

# **IPX Series DSP Multichannel Networking Power Amplifier Q-SYS Plugin**



## Release Notes

Release Date	Version	Changes
03/2019	V1.0.0	<ul style="list-style-type: none"> <li>First release.</li> </ul>
09/2019	V1.1.0	<ul style="list-style-type: none"> <li>Added loudspeaker impedance text control for each amplifier channel.</li> <li>Added loudspeaker impedance control pin for each channel.</li> </ul>
11/2019	V1.2.0	<ul style="list-style-type: none"> <li>Fixed a bug so that the “Device &gt; Connection Status” control pin will report its status to the Status Combiner component properly.</li> <li>Added “Collected Error” status of the amplifier to the “Device &gt; Connection Status” control pin. This control pin should now be used to report the general health and connectivity status of the amplifier to other Q-SYS status components (e.g. Status Display and Status Combiner components).</li> <li>Added new property “Enable Standby Warning”. If set to yes, the plugin will report a Compromised state to the “Device &gt; Connection Status” control pin whenever the amplifier is switched to standby. If set to no, the standby warning will be ignored.</li> </ul>
03/2020	V1.3.0	<ul style="list-style-type: none"> <li>Added new property “Port”. Allows the TCP communications port number to be changed. Amplifiers with firmware prior to V1.2.0 use port 49152. Amplifiers with firmware V1.2.0, or later, use port 1024.</li> <li>Efficiency improvements to prevent the outgoing message queue from growing too large when Q-SYS is handling a large number of IPX plugins.</li> <li>Updated the “Device &gt; Connection Status” control pin so that failure of either Dante primary or secondary is reported as compromised. Failure of both Dante primary and secondary is reported as fault.</li> </ul>
02/2021	V1.4.0	<ul style="list-style-type: none"> <li>Added new text controls for Device Name and Device ID.</li> <li>Added support for the Dynacord OMNEO Discovery plugin. Devices can now be discovered and connected using their Device Name, rather than manually entering the IP address and TCP port number.</li> <li>Removed ‘IP Address’ and ‘TCP Port’ properties. Where manual entry of these properties is still desired, they can now be entered directly on the plugin Control Panel &gt; Info page. It is no longer</li> </ul>

		necessary to recompile the Q-SYS design if the IP settings need to be changed.

# Introduction

Dynacord IPX Series power amplifiers are designed for use in fixed installation audio applications that require high power, multi-channel output, such as stadiums, arenas, houses of worship, concert halls, and theatres. There are four models in the family, all offering the same level of advanced DSP loudspeaker processing and supervision functions, but differing with their channel count and output power combinations:

- IPX5:4                      4 x 1250W @ 4 Ohms
- IPX10:4                    4 x 2500W @ 4 Ohms
- IPX10:8                    8 x 1250W @ 4 Ohms
- IPX20:4                    4 x 5000W @ 4 Ohms

All models allow each channel to be configured independently to drive either low impedance loudspeakers, or 70V and 100V lines. The amplifiers support sophisticated loudspeaker processing, numerous supervision functions, and an OMNEO network interface.

OMNEO is a media networking architecture that combines studio-quality multi-channel audio and a common control system over standard IT networks. OMNEO's media transport uses Dante, while the control system uses Open Control Architecture (OCA). OCA is an open public standard, also known as AES70, for control and monitoring of professional media networks.

The plugin supports all models of the IPX family and allows them to be integrated into the Q-SYS platform. This enables Q-SYS Core processors to control many common functions of the amplifiers, such as gain, mute, power, and preset recall. The Core can also supervise amplifier status and operating conditions in real time, including metering, temperature, and error status of both the amplifier and the connected loudspeaker loads. The plugin is compatible with all Q-SYS Core models for control and supervision functions. If the Core supports, and is configured with, either the CDN64 Dante Audio Bridge card, or software Dante, networked digital audio can also be routed between the Core and the IPX series amplifiers. Both Q-SYS Cores and IPX Series amplifiers also support the AES67 network audio protocol.

The IPX Series amplifiers should initially be setup and configured with Dynacord's SONICUE or IRIS-Net software. These are used to load the required loudspeaker settings and setup the required error notifications. Once this is done the plugin can operate simultaneously with SONICUE and IRIS-Net, or completely standalone, if they are not required for routine operation.

When the plugin connects to the amplifier it will synchronise with all the required values currently stored on the amplifier. If the values on the amplifier are different, the values in the plugin will be updated to match. For example, if channel 1 gain on the amplifier is set at -20dB but the gain fader on the plugin component is set at 0dB, when the plugin is connected to the amplifier its channel 1 gain will change to -20dB.

To simplify connecting to the IPX Series amplifier we recommend using the Dynacord OMNEO Discovery plugin to discover OMNEO compatible devices on your network. This plugin allows you to

discover and connect to your amplifier by name, without having to worry about IP addressing or TCP/IP port numbers.

This guide explains how to integrate the plugin into a Q-SYS design.

More information about Q-SYS and the Q-SYS Designer software can be found on the QSC website at; <https://www.qsc.com/resources/software-and-firmware/q-sys-designer-software/>

More information about Dynacord IPX Series amplifiers can be found on the Dynacord website at; <https://products.dynacord.com/na/en/ipx-series/>

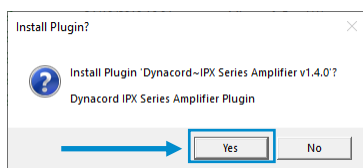
# 1. Installing the plugin

The plugin requires Q-SYS Designer version 8.3 or higher. The latest version can be downloaded from the QSC website. If necessary, install Q-SYS Designer following the instructions given by QSC.

**Note:** Plugins use the Q-SYS Scripting Engine, which is a licensed feature on certain Cores. You may need to purchase and install a feature license from QSC in order to deploy this plugin on a Core. More information can be found in the Q-SYS Designer Help and on the QSC website.

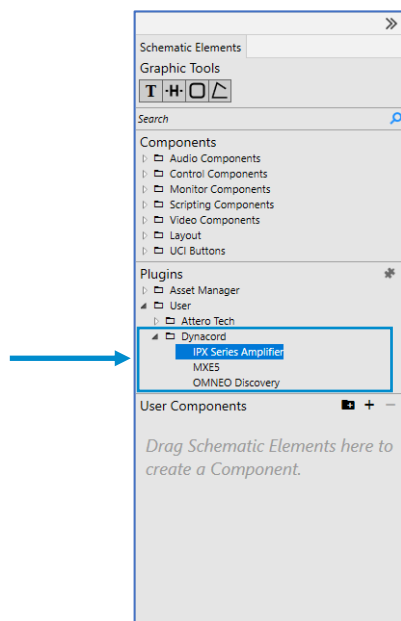
To install the plugin:

1. Double-click the plugin file **Dynacord IPX Series vx.x.x.qplug** then click **Yes** in the confirmation dialog to complete the installation.



2. Double-click on the plugin file **Dynacord OMNEO Discovery vx.x.x.qplug** to install it in the same way.
3. Open Q-SYS Designer. The plugin is located in the right-side **Schematic Elements** pane. It can be found in the Plugins section by expanding the menu option, **User > Dynacord**.
4. The plugin is now installed and ready for use in your Q-SYS design.

You can also manually install the plugin by copying the file into the Plugins folder at:  
C:\Users\username\Documents\QSC\Q-Sys Designer\Plugins



## 2. Removing the plugin

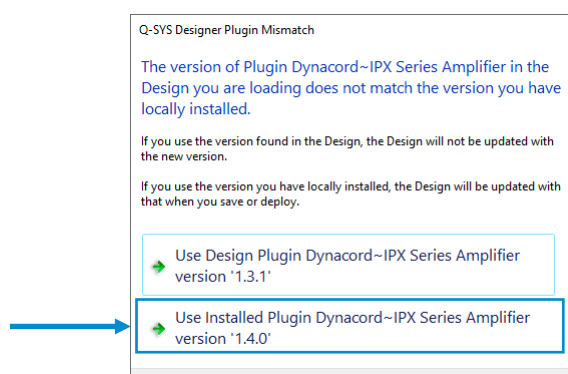
If you need to remove the plugin you can do this by deleting it from the Plugins folder at:  
*C:\Users\username\Documents\QSC\Q-Sys Designer\Plugins*

**Note:** This will not remove the plugin from any of your design projects. If you need to remove it from a design you will need to manually delete each plugin component added to the design.

## 3. Updating the plugin

If a newer version of the plugin becomes available you can update it by following the procedure to install the plugin above. Once a newer version is installed, Q-SYS Designer will ask if you want to update to that version when you next open a design containing the plugin.

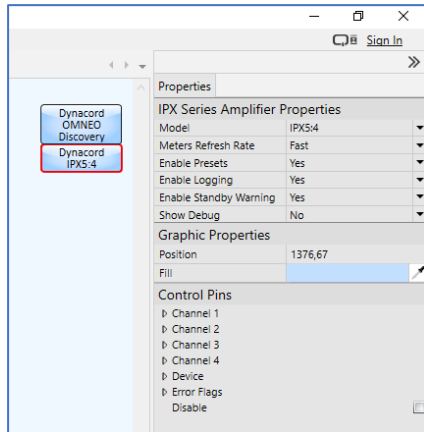
Select the option to **Use Installed Plugin** to update the design. The design will be updated when you next save and deploy it.



**Note:** If you don't want to update the plugin at this time select the option to **Use Design Plugin** instead.

## 4. Plugin overview

Drag an **OMNEO Discovery**, and an **IPX Series Amplifier** component from the **Plugins** pane onto the **Schematic**. Click the component to select it. This will also display its properties in the right-hand **Properties** pane of Q-SYS Designer.



### Properties

**Model:** Combo box to select the IPX amplifier model, the default model is the IPX5:4. Select the model that matches your amplifier from the drop-down list. The available models are;

- IPX5:4
- IPX10:4
- IPX10:8
- IPX20:4

**Meters Refresh Rate:** Combo box to select how frequently the signal meters are updated, the default setting is fast. The available options are;

- Fast - (meters are updated every 100ms)
- Medium - (meters are updated every 250ms)
- Slow - (meters are updated every 500ms)
- Off - (meters are not updated)

For most applications the refresh rate can be left on the Fast setting as this will give the best graphical display for the meters. If the network is very congested, or you are working with a very large number of amplifiers, using a slower setting will consume less network bandwidth per amplifier and Q-SYS processing horsepower. If metering is not important for your application it can be turned off completely, in this case all other supervision functions will be refreshed once per second.

**Enable Presets:** Combo box with Yes/No option, the default setting is Yes. When set to Yes, amplifier presets can be recalled from the plugin. When set to No, the Load Preset controls on the amplifier control panel will be hidden.



**Enable Logging:** Combo box with Yes/No option, the default setting is Yes. When set to Yes, OCA communication errors, and supervision errors generated by the amplifier, will be written to the Core's event log. Individual control of which supervision errors should be written to the log can be set on the 'Supervision' page of the amplifier control panel. When set to No, errors are not written to the event log.

**Enable Standby Warning:** Combo box with Yes/No option, the default is Yes. When set to Yes, the plugin will report a Compromised state on the "Device > Connection Status" control pin when the amplifier is in standby. When set to No, putting the amplifier in standby will not report a Compromised state.

**Show Debug:** Combo box with Yes/No option, the default is No. When set to Yes, the plugin will display the Q-SYS Debug Output window below the device's control panel. The Debug Output window displays the list of devices (of the same type) discovery by the OMNEO Discovery plugin, error messages, and log messages that are written to the Core's event log. Log messages are written to the Debug Window even in emulation mode, enabling you to test various device error log settings before deploying to your Core.

## Graphic Properties

**Position:** Coordinates of the plugin component on the Schematic page.

**Fill:** Sets the background colour of the plugin component.

Refer to the Q-SYS Designer Help for more information on Graphic Properties.

## Control Pins

Control pins are an advanced Q-SYS Designer function that enable controlling and monitoring of many of the plugin components parameters via other Q-SYS Control Components.

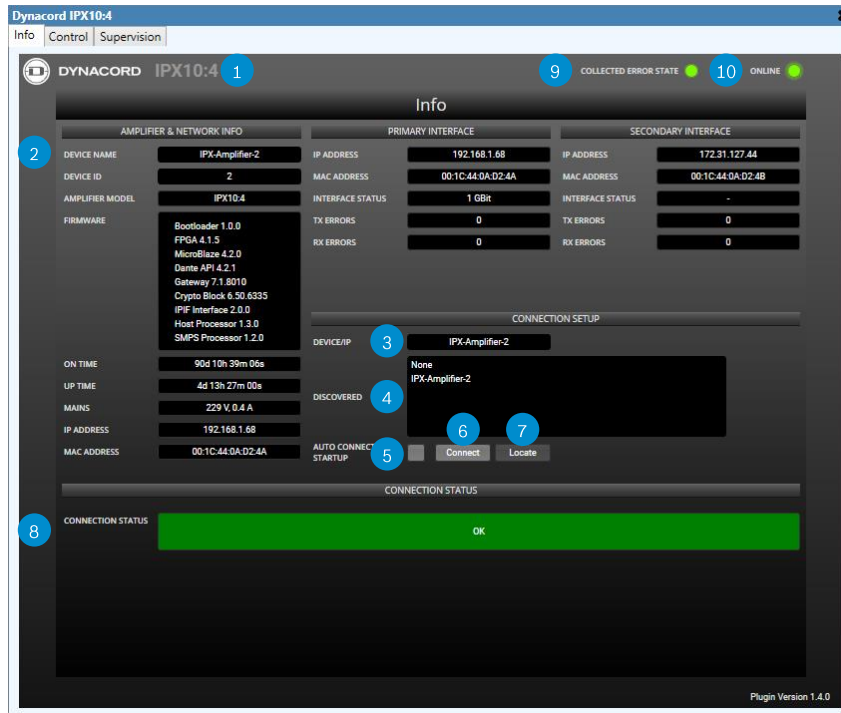
Using Control Pins and Control Components is beyond the scope of this user guide. However, there is a simple example shown for connecting to several amplifiers simultaneously in the section

**Getting Started.** Refer to the Q-SYS Designer Help for several more useful examples of using Control Pins.

## Control Panel

Double-click the component to open its control panel. Amplifier information, control, and supervision functions are split over three pages. Click the tabs at the top of the control panel to change pages.

### Info Page:



1. Displays the amplifier model.
2. Displays information about the amplifier name, ID, model, firmware, network interfaces, and operational times.
3. **Device/IP:** Displays the amplifier selected from the 'Discovered' list of devices, or allows you to manually enter the IP address and port number.
  - **Discovery mode:** Use the OMNEO Discovery plugin to find OMNEO devices on the network. Once the Discovery plugin has found devices, they appear in the 'Discovered' box. Select the device you want to control from the list.
  - **Manual mode:** The IP address and TCP/IP port number can be manually entered into the 'Device/IP' box in the format <IP address>:<Port Number>, (for example 192.168.1.100:1024). IPX amplifiers with firmware prior to V1.2.0 use TCP port 49152. Amplifiers with firmware V1.2.0, or later, use port 1024. If the port number is incorrect you will not be able to connect to the device.

**Tip:** The Device/IP box is disabled while you are connected to a device. If you need to make changes to the connection settings disconnect from the device first.

4. **Discovered:** Displays a list of compatible devices discovered by the OMNEO Discovery plugin. The list is automatically updated as devices come and go from the network. Select

the device you want to connect to from the list, or select 'None' to clear the currently selected device. If no devices appear in the list check the OMNEO Discovery plugin has been added to your Q-SYS design and that discovery is actually running (make sure the 'Start' button is pressed on the Discovery plugin). Refer to the OMNEO Discovery plugin user guide for further information.

5. **Auto Connect at Startup:** When this button is 'on' the plugin component will automatically connect to the amplifier whenever the design is saved to the Core, or the Core is rebooted.
6. **Connect:** Toggle this button to connect to, and disconnect from, the amplifier.
7. **Locate:** Toggle this button to identify a physical amplifier in a large system setup. When enabled, the amplifier's front LCD display will display identity information and the blue OMNEO LED will flash. Note, you must connect to the device first for locate to work.
8. **Connection Status:** Displays the current status to the amplifier;
  - Grey – Disconnected.
  - Blue - Initializing. Connection to the amplifier is underway, it will be available soon.
  - Green - Connected. The amplifier is now connected to the plugin component.
  - Orange - Compromised. The amplifier is in standby, or it is reporting a compromised collected error state.
  - Red - Fault. The amplifier is reporting a fault collected error state, or there is a network error and communication with the amplifier is not possible.
  - Dark Red - Device Missing. The amplifier is not responding to the plugin component.
9. **Collected Error State:** LED glows red whenever one or more supervision errors are reported by the amplifier. The supervision error flags which activate this LED are defined in SONICUE, or IRIS-Net. This LED is displayed on every page of the plugin control panel.
10. **Online:** LED glows green when the amplifier is connected to the plugin component. This LED is displayed on every page of the plugin control panel.

## Control Page:



1. **Channel Label:** Change the channel label text according to your requirements.
  2. **Input Source:** LED's glow green to indicate the channel's input signal sources;
    - **ANL** - one or more analogue signal sources are routed to this channel.
    - **NET** - one or more network (Dante) signal sources are routed to this channel.
    - **DEF** - the default signal source is currently routed to this channel.
    - **F/O** - the failover signal source is currently routed to this channel.
- Note:** Routing for the default and failover signal sources is set in SONICUE or IRIS-Net.
3. **Limiter:** Corresponding LED will glow yellow when either the Peak or RMS limiter is active. Limiter parameters are part of the speaker settings which are loaded in SONICUE or IRIS-Net.
  4. **Lspk Load:** Displays the status of the connected loudspeaker load.
    - Black - Invalid. A signal with a voltage > 150mV is required for the amplifier to measure the connected load. When the signal drops below this value the invalid indicator will be displayed.
    - Green - OK. The connected load is between the upper and lower impedance limits set in IRIS-Net.
    - Red - Open. The connected load is above the upper impedance limit set in IRIS-Net.
    - Red - Short. The connected load is below the lower impedance limit set in IRIS-Net.
  5. **Lspk Impedance:** Displays the real-time impedance of the connected loudspeaker load.

## 6. **Amplifier:**

- **Temp** - Displays the amplifier channel temperature.
  - Green - the temperature is below 65°C.
  - Yellow - the temperature is between 65°C and 75°C.
  - Red - the temperature is above 75°C.
- **Prot** - LED glows red when one of the amplifier channel internal protection functions has been activated (thermal overload, short-circuit, back-EMF, HF/DC at the output stage etc.).
- **Limit** - LED glows yellow when the amplifier channel protection limiter has been activated (thermal, over current, mains circuit breaker protection etc.).
- **Gain** - fader and text box to set the amplifier channel output level.
- **GR** - gain reduction meter showing the amount of gain reduction being applied by the digital limiters.
- **In** - input signal meter.
- **Out** - output signal meter.
- **Mute** - toggles the amplifier channel between muted and unmuted.

7. **Ch Mode:** Displays the operational mode of the corresponding group of channels (Normal, Bridge, Parallel, Par-Bridge). The channel mode is setup in IRIS-Net.

8. **Active Preset:** Displays the currently loaded preset number and description. The Edited LED glows green if any of the preset's parameters are different to the actual preset. For example, a channel gain has been changed to a value that is different to the value stored in the preset.

9. **Load Preset:** Enables a different preset to be loaded. Click the required preset number from the pop-up list. The preset name will then be displayed. The preset will not be loaded until you click the Load button. This enables the preset name to be previewed before it is applied.

**Note:** If the property **Enable Presets** is set to **No** these controls will not be displayed. This is useful if you don't want system operators to change presets.

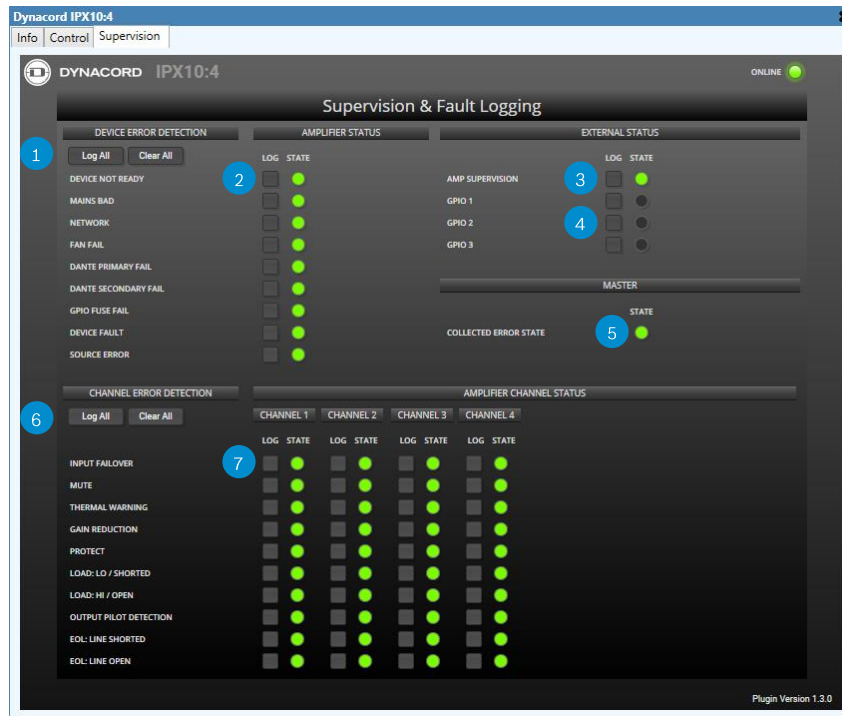
## 10. **Power:**

- **Power** - LED glows green when the amplifier is powered on and ready for operation.
- **Standby** - LED glows yellow when the amplifier is in standby mode.
- **Eco** - LED glows green when the amplifier is in eco rail mode. In this mode the amplifier is using the lower voltage rail to play low level signals, such as background music, or

pilot tone surveillance signals. Under these conditions the idle power consumption of the amplifier is considerably reduced, saving on energy costs. When the eco LED is off the amplifier is operating on its higher voltage rail, providing full output capability.

- **Power** - toggles the amplifier between the On and Standby states.

## Supervision & fault logging page:



### Device Error Detection

1. **Log All / Clear All:** Clicking these buttons provides a shortcut to selecting, or deselecting, all of the device error detection Log buttons. Individual device error Log buttons can then be toggled to customise the selection.
2. **Log:** Enables/disables writing the corresponding device error to the Core's event log.

**State:** Error state LED's glow red if the amplifier is flagging an error for the corresponding device supervision function.

### External Status - Amp Supervision

3. **Log:** Enables/disables writing external amp supervision errors to the Core's event log.

**State:** Error state LED glows red if the amplifier is flagging an error from a supervised external IPX amplifier.

### External Status - GPIO

4. **Log:** Enables/disables writing GPI Active events to the Core's event log.

**State:** Active state LED glows green if corresponding GPI digital input is on.

### **Master**

5. **State:** Error state LED glows red if the amplifier is flagging a collected error.

**Note:** This is the same collected error state as shown on the Info and Control pages.

### **Channel Error Detection**

6. **Log All / Clear All:** Clicking these buttons provides a shortcut to selecting, or deselecting, all of the channel error detection Log buttons. Individual channel error Log buttons can then be toggled to customise the selection.
7. **Log:** Enables/disables writing the corresponding channel error to the Core's event log.

**State:** Error state LED's glow red if the amplifier is flagging an error for the corresponding channel supervision function.

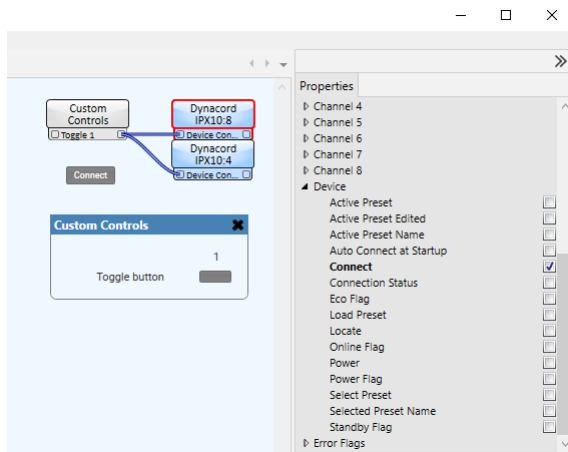
**Note:** All required supervision functions must first be enabled in SONICUE or IRIS-Net to be available through the plugin.

## **5. Getting started**

1. Drag an OMNEO Discovery component onto the Schematic. Only one discovery component is required in a design as it sends the discovered device information to all of the other Dynacord OMNEO enabled components.
2. Drag an IPX Series Amplifier component onto the Schematic for each physical amplifier you have in your system.
3. Change the Model of each component to match the amplifier model it will connect to.
4. Save the design to the Core (press F5), then double-click the OMNEO Discovery component to open its control panel and click 'Start' to begin device discovery. Refer to the OMNEO Discovery user guide for further information on working with the discovery plugin.
5. Once your device is displayed in the 'Discovered OMNEO Devices' list of the Discovery plugin, double-click the IPX amplifier component. On the Info page, select your amplifier from the 'Discovered' list, it appears in the 'Device/IP' box. Click 'Connect' to connect to the device.
6. If you don't have a Core available the plugin can also be tested in Emulation mode (press F6), then follow the remainder of steps 4 and 5.

**Tip:** You can use the Control Pins of the plugin to create a global Connect button. This is especially useful if you have several amplifiers in your system.

7. Return to Q-SYS design mode (press F7) and add a Custom Controls component from the Q-SYS Schematic Elements pane.
8. Set the Custom Controls type to a toggle button in the properties pane.
9. Enable the 'Connect' control pin on each IPX Series Amplifier component in your design.
10. Wire the toggle button control pin to each IPX Series Amplifier 'Device Connect' control pin.
11. Double-click the Custom Controls component, select the toggle button, then drag it onto the Schematic page.
12. Save the updated design to the Core (F5), or emulate (F6).
13. Now when you click the toggle button it will connect all amplifiers simultaneously.
14. You can create other global controls, such as a global mute, or a global power button, in a similar way.



## 6. AES67

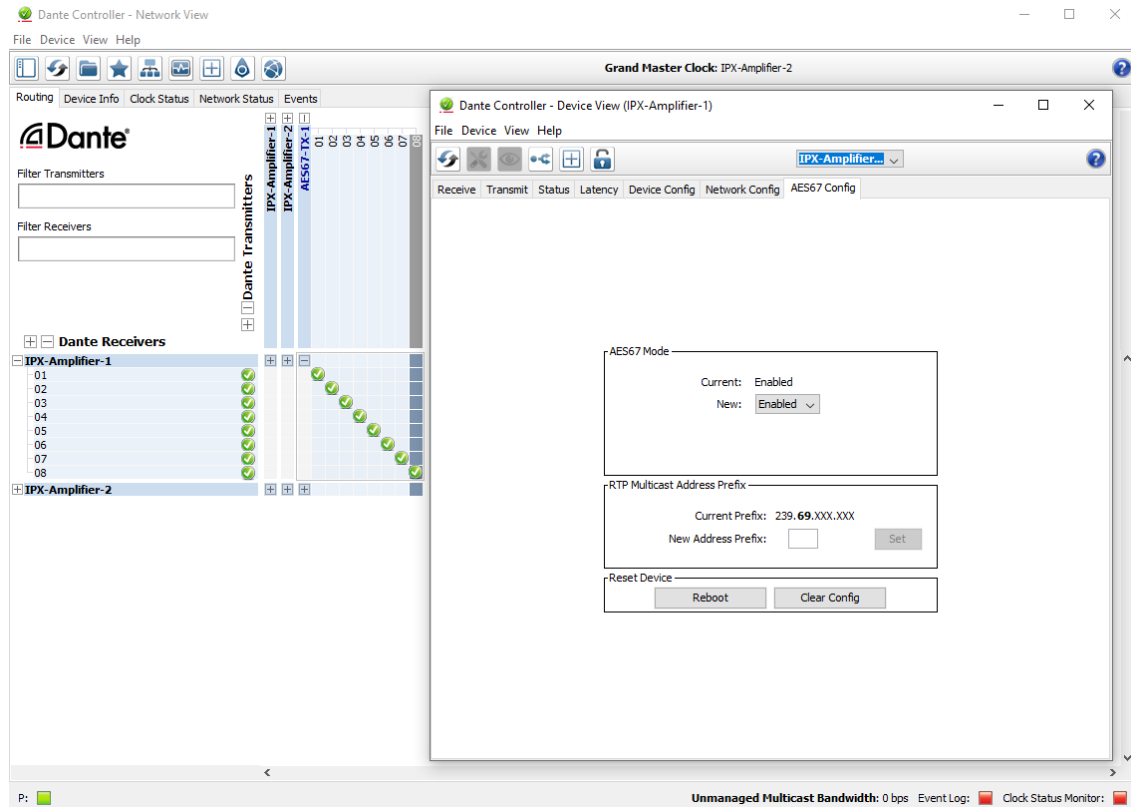
If your Core is not configured with a CDN64 Dante Audio Bridge card or Software Dante, it is still possible to transmit networked audio from the Core to an IPX amplifiers using AES67.

To enable AES67:

1. Enable AES67 mode on your IPX amplifier using Dante Controller.



- Click Reboot to apply the new configuration.



- Add an AES67 transmitter to your Q-SYS design.
- Save the design to the Core.
- Route the stream channels from the AES67 transmitter to the amplifier using Dante Controller.

**Tip:** The AES67 transmitter will not work in emulation mode. Your design must be run on a Core.

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