

Operation Manual

Lake[®] Controller



Table of Contents

1. Welcome	1
1.1 Important Information	1
1.2 Introduction	1
1.3 Controller Overview	1
1.4 Manual Overview	2
2. Software Installation	5
2.1 Computer Requirements	5
2.2 Lake Controller Installation	9
2.3 Moving User Files between Installations	10
3. Network & Firewall Overview	11
3.1 Ethernet Overview	11
3.2 Firewall Configuration	12
3.3 IP Address Configuration	13
3.4 Wired Network Setup	16
3.5 Wireless Network Setup	18
3.6 Dante Digital Audio Networking	21
4. Lake Controller Tutorial	26
4.1 Starting the Lake Controller	26
4.2 Overview of Main Page Components	27
4.3 Modules and Frames	29
4.4 Equalization	44
4.5 Crossovers	52
4.6 Groups	54
4.7 Lake Controller File Types	56
5. Home Menu Reference	59
5.1 Main Screen Home Menu	59
5.2 Accessing EQ/Levels from HOME	61
6. System Store Recall Menu Reference	62
6.1 System Store Recall Navigation	62
6.2 Shortcut to Data/User Folder	62
6.3 Recall as New System—Open	63
6.4 Recall as Subsystem	63
6.5 Recall Compare	63
6.6 Recall as Virtual Sub System (SS)	64
6.7 Store System	65
6.8 Store Subsystem	65
6.9 File Utilities	65
6.10 System Presets	67
7. EQ/Levels Menu Reference	71
7.1 EQ/Levels Overview	71

7.2	Levels.....	74
7.3	EQ.....	81
7.4	Crossovers and HPF/LPF.....	92
7.5	Auxiliary Output Channels.....	104
8.	Modules Menu Reference.....	112
8.1	EQ/Levels.....	112
8.2	I/O Config.....	112
8.3	Label & Lock.....	142
8.4	Copy/Paste/Replace.....	143
8.5	Remove.....	146
8.6	Module Store/Recall.....	146
8.7	Add Page.....	151
8.8	Super Modules (LM and PLM Series Contour Modules only).....	151
9.	Module File Types & LoadLibrary™.....	155
9.1	Module Types Overview.....	155
9.2	Supplementary Module Data.....	155
9.3	Module Type Abbreviations.....	156
9.4	Classic Crossovers/Auxiliary Outputs.....	157
9.5	Linear Phase Crossovers.....	162
9.6	FIR Module [PLM Series Devices Only].....	164
9.7	Mesa EQ Module.....	166
9.8	LoadLibrary.....	166
10.	Groups Menu Reference.....	167
10.1	Adding a Group.....	167
10.2	EQ/Levels.....	168
10.3	Assign.....	168
10.4	Label.....	169
10.5	Copy/Paste.....	169
10.6	Remove.....	170
10.7	Gang.....	170
10.8	Add Page.....	171
11.	Solo/Mute Menu Reference.....	172
11.1	EQ/Levels.....	172
11.2	Solo/Mute Enable.....	172
11.3	Pile.....	173
11.4	All Mute.....	173
12.	Icon Control Menu Reference.....	174
12.1	Meters On/Off.....	174
12.2	Icon Small/Normal/Medium/Large.....	174
13.	User Preferences Menu Reference.....	175
13.1	Contexts.....	175
13.2	Delay Units.....	175
13.3	Designer Functions.....	176
13.4	Keyboard Shortcuts.....	177

13.5 About	177
13.6 Graphics	177
13.7 Show Mode.....	178
14. Pages Menu Reference.....	179
14.1 Cut Icon	179
14.2 Copy Icon	180
14.3 Paste Icon	180
14.4 Page Label	180
14.5 Page Delete	181
14.6 Page Add.....	181
14.7 Page Hide.....	181
14.8 Scrolling Pages.....	181
15. Network Menu Reference.....	182
15.1 Network	182
15.2 Multiple Controllers.....	183
15.3 Working Offline	185
16. Communication and Synchronization	187
16.1 Offline Modules	187
16.2 Communication/Network Errors	187
16.3 Synchronization	188
17. Analyzer Plug-in.....	193
17.1 Overview.....	193
17.2 System Requirements.....	194
17.3 Analyzer Plug-in Quick Start Guide	195
17.4 Function Reference	196
18. Designer Mode Menu Reference.....	206
18.1 Designer Mode Basics	206
18.2 Designer Mode Security	209
18.3 Functional Reference Guide	220
18.4 Designer Worksheets.....	227
19. PLM Series Reference and Operation	233
19.1 Monitoring & Control.....	233
19.2 LoadLibrary™	233
19.3 LoadSmart™	233
19.4 SpeakerSafe™	234
19.5 Navigation	234
19.6 Status Tab	235
19.7 History Tab	239
19.8 Events Tab.....	242
19.9 Load Tab.....	242
19.10 Control Tab	248
19.11 Global Events Tab.....	251
19.12 Global Control Tab	253
19.13 Log Files.....	256

20. LM Series Reference and Operation	257
20.1 Pass-Thru Input Router Functionality	257
20.2 GPIO Configuration	260
20.3 Remote Power Control & Event Logs	260
21. MY8-LAKE Reference and Operation	267
21.1 Signal Flow	267
21.2 Operation Mode	270
21.3 Host Analog Output Reference Configuration	270
21.4 I/O Configuration View Mode Options.....	271
22. Keyboard Shortcuts	273
22.1 Enabling/Disabling Keyboard Shortcuts	273
22.2 General Keyboard Shortcuts	273
22.3 Button Bar Shortcuts.....	273
22.4 EQ, LEVELS, XOVER, and AUX Screen Shortcuts	274
23. External Control Interfaces	278
23.1 GPIO (LM Series Devices Only).....	278
23.2 AMX® and Crestron® Control.....	278
24. Command Line Options	280
24.1 Overview.....	280
24.2 Reference.....	280
25. Firmware Update	282
25.1 Backup System Configuration and Presets	282
25.2 Updating Firmware.....	282
25.3 Old Firmware Notification in Lake Controller	285
26. Preset Manager	286
26.1 Starting the Lake Preset Manager	286
26.2 Screen Layout	287
26.3 Working with Frames	288
26.4 Working with Bank Files	291
26.5 Common Functionality	295
27. IP Address Reference	296
27.1 Network Essentials	296
27.2 Factory Reset Configuration.....	296
28. Corporate Information	298
28.1 Contact Details.....	298
28.2 Trademarks.....	298

1. Welcome

1.1 Important Information

In January 2009, Lab.gruppen acquired from Dolby Laboratories, Inc. both the Lake trademarks and the exclusive rights for use of Dolby® Lake® Processor technology for both touring and permanent sound reinforcement markets. Lab.gruppen is now developing the Lake Processing technology and the Controller software independently for these markets. The Lab.gruppen-developed Controller software version will be forthwith named Lake Controller software.

1.2 Introduction

The Lake Controller software provides a unified interface for the Lab.gruppen PLM™ Series, Lake LM Series and the MY8-LAKE (Yamaha Mini-YGDAI). Optimized for a wireless touch-screen or Tablet PC, the Controller uses a unique graphic interface that brings back the feel of analog faders and controls. The software operates on any Microsoft® Windows® PC with a standard Ethernet network interface.

The Lake Controller may also be accessed via media tablet devices such as the Apple® iPad™ by using remote desktop connectivity software that requires additional configuration. For further details on configuring the Lake Controller for use via a media tablet, please refer to the Product Documentation category of the support section at <http://lakeprocessing.com>.

This manual describes the functionality of the Lake Controller software suite, including the main Lake Controller component, along with associated Firmware Update Utilities and Preset Manager Utilities.

For a full understanding of the Lake Controller System, use this manual together with associated hardware operation manuals, audio networking information and quick reference guides that are provided in the documentation folder of your software installation.

Note that the Lake Controller software has all necessary functionality to control the Lake LM Series devices, Lab.gruppen PLM Series devices and the MY8-LAKE (Yamaha Mini-YGDAI). Support for legacy devices including the Dolby Lake Processor™, Contour Pro 26™ and Mesa Quad EQ™ discontinued in Lake Controller v6.x; for control of these devices please use Lake Controller v5.x.

Throughout this manual, the generic term 'device' will be used to describe any hardware product containing Lake Processing technology.

1.3 Controller Overview

Using the Controller software, a sound engineer can control a distributed network of Lake devices from a single location. Instant adjustments can be made to any parameter of any device on the network, or to selected device Groups. By creating Groups, the Controller can deliver the appropriate EQ and level settings to a large, segmented sound system.

A single device can belong to multiple Groups (up to 28); for example, a traditional arena-sized system comprises several left and right main stacks, side-, front-, and down-fills, and multiple levels of delays to different subsystems. Typical technology requires a chain of processing units to enable an overall stereo master and various sub-masters to individually control equalization, dynamics, and gain.

In contrast, the Controller can use multiple Groups to send global adjustments to all PA areas while still providing independent control of individual system components.

1.4 Manual Overview

This operation manual provides software installation instructions, a tutorial for new users, and full-detail reference information for all software functions and features of the Lake Controller user interface.

The manual is organized as follows:

- ▶ Chapter 1, Welcome, this chapter.
- ▶ Chapter 2, Software Installation, provides details for installing the Lake Controller software, along with information for configuring various Tablet PC related options.
- ▶ Chapter 3, Network & Firewall Overview, provides information for PC networking and firewall configuration, and verifying of both wired and wireless Lake Controller and device connectivity.
- ▶ Chapter 4, Lake Controller Tutorial, provides a tutorial that introduces the features of the software, and the terminology utilized in the user interface.
- ▶ Chapter 5, Home Menu Reference, describes the top-level functions of the button bar located at the bottom of the Lake Controller user interface.
- ▶ Chapter 7, EQ/Levels Menu Reference, details the functions found within the EQ/Levels menu. This menu provides the most commonly used functions within the Lake Controller.
- ▶ Chapter 6, System Store Recall Menu Reference, describes menu functions related to saving and recalling system configuration files.
- ▶ Chapter 8, Modules Menu Reference, details the functions found on the Modules Menu, including how to store and recall Module files, Super Module functionality, adjusting the I/O configuration of Modules and Super Modules, and accessing other Module-specific functions.
- ▶ Chapter 9, Module File Types & LoadLibrary™, provides a reference for the available Module file types, including traditional crossovers, linear phase crossovers, and Mesa EQ Modules.
- ▶ Chapter 10, Groups Menu Reference, describes Groups, which provide a sophisticated way to partition complex systems, enabling system-wide control of EQ and Levels in real time. This chapter details all functions related to creating and assigning Modules to Groups.

- ▶ Chapter 11, Solo/Mute Menu Reference, describes functionality relating to Solo/Mute.
- ▶ Chapter 12, Icon Control Menu Reference, describes how to change the size of Module icons within the interface, as well as how to change meter icon views.
- ▶ Chapter 13, User Preferences Menu Reference, provides explanation of the functions contained in the User Preferences menu, including access to Designer Mode, daylight operation, Show mode, and more.
- ▶ Chapter 14, Pages Menu Reference, details the functions associated with adding and naming new page displays within the user interface.
- ▶ Chapter 15, Network Menu Reference, describes how to change between available networks, along with details on Multiple Controller functionality.
- ▶ Chapter 16, Communication and Synchronization, describes how the Lake Controller synchronizes to Lake devices, and provides explanations and suggestions on how to resolve issues that may arise due to network problems, such as moving out of range of a wireless access point.
- ▶ Chapter 17, Analyzer Plug-in, details the functionality of the analyzer plug-in that enables the Lake Controller to display and control third-party analyzers.
- ▶ Chapter 18, Designer Mode Menu Reference, details the security features provided by the Designer Mode of operation.
- ▶ Chapter 19, PLM Series Reference and Operation, provides Lake Controller specific information relevant to PLM Series devices.
- ▶ Chapter 20, LM Series Reference and Operation, provides Lake Controller specific information relevant to the LM Series devices.
- ▶ Chapter 21, MY8-LAKE Reference and Operation, provides Lake Controller specific information relevant to MY8-LAKE devices.
- ▶ Chapter 22, Keyboard Shortcuts, details the available Lake Controller keyboard shortcuts.
- ▶ Chapter 23, External Control Interfaces, describes the available external-control interfaces supported by the Lake Controller, including GPIO, AMX®, Crestron®.
- ▶ Chapter 24, Command Line Options, provides the list of available switches that can be used when starting the Lake Controller to provide alternate functionality.
- ▶ Chapter 25, Firmware Update, presents the methods in which you can update the firmware of your Lake device using the associated Firmware Update Utilities.
- ▶ Chapter 26, Preset Manager, provides information on using the separate Preset Manager utilities that are provided in the Lake Controller software suite.

- ▶ Chapter 27, IP Address Reference, provides reference information for configuring IP addresses for the Lake Controller and Lake device network.

If you are using the Controller for the first time, please read the tutorial in chapter 4 to become familiar with the features and terminology. For information on Lake device hardware and front panel functionality, please refer to the associated operation manuals.

The information in this manual is based on the use of a touchscreen Tablet PC, which utilizes a pen interface instead of a mouse. Therefore the word TAP is used instead of CLICK when referring to tapping the pen on the screen, which is equivalent to clicking the left mouse button. If you are using a mouse instead of a pen, substitute a click of your left mouse button when instructed to tap.

2. Software Installation

These software installation instructions assume some basic knowledge of Microsoft Windows concepts, such as selecting menu items, locating folders and files, and starting programs. For more information on Windows, please consult your Windows documentation.

Before installing the Lake Controller software, please read the license agreement presented at the beginning of the Lake Controller software installer.



It is highly recommended that the video card driver is updated to the latest version prior to installing the Lake Controller software.

2.1 Computer Requirements

This section describes the recommended computer specifications and settings for optimal use of the Lake Controller software.

2.1.1 PC Specifications

The recommended computer specifications for using the Lake Controller software are:

- ▶ 1.5 GHz Dual Core Processor or faster
- ▶ 1 GB RAM or greater
- ▶ 256 MB video RAM or greater (ensure latest video drivers are installed)
- ▶ Windows 7 or later
- ▶ Microsoft DirectX® 8.1 or later
- ▶ 100/1000 Base-T wired Ethernet adapter and/or 802.11 wireless Ethernet adapter
- ▶ A touch-screen Tablet style interface is recommended for optimal user experience

The minimum computer specifications for using the Lake Controller software are:

- ▶ 1 GHz Processor (for Intel Atom processors the 'emulation' command line option is required - please refer to "24. Command Line Options" on page 280)
- ▶ 512 MB RAM

- ▶ 128 MB video RAM WinXP, 'emulation' for Win 7 (ensure latest video drivers are installed)
- ▶ Windows XP Service Pack 3 or later
- ▶ Microsoft DirectX® 8.1 or later
- ▶ 100/1000 Base-T wired Ethernet adapter and/or 802.11 wireless Ethernet adapter

2.1.2 Video Card Settings

It is important that the video card is configured correctly to ensure smooth operation of the Lake Controller software. Incorrect video card settings may result in corruption of graphics, unusual behavior, or unexpected exit of the Lake Controller software.

In addition to the settings presented below, **please visit your video card manufacturer's website** and download the latest drivers for your specific video card. The video drivers that come pre-installed with Windows are often out of date and do not include enhancements provided by the video card manufacturer's drivers. Almost all video card issues can be resolved by updating your video card driver to the latest release version.



It is highly recommended that the video card driver is updated to the latest version if you encounter any graphical problems when using the Lake Controller software.

For optimal results, please ensure the follow settings are made on your Lake Controller PC:

- ▶ A display resolution of 1024 x 768 pixels or greater is recommended. Resolutions of 800 x 600 and 1024 x 600 pixels are supported, but provide a lower-quality interface with some features less accessible or unavailable.
- ▶ Color should be set to 32-bit (does work with 16 bit, but screen minimize / maximize is faster with a 32-bit color mode setting).
- ▶ 3D Acceleration set for best performance with anti-aliasing turned off.
- ▶ Hardware Acceleration set to Full (Windows XP only).

2.1.3 Tablet PC and Laptop Power Settings

When using a wireless laptop or Tablet PC with the Lake Controller, you may need to switch off power-saving features, which can reduce the performance of your PC.

If you experience slower performance while using the Controller on battery power, turn off any battery power-saving settings that affect general performance of your PC. Some battery optimizations also affect wireless connection speed; if you experience a slow wireless connection while in Battery mode, these settings should be disabled.

To turn off power-saving features, navigate using the Windows Control Panel:

1. Go to Windows Start Menu > Settings > Control Panel > Power Options
2. As settings vary depending on each Tablet or laptop, please consult the appropriate hardware manual for further information.

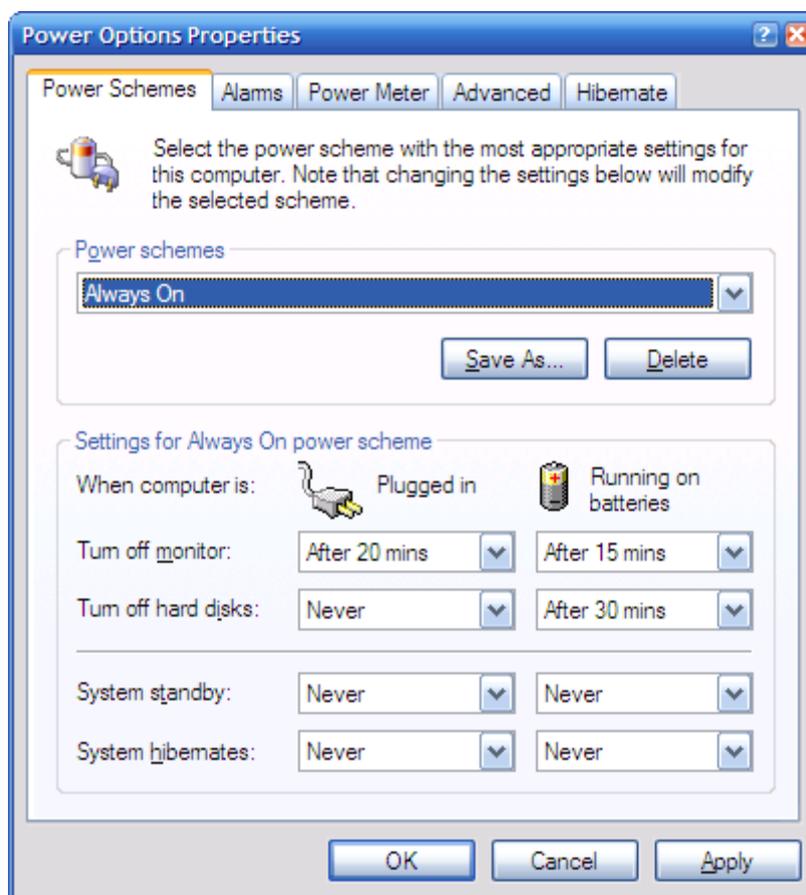


Figure 2-1: Power Option Properties

2.1.4 Tablet PC Input Panel Settings

Windows XP Tablet Edition provides the pen action Start Input Panel gesture, which starts the Tablet Input Panel (keyboard or writing pad). This gesture is a quick movement of the pen from side to side. If the Input

Panel appears while using the Lake Controller, it will cause flickering because both the Controller and the Input Panel attempt to be in the foreground.

To disable the Input Panel gesture:

1. Access TABLET AND PEN SETTINGS through the Windows Control Panel.
Start Menu > Settings > Control Panel > Tablet and Pen Settings, Pen Options
2. Select PEN OPTIONS.

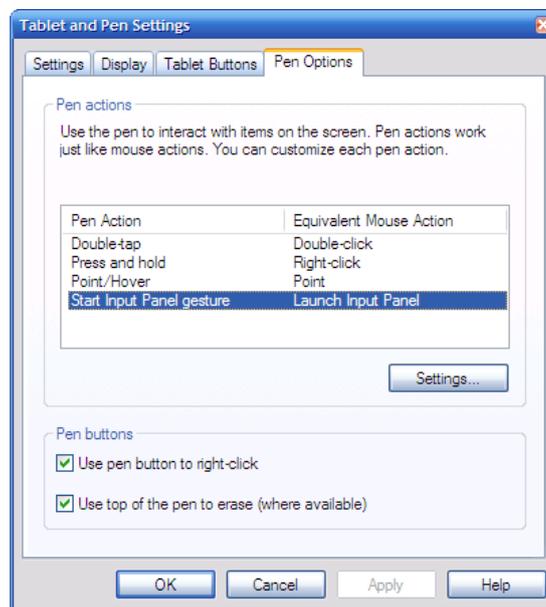


Figure 2-2: Tablet and Pen Settings

3. Select START INPUT PANEL GESTURE, and tap SETTINGS.

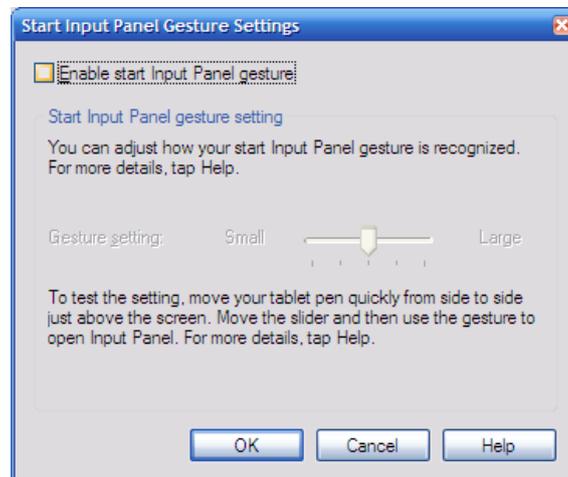


Figure 2-3: Disabling Start Input Panel Gesture

4. Uncheck ENABLE START INPUT PANEL GESTURE.
5. Tap OK.
6. Tap OK again to store your changes.

2.2 Lake Controller Installation

2.2.1 First Time Lake Controller Installation

To install the Lake Controller software suite, insert the installer CD-ROM or USB key into your computer or double-tap the executable installer that was downloaded via the Internet; choose INSTALL LAKE CONTROLLER then follow the on-screen setup instructions.

1. Read installation information, and tap NEXT to proceed through the installation dialog boxes.
2. Tap INSTALL when requested.
3. Tap FINISH when installation is complete.

Following successful installation, the Lake Controller icon appears on the desktop.



Before using the Lake Controller with a network of Lake devices, please follow the configuration procedures described in chapter 3.

2.2.2 Overwriting Existing Lake Controller Installation

Overwriting an existing installation requires that both the Installation and Shortcut folders be identical to those of the existing installation.

If you decide to overwrite your existing installation, ensure that you specify the same location during the software installation process.

2.2.3 Multiple Lake Controller Installations

If you wish to retain previous versions of the Lake Controller, please ensure that the installation location specified during software installation is unique.



Only one instance of the software may be used at any one time. Be aware that different versions of the software are only compatible with certain firmware versions.

2.3 Moving User Files between Installations

To copy preset files from an existing (old) installation to a new Lake Controller installation.

1. Tap Windows Start > All Programs > Lake Controller vX.X > User Data Files
Where X.X is previous version of the Lake Controller installation.
2. Tap Windows Start > All Programs > Lake Controller vY.Y > User Data Files
Where Y.Y is the latest Lake Controller installation.
3. Use the two Explorer folders that are now visible to transfer user files and folders between the old and new installations of the Lake Controller.

3. Network & Firewall Overview

This chapter provides an overview of key requirements in terms of firewall configuration, wired and wireless network configuration, and Dante audio network configuration. The separate Lake Network Configuration Guide and Dante configuration literature that is included as part of Lake Controller installation should also be consulted for additional information.

3.1 Ethernet Overview

The TCP/IP protocol suite is structured in layers as illustrated in Figure 3-1. The link layer is Ethernet and is responsible for connecting to the cabling and Ethernet switches. For communication to occur, each device must have a valid IP address. The IP layer uses these addresses to route packets between devices. The transport layer provides flows of data and is used by applications to communicate with each other over the network.

The Lake Controller uses UDP messaging to communicate with Lake devices on the network. Network setup and configuration is fast and easy; simply hook up all the devices on the network, and the Lake Controller software detects and communicates with all devices as required.

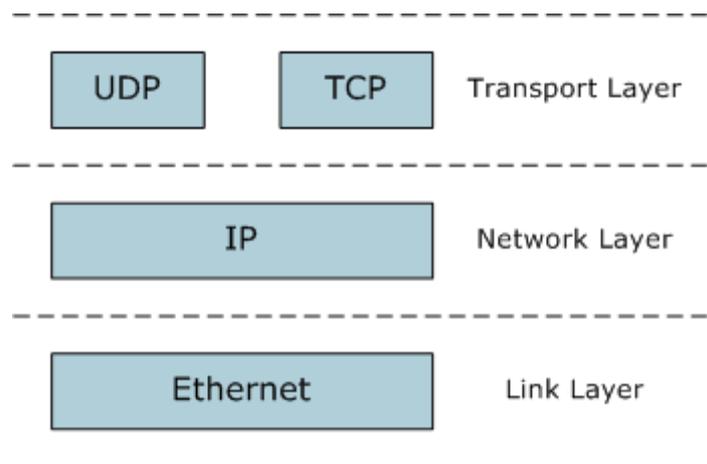


Figure 3-1: TCP/IP Protocol Suite

Lake devices are configured to use Automatic Private Addressing which allocates IP addresses from the range 169.254.x.x. In most scenarios, this automatic allocation setting will not need to be changed. However, if the device is integrated into a sophisticated network configuration, the IP address allocation method can be changed using the Lake Controller software.

3.2 Firewall Configuration

3.2.1 Overview

The Lake Controller, Firmware Update, and Preset Manager utilities may not display devices that are connected to the network if a firewall is enabled and is blocking these programs from obtaining network access. Lake applications utilize TCP/IP networking for Controller and device communication and must be allowed access through any firewall in order to work correctly.

The application “mDNSResponder.exe” is part of the Dante Discovery service for device advertisement and discovery and is required by the Lake Controller for networking purposes; it is also safe to allow this application access to the network.



UDP-Broadcast traffic cannot be blocked as it forms part of the unique device discovery process.

3.2.2 Windows 7 Specific

By default, Windows 7 security functions will display a security alert similar to that shown in the first time each application is started.

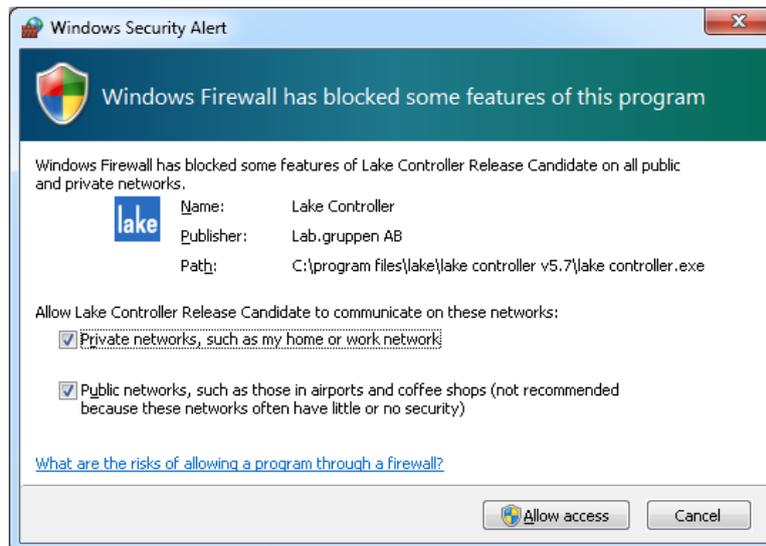


Figure 3-2: Standard Windows Firewall Security Alert

When using the standard Windows 7 firewall and an alert similar to that shown in Figure 3-2 is displayed:

1. Select checkboxes to allow the Lake Controller (or other Lake application) to access both the Private and Public networks.
2. Tap Allow Access.

When the Lake Controller or other Lake application opens without this warning, but connected Frames cannot be identified on the network, the application firewall settings can be verified manually:

1. Type “firewall” into the Windows 7 search feature as shown in Figure 3-3.
2. Select “Allow a program through Windows Firewall” from the list of Control Panel options.
3. Tap Change Settings and locate the Lake application in the list
4. Ensure all checkboxes are marked then tap OK

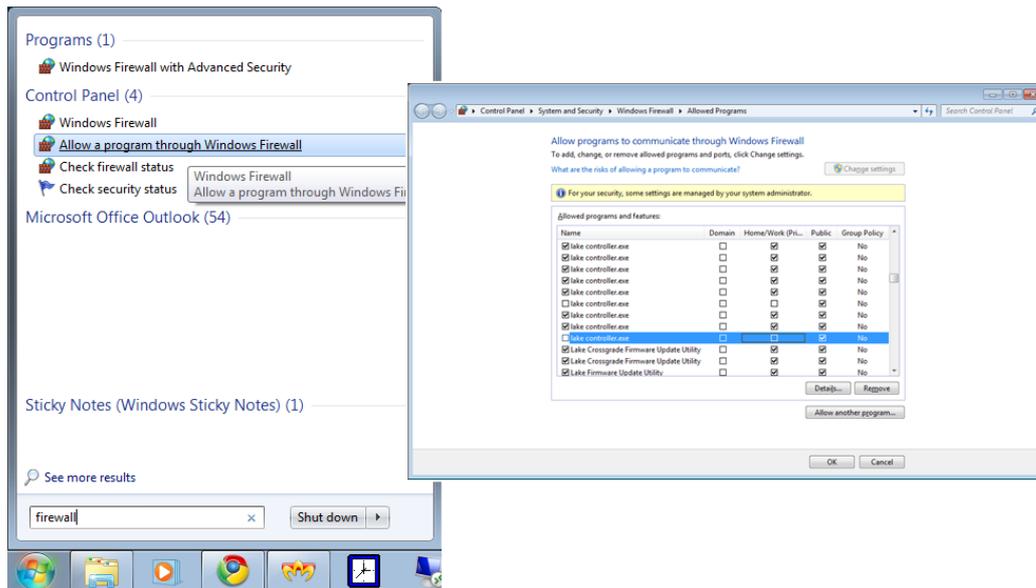


Figure 3-3: Allow a Program through Windows Firewall (via Win 7 Search)

3.3 IP Address Configuration

The network card of the host computer running the Lake Controller must have a valid IP address to communicate with Lake devices on the network.

By default, Windows computers are configured to obtain an IP address automatically. This default setup works successfully for most configurations and is the recommended starting point. On an unmanaged network this option will allocate the PC an IP address from the range 169.254.x.x.

Network & Firewall Overview

If using automatic IP address allocation, please ensure your Ethernet switch and/or Lake devices are turned on and connected to your PC for a minute or so (Windows XP - generally faster on Windows 7) before starting the Lake Controller. This allows Windows time to correctly identify your PC's IP address, and therefore allows the Lake Controller to communicate properly when it scans the network.

If you are on a managed network (such as a corporate network) with a DHCP server and you are having communication problems, it is recommended that you change the IP addressing mode on the devices to use DHCP. Please consult a network specialist if you have trouble with complex network configurations.

A fixed IP address is useful if you are frequently switching between network adapters, or unplugging and reconnecting your network cable. The automatic IP address allocation used by Windows requires a valid network to be present, and can take up to one minute for the PC to discover its IP address. In this case it is recommended that you try using a fixed IP address in the same subnet as that used by default address allocation (i.e. 169.254), but using the reserved ranges of either 169.254.0.x or 169.254.255.x.



The IP address ranges 169.254.0.x and 169.254.255.x are reserved by IANA so future use of these address ranges cannot be guaranteed.

You can specify a fixed IP address by following these steps in Windows 7:

1. Tap the Windows Start icon, type "network" in the search bar then tap NETWORK AND SHARING CENTER from the options listed under the Control Panel heading as shown in Figure 3-4.

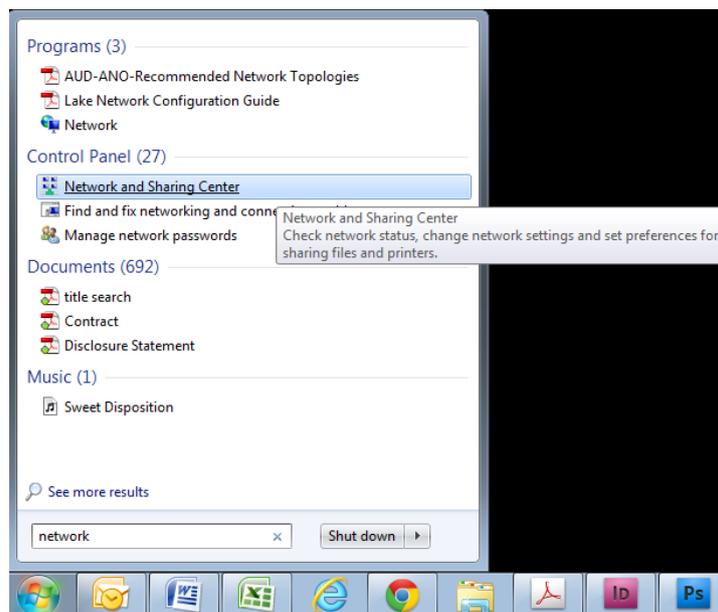


Figure 3-4: Opening Windows Network and Sharing Center

2. Select the appropriate network connection (Local Area Connection or Wireless Network Connection) to configure, then select “Change settings of this connection” as shown in Figure 3-5.



Figure 3-5: Selecting Wired Network Connection



Although this tutorial uses Local Area Connection as an example, the principles also apply to Wireless Network Connection.

3. Select INTERNET PROTOCOL VERSION 4 (TCP/IPV4), and tap the PROPERTIES button.

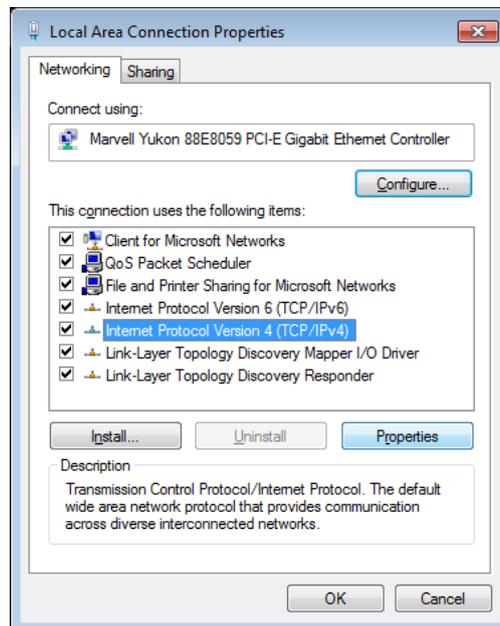


Figure 3-6: Local Area Connection Properties

4. Select "Use the following IP address," enter an IP address, tap TAB or tap in the Subnet mask box to auto-populate with the correct mask.

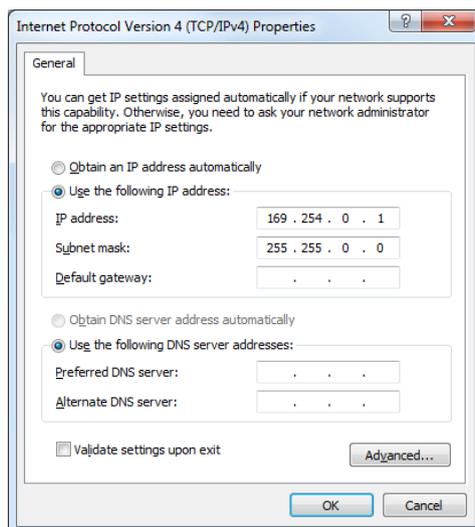


Figure 3-7: TCP/IPv4 Properties

5. Tap OK to apply changes, and exit Internet Protocol (TCP/IP) Properties.
6. Tap OK to apply changes, and exit Local Area Connection Properties.



Please refer to Chapter 27 for more information on the selection of an appropriate IP address.

3.4 Wired Network Setup

3.4.1 Overview

The Lake Controller host computer can be connected directly to any Lake device through the Ethernet connectors. Multiple devices can be connected by cascading connections between units, although this is not a recommended solution for the successful use of Dante™ (Digital Audio Networking via Ethernet). Connecting devices via a good quality external Ethernet switch with QoS is highly recommended. Please refer to tutorial section 4.3.6 for further information regarding Dante, and section 3.6.4 for details on using QoS with Dante.

The Lake Controller can be connected to a network of Lake devices using a wired or wireless Ethernet solution. A wired network is a simpler, faster and more robust solution and should be implemented where possible in preference to using a wireless system. Additionally, when implementing Dante audio networking in conjunction with a wireless access point for Lake Controller data, additional configuration of an external

Ethernet switch is required to filter Dante audio traffic from reaching the access point. Please refer to section 3.6.3.

The Controller can connect anywhere on a network of Lake devices. LEDs next to each port flash to confirm valid communication. Please connect the Controller computer to the network with an Ethernet cable, and follow the verification steps in the next section.

3.4.2 Verifying Wired Controller and Device Communication

Once the network is connected, follow these steps to confirm communication between the Lake Controller and Lake devices:

1. Double-tap the Lake Controller shortcut icon from the Windows desktop. The SELECT NETWORK Adapter dialog box (shown) appears if your computer has more than one network interface enabled. This typically occurs if your PC has both wired and wireless network interfaces.



Only one network adapter should be enabled on your PC when using the Lake Controller. Network adapters can be disabled via the Windows Network and Sharing Center > Change Adapter Settings.

2. Select the Ethernet adapter currently used for the network (the wired adapter for this example).

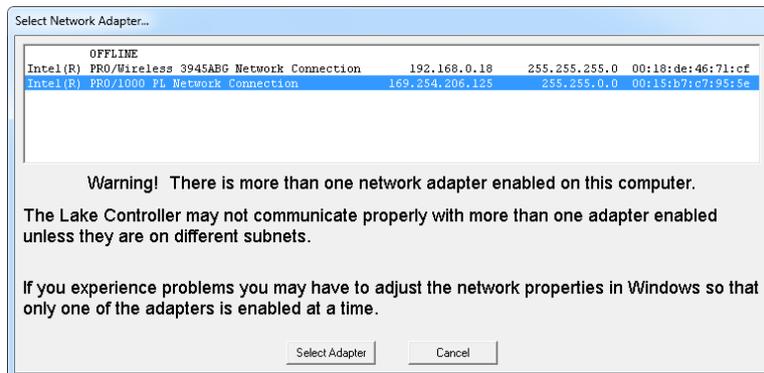


Figure 3-8: Select Network Adapter

When the Controller begins, you will be prompted with a dialog box asking whether to load the last configuration.

3. Tap NO to this dialog. The Main page of the Controller is displayed.
4. To verify that the devices are on the network and communicating, tap the Modules button. The Module scroll bar will be displayed.



Figure 3-9: Module Scroll Bar

The icons on the left of the Module scroll bar represent Virtual Frames, which are always available whether or not the network is connected. Virtual Frames allow you to create a complete system configuration offline.

If your network connections are valid, all devices connected to the network appear on the Module scroll bar to the right of the Virtual Frames.

Figure 3-9 shows the Module scroll bar, which visually identifies the number of Modules within each Frame on the network. The number of Modules within a Frame depends on the device type/configuration. Modules shown with a circle are available on the network, but not currently in use; Modules identified with text only are already in use in the current system configuration. Please refer to the tutorial in chapter 4 for more information on Modules and Frames.

3.5 Wireless Network Setup

3.5.1 Overview

Several hardware manufacturers supply wireless networking solutions that adhere to the various 802.11 wireless Ethernet standards. This means that any standard Ethernet 802.11 wireless networking solution should work with this network system.

When using a wireless access point on the same network as Dante digital audio, an approved external Ethernet switch must be configured to filter Dante audio packets from reaching the wireless network. Please refer to section 3.6.3 for further information.

An access point is used in a wireless Ethernet network configuration to connect Lake devices to the Lake Controller host computer. The access point is connected to the wired network using standard Ethernet cables. It performs the same function as a switch: receiving, buffering, and transmitting data between wired and wireless networks.

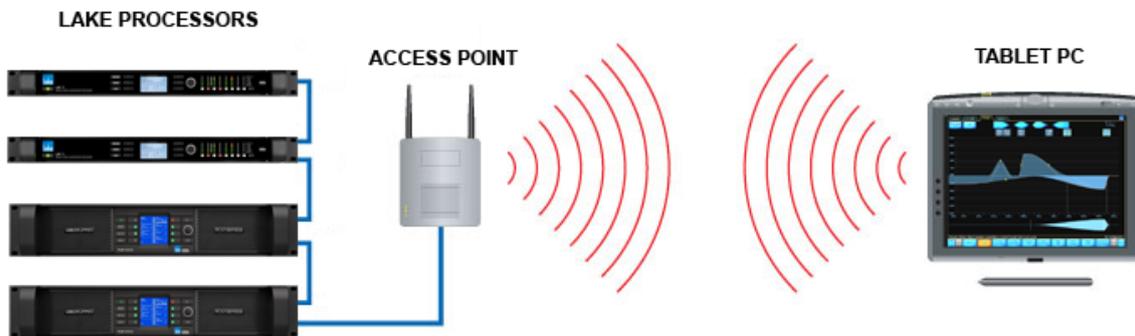


Figure 3-10: Basic Wireless Setup (Not Suitable for Use with Dante or larger networks)

Ideally, the procedure just described yields a perfectly functional and secure system. However, there are two complications: Some environments have additional wireless network systems and communications equipment competing for the same airspace used by the Lake system. It is also important to provide security so another wireless network cannot access this network system.

As part of the 802.11 standard, various levels of access control and encryption exist. There are also different communication channels that operate at different frequencies.

The service set identifier (SSID) controls access to this wireless network by functioning as a password or key between wireless network devices to differentiate them from each other. The SSID must be exactly the same on all wireless devices (the access point and all Controller host computers). The SSID is case sensitive.

Although the SSID differentiates among wireless systems, it does not provide security to the network. Wired Equivalent Privacy (WEP) is a security protocol for wireless networks defined in the 802.11 standard. The WEP protocol provides the same level of security as a wired network by encrypting data over radio waves to protect it during transmission. It is recommended that WEP encryption is enabled if other computers are connected to your Ethernet network.

3.5.2 Configuring the Tablet PC for Wireless Networking

Assuming that the wireless access point has been set up appropriately and is turned on, we now need to configure the Tablet PC to connect to this access point.

1. Navigate to the Windows Network and Sharing Center as shown in Figure 3-4.
2. Tap the wireless signal strength icon at the bottom-right of the screen in the Windows notifications area and select the wireless access point from the list that appears and tap CONNECT as shown in Figure 3-11.



Figure 3-11: Connecting to a wireless access point

3. Enter the network security key, or press the button on the wireless access point if requested.
4. If you encounter network problems when using the default automatic IP address allocation (more likely with Windows XP), please setup a fixed IP address as described in section 3.3.



Please refer to chapter 27 for more information on the selection of an appropriate IP address.

3.5.3 Confirming Wireless Operation of the Lake Controller

To confirm wireless operation:

1. Double-tap the LAKE CONTROLLER icon to start the software. If you have more than one network adapter enabled, the SELECT NETWORK ADAPTER dialog box will be displayed; select the WIRELESS NETWORK ADAPTER.
2. Tap NO when asked whether to recall the last configuration. A brief resync message will appear for each Lake device on your network, confirming that your network connection is operating properly.
3. Tap MODULES. Each online device is represented on the Module scroll bar by a number of Module icons surrounded by a border.
4. Tap QUIT CONTROLLER to exit.

3.6 Dante Digital Audio Networking

Dante provides multi-channel digital audio networking over standard a standard Ethernet network, alongside control data for the Lake network. Various topics relating to network configuration are summarized in this section; for further details please refer to associated Dante literature available via:

Start > All Programs > Lake Controller vX.X > Documentation > Dante Documentation after installing the Lake Controller software.

Additional Dante product information is available at the Audinate website: <http://www.audinate.com/>

3.6.1 Dante Controller Compatibility

The LM & PLM Series devices are compatible with Audinate's Dante Controller software.

Changes made via the Lake Controller will be reflected in the Dante Controller and vice-versa:

- ▶ When both the Lake Controller and Dante are active, changes will synchronize immediately across both software controllers and affected devices.
- ▶ When Dante-related parameters are changed via the Lake Controller while the Dante Controller is disconnected or closed, the Dante Controller will inherit the the change the next time it is connected or opened.
- ▶ When Dante-related parameters are changed via the Dante Controller while the Lake Controller is disconnected or closed, the Lake Controller will identify the Frames as Out of Sync the next time it is connected, or opened using the Recall Last System Configuration option.

3.6.2 Dual Redundant Network Configuration (LM and PLM Series only)

The LM and PLM Series provide dual redundant networking capabilities for Dante digital audio. With dual redundancy activated, the Controller can be connected to the secondary network connection using an IP address in the range 172.31.x.x. on the Lake Controller computer. This configuration allows for fail-over to the secondary network should a problem occur with the primary network.



Do not connect Controllers to the primary and secondary network connections simultaneously.

3.6.3 Using Dante with Wireless Data Control or Low-Bandwidth Devices

Dante (Digital Audio Networking) technology requires a reliable 100 Mbps (or faster) network to operate, and therefore cannot operate via a wireless transmitter/receiver. However, in most Lake networks, it is likely that wireless control of the Lake devices will be required on the same network that is transmitting and receiving Dante digital audio signals.

To achieve this, you must configure the Ethernet switch on the boundary of the wireless network to filter Dante traffic from reaching the wireless access point or other lower bandwidth devices (e.g. legacy devices such as the Contour Pro 26 or Mesa Quad EQ), or you will most likely experience communication problems.

The diagram below summarizes the desired outcome from correctly configuring your Ethernet switch to filter Dante audio packet

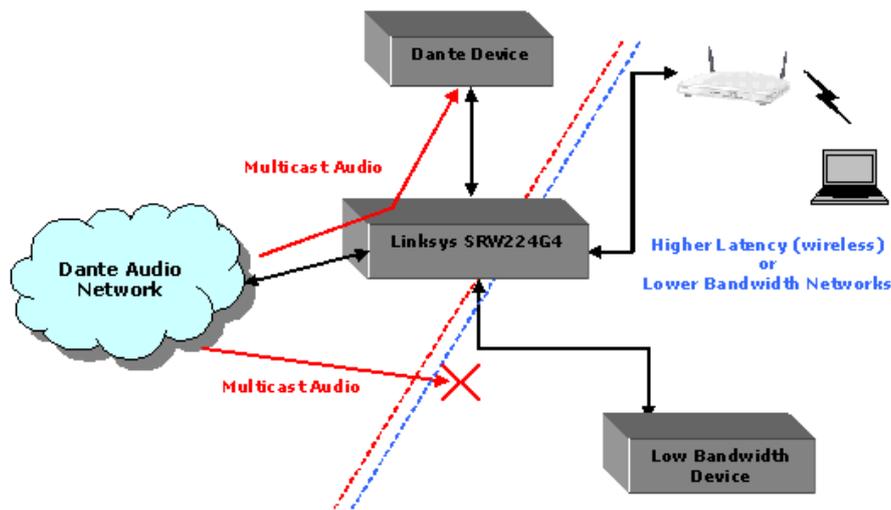


Figure 3-12: Using Dante with Low Bandwidth devices

Please refer to the Audinate® document AUD-ANO-ACL Filtering SRW224G4 for further details regarding ACL packet filtering. This document is available via:

Start > All Programs > Lake Controller vX.X > Documentation > Dante Documentation after installing the Lake Controller software.

Additional Dante product information is available at the Audinate website: <http://www.audinate.com/>

3.6.4 Dante with Quality of Service Ethernet Switches

The use of an external Ethernet switch with QoS (Quality of Service) is strongly recommended when using Dante digital audio over your Lake network. Dante uses standard network QoS techniques available in

off-the-shelf Ethernet switches to prioritize clocking and audio traffic, and to allow non-Dante devices such as personal computers to share a single network with Dante devices. The diagram below shows the order of priority given to the different types of data packets going through the switch. Using a switch without QoS, or with QoS turned off on a busy network, may result in audio packets arriving too late to be played out, resulting in audio glitches.

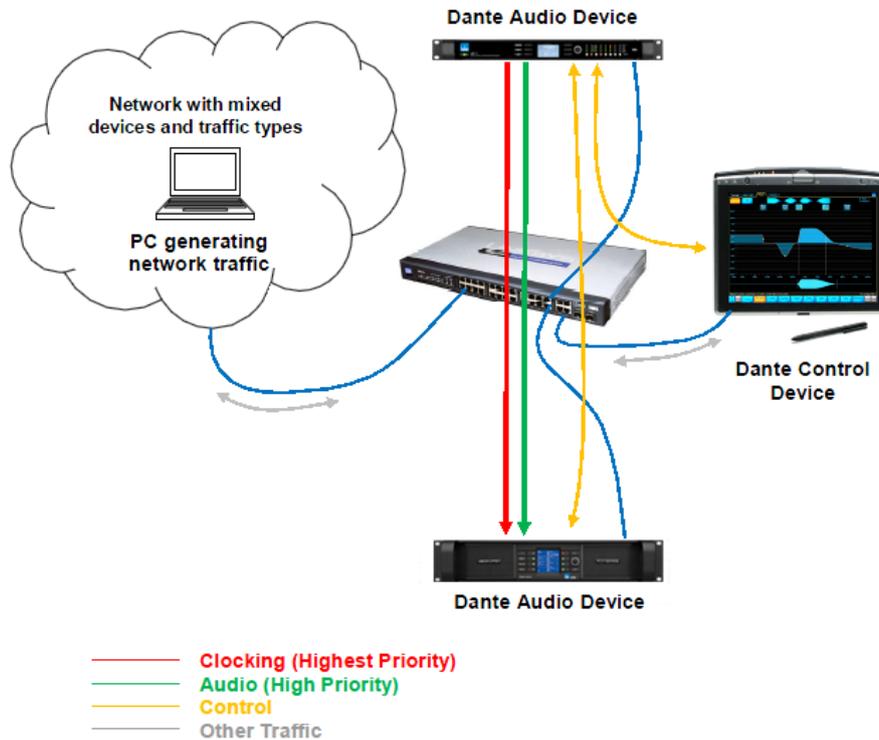


Figure 3-13: Dante Quality of Service Switch Configuration

Please refer to the Audinate document AUD-ANO-QoS Switch Configuration for further details regarding ACL packet filtering. This document is available via:

Start > All Programs > Lake Controller vX.X > Documentation > Dante Documentation after installing the Lake Controller software.

Additional Dante product information is available at the Audinate website: <http://www.audinate.com/>

3.6.5 Recommended Network Topologies When Using Dante

The use of an external Ethernet 100 Mbps switch with QoS (Quality of Service) is highly recommended. It is also recommended that each device has its own direct connection to that switch. Where switches are connected together, this should be achieved via a gigabit fiber or copper connection.

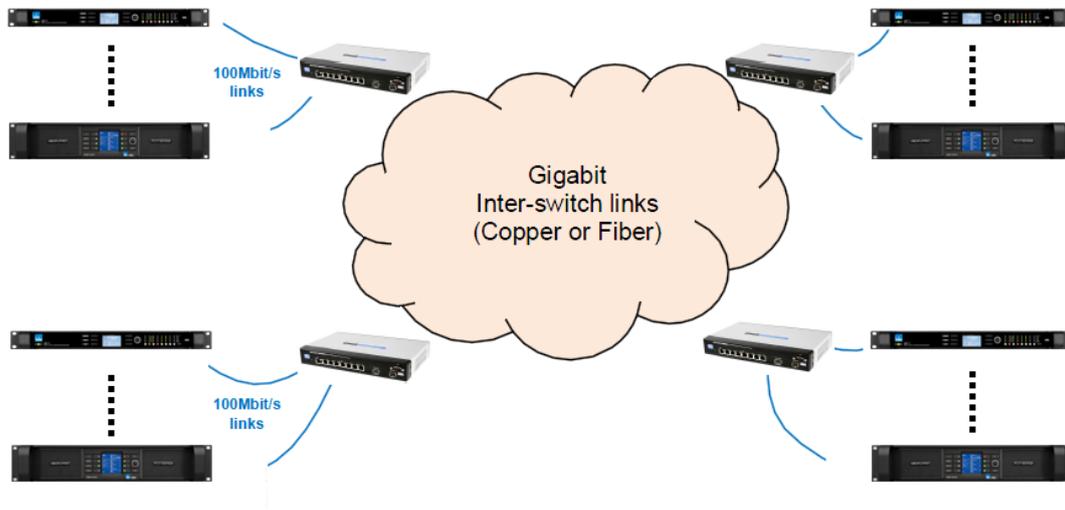


Figure 3-14: Recommended Network Topologies

Two Lake devices may be daisy chained together and run Dante. The recommended latency when connecting two Lake devices in this manner is 0.8 ms.



Figure 3-15: Only two Lake devices may be daisy chained for use with Dante

More than two Lake devices should not be daisy chained together when Dante is being used.



Figure 3-16: Do not daisy chain more than two Lake devices when using Dante

The use of Dante across wireless networks as shown below is not supported.



Figure 3-17: Do not use Dante across wireless networks

Please refer to the Audinate document AUD-ANO-QoS Recommended Network Topologies for further details regarding ACL packet filtering.

This document is available via:

Start > All Programs > Lake Controller vX.X > Documentation > Dante Documentation after installing the Lake Controller software.

Additional Dante product information is available at the Audinate website: <http://www.audinate.com/>

4. Lake Controller Tutorial

This tutorial will help you start using the Lake Controller software quickly and easily by providing an overview of common features. There are many underlying details not covered in this tutorial, so please refer to the other sections of this manual for detailed reference information.

The tutorial uses the Lake LM 26 (Contour Mode) & LM 44 (Mesa Mode) these are the two main types of Modules that are available across Lake-enabled devices. You may however follow this tutorial with any product; most features and functionality are common across all products.

4.1 Starting the Lake Controller

To start the Lake Controller:

1. Double-tap the Lake Controller software icon located on the Microsoft® Windows® desktop.
2. Tap NO in the dialog box asking if you would like to recall the last configuration.



Tapping YES recalls the configuration in use prior to exiting the last Lake Controller session. A comparison occurs and any differences are highlighted for online Modules. Audio processing is not affected.

The Main page appears and is in its default, blank state.

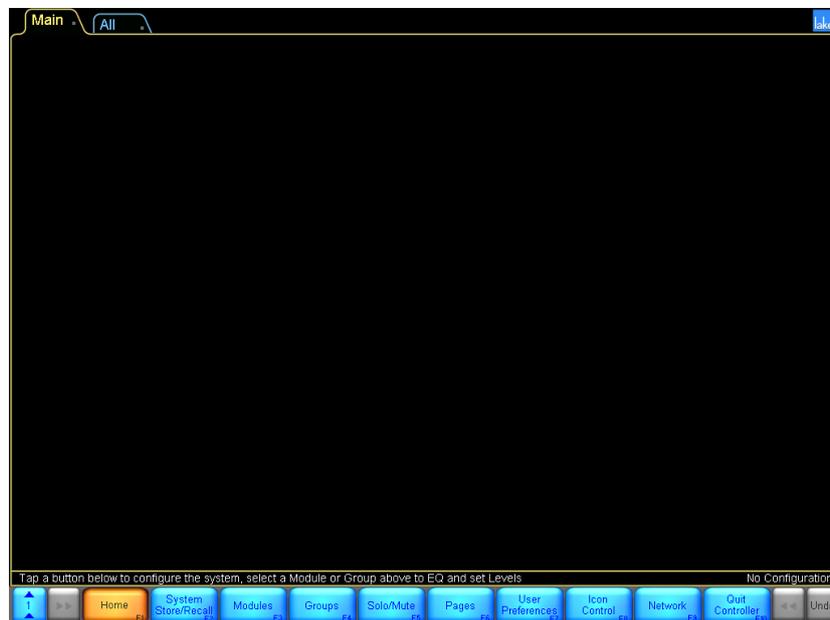


Figure 4-1: Main Lake Controller HOME Page

4.2 Overview of Main Page Components

This section covers the various components shown on the main page.

4.2.1 Button Bar Interface

The button bar, located at the bottom of every page in the software, is used to navigate through and activate the Lake Controller features and functions. Three colors indicate the button status:

- ▶ ORANGE - currently selected menu or function
- ▶ BLUE - available menu or function based on current selection
- ▶ GRAY - currently unavailable menu or function



Figure 4-2: Context, Scroll and HOME Buttons

The button with the numbered arrows pointing upward shown in Figure 4-2 is the CONTEXT button, which enables fast system navigation. Contexts allow you to jump directly from one view to another view without having to use the tool bar for navigation. For further detail, please refer to section 13.1.

The button with arrows pointing right is active when a page or menu scroll bar contains more information than can be displayed on the width of the screen. Tap this button to move the scroll bar, pages, or overlay tabs to the right, revealing additional data.

The HOME button is available from almost all menu levels, and returns you to the Main page of the system.



Figure 4-3: Scroll and Undo Buttons

The scroll and undo buttons shown in Figure 4-3 are available on the right side of the button bar and may be active or deactive depending on the screen being viewed. The button with arrows pointing left moves the scroll bar, pages, or overlay tabs to the left.

The button labeled UNDO (or REDO after UNDO has been used) provides a single-level UNDO/REDO function for adjustments made to EQ/levels and crossovers (where applicable).

Generally, labels on buttons describe the open submenu or the function performed by tapping the button.

4.2.2 Help and Status Messages

Context-sensitive help is displayed above the button bar on the left.



Figure 4-4: Context Level Help

System status messages are displayed above the button bar on the right. In the following example, the network status is shown to be offline.



Figure 4-5: Network Status Messages

4.2.3 Page Tabs

At the top left of the user interface, the MAIN and ALL pages are presented. The MAIN page is the default page ready to use. The ALL page provides monitoring of up to 260 Modules on a 1,024 × 768 pixel screen without scrolling. It displays a status summary for each Myodule, with additional status information for Lab.gruppen amplifiers. More pages can be added as required to logically partition your system.



Figure 4-6: Example Page Tabs

For further details, please refer to section 8.7.

4.2.4 Minimizing the Lake Controller

To minimize the Lake Controller software and return to Windows, tap the Lake icon in the top-right corner of any screen.



Figure 4-7: Use the Lake logo (top right of screen) to minimize the Lake Controller

This icon is animated. It rotates when the software is performing any function that requires the user to wait for data to be transferred or for a processing function to complete.

4.3 Modules and Frames

4.3.1 Overview

A Frame represents one physical Lake device on the network. Multiple Modules are contained within each Frame. The number of Modules available for a given device is dependent upon the signal processing configuration/capabilities of the device.

PRODUCT	CONFIGURATION	NUMBER OF MODULES
PLM 10000Q	2x4 Power Amplifier	2 Contour Modules
PLM 14000	2x2 Power Amplifier	2 Contour Modules
PLM 20000Q	2x4 Power Amplifier	2 Contour Modules
Lake LM 26	2x6 Loudspeaker Processor	2 Contour Modules
	4x4 System Equalizer	4 Mesa Modules
Lake LM 44	4x4 System Equalizer	4 Mesa Modules
	2x6 Loudspeaker Processor	2 Contour Modules
MY8-LAKE	4x12 Loudspeaker Processor	4 Contour Modules
	8x8 System Equalizer	8 Mesa Modules
	2x6 Loudspeaker Processor + 4x4 System Equalizer	2 Contour Modules + 4 Mesa Modules

Table 4-1: Overview of Lake Devices and Module Configurations

Figure 4-8 shows the Module scroll bar displaying Virtual Frames for the LM 44, PLM Series and MY8-LAKE, along with online Frames for the LM 26 and LM 44.



Figure 4-8: Module Scroll bar - Virtual and Online Frames

To place an online Frame in the work area for use during this tutorial:

1. Tap the Module button to display the Module scroll bar as shown in Figure 4-8
2. Tap one of the gray circles (which indicates an available online Frame)
The cursor takes on the form of the selected frame.

- Place the selected Frame in the work area by tapping in the required location.

An LM 26 (Contour Mode) and an LM 44 (Mesa Mode) are used for most examples in this tutorial; the resulting screen will look similar to that shown in Figure 4-9, depending on the product you are using.



Figure 4-9: LM 26 Frame Placed in Main Work area

4.3.2 Module Icons

Each Module icon provides configuration information as shown in Figure 4-10.

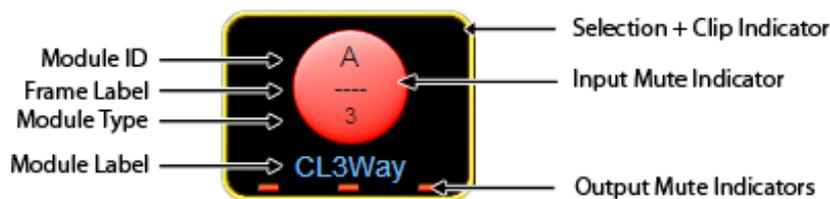


Figure 4-10: Module Icon Components

- ▶ Module ID - Identifies a particular Module within the device, represented by this icon.
- ▶ Frame Label - Identifies the Frame (device) associated with this icon by a user-defined label that also appears on the front panel of the device.
- ▶ Module Type - Identifies the number of output channels or an abbreviation of a Module type description (MEq for a Mesa EQ Module).

- ▶ Module Label - User-defined label that describes the Module's use or speaker type.
- ▶ Module Selection and Clip Indicator - The Module icon border is yellow to indicate the Module is selected. If it flashes red, a channel on that Module is clipping.
- ▶ Input Mute Indicator - If the central round part of the icon is red, the input is muted; if the icon is blue, the input is not muted.
- ▶ Output Mute Indicators - Displayed as small red bars when the outputs are muted and are absent if unmuted. The number of mute indicators depends on the number of output channels in the selected Module type.
- ▶ Module Label - Displays the label for the Module, in this case a default Classic 3-Way. For further details on Module label abbreviations and an explanation on Module types, please refer to chapter 9.

4.3.3 Selecting and Moving Icons

Multiple icons may be selected (via the MODULES, GROUPS, PAGES, and ICON CONTROL menus), providing a faster solution to graphical arrangement of the work area. For example, multiple icons can be dragged back to the scroll bar, moved around on screen, or dragged to another page tab.

This example uses an LM 26 (Contour Mode) and an LM 44 (Mesa Mode) for demonstration purposes; the logic remains the same for all types of Group, Module, and Super Module icons.

1. Drag a box around the icons you wish to move.

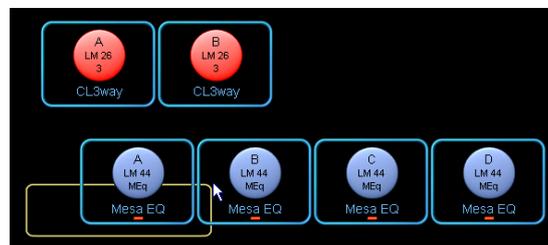


Figure 4-11: Click and drag around Module icons

2. Release the pen (or mouse); icons inside the yellow rectangle are now selected.



Figure 4-12: Yellow border snaps to selected Module icons

3. Tap inside the yellow box, and drag it to the new area.



Figure 4-13: Dragging multiple Module icons

4. Release the pen (or mouse); the icons are now deselected.



Figure 4-14: Release to deselect Module icons

To drag icons to a new page, select the icons you wish to move and then drag them over the page's tab at the top. That page will be automatically selected. You may then place the icons where required.

4.3.4 Labeling Frames and Modules

The Frame label initially shows the product code (e.g. 10000Q) which varies depending on the device. The Frame label is the same on all Modules in the Lake Controller, and on the front panel of the associated device. The Frame label helps to identify the physical location of a device on the network.

To label a Frame:

1. Tap the A Module to select it.
A yellow border surrounding the Module icon indicates it is selected.



If a Module is not selected, most of the button bar functions are gray to signify they are inactive.

2. Tap LABEL & LOCK.
3. Tap LABEL FRAME to display the on-screen keyboard.



Figure 4-15: On-screen keyboard

4. Type 'Demo' using the on-screen (or external) keyboard, and tap OK.

The Frame label field for the Frame's Modules displays 'Demo'.

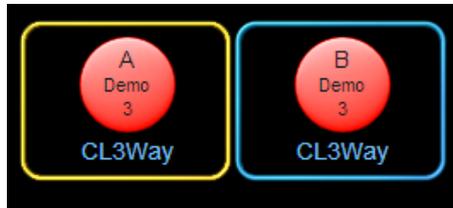


Figure 4-16: Changing the Frame Label

Now let's assign a name to the A Module:

5. Tap the A Module to select it.
6. Select LABEL MODULE from the button bar.
7. Name this Module 'My 3-Way' using the on-screen keyboard, and tap OK.
8. Tap LABEL EXIT to return to the MODULES menu.

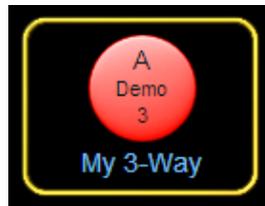


Figure 4-17: Labelling a Module



To label a Super Module, select it in the work area and tap LABEL SUPERMOD.

4.3.5 I/O Config



This section assumes the use of an LM, PLM or MY8-LAKE in classic routing mode; all providing extensive I/O routing options. The MY8-LAKE in simplified view provides a fixed output config.

1. Tap the I/O CONFIG button to display the block diagrams of each Module in the Frame.



Figure 4-18: LM 26 I/O Configuration Screen

The right side of the I/O CONFIG page can be dragged to scroll up and down for viewing of all Module block diagrams where all diagrams cannot fit on the screen.

2. Tap any black space within the block diagram area and drag up or down to scroll. The I/O CONFIG page is interactive; each blue processing block can be selected to directly access the relevant screen in the software. Each block diagram has a front-end input mixer.
3. Tap any one of the four inputs of the 'My 3-Way' Module to access the input mixer.

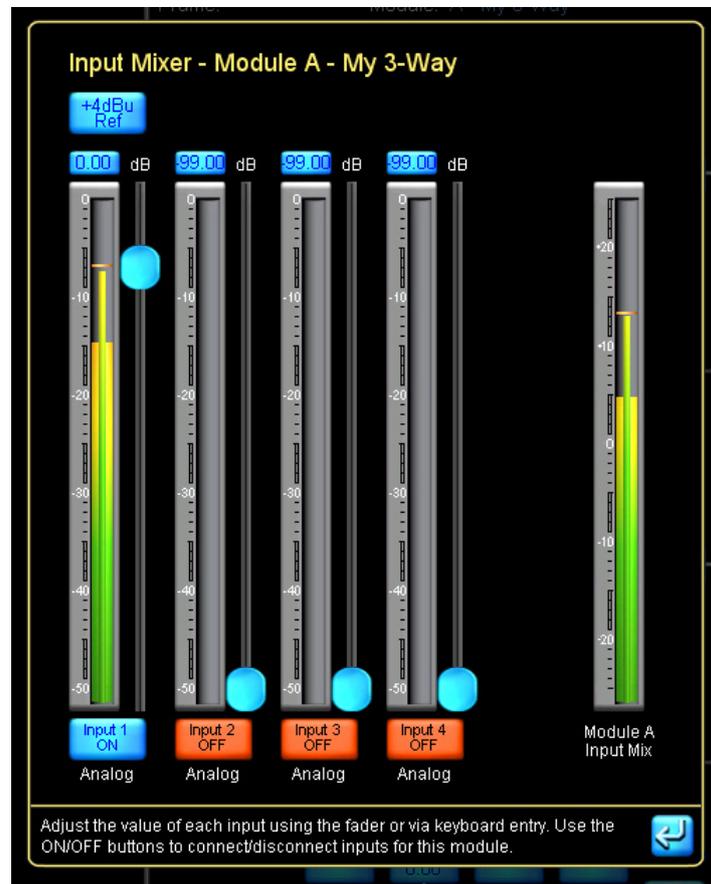


Figure 4-19: Four-Channel Input Mixer

The LM Series and MY8-LAKE Contour Modules provide a four-channel input mixer, allowing the inputs to be mixed together differently for each Module. PLMs provide a two-channel input mixer and LM Series and MY8-LAKE Mesa EQ Modules provide an eight-channel input mixer.

4. Tap the exit button  in the bottom-right corner of the Input Mixer pop-up window to return to the I/O CONFIG screen.

Each output can be custom configured by the user. Tap one of the zoom icons (represented by a magnifying glass) on the right side of the Module's block diagram. This action will open the Output Configuration window.

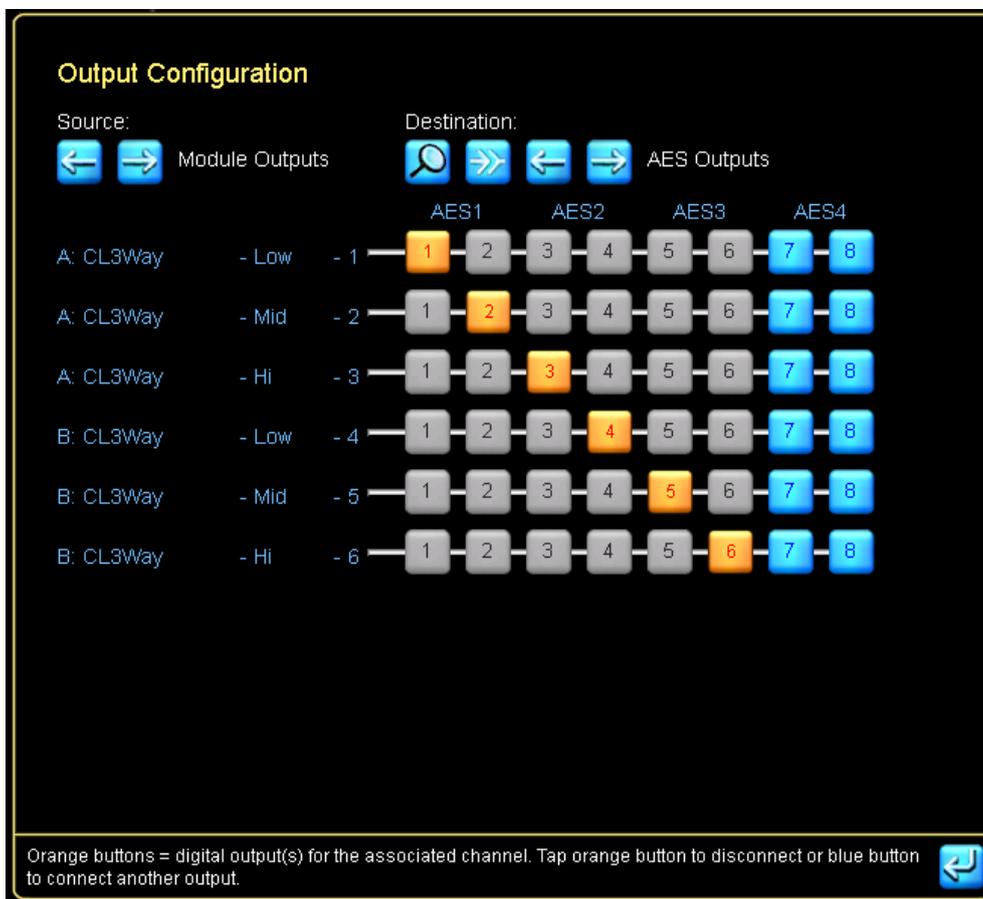


Figure 4-20: LM 26 Output Configuration

The Output Configuration window provides the ability to route any physical input or Module output to any available analog or digital output on the device. The arrows below the source and destination labels allow selection and mapping of all available I/O.

LM Series devices provide the ability to route any of the eight the Input Router Outputs directly to any output. This allows fail-over input switching to be configured for pass-thru / format conversion purposes. For instance, an input router can be configured for fail-over to Analog if AES input fails, and the whichever audio is used can be passed through to Dante (or any other output type). For further information, please refer to section 20.1.

5. Tap the blue EXIT/RETURN button in the bottom right to return to the I/O CONFIG page.

The left side of the I/O CONFIG summary screen provides both clock and INPUT CONFIGURATION functions along with other Frame specific functionality. Status information is provided, and zoom icons open pop-up windows for access to configuration parameters.

Lake devices have sophisticated digital clocking systems, allowing selection between internal and external clock sources at all standard audio sample rates. By default, all Lake devices (except the MY8-LAKE) use

an internal clock operating at 96 kHz. You can choose to use any available external clock source using the interface provided by the clock source configuration window.

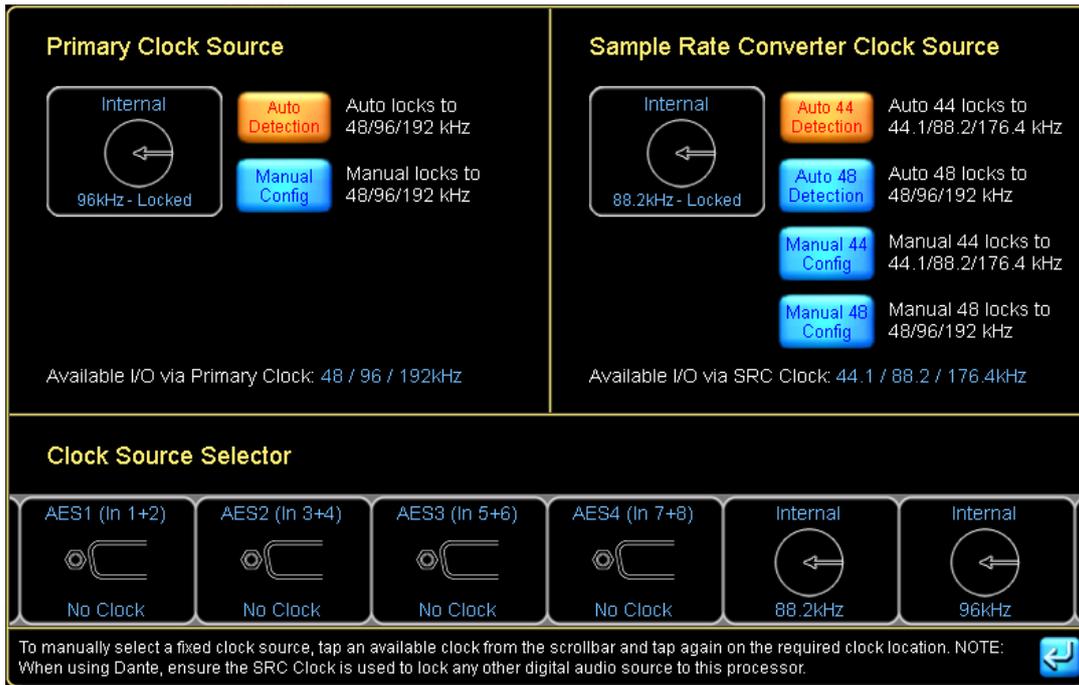


Figure 4-21: LM 44 Digital Clock Configuration

The current Primary Clock Source is shown on the top left of the screen, and the current Sample Rate Converter Clock Source is shown on the top right. You can choose any available clock source using the Clock Source Selector scroll bar at the bottom of this window.

Please refer to each product’s Operational manual for further details on clocks, clock source priorities, sample-rate converters, and signal processing latency the product.

The INPUT CONFIGURATION pop-out window allows flexible routing of all available inputs to each Input Mixer channel along with a four-level auto-select priority allocation for each input, as shown in Figure 4-22.

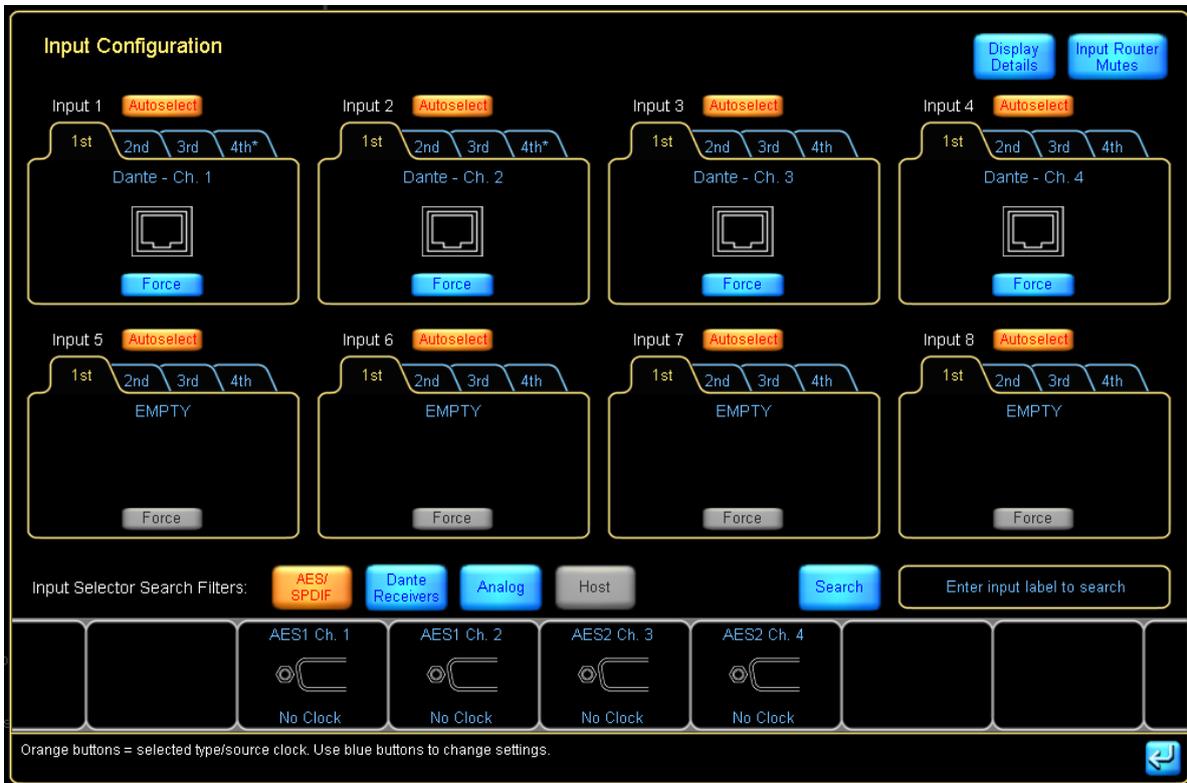


Figure 4-22: LM 44 Input Configuration Screen

From this interface, you can allocate which input is used for each input channel of the Input Mixer, and in which order up to four inputs should auto-select (fail over) for each input channel.

The input AUTOSELECT feature allows you to set up a redundant system. The device will attempt to use the first signal; if the first signal is unavailable it will try the second, third, and fourth signals.

Tapping DISPLAY DETAILS allows control of digital clock selection/digital gain offsets and analog input headroom as shown in Figure 4-23.

DIGITAL GAIN OFFSET allows fine-tuning of gain between different digital and analog signals to allow for a seamless transition between the signal sources.

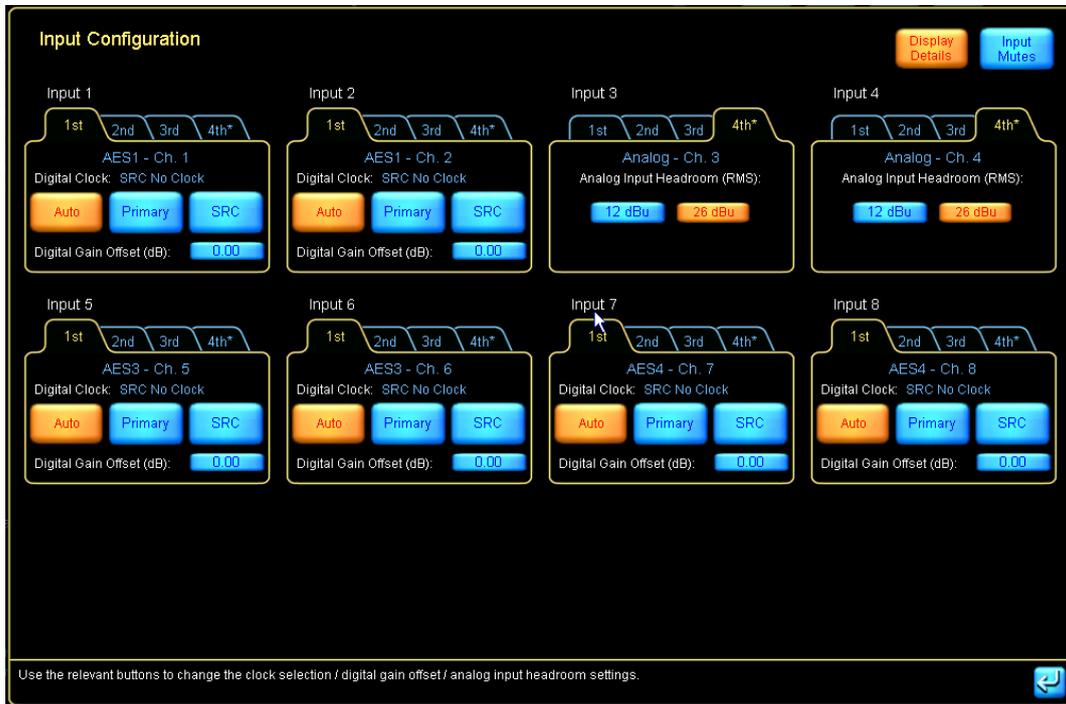


Figure 4-23: LM 44 Input Configuration - Details View

The next summary item on the left side of the I/O CONFIG screen (LM Series devices only) is GPIO Configuration. Tapping this icon, or the summary text, will display the screen shown in Figure 4-24.

GPIO Configuration

General Purpose Input Configuration

	Acting on	Action when transition to CLOSED	Action when transition to OPEN	Current state
GPI 1	No Action	-	-	OPEN
GPI 2	No Action	-	-	OPEN

General Purpose Output Configuration

	Indicating	State when CLOSED	State when OPEN	Current state
GPO 1	Standby	Standby	On	OPEN
GPO 2	Fault	Any Fault	No Fault	OPEN

Figure 4-24: GPIO Configuration (LM Series Devices Only)

GPIO Configuration is used to set the actions for this contact-closure style external control interface. For further details, please refer to the LM Series Operation Manual and to section 8.2.3 in this document.

The last item on the left side of the I/O CONFIG page allows remote control of Iso-Float™. This powerful feature allows you to troubleshoot grounding issues remotely from the Controller.

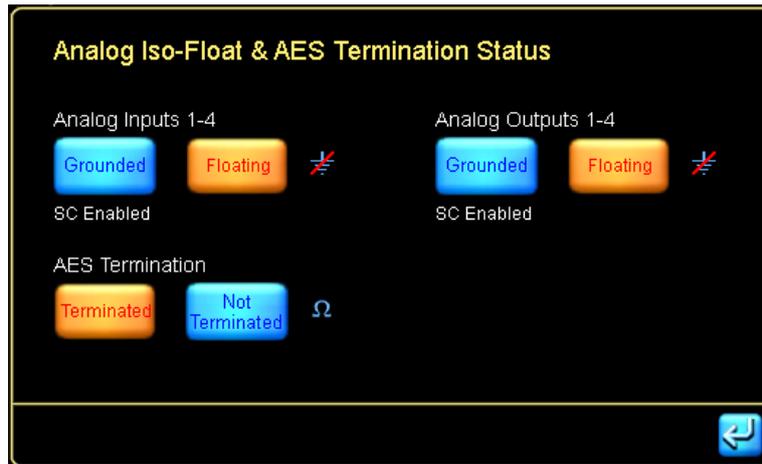


Figure 4-25: Analog Iso-Float Status Screen

The ANALOG ISO-FLOAT STATUS window shows you the current state of the device hardware and allows you to make changes to the grounding state of each analog converter card.

After closing the ANALOG ISO-FLOAT STATUS pop-up window, return to the Main page by tapping the HOME button.

4.3.6 Dante

Dante audio networking technology from Audinate provides a hassle-free digital audio networking solution for Dante-enabled Lake devices providing reliable, sample-accurate, low-latency audio distribution over Ethernet.

Dante provides a reliable, digital-audio networking system with complete flexibility, ease of use, and cost-effectiveness. With innovative features such as Zen™, Dante-enabled Lake devices automatically find each other and also allow any Dante audio channel on the network to be routed to the input of one or more devices.

Dante can be easily integrated into an existing network, sharing the system with normal data traffic. Dante also offers a virtual sound card feature for audio recording, processing or playback using computer-based programs. This feature is enabled by plugging into the standard Ethernet port on a PC; no external boxes or sound cards are required.

On Dante-enabled Lake devices no additional hardware is required; a single Ethernet connection can transmit all audio and control data. Table 8-2 summarizes the number of Dante input and output channels per Lake product, along with an indication of whether the product provides dual redundant Dante audio networking which as described in section 3.6.2, and the associated Product Operation manuals.

4.3.7 Levels and Meters

From the Main page, tap the My 3-Way Module icon to display its parameters. This action will enter the EQ and Levels interface for the Module, displaying the EQ screen the first time it is accessed.

Tap the LEVELS tab at the top left of the display to access the LEVELS interface. This provides metering information and faders for adjustment of gains, delays, and limiters.

By default, gain controls and meters are displayed for the input and all outputs of the Module. Mute controls are located below each input and output meter, with a polarity button for the input.

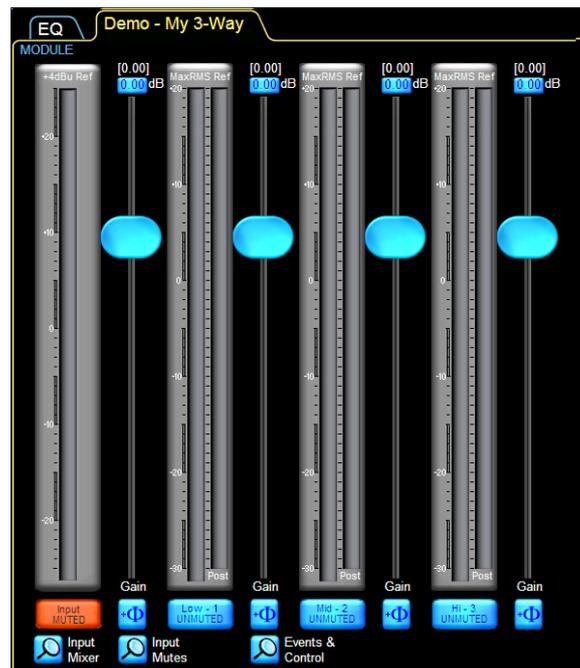


Figure 4-26: Levels Screen

To unmute the Module input, tap the red mute button labeled Input MUTED.



The Module input mute button controls the post input mixer signal mute. To adjust levels of each physical input, tap the Input Mixer button below the Module Input Mute button.

4.3.7.1 Adjusting Levels

There are three ways to adjust the gain of an input or output:

- ▶ Make large changes (1 dB increments) by tapping and sliding the fader.

- ▶ Make small adjustments (0.1 dB increments) by tapping and dragging above, below, or to the left of each fader control.
- ▶ Adjust the gain to an exact value (0.01 dB increments) by tapping the gain value directly and using the on-screen keyboard to enter the new value as follows:
 1. Tap the input gain value (highlighted in blue at the top left of the screen).
 2. Enter -3.75 dB of gain, and tap OK.



Figure 4-27: Using the parameter edit function to enter values

The same principles apply to adjusting other levels (delays, limiters, and so on) throughout the Lake Controller software.

To view/update other types of levels, simply tap the required type of level from the button bar (Delay, Limiter Max RMS, and so on). The faders and levels change to display the value of the selected level type.

4.3.7.2 Metering

In the Levels interface, all input and output levels are accompanied by metering. Input meters show both average level and peak level, with a user-definable peak hold. Output meters show the aforementioned level metering on the left side of the meter face, and additionally show limiter activity on the right side of the meter face.



Regardless of the level type currently being adjusted, gain and limiter metering is always displayed.

If an audio channel is clipped, the meter face turns red. Additionally, if an audio channel is within 2 dB of clipping, the meter face turns orange.

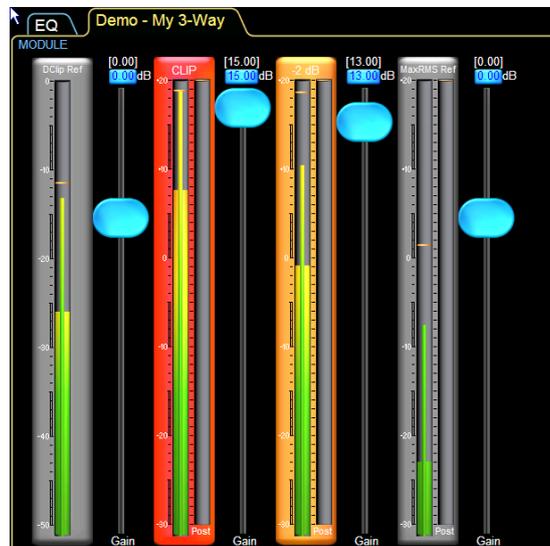


Figure 4-28: Clipping and -2 dB warning indicators

As limiters are engaged, the amount of gain reduction is shown with a meter operating in the downward direction.

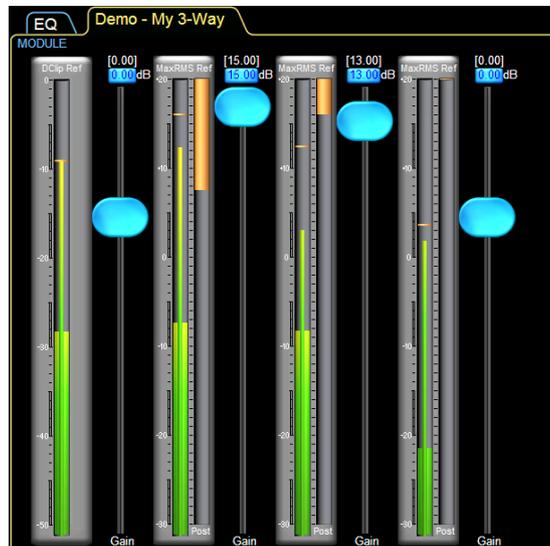


Figure 4-29: Orange downward meters indicate channel limiting

The limiter meter displays the total amount of limiting resulting from both peak and RMS limiter functions of the LimiterMax™ loudspeaker protection system.

4.4 Equalization

From the LEVELS interface, tap the EQ tab in the top-left corner of the display to move to the EQ controls for the Module. Parametric EQ (PEQ) is displayed by default.

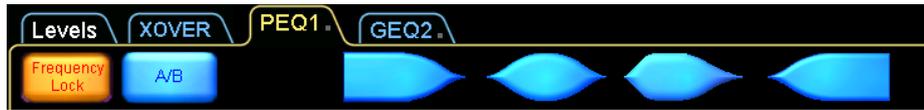


Figure 4-30: PEQ tab with EQ filter tools and options

Multiple EQ overlays are identified by tabs at the top left of the display. A three-way Module initially has one parametric (PEQ1) and one graphic (GEO2) overlay, in addition to the XOVER tab. A Mesa EQ Module has a tab labeled HPF/LPF instead of XOVER.

The parametric overlay (PEQ) provides low-shelf, parametric, Mesa, and high-shelf filters. The graphic overlay (GEO) provides third-octave EQ controls. The XOVER screen allows selection and adjustment of crossover filters, in addition to output EQ.

4.4.1 Graphic EQ

1. Tap the GEO2 overlay to access the default third-octave graphic overlay. The bottom section of the graphic EQ screen contains the EQ Tool, which is used to select a frequency band for gain adjustment.

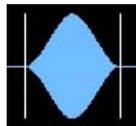


Figure 4-31: EQ Selector

2. To select a frequency band, tap and drag the selector left or right. To adjust gain of the selected filter, tap the red rotating X and slide up to boost or down to cut.



If Frequency Lock is off (blue), the frequency can also be selected and changed by directly tapping and dragging a yellow X filter point on the EQ interface.

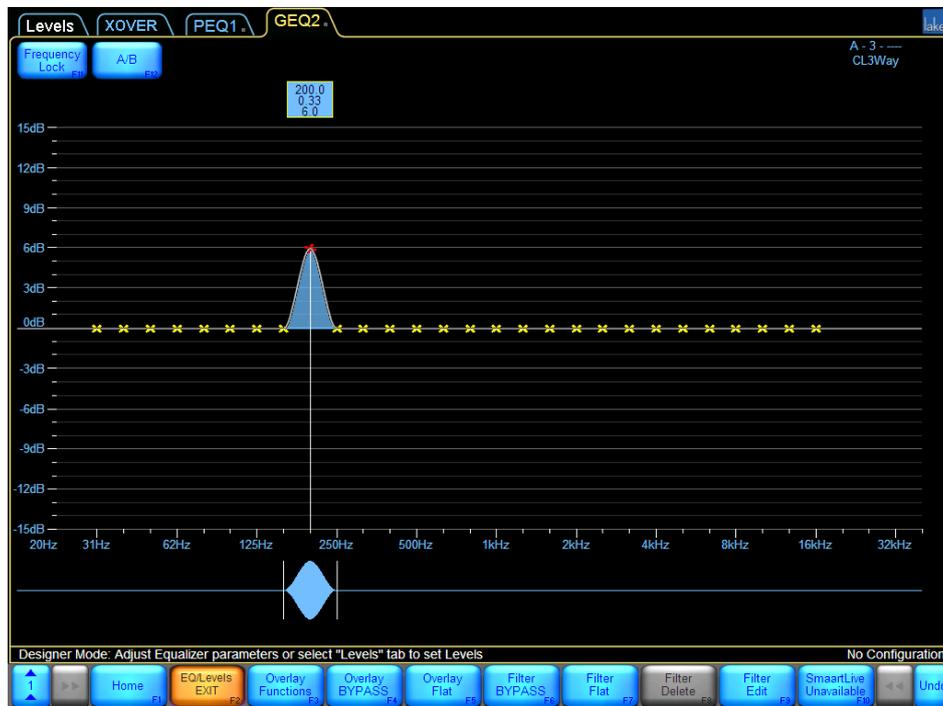


Figure 4-32: Graphic EQ Screen

3. Tap Filter Flat on the button bar to flatten the selected filter.

Many other features are available on the EQ button bar; please refer to chapter 7 for further details.

4.4.2 Ideal Graphic EQ™

A unique innovation found in all Lake devices is the Ideal Graphic EQ. Conventional analog and digital graphic equalizers do not provide intuitive results. For example, pulling up the faders on a conventional graphic equalizer to boost 6 dB at 500; 630; 800; 1,000; 1,250; 1,600; and 2,000 Hz produces the frequency response shown in Figure 4-33.

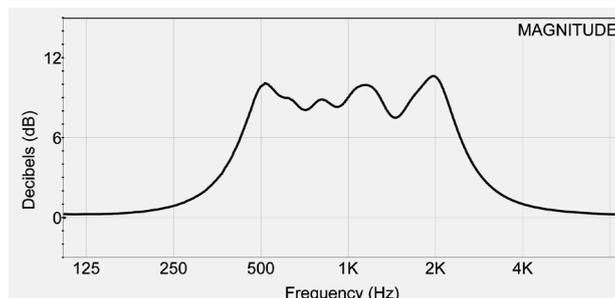
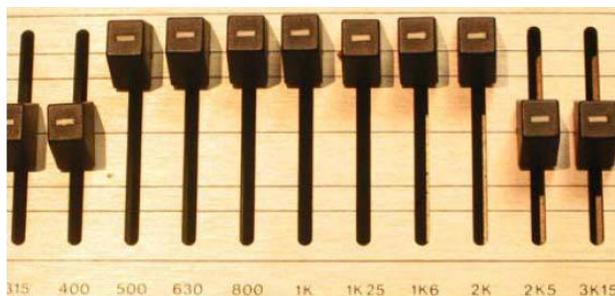


Figure 4-33: Conventional Graphic Equalization and Resulting Frequency Response

This measured frequency response is not what you would expect from the graphic EQ controls.

If we use the Lake Controller GEO overlay to boost 6 dB at 500; 630; 800; 1,000; 1,250; 1,600; and 2,000 Hz, the frequency response is shown by the flat top trace in Figure 4-34.

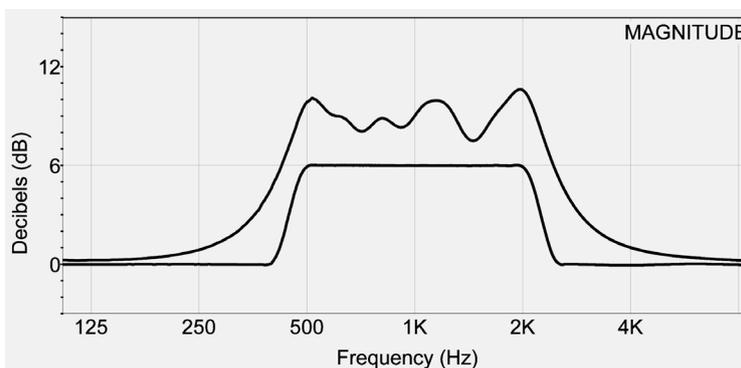
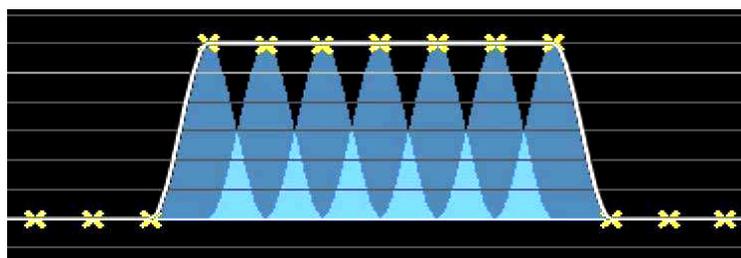


Figure 4-34: Lake Ideal Graphic EQ and Resulting Frequency Response

To implement this EQ overlay:

1. Tap and drag the filter tool on the bottom to 500 Hz.
2. Tap and drag the red X upward until the filter's gain parameter reads 6 dB.
3. Perform these steps for each of the frequencies listed.

The bottom trace in Figure 4-34 shows that the adjacent filters on a Contour or Mesa EQ sum to flat, unlike all previous graphic equalizer implementations. This is because of the raised cosine filters that give rise to the Ideal Graphic EQ.

Figure 3-7 shows a traditional third-octave graphic EQ filter (red curve) in comparison to a third-octave raised cosine filter. The area highlighted gray shows the difference between the two filter shapes.

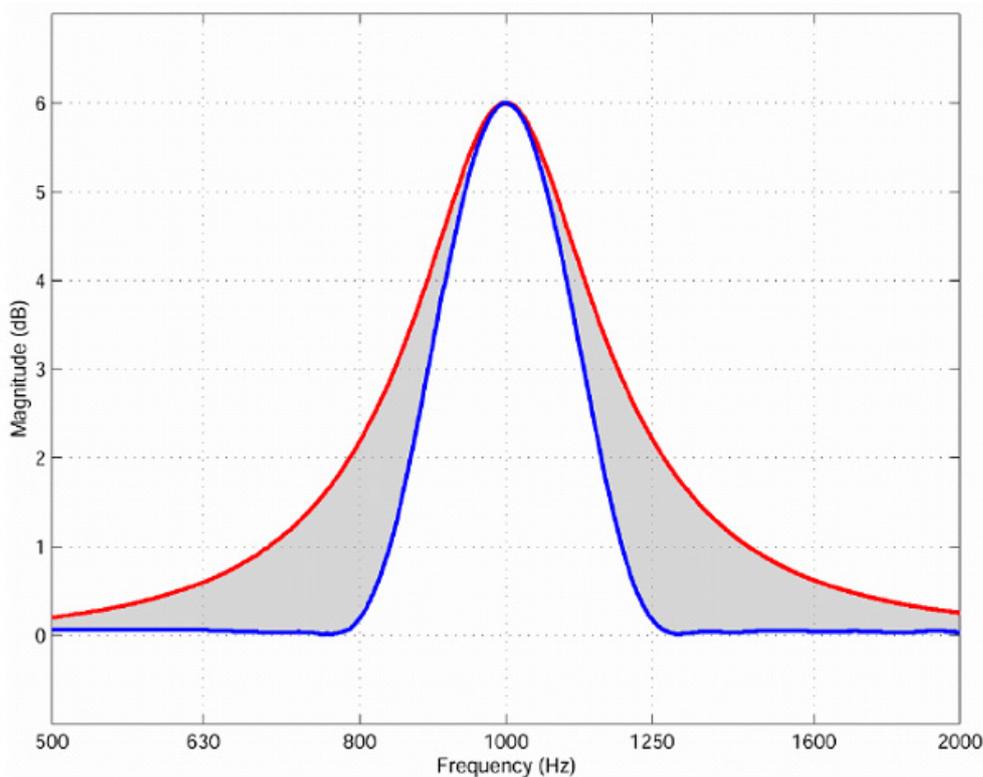


Figure 4-35: Comparison of Raised Cosine (blue) and Traditional Third-Octave (red)

4.4.3 EQ Overlays

The concept of EQ overlays is another innovative Lake feature. Tap the PEQ1 tab at the top of the page. GEQ2 and PEQ1 are two different EQ overlays. The white line represents the composite response of all EQ overlays. It now shows the wide band 6 dB boost created in the GEQ2 tab. In the next section, we will see how multiple EQ overlays interact.

4.4.4 Parametric EQ

To add a parametric filter to the PEQ1 overlay:

1. Tap the parametric filter at top of the EQ display.
2. Tap the screen near 125 Hz to insert the filter there.

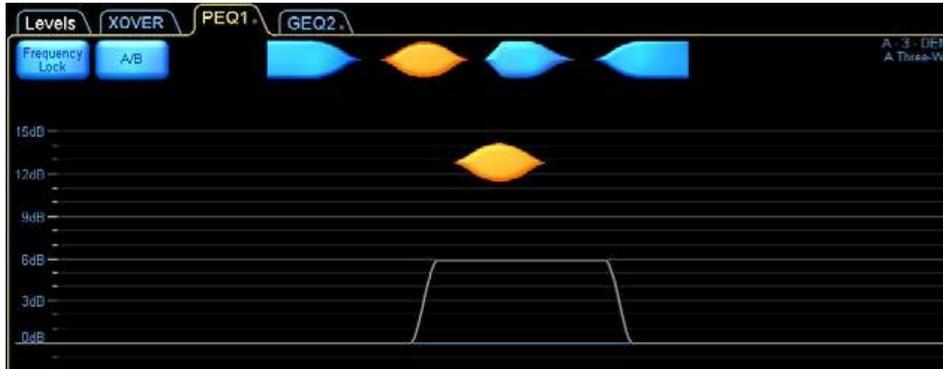


Figure 4-36: Adding a Parametric EQ filter on the PEQ1 Overlay

The parametric filter tool is similar to graphic EQ tool except the filter bandwidth is adjustable.

3. Tap and drag the red X up to boost the volume of this frequency.

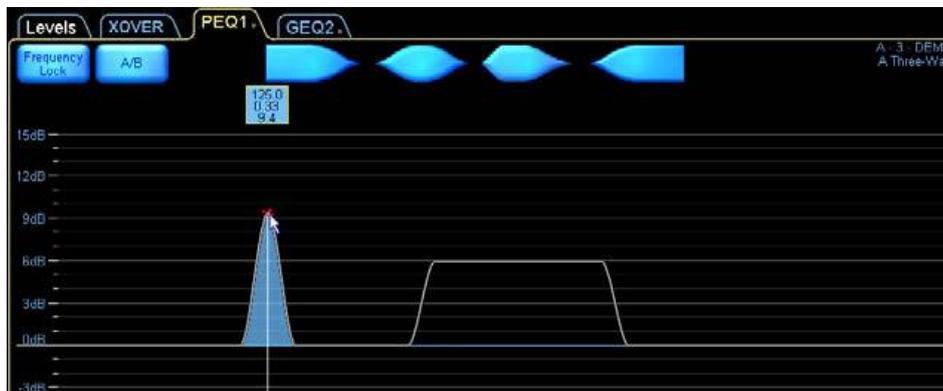


Figure 4-37: Changing filter gain by dragging the filter point

4. Tap and drag either of the vertical end lines on the filter tool to increase the bandwidth as shown:

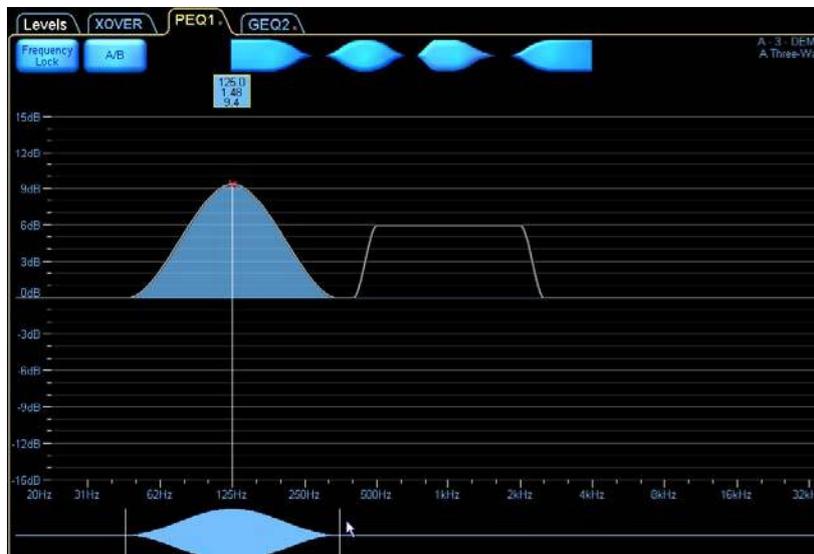
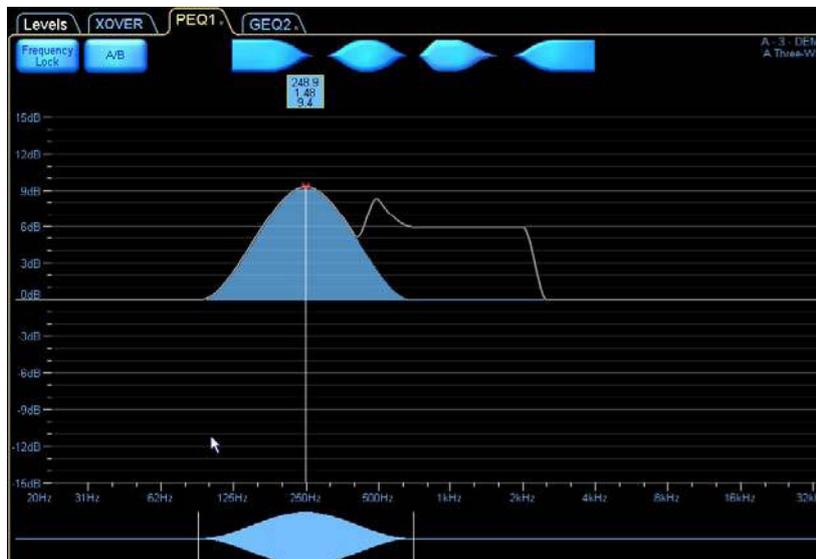


Figure 4-38: Changing the filter bandwidth using the EQ tool

5. Change the center frequency of the parametric filter by tapping and dragging inside the vertical divider lines of the EQ tool.



6. Drag the parametric filter into the same frequency range as the GEQ2 filters to see the result of all the filters (the white composite line in the previous figure).

4.4.5 Add a New EQ Overlay

To add a new EQ overlay:

1. Tap OVERLAY FUNCTIONS.
2. Tap OVERLAY NEW.

By default, a new overlay is parametric but can be changed to graphic by tapping the OVERLAY GEO button. You can also change an overlay from graphic to parametric by tapping this same button, which will read OVERLAY PEQ in this instance.

4.4.6 Mesa Filter

The Mesa filter is a highly versatile filter that can rapidly adjust a loudspeaker's frequency response. The Mesa filter provides a fast, effective optimization tool that truly matches a loudspeaker's asymmetric response. The Mesa filter allows independent adjustment of the slopes and center frequencies of the lower and higher edges.

To add a Mesa filter to the new PEQ3 overlay:

1. Tap the Mesa filter type at the top of the EQ interface.
2. Tap the EQ display near the frequency you wish to insert the Mesa filter.

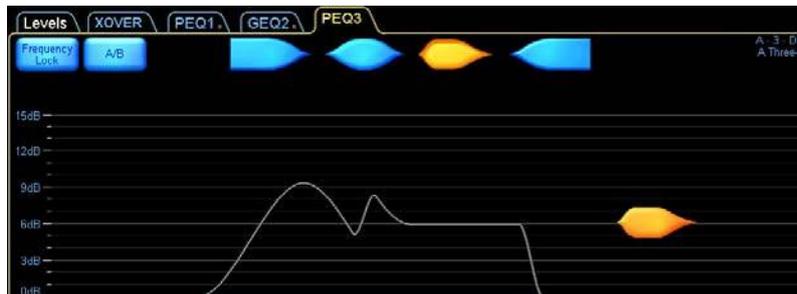


Figure 4-39: Adding a Mesa filter

3. Tap and drag up between the red X marks in the EQ display to increase gain.

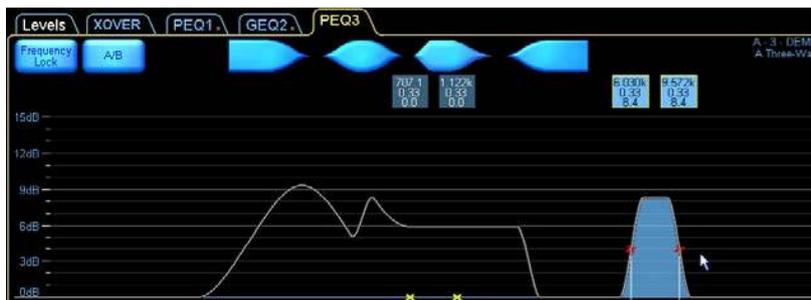


Figure 4-40: Increasing the gain on a Mesa filter

The Mesa filter tool has four dividing lines.

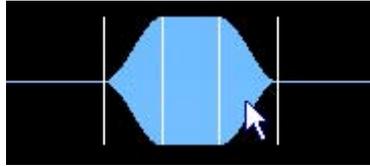


Figure 4-41: Mesa EQ Filter Tool

4. Tap between the center and right dividing lines and drag to the right. This spreads the filter points, creating a variable-width flat top.

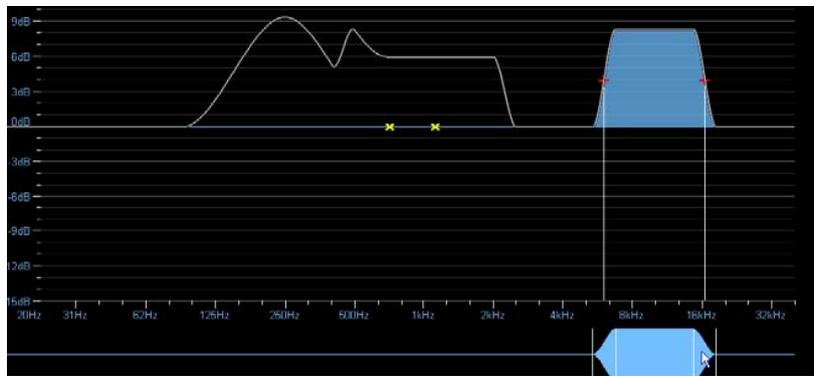


Figure 4-42: Adjusting the Mesa filter width

5. Tap and drag to the left of the far-left divider line.



Figure 4-43: Adjusting a Mesa Filter Slope

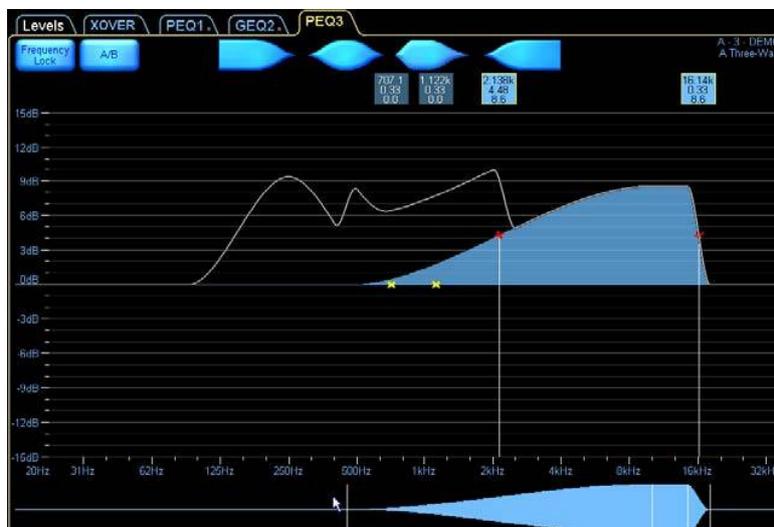


Figure 4-44: Effect of Adjusting the Mesa Filter Slope

The same principle applies to the high-frequency edge (right side).

6. Tap and drag between the two center divider lines to change the frequency.

4.5 Crossovers

The Lake Controller, when used in conjunction with Contour loudspeaker Modules, allows real-time adjustments to crossovers through the XOVER screen.

Crossover frequency and type and post-crossover equalization can be adjusted. In the default three-way configuration, the Contour Module has 24 dB Linkwitz-Riley crossovers with center frequencies set at 250 Hz and 1.6 kHz. Tap the XOVER tab to view the crossover interface.



Figure 4-45: Crossover Screen

The low-output crossover is selected in this example. Use the crossover tool to change the center frequency. The low and high parts of the crossover are currently combined. Tap the CROSSOVER SPLIT button to split the crossover, and drag the CROSSOVER SELECTor tool left to reduce the frequencies sent to the low output.



Figure 4-46: Splitting and moving the low channel HPF

Parametric filters (with the exception of the Mesa filter) can be added to further modify the crossover. Add a parametric filter near the center frequency of the low-output crossover.

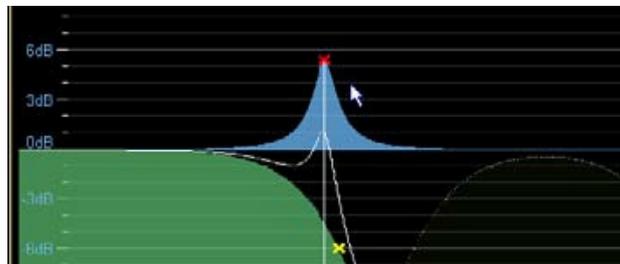


Figure 4-47: Adding a parametric EQ to the low channel

The full response of the parametric filter is shown in blue, but the parametric filter affects only the output it is associated with. The solid white line shows the resulting crossover curve for the low output.

Tap the CROSSOVER SELECT button to display the crossover scroll bar, from which you can select various standard crossover types. If crossover sections are combined, the new CROSSOVER SELECTION is applied to both sides of the selected crossover. If crossovers are split, the CROSSOVER SELECTION applies only to the currently selected output.

To change the crossover type to a 48 dB Linkwitz-Riley:

1. Tap the 1.6 kHz filter box to select that crossover.
2. Tap CROSSOVER SELECT.
3. Select 48 dB Linkwitz/Riley from the scroll bar.

4. Tap CROSSOVER SET.
5. Tap YES in the dialog box to load the new crossover.

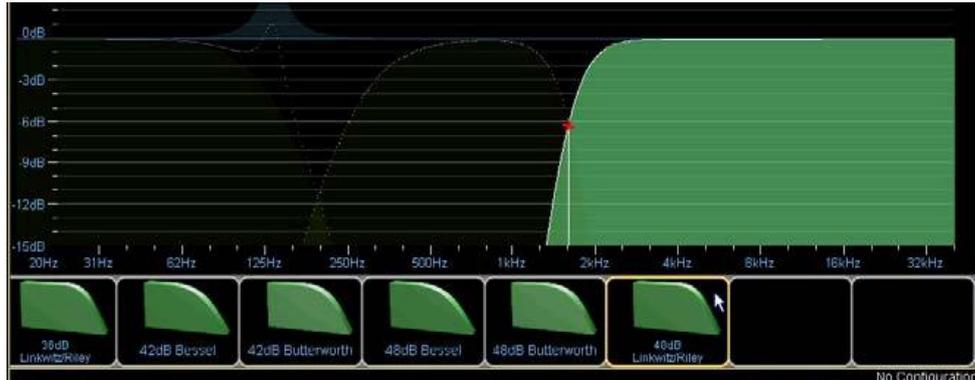


Figure 4-48: Changing the crossover slope

The crossover interface provides a fast and easy method for configuring your loudspeaker system. You can create your own presets or build them based upon data available from speaker manufacturers.

4.6 Groups

The Lake Controller allows Grouping of multiple Modules. This unique concept allows the EQ and levels of multiple Modules to be changed with a single adjustment. Every Module may be a member of up to 28 Groups.

All EQ functions available for a Module are also available for a Group, with a maximum of four EQ overlays per Group.

Most Levels functions are also available for Groups, except the following:

- ▶ LimiterMax RMS Corner
- ▶ LimiterMax RMS Attack
- ▶ LimiterMax RMS Release
- ▶ Input Headroom
- ▶ Control of output levels where the Group contains Modules of varying crossover types (e.g. 3-Way and 4-Way Modules assigned to the same Group).

4.6.6.1 Assigning Modules to a Group

To assign both Modules of a Frame to a Group:

1. Tap the HOME button to locate to the MAIN page.
2. Tap the GROUPS button to display the Groups scroll bar.
3. Tap GROUP 1, and then tap the MAIN page to add the Group to your configuration.

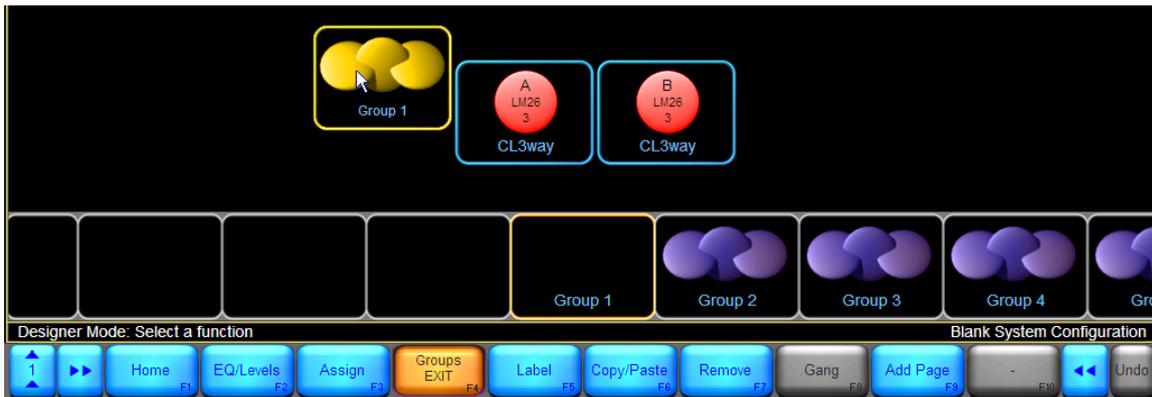


Figure 4-49: Adding a Group to the Main page

4. Tap the ASSIGN button, and tap the icons for Modules A and B to assign them to the Group. Assigned Modules are highlighted with a yellow border.

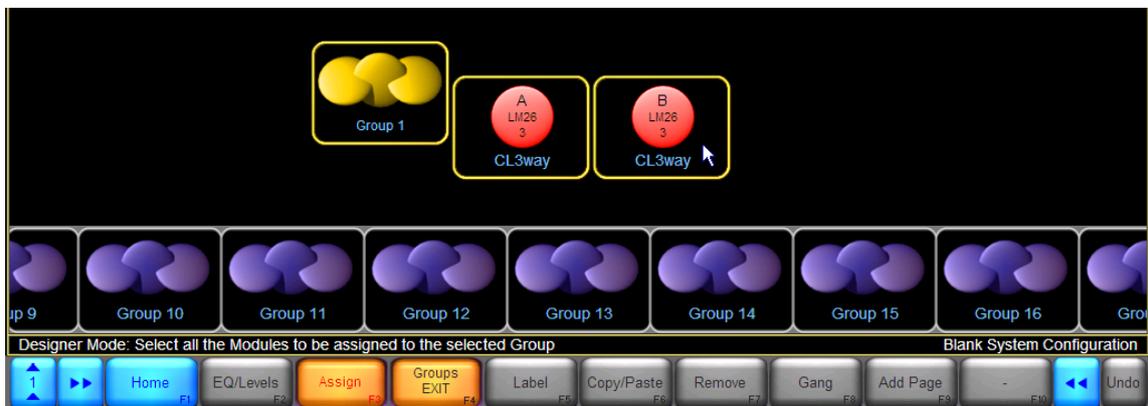


Figure 4-50: Assigning Modules to a Group

5. Tap the ASSIGN button again to exit ASSIGN mode.
6. Tap GROUPS EXIT or HOME to return to the MAIN page.

4.7 Lake Controller File Types

Before saving the simple configuration just created, it is useful to learn about the file types used to store and recall settings within the Lake Controller software. The following sections describe the various file types.

4.7.1 Base Configuration Files

A base configuration file defines a starting point for the Module setup. It can contain EQ, crossover, and level settings that can be hidden or protected from end-user adjustment. The result of all EQ, levels, and crossover settings for the Module, and any Group that it belongs to, can be combined and stored in the base configuration file.



Figure 4-51: Contour [.cbm] & Mesa [.mbm] Base Configuration Files

4.7.2 Single Module File

These files store all information contained in the base configuration file plus user settings for each Module including the mute states, levels (gain, delay, and limiters), and equalization (filters and EQ overlays).



Figure 4-52: Contour [.csm] and Mesa [.msm] Single Module Files

4.7.3 System Configuration File

This file stores/recalls all information contained within all Contour or Mesa single-Module files on a given network, and additionally includes generic Frame data and all Group assignments and settings.

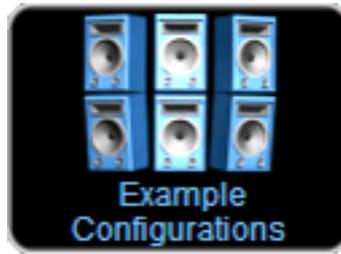
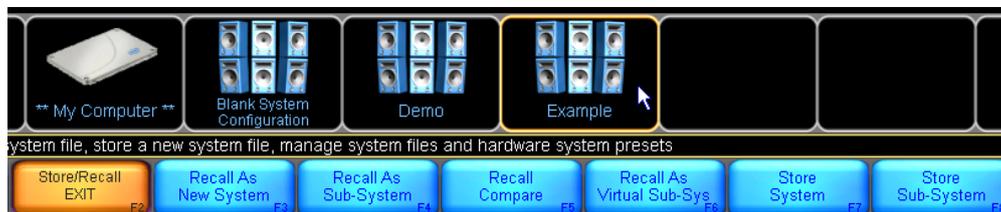


Figure 4-53: Lake Controller System Configuration File [.csc]

4.7.4 Storing a System Configuration

To store a system configuration file:

1. Tap HOME.
2. Tap SYSTEM STORE/RECALL to display the scroll bar.
3. Tap the STORE SYSTEM button to display the on-screen keyboard.
4. Name the system configuration 'Example' and tap OK.
The system configuration is stored and the file is displayed in the scroll bar.
5. Tap the file labelled 'Example' to select it.
This activates all recall and store options on the SYSTEM STORE/RECALL button bar.



- ▶ RECALL AS NEW SYSTEM clears current configuration and loads the selected configuration.
- ▶ RECALL AS SUB-SYSTEM retains the current configuration and appends the selected configuration.
- ▶ RECALL COMPARE allows a comparison between the data stored on file and the current system configuration.
- ▶ RECALL AS VIRTUAL SS (Sub System) loads the data from the file into a virtual offline system, appending it to any currently recalled system configuration.
- ▶ STORE SYSTEM stores the entire configuration.
- ▶ STORE SUB-SYSTEM stores only the data in the selected Modules and Groups.

Individual Module settings can also be stored to a file. The single-Module file stores everything about a particular Module, including its EQ overlays, but does not retain Frame data (such as I/O config) or Group assignments. This file can be recalled into any Module of the same type (Contour/Mesa).

4.7.5 Storing a Single Module File

To store the settings of a single Module:

1. Tap the HOME button, then tap MODULES.
2. Select the Module 'My 3-Way'.
3. Tap MODULE STORE/RECALL.
4. Tap FILE UTILITIES, then NEW FOLDER.
5. Enter the folder name 'Test', and tap OK.
6. Tap FILE UTIL EXIT
7. Double-tap the folder icon labelled 'Test' on the scroll bar to open it.
8. Tap NEW STORE, name the file My 3-Way, then tap OK.

5. Home Menu Reference

This chapter provides detailed information on the top-level structure of the Lake Controller button bar, located at the bottom of every display within the software.

5.1 Main Screen Home Menu

When the Controller starts, the MAIN page, ALL page, and HOME button bar are displayed.

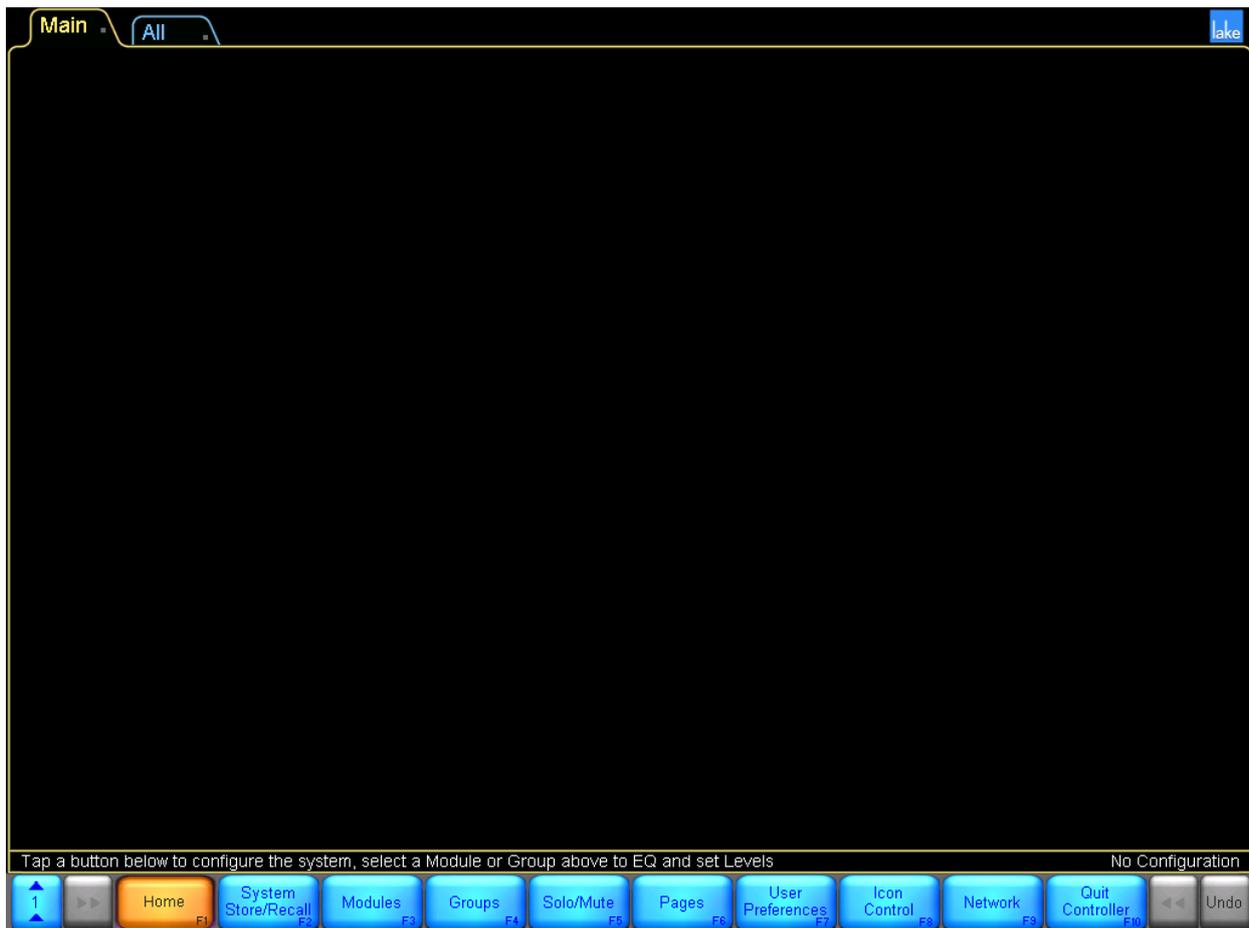


Figure 5-1: Main Screen - HOME Menu

From the HOME button bar, you can navigate to all user-interface displays and functions provided by the Controller. Table 5-1 provides a description of each button.

Button	Description
	Available from most screens in the Lake Controller, the HOME button returns you to the top-level display.
	Submenu providing functionality for storing and recalling system configuration files. File utilities are also provided for creating, renaming, and deleting files and folders.
	Submenu providing Module functionality. This is one of the most extensive menus within the Controller, providing access to Modules, Super Modules, EQ, Levels, I/O Configuration, labeling, locking, copying, pasting, removing, recalling, and storing.
	Submenu providing Grouping functions. Groups are a powerful component of the Controller, allowing you to Group any number of Modules into logical partitions. Groups provide EQ level control across the set of Modules that are assigned to the given Group.
	Submenu providing solo and mute functionality. The solo/mute controls allow you to solo Modules and Groups, and also provide a mode to allow soloing for multiple Modules and Groups.
	Submenu providing page functions. You can add pages, label pages, and move Groups and Modules between the pages that you create.
	Submenu providing user preferences. These functions include contexts, delay units, designer mode functions, keyboard shortcuts, graphic options, and show mode.
	Submenu providing icon control. You can change the size of icons, and change to the meter icon view.
	Submenu providing network functions. You can select between available networks and access multiple-controller functions.
	Quits the Lake Controller.

Table 5-1: Summary of HOME Menu Options

The menu reference chapters that follow this chapter provide detailed reference for each of the top-level functions on the HOME button bar.

5.2 Accessing EQ/Levels from HOME

When the Lake Controller displays the HOME button bar, you can tap any icon on the current page to immediately access the EQ/Levels interface for the given Module, Super Module, or Group. This provides instant access to the Module or Group, without having to navigate through the button bar to gain access to these most important parameters.

Tapping a Module icon from HOME is equivalent to the following sequence:

1. From HOME, tap MODULES.
2. Tap a Module icon to select the Module.
3. Tap EQ/LEVELS.

Tapping a Group icon from HOME is equivalent to the following sequence:

1. From HOME, tap GROUPS.
2. Tap a Group icon to select the Group.
3. Tap EQ/LEVELS.

Since the EQ/Levels interface for Modules and Groups is the most frequently used component of the Lake Controller, this is the first menu reference chapter to be presented.

6. System Store Recall Menu Reference

The Lake Controller allows the user to store and recall complete system configurations. This enables the same Lake device to be used in entirely different situations, as their complex configurations can be changed in seconds.

6.1 System Store Recall Navigation

From the HOME menu, tap SYSTEM STORE/RECALL. The button bar displays the following options, and a scroll bar also appears containing files and folders.

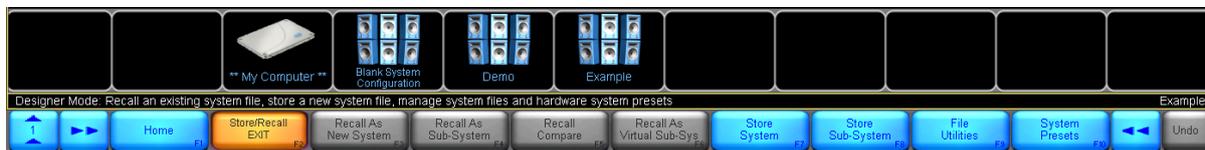


Figure 6-1: System Store Recall Scroll Bar

The first icon on the system scroll bar is labeled ****My Computer****. Selecting this and tapping OPEN will allow you to navigate to folders and files on your hard drive or any removable disk.

The other files shown at the root of this directory are the system configuration files stored from within the Controller software.

If there are many folders or files, drag the scroll bar to the left or right, or tap the << or >> buttons. Most options on the button bar appear gray and are inactive until a folder or file is selected on the scroll bar.

6.2 Shortcut to Data/User Folder

Default software installation of the Lake Controller places a shortcut in the Windows Start menu:

START > PROGRAMS > LAKE CONTROLLER > USER DATA FILES



*In Windows XP this links to:
C:\Program Files\Lake\Lake Controller v5.x\data\user*



*In Windows 7 this links to:
C:\User\"username"\AppData\Local\VirtualStore\
ProgramFiles\Lake Controller v5.x\data\user*

This shortcut can be used to open the Microsoft Windows folder containing your system and Module files.

In Windows 7, all System and Module files stored in the Lake Controller can be located in the virtual store directory.

6.3 Recall as New System—Open

The function and label of the button depend on whether a folder or file is selected. The button is inactive when neither a file nor folder is selected.

The button is labeled OPEN when a folder is selected.

To open a folder:

1. Tap the desired folder icon
The selection is indicated by a yellow border.
2. Tap OPEN. Double-tapping the folder icon also opens the folder.

The button is labeled RECALL AS NEW SYSTEM when a file is selected; recalling the file will clear all current settings from the Controller and load the details stored in the file into the associated devices.

To recall a system configuration file as a new system:

1. Tap the desired file to recall.
2. Tap RECALL AS NEW SYSTEM.
3. Confirm the action by tapping the YES button on the warning message.



RECALL AS NEW SYSTEM overwrites current settings in associated Lake devices and will affect audio processing. Presets stored in hardware devices are not overwritten during a system file recall.

6.4 Recall as Subsystem

RECALL AS SUBSYSTEM enables the content of a system configuration file to be added to the current system configuration.

This function adds the Modules, Super Modules, and Groups to your current configuration, or replaces the data if the device is already in use. This function does not automatically arrange icons so they do not overlap. Be careful to either move existing icons before loading a sub-system, or ensure icons are placed appropriately in the stored files.

6.5 Recall Compare

RECALL COMPARE enables comparison of a system configuration file with the system configuration that is currently active in the Lake device. This button is active only when a file is selected.

To compare the current configuration with one stored in a file:

1. Tap SYSTEM STORE/RECALL.
2. Navigate to the file you wish to compare.
3. Tap the file icon to select it.
4. Tap RECALL COMPARE.
5. Confirm the action by tapping the YES button in the warning message.

This function can help identify any changes that have been made since a file was recalled. Modules with altered data are identified by a red disc behind their normal icon. This indicates that the Lake Controller is out of sync with the device.



Figure 6-2: Module Out of Sync Identification



RECALL COMPARE does not overwrite any data in the device. Audio will not be changed until you tap the button labeled USE DATA IN CONTROLLER.

6.6 Recall as Virtual Sub System (SS)

The RECALL AS VIRTUAL SS button enables you to work on a system file when no physical units are connected. All Frames are seen as virtual. Once the system has been designed, the Virtual Frames can be replaced by physical Frames.

This function adds the Modules, Super Modules and Groups from the selected file to the current system configuration as virtual Modules.

The button will read RECALL AS VIRTUAL SS on screen resolutions of 1024 x 768 or less; the full label RECALL AS VIRTUAL SUB SYSTEM will be displayed on higher resolution screens.



When recalling a Dante-configured system as a Virtual Sub System, all devices receive new default Dante Device names to ensure no conflicts occur if the same system is recalled multiple times. Dante receivers will subscribe to the same Dante channels prior to the virtual recall.

6.7 Store System

The STORE SYSTEM button stores the entire system configuration. If a file is selected on the scroll bar, the name of that file will appear in the on-screen keyboard, allowing the file to be overwritten or for a file name variation to be used.

1. Tap STORE SYSTEM.
2. Confirm the action by tapping the YES button in the warning message



If the selected file is set to read only, the STORE SYSTEM function is inactive (gray).

6.8 Store Subsystem

The STORE SUBSYSTEM button stores the selected Modules, Super Modules, and Groups as a subsystem. Only the data from the selected Modules, including Group assignments, will be stored in the file.

1. Navigate the file system, and tap the desired destination folder to select it.
2. Select the required Modules, Super Modules, and Group icons.
3. Tap STORE SUBSYSTEM.
4. Enter the file name using the on-screen keyboard (or an external keyboard).
5. Tap OK.

The scroll bar displays the new file.

6.9 File Utilities

This button provides a submenu containing further functions that manage files and folders from within the Lake Controller.

6.9.1 Open

This button is active only when a folder is selected. Tap Open to open the selected folder.

6.9.2 Read Only

This function protects important files from being accidentally overwritten or deleted and is active only when a file is selected. The currently selected file's status is identified by the color of the Read Only button:

- ▶ ORANGE - the selected file is set to Read Only.
- ▶ BLUE - the selected file is not set to Read Only.

To change the status of a file:

1. Tap a file from the scroll bar to select it.
2. Tap READ ONLY to toggle the function on (orange) and off (blue).

6.9.3 Rename

This button changes the name of a file or folder.

1. Tap the file/folder from the scroll bar.
2. Tap RENAME.
3. Enter the new name using the on-screen keyboard (or an external keyboard).
4. Tap OK.

6.9.4 Delete

This button is active only when a file or folder is selected. When a file is selected, this function is not available if the file is set to Read Only.

To delete a file or folder:

1. Tap a file or folder to select it.
2. Tap DELETE.
3. Confirm the action by tapping YES in the warning message.



Deletion of a file is permanent and cannot be restored using the UNDO function.

6.9.5 New Folder

This button creates a new folder in the current directory. To create a new folder:

1. Navigate to the directory where the NEW FOLDER will reside.
2. Tap NEW FOLDER.
3. Enter the NEW FOLDER name using the on-screen (or external) keyboard.
4. Tap OK.

6.10 System Presets

The SYSTEM PRESETS function allows entire system configurations to be stored in a network of Lake devices. This enables fast retrieval and switching of configurations as there is minimal data being sent between the Controller and the devices.



Figure 6-3: System Presets Scroll Bar

System Presets are stored in each device and retrieved either via the Controller software (described in this section), via the front panel of the device, or via the relevant Preset Manager utility.

The Preset icon will contain a lock icon if the Preset is locked, and/or a crossed tag icon if the Preset is set to Exclude Labels when the Preset is recalled. For further information on using the Preset Manager Utilities, please refer to chapter 26.

6.10.1 Storing a System Preset in Multiple Devices

To store the current system configuration in multiple Lake devices:

1. Set up the configuration as required.
2. From HOME, tap SYSTEM STORE/RECALL, then tap STORE SYSTEM. This ensures that you have a backup of the exact data, which will be stored as a preset in the hardware.
3. Tap SYSTEM PRESETS.

System Store Recall Menu Reference

4. Tap the Group/Module icons that you wish to be stored as part of the system preset. Icons turn green to indicate selection.

If you require all Frames in your system configuration to be stored as a system preset, tap a Module from each Frame, or if you are using Groups, tap a Group that contains all Frames, as shown in Figure 6-4. To deselect a Frame or Group, tap the icon again.

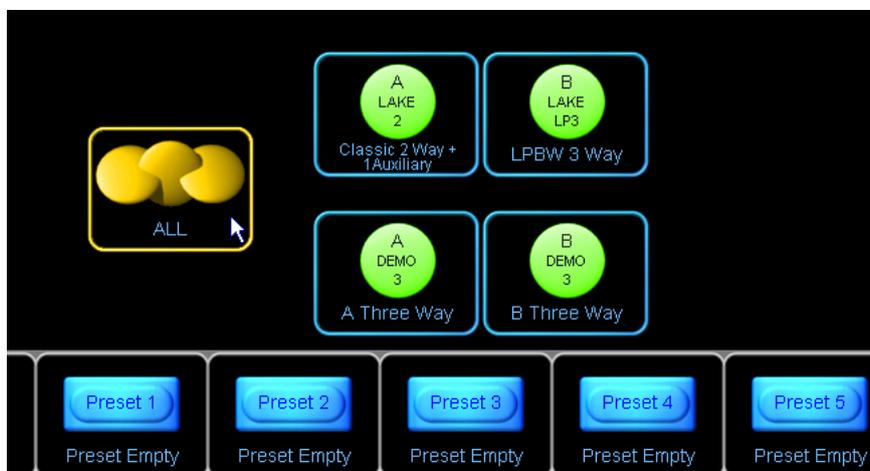


Figure 6-4: Selecting Multiple Frames for Preset Store via Group Icon

After making the desired Module selections:

5. Tap on an empty preset location from the scroll bar (for example, Preset 1). The button labeled STORE WITH NEW NAME will be activated.
6. Tap STORE WITH NEW NAME.
7. Enter a preset name using the on-screen (or external) keyboard, and tap OK.

6.10.2 Recalling a System Preset into Multiple Devices

To recall a system preset into multiple Lake devices:

1. From HOME, tap SYSTEM STORE/RECALL, then tap SYSTEM PRESETS.
2. Select each Frame you wish to recall the preset into by tapping Module or Groups icons. Selected Frames are identified by green icons.
3. Tap the required preset on the scroll bar.
4. Tap RECALL and then OK to the warning messages.

The audio will change quickly, but the Controller will not synchronize with the network until you exit the SYSTEM PRESET menu. A flashing warning message confirms this.

This enables quick comparison between different configurations without the need to synchronize the Controller after each preset is recalled



Figure 6-5: System Presets Warning Message

The system configuration name of the preset last recalled will flash at the bottom right of the screen.

Once the required system preset has been recalled, tap HOME or SYSTEM PRESET EXIT to synchronize the Controller with the new settings that have been recalled into the devices.



Individual Frame presets can also be recalled from the front panel of each Lake device.



For LM Series devices if the preset recall changes the configuration between Contour and Mesa configurations, a warning will be displayed and Modules returned to the scroll bar.

6.10.3 Quick System Preset Recall and Comparison

Quick Recall mode instantly recalls each system preset into all selected Frames when the preset location on the scroll bar is tapped. No confirmation messages are displayed while in this mode, and all other preset functions are disabled.

To enable fast recall/comparison of SYSTEM PRESETS:

1. From HOME, tap SYSTEM STORE/RECALL, then tap SYSTEM PRESETS.
2. Select each Frame you wish to recall the preset into by tapping Module or Groups icons. Selected Frames are identified by a green icon.
3. Tap QUICK RECALL.
Orange equals active; blue equals inactive.
4. Tap a preset location from the scroll bar.
5. Repeat the previous step to compare with other SYSTEM PRESETS



Confirmation/warning messages are not displayed in Quick Recall (except for configuration between Contour & Mesa). Tapping the preset location immediately recalls the selected system preset.

6.10.4 Storing over an Existing Preset

Follow the steps shown in section 6.10.1, but select a system preset location that is already used and tap STORE instead of NEW STORE. The data in the preset location of the selected Frames will be replaced by the current system configuration.

6.10.5 Clearing a Preset Location

To clear a system preset location from multiple Lake devices:

1. From HOME, tap SYSTEM STORE/RECALL, then tap SYSTEM PRESETS.
2. Select each Frame you wish to clear the preset from by tapping Module or Groups icons. Selected Frames are identified by a green icon.
3. Tap the preset location that you wish to clear from the scroll bar.
4. Tap CLEAR, then OK to the warning messages.

6.10.6 Preset Mismatch

If one or more of the selected Frames contains a different configuration in a particular preset location, PRESET MISMATCH displays as the name for that system preset location.

A mismatch occurs if different configurations are stored separately in the same Preset location across different Lake devices, and these devices are selected together in the SYSTEM PRESET menu.

To correct a preset mismatch status, either empty the preset location using the CLEAR function, or use the STORE WITH NEW NAME function to store the data of the current system configuration into all selected Frames.

The RECALL and STORE buttons will be disabled when a location is selected for multiple Frames that contain a preset mismatch.

7. EQ/Levels Menu Reference

The EQ/Levels functionality of the Lake Controller provides a sophisticated and accurate real-time interface to both Modules and Groups on the network. Modules and Groups require different features and functions for setup and configuration, although they provide the same EQ and level functionality for system optimization and during the show.

7.1 EQ/Levels Overview

Figure 7-1 shows a general overview of how Modules and Groups utilize the same EQ/Levels interface for access to the underlying signal processing parameters.

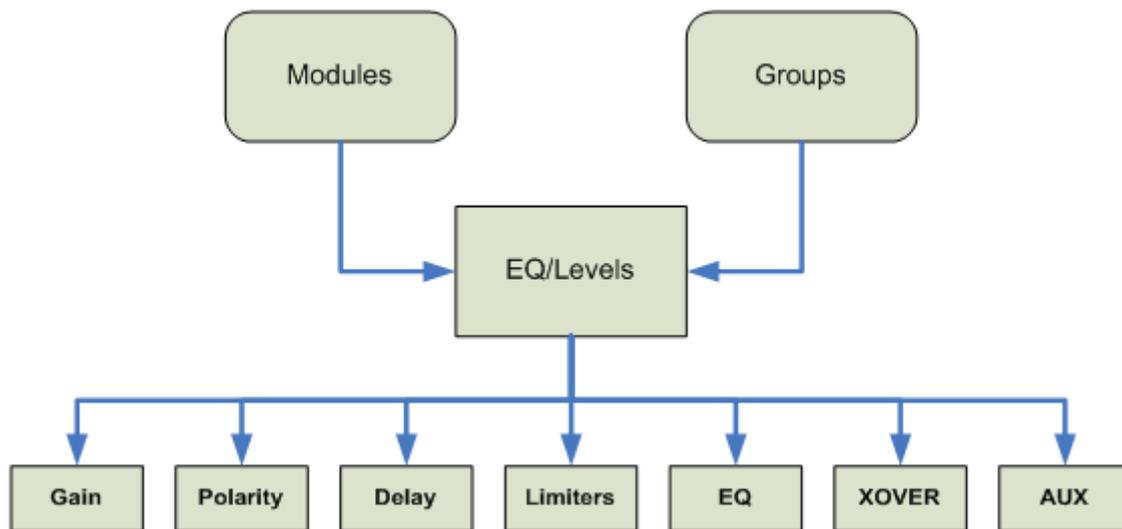


Figure 7-1: EQ/Levels Overview

Modules, Super Modules, and Groups use the EQ/Levels interface to present gain, polarity, delay, limiter, EQ, crossover, and auxiliary output parameters to the sound engineer. When adjusting any of these parameters from a Module, the sound engineer makes changes to a single Module on the network. When adjusting any of these parameters from a Group, the sound engineer makes changes simultaneously to a Group of Modules on the network.

This chapter provides a menu reference for EQ/Levels functionality, which can be accessed from multiple locations within the Controller.

7.1.1 General Access

The EQ/LEVELS button accesses the following information:

- ▶ Module and Group parametric EQ (PEQ)
- ▶ Module and Group graphic EQ (GEQ)
- ▶ Module and Group levels (gain, delays, limiters, etc.)
- ▶ Module crossovers and high-pass filter/low-pass filter (HPF/LPF) (Contour) or HPF/LPF only (Mesa EQ)

The EQ/Levels functions can be accessed by several methods from the following menu locations:

- ▶ HOME Tap a Module/Group icon once
- ▶ MODULES Select a Module/Group icon, then tap the EQ/Levels button
- ▶ GROUPS Select a Module/Group icon, then tap the EQ/Levels button
- ▶ SOLO/MUTE Select a Module/Group icon, then tap the EQ/Levels button
- ▶ I/O CONFIG Tap a section of the interactive block diagram

7.1.2 Restricted Access

The Lake Controller provides security by allowing a system designer to hide parts of the system or set them to View Only. This can be done globally in a system, or for individual Modules. This security specification may affect the screens allowed to be displayed when accessing EQ/Levels. Please refer to chapter 18 for further details.

7.1.3 Group Adjustments

Group EQ and levels are in “view only” mode when viewing via a Module. To adjust Group EQ or levels, access the Group EQ/Levels page via the Group icon.



Groups do not have a Xover or HPF/LPF page. However, the Gang Xover/Aux/HPF/LPF functions, available from the Groups menu, can be used to link the Xover/Aux/HPF/LPF for all Modules in a Group.

7.1.4 Default Settings

The following example shows the available screens and default EQ overlays for a Contour loudspeaker Module placed on the Main page of the Lake Controller.

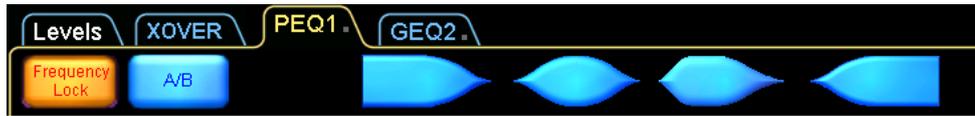


Figure 7-2: Default Screen Tabs for Contour Loudspeaker Module

The default Module contains a Classic 3-Way (CL3way) crossover. The default tabs for this Module are:

- ▶ LEVELS Displays gain, delay and limiters
- ▶ XOVER Displays crossover and output EQ settings
- ▶ PEQ1 Parametric EQ overlay
- ▶ GEQ2 Graphic EQ overlay

Tap the LEVELS tab to toggle between LEVELS and the XOVER / EQ screens.



These four screen tabs cannot be deleted, but they can be hidden if required. Please refer to the Designer Mode chapter in this manual for further details.

7.2 Levels

Figure 7-3 shows the LEVELS interface for a Classic 3-Way Module with letters identifying key features.

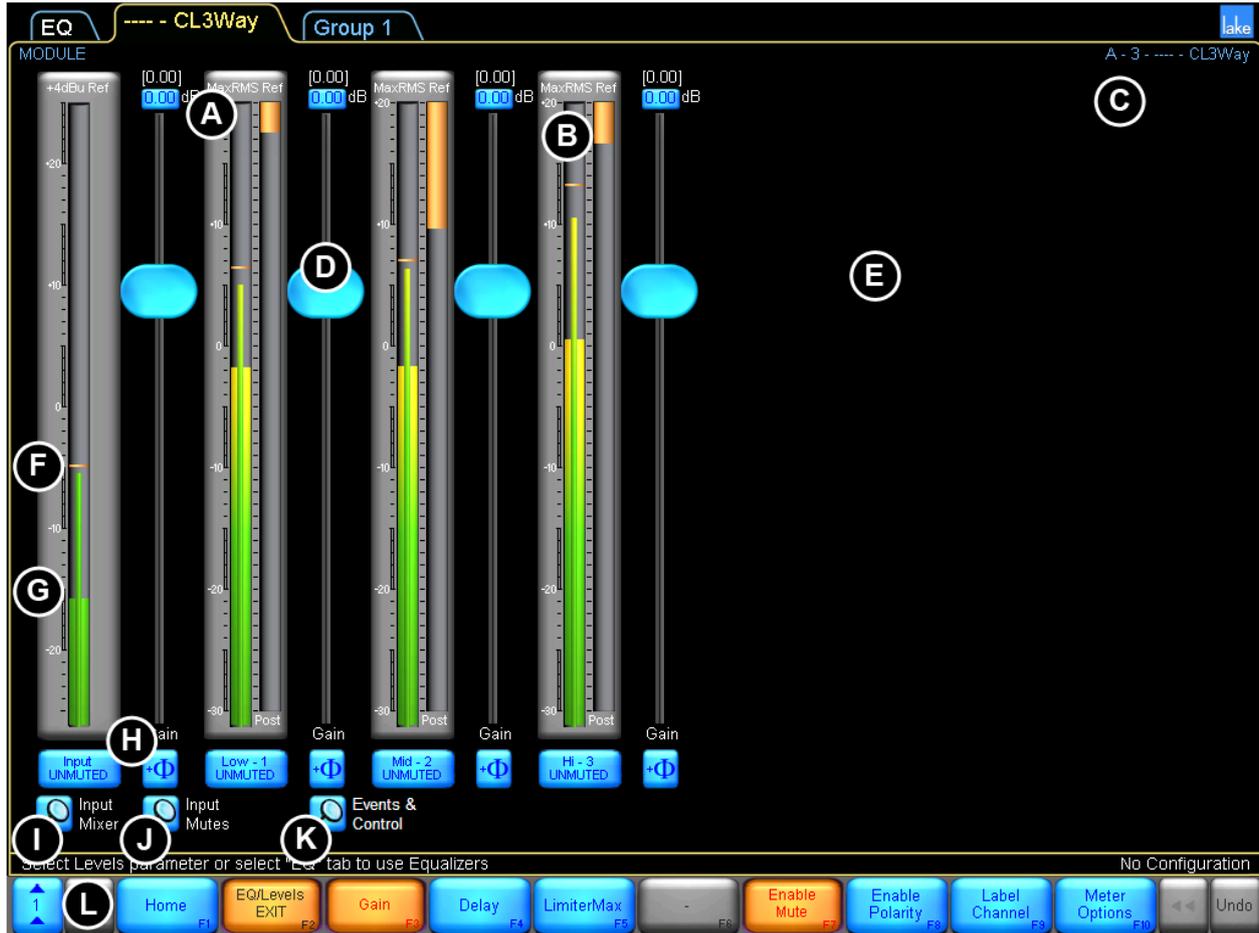


Figure 7-3: Levels Screen Overview

Table 7-1 on page 75 provides definitions for the labels in Figure 7-3 above.

Level Limits

All levels are subject to limits set by the system designer. If you are unable to change a value to the desired level, this may be due to restrictions set for that channel.

Hidden Output Channels

A system designer may choose to hide an output channel if it is not being used. It is possible that the number of visible output channels will differ from the number suggested by the Module type.

Label	Function	Description
A	Parameter Values	For Modules, the value presented in brackets represents the overall parameter value, which includes any Groups the Module is assigned to. The bottom value (in the blue box) represents the value of the Module parameter. The Group parameter value is shown in the blue edit box.
B	Limiter Indicator	Indicates the total RMS and peak limiting gain reduction with an orange bar that moves downward as gain reduction increases.
C	Frame/Module/Group Label	Modules display the selected Module's name. Groups display the name of the Module providing metering.
D	Fader	Drag the fader up or down to adjust its level. Drag below, above, or to the left of the fader to adjust by smaller increments.
E	Additional Outputs	For a 4-, 5-, or 6-Way/Aux Module, additional output channels appear here. The number of output channels depends on the Module type.
F	Peak Level / Peak Hold	Indicates peak level with a thin green bar, and peak hold with a wide orange segment.
G	RMS Level Indicator	Indicates RMS level with a wide green bar.
H	Input Channel Label Mute Button Polarity Button	The channel label is user defined. The color and label of the mute button identifies the mute status of the channel: A blue UNMUTED button = channel unmuted A red MUTED button = channel muted Modules: A red button with blue text denotes the channel has been muted by a Group the Module is assigned to. The polarity button for the channel is located to the right of the mute button. Groups: An orange button with blue text denotes that at least one Module in that Group has the channel muted. A red mute button with blue text denotes the channel is muted on all Modules in the Group. The polarity button is not available at Group level.
I	Input Mixer	Modules only - provides access to the Input Mixer, which allows audio input channel from available Input Routers to be enabled, disabled, and mixed as required.
J	Input Router Mutes	Modules only - provides access to the Input Router Mutes, which will affect any Module on a device using selected Input Router.
K	Events & Control	LM & PLM Only - opens a screen containing product specific event logging and other features.
L	Levels Menu Button Bar	The functions and submenus available on the Levels screens are described throughout in this section.

Table 7-1: Function Descriptions for Levels Screen

7.2.1 Gain

Tap GAIN to display the gain levels for each channel of the selected Module/Group. To adjust gain values, drag the fader (D) for large increments, drag above or below the fader for fine adjustment, or tap the value (A) for keyboard entry.

7.2.2 Delay

Tap DELAY to display the delay time for each channel of the selected Module/Group. Delay values can be adjusted in four ways:

- ▶ Drag the fader (D) to adjust by large increments
- ▶ Drag above or below the fader for fine adjustment
- ▶ Drag on the meter to the left of the fader for very fine adjustment
- ▶ Tap the delay value (A) for keyboard entry

A total delay of 2,000 ms (input plus output) can be set, subject to level limits set by the system designer.

7.2.3 LimiterMax™

Tap the LIMITERMAX button to view a submenu containing functions relating to the MaxRMS and MaxPeak limiters.

7.2.3.1 MaxRMS Level

Tap MAXRMS LEVEL to display the maximum RMS signal level (dB) allowed at the output. An orange bar moves downward from the top of the channel meter to indicate the limiting amount. To adjust Limiter MaxRMS values, drag the fader (D) for large increments, drag above or below the fader for fine adjustment, or tap the value (A) for keyboard entry.

The MaxRMS Level value is relative to the factory MaxRMS value (dBu). While dragging the fader, the total value is displayed in the status bar as dBu-rms, dBV-rms and Vrms.

7.2.3.2 MaxRMS Corner

MaxRMS Corner applies to Modules only; this function is inactive if a Group is selected.

This limiter corner function softens MaxRMS limiting by creating a curve that gradually introduces limiting. This function is similar to an audio compressor's knee function. For example, if MaxRMS Level equals -6

dB and Limiter Corner equals -4 dB, limiting begins gradually when the Max RMS level reaches -10 dB and increases until maximum limiting occurs at -6 dB.

Tap MAXRMS CORNER to display the value (dB) for each channel of the selected Module. To adjust, drag the fader (D) or tap the value (A) for keyboard entry.

7.2.3.3 MaxRMS Attack and MaxRMS Release

MaxRMS Attack MaxRMS Release apply only to Modules; these functions are inactive if a Group is selected.

The attack and release times (also referred to as 'time constants') determine the time in milliseconds that the MaxRMS Limiter takes to fully engage and disengage once the MaxRMS Corner level has been reached.

Tap MAXRMS ATTACK or MAXRMS RELEASE to display the value (ms) for each channel of the selected Module. To adjust the value, drag the fader (D) or tap the value (A) for keyboard entry.

7.2.3.4 Auto Time Constant

The MaxRMS attack and release values may be set manually by the user, or may be calculated automatically. Automatic calculation is determined by the crossover frequency of the channel's high-pass filter, if applicable. Otherwise, it is fixed at 160 ms.

The TC AUTO button is displayed underneath the slider when viewing either the attack or release settings. When TC AUTO is enabled (Orange), the slider is disabled and the attack or release values are calculated automatically.

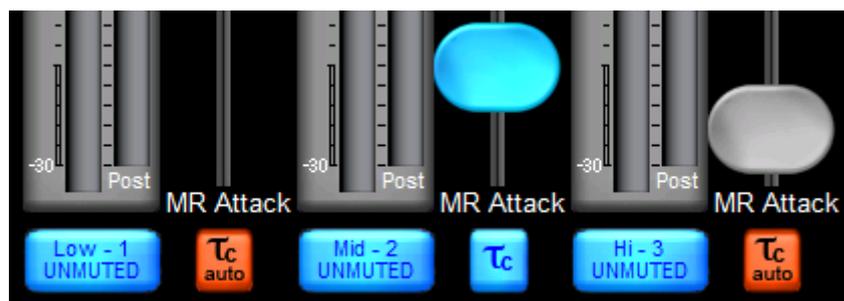


Figure 7-4: Tc Auto Attack and Release Controls

7.2.3.5 MaxPeak Level

Tap MAXPEAK LEVEL to display the maximum peak signal level (dB) allowed at the output.

The MaxPeak limiter process is disabled when the total MaxPeak level (including Group and factory settings) is 25 dBu or greater.

An orange bar moves downward from the top of the channel meter to indicate the limiting amount. To adjust Limiter MaxPeak values, drag the fader (D) for large increments, drag above or below the fader for fine adjustment, or tap the value (A) for keyboard entry.

The MaxPeak Level value is relative to the factory MaxPeak value (dBu-pk). While dragging the fader, the total value is displayed in the status bar as dBu-pk, dBV-pk, and Vpk

7.2.4 Input Headroom

This function is available only for Modules on the Contour Pro 26 and Mesa Quad EQ. Input Headroom is configured via I/O CONFIG > INPUT CONFIGURATION for all other products, and is not available for Groups.

To adjust input headroom values, drag the fader (D) for large increments, drag above or below the fader for fine adjustment, or tap the value (A) for keyboard entry.

7.2.5 Enable Mute

This button locks and unlocks the mute buttons and is active by default (that is, muting or unmuting is allowed). When the button is active (orange), channel muting via the Controller is enabled. When the button is inactive (blue), channel muting is disabled.

7.2.6 Enable Polarity

This button locks or unlocks the polarity buttons and is inactive by default (polarity buttons locked). When the button is active (orange), the polarity can be changed. When the button is inactive (blue), the polarity cannot be changed.



If a system designer has locked polarity changes on one or more outputs, the polarity button for the outputs will not be displayed in User mode.

7.2.7 Label Channel

This function applies to Modules only and is inactive if a Group is selected. Channel labels for Groups are derived from the Module that has been assigned for metering purposes as just described.

The channel label is a user-defined value that appears on the mute button at the bottom of each channel, the Module I/O CONFIG page, and on any auxiliary output EQ tabs.

To label a channel:

1. Access a Module levels page through a Module icon.
2. Tap LABEL CHANNEL, then tap the required channel label/mute button.
3. Enter the channel label using the on-screen keyboard (or an external keyboard).
4. Tap LABEL CHANNEL to exit this mode.

7.2.8 Meter Options

Tap the METER OPTIONS button to view a submenu containing functions relating to alternate meter views and system designer features.

7.2.8.1 Input +4dBu Reference

Tap INPUT +4dBu REFERENCE to view the physical input signal meter relative to +4 dBu. Tap the button again to return to the default Digital Clip [DClip] view.

The DClip metering mode shows the audio level prior to any gain adjustment (input headroom, or digital gain offset), and indicates when the A/D converters will clip. The +4 dBu metering mode shows the audio level after any gain adjustment, and is useful for comparing levels of different input signals prior to processing.

This is a global function; all physical input meters throughout the system display the reference selected here.

7.2.8.2 Pre Limiter

Tap the PRE LIMITER button to view the pre-limiter output signals. Tap again to return to post-limiter mode. This is a global function; all meters throughout the system display the reference selected here.



The limiter status is identified on the bottom right of each output meter above the channel label/mute button.

7.2.8.3 AmpClip Reference

Tap the AMPCLIP REFERENCE button to view output signals with respect to the AmpClip reference level. Tap again to return to the normal view, which is relative to the factory MaxRMS level as defined using Designer Mode.

When AMPCLIP REFERENCE is selected, the Amp Clip level is used as the reference for the 0 dB level on the meter. With correct settings, the output meter will identify the onset of clipping.

AMPCLIP REFERENCE is a global function; all meters throughout the system display the reference selected here.

7.2.8.4 Assign Meters

The ASSIGN METERS function is active only when a Group levels page is accessed via a Group icon. For metering purposes, a Module may be assigned to a Group. This provides an overview of the input/output signals for that Group.

When a Group is created, the first Module to be assigned to that Group is assigned to metering automatically.

To assign a Module to a Group for metering purposes:

1. Access a Group LEVELS page through a Group icon.
2. Tap METER OPTIONS, then tap ASSIGN METERS.
3. The Module scroll bar appears displaying Modules assigned to the selected Group.
4. On the scroll bar, tap the Module you wish to use for metering.
5. Tap ASSIGN METERS again, then METER OPTIONS EXIT to exit this mode

7.2.8.5 AmpClip

AmpClip provides a parameter for scaling the output metering of the Lake device to calibrate the clipping point to a given amplifier's sensitivity. This value (the AmpClip reference level) is set in dBu and is a sum of the factory AmpClip value (dBu) and the user AmpClip value (dB).

In both AmpClip Reference and MaxRMS Reference metering modes, the output peak meters will turn red at the AmpClip reference level to indicate possible output clipping as shown in Figure 7-5.

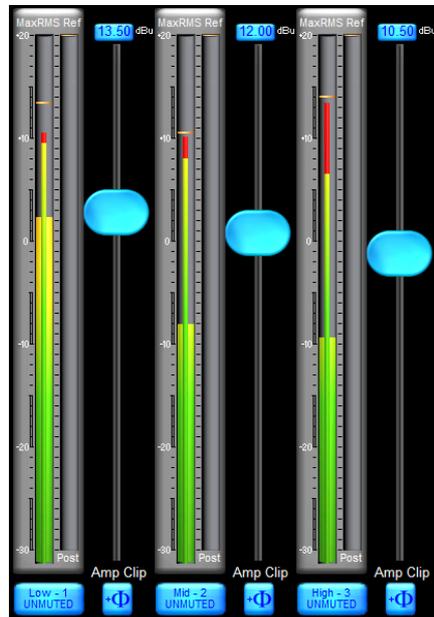


Figure 7-5: AmpClip Level Indicators

7.2.8.6 Level Limits

This function button is visible only in Designer Mode, and is used for setting minimum and maximum values for all Levels attributes described in this chapter.

7.2.8.7 Adjust Factory

This function button is visible only in Designer Mode and is used for defining default level settings and level limits for all attributes described in this chapter.

7.3 EQ

The Controller has two types of input EQ: Parametric EQ and Graphic EQ. Additional parametric output EQ is available on the XOVER page and Aux tabs. This section deals with input EQ.

Groups and Modules can have multiple layers of EQ, called EQ overlays. Each Module can have up to eight EQ overlays, and each Group can have up to four EQ overlays. A Module can have up to 256 input EQ filters distributed amongst these EQ overlays. Although this may sound extreme, the large number of filters is necessary in order to allow for sophisticated Grouping of Graphic EQ overlays.

A Module's overall input EQ response is calculated by combining its input EQ overlays with those of all Groups to which that Module is assigned. The resulting composite EQ curve is indicated by a white line that is displayed on all overlays.



Figure 7-6: Composite EQ Curve

7.3.1 Default Overlays

Modules and Groups both use the same EQ overlays and EQ functions. If a Module is assigned to a Group, the Group EQ overlays can be viewed from the Module but cannot be updated. Changes to Group EQ are performed by accessing the Group's controls.

By default, a Module has parametric (PEQ1) and graphic EQ (GEQ2); a Group has a single parametric EQ (PEQ1). A small gray dot to the bottom right of these OVERLAY LABELS signifies they are default overlays that cannot be removed.



Figure 7-7: PEQ1 Tab

7.3.2 Hidden Overlays

A system designer can:

- ▶ Hide specific overlays
- ▶ Hide all overlays throughout the system
- ▶ Set specific overlays to View Only
- ▶ Set all overlays to View Only

It is important to be aware that there may be an overlay present that affects the overall EQ curve, but is not accessible by the end user

7.3.3 Parametric EQ Screen

Figure 7-8 shows a parametric EQ (PEQ1) screen, including letters marking its key functions.

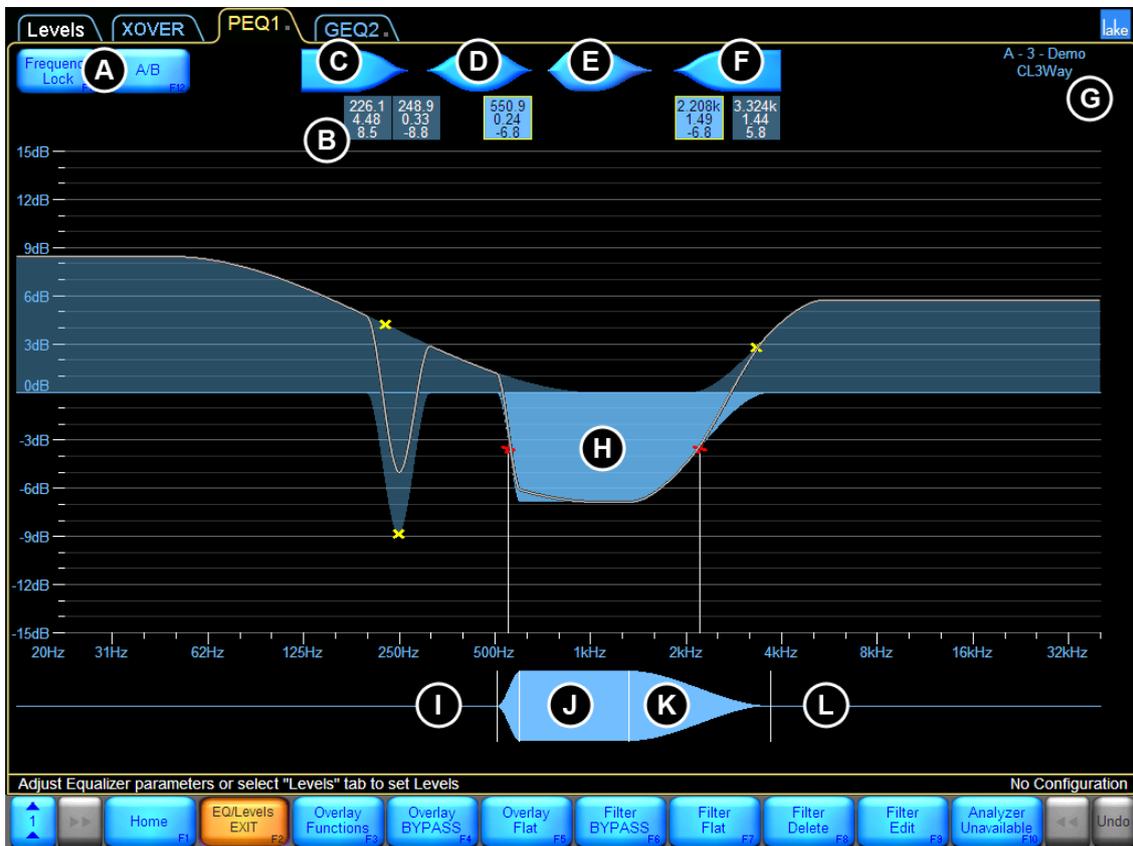


Figure 7-8: Parametric EQ Screen

Table 7-2 on page 84 describes the functions labelled in Figure 7-8 above.

Label	Function	Description
A	Frequency Lock A/B	If FREQUENCY LOCK is blue then filter frequency is unlocked; the frequency is locked if the button is orange. When locked, the frequency can only be adjusted using the EQ Tool (J). Tap the A/B button to create a bypassed copy of the selected overlay for fast EQ comparison.
B	Filter Box	Displays the frequency, bandwidth, and gain values of each filter. Tap a filter box to select a particular filter. Double-tap the filter box to switch to Fine Adjustment mode. Drag the filter box down to bypass the filter. Drag the filter box up to insert. Drag the filter box off the top of the screen to delete.
C	Low Shelf Filter	Boost/cut low frequencies. The shelf filter can be adjusted from very shallow to extremely steep filter slopes.
D	Parametric Filter	Boost/cut a specified frequency band, from one-tenth of an octave to multiple octaves of bandwidth.
E	Mesa Filter	The unique Mesa filter contains two filter points that can be adjusted on either side to create a steep peak or a gentle slope with a variable-width flat-top frequency response.
F	High Shelf Filter	Boost/cut high frequencies. The shelf filter can be adjusted from very shallow to extremely steep filter slopes.
G	Module Icon	Displays the currently selected Module and status information.
H	Filter Shape EQ Curve	The selected filter is highlighted in light blue. The overall EQ curve is identified by a white line.
I	EQ Tool (Left Side)	Adjusts the filter bandwidth for parametric, Mesa, and high-shelf filters by dragging left or right.
J	EQ Tool (Center)	Changes the frequency of the selected filter by dragging left or right.
K	EQ Tool (Flat Top)	Drag left or right at this point on either side of (J) to adjust the flat top width of the Mesa filter.
L	EQ Tool (Right Side)	Adjusts the filter octave width for parametric, Mesa, and low-shelf filters by dragging left or right.
M	EQ Menu Button Bar	The functions and submenus available on the EQ overlays are described in the following sections.

Table 7-2: Function Descriptions for Parametric EQ Screen

To add an EQ filter to a parametric EQ overlay:

1. Tap the required parametric EQ shape (C, D, E, or F).
2. Tap again anywhere on the EQ curve (H).
3. Boost/cut the frequency gain by dragging the filter point up or down.



If a mouse with a wheel is attached to the computer, you can use the wheel to adjust the gain of the selected filter.

4. Adjust the frequency by dragging the filter point left or right.

If FREQUENCY LOCK (A) is active (orange), you cannot adjust the frequency by dragging the filter point in the main EQ overlay display. Deactivate FREQUENCY LOCK (A) or use the EQ Tool (J) to adjust frequency.

7.3.4 Graphic EQ Screen

The Lake Controller provides a 28-band graphic EQ overlay. Figure 7-9 shows the Graphic EQ (GEQ2) screen along with letters marking its key functions.

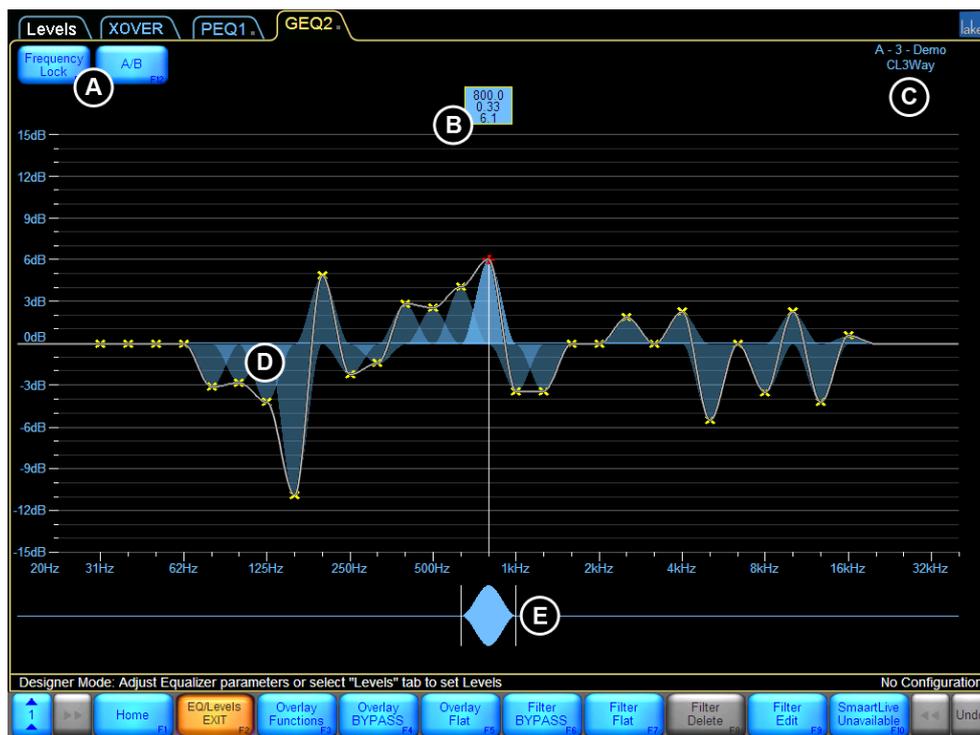


Figure 7-9: Graphic EQ Overlay

Label	Function	Description
A	Frequency Lock A/B	If FREQUENCY LOCK is blue then filter frequency is unlocked; the frequency is locked if the button is orange. When locked, the frequency can only be adjusted using the EQ Tool (J). Tap the A/B button to create a bypassed copy of the selected overlay for fast EQ comparison.
B	Filter Box	Displays the frequency, bandwidth, and gain values of each filter. Tap a filter box to select a particular filter. Double-tap the filter box to switch to Fine Adjustment mode. Drag the filter box down to bypass the filter. Drag the filter box up to insert. Drag the filter box off the top of the screen to delete.
C	Frame & Module Label	Describes the currently selected Module and status.
D	EQ Curve	A white line identifies the overall EQ curve.
E	EQ Tool	Drag the EQ Tool left or right to select the frequency to change.

Table 7-3: Function Descriptions for Graphic EQ Screen

To add graphic EQ:

1. Select the filter point to adjust using the EQ Tool (E).
2. Drag the filter point up or down to increase or decrease gain.

If FREQUENCY LOCK (A) is inactive, you can also tap a filter point to select it and drag up or down to adjust the gain.

7.3.5 Input EQ Menu Reference

The button bar presented while viewing the Input EQ display provides a number of applicable functions for adjusting EQ and configuring EQ overlays.



Figure 7-10: EQ/Levels Menu

OVERLAY FUNCTIONS, immediately to the right of the EQ/LEVELS button, provides a submenu with the following items:



Figure 7-11: Overlay Functions Menu

7.3.5.1 Overlay Properties/EQ Preferences

In User Mode, the only function active under the OVERLAY PROPERTIES menu is EQ PREFERENCES, which provides a submenu containing functions that control the view of the EQ scale and screens.

Separate settings can be stored for crossover EQ and input/auxiliary EQ. Therefore, most changes made using OVERLAY PROPERTIES/EQ PREFERENCES affect only the input and auxiliary output EQ scales.

Function	Description
No Scale [F2]	Removes the scale lines on all EQ/Crossover and Auxiliary screens.
Reset Scale [F3]	Resets the EQ scale to the default setting of ± 15 dB.
Zoom In [F4]	Zooms the EQ scale in by 3 dB increments (for example, if scale is ± 15 dB, tapping Zoom In will change the scale to ± 12 dB).
Zoom Out [F5]	Zooms the EQ scale out by 3 dB increments (for example, if scale is ± 15 dB, tapping Zoom Out will change the scale to ± 18 dB).
EQ Pref Exit [F6]	Returns the previous menu level.
Full Response [F7]	Available only for Crossover and Auxiliary Output screens. When active (orange), the overall EQ curve is shown taking into account all crossovers, HPF, LPF, input and output EQ for the Module and any Groups it is assigned to. Not applicable for input EQ screens (PEQ/GEQ).
Up [F8]	Moves the zero line up in 3 dB increments.
Down [F9]	Moves the zero line down in 3 dB increments.

Descriptions for EQ Preferences Menu

Table 7-4: Function

7.3.5.2 Overlay Hide/Overlay View Only

These functions are active only when in Designer Mode. Please refer to chapter 18.

7.3.5.3 Overlay GEQ/Overlay PEQ

This button's label changes depending on the currently selected overlay type.

If a parametric EQ (PEQ) overlay is selected, the button reads OVERLAY GEQ. Tapping it flattens all PEQ and converts the overlay to a graphic EQ.

If a graphic EQ (GEO) overlay is selected, the button reads OVERLAY PEQ. Tapping it flattens all GEO and converts the overlay to a parametric EQ.

7.3.5.4 Overlay Delete

OVERLAY DELETE is inactive for the default overlays. An overlay created by a user may be deleted by selecting the overlay and tapping OVERLAY DELETE. If the overlay contains filters, a warning message will be displayed.

7.3.5.5 Overlay Copy

Tap OVERLAY COPY to copy the selected overlay. This function is used in conjunction with OVERLAY PASTE OVER.

7.3.5.6 Overlay New

Tap OVERLAY NEW to create a new PEQ overlay. This can be changed to a GEQ overlay if required, refer to section 7.3.5.3.



Each Module can have up to eight overlays; Groups can have up to four overlays.

7.3.5.7 Overlay Paste Over

After using the OVERLAY COPY action, tapping OVERLAY PASTE OVER pastes the copied data into the selected overlay, overwriting its previous content.

7.3.5.8 Overlay Label

An Overlay Label is a user-defined value that appears on the overlay tab at the top of the screen.

To label an overlay:

1. Tap the desired overlay tab.
2. Tap OVERLAY LABEL.
3. Enter the label name using the on-screen keyboard (or an external keyboard).
4. Tap OK.

7.3.6 Overlay Bypass/Overlay Insert/Overlay Compare

This button's label changes depending on whether the selected overlay is currently active or bypassed.

If the overlay is active, the button reads OVERLAY BYPASS. Tap the button to bypass the overlay. A bypassed overlay is displayed at the bottom of the screen, just above the button bar.

If the overlay is bypassed, the button reads OVERLAY INSERT. Tap the button to insert the overlay. An active overlay is displayed at the top of the screen.

If a bypassed overlay is placed directly underneath an active overlay, the button reads OVERLAY COMPARE.



An overlay can be bypassed by dragging the overlay tab downwards or inserted by dragging upwards. In A/B mode, dragging up or down swaps the active/bypassed overlays.

7.3.6.1 A/B Overlay Compare

In addition to the bypass feature, you can compare two overlays within a Module or Group. The two ways to create an A/B comparison are described in the following sections.

7.3.6.2 Using the A/B Button

The A/B button at the top left of the screen creates a bypassed copy of the selected overlay. Changes can then be made to one of the overlays, and compared by tapping OVERLAY COMPARE.

7.3.6.3 Comparing Existing Overlays

Follow this process to compare two existing EQ overlays:

1. Tap overlay A to select it.
2. Tap OVERLAY BYPASS. Overlay A moves to the bottom of the screen.
3. Tap and drag overlay A left or right along the bottom of the screen until it is aligned directly underneath the EQ overlay you wish to compare.
4. Tap OVERLAY COMPARE.

Each time the button is tapped, the two overlays switch positions; the top overlay is active and the bottom is bypassed.

7.3.7 Overlay Flat

Tap OVERLAY FLAT to flatten and delete all filters from the selected overlay. This function is inactive if the selected overlay does not contain any filters.

7.3.8 Filter Bypass/Filter Insert

The button label changes depending on whether the selected filter is active or bypassed. The button reads:

FILTER BYPASS: If the filter is active; tap to bypass the filter.

FILTER INSERT: If the filter is bypassed; tap to insert the filter.

The FILTER EDIT box of a bypassed filter is positioned slightly lower than an active filter's edit box and does not have a yellow border when selected.



A filter can be bypassed/inserted by dragging the filter edit box down (bypass) or up (insert).

7.3.9 Filter Flat

Tap FILTER FLAT to flatten the selected filter. This sets the filter gain to zero, but frequency and bandwidth remain unchanged.

FILTER FLAT is inactive if the selected overlay does not contain any filters.

7.3.10 Filter Delete

Tap FILTER DELETE to remove the selected filter from the overlay.



A PEQ filter can be deleted by dragging the filter box upward off the screen

FILTER DELETE is inactive if the selected overlay is a:

- ▶ Graphic EQ, because its filter points are fixed and cannot be deleted
- ▶ Parametric EQ overlay without any filters

7.3.11 Filter Edit

This function allows manual entry of gain (dB), frequency (Hz), and bandwidth (octave) for the selected filter. If a PEQ overlay is selected and the FILTER EDIT button is pressed, the parametric shapes are replaced with the values of the selected filter



Figure 7-12: Manual Filter Edit Options

To adjust filter parameters using FILTER EDIT:

1. Tap the overlay to select it.
2. Tap the filter box, or use the EQ Tool to select the filter.
3. Tap FILTER EDIT.
4. Tap the gain, frequency, or bandwidth value (highlighted in blue).
5. Enter the value required using the on-screen keyboard (or an external keyboard), and tap OK. The FILTER EDIT function is inactive if the selected overlay does not contain any filters.



High-frequency values can be entered using k to denote kHz, instead of Hz (for example, 12k instead of 12,000 Hz).

7.3.12 Analyzer Ready / Analyzer Unavailable

The Lake Controller can interface directly with certain audio analyzer software programs that are installed on the same computer, or on another computer on the same network.

When the analyzer is enabled, and a compatible audio analyzer is online and on the same network, the Lake Controller provides spectrum, spectrograph, and transfer function displays on the XOVER, Aux, and EQ overlays.

If a compatible analyzer is identified on the network this button will read ANALYZER READY, otherwise the button will read ANALYZER UNAVAILABLE.

7.3.13 High-Precision Filter Adjustments

Double-tap the filter parameters box so it turns from its normal appearance to a gray outline and gray text. This switches from Normal Adjustment to Fine Adjustment mode. To return to Normal Adjustment mode, tap the filter box once. Fine Adjustment mode is also implemented globally when Show mode is selected.

7.4 Crossovers and HPF/LPF

The XOVER and HPF/LPF screens display the crossover and/or HPF/LPF information for the selected Module, depending on the Module type. The XOVER and HPF/LPF screens do not apply to Groups.

To view the XOVER screen:

1. Access EQ/LEVELS, and tap the EQ page tab at the top left of the screen.
2. Tap the XOVER or HPF/LPF tab next to Levels at the top of screen.

Figure 7-13 shows the XOVER screen along with letters marking key functions that are described in Table 7-5 on page 93.



Figure 7-13: Xover Screen

Label	Function	Description
A	Frequency Lock HPF Enable	Frequency Lock is relevant only to parametric filters (B, C, and D). When button is blue, the filter frequency is unlocked. When the button is orange, the filter frequency is locked (i.e. can only be adjusted with the EQ Tool). HPF Enable activates or deactivates the high-pass filter (HPF). When button is blue the HPF is disabled, when orange the HPF is enabled.
B	Low Shelf Filter(Xover/Aux)	Used to boost/cut low frequencies.
C	Parametric Filter (Xover/Aux)	Used to boost/cut a specific frequency band.
D	High Shelf Filter (Xover/Aux)	Used to boost/cut high frequencies.
E	Filter Edit Box	Displays the crossover or HPF/LPF center frequency and type, or the details of any EQ filters on the selected output.
F	Module/Frame Labels and Selected Output Channel Label	This area of the screen displays the Frame and Module labels and the selected output label.
G	Low Output Frequency Range (Selected)	The lowest frequency output of the crossover. This output channel is the currently selected crossover filter, identified by light green shading. A solid white line identifies the frequency response of this output channel.
H	Mid Output Frequency Range	The pass band crossover that is currently not selected, as identified by dark green shading.
I	High Output Frequency Range	The highest frequency output of the crossover. For a two-way Module, the Xover screen displays two crossover channels instead of three.
J	Crossover/Filter Point	An X marks the frequency at which the output filters cross over. Parametric filter points are also identified by a red (selected) or yellow (not selected). Only filter points/filter boxes for the selected output are displayed.
K	Crossover Selector	This is used to change the crossover frequency and to select the side of the crossover you wish to affect. Light green denotes the selected half, and dark green is not selected. When a PEO filter is selected, the crossover selector changes to the blue EQ filter tool.
L	Crossover Menu Button Bar	The functions and submenus available on the Xover page are described in the following sections.

Table 7-5: Function Descriptions for Xover Screen

7.4.1 Using the High-pass Filter (HPF Enable)

The high-pass filter filters all frequencies below the specified frequency. Input HPF and Low Output HPF are available. Input HPF affects all output channels; Low Output HPF affects only the lowest output of the Module. These two different modes of operation are provided in order to satisfy the requirements of various loudspeaker manufacturers' required signal-processing configurations.

To set the Low Output HPF:

1. Tap HPF ENABLE, then tap HPF Select.
2. Select a filter from the scroll bar (24 dB or less).
3. Tap HPF Set, then YES to the warning message.

To change the HPF to affect all outputs (Input HPF):

1. Tap CROSSOVER FUNCTIONS, then HPF Functions.
2. Tap INPUT HPF.

While in this mode, move the HPF center frequency, and note how it affects all outputs of the Module



The center frequency of the HPF can be set to a minimum of 10 Hz using the Filter Edit function.

7.4.2 Using EQ Filters on the Xover Screen

The XOVER screen provides low-shelf (B), parametric (C), and high-shelf (D) filters to shape the audio from each output as required. When used on the XOVER screen, the parametric EQ filters affect only the selected output.



Only EQ filter points and filter boxes of the selected output are displayed. To select an output, tap the associated green filter box and toggle between outputs using the crossover tool.

Figure 7-14 on page 95 shows a parametric filter used to affect audio on output 1, the first channel of Module A. Letter-labeled references in this example are used in the subsequent instructions.

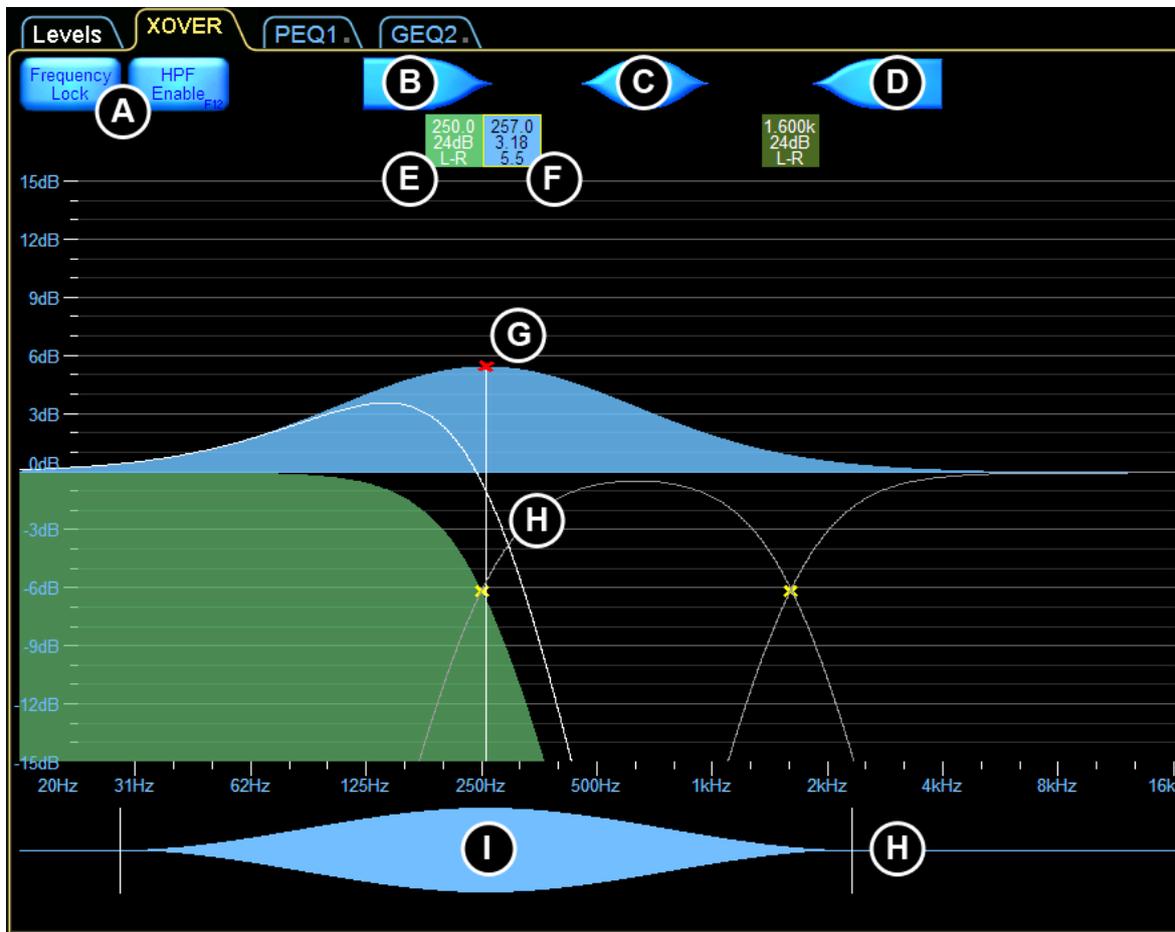


Figure 7-14: Using Output EQ Filters on the Xover Screen

Although this parametric filter crosses the range used by all outputs, it affects only the range of the selected output. The curved white line identifies the effect the parametric filter has on output 1.

To add parametric EQ to an output:

1. Tap the required crossover filter box (F) to select the crossover.
2. Use the crossover tool to select the required output of the crossover (light green is selected).
3. Tap an EQ filter (B, C, or D), and tap again in middle of screen.
4. Boost/cut the frequency gain by dragging the filter point (G) up/down.
5. Adjust the frequency by dragging the filter point (G) left or right. If FREQUENCY LOCK (A) is active (orange), you cannot change the frequency by dragging the filter point. Either deactivate FREQUENCY LOCK or use the EQ Tool (I) to change the frequency.
6. Adjust the bandwidth by dragging to the left or right of the shape tool (J).

7.4.3 Linear Phase Crossovers

The linear phase crossover Modules provide steep crossovers without phase distortion. Figure 7-15 shows the XOVER screen for a Linear Phase Brick Wall 4-Way Module (LP4way).

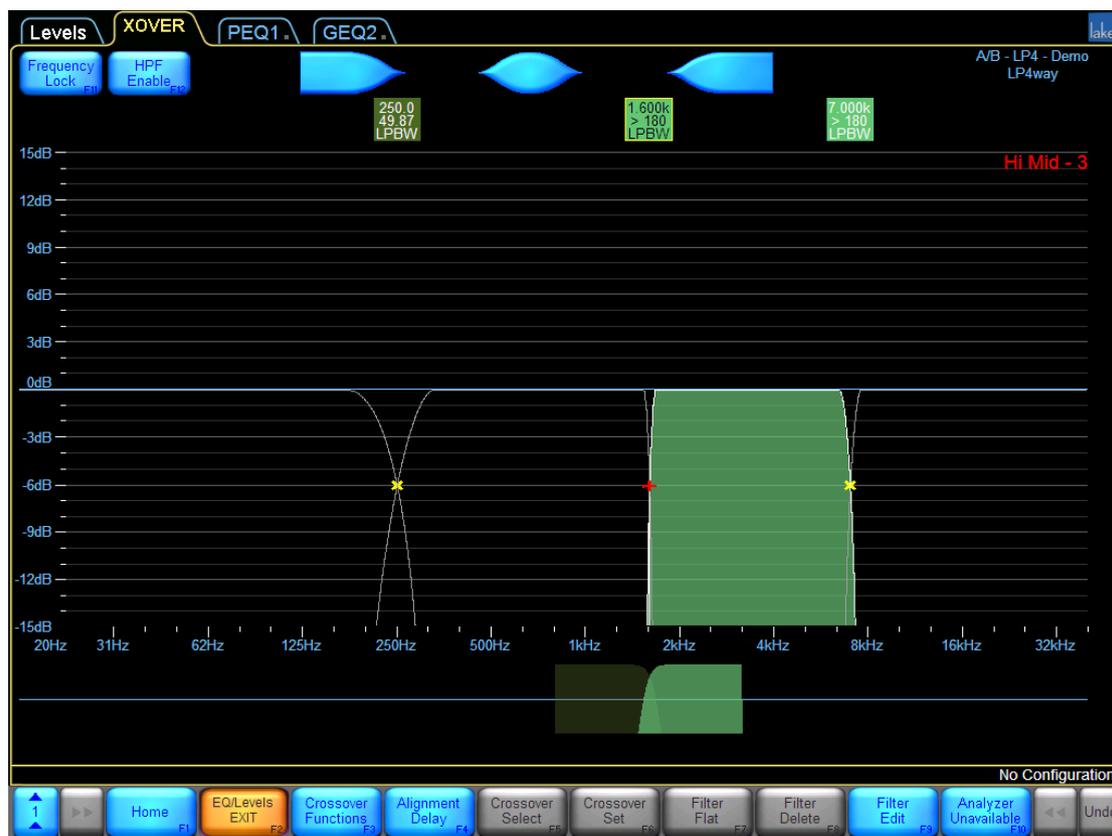


Figure 7-15: Linear Phase Crossover Screen

While most of the button bar functions are the same, some XOVER menu options and functions are different for linear phase Modules. These differences are identified in the following sections.

7.4.4 Crossover Functions

CROSSOVER FUNCTIONS provides a submenu containing the following functions:

7.4.4.1 HPF/LPF Functions

- ▶ HPF/LPF FUNC EXIT exits this menu and returns to the CROSSOVER FUNCTIONS menu.
- ▶ INPUT HPF SETs the HPF to affect all output channels for the Module (depending on the frequency of the HPF and outputs). Applicable to Contour Modules only.

- ▶ LOW OUTPUT HPF SETs the HPF to affect only the lowest output channel of the selected Module. Applicable to Contour Modules only.
- ▶ HPF ENABLE enables/disables the HPF for the selected Module.
- ▶ LPF ENABLE enables/disables the LPF on the highest output channel for the selected Module.



INPUT HPF and LOW OUTPUT HPF are disabled for the Linear Phase Brick Wall 4-Way Module. The LP4way HPF is fixed to INPUT HPF. Other Module types, incl. LP2/LP3way provide the HPF option.

7.4.4.2 Crossover Hide

Available only in Designer Mode. When enabled (orange), the crossover page will be hidden when the Module is locked, or after exiting from Designer Mode.

7.4.4.3 Crossover View Only

Available only in Designer Mode. When enabled (orange), the crossover page will be set as view only when the Module is locked, or after exiting from Designer Mode.

7.4.4.4 EQ Preferences

This provides a submenu containing options regarding the view of the EQ scale.

7.4.4.5 Crossover Copy

Copies all crossover and EQ settings from the selected XOVER or HPF/LPF page.

7.4.4.6 Crossover Paste

Active only when a crossover or HPF/LPF page has previously been copied and the current Module is the same type.

A crossover can only be pasted to a Module of the same number of channels and the same type. For example, a Classic 3-Way crossover can only be pasted into another Classic 3-Way crossover; the HPF/LPF of a Mesa EQ Module can only be pasted onto another Mesa EQ HPF/LPF page; and a Classic 4-Way crossover cannot be pasted into a Linear Phase Brick Wall 4-Way.



CROSSOVER COPY and CROSSOVER PASTE only transfer the crossover and output EQ settings. Levels and input EQ (PEQ/GEQ) will not be transferred to the destination Module.

7.4.5 Crossover Split/Crossover Combine/Alignment Delay

This button's label depends on the state of the currently selected crossover and the Module type. A classic crossover Module will read CROSSOVER SPLIT / CROSSOVER COMBINE; a linear phase Module will read ALIGNMENT DELAY.

7.4.5.1 Crossover Split

The label reads CROSSOVER SPLIT when a filter box is selected for a classic crossover that is currently combined. This function separates the HPF and LPF of a classic crossover, enabling independent adjustment of the crossover frequency and type.

To split a crossover, tap a crossover filter box, then tap CROSSOVER SPLIT.



CROSSOVER SPLIT is not applicable for linear phase crossovers.

7.4.5.2 Crossover Combine

The label reads CROSSOVER COMBINE when a filter box is selected for a classic crossover that is currently split. This function joins the separated classic crossover filters together based on the frequency and type of the currently selected filter.

To combine a previously split crossover, select the crossover filter box you wish to use, then tap CROSSOVER COMBINE.



CROSSOVER COMBINE is not applicable for linear phase crossovers.

7.4.5.3 Alignment Delay

A linear phase response requires considerable processing; the Alignment Delay function allows a linear phase response to be used in different circumstances depending on the maximum delay that can be permitted in conjunction with the crossover slope.

Steeper low-frequency linear phase crossovers can be calculated with a longer alignment delay. If a steep low-frequency linear phase crossover is not required, a shorter alignment delay can be utilized.

The label on this button reads Alignment Delay for linear phase crossovers, and is not applicable for Classic crossovers or other Module types.

To change Alignment Delay settings:

1. Tap ALIGNMENT DELAY. The currently selected delay setting is highlighted in orange.
2. Tap the required delay setting. A shorter alignment delay equals a shallower linear phase crossover transition band slope. A longer alignment delay equals a steeper linear phase crossover transition band slope.

LP2way and LP3way Modules use different Alignment Delay settings than the LP4way.

Table 7-6 shows the highest and lowest frequencies available for the Linear Phase Brick Wall 2/3-Way Modules, along with associated roll-off per octave at these settings.

Alignment Delay	Lowest Frequency	dB/Octave	Highest Frequency	dB/Octave
1.25 ms	500 Hz	13.61	12 kHz	93.37
2.50 ms	250 Hz	11.04	12 kHz	93.37
5.00 ms	125 Hz	11.01	12 kHz	93.37
10.0 ms	62.5 Hz	11.03	12 kHz	93.37
20.0 ms	32.5 Hz	10.84	12 kHz	93.37
40.0 ms	32.4 Hz	14.47	12 kHz	93.37

Table 7-6: Linear Phase Brick Wall 2/3-Way

Table 7-7 shows the highest and lowest frequencies available for the Linear Phase 24 dB/octave 2/3-Way

Alignment Delay	Lowest Frequency	Highest Frequency
1.25 ms	1.03 kHz	6.022 kHz
2.50 ms	515 Hz	6.022 kHz
5.00 ms	258 Hz	6.022 kHz
10.0 ms	129 Hz	6.022 kHz
20.0 ms	32.5 Hz	6.022 kHz
40.0 ms	31.6 Hz	6.022 kHz

Table 7-7: Linear Phase 24 dB/Octave 2/3-Way

Table 7-8 shows the highest and lowest frequencies available for the Linear Phase 48 dB/octave 2/3-Way.

Alignment Delay	Lowest Frequency	Highest Frequency
1.25 ms	1.03 kHz	8.501 kHz
2.50 ms	515 Hz	8.501 kHz
5.00 ms	258 Hz	8.501 kHz
10.0 ms	129 Hz	8.501 kHz
20.0 ms	32.5 Hz	8.501 kHz
40.0 ms	31.6 Hz	8.501 kHz

Table 7-8: Linear Phase 48 dB/Octave 2/3-Way

Table 7-9 shows the highest and lowest frequencies available for the Linear Phase Brick Wall 4-Way (LP4way), along with associated roll-off per octave at these settings.

Alignment Delay	Lowest Frequency	dB/Octave	Highest Frequency	dB/Octave
3.15 ms	220 Hz	13.61	16 kHz	> 180
6.29 ms	110 Hz	13.61	16 kHz	> 180
12.58 ms	62.5 Hz	13.56	16 kHz	> 180
25.17 ms	62.5 Hz	24.58	16 kHz	> 180

Table 7-9: Linear Phase Brick Wall 4-Way

7.4.6 Crossover/HPF/LPF Select

7.4.6.1 Crossover Select

This button reads CROSSOVER SELECT and is active only when a crossover filter box is selected on a Classic crossover or a Linear Phase 2/3-Way. This function is not available for the Linear Phase Brick Wall 4-Way Module.

Tap CROSSOVER SELECT to display a scroll bar containing available crossover types. For a Classic crossover, the following scroll bar displays.



Figure 7-16: Classic Crossover Selection

For a Linear Phase 2/3-Way crossover, the following scroll bar displays.



Figure 7-17: Linear Phase 2/3-Way Crossover Selection

To change the crossover type:

1. Tap a crossover filter box, then tap CROSSOVER SELECT.
2. Drag the scroll bar left or right, and tap the desired crossover.
3. Tap CROSSOVER SET, then YES to the warning message.

7.4.6.2 HPF Select

This button reads HPF SELECT and is active only when a high-pass filter box is selected. Follow the process described for CROSSOVER SELECT to set the high-pass filter.

7.4.6.3 LPF Select

This button reads LPF SELECT and is active only when a low-pass filter box is selected. Follow the process described for CROSSOVER SELECT to set the low-pass filter.



The LPF is enabled via the HPF/LPF FUNCTIONS menu.

7.4.7 HPF Set/LPF Set/Crossover Set/Filter Bypass/Filter Insert

This button has various states depending on the status of the selected filter. For further details, refer to section 7.4.6.

7.4.7.1 HPF Set

The button reads HPF SET when a high-pass filter has been selected from the HPF SELECT scroll bar.

7.4.7.2 LPF Set

This button reads LPF SET when a low-pass filter has been selected from the LPF SELECT scroll bar.

7.4.7.3 Crossover Set

This button reads CROSSOVER SET when a crossover filter has been selected from the CROSSOVER SELECT scroll bar.



CROSSOVER SET is not applicable for the Linear Phase Brick Wall 4-Way crossover.

7.4.7.4 Filter Bypass/Filter Insert

This button reads FILTER BYPASS when a parametric filter is selected, or when a crossover filter has been split. For parametric EQ filters, select the filter box and tap FILTER INSERT / FILTER BYPASS to activate or deactivate the selected filter.

A crossover HPF/LPF filter can be disabled by splitting the crossover and tapping FILTER BYPASS, followed by OK on the warning confirmation dialog.



Linear phase crossovers, or combined Classic crossovers, cannot be bypassed. To bypass the Module's overall HPF or LPF, toggle the HPF ENABLE / LPF ENABLE button.

7.4.8 Filter Flat

The FILTER FLAT button is active only when a PEQ filter is selected. The function is inactive if a crossover is selected. Tap FILTER FLAT to set the filter gain to zero and leave frequency/bandwidth unchanged.

7.4.9 Filter Delete

The FILTER DELETE button is active only when a PEQ filter is selected. The function is inactive if a crossover is selected. Tap FILTER DELETE to remove the selected PEQ filter from the overlay.

7.4.10 Filter Edit

Tap FILTER EDIT to manually enter values for a selected filter using the on-screen (or external) keyboard. The values available for adjustment depend on whether a crossover or PEQ filter is selected. For a crossover, HPF or LPF only the frequency can be edited; for a parametric EQ filter the gain (dB), frequency (Hz), and width (octave) can be edited.

To manually edit a filter:

1. Tap the filter box, then tap FILTER EDIT.
2. Tap the value to edit at the top of the screen (highlighted in blue).

3. Enter the value using the on-screen (or external) keyboard, and tap OK.
4. Tap FILTER EDIT again to exit this mode.

7.4.11 Analyzer Ready/Analyzer Unavailable

Please refer to section 7.3.12 for details on this function.

7.5 Auxiliary Output Channels

Contour Modules provide various options to configure channels as auxiliary outputs. Up to 12 individually configured auxiliary outputs can be created. The Auxiliary Output Module files allow full-bandwidth custom settings to be configured by the user. Independent Aux tabs are provided for each output channel instead of a unified crossover tab. These tabs are provided in addition to the PEQ and GEQ overlays that still apply to all outputs for the Module.

Because a different process is used to calculate output-specific EQ, the Mesa filter is not available. However, in addition to low-shelf, high-shelf, and parametric filters, the Auxiliary Output Modules provide both low-pass and high-pass filters. In Designer Mode, all-pass filters are also available.

7.5.1 Auxiliary Output Module Types and Combinations

This section describes the available Auxiliary Output Module types along with the combinations of Modules that are allowed.

7.5.1.1 One Auxiliary Output

The 1-Auxiliary Outputs Module is automatically recalled into Module B/D when a Classic 5-Way Module is recalled into Module A/C. This Module type cannot not be used in Module A/C.

7.5.1.2 Two Auxiliary Outputs

The 2-Auxiliary Outputs Module may be recalled into any Module. The other Modules of the Frame may contain any Classic or Linear Phase Module that uses two or three output channels.

7.5.1.3 Three Auxiliary Outputs

The 3-Auxiliary Outputs Module may be recalled into any Module. The other Modules of the Frame may contain any Classic or Linear Phase Module that uses two or three output channels.

7.5.1.4 Four Auxiliary Outputs

The 4-Auxiliary Outputs Module may be recalled into Module A or C. When loading this Module type, and option to load either the Classic 2-Way or 2-Auxiliary Outputs Module into Module B/D will be provided. No other combinations are allowed.

7.5.1.5 Five Auxiliary Outputs

The 5-Auxiliary Outputs Module may be recalled into Module A or C. When loading this Module type, the 1-Auxiliary Outputs Module will be recalled into Module B/D. No other combinations are allowed.

7.5.1.6 Six Auxiliary Outputs

The 6-Auxiliary Outputs Module uses two Modules (A&B, or C&D). This Module type can only be recalled into Module A or C.

7.5.1.7 Classic 2-Way + 1-Auxiliary Outputs

The Classic 2-Way + 1-Auxiliary Outputs Module may be recalled into any Module. The other Modules of the Frame may contain any Classic or Linear Phase Module that uses two or three output channels.

7.5.1.8 Classic 3-Way + 1-Auxiliary Outputs

The Classic 3-Way + 1-Auxiliary Outputs Module may be recalled into Module A or C. When loading this Module type, and option to load either the Classic 2-Way or 2-Auxiliary Outputs Module into Module B/D will be provided. No other combinations are allowed.

7.5.1.9 Linear Phase Brick Wall 2-Way + 1-Auxiliary Outputs

The Linear Phase 2-Way + 1-Auxiliary Outputs Module may be recalled into any Module. The other Modules of the Frame may contain any Classic or Linear Phase Module that uses two or three output channels.

7.5.2 Using Auxiliary Outputs

To configure a Module for output-specific EQ, first load an Auxiliary Output file into a Module.

1. From Home, tap MODULES.
2. Place Module A of a Frame on the MAIN page, or select an existing Module.
3. Tap MODULE STORE/RECALL.

4. Select an Auxiliary Output file from the scroll bar, and tap RECALL.
5. Read and tap YES to both warning messages.

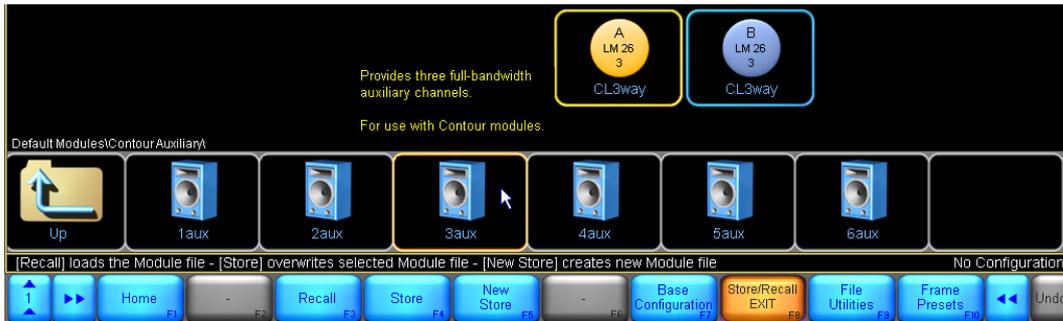


Figure 7-18: Loading an Auxiliary Output file

6. After loading an Auxiliary Output Module file, access EQ/LEVELS for this Module by tapping STORE/RECALL EXIT, then tap EQ/LEVELS

7.5.3 Adding Output-Specific EQ

The available overlays for the 3-Auxiliary Outputs Module are shown in Figure 7-19.



Figure 7-19: Auxiliary Output Tabs for 3-Aux Module

The Levels, PEQ & GEQ screens are the same for all Module types. Refer to section 7.1 for further information.

The XOVER tab is not displayed as it is not relevant for this Module type. The XOVER tab will be present for the Classic 2-Way + 1-Auxiliary Outputs (CL2w+1a) Module.

Three additional AUX tabs are present, providing individual high-pass, low-pass, and EQ filters for each output.

1. Tap AUX-1 to select the Auxiliary Output tab for output 1.
2. Add a low and a high-shelf filter.

The screen should look similar to Figure 7-20.

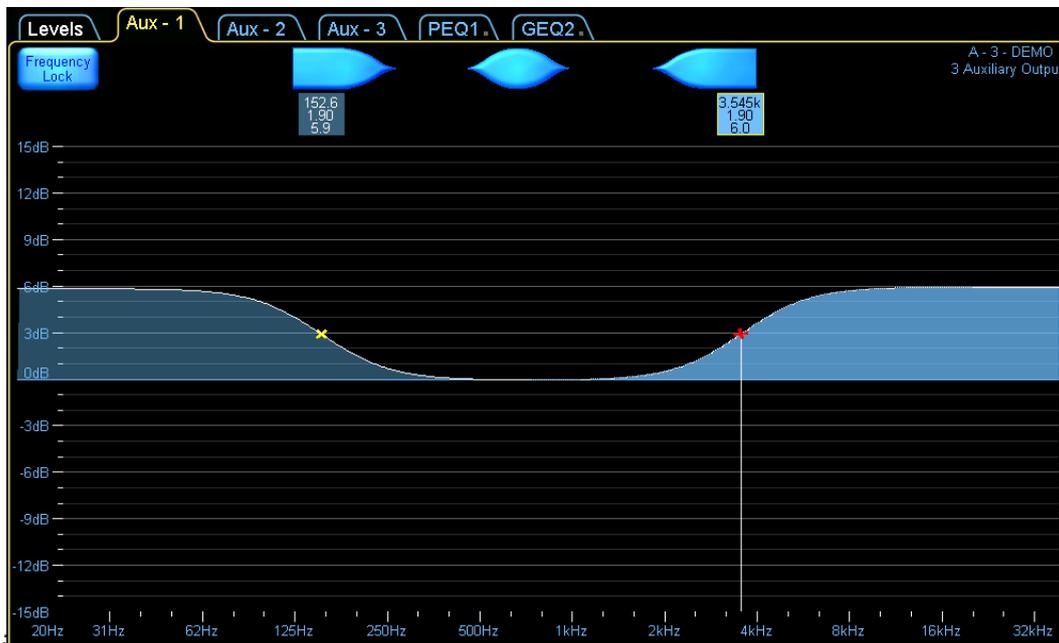


Figure 7-20: Adding a High Shelf and Low Shelf Filter to Aux-1

EQ added to an Aux tab affects only the associated output. Module and Group PEQ and GEQ still affect all outputs of the Module.

7.5.4 High-pass and Low-pass Filters

The high-pass and low-pass filter controls are located under the AUX OUTPUT FUNCTIONS submenu.

1. With the AUX-1 tab selected, tap AUX OUTPUT FUNCTIONS
2. Tap HPF ENABLE then tap LPF ENABLE

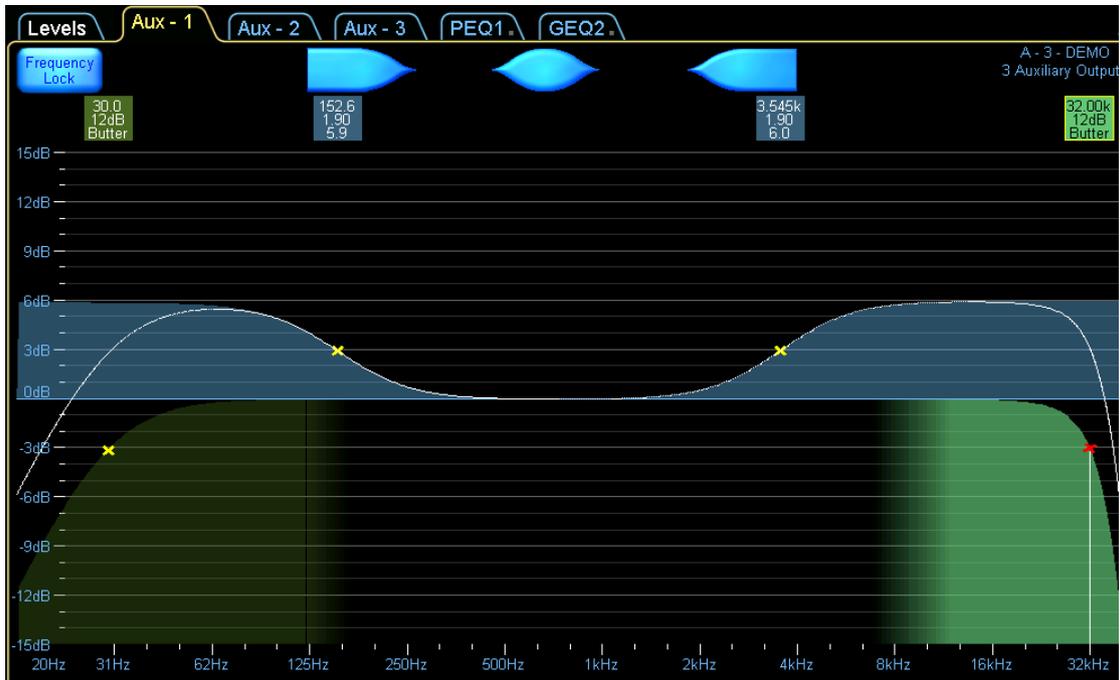


Figure 7-21: Aux Output with HPF and LPF Enabled

To adjust the slope of these filters:

1. Tap FILTER SELECT
A scroll bar appears displaying available HPF/LPF types.
2. Drag the scroll bar or use the << and >> buttons to view available filters.
3. Select the 24dB LINKWITZ/RILEY filter from the scroll bar.
4. Tap FILTER SET to activate this filter, then YES to the warning message.



Figure 7-22: Selecting a new filter slope for HPF or LPF



To protect loudspeaker drivers, the audio output for the affected channel is muted momentarily while the settings are changed.

5. Select the HPF by tapping its filter box located top left of the screen.
6. Select the 18dB BUTTERWORTH filter from scroll bar.
7. Tap FILTER SET, then YES to the warning message.
8. Tap AUX OUTPUT EXIT to return to the EQ/LEVELS menu.



Steep high-pass and low-pass filters (48 dB) require more EQ resources than shallower slopes (6 dB).

7.5.5 Auxiliary Output Menu Options

The menu options shown in Figure 7-23 are available when an EQ filter is selected on an Auxiliary Output in the EQ/Levels section of an Auxiliary Output Module.



Figure 7-23: Auxiliary Output Button Bar

A summary of the functions relevant to Auxiliary Outputs is shown below; many are identical to those used on the EQ and XOVER screens.

7.5.5.1 Home

Navigate back to the HOME menu.

7.5.5.2 EQ/Levels EXIT

Navigates to HOME menu, or I/O CONFIG if the current screen accessed via interactive block diagram.

7.5.5.3 Aux Output Functions

Provides EQ preferences, high-pass and low-pass filter options, and OVERLAY COPY/PASTE (and overlay access controls in Designer Mode).

7.5.5.4 Aux Output Flat

Deletes all EQ filters and disables HPF, and LPF filters on the selected auxiliary output channel.

7.5.5.5 Filter Bypass / Filter Insert

Bypasses or inserts a selected EQ filter (not applicable to high-pass and low-pass filters).

7.5.5.6 Filter Flat

Resets the gain of the selected EQ filter to zero. Frequency and bandwidth are unchanged (not applicable for high-pass and low-pass filters).

7.5.5.7 Filter Delete

Deletes the selected EQ filter (not applicable for high-pass and low-pass filters).

7.5.5.8 Filter Edit

Allows keyboard entry of gain, frequency, and bandwidth values for EQ filters (frequency only for high-pass and low-pass filters). Tap the required value at the top of the screen (highlighted in blue) to edit using the on-screen (or external) keyboard.

7.5.5.9 Analyzer Ready / Analyzer Unavailable

Please refer to section 7.3.12 for details on this function.

After selecting AUX OUTPUT FUNCTIONS, the following menu is displayed:



Figure 7-24: Aux Output Functions Menu

7.5.5.10 Home

Navigate back to the HOME menu.

7.5.5.11 Aux Output Properties

Provides a submenu containing EQ Preferences. Access control functions such as AUX OUTPUT HIDE and AUX OUTPUT VIEW ONLY are available only in Designer Mode. Please refer to chapter 18.

7.5.5.12 Aux Output Exit

Navigate back to the main EQ/Levels menu.

7.5.5.13 Filter Select

When selected (orange), a scroll bar is displayed with available high-pass and low-pass filters. Available only when a high-pass or low-pass filter is active and selected; not applicable to EQ filters

7.5.5.14 Filter Set

Available only when a high-pass or low-pass filter is selected on the FILTER SELECT scroll bar.

7.5.5.15 HPF Enable

The high-pass filter is disabled when this button is blue, and enabled when orange.

7.5.5.16 LPF Enable

The low-pass filter is disabled when this button is blue, and enabled when orange.

7.5.5.17 Aux Output Copy

Tapping this button copies the settings of the currently selected output.

7.5.5.18 Aux Output Paste

This button is active only after AUX OUTPUT COPY has been used, and will overwrite the selected auxiliary output with the settings in the copy buffer.

Auxiliary Outputs can be copied and pasted within or between Modules, but the data cannot be pasted on XOVER, PEQ, or GEQ screens; the destination channel must be an Auxiliary Output.

8. Modules Menu Reference

From the HOME menu, tap MODULES. The Modules menu and scroll bar appear as shown below. The scroll bar shows all Lake devices connected to the network.



Figure 8-1: Modules Menu and Scroll Bar

The scroll bar pictured above displays the following (from left to right):

- ▶ Virtual Frame icons that are always available for creating systems offline
- ▶ Two Modules of a PLM 10000Q that are available on the network but not used in the current system
- ▶ Four Modules of a Lake LM 44 that are in use in the current system

If many devices are available, tap and drag the scroll bar to the left/right, or tap the blue << or >> buttons. Most options on the button bar appear gray (inactive) until a Module is placed from the scroll bar onto the Main page.



Devices are sorted by product type, followed by alphabetical Frame name order on the Module scroll bar..

8.1 EQ/Levels

Navigate to the Modules menu, and tap the EQ/Levels button to display the parametric EQ, graphic EQ, XOVER, and LEVELS screens for the selected Module. This function is active only when a Module has been selected in the work area. For more information, please refer to section 7.1.

8.2 I/O Config

The I/O CONFIG screen provides access to I/O Configuration, Technical Information and Input Router Mutes; it also provides an interactive signal path that can be used to directly navigate to the LEVELS/EQ/XOVER screens, and the ability to reset or configure the device.

To view the I/O CONFIG screen:

1. From HOME, access the MODULES menu.

- Select a Module icon in the work area, and tap I/O CONFIG
The I/O CONFIG button is active only when a Module is selected in the work area.



Figure 8-2: LM 26 I/O Configuration Screen

Figure 8-2 shows the I/O CONFIG page for an LM 26. The sections that follow describe each screen/function in further detail.



I/O Config settings are stored in system configuration files and in Frame/system presets. I/O Config parameters are transferred during the Frame Replace function.



I/O Config parameters are not stored, recalled, copied, or pasted via Module or base configuration files.

8.2.1 Digital Clock Configuration

LM Series devices provide two digital clock domains:

- ▶ The Primary Digital Clock locks to sample rates of 48, 96, or 192 kHz.
- ▶ The Sample Rate Converter (SRC) Clock locks to 44.1, 48, 88.2, 96, 176.4, and 192 kHz.

Modules Menu Reference

The PLM Series provide a single digital clock, equivalent to the SRC Clock on LM Series devices. The MY8-LAKE provides a Primary clock fixed to multiples of 48 kHz and an SRC clock fixed to multiples of 44.1 kHz. The LM Series digital clock screens will be used in the examples below.

To access the Digital Clock Configuration window, tap the zoom button located at the top left of the I/O CONFIG page.



Figure 8-3: LM 26 Digital Clock Summary - I/O Configuration

After tapping the zoom button shown in Figure 8-3 the following screen is displayed:

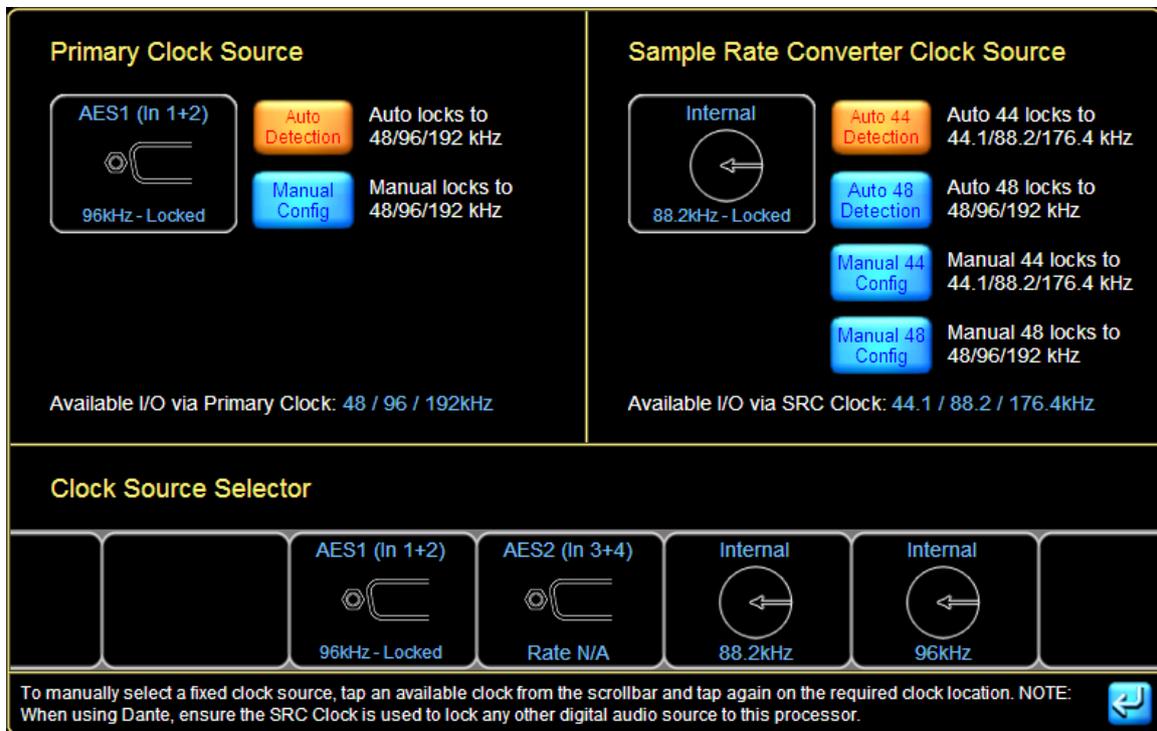


Figure 8-4: LM 26 Digital Clock Configuration Screen

8.2.1.1 Auto Detection

By default, the most appropriate digital clocks are automatically detected. The first valid clock in the order of the list shown below is chosen to configure the Primary Clock as 48/96/192 kHz, and the SRC Clock as 44.1/88.2/176.4 kHz.

1. Host Word Clock (MY8-LAKE Only)
2. AES1 (In 1+2)
3. AES2 (In 3+4)
4. AES3 (In 5+6)
5. AES4 (In 7+8)
6. Internal Clock (88.2 or 96 kHz)

If a clock signal is not relevant for the product, or is not connected, or the signal has been temporarily lost, the automatic detection process chooses the next valid clock source from the list, provided it matches the selected base rate (either 44.1 or 48 kHz). If a valid clock source is detected from a source which is higher on the list than the currently selected source, then the clock will switch to use the higher priority source.



The SRC Clock has two options for automatic clock detection: Auto 44 and Auto 48. These settings provide automatic detection within a particular range of frequencies (either 44.1/88.2/176.4 kHz or 48/96/192 kHz)

8.2.1.2 Manual Config

For a fixed configuration, it is possible to fix the clock selection independently for each digital clock.

1. Tap the required clock from the CLOCK SOURCE SELECTOR at the bottom of the DIGITAL CLOCK CONFIGURATION window.
2. Tap the icon showing the currently selected clock under the relevant clock heading in the top-left (Primary) or top-right (SRC) sections of the window.

The larger icon in each of the windows shows the selected clock, and the associated text confirms the rates that are available when using this clock for either inputs or outputs.



Manual configuration is necessary when two asynchronous base-48 kHz clock domains are connected to a device. In this scenario, ensure that each digital clock, digital input and digital output is manually forced to lock to the appropriate clock domain.

8.2.1.3 Dante Clock

When Dante is enabled on a Lake device, the Primary Clock is used for Dante purposes. One Dante device will be allocated as the Dante Master, and all other devices will be Dante Slaves. The Dante master is selected automatically following these priorities:

1. Preferred Dante master (available for LM & PLM Series device via Dante Configuration screen)
2. Devices with an external BNC Word Clock input
3. Devices with other external clocks (e.g. AES Inputs)
4. Hardware-based devices
5. Software-based devices, e.g. Dante Virtual Soundcard

Where there is no distinguishing feature for a device to be selected (for example, all devices have a BNC Word Clock connected, or multiple devices have an AES signal), then Dante uses the device with the lowest Mac Address as a unique distinguishing feature. However, if a Frame has been the Dante master for more than one minute, its priority is elevated to prevent a master transition based on Mac address alone.

The Dante Master may lock to an external clock via the Primary Clock as shown in the example below. If the Frame requires locking to another signal type, the SRC Clock should be used. The example below shows how two differing AES signals can be connected to one Lake device, with Dante locking to the Primary Clock's AES signal:

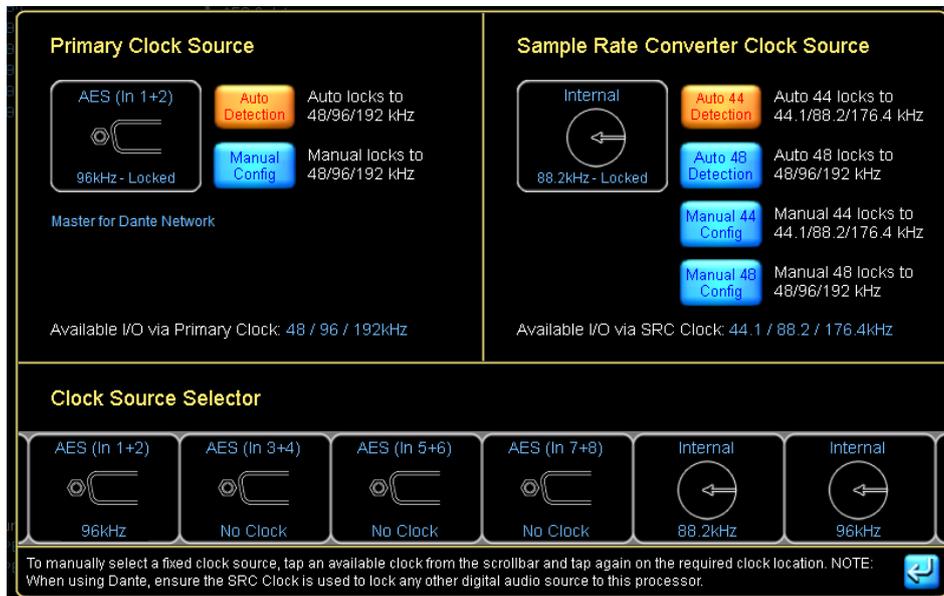


Figure 8-5: Primary Clock as Dante Master

Other Lake devices on the network that have Dante enabled will be Dante slaves, and the clock will report that it is overridden by Dante, as shown in Figure 8-6. Any other 96 kHz signal, or 44.1 kHz based signal should be locked using the SRC Clock (applicable for LM Series only).

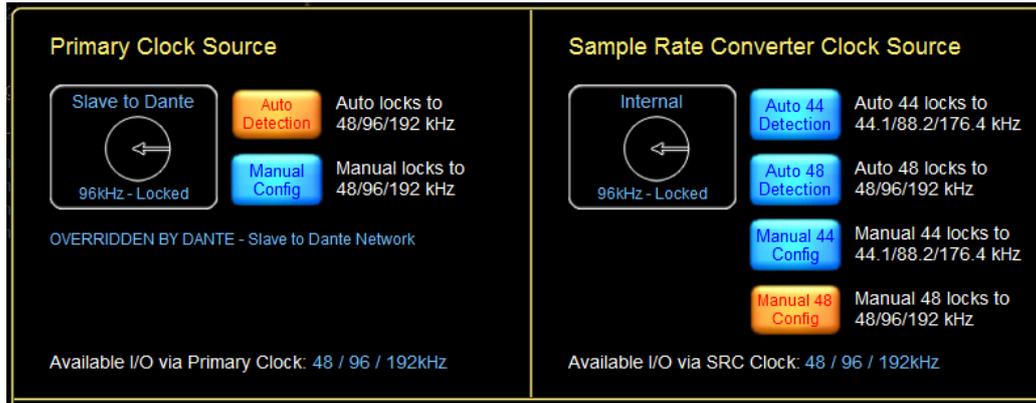


Figure 8-6: Primary Clock as Dante Slave

8.2.1.4 Host Clock (MY8-LAKE only)

The highest priority auto-clock selection for the MY8-LAKE device is the Host Clock as shown in section 8.2.1.1. For the MY8-LAKE device, the Primary Clock can only lock to a source operating in multiples of 48 kHz, and the Sample Rate Converter Clock can only lock to a source operating in multiples of 44.1 kHz.

Ensure that AES & Host clocks operating at the same base-rate (e.g. multiples of 48 kHz) are in-phase to avoid any clock slipping errors.

8.2.2 Input Configuration

Each input may be configured to use any available input source. Sources include AES/EBU digital inputs, Dante inputs, analog inputs, and Host digital inputs (MY8-LAKE only).

To access the input configuration, tap the zoom button, or any area of the INPUT CONFIGURATION summary text on the I/O CONFIG screen shown in Figure 8-7.

#	Auto	Type	Clock	Status	Offset/Headroom
1	Auto	Dante	PRI(96)	Lock	0.00dB
2	Auto	Dante	PRI(96)	Lock	0.00dB
3	Auto	Dante	PRI(96)	Lock	0.00dB
4	Auto	Dante	PRI(96)	Lock	0.00dB
5	Force	Analog			26dBu
6	Force	Analog			26dBu
7	Force	AES	No Clock		0.00dB
8	Force	AES	No Clock		0.00dB

Figure 8-7: Input Configuration Summary on I/O Config screen

After tapping the zoom button or anywhere on the text, an INPUT CONFIGURATION screen similar to that shown in Figure 8-8 will be displayed. The number of available input routers varies depending on the product type

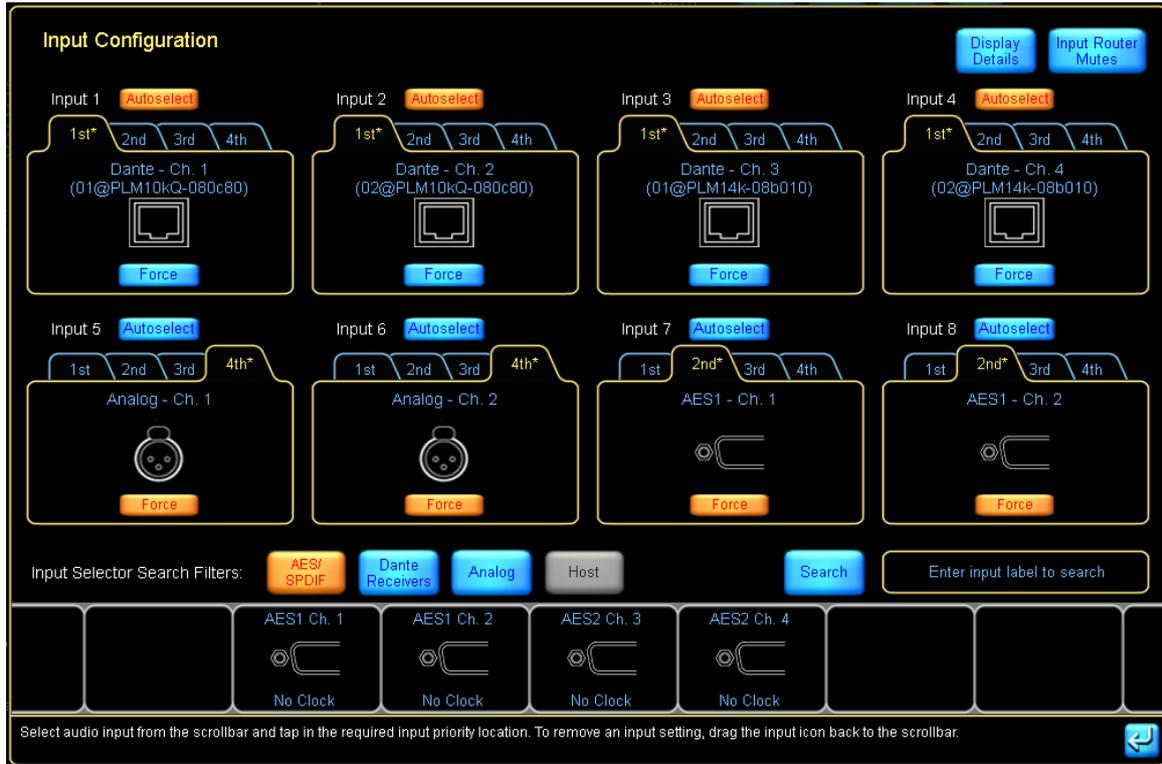


Figure 8-8: LM 44 Input Configuration Screen

8.2.2.1 Autoselect

The input auto-selection feature enables the set up of a redundant system. The device will attempt to use the first signal; if the first signal is unavailable it will try the second, third, or fourth signal.

By default Priority 1 is set to Dante Receivers, Priority 2 is empty, Priority 3 is AES and Priority 4 is Analog.

8.2.2.2 Force

This feature forces the input to the selected input, regardless of whether a valid signal is present.

8.2.2.3 Input Selector Search Filters

- ▶ AES displays the available AES input signals

- ▶ DANTE displays the available DANTE input signals
- ▶ HOST displays the available HOST input signals
- ▶ ANALOG displays the available ANALOG input signals
- ▶ SEARCH filters the available input signals based on text that is entered

8.2.2.4 Input Configuration Display Details View

After tapping the DISPLAY DETAILS button, a screen similar to Figure 8-9 is displayed.



Figure 8-9: LM 44 Input Configuration - Display Details View

8.2.2.5 AES Input Options

These options are available only for a Lake device with two clock domains.

- ▶ AUTO chooses the clock most relevant to the incoming digital signal. For example, if the input signal is 48 kHz, the Primary Clock will be selected; if the input is 44.1 kHz, the SRC Clock will be selected. The default is Primary Clock if a digital input signal is not present.

- ▶ PRIMARY forces use of the Primary Clock, regardless of whether the clock rate matches the incoming signal rate.
- ▶ SRC forces use of the SRC Clock, regardless of whether the clock and incoming signal rates match.



When both the Primary and SRC clocks are manually locked to separate asynchronous base-48 kHz domains, it is important to manually select which clock domain each AES input should lock to. Leaving as AUTO may result in clock slipping errors.

8.2.2.6 Analog Input Options

For analog inputs on an LM Series or PLM Series device, ANALOG INPUT HEADROOM (RMS) provides a two-way toggle for selecting 12 or 26 dBu. Tap the required headroom level to set the maximum RMS level for the input.

8.2.2.7 Digital Gain Offset

The Digital Gain Offset represents the amount of gain increase or reduction in dB that will be applied to the digital input signal to allow seamless transition between all input types.

As levels of digital and analog signal vary, the Digital Gain Offset can be used to adjust the digital input signal level to match the analog input signal level.

This can be used in conjunction with AUTOSELECT to provide an automatic analog backup to the incoming digital audio. Separate values are provided for AES and CobraNet.

To change an offset, tap the value that you wish to change and enter a new value using the on-screen (or external) keyboard. These offsets are shown on the I/O CONFIG summary.



When aligning analog and digital signals using the Digital Gain Offset setting, the +4 dBu Reference meter mode should be used to ensure levels are matched with a common internal reference.

8.2.2.8 Input Router Mutes

Tapping the INPUT ROUTER MUTES button from the Input Configuration screen will display the Input Router Mutes floating tool bar.

Please refer to section 8.2.11 for further information.

8.2.3 GPIO Configuration (LM Series Only)

For LM Series devices, a summary of the current GPIO settings is displayed on the I/O CONFIG screen. Please also refer to the LM Series Operation Manual for additional information on the GPIO feature.

GPIO allows external interface with alarm and monitoring systems, providing basic functionality such as muting, power control, preset recall and fault monitoring. GPI (input) allows external devices to control certain features of LM Series devices as listed in Table 8-1. GPO (output) enables the LM Series device to report certain statuses and faults to external devices as summarized in Table 8-1.

Tapping the summary text or associated zoom button on the I/O CONFIG screen will display the screen shown in Figure 8-10.

The screenshot shows a 'GPIO Configuration' screen with two main sections: 'General Purpose Input Configuration' and 'General Purpose Output Configuration'. Each section contains a table of settings for two channels (GPI 1, GPI 2 and GPO 1, GPO 2).

General Purpose Input Configuration				
	Acting on	Action when transition to CLOSED	Action when transition to OPEN	Current state
GPI 1	No Action	-	-	OPEN
GPI 2	No Action	-	-	OPEN

General Purpose Output Configuration				
	Indicating	State when CLOSED	State when OPEN	Current state
GPO 1	Standby	Standby	On	OPEN
GPO 2	Fault	Any Fault	No Fault	OPEN

Figure 8-10: LM Series GPIO Configuration Screen

The screen is split into two sections - the top section provides options for two General Purpose Input (GPI) actions, and the bottom section provides actions two for General Purpose Output (GPO) commands.

8.2.3.1 GPI Options and Configuration (LM Series Only)

Table 8-1 lists the options available for General Purpose Input (GPI). These options can be set independently for a transition from closed > open and from open > closed.

To change the action that occurs for a GPI command:

1. Tap the 'Acting On' cell for the required GPI command

2. Select the required option from the pop-up window.
3. Tap the corresponding 'Action when transition to CLOSED' cell
4. Select the required option from the pop-up window that is displayed
5. Tap the corresponding 'Action when transition to OPEN'
6. Select the required option from the pop-up window that is displayed

8.2.3.2 GPO Options and Configuration (LM Series Only)

Table 8-1 lists the options available for General Purpose Output (GPO). The state when closed is user-defined and the state when open is set to the opposite value automatically.

Indicating	State when Closed
Protective Mute State	1. Muted 2. Unmuted
Standby State	1. Standby 2. On
Fault	1. No Fault 2. Any Fault
Ready	1. Ready 2. Not Ready
No Indication	-

Table 8-1: GPO Options

To change the action that occurs for a GPO command:

1. Tap the 'Indicating' cell for GPO1 or GPO2
2. Select the required option from the pop-up window.
3. Tap the corresponding 'State when CLOSED' cell
4. Select the required option from the pop-up window that is displayed
'State when OPEN' will be set automatically.

8.2.4 Breaker Emulation Limiter (BEL™) - PLM 20000Q Only

Three types of breaker are available (Conservative, Fast and Universal) as shown in Figure 8-11; each breaker behaves accordingly when the nominal current is reached.

The Conservative breaker type does not allow the current to exceed the nominal current value.

The Fast and Universal breaker types allow the current to exceed the nominal current value, but calculate how the temperature of the breaker is affected. The allowed current is decreased when necessary to reduce breaker temperature; the Universal breaker type allows a higher temperature before the allowed current is reduced.

The meters on the right of the screen display Volts RMS and Amps RMS. The Volts RMS meter is gray (voltage OK) when the voltage is between 80 and 265 V. The meter turns orange (voltage warning) when between 65 V and 80 V, and turns red (voltage fault) when below 65 V or above 265 V.

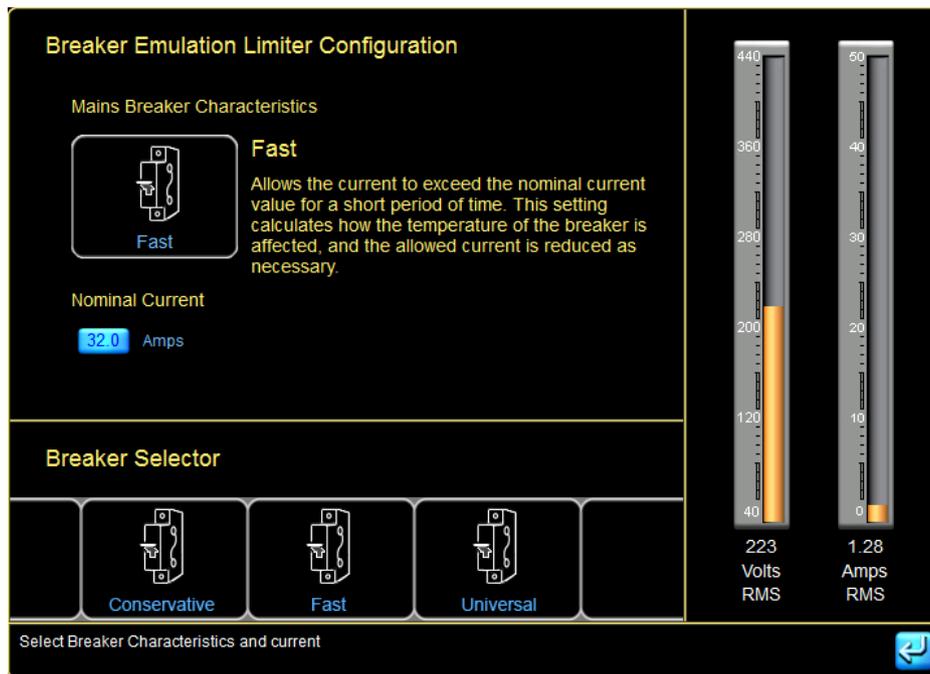


Figure 8-11: Breaker Emulation Limiter Screen

To change the nominal current, tap the blue edit value and enter a value between 5.0 A and 32.0 A.

To change the currently selected breaker type, tap the required breaker on the scrolling bar at the bottom of the screen then tap again in the Breaker Type box at the top of the screen.

8.2.5 Dante Configuration

The Dante Configuration summary on the I/O CONFIG screen reports either the Global Dante Clock Sample Rate, or advises that Dante is disabled; it additionally lists the assigned receiver subscriptions and associated sample rate and status.

Further information on Dante settings can be accessed by tapping the zoom button or the associated text. A screen similar to that shown in Figure 8-12 will be displayed.

To configure the device for Dante dual redundant operation (LM and PLM Series only), navigate to the TECHNICAL DATA screen via the I/O CONFIG menu and enable the Dual Redundancy option. This change will require a power cycle of the device; please refer to section 8.2.10.4.

8.2.5.1 Device Tab

Tapping the zoom button labeled DANTE CONFIGURATION displays the Dante Configuration > Device tab, with Dante disabled by default:

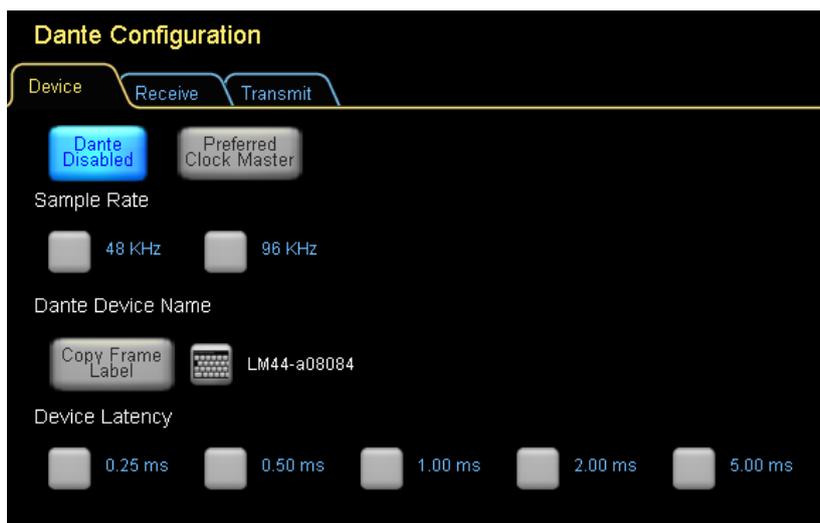


Figure 8-12: Dante is Disabled by Default

To enable Dante, tap the button labelled Dante Disabled; the button turns orange and now reads Dante Enabled and other functions become available.



Dante can be enabled globally for all Dante-capable devices in the current system configuration via Home > All > Global Info > Events & Control > Control > Global Dante Enabled control.

Preferred Clock Master

This option identifies this device as the preferred clock master device for the Dante network. To enable this device as the Preferred Clock Master, tap this button.

This parameter is stored in System Files, and synchronizes between the Lake Controller and the Dante Controller.

If this button is disabled when Dante is Enabled, the device is set to Dante Slave Only mode. The Dante Slave Only mode can be viewed/edited via the Technical Data screen - refer to section 8.2.10.

Sample Rate

Dante may operate at either 48 kHz or 96 kHz; tap the appropriate button to select the preferred sample rate.

Dante Device Name

The Copy Frame Label button copies the Frame label into the Dante Device Name parameter for this device; after tapping this button, click OK on the on-screen keyboard to confirm the change. Alternatively the keyboard icon may be selected to display the keyboard for manual Dante Device Name entry.



If the Dante Device Name is changed after another device has already subscribed using the previous name, the existing audio connection will be lost and the other device will need to subscribe again.



When recalling a system file created before Lake Controller v6.1, the legacy DLP-XX-XX device names are restored to retain Dante subscriptions.

This parameter is synchronized between the Lake Controller and the Dante Controller.

Device Latency Options

This latency is additional Dante-specific latency used to ensure uninterrupted digital audio. The latency is added to the normal latency of your chosen signal path and Module type.

The following latencies are available dependent on the device:

- ▶ LM Series (Gigabit Ethernet): 0.25ms / 0.50ms / 1.00ms / 2.00ms / 5.00ms
- ▶ PLM Series (100 Mbit Ethernet): 1.00ms / 2.00ms / 5.00ms

This parameter is synchronized between the Lake Controller and the Dante Controller.



Dante latency values changed in Lake Controller v6.1. When recalling a system file created before Lake Controller v6.1, previous Dante latency options will be converted, rounding up to the nearest latency value.

These minimum receive latency options are provided to allow flexibility depending on the network complexity and architecture. Higher latency reduces the risk of audio glitches due to audio packets being delayed via the network, and is therefore recommended for complex networks containing many hops, or in circumstances where a small delay is irrelevant and reliability is paramount.



Using Ethernet switches without Quality of Service (QoS) is not recommended. If QoS is unavailable, use the 5 ms latency option on all devices to reduce the risk of audio glitches.

8.2.5.2 Receive Tab

To configure the Dante Receivers for the selected device, tap the RECEIVE tab then assign up to four channels (LM Series) or two channels (PLM Series) from another Dante device which will be used as inputs to this device.

To assign Dante Receive channels to a device:

1. Tap the RECEIVE tab
2. Select a device from the DEVICES scrollbar
3. Tap a channel on the Channels scrollbar then place the selected channel in a Receiver location at the top of the screen.

This parameter is synchronized between the Lake Controller and the Dante Controller.



Channels that cannot be subscribed to due to sample rate differences or other reasons are displayed greyed out after those which can be subscribed.



When Dante is locked for the receiving channel, an asterisk * is shown next to the Receiver number as shown in Figure 8-13.

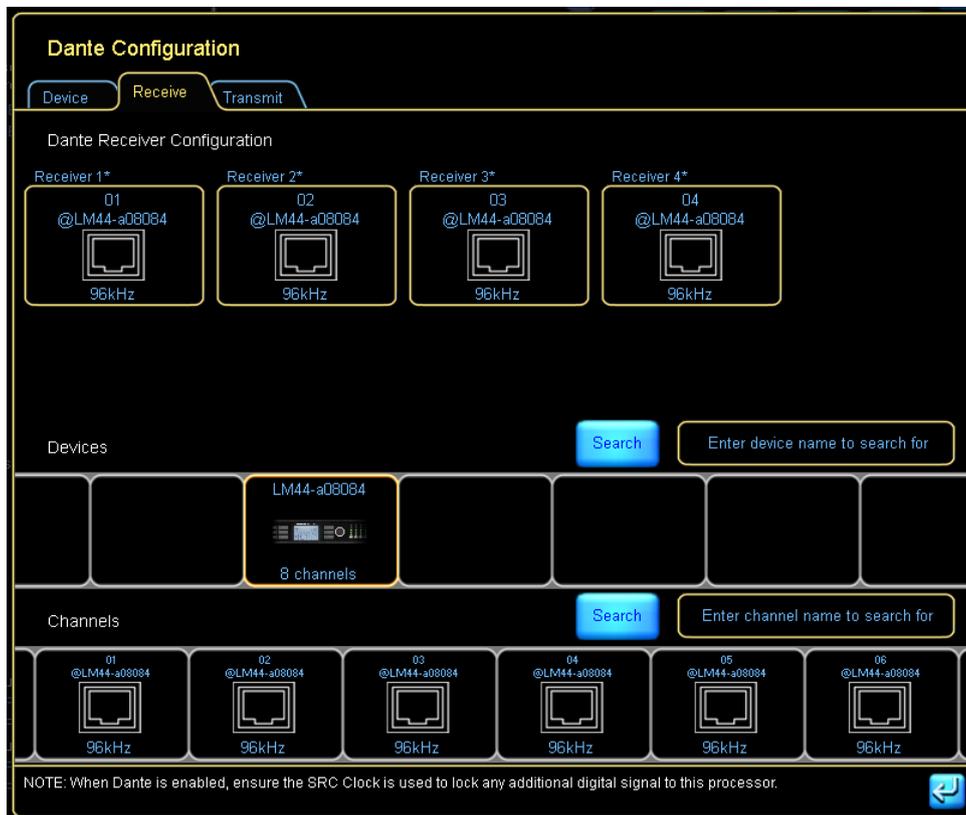


Figure 8-13: LM Series Dante Receive

When Dante is enabled, the INPUT CONFIGURATION screen provides an option to view the assigned Dante Receivers as configured on the DANTE CONFIGURATION > RECEIVE tab. To assign a Dante Receive channel to an available Input Priority, tap on an icon on the scrollbar and place in an Input Priority tab.

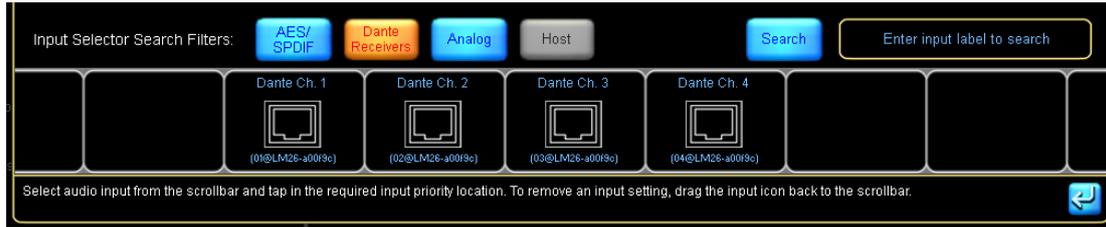


Figure 8-14: Dante Receivers on Input Configuration scrollbar

PRODUCT	DANTE IN	DANTE OUT	DUAL REDUNDANCY
Lake LM Series	4 channels	8 channels	YES
PLM Series	2 channels	2 channels (unprocessed audio only)	YES
MY8-LAKE	N/A	N/A	N/A

Table 8-2: Dante Input / Output Channels by Product

8.2.5.3 Transmit Tab

When Dante is enabled, by default the device will receive audio but will not transmit audio. Transmission is disabled in order to prevent unnecessary network traffic and unused channels on the INPUT CONFIGURATION screen of all other devices on the network.

To transmit Dante channels from a device:

1. Tap the DANTE DISABLED button on the DEVICE tab
2. Tap the TRANSMIT tab
3. Tap the TRANSMIT OUTPUTS button

Transmit channels from this device will now appear on the list of all available Dante channels on the network.



Dante Transmit can be enabled globally for all Dante-enabled devices in the current system configuration via Home > All > Global Info > Events & Control > Control > Global Dante Transmit Enabled control.

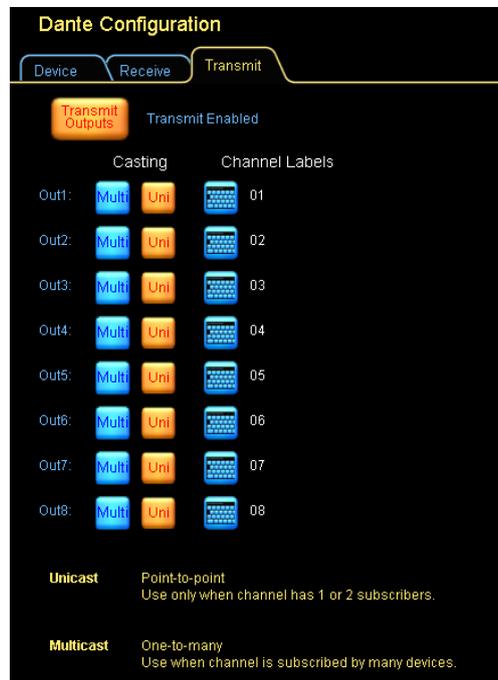


Figure 8-15: LM Series Dante Transmit Enabled

When the TRANSMIT OUTPUTS button is active (orange), all Dante channels will be advertised on the Dante audio network as available channels for any other Dante receiver to use for its input/s. In addition, this screen provides MULTI/UNI options for each channel, and output channel labeling functions as shown in Figure 8-16.



Figure 8-16: Options and Labels for Dante Outputs

Multicast / Unicast Setting

The MULTI/UNI options provide the ability to identify whether each channel will be configured as multicast (i.e. many devices receive a connection to the same audio flow), or configured as unicast (i.e. each device receives a separate point-to-point audio flow).



Use alphanumeric characters (uppercase or lowercase) and the "-" character only. DO NOT use any other characters, especially @ . =



It is important to use Multicast when a particular channel is distributed to three or more receivers; this ensures optimal bandwidth usage and Dante network stability.

Set to multicast before enabling the transmit outputs option if it is known that three or more receivers will subscribe to this channel.

This parameter is synchronized between the Lake Controller and the Dante Controller.

Output Channel Labeling

Tapping the keyboard button to the right of the UNI button will display the on-screen keyboard allowing up to a 31-character name to be entered for this Dante channel.



Use alphanumeric characters (uppercase or lowercase) and the "-" character only. DO NOT use any other characters, especially @ . =

Entry of appropriate and meaningful channel labels on all devices is recommended before configuring system routing. If a Dante device name or output channel label is changed on a Dante transmitter after routing to receiving devices, the channel must be disconnected and re-routed on the receiver/s to reestablish a valid connection.

For additional information regarding Dante configuration, please refer to chapter 8.2.

As Dante uses standard Ethernet for digital audio transmission, there are certain guidelines and rules which must be adhered to for successful implementation. Please refer to section 3.6 for further details, along with the Dante literature included with the Lake Controller software installation.

To configure the device for Dante dual redundant operation (LM and PLM Series only), navigate to the TECHNICAL DATA screen via the I/O CONFIG menu and enable the Dual Redundancy option.

This change will require a power cycle of the device; please refer to section 8.2.10.4.



Dual redundancy status is also displayed on the Front Panel of the device.

8.2.6 Iso-Float Status & AES Termination

When an online LM or PLM Series device is selected the button reads Analog Iso-Float & AES Termination. When a virtual LM or PLM Series, or an online or virtual MY8-LAKE device is selected then neither option is available.

The Analog Iso-Float & AES Termination Status screen is accessed by tapping the zoom button to the left of this summary as shown in Figure 8-17.



Figure 8-17: Analog Iso-Float & AES Termination Summary

Software control of the Analog Iso-Float is available for LM & PLM Series, along with separate control for the analog outputs on LM Series devices. AES Termination is available for LM & PLM Series. The current status is identified by an orange button as shown in Figure 8-18.

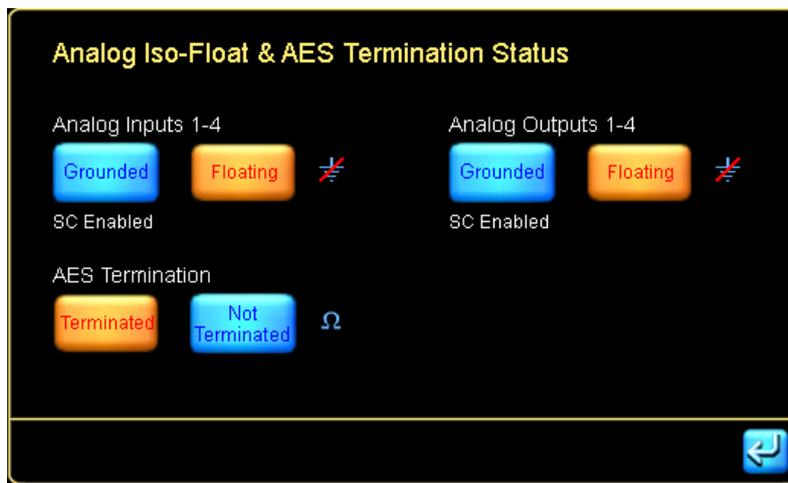


Figure 8-18: LM Series Analog Iso-Float & AES Termination Status

8.2.7 Input Mix Summary and Input Mixers/Switches

Input mix summaries and switches are shown on the I/O CONFIG page as part of the interactive signal path for each Module.

8.2.7.1 Input Mix Summary

The block diagram for each Module shows a summary of the connected inputs and associated gain settings. The example in Figure 8-19 shows a LM Series Mesa Module.

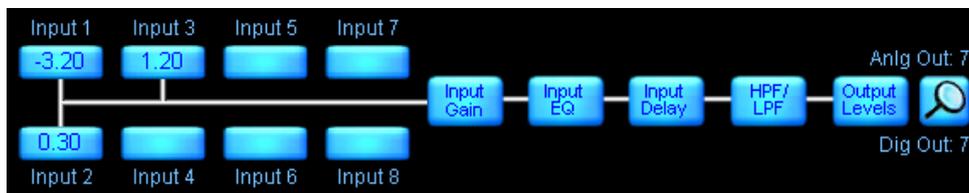


Figure 8-19: LM Series Mesa Module Input Mix Summary and Interactive Block Diagram

8.2.7.2 Input Mixer

The Input Mixer provides the ability to mix two incoming audio channels for PLMs; four channels for LM Series and MY8-LAKE Contour Modules; and eight channels for LM Series Mesa EQ Modules.

The Input Mixer can be accessed from two locations:

- ▶ Tap the Input Mix Summary from I/O CONFIG
- ▶ Tap the INPUT MIXER zoom button from LEVELS

The input mixer provides gain faders and ON/OFF connection buttons as shown in Figure 8-20.

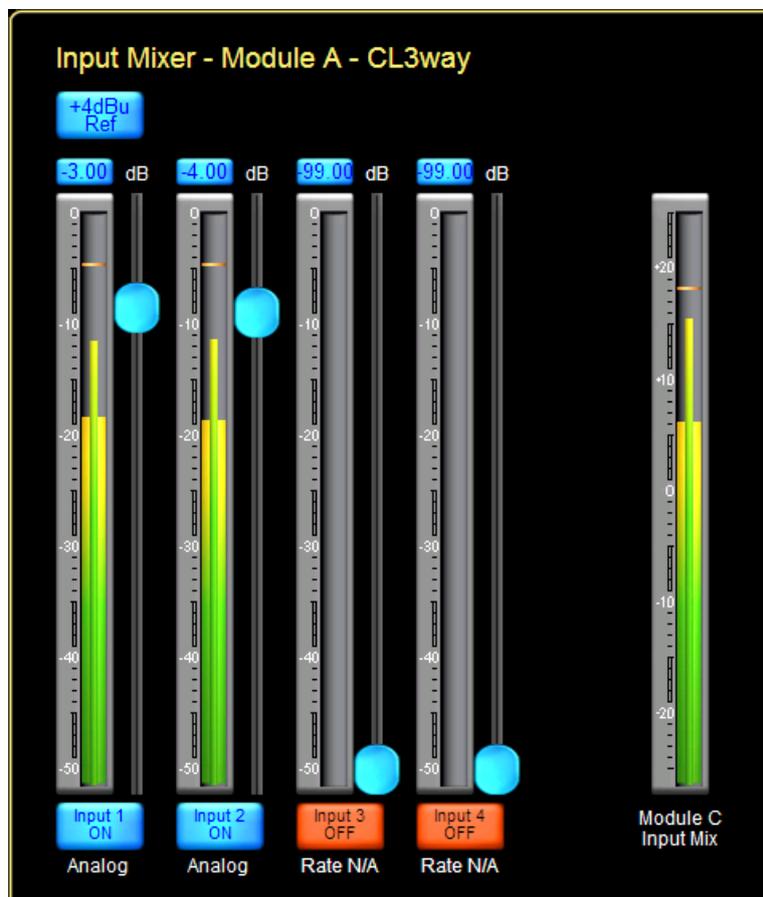


Figure 8-20: LM Series and MY8-Lake Contour Module Input Mixer

To connect/disconnect an input, tap the button labeled ON/OFF or drag the fader. The total Module input mix is shown on the far right of the Input Mixer window.

For Dante inputs, the receiver input channel label is displayed below the ON button.

Input +4dBu Button

Tap the INPUT +4dBu button to view the physical input signal meter relative to +4 dBu. Tap the button again to return to the default Digital Clip (DClip) view.

The DClip metering mode shows the audio level prior to any gain adjustment (input headroom, or digital gain offset), and indicates when the A/D converters will clip. The +4 dBu metering mode shows the audio level after any gain adjustment, and is useful for comparing levels of different input signals prior to processing.

This is a global function; all physical input meters throughout the system display the reference selected here.

Auxiliary Input Toggle Switch

An auxiliary channel is available on the following Module types:

- ▶ Classic 2-Way + 1-Auxiliary Outputs (CL2w+1a)
- ▶ Classic 3-Way + 1-Auxiliary Outputs (CL3w+1a)
- ▶ Linear Phase Classic 2-Way + 1-Auxiliary Outputs (LP2w+1a)

The interactive block diagram for these Modules types looks similar to that shown in Figure 8-21.

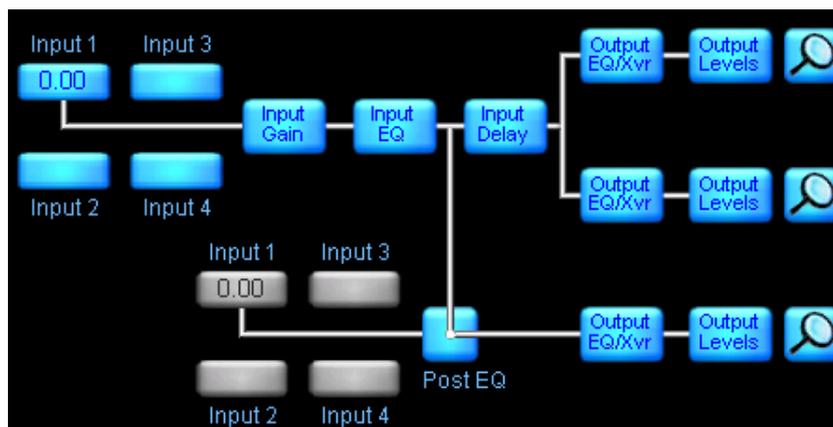


Figure 8-21: 2-Way + 1-Auxiliary Outputs Block Diagram and Input Mixers

These Module types provide a separate input selector for the auxiliary channel. This allows the auxiliary channel to be sourced independently of the crossover, or from the same post-input EQ signal.



The parametric [PEQ] and graphic [GEQ] overlays for the crossover section also affect the auxiliary output channel when the input switch is set as shown in Figure 8-21.

Simplified View Input Toggle (MY8-LAKE Mesa Mode Only)

For an MY8-LAKE in Mesa Mode, the default I/O configuration view is set to Simplified View. In this view, either the Host output or AES input can be selected as the source input signal. The Input Mixer and Input Router are not available; the input selector toggles between Host Output and AES Input.

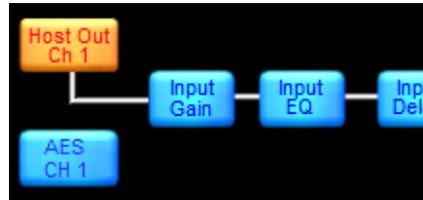


Figure 8-22: MY8-LAKE Simplified View Input Mixer

Please refer to section 21.4 for further information on Simplified View.

8.2.8 Output Configuration

The Output Configuration window is displayed after tapping the zoom button located to the right of each output on the right side of the I/O CONFIG page. A summary of the output connections for each Module appears at the bottom of each Module cell on the I/O CONFIG page.

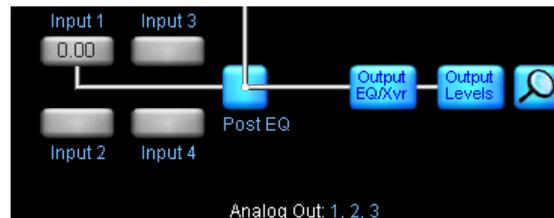


Figure 8-23: Output Configuration Zoom Button

After tapping any of these zoom buttons, an Output Configuration window is displayed, which looks similar to that shown in Figure 8-24. The options and number of channels available on this screen depend on the type of Lake device currently selected.

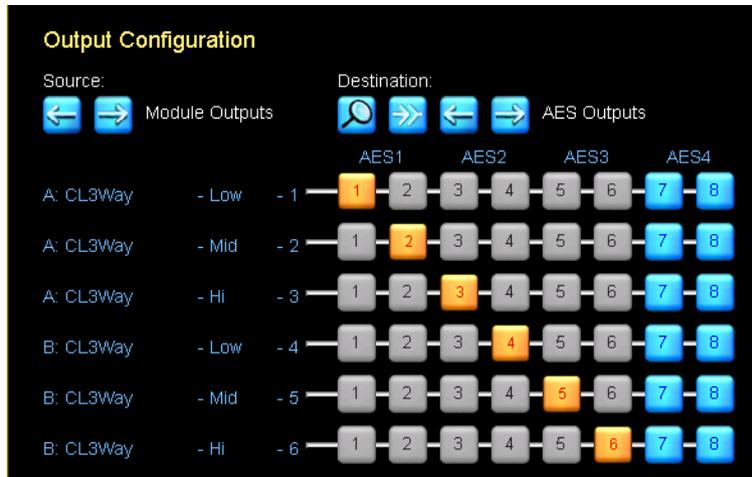


Figure 8-24: Output Configuration Screen

The left side of the screen lists the output channels for each Module. The orange numbered blocks denote the output/s from which the signal will be sent. The same audio channel can be sent from multiple outputs, but each digital output can contain only one channel of audio.

The following sections describe the options for SOURCE and DESTINATION. Selecting the required SOURCE and DESTINATION values enables patching of any input or Module output to any available audio output on the device.

8.2.8.1 Source

The arrow buttons  enable selection of the audio source. The default setting is Module Outputs, which are the Lake device DSP channels. Depending on the device type and installed options, the source can also be set to AES Inputs, Analog Inputs, Input Router Outputs, Dante Receivers or Host Inputs.

All Source options except Module Outputs bypass the DSP, providing pass-thru routing / signal conversion.

8.2.8.2 Destination

The arrow buttons  enable selection of the audio destination. The default setting is AES (or Host for MY8-LAKE). The destination can also be set to Analog or Dante where available.

8.2.8.3 Destination Output Options

Tapping the zoom button  under DESTINATION will provide a pop-up screen with further options for the selected output type.

Analog Output Options

For analog outputs, the ANALOG ISO-FLOAT & AES TERMINATION STATUS is displayed. Please refer to section 8.2.6 for further details.

AES Output Options

For devices with AES outputs, the relevant AES Output Sample Rate Configuration screen is displayed as shown in Figure 8-25. For the MY8-LAKE device, additional Auto/Manual controls are provided with Auto as the default. Auto sets the AES Outputs to follow the settings in the host device, selecting manual allows independant configuration for each AES output.



When both the Primary and SRC clocks are manually locked to separate asynchronous base-48 kHz domains, it is important to manually select which clock domain each AES input should lock to. Leaving as AUTO may result in clock slipping errors.

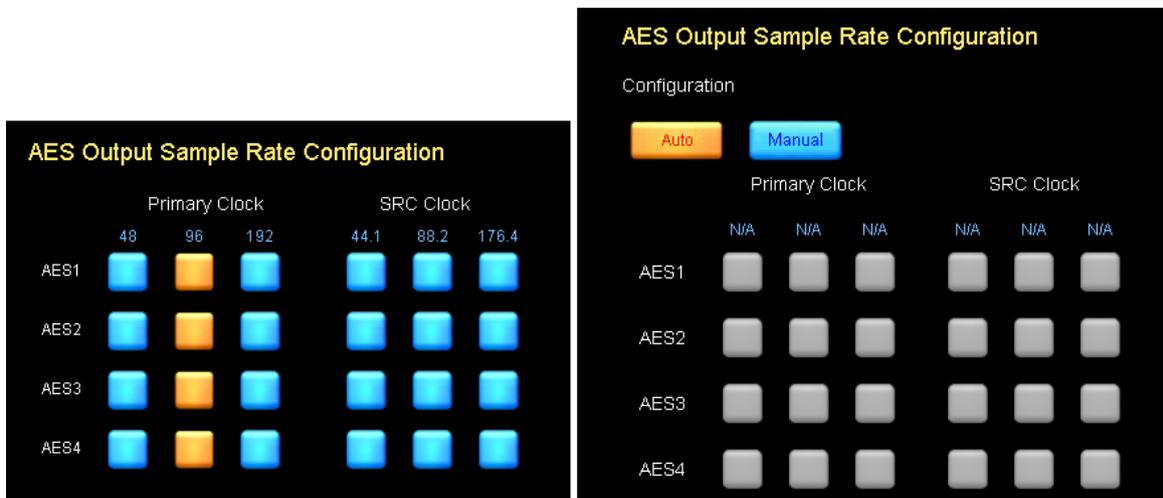


Figure 8-25: AES Output Sample Rate Configuration (LM Series / MY8-LAKE)

Please refer to section 8.2.1 for further information on Digital Clock Configuration.



For all output types, the number of channels varies depending on the options available for the selected device.

Dante Output Configuration

For Dante outputs the DANTE CONFIGURATION screen is displayed. Please refer to section 4.3.6 for further details regarding Dante.

Disconnecting Outputs for Output Type

Tapping the DISCONNECT ALL icon  will disconnect all outputs for the currently selected destination output type. For example, if ANALOG is the currently selected output type, tapping this button will disconnect all analog outputs from any source they are currently connected to. A warning dialog is displayed for confirmation on this action.

Bridge Mode Configuration (PLM Series devices only)

To activate power output channel bridge mode on a PLM Series device, tap the blue Bridge button on the Output Configuration page as shown in Figure 8-26. The Bridge button turns orange and the output selectors merge to indicate bridge mode is active. To deactivate output channel bridge mode, tap the orange Bridge button again.

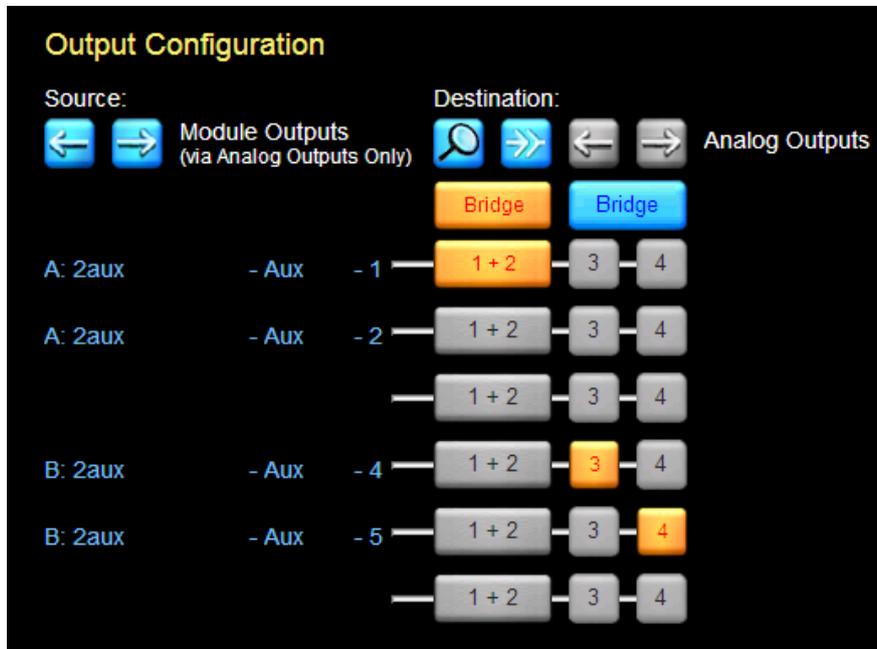


Figure 8-26: Bridge Mode (PLM Series only)



When Bridge Mode is activated, CLASS 3 WIRING is required. Please refer to the PLM Series Operation Manual for additional wiring information.

8.2.9 Latency Match

This button is available on LM and PLM Series devices. It is blue when disabled and orange when enabled.

This feature adds additional latency to the output signal to enable integration with legacy Contour Pro 26 or Mesa Quad EQ products. LATENCY MATCH is based on the following criteria:

- ▶ Input types for all devices are identical (Analog or AES only).
- ▶ Input sample rates for all devices are identical where AES inputs are being used.
- ▶ Outputs are set to analog.

For any other scenarios, the appropriate delay adjustments must be made manually.

8.2.10 Technical Data

The technical data screen is displayed by tapping TECHNICAL DATA (F5) on the I/O CONFIG button bar for the LM Series, PLM Series and MY8-LAKE devices.

Technical Data includes hardware-based Frame data including IP Address, Dual Redundancy and Dante Slave Only settings that are unaffected by SYSTEM RECALL, FRAME REPLACE, FRAME PRESET RECALL or FRAME CONFIGURATION and SOFT RESET options. When any of these hardware-based parameters are changed, a power cycle is required to the change the device.

Figure 8-27 shows the technical data screen for an LM 44. Most information is similar for all products, any product differences are detailed in the following sections.



Figure 8-27: LM 44 Technical Data Screen

8.2.10.1 Product/Model

The description and model number for the selected device.

8.2.10.2 MAC Address

The MAC address is the unique Ethernet address of the selected device.

8.2.10.3 Dante Slave Only

If Dante Slave Only is Enabled, the device can only operate as a slave to the Dante network, and will not be part of the Dante Clock Master selection process. It is recommended that this setting is enabled for all devices unless the device is specifically required to be part of the Dante Clock Master selection process. This setting is enabled (ON) by default for PLM Series devices and disabled (OFF) by default for LM Series devices.

This is a hardware-based parameter that is unaffected by SYSTEM RECALL, FRAME REPLACE, FRAME PRESET RECALL or FRAME CONFIGURATION and SOFT RESET options. It can be changed only via this screen and via the Factory Reset option on the Front Panel of the device.

8.2.10.4 Dual Redundancy (LM and PLM Only)

This option activates dual redundant network capabilities for Lake Controller data and Dante audio. The secondary Ethernet port has an IP address in the 172.31.x.x range. The power must be cycled on the Lake device to complete the change.

The Dual Redundancy option can also be viewed and changed for all LM & PLM Series devices via the Global Control Tab.



This hardware parameter is unaffected by SYSTEM RECALL, FRAME REPLACE, FRAME PRESET RECALL or FRAME CONFIGURATION and SOFT RESET options.

This value can only be changed via the Technical Data screen, Global Control Tab, or via a the Factory Reset option from the device front panel.

8.2.10.5 IP Address Config

This field is set by default to AUTO - ZERO CONF. It can also be set to AUTO - DHCP (if a DHCP server is used) or to a FIXED IP ADDRESS. The power must be cycled on the Lake device to complete the change.



This hardware parameter is unaffected by SYSTEM RECALL, FRAME REPLACE, FRAME PRESET RECALL or FRAME CONFIGURATION and SOFT RESET options.

This parameter is changed only via this screen and via the FACTORY RESET option from the front panel of the device.

8.2.10.6 IP Address

The Internet protocol (IP) address identifies which device is sending or receiving information. The power must be cycled on the Lake device to complete the change.

If the FIXED IP ADDRESS option is selected as described in 8.2.10.5, this field becomes editable and an IP Address may be entered manually.



This hardware parameter is unaffected by SYSTEM RECALL, FRAME REPLACE, FRAME PRESET RECALL or FRAME CONFIGURATION and SOFT RESET options.

This parameter is changed only via this screen and via the FACTORY RESET option from the front panel of the device.

8.2.10.7 Subnet Mask

The subnet mask is used for IP address routing; the default setting is 255.255.0.0 when AUTO - ZERO CONF is selected. The power must be cycled on the Lake device to complete the change.

If the FIXED IP ADDRESS option is selected as described in 8.2.10.5, this field becomes editable and a Subnet Mask may be entered manually.

This parameter is unaffected by SYSTEM RECALL, FRAME PRESET RECALL or soft FRAME RESET options. It is reset only via the FACTORY RESET option from the front panel of the device.

8.2.10.8 ID

The unique Lake device identifier.

8.2.10.9 Firmware

The firmware version that is currently running on the selected device.

8.2.10.10 Serial Number:

Displays the hardware serial number for the selected device.

8.2.11 Input Router Mutes

Input Router Mutes represent the actual inputs to the device. Muting an input via Input Router Mutes will mute the signal to all Modules that are connected to that Input Router. To display the Input Router Mutes tool-bar:

- ▶ Tap INPUT ROUTER MUTES (F6) from the button bar on the I/O CONFIG screen
- ▶ Tap the INPUT ROUTER MUTES zoom button from the Levels screen

The buttons describe the current status. An input with a red button labelled MUTED is currently muted and may be tapped to unmute the input. A button labelled UNMUTED is currently unmuted and may be tapped to mute the input.

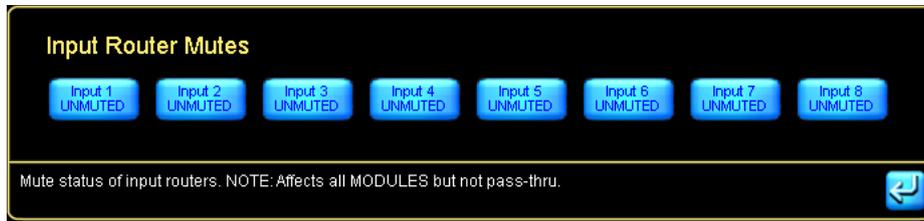


Figure 8-28: Input Router Mutes



Input Router Mutes are not available when a device is offline.

8.2.12 Interactive Signal Path Block Diagram

The signal path of each Module is shown in graphical form on the right of the I/O CONFIG page. Each of the blocks can be selected to navigate directly to the associated EQ/LEVELS/XOVER/AUX/HPF/LPF screens.



After using the interactive block diagrams to access the other screens, the EQ/LEVELS EXIT button returns you to the I/O CONFIG page instead of HOME.

8.2.13 Input Selection (MY8-LAKE in Simplified View Only)

The MY8-LAKE device has a unique simplified view for the Mesa Frame configuration by default. In this view the input can be easily toggled between default Host output and AES input. Please refer to “8.2.7.2 Input Mixer” on page 131 and “21.4 I/O Configuration View Mode Options” on page 271 for further information.

8.2.14 Frame Config/Soft Reset

For PLM Series devices this button reads SOFT RESET and resets the device to its factory default state, without removing any presets stored in the device, and without resetting the networking configuration data including IP Config, IP Address, Subnet Mask & Dual Redundancy settings.

For LM Series and MY8-LAKE devices, this button reads FRAME CONFIG and provides a sub-menu allowing the device to be configured as:

- ▶ CONTOUR (2-Contour Modules for LM Series; 4-Contour Modules for MY8-LAKE)
- ▶ MESA EQ (4-Mesa EQ Modules for LM Series; 8-Mesa EQ Modules for MY8-LAKE)
- ▶ CONTOUR/MESA EQ (2-Contour Modules and 4-Mesa EQ Modules - MY8-LAKE)



For all products, configuring or resetting a device via the Lake Controller retains the current IP address setting and system/Frame presets.

8.3 Label & Lock

From the Modules menu, tap LABEL & LOCK to view a submenu with functions to label a Module or Frame and allow a system designer to lock Module and base configurations

8.3.1 Module Label

The Module Label is a user-definable value at the bottom of the Module icon that identifies the Module.

To label a Module:

1. Tap the desired Module icon on the MAIN page.
2. Tap MODULE LABEL, enter a Module name, and tap OK.

8.3.2 Frame Label

The Frame label is a ten-character user-defined value that appears on the Module icon and on the front panel of the device. The Frame label associates the Module icons with a Lake device.

To label a Frame:

1. Tap any Module of the Frame you wish to label.
2. Tap FRAME LABEL, enter a Frame name, and tap OK.



When a Frame consists of multiple Modules, labelling the Frame via one Module automatically updates the Frame label on any associated Module icons.

8.3.3 Module and Base Configuration Locking

The following functions are active only in Designer Mode:

- ▶ MODULE UNLOCKED/UNLOCK MODULE

- ▶ SET MOD PASSWORD
- ▶ BASE UNLOCKED/UNLOCK BASE
- ▶ SET BASE PASSWORD

For additional details on these functions, please refer to chapter 18.

8.4 Copy/Paste/Replace

From the MODULES menu, tap the COPY/PASTE/REPLACE button to view a submenu that allows the transferring of data between Modules. These functions enable fast setup of multiple speakers using the same type and configuration.

The REPLACE function allows assignment of a different physical hardware device to perform the task of a selected device (i.e. to transfer all data from one hardware device to another). The BATCH REPLACE function allows fast transfer of data from a virtual or offline configuration to online Frames.

8.4.1 Copy

This function is active only when a Module icon is selected. To copy data from a Module:

1. Tap the Module icon that contains the data to copy.
2. Tap COPY.

8.4.2 Paste

This function is active only when Module data has been previously copied and a destination Module icon is selected. To paste data to a Module:

1. Tap the Module icon in which to paste the data.
2. Tap PASTE.



A Mesa EQ Module cannot be pasted into a Contour Module and vice versa.

NOTE

8.4.3 Replace Frame

The REPLACE function allows transfer of Module/Super Module/Group data between devices. If a previously used device is unavailable, or the device that performs a task is required to change, follow these steps:

1. Tap COPY/PASTE/REPLACE from the Modules menu.
2. Tap a Module from the Frame you wish to replace on the work area.
3. Tap REPLACE FRAME
The Module scroll bar displays used and unused Modules.
4. Tap a Module from an unused Frame then tap COMPLETE REPLACE.
To locate a particular device, tap the SEL button on the front panel to center the unit on the scroll bar.



To locate an LM Series device, tap the top left dynamic function button on the front panel. To locate a PLM Series device, tap dynamic function button two from the top left of the LCD display.



To locate an MY8-LAKE device, select an online MY8-LAKE Module icon in the Controller; the associated unit displays a static white LED on the rear panel. Selection via hardware is unavailable.

- ▶ A Frame can only be replaced with a currently unused Frame of the same product type.
- ▶ All Modules of a Frame must be present on the Module scroll bar for the Replace Frame function to work.
- ▶ For LM Series and MY8-LAKE devices, the source and destination Frames must be of the same configuration type (i.e. Contour, Mesa, or Contour/Mesa)



Network IP settings and Dual Redundancy configuration are not transferred during a Frame Replace operation; configure this manually on the destination Frame.

8.4.4 Complete Replace

This button completes the REPLACE FRAME function. This function is active only when the REPLACE button is selected and a destination Module has been selected from the Module scroll bar.

Data from the source Frame is transferred to the destination Frame and the Frame from the scroll bar will now take the place of the source Frame in the system configuration.

If the source Frame is online, all Modules in the work area are returned to the scroll bar.

8.4.5 Batch Replace

This button is active (blue) regardless of whether a Module is selected in the work area. When tapped a screen similar to Figure 8-29 is displayed.

The left side of the screen displays offline or Virtual Frames present in the main work area. The right side of the screen displays online Frames.



To complete the BATCH REPLACE, all online destination Frames must be on the Module scroll bar, and not currently in use in the work area.

Frames are sorted by Frame type (product/configuration), then by Frame name. If the product type and Frame name match between an online and offline Frame, a number will automatically be assigned to the destination Frame.

Pressing the ME/SEL button on the front panel will identify the selected destination Frame with yellow highlighting.

Offline / Virtual Frames (Source)				Online Frames (Destination)			
#	Frame ID	Frame Type	Frame Name	#	Frame ID	Frame Type	Frame Name
1	Virtual	PLM 10000Q	10000Q	1	4a000010:fce19b01	PLM 10000Q	10000Q
2	Virtual	LM 26 Contour	LM 26	2	d6000010:9e792c01	LM 26 Contour	LM 26
3	Virtual	LM 44 Mesa	LM 44	3	7000014:7feeab01	LM 44 Mesa	LM 44

Clear Dest # Start Replace

Enter the destination frame number to match the offline frame(s) you would like to replace. Online frames without a destination number will be ignored during the batch replace. ↩

Figure 8-29: Batch Replace Screen

8.4.5.1 Assigning the Virtual Frames to the Destination Frames

With the exception of very small systems, the virtual/offline Frame must be labeled to enable Frame identification. If the destination Frame of the same product type and configuration is also labeled with a matching name, the assignment will be automatic. Tapping START REPLACE will transfer data to the associated online Frames.

If the destination Frames are not labeled:

1. Type the corresponding offline/Virtual Frame number into the # field, either via the on-screen or a manual keyboard.
2. The destination Frame will move up or down the list so that it is on the same row as its corresponding offline/Virtual Frame.
3. Tap START REPLACE, then tap YES to the confirmation message.

All offline/Virtual Frame data will be transferred to the online Frames.

8.5 Remove

To remove a Module from the current system, tap the Module icon in the work area while in the MODULES menu then tap REMOVE.

Audio will not be affected unless the Module is assigned to a Group that contains settings that affect the audio of the Module.



You can also remove a Module by dragging the Module icon to the Module scroll bar when in the MODULES menu



No warning is displayed unless the selected Module is assigned to a Group. In this instance, removing a Module de-assigns it from all Groups to which it is currently assigned.

8.6 Module Store/Recall

Tap the MODULE STORE/RECALL button to view a submenu containing functions that recall and store Module and base configurations, and to store Frame presets. The button bar displays the following options and a scroll bar with files and folders.



Figure 8-30: Module Store/Recall Menu and Scroll Bar

For detailed information on all of the Module file types supported by the Lake Controller, please refer to section 4.7.

8.6.1 Recall/Open

This button's function and label depends on whether a folder or file is selected. It is inactive when neither a file nor folder is selected, or when a Group icon is selected in the work area.

The button is labeled OPEN when a folder is selected. To open a folder, tap the desired folder icon on the scroll bar, then tap OPEN.



Double-tapping a folder or file icon also opens the folder or file.

The button is labeled RECALL when a file is selected. To recall a Module file, tap the desired file, then tap RECALL. Confirm the action by tapping YES to the warning message.



Figure 8-31: Recalling a Module File



Recalling a Module file overwrites all data currently stored in the selected Module and removes the Module from any Groups.



EAW® Greybox file (.gyx) may also be recalled directly into the Modules of PLM Series devices. Please refer to chapter 9 for further details.

8.6.2 Store

The STORE button stores over an existing file. This button is active only when a file is selected.

1. Tap an existing file to store over (overwrite).
2. Tap STORE.
3. Confirm the action by tapping the YES button in the warning message.



If the selected file is set to READ ONLY, the STORE function is gray (inactive).

8.6.3 New Store

The NEW STORE button stores the current Module configuration under a new file name.

1. Navigate the file system, and tap the desired destination folder to select it.
2. Tap NEW STORE.
3. Enter the file name.
4. Tap OK.
The scroll bar displays the new file

8.6.4 Base Configuration

A base configuration file defines a starting point for the Module setup. It contains EQ and levels settings, invisible to the user, which represent the appropriate general configuration for a particular speaker type.

EQ, LEVELS and XOVER settings for an existing Module may be stored as a base configuration for future use when configuring new Modules. A system designer can also lock access to the XOVER/AUX screens (Contour) or HPF/LPF screen (Mesa EQ) within the base configuration file. For details on this function, please refer to chapter 18.

The RECALL/OPEN, STORE, and NEW STORE functions operate identically as described above, but the available files/folders in the scroll bar change when BASE CONFIGURATION is selected.

To store or recall a base configuration file, perform the following steps:

1. Select a Module icon in the work area.
2. Tap MODULE STORE/RECALL from the MODULES menu.
3. Tap BASE CONFIGURATION.
4. Navigate to the desired folder/file.
5. Use the RECALL/STORE/NEW STORE functions as required.



A base configuration file cannot be created from a Virtual Frame.

8.6.5 File Utilities

This button provides a submenu containing further functions that manage files and folders from within the Lake Controller.

8.6.5.1 Open

This button is active only when a folder is selected. Tap OPEN to open the selected folder.

8.6.5.2 Read Only

This function protects important files from being accidentally overwritten or deleted and is active only when a file is selected. The currently selected file's status is identified by the color of the READ ONLY button:

- ▶ ORANGE - indicates the selected file is set to READ ONLY.
- ▶ BLUE - indicates the selected file is not protected.

To change the Read Only status of a file:

1. Tap a file from the scroll bar to select it.
2. Tap READ ONLY to toggle function ON (orange) and OFF (blue).

8.6.5.3 Rename

This button allows the name of a file/folder to be changed.

1. Tap the required file/folder from the scroll bar, then tap RENAME.
2. Enter the new name, and tap OK.

8.6.5.4 Delete

This button is active only when a file or folder is selected. When a file is selected, this function will only be available if the file is not set to READ ONLY. To delete a file or folder:

1. Tap a file or folder to select it, then tap DELETE.

2. Confirm action by tapping YES in the warning message.



Deletion of a file is permanent and cannot be restored using the UNDO function.

8.6.5.5 New Folder

This button creates a new folder in the current directory.

1. Navigate to the desired directory location and tap NEW FOLDER.
2. Enter the folder name, and tap OK.

8.6.6 Frame Presets (LM and PLM Series Only)

A Frame preset is effectively a configuration for the device that is stored in local memory inside the device for fast retrieval with or without the Lake Controller.

There are 100 preset locations available for LM and PLM Series devices; the MY8-LAKE card does not support presets as the host controls all snapshot/preset functionality.

Frame presets can be recalled instantly using the front panel, without the use of the Lake Controller software. For further information on presets and the Preset Manager Utility, please refer to chapter 26.

The FRAME PRESETS button provides a submenu containing the functions described below.

8.6.6.1 Store

This button is active only when a Module of an online Frame is selected and a preset location is selected that is not empty (such as when overwriting an existing preset).

To overwrite the settings of the Frame preset:

1. Recall or configure both Modules of the Frame with the required settings.
2. Tap a Module icon of the Frame containing the data you wish to store.
3. Tap FRAME PRESETS from the MODULE STORE/RECALL menu.
4. Select a previously used preset location, and tap STORE.

8.6.6.2 Store with New Name

This button is active only when a Module of an online Frame is selected and a preset location is selected. The function is similar to STORE, but always provides the on-screen keyboard for entering a preset name.

8.6.6.3 Clear

This button is active only when a Module of an online Frame is selected and a preset location containing data is selected. To delete the data in a preset location, perform the following steps:

1. Tap a Module icon of the Frame containing the preset for deletion.
2. Select the preset location from the scroll bar.
3. Tap CLEAR, then YES to the warning message.

8.7 Add Page

The ADD PAGE function is always available from the MODULES menu and creates additional pages that help manage large systems that contain many Module and Group icons.

8.8 Super Modules (LM and PLM Series Contour Modules only)

Super Modules enable the user to control Contour Modules that span multiple Frames (LM and PLM Series devices only) as a single entity in the user interface. A Super Module can be a combination of two or more processing Modules on the same or different Frames that act together to provide the same audio processing with flexible output routing.

8.8.1 Assigning Super Modules

1. Tap MODULES.
2. Tap a Module on the scroll bar, and place it in the work area.
3. Tap SUPER MODULES from the MODULES menu.
A Venn icon that represents the combination of multiple Modules appears in the scrolling bar as shown in Figure 8-32.
4. Tap this Super Module icon and place it in the work area.
The icon displays as a Super Module marked as empty.

5. Tap the empty Super Module to select it, then tap ASSIGN MODULE.
A message displays, advising Group assignments of the first Module assigned to a Super Module will be transferred to subsequently assigned Modules.
6. Tap the icons for Modules to be included in the Super Module.
The Modules are assigned to the Super Module and removed from the work area. The Modules contained in the Super Module appear in the scrolling bar when the Super Module is selected.

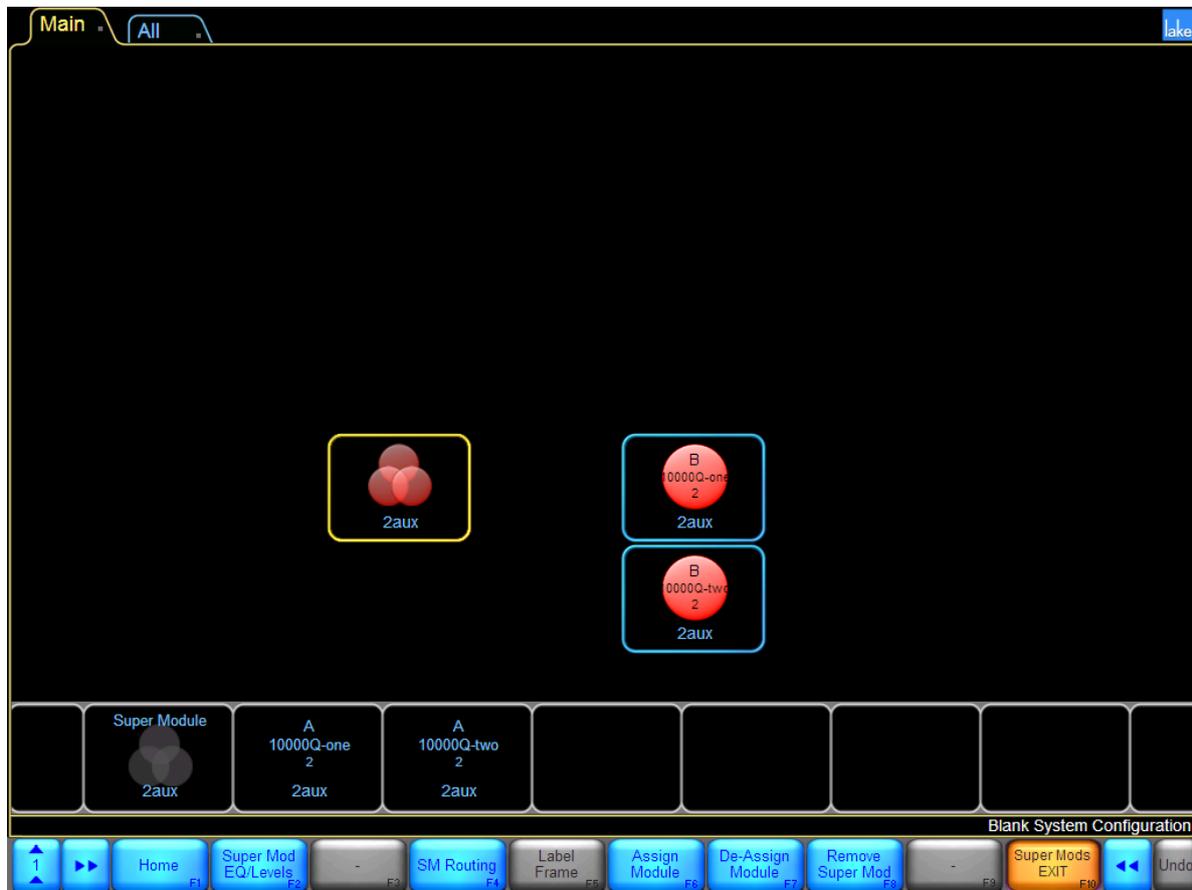


Figure 8-32: Super Modules

8.8.2 Super Module EQ/Levels or Module EQ/Levels

These functions enable you to view or change the EQ levels of a Module or Super Module. When a Module is selected, you change only the EQ and level of that Module. When a Super Module is selected, you change the EQ and level for all Modules contained in that Super Module. See chapter 7 for more information on EQ/Levels.

To view the EQ/Levels of a Module or Super Module, tap the Module or Super Module to select it, then tap SUPER MOD EQ/LEVELS or MODULE EQ/LEVELS.

8.8.3 SM Routing: I/O Config

This button reads I/O CONFIG when a Module is selected and SM ROUTING when a Super Module is selected. For further information on the I/O CONFIG option, please refer to section 8.2.

The SM ROUTING function displays the Super Module output routing pop-up window. It shows each of the elemental Modules contained in the Super Module and its available output routing options.

To configure routing for a Super Module:

1. From HOME, tap MODULES.
2. Select a Super Module in the work area.
3. Tap SM ROUTING.

Figure 8-33 shows the SM ROUTING screen for a stereo Classic 4-Way configuration split across two Lab.gruppen PLM 10000Q amplifiers. The sub and low channels are being driven by one amplifier in Bridged Mode, and the mid and high channels by a separate amplifier in normal mode.

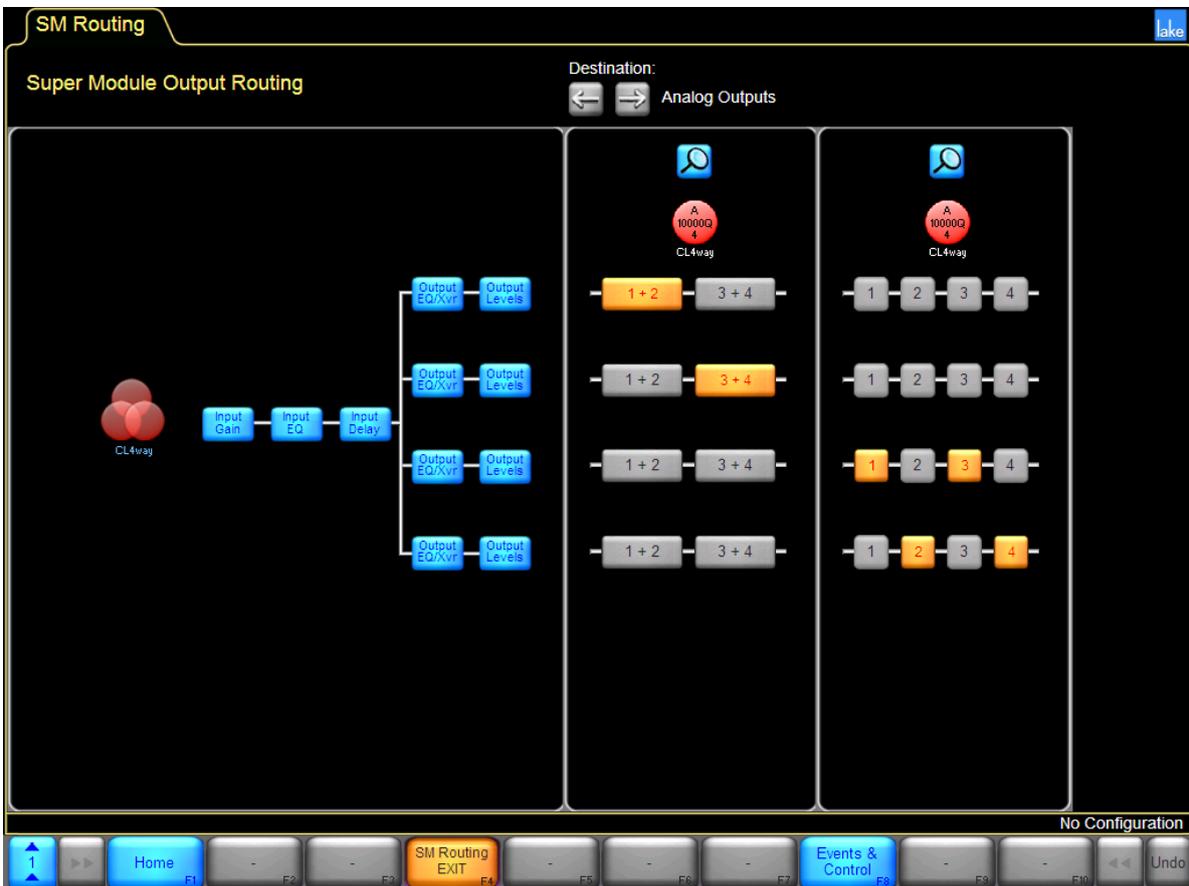


Figure 8-33: SM Routing Screen

With this Super Module configuration, two 4-Way speakers can be controlled simultaneously via one Super Module icon, with all changes to levels, EQ and crossover being duplicated in real time across both amplifiers.

The DESTINATION arrow icons  enable selection of available output types. The magnifying glass icon  navigates to the I/O CONFIG screen of the associated Frame. Please refer to section 8.2 for further details.

The SM Routing screen is divided into two sections. The left side contains the interactive block diagram that provides access to Super Module settings; the right side displays output configuration information for each Module.

8.8.4 Label Frame

To label a Frame, perform the following steps:

1. Select a Module in the work area, or from the Super Module scroll bar if all Modules of the Frame are already assigned to a Super Module.
2. Tap LABEL FRAME

8.8.5 De-assigning a Super Module

To de-assign a Super Module:

1. Select a Super Module in the work area and tap DE-ASSIGN MODULE [F7]
2. Tap the Module icons on the scroll bar to remove them from the Super Module

8.8.6 Remove Super Module

To remove a Super Module:

1. Tap the Super Module icon in the work area and tap REMOVE SUPER MOD.
A message appears, advising that removing the Super Module disassociates it with all the Modules currently assigned to it.
2. Tap YES to proceed. The Super Module disappears.



A Super Module can also be removed by dragging it to the Super Module scroll bar.

9. Module File Types & LoadLibrary™

Lake devices provide two categories of Modules; Contour Modules and Mesa Modules. Contour Modules are suitable for devices that can perform loudspeaker crossover functionality, and Mesa Modules are suitable for devices that provide equalization only.

This chapter provides a detailed reference for all Lake Module file types. Default Module files are located in the Default Modules folder and can be accessed and recalled utilizing the MODULE STORE/RECALL menu.

9.1 Module Types Overview

Within the Contour Module category, there are four distinct types of Module:

1. Classic Crossover Modules (featuring Bessel, Butterworth, and Linkwitz-Riley crossovers, available with roll-off ranging from 6 dB/octave to 48 dB/octave).
2. Auxiliary Output Modules (provides EQ only functionality with a single input mix to multiple outputs when in Contour Mode).
3. Linear Phase Crossover Modules (providing zero phase distortion with steep transition slopes using FIR filters).
4. FIR Modules (combination of FIR filters, Classic crossovers, and output-specific driver EQ) - only available on PLM Series devices via the import of EAW Greybox files (.gyx), providing support for EAW Focusing.

The MESA EQ Module category provides a signal Module type of MESA EQ, that it defaulted for use as a single input to single output, full bandwidth EQ Module and also provides HPF/LPF functionality.

9.2 Supplementary Module Data

Any Module file may contain additional parameters relating to the PLM output stage, including Amplifier Gain and ISVPL™ limiter. These parameters are used when the file is loaded into a PLM device and ignored when loaded into another Lake device; these parameters are retained and passed through to new Module files via the Module/System Store commands.

Additionally, loudspeaker electrical characteristic parameters (termed Fingerprint and used for load verification (LoadSmart™) and monitoring (SpeakerSafe™) for PLM devices) are stored and recalled via a supplementary “.mdl” file with the same filename. This Fingerprint file must be present in the same directory as the Module file; it is stored and recalled for PLM devices, and ignored for other Lake devices. Fingerprint data may be reconnected with a Module file simply by renaming or moving the mdl file to ensure it has the same filename and directory location as its associated Module file.

9.3 Module Type Abbreviations

Figure 9-1 identifies the Module type abbreviation code.

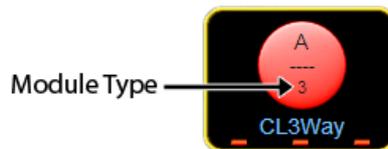


Figure 9-1: Module Icon indicating Module Type Code

Table 9-1 describes the various abbreviation codes along with the associated Module description.

Abbr.	Description
1	1-Auxiliary Outputs
2	Classic 2-Way or 2-Auxiliary Outputs
2+1	Classic 2-Way + 1-Auxiliary Outputs
3	Classic 3-Way or 3-Auxiliary Outputs
3+1	Classic 3-Way + 1-Auxiliary Outputs
4	Classic 4-Way or 4-Auxiliary Outputs
5	Classic 5-Way or 5-Auxiliary Outputs
6	Classic 6-Way or 6-Auxiliary Outputs
LP2	Linear Phase 2-Way + 1-Auxiliary Outputs
LP3	Linear Phase 3-Way
LP4	Linear Phase Brick Wall 4-Way
FIR1	FIR 1-Way
FIR2	FIR 2-Way
FIR3	FIR 3-Way
MEq	Mesa EQ

Table 9-1:

Module Type Abbreviations



The Mesa EQ Module can only be used on LM Series and MY8-LAKE devices.



The FIR Modules can only be used on PLM Series devices.

9.4 Classic Crossovers/Auxiliary Outputs

This section describes the available combinations of classic crossovers and shows the default signal path for each configuration.

Classic 2- or 3-Way Modules, or any Module with requiring less than three channels, may be used in any combination on a Lake device. Linear Phase 2-Way and 3-Way Modules may also be recalled in any combination alongside classic crossover Modules.

Classic 4-, 5-, and 6-Way Modules, as well as Modules requiring more than three channels, are provided as fixed configuration options. A Module with more than three channels may only be recalled into Module A or C and, in most cases, the remaining outputs of the device can be configured to provide other crossovers and auxiliary outputs.

9.4.1 Classic 2-Way + 1-Auxiliary Outputs

The CL2w+1a Module provides an auxiliary output that can be driven by the post-input EQ signal, or its own independent input mix. By default, the auxiliary output is driven by the post-input EQ signal.

If you switch the auxiliary channel to receive input from its own input mixer, the auxiliary channel will no longer be muted by the Module input mute control. The auxiliary channel can be muted by the channel's output mute control.

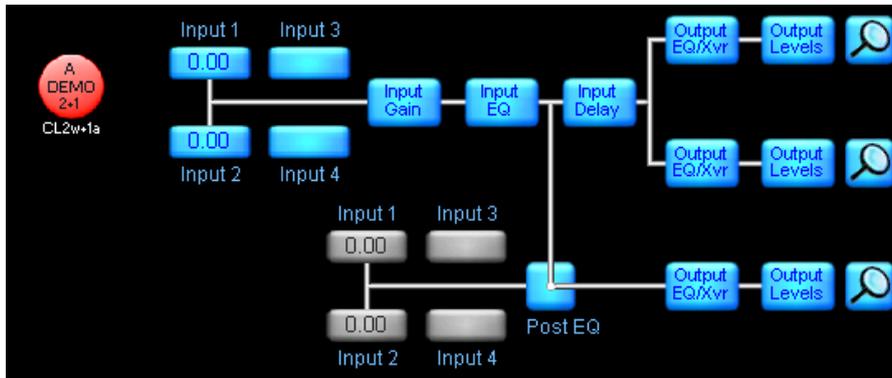


Figure 9-2: Classic 2-Way+1-Auxiliary Outputs

To change the auxiliary output to receive its own independent input mix, tap the switch selector box labeled POST EQ.

9.4.2 Classic 3-Way and 3-Auxiliary Outputs

The signal paths for both of these Module types look similar, but the Classic 3-Way (shown in Module A) has a single crossover page providing specific frequency bands from each output.

The 3-Auxiliary Outputs Module provides three full-bandwidth channels per Module. Each of these outputs can be configured independently as required using traditional high-pass and low-pass filters, which are available on each independent Auxiliary Output page.

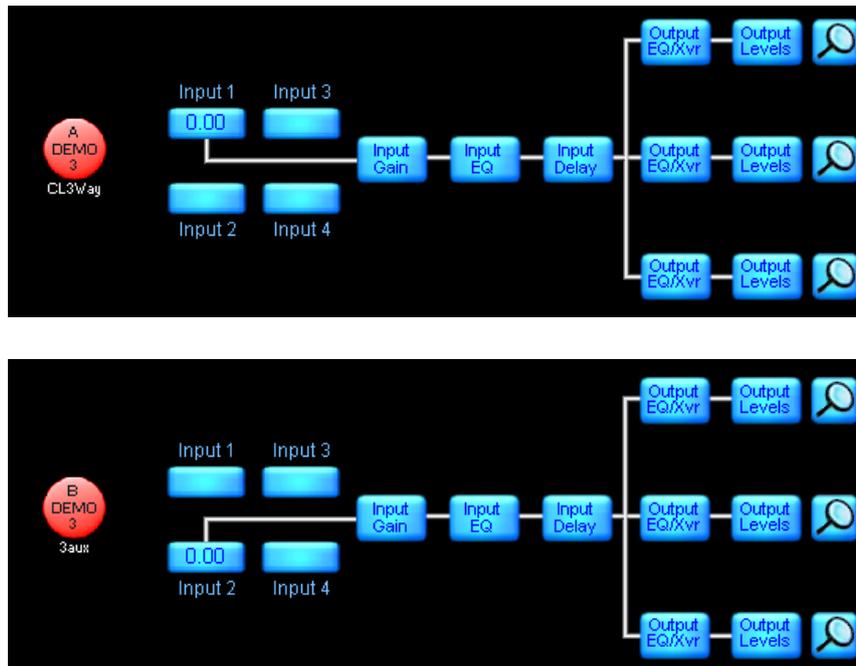


Figure 9-3: Classic 3-Way and 3-Auxiliary Outputs



The Classic 2-Way, Classic/Linear Phase 2-Way + 1-Auxiliary Outputs, Classic/Linear Phase 3-Way, and Classic 3-Auxiliary Outputs Modules can be used in any combination on all available Modules.

9.4.3 Classic 3-Way + 1-Auxiliary Outputs (with Classic 2-Way/2-Aux)

The Classic 3-Way + 1-Auxiliary Output (CL3w+1a) Module allows the remaining two output channels to be configured as either Classic 2-Way or 2-Auxiliary Outputs.

Separate input EQ (PEQ/GEQ) is available for the CL3w+1a and the 2-Way/2-Aux Modules.

As with the Classic 2-Way + 1-Auxiliary Outputs Modules, the Auxiliary channel on the CL3w+1a can be fed POST INPUT EQ, or from its own independent Input Mixer.

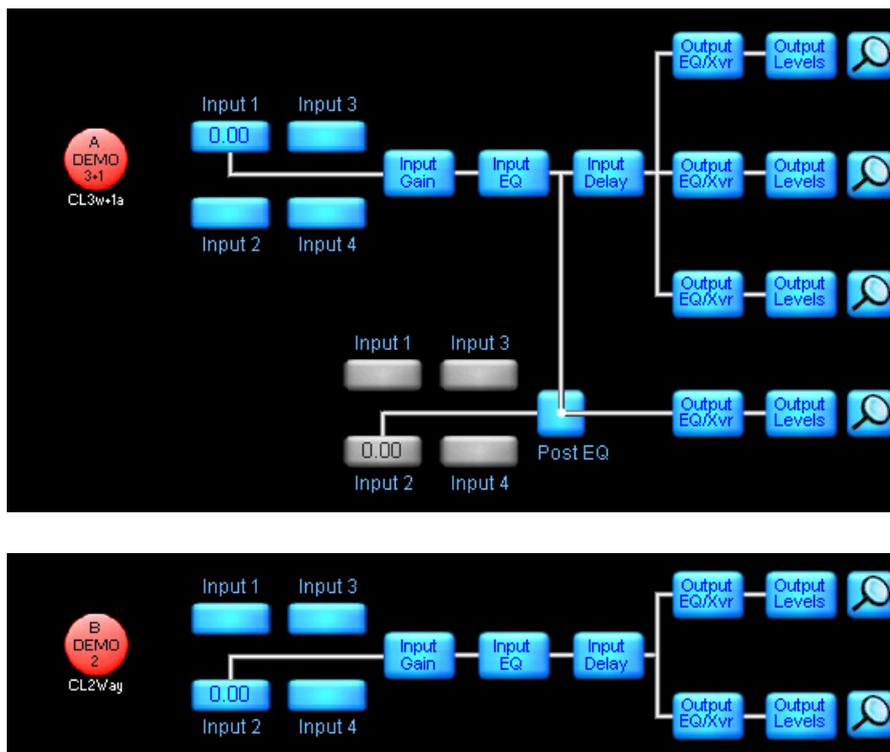


Figure 9-4: Classic 3-Way+1-Aux with Classic 2-Way

9.4.4 Classic 4-Way/4-Aux (with Classic 2-Way/2-Aux)

The Classic 4-Way (CL4way) or 4-Auxiliary Outputs (4aux) Modules allow the remaining two output channels to be configured as either Classic 2-Way or 2-Auxiliary Outputs.

Separate input EQ (PEQ/GEQ) is available for the Classic 4-Way/4-Aux and the 2-Way/2-Aux Modules

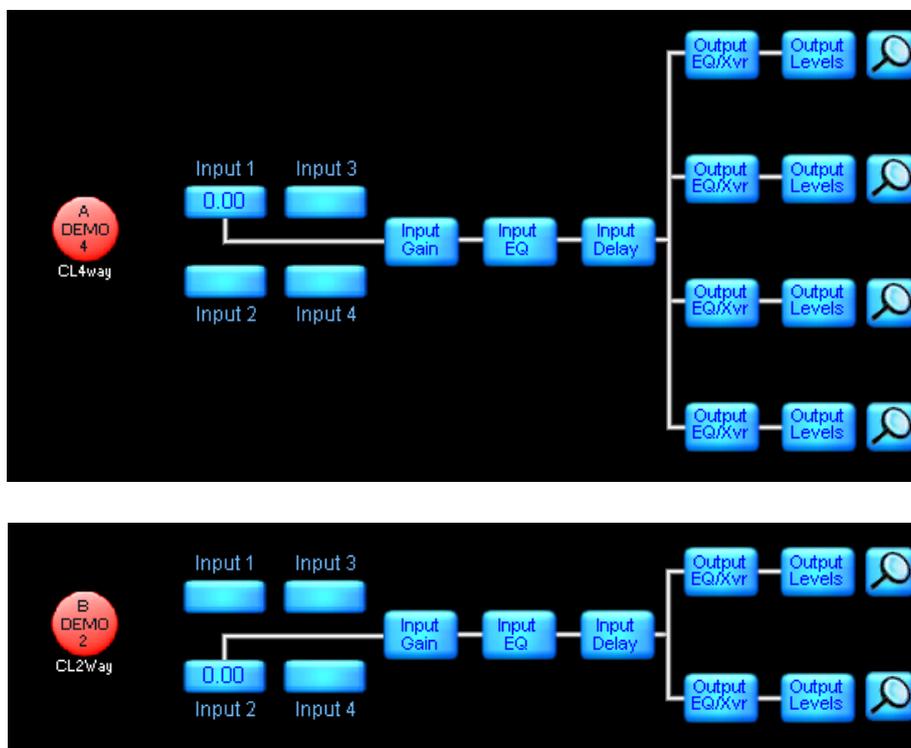


Figure 9-5: Classic 4-Way with Classic 2-Way

9.4.5 Classic 5-Way/5-Aux (with 1-Auxiliary Outputs)

The Classic 5-Way (CL5way) or 5-Auxiliary Outputs (5aux) Module provides an auxiliary channel on output 6.

Separate input EQ (PEQ/GEQ) is available for the Classic 5-Way/5-Aux and the 1-Auxiliary (1aux) Output Modules

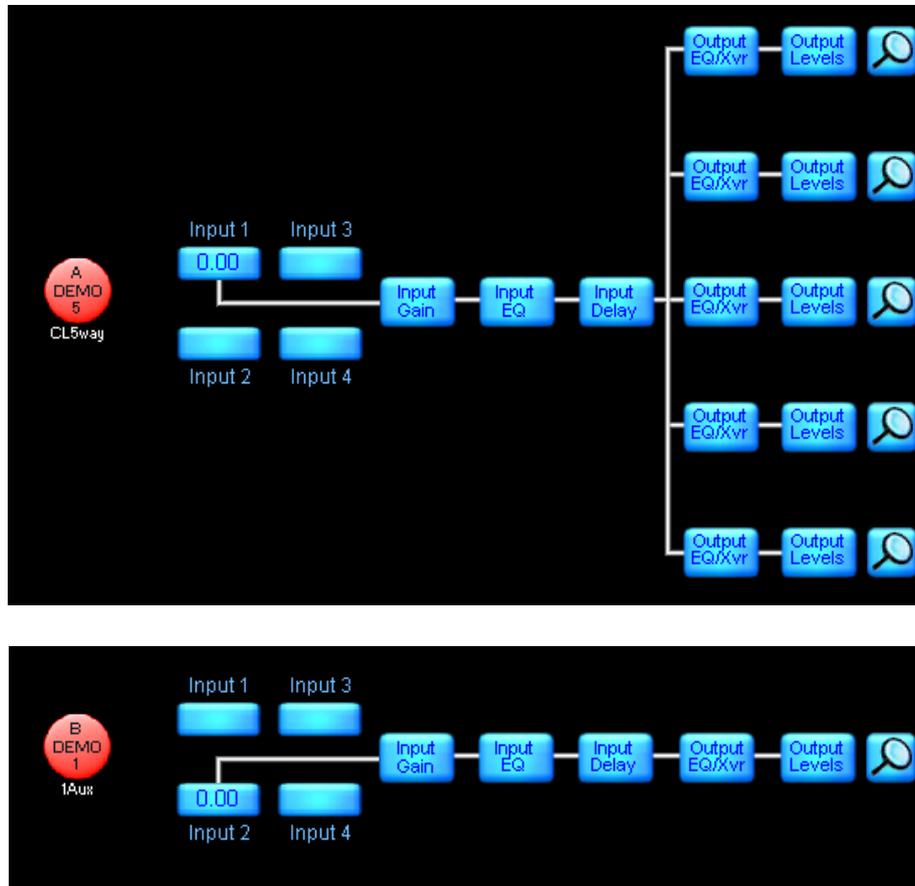


Figure 9-6: Classic 5-Way with 1-Auxiliary Outputs

9.4.6 Classic 6-Way/6-Auxiliary Outputs

The Classic 6-Way (CL6way) or 6-Auxiliary Outputs (6aux) Modules use a single Module input mix with the output split to all six output channels.

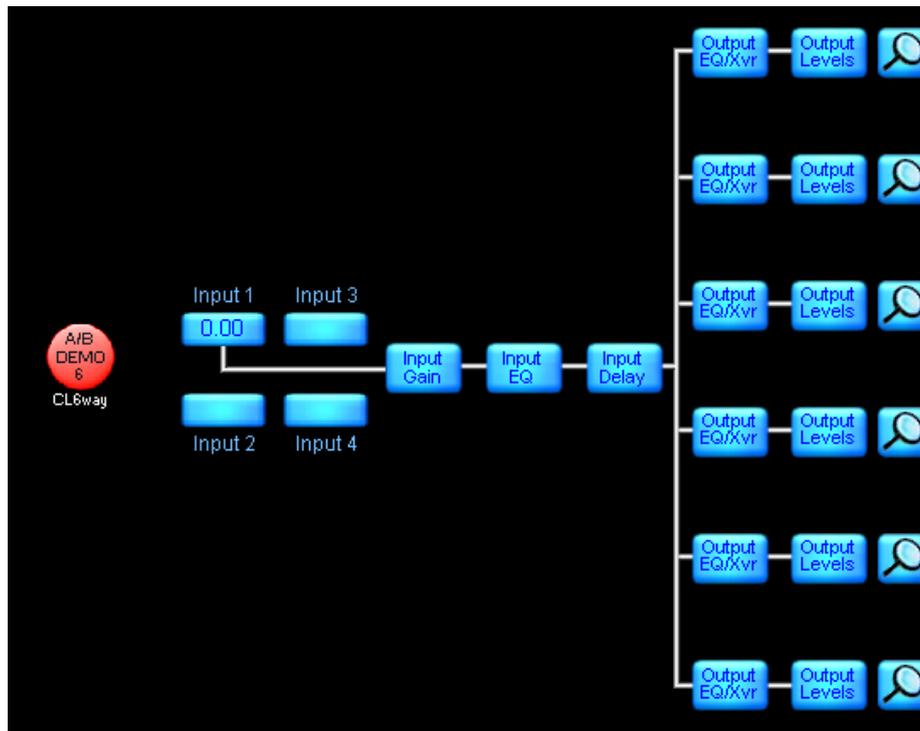


Figure 9-7: Classic 6-Way

9.5 Linear Phase Crossovers

Linear phase modules utilize FIR filters to create steep transition slopes to divide the frequency bands. The phase response of all channels summed together is flat and therefore all frequencies are equally delayed which results in no phase distortion. Linear phase crossovers are available as 2-, 3-, and 4-Way Module types.

9.5.1 Linear Phase 2-Way (+1-Auxiliary Outputs)

The Linear Phase 2-Way (LP2way) provides an auxiliary channel with traditional HPF/LPF for each Module (LP2w+1a).

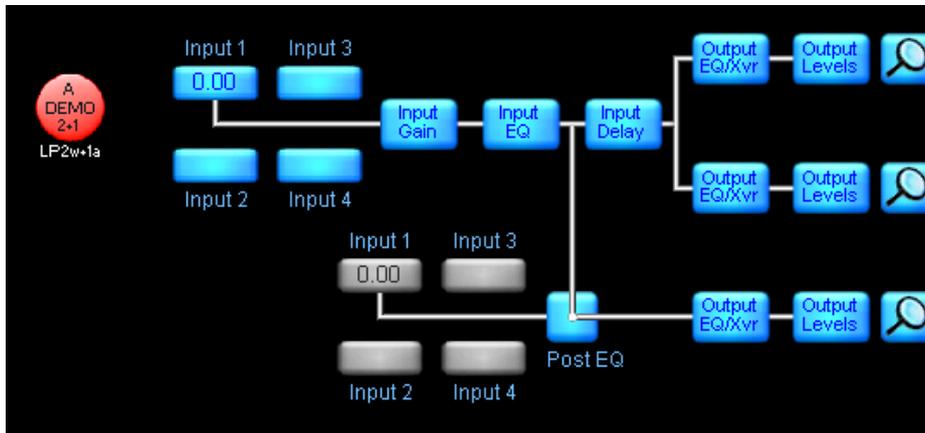


Figure 9-8: Linear Phase 2-Way + 1-Auxiliary Outputs

9.5.2 Linear Phase 3-Way

The Linear Phase 3-Way (LP3way) has a similar signal path to the Classic 3-Way (CL3way).

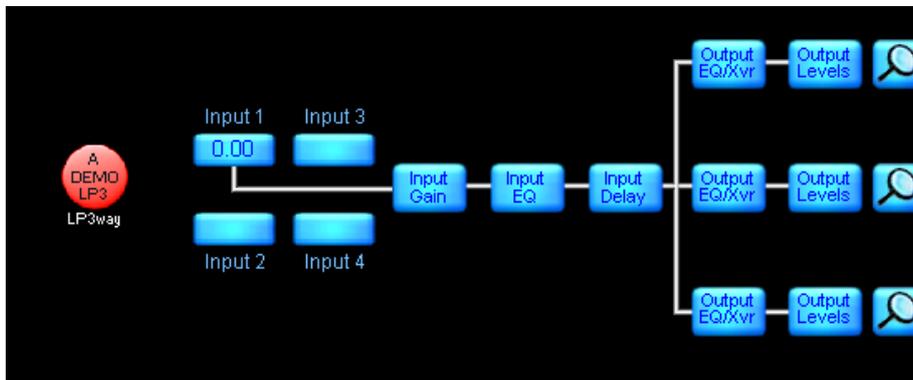


Figure 9-9: Linear Phase 3-Way

9.5.3 Linear Phase 2-/3-Way EQ/MaxPeak combinations

The LP2 and LP3way Modules use a significant amount of processing power to create steep crossovers with flat phase response. For this reason, the full amount of output-specific EQ filters can only be used if the MaxPeak is disabled on the Module, as the MaxPeak Limiter also requires a large amount of processing.

The MaxPeak Limiter process is disabled when the total MaxPeak level (including Group and factory settings) is 25 dBu or greater. The following crossover EQ filters for the LP2 and LP3way are available:

- ▶ MaxPeak Activated: 10 EQ Filters + High-pass Filter
- ▶ MaxPeak Deactivated: 15 EQ Filters + High-pass Filter

9.5.4 Linear Phase Brick Wall 4-Way

The Linear Phase Brick Wall 4-Way (LP4way) uses the processing power of two Modules to create extra-steep crossovers.

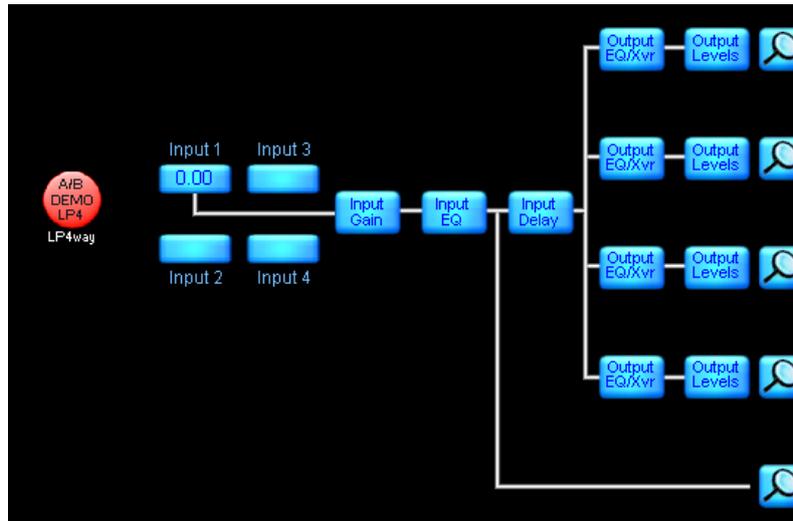


Figure 9-10: Linear Phase Brick Wall 4-Way

9.6 FIR Module [PLM Series Devices Only]

PLM Series devices support the FIR Module type, which incorporates a combination of FIR and IIR technology. The extensive FIR filters can be used to create both crossovers and driver EQ. The phase can be absolutely controlled rendering linear phase, minimum phase, or arbitrary phase filters. The IIR filters can be used to create classic crossovers and specific driver EQ.

FIR modules supports EAW Focusing through direct import of EAW greybox files into the Lake Controller. The latest EAW greybox files can be downloaded via: <http://www.eaw.com/downloads/>

9.6.1 FIR 1-Way for EAW Greybox Import [PLM Series Devices Only]

The FIR 1-Way (FIR1) is a FIR/IIR processing program capable of EAW Focusing, and uses the processing power of two Modules. This program is activated by recalling a EAW Greybox (.gyx) file in the Lake Controller.

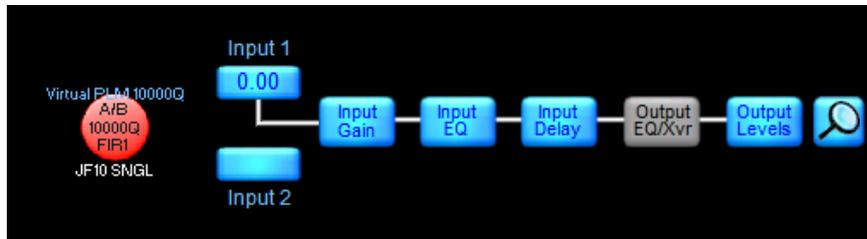


Figure 9-11: FIR 1-Way

9.6.2 FIR 2-Way for EAW Greybox Import [PLM Series Devices Only]

The FIR 2-Way (FIR2) is a FIR/IIR processing program capable of EAW Focusing, and uses the processing power of two Modules. This program is activated by recalling a EAW Greybox (.gyx) file in the Lake Controller.

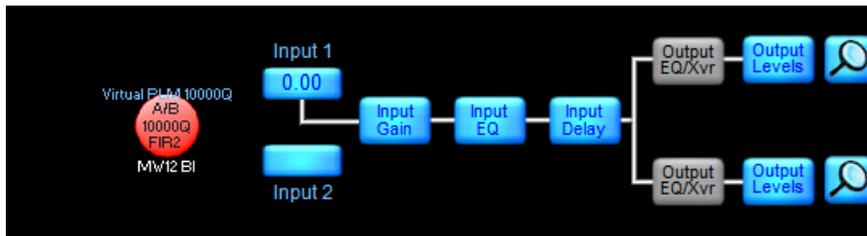


Figure 9-12: FIR 2-Way

9.6.3 FIR 3-Way for EAW Greybox Import [PLM Series Devices Only]

The FIR 3-Way (FIR3) is a FIR/IIR processing program capable of EAW Focusing, and uses the processing power of two Modules. This program is activated by recalling a EAW Greybox (.gyx) file in the Lake Controller.

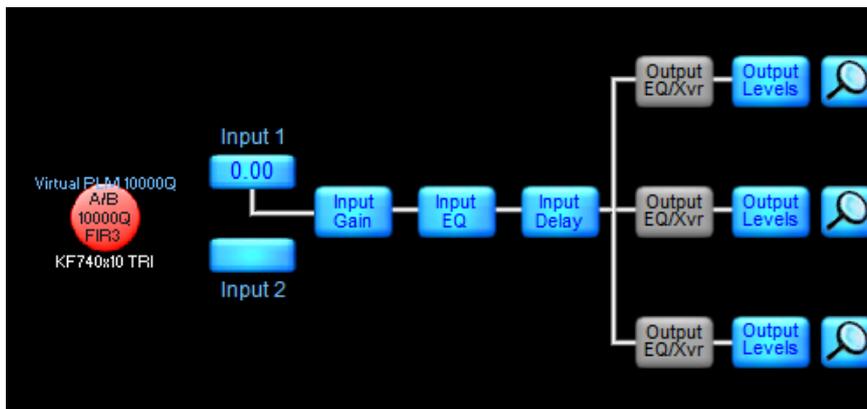


Figure 9-13: FIR 3-Way

9.7 Mesa EQ Module

The Mesa EQ Module type is abbreviated as MEq on the Module icon. The Mesa EQ provides EQ only (with HPF/LPF) functionality.

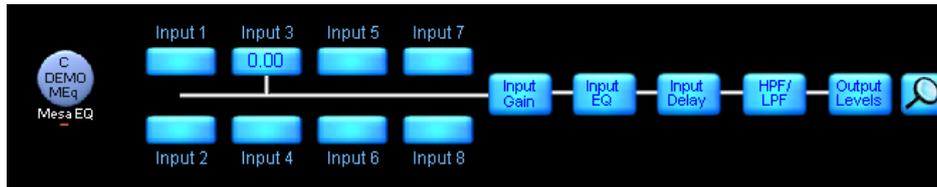


Figure 9-14: Mesa EQ

9.8 LoadLibrary

The LoadLibrary is a collection of Module files and Frame Presets that are distributed with the Lake Controller. LoadLibrary presets can include individual or sets of Contour or Mesa Module files, and can also include additional parameters specific to certain devices either within the Module file itself, or via a supplementary .mdl file as explained in section 9.2.

The LoadLibrary can include:

1. Presets designed by the loudspeaker manufacturer
2. Presets designed by Lab.gruppen
3. Presets designed by the Lake community (end-users)

10. Groups Menu Reference

Groups provide powerful control over all Modules in a system. Modules can be assigned to multiple Groups, and each Module can be a member of up to 28 different Groups.

Groups enable several important functions, including the following:

1. Master EQ and Levels control over an entire system
2. EQ and Levels control over subsections of a system (for example, speaker clusters)
3. HPF/LPF/Crossover/Auxiliary Output ganging, allowing a change to a crossover or output-specific EQ to be reflected across all Modules of the same type within the Group
4. Simplified control over multiple speakers or zones

Once the speakers are configured, the Modules that control each speaker's response can be locked using Designer Mode security features; alternatively, individual Modules can be placed on a separate page, leaving Groups to simplify the overall control of the audio system.

Multiple Groups can be used to logically partition a large-scale loudspeaker system. For instance, Modules driving the left loudspeaker array can be grouped to create a left sub-master, or Groups can be used to control the center cluster, side-array, side-fill, down-fill, front-fill, and delay systems. A master Group can be created to enable a system-wide interface for EQ and Levels, allowing instant adjustments to all Lake devices on the network.

10.1 Adding a Group

Tap the GROUPS button from the HOME menu. The available Group icons appear in the scroll bar. Most options in the button bar appear gray and are inactive until a Group is moved from the scroll bar to the work area.



Figure 10-1: Groups Menu

The GROUPS scroll bar in Figure 10-1 shows the status of different Group icons while on the scroll bar.

- ▶ Group 1 (empty) is being used in the current system configuration.

- ▶ Group 2 (gray) is assigned to a Module that is not a part of the current system configuration.
- ▶ Groups 3 through 28 are available for use and are not currently assigned to any other Modules.

Tap and drag the scroll bar to the left/right or tap the << or >> buttons to access additional Group icons.

To add a Group to the system configuration, perform the following steps:

1. Tap a Group icon on the scroll bar. The cursor changes to the Group icon.
2. Tap somewhere in the work area to add the Group to your system configuration.
3. Follow the instructions in section 9.3 to assign Modules to the Group.

10.2 EQ/Levels

Tap the EQ/LEVELS button from GROUPS to display the parametric EQ, graphic EQ, and Levels screens for the selected Group. This function is active only when a Group is selected in the work area.

Module level limits are always adhered to when Group levels are changed. If one Module in the Group would exceed its level limit as a result of a change to Group data, then the change will not be allowed.



Level limits can be adjusted in Designer Mode.

10.3 Assign

Changes made to the Group EQ/Levels affect only those Modules assigned to that Group. Before assigning Modules to a Group, make sure the required Modules and Groups are in the work area and navigate to the Groups menu.

To assign Modules to a Group, perform the following steps:

1. Tap ASSIGN to activate the function.
2. Tap a Group icon. The icon illuminates yellow.
3. Tap each Module icon you wish to assign to that Group. Each Module icon's border illuminates yellow indicating it is assigned to the selected Group.
4. Tap ASSIGN to deactivate the function.

Module Group assignments can be verified by selecting a Group icon in the work area. The selected Group and associated Module icons will display yellow borders as shown in Figure 10-2.

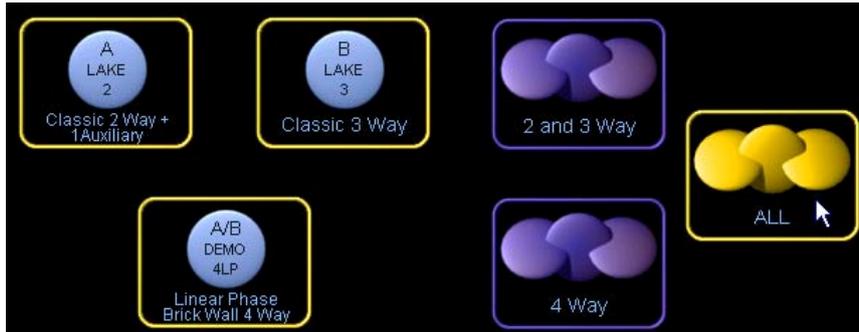


Figure 10-2: Group Assignment Indication



Modules will not allow assignment of Group/s if it will result in level limits being exceeded. Warning messages will be displayed if a Group assignment would cause the Module to exceed its level limits.



The first Module assigned to the Group will be used for Group level metering purposes. This metering assignment can be changed later if required; please refer to section 7.2.8.

10.4 Label

The Group label is a user-defined value at the bottom of the Group icon that is useful for identifying the part of the sound system to which the Group communicates (front of house, monitors, down-fill, and so on).

To label a Group, perform the following steps:

1. Tap the desired Group icon.
2. Tap LABEL and enter a Group label.
3. Tap OK.

10.5 Copy/Paste

Select a Group in the work area, and tap COPY/PASTE to view a submenu that transfers attributes between Groups.

10.5.1 Copy

The COPY button is active only when a Group icon is selected. To copy data from a Group, tap the Group icon that contains the data to be copied, then tap COPY.

10.5.2 Paste

The PASTE button is active only when Group data has been previously copied and a Group icon is selected. To paste data to a Group, tap the Group icon in which to paste the copied data then tap PASTE.



The Paste operation overwrites all the destination Group's EQ and Levels settings, but not the Module label or Module assignments.

10.6 Remove

This function removes the selected Group from the current system configuration. To remove a Group, select the Group icon, tap REMOVE, then tap YES to the warning message.

The warning message is displayed only if the Group has Modules assigned to it. The Group icon reappears in the scroll bar indicating it is not currently in use.



A Group can also be removed by dragging the icon back to the GROUPS scroll bar.

10.7 Gang

Tapping this button activates a scroll bar containing all Modules currently assigned to the selected Group, along with a submenu.



Figure 10-3: Group Gang Menu

10.7.1 Gang Xover/Aux or Gang HPF/LPF

This button read GANG XOVER/AUX when a Group containing Contour Modules is selected, and GANG HPF/LPF when a Group containing Mesa EQ Modules is selected. These functions allow the crossovers, auxiliary output channels, and HPF/LPF settings of Modules on different Frames to be linked together.

- ▶ When GANG XOVER/AUX is active on a Group containing crossover Modules, the crossovers, HPF/LPF, and auxiliary channels of all Modules in the Group are synchronized. A change made in one Module will be reflected in all Modules of that Group.
- ▶ When Gang HPF/LPF is active on a Group containing Mesa EQ Modules, the HPF/LPF will be linked on all Modules in the Group.

To gang the crossover or HPF/LPF of all Modules in a Group, perform the following steps:

1. Assign the Modules to a Group. All Modules must be of the same crossover type, such as Classic 3-Way (CL3way), for example.



All Modules must be of the same Module type, such as a Classic 3-Way (CL3way), for example.

2. From the GROUPS menu, tap GANG.
3. Tap the Module on the scroll bar to select which Module's settings will be transferred to all other Modules in the Group.
4. Tap GANG XOVER/AUX (Contour Modules) or GANG HPF/LPF (Mesa EQ Modules).
5. Tap YES to the warning message.



Only the XOVER/AUX/HPF/LPF and associated OUTPUT EQ data is ganged. LEVELS data and INPUT EQ (PEQ/GEQ) cannot be ganged. Use Group EQ/LEVELS to control multiple Modules.



To synchronize all data across multiple Modules, you can use the powerful SUPER MODULE feature. Refer to section 8.8 for details.

10.8 Add Page

The ADD PAGE function is always available from the GROUPS menu and creates additional pages that help manage large systems with many Module and Group icons.

11. Solo/Mute Menu Reference

The functionality provided by the SOLO/MUTE menu provides an invaluable tool for the sound engineer during system setup and optimization. The solo function allows specific Module or Groups to be isolated, instantly muting the rest of the system. This allows for rapid measurement and analysis, including lobe studies in large, complex systems.

Tap SOLO/MUTE from the HOME menu. This action displays a submenu with mute and solo functions for Modules and Groups.

11.1 EQ/Levels

Tap EQ/LEVELS from the SOLO/MUTE menu to display the parametric EQ, graphic EQ, XOVER, and LEVELS screens for the selected Module or Group. This function is active only when a Module or Group icon has been selected.



When SOLO/MUTE is enabled, EQ/LEVELS can only be accessed for a Module that is in SOLO mode.

The ability to access EQ/LEVELS from the SOLO/MUTE button bar is necessary as the Lake Controller will exit SOLO/MUTE mode when you navigate to other areas of the user interface. This is a safety feature to ensure that no Modules or Groups are left accidentally muted.

Additionally, context switching is also disabled to ensure that no Modules or Groups are left accidentally muted.

11.2 Solo/Mute Enable

Tap SOLO/MUTE ENABLE button to toggle the SOLO/MUTE functionality ON (orange) and OFF (blue). While the SOLO/MUTE function is on, icons are red when muted or green when in solo mode. All Modules default to solo mode when SOLO/MUTE is first turned on.

Tap a Module or Group icon to keep solo mode active on that Module (or all Modules in the selected Group) and mute all other Modules in the system. Tap the same icon again to UNMUTE all Modules.

Figure 11-1 shows Module B of a Frame in solo mode. The other two Module icons are muted through the SOLO/MUTE function.

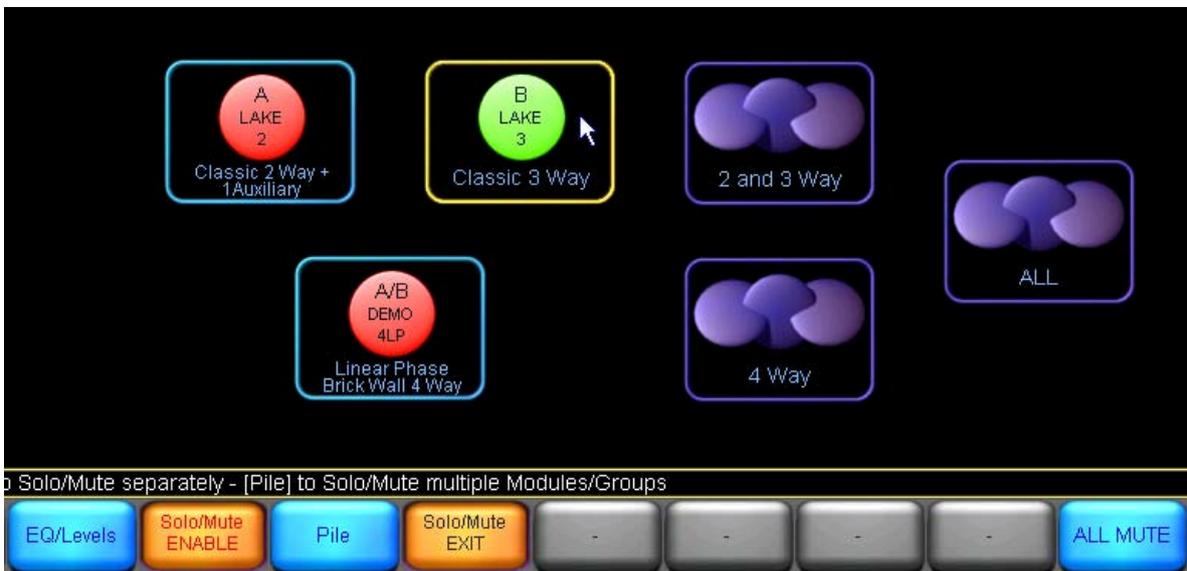


Figure 11-1: Solo/Mute

11.3 Pile

The Pile function allows for multiple Modules or Groups to solo at the same time.

1. Tap SOLO/MUTE ENABLE from the SOLO/MUTE menu. The button illuminates orange.
2. Tap PILE. The button illuminates orange.
3. Tap a Module or Group icon to solo. Repeat for other Modules or Groups to solo.
4. Tap SOLO/MUTE ENABLE again to exit this function.

11.4 All Mute

To mute all Modules in a system, perform the following steps:

1. Tap SOLO/MUTE ENABLE from the SOLO/MUTE menu. The button illuminates orange.
2. Tap ALL MUTE.
3. Tap SOLO/MUTE ENABLE or SOLO/MUTE EXIT to resume normal status.

12. Icon Control Menu Reference

The functionality provided through the ICON CONTROL menu allows configuration icon size and an option to change the icons to show input and output metering. Pages can be configured to provide an overview of all Modules on the network, providing a system-monitoring interface including both level and limiting activity.

12.1 Meters On/Off

This feature is active for Modules and Groups when an icon is selected. Meters on the icon display input and output levels, limiting, clipping, and the Module label.

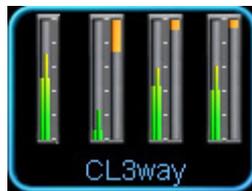


Figure 12-1: Icon Metering

To toggle meters on and off:

1. Tap ICON CONTROL from the HOME menu.
2. Tap METERS ON/OFF. The button illuminates orange.
3. Tap the Module or Group icon to toggle between METERS ON/OFF.
4. Tap METERS ON/OFF again to exit this mode.

The ICON SMALL, ICON NORMAL, ICON MEDIUM, and ICON LARGE buttons are active only when a Module or Group icon is selected from the main work area and the METERS ON/OFF mode is not selected. (i.e. The METERS ON/OFF button is blue.)

12.2 Icon Small/Normal/Medium/Large

Tap these icon size buttons to change the size of the selected Module, Super Module, or Group icon.

13. User Preferences Menu Reference

The User Preferences menu provides various functions for customizing of the Lake Controller interface.

Tap USER PREFERENCES from the HOME menu to display a submenu containing functions and various additional menus. These functions change settings globally throughout the system.

13.1 Contexts

Contexts allow up to eight views to be stored and retrieved easily using the CONTEXT button, which is available on the far left of the button bar on most screens, identified at [A] in Figure 13-1.



Figure 13-1: Context View Options

The Context menu enables selection of the number of views to be available throughout the system.

To set up four contexts in your system, perform the following steps:

1. From HOME, tap USER PREFERENCES.
2. Tap CONTEXT, then tap the button labelled [4].
3. Tap HOME.
4. Navigate to the first screen.
5. Tap the numbered context button [A] to move to the next view.
6. Repeat steps 4 and 5 until all four contexts are configured.

Tapping the CONTEXT button now allows you to switch instantly between these views.



The last screen viewed is stored under the currently selected context number.

13.2 Delay Units

The DELAY UNITS preference selection is reflected throughout the Lake Controller interface.

This menu provides the option for values to be entered and viewed in feet and meters. Tap the relevant button to change to your required default setting. The system default is milliseconds.

Delay calculations in meters and in feet are performed with the speed of sound being 343.6 meters (1127.3 feet) per second. This is the speed of sound as calculated for an ambient temperature of 20 degrees Celsius (68 degrees Fahrenheit).

13.3 Designer Functions

DESIGNER FUNCTIONS provide a gateway to Designer Mode, an advanced mode of the Lake Controller that provides the engineer with the ability to secure various aspects of the user interface.

13.3.1 Change Password

The CHANGE PASSWORD function is active only when Designer Mode is on. It allows a system designer to password protect access to Designer Mode.

13.3.2 Designer Mode

Tap DESIGNER MODE to toggle Designer Mode ON (orange) and OFF (blue). With DESIGNER MODE ON, the user can access and adjust additional functions throughout the system, including the following:

- ▶ Global and Individual Overlay access security settings
- ▶ Crossover and HPF/LPF access security settings
- ▶ Hidden channels
- ▶ Factory settings and Level Limits

When DESIGNER MODE is active, the text Designer Mode is displayed on the status bar as shown .

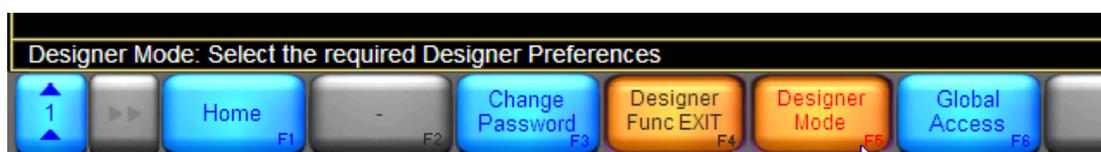


Figure 13-2: Designer Mode Help Text

13.3.3 Global Access

GLOBAL ACCESS function is active only when Designer Mode is on. It allows a system designer to hide or set parts of the system to VIEW ONLY. Refer to chapter 18 for further details.

13.4 Keyboard Shortcuts

The KEYBOARD SHORTCUTS button enables (orange) or disables (blue) keyboard shortcut functionality. For details on all available keyboard shortcuts, please refer to chapter 18.

13.5 About

Tap the ABOUT button to view the current Lake Controller software version. Tap anywhere on the display to return to the previous view.

13.6 Graphics

13.6.1 Auto Icon Arrange

This button is on by default, automatically placing icons so they do not overlap each other.

13.6.2 Screen Capture

This button changes the UNDO button into a SCREEN CAPTURE button, which stores a bitmap of any screen in the system to the data/user/printout folder in your Lake Controller installation directory.

13.6.3 Animate

This button is on by default, enabling various animation and graphic effects during use of the Lake Controller. For slower computers or when connecting via remote desktop, it is recommend that this feature is disabled.

13.6.4 Daylight Mode

Daylight Mode provides high-contrast graphics on a white background, making the Controller easier to view under daylight conditions.

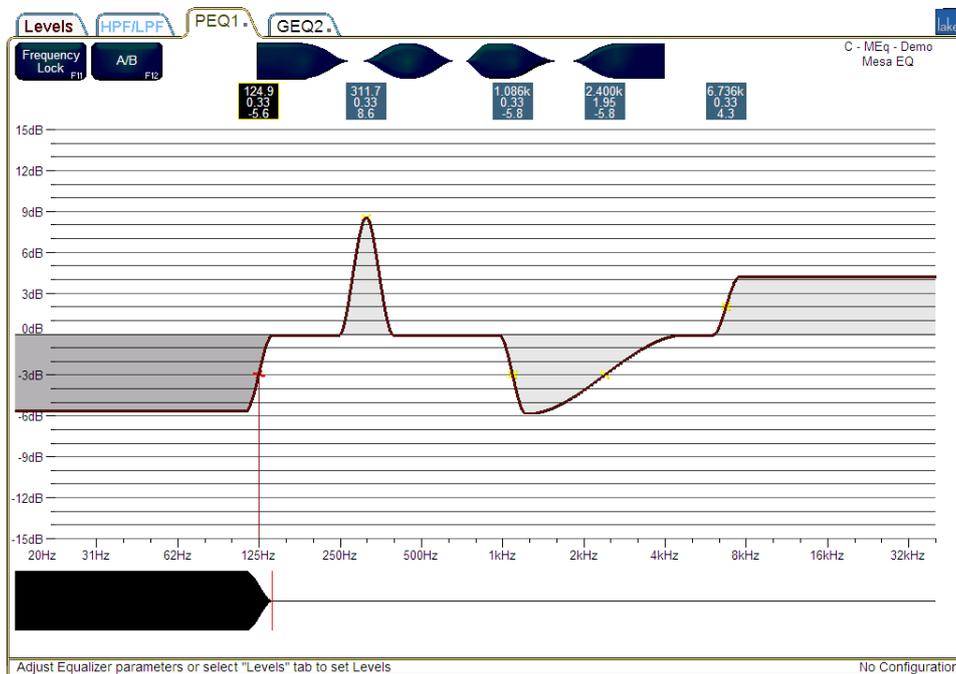


Figure 13-3: Lake Controller in Daylight Mode

Figure 13-4:

Tap the DAYLIGHT MODE button to toggle between normal graphics settings (black background) and the high contrast daylight view (white background).

13.7 Show Mode

Tap SHOW MODE to toggle ON (orange) and OFF (blue). SHOW MODE can be activated during a show to prevent accidental changes. When SHOW MODE is on:

- ▶ MUTE and POLARITY buttons are disabled on all LEVELS screens.
- ▶ INPUT MIXER and INPUT MUTE controls are disabled.
- ▶ All changes to EQ and LEVELS are restricted to fine adjustments.
- ▶ All XOVER screens become unavailable.
- ▶ All HOME menu options are disabled except USER PREFERENCES and NETWORK.

14. Pages Menu Reference

Tap the PAGES button from the HOME menu to display a submenu with functions that manage the main work area of the system, along with the Module and Group icons. The default system setting is a single page, labelled MAIN. Large systems with many Modules and Groups may require additional pages.

The functions described in this chapter may be used to manage pages and copy or move icons across the pages. The following example shows a configuration containing three pages: one containing Groups for main front-of-house EQ and Levels, another for monitor EQ and Levels, and another to store all the Module icons.

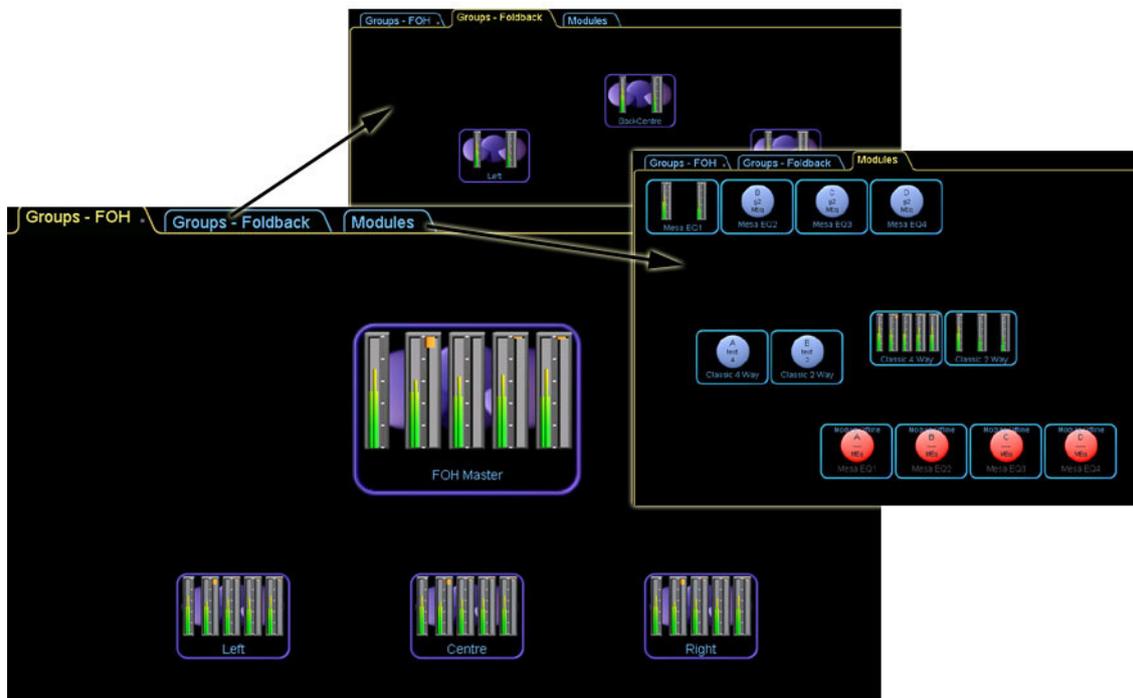


Figure 14-1: Lake Controller Pages

14.1 Cut Icon

The CUT ICON button is active only when a Module or Group icon is selected. To move an icon from one page to another, perform the following steps:

1. Tap a Module or Group icon on the work area.
2. Tap CUT ICON.
3. Select another page using the tabs at top of the screen, or tap ADD PAGE if no other pages exist.
4. Tap PASTE ICON.

14.2 Copy Icon

The COPY ICON button is active only when a Module or Group icon is selected. More than one copy of an icon can exist on different pages.

To copy an icon, perform the following steps:

1. Tap a Module or Group icon on the work area.
2. Tap COPY ICON.
3. Select another page using the tabs at top of screen, or tap ADD PAGE if no other pages exists.
4. Tap PASTE ICON.



There can be only one instance of an icon on each page.

14.3 Paste Icon

The PASTE ICON button is active only after a CUT ICON or COPY ICON action. When tapped, this button will paste a copy of the icon currently in memory to the currently selected page.



Icons can also be moved by selecting and dragging the icon to a page tab at the top of the screen. Select and drag the icon/s to the required page tab then release in the required location.

14.4 Page Label

The PAGE LABEL button is always active.

To label a page, perform the following steps:

1. Select the page to be labeled (top of screen).
2. Tap PAGE LABEL.
3. Enter the label using either the on-screen or external keyboard.
4. Tap OK.

14.5 Page Delete

This function deletes the selected page, including all Module and Group icons, which return to the Module and Group scroll bars.



PAGE DELETE is inactive if the MAIN page or the ALL page is selected..

14.6 Page Add

Tap the ADD PAGE button to add another page to the Lake Controller interface.

14.7 Page Hide

This button is active only in Designer Mode and is used for hiding pages. For further information, please refer to chapter 18.

14.8 Scrolling Pages

The << and >> buttons on the button bar activate if there are more pages than can fit across the screen. Tap these buttons to view pages that are currently out of view.

15. Network Menu Reference

This chapter provides information on the Network menu functions in the Lake Controller. For additional information on network configuration, please refer to chapter 3 and to the separate Lake Network Configuration Guide and Dante configuration literature included in the Lake Controller installation.

15.1 Network

Tap NETWORK to display the network adapters used to connect the Lake Controller to the network. This feature can be used to switch between network adapters or to work offline.

1. From HOME, tap NETWORK.
2. Tap the required network connection on the scroll bar.
3. Tap SELECT NETWORK, and then tap YES to the warning message.

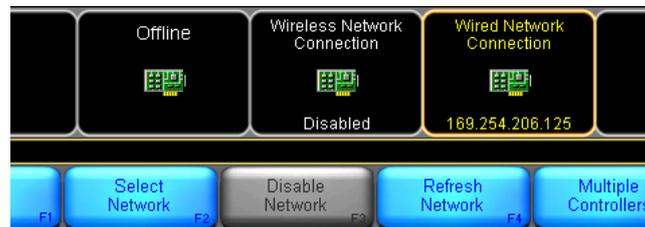


Figure 15-1: Network Menu

If multiple adapters are enabled, any adapters other than the currently selected adapter may be disabled to avoid communication errors.

- ▶ To disable an adapter, tap the desired network adapter in the scroll bar and tap DISABLE NETWORK.
- ▶ To enable a currently disabled adapter, tap on the desired network adapter and tap ENABLE NETWORK.
- ▶ To update information about the currently selected network adapter, tap the desired network adapter and tap REFRESH NETWORK.
- ▶ To enable multiple Controllers to be connected to the same network, tap the desired network adapter and tap MULTIPLE CONTROLLERS. Please refer to section 15.2 for further details.

15.2 Multiple Controllers

15.2.1 Overview and Menu Options

The Lake Controller system allows multiple Controllers to be connected to the same network. When in this mode, certain functionality is restricted.

The first Controller to connect to a network is called the primary Controller. Any subsequent Controllers are referred to as secondary Controllers.

The following options are available on the MULTIPLE CONTROLLERS submenu:

15.2.1.1 Multi Cont Enable

This button is available only on the primary Controller and is disabled (gray) on any secondary Controllers. When this button is active (orange), multiple Controllers are allowed on the same network. When the button is inactive (blue), only one Controller is allowed on the network.

15.2.1.2 Confirmation Required

This button is available only on the primary Controller and is disabled (gray) on any secondary Controllers. When this button is active (orange), a confirmation dialog box is displayed on the primary Controller when a secondary Controller attempts to connect. If this button is inactive (blue), then additional Controllers are able to connect to the network without primary Controller approval.

15.2.1.3 Analyzer Enable

This button provides the option to disable analyzer data on a per-controller basis (useful when using multiple Controllers). If this button is active (orange), analyzer data will be displayed on this Controller. If this button is inactive (blue), analyzer data will not be displayed. This button is disabled (gray) if the analyzer is not available.

15.2.2 Primary and Secondary Controllers

The primary Lake Controller communicates with the network of Lake devices, and also with secondary Controllers. The secondary Controllers communicate only via the primary Controller.



The date, time and time-zone must be synchronized on all computers for multiple controller functionality to work correctly, and ensure firewalls are correctly configured to allow Lake Controller data.

The primary Controller can be used in either Designer or User Mode (in which various Designer Mode functions will be restricted). Secondary Controllers are always restricted to a limited version of User Mode operation.

The primary Controller must have a connection to the network for secondary Controllers to function.

If communication is lost between the primary Controller and the network, all secondary Controllers are suspended with a warning message displayed until the network connection returns.

If the primary Controller is restarted, all secondary Controllers must also be restarted.

If the Controllers become out of sync with the network, the primary Controller must be used to synchronize the network.

In a multiple Controller environment, it is recommended that the primary Controller is either wired to the network or kept within range of the wireless transmitter to ensure that all Controllers can function without interruption.



When using multiple Controllers, each Controller must have a unique IP address.

15.2.3 Restricted Functionality

Various functionality is restricted when multiple Controller mode is active. The following figure shows the top-level menus that are available from the HOME menu when multiple Controllers enabled; the buttons shown in gray are unavailable.

Note the ****PRIMARY**** label on the far right of the help text identifies the Controller status and reads ****SECONDARY**** for all secondary Controllers.



Figure 15-2: Limited Functionality using Multiple Controllers

From within the SYSTEM STORE/RECALL and MODULES menu, both primary and secondary Controllers can STORE SYSTEM files and use the REPLACE FRAME functionality; most other functions in these menus are disabled. SOLO/MUTE functionality is available on both primary and secondary Controllers.

Certain functions on the EQ/LEVELS/XOVER screens are also disabled in multiple Controller mode; any unavailable function is identified by a gray button.

To restore full functionality, the primary Controller has the ability to disable multiple Controllers using the MULTI CONT ENABLE button. Disabling multiple Controllers disconnects all secondary Controllers. The

primary Controller can re-enable multiple Controller mode in the same session and the secondary Controllers will automatically reconnect.



If multiple Controller mode is disabled then restored by the primary Controller, the system configuration will be transferred again to all secondary Controllers to ensure data is synchronized.

15.2.4 Using the Analyzer with Multiple Lake Controllers

If a compatible analyzer is available on the network, Analyzer data can be transmitted and displayed on all Controllers that have the ANALYZER ENABLE button activated.

Each Controller has the ability to disable the analyzer independently. One Controller can view analyzer data while other Controllers continue working without the analyzer data being displayed.

To enable/disable analyzer data on a Controller, perform the following steps:

1. From HOME, tap NETWORK, then MULTIPLE CONTROLLERS.
2. Toggle the ANALYZER ENABLE button (orange equals enabled; blue equals disabled).

15.3 Working Offline

Working offline enables the Lake Controller to be used even if a network is not enabled or present. This allows offline setup of system configurations.

Therefore, systems can be created or modified when the network of Lake devices is unavailable. To work offline, start the Controller without a network adapter enabled, or select OFFLINE during initial network selection on startup, or tap the NETWORK button and select the network card graphic labeled OFFLINE from the scroll bar.

A large majority of functions can be used when offline, although some hardware-specific configuration functions are not accessible.



If an existing system configuration has been modified and stored while offline, the new values will take effect when the system configuration is recalled with an online Lake device network.

15.3.1 Virtual Frames

Virtual Frames can be used while working offline. A Virtual Frame provides the same functions as online Modules; Module files can be recalled, stored, copied and pasted, and the Virtual Frames can be stored as part of a system configuration.

The Module scroll bar always contains the following Virtual Frame configurations that represent the Lake device range of products.



Figure 15-3: Virtual Frame Icons

To use Virtual Frames, perform the following steps:

1. Tap the Virtual Frame icon that you require. The cursor will represent the relevant number of Module icons.
2. Place the Virtual Frame in the work area. The majority of functions are available, enabling full offline configuration.

Virtual Frames do not have a device identifier, and therefore a replace function is used to assign the Module to an online Lake device.

Refer to section 4.3 for details about Contour and Mesa Modules.

15.3.2 Replacing Virtual Frames with an Online Device

The MODULE STORE/RECALL or COPY/PASTE/REPLACE functions can be used to transfer the data from a Virtual Frame to an online Frame.

Individual Modules created offline can be stored as Module files and recalled into an online device.

Offline system configurations can be stored and recalled, and then each Frame can be replaced with an online device.

Please refer to section 8.4.3 for detailed information on the REPLACE FRAME functionality

16. Communication and Synchronization

The Lake Controller and Lake devices communicate via an Ethernet network. All updates made using the Controller are transmitted in real time to the network of devices. Both the Controller and the devices store all required information, which results in two copies of the data for each Module:

- ▶ A copy stored in the Lake Controller software
- ▶ A copy stored in the Lake device hardware (aka Processor)

This data redundancy ensures an extremely high level of confidence in communicating over an Ethernet network that can be subjected to other network traffic, as well as interference or lost data packets due to a noisy transport such as wireless Ethernet configurations.

If there is ever a discrepancy found between these two data records, the Controller immediately notifies the user that the two data records are out of sync, and provides a choice to either continue using the settings on the device (aka Processor) or to use the settings in the Controller software. Discrepancies are typically caused by making adjustments via the device front-panel interface while the Controller is offline.

This chapter provides useful terminology definitions and reference information for dealing with communication and synchronization issues.

16.1 Offline Modules

A Module that cannot be found on the network is referred to as OFFLINE. This can occur for the following reasons:

- ▶ The device is turned off.
- ▶ The device is not connected to the network.
- ▶ The wireless transmitter is out of range or turned off.
- ▶ Network cabling or hardware is faulty.

Virtual Frames always show offline because they have not been assigned to a device, and therefore exist only in the computer's data record.

16.2 Communication/Network Errors

The Lake Controller displays communication or network problems highlighted in red at the bottom right of the screen:



Figure 16-1: Network Related Warning Messages

If a network problem persists, the affected Modules become offline as described above. To rectify the situation, check all network connections. If using a wireless access point, make sure the computer is within range.

16.3 Synchronization

This section describes the various synchronization processes between the Lake Controller software and Lake devices.

16.3.1 Resync Process

The resync process ensures that the data in the Lake Controller software and on the Lake devices (aka Processors) is synchronized, or that the operator is informed of differences between the two copies of data.

The resync process compares the data in the Controller software with that stored on the devices. If differences are found, the Controller software informs the user that Modules are out of sync.

A resync occurs when:

- ▶ A system configuration file is recalled
- ▶ An offline Module becomes online
- ▶ A network or communication error occurs

The Controller provides a general PLEASE WAIT message if any Module is syncing, along with a RE-SYNCING indication on the Module icon as shown in Figure 16-2.

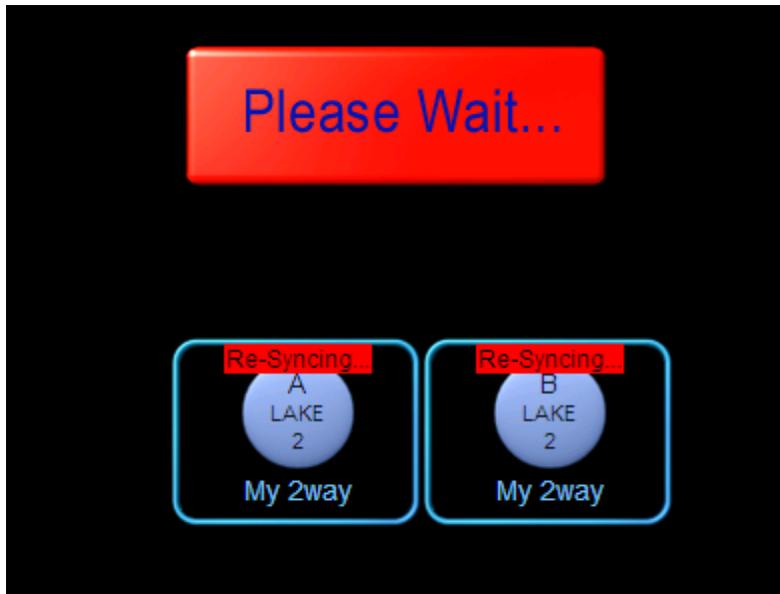


Figure 16-2: Please Wait and Re-Syncing Indications

16.3.2 Out of Sync

The Lake Controller and Lake devices could become out of sync for the following reasons:

- ▶ An update was made using the Controller software while a device was offline.
- ▶ A communication or network error occurred during an update.

When the affected Modules return online, the Controller compares its data with that in the devices. If differences are found, the Controller highlights which Modules are out of sync.



OUT OF SYNC Modules or related Groups are set to VIEW ONLY. No further changes can be made until the Lake Controller (Computer) and Lake devices (Processors) are synchronized.



Audio will not be affected unless the USE COMPUTER SETTINGS option is selected; in this instance audio may change depending on the differences from the current Processor settings.

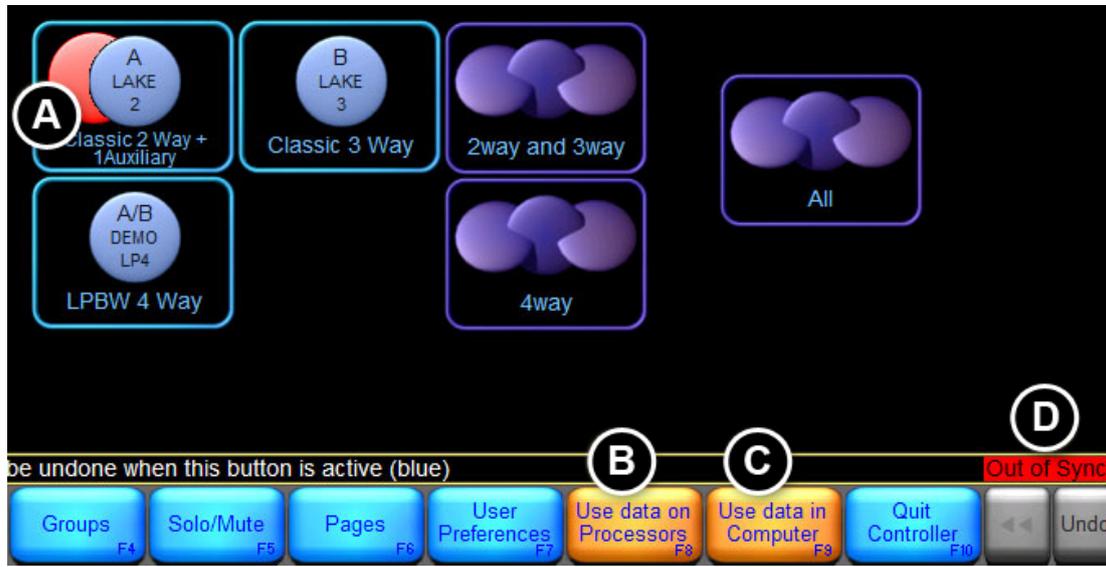


Figure 16-3: Out of Sync Notifications

- ▶ (A) The red disc behind the Module icon indicates that the Module is out of sync.
- ▶ (B) Flashing USE DATA ON PROCESSORS button.
- ▶ (C) Flashing USE DATA IN COMPUTER button.
- ▶ (D) A warning message appears that is visible from any screen in the system.

16.3.3 Updating All Devices with Computer Settings

To update all devices with the information stored in the Controller, perform the following steps:

1. From the HOME menu, tap the flashing USE DATA IN COMPUTER button.
2. Tap YES on the warning message to confirm the action.



This option may result in an audible effect, as the data in the devices will be overwritten with the data stored in the computer.

16.3.4 Updating the Controller with Device Settings

To update the Lake Controller with the information stored on the devices, perform the following steps:

1. From the HOME menu, tap the flashing USE DATA ON PROCESSORS button.

2. Tap YES on the warning message to confirm the action.



Audio will not change if this option is selected

16.3.5 Synchronizing the Lake Controller and Devices

In the following example, a communication error occurred while the PEQ1 overlay was being updated using the Controller. Figure 15 2 shows an example of the COMPUTER SETTINGS view, along with letters marking key information.

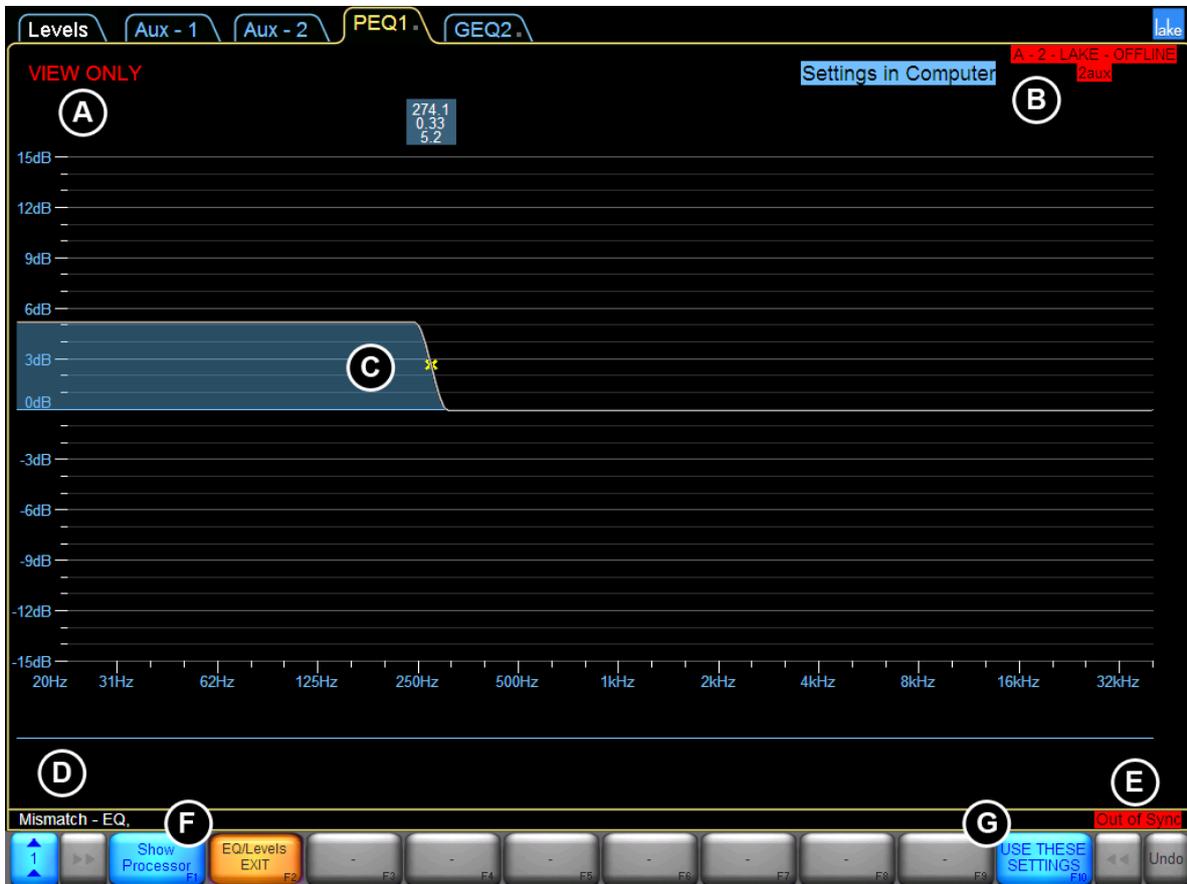


Figure 16-4: Computer Settings on the PEQ1

The referenced information in Figure 16-4 is described below.

- ▶ A OUT-OF-SYNC Modules are set to VIEW ONLY pending synchronization.
- ▶ B The settings currently viewed are:
COMPUTER - Frame/Module name highlighted in red as offline
PROCESSOR - Frame/Module name displayed in blue text as online
- ▶ C The main part of the screen changes to show the Computer and Processor settings as selected.
- ▶ D The help text shown here indicates the type of data that is out of sync.
Navigate to the relevant section of the system to view/update.
- ▶ E The OUT OF SYNC warning message is visible on all screens.
- ▶ F This button changes labels depending on the currently selected view.
SHOW PROCESSOR - when viewing computer settings
SHOW COMPUTER - when viewing device (Processor) settings
- ▶ G Tapping this button updates either the computer or the device with the settings being viewed.

To compare and update settings stored in the Lake Controller software and Lake devices, perform the following steps:

1. From the HOME menu, tap a Module icon that is out of sync.
An out-of-sync Module is indicated by a red disc behind the normal Module icon.
2. View the help text [D] that advises which parameters are affected.
3. Navigate to the relevant EQ/LEVELS page. Computer settings are displayed by default.
4. Tap SHOW PROCESSOR/SHOW COMPUTER [F] to compare settings.
5. Decide which settings to use, and tap USE THESE SETTINGS.
6. Repeat the process for each out-of-sync Module.

Alternately, all Modules can be updated with the USE DATA IN COMPUTER or USE DATA ON PROCESSOR functions.

16.3.6 Audible Changes when Synchronizing

If a Module becomes out of sync while audio is being processed, choosing to synchronize with the Controller could affect the sound, depending on the values that are out of sync.

If the Controller EQ/XOVER/LEVELS settings differ from those currently used by the device, the audio signal may change or be momentarily muted while settings are configured if USE DATA IN COMPUTER is selected.

17. Analyzer Plug-in

17.1 Overview

The analyzer plug-in provides an interface between the Lake Controller and third-party audio analyzer software products. The plug-in displays measurement results within the Lake Controller, and passes control information from the Lake Controller back to the third-party analyzer software. This communication link can be provided on the same host computer, or between computers over an Ethernet network as Figure 17-1 and Figure 17-2 illustrate.

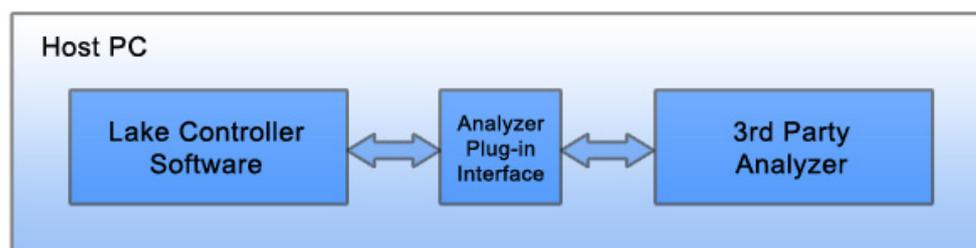


Figure 17-1: Single host computer

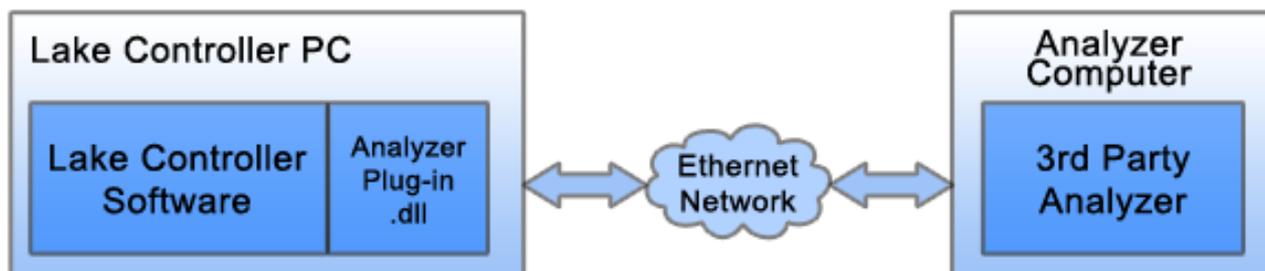


Figure 17-2: Two computers connected across Ethernet network

Figure 17-3 shows a practical example connection for connecting the Lake Controller using two computers. The analyzer PC (running the third-party analyzer software with associated plug-in functionality) has a wired connection to an Ethernet switch that connects the Lake network. A wireless tablet PC running the Lake Controller is connected to the same switch using a wireless access point. This configuration allows the analyzer results to be transmitted via a wireless access point to the Lake Controller.

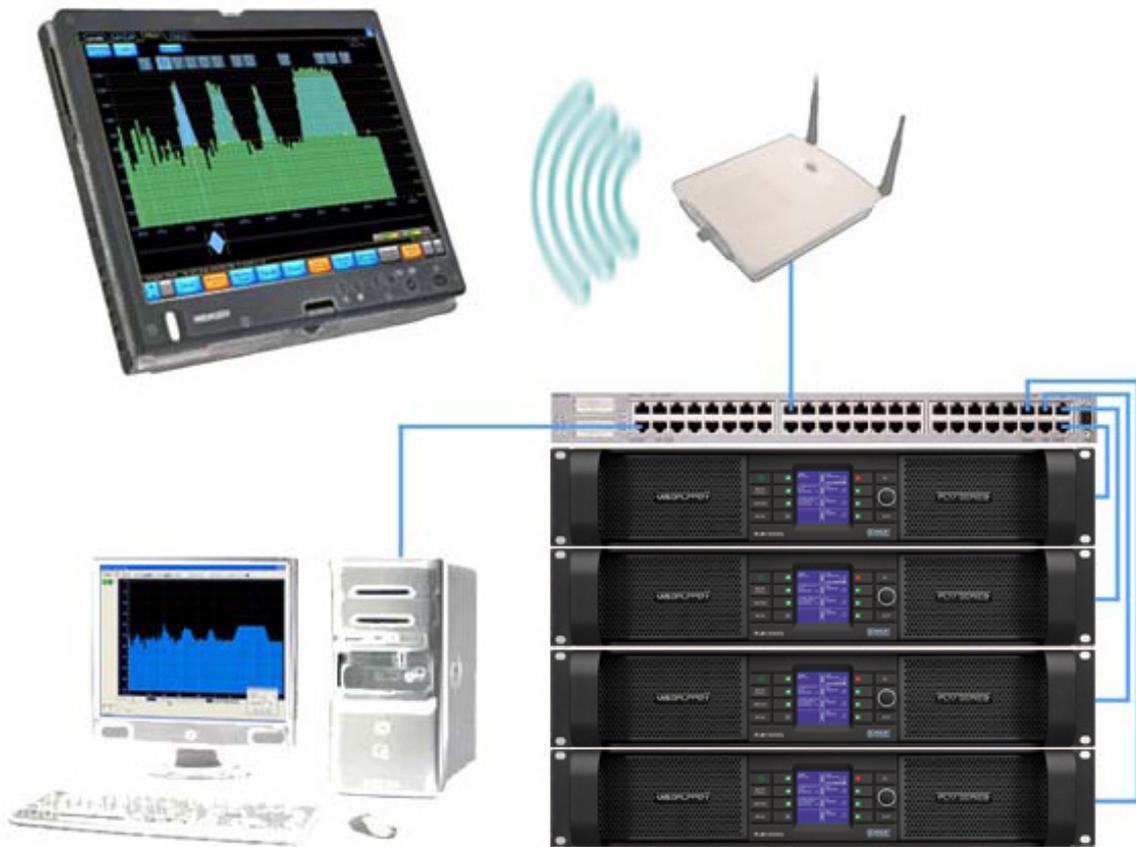


Figure 17-3: Example network configuration

For further information on networking and hardware configuration, please refer to chapter 3 of this Operation Manual and your hardware device Operation Manual.

17.2 System Requirements

To use the analyzer plug-in, the following items are required:

1. A Microsoft® Windows® PC with a fully registered installation of an approved analyzer meeting the computer requirements for the analyzer. Approved analyzers include:
 - ▶ Rational Acoustics Smaart 7 or
 - ▶ AFMG SysTune or
 - ▶ WaveCapture Live-Capture Light / Live-Capture Pro
 - ▶ Additional third-party analyzers approved in the future

2. A Windows PC with an installation of the Lake Controller v6 or later, meeting the Lake Controller minimum computer requirements as specified in section 2.1.

Operating the Lake Controller and the third-party analyzer on the same computer may result in slow performance even where the required minimum specifications are met. The Lake Controller is graphic intensive and audio analyzer software FFT calculations are CPU intensive; therefore, the performance of the graphics card is important. A graphics card with slow performance or low video memory will reduce computer performance by the transfer of rendering and display data. Please ensure that the graphics card driver is updated to the latest version available from the graphics card manufacturer; drivers shipped with Microsoft Windows are generic and may not take full advantage of video card resources.

17.3 Analyzer Plug-in Quick Start Guide

The analyzer plug-in relies on correct configuration of the third-party analyzer for the analyzer functionality to operate correctly in the Lake Controller. When the Lake Controller starts, it verifies if an approved and correctly configured analyzer can be found on the local machine or on the selected network.

The following steps may need to be completed in your software analyzer to enable successful connection to the Lake Controller:

1. Start the analyzer software.
2. Enable API / external communication.
3. Create new measurement routing pairs (groups) & associated measurement configurations.
4. Adjust all levels for optimal gain structure and verify generator levels.
5. Start both spectrum and transfer functions and verify measurements are working correctly in the analyzer.
6. Start the Lake Controller.

If the Lake Controller detects a valid analyzer on the network, the F10 button will read ANALYZER, providing access to the submenu for further controls, please refer to section 17.4 for details.

If the Lake Controller cannot find a valid analyzer the F10 button on PEQ, GEQ, and XOVER overlays will read ANALYZER TAP TO SEARCH. Tapping this button initiates a network search for approved and correctly configured analyzers; during the search the button reads ANALYZER SEARCHING.



Please refer to your analyzer documentation for further information on configuring your chosen third-party analyzer software.

17.4 Function Reference

This section details each function of the analyzer functionality available via the Lake Controller software. The Analyzer submenu provides access to enter the three types of measurement mode: Spectrum, Spectro-graph, and Transfer functions. The following sections explain these modes and their functions.

17.4.1 Global Control Functions

The following functions affect the overall operation of the third-party analyzer. These functions are provided on the button bar of the top-level interface of the Analyzer submenu.



Figure 17-4: Top Level Analyzer submenu

17.4.1.1 Pause

This command pauses the analyzer in all modes of operation, and the last measurement trace remains frozen on the screen. Pause is a toggle command; to resume the analyzer tap the Pause button again.

17.4.1.2 Signal Generator

Tapping this button turns the analyzer's signal generator on or off. When the button is selected (orange), the Signal Generator is turned on. Use the third-party analyzer software interface to select the type of generated signal or to adjust the signal generator gain.

17.4.1.3 Measurement Selection

Tapping this button displays a scrollbar displaying available measurement configurations that have been pre-configured in your third-party software analyzer.

17.4.2 Spectrum RTA Measurement Mode

The SPECTRUM real-time analyzer (RTA) display provides real-time spectrum analyzer functionality. This display plots the spectrum (magnitude values by frequency) of the channel selected for measurement via the third-party analyzer software. The SPECTRUM RTA plot assigns magnitude to the (vertical) y-axis and frequency to the (horizontal) x-axis.

When the SPECTRUM button is selected, the Lake Controller will show the SPECTRUM display on EQ and Auxiliary Overlays.

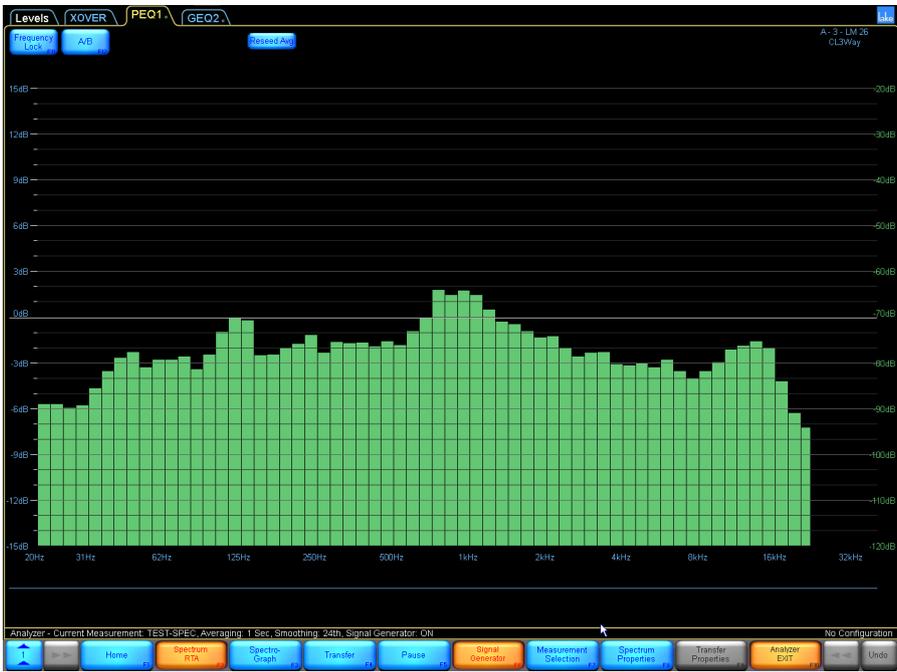


Figure 17-5: Spectrum measurement mode

The y-axis scale of the SPECTRUM RTA is displayed on the right side of the Lake Controller interface. The SPECTRUM PROPERTIES button provides access to additional functions.



Figure 17-6: Spectrum Properties submenu

17.4.2.1 Averages

Averaging methods and calculations may vary depending on the analyzer being used and the available options will be displayed in the scrollbar accordingly. Please refer to your analyzer documentation

Upon entering the AVERAGES submenu, the Lake Controller displays a scrollbar with available averaging schemes. Tap the desired averaging period then tap the AVERAGES SELECT button. The status text between the scrollbar and the button-bar shows the active measurement parameters.



Figure 17-7: Averages submenu scrollbar

17.4.2.2 Amplitude Range

- ▶ **Move Primary Up:**
Move displayed range upward to show higher magnitudes
- ▶ **Move Primary Down:**
Move displayed range downward to show lower magnitudes
- ▶ **Zoom Primary In:**
Magnify displayed vertical range for most plot types; narrows magnitude range for Spectrograph
- ▶ **Zoom Primary Out:**
Decrease magnification of vertical range for most plot types; widens magnitude range for Spectrograph

17.4.2.3 Banding

The BANDING submenu provides options for the horizontal (x-axis) scaling of the RTA; whole-octave, 1/3-octave, 1/6-octave, 1/12-octave and 1/24-octave resolutions.

17.4.3 Spectrograph Measurement Mode

The Spectrograph displays frequency content of an input signal over a period of time. Instead of displaying results for one measurement at a time (whether averaged or instantaneous), as per the Spectrum display, the Spectrograph displays a measurement history over an adjustable period of time.

A Spectrum analyzer displays magnitude values for each fractional octave frequency band indicated by vertical bars of varying height; a Spectrograph indicates the “height” using a range of colors to indicate higher or lower magnitude.

The Spectrograph displays three-dimensional data (time, frequency, and energy) on a two-dimensional plot with time on the y-axis, frequency on the x-axis, and magnitude represented by color. Exactly which color represents which magnitude value is determined by the magnitude range specified.

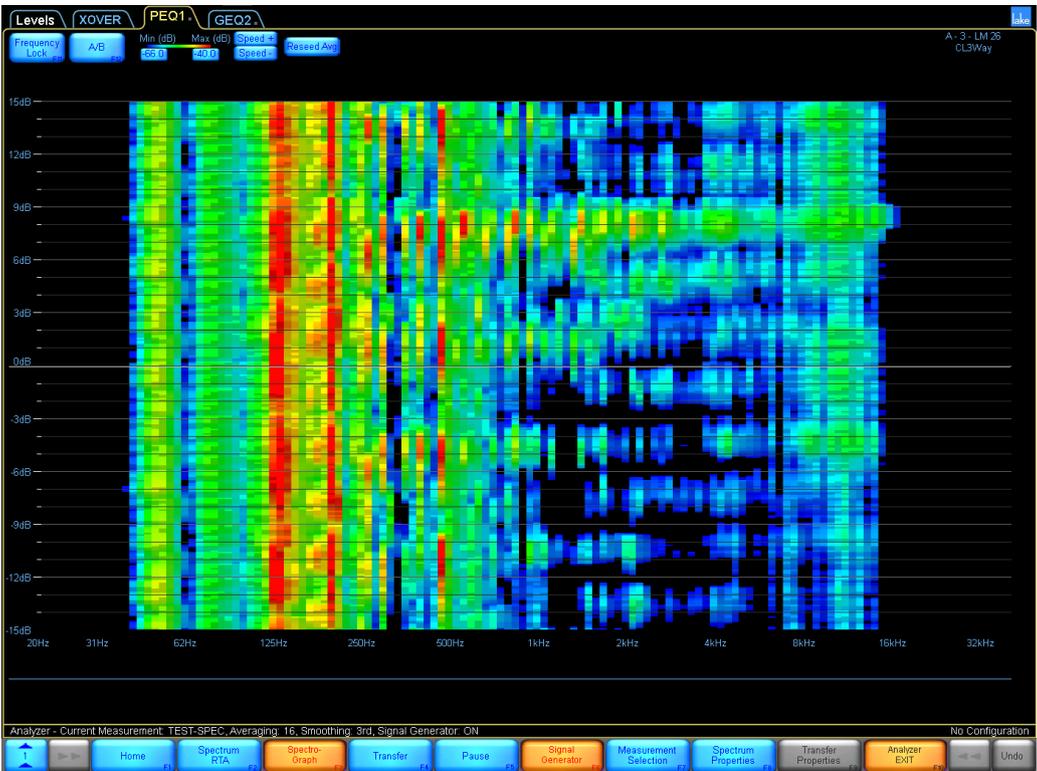


Figure 17-8: Spectrograph measurement mode

17.4.3.1 Colormap Range

The magnitude range of the Spectrograph colormap is displayed on the top of the Spectrograph display. Two edit fields are provided to adjust the minimum and maximum range values for the colormap. To adjust a value tap either field to display the onscreen keyboard.

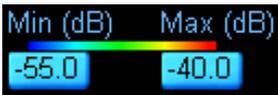


Figure 17-9: Colormap range

17.4.3.2 Speed

Two buttons are provided to increase or decrease the speed of the Spectrograph. By adjusting the speed of the Spectrograph, you can increase or decrease the amount of time it takes for data to traverse the display.



Figure 17-10: Speed controls

17.4.3.3 Spectrograph Properties

The Spectrograph measurement mode is controlled by all of the settings under Spectrum Properties, as detailed in section 17.4.2 on page 196.

17.4.4 Transfer Function Measurement Mode

The analyzer's real-time Transfer Function measurement capability is a useful tool for setting up sound system equalizers and crossovers. The Transfer Function is calculated by comparing the signal on input to a system (reference) to the signal on the output of the system (measured).

By comparing what goes into a device or system with what comes out, the transfer function calculates its frequency (magnitude and phase) response very precisely. A major advantage of this dual-channel approach is that it works with a wide variety of test signals, including music or other recognizable program material.

To make a transfer function measurement, a test signal is split at the source and sent to both the system under test and back through the analyzer as a reference signal. The output of the system under test is returned to the analyzer as the measurement signal.

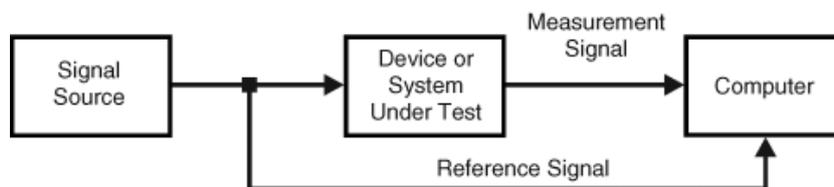


Figure 17-11: Block-diagram of Transfer function measurement

In Transfer Function mode, calculations are performed using audio data from the two inputs. This data is compared and displayed as a single trace showing the relative magnitude difference between the two signals frequency by frequency.

The default Transfer Function mode Magnitude display plots magnitude values on the y-axis with 0 dB in the center and positive and negative decibel values above and below the zero line. The x-axis of the plot shows frequency and is normally displayed in logarithmic scaling with grid lines at octave intervals. On the standard magnitude display, a value of 0 dB for a given frequency data point represents an equal amount of energy (that is, a relative difference of zero) in both the reference (system input) and measurement (system output) signals at that frequency. A positive or negative decibel value for a given frequency indicates more or less magnitude in the measurement signal relative to the reference signal at that frequency. The Phase display in Transfer Function mode is a second plot showing the relative difference in phase between the two signals for each frequency.

In most cases there is a distance between the loudspeaker and the measurement microphone. This distance creates a propagation delay (the sound travelling through the air) which must be compensated for.

When a transfer function channel is started a reference channel must be selected. Press FIND to find the delay so the reference signal can be adjusted to the same delay.



Figure 17-12: Transfer function measurement mode

The y-axis scale of the Transfer Function is displayed on the right-side of the Lake Controller interface. The controls at the top of the Transfer Function display provide easy access to common controls as described below.

17.4.4.1 Reseed Avg

Reseed Averages clears the averaging buffers (used to increase the stability of the live traces); the trace will require a short period of time to re-stabilize while the buffers are filled. This function is not available for all analyzers, or may be automated; please refer to your analyzer documentation for further details.



Changing the number of averages, FFT size, or sampling rate, or switching between main display modes, also reseeds the averaging buffers.

17.4.4.2 Delay Controls

The Delay controls are grouped together at the top of the screen as shown in Figure 17-13 when Transfer mode is selected. These controls are used to provide signal alignment between the reference and measurement signals for transfer function measurements.



Figure 17-13: Transfer function delay controls



Delay must be adjusted to provide a meaningful measurement. Delay compensates for the system propagation delay, the time taken to create sound through the system and to travel through the air.

The Delay (ms) value is displayed in the Delay edit field. To change the delay value, tap this edit field and enter the required delay using the onscreen keyboard.

The Delay+ and Delay- buttons to the right of the Delay edit field can be used to decrease and increase the current Delay setting by 0.02 milliseconds.

The FIND button identifies the time offset (delay) between two input signals by measuring the impulse response of the device or system under test.

The TRACK button continuously measures and adjusts the delay between the reference and measured signals. This feature is CPU intensive should only be used when the distance between a measurement microphone and the signal under test is constantly changing.

Please refer to individual analyzer documentation for further information.

17.4.4.3 Transfer Properties

The Transfer Properties button at the bottom of the interface provides access to Transfer Function specific functions.



Figure 17-14: Transfer function properties submenu

17.4.4.4 Averages

Please refer to section 17.4.2.1 on page 197.

17.4.4.5 Amplitude Range

- ▶ **Move Primary Up:** Moves displayed range upward to show higher magnitudes.
- ▶ **Move Primary Down:** Moves displayed range downward to show lower magnitudes.
- ▶ **Zoom Primary In:** Magnifies the displayed vertical range for most plot types or narrows the magnitude range of the Spectrograph display.
- ▶ **Zoom Primary Out:** Decreases magnification of the vertical range of the primary display for most plot types or widens the magnitude range of the Spectrograph display.

17.4.4.6 Smoothing

Smoothing is a graphical averaging available only in Transfer Function mode. This feature helps reduce jagged display on the Transfer Function trace helping to more clearly visualize the overall system response.



Figure 17-15: Smoothing submenu

17.4.4.7 Coherence

Selecting the Coherence button will turn on the Coherence trace display. The Coherence is displayed in red in the top-half of the screen. The Coherence y-axis scale is displayed in red on the right side of the display.

Coherence is a measure of quality (such as signal to noise ratio and time-matching) between signals in a transfer function measurement. Coherence values are given as a percentage, where 100% equals perfect coherence; values closer to one equal improved quality and therefore more accurate results. It is important to note that low coherence values do not necessarily mean your data is untrustworthy. This is particularly true when making acoustic measurements in environments with many reflections where a lot of averaging is required.

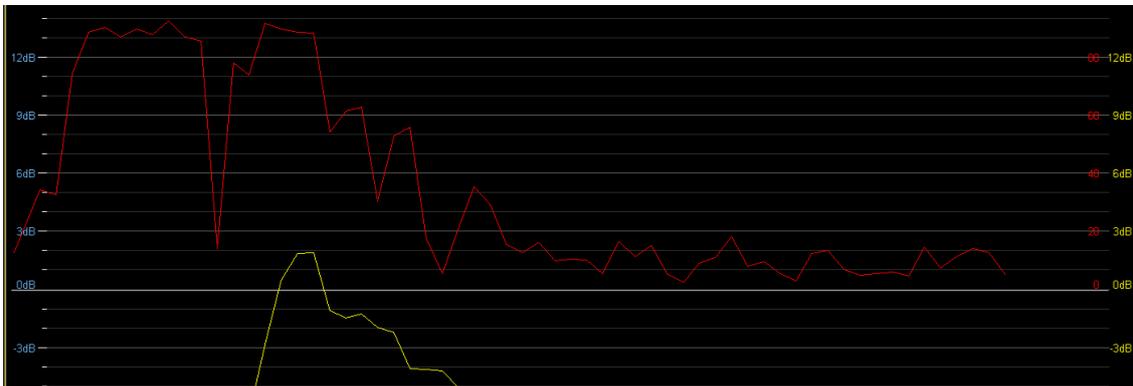


Figure 17-16: Coherence display

17.4.4.8 Phase

Selecting the Phase button will turn on the Phase trace display, shown as a blue line across the screen.

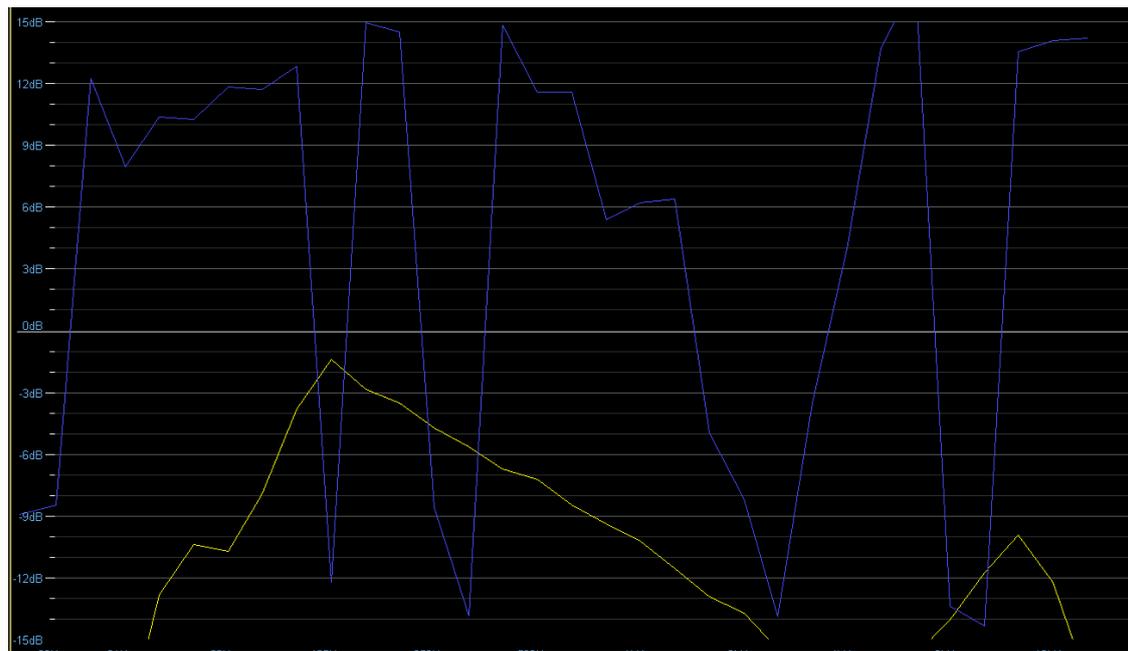


Figure 17-17: Transfer Function showing Phase (blue line)

17.4.4.9 Phase Properties

The Phase Properties button provides access to Phase-specific functions.

Phase Normal / Phase Alternate

On the default Phase display plot, all phase values are plotted within a 360° range of +180° to -180°, with 0° in the center [wrapped phase]. This 360° range represents one complete cycle of delay at any given frequency. You can also choose to view the phase within a 360° range of 0° to 360° (alternate phase). This is useful if there is a reverse of signal polarity within your transfer function measurement setup. Please refer to your analyzer documentation for further information regarding phase and the implementation of these options.

17.4.4.10 Invert

Pressing the INVERT button swaps the inputs to the Transfer Function calculation, so the analyzer divides the reference signal by the measurement signal. This feature is mainly used when you want to display the inverse (upside-down) magnitude response curve of an EQ or processor channel to facilitate using the room or system response as a template for setting EQ filters.

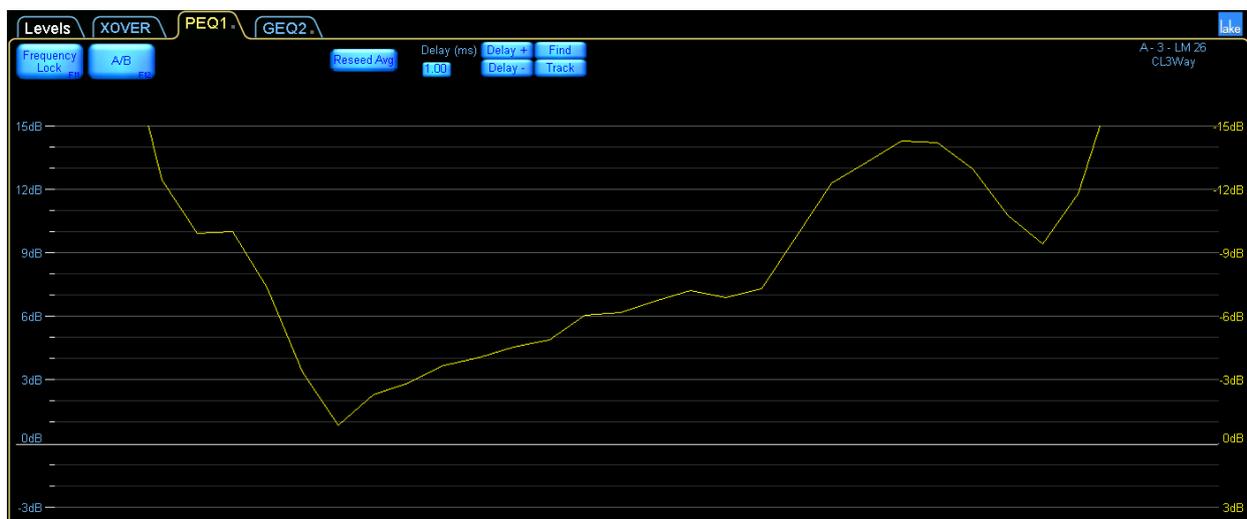


Figure 17-18: Invert enabled

18. Designer Mode Menu Reference

The Lake Controller software provides two modes of operation: User Mode and Designer Mode. This chapter describes Designer Mode.

18.1 Designer Mode Basics

Various important functions that Designer Mode activates include:

- ▶ Global Access security
- ▶ Individual overlay/screen access security
- ▶ Level Limits
- ▶ Factory levels (Adjust Factory mode)
- ▶ Password protection of Modules and base configurations
- ▶ All-pass filters
- ▶ Designer Worksheets
- ▶ Polarity locking

This chapter provides detailed descriptions of these functions. An example system design illustrates the utility of Designer Mode functions. A quick reference guide provides a high-level overview of Designer Mode functions.

This document refers to loudspeaker Modules in the examples, although all features (with the exception of crossovers) also apply to Mesa EQ Modules.

18.1.1 Security Levels

Designer Mode provides three levels of password-protected security.

18.1.1.1 Global

At the global level, a simple selection makes system-wide changes that affect what can be seen or adjusted in User Mode. A system designer can choose to hide any combination of LEVELS, PEQ, GEQ, XOVER, AUX, HPF/LPF. These items can also be set to View Only, allowing a User Mode operator to view but not change information as required.



Global Designer Mode settings are stored in the system configuration file.

18.1.1.2 Module

Individual EQ overlays and crossover tabs can be hidden or set to View Only. Additional settings normally invisible in User Mode can also be adjusted and hidden at the Module level.

At the Module level, changes are specific to individual Modules and Groups. Discrete password protection can be applied to Modules, providing an additional level of security.

18.1.1.3 Base Configuration

Base configuration is the lowest level of Module security, enabling the system designer to define an underlying base EQ curve and crossover settings along with factory levels and level limits. A system designer can restrict what can be seen or adjusted and provide optional password protection to the underlying settings.



The Lake Controller is not shipped with base configuration files. These can be created if required using default Module files.

18.1.2 Designer Mode

The functions available in Designer Mode can be used with or without password protection. By default, the Designer Mode password is empty, allowing unprotected access to Designer Mode in a new installation of the Lake Controller software.

To access Designer Mode:

1. From Home, tap USER PREFERENCES.
2. Tap DESIGNER FUNCTIONS.
3. Tap DESIGNER MODE.

Additional buttons on the button bar become active, providing functions specific to Designer Mode.



Figure 18-1: Accessing Designer Mode

Designer Mode Menu Reference

When Designer Mode is active, the label DESIGNER MODE appears before any other help text above the button bar.

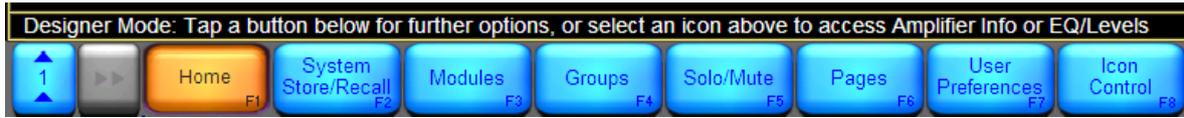


Figure 18-2: Designer Mode Help Text

18.1.2.1 Password Protection of Designer Mode

Each software installation has one Designer Mode password. This password is stored on the host computer and is relevant for any system configuration.

To password protect Designer Mode, perform the following steps:

1. Tap CHANGE PASSWORD.
2. Enter a password, and tap OK.
3. Confirm the password, and tap OK.

It is important that you record the Designer Mode password in a safe place. Once the password is set, it will always be required to enter Designer Mode.



If the Designer Mode password is forgotten, please email support@lakeprocessing.com for details on password retrieval.

18.1.2.2 Simple Designer Mode System Security

If multiple levels of security are not required for your Lake Controller installation, exiting Designer Mode activates all security features described in this document without needing to lock or password protect individual Modules or base configuration files.

18.1.3 Designing and Protecting a Lake Controller System

This section describes how to use Designer Mode to protect your system by developing an example system with one Lake device. The example includes detailed instructions to define a base configuration, lock individual Module level settings, and enforce global security



An online Lake Controller and Lake device network is required for the following tutorial.

18.1.3.1 System Setup for Designer Mode Tutorial

Follow the steps below to prepare for the tutorial.

To access Designer Mode, perform the following steps:

1. From HOME, tap USER PREFERENCES.
2. Tap DESIGNER FUNCTIONS.
3. Tap the Designer Mode button and enter your Designer Mode password if prompted. (If the Designer Mode button is orange, you are already logged in to Designer Mode.)
4. Tap HOME to return to the MAIN menu.
5. Place the Modules of a factory-reset Lake device in the work area.

To label the Frame and store the system:

1. Tap STORE/RECALL EXIT, then tap LABEL & LOCK.
2. Tap LABEL FRAME, enter 'Lake' as the Frame name, and tap OK.
3. Tap HOME, then SYSTEM STORE/RECALL.
4. Navigate to or create a folder in which to store the file.
5. Tap NEW STORE, enter the file name as 'Designer Mode Tutorial', and tap OK.
6. Your system configuration is now ready for the following tutorials.

18.2 Designer Mode Security

18.2.1 Security for the Base Configuration

A base configuration file contains EQ, levels, crossover, and HPF/LPF information for a particular speaker type. A base configuration file can be used to create a standard starting point for a particular make and model of speaker; this can then be used in a variety of system configurations and fine-tuned using Module and Group settings.

Designer Mode Menu Reference

The base password is stored with the base configuration file preventing access to locked data even in Designer Mode. Using a base password allows hiding of your custom settings from any Lake Controller user.



Base Configuration files hide EQ curves, crossovers, or high-pass and low-pass filters, and convert Group and Module levels to hidden Factory values. The use of base configuration files is recommended for experienced Lake Controller users who require this additional level of security and functionality.



Module files provide additional functionality to base configuration files and can be used instead of base configuration files in most circumstances.

18.2.1.1 Crossover and Output EQ

All information in the XOVER screen (Lake Contour) or HPF/LPF screen (Mesa EQ) is stored in the base configuration file, including crossover frequencies, crossover type (for example, Bessel, Butterworth, or Linkwitz-Riley), along with any output-specific EQ, HPF/LPF settings, and crossover access status. All data in the XOVER screen can be adjusted for each Module, unless the designer has applied security to the base configuration file.

A base configuration file cannot be recalled into a Module running a different DSP program. For example, a two-way base configuration file cannot be recalled into a Module that is currently running a three-way Module program; a two-way Module program must be recalled first.

18.2.1.2 PEQ and GEO

All Module and Group EQ overlays are combined and stored as an invisible default EQ curve for the new base configuration. Once stored in the base configuration files, this default EQ curve cannot be viewed or adjusted, although further EQ overlays can be created at the Module or Group level. When the new base configuration file is recalled into a different Module, the main EQ appears flat. Output-specific EQ from the XOVER or output EQ screens can still be viewed or adjusted, unless the system designer has protected it.



The EQ curve created in the PEQ and GEO overlays is separate from any output-specific EQ created on the XOVER/AUX pages.

18.2.1.3 Levels

With the exception of the MaxRMS Limiter Corner, Attack and Release, the current Module and Group levels are combined and stored as factory levels when a base configuration file is stored. The factory levels can be viewed and adjusted in Designer Mode after activating the ADJUST FACTORY option in the LEVELS/METER OPTIONS menu.

Level Limits, also stored with a base configuration file, can be viewed and adjusted from LEVELS/METER OPTIONS/LEVELS LIMITS.

18.2.1.4 Base Configuration Tutorial

This tutorial illustrates important features of base configuration files, using loudspeaker Modules as the example. For Mesa EQ Modules, use the only output available on each Module and ignore the steps regarding crossovers.

To adjust levels and level limits, perform the following steps:

1. Navigate to the GAIN levels page of Module A.
2. Adjust the Output 2 gain to -9 dB.
3. Tap the DELAY button and increase Output 3 delay to 6 ms.
4. Tap METER OPTIONS, then tap LEVEL LIMITS.
5. Select GAIN/DELAY LIMITS.
6. Tap the MAX DELAY value highlighted in blue for the input channel. This is located on the left of the screen, second from bottom, and should initially read 1800.00.
7. Enter 0 (zero), and tap OK.

Setting a maximum value identical to the minimum value removes the fader when in User Mode, or when the base configuration file or Module is locked.

To adjust crossover settings, perform the following steps:

8. Tap the EQ tab (top left) and select XOVER (Contour) or HPF/LPF (Mesa EQ).
9. With the first output (low frequency) selected, tap CROSSOVER SELECT.
10. Select 36 dB Butterworth from the scroll bar.
11. Tap CROSSOVER SET, then tap YES to the warning message.
12. Tap HPF ENABLE located at the top left of the screen.
13. Tap XOVER FUNCTIONS from the button bar, then tap CROSSOVER VIEW ONLY. This hides the crossover screen or HPF/LPF screen when in User Mode, or when the base configuration/Module is locked.

To add EQ, perform the following steps:

14. Tap PEQ1 and add a low-shelf filter around 80 Hz, with 3 dB of gain.
15. Tap HOME.

Designer Mode Menu Reference

To lock the base configuration, perform the following steps:

16. Tap MODULES, then tap Module A to select it.
17. Tap LABEL & LOCK. The options shown in Figure 18-3 are displayed.



Figure 18-3: Label & Lock Menu Options

18. Tap SET BASE PASSWORD, type 'Demo', and tap OK.
19. Type 'Demo' again to confirm, and tap OK to the message.
20. Tap BASE UNLOCKED. This changes to read UNLOCK BASE and the password is now required to unlock this base configuration file.

The XOVER page will be displayed as VIEW ONLY until it is unlocked. Any user, even a system designer, cannot adjust the settings without first unlocking the base configuration file.

LEVEL LIMITS and ADJUST FACTORY options are locked out in both User Mode and Designer Mode, and the input delay fader is removed when in User Mode.

To store the new base configuration file, perform the following steps:

21. Tap LABEL EXIT, then MODULE STORE/RECALL.
22. Tap BASE CONFIGURATION.
23. Navigate to the desired folder location or create a NEW FOLDER.
24. Tap NEW STORE, enter 'Base Config Test', and tap OK.

The file is stored in the folder you navigated to prior to storing, and the screen appears similar to Figure 18-4.



Figure 18-4: Storing a Base Configuration File

In addition to locking the crossover, HPF/LPF, and EQ of a base configuration file, the entire file can be protected from accidental deletion.

To secure the base configuration file, perform the following steps:

25. Tap FILE UTILITIES.
26. Select the BASE CONFIG TEST base configuration file from the scroll bar.
27. Tap READ ONLY. Notice that the DELETE button is now disabled for this file.



Figure 18-5: Setting a Base Config File to Read Only



For further protection, base configuration file utilities are disabled when in User Mode.

To load the new base configuration file into Module B:

28. Tap FILE UTIL EXIT, then tap the Module B icon to select it.
29. Select the BASE CONFIG TEST file on the scroll bar, and tap RECALL.
30. Tap YES to the warning message.

All data changed during this tutorial is recalled into Module B, and because the base configuration was locked, some data is now invisible or protected. Table 18-1 below describes various affected parameters. Navigate using Module B to verify the changes made to the base configuration file.

Designer Mode Menu Reference

SCENARIO	NAVIGATE TO
Factory Levels Locked	Levels > Meter Options The Adjust Factory button normally present is not available until the base configuration file is unlocked.
Level Limits Locked	Levels > Meter Options The Level Limits button normally present is not available until the base configuration file is unlocked.
The Input Delay Max Level Limit is set to zero.	Levels > Delay Attempt to move the input delay fader, shown in Designer Mode only. (In User Mode, this delay fader is removed.)
XOVER/HPF/LPF transferred and set to View Only	EQ > XOVER (or HPF/LPF)
EQ is affecting the audio, but cannot be viewed	PEQ and GEQ settings stored in base configuration files cannot be viewed, although an audio comparison can be made between Module A and B to verify they are identical.

Table 18-1: Designer Mode Security Examples

18.2.1.5 Summary

Base configuration files enable low-level security allowing control over individual aspects of the system. The system designer can fine-tune a speaker configuration or system EQ and protect the settings by hiding or setting them as View Only.

The base configuration files can be stored and recalled into other Modules in the same system or in different systems. This provides a starting point from which the Module can be fine-tuned by another designer or user.



The I/O CONFIG screen displays the name of the base configuration file that was originally recalled or most recently stored. I/O CONFIG is located under the MODULES menu.

18.2.2 Security for Module Functions

All settings that can be protected for a base configurations can also be protected for a Module. Base configuration settings are overwritten by Module settings, unless access has been restricted in the base configuration file, in which case certain parameters will not be accessible. The base configuration file itself will not be affected by any changes made to a Module after the file is recalled.

The Module password is stored with the single Module file, and is stored at the hardware level when recalled into a Lake device. This prevents access to certain data stored in the Module file, even if you are in Designer Mode in the Lake Controller. Using a Module password allows hiding of your custom settings from any user of the Controller.

The following features are available for both base configuration and Module files:

- ▶ Adjust and lock factory levels
- ▶ Adjust and lock access to crossover settings
- ▶ Hide unused channels
- ▶ Adjust Level Limits
- ▶ Disable individual level faders or entire levels sections from other users

In addition to these features, a system designer can also adjust and lock access to individual PEQ and GEO overlays.

18.2.2.1 Module Tutorial

The following tutorial illustrates Designer Mode's most important Module features. It also includes some functions that relate to both base configuration and Module files, such as Level Limits. Use the same Designer Mode tutorial system configuration described in section 18.1.3.1. Ensure you are in Designer Mode and that the base configuration is unlocked before proceeding.

For Mesa EQ Modules, use the only output available on each Module and ignore the steps regarding crossovers.

To add PEQ and set the overlay to View Only, perform the following steps:

1. Navigate to the PEQ1 page of Module A.
2. Add a high-shelf filter (gain: 10 dB; frequency: 10 kHz; bandwidth: 3).
3. Tap OVERLAY FUNCTIONS, then OVERLAY PROPERTIES.
4. Tap OVERLAY VIEW ONLY (illuminates orange).

Designer Mode Menu Reference

To add GEO and hide the overlay, perform the following steps:

5. Tap GEO2.
6. Reduce the 125 Hz filter by 6 dB.
7. Tap OVERLAY HIDE (illuminates orange).



When an EQ overlay is hidden, the effect its filters have on the overall EQ curve is not visible in User Mode or when the Module is locked.

To remove an unused channel meter and fader, perform the following steps (not applicable for Mesa EQ):

8. Tap the LEVELS tab.
9. Tap LABEL CHANNEL.
10. Tap the MUTE/LABEL button of output 3.
11. Type 'unused', and tap OK.

To lock the Module, perform the following steps:

12. Tap Home, then MODULES.
13. Tap the icon for Module A to select it.
14. Tap LABEL & LOCK, then SET MOD PASSWORD.
15. Type 'demo', then tap OK.
16. Type 'demo' again to confirm, tap OK, then tap OK to the message.
17. Tap MODULE UNLOCKED.

To store the new Module file, perform the following steps:

18. Tap LABEL EXIT, then MODULE STORE/RECALL.
19. Navigate to the required folder.
20. Tap NEW STORE, type demo Module, and tap OK.

To load this new Module file into Module B, perform the following steps:

21. Tap the icon for Module B.
22. Tap the DEMO Module file on the scroll bar.
23. Tap RECALL, then YES to the warning message.
24. Exit Designer Mode to see the effect of the changes on Module A. Module B is already locked following loading the Module file.

18.2.2.2 Summary

All data that can be stored and secured for a base configuration also can be stored and secured for Modules. In addition, the Module can restrict access to input EQ overlays.

18.2.3 Security for Group Functions

Groups are used to connect and adjust multiple Modules. Groups cannot be locked or password-protected, but individual EQ overlays can be hidden. Global Access settings also apply to Groups. Security for levels and crossovers is not relevant for Groups.

A Group may contain various types of Modules, each with different security settings. Group levels, however, are restricted by the level limits set for the Modules within the Group. For example, if changing a Group level causes one or more Modules to exceed their minimum/maximum level limits, the action is not permitted.

18.2.3.1 Group Tutorial

To add a Group to the configuration, perform the following steps:

1. From HOME, tap GROUPS.
2. Tap GROUP 1 from the GROUPS scroll bar, and tap again in the work area.
3. Tap ASSIGN, then tap the Module A and Module B icons.
4. Tap ASSIGN again to exit the Group Assignment mode.
5. Tap EQ/LEVELS and navigate to the PEQ1 page of Group 1.

To add PEQ and hide the overlay, perform the following steps:

6. Add a parametric filter (gain: -6 dB; frequency: 125 Hz; bandwidth: 1).
7. Tap OVERLAY FUNCTIONS, then OVERLAY PROPERTIES.

8. Tap OVERLAY HIDE (illuminates orange), then tap OVLAY PROP EXIT.



When an EQ overlay is hidden, the effect its filters have on the overall EQ curve are not visible in User Mode or when the Module is locked.

To add GEQ and set the overlay to View Only, perform the following steps:

9. Tap OVERLAY NEW. The overlay Group 1/PEQ2 is created.
10. Tap OVERLAY GEQ, then YES to the warning message.
11. Reduce the 4 kHz filter by 4 dB.
12. Tap OVERLAY PROPERTIES, then OVERLAY VIEW ONLY (illuminates orange).

To verify the effect of the changes, perform the following steps:

13. Tap HOME, then USER PREFERENCES.
14. Tap DESIGNER MODE to return to User Mode (button becomes blue).
15. Tap HOME, then tap the GROUP 1 icon and navigate to EQ.

PEQ1 is hidden, and its filter is not displayed in the EQ curve, although its effect is still audible. GEQ2 is displayed as View Only, and most functions are disabled.

18.2.3.2 Summary

Because a Group may contain various types of Modules with different security settings, Group security is limited to EQ overlays only. Crossovers are not relevant to Groups, and all security for levels is controlled via individual Modules.

18.2.4 Security for Global Access Functions

Global Access settings affect all Modules and Groups within a system configuration. To enable Global Access mode, perform the following steps:

1. From HOME, tap USER PREFERENCES.
2. Tap DESIGNER FUNCTIONS. Ensure Designer Mode is active - orange.
3. Tap GLOBAL ACCESS.

The options for Global Access are shown in Figure 18-6.



Figure 18-6: Global Access Options

- ▶ [F2] EQ HIDE hides all EQ overlays for all Modules and Groups.
- ▶ [F3] EQ VIEW ONLY protects all EQ overlays from adjustment for all Modules and Groups.
- ▶ [F4] XOVER HIDE hides all XOVER screens or HPF/LPF screens for all Modules and Groups.
- ▶ [F5] XOVER VIEW ONLY protects XOVER/AUX/HPF/LPF from adjustment for all Modules and Groups.
- ▶ [F7] LEVELS HIDE hides all LEVELS screens for all Modules and Groups.
- ▶ [F8] LEVELS VIEW ONLY protects all LEVELS screens from adjustment for all Modules and Groups.

18.2.4.1 Global Access Tutorial

To hide all XOVER, AUX, HPF/LPF and EQ overlays in a system, perform the following steps:

1. From HOME, tap USER PREFERENCES.
2. Tap GLOBAL ACCESS, then tap EQ Hide.
3. Tap XOVER HIDE.
4. Tap GLBL ACCESS EXIT.
5. Tap DESIGNER MODE to exit Designer Mode.
The button becomes blue (inactive/available) in User Mode.

18.2.4.2 Summary

The Global Access functions apply an overall security to a particular Controller system and can be used in addition to the system security settings.

18.3 Functional Reference Guide

This section provides an overview of the steps required for each Designer Mode process. This can be used as a quick reference for the features described throughout the tutorial based on the procedure or function. This section describes the standard functions using the LEVELS, XOVER, and EQ screens.



Designer Mode must be active to access the functions described in this section.

18.3.1 Xover/Aux/HPF/LPF Functions

These functions apply to base configurations and Modules only. The XOVER buttons listed below could read Aux Output or HPF/LPF depending on the Module type.

18.3.1.1 Set Individual Xover Screens to Hide/View Only

1. Navigate to the XOVER screen.
2. Tap CROSSOVER FUNCTIONS.
3. Tap CROSSOVER VIEW ONLY or CROSSOVER HIDE.
The selected status illuminates orange.



The same process applies to AUX and HPF/LPF.

18.3.1.2 Set All Xover/Aux or HPF/LPF Screens to Hide/View Only

This process will affect all XOVER/AUX/HPF/LPF screens in the current system configuration.

1. From HOME, tap USER PREFERENCES.
2. Tap GLOBAL ACCESS.
3. Tap CROSSOVER HIDE or CROSSOVER VIEW ONLY.
The selected status illuminates orange.

18.3.1.3 All Pass Filters

In Designer Mode, the All Pass filter is available on the XOVER/AUX screens. The All Pass filter icon is identified at [A] in Figure 18-7:

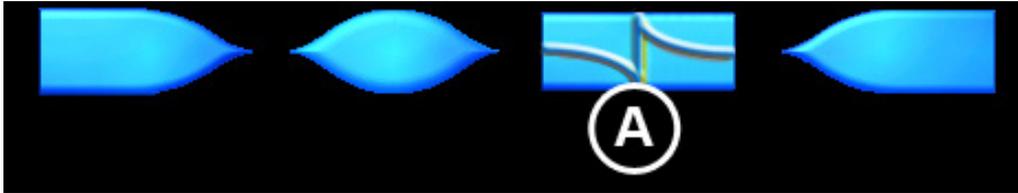


Figure 18-7: All Pass Filter

The ALL PASS filter allows first- and second-order (default) phase adjustment with variable bandwidth and frequency.

To add an ALL PASS filter to an output, perform the following steps:

1. Select an output on the Xover page, or select the required Aux Output screen.
2. Tap the ALL PASS filter icon [A].
3. Tap on the EQ scale to add the filter.
4. Adjust the order, frequency, and bandwidth as required.

18.3.2 EQ Functions

18.3.2.1 Set Hide/View Only Status for an Individual EQ Overlay

1. Navigate to the Module or Group overlay in EQ/LEVELS.
2. Tap OVERLAY FUNCTIONS, then OVERLAY PROPERTIES.
3. Tap OVERLAY VIEW ONLY or OVERLAY HIDE. The selected status is illuminated orange.

18.3.2.2 Set Hide/View Only Status for All EQ Overlays

This affects all EQ overlays in the current system configuration.

1. From HOME, tap USER PREFERENCES.
2. Tap GLOBAL ACCESS.
3. Tap EQ HIDE/EQ VIEW ONLY.

18.3.3 Levels Functions

18.3.3.1 Adjust Factory Levels

A button labeled ADJUST FACTORY is available on the METER OPTIONS menu from the LEVELS page of a Module. When this button is active (orange), a label reading ADJUST FACTORY appears at the top of each Levels page to confirm this special mode of operation. Factory levels are not applicable for Groups.

In this mode, a different set of factory levels are displayed for each level type. These are displayed using the same faders and meters used for the adjustment of user levels; the fader positions and gain values change to indicate the factory level instead of the user level.



The sum of factory, user, and Group levels are combined to provide the actual total. Factory levels are not included in the total level value that is shown in brackets in User Mode.



Adjust Factory values are available for all level types with the exception of MaxRMS Corner, MaxRMS Attack and MaxRMS Release.

To set factory levels, perform the following steps:

1. From the LEVELS page, tap METER OPTIONS, then ADJUST FACTORY.
2. Tap METER OPTS EXIT, and navigate to the relevant LEVELS page.
3. Enter the values required using the fader or keyboard entry.
4. Tap METER OPTIONS, then ADJUST FACTORY to exit this mode



Factory levels can be hidden from the end user by locking the Module or exiting Designer Mode.

18.3.3.2 Restrict Level Adjustments

Level Limits are used to restrict minimum and maximum levels for a Module. Although a Group's Level Limits cannot be set, they adhere to the limits of all Modules that are assigned to it. For example, if changing a Group level causes any of its Modules to exceed their allowable range, the action is not permitted.

1. Navigate to Module Levels, tap METER OPTIONS, then tap LEVEL LIMITS.
2. Tap GAIN/DELAY LIMITS or LIMITERMAX LIMITS.
3. Tap the relevant minimum/maximum level. Each channel is displayed in the same order as the channel faders (from left to right: Input, Output 1, Output 2, and so on).

4. Enter the limit, and tap OK.



Figure 18-8: Restricting the Minimum Gain Value for Output 1

18.3.3.3 Disable Level Adjustments

If the minimum and maximum level limits are identical for a particular channel and level type, that control is effectively disabled. The fader for the associated channel and level type is not visible in User Mode or when the Module is locked.

Set both the minimum and maximum values of a particular level output and level type to the same value. To verify that the fader has been removed and the level fixed, either lock the Module or base configuration or switch to User Mode.

18.3.3.4 Disable Access to a Levels Function

To disable access to an entire level function (delay, for example), set identical minimum and maximum delay level limits for every channel for the Module. Set the minimum and maximum values of all inputs/outputs for a particular level type to the same value.



Figure 18-9: Disabling an Entire Levels Function

Figure 18-9 shows an example of identical minimum/maximum settings for delay. These settings disable the DELAY button on the EQ/LEVELS menu in User Mode, or when the Module or base configuration is locked.



Figure 18-10: Access to the Delay Function is Disabled

18.3.3.5 Disable/Enable Unused Output Channels

To completely hide a levels meter/fader, set the name of fader to Unused, perform the following steps:

1. Navigate to the relevant Module LEVELS page.
2. Tap LABEL CHANNEL, then tap the mute/label button of the relevant channel.
3. Type UNUSED, and tap OK.

The meter and fader will be invisible on the software Controller, and the meter is also disabled on the front panel of the Lake device. To enable the channel again, change the channel label to something other than UNUSED.

18.3.3.6 Set Hide/View Only Status for All Levels Screens

This function affects all Levels screens in the current system configuration.

1. From HOME, tap USER PREFERENCES.
2. Tap GLOBAL ACCESS, then tap LEVELS HIDE or LEVELS VIEW ONLY.
The selected button is illuminated orange.

18.3.4 Additional Designer Mode Functions

18.3.4.1 Switch between Designer Mode and User Mode

To access Designer Mode, perform the following steps:

1. From HOME, tap USER PREFERENCES, then tap DESIGNER MODE.
2. Enter the password (if set), and tap OK.

To switch to User Mode, perform the following steps:

1. From HOME, tap USER PREFERENCES.
The Designer Mode button is orange when Designer Mode is active.
2. Tap DESIGNER MODE.
The Designer Mode button is now blue; Designer Mode is inactive.

18.3.4.2 Lock and Password-Protect a Module or Base Configuration

Locking a Module or base configuration enables access security (such as hiding EQ overlays, setting XOVER screens to View Only, and disabling level functions). The LABEL & LOCK function activates security in both User Mode and Designer Mode, allowing certain settings to be protected from other system designers.

From the Modules menu, tap a Module icon to select it.

1. Tap LABEL & LOCK.
2. Tap SET MOD PASSWORD (for Module) or SET BASE PASSWORD (for base Module).
3. Enter a password, and tap OK.
4. Confirm password, tap OK, then tap OK to the warning message.
5. Tap MODULE UNLOCKED or BASE UNLOCKED to lock the relevant settings.

18.3.4.3 Unlock a Locked Module or Base Configuration

From the MODULES menu, tap a Module icon to select it.

1. Tap LABEL & LOCK.
2. Tap UNLOCK MODULE or UNLOCK BASE.
3. Enter the associated password, and tap OK.

18.3.4.4 Creating Descriptions/Assigning Graphics for Module Files

Text files (.txt) and bitmap files (.bmp) with the same file name as a Module file can be placed in the data/user/Modules directory of your Lake Controller installation.

When a text file is present with the same file name, the Controller displays the text when the Module file is selected on the MODULE STORE/RECALL scroll bar. When a bitmap file is present, the graphic is displayed in place of the default Module icon.



Bitmap files must be 24-bit Microsoft Windows format with a dimension of 80x80 pixels. MODULE LABEL text will overwrite the bottom portion of the bitmap.

Follow these steps to create and view Module file descriptions:

1. Store a Module with the file name 'example' at the Modules root directory.

Designer Mode Menu Reference

2. Minimize the Controller and, using a text editor (such as Microsoft Notepad), create a text (.txt) file containing the text you require.
3. Store this text file in your Lake Controller installation directory
e.g. C:\Program Files\Lake\Lake Controller vX.X\data\user\Modules\Modules.txt



In Windows 7 these files are created in the virtual store; please use the [User Data files] shortcut from the Start > All Programs menu for easy access to these files.

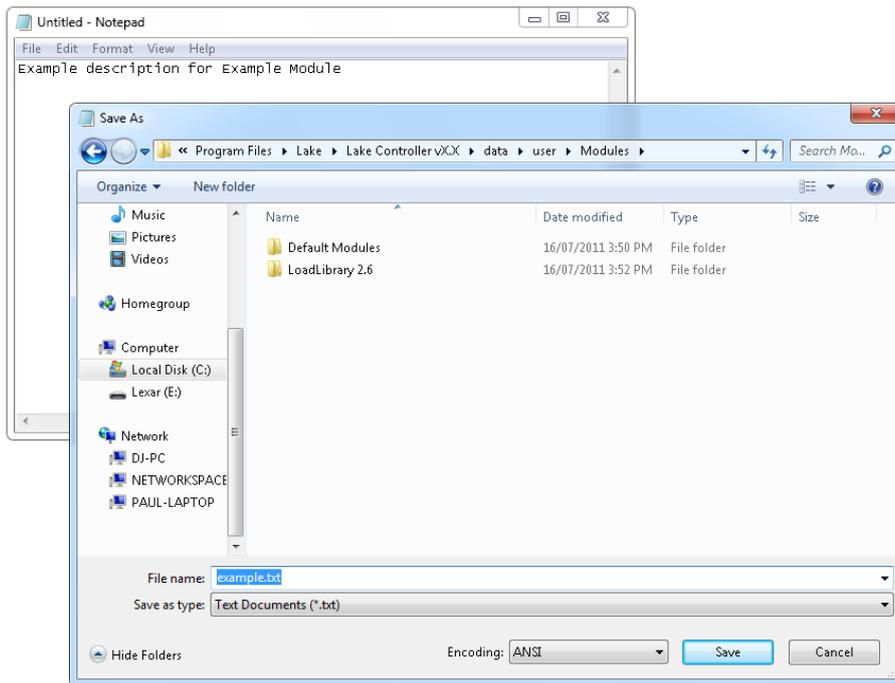


Figure 18-11: Storing a Module Help Text File

4. Maximize the Lake Controller and navigate to MODULE STORE/RECALL.
5. Select the Module file example from the scroll bar.
The text you entered appears above the Module as shown in Figure 18-12.



Figure 18-12: Module Help Text

Module descriptions can be modified by editing the text file, or removed by deleting the text file. A shortcut to the data/user folder is available at:

START > PROGRAMS > LAKE CONTROLLER > LAKE CONTROLLER USER DATA FILES.



Folder descriptions can also be created by placing a text file with the same name as the folder in the same directory as the folder.

18.4 Designer Worksheets

18.4.1 Overview

The Designer Worksheets provide the ability to quickly view and edit the majority of data for a Lake device via a spreadsheet style interface.

Designer worksheets are available only in Designer Mode, via the I/O CONFIG & Worksheets button.

To access the Designer Worksheets, perform the following steps:

1. From HOME, tap MODULES.
2. Select a Module in the work area.
3. Tap I/O CONFIG & WORKSHEETS.

The following screen tabs are available for loudspeaker Modules in Designer Mode.



Figure 18-13: Designer Worksheets for Contour Modules

The following screen tabs are available for Mesa EQ Modules in Designer Mode.



Figure 18-14: Designer Worksheets for Mesa EQ Modules

4. Tap LEVELS - DESIGN.
A screen similar to that shown below will be displayed.

Module		A - CL3Way				B - CL3Way					
Channel Type	Input Mix	Output	Output	Output	Input Mix	Output	Output	Output	Input Mix	Output	
Channel	n/a	1	2	3	n/a	4	5	6	n/a		
Channel Label	Input	Low	Mid	Hi	Input	Low	Mid	Hi	Input	Lo	
Polarity	Polarity (+/-)	+	+	+	+	+	+	+	+		
Lock Polarity? (Y/N)	n/a	N	N	N	n/a	N	N	N	n/a		
Gain	Factory Gain (dB)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	User Gain (dB)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Delay	Factory Delay (ms)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	User Delay (ms)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
MaxRMS Limiter	Factory MaxRMS Level(dBu)	n/a	4.00	4.00	4.00	n/a	4.00	4.00	4.00	n/a	
	User MaxRMS Level(dB)	n/a	20.00	20.00	20.00	n/a	20.00	20.00	20.00	n/a	
	User										

Frame: ---
 Designer Mode: Use keyboard to edit, arrow keys to update/navigate, tab to switch worksheet
 No Configuration

Buttons: 1, Home (F1), Print (F2), Save As Bitmap (F3), I/O Config EXIT (F4), F5, F6, F7, F8, F9, E10, Undo

Figure 18-15: Levels-Design Worksheet

18.4.2 Worksheet Navigation and Data Entry

To navigate to the worksheets, select one of the Design tabs at the top of the screen.

18.4.2.1 External Keyboard Entry

For fast data entry via the Designer Worksheet, an external keyboard should be attached. Use the arrow keys to navigate around the cells of the worksheet, and enter values and data using the keyboard. The data of the current cell will be verified and updated when you move to the next cell.

Cut/Copy/Paste functionality between cells in the worksheet is available using the following standard keyboard shortcuts.

- ▶ Ctrl+X Cut
- ▶ Ctrl+C Copy
- ▶ Ctrl+V Paste

18.4.2.2 On-screen Keyboard Entry

If a keyboard is not attached, you may select a cell using the touch screen:

- ▶ A single tap selects the cell.
- ▶ A double tap displays the on-screen keyboard to allow you to enter the data.



Cell Cut/Copy/Paste functionality is not available without an external keyboard attached.

18.4.3 Xover/Aux: Design (Loudspeaker Modules Only)

The XOVER/AUX screens provide access to HPF and LPF frequencies and types (including crossovers) along with output EQ filters and types. The abbreviated codes for this data are listed here with descriptions.

18.4.3.1 HPF and LPF Types

The same HPF/LPF/Crossover types are allowed via data entry as are allowed via the HPF/LPF/Crossover scroll bars on the XOVER page. The following HPF/LPF types are available for the lowest output HPF and highest output LPF.

BESSEL	BUTTERWORTH	LINKWITZ-RILEY
BE6	BU6	-
BE12	BU12	LR12
BE18	BU18	-
BE24	BU24	LR24

Table 18-2: HPF/LPF Types

18.4.3.2 Classic Crossover Types

The following HPF/LPF types are allowed for crossover points only (all HPF/LPF fields except for the HPF on the lowest output channel, and the LPF on the highest output channel for the Module).

BESSEL	BUTTERWORTH	LINKWITZ-RILEY
BE6	BU6	-
BE12	BU12	LR12
BE18	BU18	-
BE24	BU24	LR24
BE30	BU30	-
BE36	BU36	LR36
BE42	BU42	-
BE48	BU48	LR48

Table 18-3: Classic Crossover Types

18.4.3.3 Linear Phase Crossover Types

The following HPF/LPF types are allowed for Linear Phase 2-Way and 3-Way Module crossover points only (i.e. not the HPF on the lowest output channel or the LPF on the highest output channel for the Module).

LINEAR PHASE 24 dB	LINEAR PHASE 48 dB	LINEAR PHASE BRICK WALL
LP24	LP48	LPBW

Table 18-4: Linear Phase Crossover Types



Linear phase crossovers require both sides of the crossover point to be the same crossover type. Therefore if the one side of the crossover is changed, the other side will change automatically.

18.4.3.4 Linear Phase Alignment Delay

Unlike most values in the worksheet, ALIGNMENT DELAY is a Module-based value, not a channel-based value. Therefore, when ALIGNMENT DELAY is changed for any channel, all other channels of that Module will be updated automatically.

Linear Phase 2-Way and 3-Way Modules provide six settings: 1.25 ms, 2.5 ms, 5 ms, 10 ms, 20 ms, 40 ms.

Linear Phase Brick Wall 4-Way Modules provide four settings: 3.15 ms, 6.29 ms, 12.58 ms, 25.17 ms.

18.4.3.5 Output EQ Types

Table 18-5 shows the abbreviations for adding output EQ filters via the XOVER - DESIGN worksheet, along with associated default values.

EQ TYPE	DESCRIPTION	GAIN	FREQUENCY	BANDWIDTH
LS	Low Shelf	0 dB	125 Hz	1.9
BP	Band-pass (Parametric)	0 dB	500 Hz	0.33
AP	All Pass	2nd Order	800 Hz	0.33
HS	High Shelf	0 dB	8 kHz	1.9

Table 18-5: Output EQ Types

18.4.4 HPF/LPF - Design (Mesa EQ Only)

Crossovers, EQ, and All Pass filters are not available on the Mesa EQ HPF/LPF - DESIGN screen. The same HPF/LPF types are available for Mesa EQ as listed in Table 18-2.

18.4.5 Levels - Design

The data on the LEVELS - DESIGN worksheet is entered by typing the appropriate numerical value into a cell on the worksheet. An error message will be displayed if the value is invalid or incorrect.

To set polarity through the LEVELS - DESIGN worksheet, enter either + (positive) or – (negative) in the polarity field. The polarity of each output can be independently locked using the LOCK POLARITY? field, which is only available via this worksheet.

To lock polarity of an output, change the value in the associated LOCK POLARITY? field to Y. The example Module in Figure 18-16 has the polarity of all channels locked except for the input and lowest output.

	Output Channel No.	n/a	1	2	3	4
	Channel Label	Input	Low	Low Mid	Hi Mid	Hi
Polarity	Polarity (+/-)	+	+	-	+	-
	Lock Polarity? (Y/N)	n/a	N	Y	Y	Y

Figure 18-16: Locking Polarity

When the Module is locked, the worksheet will appear as shown Figure 18-17. In this example, output polarity for channels 2, 3, and 4 will be locked even in Designer Mode.

Designer Mode Menu Reference

	Output Channel No.	n/a	1	2	3	4
	Channel Label	Input	Low	Low Mid	Hi Mid	Hi
Polarity	Polarity (+/-)	+	+	Locked	Locked	Locked
	Lock Polarity? (Y/N)	n/a	N	Y	Y	Y

Figure 18-17: Polarity Locked

Designer worksheets are not available in User Mode, and in the example shown in Figure 18-17, only the input and low output polarity buttons will be visible.

18.4.6 PEQ - Design

The PEQ-DESIGN worksheet displays the details for each PEQ overlay for the selected Lake device. Table 18-6 shows the available PEQ type abbreviations, descriptions, and default values.

EQ TYPE	DESCRIPTION	GAIN	FREQUENCY	BANDWIDTH
LS	Low Shelf	0 dB	125 Hz	1.9
BP	Band-pass (Parametric)	0 dB	500 Hz	0.33
ME	Mesa Filter	0 dB	830 Hz	0.33
		0 dB	1.2 kHz	0.33
HS	High Shelf	0 dB	8 kHz	1.9

Table 18-6: PEQ Types



The extra fields for the Mesa filter can only be edited when a Mesa filter type is entered.

18.4.7 GEQ - Design

The GEQ-DESIGN worksheet displays the details for each GEQ overlay for the selected Lake device, including the gain value of each GEQ filter and the bypassed/inserted status of each filter and each overlay.

18.4.8 Locked Modules/Hidden/View Only Data

If data on a Module has been hidden or set to view only, and the Module has been locked, the associated data will either be view only on the worksheets (View Only data) or will be replaced with the word LOCKED (Hidden data).

19. PLM Series Reference and Operation

This chapter describes information specific using the Lake Controller with PLM Series devices. For further details on the use of PLM Series products, please refer to the PLM Series Operation Manual.

19.1 Monitoring & Control

Many of the PLM's basic operating parameters are available in both the Lake Controller software and the PLM front panel. These include, for example, gain adjustment, monitoring of output levels and temperatures, and power control.

Basic per-channel operating parameters and gain adjustments are presented in the Status tab, with certain adjustments and power control accessed via the Control tab. The History and Events tabs provide both real-time log data and a graphical representation of the PLM's performance.

19.2 LoadLibrary™

In addition to the standard loudspeaker preset Module files, the Lake Controller includes a set of enhanced files specifically for use with the PLM Series.

Termed the LoadLibrary™, these supplementary PLM Module files incorporate both standard Lake DSP parameters along with data relating specifically to the PLM. LoadLibrary Module files provide parameter settings for the PLM's Amplifier Gain and ISVPL™ limiter. Additionally, LoadLibrary loudspeaker types may include electrical characteristics data for the associated loudspeaker.

The data set relating to the loudspeaker's electrical characteristics is used to enable load verification (LoadSmart™) and monitoring facilities (SpeakerSafe™) to be performed on the PLM. This data set is termed a Fingerprint. When a PLM-specific loudspeaker type is recalled, its Fingerprint load characteristics are included. These load characteristics are stored in a file with a ".mdl" suffix and are recalled simultaneously with the Module file.

LoadLibrary Modules and standard Module files are cross-compatible; when a LoadLibrary Module is recalled into a legacy Lake product the extra data is ignored.

19.3 LoadSmart™

LoadSmart is Lab.gruppen's exclusive system for verifying the load connected to each output channel of the PLM. LoadSmart is set up and run from the Load tab. The number of each type of cabinet that should be connected to each power channel can be specified, along with cable lengths, resistance, etc. LoadSmart evaluates the load characteristics on each PLM power output channel and either confirms them as correct or reports if they are exhibiting anomalies.

LoadSmart is available when a Module with an associated Fingerprint file is loaded - please refer to section 9.8 for further details.

19.4 SpeakerSafe™

SpeakerSafe, accessed from the Load tab, is an exclusive Lab.gruppen real-time performance monitoring and logging feature.

SpeakerSafe constantly monitors the characteristics of the load connected to each PLM output while audio is running. Operation is initiated from the Load tab following a successful LoadSmart verification.

The loudspeaker Fingerprint is again used to calculate operating parameters such as loudspeaker magnet and voice coil temperatures. Numerical and graphic displays, along with warning alerts (when warranted), allow the operator to detect any excessive or anomalous conditions before serious problems can develop.

19.5 Navigation

The EVENTS & CONTROL functionality, when used with PLM Series units, provides additional module-level information including STATUS, HISTORY and LOAD information. PLM MODULE VIEW and PLM GLOBAL VIEW. Each has further tabbed views.



Figure 19-1: PLM Module View Tabs

19.5.1 Accessing PLM Module View

PLM Module View can be accessed by three different methods.

1. Tap HOME [F1] then tap a Module icon. Ensure LEVELS is selected, then tap EVENTS & CONTROL (located below the first output fader).
2. Tap HOME [F1] then tap MODULES [F3]. Select a Module, tap I/O CONFIG [F4] then tap EVENTS & CONTROL [F7].
3. Tap HOME [F1] then tap the ALL page tab. Tap a PLM icon to directly access EVENTS & CONTROL.

19.5.2 Accessing Global View

To access Global View:

1. Navigate to the ALL page
2. Tap GLOBAL INFO [F9]
3. Tap EVENTS & CONTROL [F8]



Figure 19-2: Global View Tabs

19.6 Status Tab

The STATUS display is selected by tapping the STATUS tab in PLM MODULE VIEW.

Channel strips display data relating to each power output section assigned to the selected Module.

The channels are presented in Module output order (e.g. low, mid, high). If a Module output is assigned to more than one power output channel then this is displayed accordingly (e.g. low, low, mid, high).

The PLM's meters are reproduced as vertical bar graphs. Each channel strip provides an attenuation fader, phase reverse button, and mute button. Additional identity and status information concerning the output channel and connected loads is shown below in two data blocks. To the right of the channel strips, a column of control buttons provide options for displaying and enabling the mute and polarity buttons on individual channels.

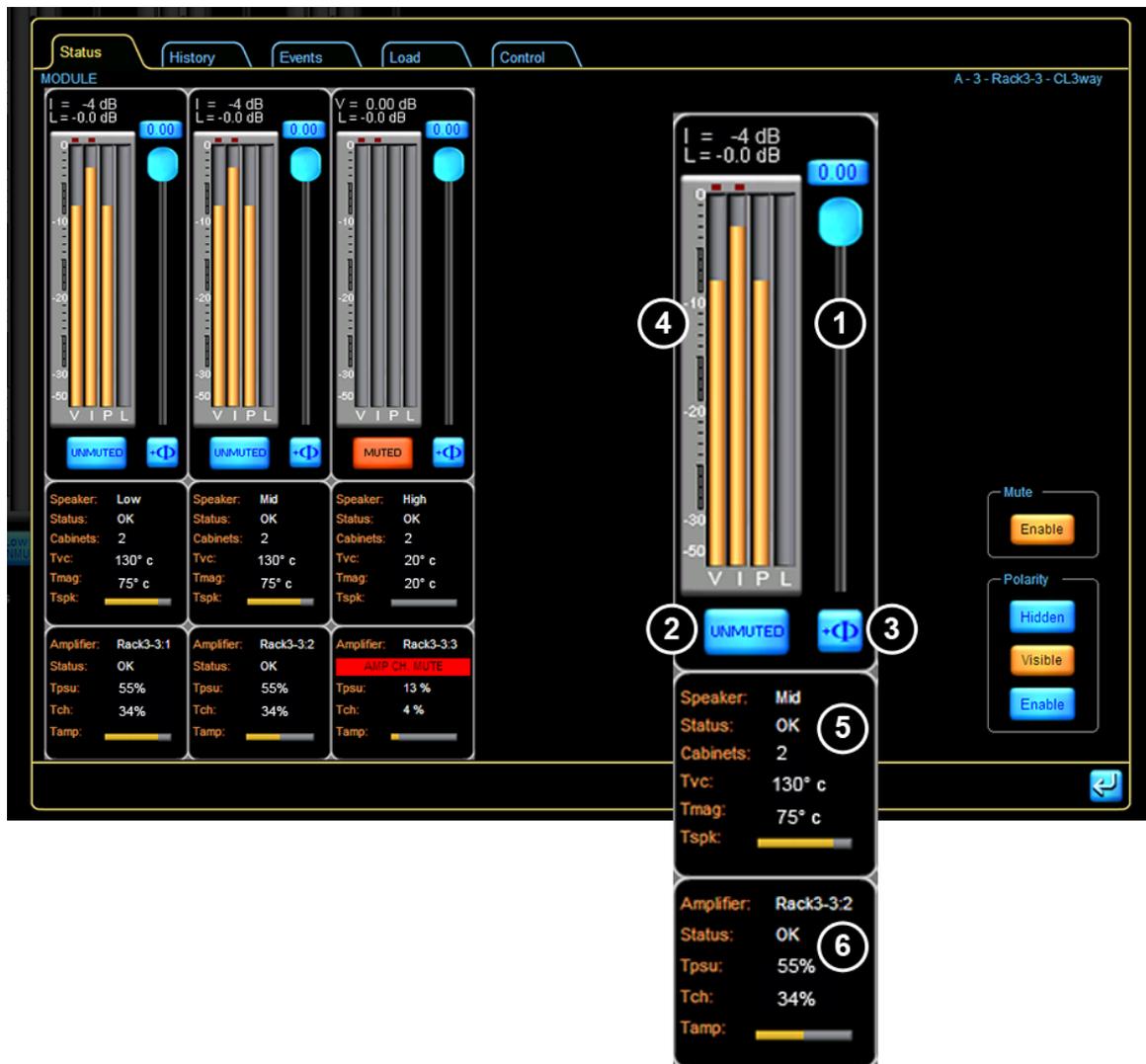


Figure 19-3: Status Tab Speaker and Power Output Channel Status

19.6.1 Attenuation ¹

The virtual fader permits adjustment of the channel's attenuation, from 0 dB (fader fully open) to $-\infty$ dB (fader closed). Moving this fader has the same effect as adjusting attenuation on the PLM front panel in Menu Mode, via MENU > ATTENUATION.

The attenuation value may also be set by tapping the numeric display at the top of the fader. A numeric keypad opens allowing an absolute value to be entered.

19.6.2 Mute 2

The large mute button below the meter display activates the mute function for the power output channel. The button changes color to red when the mute is applied, and the legend changes from UNMUTED to MUTE. Tapping this button is equivalent to pressing soft buttons 5 – 8 on the PLM's front panel in METER mode, with MUTE ENABLE selected.

19.6.3 Phase Reverse 3

A phase reverse button is provided which inverts the audio signal within the channel power output stage. The button is blue and normally shows the legend $+\Phi$; when applied it turns red and shows $-\Phi$. Note that this is an additional phase reversal at a later stage in the signal chain from the Lake Processing Modules, and does not have an equivalent control in either the PLM's Menu system or elsewhere in the Lake Controller software.

19.6.4 Meters 4

Four vertical bar graph meters are depicted for each channel. These display output voltage (V), current (I) and power (P), along with the amount of gain reduction applied by combined action of the various limiters and protection circuitry (L). The meters correspond to the four bar graph meters on the PLM front panel display in METER MODE, MODULE VIEW. Clip indicators for, respectively, voltage and current are located directly above the voltage and current meter. Clip behavior is shown by a red light, using a fast update rate to correctly indicate ballistics.

Two numerical displays are above the meter block. The top display switches mode dynamically to show the parameter closest to clipping at the moment: voltage (V), current (I) or power (P). The bottom display shows the current value of the Limiter meter.

19.6.5 Speaker Data Block 5

The display block below the meter section provides user feedback about the loudspeaker connected to each PLM power output channel.

- ▶ SPEAKER - The name shown here corresponds to that of the Module outputs and usually describes the frequency band (e.g. Low, Mid, High) that a particular power output channel addresses.



For Modules with two or more identical output channel names, the channel number will be appended.

- ▶ STATUS - OK is displayed when all load detection and monitoring functions report that the load attached to the power output channel is normal. If output conditions are such that a fault or warning state arises, a message will be displayed here advising the nature of the problem. Please refer to the PLM Series Operation Manual for a list of fault/warning messages.
- ▶ CABINETS - During SpeakerSafe monitoring, the software application calculates the number of speaker cabinets of the selected type which appear to be connected to the channel output. The result is displayed here.
- ▶ TVC - This indicates the calculated loudspeaker voice coil temperature, derived from channel output power measurement and Fingerprint data.
- ▶ TMAG - This shows the calculated loudspeaker magnet temperature, derived and displayed in the same way.
- ▶ TSPK - Whichever of TVC or TMAG is closer to the maximum temperature allowed is also displayed on a horizontal bar graph.

19.6.6 PLM Power Output Data Block **6**

The bottom display block provides user feedback about the performance of the PLM. The information is (from top):

- ▶ AMPLIFIER - Confirms PLM Frame label and channel number. This name also displays in Frame block, line 2, on the PLM front panel display. The channel number corresponds to the power output channel. The Frame name and number are separated by a colon.
- ▶ STATUS - OK is displayed during normal operation, when no faults, warnings or clipping is occurring. If an amplifier-related fault or warning state arises, a message is displayed here indicating the problem.
- ▶ TPSU - Provides the temperature of the PLM power supply. The temperature is expressed as a percentage of the maximum safe value.
- ▶ TCH - Provides the temperature of the particular PLM channel's output stage, displayed as a percentage of the maximum safe value.
- ▶ TAMP - Whichever of TPSU or TCH is closer to the maximum temperature allowed is also displayed on a horizontal bar graph.



The Tpsu, Tvc, Tmag and Tch displays correspond to temperature meters provided on the PLM Front Panel METER MODE > TEMPERATURE VIEW.

19.6.7 Mute and Polarity Enable

Controls to the right of the channel strips enable and disable the MUTE and POLARITY functions on a global basis. When MUTE is enabled (default), the mute buttons are active. When MUTE is disabled, the mute status cannot be changed.

Polarity control allows three states:

- ▶ HIDDEN (default) removes the polarity buttons from the channel strips.
- ▶ VISIBLE displays the polarity buttons but they are disabled.
- ▶ ENABLED activates the buttons and allows a change of state.



The Mute and Polarity enable controls are global for all Modules currently in the work area. Controls are reset to defaults at the start of each new session.

19.7 History Tab

A log of various optional parameters is maintained within the PLM. Samples are taken every two minutes. The last 120 samples (i.e. the last 4 hours of operation) may be viewed graphically on the HISTORY tab.

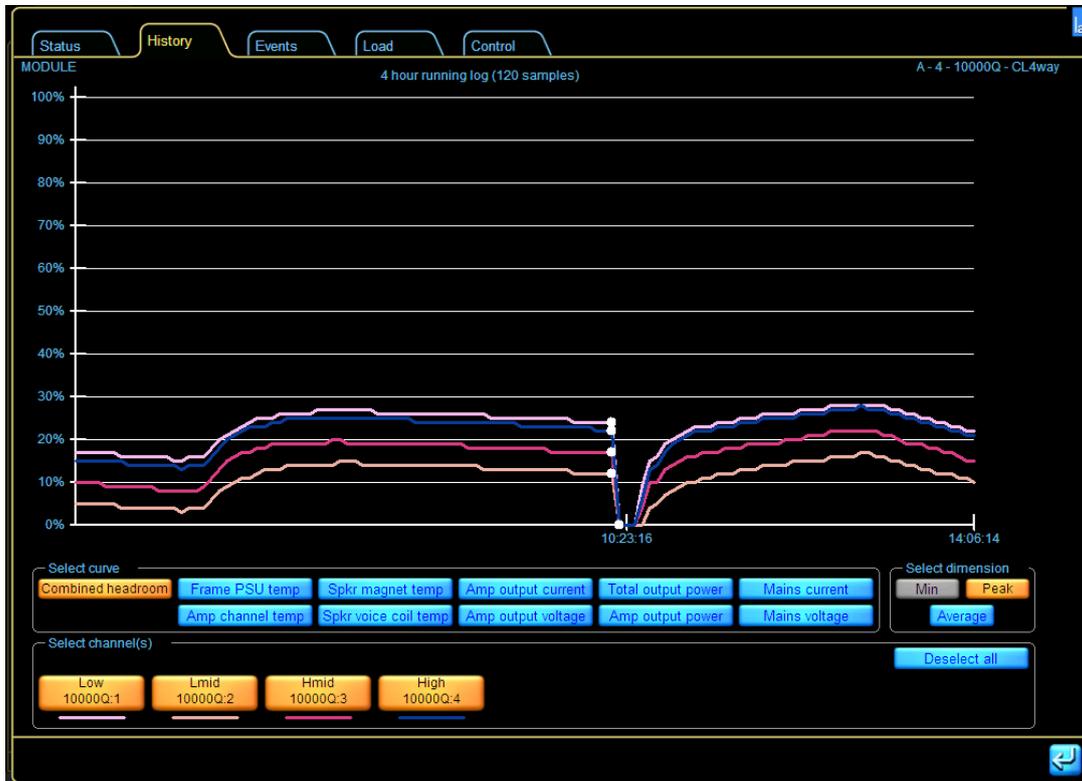


Figure 19-4: Module History Tab

19.7.1 Select Curve

The HISTORY tab displays a graph of several PLM operational parameters against time. The vertical (Y-) axis is in arbitrary units and is scaled from 0 to 100%; the horizontal (X-) axis is effectively 'time', but actually shows the previous 120 samples taken at 2 minute intervals.

The parameter to be displayed is selected by tapping on one of the buttons in the SELECT CURVE box below the graph. The options are:

- ▶ COMBINED HEADROOM – This curve is constructed from all the individual parameters listed below, and shows the maximum value derived from all of them at each sample time.
- ▶ FRAME PSU TEMP – Displays the temperature of the PLM PSU relative to its maximum safe level.
- ▶ AMP CHANNEL TEMP – Displays the temperature of the PLM power output channel devices relative to their maximum safe level.
- ▶ SPEAKER MAGNET TEMP – Displays the SpeakerSafe computed temperature of the loudspeaker magnet/s for each channel.
- ▶ SPEAKER VOICE COIL TEMP – Displays the SpeakerSafe computed temperature of the loudspeaker voice coil/s for each channel.

- ▶ AMP OUTPUT CURRENT – Displays the PLM channel’s output current relative to its maximum safe value. (This is the value at which the CPL becomes active.)
- ▶ AMP OUTPUT VOLTAGE – Displays the power output channel’s voltage relative to the voltage permissible, regardless of ISVPL setting.
- ▶ TOTAL OUTPUT POWER – Displays the total output power (sum of all channels in that Frame) relative to the maximum rated power.
- ▶ AMP OUTPUT POWER – Displays the power output channel’s power relative to the maximum rated power.
- ▶ MAINS CURRENT – (PLM 20000Q Only) Displays the mains current as a percentage of the maximum current.
- ▶ MAINS VOLTAGE – (PLM 20000Q Only) Displays the mains voltage as an actual value in volts.

19.7.2 Select Dimension

The MIN, PEAK and AVERAGE buttons in the SELECT DIMENSION box determine whether the data displayed on the graph is the log of minimum, peak or average values for the displayed parameter.

MIN is only active for the Mains Voltage parameter, and displays the minimum Mains Voltage levels at intervals during the sample period (PLM 20000Q only).

PEAK displays the highest values attained by each parameter during the sample period.

AVERAGE displays the average of the values measured during the sample period.

19.7.3 Channels

The graph displays data for any selected power output channel assigned to the selected Module, or any combination of channels. The number of channel buttons that appear under SELECT CHANNEL/S depends on the Module configuration. The channel buttons display the associated Module channel labels; the curves on the graph are color coded, with a key color shown below each channel button.

The SELECT/DESELECT ALL button toggles states to either select or deselect all channels on the selected Module.



With a single channel selected, clicking the graph will display the time and sample number for that sample on the status line.



A white dot is displayed on the graphs if a powercycle of the Frame was performed during the sampling period.

19.8 Events Tab

The MODULE EVENTS tab shown in Figure 19-5 lists all faults and warnings occurring in the power output channels allocated to the selected Module.

The EVENT LOG displayed on this screen is the same as that displayed via GLOBAL EVENTS with filters applied to only display events relevant to the currently selected Module, power output channels assigned to that Module, and the Frame/s incorporating those channels. The tab is identical in format and function to the GLOBAL EVENTS tab. Please refer to section 19.11 for further details.



Figure 19-5: Module Events Tab

19.9 Load Tab

The Load page is selected by tapping the LOAD tab in Module view. LoadSmart loudspeaker verification is initiated from this tab. LoadSmart generates a test signal which is applied to the power output stage. Measurements are taken at the power output stage, and the results computed for the speaker type, using data from the LoadLibrary.



The **LOAD** tab is disabled if fingerprint data is not present, and also when the PLM is in Standby mode.

The Load tab allows editing of default cable data in the Fingerprint, including cable characteristics that are used in the calculation of the total cable resistance for each loudspeaker. The Lake Controller application combines this information with the known loudspeaker characteristics contained in the fingerprint to accurately verify the load and to confirm correct loudspeaker system operation.

The screenshot displays the 'Load' tab interface. At the top, there are navigation tabs: Status, History, Events, Load (selected), and Control. The main area is titled 'MODULE' and shows the following data:

	ALL	Low Rack3Top:1	Mid Rack3Top:2	High Rack3Top:3
No. of cabinets in parallel	2	2	2	2
Total cable resistance (ohm)	0.22	0.22	0.22	0.22
Ambient temperature	20°C			
Fingerprint label	Y10			

Below this is the 'Cable resistance calculator' section:

Cable length (m)	Cable area (A/G)	Cable contact resistance (ohm)	Cable resistivity (nano ohm m)	Total cable resistance (ohm)
8.0	15.41	0.0020	20.20	0.223

The 'LoadSmart' section includes a 'Verify the load' button and a 'Verify' button.

At the bottom right, there are unit selection buttons: °C, °F, Meters, Feet, AWG, and mm².

Figure 19-6: Load Tab and LoadSmart Verification

19.9.1 Number of Cabinets

The number of loudspeaker cabinets connected in parallel to each channel is entered in the No. of Cabinets in Parallel field. LoadSmart uses this value for verification purposes. This data may also be entered via the PLM front panel. Please refer to the PLM Series Operation Manual for further information.

19.9.2 Cable Resistance

The Cable Resistance field presents the total cable resistance that is configured for each power output channel. The fingerprint contains a default cable type that is recalled with the file. Tapping the CABLE RESISTANCE field opens the Cable Resistance Calculator where the individual cable parameters can be viewed and edited.

Changes made on the Cable Resistance Calculator are reflected in the Cable Resistance field.

19.9.2.1 Calculator

The Cable Resistance Calculator provides input fields for cable length, cable gauge, contact resistance and cable resistivity. The entered data fields give a calculated result for the total loudspeaker cable resistance in ohms. This value is reflected in the TOTAL CABLE RESISTANCE field for the selected power output channel in the upper table. The values for a specific cable's properties (resistivity, gauge, etc.) can be obtained from the cable manufacturer's data sheets.

19.9.2.2 Ambient Temperature

The load verification and monitoring system takes ambient temperature into account when checking the performance of the load. The ambient temperature for the system is entered in the GLOBAL CONTROL tab, accessed from the ALL view. Please refer to section 19.9 for further details.



The TEMPERATURE setting also affects the temperature presentation in LOAD RESULTS and STATUS.

19.9.3 Fingerprint Label

This field presents the label of a particular fingerprint as it was set when the fingerprint was created.

19.9.4 Verify

After all required cable data is entered, tap VERIFY to initiate LoadSmart verification. Tap YES to confirm. Load verification commences for all PLM power output channels assigned to the selected Module. The channels are muted and a sequenced sweep is issued. After the verification procedure has been conducted, the LOAD RESULTS window appears.

Simultaneous load verification of all PLMs on the network can be initiated from the GLOBAL CONTROL tab. Please refer to section 19.9.



LoadSmart verification can be initiated from the PLM front panel, with a reduced set of results displayed on the front-panel LCD. Refer to the PLM Series Operation Manual for further information.

	ALL	Low	High
Load type	Verified/Uncertain/Wrong 2/0/0	Correct	Correct
Number of cabinets	Verified/Wrong 1/0	Correct	Correct
Voice coil temperature	Min/Average/Max 18/20/22	18	22

<input type="checkbox"/> Accept measured temperature 18-22	<input type="button" value="Start SpeakerSafe"/> <input type="button" value="Start"/>
<input type="button" value="Set temperature"/> 20	<input type="button" value="LoadSmart Verification"/> <input type="button" value="Re-verify"/>

Figure 19-7: Load Verification Results

19.9.5 Settings

The set of buttons at the foot of the page allow the user to select the most convenient measurement units for the load verification system and cable resistance calculation. The options are:

- ▶ TEMPERATURE – °C or °F
- ▶ CABLE LENGTH – Meters or Feet
- ▶ CABLE GAUGE – AWG numbers or as mm² cross-section

19.9.6 LoadSmart Results

LOAD RESULTS reports the findings of the verification procedure and contains the function controls for SpeakerSafe. Results for each PLM power output is displayed together with a summary in the ALL column.

19.9.6.1 Load Type Verification

The results shown in the Load type row of the table will be one of the following:

- ▶ **CORRECT** – The measured load characteristics closely match the values predicted from the load library data in combination with the total resistance calculation.
- ▶ **UNCERTAIN** – The measured load characteristics exhibit a degree of variance from the predicted values. A warning becomes active on the channel.
- ▶ **WRONG** – The measured characteristics differ widely from the predicted values; it is assumed that the load has malfunctioned or is of the wrong type. A fault is issued and the channel remains muted. A successful re-verification, power cycle, or placing the PLM into standby mode, will clear the fault and the mute state.
- ▶ **NO MODEL** – Fingerprint data is missing from the Module file selected.
- ▶ **ABORTED** – A power output channel was in a protective state during the load verification process (e.g. temperature fault).



The ALL column summarizes the NUMBER OF CABINETS verification result from each power output channel in the order VERIFIED > WRONG. e.g. 2/1 = two channels match, one does not.



If LOAD TYPE VERIFICATION fails, the power output channel will be muted to prevent speaker damage. A subsequent CORRECT or UNCERTAIN verification (or power cycle) resolves the mute.

19.9.6.2 Cabinet Count Verification

The results in the NUMBER OF CABINETS row will be one of the following:

- ▶ **VERIFIED** – The measured load impedance indicates the number of cabinets connected to this power output matches that configured.
- ▶ **WRONG** – The measured load impedance indicates either that the number of cabinets connected to this power output channel is incorrect.



If the correct number of cabinets is entered but the results returned are wrong it is possible to force settings through for SpeakerSafe to monitor by selecting FORCE TO CONFIGURED.

19.9.6.3 Voice Coil Temperature

The VOICE COIL TEMPERATURE row indicates the estimated loudspeaker voice coil temperature from the LoadSmart test results. This is calculated from the LoadSmart verification results and Fingerprint data.



The ALL column summarizes temperatures in the order Min/Average/Max. e.g. 20/23/25 = voice coil temperatures in range 20° C to 25° C, with an average value of 23° C.

19.9.6.4 SpeakerSafe Starting Temperature

There are two options for selecting the starting voice coil temperature for SpeakerSafe operation. The first option is to accept the measured temperature. The second option is to set a specific temperature. The selection is made with via the soft buttons to the left of the display.

The range of voice coil temperatures from minimum to maximum is displayed to the right of the ACCEPT MEASURED TEMPERATURES button. Thus, in this example, 20-25 would be displayed. If the range is acceptable and the ACCEPT MEASURED TEMPERATURES button is selected when SpeakerSafe is started, these results will be the starting values for SpeakerSafe monitoring.

ACCEPT MEASURED TEMPERATURES is the default condition for this button. Temperatures will be used unless modified as explained below.

If one or more anomalous results is suspected a starting temperature for SpeakerSafe monitoring may be entered manually.

Tapping the left-hand button in the SET TEMPERATURES box sets the temperature currently displayed in the right-hand button. Tapping this button opens a numeric keypad allowing a temperature value to be entered. A SpeakerSafe starting temperature entered manually in this way effectively cancels out any errors and the entered values will be stored in the PLM for the next verification.

19.9.6.5 Start SpeakerSafe

Following acceptance of the calculated voice coil temperatures from the LoadSmart verification (or manual entry of a value), SpeakerSafe performance monitoring may be initiated. Press the START SPEAKERSAFE button. The status of the load on each power output channel will now be monitored continuously, and the results displayed on the STATUS and HISTORY tabs of the Lake Controller, and also on the corresponding front panel screen/s of the PLM/s.

Note that SpeakerSafe will not run if a WRONG result was obtained in LoadSmart verification for any of the PLM channels. The problem leading to the WRONG result must be resolved before SpeakerSafe live monitoring can be run.

If SpeakerSafe is not started, a warning message will be generated. The SPEAKERSAFE NOT STARTED warning will be displayed in the EVENT LOG, and the message SPKSAFE INACT warning will be displayed on the PLM front panel and in the Lake Controller software.

19.9.6.6 Re-verify

If there is a reason to doubt the test results, or an obvious reason for an unacceptable result (e.g. a cabinet not plugged in), the load verification can be re-run by tapping RE-VERIFY.

19.10 Control Tab

The Module control page is selected by tapping the CONTROL tab in Module view.

The Control tab displays data contained in the Module output channel, and not the power channels. It is important to remember that AMPLIFIER GAIN and ISVPL data are stored within each Module alongside other Lake Module data. Appropriate AMPLIFIER GAIN and ISVPL data are transferred to the respective power output channel/s when they are routed to the Module outputs.

19.10.1 Power Control

POWER ON and STANDBY buttons are provided on the Control tab. These buttons can control the PLM Frame (or multiple Frames in a Super Module configuration) containing any power output channels assigned to the Module, allowing the Frame/s to be set in Standby mode. A system-wide power control facility is available from the Control tab in Global View. Please refer to section 19.9 for further details.

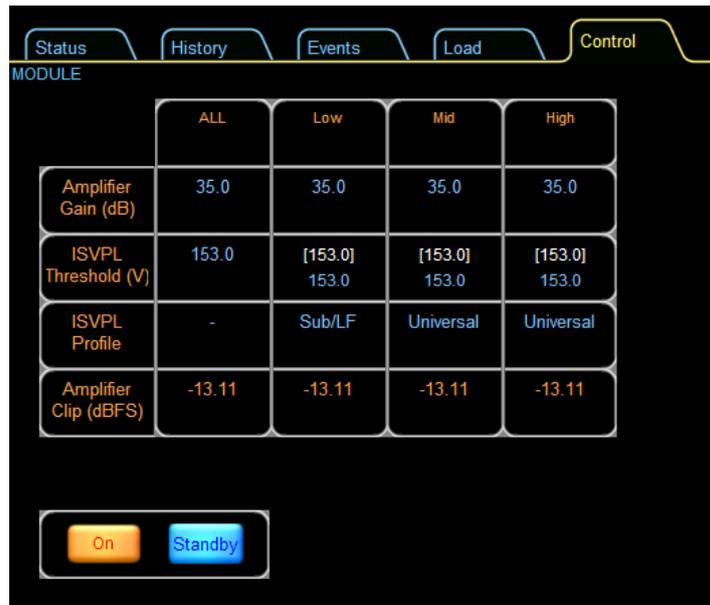


Figure 19-8: Control Tab with Parameters and Power Control

19.10.2 Amplifier Gain

The amplifier gain parameter on the Control tab relates to the power output stage of the amplifier.

To change the amplifier gain for a channel, tap on the associated cell and enter a value via the pop-up numeric keypad. Entering a value in the ALL cell applies that value to all power output channels.

Amplifier gain may also be set via the PLM front panel via MENU > MODULE > AMP GAIN.

19.10.3 Inter-Sample Voltage Peak Limiter (ISVPL) Threshold

The ISVPL threshold is displayed in the second row of the Control tab table.

Blue text indicates the configured value; white text within block parenthesis indicates the actual value. The actual value can be limited by the maximum voltage a particular PLM Series model can produce.



The maximum upper limit is 600 V, but is capped at the maximum allowed channel voltage for the PLM model; in Bridge mode, double the normal maximum channel voltage is allowed. Please refer to the PLM Series Operation Manual for additional information.

Module settings are cross compatible between models and the ISVPL threshold can be set to the voltage that a speaker may require. If the Module is recalled or copied to a PLM with a lower output voltage capability than the configured value, the actual value will be limited accordingly. When using a PLM Series model with lower output voltage, a higher configured value can still be adjusted and stored.

These values correspond to the ISVPL settings adjusted on the PLM front panel via MENU > MODULE > LIMITERS > ISVPL. Threshold values may be adjusted on the front panel interface or on screen in the same manner as above.

AMPLIFIER GAIN and ISVPL are subject to limits set by the system designer. If you are unable to change a value, this may be due to restrictions set by the system designer for that parameter. See section 19.10.6.

19.10.4 ISVPL Profile

The ISVPL profile controls attack and release times of the ISVPL limiter along with the associated voltage clip behavior. There are six options available as shown and described in Figure 19-9.

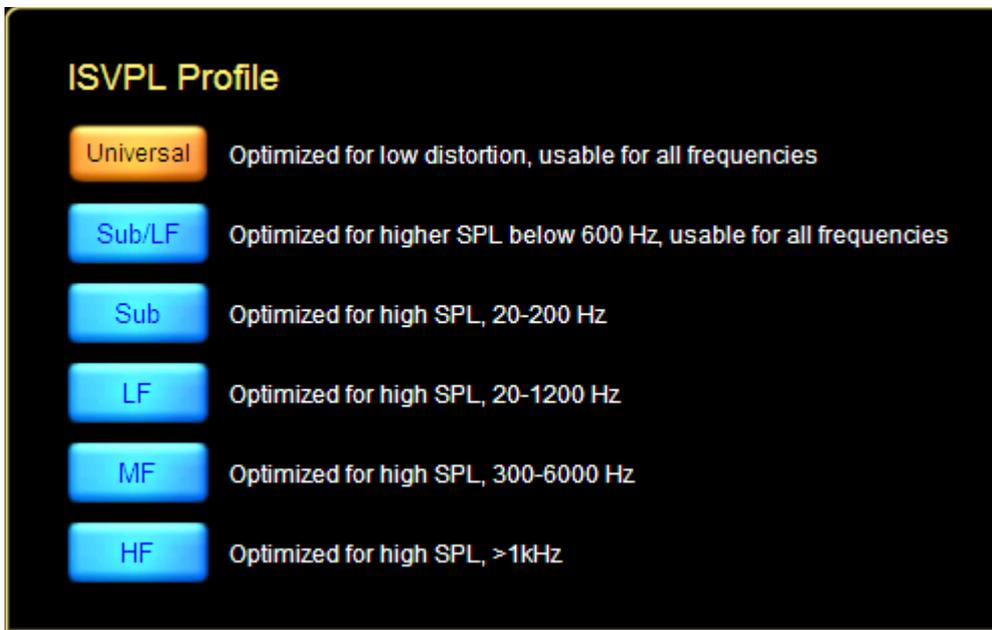


Figure 19-9: ISVPL Profile Options

19.10.5 Amplifier Clip Level

The Amplifier Clip level is calculated from Amplifier Gain and ISVPL values. This figure represents the digital signal level from the Module output that will produce clipping or limiting at the power output channel. If no EQ or additional gain is applied in the Lake Processing Module, this figure also represents the digital input level at which clipping or limiting will be produced at the power output channel.



The ALL column parameter displays if all values for the parameter type are identical.

19.10.6 Amplifier Gain and ISVPL Level Limits

Designer Mode allows a system designer to set level limits for Amplifier Gain and ISVPL, and hide these parameters. This function is accessed from a button visible only in Designer Mode when both the Module and base configuration file are unlocked.

The LEVEL LIMITS button, located in the bottom right hand corner opens a new window where minimum and maximum levels can be set.

Level limits are stored as factory levels when a base configuration file is stored. Users loading a Module file employing this base configuration can only adjust parameters within the allowed range. If the maximum and minimum values are identical, the value is locked and hidden from view. For more information on Designer Mode, please refer to chapter 18.

19.11 Global Events Tab

The GLOBAL EVENTS tab provides an EVENT LOG listing warnings, faults, and user actions that have occurred in all devices on the network since the Lake Controller software was started. In addition, it contains events that can be read from each PLM’s internal log covering four hours prior to starting the Lake Controller. Various filter options are available for displaying a user-definable subset of the log.



The data set for the most recent event is repeated in the separate horizontal pane at the bottom of the table.

Event	Start time	Duration	Frame	Module	Channel	Description
21:21:21	Mar-11	-	10000Q	AX344 BI_FR	-	New module data loaded
21:21:19	Mar-11	-	10000Q	AX344 BI_FR	-	New module data loaded
21:21:18	Mar-11	-	10000Q	AX344 BI_FR	LF:3	Routed DSP 4 to ANALOG 3
21:21:18	Mar-11	-	10000Q	n/a	MF/HF:4	Routed DSP 5 to ANALOG 4
21:20:34	Mar-11	-	10000Q	Spektrix L 2008	High:4	Routed DSP 4 to ANALOG 4
21:20:34	Mar-11	-	10000Q	Spektrix L 2008	-	New module data loaded
21:18:57	Mar-11	-	10000Q	CL3way	High:4	Input source: NO SOURCE to ANALOG
21:18:56	Mar-11	00:00:01	10000Q	CL3way	High:4	No input source
21:18:56	Mar-11	-	10000Q	CL3way	High:4	Input source: ANALOG to NO SOURCE
21:18:50	Mar-11	-	10000Q	CL3way	High:3	Input source: NO SOURCE to ANALOG
21:18:50	Mar-11	-	10000Q	CL3way	Low:1	Input source: NO SOURCE to ANALOG
21:18:50	Mar-11	-	10000Q	CL3way	Mid:2	Input source: NO SOURCE to ANALOG
21:18:49	Mar-11	00:00:02	10000Q	CL3way	High:3	No input source
21:18:49	Mar-11	00:00:02	10000Q	CL3way	Low:1	No input source
21:18:49	Mar-11	00:00:02	10000Q	CL3way	Mid:2	No input source
21:18:49	Mar-11	-	10000Q	CL3way	High:3	Input source: ANALOG to NO SOURCE
21:18:49	Mar-11	-	10000Q	CL3way	Low:1	Input source: ANALOG to NO SOURCE
21:18:49	Mar-11	-	10000Q	CL3way	Mid:2	Input source: ANALOG to NO SOURCE
21:18:24	Mar-11	00:01:09	10000Q	CL3way	-	Module input mute
21:18:24	Mar-11	-	10000Q	CL3way	-	New module data loaded
21:18:23	Mar-11	-	10000Q	CL3way	High:3	Routed DSP 3 to ANALOG 3
21:18:23	Mar-11	-	10000Q	CL3way	Mid:2	Routed DSP 2 to ANALOG 2
21:18:21	Mar-11	-	10000Q	CL3way	Low:2	Routed DSP 4 to ANALOG 2
21:18:21	Mar-11	-	10000Q	n/a	High:4	Routed DSP 6 to ANALOG 4
21:18:21	Mar-11	-	10000Q	n/a	Mid:3	Routed DSP 5 to ANALOG 3
21:18:21	Mar-11	-	10000Q	CL3way	-	New module data loaded
21:17:21	Mar-11	00:00:22	10000Q	-	-	Frame in standby
21:17:20	Mar-11	00:03:15	10000Q	CL2Way	-	Module input mute
21:17:18	Mar-11	-	10000Q	-	-	Frame added

Figure 19-10: Global Events Logging Tab

19.11.1 Log Entries

Seven items of information per event are displayed in the log in tabular form, as follows:

- ▶ **EVENT** – Displays system faults or warning notifications. Icons shown below reference the source of the notification. Icons change color, from yellow (warning) to red (fault) to indicate severity.

	Speaker: Warning
	Speaker: Fault
	Amplifier: Warning
	Amplifier: Fault
	User Event

Figure 19-11: Events Tab Warning Icon Descriptions

- ▶ START TIME – Displays the system time and date at which the event occurred
- ▶ DURATION – Displays ACTIVE while the fault/warning is active. Once the fault/warning becomes inactive, the duration for which it was active is displayed. Once the event is cleared, its line of text in the log changes color from white to gray.
- ▶ FRAME – Identifies the PLM Frame in which the fault/warning/event occurred by displaying the Frame label. If a Frame label has not been allocated, this field displays the default model name i.e. 10000Q.
- ▶ MODULE – Displays the name of the Module in which the event occurred. This will be the default name (i.e. 3way, 2aux, etc.) if the Module has not been renamed.
- ▶ CHANNEL – Indicates the channel on which the event occurred. This column will be blank if the event was a Frame event – e.g. network failure, etc.
- ▶ DESCRIPTION – Displays a description of the event. A full list of the possible warning messages can be found in the PLM Series Operation Manual.

19.11.2 Sorting Options

The default list order for the data displayed in the event log is chronological, with the most recent event at the bottom of the list. To sort the data by another column, tap the button at the top of the required column.

19.11.3 Filtering Options

The default event log records and displays all events for all Modules and Frames in the system. To reduce the number of log entries displayed, apply the filter options on the right of the screen. Regardless of filtering options currently selected, all events are recorded, and may be displayed later as required.

19.11.3.1 Severity

Recorded events are divided into three categories: FAULTS, WARNINGS and USER ACTIONS. Events in any or all of these categories may be displayed in the log by tapping the three buttons in the SEVERITY box. The ALL button restores the default state of all three categories being selected.

19.11.3.2 Source

Using buttons in the SOURCE box, events may also be filtered on the basis of which part of the system generated them. Any or all of six event sources may be selected, as follows:

- ▶ Loudspeaker Identification
- ▶ Loudspeaker Temperature
- ▶ Amplifier Device
- ▶ Amplifier Output
- ▶ Other: Audio distribution
- ▶ Other: Network

The ALL button restores the default state of all six categories being selected.

19.11.3.3 Time

It is possible to display only events which have occurred within a user-defined time interval, using the buttons in the TIME box. The options are:

- ▶ SINCE HH:MM – Tapping the HH and MM buttons opens a numeric keypad to allow a 'Start time' for displayed events to be entered. Tapping the Since button activates the option.
- ▶ LAST POWER CYCLE – Tapping this button causes the Event Log to only display events which have occurred since the last time the PLM was powered up.

19.12 Global Control Tab

The GLOBAL CONTROL tab is the second of two tabs available in AMPLIFIER GLOBAL VIEW.

To access AMPLIFIER GLOBAL VIEW:

1. Select the ALL page.
2. Tap GLOBAL INFO.
3. Tap EVENTS & CONTROL [F8]
4. Tap the CONTROL tab

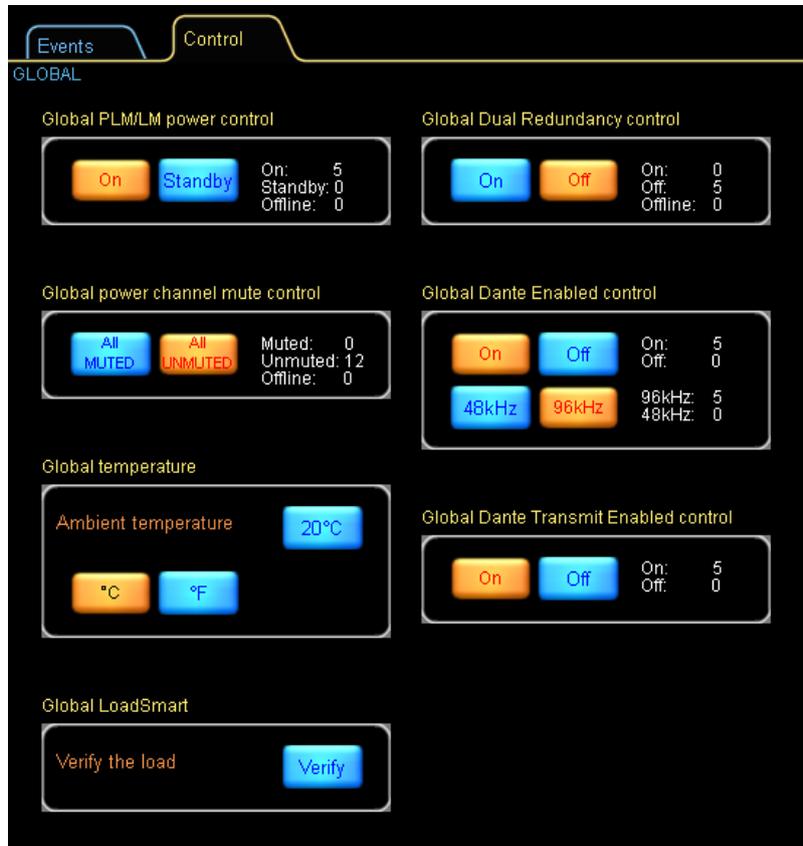


Figure 19-12: Global Control Tab

19.12.1 Global PLM/LM Power Control

Two buttons, ON and STANDBY, control the power status of all LM and PLM Series devices that are online and present in the current system configuration. A confirmation is required prior to changing this status across all devices.

Both buttons will be blue if a combination of status are present, or one button will be orange if all devices have the same status.

Status indicators to the right of the buttons show the total number of LM and PLM Series devices in the current system configuration that are ON, in STANDBY or OFFLINE.

19.12.2 Global Power Channel Mute Control

Two buttons, ALL MUTED and ALL UNMUTED, indicate and control the power channel mute status across all PLM Series devices that are online and present in the current system configuration. A confirmation is required prior to changing this status across all devices.

Both buttons will be blue if a combination of status are present, or one button will be orange if all devices have the same status.

Status indicators to the right of the buttons show the total number of PLM Series power channels in the current system configuration that are MUTED, UNMUTED or OFFLINE.

19.12.3 Global Temperature

The current ambient temperature (the temperature of the air surrounding the cabinets) may be entered on this tab. Tapping on the blue button in the AMBIENT TEMPERATURE box opens a numeric keypad for the purpose.

The temperature value is transferred to the LOAD table on the MODULE LOAD tab and used for load verification and monitoring procedures. Buttons allow selection of temperature display in degrees CELSIUS or FAHRENHEIT.

19.12.4 Global LoadSmart

The GLOBAL LOAD CONTROL VERIFY button initiates the system-wide load verification of all Frames.

19.12.5 Global Dual Redundancy Control

Two buttons, ON and OFF, control the Dual Redundancy network status of all LM and PLM Series devices that are online and present in the current system configuration. A confirmation is required prior to changing this status across all devices.

Both buttons will be blue if a combination of status are present, or one button will be orange if all devices have the same status.

Status indicators summarize the number of online devices in the current system configuration that have this status set to ON or OFF.



The power must be cycled on the device for this parameter change to complete. (i.e. disconnect or turn off mains power then reconnect or turn on mains power).

Please refer to section 8.2.10.4 for further information regarding Dual Redundancy.

19.12.6 Global Dante Enabled Control

Two buttons, ON and OFF, control the Dante Enabled status of all LM and PLM Series devices that are online and present in the current system configuration. A confirmation is required prior to changing this status across all devices.

Both buttons will be blue if a combination of status are present, or one button will be orange if all devices have the same status. Status indicators summarize the number of online devices in the current system configuration that have this status set to ON or OFF.

Two additional buttons, 48 kHz and 96 kHz control the Dante sample rate for all Dante-enabled devices in the current system configuration.

19.12.7 Global Dante Transmit Enabled Control

Two buttons, ON and OFF, control the Dante Transmit Enabled status of all LM and PLM Series devices that are online and present in the current system configuration. A confirmation is required prior to changing this status across all devices.

Both buttons will be blue if a combination of status are present, or one button will be orange if all devices have the same status.

19.13 Log Files

For every Lake Controller session, two sets of log files are created. These XML files can be viewed as text or imported into Microsoft Excel. The files are located in the installation folder /logs, also available via a Windows Start menu shortcut.



To import log files into Microsoft Excel, right click on the file and choose OPEN WITH->EXCEL. For Excel 2003 and later, select OPEN AS AN XML LIST.



Earlier versions of Excel (pre-2003) do not provide full XML support and should not be used for log file import.

19.13.1 Statistical log files

Assuming at least one PLM Series device is present in the current system configuration, the Lake Controller software will continuously log statistical information to a file. The logged data includes PLM operation statistics in addition to faults and warnings.

19.13.2 Event Log

When a session is ended the EVENT LOG currently viewable in the EVENT LOG tab is written to a file.

20. LM Series Reference and Operation

This chapter provides information specific to using the Lake Controller with LM Series devices. Please refer to the LM Series Operation Manual for further details on LM Series hardware and front panel functionality.

20.1 Pass-Thru Input Router Functionality

20.1.1 Overview

Although other types of Lake device provide the ability to pass audio directly from any input to any output, the LM Series devices provide the ability for the signal from any of the eight Input Routers to be patched directly to any other output. This allows the result of automatic fail-over input priority switching to be fed to the Module Input, or to any analog or digital output directly.

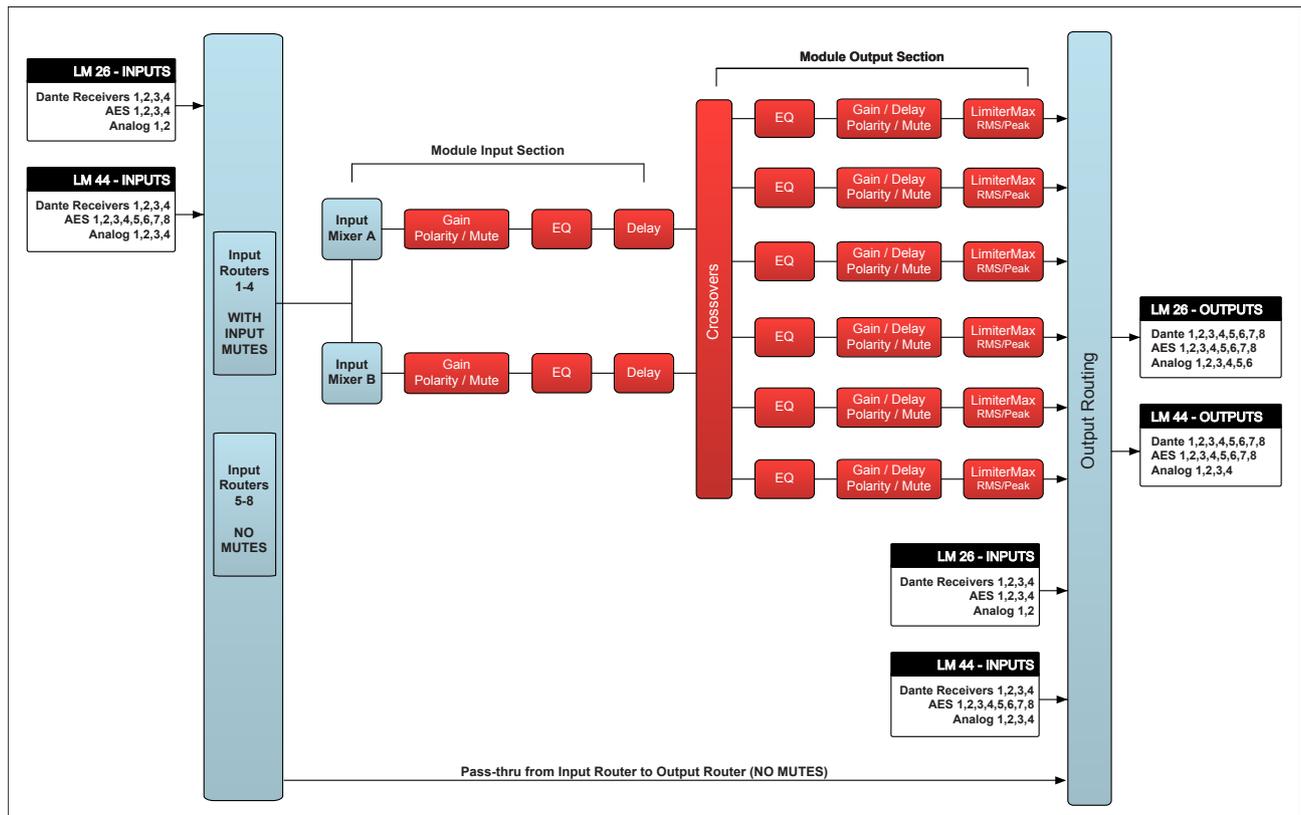


Figure 20-1: LM Series Signal Flow (Contour Mode)

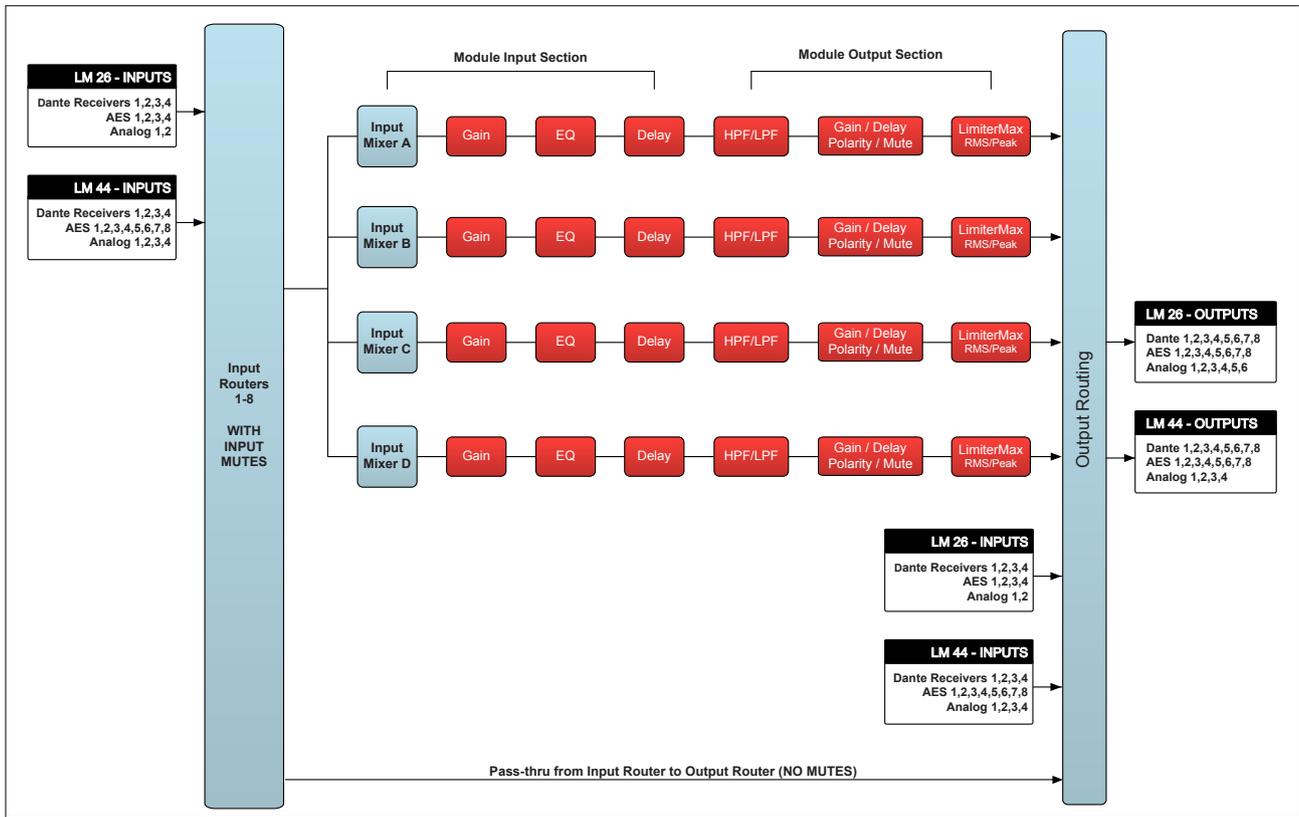


Figure 20-2: LM Series Signal Flow (Mesa Mode)

The signal from any of the eight input routers identified in Figure 20-1 and Figure 20-2 can be connected directly to any output. This is useful for various reasons, including audio signal conversion (e.g. from analog to digital) and for using the LM Series devices as a break-in box for Dante.

For example, Input Routers 1-4 could be configured to provide inputs to the processing modules, while input routers 7+8 could be configured to provide a stereo break-in for the Dante audio network. As it is the signal coming out of the input router that is connected to the outputs, rather than directly routing the input to the output, this provides the ability to fail-over from AES to Analog input before sending the signal to the output. This ensures that the receiving device has uninterrupted audio when fail-over from AES to analog occurs.



In Mesa Mode, the signal from all eight Input Routers is available for Input Mute and Module Input Mixer functionality. In Contour Mode, only Input Routers 1-4 provide this functionality; the signal from Input Routers 5-8 may be patched directly to the outputs.

20.1.2 Configuring Pass-Thru Input to Output via Input Router

To configure the a pass-thru configuration via an input router:

1. Navigate to HOME > MODULE > IO CONFIG > INPUT CONFIGURATION.
2. Configure the input router with the relevant inputs and priorities as described in section 8.2.2.

To route the signal from the pass-thru input routers to a particular output:

3. Navigate to HOME > MODULE > IO CONFIG > OUTPUT CONFIGURATION.
Please refer to section 8.2.8 for further details.
4. Tap the left arrow under the label 'Source'.
The source will change to display 'Input Router Outputs' similar to that shown in Figure 20-3. This example has the source from Input Router 7 & 8 directly patched to AES4 (Out 7 & 8).

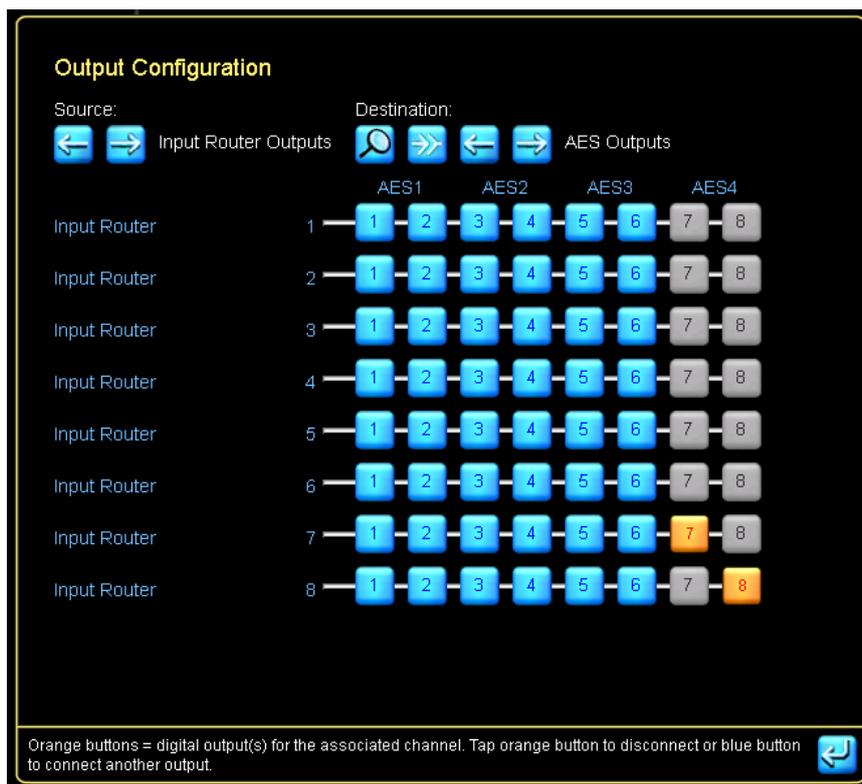


Figure 20-3: Output Configuration - Input Routers selected as Source

5. Use the 'Destination' arrows to select the required output type, then select an available (blue) routing point to connect the signal from the Input Router to one of more outputs.



When connecting the Input Router signal directly to an output (bypassing the Module processing), the Input Router Mutes do not have any affect on the signal path. Please refer to the signal flow diagrams in Figure 20-1 and Figure 20-2.

20.2 GPIO Configuration

General Purpose Input/Output control (GPIO), allows external devices such as alarm systems to interface with the LM Series devices and control basic functions including mute, preset recall and standby/power control. The LM Series device can report the current state of protective mute and standby settings to an external system and also advise if a fault or warning occurs.

Please refer to section 8.2.3 on page 121 for further details, and also refer to the LM Series Operation Manual for GPIO technical reference and front panel functionality.

20.3 Remote Power Control & Event Logs

In addition to the common Lake Controller screens available for all Lake devices, the LM Series devices have additional Events & Control tabs available by navigating to EVENTS & CONTROL as described in section 20.3.1.

The Control tab provides the ability to remotely control the power/standby state of the LM Series device. Please refer to section 20.3.2 for further details.

The Event tab provides information on frame activity along with all faults and warnings that occur on the LM Series device. Please refer to sections 20.3.7 for further details.

20.3.1 Navigation

The Events and Control screens are accessed as described in the following sections, depending on whether a Module, Super Module or Global View is required. Two tabs are displayed at the top of the screen in each case, distinguished by the words MODULE, SUPER MODULE or GLOBAL as shown in Figure 20-4, Figure 20-5 and Figure 20-6.

- ▶ Module View displays Events relating to the selected Module/Frame, and provides Power Control for that Frame only via the Control tab.
- ▶ Super Module View displays Events relating to all Modules/Frames that are assigned to the selected Super Module, and provides power control for those Frames.
- ▶ Global View displays Events relating to all LM and PLM Series Modules/Frames in the current system configuration, and allows power control for all LM and PLM Series Frames.



Super Modules or Systems containing LM & PLM frames will display additional data relevant to PLM Series devices only. Please refer to chapter 19 for further details.

20.3.1.1 Accessing Events and Control (Module View)

Events & Control Module View for LM Series devices can be accessed by three different methods.

1. Tap HOME [F1] then tap a Module icon. Ensure LEVELS is selected, then tap EVENTS & CONTROL (located below the first output fader).
2. Tap HOME [F1] then tap MODULES [F3]. Select a Module, tap I/O CONFIG [F4] then tap EVENTS & CONTROL [F7].
3. Tap HOME [F1] then tap the ALL page tab. Tap a Module icon to directly access EVENTS & CONTROL.

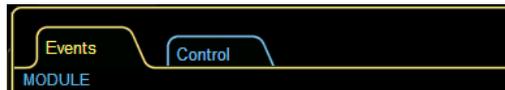


Figure 20-4: LM Series Module Events & Control Tabs

20.3.1.2 Accessing Events & Control (Super Module View)

Events & Control Super Module View for LM Series devices can be accessed by three different methods.

1. Tap HOME [F1] then tap a Super Module icon. Ensure LEVELS is selected, then tap EVENTS & CONTROL (located below the first output fader).
2. Tap HOME [F1] then tap MODULES [F3]. Select a Super Module, tap SM ROUTING [F4] then tap EVENTS & CONTROL [F8].
3. Tap HOME [F1] then tap the ALL page tab.
4. Tap a Super Module icon to directly access EVENTS & CONTROL.



Figure 20-5: LM Series Super Module Events & Control Tabs

20.3.1.3 Accessing Events & Control (Global View)

To access Events & Control Global View:

1. Navigate to the ALL page
2. Tap GLOBAL INFO [F9]
3. Tap EVENTS & CONTROL [F8]



Figure 20-6: Global Events and Control Tabs

20.3.2 Control Tab

The Control screen is selected by tapping the CONTROL tab after navigating to EVENTS & CONTROL. In either case, a similar screen is displayed, with text at the top-left indicating whether Module, Super Module or Global View is selected as described in section 20.3.1.

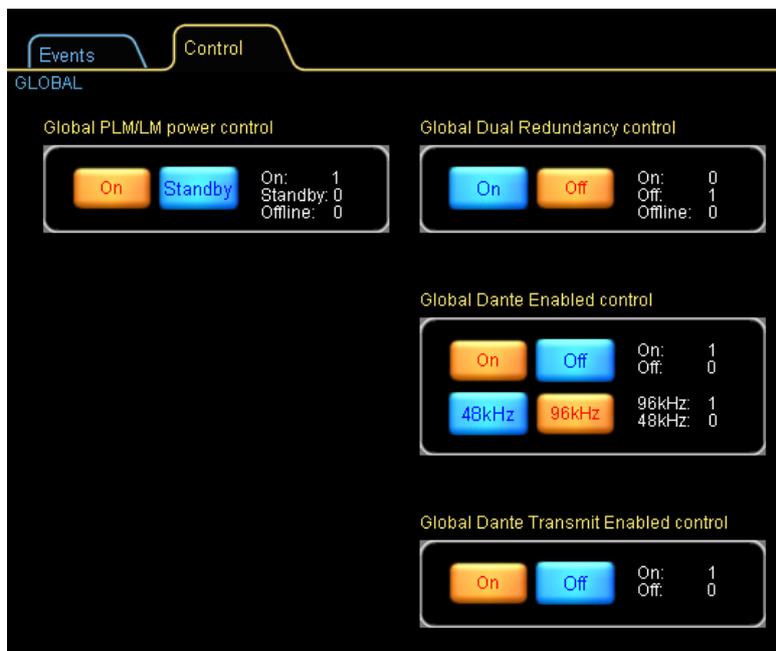


Figure 20-7: LM Series Global Control Tab

20.3.3 Global PLM/LM Power Control

Two buttons, ON and STANDBY, control the power status of all LM and PLM Series devices that are online and present in the current system configuration. A confirmation is required prior to changing this status across all devices.

Both buttons will be blue if a combination of status are present, or one button will be orange if all devices have the same status.

Status indicators to the right of the buttons show the total number of LM and PLM Series devices in the current system configuration that are ON, in STANDBY or OFFLINE.

20.3.4 Global Dual Redundancy Control

Two buttons, ON and OFF, control the Dual Redundancy network status of all LM and PLM Series devices that are online and present in the current system configuration. A confirmation is required prior to changing this status across all devices.

Both buttons will be blue if a combination of status are present, or one button will be orange if all devices have the same status.

Status indicators summarize the number of online devices in the current system configuration that have this status set to ON or OFF.



The power must be cycled on the device for this parameter change to complete. (i.e. disconnect or turn off mains power then reconnect or turn on mains power).

Please refer to section 8.2.10.4 for further information regarding Dual Redundancy.

20.3.5 Global Dante Enabled Control

Two buttons, ON and OFF, control the Dante Enabled status of all LM and PLM Series devices that are online and present in the current system configuration. A confirmation is required prior to changing this status across all devices.

Both buttons will be blue if a combination of status are present, or one button will be orange if all devices have the same status. Status indicators summarize the number of online devices in the current system configuration that have this status set to ON or OFF.

Two additional buttons, 48 kHz and 96 kHz control the Dante sample rate for all Dante-enabled devices in the current system configuration.

20.3.6 Global Dante Transmit Enabled Control

Two buttons, ON and OFF, control the Dante Transmit Enabled status of all LM and PLM Series devices that are online and present in the current system configuration. A confirmation is required prior to changing this status across all devices.

Both buttons will be blue if a combination of status are present, or one button will be orange if all devices have the same status.



The layout and functionality of this screen is designed for compatibility with mixed systems containing both PLM and LM Series devices.

20.3.7 Events Tab

The screenshot shows the 'Events' tab in a software interface. At the top, there is a 'Control' button. Below it, the title 'A - 4 - LM26 - CL4way' is visible. The main area is a table with the following columns: Event, Start time, Duration, Frame, Module, Channel, and Description. The table contains a list of events with various statuses (ACTIVE, warnings, faults) and descriptions like 'Module output mute', 'Module input mute', and 'Output routing: routed to AES'. To the right of the table is a 'Filter options' panel with sections for Severity (All, Faults, Warnings, User actions), Source (All, Loudspeaker, Identification, Temperature), Frame (Device, Power channel), Other (Audio distribution, Network), and Time (Any, Since, 19:00, Last power cycle).

Event	Start time	Duration	Frame	Module	Channel	Description
16:22:23	Jan-13	ACTIVE	LM26	CL4way	Hmid:3	Module output mute
16:22:16	Jan-13	ACTIVE	LM26	CL4way	-	Module input mute
15:00:07	Jan-13	-	LM26	CL4way	High:4	Output routing: unrouted
14:59:18	Jan-13	00:00:03	LM26	CL4way	:8	No input source
14:59:18	Jan-13	00:00:03	LM26	CL4way	:7	No input source
14:59:18	Jan-13	00:00:03	LM26	CL4way	High:6	No input source
14:59:18	Jan-13	00:00:03	LM26	CL4way	High:5	No input source
14:59:18	Jan-13	00:00:03	LM26	CL4way	High:4	No input source
14:59:18	Jan-13	00:00:03	LM26	CL4way	Hmid:3	No input source
14:59:18	Jan-13	00:00:03	LM26	CL4way	Lmid:2	No input source
14:59:18	Jan-13	00:00:03	LM26	CL4way	Low:1	No input source
14:50:32	Jan-13	-	LM26	CL4way	High:8	Output routing: routed to AES 8
14:50:32	Jan-13	-	LM26	CL4way	High:7	Output routing: routed to AES 7
14:50:32	Jan-13	-	LM26	CL4way	High:6	Output routing: routed to AES 6
14:50:31	Jan-13	-	LM26	CL4way	High:5	Output routing: routed to AES 5
14:50:09	Jan-13	-	LM26	CL4way	High:4	Output routing: routed to AES 4
14:50:08	Jan-13	-	LM26	CL4way	Hmid:3	Output routing: routed to AES 3
14:50:08	Jan-13	-	LM26	CL4way	Lmid:2	Output routing: routed to AES 2
14:50:08	Jan-13	-	LM26	CL4way	Low:1	Output routing: routed to AES 1
14:49:56	Jan-13	00:08:54	LM26	CL4way	-	Module input mute
14:49:55	Jan-13	-	LM26	CL4way	-	New module data loaded
14:33:46	Jan-13	00:00:02	LM26	6aux	-	Module input mute
14:33:39	Jan-13	00:00:02	LM26	6aux	-	Module input mute
14:33:26	Jan-13	00:00:04	LM26	6aux	-	Module input mute
14:33:10	Jan-13	00:00:14	LM26	6aux	-	Module input mute
11:43:06	Jan-13	00:00:04	LM26	6aux	-	Module input mute
11:42:54	Jan-13	00:00:07	LM26	6aux	-	Module input mute
11:42:50	Jan-13	00:00:02	LM26	6aux	-	Module input mute

Figure 20-8: Events Tab

The EVENTS tab provides an Event Log listing warnings, faults, and user actions that have occurred on the network since the Lake Controller software was started. In addition, it contains events that can be read from the internal log of the device covering four hours prior to starting the Lake Controller. Various filter options are available for displaying a user-definable subset of the log.

- ▶ Module View filters the results to show events that apply to the selected Module.

- ▶ Super Module View filters the results to show events that apply to all Modules in the Super Module.
- ▶ Global View displays all results for LM and PLM Series devices in the system configuration.



The data set for the most recent event is repeated in the separate horizontal pane at the bottom of the table.

20.3.7.1 Log Entries

Seven items of information per event are displayed in the log in tabular form, as follows:

- ▶ **EVENT** – Displays system faults or warning notifications. Icons shown below reference the source of the notification. Icons change color, from yellow (warning) to red (fault) to indicate severity.
- ▶ **START TIME** – Displays the system time and date at which the event occurred
- ▶ **DURATION** – Displays ACTIVE while the fault/warning is active. Once the fault/warning becomes inactive, the duration for which it was active is displayed. Once the event is cleared, its line of text in the log changes color from white to gray.
- ▶ **FRAME** – Identifies the Frame in which the fault/warning/event occurred by displaying the Frame label. If a Frame label has not been allocated, this field displays the default product model name i.e. LM 26.
- ▶ **MODULE** – Displays the name of the Module in which the event occurred. This will be the default name if the Module has not been renamed (i.e. CL3way, 2aux, etc.).
- ▶ **CHANNEL** – Indicates the channel on which the event occurred. This column will be blank if the event was a Frame event – e.g. network failure, etc.
- ▶ **DESCRIPTION** – Displays a description of the event. A full list of the possible warning messages can be found in the LM and PLM Series Operation Manuals.

20.3.7.2 Sorting Options

The default listing order for the data displayed in the event log is chronological, with the most recent event at the bottom of the list. To sort the data by another column, tap the button at the top of the required column.

20.3.7.3 Filtering Options

The default event log records and displays all events for all Modules on all Frames on the system. It is possible to reduce the number of log entries displayed by applying filter options available on the right hand side of the table. Regardless of filtering options currently selected, all events are recorded, and may be displayed later as required.

Severity

Recorded events are divided into three categories: FAULTS, WARNINGS and USER ACTIONS. Events in any or all of these categories may be displayed in the log by tapping the three buttons in the SEVERITY box. The ALL button restores the default state of all three categories being selected.

Source

Using buttons in the SOURCE box, events may also be filtered on the basis of which part of the system generated them. Some of these sources apply only to PLM Series devices and will only be relevant for mixed system configurations. Any or all of the event sources may be selected; the sources relevant to LM Series devices include:

- ▶ Frame > Device
- ▶ Other > Audio Distribution
- ▶ Other > Network

The ALL button restores the default state of all six categories being selected.

Time

It is possible to display only events which have occurred within a user-defined time interval, using the buttons in the TIME box. The options are:

- ▶ SINCE HH:MM – Tapping the HH and MM buttons opens a numeric keypad to allow a 'Start time' for displayed events to be entered. Tapping the Since button activates the option.
- ▶ LAST POWER CYCLE – Tapping this button causes the Event Log to only display events which have occurred since the last time the PLM was powered up.

20.3.8 Event Log Files

When a session ends, the session's EVENT LOG is written to a file.

21. MY8-LAKE Reference and Operation

This chapter provides information specific to using the Lake Controller with MY8-LAKE devices. Please refer to the MY8-LAKE Operation Manual for further details on MY8-LAKE hardware.

21.1 Signal Flow

The diagrams below depict the audio signal flow configurations available for the MY8-LAKE card. Please refer to the section 8.2.14 for details on how to change the audio processing configuration via the Lake Controller software.

21.1.1 Mesa Configuration Signal Flow Diagram

The MY8-LAKE defaults to an 8x8 system equalizer configuration known as Mesa mode. This configuration provides eight discrete channels of audio processing as shown below.

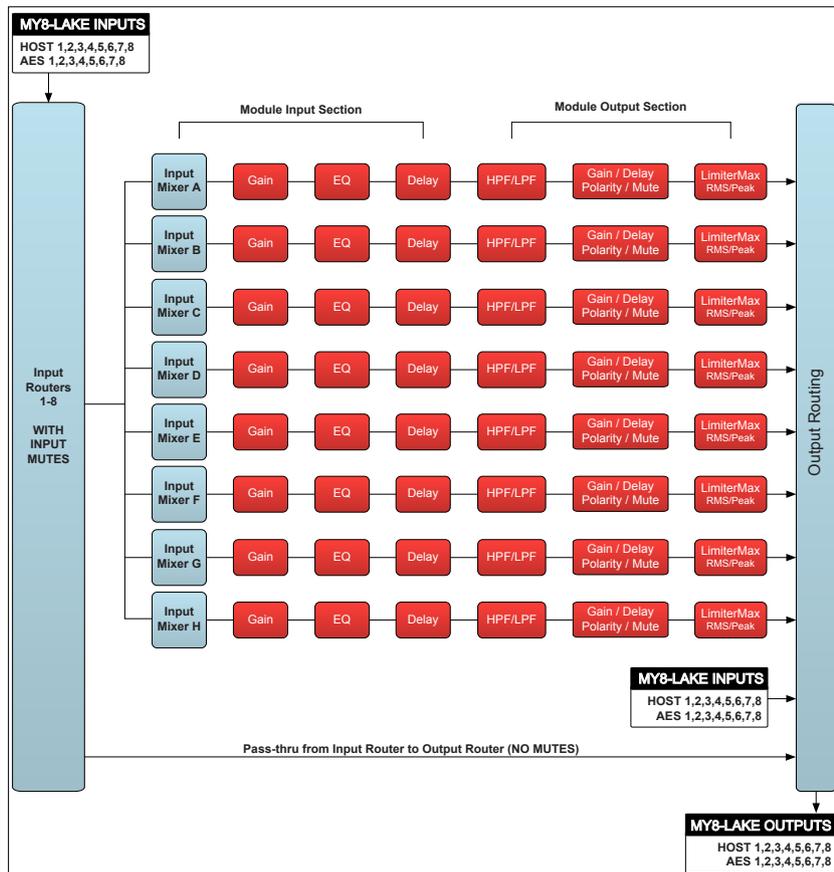


Figure 21-1: MY8-LAKE Mesa Configuration Signal Flow Diagram

21.1.2 Contour Configuration Signal Flow Diagram

In loudspeaker processor configuration (Contour mode), the MY8-LAKE provides a 4x12 matrix of loudspeaker processing Modules as shown in the diagram below.

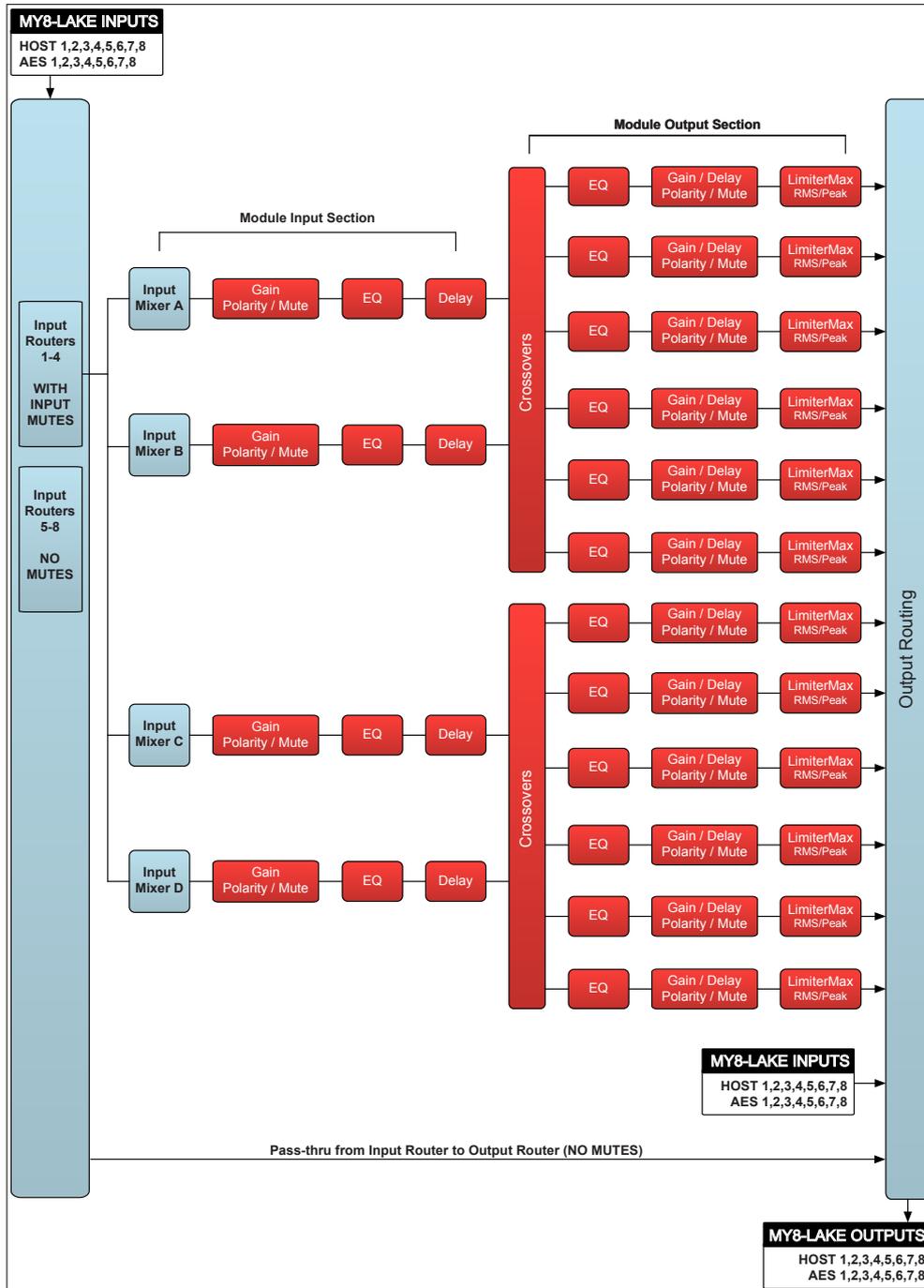


Figure 21-2: MY8-LAKE Contour Configuration Signal Flow Diagram

21.1.3 Contour/Mesa Configuration Signal Flow Diagram

In hybrid mode (Contour/Mesa), the MY8-LAKE provides a 4x6 matrix of loudspeaker processing Modules and an 8x4 matrix of single channel EQ Modules as shown in the diagram below.

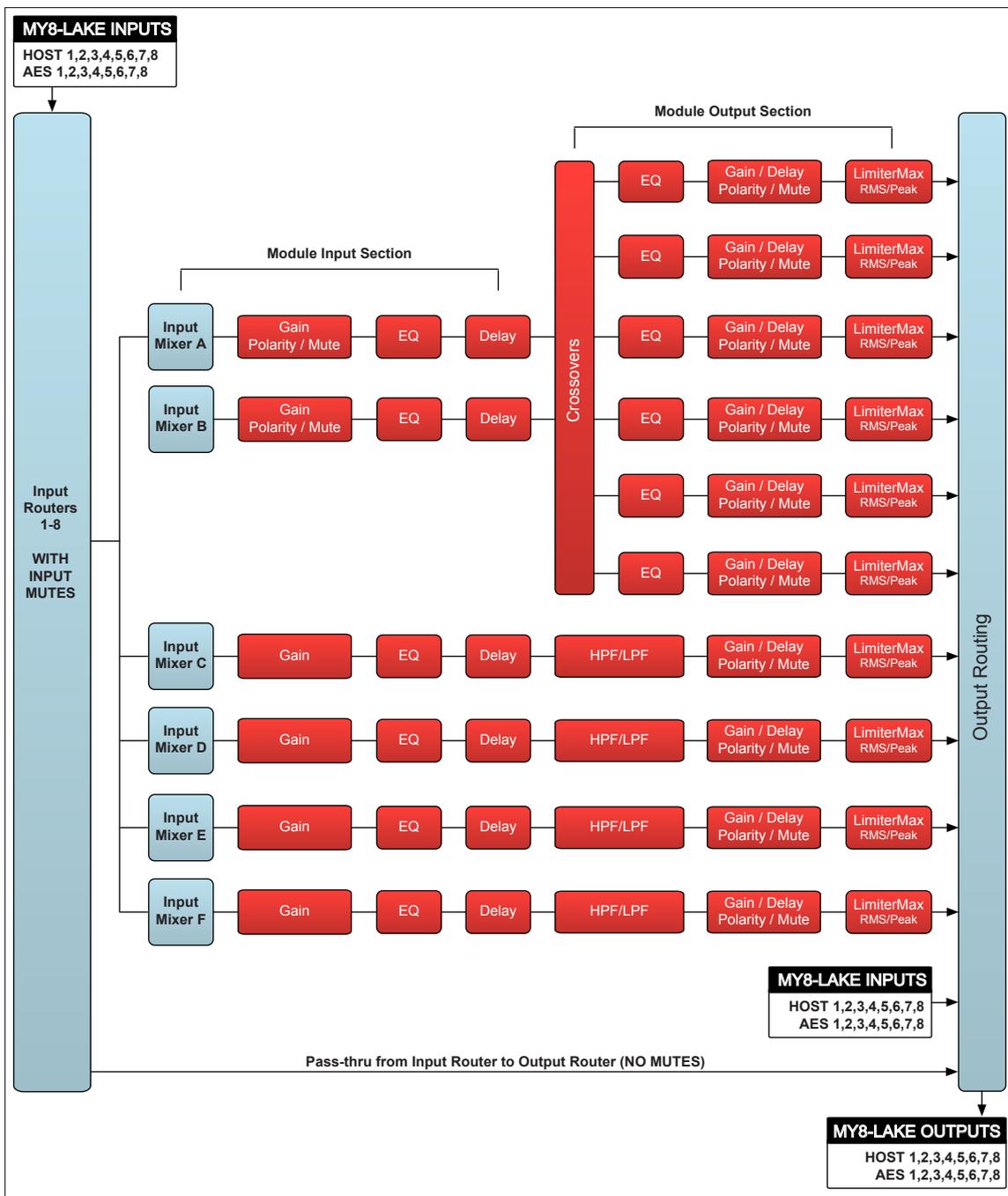


Figure 21-3: MY8-LAKE Contour/Mesa Configuration Signal Flow Diagram

21.2 Operation Mode

The MY8-LAKE device supports three modes for Host device recognition as shown in Figure 21-4. The default setting of MY8-AE96 provides full functionality.

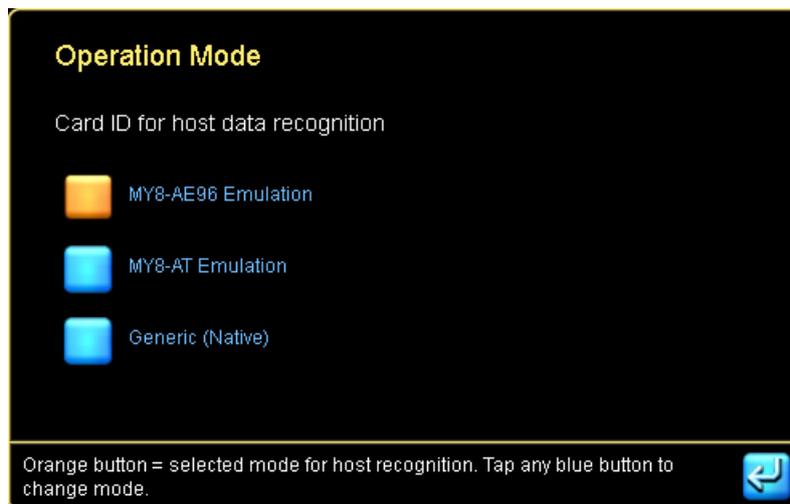


Figure 21-4: Card ID Operation Mode for Host data recognition

After changing the operation mode, cycle the power on the MY8-LAKE device to complete the process.



The Operation Mode parameter is unaffected by the recall of a Module or System file, or by the resetting of a Frame to default Contour or Mesa configurations.

21.3 Host Analog Output Reference Configuration

To ensure that limiter levels in the LoadLibrary Module files remain compliant with the MY8-LAKE device, an additional option will be available via the I/O CONFIG entitled ANALOG OUTPUT REFERENCE.

Analog Output Reference provides limiter compensation options as shown in Figure 21-5.

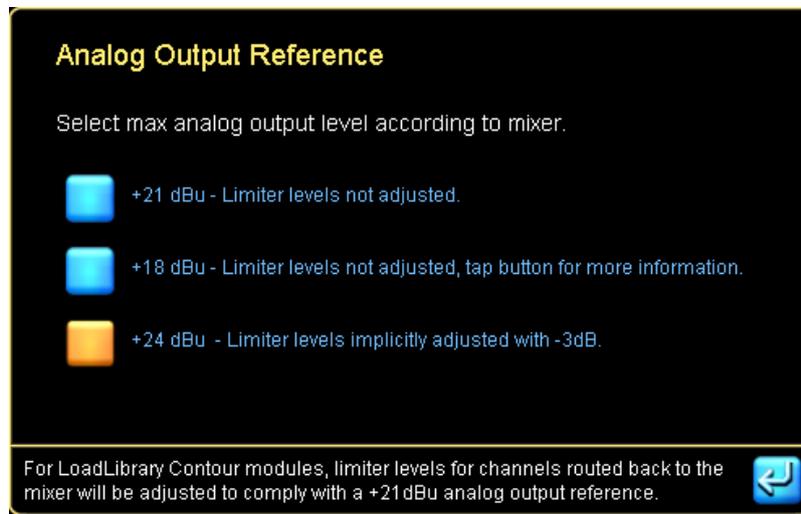


Figure 21-5: Analog Output Reference Options

The limiter compensation is active only on Host input channels (Host returns) from Contour Module outputs; outputs from Mesa Modules, or other output types will not have this compensation applied.

21.4 I/O Configuration View Mode Options

21.4.1 Simplified View (MY8-LAKE Mesa Configuration Only)

The MY8-LAKE provides a simplified I/O routing view by default for Mesa Mode that allows simple configuration of all input and output parameters. In Simplified View, the following functionality differs compared to normal Lake Controller operation:

- ▶ The Digital Clock Configuration screen is disabled; the clock signal is locked by default to the same clock as the selected input source (i.e. Host Output or AES Input). Summary data is still displayed confirming the current automatic selection.
- ▶ The Input Configuration screen is disabled; the input type selected via the Input Toggle (Host Output or AES Input) is set as Priority 1 for the selected Module and corresponding input (i.e. Module A Input = Host Out 1 or AES In 1, Module B In = Host Out 2 + AES In 2, etc.)
- ▶ The Output Configuration screen is disabled; the Module is set to pass the processed signal to the corresponding Host Input and AES Output (i.e. Module A = Host In 1 + AES Out 1, Module B = Host In 2 + AES Out 2, etc.)

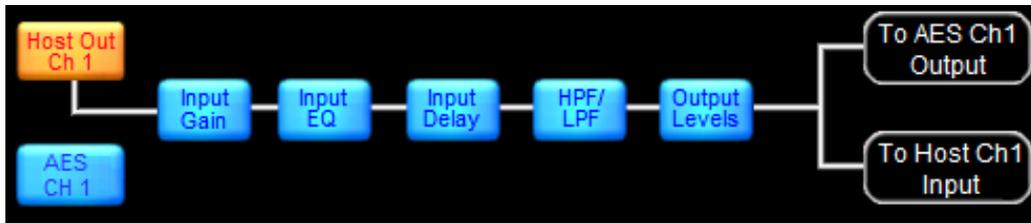


Figure 21-6: Signal Path for Mesa Module A in Simplified View

21.4.2 Classic View (All devices and configurations)

The standard fully functional Lake Controller I/O configuration view (Classic View) is also available for MY8-LAKE Mesa configurations. Classic View is the only option available when the MY8-LAKE is configured in Contour configuration or in the Contour/Mesa hybrid configuration.

This view provides all standard input and output configuration options that are applicable for the MY8-LAKE device as per normal Lake Controller operation; please refer to section 8.2 of this manual for further information.

21.4.3 Changing between Simplified View and Classic View

To change between Simplified View and Classic View:

1. Tap Routing Mode at the bottom left of the screen
2. Tap either the Simplified View or the Classic View button depending on the view required



Figure 21-7: MY8-LAKE Routing Mode Summary



When switching from Classic View to Simplified View, a router reset will be implemented to return the routing to the default Mesa Configuration routing.

22. Keyboard Shortcuts

This section describes various keyboard shortcuts that are available when using a computer with a keyboard attached.

22.1 Enabling/Disabling Keyboard Shortcuts

Keyboard shortcuts are enabled by default. To disable keyboard shortcuts, perform the following steps:

1. From HOME, tap USER PREFERENCES.
2. Tap KEYBOARD SHORTCUTS [F5].

All keyboard shortcuts will be disabled and the function key labels will be removed from the buttons on the button bar. Tap KEYBOARD SHORTCUTS again to enable this feature.

22.2 General Keyboard Shortcuts

- ▶ ESCAPE - Equivalent to tapping NO or CANCEL for warning messages, dialog boxes and when using the on screen keyboard. Equivalent to tapping EXIT on button bar menus
- ▶ ENTER - Equivalent to tapping YES or OK for warning messages, dialog boxes and when using the on screen keyboard.
- ▶ MOUSE WHEEL - Equivalent to dragging the selected filter point up or down on XOVER, PEQ or GEO screens.

22.3 Button Bar Shortcuts

22.3.1 Context Switching

To change a context view using the keyboard, perform the following steps:

1. Hold down the C key.
2. Tap the number on the keyboard that corresponds to the required context.
3. Release the C key.

22.3.2 Main Navigation/Function Buttons

The [F1] through [F10] function keys are mapped sequentially from left to right to the main navigation and function buttons on the button bar. Pressing a function key will have the same effect as tapping the associated button with a touch-screen pen or pointer. This applies to all button bar buttons throughout the system.

22.3.3 Undo/Redo

To undo/redo the last LEVELS or EQ change, perform the following steps:

1. Hold down the CTRL key.
2. Tap the Z key.

This function toggles between undo and redo, providing the same affect as tapping the Undo/Redo button.

22.3.4 Shortcut Combination Keys

Throughout the following sections, specific actions are described. These are based on the generic rules for certain keys as shown below:

- ▶ TAB: Moves forward, to the right, through pages in the MAIN work area, screens, or EQ overlays.
- ▶ SHIFT: Used in conjunction with TAB, reverses the order or page/screen/overlay navigation. Used with arrow keys, switches between FINE and NORMAL adjustment mode (LEVELS/EQ/XOVER/AUX).
- ▶ CAPS LOCK: Permanently selects FINE or NORMAL adjustment mode (LEVELS/EQ/XOVER/AUX). Does not work in conjunction with TAB.
- ▶ CTRL: Allows a key to perform another related function.

22.4 EQ, LEVELS, XOVER, and AUX Screen Shortcuts

For the purposes of keyboard shortcut navigation, the TAB function cycles through all LEVELS screens, if a LEVELS screen is selected, or through all XOVER/AUX/EQ screens if a XOVER/AUX/EQ screen is selected.

- ▶ TAB+CTRL: Cycles forward through the visible screens for either Levels or XOVER/Aux/EQ, depending on what is currently selected.
- ▶ TAB: Moves forward (to the right) through visible screens/overlays. When the last screen/overlay is reached, it will cycle back to the first screen/overlay.
- ▶ TAB+SHIFT: Moves backward (to the left) through visible screens/overlays. On the screen overlay, it will cycle to the last screen/overlay.

22.4.1 GEQ Overlay Shortcuts

- ▶ LEFT ARROW: Moves the GEQ selector one filter to the left
- ▶ RIGHT ARROW: Moves the GEQ selector one filter to the right
- ▶ UP ARROW: Increases the gain of the selected GEQ filter (Fine).
- ▶ UP ARROW + SHIFT/CAPS LOCK: Increases the gain of the selected GEQ filter (Coarse).
- ▶ DOWN ARROW: Decreases the gain of the selected GEQ filter (Fine).
- ▶ DOWN ARROW + SHIFT/CAPS LOCK: Decreases the gain of the selected GEQ filter (Coarse).

22.4.2 PEQ Overlay Shortcuts

- ▶ [1]: Adds a low-shelf filter at 125 Hz.
- ▶ [2]: Adds a parametric filter at 500 Hz.
- ▶ [3]: Adds a Mesa filter with low frequency at 830 Hz and high frequency at 1.2 kHz.
- ▶ [4]: Adds a high-shelf filter at 8 kHz.
- ▶ [G]: The gain value for the selected filter is displayed in the on-screen keyboard.
- ▶ [F]: The frequency value of the selected filter is displayed in the on-screen keyboard.
- ▶ [F] + [CTRL]: The high-frequency value of a selected Mesa filter is displayed in the on-screen keyboard.
- ▶ [B]: The bandwidth value of the selected filter is displayed in the on-screen keyboard.
- ▶ [B] + [CTRL]: The high-bandwidth of the selected Mesa filter is displayed in the on-screen keyboard.
- ▶ [<]: Moves the center frequency of the selected filter to the left (Fine).
- ▶ [<] + [SHIFT] or [CAPS LOCK]: Moves the center frequency of the selected filter to the left (Coarse).
- ▶ [>]: Moves the center frequency of the selected filter to the right (Fine).
- ▶ [>] + [SHIFT] or [CAPS LOCK]: Moves the center frequency of the selected filter to the right (Coarse).
- ▶ LEFT ARROW: Selects the filter to the left of the currently selected filter.
- ▶ RIGHT ARROW: Selects the filter to the right of the currently selected filter.
- ▶ UP ARROW: Increases the gain of the selected PEQ filter (Fine).
- ▶ UP ARROW + [SHIFT] or [CAPS LOCK]: Decreases the gain of the selected PEQ filter (Coarse).
- ▶ DOWN ARROW: Decreases the gain of the selected PEQ filter (Fine Adjustment).
- ▶ DOWN ARROW + [SHIFT] or [CAPS LOCK]: Decreases the gain of the selected PEQ filter (Coarse).
- ▶ [Q]: Increases bandwidth of selected filter, or the lowest frequency segment of a Mesa filter (Fine).

- ▶ [Q] + [SHIFT] or [CAPS LOCK]: Increases bandwidth of selected filter, or the lowest frequency segment of a Mesa filter (Coarse).
- ▶ [W]: Decreases bandwidth of selected filter, or the lowest frequency segment of a Mesa filter (Fine).
- ▶ [W] + [SHIFT] or [CAPS LOCK]: Decreases bandwidth of selected filter, or the lowest frequency segment of a Mesa filter (Coarse).
- ▶ [A] Increases the high bandwidth of a selected Mesa filter (Fine).
- ▶ [A] + + [SHIFT] or [CAPS LOCK]: Increases the high bandwidth of a selected Mesa filter (Coarse).
- ▶ [S]: Decreases the high bandwidth of a selected Mesa filter (Fine).
- ▶ [S] + [SHIFT] or [CAPS LOCK]: Decreases the high bandwidth of a selected Mesa filter (Coarse).
- ▶ [Q]+[CTRL]: Moves the low-frequency segment of a Mesa filter to the left.
- ▶ [W]+[CTRL]: Moves the low-frequency segment of a Mesa filter to the right.
- ▶ [A]+[CTRL]: Moves the high-frequency segment of a Mesa filter to the left.
- ▶ [S]+[CTRL]: Moves the high-frequency segment of a Mesa filter to the right.

22.4.3 XOVER/AUX Screen Shortcuts

- ▶ [1]: Adds a low-shelf filter to the selected output at 125 Hz.
- ▶ [2]: Adds a parametric filter to the selected output at 500 Hz.
- ▶ [3]: Adds an all-pass filter to the selected output at 1 kHz. Available in Designer Mode only.
- ▶ [4]: Adds a high-shelf filter to the selected output at 8 kHz.
- ▶ [G]: The gain value for the selected filter is displayed in the on-screen keyboard for instant editing.
- ▶ [F]: The frequency value of the selected filter is displayed in the on-screen keyboard for instant editing.
- ▶ [B]: The bandwidth value of the selected filter is displayed in the on-screen keyboard for instant editing.
- ▶ [O]: The order of a selected all-pass filter is displayed in the on-screen keyboard for instant editing. Not applicable to any other filter type and available only in Designer Mode.
- ▶ [<]: Moves the center frequency of the selected filter to the left (Fine).
- ▶ [<] + [SHIFT] or [CAPS LOCK]: Moves the center frequency of the selected filter to the left (Coarse).
- ▶ [>]: Moves the center frequency of the selected filter to the right (Coarse).
- ▶ [>] + [SHIFT] or [CAPS LOCK]: Moves the center frequency of the selected filter to the right (Fine).
- ▶ LEFT ARROW: Selects the filter to the left of the currently selected filter.
- ▶ RIGHT ARROW: Selects the filter to the right of the currently selected filter.
- ▶ UP ARROW: Increases the gain of the selected EQ filter (Fine).

- ▶ UP ARROW + [SHIFT] or [CAPS LOCK]: Increases the gain of the selected EQ filter (Coarse).
- ▶ DOWN ARROW: Decreases the gain of the selected EQ filter (Fine).
- ▶ DOWN ARROW + [SHIFT] or [CAPS LOCK]: Decreases the gain of the selected EQ filter (Coarse).
- ▶ [Q] Increases the bandwidth of the selected EQ filter (Fine).
- ▶ [Q] + [SHIFT] or [CAPS LOCK]: Increases the bandwidth of the selected EQ filter (Coarse).
- ▶ [W]: Decreases the bandwidth of the selected EQ filter (Fine).
- ▶ [W] + [SHIFT] or [CAPS LOCK]: Decreases the bandwidth of the selected EQ filter (Coarse).

22.4.4 LEVELS Screen Shortcuts

- ▶ [0] + [ENTER]: Displays on-screen keyboard for instant input-level editing of selected level type.
- ▶ [1] + [ENTER]: Displays on-screen keyboard for OUT 1–level editing for selected level type.
- ▶ [2] + [ENTER]: Displays on-screen keyboard for OUT 2–level editing for selected level type.
- ▶ [3] + [ENTER]: Displays on-screen keyboard for OUT 3–level editing for selected level type.
- ▶ [4] + [ENTER]: Displays on-screen keyboard for OUT 4–level editing for selected level type.
- ▶ [5] + [ENTER]: Displays on-screen keyboard for OUT 5–level editing for selected level type.
- ▶ [6] + [ENTER]: Displays on-screen keyboard for OUT 6–level editing for selected level type.
- ▶ [0] + UP or DOWN ARROW: Increases or decreases INPUT level for selected level type (Fine).
- ▶ [1] + UP or DOWN ARROW: Increases or decreases OUT 1 level for selected level type (Fine).
- ▶ [2] + UP or DOWN ARROW: Increases or decreases OUT 2 level for selected level type (Fine).
- ▶ [3] + UP or DOWN ARROW: Increases or decreases OUT 3 level for selected level type (Fine).
- ▶ [4] + UP or DOWN ARROW: Increases or decreases OUT 4 level for selected level type (Fine).
- ▶ [5] + UP or DOWN ARROW: Increases or decreases OUT 5 level for selected level type (Fine).
- ▶ [6] + UP or DOWN ARROW: Increases or decreases OUT 6 level for selected level type (Fine).
- ▶ [0] to [6] + UP or DOWN ARROW + [SHIFT] or [CAPS LOCK]: Coarse adjustment mode for the levels of the number/arrow combinations listed above.

23. External Control Interfaces

This chapter describes the options for interfacing with Lake devices from external controllers and interfaces. Functionality is often product specific; please refer to the relevant product operation manual for additional information.

23.1 GPIO (LM Series Devices Only)

LM Series devices provide General Purpose Input Output functionality (GPIO) allowing interface with external systems. Unlike the other forms of external control described in this chapter, GPIO provides full configuration options via the Lake Controller or via the front panel of LM Series device.

- ▶ For information on configuring GPIO via the Lake Controller, please refer to section 8.2.3 on page 121 of this manual.
- ▶ For information on configuring GPIO via the Front Panel of the LM Series device, please refer to the Front Panel Interface chapter of the LM Series Operation Manual.
- ▶ For information on GPIO hardware, including a pinout reference, please refer to the Back Panel Interface chapter of the LM Series Operation Manual.

23.2 AMX® and Crestron® Control

23.2.1 DLM Protocol (LM and PLM Series Only)

The Direct Lake Messaging third party protocol (DLM) is provided for LM and PLM Series devices, allowing integration with external control and monitoring applications such as AMX and Crestron. Please email support@lakeprocessing.com to obtain DLM Control Protocol technical information.

The extensive function control list includes:

- ▶ Frame & Module labelling
- ▶ Adjustment of Module input gain, delay, mute, phase and label
- ▶ Adjustment of Module output gain, delay, MaxRMS & MaxPeak limiters, mute, phase and label
- ▶ Input configuration, Iso-Float & AES Termination controls
- ▶ Standby power control, factory reset options
- ▶ Preset Recall (LM & PLM) & Preset Store (PLM Only)

- ▶ Adjustment of amplifier gain and Voltage Peak Limiter (PLM Only)
- ▶ Activation of pilot tone on individual power output channels (PLM Only)
- ▶ Activation of data transmission for amplifier output voltage and current via Dante (PLM Only)

Additionally, the following parameters may be retrieved from LM and PLM Series devices using the DLM Protocol:

- ▶ Preset Name, Firmware Version, Unique ID and Mac Address
- ▶ IP Address and Subnet Mask
- ▶ Dante Break-In and Enable Status
- ▶ Input Activity and Configuration
- ▶ Metering and Fault Information
- ▶ Current DSP > Amp Routing (PLM Only)
- ▶ Amp and DLM Latency in milliseconds (PLM Only)
- ▶ Output channel Impedance Measurement in Ohms (PLM Only)

These external control systems must form valid Ethernet packets that follow the requirements of the network packet specification. Please email support@lakeprocessing.com to obtain the information required for integration.

24. Command Line Options

24.1 Overview

The Lake Controller provides a number of command-line options to enable or disable certain functionality. These options may be entered when launching the Controller from a command prompt, or may be set using a shortcut's target option.

As an example, the following steps describe how to configure a shortcut on the desktop to launch the Lake Controller in daylight mode:

1. Right-click on the Microsoft Windows desktop and select NEW > SHORTCUT.
2. When asked for the location of the item type the following, ensuring you use quotation marks as shown below, and exchanging LAKE CONTROLLER vX.X for the Lake Controller the installation directory.

`"C:\Program Files\Lake\Lake Controller vX.X\Lake Controller.exe" daylight`

3. Tap NEXT.
4. When asked for a shortcut name, enter OUTDOOR.
5. Tap FINISH.



Multiple shortcut command line options may be used by separating them with a space.

24.2 Reference

Table 24-1 on page 281 describes the options for command line functionality.

Command	Description
daylight	Forces daylight mode when opening the Lake Controller.
digswitch	<p>Enables a button labelled “Prio” at the top right of the Lake Controller next to the minimize button. Tapping this button provides additional options to allow the entire system to be switched instantly between Input priority 1,2,3 or 4, or reverted to independant automatic selection, or to check the current status of all frames.</p> <p>[Prio 1] forces all online devices in the current system configuration to use forced priority 1 input for all input routers. Prio 2, 3 and 4 work on the same way for the associated input priorities.</p> <p>[Auto] reverts all inputs of all frames to automatic priority selection.</p> <p>[Check] displays a report of input router status for frames in the current system configuration.</p>
emulation	Disables hardware graphics-card based acceleration and enables software emulation for graphics acceleration. This may be useful for devices with low-end graphics cards, where virtual control of the Lake Controller is required, or where video hardware problems are encountered. When this command is enables, the systemmem command has no effect as all data is stored in memory. This option may decrease performance.
fullscreen	Forces the screen resolution during the Controller session to 1024x768 16-bit color, instead of the current Windows settings. These changes apply only to the Lake Controller, and are restored when minimizing or quitting the Controller.
netfix	Enables the automatic disabling of unused multiple network adapters in the case of communication errors. Only use if you have multiple network cards and are experiencing communication problems.
nodblick	Disables the use of double-clicking on the menu bar to rename Groups or select files.
nonfullscreen	This mode stops the automatic change of any video card settings during the Controller session; therefore correct manual settings must be made. The whole screen is still used. This is not a windowed mode option.
offline	Forces the Controller into offline mode during start-up so no network adapter is selected.
systemmem	Forces the use of system memory (RAM) instead of dedicated or shared video memory on the graphics-card (GPU) for certain graphics resources. This may be useful if available video memory is exceeded, or if other video-memory related issues are encountered. If this option does not resolve the encountered problem, try using the emulation option described above. This option may decrease performance.

Table 24-1: Command Line Options

25. Firmware Update

25.1 Backup System Configuration and Presets

While every effort is made to retain all settings in the device during the firmware upgrade procedure, it is highly recommended that the following steps are followed:

1. Open the previously used version of the Lake Controller software.
2. Tap YES when asked “Do you want to recall the last configuration?”
3. Store the current system configuration using the old version of the Lake Controller.
4. Open the previous of the associated Preset Manager and store all Presets that are contained within all Lake devices on the network.
5. Proceed to section 25.2 and update the device firmware.

25.2 Updating Firmware

The Lake Firmware Update Utility provides a fast firmware upgrade procedure for small or large networks of Lake devices. Follow the steps below to upgrade your device:

1. Install the latest version of the Lake Controller software.
2. Power on all devices, and connect using a wired network.
3. Select the Lake Firmware Update Utility via Windows START > PROGRAMS > LAKE CONTROLLER
By default, this utility is located in a folder labeled: Lake Controller vX.X > Firmware Update Utilities
4. Select the platform to update from the dialog that is displayed as shown in Figure 25-1.

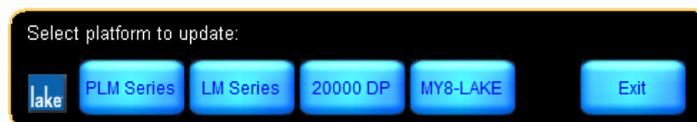


Figure 25-1: Device Platform Selection Dialog

If more than one network adapter is enabled, a screen similar to that shown in Figure 25-2 will be displayed. Always ensure you select a wired network for updating firmware as a loss in connectivity could corrupt the firmware.

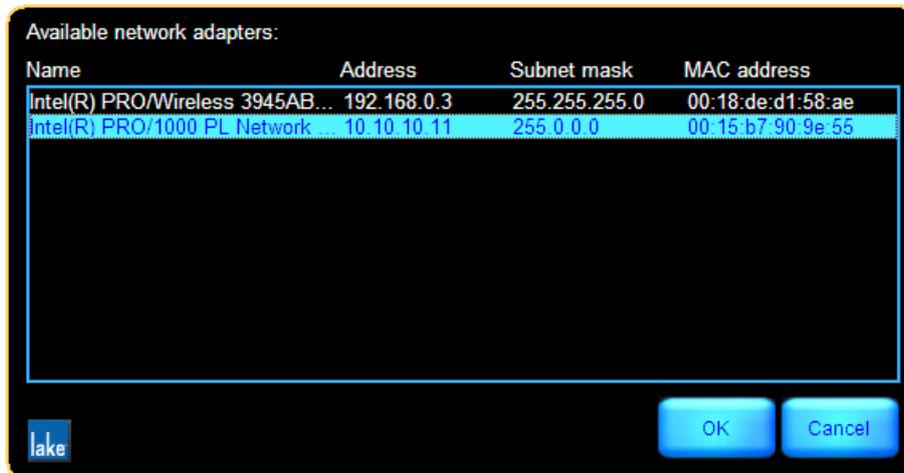


Figure 25-2: Network Adapter Selection

5. Select the wired adapter to which the Lake devices are connected.

The Lake devices will appear in a list with their current firmware versions displayed, similar to that shown in Figure 25-3. The firmware version to be loaded is shown at the top of the screen (target firmware); this will default to the latest version available.



Figure 25-3: PLM Firmware Utility Main Screen

6. Tap SELECT OLD and then UPDATE. A warning message appears.

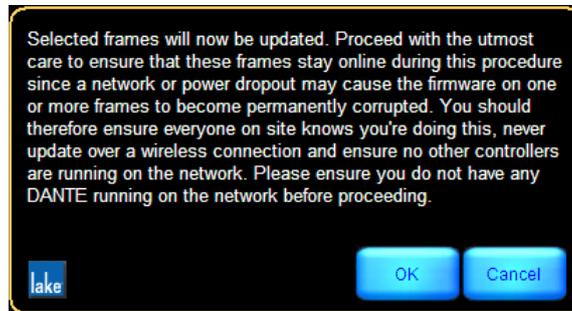


Figure 25-4: Firmware Update Warning Message

7. Tap OK in response to the warning message. All selected devices are updated in parallel with the latest firmware. A green tick indicates the firmware is already at the latest version, a percentage indicates the update status for the devices currently being updated, and a red cross indicates the firmware is old and is awaiting update or the device requires a power-cycle to complete the upgrade.

Frame ID	Name	Version
6c000011:d6fd5401	14000	⌘ 34%
cc000010:fd4f501	10000Q	⌘ 34%
1c000011:d71dde01	14000	⌘ 34%
4a000010:fce19b01	10000Q	⌘ 37%

Figure 25-5: Firmware Update Status

8. Wait for all devices to be updated.

A message appears, indicating that you must restart the updated Frames. When the firmware on an LM Series, PLM Series or MY8-LAKE device is updated, the warning advises that the mains power must be cycled (using the standby button on the Front Panel is not sufficient). For the MY8-LAKE, please power-cycle the host device.



Figure 25-6: Firmware Update Confirmation

9. Cycle the power of each Lake device appropriately.



The mains power must be cycled to complete the firmware update on an LM or PLM series device. Pressing the front panel standby button will not complete the upgrade.

10. Tap OK, then tap EXIT to quit the firmware update utility.

For PLMs, if the firmware includes a change for amplifier or front panel components, additional upgrade activity and progress will be indicated on the front panel. After an upgrade of the amplifier firmware, the unit will reboot automatically.

25.3 Old Firmware Notification in Lake Controller

If a device with old firmware is placed in the Lake Controller work area, an indication similar to that shown in Figure 25-7 will be displayed on the associated Module icons.

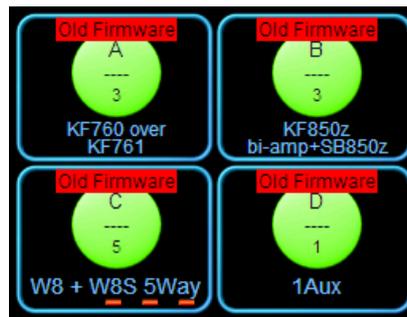


Figure 25-7: Old Firmware Notification in the Lake Controller

The firmware cannot be updated from within the Lake Controller; to update firmware, quit the Lake Controller and access Lake Firmware Update Utility as described in section 25.2.

26. Preset Manager

The Lake Preset Manager Utilities are provided as separate applications for each Lake device. These utilities operate on any PC with a Microsoft Windows XP or above, and a standard Ethernet network interface.

For further details about presets, please refer to section 6.10 of this manual.

Using the Preset Manager utilities, a sound engineer can easily manage the presets that reside on the device. Presets can be created, named, copied, locked, and transferred across multiple devices of the same type and may also be set to exclude the recall of Frame labels and Dante device names when a preset is recalled.

Presets may be stored into PC files (called bank files) for backup or transfer purposes; these files have different file extensions depending on the device type.

There are two Preset Manager utilities, one for each range of Lake devices:

- ▶ LM Series Preset Manager
- ▶ PLM Series Preset Manager

All LM Series devices are accessed via the LM Series Preset Manager utility; PLM Series devices are accessed via the PLM Series Preset Manager. Model selection is made within each application, presets are not transferable between models within the same range, or across ranges.

A preset is specific to each type device, and therefore cannot be used for other devices. Preset Manager functionality is identical for both applications, allowing the storage of up to 100 presets per device.

In the following sections, the PLM 10000Q Preset Manager will be used as an example; this tutorial will help you start using the Lake Preset Manager software quickly by providing an overview of common features. The examples provided will guide you through basic setup procedures.

At least one Lake device must be connected to proceed with this tutorial. This tutorial assumes the use of a factory-reset device; if necessary, please refer to your associated product operation manual for information on how to restore the factory configuration.

26.1 Starting the Lake Preset Manager

To start the Lake Preset Manager, select the Windows Start menu, then select Programs > Lake Controller vX.X > Preset Manager Utilities.

Select the preset manager applicable to your product; the following example shows the PLM Preset Manager after selecting the device type of PLM 10000Q, displaying only online devices of that type.



Figure 26-1: Preset Manager Default State

26.2 Screen Layout

26.2.1 Main Area

The main area is divided into four columns labeled ABCD in Figure 22 1. By default, columns A&B display the contents for the presets folder located on the computer and Columns C&D show the online Frames.



The current directory path is displayed above column A / C when COMPUTER is selected. The Preset Manager stores this location upon exiting the program, and restores it when restarted.

26.2.2 Button Bar Interface

The button bar, labeled E in Figure 26-1 follows the same logic as the Lake Controller, three colors indicate the button status.

- ▶ ORANGE - currently selected function

- ▶ BLUE - available function based on current selection
- ▶ GRAY - unavailable function based on current selection

26.3 Working with Frames

26.3.1 Selecting a Frame

To select a single Frame, tap the associated row in column C. The selected Frame is highlighted orange. Buttons are enabled and disabled depending on the current selection. With one or more Frames selected, the presets are displayed in the column to the right.



Figure 26-2: Online Frames

26.3.1.1 Rename Frame [F5]

Allows the name of the selected Frame to be changed. Only alphanumeric characters are accepted.

26.3.1.2 Select Multiple [F6]

Allows the selection of multiple Frames/presets by tapping multiple times on column C or D. Equivalent to holding down [CTRL] on a keyboard.

26.3.1.3 Set Frame Password/Change Password [F7]

Sets or changes the current Frame password.

26.3.2 Storing a Preset

To store the current configuration as a preset on an online Frame:

1. Select an empty slot in column D, and tap STORE PRESET [F2].
2. Enter a name in the popup window, and tap OK.

The current configuration is now stored as a preset on the selected Frames.



Figure 26-3: List of Presets for Selected Frame

When an existing preset is selected, functions available are:

26.3.2.1 Recall Preset [F1]

Loads the selected preset as the current configuration for selected Frames.

26.3.2.2 Store Preset [F2]

Stores the current configuration as a preset on the selected Frames.

26.3.2.3 Clear Preset [F4]

Clears the selected presets on the selected Frames.

26.3.2.4 Rename Preset [F5]

Renames the selected preset on the selected Frames.



*If one or more of the selected Frames contains a different configuration in a particular preset location, *MISMATCH* displays as the name for that system preset location.*

The RECALL PRESET and RENAME PRESET buttons are disabled when a location is selected for multiple Frames that contain a preset mismatch.

26.3.2.5 Select Multiple [F6]

Allows the selection of multiple items. Equivalent to holding down [CTRL] on a keyboard.

26.3.2.6 Set Frame Password/Change Password [F7]

Sets or changes the current Frame password.

26.3.2.7 Lock Preset/Unlock Preset [F8]

Presets can be locked to prevent changes or deletion. Locking the first preset on a Frame requires a Frame password to be set. When a preset is locked, a lock icon is displayed next to it and next to its Frame. Any further operation on that preset requires the user to enter the Frame password.

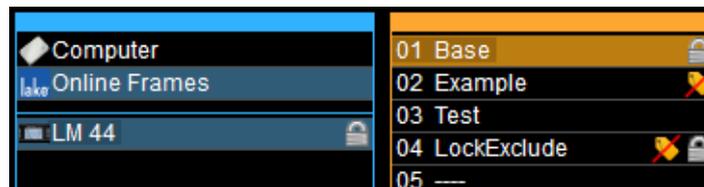


Figure 26-4: Online Frame with Locked and Unlocked Presets

In this example, Presets 1+4 are locked, and Presets 2+3 are unlocked. When a Preset is locked, the Exclude/Include Labels function may be changed without the need to enter a password. Please refer to Exclude/Include Labels section below for further information on this feature.

Unlocking a preset removes its lock but not the associated Frame password.



To remove an existing Frame password, select the Frame, tap CHANGE PASSWORD, enter the current password, then tap OK twice.

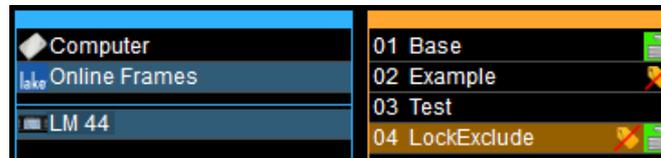


Figure 26-5: Online Frame with Locked Presets and Password Removed



The open green lock displayed in Figure 26-5 identifies the preset is locked but no password is set. Setting a FRAME PASSWORD will lock the preset again.

26.3.2.8 Exclude/Include Labels [F9]

Presets may be set to exclude the Frame label and Dante device name by using the EXCLUDE LABELS function. When the Exclude Labels function has been activated for a Preset (indicated by a crossed tag icon as shown on Presets 2+4 in Figure 26-5), the Frame label and Dante device name will not be changed from the existing setting when the Preset is recalled.

The Exclude/Include Labels function works on individual and multiple presets in bank files and online frames based on the currently selected preset or presets.

This function is available only via the Preset Manager utility, but the Exclude Labels status for each Preset is visible via the Lake Controller as shown in Figure 6-3 on page 67.

26.4 Working with Bank Files

A bank file is a software file, stored on a computer or external storage device, that contains the details for all presets on a device. It can be used as a backup file, as well as to transfer presets between devices. The bank file is specific to each device type.



It is recommended to Exclude Labels on all Presets when transferring the same Presets or Bank Files to multiple devices. If Exclude Labels is not set, the device's Frame Label and Dante device name will change during Preset Recall to the value present when the Preset was created.

26.4.1 Creating a New Bank File

A new empty bank file is created by tapping NEW BANK [F3]. This button is available only when the COMPUTER column is selected, column A by default.

After entering a bank file name, either double-tap the bank file in column A, or select the bank file and tap OPEN [F1]. The empty bank file is shown in column B.

A bank file can also be created by dragging an online Frame (column C) into column A (or vice versa). This bank file contains all presets from the dragged Frame, and thus may not be empty. An automatic name is set for that bank file.

Figure 26-6 shows a bank file containing four presets with varying Lock and Exclude Label statuses.

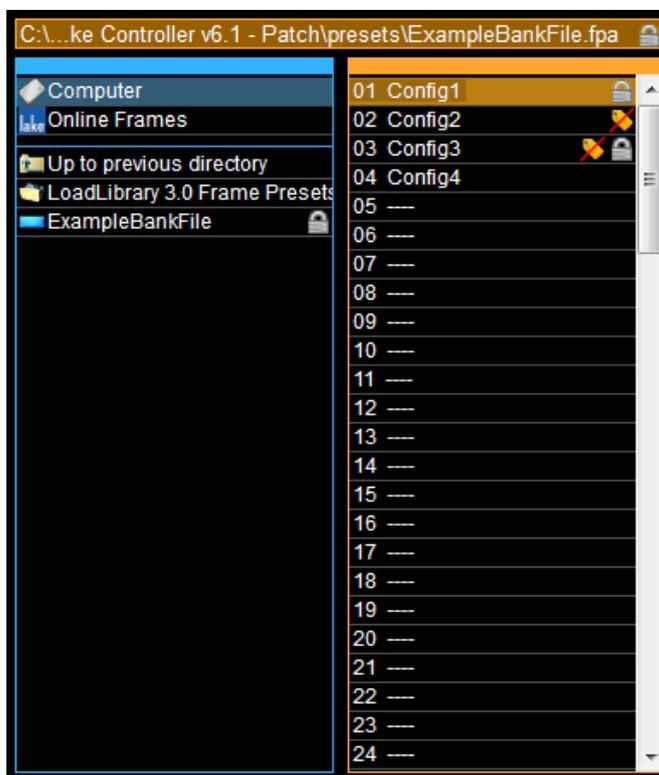


Figure 26-6: Open Bank File in Default Presets Folder

26.4.2 Bank File / Folder Functions

When a bank file or a folder is selected, the following options are available.

26.4.2.1 Open [F1]

The action of OPEN [F1] depends on what is currently selected. If a bank file is selected, it displays the presets of the selected bank file in column C or D. If a folder is selected, it displays the contents of the folder in column A or B.

26.4.2.2 New Folder [F2]

Creates a new folder in the working directory.

26.4.2.3 Delete [F4]

Deletes the selected items.

26.4.2.4 Rename [F5]

Renames the selected item.

26.4.2.5 Select Multiple [F6]

Allows the selection of multiple items. Equivalent to holding down [CTRL] on a keyboard.

26.4.2.6 Set Bank Password/Change Password [F7]

Sets or changes the password for the selected bank file. When a password is set, a lock icon is displayed next to the bank file and on any locked Presets. Bank File and Frame passwords follow the same logic.



To remove an existing password, tap CHANGE PASSWORD, enter the current password, then tap OK twice.

26.4.3 Preset Functions

When a preset in a bank file is selected, the following actions are available.

26.4.3.1 Clear Preset [F4]

Deletes the selected presets from the bank file.

26.4.3.2 Rename Preset [F5]

Renames the selected preset in the bank file.

26.4.3.3 Select Multiple [F6]

Allows the selection of multiple items using multiple single tap actions; equivalent to holding down [CTRL] on a keyboard.

26.4.3.4 Set Bank Password/Change Password [F7]

Sets or changes the password for the selected bank file. When a password is set, a lock icon is displayed next to the bank file and on any locked Presets. Bank file and Frame passwords follow the same logic.



To remove an existing password, tap CHANGE PASSWORD, enter the current password, then tap OK twice.

26.4.3.5 Lock / Unlock Preset [F8]

Locks or unlocks the selected preset/s in a bank file as described in section 26.3.2.7.

26.4.3.6 Exclude / Include Labels [F8]

Sets the Exclude / Include Labels function for the selected Preset/s as described in section 26.3.2.8.

26.4.4 Transferring Presets between Bank Files and Devices

To transfer Presets between Devices and Bank Files, select the Preset/s and drag between column B and column D as shown in Figure 26-7.

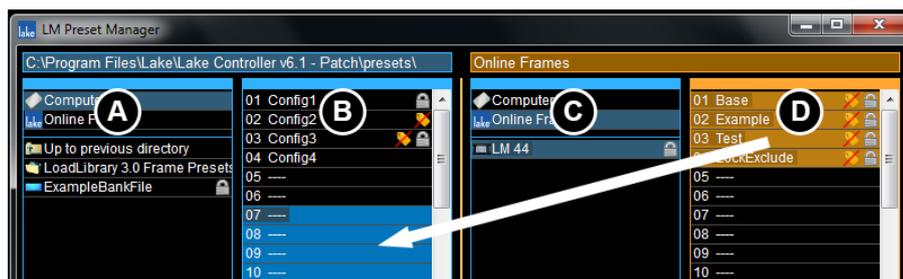


Figure 26-7: Transferring Presets from a Device to a Bank File

In this example, files are copied from the device to the computer (bank file) and will appear in the destination column as shown on column B in Figure 26-8 once the transfer is complete. Bank file presets can be transferred in the same way as indicated below.



Figure 26-8: Transferring Presets from a Bank File to a Device

26.4.5 Bank Filename Extensions

Each Lake device has a unique file extension for Bank files as shown in Table 26-1.

Lake Device	Bank Filename Extension
PLM 20000Q	.tpa
PLM 14000	.gpa
PLM 10000Q	.ppa
LM 44	.fpa
LM 26	.lpa*
20000DP	.tsb

Table 26-1: Bank File Extensions



*The LM 26 and legacy Dolby Lake Processor file extensions are identical, although the Presets contained within these files are not compatible across these device types.

26.5 Common Functionality

26.5.1 Exit [F10]

Closes the Preset Manager application.

27. IP Address Reference

In most applications, the IP addresses and other configuration parameters of the underlying Ethernet system will not need to be adjusted by the end user. If a system requires advanced networking requirements, however, such as the partitioning of a high-bandwidth Ethernet backbone into virtual local area networks (VLANs), then a qualified network engineer may need to make adjustments to the default Ethernet configuration of the Lake device and the computer running the Lake Controller software. This chapter provides reference information pertaining to Ethernet configuration.

27.1 Network Essentials

Ethernet is a cost-effective and easy-to-configure system for networking personal computers, servers, local area networks (LANs), industrial and professional equipment, and even provides the fundamental transport backbone of the Internet. Since Ethernet is widely used for many applications, there are a number of rules governing network configuration to ensure there are no conflicts between multiple devices.

IP addresses provide the unique identifier of each node (unit of network hardware) on an Ethernet network. The address uniquely identifies the network that the node is on, as well as uniquely identifying the node on that network. For example, this unique identifier ensures that personal computers all around the world do not clog the Internet with messages intended for local data transfers.

Since Ethernet is used locally and globally, Ethernet standards reserve ranges of IP addresses for various applications. Public IP addresses are used on the Internet, and should not be used in LANs. A range of private IP addresses have also been defined and set aside for use on internal networks. These private IP addresses can be used on internal networks by anyone, as the Internet's backbone routers will not route packets with these addresses.

Lake devices and the Lake Controller software have been developed and tested for use on internal networks that are not intended to be connected to the Internet. Therefore, we recommend that you use private IP addresses when configuring the network.

27.2 Factory Reset Configuration

A factory reset Lake device will have an IP address set in the Automatic Private IP Address range 169.254.x.x with a subnet mask of 255.255.0.0.

Dante digital audio networking utilizes the Dante Discovery service to automatically identify all Dante devices on the network. It is imperative that the Dante Controller, which includes installation of the Dante Discovery service, is installed on the Lake Controller PC for Dante to function.

The default starting point is for all device to be left with this factory reset automatic IP address range, with the Controller PC configured to obtain an IP address automatically. If problems are encountered, or you require a more complex configuration, please refer to a network specialist, and in the case of a Dante audio network, refer also to:

- ▶ Dante specific documentation included in the Lake Controller software installation
- ▶ Lake Processing forum @ <http://supportforum.lakeprocessing.com>

If desired, you can also use Class A, Class B or Class C private IP address ranges. These addresses require additional configuration, and thus more knowledge of IP addresses and networking. Table 27-1 shows a selection of private IP address ranges recommended for use with the Lake device and Lake Controller network. It is recommended that all hardware is configured with a private IP address within these ranges.

Class	Range
A	10.x.x.x
B	169.254.x.x (Default - Automatic Private IP Address)
C	172.16.x.x through 172.31.x.x*
D	192.168.0.x through 192.168.255.x

Table 27-1: Recommended Private IP Addresses



**172.31.x.x is used on the secondary computer's network interface for Dante Dual Redundancy configuration. Please refer to chapter 3 for further details.*

Lake devices and Lake Controllers can be configured to communicate over a network using any IP address and subnet mask combination required for your particular application. More sophisticated networks that include traffic from other professional and consumer equipment must be configured correctly to achieve desired operation.



IP Address & Dual Redundancy settings can only be changed either manually by the user via software, or via a Factory Reset. These parameters are unaffected by System Recall, Preset Recall, Frame Replace, Soft Reset etc.

28. Corporate Information

28.1 Contact Details

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SWEDEN

Phone: +46 300 56 28 00
Fax: +46 300 56 28 99

Email: support@lakeprocessing.com
Website: www.lakeprocessing.com

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