

MXE5 DSP Matrix Mix Engine

Q-SYS Plugin (for fixed DSP config mode)



Release Notes

Release Date	Version	Changes
10/2020	V1.0.0	<ul style="list-style-type: none">• First release.
02/2021	V1.1.0	<ul style="list-style-type: none">• Improvements to device discovery when using the OMNEO Discovery plugin.
09/2023	V1.2.0	<ul style="list-style-type: none">• Compatibility update to support SONICUE 1.3.1, and MXE5 firmware V1.4.3161 or greater.• For use with an MXE5 in fixed DSP configuration mode (if you are configuring an MXE5 for flexible DSP mode please use the Q-SYS plugin for flexible DSP configuration).• Compatible with SONICUE versions from 1.2.4 onwards

Introduction

The Dynacord MXE5 DSP Matrix Mix Engine is designed to control, mix, and route audio signals through professional audio systems in fixed installations and live audio applications. Its key features are;

- 24 x 24 mixing matrix
- 12 mic/line inputs and 8 x line outputs
- 24 x 24 Dante IO, and AES70 remote control, via the OMNEO networking interface
- 8 x GPIO control ports
- 48 kHz and 96 kHz sample rates

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 allows the MXE5 to be integrated into the Q-SYS platform. This enables Q-SYS Core processors to control many common functions of the device, such as its central matrix zone mixer, input and output channel gains and mutes, power, and preset recall. The Q-SYS Core can also supervise the MXE5's status and operating conditions in real time, including metering, and error status of numerous parameters. 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 MXE5.

The MXE5 should initially be setup with Dynacord's SONICUE software. This is used to configure DSP processing, zone mixing and loudspeaker settings, create presets, and setup the required error notifications. Once this is done the plugin can operate simultaneously with SONICUE, or completely standalone, if SONICUE is not required for routine operation.

To simplify connecting to the MXE5 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 MXE5 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 the Dynacord MXE5 can be found on the Dynacord website at; <https://products.dynacord.com/na/en/mxe5/>

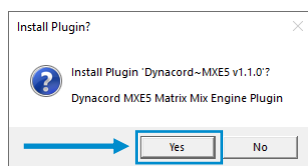
1. Installing the plugin

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.

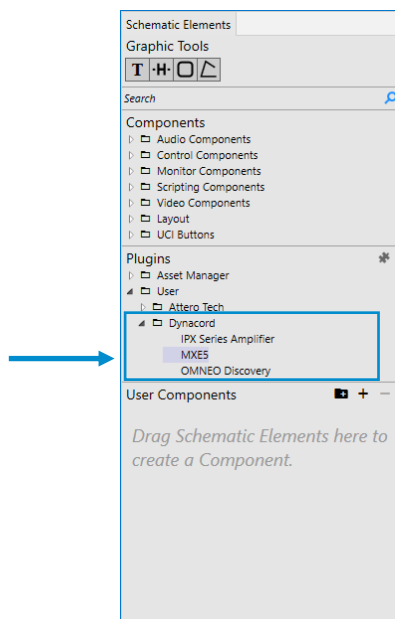
To install the plugin:

1. Double-click the plugin file **Dynacord MXE5 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 plugins are located in the right-side **Schematic Elements** pane. They can be found in the Plugins section by expanding the menu option, **User > Dynacord**.
4. The plugins are now installed and ready for use in your Q-SYS designs.

You can also manually install the plugins by copying the files into the Plugins folder (typically located) 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:

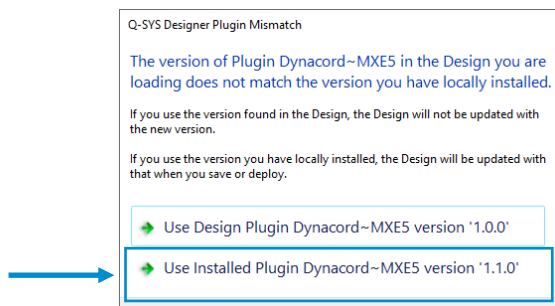
C:\Users\username\Documents\QSC\Q-Sys Designer\Plugins

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.

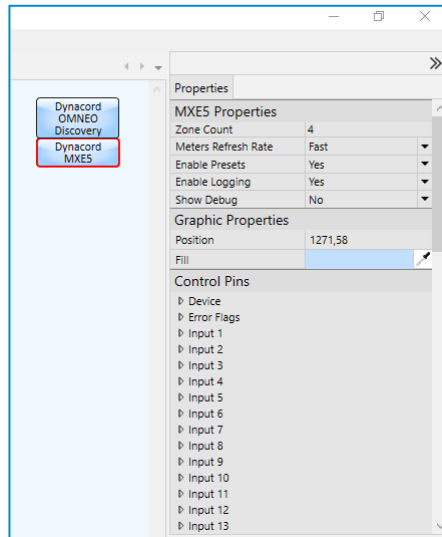
Select the option to **Use Installed Plugin** to update the design. The design will be updated when you next save and deploy it.



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** component, and an **MXE5** component from the **Plugins** pane onto the **Schematic**. Click the MXE5 component to select it. This will also display its properties in the right-hand **Properties** pane of Q-SYS Designer.



Properties

Zone Count: The MXE5 incorporates a sophisticated zone mixer to handle routing and mixing between all of the input and output channels of the matrix. It operates much like a conventional mixer, where several inputs can be mixed together and then routed to a number of subgroup outputs. On the MXE5 these subgroups, or zones as they are referred to, can each have its own entirely different mix of the available inputs. The number of zones in a design are initially set up with SONICUE, where the zones, and the inputs that are routed to those zones are defined. The Zone Count in the plugin should be set to the number of zones defined within SONICUE. Refer to the SONICUE help for further information on the matrix Zone Mixer element of the device, and how it is configured through the Routing and Mixing tabs in the SONICUE MXE5 workspace.

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 plugins, using a slower setting will consume less network bandwidth and Q-SYS processing horsepower. If metering is not important for your application it can be turned off completely by selecting the 'Off' setting.

Enable Presets: Combo box with Yes/No option, the default setting is Yes. When set to Yes, MXE5 presets, created beforehand using SONICUE, can be recalled from the plugin. When set to No, the Load Preset controls on the 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 MXE5, 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 'Info' page of the control panel. When set to No, errors are not written to the event log.

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

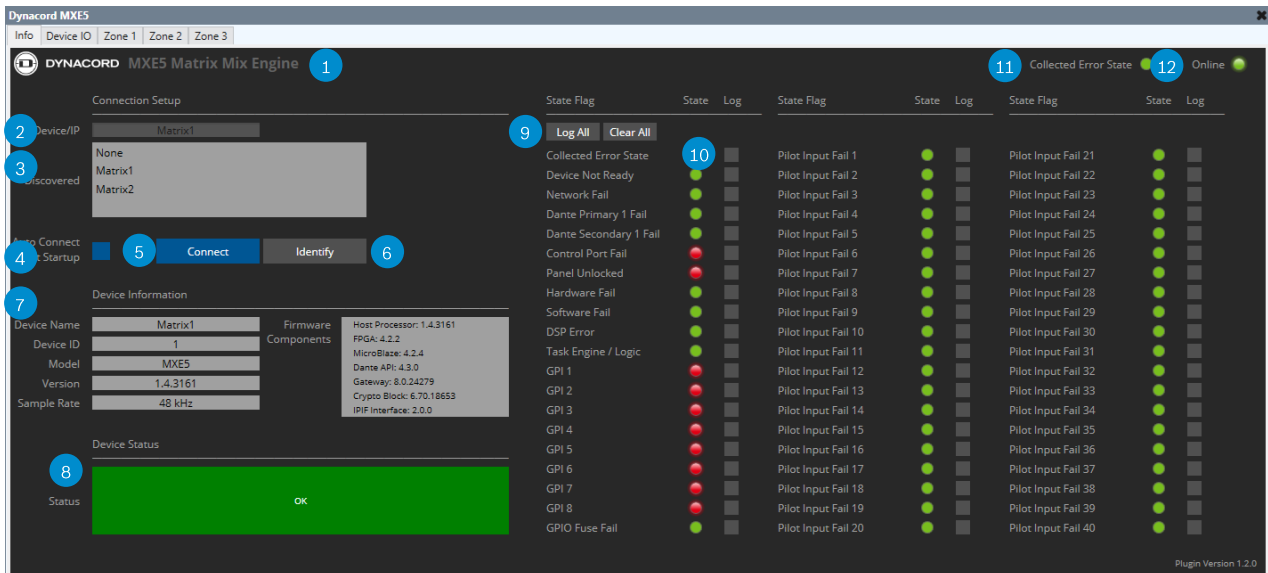
Control Pins are an advanced Q-SYS Designer function that enable controlling and monitoring of many of the plugin components parameters via other Q-SYS Control Components.

Using Control Pins and Control Components is beyond the scope of this user guide. However, there are a couple of simple examples shown in the section **Getting Started**. Refer to the Q-SYS Designer Help for more examples of using Control Pins.

Control Panel

Double-click the component to open its control panel. Device information, IO, and zone mixing functions are split over several pages. Click the tabs at the top of the control panel to change pages.

Info Page:

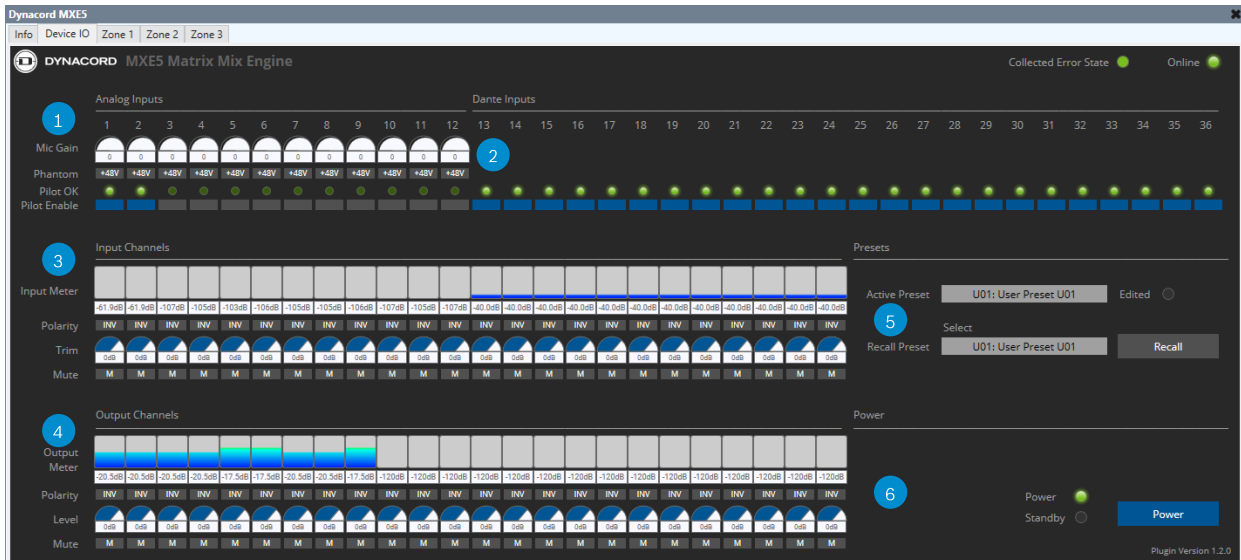


1. Displays the MXE Matrix model.
2. **Device/IP:** Displays the MXE5 selected from the 'Discovered' list of devices, or allows you to manually enter the IP address and port number.
 - **Discovery mode:** Use the OMNEO Discovery plugin to find OMNEO devices on the network. Once the Discovery plugin has 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 192.168.1.100:32485). Manual mode can be useful for testing but be aware that the MXE5 assigns its port number dynamically and it will almost certainly change each time the device is rebooted or power cycled. If the port number is incorrect you will not be able to connect to the device. Therefore, it is recommended to use the discovery method, with the OMNEO Discovery plugin, whenever possible. If you need to use manual mode to test or debug an installation the OMNEO Discovery plugin is still an invaluable tool for finding the port number the MXE5 has been assigned. The Discovery plugin displays a list of all OMNEO devices discovered on the network including the device type, the device name, its IP address, and the port number it is using.

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.

3. **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.
4. **Auto Connect at Startup:** When this button is enabled (blue background = enabled) the plugin will automatically attempt to connect to the MXE5 whenever the design is saved to the Core, or the Core is rebooted/power cycled.
5. **Connect:** Toggle this button to connect to, and disconnect from, the MXE5 (blue background = connect).
6. **Locate:** Toggle this button to identify a physical device in a large system setup (blue background = enabled). When enabled, the MXE5's front panel LCD display will show identity information and the blue OMNEO LED will flash. Note, you must connect to the device first for locate to work.
7. Displays information about the MXE5 including version and firmware, and the current sample rate.
8. **Status:** Displays the current status of the MXE5;
 - Grey – Disconnected.
 - Blue – Initializing: Connection to the MXE5 is underway, it will be available soon.
 - Green – Connected: The plugin component is now connected to the MXE5.
 - Orange – Compromised: The MXE5 is reporting a Compromised collected error state.
 - Red – Fault: The MXE5 is reporting a Fault error state, or there is a network error and communication with the device is not possible.
 - Dark Red - Device Missing: The MXE5 is not responding to the plugin component.
9. **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.
10. **Log:** Enables/disables writing the corresponding device error to the Core's event log.
11. **Collected Error State LED:** Glows red whenever one or more supervision errors are reported by the MXE5. The supervision error flags that activate this LED are defined in SONICUE. This LED is displayed on every page of the plugin control panel.
12. **Online LED:** Glows green when the MXE5 is connected to the plugin component. This LED is displayed on every page of the plugin control panel.

Device IO Page:



1. Analog Inputs:

- **Mic Gain** – sets the input gain of the analog input.
- **Phantom** – enables phantom power on the analog input (blue background = enabled).
- **Pilot OK** – LED glows green to indicate that the input is receiving the pilot tone supervision signal from an upstream device.
- **Pilot Enable** – Enables pilot tone supervision for the input (blue background = enabled). Note, when pilot tone supervision is disabled the ‘Pilot OK’ LED will also extinguish.

2. Dante Inputs:

- **Pilot OK** – LED glows green to indicate that the input is receiving the pilot tone supervision signal from an upstream Dante device.
- **Pilot Enable** – Enables pilot tone supervision for the input (blue background = enabled). Note, when pilot tone supervision is disabled the ‘Pilot OK’ LED will also extinguish.

3. Input Channels: The MXE5 supports up to 24 input channels selected from any of the 12 analog, and 24 Dante input sources that are available. How the available input sources are patched to the DSP input channels is set up in SONICUE. Although all available input sources are displayed in the plugin, not all of them may be in use. When creating custom UCI's, remember to select only the controls that have been enabled in SONICUE.

- **Input Meter** – VU signal meter for the input channel in dBFS.
- **Polarity** – Inverts the polarity of the input channel (blue background = inverted).
- **Trim** – Adjusts the level of the input channel, most commonly used to balance the input levels of differing input sources where the adjustment cannot be made at the output of the upstream device.
- **Mute** – Mutes the input channel (red background = muted). Input meter signal levels are taken pre-input mute; therefore, the meters will continue to display signal level even when the channel is muted.

4. **Output Channels:** The MXE5 supports up to 24 output channels selected from any of the 8 analog line, and 24 Dante outputs that are available. How the DSP output channels are patched to the physical outputs is set up in SONICUE.

- **Output Meter** – VU signal meter for the output channel in dBFS.
- **Polarity** – Inverts the polarity of the output channel (blue background = inverted).
- **Level** – Adjusts the level of the output channel.
- **Mute** – Mutes the output channel (red background = muted).

5. **Presets:**

- **Active Preset** – Displays the currently loaded preset number and description.
- **Edited LED** - glows red if any of the preset's parameters are different to the actual preset. For example, a channel trim level has been changed to a value that is different to the value stored in the preset.
- **Recall Preset** – Enables a different preset to be recalled. Click the required preset from the pop-up list to select. The preset will not be recalled until you click the 'Recall' button.

Note: If the **Enable Presets** property is set to **No** the Recall Preset controls will not be displayed. This is useful if you don't want system operators to change presets. Also, the plugin can only be used to recall presets, you must create them first using SONICUE. If you select a preset that hasn't previously been saved, recalling it will have no effect.

6. **Power:**

- **Power LED** - Glows green when the MXE5 is powered on and ready for operation.
- **Standby LED** - Glows red when the MXE5 is in standby mode.
- **Power** - Toggles the MXE5 between the On and Standby states (blue background = on).

Zone page(s):



SONICUE enables the Zone Mixer to be changed dynamically in real-time (number of inputs per zone, number of busses, whether outputs are mono or stereo, and so on). However, we need to know all of the available inputs, and busses in advance in Q-SYS so we can create our UCI's etc. Therefore, all of the available inputs and bus controls for a zone are provided on the plugin. When you create custom UCI's just drag off the sub-set of controls you actually need. The signal meters are the pre-zone mixer and post-zone mixer meters when viewed on the MXE5 workflow in SONICUE. They are all displayed on every Zone control page, but only certain meters will be relevant to each particular zone.

1. **Zone Outputs:**

- **Left/Mono** – Left (if the zone bus output has been configured as stereo in SONICUE), or mono bus output level.
- **Left/Mono Mute** – Left/mono but output mute (red background = muted).
- **Right** – Right bus output level, has no effect if that particular bus output is mono.
- **Right Mute** – Right bus output mute, has no effect if that particular bus output is mono (red background = muted).
- **Label** – Text edit box to allow you to add your own custom label for the bus.

2. **Master** – Master level and mute controls for the zone.

3. **Zone Mixer Output Meters:** Post-zone mixer output signal meters in dBFS.

4. **Zone Inputs:**

- **Pan/Balance** – Pan for a mono input channel, balance for a stereo input.
- **Level** – Input channel level fader.
- **Meter** – Pre-zone mixer input signal meter in dBFS.
- **Mute** – Input channel mute (red background = muted).
- **Label** - Text edit box to allow you to add your own custom label for the input.

5. **Test Generators:** Zone mixer inputs 25 and 26 are dedicated to the noise (input 25) and sine (input 26) generators on the MXE5. Enable the generators in SONICUE if you wish to use them with the plugin.

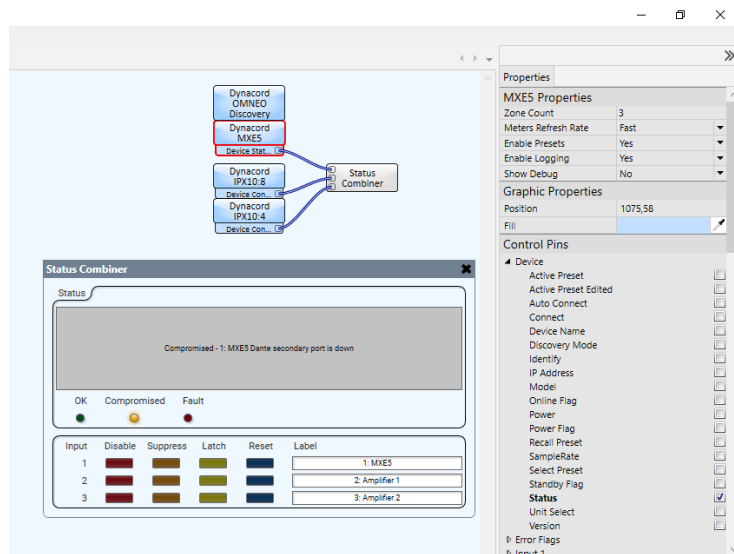
5. Getting started

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 MXE5 component onto the Schematic for each physical device you have in your system.
3. Change the Zone Count property to match the number of zones created in SONICUE.

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 MXE5 component. On the Info page, select your MXE5 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.
7. When the plugin connects to the MXE5 it will synchronise with the control values currently stored on the device. If the values on the device are different, the values in the plugin will be updated to match. For example, if channel 1 trim on the MXE5 is set at -20dB but the trim knob on the plugin component is set at 0dB, when the plugin is connected to the device its channel 1 trim knob will change to -20dB.

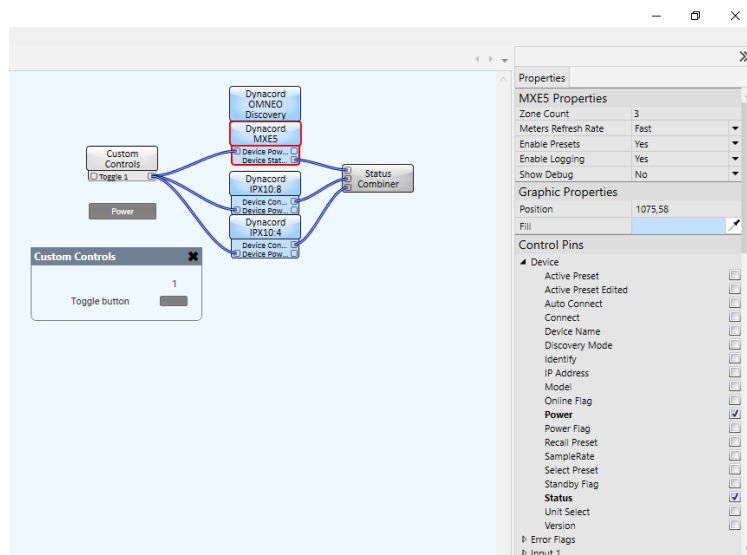
Tip 1: You can use the 'Status' control pin of the plugin to send the status of multiple devices to a Q-SYS Status Combiner component.

8. Return to Q-SYS design mode (press F7) and add a Status Combiner component from the Schematic Elements pane. In this example we will use this to collect the status of an MXE5 and several Dynacord IPX Series amplifiers.
9. Enable the 'Status' control pin on the MXE5 and the 'Connection Status' control pin on each IPX amplifier component in your design.
10. Wire the status control pin of each MXE5 and IPX amplifier to an unused input pin on the Status Combiner. If necessary, increase the 'Input Count' property of the Status Combiner to match the number of devices in the system.
11. Save the updated design to the Core (F5), or emulate (F6).
12. Now, after going online to all of the devices, the status of the entire system of the MXE5 and IPX amplifiers can be monitored from a single point.



Tip 2: You can also use the control pins to create global controls, such as a global mute, or a global power button. Here, one control can be used to activate a function simultaneously on numerous devices.

13. Add a Q-SYS Custom Controls component from the Schematic Elements pane.
14. Set the custom control's type to a 'toggle button' in the properties pane.
15. Enable the 'Power' control pin on each MXE5 and IPX amplifier component in your design.
16. Wire the toggle button control pin on the custom control to the MXE5 and IPX amplifier 'Power' control pins.
17. Double-click the custom controls component, select the toggle button, then drag it onto the Schematic page. Resize the toggle button to make it a little larger, and label it 'Power'.
18. Save the updated design to the Core (F5), or emulate (F6).
19. Now when you click the toggle button it will power up/down all of the MXE5 and IPX amplifiers simultaneously.



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