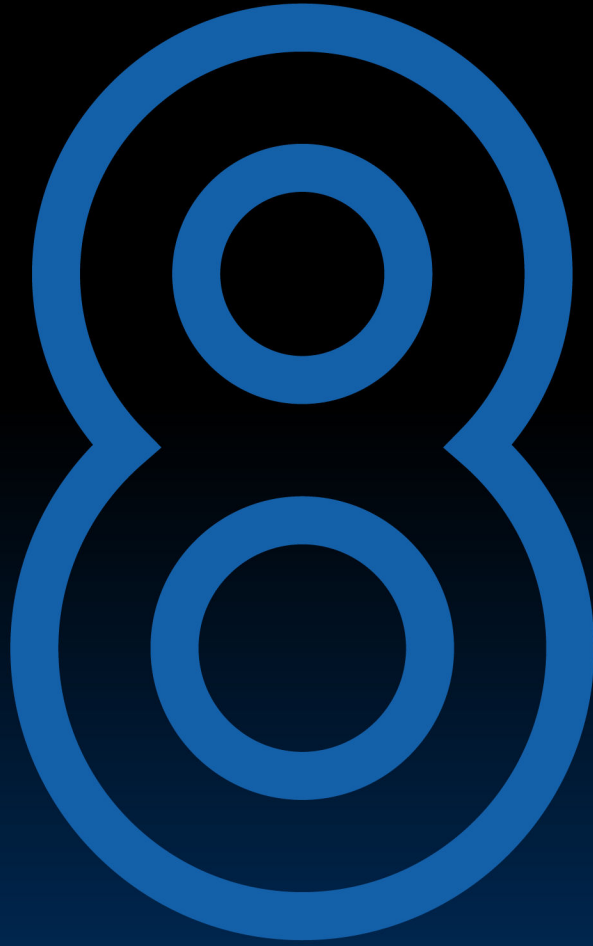


System Engineer 8 User Manual



system engineer
CONTROL • TELEMETRY

Table of Contents

Introduction	4
About Linea Research Amplifiers	4
Purpose of the Manual	4
Who is this Manual for?	4
How to use this manual	4
Technical Support	4
Installation	5
System Requirements	5
Installing on Windows	5
Installing on MacOS devices	6
Installing on Windows	6
Network and Connection Guide	7
Recommended Networking with Linea Research Devices	7
Requirements	7
Static IP Configuration	7
Auto IP Configuration	9
User Interface	10
Global Window	11
Application Settings	12
Setup Workflow	13
Preset Workflow	14
Tune Workflow	15
Crossover and Limiters in the Tune Workflow	16
Groups in the Tune Workflow	17
Configuring a Device	19
Loading and Saving a Device Settings File	19
Device Operations	21
Snapshots	22
Saving a Snapshot	22
Recalling a Snapshot	24
Input Sources	24
Input Type	24
Setting Input Fallover	26
Creating a Drive Module	28
Setting Output Load Impedance	28
Setting Device IP and Subnet Mask	30
Setting Device Power Options	32
Using Multi-Select in the Setup Workflow	33
Device Monitoring	35
Preset Management	36
Local Preset Management	36
Import a Published Preset Library	36
Saving a Preset Library	37
Creating a Folder	37
Creating a New Preset	38
Preset Preview	40
Loading a Preset to a Drive Module	41
Saving a Preset from a Drive Module	42
Device Memory Management	42
Device Memory Folders	42
Tune Workflow	46
Arranging your System	46
Arranging Drive Modules on The Canvas	47
Using the Quick Views	48
Equalisation	49
Using the EQ Drag Handle	50
Using EQ Toggle	51
Crossovers	52
Limiters	53
Using Multi-Select	55

Using Overlay Groups 56

 Adding and Removing Drive Modules to and from Overlay Groups 57

Output Channel Monitoring 58

 Output Channel Monitoring User Interface 58

Introduction

Welcome to the user manual for System Engineer 8. This manual is designed to help you understand, set up, and use our amplifier and DSP control software effectively. Whether you are a first-time user or an experienced professional, this guide will provide you with the information you need to get the most from System Engineer 8 and maximise the potential of your Linea Research DSP Amplifiers.

About Linea Research Amplifiers

Linea Research is known for its innovative and high-quality audio products. Linea Research DSP amplifiers combine cutting-edge technology with superior sound quality, providing a reliable solution for various audio applications. These amplifiers offer advanced signal processing capabilities, user-friendly software interfaces, and reliable performance, making them ideal for live sound and fixed installations.

Purpose of the Manual

This manual aims to:

- Provide comprehensive instructions for installing and using the software.
- Help users configure and optimise their DSP amplifiers and controllers for different applications.
- Serve as a reference for troubleshooting and maintenance.

No prior experience with DSP amplifiers and controllers is required, but a basic understanding of audio systems will be beneficial.

Who is this Manual for?

This manual is intended for:

- Sound engineers and audio technicians.
- System integrators and installers.
- Anyone responsible for setting up and managing audio systems.

How to use this manual

This manual is organised into several sections, each focusing on a different aspect of the software. The table of contents allows you to navigate to specific topics. Key features and instructions are highlighted for easy reference. The first sections of the manual will cover system requirements, installation, and network configuration. We will then cover the user interface, followed by the remainder of the user manual, which covers different use cases in step-by-step 'how-to' guides.

Technical Support

For technical support and enquiries, please contact our support team at support@linea-research.co.uk or visit our support page, [Linea Research Support](#). Our website offers additional resources, including FAQs, software and firmware updates: linea-research.co.uk/

Installation

This section provides detailed instructions for installing System Engineer 8 Amplifier and DSP Controller software on your computer. Please read the following information carefully to ensure a successful installation.

System Requirements

Hardware

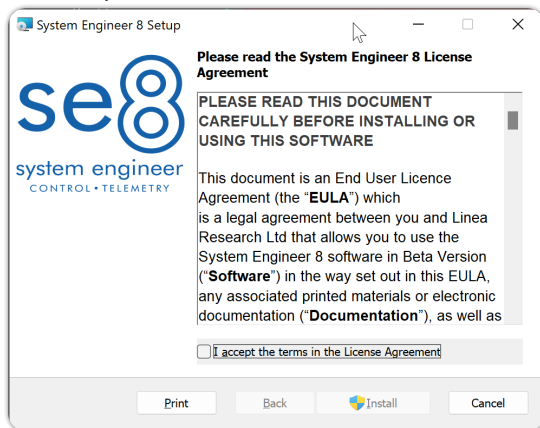
- **Processor:** Intel Core i5 or higher
- **RAM:** 8 GB
- **Hard Disk Space:** 1 GB free space
- **Display:** 1920 x 1080 resolution
- **Network:** Ethernet or high-speed Wi-Fi connection for remote control features

Software

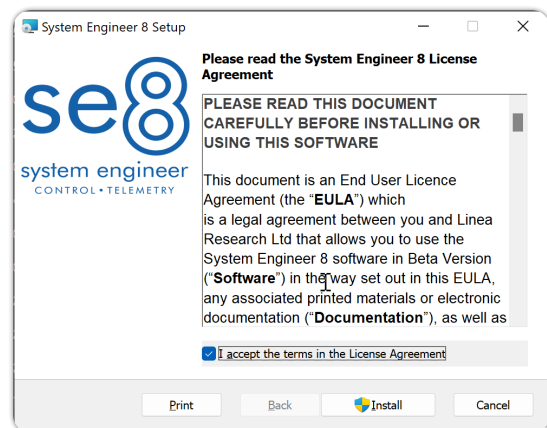
- **Operating System:** Windows 10/11 (64-bit)

Installing on Windows

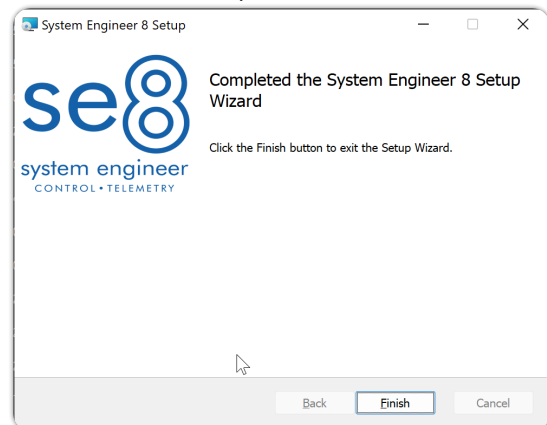
1. Download the latest version of System Engineer from the Linea Research website [System Engineer 8](#).
2. Run the installer
 - a. Locate the downloaded installer file **System.Engineer.8.1.xx.xx.x.msi**
 - b. Double-click the installer file to begin the process.



3. License Agreement:
 - a. Read the End User License Agreement.
 - b. If you agree to the terms, select **I accept the agreement** and click **Install**.



4. Click **Finish** to complete the installation.



Installing on MacOS devices



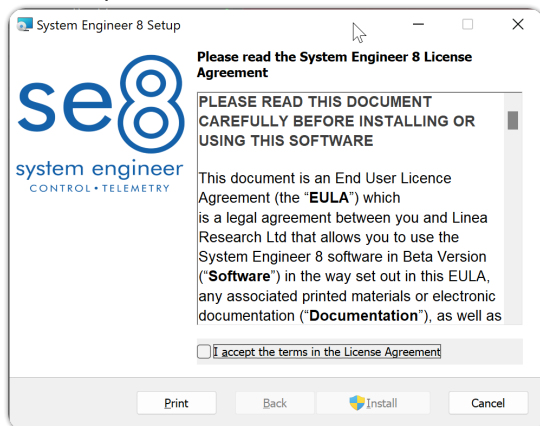
NOTICE

While System Engineer 8 software is designed to run on native Windows environments, users may choose to install and run the software on Windows ARM through Parallels Desktop for Mac. Before proceeding with this installation method, please carefully read and understand the following disclaimer:

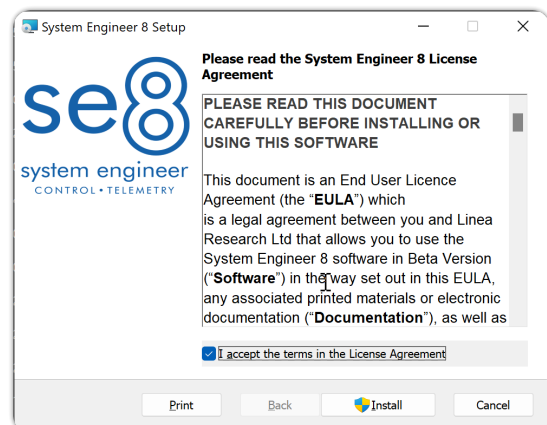
1. **Compatibility:** System Engineer 8 software is primarily developed and tested for Windows running on x86 and x64 architectures. Running the software on Windows ARM via Parallels Desktop for Mac may result in unexpected behaviour, performance issues, or compatibility problems.
2. **Performance:** Due to the emulation layer provided by Parallels Desktop, the software may not perform as efficiently as it would in a native Windows environment. Users might experience slower performance, increased latency, or other performance-related issues.
3. **Support Limitations:** Official technical support for System Engineer 8 software is only provided for installations on native Windows environments (x86/x64/ARM). While we strive to assist our users to the best of our ability, we cannot guarantee support for issues arising from using Parallels Desktop.

Installing on Windows

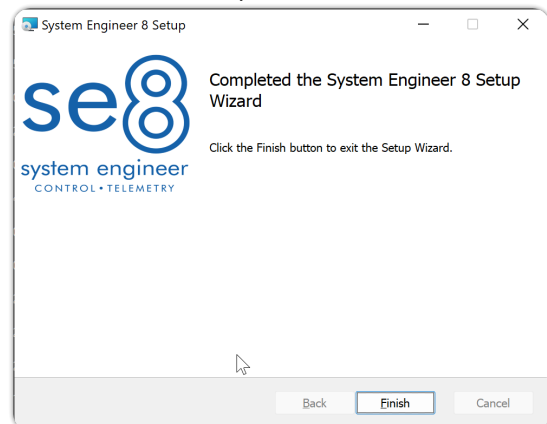
1. Download the latest version of System Engineer from the Linea Research website [System Engineer 8](#).
2. Run the installer
 - a. Locate the downloaded installer file **System.Engineer.8.1.xx.xx.x.msi**
 - b. Double-click the installer file to begin the process.



3. License Agreement:
 - a. Read the End User License Agreement.
 - b. If you agree to the terms, select **I accept the agreement** and click **Install**.



4. Click **Finish** to complete the installation.



Network and Connection Guide

This guide provides detailed instructions on connecting to Linea Research Amplifiers with System Engineer 8 using TCP/IP. It covers setting up a Static IP, Auto IP, and adding a DHCP server.

Recommended Networking with Linea Research Devices

Linea Research recommends using separate Network Interface Cards (NICs) and data networks for control, audio, and third-party equipment control data. This separation optimises network performance, reduces latency, and enhances reliability. It also supports scalability, simplifies troubleshooting, and improves overall system performance. If separate physical networks cannot be implemented, VLAN networks can be used to segregate data effectively.

Requirements

Before starting, ensure you have the following:

- Linea Research Amplifier or Controller
- Ethernet cable
- Computer with network interface
- Network switch or router if connecting more than one device

Static IP Configuration



NOTE

For information on setting Static IP using System Engineer 8, Please see [Setting Device IP and Subnet Mask \[30\]](#) in the System Engineer 8 User Manual.

1. Connect the Computer to the Amplifier or Controller
 - a. Connect your computer to the amplifier or controller using an Ethernet cable. If you are connecting more than one device, ensure that all devices and the computer are connected to an ethernet switch.
 - b. Ensure that your computer's network interface is enabled.
 - c. Ensure the amplifiers and controllers you wish to connect to are configured in Static IP mode. *See step 3 in this guide for more detail*
2. Configure Network Settings on Your Computer
 - a. Open the network settings on your computer.
 - b. Select the network interface to which your amplifiers and controllers are connected.
 - c. Navigate to the TCP/IPv4 properties.
 - d. Set the IP address to a static address within the same subnet as the amplifier. For example:
 1. IP Address: 192.168.1.100
 2. Subnet Mask: 255.255.255.0

3. Default Gateway: 192.168.1.1 (if applicable)



NOTE

On M-Series Amplifiers and ASC48 Controllers, the current IP Address flashes on the front panel's home screen when Static IP mode is active. The current subnet mask is viewable from the Utility menu.

3. Set Static IP on the Amplifier or Controller Using the Front Panel Control
 - a. Setting Static Mode using the Front Panel Control
 - i. From the device's Utility Menu, use the up or down navigation buttons to find the **IP Mode** menu.
 - ii. Using the Select encoder, select **Mode**.
 - iii. Using the Adjust encoder, Select **Static Mode**

- b. Setting the Static IP address using the Front Panel Control
 - i. From the device's utility menu, use the up or down navigation buttons to find the **IP Static** menu.
 - ii. Using the Select and Adjust encoders, Enter a static IP address within the same subnet as your computer.
For example:
IP Address: 192.168.1.100
 - c. Setting the Subnet Mask using the Front Panel Control
 - i. From the device's Utility Menu, use the up or down navigation buttons to find the **IP Mode** menu.
 - ii. Using the Select encoder, select **Subnet**.
 - iii. Using the Select encoder, select the CIDR Notation for the Subnet you wish to use. You should ensure that all devices on the network are within the same subnet range that we previously set on the computer.
Example **/24**
4. Connect to Amplifiers and Controllers
Now that your amplifiers and controllers are in the same IP and Subnet ranges, you can launch System Engineer 8, and your devices will be discovered.



NOTE

Classless Inter-Domain Routing (CIDR) notation is a method for describing IP addresses and their associated network prefixes. It simplifies the representation of subnet masks and allows for more efficient IP address allocation. CIDR notation combines an IP address with a suffix that indicates the number of bits used for the network part of the address.

Example: 192.168.1.0/24

The prefix length (the number after the slash) specifies the number of bits used for the network portion of the address. The remaining bits are used for the host portion.

- **/8**: 8 bits for the network, 24 bits for hosts (e.g., 255.0.0.0)
- **/16**: 16 bits for the network, 16 bits for hosts (e.g., 255.255.0.0)
- **/24**: 24 bits for the network, 8 bits for hosts (e.g., 255.255.255.0)

Auto IP Configuration



NOTE

When amplifiers and controllers on a network are initially connected in Auto IP mode without a DHCP server, the orange Online LED on the front panel will flash. This indicates that the device is waiting for an IP address to be assigned. This will continue for up to 120 seconds, after which the device will assign itself an IP address. Amplifiers and controllers will not be discovered by System Engineer 8 while the orange LED is flashing on the front panel.

1. Connect the Computer to the Amplifier or Controller
 - a. Connect your computer to the amplifier or controller using an Ethernet cable. If you are connecting more than one device, ensure that all devices and the computer are connected to an ethernet switch.
 - b. Ensure that your computer's network interface is enabled.
 - c. Ensure the amplifiers and controllers you wish to connect to are configured in Auto IP mode. *See step 3 in this guide for more detail.*
2. Configure the Computer to Use Auto IP
 - a. Open the network settings on your computer.
 - b. Select the network interface to which your amplifiers and controllers are connected.
 - c. Navigate to the TCP/IPv4 properties.
 - d. Select **Obtain an IP address automatically**.
3. Set Auto IP on the Amplifier or Controller Using the Front Panel Control
 - a. From the device's Utility Menu, use the up or down navigation buttons to find the **IP Mode** menu.
 - b. Using the Select encoder, select **Mode**.
 - c. Using the Adjust encoder, Select **Auto Mode**
4. Connect to Amplifiers and Controllers

Now that your amplifiers and controllers are set to Auto IP, you can launch System Engineer 8, and your devices will be discovered.

User Interface

Welcome to the User Interface section of the System Engineer 8 user manual. This section will help you become familiar with the software's user interface layout and features. It provides a comprehensive overview of each workflow to ensure that you can navigate and use the application effectively.

Overview

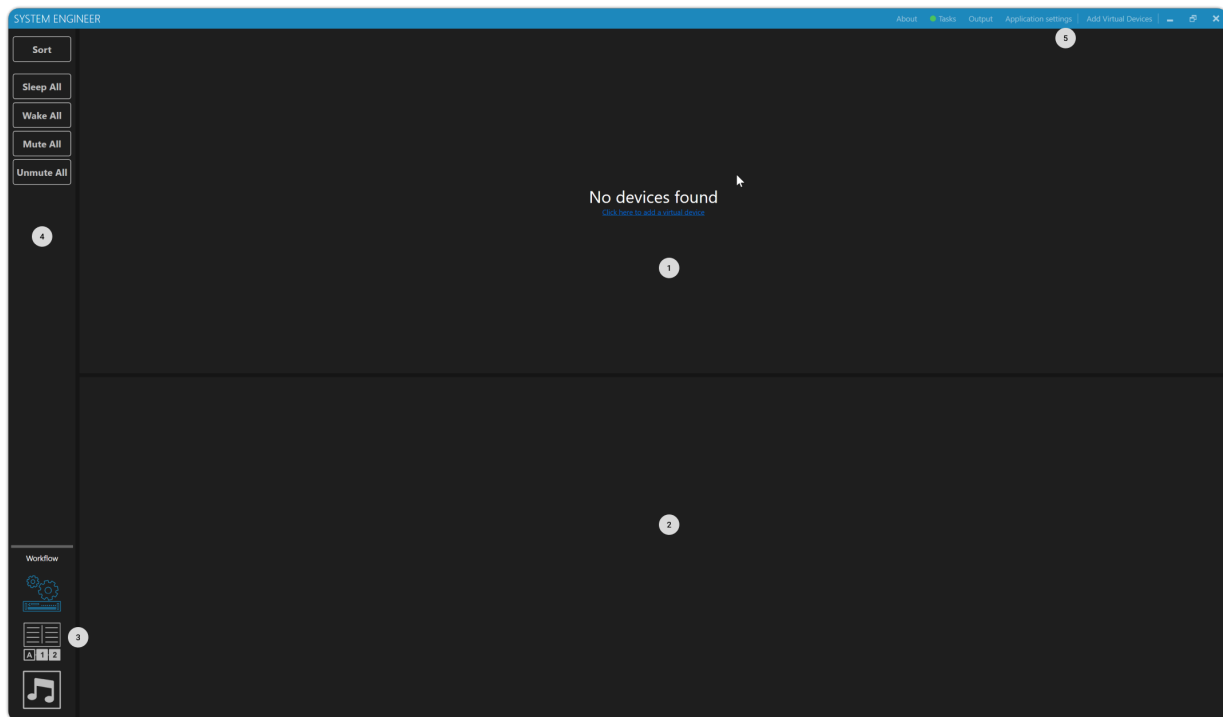
The user interface of System Engineer 8 is designed with user-friendliness and functionality in mind. Whether configuring Devices, monitoring a system, or adjusting DSP parameters, the intuitive single-window layout makes it easy to access and manage all features.

In this section, you will find detailed descriptions and visual guides for each part of the user interface, including:

1. Global Window
2. Application Settings
3. Device Workflow
4. Preset Workflow
5. Tune Workflow

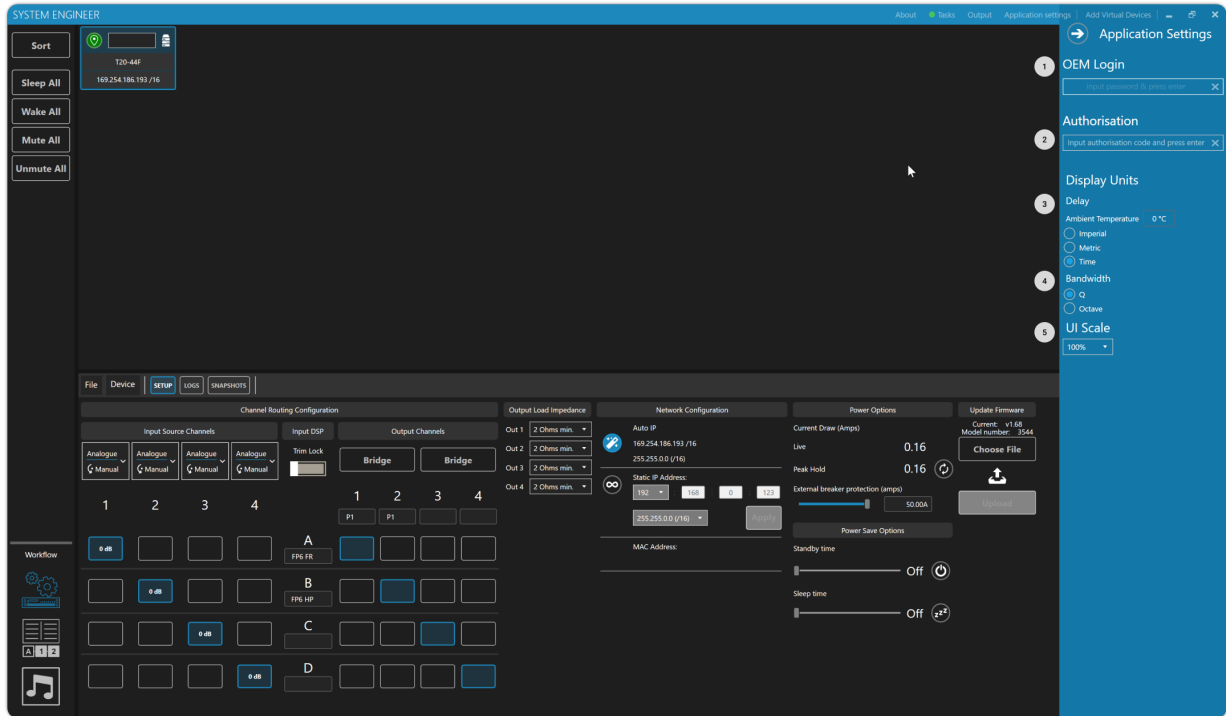
It is recommended to study this section in its entirety before moving on to the User story step-by-step guides at the end of this user manual.

Global Window



1. **Explorer** - The Explorer View on the top half of the screen shows connected devices or drive modules depending on your selected workflow.
2. **Detail View** - The Detail View on the bottom half of the screen displays the editable parameters from the selected device or Drive Module in either Setup Work Flow or Tune Work Flow. In the Preset workflow, the Detail View displays your User Preset Libraries and any Published Manufacturer Libraries.
3. **Workflow Navigation** - The Workflow Navigation buttons are located at the bottom left of the window. They allow you to navigate the different workflows: Setup, Presets, and Tune.
4. **Tool Bar** - The Toolbar is located on the upper left of the window. Common tools across all workflows are Sleep all, Wake all, Mute All and Un-mute all.
5. **Global Menu Bar** - The Global Menu Bar contains the About Page, Tasks, Output, Application Settings and the Virtual Devices flyout window.

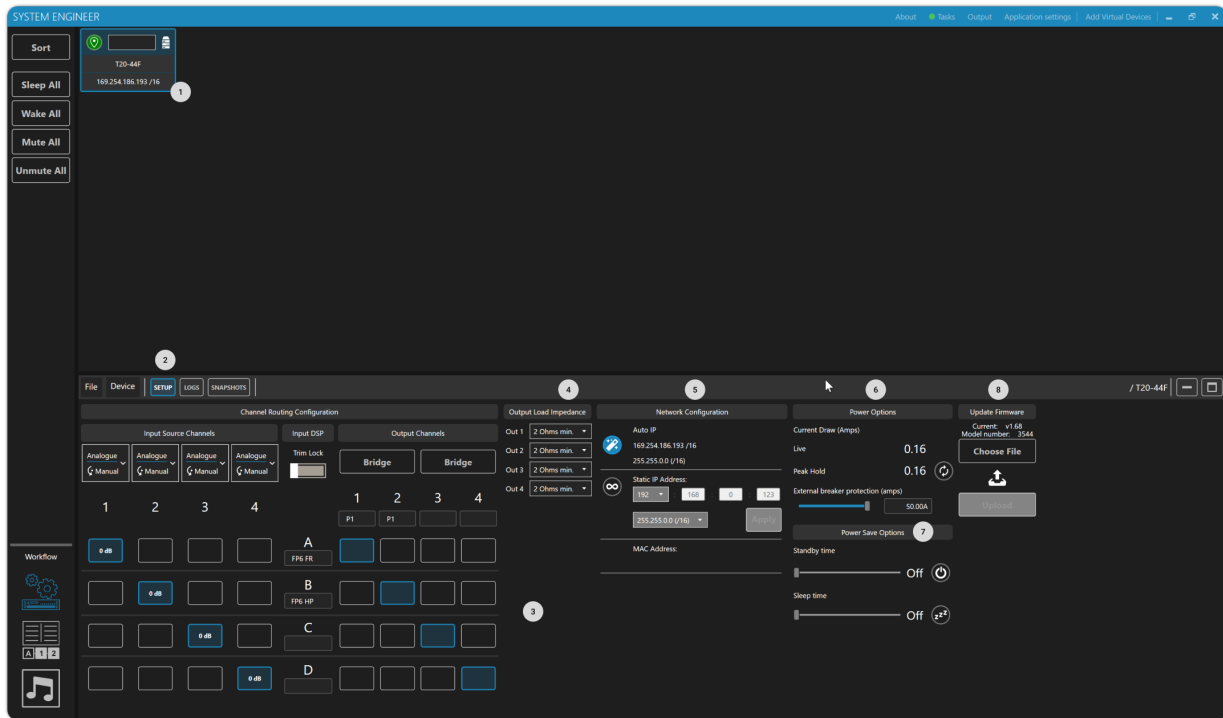
Application Settings



1. **OEM Login** - If you are an OEM user you can enter your OEM password here to access your OEM features.
2. **Authorisation** - Please input your brand authorisation here. If you've installed System Engineer by downloading the installer from the Linea Research website, the default brand will be Linea Research and will provide access to Linea Research Virtual Devices. If you need access to virtual devices for a different brand, you should obtain a configured installer from the brand's website or contact the brand directly for the authorisation code.
3. **Display Units Delay** - This allows you to change the global Delay Units between Imperial, Metric or Time. The selection will persist between sessions.
4. **Display Units Bandwidth** - This allows you to change the global EQ Bandwidth Units between Q and Octave. The selection will be persisted between sessions.
5. **UI Scale** - Changing the UI Scale allows for scaling the UI between 50% and 150%. For the best user experience, it is recommended to keep both the Windows native scaling and System Engineer 8 UI Scaling at 100%.

Setup Workflow

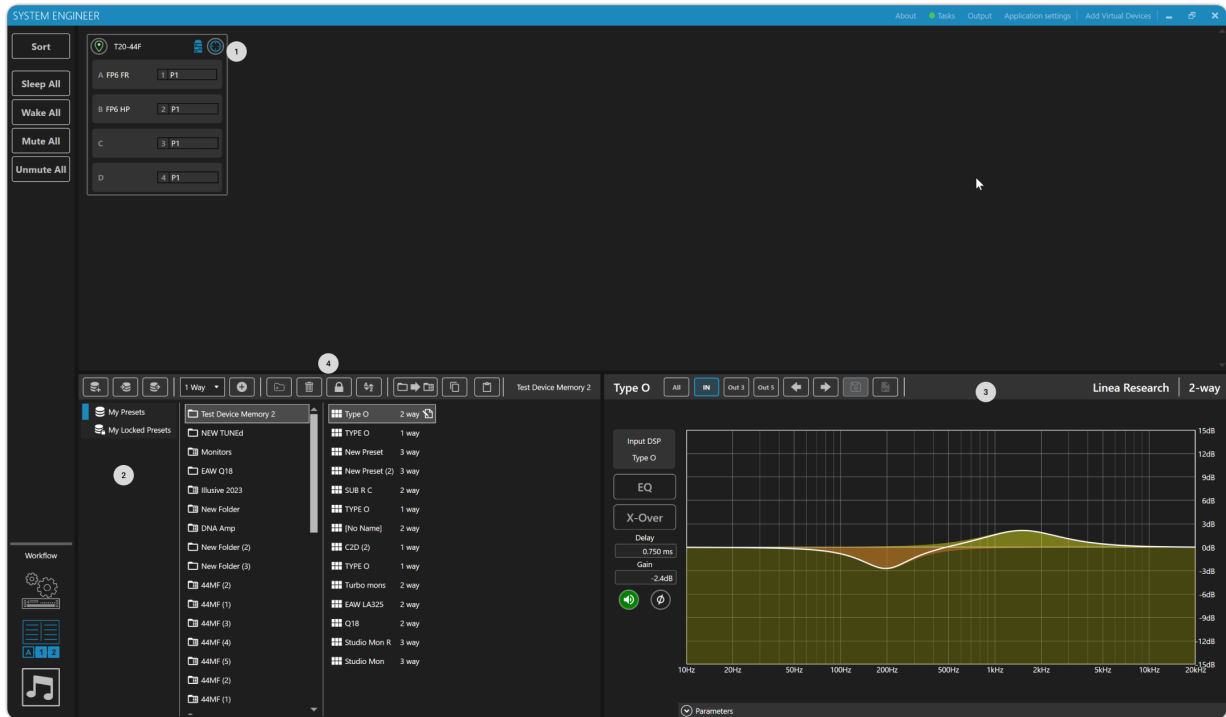
The Setup Workflow is a device focused workflow that allows configuration of input/output routing, network settings, power options and device firmware update.



1. **Device Bar** - The Device Bars are displayed in the Explore view of the Device Workflow. Each Device Bar represents either an online device or a virtual device. By clicking on a Device Bar, you can open it in the Detail View for configuration.
2. **Device Menu Bar** - The Device Menu Bar contains a file menu for loading and saving device setting files, as well as a Device menu for device-centric operations. You can also switch between Device Setup, Device Logs, and Device Snapshots for the selected device.
3. **Matrix Mixer** - The Matrix mixer allows audio to be routed from inputs to outputs to create drive modules. It also enables you to select input types and bridge outputs on amplifiers.
4. **Output Load Impedance** - The Output Load Impedance setting enables you to optimise the performance of your amplifier according to the load connected to it. From this menu, you can also choose settings for 100V, 75V, and 25V line systems.
5. **Network Configuration** - Network Configuration lets you switch your device between Static or Auto IP Modes
6. **Power Options** - Power Options gives you the live current draw of the device with peak hold that can be reset. You can also set EBP (Electronic Breaker Protection) to limit the current the device is able to use
7. **Power Save Options** - The Power Save Options let you set both Standby Time and Sleep Time for the selected Device.
8. **Firmware Update** - Firmware Update allows you to update or downgrade the Firmware on the selected Device.

Preset Workflow

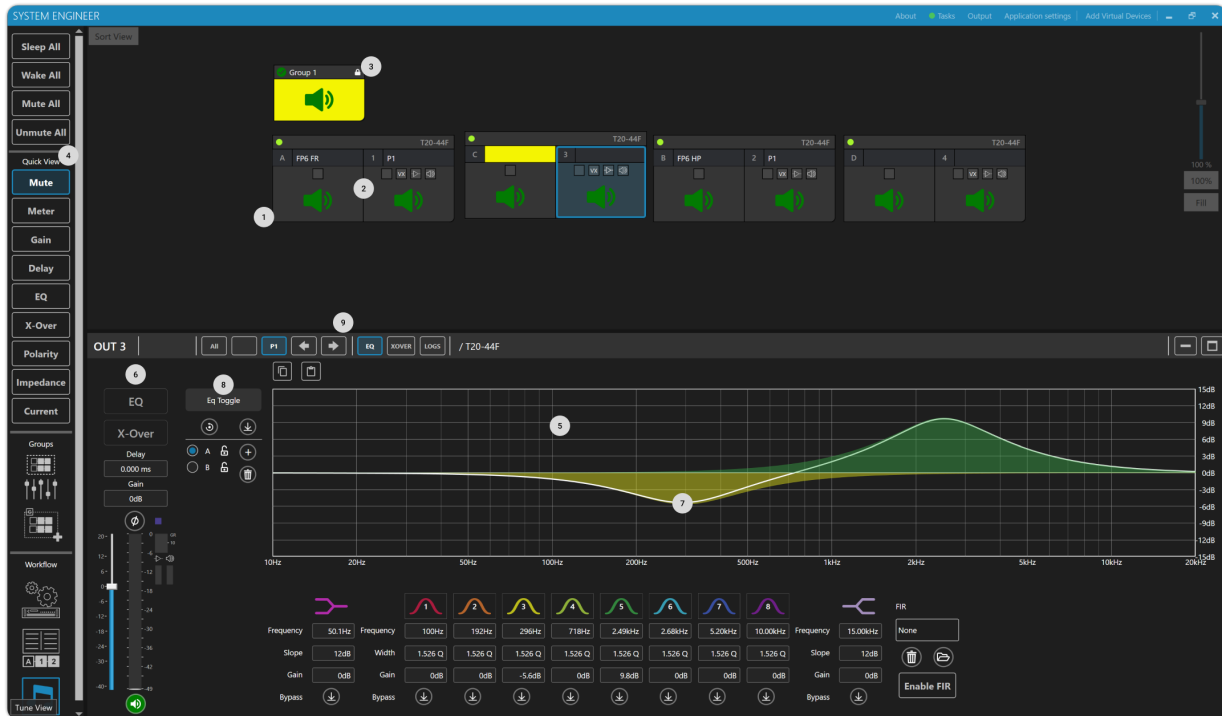
The Presets Workflow is a collection of tools that allows the design, editing, organisation and sharing of presets and preset libraries.



1. **Device Bar** - The Device Bar in the preset workflow shows the device with the routed drive modules inside.
2. **Preset Library** - The preset library is a file explorer that enables you to create, organise, and share Drive Module Preset Configurations. In the Preset Library, you can load and save Drive Module Preset Configurations to your drive module, as well as load and save Device Memory Folders to and from a device.
3. **Preset Preview** - The Preset Preview allows you to preview the currently selected preset in the preset library and also create and edit presets.
4. **Preset Library Menu Bar** - The Preset Library Menu Bar contains the tools for creating, editing, and sharing preset libraries and configurations.

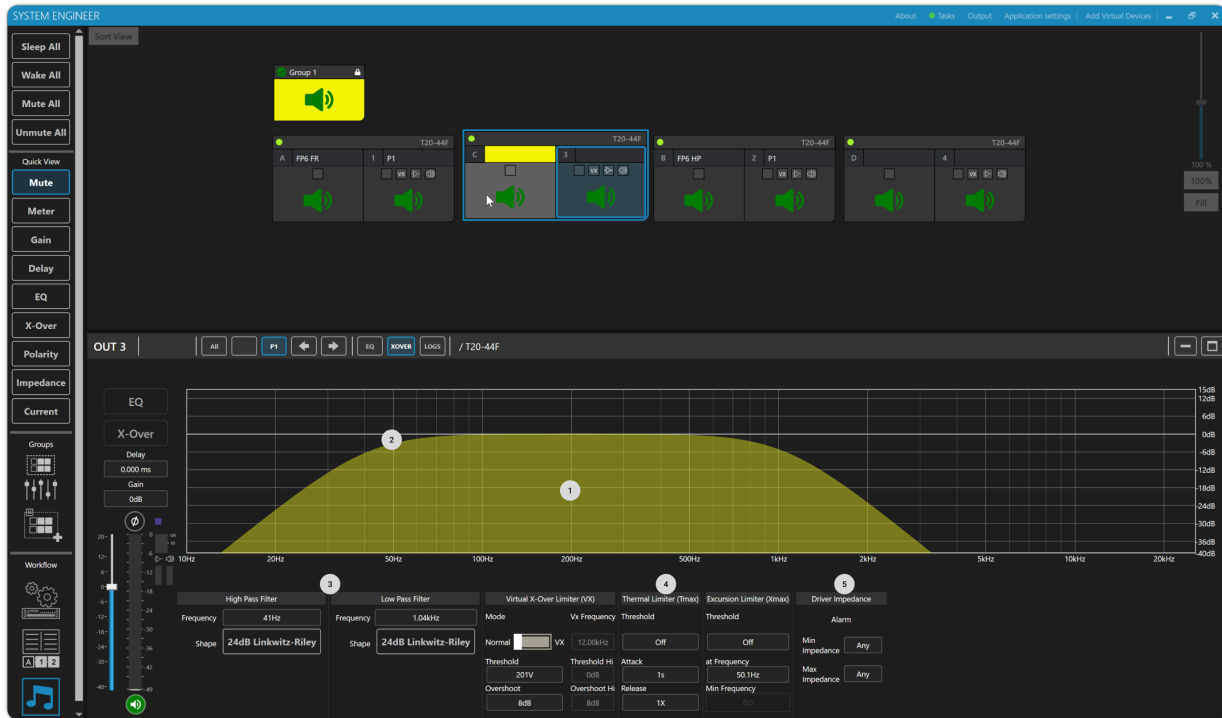
Tune Workflow

The tune workflow provides a drive module focused view for tuning, optimising and monitoring of your loudspeaker system.



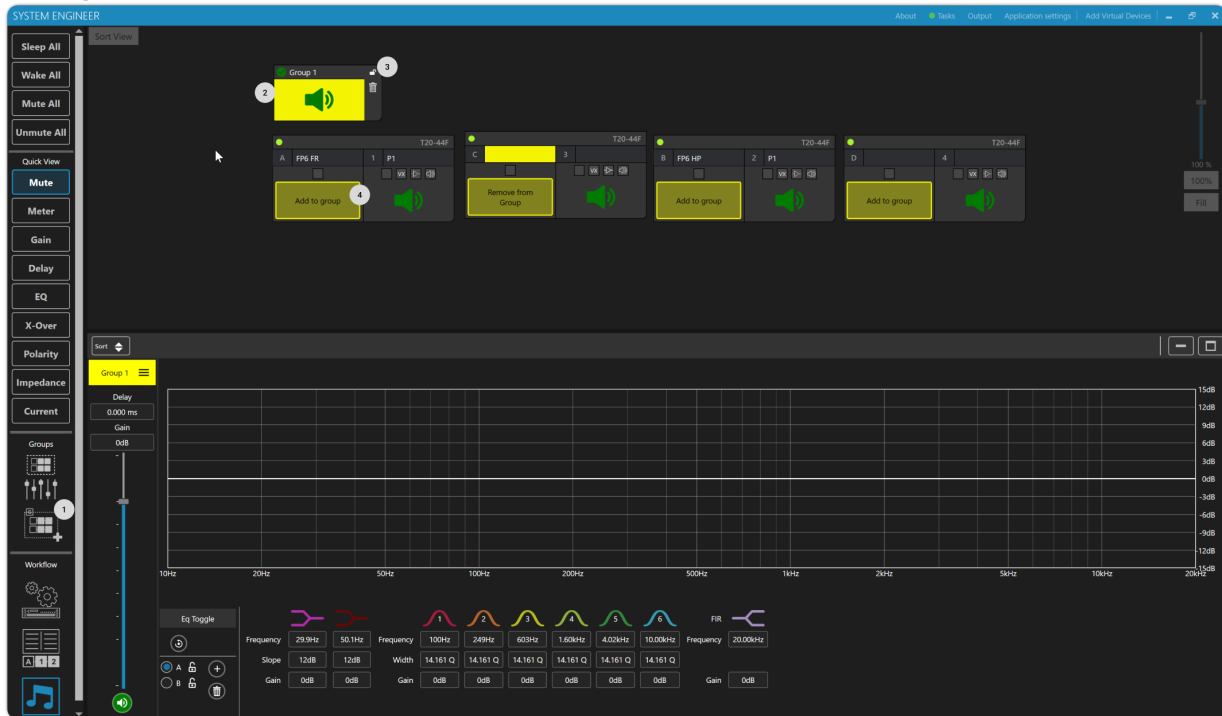
1. Drive Module - Drive Modules are presented in the Explorer view. A Drive Module is a DSP processing block with several physical inputs and outputs routed to it, Drive Modules are configured using the matrix router in the Setup workflow. Drive Modules can then be arranged freely in the Explorer View
2. Input/Output - Clicking on an input or output in a drive module will open it in the Detail View for editing.
3. Group Overlay - Clicking a Group Overlay will open the Group Overlay EQ, Gain and Delay controls on the Detail View. Configuring groups is described in detail later in this document.
4. Quick View - The quick view allows the user to select which parameters are displayed on the Drive Modules in the Explorer view. The Mute, Gain, Delay and Polarity quick views allow direct editing from the Drive Module.
5. EQ Graph - The EQ Graph window in the Detail View allows you to edit the selected EQ
6. Channel Strip - The Channel Strip in the detail view allows the editing of Delay, Gain, polarity and Mutes. Stereo Linking and EQ/Xover navigation are also located on the Channel Strip.
7. EQ Control - The EQ Control allows direct dragging of EQ points on the graph. The middle point of the control allows free movement of the EQ point in all directions. The top point of the control locks the control in frequency and the bottom point of the control locks the control in Gain. The middle slider changes the bandwidth of the EQ point.
8. EQ Compare - The EQ Compare feature allows you to quickly create and compare multiple EQ curves on any EQ in the system.
9. Navigation Bar - The Navigation Bar across the top of the Detail View allows navigation through the channels, EQ, Xover and Logs of the selected Drive Module. On the right hand side of the Navigation bar is maximise and minimise buttons that resize the Detail View.

Crossover and Limiters in the Tune Workflow



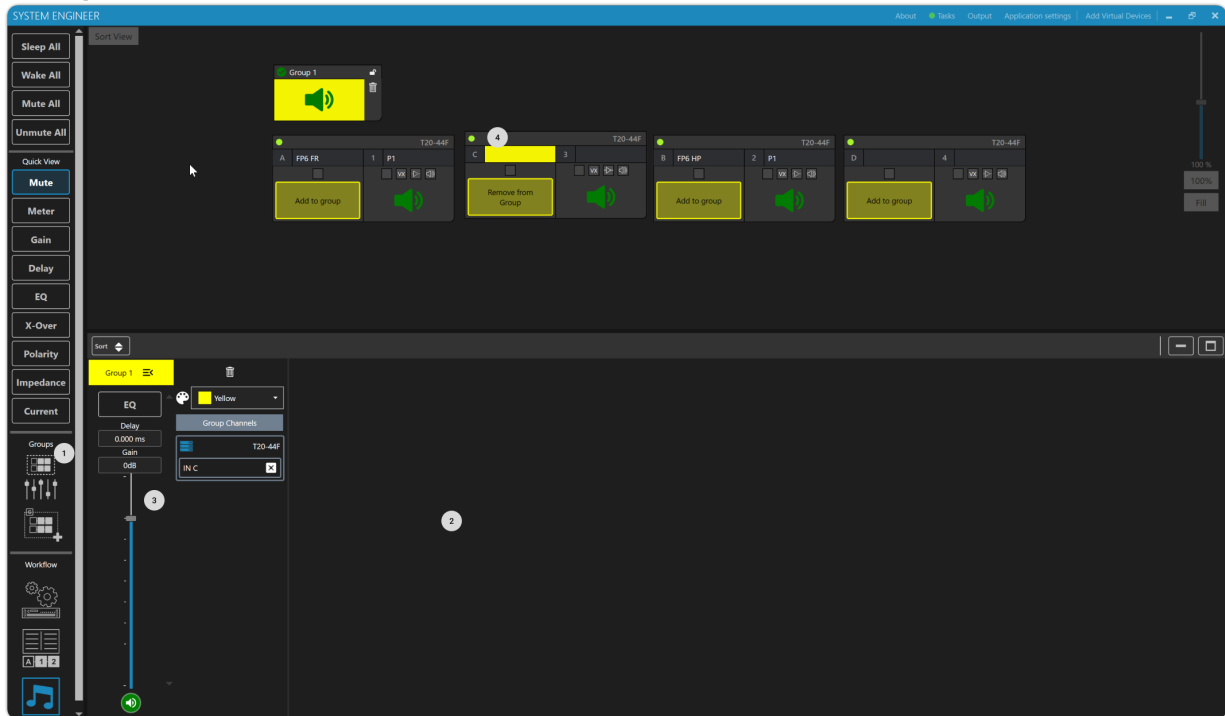
1. **Crossover Graph** - The Crossover Graph window in the Detail View allows you to edit the selected EQ
2. **Crossover Control** - The Crossover Control allows direct dragging of crossover points on the graph. The middle point of the control allows free movement of the crossover point in frequency. The middle slider changes the crossover shape.
3. **Crossover Shape Selector** - Allows selection from all available crossover types for low pass and high pass filter. The frequency input box allows the desired frequency to be entered for the selected high pass or low pass filter.
4. **Limiters** - 3 complementary limiter types are available for driver protection: VX Limiter, TMAX Limiter and XMAX Limiter. More information on suggested strategies on how to setup limiters please visit our website.
5. **Driver Impedance Alarm** - This setting allows you to set the expected operating impedance range of the speaker, if the measured impedance drifts out of this range it will trigger an alarm and you will be notified in the Tune Workflow on the effected output.

Groups in the Tune Workflow



1. **Add Overlay Group** – Click the Add Group button in the tool bar to add up to 12 Overlay Groups
2. **Group Overlay Bar** - Clicking a Group Overlay in the explorer view will open the Group Overlay EQ, Gain and Delay controls in the Detail View.
3. **Group Membership Lock/Unlock** – Click Group Overlay Lock to edit the members of the selected group
4. **Add/Remove Group** – The Add/Remove button on the module bar allows editing of the membership of the module in the selected Group Overlay Bar. If there are no members in the selected group you will prompted to add members with a message in the detail view.

Group Mixer User Interface



1. **Group Mixer Button** – The Groups Mixer Button in the tool bar opens the Group Mixer in the Detail View.
2. **Group Mixer** - The Group Mixer displays groups with memberships in the detail view.
3. **Group Mixer Channel Strip** – Displays Gain, Delay and EQ navigation button for that group.
4. **Group Membership Highlight** – When selecting a group in the explorer view Drive modules that are members of the selected group will be highlighted with a colour coded border around the input DSP.

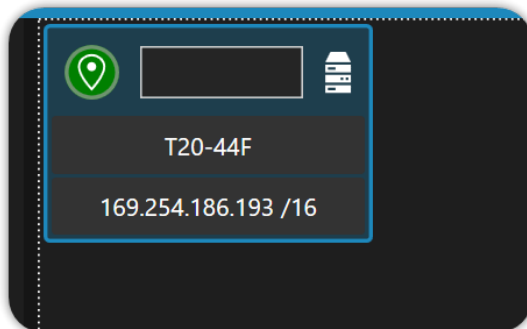
Configuring a Device

Loading and Saving a Device Settings File

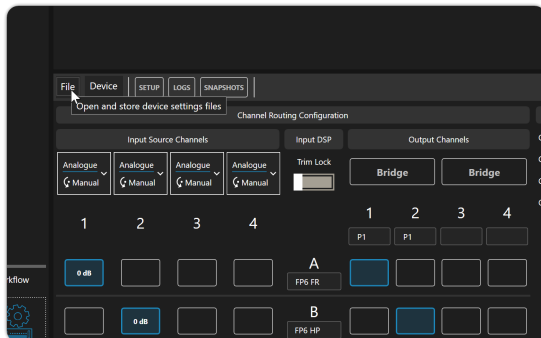
This guide covers how to load and save a Device Settings file in System Engineer 8

Loading a Device Settings File

1. From the **Setup Workflow** select the **Device** you would like to load the Device Settings File on to.



2. From the **Device Menu Bar** select **File**.

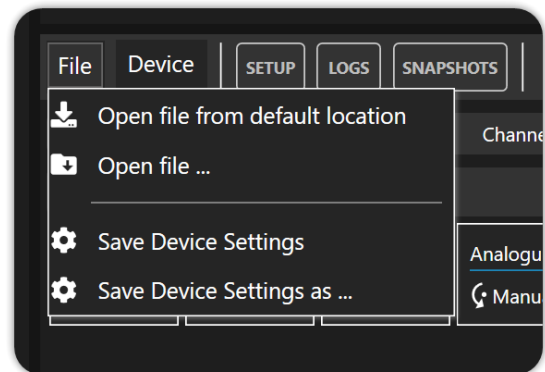


3. From **The File Menu**, click **Open File From Default Location** or **Open File ...**

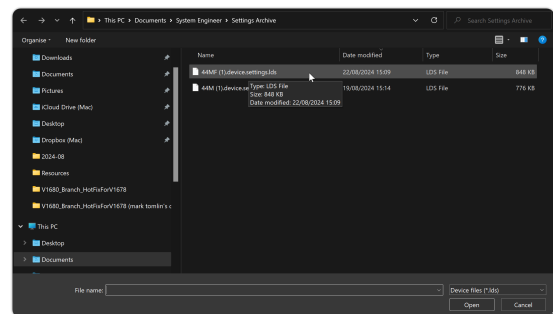


TIP

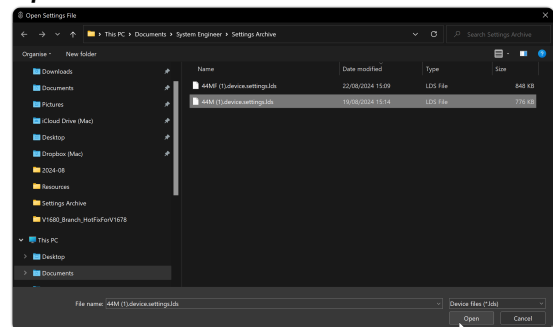
The default location for System Engineer 8 Device Settings files is *Home\Documents\System Engineer\Settings Archive*. Clicking **Open File ...** Will open a Windows file browser to the last opened folder.



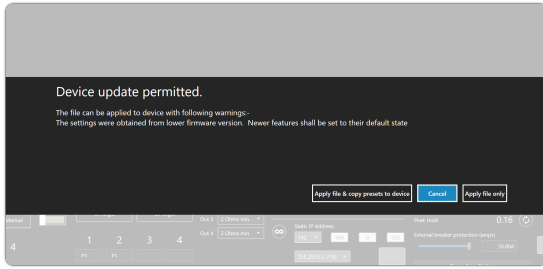
4. From the **Windows File Browser**, locate and select the **Device Settings File** you would like to load onto the device .



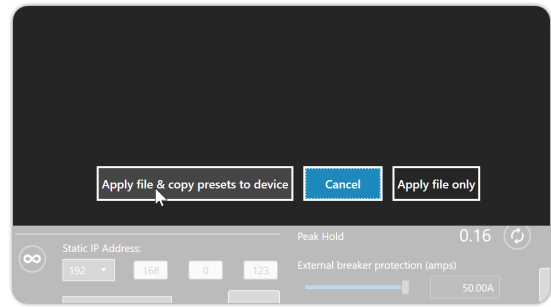
5. From the **Windows File Browser**, click **Open**.



6. If the OEM ID of the Device Settings File matches the Device OEM ID you will be permitted to load the file.

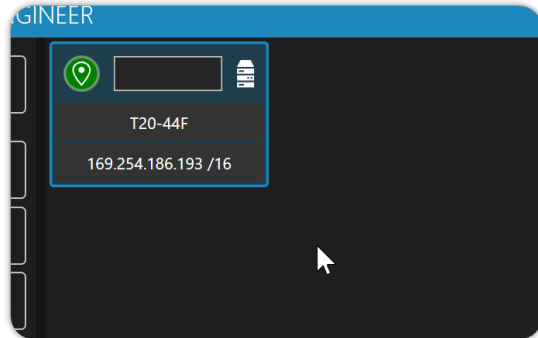


- From the **Loading device settings permitted** dialogue click **Apply Device Settings and copy Device Memory Presets to Device** or **Apply Device Settings only** depending what you would like to load from the file.

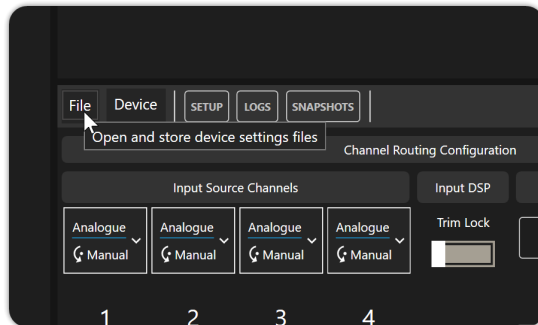


Saving a Device Settings File

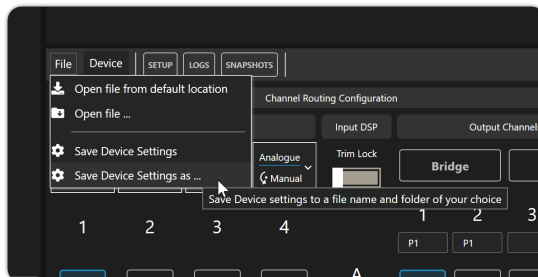
- From the **Setup Workflow** select the **Device** you would like to Save the Device Settings File from.



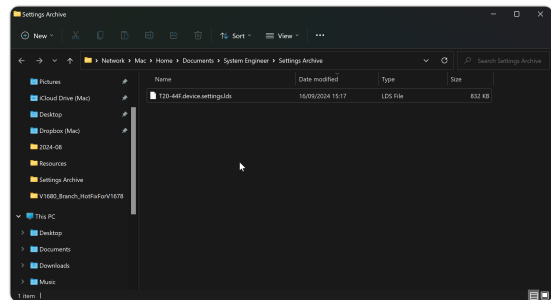
- From the **Device Menu Bar** select **File**.



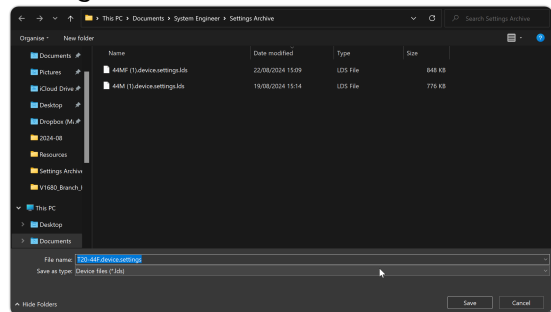
- From **The File Menu**, click **Save Device Settings** or **Save Device Settings as ...**



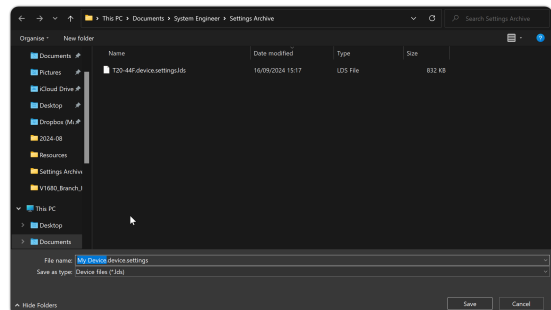
- Clicking **Save Device Settings** will save a Device Settings file to the default location *Home\Documents\System Engineer\Settings Archive*. Clicking **Save Device Settings as ...** will open a **Windows File Browser**



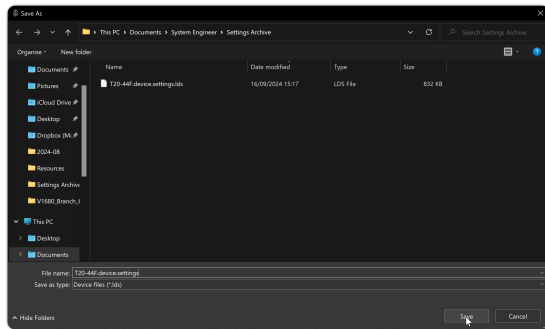
- Locate the folder in the **Windows File Browser** where you want to save the device settings file.



- Enter the name of the device settings file in the **File name** field of the **Windows File Browser**.

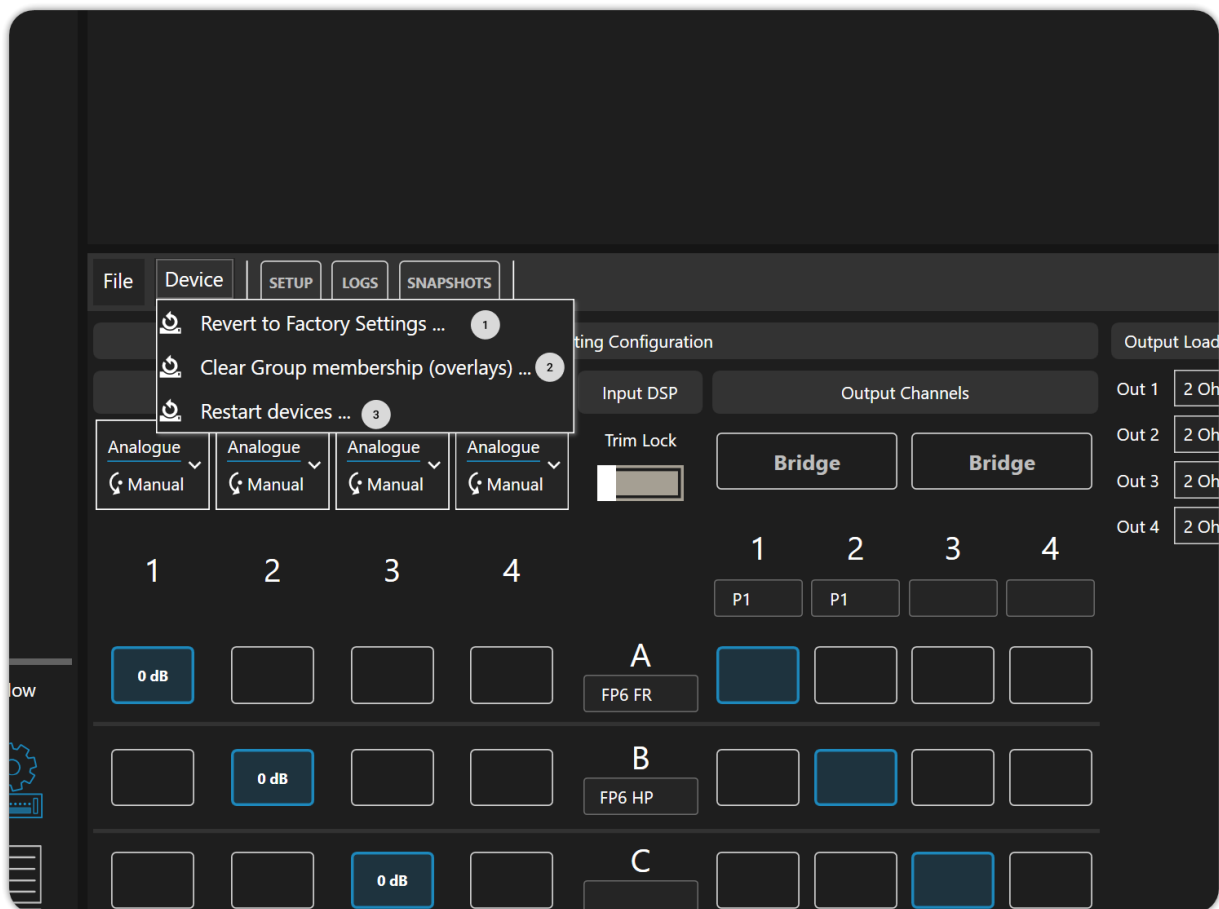


- Click **Save**



Device Operations

The Device Operations menu is located on the Device Menu Bar in the Setup Workflow. It contains 3 device operations.



1. **Revert to Factory Settings ...** - Clicking **Revert to Factory Settings ...** will set the device back to its default state. Before doing this, be sure to back up any settings, Device Memory Presets and Snapshots.



NOTE

Setting a device to factory settings will also reset any IP and Subnet settings. If using Auto IP, the device will have to be power-cycled and SE8 restarted before devices will reconnect.

2. **Clear Group Memberships (Overlays) ...** - Clicking **Clear Group Memberships (Overlays) ...** will remove all group memberships associated with the device.
3. **Restart Devices ...** Clicking **Restart Devices ...** will restart the selected device.

Snapshots

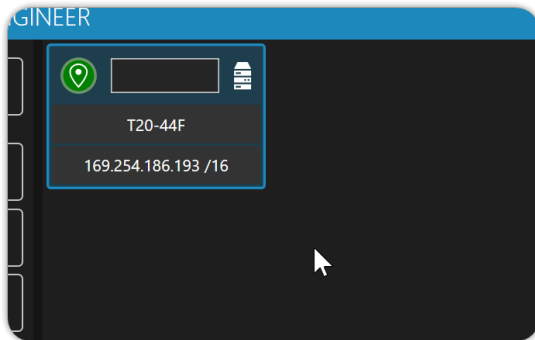
Snapshots allow you to recall Device routing and preset configurations for your device from the device memory. When you recall a Snapshot, it loads Device Memory Presets for each input and output, and will recall other device-wide settings, restoring a device-wide preset. You can recall a Snapshot in three ways:

1. Using the device's User Interface.
2. Via the System Engineer 8 application.
3. Through the AUX port on the rear of the device.

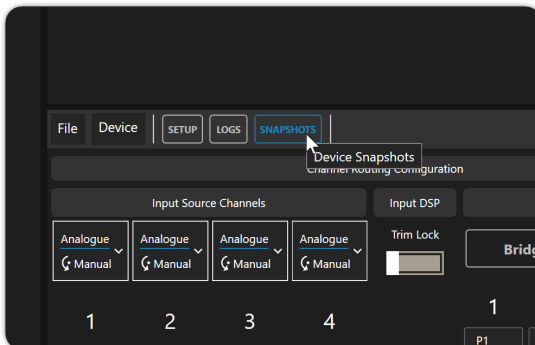
In the following topic, we will focus on Snapshots from the perspective of System Engineer 8.

Saving a Snapshot

1. From the **Setup Workflow**, Select a **Device** from the Explorer.



2. From the **Device Menu Bar** Select **Snapshots**.



3. From the **Select Snapshot** dropdown, choose the **Snapshot Slot** to save the snapshot into.

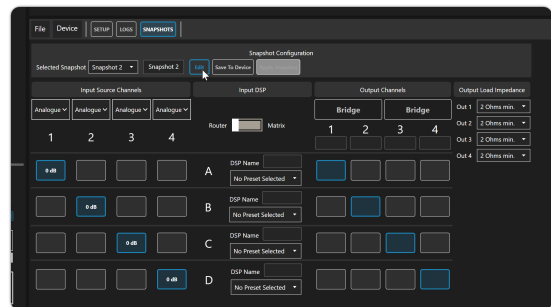


NOTE

The device can store up to 20 snapshots in its memory.



4. Click **Edit**.

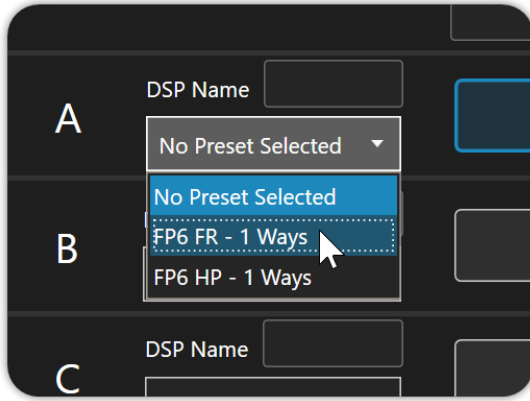


5. From the dropdown next to each DSP, select the **Drive Module Presets** you want to recall with the Snapshot.

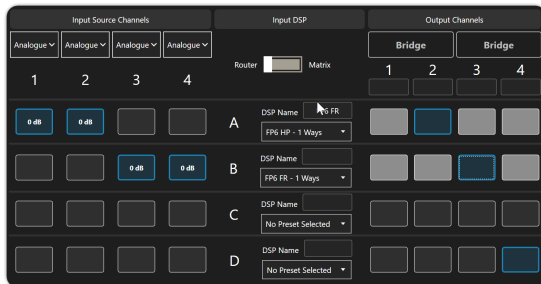


NOTE

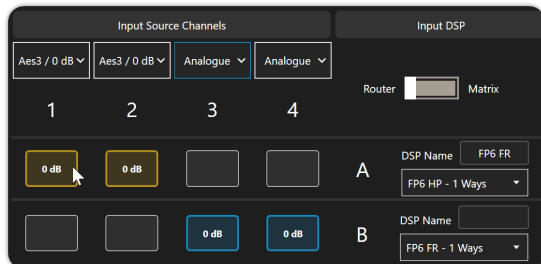
Presets must first be saved into device memory before they can be recalled by a Snapshot.



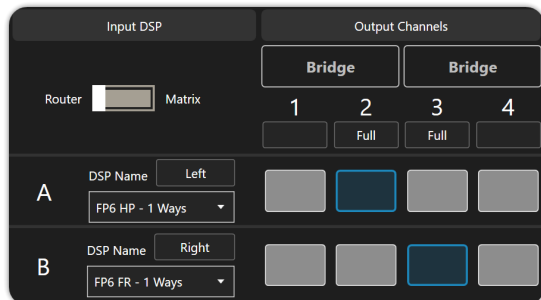
6. Select the **Input Routing** and **Output Routing** for each Drive Module Preset or set the **Input Routing** and **Output Routing** as you would like it to be recalled.



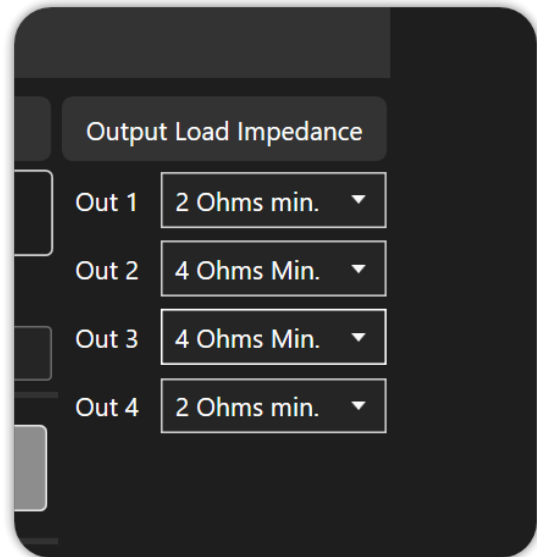
7. Choose the **Input Source** for each **Input**.



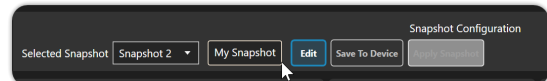
8. Add any custom **DSP Names** and **Output Names** you would like the snapshot to recall in the DSP and Output name fields.



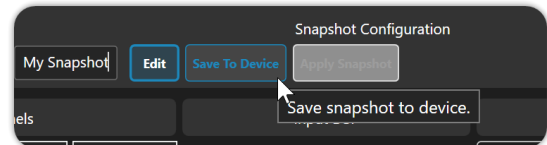
9. Select the **Output Load Impedance** settings for each output from the dropdown menus.



10. Name the Snapshot from the **Snapshot Name** field.



11. Click **Save To Device**

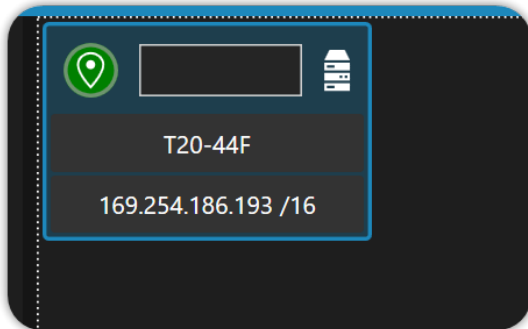


WARNING

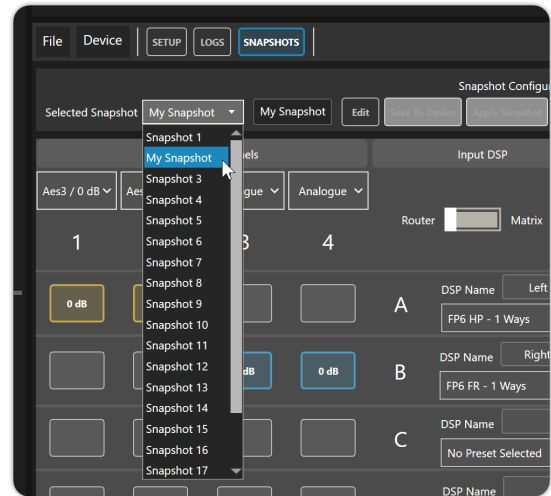
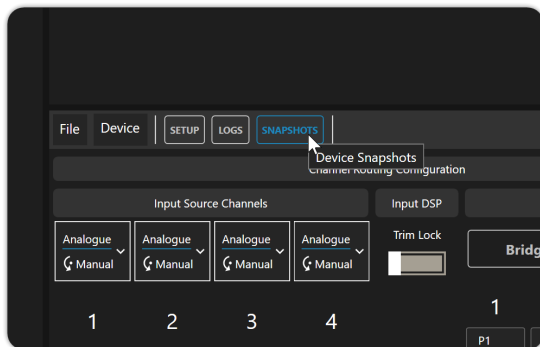
Snapshots rely on recalling settings from presets saved to device memory. If you replace, delete, or move presets in device memory after saving a snapshot, it will result in the snapshot recalling the wrong settings in the wrong places.

Recalling a Snapshot

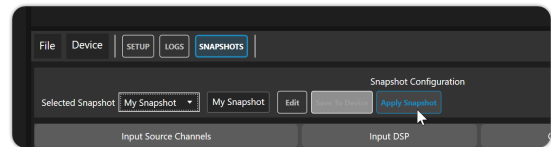
1. From the **Setup Workflow**, Select a **Device** from the Explorer.
3. From the **Select Snapshot** dropdown, choose the **Snapshot Slot** to recall to the Device.



2. From the **Device Menu Bar** Select **Snapshots**.



4. Click **Apply Snapshot**.

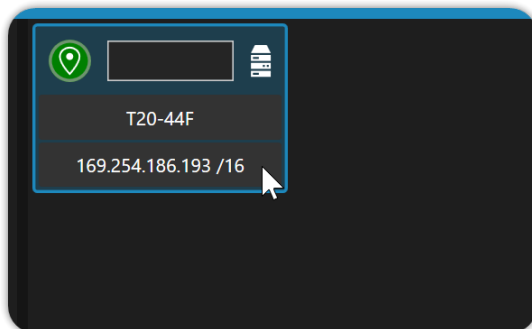


Input Sources

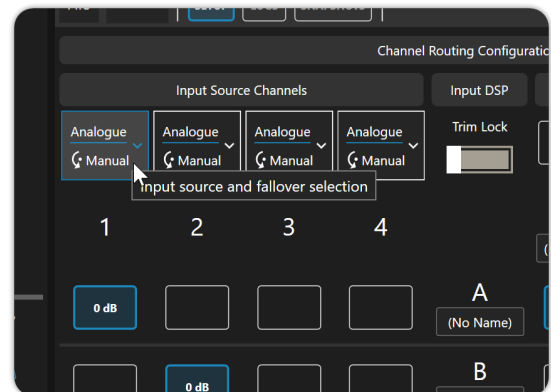
The Input Source Selector is located on the Detail View of the Setup Workflow. The next two topics will cover selecting the Input type and configuring Fallover.

Input Type

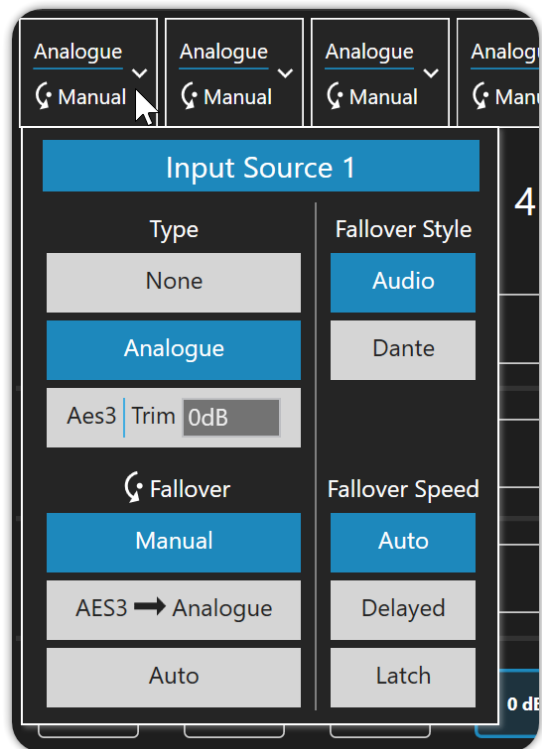
1. From the **Setup Workflow**, select a **Device** in the **Explore View**.



2. Select the **Input Source Dropdown** for the **Input** you would like to configure.



3. Select the **Input Type** you would like to use for the **Input**



Setting Input Fallover

The Input Source Fallover options allow users to configure redundant audio sources that will switch over when the primary audio source is interrupted or lost. There are three components to Fallover: Fallover Mode, Fallover Detect, and Fallback Speed.

Fallover Mode

The Fallover Mode determines the order in which the audio sources will Fallover. In Auto Mode, the sequence is Dante > AES > Analogue.

Fallover Detect

When a Dante Card is installed in the device, you will have two options for audio detection. Choosing **Audio** will detect the audio stream, and choosing **Dante** will detect the Dante Stream connection.



NOTE

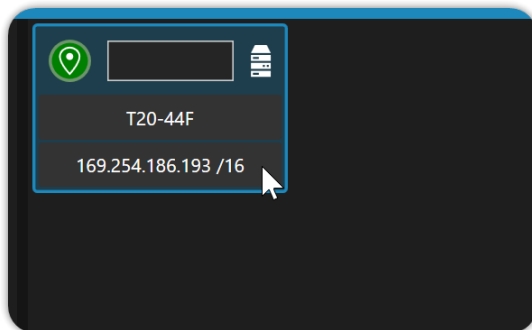
The loss of the Dante stream connection can take up to 5 seconds to detect.

Fallback

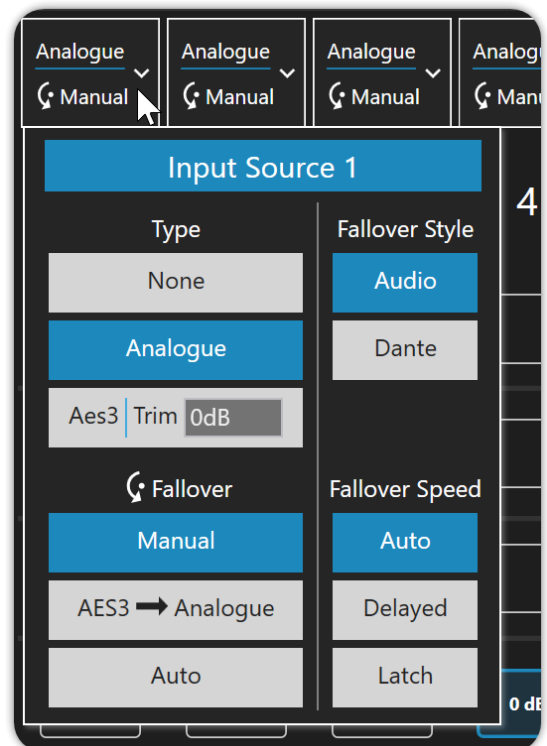
Remember the following details: Fallback options determine how quickly the audio source will return to the primary source after being re-detected. The default setting is **Auto**, which means the audio will immediately switch back to the primary source once re-detected. **Slow** will cause the audio to switch back after 5 minutes. In **Latch** mode, the audio will not switch back automatically; the user must manually select the audio source when Fallover occurs in Latch mode.

Setting Fallover

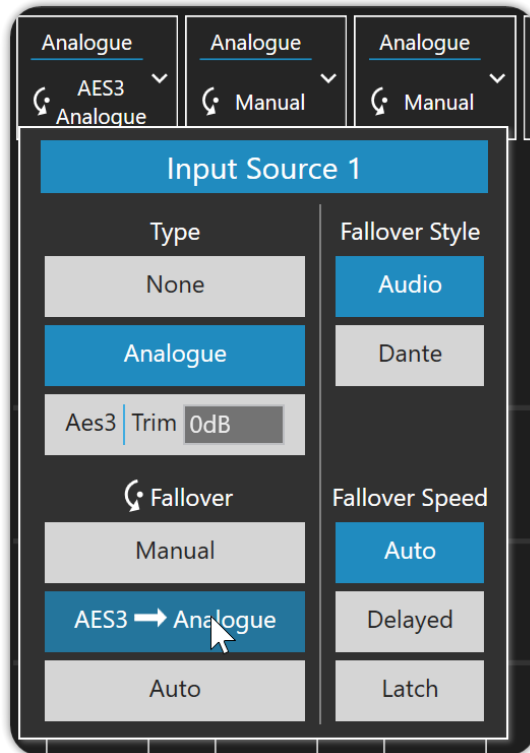
1. To enable Fallover Mode, first choose a device from the Device Explorer in the Setup Workflow.



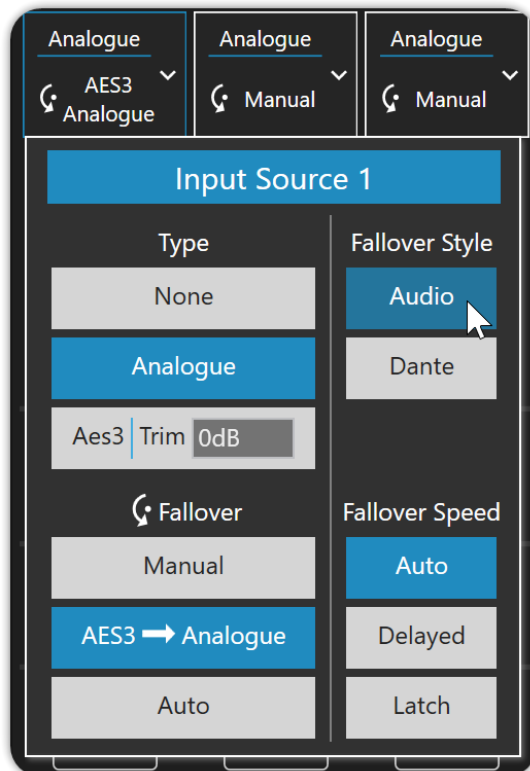
2. Select the **Input Source Dropdown** for the **Input Fallover** you would like to configure.



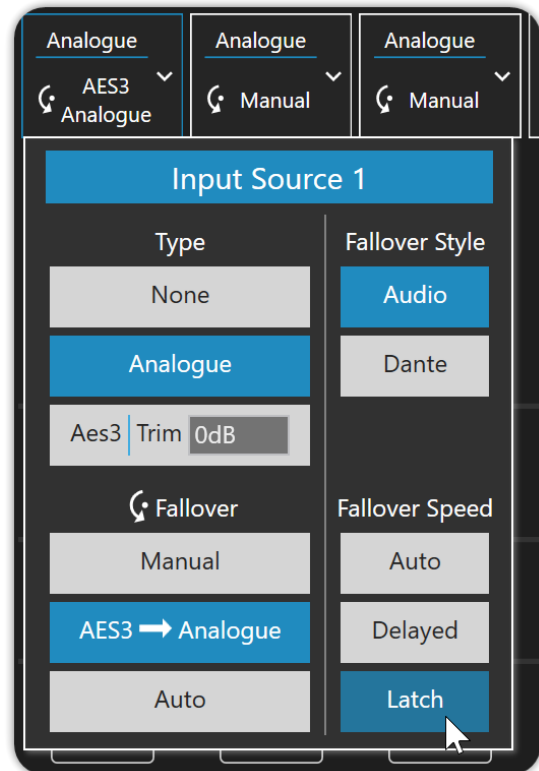
3. Select the **Fallover Mode** you would like to use.



4. Select **Fallover Detect** Mode you would like to use if you have a Dante enabled device.



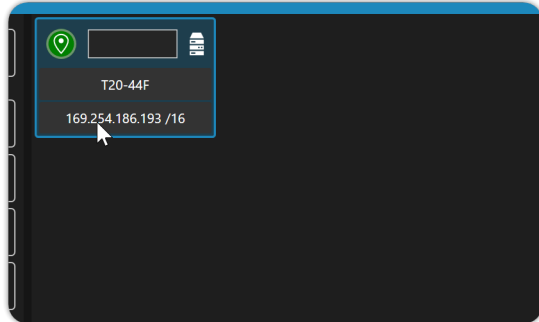
5. Select the **Fallback mode** you would like to use.



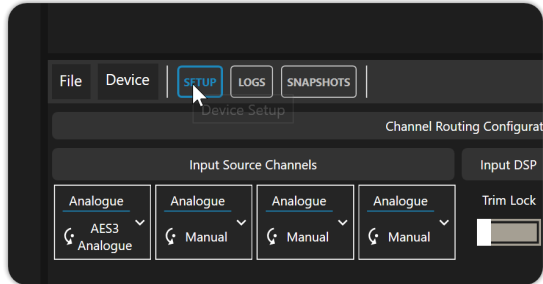
Creating a Drive Module

A Drive Module comprises one or multiple inputs routed through a DSP processing block to one or several outputs. It could be compared to a loudspeaker with its input and output settings. The following steps will guide you through how to configure a Drive Module using DSP processing block A.

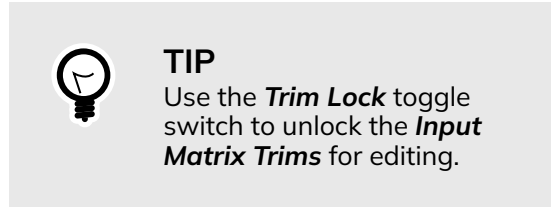
1. From the **Setup Workflow**, select the **Device** from the **Explorer view** that you want to configure the **Drive Module** on.



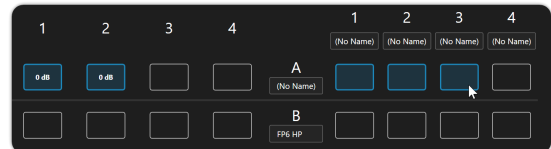
2. From the **Device Menu Bar** located at the top of the **Device Detail View**, click **Setup**.



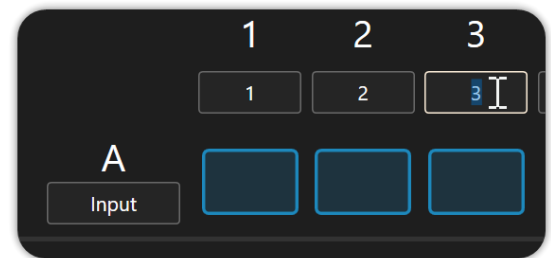
3. Using the **Input Source Channels** section of the **Router Matrix**, select the **Input Channels** you want to drive **DSP A** with.



4. Using the **Output Channels** section of the **Router Matrix** select the **Outputs** you would like to drive with **DSP A**.



5. You now have the option to **Name** the **DSP** and **Outputs** of your **Drive Module**

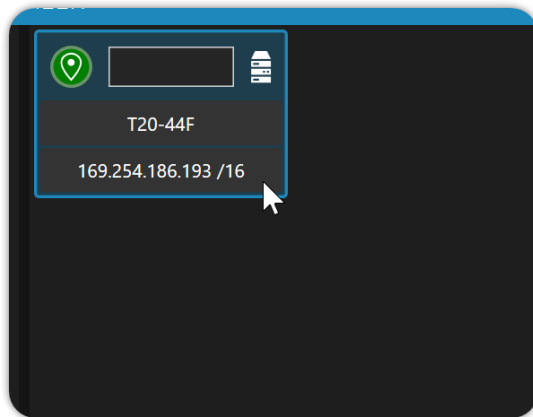


Setting Output Load Impedance

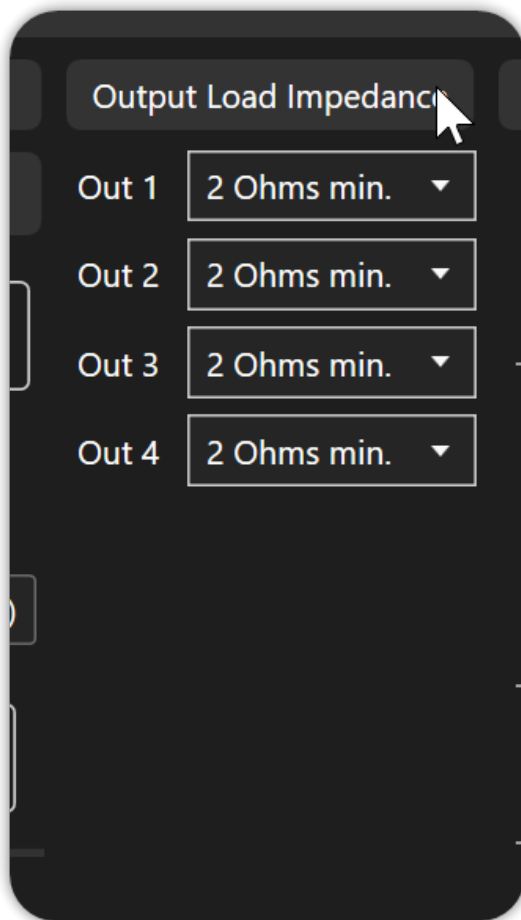
The Output Load Impedance setting is specific to Linea Research Amplifiers. It enables users to specify the expected average load for each output, which allows the Amplifier to optimize its power delivery to that load. Additionally, the Output Load Impedance settings also include Line Voltage Settings for usage with Line Systems such as 100v, 75v, and 25v.

Setting Output Load Impedance

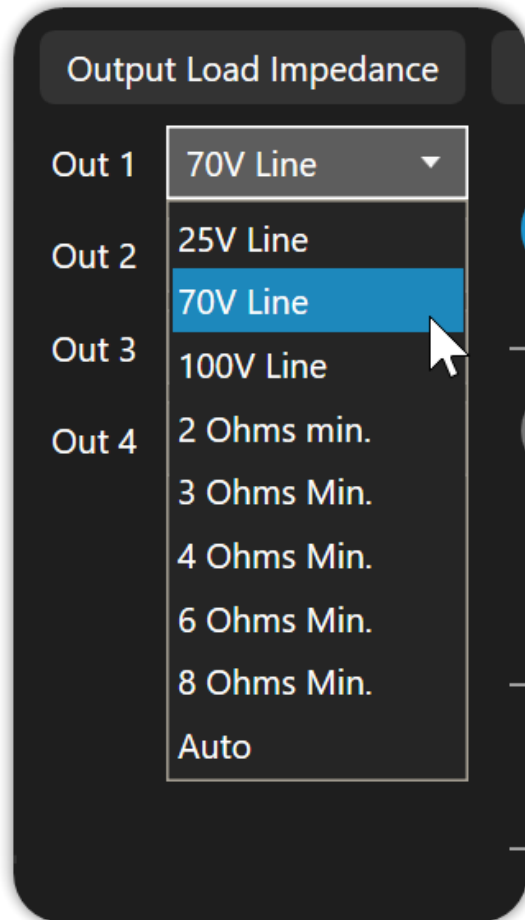
1. From the **Setup Workflow**, select a **Device** from the **Explorer View**.



2. From the **Device Detail View** locate the **Output Load Impedance** section.



3. Select the **Driver Load Impedance Setting** or **Line Voltage Setting** for each **Output** as required



Setting Device IP and Subnet Mask

Auto IP

By default, devices are set to Auto IP, for detailed information on how Auto IP works, see [Auto IP Configuration \[9\]](#)

Static IP

Devices can be configured with a Static IP, allowing the user to set the device's IP Address and Subnet Mask. For more information on Static IP see [Static IP Configuration \[7\]](#)

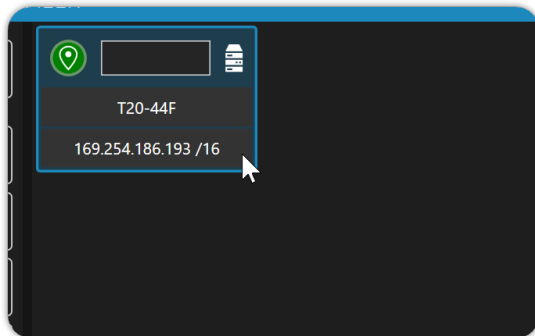
Setting Static IP



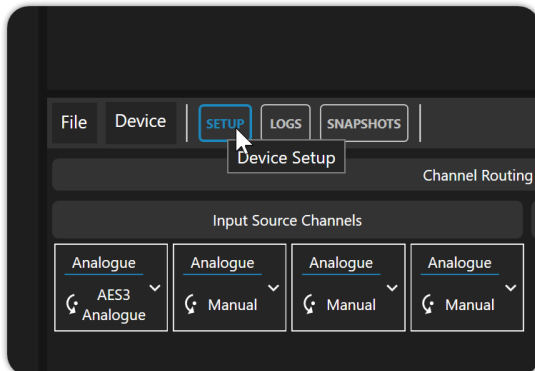
WARNING

After applying a Static IP address and Subnet Mask, the device may lose connection.

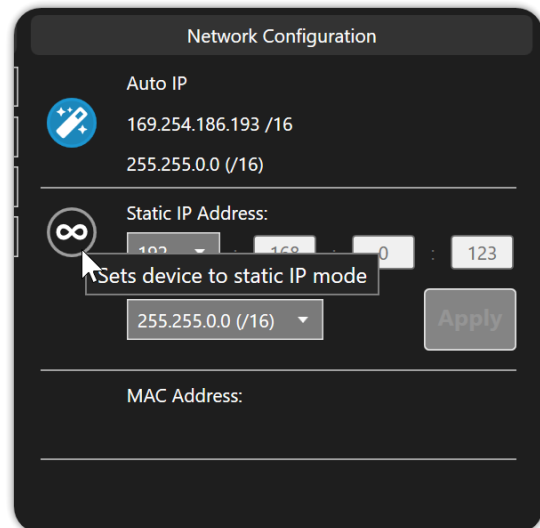
1. From the **Setup Workflow**, select a **Device** from the **Explorer View**.



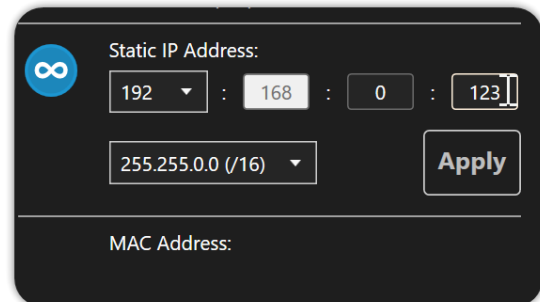
2. From the **Device Menu Bar** select **Setup**.



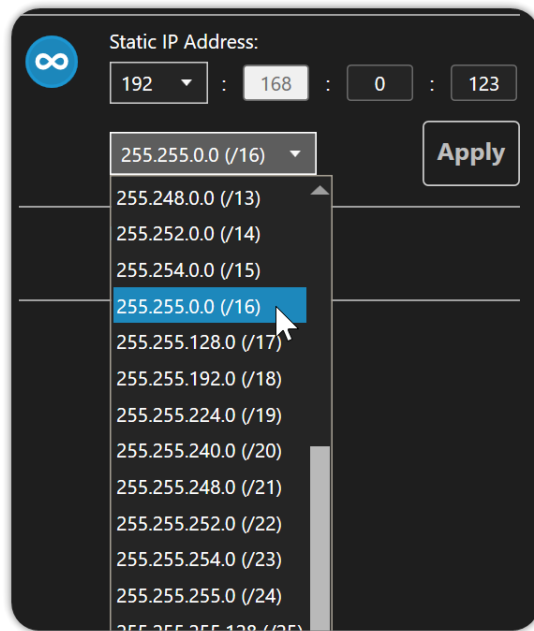
3. From the **Network Configuration** area select **Static IP**



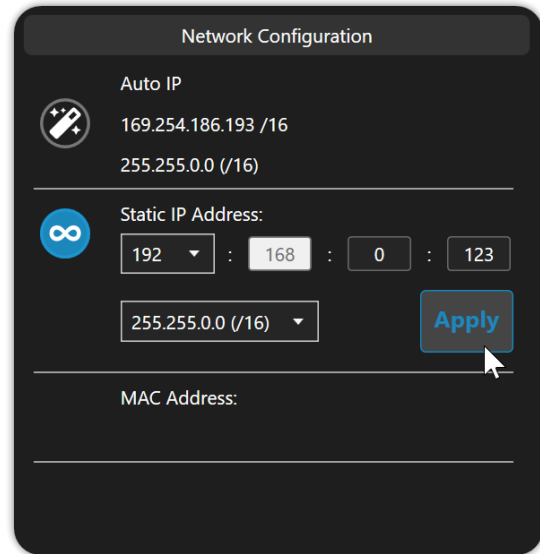
4. Enter the **IP Address** you would like to use.



5. From the **dropdown** select the **Subnet Mask** you would like to use.



6. Click **Apply**.



Setting Device Power Options

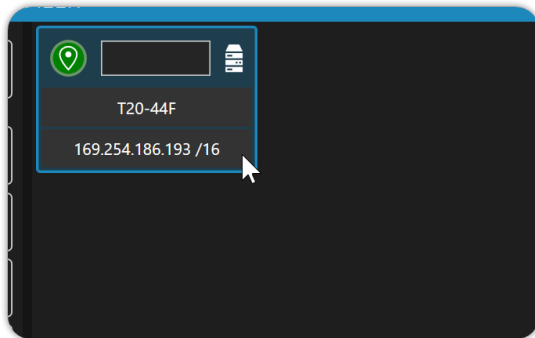
Amplified devices offer power options for limiting current draw and options for power saving.

Power Options

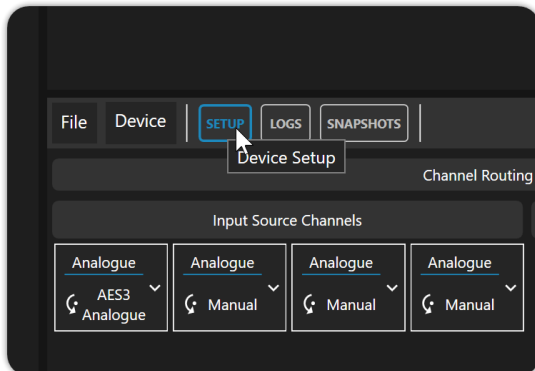
In the Power Options section of the Device Detail View, you will see the live current draw for the device you are viewing, along with the historical peak hold. Here you will also find the External Breaker Protection (EBP). EBP allows you to limit the current that the Amplifier can draw from the mains.

Setting Electronic Braker Protection (EBP)

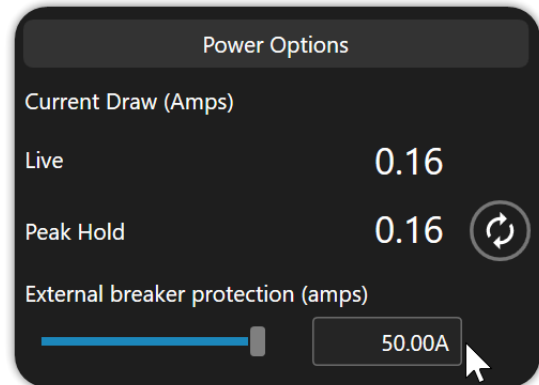
1. From the **Setup Workflow**, select a **Device** from the **Explorer View**.



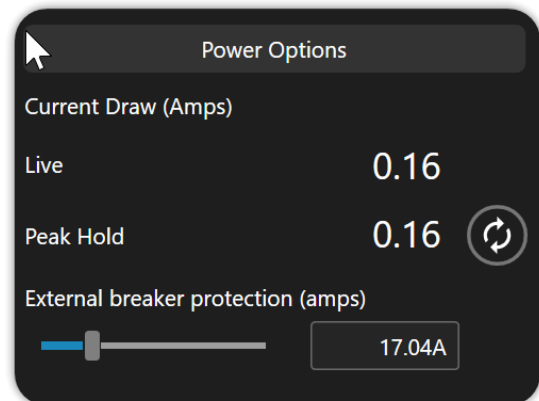
2. From the **Device Menu Bar** select **Setup**.



3. Locate the **Electronic Breaker Protection** slider in the **Power Options** section of the **Device Detail View**.



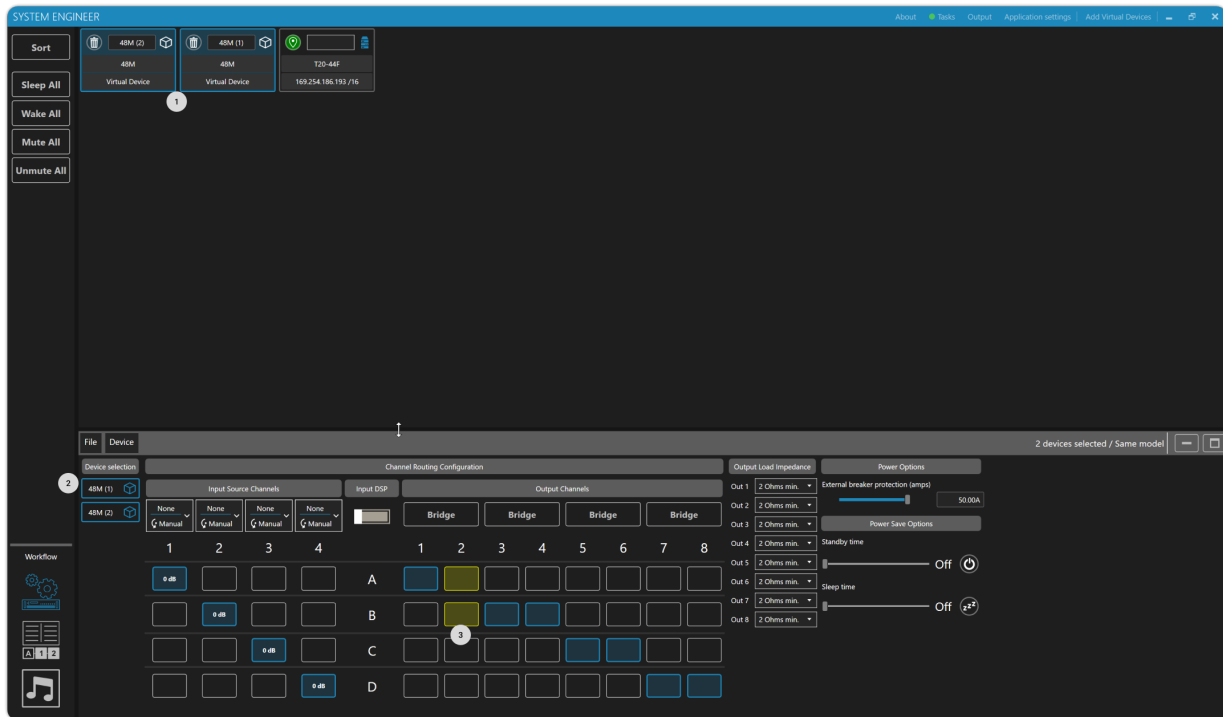
4. Adjust the **Slider** or enter your EBP value in the **Number Box**.



Using Multi-Select in the Setup Workflow

When using the Multi-Select feature in the Setup Workflow, you can easily configure multiple devices with the same settings. If you select devices of different models, Multi-Select will only display the settings that are common to all the selected devices. For instance, if you choose a 4-channel device with Dante and an 8-channel device without Dante, Multi-Select will not show settings for channels 5-8 or Dante. When you select multiple devices with different settings, the multi-select detail view will indicate ambiguous settings with an exclamation mark or a yellow accent colour in the router matrix.

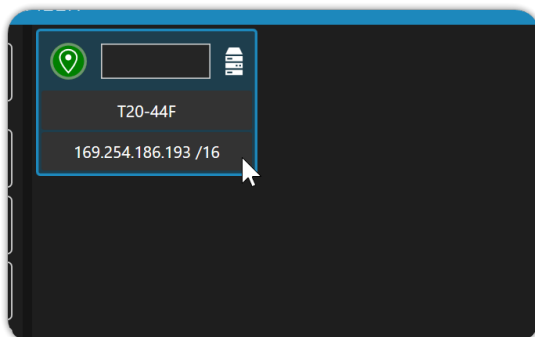
Multi-Select User Interface



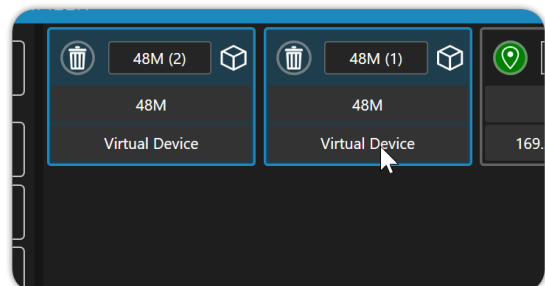
1. The blue border indicates selected devices in the Explorer View.
2. Device Selection Summary.
3. Ambiguous Settings - Settings that are different between multi-selected devices are displayed in yellow in the Matrix.

Using Multi-Select

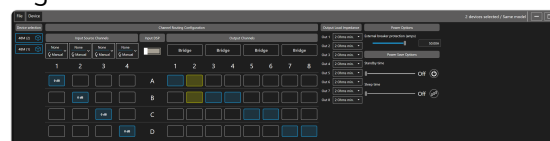
1. From the **Setup Workflow**, select a **device**.



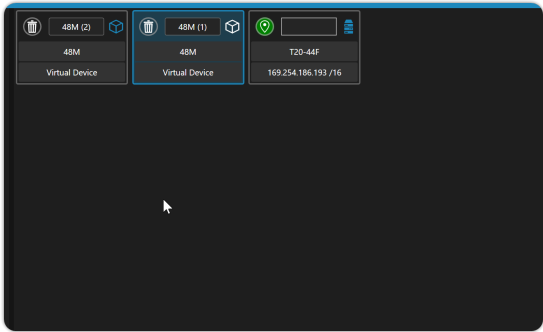
2. While holding down the **Ctrl** key, select one or more other **devices**.



3. When you **release Ctrl**, the Detail View will display your multi-selected devices for editing.

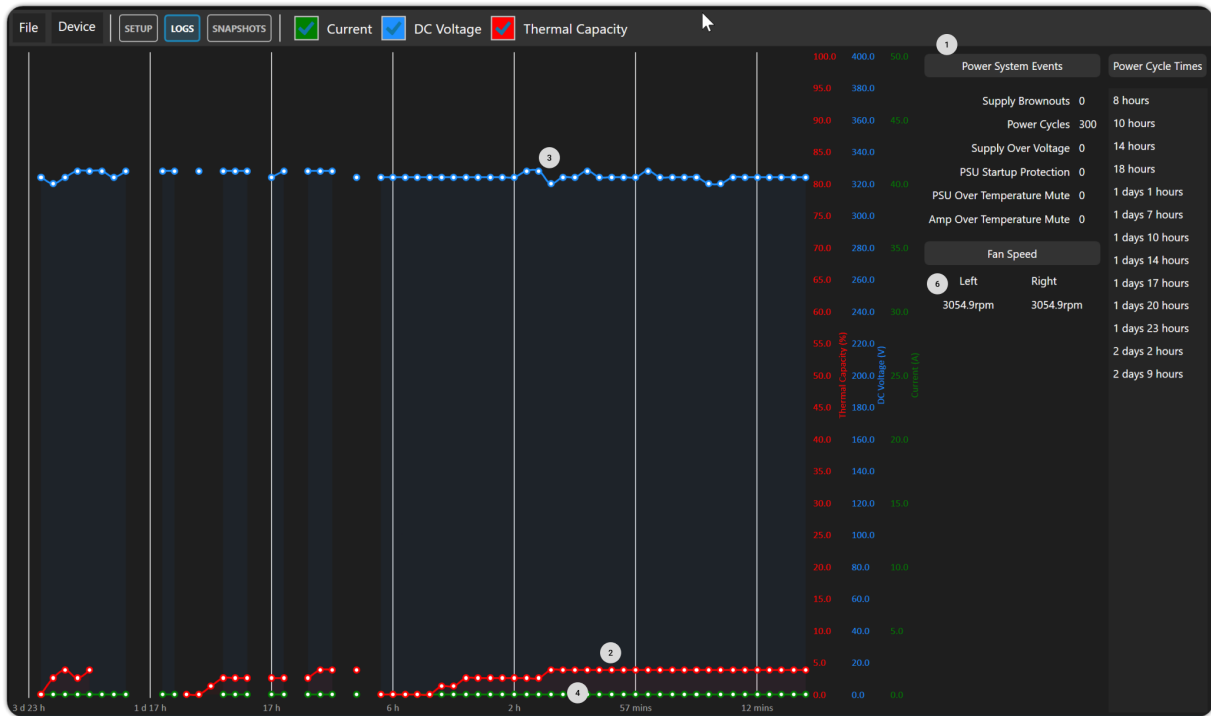


4. Select a **device** to clear the multi-selection.



Device Monitoring

In the Setup Workflow, you can monitor device health and view events from the logs tab on the Device detail view menu bar.



- Power System Events** - These counters will log events related to the power supply.
- Thermal Capacity** - The red graph shows the thermal capacity of the device as a percentage.
- DC Link Voltage** - The blue graph shows the DC Link Voltage in volts
- Current Draw** - The green graph shows the Current draw of the amplifier in amps
- Power Cycle Times** - This list shows the last time the device was power cycled in relation to the current time, in hours and minutes.
- Fan Speed** - Displays the current left and right fan speeds.

Preset Management

System Engineer 8 provides a comprehensive set of tools for managing presets on your computer and Linea research devices. The following topics will cover Local Preset Management and Device Memory Preset Management.

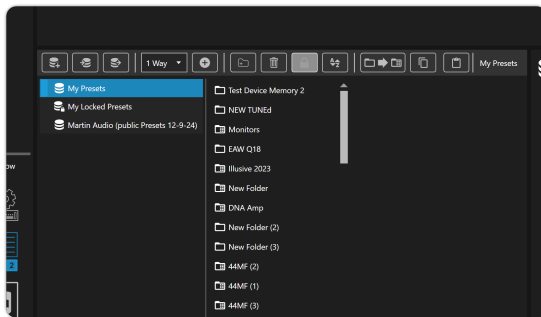
Local Preset Management

The next sections will walk through managing presets on your computer.

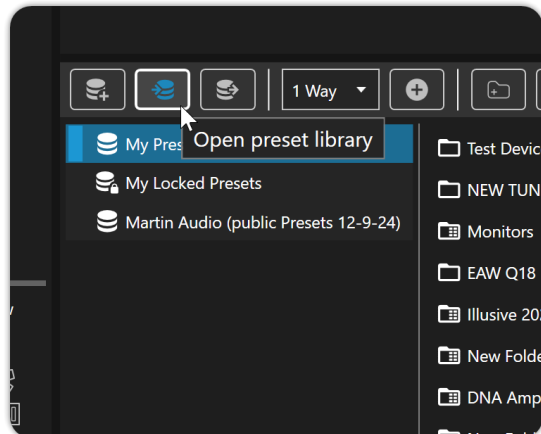
Import a Published Preset Library

This guide will cover importing a Published Preset Library into your User Libraries in System Engineer 8.

1. From the **Preset Workflow**, locate the **Preset Library Menu Bar** at the top of the **Detail View**.



2. From the **Preset Menu Bar**, click the **Import Preset Library icon**.

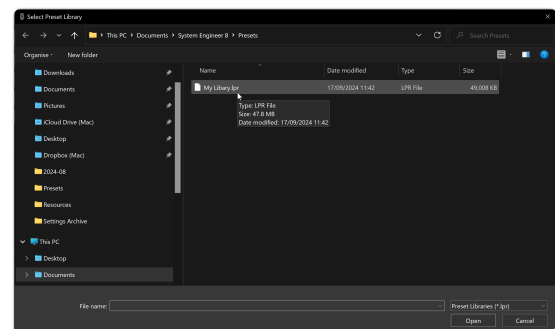


3. From the **Windows File Explore**, locate the **Preset Library File** you want to Import.

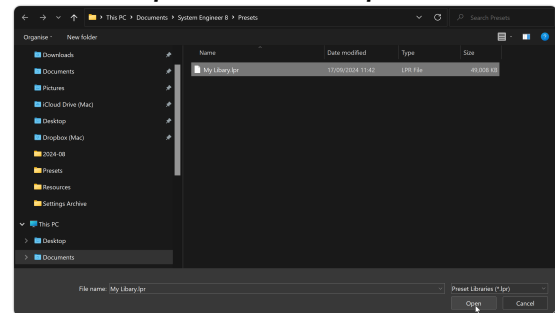


TIP

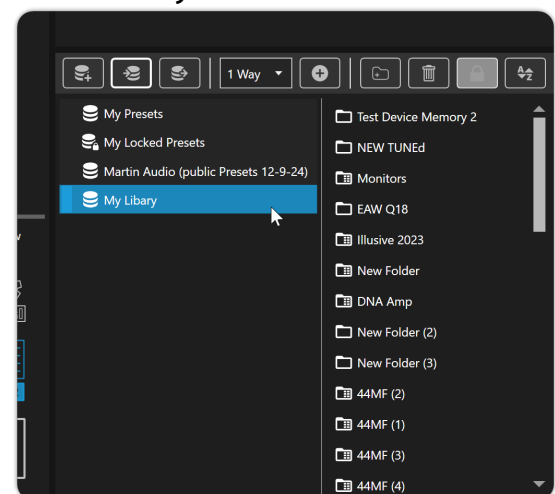
Linea Research preset library files use the extension **.lpr**



4. Select the **.lpr** file and click **Open**.



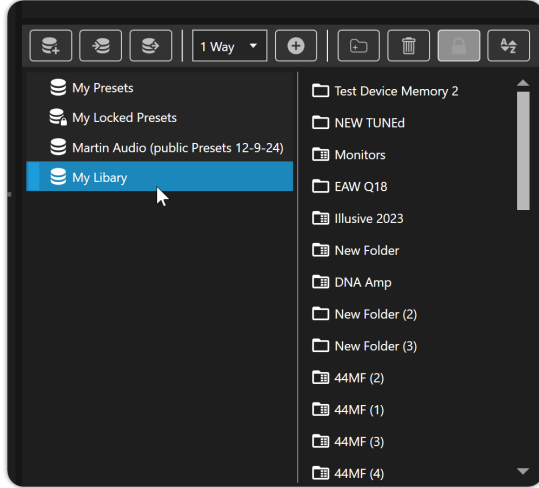
5. The preset Library will now be in your **User Preset Library** in the **Detail View**.



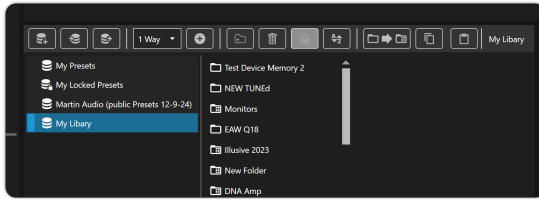
Saving a Preset Library

This guide will cover Exporting a Preset Library in System Engineer 8.

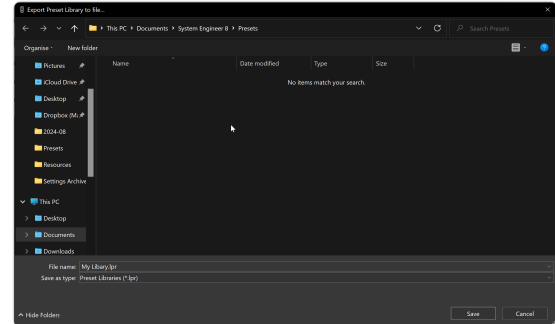
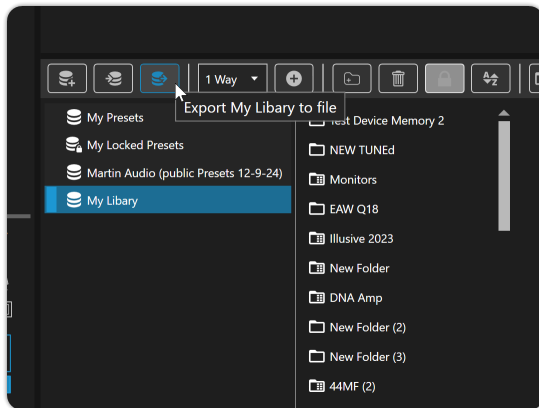
1. From the **Preset Workflow**, select the **Preset Library or Folder** you would like to Export.
4. From the **Windows File Explorer**, select a **location** to which you would like to export the Preset Library.



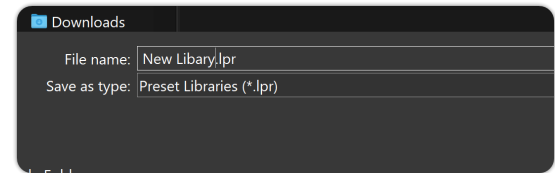
2. Locate the **Preset Library Menu Bar** at the top of the **Detail View**.



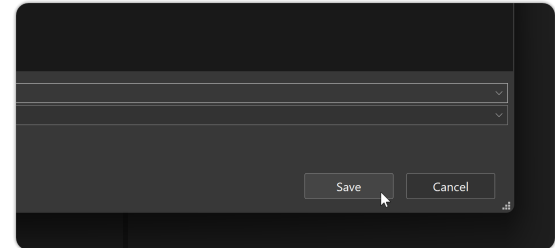
3. From the **Preset Menu Bar**, click the **Export Preset Library icon**.



5. **Name** the Preset Library.

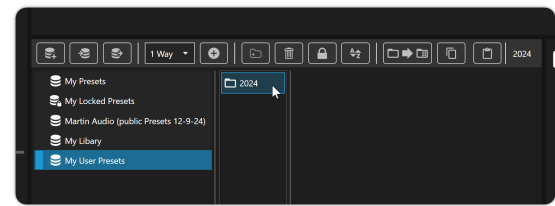
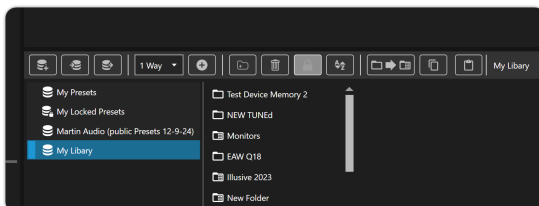


6. Click **Save**.

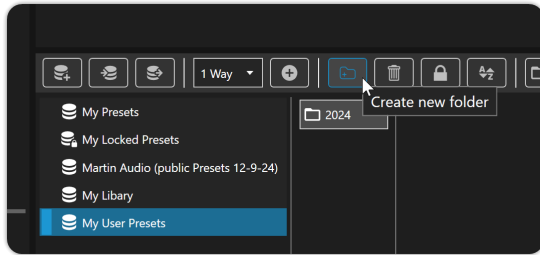


Creating a Folder

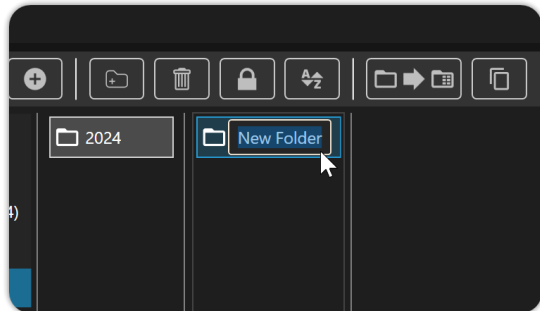
1. From the **Preset Workflow**, locate the **Preset Library Menu Bar** at the top of the **Detail View**.
2. From your **Libraries**, select the **Preset Library or Folder** you would like to add the new Folder to.



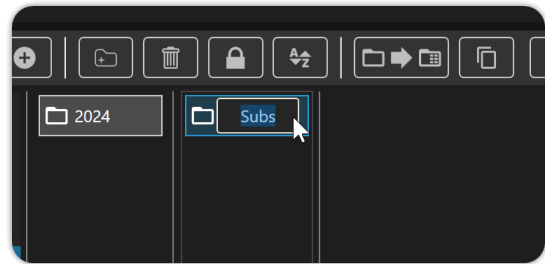
- From the **Preset Menu Bar**, click on the **Add Folder** icon.



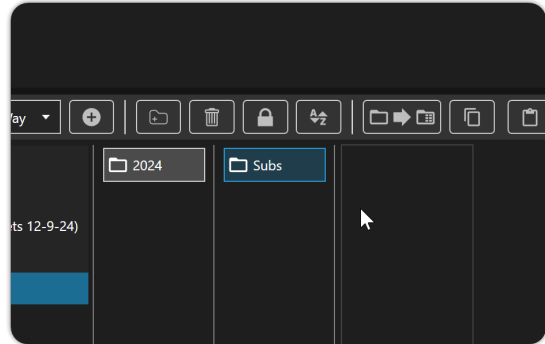
- To **rename** the folder, **double-click** on the folder.



- Enter the **Name** you would like for the Folder.

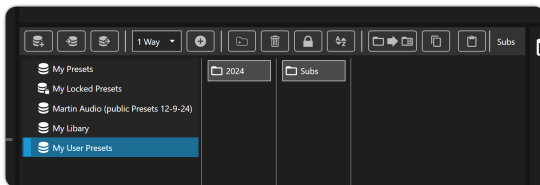


- Click **Enter**.

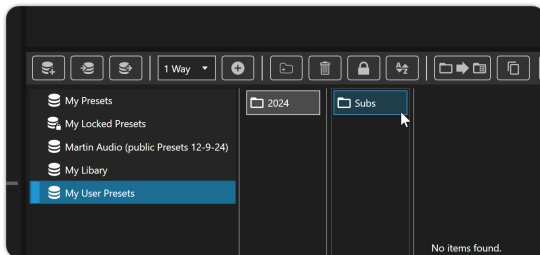


Creating a New Preset

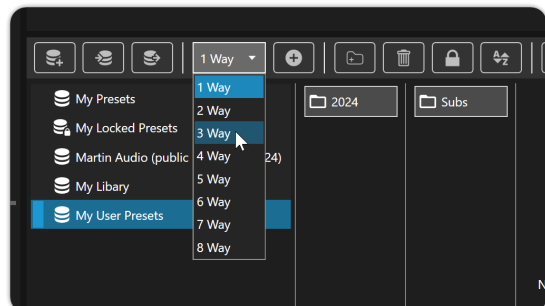
- From the **Preset Workflow**, locate the **Preset Library Menu Bar** at the top of the **Detail View**.



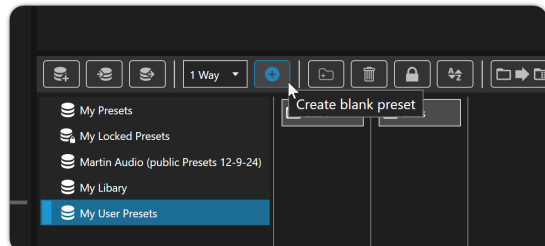
- From your **Libraries**, select the **Preset Library or Folder** you would like to add the new Preset to.



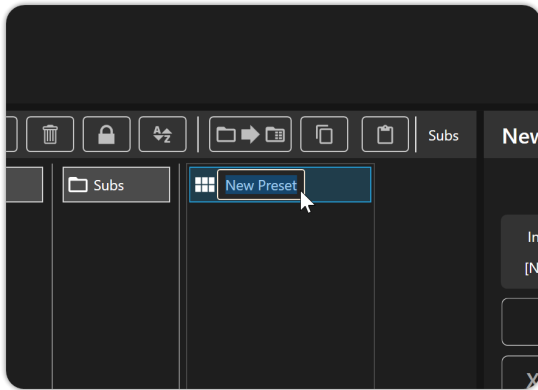
- From the **Preset Menu Bar**, click on the **Ways** dropdown and select the number of **outputs** you would like the new Preset to have.



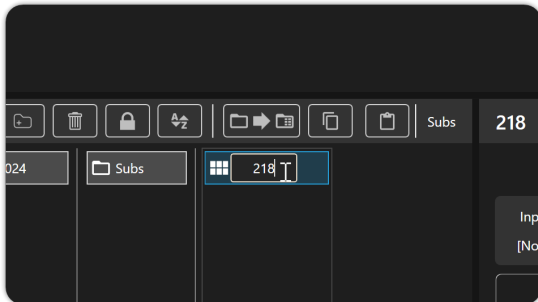
- From the **Preset Menu Bar**, click on the **+** icon next to the **Ways** Dropdown.



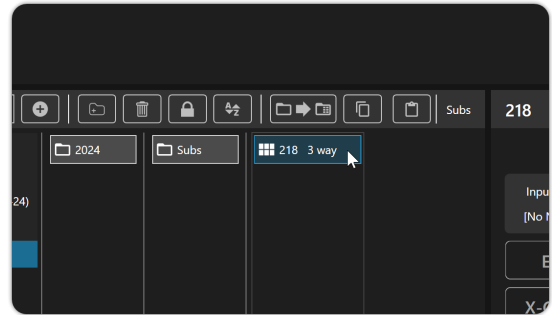
- To rename the Preset, **double-click** on the **Preset**.



6. Enter the **Name** you would like for the Pre-set.



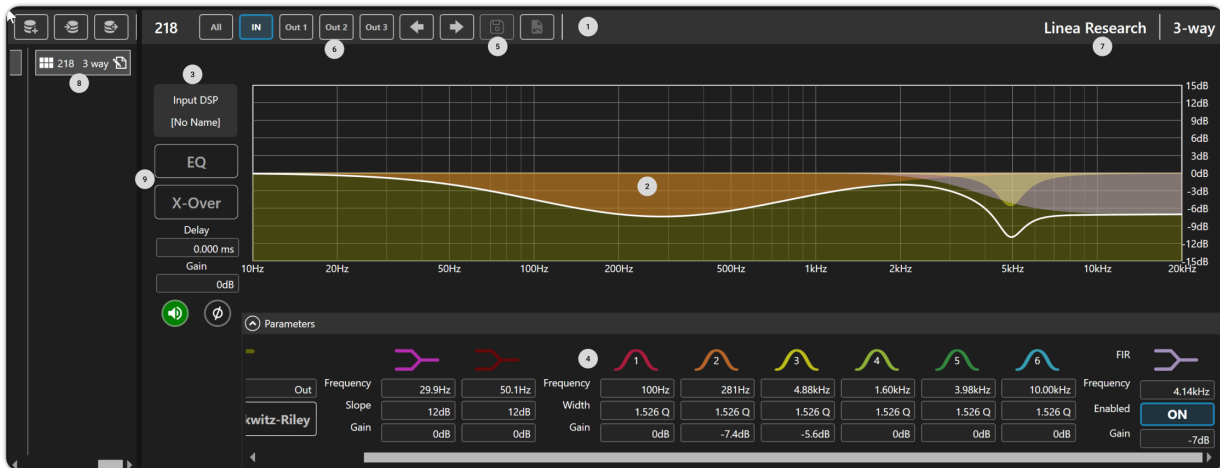
7. Click **Enter**.



Preset Preview

The Preset Preview is a powerful tool that allows you to view, create, and edit Presets offline in the Preset Library. The following topics will cover the Preset Preview User Interface and how to use the Preset Preview.

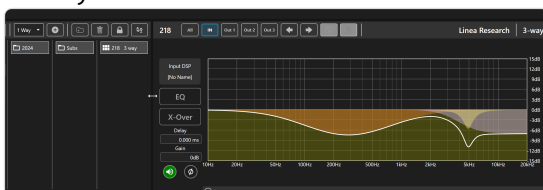
Preset Preview User Interface



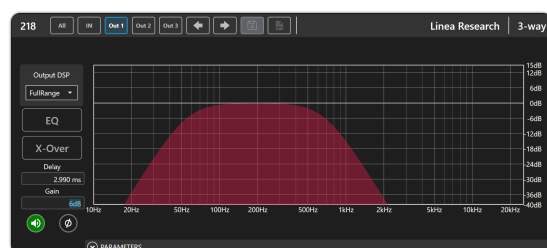
1. **Preset Preview Tool Bar** - Contains tools for the Preset Preview.
2. **Preset Preview EQ Graph** - EQ Graph for the selected input or output in the Preset Preview.
3. **Preset Preview Channel Strip** - Displays the Name, EQ/X-Over Navigation, Gain, Delay, polarity and Mute for the selected input or output in the Preset Preview.
4. **EQ Parameters** - Allows the input of EQ values for the selected input or output.
5. **Preset Preview Save** - Saves Changes to the preset.
6. **Preset Preview Input/Output Navigation** - Select the input or output you want to work on.
7. **Preset Brand ID** - Displays the OEM Brand ID for the selected preset.
8. **Selected Preset** - The selected preset that is currently in view

Editing and Saving a Preset in Preset Preview.

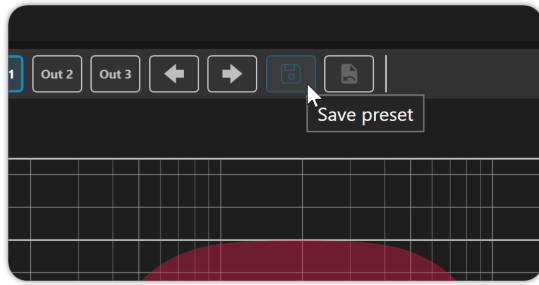
1. From the **Preset Preview**, choose an existing or newly created **Preset** from the Preset Library



2. Using the **Preset Preview User Interface**, enter or edit parameters as needed. See [Preset Preview User Interface \[40\]](#) for detailed information on the Preset Preview User Interface.



3. When you are finished click the **Save Preset icon** located on the **Preset Preview Menu Bar**.



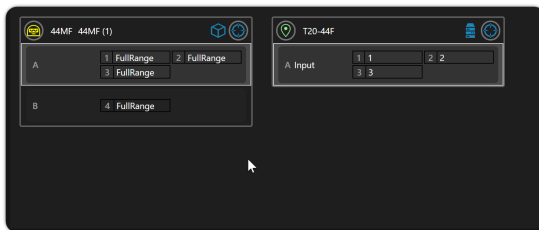
Loading a Preset to a Drive Module

1. From the **Preset Workflow** select a **Drive Module** from the **Explorer View**. You can select multiple **Drive Modules** by holding down **Ctrl** while selecting.



NOTE

If you select more than one Drive Module, you will only be able to choose Modules with the same output channel count.

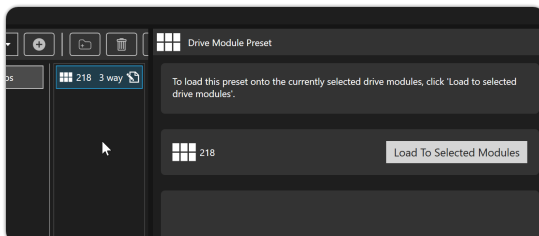


2. From the **Preset Library**, select the **Drive Module Preset** you would like to load.

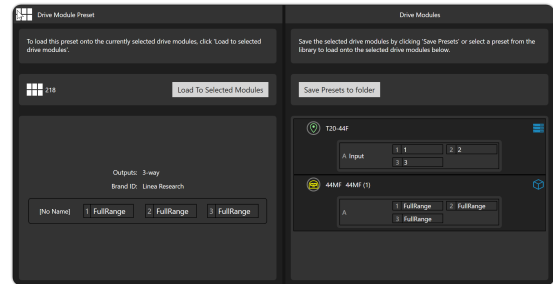


NOTE

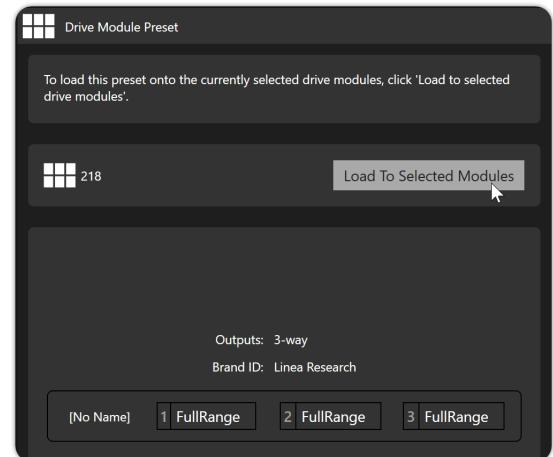
Only Drive Module Presets with the correct number of output channels to match the selected Drive Modules will be available for selection.



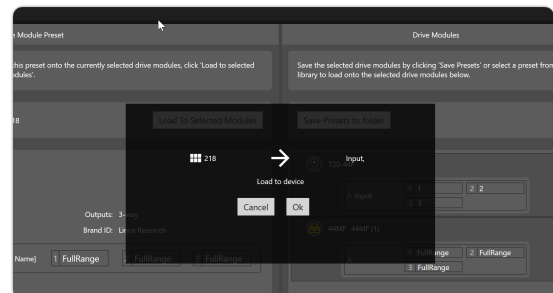
3. Using the **Preset load Summary**, check you are loading the correct Drive Module Preset to the correct Drive Modules.



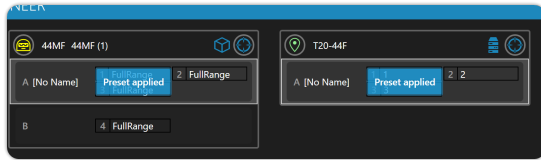
4. From the **Drive Module Preset Summary**, Click **Load to Selected Modules**.



5. Check you are loading the correct Drive Module Preset to the correct Drive Modules. Click **OK** to confirm.

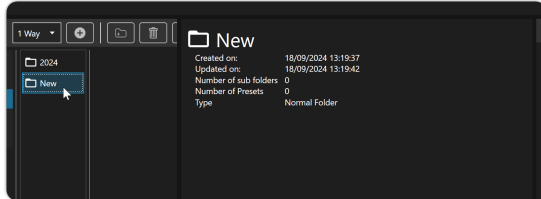


6. The Selected Drive Modules will display a confirmation that the Drive Module Preset has been loaded successfully.

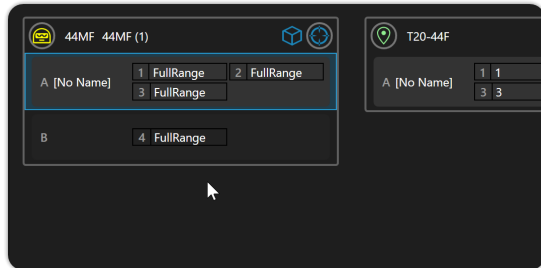


Saving a Preset from a Drive Module

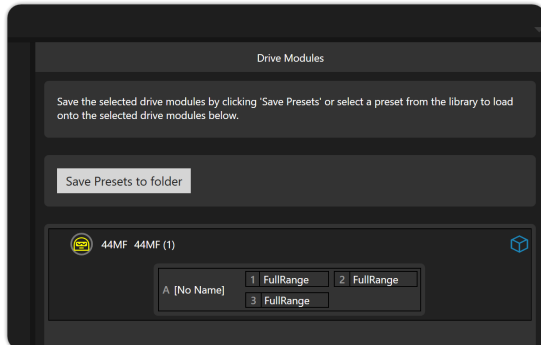
1. From the **Preset Workflow**, select a **Drive Module** in the **Explorer View** to save. You can choose multiple Drive Modules by holding down **Ctrl**.



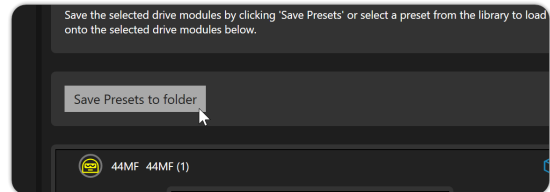
2. From the **Preset Library**, choose the **folder or library** to save the Drive modules into.



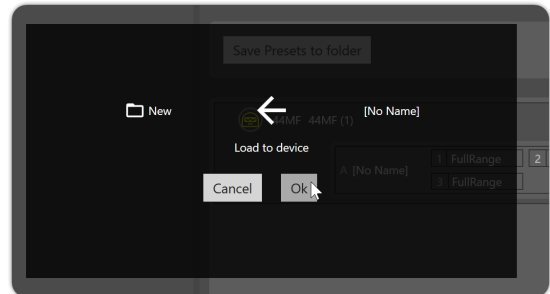
3. Using the **Preset Save Summary**, check you are saving the correct Drive Module Presets to the correct Library or Folder.



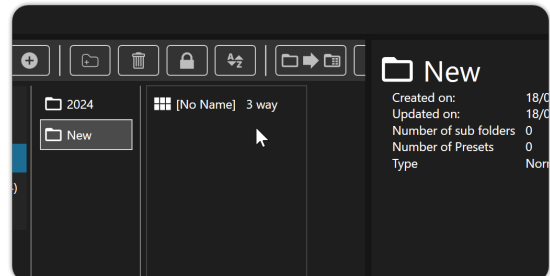
4. From the **Drive Module Preset Summary**, Click **Save Presets to Folder** button.



5. Check that you are saving the correct Drive Module Presets to the correct Library or Folder. Click **OK** to confirm.



6. The Selected Presets will now be saved in the Selected Folder or Library.



Device Memory Management

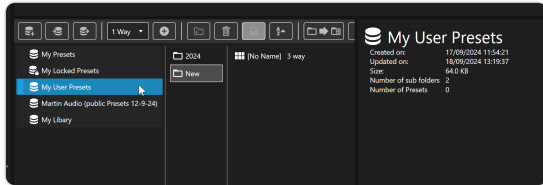
The Device Memory Preset Management Tools in System Engineer 8 allow you to efficiently load, save, and edit presets stored in Device Memory.

Device Memory Folders

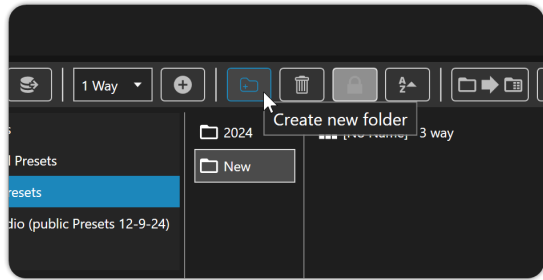
The Device Memory Folder is a special folder type located in the preset Library. It represents the 50 device memory preset slots in Linea Research devices. This folder type enables you to save, edit, and recall device memories between the device and your preset library.

Create a Device Memory Folder

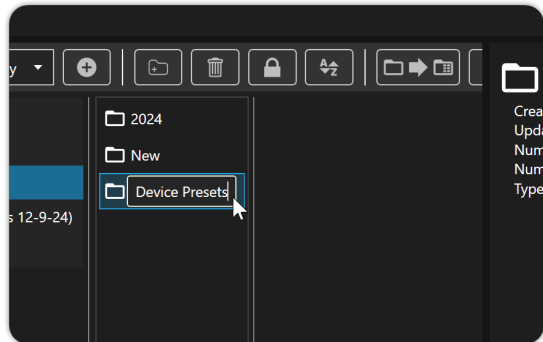
- From the **Preset Workflow**, Select a **Preset Library** that you would like to create the **Device Memory Folder**.
- Click the **Create Folder** icon from the **Menu Bar** in the **Preset Library Detail View**.



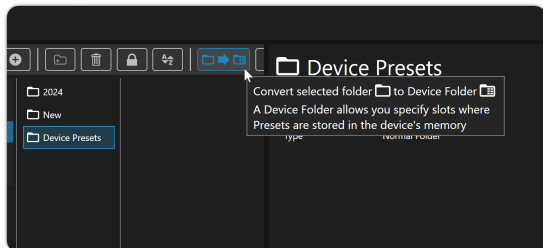
- Click the **Create Folder** icon from the **Menu Bar** in the **Preset Library Detail View**.



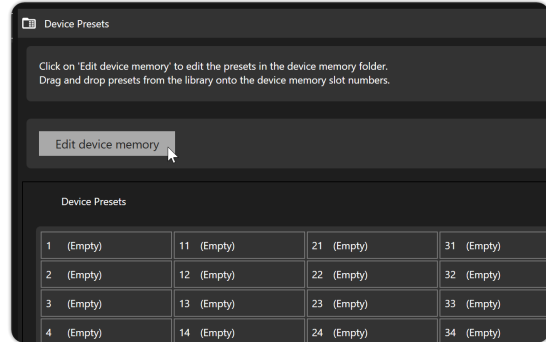
- Double-click** the **folder** and **rename** it.



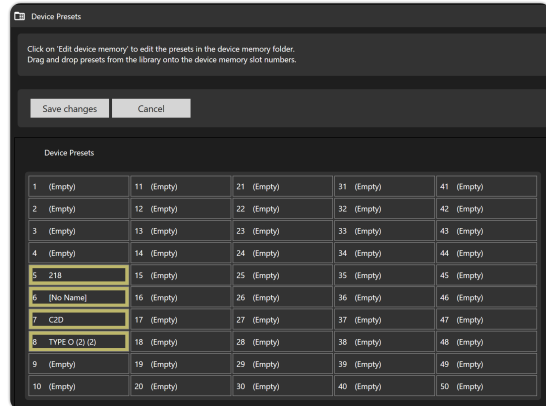
- While the **Folder is selected**, click the **Convert Folder to Device Memory Folder** icon located in **Menu Bar** at the top of the **Preset Library Detail View**.



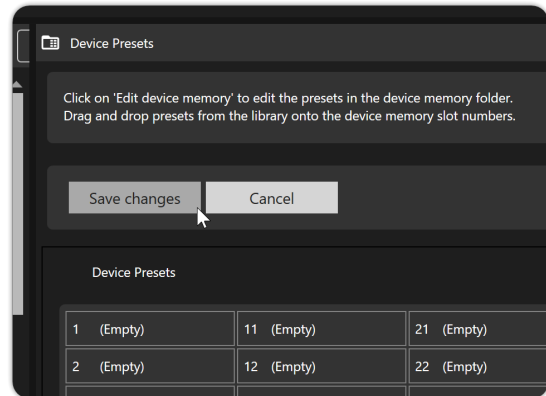
- In the new **Device Memory Folder**, click the **Edit** button



- Add presets** from your libraries to the **Device Memory Slots** in the order you would like them to appear on the Device.

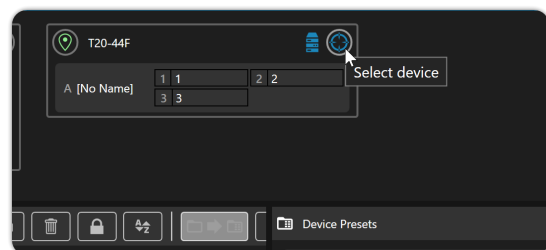


- Click **Save Changes**.



Load Device Memory Folder

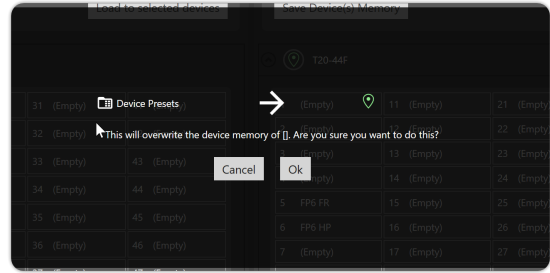
- From the **Preset Workflow** select a **Device Memory** by clicking the **Target Icon** in the top right corner of the **Device**. If you want to select **multiple devices**, hold down the **Ctrl** key while making your selections.



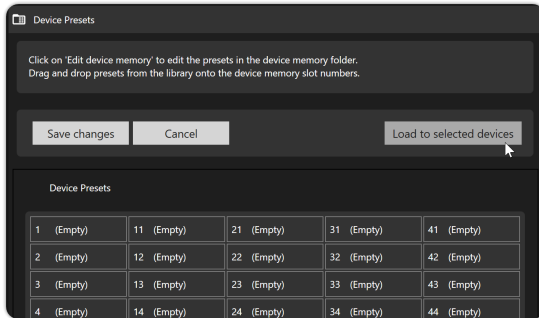
- From your **Preset Library**, select a **Device Memory Folder** to load into the device.



- Click **Ok** to confirm.

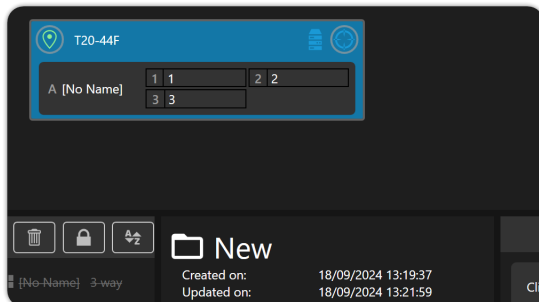


- Check your selections and if you are happy click **Load to Selected Devices**.

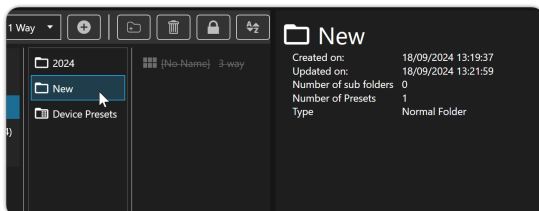


Save Device Memory Folder

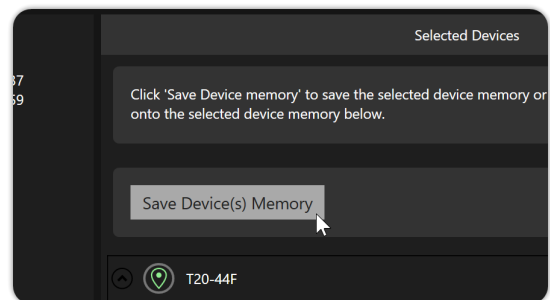
- From the **Preset Workflow**, select a **Device Memory** by clicking the **Target Icon** in the top right corner of the **Device**. If you want to select **multiple devices**, hold down the **Ctrl** key while making your selections.



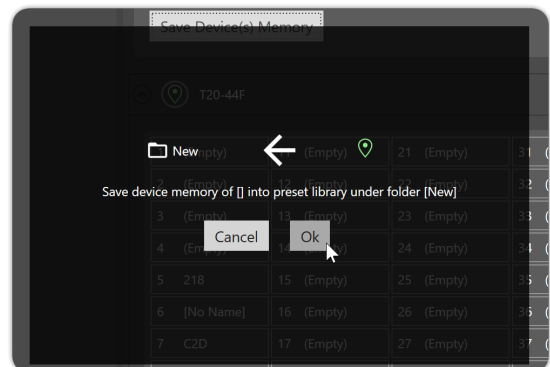
- From your **Preset Library**, select a **Folder** to save the Device Memories into.



- Please review your selections. If you are satisfied, click **Save Device Memory**.



- Click **Ok** to confirm.



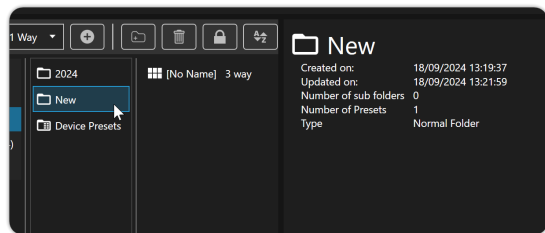
Convert an Existing Folder to Device Memory Folder

You might already have a folder of Drive Module Presets that you wish to convert into a Device Memory Folder to load onto a device. This guide will walk you through the necessary steps.

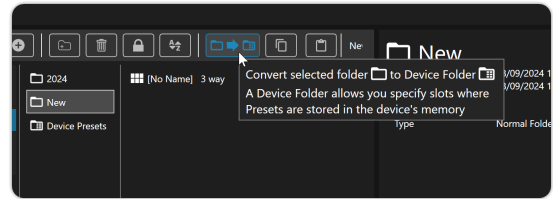
1. From the **Preset Workflow**, choose a **folder** containing **Drive Module Presets** to load on-to a device.

 **NOTE**

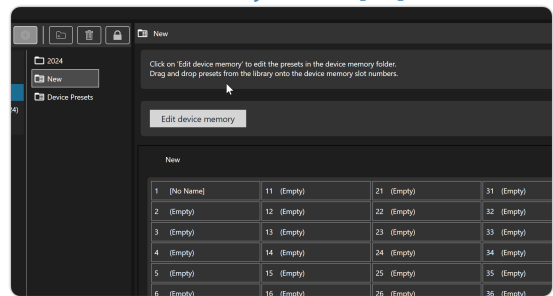
The folder must contain 50 presets or less to be converted to a Device Memory Folder.



2. With the **folder selected**, click the **Convert Folder to Device Memory Folder** icon on the **Preset Detail View Menu Bar**.



3. You can now load the Device Memory Folder onto a Device, for detailed steps please see [Load Device Memory Folder \[43\]](#)



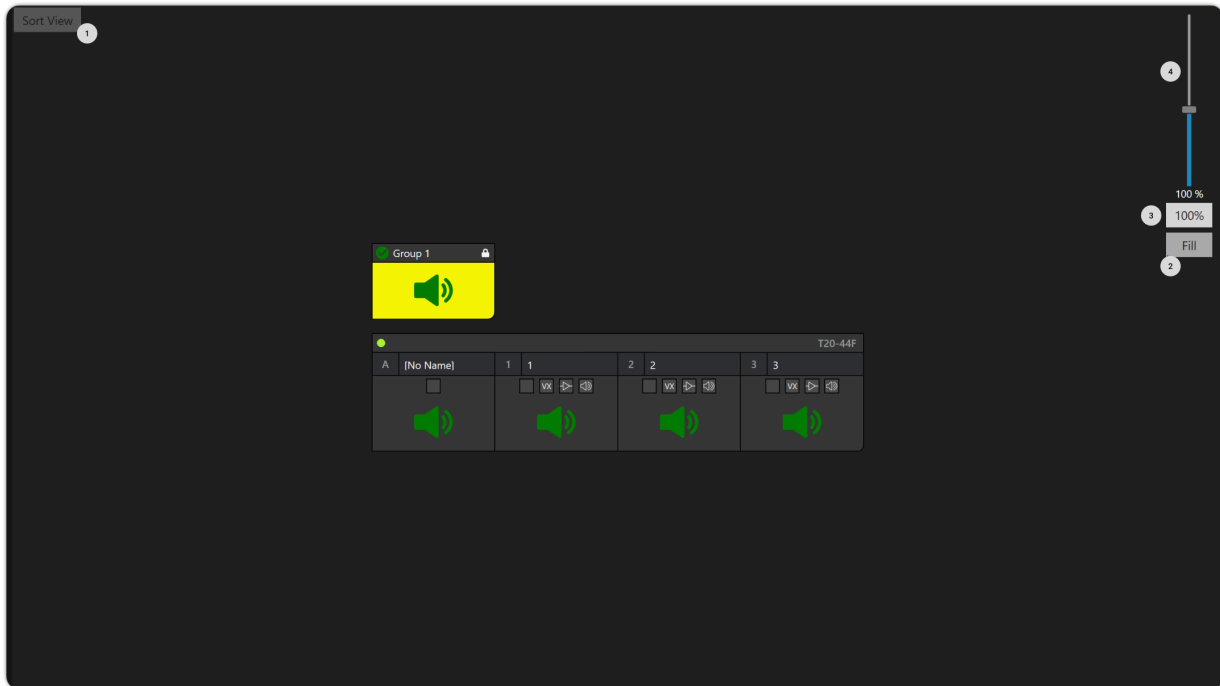
Tune Workflow

The Tune Workflow provides you with all the tools to fine-tune, optimize, and monitor your Linea Research Devices. The following guides will cover... [Arranging your System \[46\]](#), [Using the Quick Views \[48\]](#), [Equalisation \[49\]](#), [Crossovers \[52\]](#), [Limiters \[53\]](#), [Using Multi-Select \[55\]](#), [Using Overlay Groups \[56\]](#) and [Output Channel Monitoring \[58\]](#).

Arranging your System

The Explorer View in the Tune Workflow provides a canvas for arranging Drive Modules. The guides will cover system arrangement in the Explorer and the use of Canvas Tools.

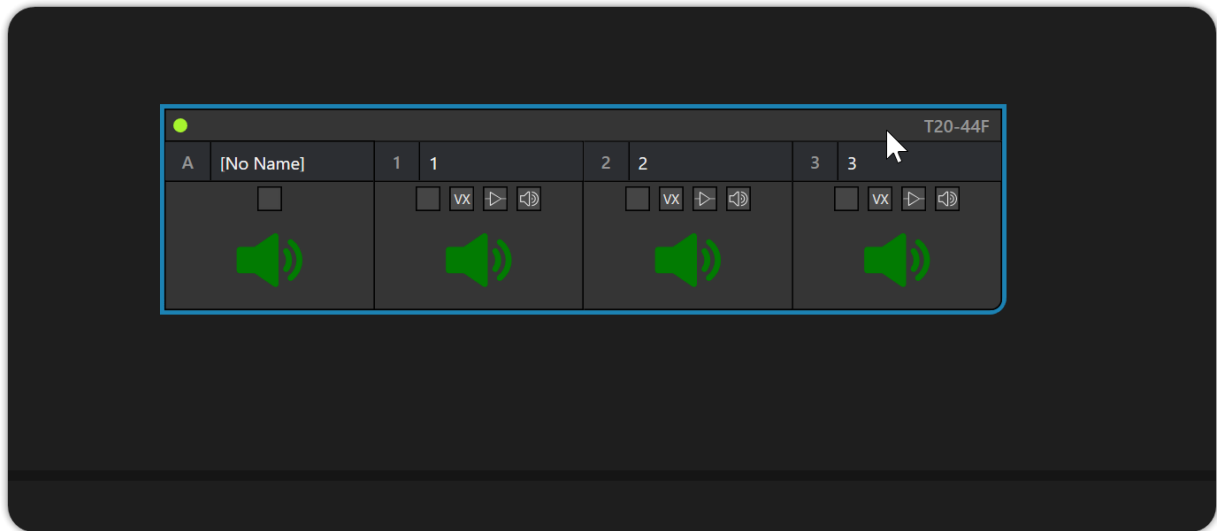
Explorer Canvas User Interface



1. **Sort View** - Sort View will gather all the drive modules on the canvas and sort them into device and module order in the middle of the canvas.
2. **Fill** - Fill will fit all Drive Modules on the canvas into view.
3. **100%** - will reset the zoom value back to 100%
4. **Zoom Slider** - The Zoom Slider enables you to adjust the zoom level on the canvas from 20% to 200%.

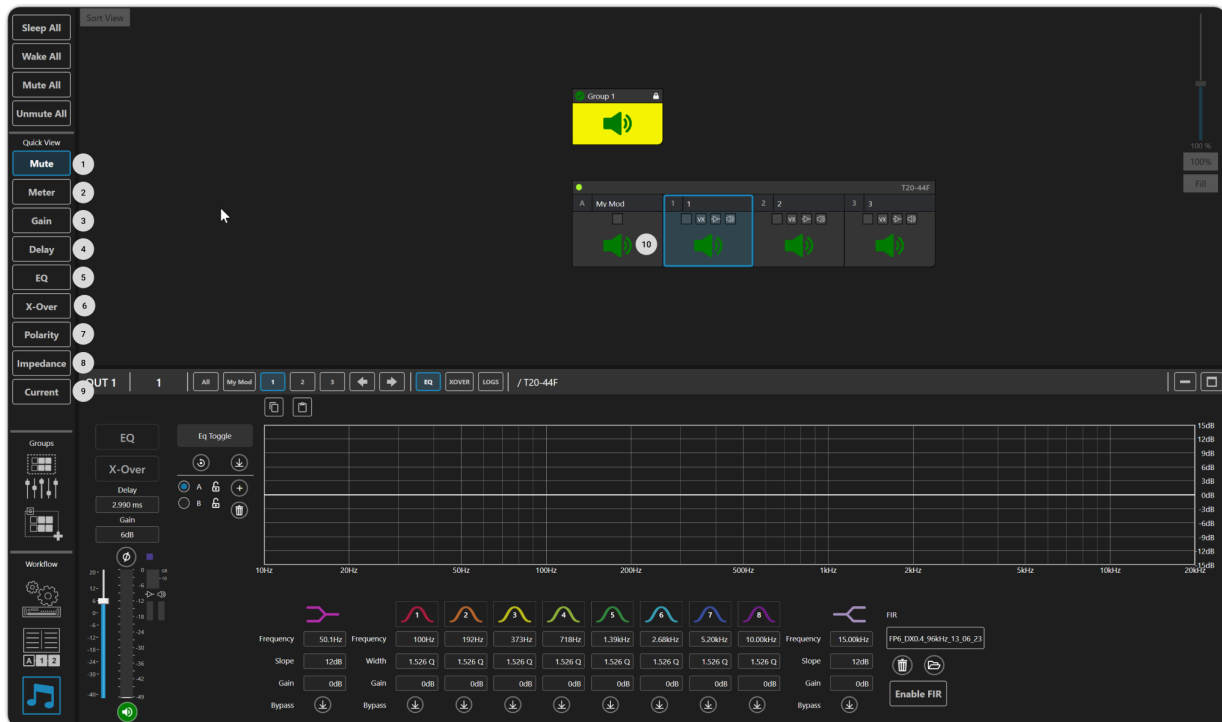
Arranging Drive Modules on The Canvas

To arrange Drive Modules on the Canvas, click and hold the Drive Module Title Bar and move it to the desired position.



Using the Quick Views

In the Tune Workflow, Quick Views allow you to easily see, edit, and compare common parameters across your entire system. Select a Quick View from the Tool Bar, and the relevant information will be displayed in the Quick View Area of the Drive Module.



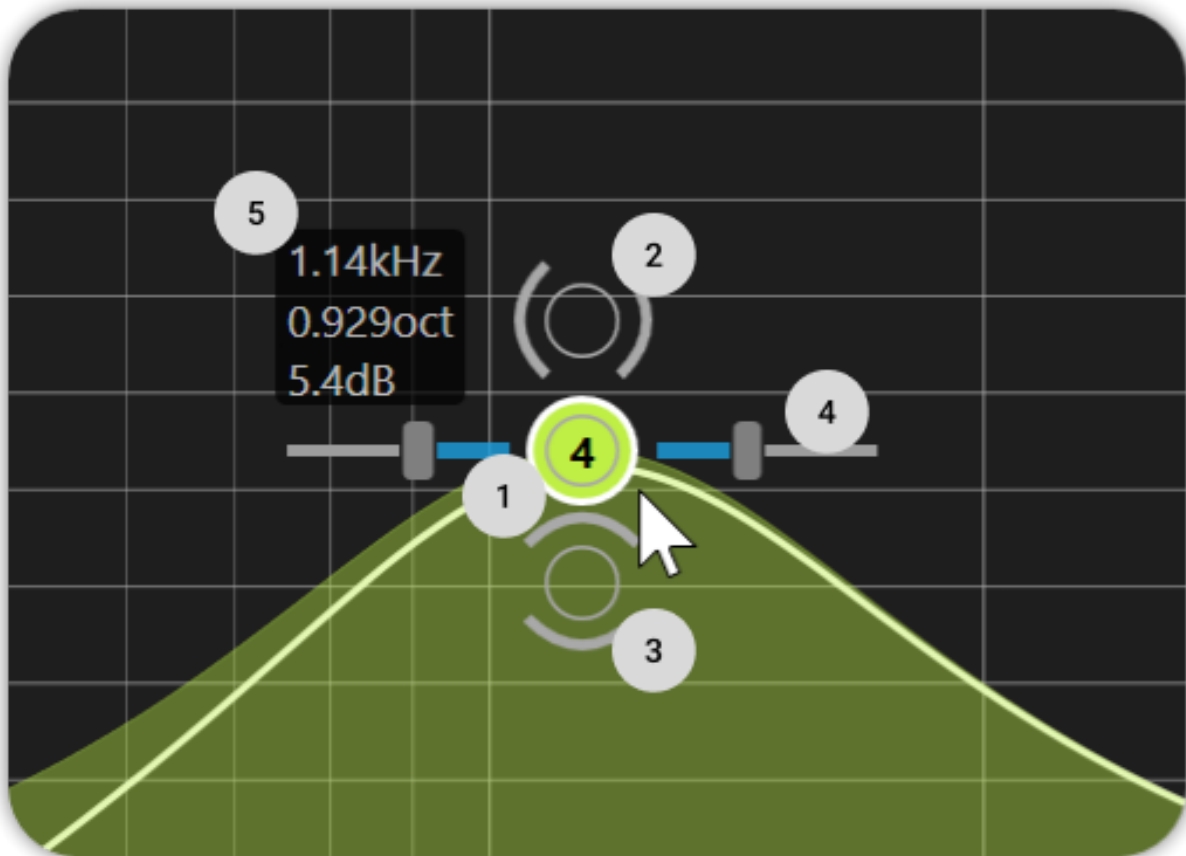
- Mute** - Mute Quick View displays the mute states across all inputs and outputs of the system. The Mutes can be toggled directly from the Drive module Quick View area.
- Meters** - Meters Quick View displays larger metering for inputs, outputs, and protection limiting across all outputs of the system.
- Gain** - Gain Quick View displays the current input and output gains across the system. If a Drive Module is a member of an overlay group, the overlay Gain will also be displayed in the quick view. It is also possible to make changes to the gain from the Quick View.
- Delay** - Delay Quick View shows the current input and output delay across the entire system. If a Drive Module is part of an overlay group, the overlay delay will also be displayed in the Quick View. It is also possible to make changes to the delay from the Quick View.
- EQ** - EQ Quick View allows navigation to input and output EQ in the Detail View.
- X-Over** - X-Over Quick View allows navigation to output X-Over in the Detail View.
- Polarity** - Polarity Quick View displays the polarity for all inputs and outputs of the system and allows direct toggling.
- Impedance** - Impedance Quick View provides a real-time display of the impedance of the load on each output channel.
- Current** - Current Quick View provides a real-time display of the current draw of each amplifier output.
- Drive Module Quick View Area** - This area displays the currently selected Quick View information.

Equalisation



- EQ Graph** - Displays the EQ curve for the selected input or output channel.
- Parametric / All Pass Filter Toggle** - Toggles the filter type between parametric or all-pass filter for the selected EQ band.
- Bypass** - Bypasses the selected EQ band.
- FIR** - Load and enable/disable FIR files.
- EQ Drag Control** - EQ Drag Control allows the manipulation of the EQ bands with a mouse or track pad.
- Copy and Paste** - You can copy and paste EQ settings between inputs and outputs.
- EQ Toggle** - Enables the comparison of various EQ settings.
- EQ Number Boxes** - "Exact EQ settings can be entered using a keyboard."

Using the EQ Drag Handle



1. **EQ Drag Point** - The centre point of the EQ drag handle allows the EQ point to move freely in the frequency and gain domains.
2. **Frequency Drag Point** - The Frequency Drag Point allows for the movement of the EQ point in the frequency domain while leaving the Gain unaffected.
3. **Gain Drag Point** - The Gain Drag Point allows for the movement of the EQ point in the Gain domain while leaving the Frequency unaffected.
4. **Bandwidth Slider** - The Bandwidth Slider adjusts the bandwidth or Q of the EQ point. You can also control the bandwidth by scrolling the mouse wheel when the pointer is on the EQ center point.
5. **Floating EQ Summary** - Displays a summary of the currently focused EQ point.

Using EQ Toggle

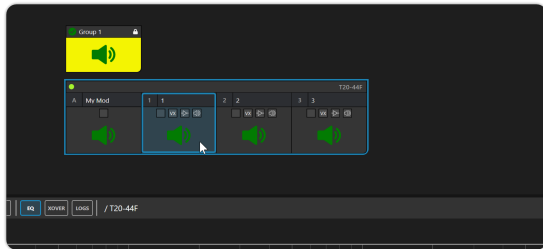
The EQ Toggle feature allows you to quickly create and compare multiple EQ curves on any EQ in the system.



1. **Bypass** - Bypasses the currently selected EQ
2. **Reset** - Resets the EQ values for the selected EQ
3. **EQ Select** - Selects the EQ you would like to listen to.
4. **Delete** - Deletes the selected EQ.
5. **Add EQ** - Adds more EQs to compare.

Comparing EQ with EQ Toggle

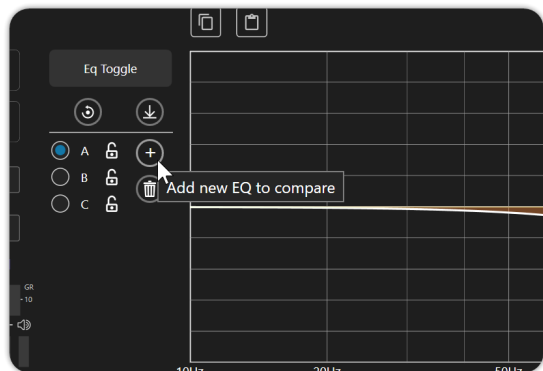
1. Select the input or output channel you would like to compare EQ on.



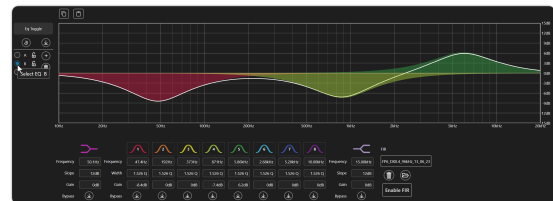
2. Add your EQ to the EQ graph using the EQ drag handle or enter values using the EQ number boxes.



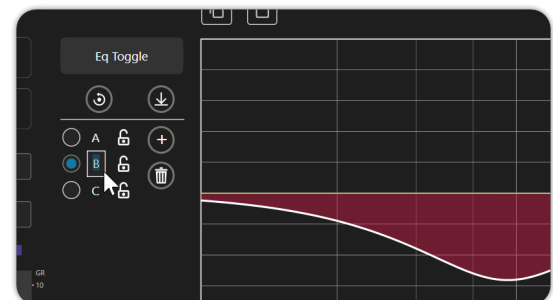
3. Use the + button to add more EQ that you would like to compare with each other.



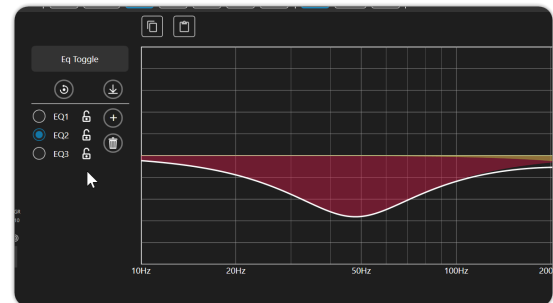
4. Select the newly created EQs and add EQ to the EQ graph using the EQ drag handle or enter EQ values in the EQ parameters number boxes.



5. You can double-click the letter next to the EQ to rename it.



6. Enter a name for the EQ's



- You can now toggle between the EQs to listen to them by clicking on the circle next the the name of the EQ.



Crossovers



- Crossover Drag Handel** - Use a mouse or track pad to drag the crossover point.
- Crossover Graph** - Displays the crossover for the selected output.
- Crossover Frequency Number Box** - Enter the crossover frequency in the number box with a keyboard
- Crossover Shape Selector** - Opens the crossover shape selector.
- Crossover Shapes** - All the crossover shapes available for the selected device.

Limiters

1 Virtual X-Over Limiter (VX)		2 Thermal Limiter (Tmax)		3 Excursion Limiter (Xmax)		Driver Impedance	
Mode	Vx Frequency	Threshold		Threshold		Alarm	
Normal <input type="checkbox"/> <input checked="" type="checkbox"/> VX	12.00kHz	Off		Off		Min Impedance	Any
Threshold	Threshold Hi	Attack		at Frequency		Max Impedance	Any
201V	0dB	1s		50.1Hz			
Overshoot	Overshoot Hi	Release		Min Frequency			
8dB	8dB	1X		5Hz			

1. VX Limiter

The Virtual Xover pseudo-peak limiter (RMS calibrated) is at the core of the Linea Research VX Suite. This section will guide you through the usage and functionality of the VX Limiter, which can be operated in two distinct modes: VX Mode on or VX Mode off.

VX Mode Off: Conventional Limiter When VX Mode is off, the VX Limiter behaves similarly to a conventional limiter, but with enhanced functionality. It operates in a multiband form, meaning different frequency ranges are independently limited. Each band has optimized attack and release characteristics, which results in a more natural sound and reduces the effect known as “pumping.” In this mode, the only controls you need to adjust are:

- Threshold:** This sets the limiter’s activation point, calibrated to the RMS dB value.
- Overshoot:** This controls the maximum output level above the threshold that the limiter will allow, typically set between 6 to 8 dB. Avoid setting this value too low (less than 4 dB), as it can result in a harsher sound. This mode is suitable for most applications, especially when passive crossover networks are not involved.

VX Mode On: Virtual Crossover When VX Mode is on, you gain additional control with a virtual crossover. This introduces a low-latency, linear-phase crossover, creating two independent limiters per output. Each limiter can have its own Threshold and time-constant characteristics. This feature is more than just a frequency-conscious limiter. The output spectrum changes based on the level of limiting applied to each band, mimicking the behavior of a bi-amped system with individual limiters for each driver. This can provide better protection for specific components, such as a tweeter, by allowing for a lower threshold and faster attack/release times for higher frequencies. When VX

Mode is engaged, the following parameters become available:

- Threshold:** Set this to the desired RMS dB value.
- Overshoot:** Set this between 6 and 8 dB for optimal results.
- Split Frequency:** This is the crossover frequency, typically matching the passive crossover network.
- Threshold Hi:** This sets the limiting threshold for higher frequencies, relative to the main threshold. For example, if the main threshold is set to 50V, and the Threshold Hi is set to -6 dB, the high frequencies will be limited to 25V (6 dB lower).
- Overshoot Hi:** Similar to the primary Overshoot control, but for high frequencies. A value between 6 and 8 dB is typical. By using these controls, you can fine-tune the VX Limiter to suit a wide range of applications, providing precise and targeted audio limiting with minimal impact on overall sound quality.

2. Thermal Limiter

Thermal limiting is crucial for protecting the most vulnerable part of a loudspeaker—the voice coil—from overheating. When a loudspeaker is in use, much of the electrical energy applied to the driver converts into heat within the voice coil. The close proximity of the voice coil to the magnet assembly allows heat to transfer between them, but this heat transfer is not perfect. As a result, the temperature of the voice coil can rise faster than the magnet assembly.

Estimating Voice Coil Temperature

While it is possible to estimate the temperature of the voice coil based on the input signal, doing so accurately requires knowledge of many detailed driver parameters, which is often impractical. Instead, the Thermal Limiter provides a powerful solution using just three key parameters:

1. Threshold level

2. Attack time
3. Release time

This approach models the voice coil's temperature and adjusts the output signal to ensure the RMS power stays within safe limits, applying attack and release characteristics to simulate the thermal behavior of the driver's voice coil and magnet assembly. Adjustable Parameters for Thermal Limiting

1. Threshold - This parameter sets the continuous RMS voltage that the driver can safely withstand, calibrated at the amplifier's output. You can disable the Thermal Limiter by setting the Threshold to its maximum "Off" value.

2. Attack Time - This defines how quickly the driver heats up, measured in seconds. Though this specification is rarely published, it can be calculated based on the thermal Time Constant of the magnet assembly, which is roughly proportional to its mass and volume. For smaller high-frequency drivers (HF drivers), an Attack time of around 50 ms is typical, while larger cone drivers may require values up to 5 seconds. Using faster attack times offers more protection but at the expense of lower average output levels.

3. Excursion Limiter

The Excursion Limiter is designed to protect your loudspeaker driver from excessive movement (excursion) of the cone and voice

coil, which can result in mechanical damage. This excessive excursion is primarily a concern at low frequencies, where the driver is most vulnerable.

To properly configure the Excursion Limiter, you need to understand the driver's Excursion vs. Frequency curves at various voltage levels. Choose the curve where the slope steeply intersects the specified X-max value for the driver. Note the peak voltage and frequency at this point, as they will be used to configure the Excursion Limiter.

The Excursion Limiter typically requires only two parameters for setup:

Threshold - This is the peak voltage at the point where the excursion reaches the driver's X-max. You can calculate this by multiplying the RMS voltage by 1.414 (the square root of 2). The threshold is calibrated at the amplifier's output. To disable the Excursion Limiter, set the Threshold to its maximum "Off" value.

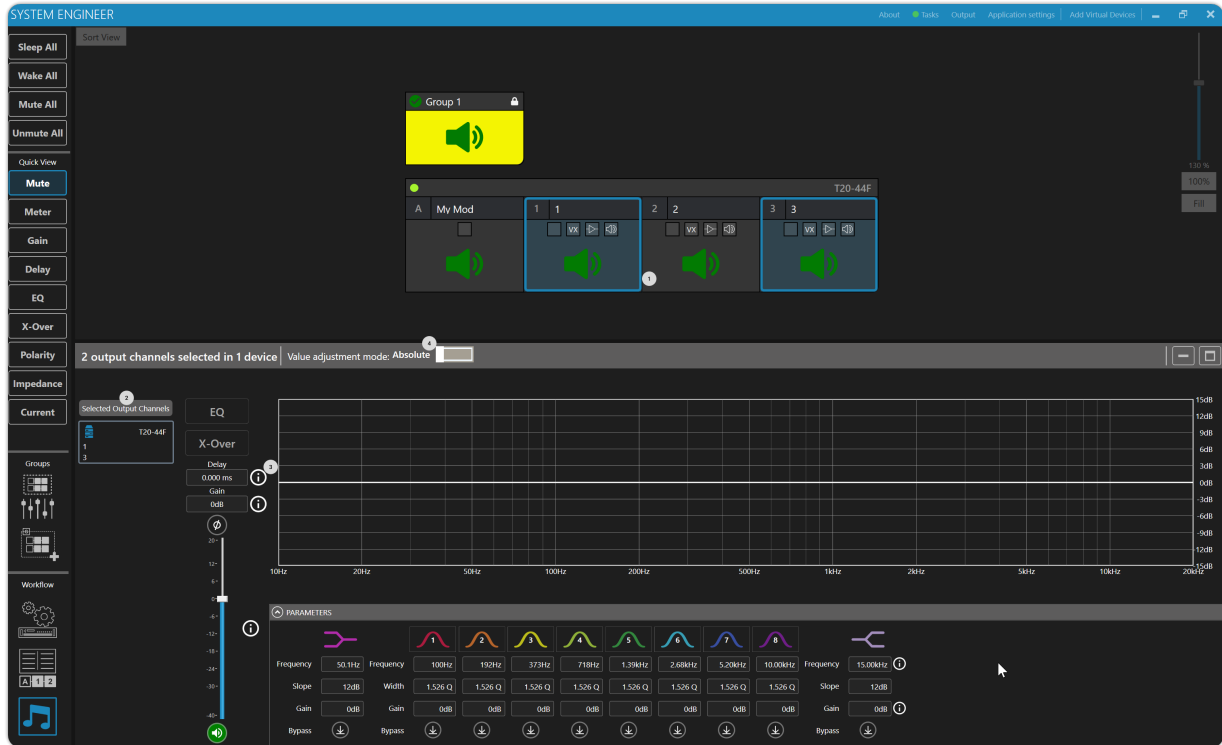
Frequency - This is the frequency corresponding to the peak voltage noted above, where the driver reaches its X-max.

Minimum Frequency (Optional) - Some applications allow the use of a Minimum Frequency (Min) parameter. This sets a frequency below which the limiter's action levels off. By default, this is set to 5 Hz and typically does not need to be adjusted unless the application specifically requires it.

Using Multi-Select

When using the Multi-Select feature in the Tune Workflow, you can easily configure and edit multiple inputs or outputs with the same settings.

Multi-Select User Interface

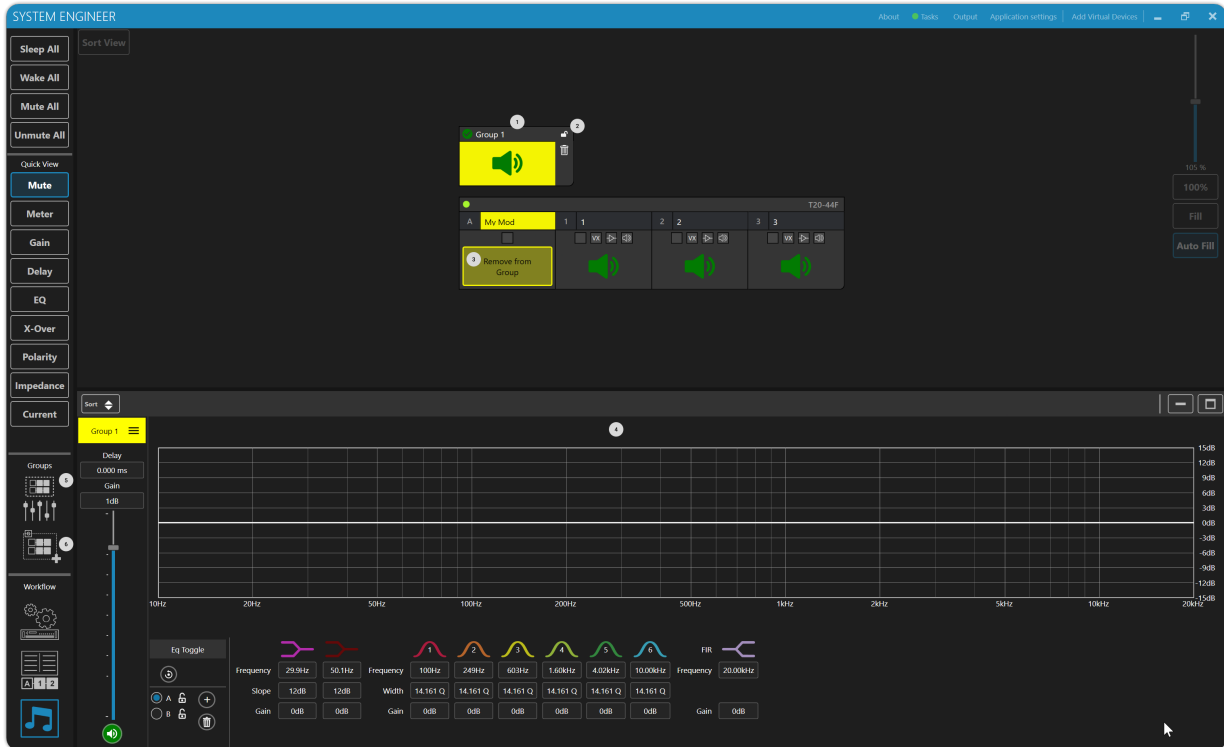


1. **Input / Output Selection** - The blue border indicates selected inputs or outputs in the Explorer View.
2. **Input / Output Selection Summary** - Displays the selected inputs or outputs in the Detail View.
3. **Ambiguous Settings** - Settings that are different between multi-selected inputs or outputs are indicated with a !.
4. **Absolute / Relative Mode Toggle** - Toggling to Relative Mode will make Relative changes to Gain, Delay, in this mode changes to EQ will be disabled.

Using Overlay Groups

Linea Research Devices support up to 12 Overlay Groups that can be controlled by System Engineer 8. Overlay Groups allow EQ, Gain, Delay, and Mute to be overlaid on the input DSP of a Drive Module. Any Drive Module from any device can be a member of as many as 12 Overlay Groups.

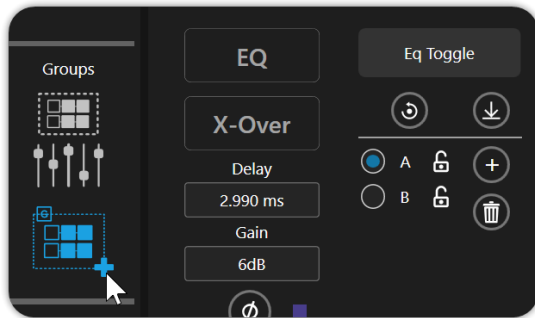
Overlay Group User Interface



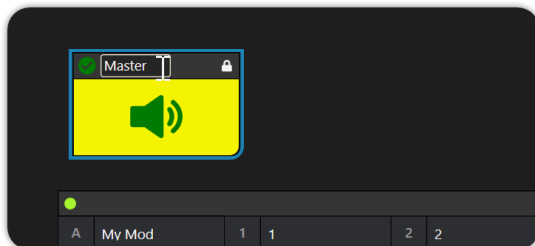
- Group Bar** - The Group Bar represents a group in the Explorer View and can be placed on the Explorer Canvas like a Drive Module Bar.
- Group Membership Lock/Unlock**- Unlocks the Group for adding or removing Drive Module Group Memberships.
- Add/Remove Drive Module** - Located on the input of a Drive Module, clicking here will add or remove the Drive Module from the currently selected Group.
- Group Detail View** - Clicking the Overlay Group Bar will open the Overlay Group in the Detail View and provide controls for EQ, Gain, Delay, and Mute.
- Group Mixer** - Opens the Group Mixer.
- Add Group** - Adds a new Group Bar to the Explorer View

Adding and Removing Drive Modules to and from Overlay Groups

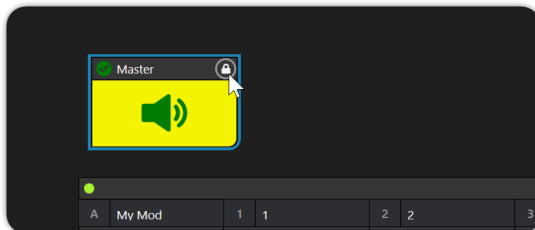
1. From the Tune Workflow click the Add Group button in the left hand toolbar to add a new Overlay Group



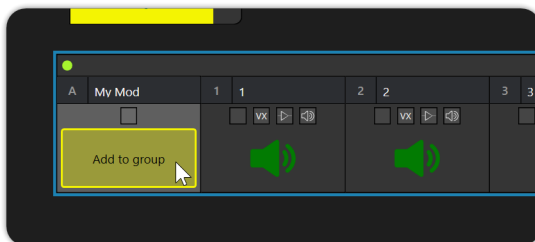
2. In the Group Bar, give the Group a Name by clicking on the text box.



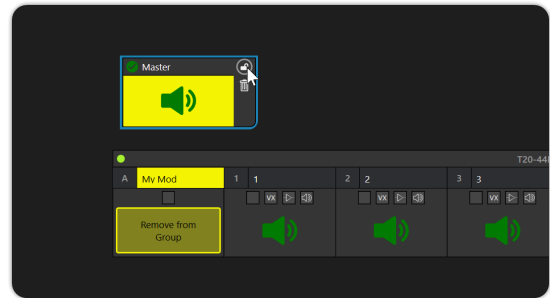
3. Click the padlock in the top right-hand corner of the Group Bar.



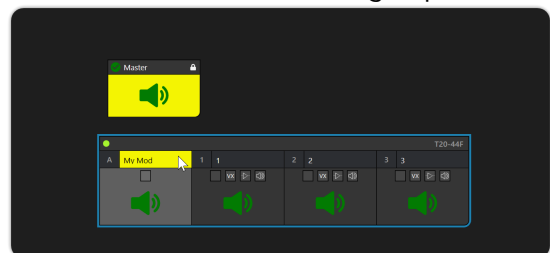
4. To add a Drive module to a selected group, click the colored "Add to Group" button. If the Drive module is already in the group, clicking the button will remove it.



5. Click the padlock to lock the group.



6. You have set up an Overlay Group. When you select the overlay group in the explorer, the name text box of the input drive modules that are members will be highlighted with the color of the selected group.



7. With the group selected, you will now have access to the Overlay Group parameters in the detail view. You can add your overlay information to the group.



Output Channel Monitoring

In the Tune Workflow, you can monitor device Outputs and view events from the logs tab on the Drive Module detail view menu bar.

Output Channel Monitoring User Interface



1. **Logs Navigation** - Switched detail view to display Logs for the selected Output.
2. **Protection Limiting** - Protection Limiting gain reduction is shown in Red on the Logs graph.
3. **Output Impedance** - Output Impedance is shown in blue on the Logs graph.
4. **Output Current** - Output Current is shown in green on the Logs graph.
5. **Power Cycle Events** - This list displays the time of the last device power cycle in hours and minutes relative to the current time.
6. **Counters** - In the Counters section, you can view the counts for overcurrent, VHF mute, and protection events.