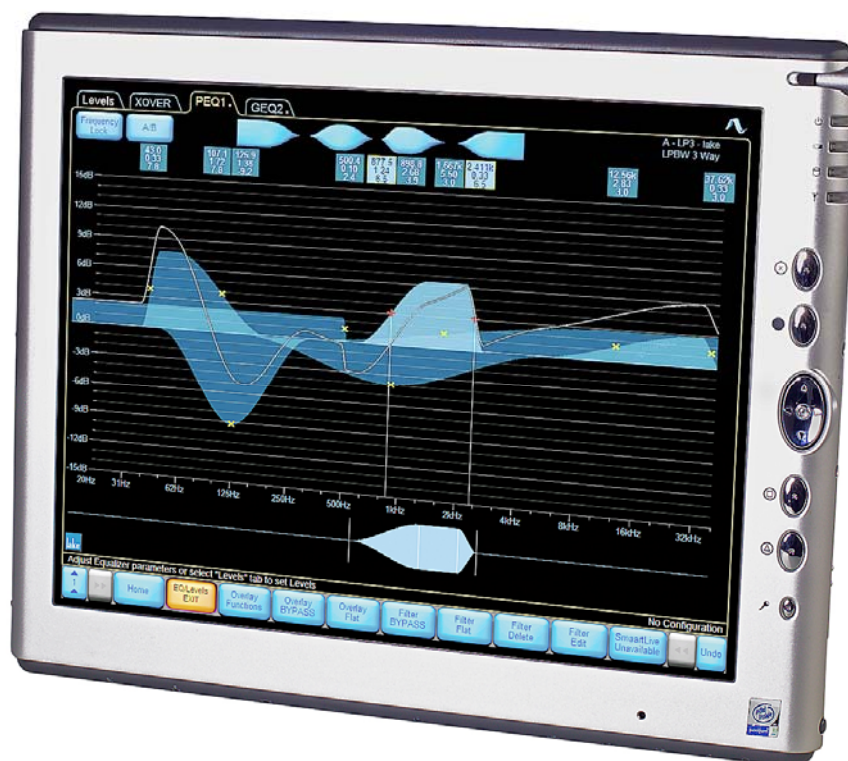




USER MODE MANUAL



RELEASE DATE: JULY 2005

DOCUMENT/SOFTWARE VERSION: V3.2

PART NUMBER: DOC-532-0005

www.lake.com

Important Safety Instructions and Warnings

Standards Compliance

This product has been certified to comply with:

- **Safety** UL6500, EN 60065, CB scheme.
- **EMC** FCC part 15 Class A

And carries the CSA mark and FCC required marking.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at own expense.

Explanation of Symbols

These symbols are internationally accepted symbols that warn of potential hazards with electrical products.



The lightning flash in an equilateral triangle alerts the user to the presence of uninsulated “dangerous voltage” within the product enclosure that may be of sufficient magnitude to constitute a risk of electric shock.



The exclamation mark in an equilateral triangle alerts the user to the presence of important safety, operating or maintenance (servicing) instructions in the literature accompanying the appliance.

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE.

Important Safety Instructions

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12. Unplug this apparatus during lightning storms or when unused for long periods of time.
13. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
14. **WARNING!** To reduce the risk of electric shock, DO NOT REMOVE COVER. No user serviceable parts inside.
15. **WARNING!** This is a Class 1 device. The electrical safety design of Class 1 devices depends on proper grounding. To maintain electrical safety ensure that a grounded mains lead is used and that it is properly connected to a grounded mains wall outlet.

Contour and Mesa EQ Warranty Statement

Lake warrants that Lake Contour and Lake Mesa EQ hardware will be free from defects in components and workmanship for a period of 12 months from the date of invoice. During the warranty period, Lake will cover the cost of all parts and labor to remedy the defect, or replace products, which prove to be defective.

If the hardware is found by Lake to be defective and needs to be serviced off site Lake will pay reasonable freight charges. Lake is not obliged to honor this warranty if the hardware has failed to be maintained and operated as specified by Lake, in the accompanying documentation, or other than in accordance with industry standards.

Defects caused by unauthorized modifications, misuse, negligence, act of God or accident are not covered by this warranty. This Limited Warranty is exclusive and no other warranty is expressed or implied.

Lake does not warrant that Lake software, or any third-party software, is error free. Third party branded or manufactured goods are supplied by Lake with care but without responsibility and subject only to third party suppliers' warranties. In all other respects Lake is not liable for consequential damages.

Support Details

If you experience problems configuring your hardware or have any questions regarding the software, please refer to the FAQ section of the website @ www.lake.com, or the forum which can also be accessed through this site.

If you require further assistance please contact us by email: support@proaudio.lake.com

Contents

Important Safety Instructions and Warnings.....	2
Standards Compliance.....	2
Explanation of Symbols.....	2
Important Safety Instructions.....	3
Contour and Mesa EQ Warranty Statement.....	4
Support Details.....	4
Contents.....	5
Chapter 1: Introduction	11
1.1 System Overview.....	11
1.2 User Manual Overview.....	11
Chapter 2: Hardware Setup and Software Installation.....	12
2.1 Hardware Requirements	12
2.1.1 Minimum Hardware Specifications.....	12
2.1.2 Recommended Hardware Specifications.....	12
2.1.3 Video Card Settings.....	13
2.1.4 Tablet/Laptop Power Settings	14
2.1.5 Windows XP Tablet PC Input Panel	15
2.2 Software Installation.....	16
2.3 Networking – Software Configuration	17
2.4 Networking – Hardware Setup	20
2.4.1 Connecting Multiple Processors.....	20
2.4.2 Wired Network Setup	21
2.4.3 Wireless Network Setup	23
2.5 Audio Connectivity	28
2.5.1 All Products – Analog I/O.....	28
2.5.2 Contour Pro26D – Digital I/O	28
2.5.3 Mesa Quad EQ – Digital I/O	29
Chapter 3: Quickstart Tutorial.....	30
3.1 Introduction	30
3.1.1 Starting the Lake Controller	30
3.1.2 Undo/Redo Function	31
3.2 Modules and Frames.....	32
3.2.1 Overview	32
3.2.2 Labeling Frames and Modules	35
3.2.3 Module Properties	36
3.2.4 Levels and Meters.....	37
3.3 EQ.....	38
3.3.1 Graphic EQ.....	39
3.3.2 Ideal Graphic EQ.....	40
3.3.3 Parametric EQ	41
3.3.4 Add a New EQ Overlay.....	43
3.3.5 Mesa Filter.....	43
3.4 Crossovers	45

3.5	Groups	47
3.5.1	Assigning Modules to a Group	47
3.5.2	Assigning Meters at Group Level	48
3.6	Lake Controller File Types	49
3.7	Detailed Function Descriptions	50
Chapter 4:	System Store and Recall	51
4.1	Shortcut to Data/User Folder	51
4.2	Recall / Open	52
4.3	Recall Compare	52
4.4	Store	53
4.5	New Store	53
4.6	File Utilities	53
4.6.1	Open	53
4.6.2	Read Only	53
4.6.3	Rename	54
4.6.4	Delete	54
4.6.5	New Folder	54
4.7	System Presets	55
4.7.1	Storing a System Preset in Multiple Processors	55
4.7.2	Recalling a System Preset into Multiple Processors	56
4.7.3	Quick System Preset Recall and Comparison	57
4.7.4	Storing over an Existing Preset	57
4.7.5	Clearing a Preset Location	57
4.7.6	Preset Mismatch	58
Chapter 5:	Modules	59
5.1	Shortcut to Data/User Folder	59
5.2	EQ/Levels	60
5.3	Properties	60
5.3.1	Contour Input Switching	61
5.3.2	Mesa EQ Input Gain Mixer	62
5.3.3	Input Mutes (Mesa EQ only)	63
5.3.4	Interactive Signal Path Block Diagram	63
5.3.5	Digital Offset	63
5.3.6	Input 1/2 Select and Input 3/4 Select (Mesa EQ only)	64
5.3.7	Input Autoselect	64
5.3.8	Analog Input	64
5.3.9	Digital Input	64
5.3.10	Dig Out 96kHz	65
5.3.11	Dig Out 48kHz	65
5.3.12	Factory Reset	65
5.4	Label & Lock	67
5.4.1	Label Module	67
5.4.2	Label Frame	67
5.4.3	Module and Base Configuration Locking	67
5.5	Copy/Paste/Replace	68
5.5.1	Copy	68
5.5.2	Paste	68

	5.5.3	Replace Frame / Replace Module.....	68
	5.5.4	Complete Replace.....	69
	5.5.5	Remove.....	69
	5.6	Module Store/Recall.....	70
	5.6.1	Recall/Open.....	70
	5.6.2	Store.....	72
	5.6.3	New Store.....	72
	5.6.4	Base Configuration.....	72
	5.6.5	File Utilities.....	73
	5.6.6	Frame Presets.....	74
	5.7	Add Page.....	76
Chapter 6:		Contour Module Types.....	77
	6.1	Overview.....	77
	6.2	Module Type Abbreviations.....	77
	6.3	Stereo Insert (includes Digital Output).....	78
	6.4	Classic Crossovers / Auxiliary Outputs.....	79
	6.4.1	Stereo Classic 2-Way (+ Auxiliary Channels).....	79
	6.4.2	Classic 3-Way / 3 Auxiliary Outputs.....	80
	6.4.3	Classic 4-Way / 4 Aux (with Classic 2-Way / 2-Aux).....	81
	6.4.4	Classic 5-Way / 5-Aux (with additional 1-Auxiliary Output).....	82
	6.4.5	Classic 6-Way / 6-Auxiliary Outputs.....	83
	6.5	Linear Phase Crossovers.....	84
	6.5.1	Linear Phase Brick Wall 2-Way (+1 Classic Auxiliary Output).....	84
	6.5.2	Linear Phase Brick Wall 3-Way.....	85
	6.5.3	Linear Phase Brick Wall 4-Way.....	86
Chapter 7:		Mesa EQ Module Type.....	87
	7.1	Overview.....	87
	7.2	Mesa EQ Module.....	87
Chapter 8:		EQ, Levels, Xover, HPF & LPF.....	88
	8.1	Overview.....	88
	8.1.1	General Access.....	88
	8.1.2	Restricted Access.....	88
	8.1.3	Group Updates.....	88
	8.1.4	Default Settings.....	89
	8.2	Levels.....	90
	8.2.1	Overview.....	90
	8.2.2	Gain.....	92
	8.2.3	Delay.....	92
	8.2.4	Limiter MaxRMS.....	92
	8.2.5	Limiter Corner.....	93
	8.2.6	Limiter Time Constant.....	93
	8.2.7	SoftClamp Properties.....	93
	8.2.8	Headroom/Amp Clip.....	95
	8.2.9	Limiter Configuration Summary and Case Study.....	96
	8.2.10	Meter Options.....	98
	8.3	Input EQ.....	101
	8.3.1	Default Overlays.....	101

8.3.2	Hidden Overlays.....	102
8.3.3	Parametric EQ Screen.....	102
8.3.4	Graphic EQ Screen.....	104
8.3.5	Overlay Functions	105
8.3.6	Overlay Bypass/Insert/Compare.....	108
8.3.7	Overlay Flat.....	108
8.3.8	Filter Bypass/Insert.....	109
8.3.9	Filter Flat	109
8.3.10	Filter Delete.....	109
8.3.11	Filter Edit.....	109
8.3.12	SmaartLive / SmaartLive Unavailable	110
8.3.13	High-Precision Filter Adjustments	110
8.4	Crossovers and HPF/LPF	111
8.4.1	Using the High Pass Filter (HPF Enable).....	112
8.4.2	Using PEQ Filters on the XOVER Screen	113
8.4.3	Linear Phase Crossovers.....	115
8.4.4	Crossover Functions	115
8.4.5	Crossover Split / Combine / Alignment Delay.....	116
8.4.6	Crossover/HPF/LPF Select.....	119
8.4.7	Crossover/HPF Set/LPF Set or Filter Bypass/Insert	120
8.4.8	Filter Flat	120
8.4.9	Filter Delete.....	120
8.4.10	Filter Edit.....	121
8.4.11	Smaart / SmaartLive Unavailable.....	121
8.5	Auxiliary Output Channels.....	122
8.5.1	Using Auxiliary Outputs.....	123
8.5.2	Adding Output-Specific EQ	123
8.5.3	High- and Low-Pass Filters.....	124
8.5.4	Auxiliary Output Menu Options.....	126
Chapter 9:	Groups	128
9.1	Overview	128
9.2	Adding a Group.....	128
9.3	EQ/Levels.....	129
9.4	Assign.....	130
9.5	Label.....	130
9.6	Copy/Paste.....	131
9.6.1	Copy	131
9.6.2	Paste.....	131
9.7	Remove.....	131
9.8	Gang	132
9.9	Add Page	132
Chapter 10:	Solo/Mute	133
10.1	EQ/Levels.....	133
10.2	Solo/Mute Enable.....	133
10.3	Pile.....	134
10.4	All Mute	134
Chapter 11:	Icon Control.....	135

11.1	Meters On/Off	135
11.2	Icon Small/Normal/Medium/Large	135
Chapter 12:	User Preferences	136
12.1	Contexts	136
12.2	Delay Units	136
12.3	Designer Functions	137
12.3.1	Change Password	137
12.3.2	Designer Mode	137
12.3.3	Global Access	137
12.4	Keyboard Shortcuts	137
12.5	About	137
12.6	Daylight Mode	137
12.7	Show Mode	138
Chapter 13:	Pages	139
13.1	Overview	139
13.2	Cut Icon	140
13.3	Copy Icon	140
13.4	Paste Icon	140
13.5	Page Label	140
13.6	Page Delete	141
13.7	Add Page	141
13.8	Hide Page	141
13.9	Scrolling Pages	141
Chapter 14:	Network, Multiple Controllers and Working Offline	142
14.1	Select Network	142
14.2	Multiple Controllers	142
14.2.1	Overview and Menu Options	142
14.2.2	Networking Multiple Controllers	143
14.2.3	Primary and Secondary Controllers	144
14.2.4	Restricted Functionality	146
14.2.5	Using SmaartLive Controller with Multiple Lake Controllers	146
14.3	Working Offline	147
14.3.1	Dummy Modules	147
14.3.2	Replacing Dummy Modules with an online Processor	147
Chapter 15:	Communication and Synchronization	148
15.1	Communication	148
15.1.1	Computer/Processor Settings	148
15.1.2	Offline Modules	148
15.1.3	Communication/Network Errors	148
15.2	Synchronization	149
15.2.1	Re-Sync Process	149
15.2.2	Out of Sync	149
15.2.3	Updating all Processors with Computer Settings	150
15.2.4	Updating the Controller with current Processor Settings	151
15.2.5	Synchronizing the Lake Controller and Processors	151
15.2.6	Audible Changes when Synchronizing	152
Chapter 16:	Keyboard Shortcuts	153

16.1	Enabling/Disabling Keyboard Shortcuts	153
16.2	General Keyboard Shortcuts	153
16.3	Button-Bar Shortcuts	153
16.3.1	Context Switching	153
16.3.2	Main Navigation/Function Buttons	153
16.3.3	Undo/Redo	154
16.4	Shortcut Combination Keys	154
16.5	EQ, Levels, Xover and Aux Screens – General	154
16.6	GEQ Overlay	155
16.7	PEQ Overlay	155
16.8	Xover/Aux Screens	157
16.9	Levels Screens	158
Chapter 17:	Contour Front Panel Functions	159
Chapter 18:	Mesa EQ Front Panel Functions	160
Chapter 19:	External Control Interfaces	161
19.1	AMX Control	161
19.2	MIDI Control	161
19.2.1	Overview	161
19.2.2	Available Functionality via MIDI	161
19.2.3	Hex conversion tables for SysEx messages	162
19.2.4	Frame Preset Recall via MIDI (00)	163
19.2.5	Insert/Bypass Group EQ Overlay via MIDI (01)	163
19.2.6	Insert/Bypass Module EQ Overlay via MIDI (02)	164
19.2.7	Mute/Unmute Group Input via MIDI (03)	164
19.2.8	Mute/Unmute Module Input via MIDI (04)	165

Chapter 1: Introduction

1.1 System Overview

The Lake Contour and Mesa EQ Processors revolutionize how artists, audiences, and engineers experience live audio. Lake's signal processing expertise has produced a revolutionary digital processor that optimizes live sound in entirely new ways. These processors have more in common with the mastering processors found in professional studios than the equalizers and crossovers typically used for live sound.

The Contour processor is a two-input, six-output DSP loudspeaker controller. The Mesa EQ is a four-input, four-output processor that provides four independent channels of EQ with a software configurable input to output matrix. These processors utilize extended precision 40-bit floating-point math to implement crossovers (Contour only), dynamics, delay, and equalization functions.

The controller software runs on a Windows (98, 2000, ME, and XP) PC. The innovative Ethernet-based network design provides a wireless touch screen interface that delivers commands from the controller to each processor. This allows the engineer to listen and adjust any parameter of all processors on the Ethernet network from any location in the venue.

Significant features include:

- State-of-the-art filter synthesis technique allows unlimited number of EQ layers
- Unique Lake Mesa Filter
- Wireless touch screen control enables adjustment from any position in the venue
- 3-position ground-lift switch provides unparalleled external noise rejection
- 40-bit floating-point precision throughout entire signal processing path
- 24-bit 96 kHz converters
- Extensive selection of linear phase, traditional, and non-traditional crossover filters (Contour only)
- Stereo AES/EBU 24-bit digital input and output supporting sample rates from 44.1 kHz to 96 kHz (Contour only)
- Four AES/EBU 24-bit digital inputs and outputs supporting sample rates from 44.1 kHz to 96 kHz (Mesa EQ only)

1.2 User Manual Overview

This User Mode Manual provides detailed descriptions from hardware setup to all functions available in the Lake Controller. For information on functions available in Designer Mode, please refer to the Designer Mode Manual.

The descriptions of the controller features and functions refer to both Lake and Mesa EQ processors unless otherwise stated.

Chapter 2: Hardware Setup and Software Installation

2.1 Hardware Requirements

A processor must be connected to a Windows PC running the Lake Controller software to enable control and communication.

2.1.1 Minimum Hardware Specifications

These are the *minimum* specifications for the computer running the Lake Controller software:

- 400 MHz Pentium III or equivalent
- 64 MB RAM
- 4 MB Video RAM
- Windows 98 SE, ME, 2000, XP
- DirectX 8.1 or higher
- 10BaseT Wired Ethernet Adapter and/or 802.11b WiFi wireless Ethernet Adapter Wireless networking requires the Lake Wireless Package or equivalent.

2.1.2 Recommended Hardware Specifications

These are the *recommended* specifications for the computer running the Lake Controller software:

- 600 MHz Pentium III or equivalent
- 128 MB RAM
- 8 MB Video RAM
- Windows 2000 Service Pack 2
- DirectX 8.1 or higher
- 10BaseT Wired Ethernet Adapter and/or 802.11b WiFi wireless Ethernet Adapter Wireless networking requires the Lake Wireless Package or equivalent.

2.1.3 Video Card Settings

It is important that the video card is setup correctly to ensure smooth operation of the Lake Controller software. Incorrect video card settings may result in problems or unusual behavior of the graphics display on the Controller.

These are *mandatory* settings for the video card:

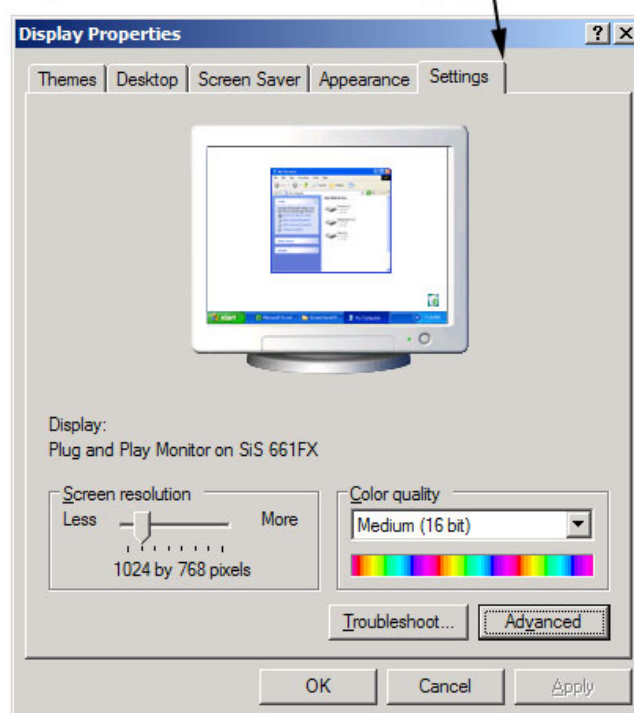
- **minimum monitor display resolution:** 800 x 600 pixels
- **color:** 16-bit

These are *recommended* settings for the video card:

- **display resolution:** 1024 x 768 pixels
- **color:** 16-bit
- **3D acceleration:** set for best performance with anti-aliasing turned off
- **Clear Type** enabled (Windows XP Only)

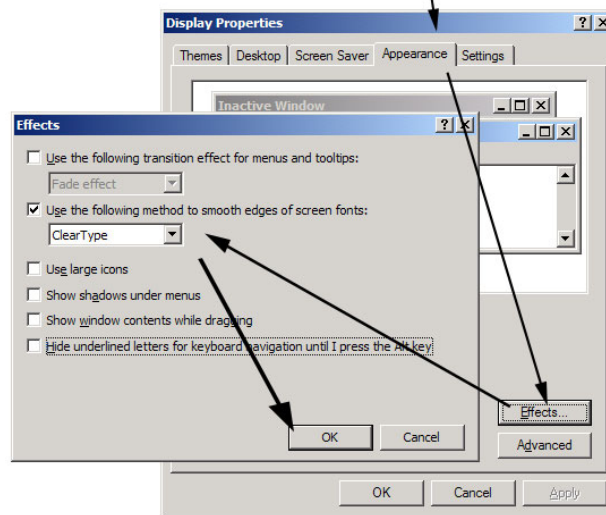
To verify display, navigate using the Windows control panel as shown below:

Start >> Programs >> Control Panel >> Display



To verify if Clear Type is enabled on Windows XP, navigate using the Windows Control Panel as shown below:

Start >> Programs >> Control Panel >> Display



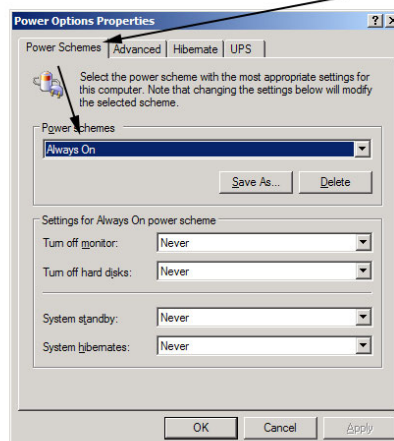
2.1.4 Tablet/Laptop Power Settings

When using a wireless tablet or laptop for your 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 Lake Controller without mains 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 as shown below:

Start >> Programs >> Control Panel >> Power Options



As settings vary depending on each tablet/laptop - please consult the appropriate hardware manual for further information.

2.1.5 Windows XP Tablet PC Input Panel

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 Lake Controller and the Input Panel attempt to be in the foreground.

To disable the Input Panel gesture:

1. Access **Tablet and Pen Settings** via Windows Control Panel: Start > Settings > Control Panel > Tablet and Pen Settings
2. Select the **Pen Options** tab
3. Select **Start Input Panel Gesture** and tap **Settings**
4. Uncheck the box labeled *Enable start Input Panel gesture*

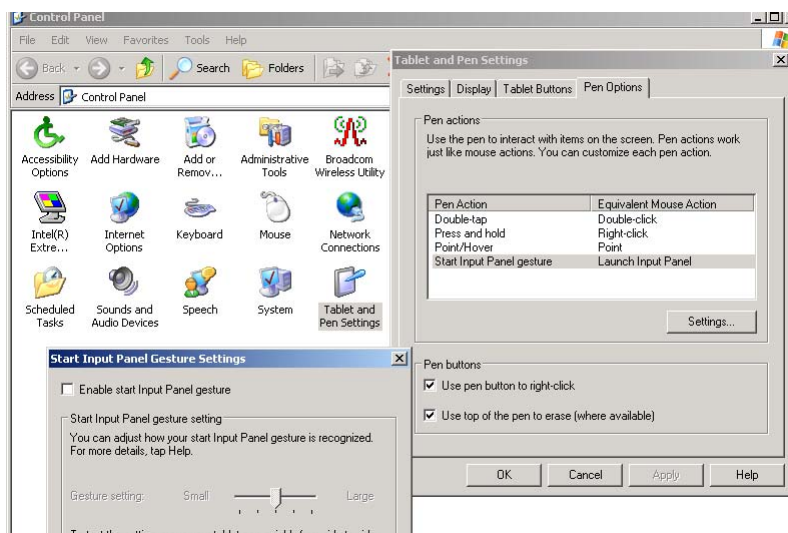


Figure 2-1

2.2 Software Installation

We recommend exiting all Windows programs before running the Lake Controller Setup program.

To install the Lake Controller software either:

1. Insert the CD-ROM provided. The Setup program runs automatically.
- or
2. Double-tap the **Lake Controller Setup.exe** program icon if installing via network or download.

The Lake Controller Setup program will guide you through software installation.

1. Read or enter information as required and tap **Next** to proceed
2. Tap **Install** when requested.
3. Tap **Finish** when installation is complete.

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

NOTE: Before starting the Lake Controller software, follow the procedures described in section 2.3 - and 2.4.

2.3 Networking – Software Configuration

The network card of the Lake Controller host computer must be configured properly in order to communicate with processors on the network. A valid fixed IP address, required for network communication between the controller software and processors, can be acquired in numerous ways depending on the network configuration.

If you are creating a network by connecting only the processors and the controller host computer together, make sure the host computer has a valid fixed IP address. Specify the host computer's IP address by following these steps:

1. Open **Network Connections** from the Windows **Start** menu. The method varies with different versions of Windows but you can usually select **Settings->Network Connections**.

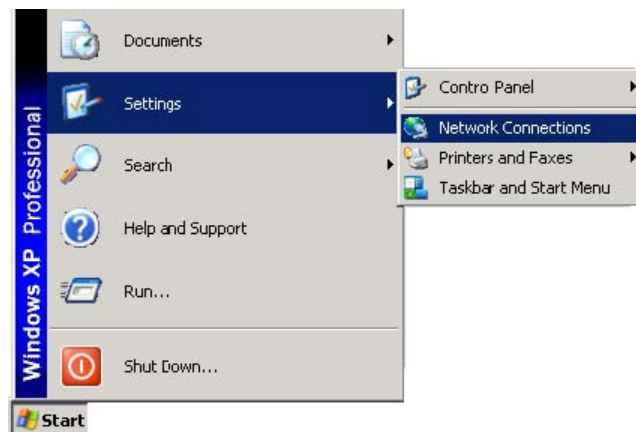


Figure 2-2

2. Double click on the appropriate network connection to configure (i.e. **Local Area Connection** or **Wireless Network Connection**.)

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

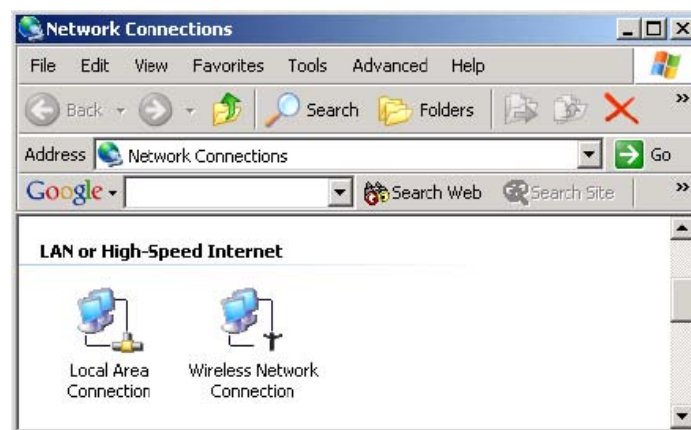


Figure 2-3

3. Select Internet Protocol (TCP/IP) and click the Properties button.

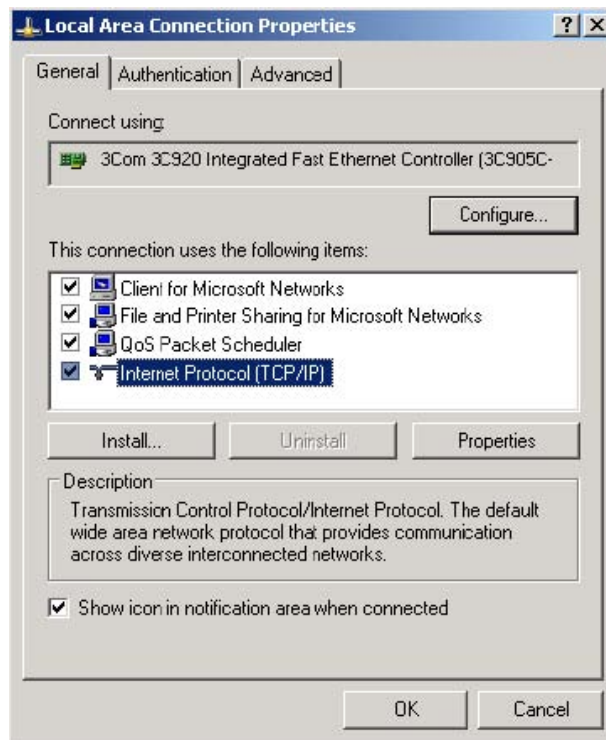


Figure 2-4

4. By default, Windows automatically obtains an IP address. You must change this default selection to specify an IP address. We recommend setting your IP address to be a part of the 10.xxx.xxx.xxx subnet (e.g., 10.0.0.10).

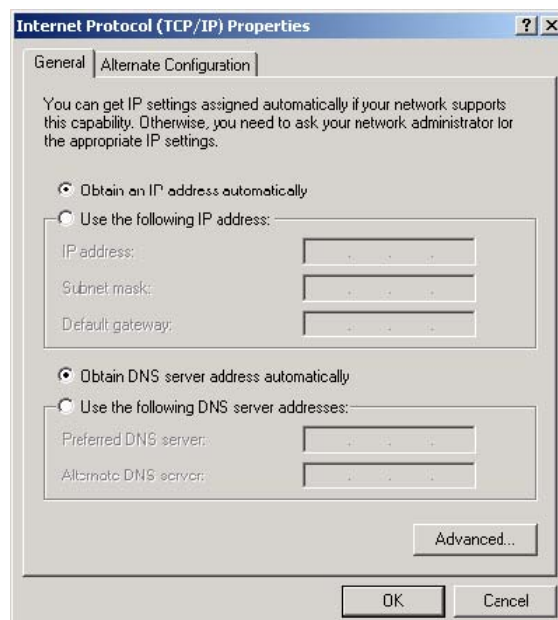


Figure 2-5

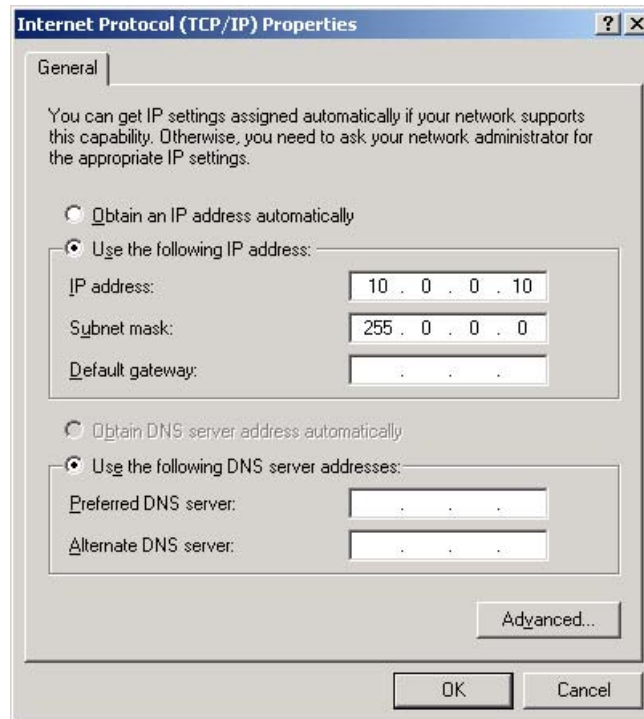


Figure 2-6

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

NOTE: The actual IP address assigned to the controller host computer is not important, as Lake network communication uses UDP messaging, which broadcasts network messages to all nodes on the network. Each node on the network must be assigned a valid fixed IP address. You can specify any required IP address for other Ethernet network related communications.

NOTE: The processors do not require IP address configuration, as each processor has a unique identifier that is used for communication.

When finished with IP address configuration, continue to section 2.4 - Networking – Hardware Setup.

2.4 Networking – Hardware Setup

Begin setup by connecting the processor to an AC power source. The unit operates normally if the AC line voltage is within the range 100–240 VAC ($\pm 10\%$) as the power supply is auto-ranging (i.e. it detects the AC power present and adjusts internally). Therefore, the processor can be used anywhere in the world without manually changing switch settings.

The first time the processor is turned on, it operates in its factory default configuration. If the processor has been configured previously, the last settings are restored. All parameters are stored in non-volatile memory so if the processor loses power during operation, it returns to its exact state prior to the loss of power. If a network communication problem occurs, the sound output from the processor continues without interruption.

2.4.1 Connecting Multiple Processors

The Contour processor supports 10Base2 and 10BaseT Ethernet cabling. The Mesa EQ processor supports 10BaseT cabling only.

10Base2 is a 10 MHz Ethernet system running over thin, 50 Ω , baseband, coaxial cable (thin coax). Thin coax cabling looks like the coaxial cable commonly used to connect test or video equipment. Each 10Base2 cable segment should be no longer than 185 m (607 ft).

50 Ω terminators must be placed on the start and end of any thin coax network, as shown in Figure 2-7. The primary benefits of 10Base2 cabling are its robust metal locking connectors and immunity to node failure.



Figure 2-7

10BaseT is a 10 MHz Ethernet system running over unshielded, twisted-pair cabling. 10BaseT cabling looks like an ordinary telephone cable but has eight wires instead of four.

Each 10BaseT cable segment should be no longer than 100–150 m (328–492 ft); the wide range depends on the cable quality. 10BaseT cabling is available in five different *categories*: Cat1–Cat5. The quality of the cable increases with the numeric suffix. Do not use Cat1 or Cat2 cable because their performance cannot be guaranteed to meet the demands of 10 MHz Ethernet. Cat3–Cat5 are acceptable for Contour/Mesa processors.

Each Contour/Mesa processor contains an Ethernet hub that allows multiple connections between each processor and the Ethernet network. The Ethernet hub regenerates and re-times the signal between each hub port.

10BaseT and 10Base2 Ethernet segments may be used together through the hub connections on each Contour processor (10Base2 is not applicable for Mesa EQ).

NOTE: When using 10BaseT to network multiple processors, each processor on the network must be powered on for network signals to pass to the next unit. 10Base2 passes network signals whether or not any of the Processors are powered on.

IMPORTANT!

10BaseT allows cascading of up to four units

10Base2 allows cascading of up to 30 units

2.4.2 Wired Network Setup

The controller PC can be connected directly to any processor through either its front or rear panel Ethernet connectors. Multiple processors can be connected by cascading connections between units.

The hardware can be interconnected as a wired or wireless network. The wired network is a simpler solution and should be implemented before using a wireless system.



Figure 2-8

Figure 2-8 shows the controller directly connected to a Contour processor through the front panel Ethernet port.

Use the PC and Uplink Ethernet ports on the rear panel (Figure 2-9) to network multiple processors:

1. Connect the Uplink port of one processor to the PC port of the next processor.
2. Repeat this interconnection method until all Processors intended for the network are connected.

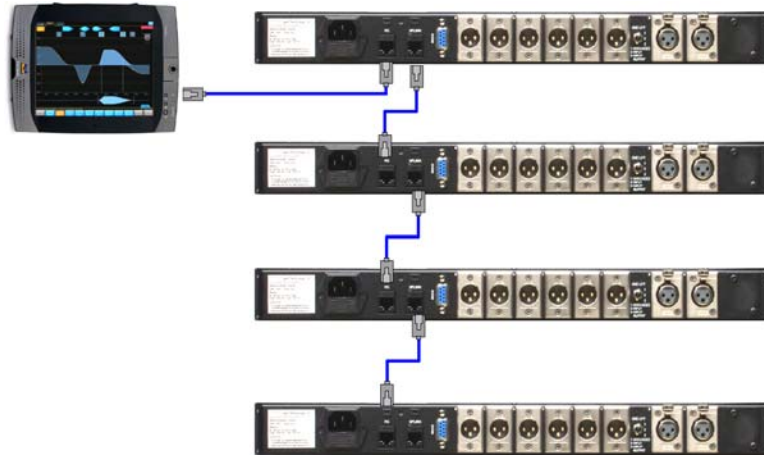


Figure 2-9

3. Connect the controller to any available PC port on either the front or rear panel of a processor.

The controller can connect anywhere on a network of multiple processors. LEDs above each port flash to confirm valid communication.

Figure 2-10 shows a system using a mix of 10Base2 and 10BaseT cabling.



Figure 2-10

Verifying Controller and Processor Communication

Once the network is connected, follow the steps below to confirm communication between the controller and processors.

1. Double-tap the **Lake Controller** shortcut icon from the Windows desktop. The **Select Network Adapter** dialog (Figure 2-11) appears if your computer has more than one network interface enabled. This typically occurs if your PC has both wired and wireless network interfaces.

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

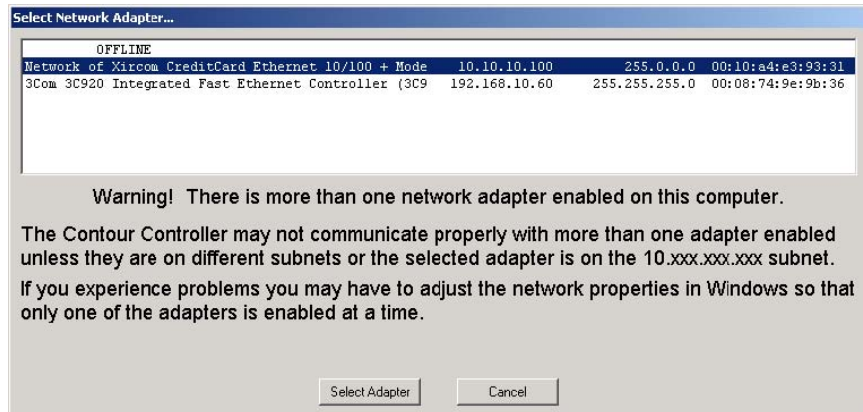


Figure 2-11

3. Tap **No** in the dialog that appears asking whether to recall the last configuration.

The Main page of the Lake Controller is displayed.

4. To verify that the processor(s) are on the network and communicating, tap the **Modules** button.

The module scroll-bar appears.



Figure 2-12

The first module from the left in the module scroll-bar is the dummy module, which is always available whether the network is operating properly or not.

If your network connections are valid, all processors connected to the network appear on the module scroll-bar to the right of the dummy module.

In Figure 2-12, the A and B modules are in a *frame* that represents one Contour Processor. A Mesa EQ processor has four module icons displayed in one *frame*. Please refer to section 3.2 for more information on modules and frames.

If you are not planning to use wireless connectivity, proceed to Chapter 3: Quickstart Tutorial.

2.4.3 Wireless Network Setup

Before setting up a wireless network for the first time, we recommend verifying system operation by connecting one of the wired networks described in the previous section. When the controller and processors are communicating on a wired network, close the Lake Controller software:

1. From the **Home** menu, tap **Quit Controller**.
2. Tap **Yes** on the warning message to confirm the action.

Several hardware manufacturers supply wireless networking solutions that adhere to the same 802.11b wireless Ethernet standard used in the Lake Controller system. This means that any 802.11b wireless networking solution should work. However, after extensive testing of available wireless networking solutions, we have found that performance varies tremendously among vendors. A trouble-free wireless networking package is available from Lake – please visit www.lake.com for further information.

NOTE: Although the following instructions are specific to the Lake wireless networking package, the majority of concepts and terminology translate directly for other 802.11b solutions.

An *access point* is used in a wireless Ethernet network configuration to connect processors to the Lake Controller host computer. An access point looks like an external modem with two small antennae. This radio-based receiver/transmitter is connected to your wired LAN using network cables. It performs the same function as a switch: receiving, buffering, and transmitting data between wired and wireless networks. Lake Processors are wired just like a wired network (refer to section 2.4.1).

1. Connect an available Ethernet port on a processor to the access point.
2. The Lake Controller host computer must also have a wireless Ethernet network interface card; this is usually included in Tablet PCs.

Figure 2-13 illustrates the wireless configuration.

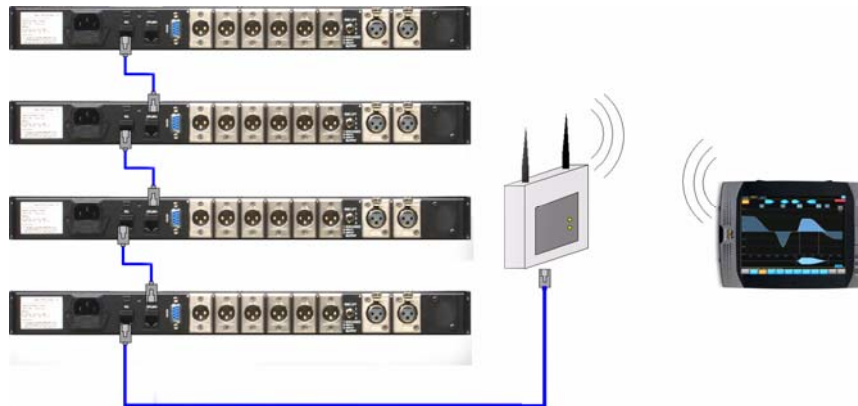


Figure 2-13

Ideally, the procedure described above 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 the Lake network.

As part of the 802.11b 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 the Lake 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 (i.e. the access point and all Lake 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 802.11b standard. WEP provides the same level of security as a wired network by encrypting data over radio waves to protect it during transmission.

The Lake Wireless Package sets the SSID for you. The SSID can be found on the back of Lake configured access points, and is a number unique to your wireless access package. WEP encryption is not enabled. This should only be necessary if you plan on using an existing LAN that includes sensitive information. We recommend that WEP encryption be enabled if any other computers are connected to your Ethernet network.

To make a connection between the Lake Controller PC and the access point, locate the SSID found on the label on the back of your access point as shown in Figure 2-14.

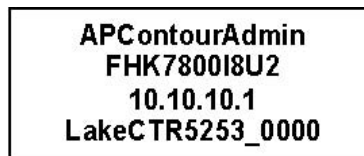


Figure 2-14

The SSID shown in this example is on the bottom line of the label: LakeCTR5253_0000

Configuring the Tablet PC for Wireless Networking

Now that the access point has been configured, we need to configure the Tablet PC to connect to this access point.

1. Open **Network Connections**, double click on **Wireless Network Connection**

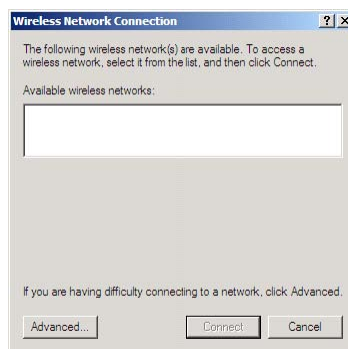


Figure 2-15

2. Click **Advanced** then click **Add** to add a preferred network

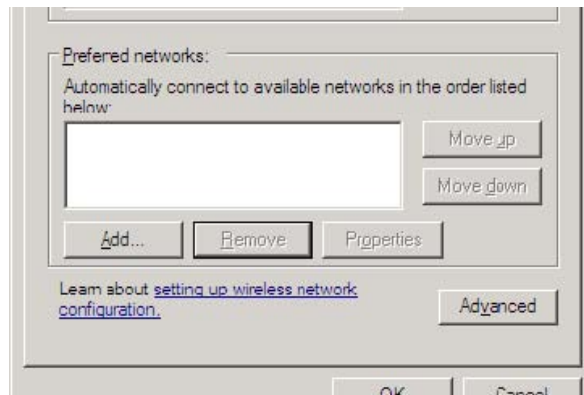


Figure 2-16

3. Specify the network name, exactly as you have configured on the access point. Remember the SSID is case-sensitive.

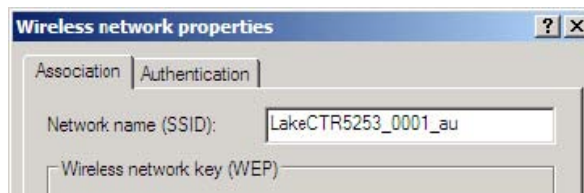


Figure 2-17

4. Click **OK** to continue. The SSID will now appear in the Preferred Networks list:

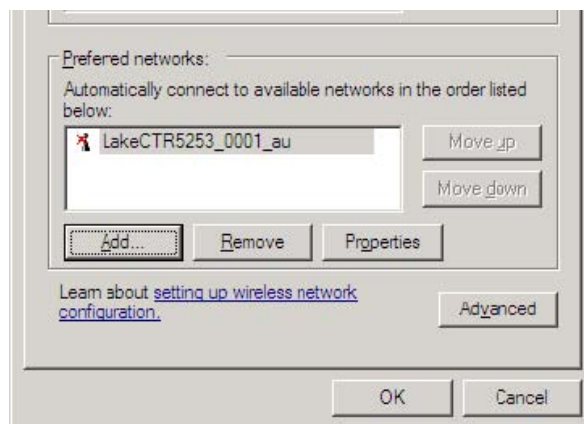
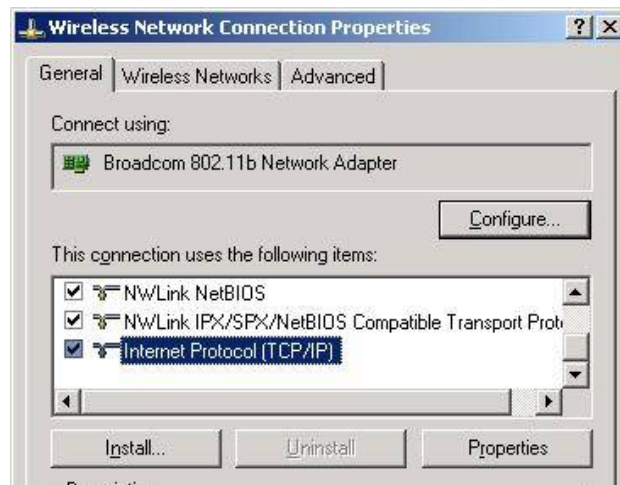


Figure 2-18

5. Select the **General** tab, scroll down to Internet Protocol (TCP/IP) and tap Properties



6. Enter an IP address, ensuring it is unique and click **OK** (e.g. do not use the same IP Address that you allocated to the access point. Any IP Address numbered 10.n.n.n with a subnet mask of 255.0.0.0 will allow communication)

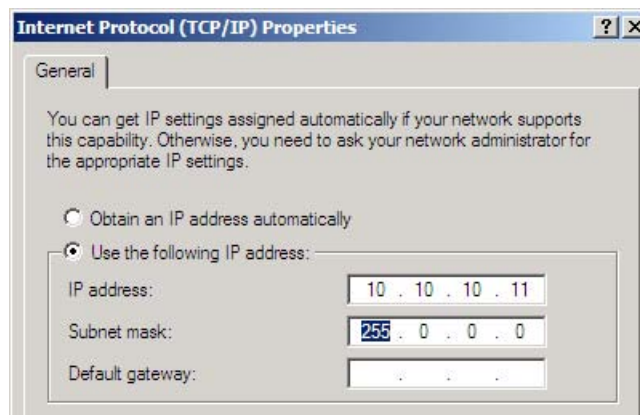


Figure 2-19

7. Click **OK** again. A pop-up message will appear in the Windows icon tray.

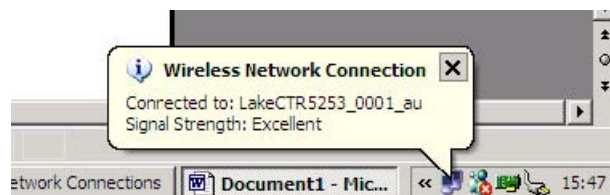


Figure 2-20

Confirming Wireless Operation of the Lake Controller

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 **Re-Sync** message will appear for each processor on your network, confirming that your network connection is operating properly
3. Tap **Modules**. Each on-line processor is represented on the module scroll-bar as two module icons surrounded by a frame
4. Tap **Quit Controller** to exit

2.5 Audio Connectivity

2.5.1 All Products – Analog I/O

Balanced XLR connectors are used for all analog audio input and output signals.

2.5.2 Contour Pro26D – Digital I/O

In addition to the standard analog connectors, the Pro26D is fitted with a custom 5-pin XLR connector for Stereo AES/EBU digital input/output.

Digital Input is available for all Module Types. Digital Output is only available when the processor is configured in Stereo Insert mode using the forced Digital or forced Analog Input options (refer to section 6.3 for further details).

The pin connections for the 5-pin to 3 pin XLR splitter cable are shown in the diagram below:

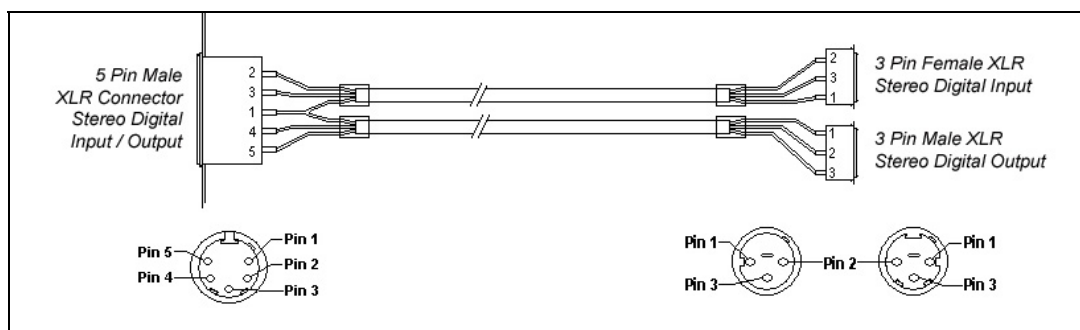


Figure 2-21

2.5.3 Mesa Quad EQ – Digital I/O

The default settings of the Mesa EQ processor connect the audio signals from:

Input 1 → Output 1
 Input 2 → Output 2
 Input 3 → Output 3
 Input 4 → Output 4

INPUT AUTOSELECT is the default input configuration, which automatically switches the input signal to analog if a digital input signal is not present. Please note that this option does NOT provide digital output.

Simultaneous Digital and Analog Output is available only when the Input is manually locked to either **Digital Input** or **Digital Output** (refer to the User Mode Manual for further information)

AES/EBU Digital Input/Output is via a standard DB25 to XLR cable, using the first two stereo pairs (1/2 and 3/4). The standard DB25 pin connections are shown in the diagram below:

AES/EBU Pinouts			
	Signal Description		Signal Description
Pin 1 *	Ch 1 & 2 In (+)	Pin 14 *	Ch 1 & 2 In (-)
Pin 2 *	Ch 3 & 4 In (+)	Pin 15 *	Ch 3 & 4 In (-)
Pin 3	Ch 5 & 6 In (+)	Pin 16	Ch 5 & 6 In (-)
Pin 4	Ch 7 & 8 In (+)	Pin 17	Ch 7 & 8 In (-)
Pin 5 *	Ch 1 & 2 Out (+)	Pin 18 *	Ch 1 & 2 Out (-)
Pin 6 *	Ch 3 & 4 Out (+)	Pin 19 *	Ch 3 & 4 Out (-)
Pin 7	Ch 5 & 6 Out (+)	Pin 20	Ch 5 & 6 Out (-)
Pin 8	Ch 7 & 8 Out (+)	Pin 21	Ch 7 & 8 Out (-)
Pin 9	N/C	Pin 22	Ground
Pin 10	Ground	Pin 23	N/C
Pin 11	N/C	Pin 24	Ground
Pin 12	Ground	Pin 25	Ground
Pin 13	Ground		

+ = Hot or positive side of balanced signal * = Mesa Quad EQ I/O
 - = Cold or negative side of balanced signal

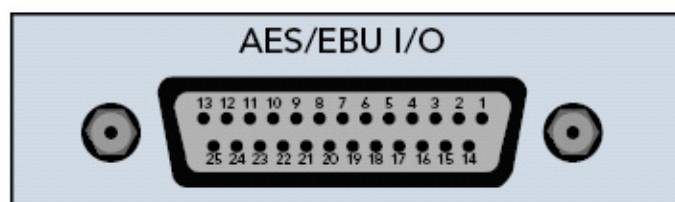


Figure 2-22

Chapter 3: Quickstart Tutorial

This Quickstart Tutorial will help you begin 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 - please refer to the following chapters and the Lake Controller Designer Mode Manual for detailed information.

The tutorial examples will guide you through some basic setup procedures. You must have at least one Contour or Mesa EQ Processor connected to the Lake Controller host computer to proceed with this tutorial (please refer to Chapter 2: Hardware Setup and Software Installation).

The following tutorial refers to a Contour processor, although many of the examples also apply to the Mesa EQ processor.

3.1 Introduction

3.1.1 Starting the Lake Controller

1. Double-Tap the **Lake Controller** software icon located on the Windows desktop.
2. Tap **No** in the dialog asking if you would like to recall the last configuration

The Main Page appears blank.

NOTE: Tapping **Yes** loads the configuration in use the last time the controller software was closed. This data is then compared to the data in the processors on the network and the system advises if any data is out-of-sync. (Refer to section 15.2 for further details on synchronization).

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

- **Orange:** Currently selected menu or function
- **Blue:** Available menu or function based on current selection
- **Gray:** Currently unavailable menu or function

On the left of the button-bar are the buttons shown in Figure 3-1.



Figure 3-1

The button with the numbered arrows is the **Context** button, which enables fast navigation around the system. For further detail, please refer to section 12.1.

The button with arrows pointing right is active when a page or menu scroll-bar contains more information that can be displayed on 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 most menu levels and returns you to the Main page of the system.

Figure 3-2 shows the common buttons, which are permanently available on the right hand side of the button-bar. The button with arrows pointing left follows the same principle as the one containing the right arrows as described above.

The button labeled **Undo** (or **Redo** after **Undo** has been used) provides a one-level Undo/Redo function for adjustments made to EQ/Levels and Crossovers (where applicable). Please refer to section 3.1.2 for further details.



Figure 3-2

Generally, the labels on buttons describe the sub-menu opened or the function performed by tapping the button. Context-sensitive help and system status messages are displayed above the button-bar on the left and right of the screen, respectively.

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



Figure 3-3

3.1.2 Undo/Redo Function

The Undo button returns the setting of any Levels, EQ or Crossover value to that before the last change was made. When the **Undo** function has been used, the button reads **Redo**, allowing you to revert back to the most recent change.

The Undo/Redo function is available for all Levels, EQ filter gain, frequency and bandwidth (and Crossover settings for Contour processors). It is disabled if functions from the button-bar menu are used, or when navigating to a different part of the system.

3.2 Modules and Frames

3.2.1 Overview

A *frame* represents one physical processor on the network. Two *modules* are available within a frame for Contour processors and four modules for Mesa EQ processors.

The default **Contour** Classic 3-Way frame is configured as follows:

- Module A controls the signal from Input A to Outputs 1, 2, and 3
- Module B controls the signal from Input B to Outputs 4, 5, and 6

The default **Mesa EQ** frame is configured as follows:

- Module A controls the signal from Input 1 to Output 1
- Module B controls the signal from Input 2 to Output 4
- Module C controls the signal from Input 3 to Output 3
- Module D controls the signal from Input 4 to Output 4

The Lake Controller software provides input switching, allowing the user to configure input to output setup subject to the module type being used. This function is described in section 5.3 Properties.

The available module/frame configurations are shown below, with the default input/output switch status.

Frame Configuration:	Module A:	Module B:
Stereo Classic 2 Way + Auxiliary	2 Way + 1 Auxiliary (Input A to Output 1,2,3)	2 Way + 1 Auxiliary (Input B to Output 4,5,6)
Stereo Classic 3 Way	3 Way (Input A to Output 1,2,3)	3 Way (Input B to Output 4,5,6)
Stereo Linear Phase 2-Way (+ 1 Auxiliary)	2 Way + 1 Auxiliary (Input A to Output 1,2,3)	2 Way + 1 Auxiliary (Input B to Output 4,5,6)
Stereo Linear Phase 3-Way	3 Way (Input A to Output 1,2,3)	3 Way (Input B to Output 4,5,6)
Linear Phase 4-Way	4 Way (Input A to Output 1,2,3,4)	<i>Not Used</i>
Classic 4 Way + Classic 2 Way	4 Way (Input A to Output 1,2,3,4)	2 Way (Input B to Output 5,6)
Classic 4 Way + 2 Auxiliary Outputs	4 Way (Input A to Output 1,2,3,4)	2 Auxiliary Outputs (Input B to Output 5,6)
Classic 5 Way + 1 Auxiliary Output	5 Way (Input A to Output 1,2,3,4,5)	1 Auxiliary Output (Input B to Output 6)
Classic 6 Way	6 Way (Input A to Output 1,2,3,4,5,6)	<i>Not Used</i>
Stereo Insert (Including Stereo Digital Input/Output)	Signal Input + Analog/Digital Output (Input A to Output 1+Digital Out Left)	Signal Input + Analog/Digital Output (Input B to Output 4+Digital Out Right)

Table 3-1

2-Way + 1 Aux, 3-Way (Classic or Linear Phase) and Classic 3-Aux modules can be combined as required on a single frame. For this tutorial, the default Stereo Classic 3-Way configuration will be used.

Tap the **Modules** button to refer to the processors on the network; the module scroll-bar appears.



Figure 3-4

With one Contour processor on the network, the module scroll-bar displays three icons that represent three modules. The first module from the left is the dummy module; the other two module icons represent the two modules of a single online Contour processor.

A dummy module is always accessible whether or not the Lake Controller is connected to a network of processors. The dummy module allows off-line adjustment of module parameters, which enables entire systems to be designed offline. Dummy modules can be replaced with online modules later.

1. Tap Module A on the scroll-bar
Both/All modules in the frame will be selected
2. Tap on the Main page where you wish to place the modules of the selected frame

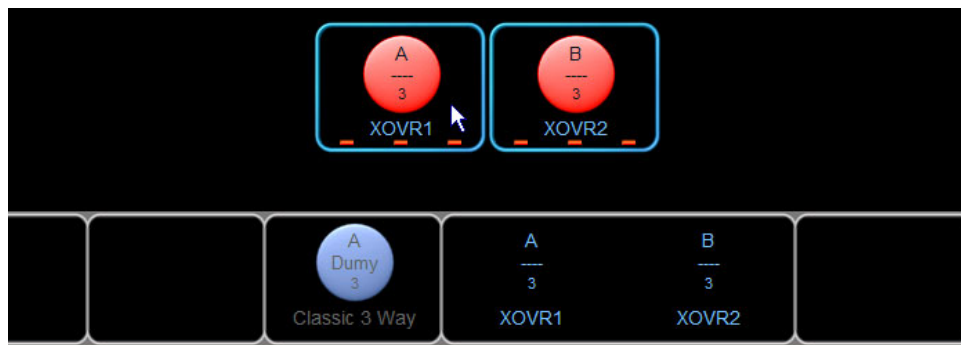


Figure 3-5

NOTE: Pressing the SEL button on the front panel of the processor will highlight the relevant processor on the module scrollbar.

The processor synchronizes itself with the controller. During the synchronization process, the controller gathers all settings for the selected processor.

Each module icon provides the following configuration information:

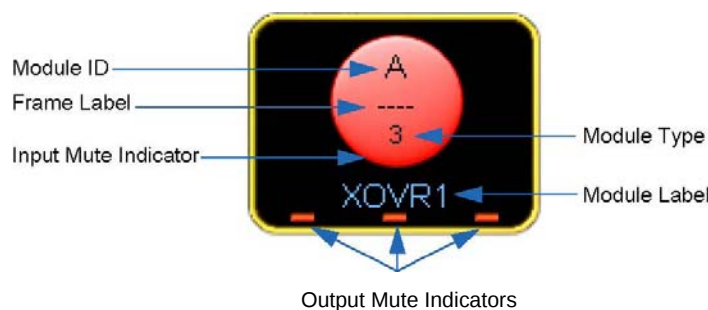


Figure 3-6

- **Module ID:** Identifies the module of the processor represented by this icon.
- **Frame Label:** Identifies the frame associated with this icon by a four-character (alpha-numeric) user-defined label that also appears on the front panel of the processor.
- **Module Type:** Identifies the number of output channels or an abbreviation of a module type description.

NOTE: A Classic 2 way + 1 Auxiliary module is represented by the number '2', but has an additional channel available for the auxiliary output.

- **Module Label:** A user-defined label that describes the module's use or speaker type.
- **Input Mute Indicator:** For Contour processors, if the central round part of the icon is red (as shown above), the input is muted; if the icon is blue, the input is not muted. For Mesa EQ processors, this indicates that the output channel is muted.

NOTE: Input Mute status for Mesa EQ processors is located on the Module Properties page due to the flexible input mixer configuration.

- **Output Mute Indicators:** These display 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.

The default configuration for a Contour processor is a stereo pair of 24dB per octave Linkwitz-Riley three-way crossovers with frequencies centered at 250 and 1600 Hz. The default module labels are **XOVR1** (Module A) and **XOVR2** (Module B).

3.2.2 Labeling Frames and Modules

The frame label is blank in the Lake Controller module icon and on the front panel of the processor [----].

To name the frame, tap one of the modules to select it. A yellow border surrounding the module icon indicates selection.



Figure 3-7

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

1. Tap **Label & Lock**.
2. Tap **Label Frame** to display the onscreen keyboard.
3. Type *Demo* and tap **OK** using the on-screen keyboard, or a manual keyboard if available



Figure 3-8

NOTE: Only Alpha-numeric characters are displayed on the front panel of the processor

Figure 3-9 shows that the processor's alphanumeric display reads *DEMO*. The alphanumeric display always shows capital letters so it can be seen clearly from a longer distance. The frame label field for both modules also displays *Demo* in the Lake Controller software.



Figure 3-9

Assign a useful name to each module:

1. Tap module A (left) to select it
2. Select **Label Module** from the button-bar

3. Name this module **A Three-Way** using the onscreen keyboard and tap **OK**
4. Repeat the process for module B (right), and name it **B Three-Way**
5. Tap **Label EXIT** to return to the **Modules** menu



Figure 3-10

3.2.3 Module Properties

Tap the **Properties** button to display the module's block diagram and the interactive signal-processing path. The example in Figure 3-11 shows a Classic 3-Way crossover configuration for Module A of a Contour processor.

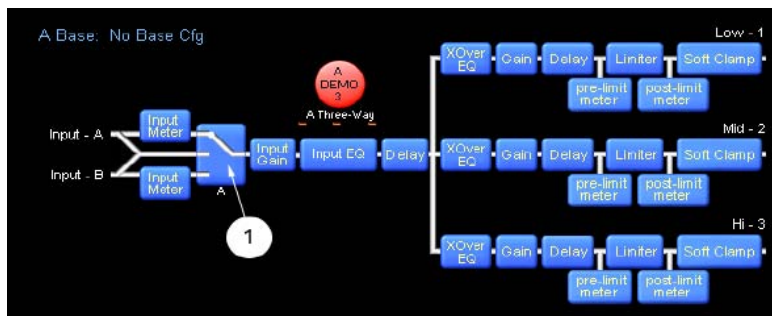


Figure 3-11

The two inputs for the Contour processor can be switched or merged by tapping the input switch (1) as shown above, although the gain cannot be adjusted.

Figure 3-12 shows the input mixer and signal path for Module A of a Mesa EQ processor. All four inputs of the Mesa EQ processor can be mapped to any output, and the gain of each of these inputs can be adjusted independently.

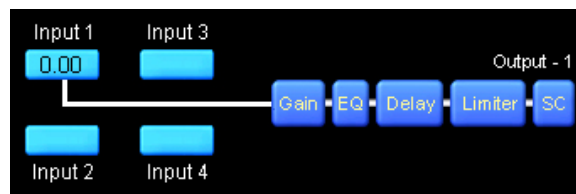


Figure 3-12

The Lake Controller software can be used to adjust all parameters shown in these signal processing blocks. The properties page is interactive - each blue processing block (except those labeled '...meter') can be selected to directly access the relevant screen in the software. For further details on the properties page, please refer to section 5.3 Properties.

Return to the Main Page by tapping the **Home** button.

3.2.4 Levels and Meters

From the main page, tap the module icon for **A Three-Way** to display its parameters. Tap the **Levels** tab at the top-left of the screen.

Gain controls and meters are displayed for the input and all outputs as shown in Figure 3-13. Mute controls are located below each input and output meter, with a polarity button for the input (user and designer mode) and for the outputs (designer mode only).

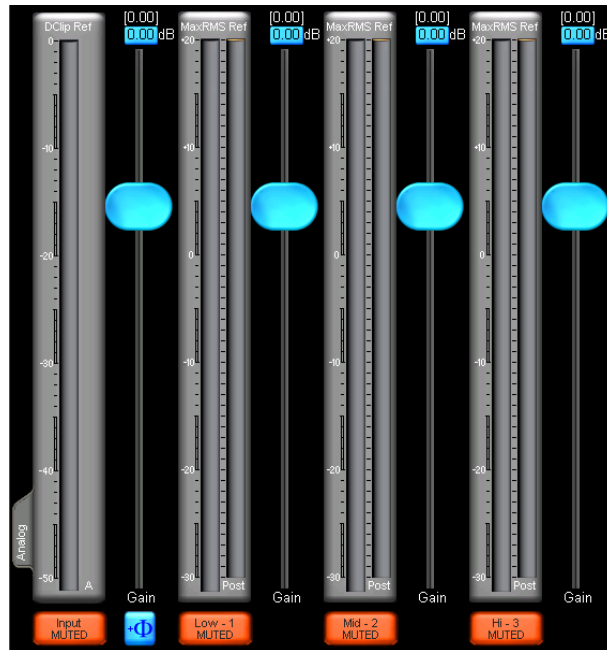


Figure 3-13

To unmute the input and outputs of module A:

1. Tap the red mute button labeled **Input MUTED**
2. Tap the **Low - 1**, **Mid - 2**, and **Hi - 3** mute buttons

NOTE: Output channels are unmuted in default module files, but muted on a factory reset frame.



Figure 3-14

3. Tap the **Home** button to view the module icon

The output mute indicators have now disappeared, and the input mute (the main circle graphic) is now blue (unmuted) as shown in Figure 3-15 below.



Figure 3-15

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

- Make large changes (1dB increments) by tapping and sliding the fader
 - Make small adjustments (0.1dB increments) by tapping and dragging above, below or to the left of each fader control
 - Adjust the gain to an exact value (0.01dB increments) by tapping the gain value directly (shown in Figure 3-16) and using the onscreen keyboard to enter the new value
4. Tap the input gain value (highlighted in blue at the top-left of the screen)
 5. Enter -3.75dB of gain and tap **OK**



Figure 3-16

The same principles apply to adjusting other levels (e.g. delays, limiters, etc.) throughout the Lake Controller software.

To view/update other types of levels, simply tap the required type of level from the button-bar (e.g. Delay, Limiter Max RMS, etc.). The faders and levels change to display the value of the selected level type. The meters continue to represent the gain levels for each channel.

3.3 EQ

There are two page tabs at the top of the screen: EQ and Levels. Tap the EQ tab to display the EQ controls for the module – parametric EQ is displayed by default.



Figure 3-17

Multiple EQ overlays are identified by tabs at the top-left of the display – a Contour 3-way module initially has one parametric (PEQ1) and one graphic (GEQ1) overlay, in addition to the XOVER screen. A Mesa EQ module has a tab labeled HPF/LPF instead of the XOVER tab.

The parametric overlay (PEQ) provides low-shelf, band-pass, Mesa and high-shelf filters (see following sections). The graphic overlay (GEQ) provides third-octave EQ controls. The Xover screen allows selection and adjustment of crossover filters, in addition to output EQ (Contour Only).

3.3.1 Graphic EQ

Tap the **GEQ2** 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 3-18

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.

NOTE: If Frequency Lock is OFF (blue), the frequency can also be selected and changed by directly tapping and dragging a yellow 'x' filter point.

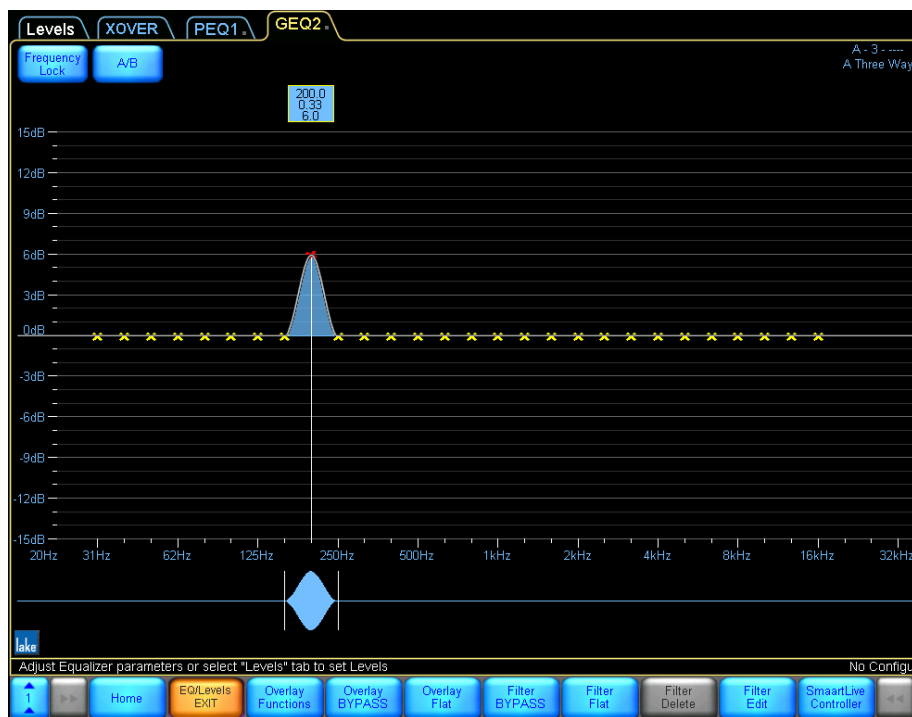


Figure 3-19

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 section 8.3 for further details.

3.3.2 Ideal Graphic EQ

A unique innovation of the Contour and Mesa EQ processors 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, 750, 1000, 1250, 1600 and 2000 Hz (top of Figure 3-20) produces the frequency response shown in the bottom of Figure 3-20.

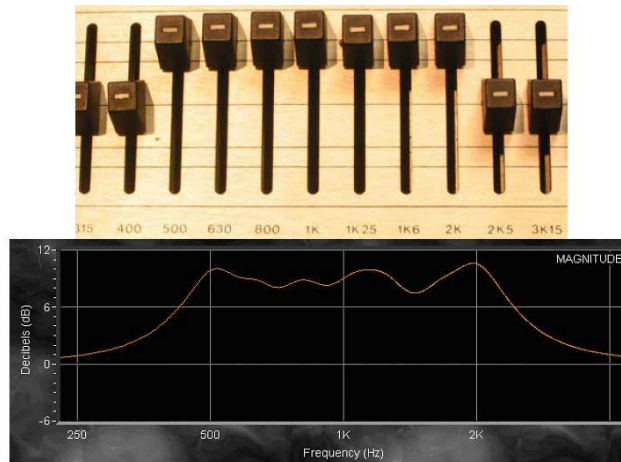


Figure 3-20

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

If we use the Contour or Mesa EQ to boost 6dB at 500, 750, 1000, 1250, 1600 and 2000 Hz (top of Figure 3-21), the frequency response is shown by the blue trace in the bottom of Figure 3-21. 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 up until the filter's gain parameter reads 6dB.
3. Perform these steps for each of the frequencies listed above.

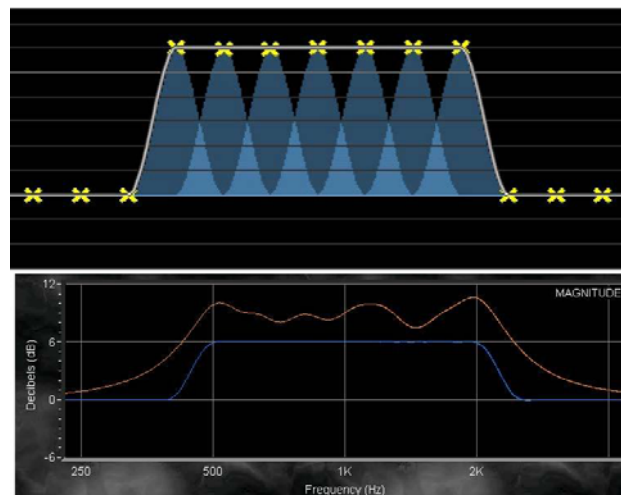


Figure 3-21

The blue trace in Figure 3-21 shows that the adjacent filters on a Contour or Mesa EQ sum to flat, unlike all previous graphic equalizer implementations.

The concept of an *EQ overlay* is another innovative Lake feature. Tap the PEQ1 tab at the top of the page. GEQ1 and PEQ1 are two different EQ overlays. The white line represents the composite response of all EQ overlays. It now shows the wide-band 6dB boost created in the GEQ1 tab.

3.3.3 Parametric EQ

Add a parametric filter to the PEQ1 overlay:

1. Tap the band-pass filter at top of the EQ display (orange in Figure 3-22).
2. Tap the screen near 125 Hz to insert the filter there.

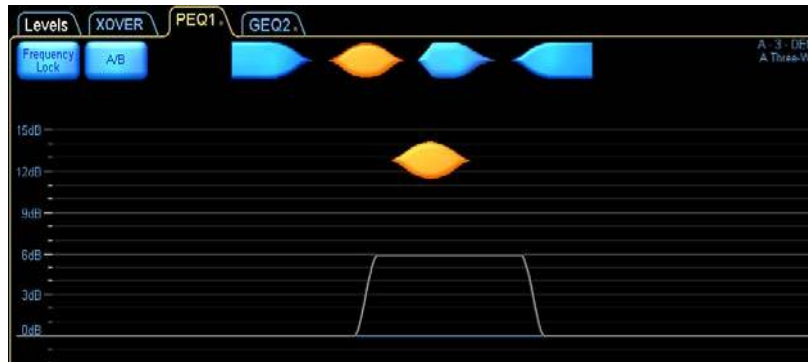


Figure 3-22

The band-pass filter tool is similar to Graphic EQ tool except the filter bandwidth is also adjustable. Tap and drag the red x up to boost the volume of this frequency:

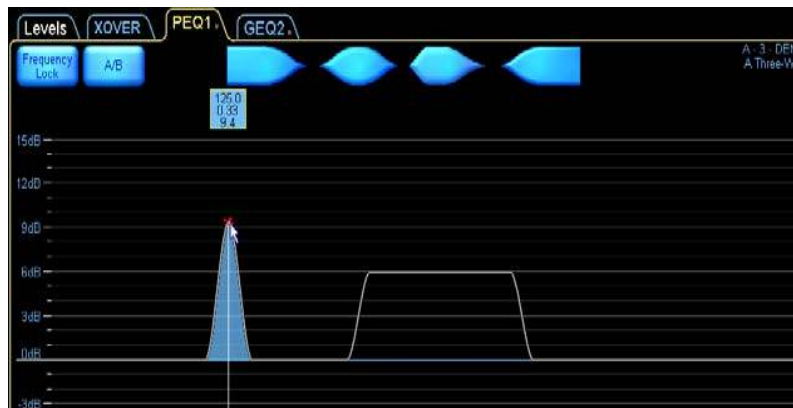


Figure 3-23

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

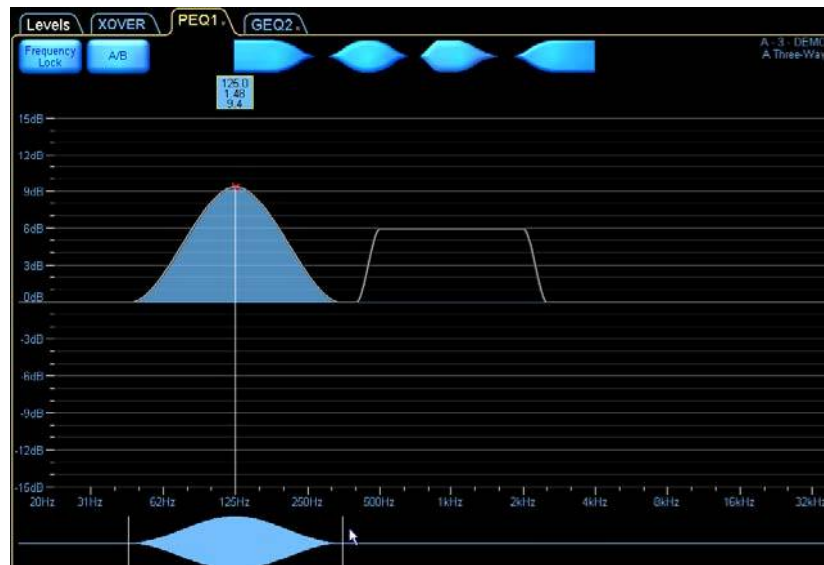


Figure 3-24

Change the center frequency of the band-pass filter by tapping and dragging inside the vertical divider lines of the EQ tool.

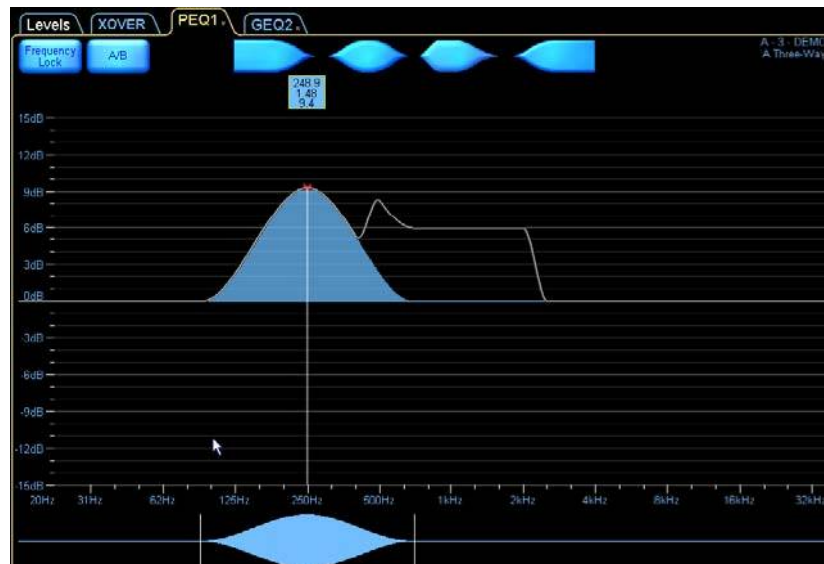


Figure 3-25

Drag the band-pass filter into the same frequency range as the GEQ1 filters to see the result of all the filters (the white composite line in Figure 3-25).

3.3.4 Add a New EQ Overlay

To add a new EQ overlay:

1. Tap the **Overlay Functions** button.
2. Tap **Overlay New**.

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

3.3.5 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 (Figure 3-26).
2. Tap the EQ display near the frequency you wish to insert the Mesa Filter.

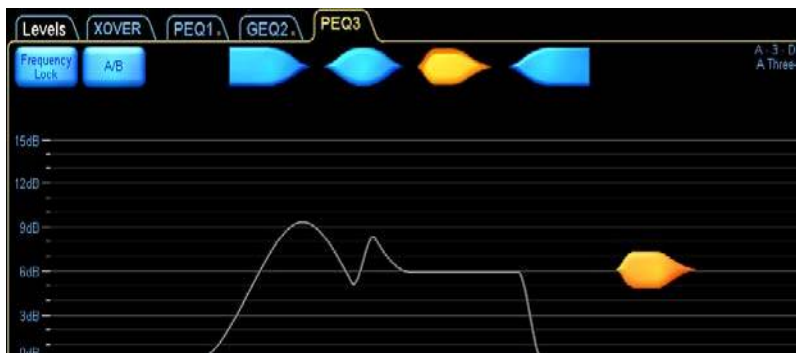


Figure 3-26

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

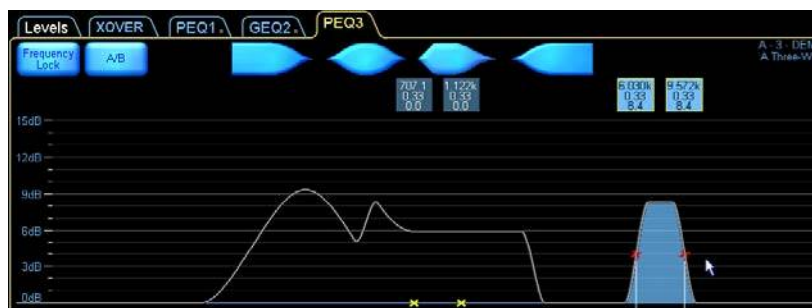


Figure 3-27

The Mesa Filter Tool has four dividing lines:

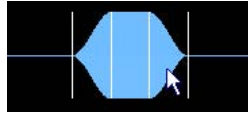


Figure 3-28

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.

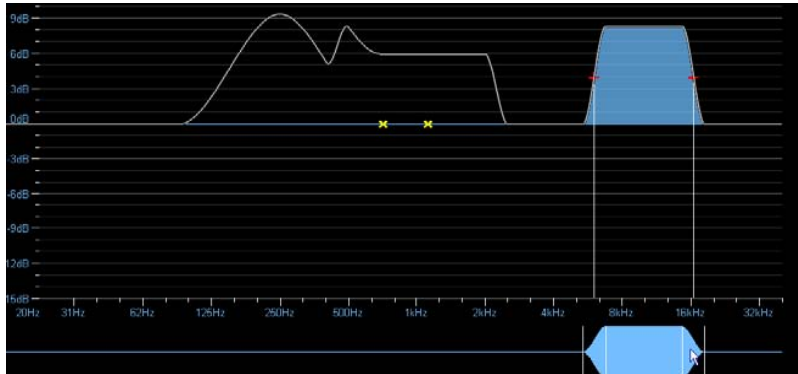


Figure 3-29

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



Figure 3-30

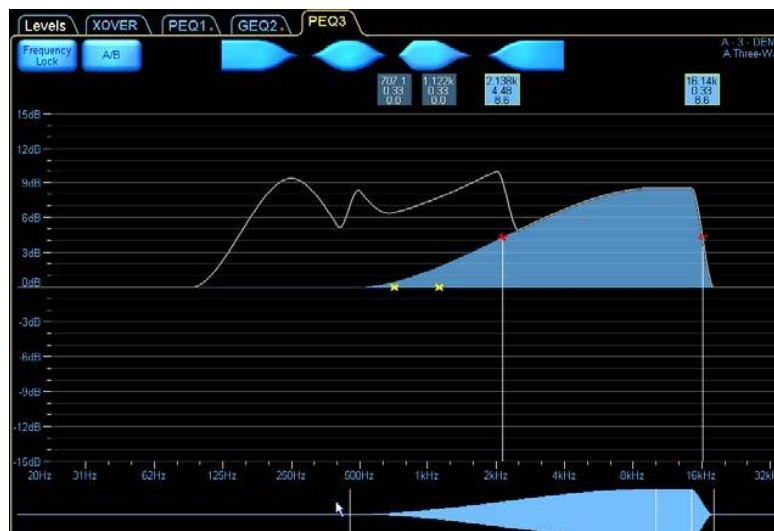


Figure 3-31

6. The same principle applies to the high frequency edge (right side).
7. Tap and drag between the center two divider lines to change the frequency

3.4 Crossovers

The Lake Controller, when used in conjunction with Contour processors allows real-time adjustments to crossovers through the XOVER screen, located under the EQ section.

Crossover frequency, type and post-crossover equalization can be adjusted. In the default 3-way configuration, the Contour has 24dB Linkwitz-Riley crossovers with center frequencies set at 250 Hz and 1.6 kHz.

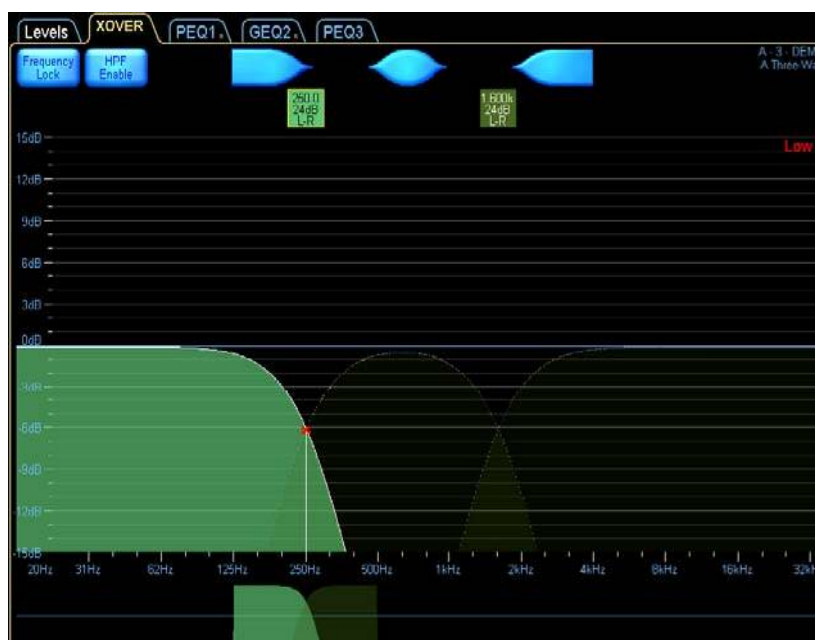


Figure 3-32

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 3-33

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

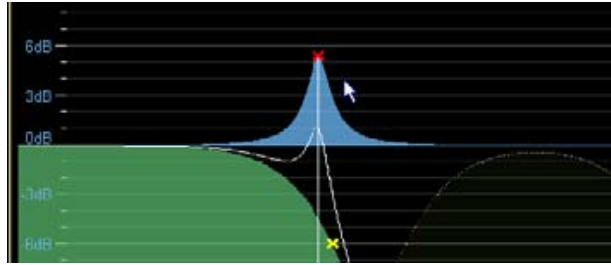


Figure 3-34

The full response of the band-pass 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 a crossover type:

1. Tap the 1.6kHz filter box to select that crossover
2. Tap **Crossover Select**
3. Select 48dB Linkwitz/Riley from the scrolling bar. Drag the scroll-bar left and right to display additional types
4. Tap **Crossover Select**
5. Tap **Yes** from the dialog to load the new crossover

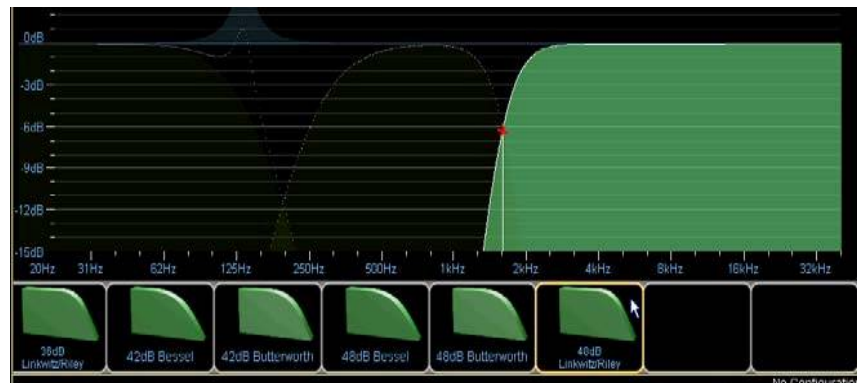


Figure 3-35

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.

NOTE: Loudspeaker Presets from various manufacturers are installed with the controller software – please refer to our online speaker preset archive for the latest configurations: www.lake.com

3.5 Groups

The Lake Controller allows grouping of multiple modules. This unique concept allows the EQ and Levels of multiple speaker controllers to be changed with a single adjustment, regardless of the speaker/crossover type. A 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:

- Limiter Max RMS Corner
- Limiter Time Constant
- Soft Clamp Corner
- Headroom/Amp Clip
- Control of output levels where the group contains modules of varying crossover type (e.g. 3- and 4-way modules assigned to the same group)

3.5.1 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 tap on the Main Page to add it to your configuration

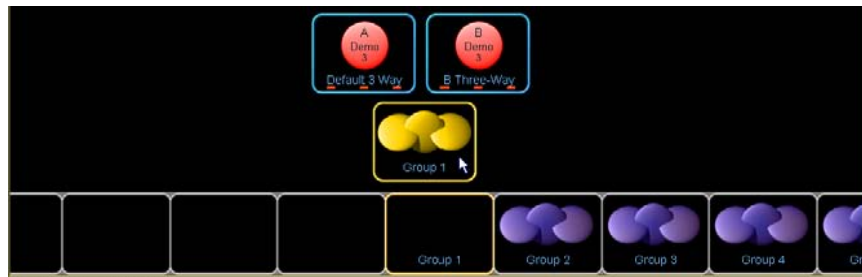


Figure 3-36

4. Tap the **Assign** button and tap the icons for modules A and B
Assigned modules are highlighted with a yellow border.

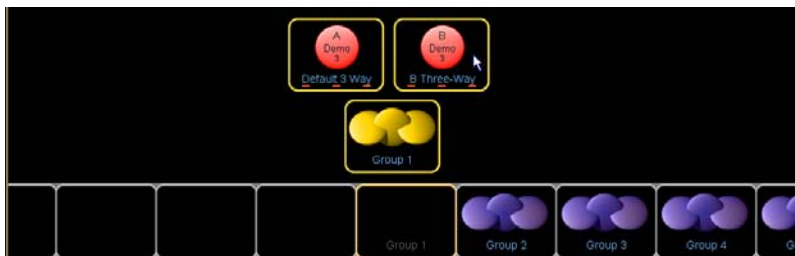


Figure 3-37

5. Tap the **Assign** button again to exit Assign mode
6. Tap **Groups Exit** or **Home** to return to the Main Page

3.5.2 Assigning Meters at Group Level

A group does not have its own input or output signals, and therefore it does not have meters. You can, however, assign a module's meters to represent the group.

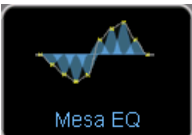
1. Tap Group 1 to see its parameters. By default, the group has one PEQ overlay, labeled with the group name (e.g. Group 1)
2. Tap the **Levels** tab and note that meters have yet to be assigned
3. Choose a module to represent the group's meters by tapping the **Meter Options** button, then the **Assign Meters** button to display the scroll-bar with modules that are members of the group
4. Tap the **A Three Way** module to associate the group's meters with that module
5. Tap **Meter Opts Exit** to exit

Meters are now available on the selected group. The top-right of the window shows the frame and module name of the module used for metering purposes.

NOTE: Group mute buttons appear orange if any member of the group has muted channel(s).

3.6 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:

File Type	Description
Contour Base Configuration File (.cbm)  Mesa EQ Base Configuration File (.mbm) 	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 the 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.
Contour Single Module File (.csm)  Mesa Single Module File (.msm) 	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), equalization (filters and EQ overlays).
Controller System Configuration File (.csm) 	This file stores/recalls all information contained within the Contour or Mesa single module files for each module on a given network, plus all group assignments and settings.

To continue with the example:

1. Tap the **Home** button.
2. Tap **System Store/Recall** to display the scroll-bar.
3. Tap the **New Store** button to display the onscreen 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 *Example* file to select it.
This activates the **Recall**, **Recall Compare**, and **Store** buttons.



Figure 3-39

Recall loads the file, **Recall Compare** allows a comparison between the data stored on file and the current system configuration, and **Store** overwrites the selected file with the current system configuration.

Module settings can also be saved to a file. The single module file stores everything about a particular module, including its EQ overlays and assigned groups. This file can be recalled into any module on the network.

To save the settings of a single module:

1. Tap the **Home** button, then tap **Modules**
2. Select the module **A Three Way**
3. Tap the **Module Store/Recall** button
4. Tap **File Utilities** then **New Folder**
5. Enter the folder name **Test** and tap **OK**
6. Tap **File Util Exit**
7. Tap **New Store**, name the file **A Three Way** then tap **OK**

3.7 Detailed Function Descriptions

Detailed descriptions of the all the main menu and sub menu functions and processes are listed in the following chapters.

Chapter 4: System Store and Recall

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

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 4-1

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 Lake 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.

4.1 Shortcut to Data/User Folder

Software installation of the Lake Controller places a shortcut in:

Start → Programs → Lake Controller → Lake Controller User Data Files

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

4.2 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.

It is labeled **Open** when a folder is selected. To open a folder:

1. Tap the desired folder icon (selection indicated by a yellow border)
2. Tap **Open** Double-tapping the folder icon also opens the folder

It is labeled **Recall** when a file is selected. To recall a System Configuration File:

1. Tap the desired file to recall
2. Tap **Recall**
3. Confirm the action by tapping the **YES** button on the warning message

NOTE: *Recalling a System Configuration file overwrites the current settings in the associated processors and will affect audio processing. System/Frame presets stored in the processors are not overwritten when a System Configuration is recalled from the controller.*

4.3 Recall Compare

The **Recall Compare** button enables the user to compare a system configuration file to the current system configuration stored in the processors. 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 will generally be used to help identify any changes that have been made since a file was loaded. Modules with altered data are identified by a red disc behind their normal icon (indicating the controller is *out of sync* with the processor).

NOTE: *Recall Compare does not overwrite any data in the processor(s). Audio will not be changed until you select to 'Use data in Controller' – refer to section 15.2.1 for information on the Out of Sync/Re-Sync process.*

4.4 Store

The **Store** button stores over an existing file. This button is active only when a file is selected.

1. Tap an existing file you wish to overwrite.
2. Tap **Store**
3. Confirm the action by tapping the **YES** button in the warning message

NOTE: *If the selected file is set to Read Only, this function is inactive (gray).*

4.5 New Store

The **New Store** button stores the current system 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 using the touch-screen or manual keyboard.
4. Tap **OK**.

The scroll-bar displays the new file.

4.6 File Utilities

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

4.6.1 Open

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

4.6.2 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 read only 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 *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).

4.6.3 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 touch-screen or manual keyboard.
4. Tap **OK**.

4.6.4 Delete

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

To delete a file or folder:

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

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

4.6.5 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 touch-screen or manual keyboard.
4. Tap **OK**.

4.7 System Presets

The **System Presets** function allows entire system configurations to be stored in a network of Lake Processors. This enables fast retrieval and switching of configurations as there is minimal data being sent between the controller and processors.



Figure 4-2

Six **System Presets** can be stored in each processor, and retrieved either via the controller software (described in this section), or via the front panel of the processor (please refer to section 5.6.6 for further details).

4.7.1 Storing a System Preset in Multiple Processors

To store the current system configuration in multiple processors:

1. Setup the configuration as required
2. From Home, tap **System Store/Recall** then tap **Store**

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**
4. Tap the group/module icons that you wish to be stored as part of the system preset (icons turn green to indicate selection)

For example, if you wish for ALL frames in your current 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 4-3. To deselect a frame or group, tap the icon again.

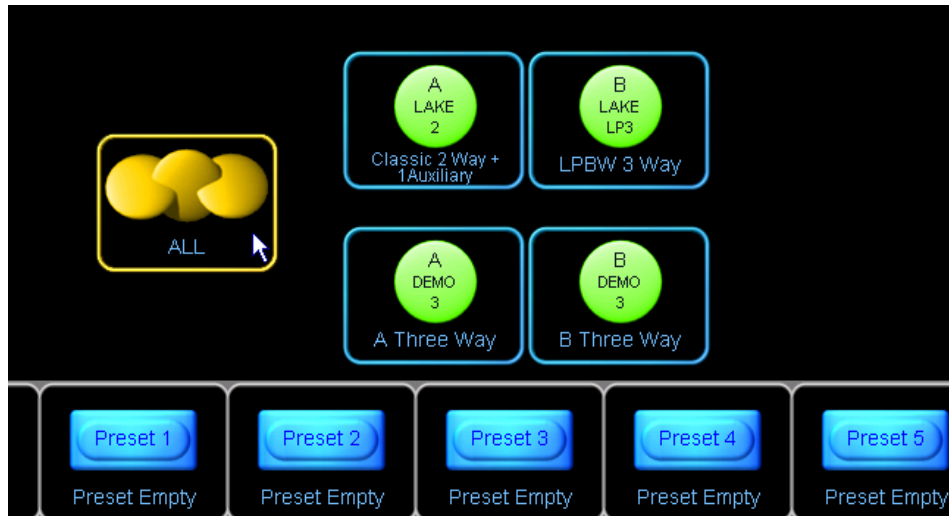


Figure 4-3

5. Tap an empty preset location from the scroll-bar (e.g. 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 a manual keyboard and tap **OK**

4.7.2 Recalling a System Preset into Multiple Processors

To recall a system preset into multiple processors:

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 the required preset on the scroll-bar
4. Tap **Recall** and **OK** to the warning messages

The audio will change quickly, but the controller will not re-sync with the network until you exit the System Preset menu. A flashing warning message confirms this as shown in Figure 4-4.

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



Figure 4-4

The **System Configuration Name** of the preset last recalled will flash at the bottom-right of the screen

5. 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 loaded into the processors.

NOTE: Individual frame presets can also be recalled from the front panel of each processor as described in section.5.6.6

4.7.3 Quick System Preset Recall and Comparison

The **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** (active = orange, inactive = blue)
4. Tap a preset location from the scroll-bar
5. Repeat step 4 to compare with other system presets

NOTE: No confirmation or warning messages are displayed while in Quick Recall mode – tapping the preset location will immediately load the selected system preset into all selected frames.

4.7.4 Storing over an Existing Preset

Follow the steps shown in section 4.7.1, 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.

4.7.5 Clearing a Preset Location

To clear a System Preset location from multiple processors:

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

4.7.6 Preset Mismatch

If one or more of the selected frames contains a different configuration in a particular preset location, **Preset Mismatch** will be displayed as the name for that System Preset location.

A mismatch occurs if different configurations are stored separately in different processors, and these processors 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 currently loaded 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.

Chapter 5: Modules

From the **Home** menu, tap **Modules**. The modules menu and scroll-bar appear (Figure 5-1). The scroll-bar shows all processors connected to the network.



Figure 5-1

The scroll-bar in Figure 5-1 displays (from left to right):

- A dummy module that is always present; this can be used for creating entire systems while working off-line.
- Two modules of a Contour processor (labeled *Demo*) that are already being used in the current system configuration.
- Two modules of a Contour processor available for use.

NOTE: Mesa EQ processors appear as four module icons as shown in Figure 5-2.



Figure 5-2

If many processors 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.

Refer to Chapter 3: Quickstart Tutorial for examples on using the functions listed below.

5.1 Shortcut to Data/User Folder

Software installation of the Lake Controller places a shortcut in:

Start → Programs → Lake Controller → Lake Controller User Data Files

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

5.2 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, refer to Chapter 8: EQ, Levels, Xover, HPF & LPF

5.3 Properties

The interactive Properties page provides technical information on the selected processor. It can also be used to view/edit the input switch status, provides stereo linking for output EQ and can be used to directly navigate to the Levels/EQ and Crossover sections of the system.

NOTE: After using the interactive Properties page to access EQ/Levels/Crossover, the **EQ/Levels Exit** button returns you to the properties page instead of **Home**.

To view the Properties page:

1. From **Home** access the modules menu.
2. Select a module icon in the work-area and tap **Properties**. The **Properties** button is active only when a module is selected in the work-area.

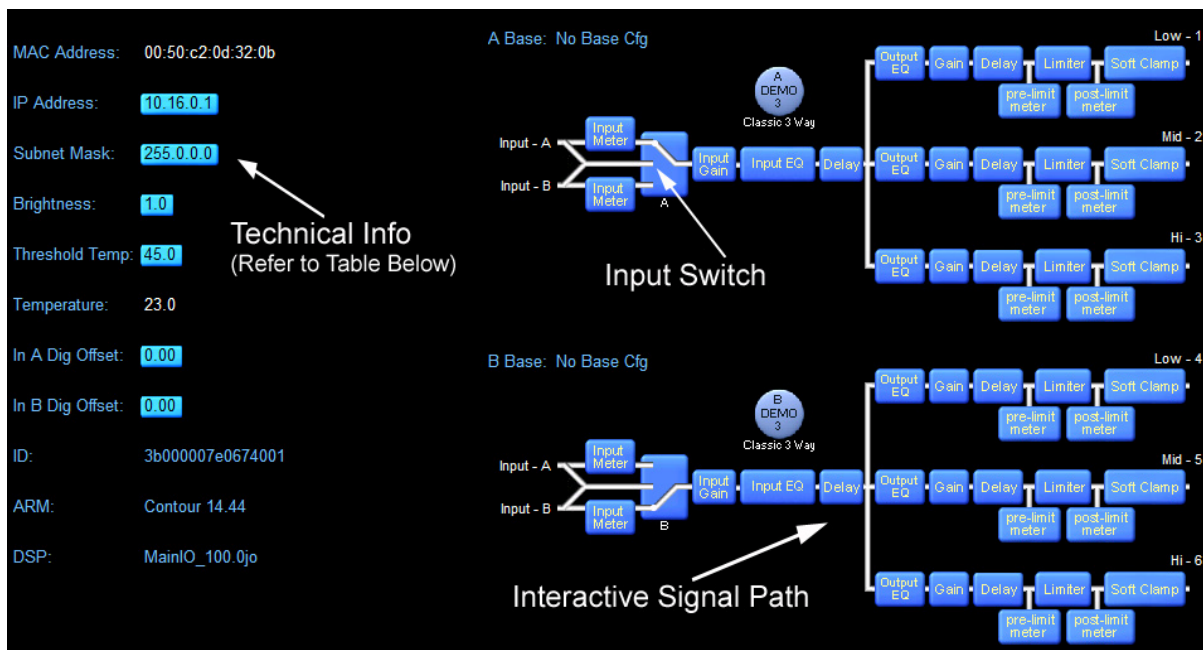


Figure 5-3

The information listed on the left side of the screen is explained in Table 5-1.

MAC Address	The Media Access Control Address is the unique Ethernet address of the selected processor.
IP Address	The Internet Protocol Address identifies which processor is sending or receiving information.
Subnet Mask	The Subnet Mask is used for IP Address routing and is fixed at 255.0.0.0
Brightness	This user-definable value between 0.1 (dim) and 1.0 (bright) adjusts the brightness of all front panel LEDs with the exception of the power LED (PWR). Brightness is adjustable in Designer Mode only - refer to the Lake Controller Designer Mode Manual for further details)
Threshold Temp	This user-definable value determines the temperature at which the fan switches to a high setting. The fan remains on the high setting until the temperature falls 5°C below this value. (Adjustable in Designer Mode only - refer to the Lake Controller Designer Mode Manual for further details)
Temperature	Displays the current temperature inside the processor.
ID	Each Lake processor has a unique identifier that cannot be changed. The controller software uses this identifier for communication purposes.
ARM	Displays the firmware version of the ARM Code used by the microprocessor responsible for starting the processor.
DSP	Displays the firmware version of the code used by both DSPs that control the audio signals.

Table 5-1

5.3.1 Contour Input Switching

The Lake Controller allows the selection of any combination of Contour inputs A and B as the source signal. To change the input used as the source signal, tap the Input Switch:

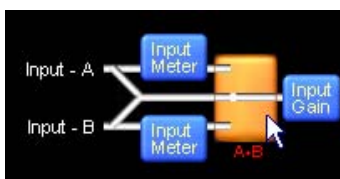


Figure 5-4

The input selector toggles between Input A, Input A+B and Input B.

The ***Classic and Linear Phase 2-way + 1 Auxiliary*** module types both provide further input switching options for the auxiliary channel as shown below:

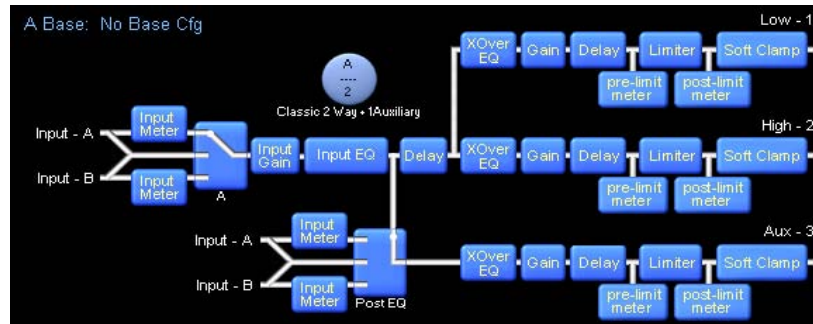


Figure 5-5

These module types provide a separate input selector for the auxiliary channel. This allows the auxiliary channel to be sourced from a signal independent of the 2-way, or from the same post-input EQ signal. (i.e. The parametric (PEQ) and graphic (GEQ) overlays for the 2-way section also affect the auxiliary channel when the input switch is set as shown in Figure 5-5)

5.3.2 Mesa EQ Input Gain Mixer

The Lake Controller allows any of the four Mesa EQ inputs to be mapped to any output of the same Mesa EQ processor. The gain of each input can be set independently for each output.

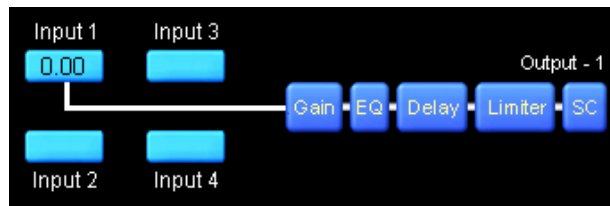


Figure 5-6

By default, Input 1 is mapped to Output1, and Input 2 to Output 2 etc. as shown in Figure 5-6. To change the input to output configuration, or to change the input gain:

From the Module **Properties** page

1. Ensure the inputs are unmuted (blue) on the button-bar
Input to output switching is disabled for muted inputs.
2. Tap the relevant input gain value
3. Enter a gain value using the on-screen keyboard, or a manual keyboard

Entering '0' (zero) connects an input at the full-scale input signal (a positive or negative value will adjust the input signal as specified independently for the selected output).

Tapping the [OFF] button on the on-screen keyboard disconnects the input from the selected output.

NOTE: Mesa Input Gain Mixer settings are stored in system configuration files, module files and in frame/system presets. Input mixer configurations are **not** stored or recalled in base configuration files. The input mixer configuration **will** be transferred during a frame replace (or module replace for dummy modules).

Any module file stored with default input mixer settings will automatically match the input to output numerically when loaded into another module. i.e. If a module file was stored from Module A (with the default setting of Input 1 at 0dB connected to Output1) then recalled into Module C – Input3 would be set as the default input at 0dB.

5.3.3 Input Mutes (Mesa EQ only)

The input mute buttons for Mesa EQ processors are located on the button-bar of the module properties page for Mesa EQ. Muting an input will stop the signal from passing to all connected outputs as defined by the input mixer, described in section 5.3.2.

NOTE: The input gain mixer cannot be configured when inputs are muted.

5.3.4 Interactive Signal Path Block Diagram

The signal path of each module is shown in graphical form on the right of the screen as shown in Figure 5-5 and Figure 5-6 above. Each of the blue blocks (except for the meter blocks) can be selected to navigate directly to the associated EQ/Levels or Crossover/Aux/HPF/LPF screens.

To return to the Properties page tap **EQ/Levels EXIT**.

5.3.5 Digital Offset

All Mesa EQ processors, and Contour processors fitted with a digital input provide the ability to offset the digital input gain to compensate for differences between digital and analog input.

Mesa EQ digital offset values are located next to each input mixer, and Contour digital offset values are located to the left of the screen. These values represent the amount of gain increase or reduction that will be applied to the digital input signal.

As the levels of digital and analog signal vary, the digital 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 **Input Autoselect** to provide an automatic analog backup to the digital signal path.

To change the digital offset for an input, tap the value that you wish to change and enter a new value using the on-screen or manual keyboard.

5.3.6 Input 1/2 Select and Input 3/4 Select (Mesa EQ only)

The Mesa EQ processor has two pairs of AES/EBU stereo inputs that can be independently set to accept analog or digital input. The input options described in the following sections are available on sub-menus **Input 1/2 Select** and **Input 3/4 Select**.

5.3.7 Input Autoselect

Contour and Mesa EQ Processors fitted with digital inputs offer the option of analog only or digital and analog inputs. By default, the processors automatically select which input is being used.

When active (orange) the **Input Autoselect** function detects and locks a digital input signal, or uses the analog input signal if a digital signal cannot be detected.

The table below summarizes the available input selections and the associated output signals available.

Controller Input Selection Status	Signals	Signal Used	Analog Output?	Digital Output?
Input Autoselect	Digital Only	Digital	Yes	Yes
	Analog Only	Analog	Yes	No
	Dig + Analog*	Digital*	Yes*	Yes*
Digital Input	Digital Only	Digital	Yes	Yes
	Analog Only	None	No	No
Analog Input	Digital Only	None	No	No
	Analog Only	Analog	Yes	Yes

NOTE: *If digital signal is lost while in **Input Autoselect** mode, the processor will switch to use analog input. Analog output will continue (using the analog input source), although **DIGITAL OUTPUT WILL CEASE**.

5.3.8 Analog Input

This button will be active only if both digital and analog inputs are available on the selected processor.

When selected (orange), this function effectively disables the digital input, locking the input source to the analog inputs and providing both digital and analog output.

5.3.9 Digital Input

This button will be active only if both digital and analog inputs are available on the selected processor.

When selected (orange), this function effectively disables the analog inputs, locking the input source to the digital input and providing both digital and analog output.

5.3.10 Dig Out 96kHz

This button will be active only if both digital and analog inputs are available on the selected processor, and the **Analog Input** option is selected (forced analog input). When active (orange), this button locks the sample rate of the digital output to 96kHz.

5.3.11 Dig Out 48kHz

This button will be active only if both digital and analog inputs are available on the selected processor, and the **Analog Input** option is selected (forced analog input). When active (orange), this button locks the sample rate of the digital output to 48kHz.

5.3.12 Factory Reset

The table below describes the various ways to return a processor to a default state for each processor type along with the results.

Contour	Mesa EQ	Results
Factory Reset via Lake Controller Module Properties page		Resets all data EXCEPT any Frame/System Presets and the IP Address
Holding output mute buttons 1+4 on the Contour front panel while turning the power on	Holding channel 2 input mute button and channel 3 output mute button on the Mesa EQ front panel while turning the power on	Resets all data EXCEPT any Frame/System Presets and the IP Address
Holding output mute buttons 1+5 on the Contour front	Holding channel 2 input mute button and channel 4 input mute button on the Mesa EQ	Resets all data INCLUDING any Frame/System Presets and the IP Address

panel while turning the power on	front panel while turning the power on	
---	--	--

For further details, please refer to Front Panel Shortcuts at the end of the document

5.4 Label & Lock

From the **Modules** menu, tap **Label & Lock** to view a sub-menu with functions to label a module or frame and allow a system designer to lock module and base configurations.

5.4.1 Label Module

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**

5.4.2 Label Frame

The **Frame Label** is a four-character user-defined value that appears in the center of the module icon and on the front panel of the processor. The **Frame Label** allows the module icons to be referenced to the physical processor.

To label a frame:

1. Tap either module of the frame you wish to label.
A yellow border indicates selection.
2. Tap **Frame Label**.
3. Enter a four-character frame name keyboard and tap **OK**.

NOTE: When a frame consists of two modules (i.e. 2- and 3-way modules), naming one of them automatically updates the other module icon with the new Label.

5.4.3 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 details on these functions, refer to the Lake Controller Designer Mode Manual.

5.5 Copy/Paste/Replace

From the **Modules** menu, tap the **Copy/Paste/Replace** button to view a sub-menu that allows the transferring of data between modules. This enables fast and easy setup of multiple speakers of the same type and configuration. The **Replace** function allows you to assign a different physical processor to perform the task of a selected processor (i.e. to swap data from one processor to another).

5.5.1 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.
A yellow border indicates selection.
2. Tap **Copy**

5.5.2 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 to paste the data to.
A yellow border indicates selection
2. Tap **Paste**

NOTE: You cannot paste data to a module that currently has a different module type if the destination module is currently assigned to a group. To change the destination module's module type by continuing with the paste function, you must first de-assign the module from the group (refer to Chapter 9: Groups). A Mesa EQ module cannot be pasted into a Contour module and vice versa.

5.5.3 Replace Frame / Replace Module

The **Replace** function allows transfer of module/group data between processors. If a previously used processor is not available, or you wish to change which unit performs which task, 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 NOTE: Dummy modules are replaced separately (Replace Module)
3. Tap **Replace Frame** (or **Replace Module** if a dummy module is selected)
The module scroll-bar appears displaying used and available modules
4. Tap an available Module icon on the scrollbar and tap **Complete Replace**.
To locate a particular processor, tap the **SEL** button on the front panel to center that unit on the scroll-bar.

NOTE: A module/frame can only be replaced with a module/frame that is not currently in the work-area (i.e. It must be on the module scroll-bar). A Mesa EQ frame cannot be replaced with a Contour frame and vice-versa.

5.5.4 Complete Replace

This button completes the **Replace Frame/Module** function. This function is active only when the **Replace** button is selected and a destination module has been selected from the module scroll-bar. Unless a dummy module is selected, both modules in the work-area are returned to the scroll-bar and those previously on the scroll-bar are loaded with the data from the source frame and become part of the system configuration.

5.5.5 Remove

Tap **Remove** to delete the selected module from the current system configuration. The module icon will appear back on the scroll-bar indicating it is available for use. To remove a module from the current system, tap the module icon from the **Modules** menu and 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.

HINT: You can also remove a module by dragging the icon to the module scroll-bar when in the modules menu.

NOTE: No warning message is displayed unless the selected module is assigned to a group. In this instance, removing the module from the work-area de-assigns the module from all groups it is currently assigned to (refer to Chapter 9: Groups).

5.6 Module Store/Recall

Tap the **Module Store/Recall** button to view a sub-menu containing functions that load and save module and base configurations, and to store frame presets. The button-bar displays the following options and a scroll-bar with files and folders.

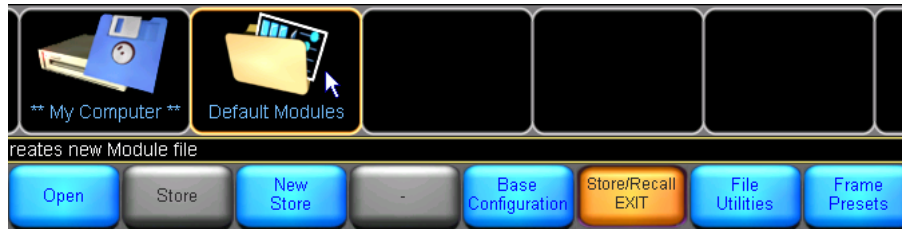


Figure 5-7

NOTE: Only relevant module file types are displayed, dependant on the module type selected. (i.e. Contour module files are displayed on the scroll-bar when a Contour module is selected in the work-area. Mesa EQ module files are displayed when a Mesa EQ module is selected in the work-area) Folders are always displayed, irrelevant of the module type selected in the work-area, and irrelevant of the folder content.

5.6.1 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**.

NOTE: 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 the **YES** button in the warning message.

NOTE: Recalling a Module file overwrites all data currently stored in the selected Module and de-assigns the Module from any Groups (refer to Chapter 9:Groups).



Figure 5-8

5.6.2 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

NOTE: *If the selected file is set to Read Only, this function is gray (inactive).*

5.6.3 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 using the touch-screen or manual keyboard.
4. Tap **OK**. The scroll-bar displays the new file.

5.6.4 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 and Levels settings for an existing module (and Crossover settings for Contour) may be saved as a base configuration for future use when configuring new modules. A system designer can also lock access to the XOVER screen (Contour) or HPF/LPF screen (Mesa EQ) within the base configuration file. For details on this function, refer to the *Lake Controller Designer Mode Manual*.

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/Recall a base configuration File:

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

NOTE: *A base configuration file cannot be stored from a dummy module. For further information on dummy modules, refer to section 14.3.1*

5.6.5 File Utilities

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

Open

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

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 *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).

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**.

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.

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

New Folder

This button creates a new folder in the current directory:

1. Navigate to desired directory to locate the new folder
2. Tap **New Folder**
3. Enter the folder name using the touch-screen or manual keyboard and tap **OK**

For further information regarding file/folder management, refer to the *Lake Controller Designer Mode Manual*.

5.6.6 Frame Presets

A maximum of six frame configurations can be stored in the processor. These settings can be activated instantly using the front-panel, without the use of the Lake Controller software.

The **Frame Presets** button provides a sub-menu containing the following functions:

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 (e.g. overwriting an existing preset).

To overwrite the settings of the frame preset:

1. Load or configure both modules of the frame with 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**

Store With New Name

This button is active only when a module of an on-line 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.

Clear

This button is active only when a module of an online frame is selected and a non-empty preset location is selected. To delete the data in a preset location:

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

Recalling Frame Presets

The processor's front panel can be used to view the **Frame Preset** name and to recall the settings of the preset. Follow the tutorial below to access preset mode, view preset names, recall a preset and exit preset mode.

NOTE: Certain hardware factory resets will delete all preset data stored in the processor. Please refer to section 5.3.12 for further information.

Store a Frame Preset:

1. Configure both modules of an online frame and store in preset location 1

Access Preset Mode using the Processor front panel:

2. Hold down the SEL button (A), then press mute button 1 (B) and mute button 6 (C) together as shown in Figure 5-9 below.

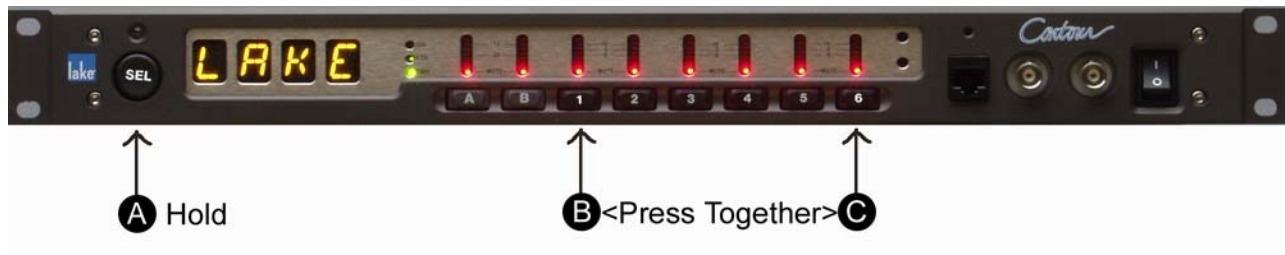


Figure 5-9

The front panel display will change to read 'PRST' as shown below:



Figure 5-10

NOTE: For Mesa EQ processors, the button locations are in the same physical position, but are labeled differently: (A)=SEL; (B)=Channel 2 Input Mute; (C)=Channel 4 Output Mute

View the Preset Name:

3. Hold down the output mute button of the corresponding preset location (e.g., hold down mute button 1 to view name of Preset 1).

The name will scroll across the 4-character display.

Recall Preset 1:

4. Hold down the output mute button that represents the preset you wish to recall (e.g., output 1, identified as (Y) below)

5. Tap either input mute (X) to recall the preset

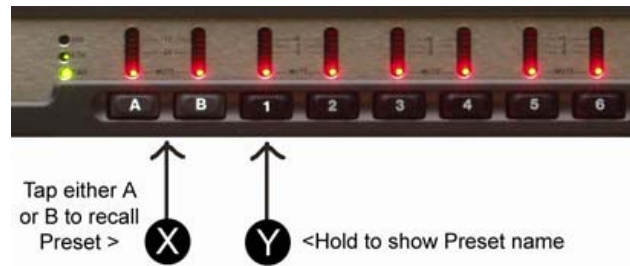


Figure 5-11

Exit Preset Mode:

6. Hold down the SEL button (A), then press mute button 1 (B) and mute button 6 (C) together as shown in Figure 5-9. Release all buttons to return to normal operating mode.

5.7 Add Page

The Add Page function is always available from the modules menu and creates additional Pages that help manage large systems with many module and group icons.

Refer to **Chapter 13: Pages** for further information.

Chapter 6: Contour Module Types

6.1 Overview

The Contour processor provides two distinct categories of crossovers. **Classic** Bessel, Butterworth and Linkwitz/Riley crossovers are available with roll-off ranging from 6dB/octave to 48dB/octave. Additionally, the Contour processor provides unique **Linear Phase Brick Wall** crossovers providing zero phase shift with steep crossovers.

The Contour Processor can be configured in various ways to maximize the use of the two inputs and six outputs as described in this chapter. Auxiliary Outputs initially provide full bandwidth signal, which can be configured using HPF/LPF filters and output specific EQ.

For Digital Units, all module types accept the Digital Input signal, and the **Stereo Insert** provides stereo Digital In/Out with independent EQ/Levels per channel.

The default configurations are located under the folder labeled *Default Modules*, which are loaded using the **Module Store/Recall** menu. Refer to section 5.6 for further information.

NOTE: The default input/output signal paths are shown in this chapter. These can be changed as desired using the input switch – refer to section 5.3.1 for further details.

6.2 Module Type Abbreviations

The table below describes the abbreviations used on the module icon (refer to Figure 3-6 in section 3.2)

Module Type Icon Abbreviation	Module Type Description
1	1 Auxiliary Output (Module B only where module A contains a Classic 5-Way)
2	Classic 2-Way + 1 Auxiliary Output OR Classic 2-Way / 2-Auxiliary Outputs on module B where module A contains a Classic 4-Way
LP2	Linear Phase Brick Wall 2-Way + 1 Classic Auxiliary Output
3	Classic 3-Way OR 3 Auxiliary Outputs
LP3	Linear Phase Brick Wall 3-Way
4	Classic 4-Way OR 4 Auxiliary Outputs (module A only)
LP4	Linear Phase Brick Wall 4-Way (uses both module A and module B)
5	Classic 5-Way OR 5 Auxiliary Outputs (module A only)
6	Classic 6-Way OR 6 Auxiliary Outputs (uses both module A and module B)
Ins	Stereo Insert module – provides Stereo Digital Input/Output (Digital Units) or Stereo Analog Input/Output (Analog Units)

Table 6-1

6.3 Stereo Insert (includes Digital Output)

The **Stereo Insert** module provides two inputs and outputs for either digital or analog configurations. Each channel has a dedicated Digital Signal Processor providing independent parametric and graphic EQ functions.

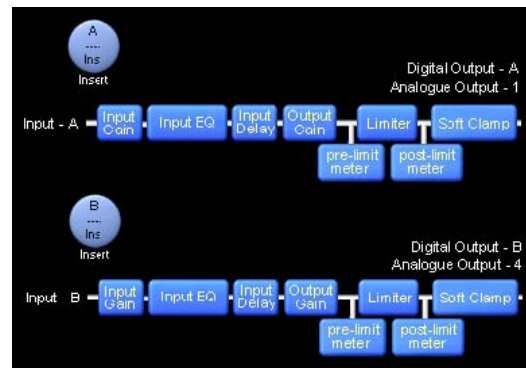


Figure 6-1

NOTE: The Stereo Insert module is automatically loaded into both modules of a frame.

Digital Insert Module

When loaded into Contour processors fitted with a 5-pin digital input/output, the **Stereo Insert** module provides input/output configurations as specified below.

Input Status	Output Status
1. Input Autoselect (Digital Signal)	Analog Outputs – via OUT1 (Left) and OUT4 (Right) and simultaneous Digital Output with the sample rate locked to the Digital Input signal
2. Input Autoselect (Analog Signal)	Analog Outputs ONLY – via OUT1 (Left) and OUT4 (Right)
3. Analog Input (Digital Disabled)	Analog Outputs – via OUT1 (Left) and OUT4 (Right) and simultaneous Digital Output manually configurable to 48kHz or 96kHz
4. Digital Input (Analog Disabled)	Analog Outputs – via OUT1 (Left) and OUT4 (Right) and simultaneous Digital Output with the sample rate locked to the Digital Input signal

Table 6-2

Analog Insert Module

For Analog only processors, the Stereo Insert module can only be operated as described by configuration 2 in Table 6-2

NOTE: Contour Processors containing a digital input only (3-pin) can use the Stereo Insert module with either digital or analog input, and analog output via channels 1 and 4.

6.4 Classic Crossovers / Auxiliary Outputs

This section describes the available combinations of classic crossovers and shows the default signal path for each configuration.

Classic 2-Way, 3-Way and 3-Auxiliary modules may be used in any combination on either module of a Contour Processor. Linear Phase 2-Way and 3-Way modules may also be loaded in any combination with these classic crossover modules.

Classic 4-Way, 5-Way and 6-Way modules can only be loaded into module A. The remaining outputs on the Classic 4-Way can be configured to provide a Classic 2-Way or 2-Auxiliary outputs; the spare channel on the 5-Way provides a single auxiliary output.

6.4.1 Stereo Classic 2-Way (+ Auxiliary Channels)

The Classic 2-Way module provides an additional auxiliary channel on output 3 (module A) and output 6 (module B). The 2-Way crossovers operate from output 1+2 (module A) and output 3+4 (module B).

By default, outputs 1-3 receive the signal from input A and outputs 4-6 receive the signal from input B, and the auxiliary channel for each module is post-EQ and post-High Pass.

If you switch an auxiliary channel to receive input A, B or A+B directly, the auxiliary channel will no longer be muted by the module's input mute control. The auxiliary channel may be muted by the channel's output mute control.

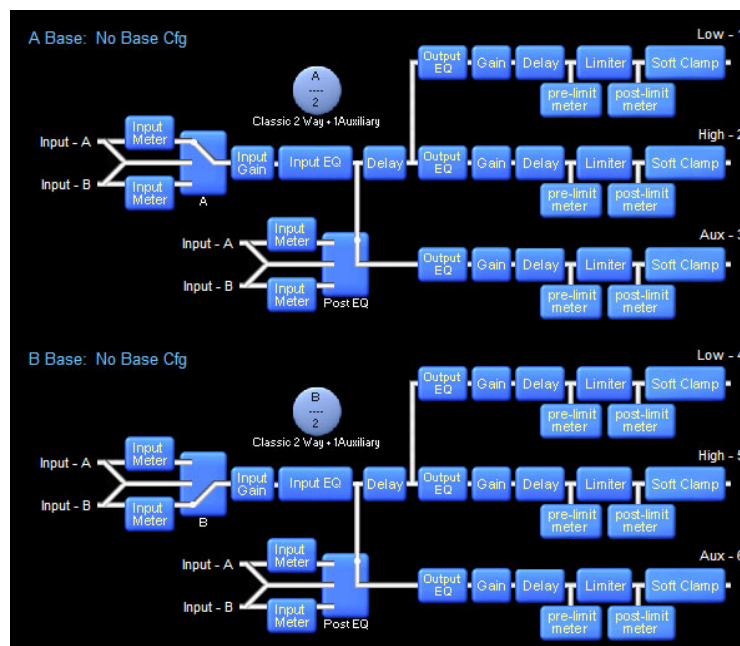


Figure 6-2

NOTE: The Classic/Linear Phase 2-Way (+1 Aux), Classic/Linear Phase 3-Way and Classic 3-Auxiliary Outputs modules can be used in any combination on modules A & B

6.4.2 Classic 3-Way / 3 Auxiliary Outputs

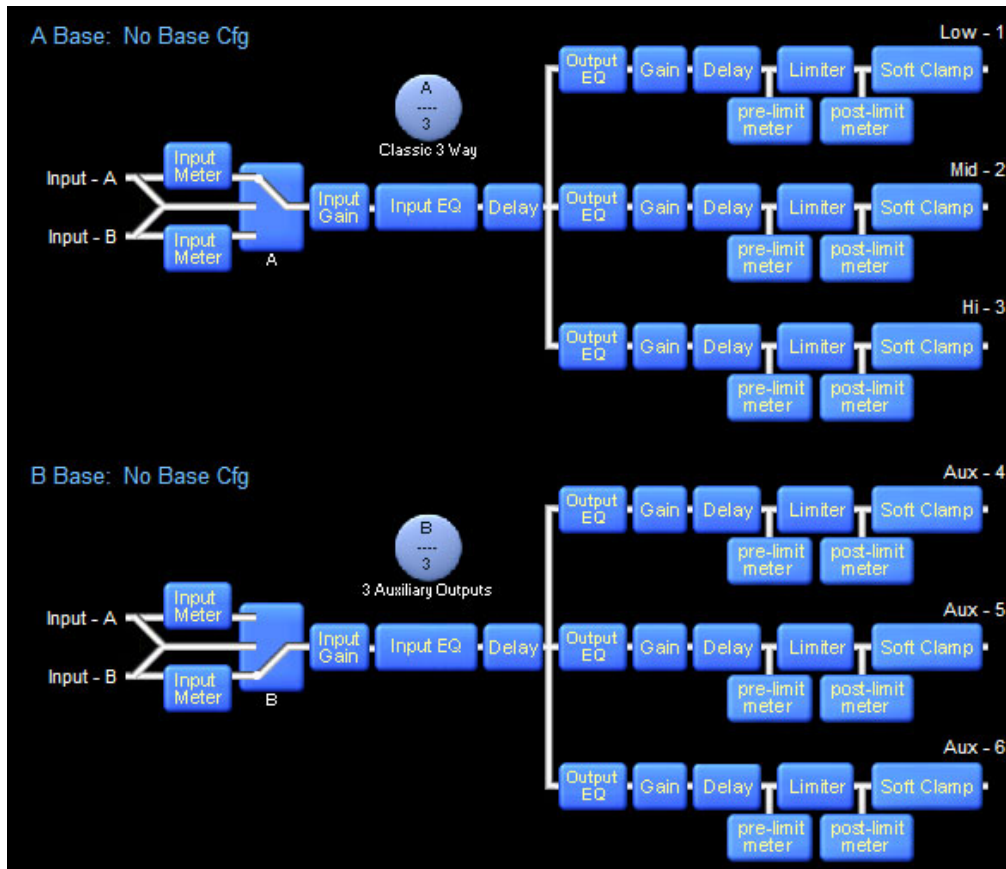


Figure 6-3

The signal paths for both these modules look similar, but the *Classic 3-Way* (shown in Module A here) 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.

By default, module A (output 1-3) receives signal from input A and module B (output 4-6) receives signal from input B.

NOTE: The *Classic/Linear Phase 2-Way (+1 Aux)*, *Classic/Linear Phase 3-Way* and *Classic 3-Auxiliary Outputs* modules can be used in any combination on modules A & B

6.4.3 Classic 4-Way / 4 Aux (with Classic 2-Way / 2-Aux)

The *Classic 4-Way* or *4 Auxiliary Outputs* modules allow the remaining two output channels to be configured as either a *Classic 2-Way* or *2-Auxiliary Outputs*.

By default, the 4-Way signal is sourced from input A, and the 2-Way / 2-Aux signal is sourced from input B. The input to output signal path can be configured as required using the input selector switches on the properties page.

Separate input EQ (PEQ/GEQ) is available for the *Classic 4-Way / 4-Aux* and the *2-Way / 2-Aux* modules.

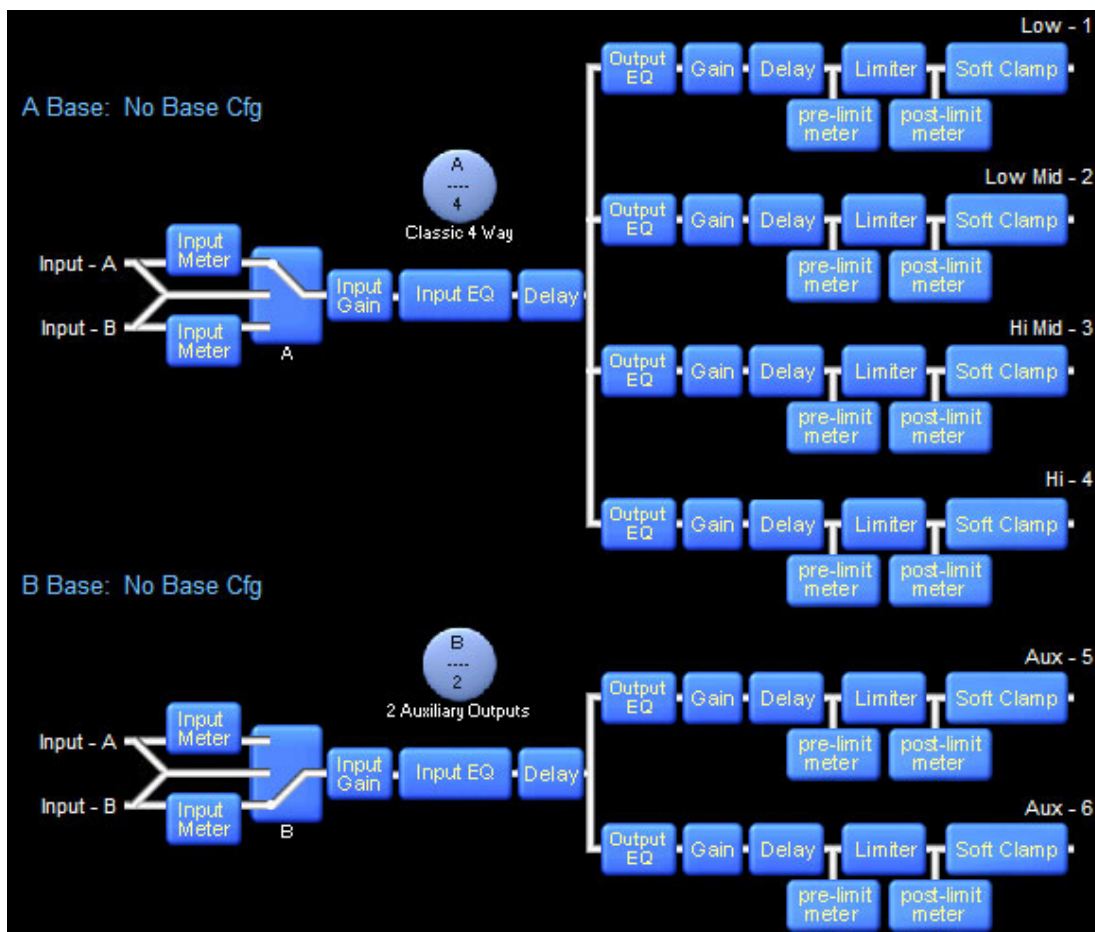


Figure 6-4

6.4.4 Classic 5-Way / 5-Aux (with additional 1-Auxiliary Output)

The *Classic 5-Way* or *5 Auxiliary Outputs* module provides an auxiliary channel on output 6. By default, the signal from input A is directed to the 5-Way/5-Aux (outputs 1-5) and the signal from input B is directed to the *1 Auxiliary Output* module (output 6). This configuration can be changed using the input selector switches.

Separate input EQ (PEQ/GEQ) is available for the *Classic 5-Way / 5-Aux* and the *1-Auxiliary Output* modules.

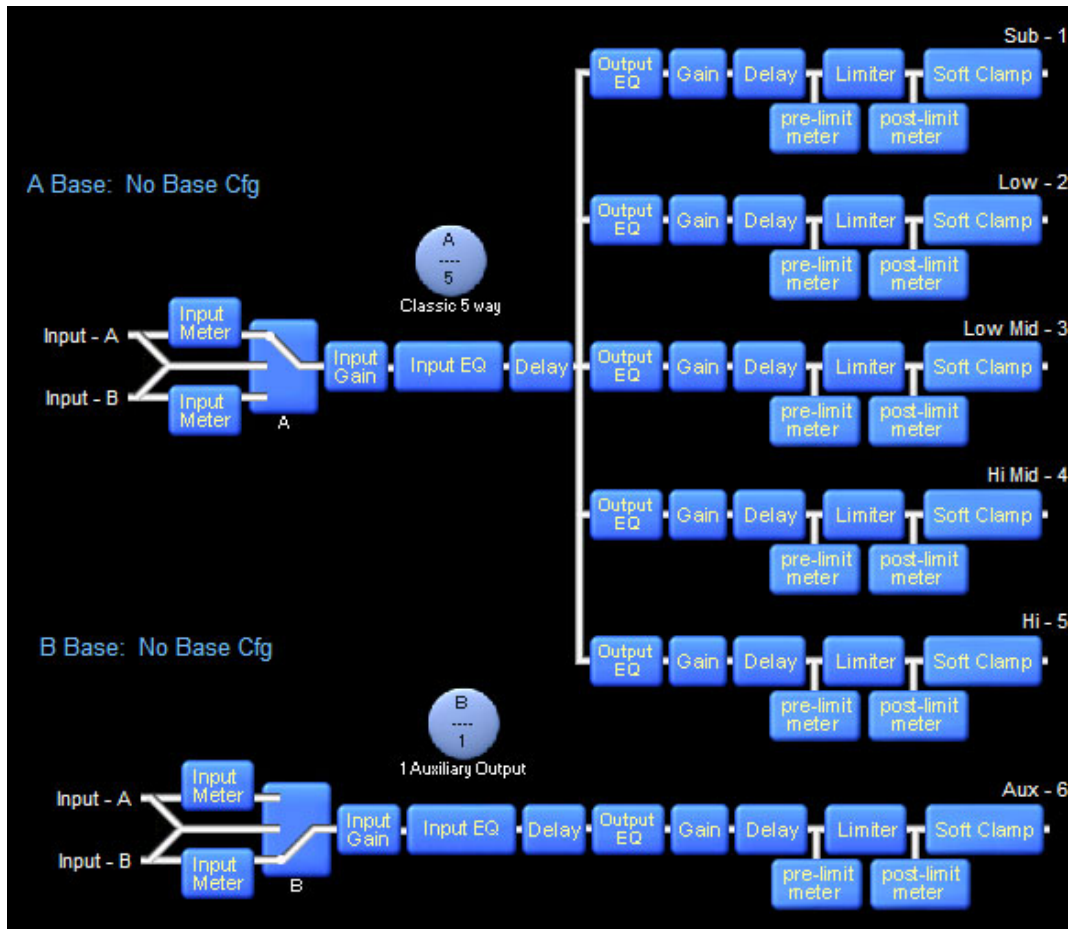


Figure 6-5

6.4.5 Classic 6-Way / 6-Auxiliary Outputs

The *Classic 6-Way* or *6 Auxiliary Outputs* modules can use any combination of input signal, which is split to all six output channels. The *Classic 6-Way* is shown below:

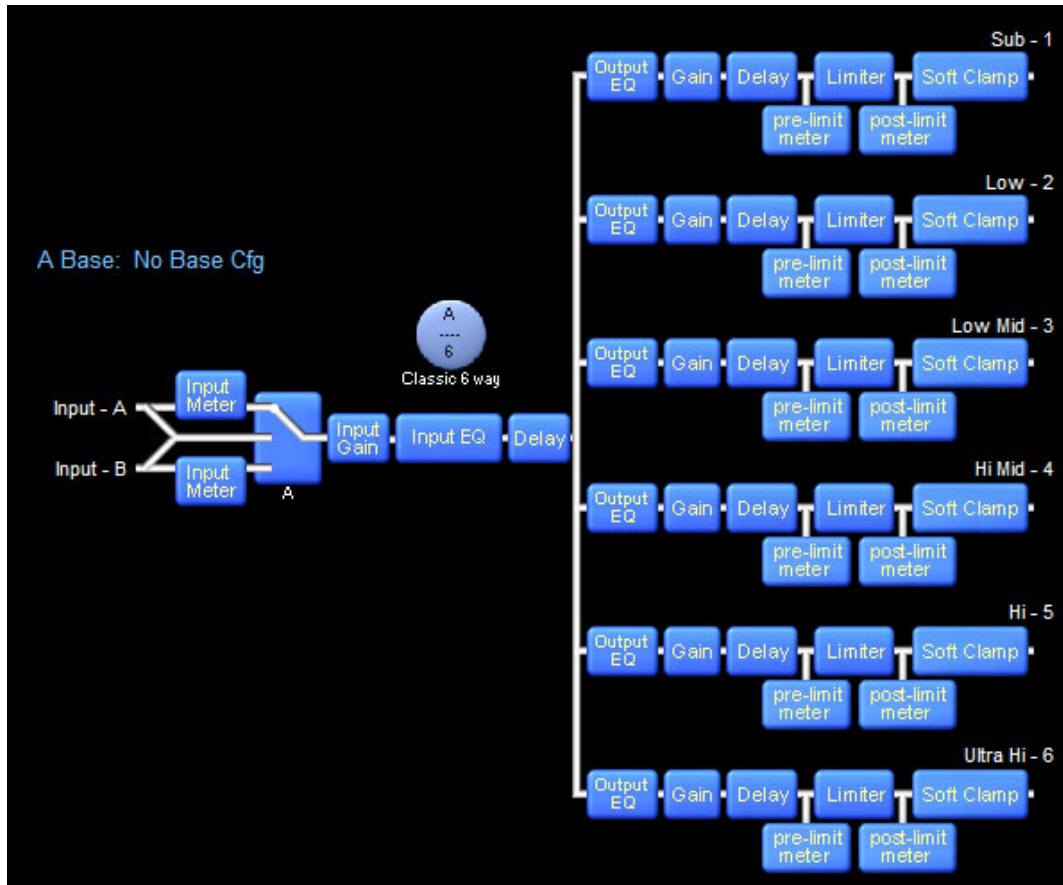


Figure 6-6

6.5 Linear Phase Crossovers

Linear Phase crossovers provide steep roll-off with zero phase shift. The **Linear Phase Brick Wall** crossover is available in 2-, 3- and 4-Way Module types.

Linear Phase 2- and 3-Way Modules allow the additional selection of 24dB and 48dB Linear Phase crossovers are shown in Figure 6-7 below:

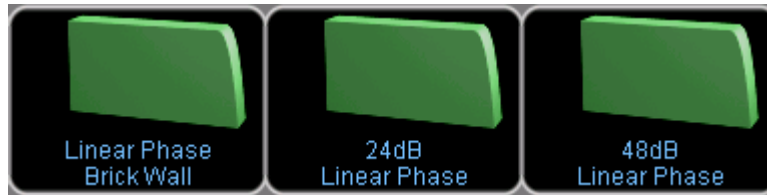


Figure 6-7

6.5.1 Linear Phase Brick Wall 2-Way (+1 Classic Auxiliary Output)

The LPBW 2-Way provides an auxiliary channel with traditional HPF/LPF filters for each module, as per the Classic 2-Way module (refer to section 6.4.1).

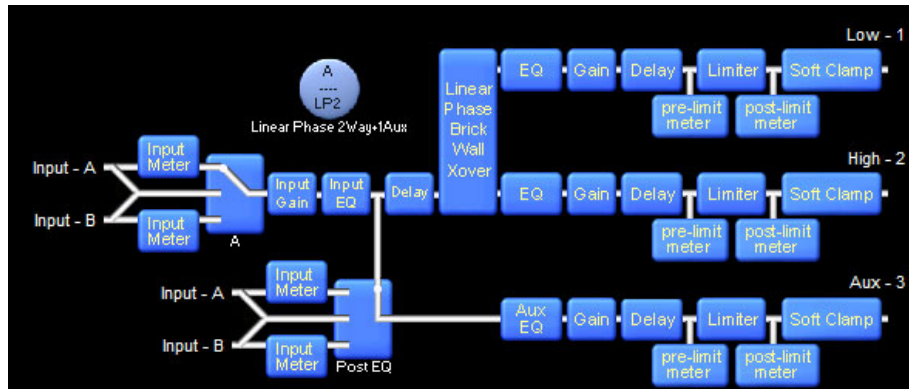


Figure 6-8

The LPBW 2-Way uses significant processing power to create the steep crossover with flat phase response. For this reason, the full amount of output specific EQ filters can only be used if the Soft Clamp is disabled on the module, as the Soft Clamp also requires a significant amount of processing.

The Soft Clamp process is disabled when every output's Soft Clamp level is set to +30dB (default setting).

Available Crossover EQ filters for the LPBW 2-Way + 1 Aux are:

Soft Clamp Activated: 16 EQ Filters + High Pass Filter

Soft Clamp Deactivated: 21 EQ Filters + High Pass Filter

NOTE: The Classic/Linear Phase 2-Way (+1 Aux), Classic/Linear Phase 3-Way and Classic 3-Auxiliary Outputs modules can be used in any combination on modules A & B

6.5.2 Linear Phase Brick Wall 3-Way

The LPBW 3-Way has a similar signal path to the Classic 3-Way – for further details refer to section 6.4.2.

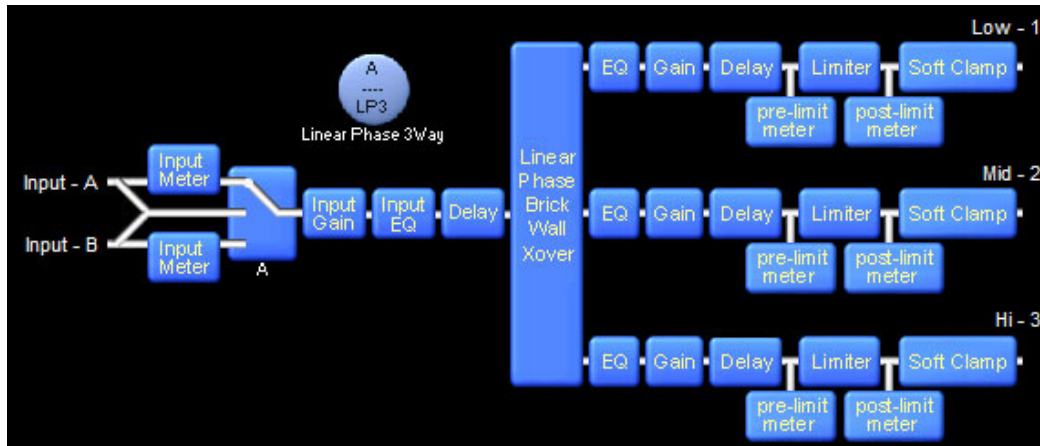


Figure 6-9

As with the LPBW 2-Way, the LPBW 3-Way uses a high amount of processing power to create the steep crossover with flat phase response. For this reason, the full amount of output specific EQ filters can only be used if the Soft Clamp is disabled on the module, as the Soft Clamp also requires a large amount of processing.

The Soft Clamp process is disabled when every output's Soft Clamp level is set to +30dB (default setting).

Available Crossover EQ filters for the LPBW 3-Way are:

Soft Clamp Activated: 10 EQ Filters + High Pass Filter

Soft Clamp Deactivated: 15 EQ Filters + High Pass Filter

NOTE: The Classic/Linear Phase 2-Way (+1 Aux), Classic/Linear Phase 3-Way and Classic 3-Auxiliary Outputs modules can be used in any combination on modules A & B

6.5.3 Linear Phase Brick Wall 4-Way

The Linear Phase Brick Wall 4-Way uses the processing power of both DSPs (modules) to create extra-steep crossovers. Input A, B or A+B can be selected, outputs 1-4 provide the sub, low, mid and high outputs of the 4-Way; there is no signal on output 5 and output 6 provides a pre-input delay, post input EQ full-bandwidth signal.

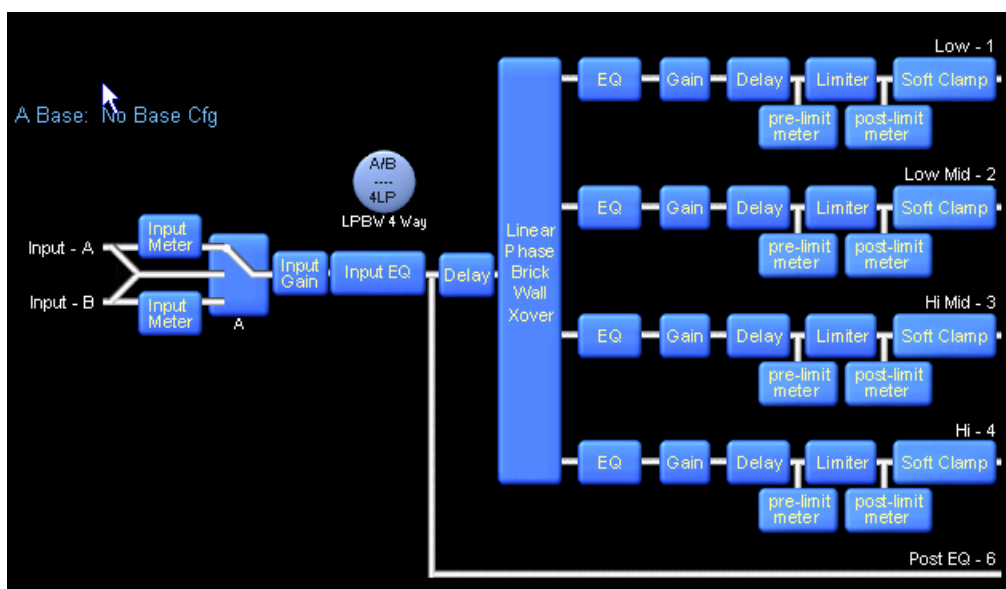


Figure 6-10

NOTE: The LPBW 4-Way does not provide selection of 24dB or 48dB transition slopes.

Please refer to section 8.4 for further details on crossover functionality, including Alignment Delay adjustments.

Chapter 7: Mesa EQ Module Type

7.1 Overview

The Mesa EQ processor has a fixed module type that provides independent control over each of the four outputs, with the ability to select or combine the input signal from any of the four inputs.

7.2 Mesa EQ Module

The Mesa EQ module type is abbreviated as **MEq** on the module icon as shown in Figure 7-1.



Figure 7-1

The default signal path for all inputs and outputs is shown in Figure 7-2 below.

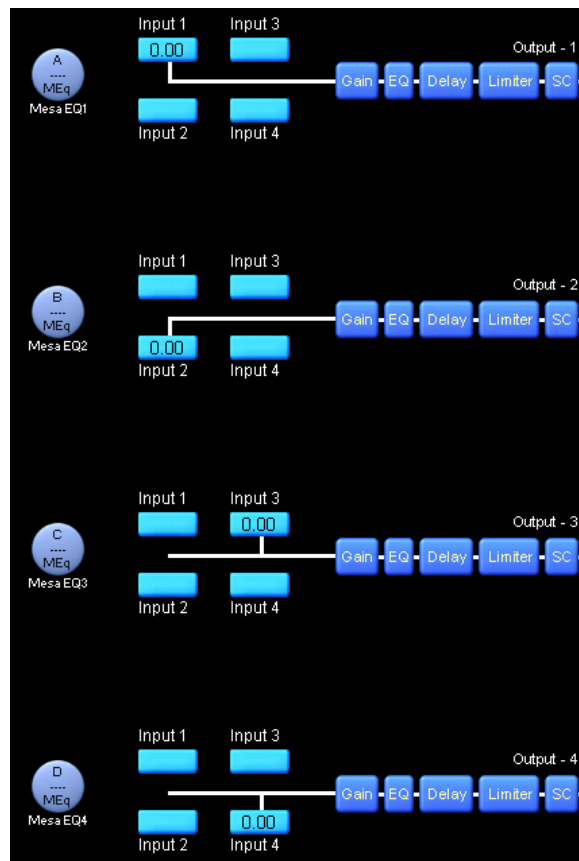


Figure 7-2

Chapter 8: EQ, Levels, Xover, HPF & LPF

8.1 Overview

8.1.1 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 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
- **Properties:** Tap a section of the interactive block diagram

8.1.2 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 could affect the screens allowed to be displayed when accessing **EQ/Levels**. Please refer to the *Lake Controller Designer Mode Manual* for further details.

8.1.3 Group Updates

Group Levels and EQ are *view only* from a module. To update any group EQ or Level, access that group EQ/Levels page via the **group** icon.

NOTE: Groups do not have a Xover page or an HPF/LPF page but the Gang Xover/Aux and Gang HPF/LPF functions, which are available from the Groups menu, can be used to link the Xover or HPF/LPF of all modules in a group

8.1.4 Default Settings

The following example shows the available screens and default EQ overlay (PEQ1) for a dummy module placed in the work-area immediately after the Lake Controller has started.



Figure 8-1

The default dummy module contains a Classic 3-Way crossover. The default tabs for this module are:

- **Levels:** Displays gains, delays and limiters
- **XOVER:** Displays crossover settings for the module
- **PEQ1:** Parametric EQ Overlay (indicated by yellow highlighting)
- **GEQ2:** Graphic EQ Overlay

Tap the Levels tab (far left in Figure 8-1) to toggle between **Levels** and **EQ**. This tab acts like a folder, containing additional screens.

A	EQ/Levels Screens	Selecting the Levels page minimizes the EQ/XOVER screens. These can be accessed again by tapping the EQ page (top-left). In Figure 8-2, the available Levels screens are: LAKE – Classic 3-Way (selected module) ALL – The group the module is assigned to NOTE: Group levels cannot be updated when accessed via a module. To update the group levels, access the Levels page via the group icon.
B	Values	The values for the selected attribute are displayed here. For manual entry, tap the value highlighted in blue, enter value using on-screen or manual keyboard, and press OK. Modules: The top value represents the overall value, which includes any Groups the module is assigned to. The bottom value (highlighted in blue) represents the value of the module. Groups: Only the value for the selected group (highlighted blue) is present.
C	Limiter Indicator	Indicates RMS limiting with an orange bar
D	Module Label	Modules: Displays the selected module's name Groups: Displays the name of the module being used for metering (refer to Assign Meters in section 8.2.10)
E	Fader	Drag the fader up/down to adjust its level. Drag below, above or to the left of the fader to adjust by smaller increments.
F	Additional Outputs	For a 4-way, 5-Way or 6-Way module, the Additional output channels appear here. The number of output channels depends on the crossover type (i.e. whether module is 2-, 3-, 4-, 5- or 6- Way)
G	Peak Level/ Peak Hold Indicators	Indicates Peak Level with a thin green bar, and Peak Hold with a wide orange segment.
H	RMS Level Indicator	Indicates RMS Level with a wide green bar
I	Analog / Digital Indicator	The digital / analog setting for this module is indicated on this tab
J	Input Channel Label/ Mute Button & Polarity Button	The channel label is user-defined (refer to Label Channel in section 8.2.10). The color/ label of the mute button/text 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 that that channel is muted on all modules in the Group. The polarity button is not available at Group level.
K	Output Channel	Each output channel has the same features as the input channel, although the output polarity buttons are only available in Designer Mode. The number of output channels depends on the module type.
L	Levels Menu button-bar	The functions and sub-menus available on the Levels screens are described throughout in this section.

Table 8-1

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. For further information, regarding level limits, refer to the *Lake Controller Designer Mode Manual*.

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.

For further information regarding hiding output channels, refer to the *Lake Controller Designer Mode Manual*.

8.2.2 Gain

Tap the **Gain** button to display the gain levels for each channel of the selected module/group. To adjust gain values, drag fader (E) for large increments, drag above or below the fader for fine adjustment, or tap value (B) for keyboard entry (refer to Figure 8-2)

8.2.3 Delay

Tap the **Delay** button to display the delay time for each channel of the selected module/group. Delay values can be adjusted in four ways (refer to Figure 8-2):

1. Drag the fader (E) to adjust by large increments
2. Drag above or below the fader for fine adjustment
3. Drag on the meter to the left of the fader for very fine adjustment
4. Tap the delay value (B) for keyboard entry.

A total delay of 2000 ms (input + output) can be set, subject to level limits set by the system designer.

8.2.4 Limiter MaxRMS

Tap the **Limiter MaxRMS** button 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 (E) for large increments, drag above or below the fader for fine adjustment, or tap the value (B) for keyboard entry (refer to Figure 8-2).

NOTE: This feature works in conjunction with **Limiter Corner & Limiter Time Constant** and is relative to the *AmpClip* level as described below.

8.2.5 Limiter Corner

Limiter Corner applies to modules only – this function is inactive if a group is selected. The Limiter Corner softens the MaxRMS limiting by creating a curve that gradually introduces limiting. For example:

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

Tap the **Limiter Corner** button to display the value (dB) for each channel of the selected module. To adjust Limiter Corner values, drag the fader (F) or tap the value (B) for keyboard entry (refer to Figure 8-2).

8.2.6 Limiter Time Constant

The limiter process involves four time constants; two fast acting and two slow acting. This is represented to the user as a single value that represents the main attack time in milliseconds.

All limiter attack and release times are optimized automatically from this single Limiter Time Constant value.

8.2.7 SoftClamp Properties

The SoftClamp Properties button provides a sub-menu containing the SoftClamp functions as described below.

On a Linear Phase 2- and 3- Way modules, Soft Clamp cannot be activated if the number of crossover EQ filters exceeds a certain amount. For details on these limits, please refer to section 6.5.

SoftClamp Level

Tap the **SoftClamp Level** button to display the maximum peak signal value (dB) allowed at the output. The default setting for SoftClamp is +30dB, which effectively results in SoftClamp being disabled.

To adjust the SoftClamp Level, drag the fader (E) or tap the value (B) for keyboard entry (refer to Figure 8-2).

NOTE: *SoftClamp Level works in conjunction with **SoftClamp Corner** and is relative to the **AmpClip Level** as described below.*

SoftClamp Corner

SoftClamp Corner applies to modules only; the function is inactive if a group is selected. Figure 8-3 depicts the Soft Clamp process. The Soft Clamp Corner sets the point at which the Soft Clamp process engages. A signal below the Soft Clamp Corner will not be affected. Amp Clip defines the clipping point. Without SoftClamp activated, a signal exceeding the clipping point will be clipped, as shown in red.

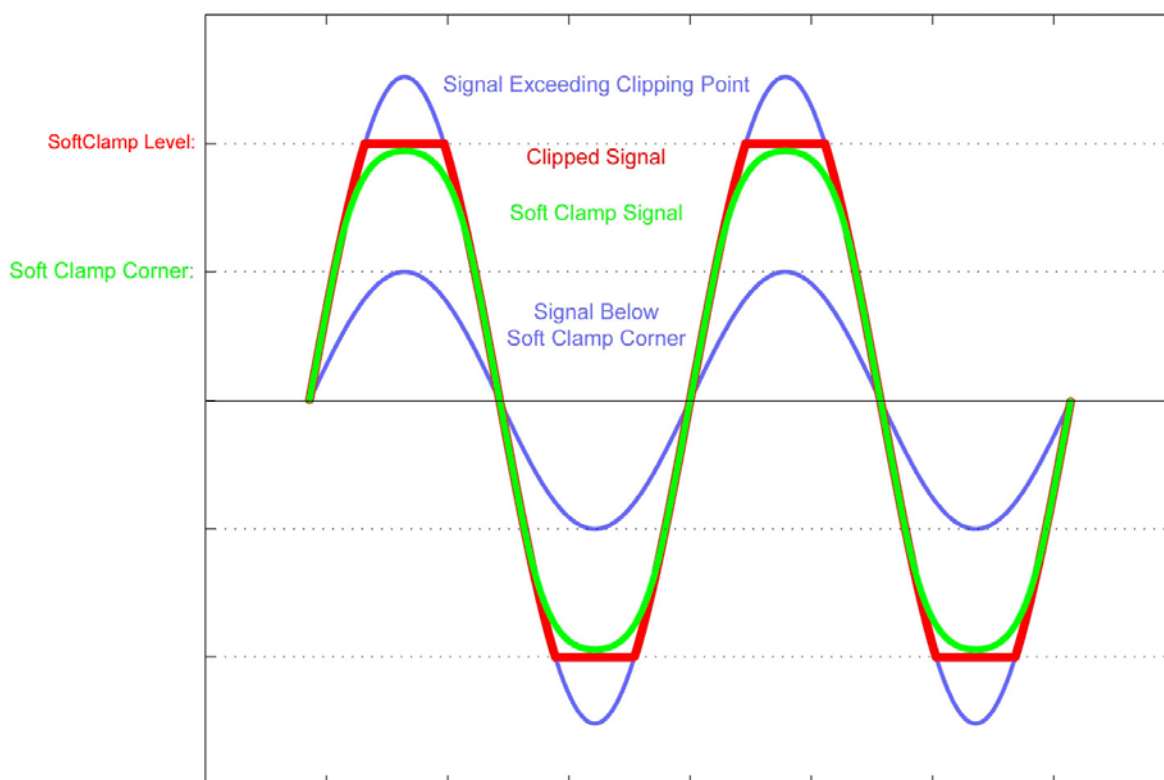


Figure 8-3

The Soft Clamp process smooths signals exceeding the Soft Clamp Corner level. Using the Soft Clamp Limiter, signals exceeding the clipping point will not clip. For example, if the SoftClamp Level = +3dB and SoftClamp Corner = -5dB, peak limiting begins gradually when the peak level reaches -2dB and will smooth all signals exceeding +3dB

Tap the **SoftClamp Corner** button to display the value (dB) for each channel of the selected module. To adjust SoftClamp Corner values, drag the fader (E) or tap the value (B) for keyboard entry (refer to Figure 8-2).

8.2.8 Headroom/Amp Clip

Headroom (Analog Input)

Headroom is only relevant to the analog input, and it defines the maximum sinewave RMS level the input will accept before clipping (from +12dBu to +24dBu). A lower Headroom level will result in a lower noise floor, but will increase the risk of clipping the input.

Input Headroom Configuration / Input Clipping

If the analog input signal is larger than the allowed Input Headroom, digital clipping will occur during the Analog to Digital conversion process.

The default Input Headroom level is 21dBu (i.e. the peak of the largest sine-wave the processor accepts before clipping is 21dBu.)

To stop the input from clipping, there are two solutions:

1. Increase the Headroom value

Increased headroom allows larger signals to pass unclipped.

2. Adjust the level of the signal being fed to the processor

If Headroom is adjusted to the maximum of 24dBu and the input is still clipping, the level of the input signal must be adjusted.

NOTE: For the best signal to noise ratio from your processor, it is important to set the Input Headroom correctly. Headroom should be set as low as possible without causing the input to clip.

AmpClip

The analog output channels allow a maximum of +24 dBu peak level before clipping (+21 dBu RMS). In the interface, this parameter is always displayed as a peak value. Due to input sensitivity, an amplifier may reach full output power prior to the Contour or Mesa processor reaching its maximum output level. Therefore, system designers can set the Amp Clip level appropriately, so the RMS Limiter is relative to the true clipping point of the given amplifier.

The system designer will set the Factory AmpClip level for each output channel to match the peak input signal level of the associated amplifier. User Mode provides a +/- 6dB adjustment to this value.

NOTE: MaxRMS and SoftClamp levels are relative to the AmpClip setting – a change in AmpClip level will change the effective MaxRMS and SoftClamp levels.

8.2.9 Limiter Configuration Summary and Case Study

Based on the information shown in the previous sections, a summary of how the various limiter values interact is described below along with a suggested method for practically configuring these limiters.

RMS Limiter

An RMS limiter is provided on each output channel. There are four parameters that affect the performance of the RMS Limiter:

AmpClip – Sets the Amp Clip level, so the RMS Limiter is relative to the true clipping point of the given amplifier.

Limiter Max RMS – Sets the threshold of the RMS Limiter. This value displays the maximum RMS signal level in dB allowed at the output before the onset of limiting.

Limiter Corner – Adjusts the ‘knee’ of the limiter, softening the amount of MaxRMS limiting by creating a curve that gradually introduces limiting.

Limiter Time Constant – Adjusts the attack and release time of the limiter. The attack and release are optimized automatically from this single value.

Amp Clip and Limiter MaxRMS both have ‘Factory’ and ‘User’ settings. Factory settings are available in Designer Mode, and enable the system designer to set up the range and limits that these parameters can control. *Please refer to the Lake Controller Designer Mode Manual for further information on Designer Mode.*

NOTE: All other limiter settings are relative to Factory Amp Clip. Factory Amp Clip is the only value in the set of parameters that is directly expressed in dBu. All other values are in dB, relative to Factory Amp Clip.

The RMS Limiter values are relative to the RMS value of the Total AmpClip. Total AmpClip is the sum of the User and Factory AmpClip values.

- Factory Amp Clip is displayed in dBu
- The User Amp Clip is displayed in dB (relative to Factory Amp Clip)

If Factory Amp Clip = +10 dBu and User Amp Clip = -3 dB

Then Total Amp Clip = +7 dBu

The following example describes the connection between the RMS limiter and AmpClip values:

To work out what the RMS limiter is set to in dBu, first take the User MaxRMS value and the Factory MaxRMS value and add them to give you your Total MaxRMS value:

Factory MaxRMS: -5dB; User MaxRMS: -10dB

Total MaxRMS = Factory MaxRMS + User MaxRMS

$= -5dB + -10dB = -15dB$

This total value is relative to the RMS value of the Total AmpClip setting, which is in dBu. Working out Total AmpClip is similar to working out Total MaxRMS:

Factory AmpClip: 24dBu; User AmpClip: -5dB

Total AmpClip (peak) = Factory AmpClip + User AmpClip

$= 24dBu + -5dB = 19dBu$

The Total AmpClip value shown here is calculated as a peak value – to convert to RMS reduce this value by 3dB:

Total AmpClip (RMS) = 19dBu (peak) – 3dB

$= 16dBu$ (RMS)

Finally, we add the Total AmpClip (dBu RMS) to Total MaxRMS to determine the MaxRMS value in dBu:

Total MaxRMS (dBu) = Total AmpClip (dBu RMS) + Total MaxRMS

$= 16dBu + 15dB = 1dBu$

SoftClamp Limiter

The SoftClamp limiter values are relative to the peak value of the Total AmpClip, which is the sum of the User and Factory AmpClips. The User AmpClip is displayed in dB, and the Factory AmpClip is displayed in dBu. The example below describes the connection between the SoftClamp limiter and AmpClip values:

To work out the SoftClamp limiter setting in dBu, first take the User SoftClamp value and the Factory SoftClamp value and add them to give you your Total SoftClamp value:

Factory SoftClamp: -5dB; User SoftClamp: -10dB

Total SoftClamp = Factory SoftClamp + User SoftClamp

$= -5dB + -10dB = -15dB$

This total value is relative to the peak value of the Total AmpClip setting, which is in dBu. Working out Total AmpClip is similar to working out Total SoftClamp:

Factory AmpClip: 24dBu; User AmpClip: -5dB

Total AmpClip (dBu peak) = Factory AmpClip + User AmpClip

= 24dBu + -5dB = 19dBu

Finally, we add the Total AmpClip (dBu peak) to Total SoftClamp to get out SoftClamp value in dBu:

Total SoftClamp (dBu) = Total AmpClip (dBu peak) + Total SoftClamp

= 19dBu + 15dB = 4dBu

8.2.10 Meter Options

Tap the **Meter Options** button to view a sub-menu containing functions relating to alternate meter views and system designer features.

Input +4dBu

Tap the **Input +4dBu** button to view the input signal meter at +4dBu. Tap again to return to the normal view, which is relative to the input clipping level. This is a global function – all meters throughout the system will display the reference selected here.

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 will display the reference selected here.

NOTE: The Pre/Post Limiter status is identified on the bottom-right of each output meter above the channel label/mute button.

AmpClip Reference

Tap the **AmpClip Reference** button to view output signals with respect to the Amp Clip reference level. Tap again to return to the normal view, which is relative to the Factory MaxRMS level defined by the Designer (refer to the Designer Mode manual).

When Amp Clip Reference is selected, the Amp Clip level is used as the reference for the 0dB level on the meter. With correct settings, the output meter will identify clipping based on these settings, removing the need to directly monitor the amplifiers.

This is a global function – all meters throughout the system will display the reference selected here.

Assign Meters

The **Assign Meters** function is active only when a group levels page is accessed via a group icon. A group does not have its own input or output signals. Groups are used to quickly assign the same information to many modules. This information is stored in each module.

For metering purposes, a module may be assigned to a group. This provides an overview of the Input/Output signals for that group, assuming that the modules within the group have similar settings.

To assign a module to a group for metering purposes:

1. Access a group levels page via a group icon
2. Tap **Meter Options** then tap **Assign Meters**

The module scroll-bar appears displaying modules assigned to the selected group.

NOTE: The **Meter Options/Assign Meters** function is different to the **Assign** function available from the **Groups** menu. For further information, please refer to Chapter 9: Groups.

3. On the scroll-bar, tap the module you wish to use for metering
4. Tap **Assign Meters** again, then **Meter Options Exit** to exit this mode

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 described above.

The **Channel Label** is a user-defined value that appears on the **Mute** button at the bottom of each channel, the module properties page, and on any auxiliary output EQ tabs.

To label a channel:

1. Access a Module levels page via a Module icon
2. Tap **Meter Options**
3. Tap **Label Channel** and select a channel label/mute button to label
4. Enter the channel label using the on-screen or manual keyboard
5. Tap **Label Channel** to exit this mode

Enable Polarity

This button locks/unlocks the polarity buttons and is inactive by default (polarity buttons locked). When the button is active (orange) the polarity can be changed; polarity cannot be changed when the button is inactive (blue). To change the input polarity:

1. From the **Meter Options** menu, tap **Enable Polarity**
This setting will remain active until it is manually disabled, or until the Lake Controller software is restarted.
2. Tap the Input polarity button (located to the right of the Input mute button)

Output polarity buttons are only displayed in Designer Mode when the module is unlocked. Please refer to the *Lake Controller Designer Mode Manual* for further details.

Enable Mute

This button locks/unlocks the mute buttons and is active by default (i.e. muting/unmuting is allowed). To lock the mute buttons:

1. From Levels tap **Meter Options**
2. Tap **Enable Mute** (button turns blue)

NOTE: The Enable Mute button is not available in Designer Mode when the module and base configuration are unlocked. Muting/Unmuting is allowed permanently in this scenario.

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. Please refer to the *Lake Controller Designer Mode Manual* for further details.

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. Please refer to the *Lake Controller Designer Mode Manual* for further details.

8.3 Input EQ

The Lake Controller has two types of input EQ - Parametric and Graphic. 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 **overlays**. Each module can have up to eight overlays and each group can have four. A module can have up to 256 input EQ filters distributed among its 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 EQ Curve is indicated by a white line that is displayed on all overlays for the selected module.



Figure 8-4

8.3.1 Default Overlays

Modules and Groups both use the same EQ overlays and functions described later in this chapter. 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 made by tapping the Group icon or by tapping the **EQ/Levels** button from the **Groups** menu.

Figure 8-5 shows the EQ overlays available for a module assigned to one group, accessed from the module menu.



Figure 8-5

If there are more overlays than can fit across the top of the screen, the << and >> buttons on the button-bar can be used to scroll overlay tabs as required.

By default a Module has a Parametric (PEQ1) and Graphic EQ (GEQ2); a Group has only a Parametric EQ (PEQ1). These EQ overlays cannot be removed and are indicated by a small gray dot after the Overlay name.



Figure 8-6

8.3.2 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. For further information regarding **Overlay Access**, please refer to the *Lake Controller Designer Mode Manual*

8.3.3 Parametric EQ Screen

The Parametric EQ (PEQ1) screen is shown below along with letters marking its key functions, which are explained in Table 8-2.

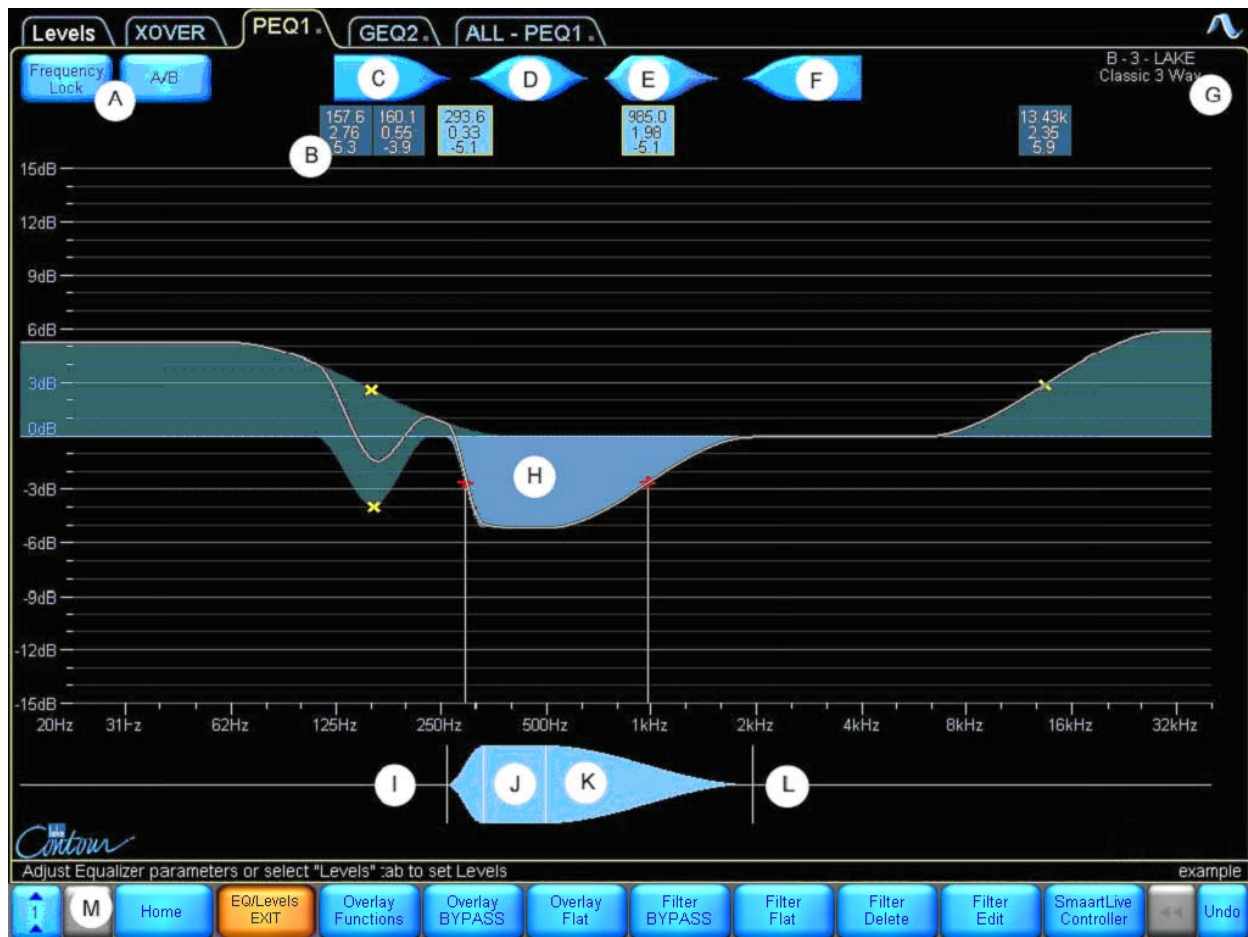


Figure 8-7

A	Frequency Lock and A/B Comparison Button	Frequency Lock: Blue = Filter Frequency Unlocked Orange = Filter Frequency Locked When locked, the Frequency of the selected filter can only be adjusted using the shape tool (J). A/B Comparison Button: Tap this button to create a bypassed copy of the selected overlay. The adjustments can then be made and compared.
B	Filter Box	Displays the Frequency, Octave, 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.
D	Parametric Filter	Boost/cut a specified frequency band.
E	Mesa Filter	The unique Lake 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.
F	High Shelf Filter	Boost/cut high frequencies.
G	Module Icon	Displays the currently selected module and status.
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 octave width 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 sub-menus available on the EQ overlays are described in the following sections.
x	Filter Point	Filter Points are identified by a red (selected) or yellow (not selected) cross in the main screen area.

Table 8-2

To add Parametric EQ:

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

NOTE: If a mouse with a wheel is attached, the wheel can be used to adjust the gain

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

If Frequency Lock (A) is active (orange), you cannot change the frequency by dragging the filter point. Either de-activate Frequency Lock (A) or use the EQ Tool (J).

8.3.4 Graphic EQ Screen

In addition to Parametric EQ, the Lake Controller also provides a 28-band Graphic EQ (GEQ). Figure 8-8 shows the Graphic EQ (GEQ2) screen along with letters marking its key functions, which are explained in Table 8-3.



Figure 8-8

A	Frequency Lock and A/B Comparison Button	Frequency Lock: Blue = Filter Frequency Unlocked Orange = Filter Frequency Locked When locked, the Frequency of the selected filter can only be adjusted using the EQ tool (E). A/B Comparison Button Tap this button to create a bypassed copy of the selected overlay. The adjustments can then be made and compared.
B	Filter Box	Displays the Frequency, Octave, 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
C	Module Description	Describes the currently selected module and status.
D	EQ Curve	A white line identifies the overall EQ Curve. In Figure 8-8, another overlay exists that also affects the curve.
E	EQ Tool	Drag the EQ Tool left or right to select the frequency to change.
x	Filter Point	The 28 Filter Points are identified by a red (selected) or yellow (not selected) cross in the main screen area.

Table 8-3

To add Graphic EQ:

5. Select the filter point to adjust using the EQ Tool (E).
6. Drag the filter point up/down to increase/decrease gain.

If **Frequency Lock** (A) is OFF, you can also tap a filter point to select it and drag up/down to adjust the gain.

8.3.5 Overlay Functions

The first option from the left on the button-bar is **Overlay Functions**, which provides another sub-menu with the following items.

Overlay Properties / EQ Preferences

In User Mode, the only function active under the Overlay Properties menu is **EQ Preferences**, which provides a sub-menu 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.

Table 8-4 describes the functions available under this menu:

Function:	Description:
No Scale	Removes the scale lines on all EQ/Crossover and Auxiliary screens
Reset Scale	Resets the EQ scale to the default setting of +15/-15dB
Zoom In	Zooms the EQ scale in by 3dB. (e.g. if scale is +15/-15dB, tapping Zoom In will change the scale to +12/-12dB)
Zoom Out	Zooms the EQ scale out by 3dB (e.g. if scale is +15/-15dB, tapping Zoom Out will change the scale to +18/-18dB)
EQ Pref EXIT	Returns the previous menu level
Full Response	Available only for Crossover and Auxiliary Output screens. When active (orange) the overall EQ curve is shown, taking into account all crossovers, high and low pass filters, output EQ and input EQ for the module and any groups it is assigned to. Not applicable for Input EQ screens (PEQ/GEQ)
Up	Moves the zero line up in 3dB increments
Down	Moves the zero line down in 3dB increments
Animate	When active (orange), the Input EQ screens provide 3D animation when accessed. This can be turned off for PCs with slower processors/graphics cards. Not applicable for Crossover and Auxiliary Output screens.

Table 8-4

Overlay Hide / Overlay View Only

These functions are active only when in Designer Mode. Please refer to the *Lake Controller Designer Mode Manual* for further details.

Overlay GEQ/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 (GEQ) overlay is selected, the button reads **Overlay PEQ**. Tapping it flattens all GEQ and converts the Overlay to a Parametric EQ.

Overlay Delete

Overlay Delete is inactive for the default overlays. Refer to section 8.3.1 for further information.

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.

Overlay Copy

Tap **Overlay Copy** to copy the selected overlay. This function is used in conjunction with **Overlay Paste Over**.

Overlay New

Tap **Overlay New** to create a new PEQ overlay. This can be changed to a GEQ overlay (refer to Overlay GEQ/PEQ above).

NOTE: Each module can have up to eight overlays; groups can have up to four.

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.

Overlay Label

The **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. A yellow border indicates selection.
2. Tap **Overlay Label**.
3. Enter the label name using the on-screen or manual keyboard.
4. Tap **OK**

8.3.6 Overlay Bypass/Insert/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 it.

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 it.

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**.

NOTE: An overlay can also be bypassed by dragging the overlay tab down to the bottom or inserted by dragging up to the top of the screen. In **COMPARE** mode, dragging either overlay up or down swaps the active/bypassed overlay.

A/B - Overlay COMPARE

In addition to the Bypass feature, you can compare two overlays within a module or Group. There are two ways to create an A/B comparison:

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**.

Comparing Existing Overlays

Follow this process to compare two existing EQ overlays:

1. Tap overlay A to select it
2. Tap **Bypass**
Overlay A is now at 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 pressed, the two overlays switch positions. The top overlay is active and the bottom is bypassed.

8.3.7 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.

8.3.8 Filter Bypass/Insert

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

- **Filter BYPASS** if the filter is ACTIVE; tap it to bypass the filter.
- **Filter INSERT** if the filter is BYPASSED; tap it 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.

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

8.3.9 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.

8.3.10 Filter Delete

Tap **Filter Delete** to remove the selected filter from the overlay.

NOTE: A PEQ filter can be deleted by dragging the filter box upwards 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

8.3.11 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 as shown in Figure 8-9.



Figure 8-9

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 on-screen or manual keyboard and tap OK.
The **Filter Edit** function is inactive if the selected overlay does not contain any filters.

NOTE: High frequency values can be entered using **k** to denote kHz instead of Hz (i.e. 12k instead of 12000 Hz).

8.3.12 SmaartLive / SmaartLive Unavailable

The Lake SmaartLive™ Controller provides an interface between the Lake Controller and SmaartLive. SmaartLive™ Version 5 - the SIA Software Company's dual-channel FFT-based audio measurement software - is the professional audio industry standard for real-time sound system management, optimization, and control. SIA's SmaartLive software combines powerful audio frequency measurement and analysis tools.

The Lake SmaartLive Controller provides spectrum, spectrograph and transfer function displays on the XOVER, AUX and EQ overlays.

If both SmaartLive and the SmaartLive Controller are identified on the network, this button will read **SmaartLive**. If either SmaartLive or the SmaartLive Controller are not present on the network, the button will read **SmaartLive Unavailable**.

For further information on the SmaartLive Controller, please visit www.lake.com or refer to the SmaartLive Controller User Guide.

8.3.13 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. For further details on **Show Mode**, please refer to section 12.7.

8.4 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 8-10

A	Frequency Lock and HPF Enable Buttons	Frequency Lock is relevant to parametric filters (B, C, D) only. Blue = Filter Frequency Unlocked Orange = Filter Frequency Locked (When locked, frequency can be adjusted only with the EQ Tool) HPF Enable activates or deactivates the High Pass Filter for the Module. Blue = HPF disabled Orange = HPF enabled
B	Low Shelf Filter (XOVER only)	Used to boost/cut low frequencies (refer to 8.4.2 Using PEQ Filters on the XOVER Screen.)

C	Parametric Filter (Xover only)	Used to boost/cut a specified frequency band (refer to 8.4.2 Using PEQ Filters on the XOVER Screen).
D	High Shelf Filter (Xover only)	Used to boost/cut high frequencies (refer to 8.4.2 Using PEQ Filters on the XOVER Screen).
E	Filter Edit Box	Displays the crossover or HPF/LPF center frequency and type, depending on the filter selected.
F	Module/Frame Labels and Selected Output Channel Label	This area of the screen displays the frame and module labels (shown here in blue text) and the selected output label (shown here in red text - i.e. <i>Low 1</i>)
G	Output 1/4 Frequency Range (selected)	The far-left crossover filter pertains to Output 1 (for module A) or Output 4 (for module B). In Figure 8-10, Output 1 of module A is the selected crossover filter, identified by light green shading. A solid white line identifies the frequency range sent to this output.
H	Output 2/5 Frequency Range	The center crossover filter (not selected and identified by dark green shading) pertains to Output 2 (module A) or Output 5 (module B).
I	Output 3/6 Frequency Range	The far-right crossover filter (not selected) pertains to Output 3 (module A) or Output 6 (module B). For a 2-way module, Output 3/6 is not used and the XOVER screen displays one crossover point instead of two. An additional EQ tab labeled <i>Aux</i> is available on 2-way modules for channels 3/6.
J	Crossover/Filter Point	An x marks the frequency at which the output filters crossover. Parametric filter points are also identified by a red (selected) or yellow (not selected) x. 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 PEQ filter is selected, the crossover selector changes to the filter shape tool (blue) which functions as described in section 8.3.3 Parametric EQ Screen.
L	Crossover Menu button-bar	The functions and sub-menus available on the XOVER page are described in the following sections.

Table 8-5

8.4.1 Using the High Pass Filter (HPF Enable)

The high-pass filter cuts off all frequencies below the specified frequency, using up to 24dB/octave filters. **Input HPF** or **Low Output HPF** are available: **Input HPF** affects all output channels, **Low Output HPF** affects only the lowest output of the Module.

To set the **Low Output HPF**:

1. Tap **HPF Enable** then tap **HPF Select**
2. Select a filter from the scrollbar (24dB or less)

3. Tap **HPF Set** and **Yes** to the warning message

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

4. Tap **Crossover Functions** then **HPF Functions**
5. Tap **Input HPF**

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

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

NOTE: A Low Pass Filter (LPF) on the highest output channel is available on the **HPF/LPF Functions** menu under **Crossover Functions**. For further details, please refer to section 8.4.4.

8.4.2 Using PEQ 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**.

NOTE: Only the PEQ filter points and filter boxes of the selected output are displayed.

To select an output, tap the relevant green filter box and toggle between outputs using the crossover tool. The selected output name is displayed in red text at the top-right of the XOVER screen.

Figure 8-11 shows a parametric filter used to shape the sound from output 1, the first output of module A, which is the currently selected module.

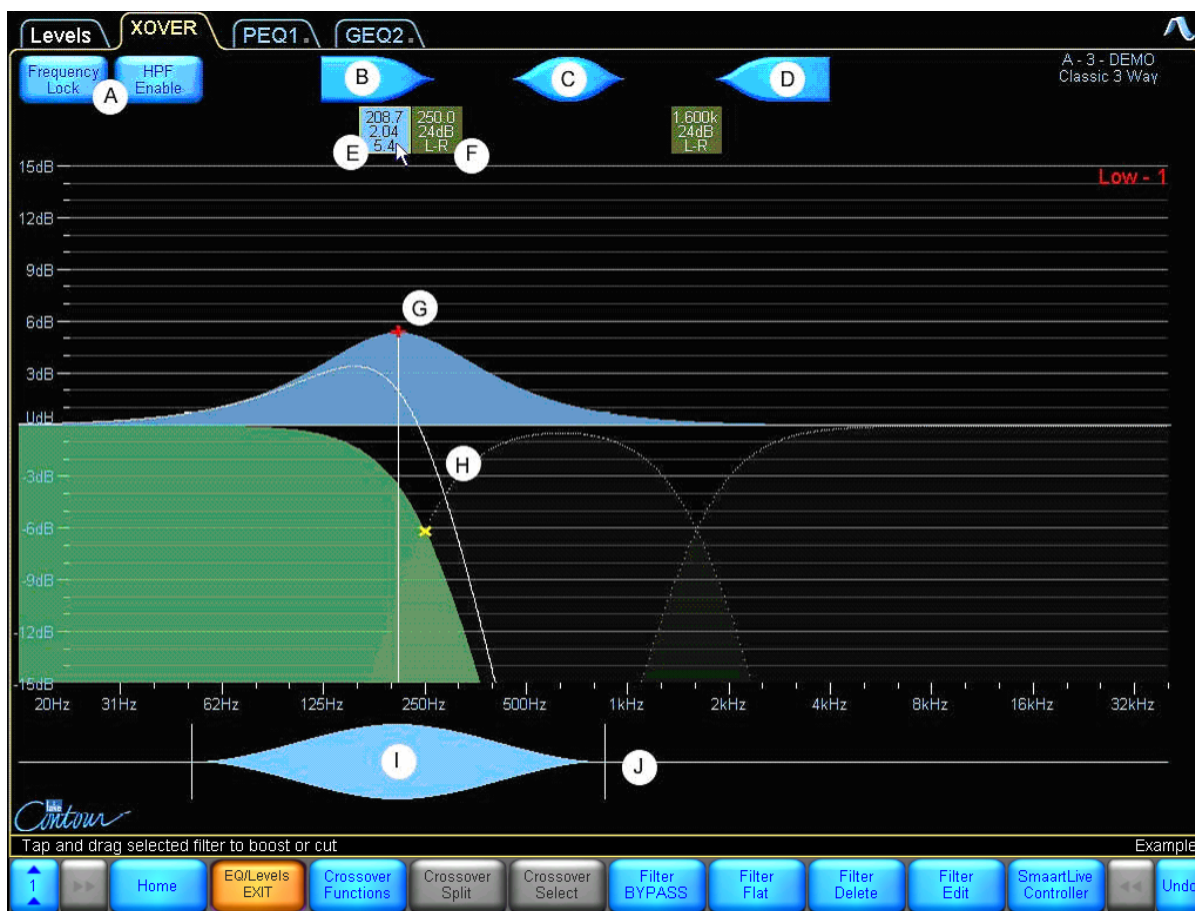


Figure 8-11

Although this band-pass filter crosses the range used by all outputs, it only affects the range of the selected output. The curved white line identifies the effect the band-pass 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 Selector** (K on Figure 8-10) to select the required output of the crossover (light green = selected)
3. Tap a PEQ 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 de-activate Frequency Lock or use the EQ Tool (I) to change the frequency.
6. Adjust the octave by dragging to the left or right of the shape tool (J)

8.4.3 Linear Phase Crossovers

The Linear Phase modules provide steep crossovers, without phase distortion. The example below shows the XOVER screen for a Linear Phase Brick Wall 4-Way module.

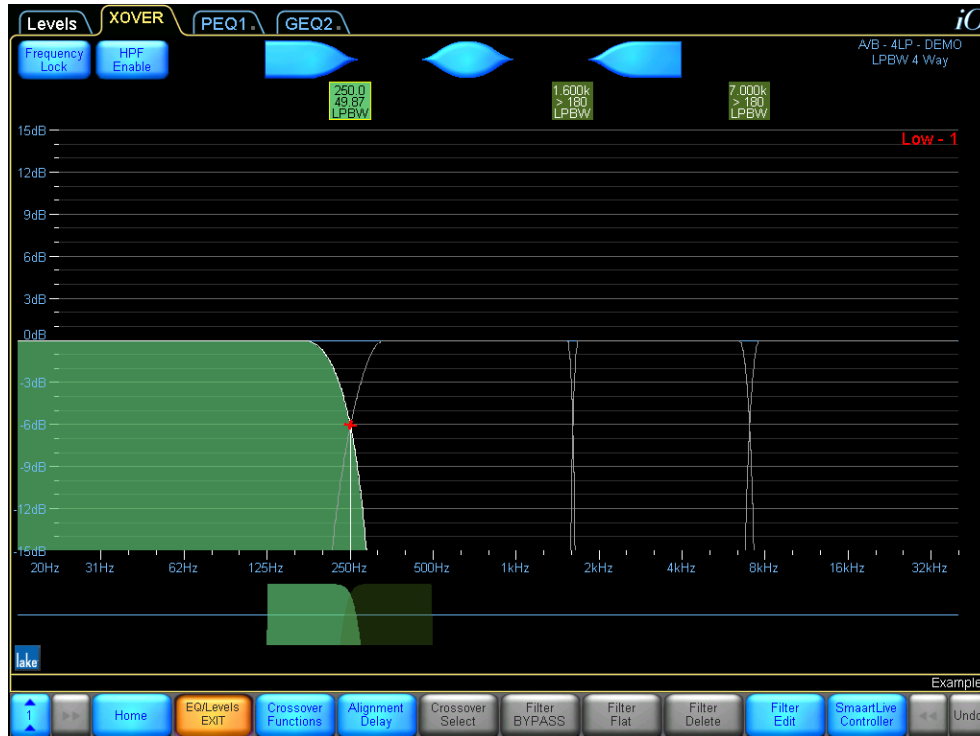


Figure 8-12

Some XOVER menu options and functions are different for Linear Phase modules, as described later in this chapter.

8.4.4 Crossover Functions

Crossover Functions provides a sub-menu containing the following functions:

HPF/LPF Functions

HPF/LPF Func EXIT	Exits this menu and returns to the Crossover Functions menu
Input HPF (Contour Only)	Sets the overall Module HPF to affect all output channels for the Module. (Depending on the frequency of the HPF and outputs)
Low Output HPF (Contour Only)	The Low Output HPF setting only affects the lowest output channel of the selected Module.
HPF Enable	Enables/Disables the High Pass Filter for the selected module
LPF Enable	Enables/Disables the Low Pass Filter on the highest output channel for the selected module.

NOTE: *Input HPF and Low Output HPF buttons are disabled for the Linear Phase Brick Wall 4-Way module. The LPBW 4-Way HPF is fixed to Input HPF. All other module types, including Linear Phase 2- and 3-Way modules provide the HPF switching option.*

Crossover Hide

Available only in Designer Mode. Please refer to the Lake Controller Designer Mode Manual for further details.

Crossover View Only

Available only in Designer Mode. Please refer to the Lake Controller Designer Mode Manual for further details.

EQ Preferences

This provides a sub-menu containing options regarding the view of the EQ scale. Please refer to section 8.3.5 for further details.

Crossover Copy

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

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 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; a Classic 4-Way crossover **cannot** be pasted into a Linear Phase Brick Wall 4-Way, etc.)

NOTE: *The crossover copy & paste functions transfer only the filter settings for the crossover and HPF/LPF (Contour) or HPF/LPF only (Mesa EQ). All levels and input EQ (PEQ/GEQ) will NOT be affected on the destination module.*

8.4.5 Crossover Split / Combine / Alignment Delay

This button's label depends on the state of the currently selected crossover and the module type (Classic = Split/Combine, Linear Phase = Alignment Delay).

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. *Not applicable for Linear Phase Crossovers.*

To split a crossover, tap a crossover filter box, then tap **Crossover Split**.

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. *Not applicable for Linear Phase Crossovers.*

To combine a previously split crossover, select the crossover filter box you wish to use, then tap **Crossover Combine**.

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 gentle low frequency linear phase crossover is acceptable, a shorter Alignment Delay can be achieved.

The label on this button reads **Alignment Delay** for Linear Phase Crossovers (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
Shorter Alignment Delay = gentle low freq linear phase crossover
Longer Alignment Delay = steep low freq linear phase crossover

LPBW 2-Way and LPBW 3-Way modules use different Alignment Delay settings to the LPBW 4-Way. Table 8-6 shows the highest and lowest frequencies available for the Linear Phase Brick Wall 2-Way/3-Way, along with associated roll-off per octave at these settings.

Linear Phase Brick Wall 2-Way and 3-Way				
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	125.0 Hz	11.01	12 kHz	93.37
10.00 ms	62.5 Hz	11.03	12 kHz	93.37

Table 8-6

Table 8-7 shows the highest and lowest frequencies available for the Linear Phase 24dB/octave 2-Way/3-Way.

Linear Phase 24dB/octave 2-Way/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
10.00 ms	129 Hz	6.022 kHz

Table 8-7

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

Linear Phase 48dB/octave 2-Way/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
10.00 ms	129 Hz	8.501 kHz

Table 8-8

Table 8-9 shows the highest and lowest frequencies available for the Linear Phase Brick Wall 4-Way, along with associated roll-off per octave at these settings.

Linear Phase Brick Wall 4-Way				
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 8-9

8.4.6 Crossover/HPF/LPF Select

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-Way/3-Way. *This function is not available for the Linear Phase 4-Way module.*

Tap **Crossover Select** to display a scroll-bar containing available crossover types. For a Classic crossover, the scroll-bar shown in Figure 8-13 will be displayed.

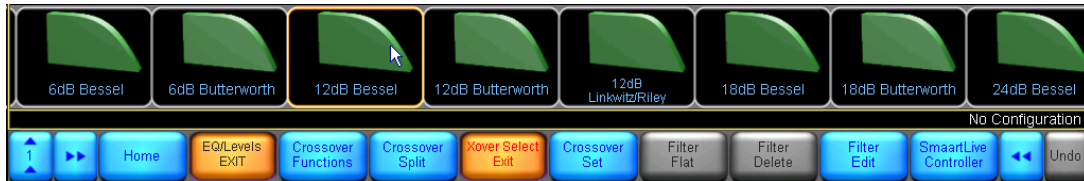


Figure 8-13

For a Linear Phase 2-/3-Way crossover, the scroll-bar shown in Figure 8-14 will be displayed.



Figure 8-14

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.

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.

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.

NOTE: The LPF is enabled via the HPF/LPF Functions menu – for further details refer to section 8.4.4.

8.4.7 Crossover/HPF Set/LPF Set or Filter Bypass/Insert

This button has various states depending on the status of the selected filter:

HPF Set

This button reads **HPF Set** when a high-pass filter has been selected from the **HPF Select** scroll-bar (refer to **Crossover Select** above for further details).

LPF Set

This button reads **LPF Set** when a low-pass filter has been selected from the **LPF Select** scroll-bar (refer to **Crossover Select** above for further details).

Crossover Set

This button reads **Crossover Set** when a crossover filter has been selected from the **Crossover Select** scroll-bar (refer to Crossover Select above for further details). *Not applicable for the Linear Phase Brick Wall 4-Way Crossover.*

Filter Bypass/Insert

This button read **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/Bypass** to activate/deactivate the selected filter.

A crossover filter can be disabled by splitting the crossover and tapping **Filter Bypass**.

NOTE: *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 until it turns blue.*

8.4.8 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.

8.4.9 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.

8.4.10 Filter Edit

Tap **Filter Edit** to manually enter values for a selected filter using the on-screen or manual keyboard. The values available for adjustment depend on whether a crossover or PEQ filter is selected.

Filter Selected	Editable values
Crossover/HPF/LPF	Frequency (Hz)
PEQ	Gain (dB), Frequency (Hz), Width (Octave)

Table 8-10

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 manual keyboard and tap **OK**
4. Tap **Filter Edit** again to exit this mode

8.4.11 Smart / SmartLive Unavailable

Please refer to section 8.3.12 SmartLive / SmartLive Unavailable for details on this function.

8.5 Auxiliary Output Channels

The Contour Processor provides various options to configure channels as auxiliary outputs. Up to six individually configured auxiliary outputs can be created (three per module). The *Auxiliary Output* module files disable traditional crossovers, allowing full-bandwidth or custom settings to be configured by the user. Independent **Aux** tabs are provided for each output channel instead of a unified Xover tab. These **Aux** tabs are addition to the parametric and graphic EQ settings 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- and high-pass filters. In Designer Mode, an All Pass filter is also available – *please refer to the Lake Controller Designer Mode manual for further details.*

Table 8-11 shows the available *Auxiliary Output* module types and the modules that these may be used in conjunction with:

Module Name	Available Uses
1 Auxiliary Output	Module B only where Module A contains a <i>Classic 5-Way</i> Module
2 Auxiliary Outputs	Module B only where Module A contains a <i>Classic 4-Way</i> Module
3 Auxiliary Outputs	Module A or Module B. The other Module of the Frame may contain any Classic or Linear Phase 2+1aux or 3 channel module.
4 Auxiliary Outputs	Module A only. An option to load either a <i>Classic 2-Way</i> or the <i>2 Auxiliary Outputs</i> modules is provided when loading the <i>4-Auxiliary Outputs</i> module.
5 Auxiliary Outputs	Module A only. Module B is loaded with the <i>1 Auxiliary Output</i> module.
6 Auxiliary Outputs	Module A/B only. Both modules are used for this module type.
Classic 2-way + Auxiliary Output	This file may be loaded into Module A or Module B. It provides an auxiliary output channel on output 3 (Module A) or output 6 (Module B). The other Module of the Frame may contain any Classic or Linear Phase 2+1aux or 3 channel module.
Linear Phase Brick Wall 2-way + Auxiliary Output	This file may be loaded into Module A or Module B. It provides an auxiliary output channel on output 3 (Module A) or output 6 (Module B). The other Module of the Frame may contain any Classic or Linear Phase 2+1aux or 3 channel module.

Table 8-11

8.5.1 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. Tap **Yes** for both warning messages.

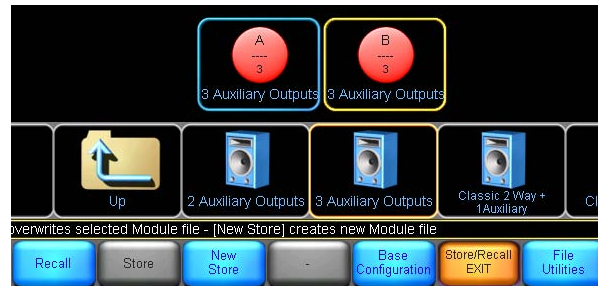


Figure 8-15

After loading an *Auxiliary Output* module file, access EQ / Levels for this module:

6. Tap **Store/Recall EXIT** then tap **EQ/Levels**

8.5.2 Adding Output-Specific EQ

The available overlays for the 3 *Auxiliary Output* module are shown here:



Figure 8-16

The Levels section of the Lake Controller is identical to that for other modules, as is the functionality for PEQ1 and GEQ2. Please refer to section for further information.

The XOVER tab is not displayed because it is not relevant for this module type. The XOVER tab will be present for the *Classic 2-Way + 1 Auxiliary Output* 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 8-17:

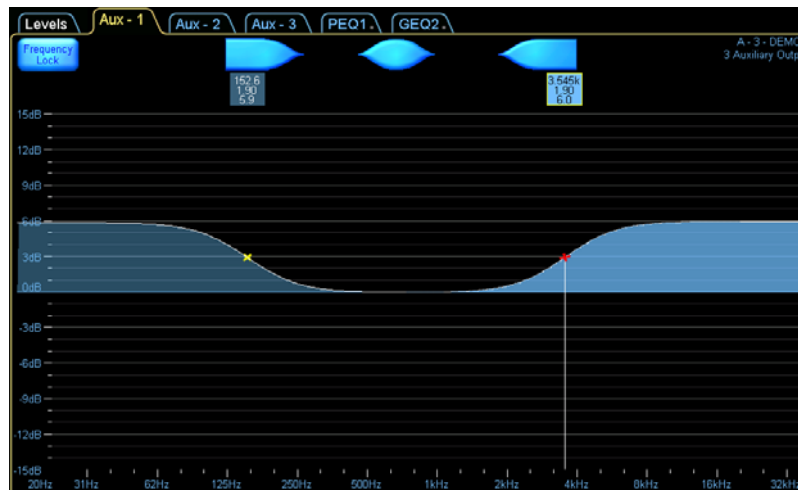


Figure 8-17

EQ added to an **Aux** tab only affects the associated output. Module and group PEQ and GEO still affect all outputs of the module.

8.5.3 High- and Low-Pass Filters

The high- and low-pass filter controls are located under the **Aux Output Functions** sub-menu.

1. With the **Aux-1** tab selected, tap **Aux Output Functions**.
2. Tap **HPF Enable** then **LPF Enable** to activate both filters.

The screen appears similar to Figure 8-18.

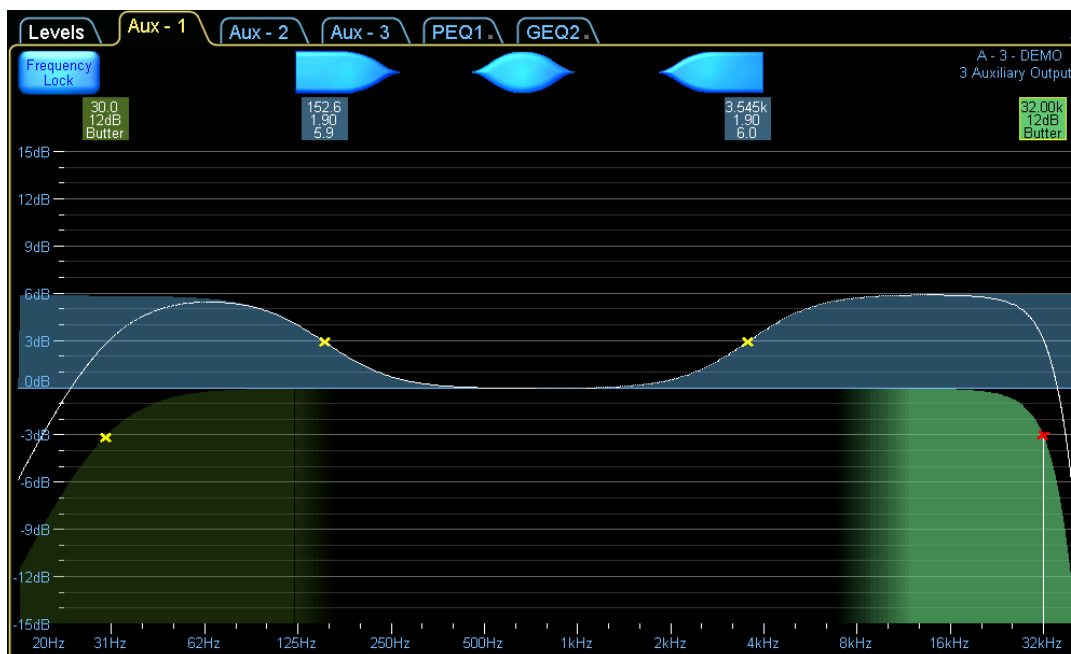


Figure 8-18

To adjust the slope of these filters:

3. Tap **Filter Select**
A scroll-bar appears displaying available HPF/LPF types
4. Drag the scroll-bar or use the >> and << buttons to view available filters
5. Select the *24dB Linkwitz-Riley* filter from the scroll-bar A yellow border indicates selection
6. Tap **Filter Set** to activate this filter and **Yes** to the warning message.



Figure 8-19

NOTE: To protect the speakers, the audio output for the affected channel is muted momentarily while the settings are changed.

7. Select the HPF by tapping its filter box located top-left of the screen
-

NOTE: The center frequency of a high-pass filter can be set to a minimum of 10Hz using the **Filter Edit** function.

8. Select the *18dB Butterworth* filter from scroll-bar
 9. Tap **Filter Set** then **Yes** to the warning message
 10. Tap **Aux Output Exit** to return to the EQ/Levels menu
-

NOTE: Steep high- and low-pass filters (e.g. 48dB) require more resources than softer slopes (e.g. 6dB). If both high- and low-pass filters are used on all outputs, we recommend using filters with slopes of 24dB or less to ensure adequate memory for output-specific EQ filters. Additional EQ can still be added using PEQ and GEQ.

8.5.4 Auxiliary Output Menu Options

The menu options shown in Figure 8-20 are available when an EQ filter is selected on an Auxiliary Output in the EQ/Levels section of an *Auxiliary Output* module.

A summary of the functions relevant to Auxiliary Outputs is shown in Table 8-12; many are identical to those used on the EQ and XOVER screens (refer to sections 8.3 and 8.4 for further details).



Figure 8-20

Button:	Function:
Home	Returns to the Home menu
EQ/Levels EXIT	Returns to the Home menu or to the Properties page if the screen was accessed via the Properties page interactive block diagram
Aux Output Functions	Provides EQ preferences, high- and low-pass filter options along with overlay copy/paste (and overlay access controls in designer mode)
Aux Output Flat	Deletes all EQ, HPF and LPF filters from the selected auxiliary output channel
Filter Bypass / Insert	Bypasses or Inserts a selected EQ filter (not applicable to high/low pass filters)
Filter Flat	Resets the gain of the selected EQ filter to zero; frequency and bandwidth are unchanged (not applicable for high/low pass filters)
Filter Delete	Deletes the selected EQ filter. (not applicable for high/low pass filters)
Filter Edit	Allows keyboard entry of gain, frequency and bandwidth values for EQ filters and frequency only for high/low-pass filters. Tap the required value at the top of the screen (high lighted in blue) to edit using the on-screen or manual keyboard.
SmaartLive / SmaartLive Unavailable	This button provides further sub-menus for the Lake SmaartLive Controller. If Smaart and/ or the SmaartLive Controller are not running on the network, this button will read <i>SmaartLive Unavailable</i> . Please refer to the SmaartLive Controller user manual for further information, or visit www.lake.com for further details.

Table 8-12



Figure 8-21

The functions shown on the button-bar above are described in Table 8-13 below.

Button:	Function:
Home	Returns to the Home menu
Aux Output Properties	Provides a sub-menu containing EQ Preferences (refer to Overlay Properties / EQ Preferences in section 8.3.5 Overlay Functions). Access control functions (Aux Output Hide and Aux Output View Only) are available only in Designer Mode – refer to the <i>Lake Controller Designer Mode Manual</i> for further details.
Aux Output Exit	Returns to the main EQ/Levels menu
Filter Select	When selected (orange), a scroll-bar is displayed with available high- and low-pass filters. Available only when a high- or low-pass filter is active and selected – it is not applicable to EQ filters.
Filter Set	This function is available after a high- or low-pass filter type has been selected from the Filter Select scroll-bar (refer to Figure 8-19)
HPF Enable	The high-pass filter is disabled when this button is blue, and enabled when orange.
LPF Enable	The low-pass filter is disabled when this button is blue, and enabled when orange.
Aux Output Copy	Tapping this button copies the settings of the currently selected output
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 that were previously copied. Auxiliary outputs can be copied and pasted within or between modules, but the data cannot be pasted on XOVER, PEQ or GEQ screen; the destination channel must be an Auxiliary Output.

Table 8-13

Chapter 9: Groups

9.1 Overview

Groups provide powerful control over all modules in a system. Modules can be assigned to multiple groups, with up to 28 groups available for each system.

Some of the functions that Groups enable include:

- Master EQ and Levels control over an entire system
- EQ and Levels control over sub-sections of a system (e.g. speaker clusters)
- HPF/LPF/Crossover/Auxiliary Output ganging, enabling a change to a crossover, or output specific EQ to be reflected across all modules of the same type within the group.
- Simplified control over multiple speakers or zones

Once your speakers are configured, the modules that control the detailed individual response for each speaker can be protected (refer to the *Designer Mode Manual*), or placed safely on another page (refer to Chapter 13: Pages) leaving Groups to simplify the overall control of the sound-system.

9.2 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 Main Page.

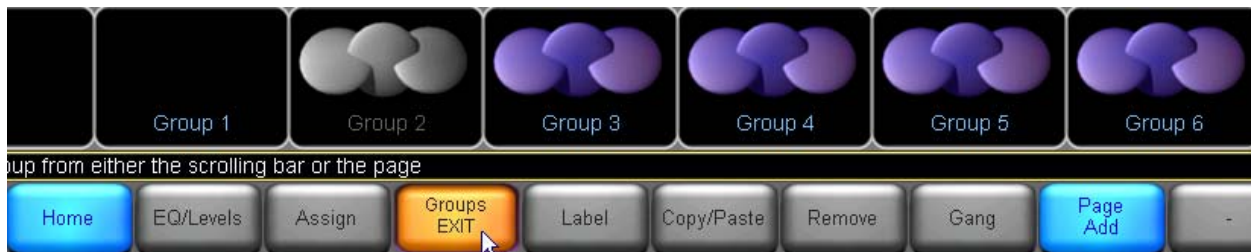


Figure 9-1

NOTE: Figure 9-1 - The Groups scroll-bar and menu shows the different status of 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 currently on the modules scroll-bar
- Group 3 onwards (purple) 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 your system configuration:

1. Tap a group icon on the scroll-bar. The cursor changes to the group icon
2. Tap on the Main Page to add the group to your system configuration
3. Follow the instructions in section 9.4 to assign modules to the Group
4. Follow steps in section 8.2.10 (Assign Meters) to assign metering from a module to be used by the group

9.3 EQ/Levels

Tap the **EQ/Levels** button from the **Groups** menu 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. The example below demonstrates the relationship between module level limits, module levels and group levels.

NOTE: Level limits are set in Designer Mode – please refer to the Lake Controller Designer Mode Manual for further details.

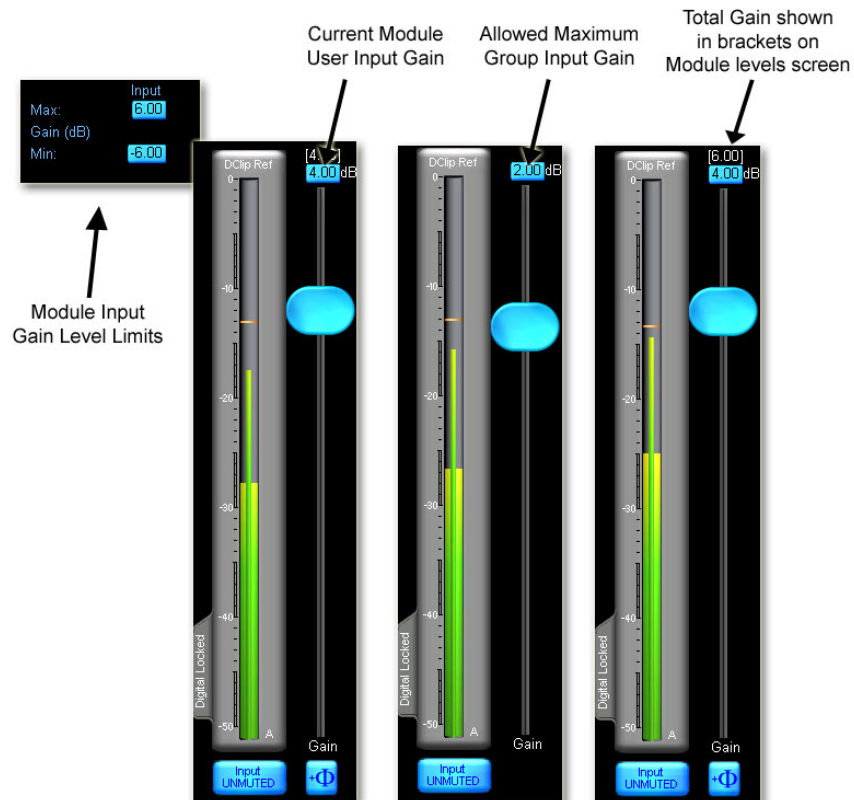


Figure 9-2

For further information on EQ and Levels, refer to Chapter 8: EQ, Levels, Xover, HPF & LPF

9.4 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/groups are in the work-area and navigate to the **Groups** menu.

To assign modules to a group:

1. Tap the **Assign** button to activate the function. The button illuminates orange.
2. Tap a group icon. The icon illuminates yellow.
3. Tap each module icon you wish to assign to that group. Each module icon border illuminates yellow indicating it is assigned to the selected group.
4. Tap the **Assign** button to deactivate the function. The button turns blue (inactive).

Module/group assignments are checked from the **Groups** menu by selecting a group icon in the work-area. The selected group and associated module icons have yellow borders as shown in Figure 9-3.

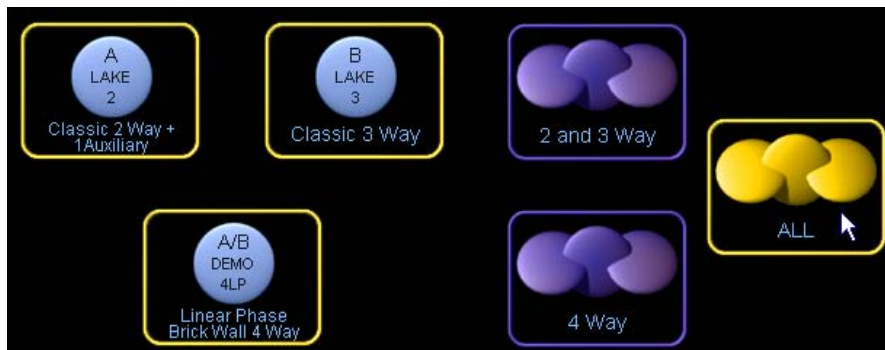


Figure 9-3

NOTE: Each module will not allow any group, or any combination of groups to break its min/max level limits – warning messages will be displayed if assigning a group would cause the module to exceed a pre-defined limit.

9.5 Label

The **Group Label** is a user-defined value at the bottom of the group icon that is useful for identifying which part of the sound system the group communicates to (e.g. front of house, monitors, downfill, etc.).

To label a group:

1. Tap the desired group icon on the main page
A yellow border indicates selection

2. Tap **Label** then enter a group label
3. Tap **OK**

9.6 Copy/Paste

Select a group from the Main Page and tap the **Copy/Paste** button to view a sub-menu that transfers attributes between groups.

9.6.1 Copy

The **Copy** button is active only when a group icon is selected.

To copy data from the group:

1. Tap the group icon that contains the data to copy.
A yellow border indicates selection.
2. Tap **Copy**.

9.6.2 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:

1. Tap the group icon to paste the copied data to.
A yellow border indicates selection.
2. Tap **Paste**.

NOTE: The Paste operation overwrites all of the destination group's EQ and Levels settings, but not the name or module assignments.

9.7 Remove

This function removes the selected group from the system configuration.

To remove a group:

1. Tap the group icon to be removed
A yellow border indicates selection.
2. Tap **Remove**
3. Confirm the action by selecting **YES** in 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 used.

NOTE: You can also remove a group from the configuration and de-assign its modules by dragging the group icon to the scroll-bar.

9.8 Gang

Tapping this button activates a scroll-bar containing all modules currently assigned to the selected group, along with a sub-menu.

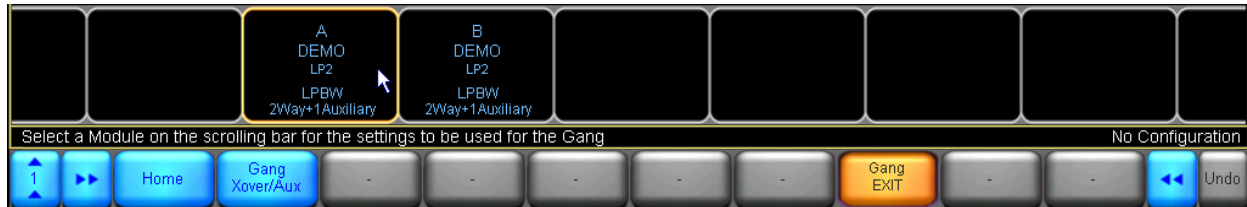


Figure 9-4

Gang Xover/Aux (Contour) or Gang HPF/LPF (Mesa EQ)

This function allows the crossovers, auxiliary output channels and/or HPF/LPF settings of modules on different frames to be linked together. When **Gang Xover/Aux** is active on a group containing Contour 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:

1. Assign modules to a group (refer to section 3.5.1 for further details)
All modules must be of the same crossover type (e.g. Classic 3-Way).
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) or **Gang HPF/LPF** (Mesa EQ)
5. Read the warning message and tap **YES** to complete

NOTE: Only the Xover/Aux/HPF/LPF/Output EQ data is ganged. Levels data and Input EQ (PEQ/GEQ) are NOT ganged – please use the Group function for master Levels and EQ control across multiple modules. For further details on Groups, please refer to Chapter 9:

9.9 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 (refer to Chapter 13: Pages).

Chapter 10: Solo/Mute

Tap the **Solo/Mute** button from the **Home** menu to display a sub-menu with Mute and Solo functions for modules and groups.

10.1 EQ/Levels

Tap the **EQ/Levels** button 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 from the Main Page. For further details about these functions, refer to Chapter 8: EQ, Levels, Xover, HPF & LPF

NOTE: When **Solo/Mute** is enabled, EQ/Levels can only be accessed for a module that is **soloed**.

10.2 Solo/Mute Enable

Tap the **Solo/Mute Enable** button to toggle the Solo/Mute functionality *On* (orange) and *Off* (blue). While the Solo/Mute function is *On*, the module icons are red when muted or green when soloed. All modules default to *solo* when Solo/Mute is first turned on.

Tap a module or group icon to keep solo 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 10-1 shows **Module B** of the frame labeled LAKE is soloed. The other two module icons are muted.

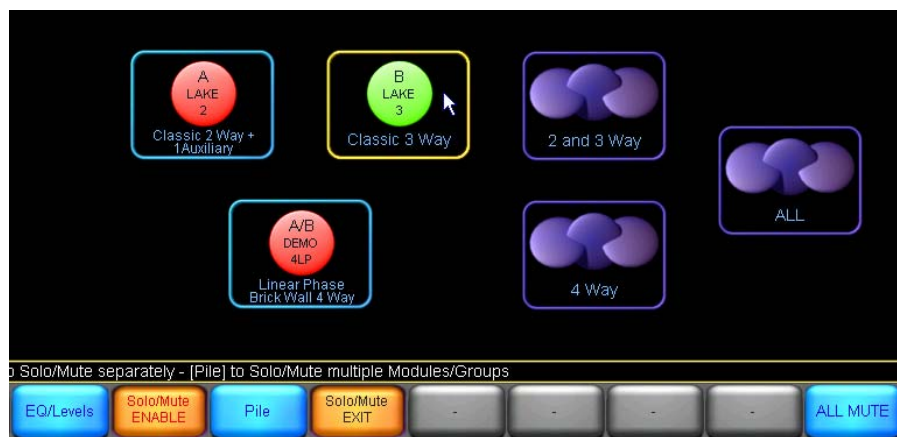


Figure 10-1

10.3 *Pile*

The Pile function designates multiple modules/groups to solo.

1. Tap the **Solo/Mute Enable** button from the **Solo/Mute** menu. The button illuminates orange.
2. Tap the **Pile** button. The button illuminates orange.
3. Tap a module/group icon to solo.
4. Repeat Step 3 for other modules/groups to solo.
5. Tap **Solo/Mute Enable** to exit from this function.

10.4 *All Mute*

To mute all modules in a system:

1. Tap **Solo/Mute Enable** from the **Solo/Mute** menu. The button illuminates orange.
2. Tap the **All Mute** button.
3. Tap **Solo/Mute Enable** or **Solo/Mute Exit** to resume normal status.

Chapter 11: Icon Control

Tap **Icon Control** to display a sub-menu with functions to alter the icon meter display and icon size. The metering and size is specific to each icon so a combination of settings can be present throughout a system.

11.1 Meters On/Off

This feature is active for modules when a module icon is selected and for groups when a module has been assigned for metering (for further information refer to section 3.5.2)

The icon on the left of Figure 11-1 displays the Module (A or B), Frame Label (e.g. LAKE), Module Type (e.g. '3' indicates a Classic 3-Way or 3-Auxiliary module), and the Module Label.

The icon on the right of Figure 11-1 displays the input Levels, output levels, limiting, clip warnings, and the module label.



Figure 11-1

To toggle between 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/group icon to toggle between the Meters On/Off.
4. Tap **Meters On/Off** again to exit this mode.

The **Icon Small**, **Icon Normal**, **Icon Medium**, and **Icon Large** buttons described below 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. **Meters On/Off** button is blue).

11.2 Icon Small/Normal/Medium/Large

Tap the icon size buttons to change the size of the selected module or group icon.

Chapter 12: User Preferences

Tap the **User Preferences** button from the **Home** menu to display a sub-menu containing functions and various additional menus as described below. **User Preferences** functions change settings system-wide.

12.1 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 (labeled (A) in Figure 12-1)



Figure 12-1

The Context menu enables selection of the number of views to be available throughout the system, along with the ability to disable the animation of the scroll-bar when context is being changed.

To set up a four contexts in your system:

1. From **Home** tap **User Preferences**
2. Tap **Contexts**, then tap **4**
3. Tap **Home**
4. Navigate to the first screen you wish to save as a context (view)
5. Tap the context button (A) to move to the next context
6. Repeat steps 4 and 5 until all four contexts are configured

Tapping the context button (A) now allows you to switch instantly between these views.

NOTE: *The last screen viewed is stored under the currently selected context*

12.2 Delay Units

The units used for setting Delay levels defaults to milliseconds.

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.

12.3 Designer Functions

12.3.1 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. Please refer to the *Lake Controller Designer Mode Manual* for further details.

12.3.2 Designer Mode

Tap the **Designer Mode** button 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:

- Global and Individual Overlay Access security settings
- Crossover (Contour) or HPF/LPF (Mesa EQ) Access security settings
- Hidden channels
- Factory settings and Level Limits

When Designer Mode is active a small ‘DM’ label appears next to the Lake logo at the bottom left of the screen.

Please refer to the *Lake Controller Designer Mode Manual* for further information.

12.3.3 Global Access

The Global Access function is active only when Designer Mode is *On*. It allows a system designer to hide or set to *view only* entire sections of the system. Please refer to the *Lake Controller Designer Mode Manual* for further details.

12.4 Keyboard Shortcuts

This button enables (orange) or disables (blue) keyboard shortcut functionality. For details on all available keyboard shortcuts, please refer to Chapter 16: Keyboard Shortcuts.

12.5 About

Tap the **About** button to view the current Lake Controller software version. Tap anywhere on screen to remove the **About** box.

12.6 Daylight Mode

Daylight Mode provides high contrast graphics on a white background, making the controller easier to view under daylight conditions.

Tap this button to toggle between normal graphics settings (black background) and daylight mode (white background).

12.7 Show Mode

Tap the **Show Mode** button to toggle Show Mode *On* (orange) and *Off* (blue). Show Mode should be activated during a show to prevent accidental changes.

When **Show Mode** is *On*:

- Channel Mute and Polarity buttons are disabled on all Levels screens.
- All changes to EQ and Levels are restricted to fine adjustments.
- All Xover screens become *view only*.
- All **Home** level menu options are disabled except **User Preferences** and **Network**.

Chapter 13: Pages

13.1 Overview

Tap the **Pages** button from the **Home** menu to display a sub-menu with functions that manage the Main work-area of the system, along with the module and group icons. The default system setting is one page labeled **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 example below shows a configuration containing three pages – one containing Groups for main front-of-house EQ and Levels, another for foldback EQ and Levels and another to store all the module icons.

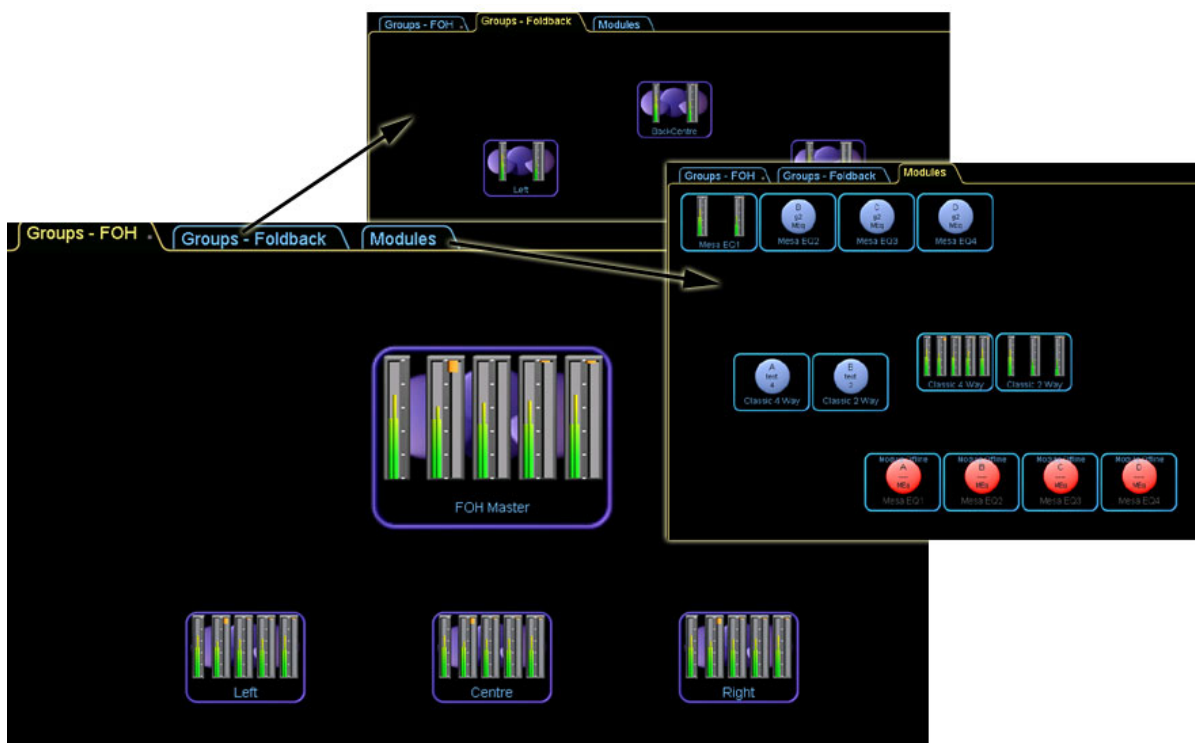


Figure 13-1

Each icon's size and display information can be changed as required – for further details refer to Chapter 11: Icon Control.

The Group metering shown above is based on a selected module's meters – this is described in section 8.2.10 Meter Options → Assign Meters.

13.2 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:

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**

13.3 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:

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 exist
4. Tap **Paste Icon**

NOTE: *There can only be one copy of an icon on a page.*

13.4 Paste Icon

The **Paste Icon** button is active only after a **Cut Icon** or **Copy Icon** action.

Please refer to the **Cut Icon** and **Copy Icon** examples above for usage of this function.

13.5 Page Label

The **Page Label** button is always active.

To label a page:

1. Select the page to be labeled (top of screen).
2. Tap **Page Label**.
3. Enter the label using the on-screen or manual keyboard. Keep the page label short if you have many pages in your system.
4. Tap **OK**.

13.6 Page Delete

The **Page Delete** button is inactive if the Main page is selected. This function deletes the selected page including all module and group icons, which return to their original positions on the relevant scroll-bars.

13.7 Add Page

Tap the **Add Page** button to add another page to the work-area.

13.8 Hide Page

This button is active only in Designer Mode and is used for hiding pages in the work-area. For further information, please refer to the Lake Controller Designer Mode Manual.

13.9 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.

Chapter 14: Network, Multiple Controllers and Working Offline

14.1 Select Network

Tap **Select Network** to display the network adapters used to connect your Lake Controller software with the processors. 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 tap **Yes** to the warning message

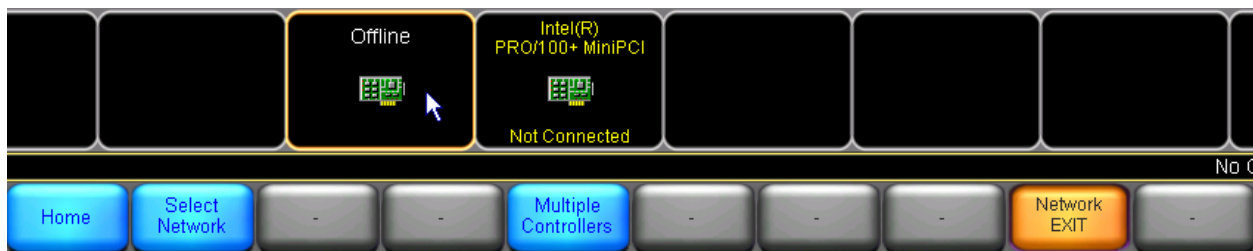


Figure 14-1

14.2 Multiple Controllers

14.2.1 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, with core EQ/Levels and Crossover functionality being available.

The first controller to connect to a network is referred to as the **Primary** controller – any subsequent controllers are referred to as **Secondary** controllers.

The options shown in Table 14-1 are available on the **Multiple Controllers** sub-menu, which is located on the **Network** menu.

Button:	Function:
Multi Cont Enable	This button is only available 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.
Confirmation Required	This button is only available on the Primary controller and is disabled (gray) on any Secondary controllers. When this button is active (orange) a confirmation dialogue 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.
Smaart Enable	When this button is active (orange), SmaartLive data will be displayed on this controller. If this button is inactive (blue), Smaart data will not be displayed. This button will be disabled (gray) if SmaartLive is not available.

Table 14-1

14.2.2 Networking Multiple Controllers

Multiple Controllers can be physically connected to the network in various ways. Networking is described in detail in sections 2.3 and 2.4 – follow the same principles for connecting multiple controllers to the network as you would to connect a single controller.

If a controller is connected directly to the processor, or via a wireless access point, each connection should be made into a port labeled **PC**. Connection via an external Ethernet hub, or using a crossover cable can be made into the ports labeled **UPLINK**.

Figure 14-2 shows an example network configuration using two controllers and three processors, with the Primary controller wired to the front **PC** connection and the wireless access point wired to a rear panel **PC** connection.

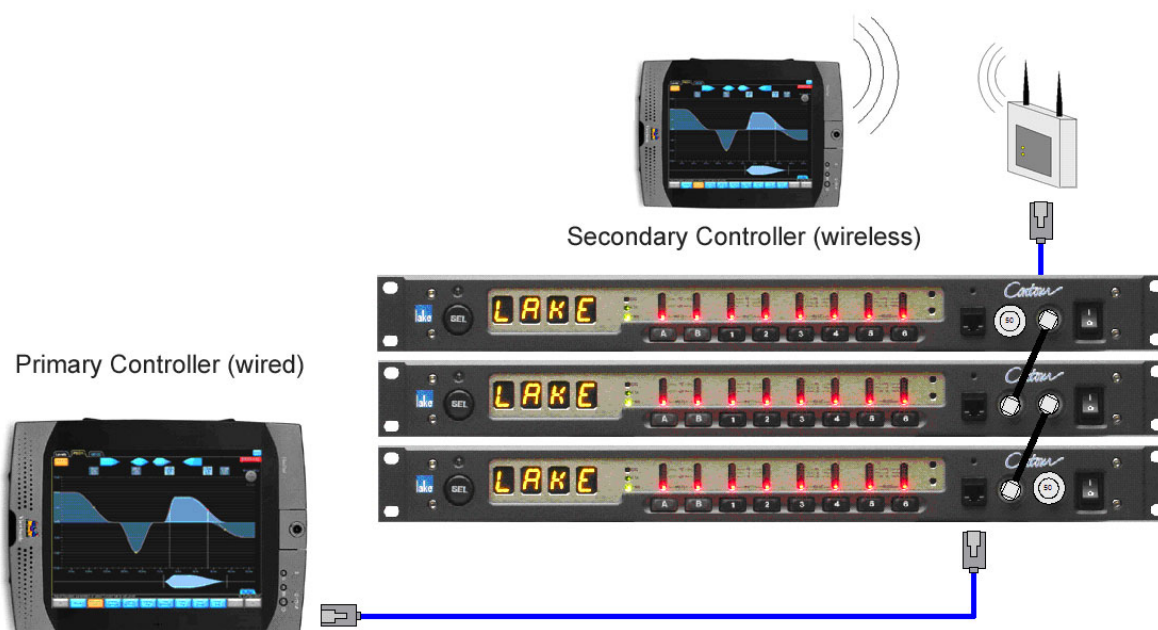


Figure 14-2

14.2.3 Primary and Secondary Controllers

The Primary controller communicates with the network of processors, and also with the Secondary controller(s). The Secondary controller(s) only communicate via the Primary controller as shown in Figure 14-3 below.

The Primary controller can be used in either Designer or User Mode (in which many Designer Mode functions will be restricted). Secondary controller(s) are always restricted to User Mode operation.

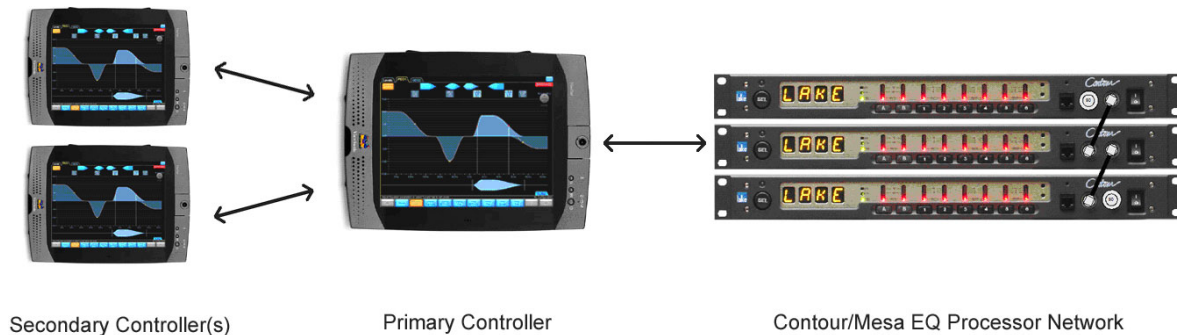


Figure 14-3

- 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. (refer to Chapter 15: for further details on synchronizing 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.

NOTE: When using Multiple Controllers, each controller must have a unique fixed IP address.

14.2.4 Restricted Functionality

Various system functions are restricted when multiple controller mode is active. Figure 14-4 shows the functions available on the **Home** menu while in multiple controller mode. The menu buttons shown in gray are unavailable.

Note the ****PRIMARY**** label on the far right of the help text, above the **Undo** button. This identifies the controller status, and will read ****SECONDARY**** for all Secondary controllers.



Figure 14-4

Certain functions on the EQ/Levels/Crossover screens are also restricted when using Multiple Controller Mode – any unavailable function is identified by a disabled (gray) button.

To restore full functionality, the Primary Controller has the ability to disable Multiple Controller mode using the **Multi Cont Enable** button as described in section 14.2.1. Disabling Multiple Controller Mode effectively disconnects all Secondary controllers, although the Primary controller can re-enable Multiple Controller in the same session and the Secondary Controllers will automatically reconnect.

NOTE: If Multiple Controller Mode is disabled then restored by the Primary Controller, the System Configuration will be completely refreshed on all Secondary Controllers to ensure data is synchronized.

14.2.5 Using SmaartLive Controller with Multiple Lake Controllers

If SmaartLive and SmaartLive Controller are available on the network, the SmaartLive data will be transmitted and displayed on all Lake Controllers that have the **Smaart Enable** button activated.

Each Lake Controller has the ability to disable SmaartLive independent of the other Lake Controllers (e.g. one controller could view SmaartLive data while other controllers continued working without SmaartLive data being displayed)

To enable/disable SmaartLive data on a controller:

1. From **Home**, tap **Network**, then **Multiple Controllers**
2. Toggle the **Smaart Enable** button (orange = enabled, blue = disabled)

14.3 Working Offline

The OFFLINE network in Figure 14-1 enables the controller to be used even if a network card is not enabled or present in the PC. This allows offline setup of system configurations on a PC that does not have a network card.

Therefore, systems can be created or modified when a network of processors are not available. To work offline; start the controller without a network adapter enabled; or select **Offline** during initial network selection on start-up; or tap the **Network** button in the button-bar (Figure 14-4) and select the network card graphic labeled **Offline** from the scroll-bar.

Most system functions can be used as normal.

NOTE: *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 network or processors.*

14.3.1 Dummy Modules

Dummy modules can be used while working offline. The dummy module provides the same functions as online modules*; they can be loaded with module files, copied and pasted, and stored as module files or as part of a system configuration. Crossover, Levels and EQ functions remain the same.

The dummy module does not have a physical processor assigned to it, and therefore the replace function is used to assign the module to a real online processor.

NOTE: **A base configuration file cannot be created from a dummy module.*

14.3.2 Replacing Dummy Modules with an online Processor

The **Module Store/Recall** or **Copy/Paste/Replace** functions can be used to transfer the data from a dummy module to an online processor.

Individual modules created offline can be stored as module files, and recalled into an online processor (refer to section 5.6 for further details)

Entire system configurations, including groups, can be created offline and stored using the **System Store/Recall** function (refer to Chapter 4: System Store and Recall)

To replace dummy modules in a system configuration, use the replace function as described in section 5.5, and then store the system configuration.

Chapter 15: Communication and Synchronization

15.1 Communication

The following sections describe important details pertaining to Lake Communication and Synchronization.

15.1.1 Computer/Processor Settings

The Lake Controller software (Computer) and the hardware processors (Processor) communicate via an Ethernet network. All updates made using the computer are transmitted in real-time to the network of processors. Both the computer and processors store all required information, which results two copies of the data for each module:

- A copy stored in the **Computer** software
- A copy stored in the **Processor** hardware

For examples of comparing and selecting Computer/Processor settings, please refer to section 15.2.2.

15.1.2 Offline Modules

A module that cannot be found on the network is referred to as *offline*. This can happen for the following reasons:

- The processor is turned off.
- The processor is not connected to the network.
- The wireless transmitter is out of range or turned off.
- Faulty network cable or hardware.

Dummy modules always show offline because they have not been assigned to a physical processor and therefore exist only in the computer.

15.1.3 Communication/Network Errors

The Lake Controller displays communication or network problems highlighted in red at the bottom-right of the screen:

[Communication Error] / [Network Error] / [All Offline]

If the problem persists, the affected modules become offline as described above. To rectify the situation, check all network connections and if using wireless, make sure the computer is within range of the Wireless Access Point.

15.2 Synchronization

The following sections describe the various synchronization processes between the software (Computer) and the hardware (Processors).

15.2.1 Re-Sync Process

The re-sync process ensures the computer and processor(s) are synchronized, or that the operator is informed of differences between the two copies of data.

The re-sync process compares the data in the computer with that stored in the processor(s). If differences are found, the Lake Controller software informs the user which modules are *out of sync* (please refer to section 15.2.2).

A re-sync occurs when:

- A system configuration file is recalled
- An offline module becomes online
- A network or communication error occurs

The controller advises that synchronization is occurring by displaying the messages shown in Figure 15-1.

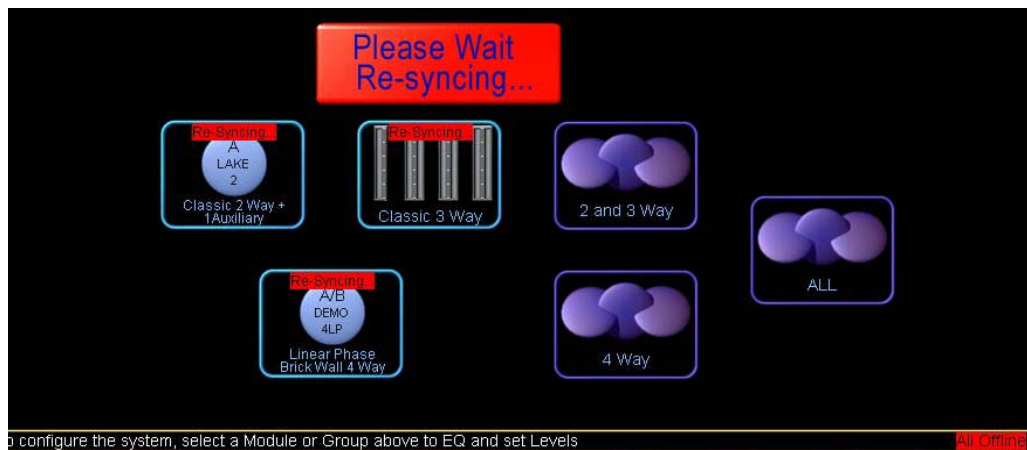


Figure 15-1

15.2.2 Out of Sync

The computer and processor(s) could become *out of sync* for the following reasons:

- An update was made using the controller software while a unit was offline
- A communication or network error occurred during an update

When the affected module(s) returns online, the controller compares its data with the processor's data. If differences are found, the controller highlights which modules are *out of sync* (refer to Figure 15-2).

NOTE: Any affected modules or related groups are set to **view only**. No further changes can be made until the computer and processors are synchronized. Audio will not be affected unless the **Use Computer Settings** option is selected (refer to section 15.2.3).

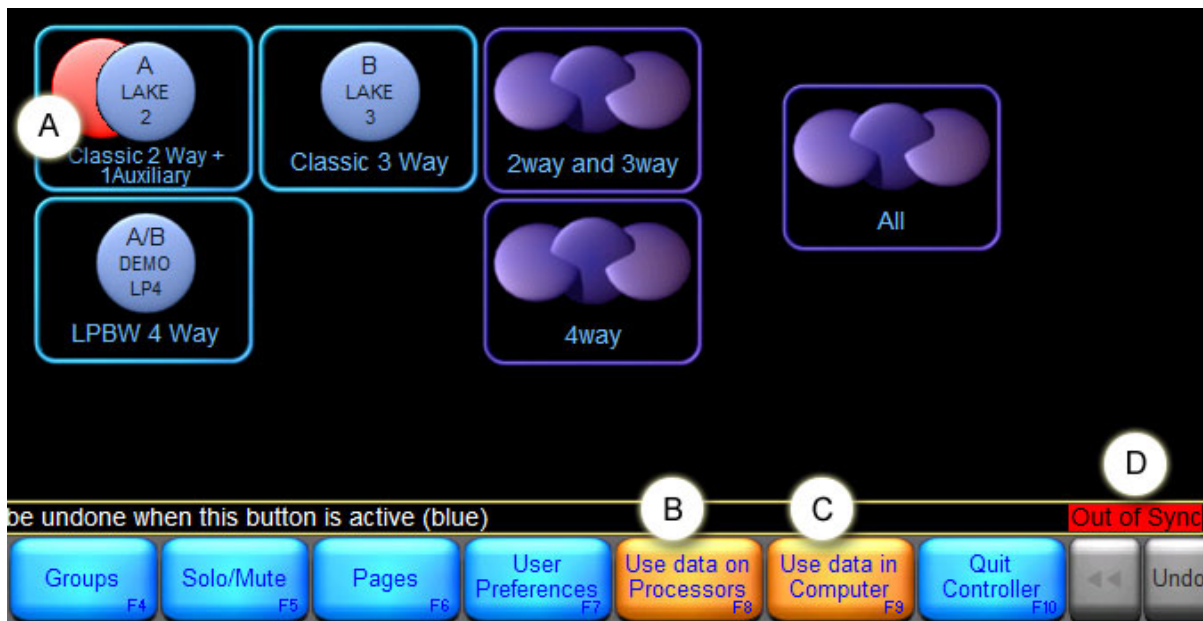


Figure 15-2

A	A red disc behind the normal module icon's disc indicates it is <i>out of sync</i> .
B	Flashing Use data on Processors button (Refer to section 15.1.1 Computer/Processor Settings)
C	Flashing Use data in Computer button (Refer section 15.1.1 Computer/Processor Settings)
D	A warning message is displayed here that is visible from any screen in the system.

Table 15-1

15.2.3 Updating all Processors with Computer Settings

To update all Processors with the information stored in the Computer:

1. From the **Home** menu, tap the flashing **Use data in Computer** button
2. Tap **Yes** on the warning message to confirm the action.

NOTE: This option may result in an audible affect, as the data in the processors will be overwritten with the data stored in the computer

15.2.4 Updating the Controller with current Processor Settings

To update the Lake Controller with the information stored in the Processors:

1. From the **Home** menu, tap the flashing **Use data on Processors** button.
2. Tap **Yes** on the warning message to confirm the action.

NOTE: Audio will not change if this option is selected.

15.2.5 Synchronizing the Lake Controller and Processors

In the following example, the module became *out of sync* due to a power interruption on the processor while the PEQ1 overlay was being updated using the controller. Figure 15-3 shows an example of the **Computer Settings** view, along with letters marking important information.



Figure 15-3

A	An Out of Sync module is set to <i>view only</i> . No changes can be made until the module is synchronized.
B	The settings currently viewed are identified here: Computer – Frame/Module name highlighted in red as <i>offline</i> as not currently being used 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 as described below.
E	The Out of Sync warning message is visible on all screens.
F	This button changes label depending on the currently selected view: Show Processor: when viewing the Computer settings Show Computer: when viewing the Processor settings
G	Tapping this button updates either the Computer or Processor with the settings currently being viewed.

Table 15-2

To compare/update settings stored in the Computer/Processor:

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 (refer to 15.1.1 Computer/Processor Settings).

15.2.6 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/Crossover/Levels settings differ from those currently used by the Processor, the audio signal may change or be momentarily muted while settings are configured if **Use data in Computer** is selected.

Chapter 16: Keyboard Shortcuts

16.1 Enabling/Disabling Keyboard Shortcuts

Keyboard shortcuts are enabled by default. To disable keyboard shortcuts:

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 the **Keyboard Shortcuts** button again to enable this feature.

16.2 General Keyboard Shortcuts

The following keyboard / mouse wheel shortcuts apply throughout the system:

Shortcut Key / Command	Area of System	Equivalent touch-screen operation
[Esc]	Warning / Error Messages / Dialog Boxes / On-screen Keyboard	Tapping [NO] or [CANCEL]
[Esc]	In sub-menus	Tapping EXIT (exiting up one menu level)
[Enter]	Warning / Error Messages or Dialog Boxes / On-screen Keyboard	Tapping [YES] or [OK]
Mouse Wheel	On a filter point (Xover, PEQ or GEQ screens)	Dragging the filter point up or down (Filter gain cut/boost)

16.3 Button-Bar Shortcuts

16.3.1 Context Switching

To change a context view using the keyboard:

1. Hold down the [C] key
2. Tap the number on the keyboard that corresponds to the required context
3. Release the [C] key

16.3.2 Main Navigation/Function Buttons

The **F1-F10** keys are mapped sequentially from left to right to the main navigation and function buttons on the button-bar. Pressing an 'F' key will have the same effect as tapping the associated button with a touch-screen pen or mouse-pointer. This applies to all button-bar buttons throughout the system.

16.3.3 Undo/Redo

To undo/redo the last levels or EQ change:

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.

16.4 Shortcut Combination Keys

Throughout the following sections, specific actions are described. These are based around the following generic rules for certain keys as shown below.

Shortcut Key	Action Description
TAB	Moves forwards (to the right) through pages (Main work-area), screens, or EQ overlay tabs
SHIFT	With TAB reverses the order or page/screen navigation With arrow keys, selects Fine Adjustment mode (Levels/EQ/Xover/Aux)
CAPS LOCK	Permanently selects Fine Adjustment mode (Levels/EQ/Xover/Aux). NOTE: Caps Lock does not work in conjunction with TAB
CTRL	Allows a key to perform another related function

16.5 EQ, Levels, Xover and Aux Screens – General

For the purposes of keyboard shortcut navigation, the TAB functions will cycle through all Levels screen if a levels screen is selected; or through all Xover/Aux/EQ screens if any Xover/Aux/EQ screen is selected.

Shortcut Key1	With Key2	Action Description
TAB	CTRL	Cycles forwards through the visible screens for either Levels or Xover/Aux/EQ, depending on what is currently selected.
TAB		Moves forwards (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 backwards (to the left) through visible screens/overlays. On the screen overlay, it will cycle to the last screen/overlay.

16.6

16.7 GEQ Overlay

Shortcut Key1	With Key2	Action Description
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
Up Arrow	SHIFT or CapsLock	Increases the gain of the selected GEQ filter (Fine Adjustment Mode)
Down Arrow		Decrease the gain of the selected GEQ filter
Down Arrow	SHIFT or CapsLock	Decrease the gain of the selected GEQ filter (Fine Adjustment Mode)

16.8 PEQ Overlay

Shortcut Key1	With Key2	Action Description
1		Adds a Low Shelf Filter at 125Hz
2		Adds a Parametric Filter at 500Hz
3		Adds a Mesa Filter with Low Freq at 830 Hz and Hi Freq at 1.2 kHz
4		Adds a High Shelf Filter at 8kHz
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
F	CTRL	The Hi Frequency value of a selected MESA 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
B	CTRL	The Hi Bandwidth of the selected MESA filter is displayed in the on-screen keyboard for instant editing
<		Moves the center frequency of the selected filter to the left
<	SHIFT or CapsLock	Moves the center frequency of the selected filter to the left (Fine Adjustment Mode)
>		Moves the center frequency of the selected filter to the right
>	SHIFT or CapsLock	Moves the center frequency of the selected filter to the right (Fine Adjustment Mode)
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

Shortcut Key1	With Key2	Action Description
Up Arrow	SHIFT or CapsLock	Increases the gain of the selected PEQ filter (Fine Adjustment Mode)
Down Arrow		Decrease the gain of the selected PEQ filter
Down Arrow	SHIFT or CapsLock	Decrease the gain of the selected PEQ filter (Fine Adjustment Mode)
Q		Increase the bandwidth of the selected filter (Lowest Frequency segment of a MESA filter)
W		Decrease the bandwidth of the selected filter (Lowest Frequency segment of a MESA filter)
A		Increase the Hi Bandwidth of a selected MESA filter
S		Decrease the Hi Bandwidth of a selected MESA filter
Q	CTRL	Move the low frequency segment of a MESA filter to the left
W	CTRL	Move the low frequency segment of a MESA filter to the right
A	CTRL	Move the hi frequency segment of a MESA filter to the left
S	CTRL	Move the hi frequency segment of a MESA filter to the right

16.9 Xover/Aux Screens

Shortcut Key1	With Key2	Action Description
1		Adds a Low Shelf Filter to the selected output at 125Hz
2		Adds a Parametric Filter to the selected output at 500Hz
3		DESIGNER MODE ONLY: Adds an All Pass filter to the selected output at 1kHz
4		Adds a High Shelf Filter to the selected output at 8kHz
G		The Gain value for the selected filter is displayed in the on-screen keyboard for instant editing. (Not applicable to HPF/LPF filters)
F		The Frequency value of the selected filter (EQ, HPF or LPF) 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. (Not applicable to HPF/LPF filters)
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 only available in Designer Mode)
<		Moves the center frequency of the selected filter to the left
<	SHIFT or CapsLock	Moves the center frequency of the selected filter to the left (Fine Adjustment Mode)
>		Moves the center frequency of the selected filter to the right
>	SHIFT or CapsLock	Moves the center frequency of the selected filter to the right (Fine Adjustment Mode)
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
Up Arrow	SHIFT	Increases the gain of the selected EQ filter (Fine Adjustment Mode)
Down Arrow		Decrease the gain of the selected EQ filter
Down Arrow	SHIFT	Decrease the gain of the selected EQ filter (Fine Adjustment Mode)
Q		Increase the bandwidth of the selected EQ filter
W		Decrease the bandwidth of the selected EQ filter

16.10 Levels Screens

Shortcut Key1	With Key2	Action Description
0 (zero)	ENTER	Displays on-screen keyboard for instant INPUT level editing of the currently selected level type.
1	ENTER	Displays on-screen keyboard for instant Output 1 level editing of the currently selected level type.
2	ENTER	Displays on-screen keyboard for instant Output 2 level editing of the currently selected level type.
3	ENTER	Displays on-screen keyboard for instant Output 3 level editing of the currently selected level type.
4	ENTER	Displays on-screen keyboard for instant Output 4 level editing of the currently selected level type.
5	ENTER	Displays on-screen keyboard for instant Output 5 level editing of the currently selected level type.
6	ENTER	Displays on-screen keyboard for instant Output 6 level editing of the currently selected level type.
0 (zero)	Up/Down Arrow	Increases (Up) / Decreases (Down) the INPUT level of the selected level type
1	Up/Down Arrow	Increases (Up) / Decreases (Down) the Output 1 level of the selected level type
2	Up/Down Arrow	Increases (Up) / Decreases (Down) the Output 2 level of the selected level type
3	Up/Down Arrow	Increases (Up) / Decreases (Down) the Output 3 level of the selected level type
4	Up/Down Arrow	Increases (Up) / Decreases (Down) the Output 4 level of the selected level type
5	Up/Down Arrow	Increases (Up) / Decreases (Down) the Output 5 level of the selected level type
6	Up/Down Arrow	Increases (Up) / Decreases (Down) the Output 6 level of the selected level type
0 to 6	Up/Down with Shift or CapsLock	Fine Level Adjustment Mode for the number + arrow combinations listed above

Chapter 17: Contour Front Panel Functions

Various information and functions are available from the Lake processor's front panel. These features are detailed below, along with the impact they have on the Lake Controller interface.

Function	Action [Button]	Effect in Processor	Effect in Controller
Select Processor	Tap [SEL]	No effect	The text on the module icon is highlighted yellow in the work-area and the module scroll-bar in the modules menu locates the selected processor
Display Module Names	Press+hold [SEL]	The module name and base configuration scroll across the front panel of the processor	As above
Display Channel Name	Press+hold [SEL] then press+hold Input or Output Mute button	The selected input/output channel name as defined in the controller will scroll across the front panel of the processor	As above
Display Current Firmware Version	Press+hold [SEL] then press+hold [A]+[B] together	Firmware versions will scroll across the front panel of the processor.	As above
Factory Reset (Partial)	Press+hold [1]+[4] while turning on processor	All data with the exception of Frame/System Presets and IP Address are reset to the factory default state.	If the frame is in the work-area, a re-sync will occur and the modules will show as out-of-sync.
Factory Reset (Full)	Press+hold [1]+[5] while turning on processor	All data is reset to a factory default state.	As above
Enter and Exit Preset Mode	Press+hold [SEL] then press+hold [1]+[6] together	The characters PRST appear on the front panel. While in this mode, all buttons function differently.	If a different preset is recalled, the controller will re-sync resulting in out-of-sync modules if the selected frame is in the work-area.
		Please refer to section 5.6.6 for further details on Frame Presets.	

Chapter 18: Mesa EQ Front Panel Functions

Various information and functions are available from the Mesa EQ processor's front panel. These features are detailed below, along with the impact they have on the Lake Controller interface.

Function	Action [Button]	Effect in Processor	Effect in Controller
Select Processor	Tap [SEL]	No effect	The text on the module icon is highlighted yellow in the work-area and the module scroll-bar in the modules menu locates the selected processor
Display Module Names	Press+hold [SEL]	The module name and base configuration scroll across the front panel of the processor	As above
Display Channel Name	Press+hold [SEL] then press+hold Input or Output Mute button	The selected input/output channel name as defined in the controller will scroll across the front panel of the processor	As above
Display Current Firmware Version	Press+hold [SEL] then press+hold input 1 and output 1 mute buttons together	The ARM and DSP firmware versions will scroll across the front panel of the processor.	As above
Factory Reset (Partial)	Press+hold input 2 and output 3 mute buttons while turning the processor on	All data with the exception of Frame/System Presets and IP Address are reset to the factory default state.	If the frame is in the work-area, a re-sync will occur and the modules will show as out-of-sync.
Factory Reset (Full)	Press+hold input 2 and input 4 mute buttons while turning the processor on	All data is reset to a factory default state.	As above
Enter and Exit Preset Mode	Press+hold [SEL] then press+hold input 4 and output 4 mute buttons together	The characters PRST appear on the front panel. While in this mode, all buttons function differently.	If a different preset is recalled, the controller will re-sync resulting in out-of-sync modules if the selected frame is in the work-area.
		Please refer to section 5.6.6 for further details on Frame Presets.	

Chapter 19: External Control Interfaces

19.1 AMX Control

Functionality is currently available for the following functions via AMX Control:

- Frame Preset Recall
- Gain Change
- Input Mute/Unmute
- Output Mute/Unmute
- Retrieve/Set Frame Name
- SEL LED On/Off

Please contact support@proaudio.lake.com if you require further information on AMX control, or to request additional AMX functionality.

19.2 MIDI Control

19.2.1 Overview

An external hardware device, or software program may be configured to transmit MIDI System Exclusive messages (SysEx) to the Lake Controller software, which will trigger the requested change to the processors on the network.

To enable this functionality, the Lake Controller PC must provide a MIDI Input, and associated MIDI software drivers – commonly via the PC's soundcard, or a dedicated MIDI Input/Output device.

19.2.2 Available Functionality via MIDI

The following functionality is available via MIDI System Exclusive messages:

- Frame Preset Recall (00)
- Group Overlay Bypass/Insert (01)
- Module Overlay Bypass/Insert (02)
- Group Input Mute/Unmute (03)
- Module Input Mute/Unmute (04)
- Group Input Delay (05)

This functionality is explained in detail in the following sections.

19.2.3 Hex conversion tables for SysEx messages

System Exclusive (SysEx) messages are structured using a string of two character Hex codes. These tables show the common numbers and alpha characters that can be used for the purposes of Lake Controller MIDI messaging.

Numeric Value > Hex Code Conversion Table

Numeric values are used to identify specific data within the message as described later in this chapter – these numeric values must be entered as Hex in the SysEx message. (e.g. The Hex code of 0C (zero, 'C') would be used to identify Group 12 for the Group muting function.)

No.	Hex	No.	Hex	No.	Hex	No.	Hex	No.	Hex	No.	Hex
1	01	10	0A	19	13	28	1C	37	25	46	2E
2	02	11	0B	20	14	29	1D	38	26	47	2F
3	03	12	0C	21	15	30	1E	39	27	48	31
4	04	13	0D	22	16	31	1F	40	28	49	32
5	05	14	0E	23	17	32	20	41	29	50	33
6	06	15	0F	24	18	33	21	42	2A	51	34
7	07	16	10	25	19	34	22	43	2B	52	35
8	08	17	11	26	1A	35	23	44	2C	53	36
9	09	18	12	27	1B	36	24	45	2D	54	37

Alpha Character > Hex Code Conversion Table

Alpha characters are used to identify which processor to update for some MIDI commands. The frame name should be configured using capital letters and each frame on the network must have a unique name.

Character	Hex	Character	Hex	Character	Hex
- (dash)	2D	I	49	R	52
A	41	J	4A	S	53
B	42	K	4B	T	54
C	43	L	4C	U	55
D	44	M	4D	V	56
E	45	N	4E	W	57
F	46	O	4F	X	58
G	47	P	50	Y	59
H	48	Q	51	Z	5A

For other numbers and characters, please refer to standard ASCII/HEX mapping tables.

19.2.4 Frame Preset Recall via MIDI (00)

The SysEx message structure for Frame Preset Recall is shown below:

Byte	1	2	3	4	5	6	7	8	9	10	11
SysEx Msg e.g.	F0	00	20	5A	00	2D	2D	2D	2D	01	F7

Byte	Description	Notes
1	Start SysEx Message Identifier	Always F0
2	Manufacturer ID – Byte One	00 20 5A for all Lake Midi messaging
3	Manufacturer ID – Byte Two	
4	Manufacturer ID – Byte Three	
5	Identifies the message type	00 = Frame Preset Recall
6	1 st character of Frame Name	The Frame Name must be unique on the network. Use capital alphanumeric values – refer to section 19.2.3 for Alpha>Hex mapping. The Hex code 2D in the example above represents the character “.”, which is the default frame name.
7	2 nd character of Frame Name	
8	3 rd character of Frame Name	
9	4 th character of Frame Name	
10	Frame Preset number to be recalled	01 → 06 respectively
11	Finish SysEx Message	Always F7

19.2.5 Insert/Bypass Group EQ Overlay via MIDI (01)

The SysEx message structure for Insert/Bypass Group EQ Overlay is shown below:

Byte	1	2	3	4	5	6	7	8	9
SysEx Msg e.g.	F0	00	20	5A	01	04	01	01	F7

Byte	Description	Notes
1	Start SysEx Message Identifier	Always F0
2	Manufacturer ID – Byte One	00 20 5A for all Lake Midi messaging
3	Manufacturer ID – Byte Two	
4	Manufacturer ID – Byte Three	
5	Identifies the message type	01 = Insert/Bypass Group EQ Overlay
6	Identifies the Group number	Group1 [01] through to Group 28 [1C] – refer to section 19.2.3 for Number>Hex mapping
7	Number of the Overlay to insert/bypass	PEQ1 = 01 , PEQ2 = 02 , etc. (01 → 04)
8	Signifies whether to insert or bypass	Bypass = 00 ; Insert = 01
9	Finish SysEx Message	Always F7

19.2.6 Insert/Bypass Module EQ Overlay via MIDI (02)

The SysEx message structure for Insert/Bypass Group EQ Overlay is shown below:

Byte	1	2	3	4	5	6	7	8	9	10	11	12	13
SysEx Msg e.g.	F0	00	20	5A	02	2D	2D	2D	2D	01	01	00	F7

Byte	Description	Notes
1	Start SysEx Message Identifier	Always F0
2	Manufacturer ID – Byte One	00 20 5A for all Lake Midi messaging
3	Manufacturer ID – Byte Two	
4	Manufacturer ID – Byte Three	
5	Identifies the message type	02 = Insert/Bypass Module EQ Overlay
6	1 st character of Frame Name	The Frame Name must be unique on the network. Use capital alphanumeric values – refer to section 19.2.3 for Alpha>Hex mapping. The Hex code 2D in the example above represents the character “-”, which is the default frame name.
7	2 nd character of Frame Name	
8	3 rd character of Frame Name	
9	4 th character of Frame Name	
10	Module Reference	Module A = 01 Module B = 02 Module C = 03 (Mesa Only) Module D = 04 (Mesa Only)
11	Number of the Overlay to insert/bypass	PEQ1 = 01 , GEQ2 = 02 , etc. (01 → 08)
12	Signifies whether to insert or bypass	Bypass = 00 ; Insert = 01
13	Finish SysEx Message	Always F7

19.2.7 Mute/Unmute Group Input via MIDI (03)

The SysEx message structure for Insert/Bypass Group EQ Overlay is shown below:

Byte	1	2	3	4	5	6	7	8
SysEx Msg e.g.	F0	00	20	5A	03	01	01	F7

Byte	Description	Notes
1	Start SysEx Message Identifier	Always F0
2	Manufacturer ID – Byte One	00 20 5A for all Lake Midi messaging
3	Manufacturer ID – Byte Two	
4	Manufacturer ID – Byte Three	
5	Identifies the message type	03 = Mute/Unmute Group Input
6	Identifies the Group number	Group1 [01] through to Group 28 [1C] – refer to section 19.2.3 for Number>Hex mapping
7	Signifies whether to mute or unmute	Unmute = 00 ; Mute = 01
8	Finish SysEx Message	Always F7

19.2.8 Mute/Unmute Module Input via MIDI (04)

The SysEx message structure for Insert/Bypass Group EQ Overlay is shown below:

Byte	1	2	3	4	5	6	7	8	9	10	11	12
SysEx Msg e.g.	F0	00	20	5A	04	2D	2D	2D	2D	01	01	F7

Byte	Description	Notes
1	Start SysEx Message Identifier	Always F0
2	Manufacturer ID – Byte One	00 20 5A for all Lake Midi messaging
3	Manufacturer ID – Byte Two	
4	Manufacturer ID – Byte Three	
5	Identifies the message type	04 = Mute/Unmute Module Input
6	1 st character of Frame Name	The Frame Name must be unique on the network. Use capital alphanumeric values – refer to section 19.2.3 for Alpha>Hex mapping. The Hex code 2D in the example above represents the character “-”, which is the default frame name.
7	2 nd character of Frame Name	
8	3 rd character of Frame Name	
9	4 th character of Frame Name	
10	Module Reference	Module A = 01 Module B = 02 Module C = 03 (Mesa Only) Module D = 04 (Mesa Only)
11	Signifies whether to mute or unmute	Unmute = 00 ; Mute = 01
12	Finish SysEx Message	Always F7

19.2.9 Change Group Input Delay via MIDI (05)

The SysEx message structure for changing Group Input Delay is shown below:

Byte	1	2	3	4	5	6	7	8	9	10
SysEx Msg e.g.	F0	00	20	5A	05	01	11	2B	4B	F7

Byte	Description	Notes
1	Start SysEx Message Identifier	Always F0
2	Manufacturer ID – Byte One	00 20 5A for all Lake Midi messaging
3	Manufacturer ID – Byte Two	
4	Manufacturer ID – Byte Three	
5	Identifies the message type	05 = Change Group Input Delay
6	Identifies the Group number	Group1 [01] through to Group 28 [1C] – refer to section 19.2.3 for Number>Hex mapping
7	(1)00 → (20)00 milliseconds of delay	First pair of digits representing hundreds and thousands; e.g. 11 = 1700 ms
8	(1)>(99) → milliseconds of delay	Second pair of digits representing single units and tens; e.g. 2B = 43 ms
9	0.(01) → 0.(99) milliseconds of delay	Third pair of digits representing numbers after decimal place; e.g. 4B = 0.75 ms
10	Finish SysEx Message	Always F7

i.e. Byte 7,8 and 9 form the delay time in milliseconds - xx.yy.zz where xx is byte 7, yy is byte 8 and zz is byte 9. In the example above (11:2B:4B) the resulting time in milliseconds is 1743.75.



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