



APPLICATION NOTES

QSYS PLUG-IN FOR CANALI SERIES DSP+D, X-SERIES & T-SERIES V.2.2

QSYS PLUG-IN CANALI SERIES DSP+D, X-SERIES & T-SERIES V.2.2

This document is intended to assist the user in deploying the QSYS Plug-in for Canali Series DSP+Dante, X-Series, and T-Series. The plug-in is designed to read from and control Input, Matrix and Output Sections. The Plug-in uses a UDP Application Programming Interface (API) for Alarms, Meters, and Snapshot management. The Plug-in uses an HTTP API to control Gain, Mute, Standby Mode, and amplifier configuration. The Plug-in also uses a WebSocket connection to receive Mains Voltage and Detected Impedance information. All output parameters are controlling the *Ways EQ* section of Armonía Plus except for Delay and Polarity which are controlling the *Advanced EQ* section of Armonía Plus.

Requirements

There are a few requirements to run the plug-in and control an amplifier:

- Powersoft Amplifier Model: *Duecanali 804 DSP+D*, *Duecanali 1604 DSP+D*, *Duecanali 4804 DSP+D*, *Duecanali 6404 DSP+D*, *Quattrocanali 1204 DSP+D*, *Quattrocanali 2404 DSP+D*, *Quattrocanali 4804 DSP+D*, *Quattrocanali 8804 DSP+D*, *Ottocanali 4K4 DSP+D*, *Ottocanali 8K4 DSP+D*, *Ottocanali 12K4 DSP+D*, *X4*, *X4L*, *X8*, *T302*, *T602*, *T304*, *T604*, with firmware v.1.10.
- QSYS Core with QSYS Designer v.8.0 or later software and firmware.
- Powersoft [Armonía Plus Software](#) v.2.0 or later.

Preparation

In preparation for the use of the plug-in, the user needs to set, or discover the IP address on the amplifier. The amplifier by default is set to receive an IP address from a DHCP server. If there is no DHCP server on the network, the amp will default to an address within the IP subnet: 169.254.X.Y, where X and Y are variable and unique to each unit.

Following are the steps to connect to the amp and read its IP address:

1. Connect the amplifier and the PC to the same network or connect them directly together if no network switch exists.
2. If there is no DHCP server available, set the PC Network Interface Card (NIC) to an address within the subnet 169.254.X.Y, otherwise, skip to the next step.
3. Open Armonía Plus software and hit *Match*, then *Discovery*. The Amp should appear under the list of amplifiers discovered on the network. By hovering the mouse over an amplifier its current IP Address and firmware version will be displayed.

Following are the steps to set the amplifier's IP address:

1. After turning "On" Synchronization, click on and drag the amp from the *Discovery* column into the *Workspace*.
2. Click on *Config* and select the amp to be configured in the *Workspace*.
3. Under "Select Mode" choose *DHCP* if a DHCP Server is present on the network and the amp is due to have a dynamic address or choose *Static* to assign a static IP address to the amp. The IP address must be a member of the subnet the QSYS core is operating within.
4. Click *Apply* and close Armonía Plus.



Installation

The plug-in will come as a “.qplugx” encrypted QSYS Plug-in file. Following are the steps to install the plug-in for use with QSYS to control Powersoft amplifiers.

1. Once the plug-in is downloaded, deposit the file *Powersoft DSP+D, X & T-Series v.2.2.qplugx* into the PC’s folder: C:\Users\UserNameHere\Documents\QSC\Q-Sys Designer\Plugins.
2. Close QSYS Designer and re-open it.
3. The plug-in will appear in the “Plugins” tab (Figure 1) under Powersoft. Click on it and drag it into your design.

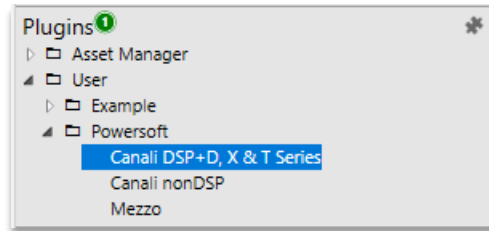


Figure 1 – Screenshot of Plugins section in QSYS Designer.

Getting Started

Following are the steps to get started with the plug-in:

1. Select the “Canali DSP+D, X & T Series” QSYS Control Module plug-in in the design.
2. Choose the model to control in the QSYS Properties pane (Figure 2).
3. Expand and connect any control pins you wish to incorporate into the design (Figure 3).
4. Enter a local UDP Port between 1024 and 49151. If controlling multiple amps, each instance of the plug-in must have a different local UDP Port (Figure 4).
5. Enter the IP Address of the amp you wish to control into the designated text field (Figure 5).
Important Note:
Please know that once the IP Address has been entered, the user is controlling the amp at that IP address. Any further action is writing to the unit.
6. Click on the *Link* button to begin the initial amp settings read process and to begin the polling/connection scheme (Figure 5).



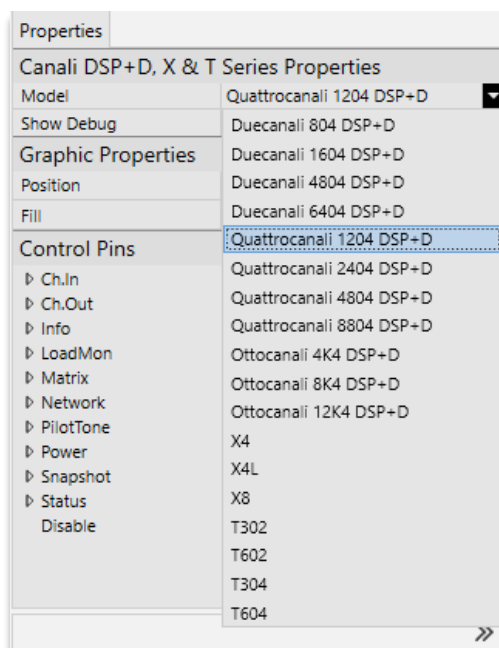


Figure 2 – Screenshot of QSYS Designer’s Properties Pane.

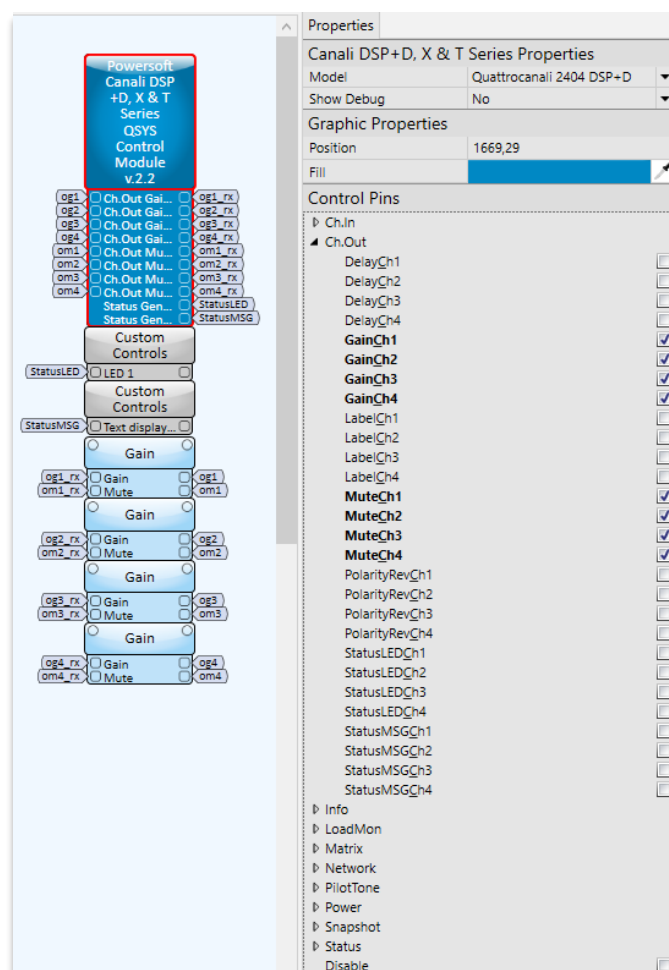


Figure 3 – Screenshot of Control Pins of the Plug-in QSYS Designer.



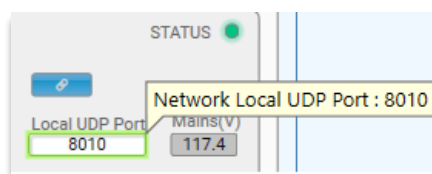


Figure 4 – Screenshot of Local UDP Port text field.



Figure 5 – Screenshot of IP Address text field and Link button.

Features

Following is a list of the plug-in features:

- In the top left corner of the plug-in's *Main* page, the *Model* of the Amp amplifier is listed. Initially, the model is selected in the Properties Pane by the user to configure the Plug-in's channel count. The *Model* appears when the user clicks the *Link* button, and the plug-in begins reading from the amplifier. If the channel count for the plug-in model selected in the Properties Pane does not match the channel count of the amp the Plug-in is reading from, the plug-in will still function, but an error will appear on the *Status* LED stating, *Incorrect Model*.
- The Power button is used to manually put the amp into Power-On, or Standby mode.
- The momentary *Blink* button will engage the (10) second LED Blink sequence. The *Blink* function can help to verify communication and identify the amp in a rack.
- The *Name* text field is for the Nickname that will live on the amplifier.
- The text entry field *IP Address* is available for the user to enter the IP Address of the Amp due to be controlled:
 - The IP address must be a 32-bit numeric IPv4 address written as (4) numbers separated by periods.
 - If the IP address is invalid a warning will appear on the *Status* LED for a few seconds.
- The text entry field *Local UDP Port* is available for the user to enter the local UDP port the QSYS Core will use to receive messages from the amplifier this instance of the Plug-in is communicating with:
 - The acceptable range for *Local UDP Port* is from 1024 to 49151
 - The Plug-in uses the UDP API for, Global Alarms, Channel Alarms, Signal Presence and Headroom Metering, as well as for Snapshot Management.



- The plug-in transmits to the amp on UDP Port 1234. This is set statically within the API. The local UDP port is used to distinguish the plug-in from other instances that are running within the design when receiving solicited messages from amp.
 - When controlling multiple amplifiers using multiple instances of the plug-in, each instance must have a unique *Local UDP Port* number.
- The *Mains(V)* display field shows the RMS value of the AC Voltage applied to the amplifier from the power service.
 - The *Link* button behaves according to toggle logic. Once a valid *IP address* and *Local UDP Port* are entered and the *Link* button is pressed, the plug-in reads all available settings and information from the amp and begins the polling with simulated connection sequence.
 - The *Status LED* is a virtual LED that can indicate several conditions in the Amp.
 - A status message of “OK” and **green** LED color is to be expected when the amplifier is running normally.
 - The *Status LED* will shine **blue** when the amplifier is in Standby Mode.
 - There are fault warning messages accompanied by a **red** LED color for the following conditions: Invalid IP Address, Incorrect Model Selected, Connection Fault, Moderate Temperature Fault, High Temperature Fault, Fan Fault, Auxiliary Voltage Rail Fault, Digital Board Temperature Fault, and Power Supply Temperature fault. If the user witnesses a **red** LED color on the *General Status LED*, they can check the *General Status Message* text and it will indicate which alarm has been triggered. The *General Status Value* will read; “OK,” “Fault,” “Compromised,” or “Missing,” depending on the condition. The Status Message pin can be used in QSYS Status Combiner to indicate the condition of the system.
 - *Serial Number* is a read-only field with data read from amp. Listed is the hardware serial number on the amp. It is read each time the user clicks the *Link* button.
 - *Firmware* is a read-only field with data read from Amp. Listed is the firmware version that lives on the amplifier. It is read each time the user clicks the *Link* button.
 - The Input section is displayed in (2) different states depending on whether the input channel’s Backup Strategy is in *Auto* (Figure 6), or in *Force* mode (Figure 7). Both modes contain the following features:
 - *Input Label* – This label lives entirely within the QSYS environment.
 - *Backup Strategy* – This control determines whether the fail-over source selection for an input is automatic (*Auto*) based on signal presence or forced (*Force*) based on a user selection.
 - *Source Priority n* – This input source slot is the n^{th} priority of the fail-over source selection scheme if the Backup Strategy is in *Auto* mode for that input channel.
 - *Input Gain* – The gain control for the input channel. The range is from -60dBu to 15dBu.
 - *Mute* – The Mute control for the input channel. The icon change is feedback from the amp confirming that the input is muted.



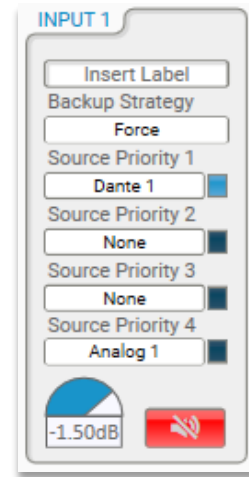
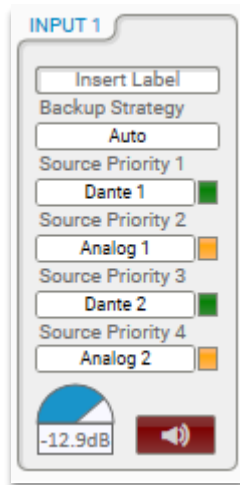


Figure 6 – Screenshot Input Section in “Auto” Mode. Figure 7 – Screenshot Input Section in “Force” Mode.

Beside each Input Source Slot there is either an indicator, or a button.

When the input channel is in *Auto* mode the graphic is an indicator:

- *Source Signal Presence Indicator* – These **green** indicators adjacent to each input source slot turn **yellow** when the input source in that slot is sounding. The indicator will turn **red** if the signal clips.

When the input channel is in *Force* mode the graphic is a button:

- *Source Priority Force Button* – These **blue** buttons adjacent to each input source slot force that input slot to play as the input’s source’s default priority when selected.

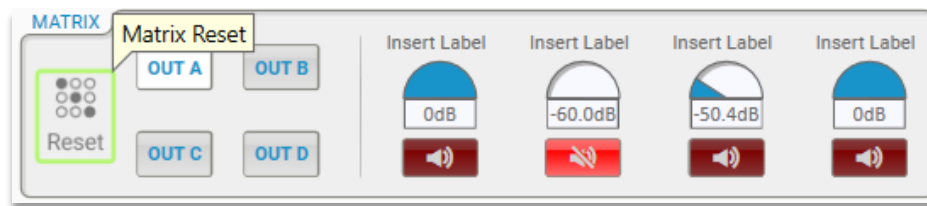


Figure 8 – Screenshot of the Matrix Section of a (4) Channel Amp

- The Matrix section is made up of the following controls (Figure 8):
 - *Output Select Buttons* – Pushing one of these buttons will display the mix of matrix input channels and mute orientation, with respect to the matrix output channel which is selected. The choices will depend on the number of channels that your amplifier has; 2, 4 or 8 channels. Upon start-up **OUT A** output select button is engaged. These buttons work according to interlock logic. Only (1) button can be active at a time.
 - *Matrix Reset Button* – This momentary button resets the visible mutes to off and assigns the gain of the corresponding input to output cross-point to 0dB. This action simultaneously assigns the gain of the other cross-points associated with the selected output to -60dB. This action is only applied to the matrix cross-points for the output which is currently selected and in view.
 - *Input Label* – Above each matrix gain and mute control is the input label. This label lives entirely within the QSYS environment and is not associated with a parameter in



the amplifier's API. It is the label name which the user has entered in the Input Section.

- *Matrix Gain* – Each matrix cross-point has a gain control associated with it. The mix to only (1) output's gain knobs is shown at a time. That which is shown is the mix of the matrix inputs to the selected matrix output.
- *Matrix Mute* – Each matrix cross-point has a mute associated with it. The icon change is feedback from the device that the cross-point is muted. That which is shown is the configuration of the mutes for the matrix inputs to the selected matrix output.

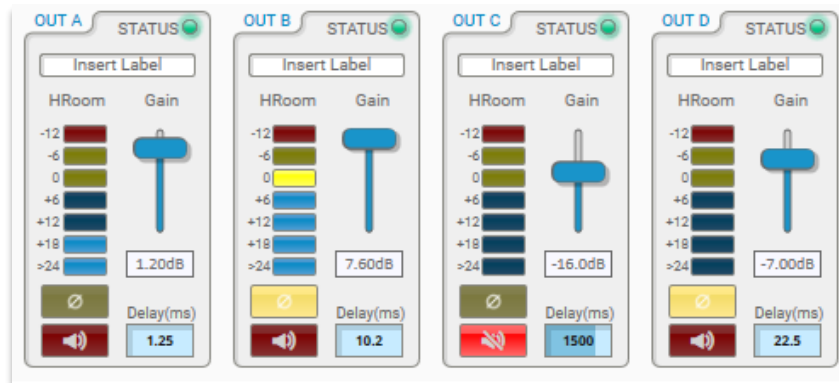


Figure 9 – Screenshot of the Output Section of a (4) Channel Amp.

- The Output Section is made up of the following controls (Figure 9):
 - The Channel *Status* LED – This virtual LED can indicate several conditions in the amplifier for the output channel.
 - A general status of “OK” and **green** LED color is to be expected when the amplifier channel is running normally.
 - There are channel status messages accompanied by a **red** color for the following channel conditions: Temperature Fault, Thermal Limiting Fault, Clip Signal Fault, Voltage Rail Fault, and Current Rail Fault. The Channel's Status Message pin can be used in QSYS Status Combiner to indicate the condition of the system.
 - *The Output Label* – This label lives entirely within the QSYS environment and is not associated with a parameter in the amplifier's API.
 - *Headroom* – A useful indicator which demonstrates the available dynamic range the user has on that output channel. The range depicted is from greater than (>) 24dB to -12dB: The blue LEDs Indicate 6dB steps of reduction in the headroom available below the limiter threshold for that channel.
 - The first **blue** LED >24 indicates signal presence.
 - The first **yellow** LED indicates a gain reduction of 0 to 6dB due to limiting.
 - The second **yellow** LED indicates that the output is experiencing a gain reduction of 6 to 12dB.
 - The **red** LED indicates a gain reduction of more than 12dB.
 - *Gain* – The gain for the output. It ranges from -60dBu to +15dBu.
 - *Polarity Invert* – A toggle button which will invert the polarity of the output channel.



- Mute – The Mute button for the output channel. The icon change is a result of feedback from the Amp confirming that the output channel is muted.
- Delay – The amount of delay applied to the output channel. The output delay range is from 0.00ms to 2000.00ms with refinement to 1/100ms.

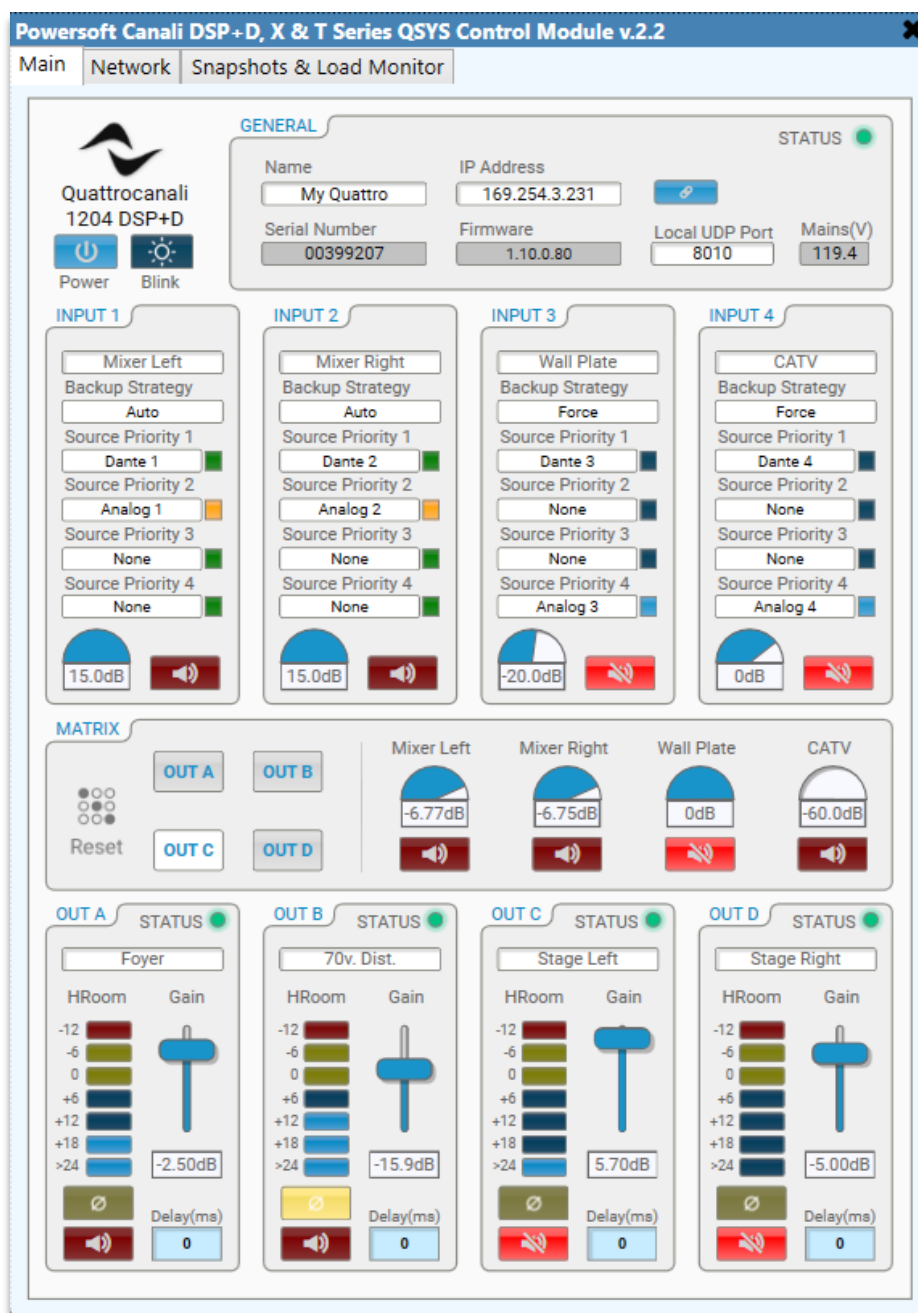


Figure 10 – Screenshot of Plug-in Main Page.



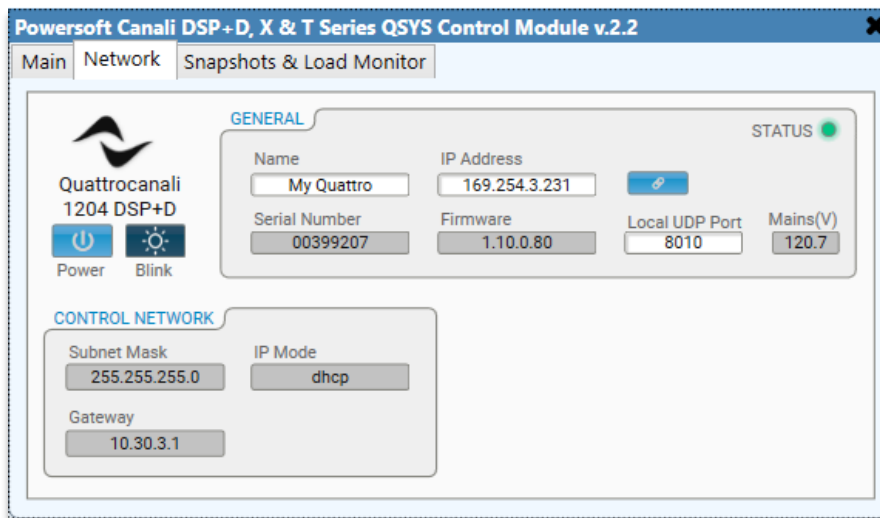


Figure 11 – Screenshot of Plug-in Network Page.

- The Network page has many identical controls to the Main page. These controls include *Power*, *Blink*, *Nickname*, *IP Address*, *Link*, *Serial Number*, *Firmware*, *Local UDP Port*, and the *Status LED*.
- The Network page also has read-only text fields for the Amp network settings, such as: *Subnet Mask*, *IP Mode* (DHCP, or Static) and the *Gateway* address.

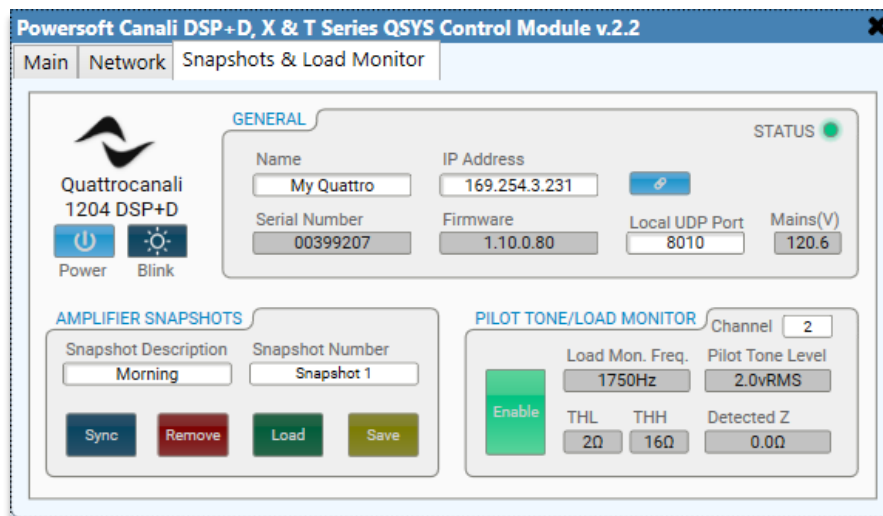


Figure 12 – Screenshot of Plug-in Snapshots & Load Monitor Page.

- The Snapshots & Pilot Tone page also has many of the same features such as *Power* and *Blink* control and the parameters that live within the *General* Group box found on other pages. Additional control elements include a section to manage the amplifier's Snapshots and another section to enable the Pilot Tone and read the Load Monitor settings.



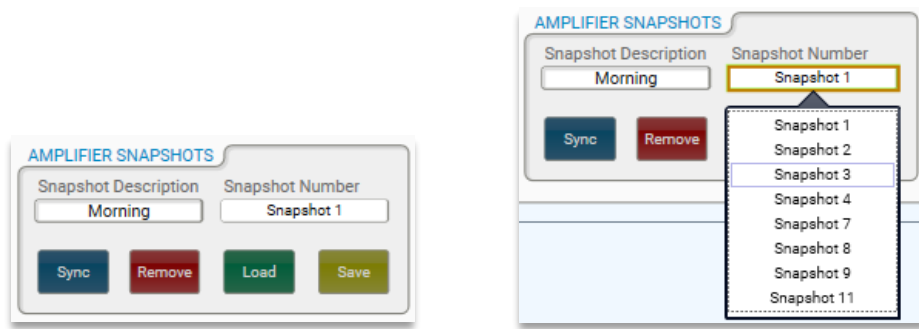


Figure 13 & 14 – Screenshots of Amplifier Snapshots Management Section.

- When the user clicks the “Link” button at the beginning of the session an amplifier read process begins. At one step in this process, the Plug-in synchronizes itself with the existing snapshots that live on the amplifier.
- (Figure 15) is a screen shot of Armonía Plus showing the existing Snapshots on the amplifier.
- The user can click on the *Snapshot Number* combo-box and choose from the existing Snapshots which they wish to *Load*. The custom name of the Snapshot will appear in the *Snapshot Description* field.
- The user can choose to *Load* the Snapshot, modify parameters in the plug-in and then *Save* the Snapshot, or *Remove* the Snapshot from the amplifier.
- If the user wishes to change the name of the Snapshot along with the parameter adjustments, enter the new name in the *Snapshot Description* field before hitting *Save*.

Important Note:

Each Snapshot is a settings picture of the entire amplifier. The Snapshots can be setup within A+, or within the plug-in. Hitting Save will overwrite every available plug-in setting onto the amp, including the name of the Snapshot if it has been changed.

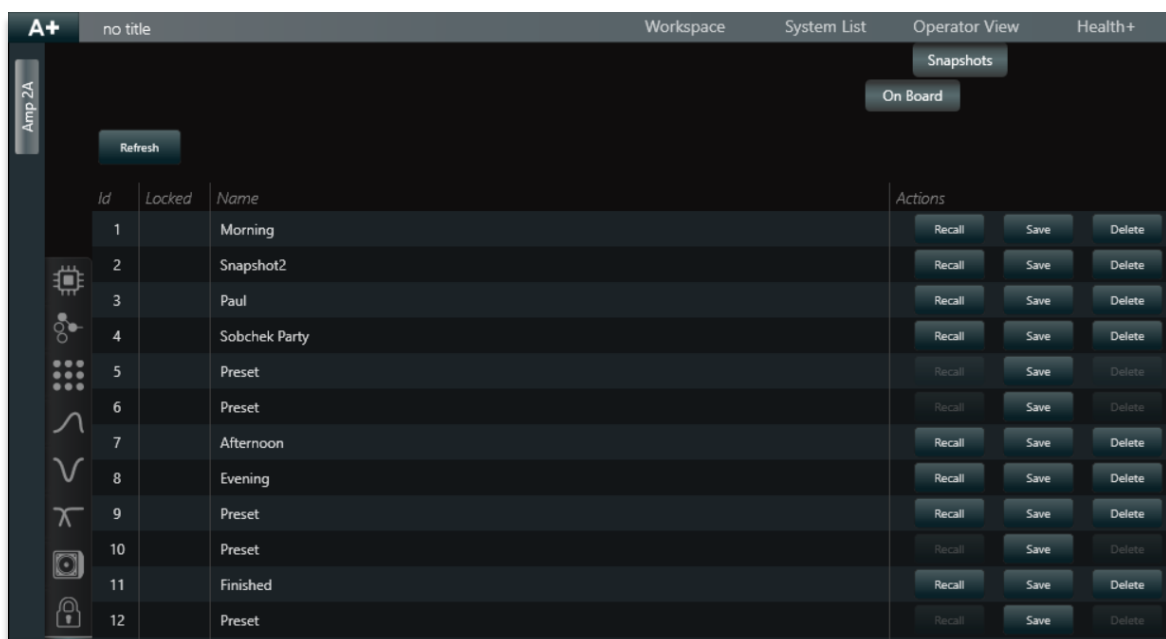


Figure 15 – Screenshot of Armonía Plus Software On-Board Memory page.



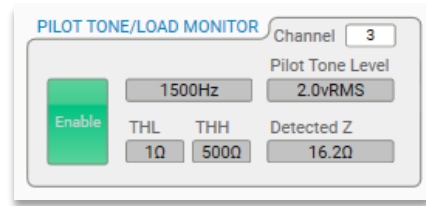


Figure 16 – Pilot Tone and Load Detect Area.

- By default, the Pilot Tone and Load Detect polling and functionality are disabled. When the user selects a channel the polling for Load Monitor Frequency, Pilot Tone Level, Load Detect Threshold Low and Load Detect Threshold High begins.
 - These settings are all entered and configured using Armonía Plus Software. The Plug-in is monitoring and displaying these settings for each channel selected.
- After selecting an output channel, the Pilot Tone can be Enabled.

Final Comments

- If replacing an amplifier in an existing system use Armonía Plus to assign the replacement amp the Static IP Address and to *Match* it with that amp in the system. This process will ensure that the amplifier is running the latest firmware and that all configuration settings, routing, Snapshots, and naming will be preserved in the system and written to the replacement amp. After the initial configuration by Armonía Plus, any further management of the available settings can be done within the QSYS plug-in.

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