately) must be attached to the GPIO connection and signal ground.
 - On models with GPIO located on removable terminal blocks, the conductor with the striped jacket will connect to O-2, while the solid black-jacketed conductor will connect to the ground terminal.
 - For wall plate models, such as DuetE5-WP, E5-WP, DuetE-WP, and E-WP, an IR emitter's 2-conductor 3.5mm plug can be inserted into the jack marked, "IR Out."

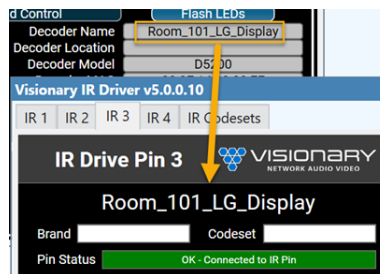
Steps to set up IR control of a device from the IR Driver in Q-SYS Designer

1. In a Q-SYS design file, add Encoder and Decoder plugins, as needed.
2. For Encoder and/or Decoder plugins which will be linked to IR-enabled units and will need infrared device control, change the plugin property, 'IR Pin' to "Yes." This exposes the IR Control pin on the right-side of the plugin.
3. From the Schematic Elements area in the lower right of the Designer window, navigate to Plugins → User → Visionary and drag an 'IR Driver' plugin into your design.
4. Select the IR Driver plugin in the schematic page.
5. In the upper-right of Designer, in the Properties panel of the plugin, change 'Encoder/Decoder Count' to match the number of Encoder and Decoder plugins needing infrared code support.
6. Either directly wire left-facing IR pins to the right-facing pins on Encoder and/or Decoder plugins OR create signal name pairs to create a neater on-screen layout. Example shown here:



7. From the Q-SYS Asset Manager, install the 'Global Caché Control Tower' asset.
8. From Plugins → Asset Manager → Global Caché, drag 'Control Tower' into your design.
9. At this point, either 'Emulate' or 'Save to Core and Connect.'
10. Open the Control Tower plugin and navigate to the Online Database page.
11. Click the 'Connect to Database' button and wait for the green 'Logged In' LED to illuminate. (Internet connection required)
12. Choose a brand name for the first device you will need to control via infrared.
13. Choose the device type of the device. For instance, perhaps the device is a display and perhaps the device is classified as "TV."
14. Choose a Model or Codeset name in the 'Model / Codeset' combo box.

15. Click the 'Get Codeset' button to retrieve the IR codeset.
16. If more IR codesets are needed, repeat the steps from Step 12 above.
17. Either disconnect by again clicking the 'Connect to Database' button or allow the connection to time out.
18. Navigate to the 'Local Database' page of the Control Tower plugin.
19. Choose a brand from the brand(s) you previously downloaded. If only one codeset was downloaded for that manufacturer, the other fields will be pre-selected for you and the 'Codeset JSON' text field will now contain the IR codeset data in JSON string form. If not, select the 'Device Type' and 'Model / Codeset' to display the JSON string.
20. Click into the 'Codeset JSON' text field. Doing so will pre-select all of the text.
21. Copy the text into the clipboard by using Ctrl-C or the top bar Edit → Copy function. (Right clicking a text field is problematic)
22. Open the Visionary 'IR Driver' plugin and navigate to the 'IR Codesets' page.
23. Click on the 'Codeset Import' text field.
24. Paste the text from the clipboard using Ctrl-V or Edit → Paste into the 'Codeset Import' text field and press the 'Enter' key.
25. If pasting was successful, the Brand, Type, Codeset, and Functions fields should be populated.
26. The 'Functions' combo box allows you to preview the list of included IR commands this codeset includes before importing to the IR Driver local database.
27. Click the 'Add Codeset' button to add this codeset to the internal codeset library of the plugin.
 - a. The 'Codeset Import' field text should be replaced with "JSON Codeset Added"
 - b. Note: If a codeset must be removed later, use the 'Brand' and 'Codeset' controls at the bottom of the 'IR Codesets' page to select the codeset for removal. Then press the 'Remove Codeset' button. The codeset will no longer be available for use within the plugin and will reduce the memory footprint of the plugin.
28. Navigate to a specific 'IR <n>' page which corresponds to the plugin you wish to use a codeset with. For convenience, the Device Name (UNIT.ID) of the physical encoder or decoder is shown underneath the top banner. For Example, if device is named, "Room_101_LG_Display" then this name is updated on the IR Driver page for that pin as shown here:



29. From the Brand combo box, choose the brand that you added previously.
30. If there is only one codeset from that manufacturer, the 'Codeset' combo box is automatically populated. Otherwise, choose the proper codeset name.
31. For each IR Commands row, select an individual IR command from the combo box. Doing so will enable the Trigger and Loop buttons corresponding to that command.
32. If more command rows are needed, this can be changed in the 'IR Button Count' property of the 'IR Driver' plugin. The count applies to all IR pages, so choose the maximum that any codeset may need. Leaving unused rows on some pages is not a problem, but having dozens of extra controls is not ideal.
33. At this point, if the 'Pin Status' control shows "OK – Connected to IR Pin," you should be able to click either Trigger or Loop buttons to transmit valid IR codes to the Visionary endpoint and IR emitter.

Further Notes on IR Driver Usage

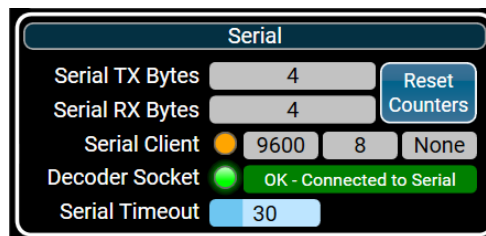
- The Trigger button sends a single IR command, such as Power On, Input Select, etc.
- The Loop button is a momentary control and continually repeats the command for the duration the button is held. A Loop button is typically used for press-and-hold features, such as volume up or down. The repeating happens at a default interval of 100ms and can be adjusted using the 'IR Loop Interval (seconds)' property of the plugin. This is a global value across all IR Pin pages.
- Copy the appropriate button to a UCI for the use-case. Normally, it wouldn't make sense to use both Trigger and Loop from the same command.

Encoder/Decoder Plugin Serial Pin Capability

The Visionary v5.x Encoder and Decoder plugins have support for a virtual Q-SYS Serial pin. Many Visionary endpoints have RS-232 capabilities via a special TCP socket server on port **6752**. If creating a Block Controller or Text Controller to control a serial device via a Visionary RS-232 port, it is recommended to implement the script as a TCP client directly to the Visionary endpoint's IP address and TCP port **6752** once Serial has been enabled via WebUI (followed by clicking the Save Required button). If writing a TCP client script using TCP port 6752, there is no need to activate the Serial Pin plugin feature.

However, many scripts or plugins exist which assume the Q-SYS Designer programmer will wire its left-facing serial pin to a native Q-SYS Serial Port block. The virtual serial port feature on Encoder and Decoder plugins exists to transport the serial bytes back and forth from those components, via TCP, to the Visionary endpoint's RS-232 port. The intention is to present the remote RS-232 port as if it were a native Q-SYS serial port. From the perspective of the serial client script or plugin, the serial behavior is the same.

If the Serial Pin functionality is engaged on an Encoder or Decoder plugin, the Controls page of the plugin is modified to include a section of serial-related controls.



For simplicity, we will refer to the plugin or script block expecting to be wired to a Q-SYS Serial Port as the "serial client."

Within Q-SYS, serial wiring is a special type of wiring, apart from audio or normal control wiring. Serial pins on the left side of a block means that the component is a "serial client," while components having right-facing pins are essentially "serial servers." The Serial pin feature on Visionary Encoder and Decoder plugin is intended to allow greater flexibility in interfacing to serial devices by existing scripts or plugins. We advise against writing new scripts to use this virtual serial pin capability because of the middleman role that it serves.

IMPORTANT NOTE: Because of the way it was implemented, the Virtual Serial Port capability is incompatible with the Command Buttons component. That component can only ever be used with a genuine Q-SYS hardware Serial inventory block. However, in the Q-SYS Asset Manager is a plugin called "Command Send & Receive Utility" (CS&RU) which is compatible with virtual serial ports and was created as a modern replacement for the original Command Buttons component (when set to Serial) mode.

An alternate approach would be to bypass the Visionary plugin altogether by the CS&RU plugin and set the 'Control Type' property to "TCP." Within the 'Connection Setup' page of the utility plugin, enter the Visionary endpoint's IP address in the 'IPAddress' field and set the blue port text knob to port 6752. The EOL settings will be determined by the controlled RS-232 device's syntax. In this scenario, the 'Serial Pin' property of the Visionary plugin should be set to "No."

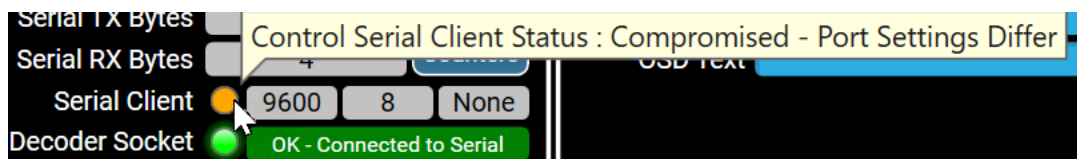
Serial Controls Details (when 'Serial Pin' is set to "Yes")

- **Serial TX Bytes** – shows a running count of the number of bytes transmitted from a connected serial client component (String; read-only)
- **Serial RX Bytes** – shows a running count of the number of bytes received from the RS-232 port (String; read-only)
- **Reset Counters** – a trigger button which resets both the TX and RX counter controls to 0
- **Serial Client Status** – a status LED which reports whether the serial settings on the connected Visionary endpoint match the settings requested by the serial client wired to the Serial pin
- **Serial Baud Rate** – shows the requested data rate by the serial client
- **Serial Data Bits** – shows the requested bit length of serial bytes by the serial client
- **Serial Parity** – shows the requested parity type by the serial client (Odd, Even, or None)
- **Decoder Socket LED** – a Boolean LED which shows the state of the TCP 6752 socket connection
- **Decoder Socket Status** – a Status text field which shows the state of the TCP 6752 connection or various errors, such as when the RS-232 feature is disabled on the device.
- **Serial Timeout** – an integer which determines the ReadTimeout of the TCP 6752 socket to the Visionary endpoint. If set to a non-zero value, an absence of any received data after this number of seconds will resort in the socket timing out, which is passed back to the serial client component as a serial connection error. If set to 0, there is no timeout, even if no bytes are received for a long interval. This control is provided because in the serial world, there is typically no such concept as "connect" and "reconnect." This read timeout helps to resolve situations where the TCP socket is lost and needs to automatically reconnect. (Integer range: 0 – 100 seconds)

Serial Pin Theory of Operation

A serial client requests to open a serial connection with a specific baud rate, data bit count and parity. These settings are also available when enabling the serial port within the Visionary endpoint's WebUI.

The Visionary Encoder and Decoder plugins do not attempt to change these settings on the physical devices. However, the plugin does report whether the client's requested settings match those of the physical unit. On the 'Serial Client' row, the displayed textboxes represent the settings requested by the wired serial client component. If the 'Control Serial Client Status' LED is green, these settings match those which are set on the physical endpoint. However, if the LED is amber, it means the requested settings do not match those set on the Visionary endpoint itself.



When the LED is amber, the TCP connection is still established, but the actual RS-232 port is not configured at the settings the serial client is requesting. Therefore, the next step should be to go to this endpoint's WebUI Configuration page and change the serial settings to match the three text indicator controls to the right of the status LED. Once the Visionary device has fully rebooted with the matching serial settings, the connection can be restarted.