



DL1608™

REFERENCE GUIDE



MACKIE®

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 a 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 are 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. Use only with a cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. 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.
15. This apparatus shall not be exposed to dripping or splashing, and no object filled with liquids, such as vases or beer glasses, shall be placed on the apparatus.



CAUTION

RISK OF ELECTRIC SHOCK. DO NOT OPEN

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK DO NOT REMOVE COVER (OR BACK) NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED PERSONNEL

The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure, that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user of the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

Correct Disposal of this product: This symbol indicates that this product should not be disposed of with your household waste, according to the WEEE Directive (2002/96/EC) and your national law. This product should be handed over to an authorized collection site for recycling waste electrical and electronic equipment (EEE). Improper handling of this type of waste could have a possible negative impact on the environment and human health due to potentially hazardous substances that are generally associated with EEE. At the same time, your cooperation in the correct disposal of this product will contribute to the effective usage of natural resources. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, waste authority, or your household waste disposal service.

16. Do not overload wall outlets and extension cords as this can result in a risk of fire or electric shock.
17. The MAINS plug or an appliance coupler is used as the disconnect device, so the disconnect device shall remain readily operable.
18. NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
 - Reorient or relocate the receiving antenna.
 - Increase the separation between the equipment and the receiver.
 - Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
 - Consult the dealer or an experienced radio/TV technician for help.

CAUTION: Changes or modifications to this device not expressly approved by LOUD Technologies Inc. could void the user's authority to operate the equipment under FCC rules.

19. This apparatus does not exceed the Class A/Class B (whichever is applicable) limits for radio noise emissions from digital apparatus as set out in the radio interference regulations of the Canadian Department of Communications.

ATTENTION — *Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de class A/de class B (selon le cas) prescrites dans le règlement sur le brouillage radioélectrique édicté par les ministere des communications du Canada.*

20. Exposure to extremely high noise levels may cause permanent hearing loss. Individuals vary considerably in susceptibility to noise-induced hearing loss, but nearly everyone will lose some hearing if exposed to sufficiently intense noise for a period of time. The U.S. Government's Occupational Safety and Health Administration (OSHA) has specified the permissible noise level exposures shown in the following chart.

According to OSHA, any exposure in excess of these permissible limits could result in some hearing loss. To ensure against potentially dangerous exposure to high sound pressure levels, it is recommended that all persons exposed to equipment capable of producing high sound pressure levels use hearing protectors while the equipment is in operation. Ear plugs or protectors in the ear canals or over the ears must be worn when operating the equipment in order to prevent permanent hearing loss if exposure is in excess of the limits set forth here:

Duration, per day in hours	Sound Level dBA, Slow Response	Typical Example
8	90	Duo in small club
6	92	
4	95	Subway Train
3	97	
2	100	Very loud classical music
1.5	102	
1	105	Ben screaming at Troy about deadlines
0.5	110	
0.25 or less	115	Loudest parts at a rock concert

WARNING — To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.

Table of Contents

Important Safety Instructions	2
--	----------

Table Of Contents	3
--------------------------------	----------

Chapter 1: Welcome.....	8
--------------------------------	----------

Version 1.2.....	8
About This Guide	8
Features	8
Introduction	9
Architecture Overview	11
Hardware.....	11
Software	11

Chapter 2: DL1608 Hardware : Front Panel	12
---	-----------

Introduction	12
iPad Tray Insert Removal [for the original iPad]	12
iPad Tray Insert Reinstall [for the all iPads, except the original]	13
iPad Dock Connector.....	14
PadLock™	15
Gain Knobs	16
Sig / OL LEDs	16
Phones Output Jack.....	16
Phones Knob	16

Chapter 3: DL1608 Hardware : Rear Panel.....	17
---	-----------

Power Connector	17
Power Switch.....	17
Power LED	18
Phantom Power Switch	18
Phantom Power LED.....	18
XLR and 1/4" Inputs	18
L/R Main Outs.....	19
Aux Sends 1-6	20
Kensington Lock	20
Network Connector	21
Force Update Button	21

Chapter 4: DL1608 Hardware : Wireless Setup 22

Introduction	22
Wi-Fi Router.....	22
Network Connectivity	22
Connect	23
Router Settings	25

Chapter 5: Mackie Master Fader Software 26

Introduction	26
Downloading and Installing the Master Fader App.....	26
Updating the Master Fader App	27
Updating the DL1608 Firmware	28
Lingo	29
Tapping, Dragging, Flicking, Swiping and Pinching.....	29
Two Main Views.....	30
Mixer View	30
Channel View	31
Grow & Glow, Current Parameter Display and The Swipe Zone.....	32

Chapter 6: Mixer View : Channel Strips 34

Introduction	34
The Swipe Zone.....	34
EQ Curve	35
Mute	35
Pan	35
Gain Reduction Meter	35
Channel Faders and Input Meters	36
Selected Output Indicators.....	36
Solo	37
Channel ID Button	37
FX [Reverb / Delay]	39
iPad / Playback.....	40

Chapter 7: Mixer View : Master Fader..... 42

Introduction	42
Output Selector / Output Channels	42
Graphic EQ.....	43
Mute	43
Balance and Pre / Post	44
Output Gain Reduction Meter	44
Master Fader and Output Meters	44
Record and Solo	45
Master ID Button.....	47

Chapter 8: Level Setting Procedure 49

Introduction	49
Level Setting Procedure	49
Headphones	50

Chapter 9: Channel View : EQ..... 51

Introduction	51
The Swipe Zone.....	51
EQ On / Off.....	52
Polarity Invert	52
Gain, Frequency and Q [Bandwidth].....	53
Low Shelving – Band 1.....	53
Low-Mid Peaking – Band 2.....	53
High-Mid Peaking – Band 3.....	54
High Shelving – Band 4	54
Shelf / Bell.....	55
HPF On / Off and Frequency.....	56
DL1608 EQ at a Glance	57

Chapter 10: Channel View : Gate and Compression..... 58

Introduction	58
The Swipe Zone.....	58
Gate On / Off.....	59
Gate Display and Settings.....	59
Threshold	59
Range	59
Attack	59
Hold.....	59
Release	59
Compressor On / Off.....	60
Compressor Display and Settings	60
Threshold	60
Ratio.....	60
Attack.....	60
Release.....	60
Gain.....	60
Soft Knee / Hard Knee Compression	60
Gate / Compressor Meters	61
DL1608 Gate at a Glance	61
DL1608 Compression at a Glance.....	61

Chapter 11: Channel View : FX 62

Introduction	62
The Swipe Zone.....	62
FX View	63
Reverb Type.....	65
Reverb Sliders	66
Pre Delay.....	66
Damping	66
Decay	66
Rolloff	66
Release	66
Delay Type	67
Delay Sliders	68
Delay	68
Delay L	68
Delay R	68
Delay 1	68
Delay 2	68
Feedback	68
Damping	68

Chapter 12: Channel View : Graphic EQ 69

Introduction	69
The Swipe Zone.....	69
Graphic EQ On / Off.....	69
31-Band EQ.....	69
Draw	70
DL1608 Graphic EQ at a Glance	71

Chapter 13: Channel View : Output Compressor / Limiter..... 72

Introduction	72
The Swipe Zone.....	72
Compressor On / Off.....	73
Compressor Display and Settings	73
Threshold	73
Ratio.....	73
Attack.....	73
Release.....	73
Gain.....	73
Soft Knee / Hard Knee Compression	73
Output Compressor / Limiter Meters	73

Chapter 14: Mixer View : Navigation Bar 74

Introduction	74
Mixer	74
Current Parameter Display	74
Tools	74
Devices.....	75
Settings.....	80
Help.....	82
File System	83
Snapshots.....	83
Snapshot List.....	84
Recall Safe	85
Shows	86
Presets	88
Factory Presets vs User Presets.....	89
Channel Presets vs DSP Presets	92

Appendix A: Service Information 95

Troubleshooting	95
Repair	96

Appendix B: iPad Optimizations 97

Appendix C: Technical Information 100

DL1608 Specifications.....	100
DL1608 Dimensions	104
DL1608 Block Diagram.....	106

Appendix D: Hookup Diagrams..... 107

Appendix E: Glossary Of Terms..... 112

Warranty Statement 122

GPL Statement 122

Chapter 1: Welcome

Version 1.2

This is V1.2 of the DL1608 Reference Guide, written and designed to pair with V1.2 of the DL1608 firmware and Master Fader app software. The DL1608 mixer and Master Fader app are unique to the pro audio world and may be updated at any time. In fact, the goal of our ninja-like Engineering team is to continue to make your DL1608 experience even better. So if you are using a newer version than V1.2, there could be a newer version of this Reference Guide to go with it. Even so, there is also a chance that something slipped under our radar. As such, some screen shots may look slightly different than what you see within these pages and there could be some functional differences, as well.

About This Guide

We strongly encourage checking out the **Quick Start Guide** before diving into this Reference Guide
It is a great way to familiarize yourself with the basic ideas of the DL1608, how to switch between views, add color to a mix, gates & compressors, FX, graphic EQ and much more. Once you do that, this will be a breeze!

This guide is designed to be accessible, with subsections as complete as practical to minimize having to leaf back and forth looking for the whole story. The entire guide does not need to be read to figure out how to use this console. However, a certain amount of familiarity with analog mixing consoles, their features, and commonly used signal processing (compressors, limiters, gates, EQs) is assumed.

This guide provides the following resources:

- A general overview of the DL1608's facilities and features.
- Dissection-by-dissection description of each input and output, every nook and cranny and — by golly — each doodad, too!
- Detailed description of each screen on the Mackie Master Fader iPad app.
- An entire chapter dedicated to the level setting procedure.
- Hookup diagrams depicting some of the more common setups.
- Bottom line: there is a TON of stuff in here. We would be dumbfounded if there was anything missing.

As the saying goes, "a picture tells a 1000 words". With that thought in mind, we added quite a few pictures, screen shots, illustrations and other images throughout to accompany the text.



This icon marks information that is critically important or unique to the DL1608. For your own good, read and remember them because there is pop quiz built in to the Master Fader app. To confirm your knowledge of these features, the app will not function until all answers are correct. Ok, maybe that's not entirely accurate (or even somewhat accurate), but it IS a good idea to pay special attention to these areas in the Reference Guide marked with the "VERY IMPORTANT" hand icon.



There's an illustration of a microscope, so, of course, you're going to get more detailed information when you see this little guy. There are explanations of features and practical tips listed here.



It's a good idea to pay attention to text displayed next to a note icon, as this icon draws attention to certain features and functions relating to the usage of the DL1608, the iPad and/or Master Fader app.

Features

- Proven hardware that sounds great
 - 16 Onyx mic preamps
 - High-end Cirrus Logic® converters
 - Ultra low-noise, high-headroom design
 - Six aux sends for monitor mixes
 - Master L/R output for mains
- Tons of built-in processing
 - Powerful, touch-sensitive plug-ins
 - 4-band EQ, gate and compression on inputs
 - 31-band GEQ and comp/limiter on outputs
 - Global reverb and delay
- Wireless mixing¹
 - Seamless wired to wireless mixing
 - Tune the room from anywhere
 - Get on stage to ring out monitors
 - Personal monitor mixing
 - Use up to 10 iPad devices simultaneously
- Total control from your iPad
 - Intuitive Master Fader app
 - “Grow & Glow” visual feedback
 - Preset and snapshot recall
 - Record the mix to the iPad for instant sharing
 - Integrate music from any app into the mix²
- Install friendly features
 - PadLock™ feature locks down iPad for permanent installs
 - Industry standard Kensington lock secures mixer
 - Compact footprint save precious workspace
 - 15.5" x 11.5" x 3.9" (394 mm x 292 mm x 99 mm)
 - 7.9 lb (3.6 kg)

¹ Wi-Fi router required for wireless operation. Wi-Fi router and iPad not included.

² iPad must be docked and the app must support background audio playback.

Introduction

Nearly 25 years ago, Mackie revolutionized the pro audio world by unleashing the CR1604 16-channel mixer. Today, Mackie redefines live mixing by combining the power of a digital mixer with the ease and portability of an iPad. Think of it as today's CR1604...but digital and unplugged.

Control the Mix from anywhere:

With the Mackie DL1608's seamless wired to wireless mixing capabilities, you can mix in real time from anywhere in the venue on your iPad³. The bar, the bathroom, the back closet. Instantly adjust mix functions from tuning front of house trouble spots to ringing out stage monitors.

Control the mix from your iPad:

Designed specifically for the iPad, the DL1608's Master Fader app brings ground-breaking DAW mixing features and functionality to the live environment. With this intuitive breakthrough app, you can create mix snapshots, channel presets and even record stereo tracks straight to your iPad. Plus, with "Grow and Glow" giving you visual indication of the function you're controlling, you can be confident that you're always in control.

Proven hardware that sounds great:

By combining 16 of our flagship Onyx mic preamps with the performance of 24-bit Cirrus Logic AD/DA converters, the Mackie DL1608 delivers unparalleled sound quality. Add to that eight balanced outputs, and you have a mixer that not only provides incredible dynamic range, fidelity and transparency, but also great versatility and outstanding value.

Tons of built-in processing:

The DL1608 is loaded with a choice of powerful plug-ins on every channel, so you won't need to set up additional racks of outboard gear. With just the touch of a finger, you have total control over 4-band EQ, compression and gate plug-ins. Plus, sweeten your sound with a full-featured reverb and tap delay or adjust your mix to the room with the 31-band graphic EQ and limiter on the main and aux outs.

Multiple iPad support:

Supporting up to 10 iPad devices simultaneously, the Mackie DL1608 allows multiple engineers to control the mix. Plus, it gives band members the ability to adjust their own monitors. We're looking at you, lead guitarist. Now, the band can dial in the mix they want to hear in real time right on stage.

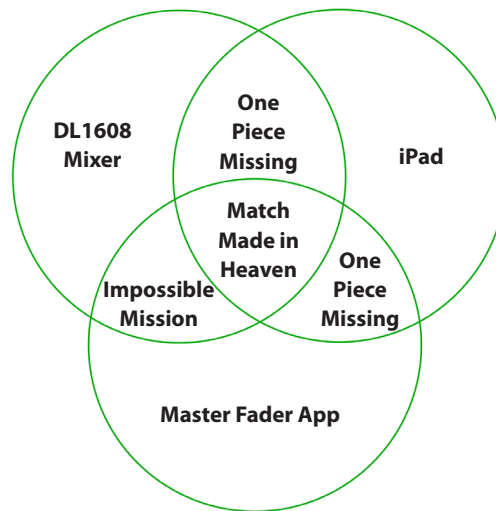
Forward looking design:

The sleek and low profile 16-channel Mackie DL1608 is rooted in design innovation. Its powerfully small format destroys the industry's notion that "bigger is better" by allowing modern technology to eliminate the need for bulky boards and racks of gear.

³ Wi-Fi router required for wireless operation. Wi-Fi router and iPad not included.

Architecture Overview

At the very core, the DL1608 system consists of three separate parts: the DL1608 mixer, an iPad and the Master Fader app. Each of these three components are equally important, none more so than the other. You can play with each component separately, but you won't be able to accomplish much. Together, though, you become Mr. Mix-A-Lot, the envy of engineers at every venue the world over. It's important to note that the DL1608 is the digital mixer here, where one or more iPads become the interface. All DSP processing and routing take place in the mixer itself, meaning it's not just a "dock". Let's take a quick look at each, what they are and how they relate to each other.

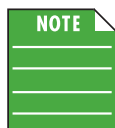


Hardware

DL1608 Mixer — Every mixer in the universe has input and output jacks. The DL1608 is no different. In addition to input and output jacks, this mixer contains 16 gain knobs and accompanying SIG/OL LEDs. On the rear panel are the power connector and network connector. Power and 48V phantom power switches and LEDs round out the mixer. Unlike most other mixers, though, the DL1608 doesn't have traditional controls and won't work without an iPad and the Master Fader app. Feel free to make all the connections you want, but you need more to control it. Mixer details begin on the next page.

iPad — The Apple iPad. Such a cool, innovative product, huh? Send and receive email, surf the web, download and install apps for gaming, business, education, entertainment, social networking, sports, travel, music and more. All this from nearly anywhere in the world! Hold on a second...what was that last one? Music? Yep, music. This is where the Master Fader app comes into play. The iPad is a tool that allows us to create the best user experience for you, a blank canvas for the Master Fader app.

So an iPad is sexy, fast and functional, but without the mixer and Master Fader app it's basically just a smaller, more portable laptop.



An additional hardware component to add to the mix is a wireless router. One of the main reasons for utilizing the DL1608 is for its wireless capabilities. It certainly is possible without one, but then you would be missing out on one of the coolest features of the DL1608. More on the router later.

Software

Master Fader App — There is a fantastic new way to mix and it's with the Master Fader app. Forgo the burden of carrying around a big, bulky desk with hundreds of knobs. The DL1608 with iPad and Master Fader app are the way to go! And with wireless capability, feel free to walk the venue creating mixes on the fly utilizing the large, full-color screen touch UI. Mixing wirelessly on the fly on an app on an iPad? That sounds out-of-this-world! It must be slow and difficult to comprehend, though, right? Wrong. The Master Fader app is fast, fluid and intuitive. Don't believe us? Download and install the Master Fader app for free and see for yourself...you don't even need a mixer to test drive the app!

Chapter 2: DL1608 Hardware : Front Panel

Introduction

We're going to start things off with a look at the mixer: its features, how and where to make connections, signal flow, and then finish off with an in-depth commentary regarding the Ethernet connector. Let's kick off our hardware discussion with the iPad tray insert.

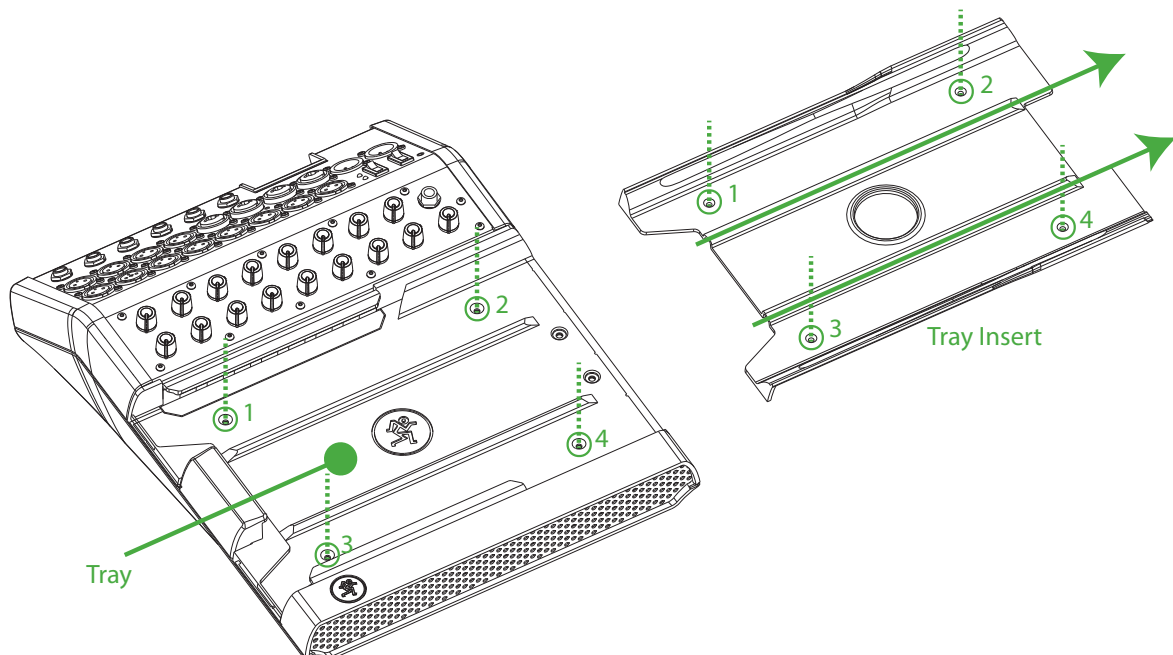
iPad Tray Insert Removal [for the original iPad]

The largest area on the mixer is the iPad tray. The iPad slides into the tray and mates with the dock connector on the DL1608. One of the really cool things about the DL1608 is that it seamlessly transitions from wired to wireless operation. Therefore, the tray is highly-durable to withstand repetitive insertion and removal of an iPad. Plus, it needs to not only accommodate the current iPad designs, but also be ready for future variations. The integrated tray fits the original iPad and a tray insert fits the iPad 2 and iPad (3rd generation). For both the tray and insert, the amazing fit is achieved by utilizing two center rails and curved supports on the sides. There are also two guides above the iPad creating the perfect alignment needed for docking. The result is that all three iPad versions are supported by DL1608. Additionally, it is ready for any new iPad design with just the addition of a new tray insert.

The DL1608 comes equipped with the iPad tray insert already installed and screwed down. If you are using an iPad 2 or iPad (3rd generation) there is nothing you need to do at this point except continue on to the "iPad Dock Connector" section on page 14.

What we're saying is: the iPad tray insert *only* needs to be removed if you are mixing with one of the original iPads. Here's how to remove the iPad tray:

- (1) remove the four screws holding the DL1608 tray insert to the DL1608, numbered 1 to 4 in the illustration below.
- (2) slide the tray insert out from the mixer and SAVE IT SOMEWHERE SAFE! Should you ever upgrade to an iPad 2 or iPad (3rd generation), the tray will be necessary.
- (3) put the screws back into the DL1608 from where you just removed them. This way they can't get lost.

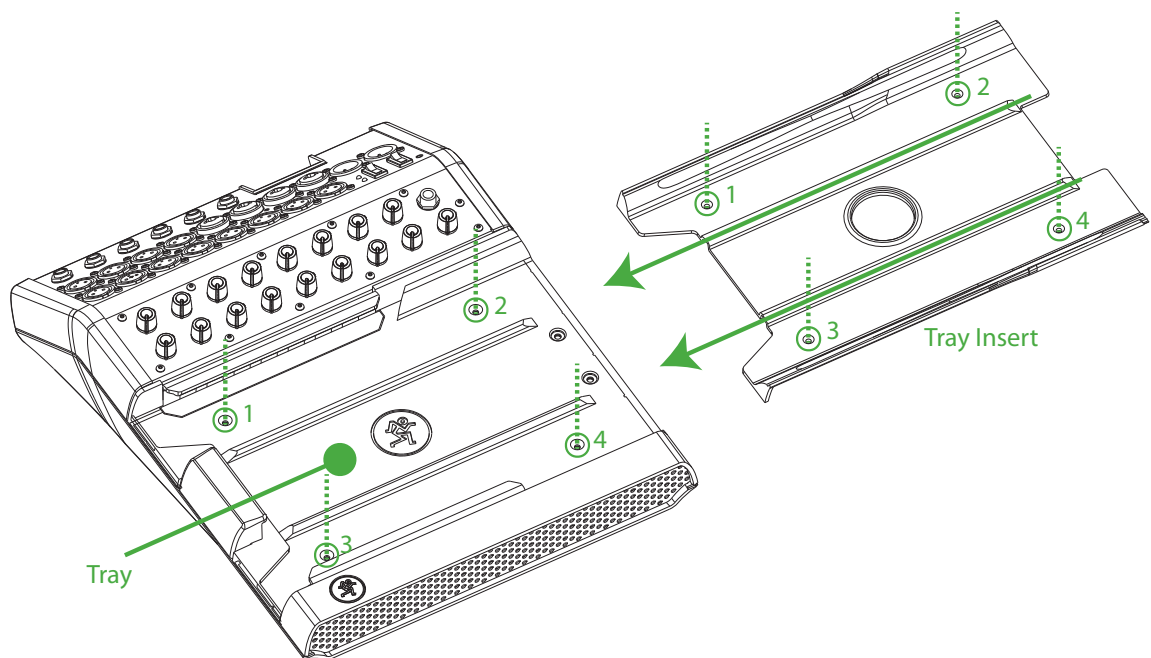


iPad Tray Insert Reinstall [for all iPads, except the original]

Here we will take a look at how to reinstall the iPad tray if it has been removed. Perhaps you made the transition from the original iPad to the iPad 2 or iPad (3rd generation). Good choice! Or maybe – just maybe – there’s an iPad that will be unveiled beyond the three that currently exist. The DL1608 is designed to be a future-proof concept, accepting of the fact that there will (most likely) be new iPads unveiled. If we need to create a new iPad tray for every future iPad, so be it. If we can, we will do it and we look forward to the opportunity!

For now, though, the iPad tray insert *only* needs to be reinstalled if you are mixing with the iPad 2 or iPad (3rd generation). Here’s how to reinstall the iPad tray:

- (1) remove the four screws from the DL1608 mixer, numbered 1 to 4 in the illustration below.
- (2) slide the tray insert into the mixer as displayed below.
- (3) put the screws back into the DL1608 from where you just removed them to hold the tray insert into place.

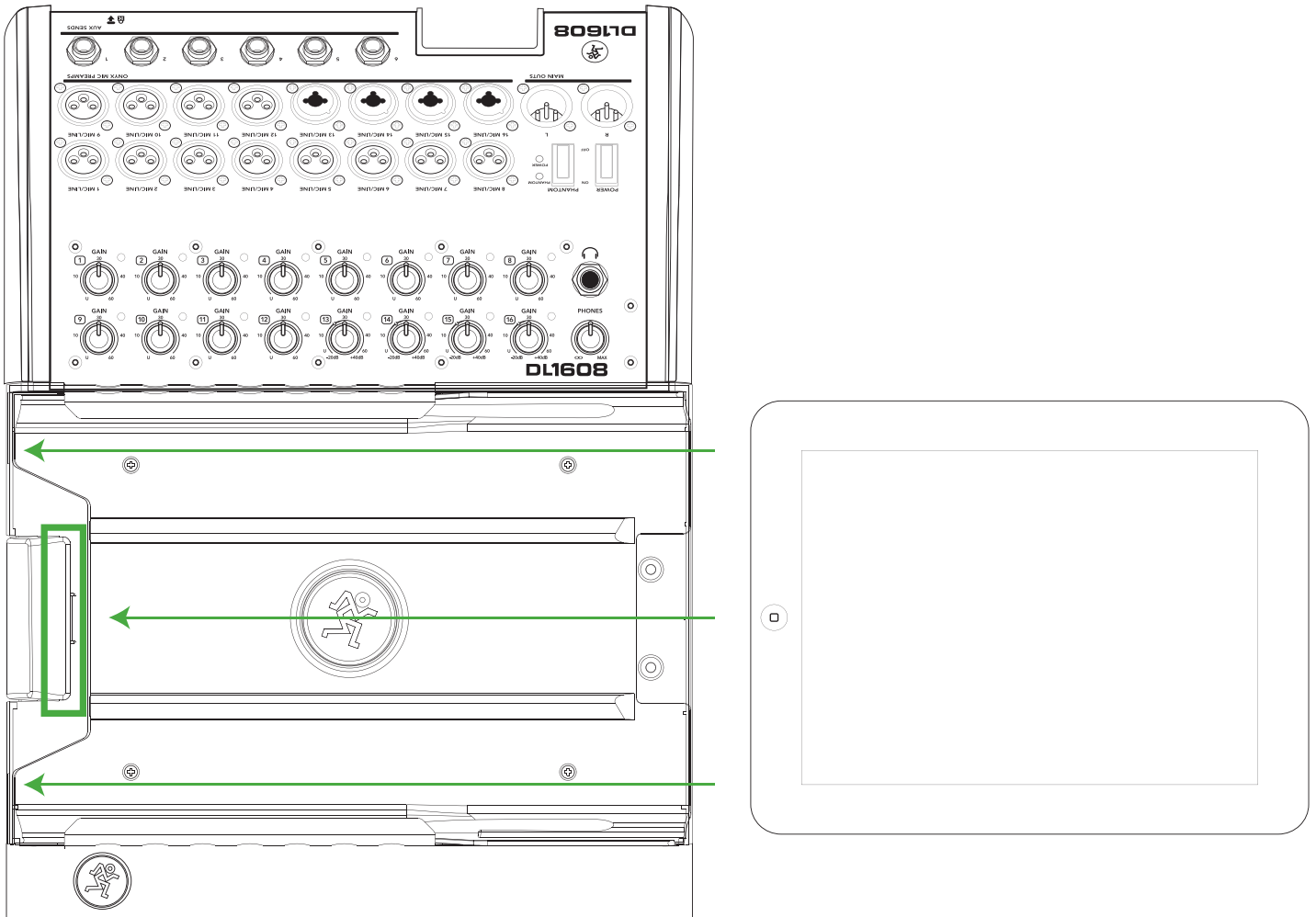


The iPad tray insert doesn't need to be locked down if switching regularly between iPads. Instead, hand-tighten the screws to the mixer before sliding the tray insert back in. This way they can't get lost and you're still able to slide the tray in and out as needed.

iPad Dock Connector

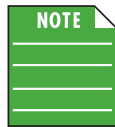
On the far left of the DL1608 (outlined by the vertical green rectangle below) is the iPad dock connector. Slide the iPad right to left, face up, home button on the left until it mates with the iPad dock connector.

This connection serves multiple purposes. For one, as long as the DL1608 is plugged in and turned on, the iPad will charge. More importantly, recording and playback are possible when an iPad is connected to the mixer. [Recording and playback are detailed in upcoming chapters]. And it just looks cool when the two are married together, connected as one. Perfection. Bliss. Do it and you'll see what we mean.

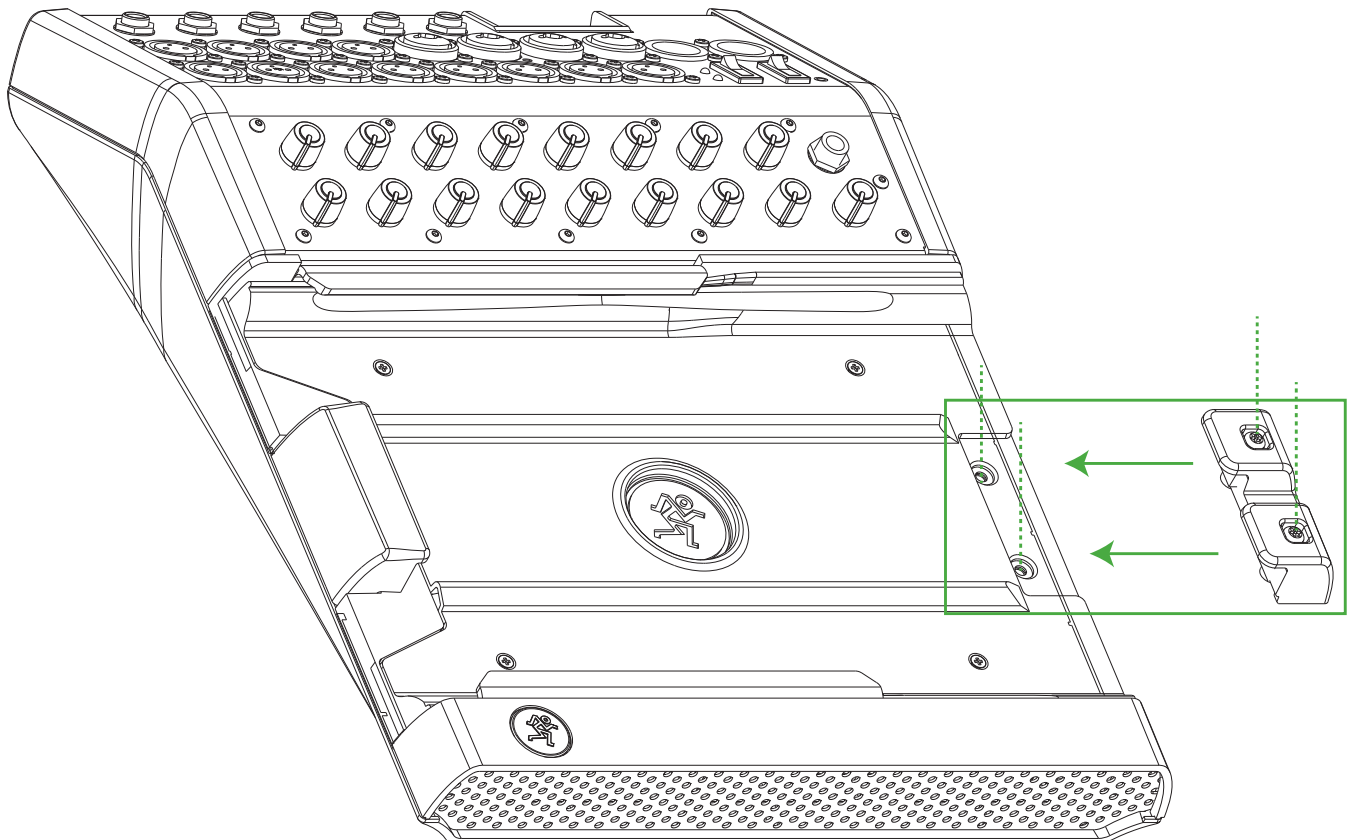


PadLock™

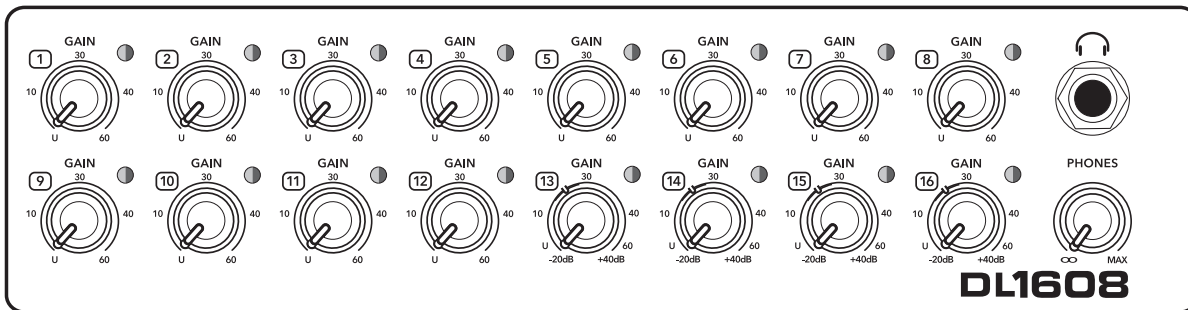
Also included with the mixer is a DL1608 PadLock. This is used to lock the iPad into place on the mixer. One might use this for fixed installs where a dedicated iPad is used and (Pad)locked to the mixer. Or leave the PadLock off so the iPad may be conveniently transferred in and out of the DL1608.



After docking the iPad (not shown), the PadLock needs to be attached by moving it right to left [horizontal green arrows], *NOT* downward. This ensures that the foam compresses against the iPad and holds it solidly in place. Then hand-tighten each of the two security screws down [vertical green dotted line] using the supplied wrench.



While the PadLock provides some level of security, it is *NOT* foolproof or guaranteed protection. LOUD Technologies Inc. is not responsible for the loss, theft, damage or destruction of your DL1608 mixer or iPad whether a PadLock has been used or not.



Gain Knobs

The gain knobs adjust the input sensitivity of the mic and mic/line inputs. This allows signals from the outside world to be adjusted to run through each channel at optimal internal operating levels. All 16 channels may accept a balanced mic or line-level signal using an XLR connector, while channels 13 – 16 also accept 1/4" line-level signals. The gain knobs are analog controls, and are therefore NOT recallable.

If a balanced mic or line-level signal is connected to any channel, there is 0 dB of gain with the knob fully down, ramping up to 60 dB of gain fully up.

If a 1/4" line-level signal is connected to channels 13 – 16, there is 20 dB of attenuation with the knob fully down and 40 dB of gain fully up, with unity gain "U" at 10:00

This 20 dB of attenuation can be very handy when inserting a hot signal from a line-level source. Without this "virtual pad," there is more chance of channel clipping.



Because of the low-noise, high-headroom Onyx mic preamps, it is possible to use the DL1608 strictly as a wireless system and store the mixer away (in an equipment room, for example). Just make sure to LOWER the gain knobs a touch to gain extra headroom before clipping.

Sig / OL LEDs

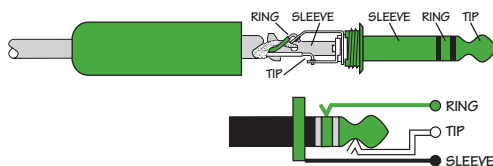
This dual-colored LED will illuminate green when the channel's input signal is present, indicating signal. It will remain lit so long as there is signal above -20 dBu present in that channel.

This dual-colored LED will illuminate red when the channel's input signal is too high, indicating a signal overload. This should be avoided, as distortion will occur. If the OL LED comes on regularly, check that the gain knob is set correctly for the input device. The signal is at -3 dB before hard clip begins.

Phones Output Jack

This 1/4" TRS connector supplies the output to stereo headphones. The volume is controlled with the phones knob located right below the output jack.

The phones output follows standard conventions:



Tip = Left channel
 Ring = Right channel
 Sleeve = Ground

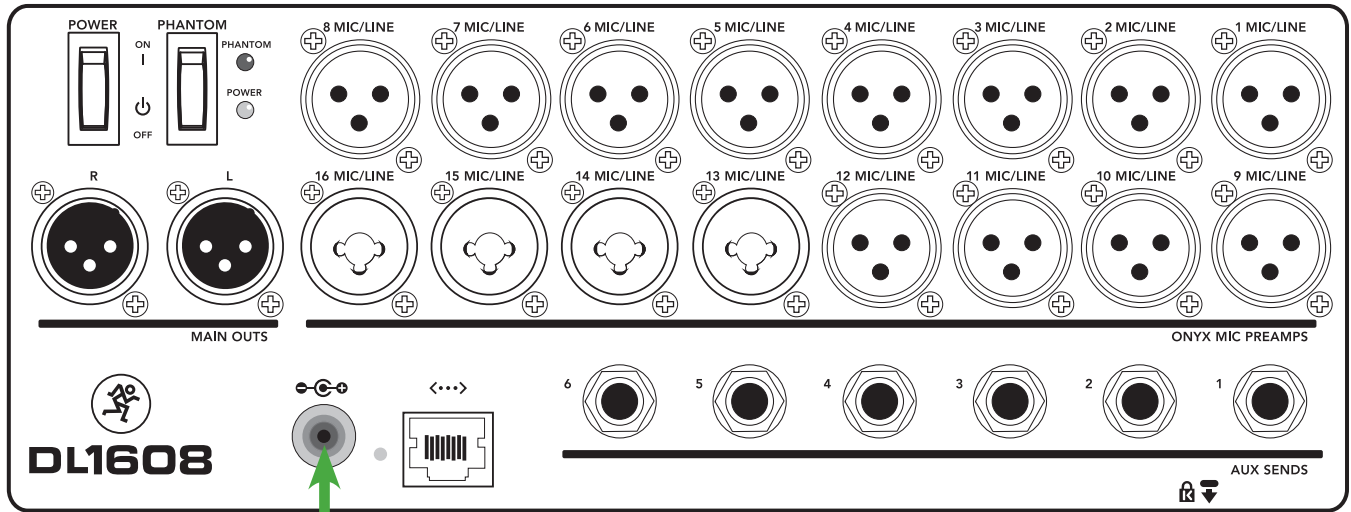
Phones Knob

This knob is used to adjust the volume from the phones output jack, from off to maximum gain (max). The phones knob is an analog control, and is therefore NOT recallable.



Warning: The headphone amp is loud and could cause permanent hearing damage. Even intermediate levels may be painfully loud with some headphones. BE CAREFUL! Always turn the phones knob all the way down before connecting headphones, soloing a channel or doing anything new that may affect the headphone volume. Then turn it up slowly as you listen carefully.

Chapter 3: DL1608 Hardware : Rear Panel



Power Connector

The DL1608 has a universal external power supply that accepts any AC voltage ranging from 100 VAC to 240 VAC. No need for voltage select switches. It will work virtually anywhere in the world. That's why we call it a "Planet Earth" power supply! It is less susceptible to voltage sags or spikes compared to conventional power supplies, and provides greater electromagnetic isolation and better protection against AC line noise.

An external 12V DC power supply [aka The Power Block] and a line cord are included with the mixer. A locking barrel connector resides at the end of the cord attached to The Power Block. Attach it to the power connector on the DL1608 and rotate the outer ring clockwise to lock. Do not over-tighten! Screw until there is resistance, then stop. Connect the female end of the line cord to The Power Block and plug the male end into a live grounded AC outlet. An LED on The Power Block will illuminate green to indicate success (whether the mixer is powered on or not).



Warning: Disconnecting the plug's ground pin is dangerous. Don't do it!

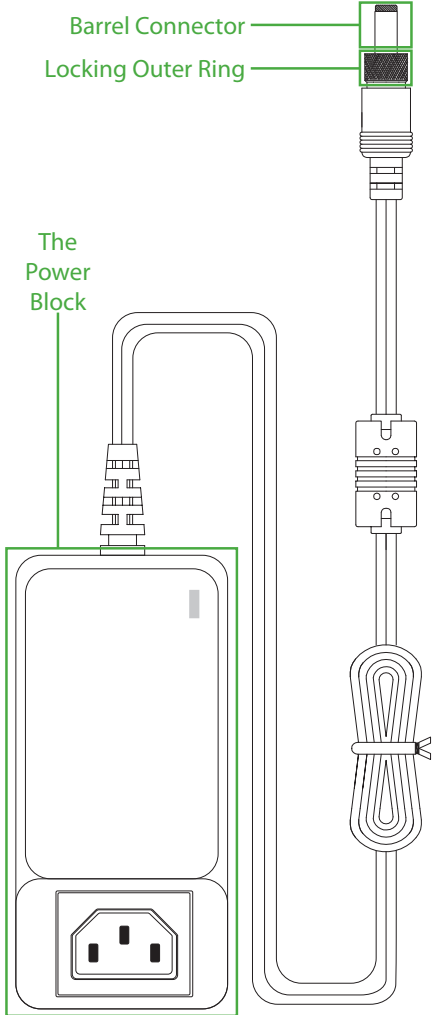
In fact, it's a bad idea to remove anything from (or add anything to) The Power Block or line cord. Again, don't do it!

Power Switch

Press the top of this rocker switch in to turn the DL1608 on and press the bottom of this switch to turn the DL1608 off.



As a general guide, the DL1608 should be turned on first, before any external power amplifiers or powered speakers. As such, it should also be turned off last. This will reduce the possibility of any turn-on or turn-off thumps in the PA.



Power LED

This LED will illuminate green when the DL1608 is turned on. If it does not turn on, confirm that The Power Block and line cord are connected correctly (to each other, the mixer and the AC outlet), the local AC mains supply is active and that the power switch is on.

Phantom Power Switch

Press the top of this rocker switch in if any microphone requires phantom power. (Always check the position of this switch before connecting microphones.) This is a global switch that affects all mic channels' XLR jacks at once. Press the bottom of this switch in to turn the phantom power off.

Most modern professional condenser mics require 48V phantom power which lets the mixer send low-current DC voltage to the mic's electronics through the same wires that carry audio. (Semi-pro condenser mics often have batteries to accomplish the same thing.) "Phantom" owes its name to an ability to be "unseen" by dynamic mics [Shure SM57 / SM58, for example], which do not need external power and are not affected by it, anyway.



Never plug single-ended (unbalanced) or ribbon microphones into the mic input jacks when phantom power is on. Do not plug instrument outputs into the mic XLR input jacks with phantom power on unless you know for certain that it is safe to do. When phantom power is engaged, be sure that the master fader is down when connecting microphones to the mic inputs to prevent pops from getting through the PA.



It is not a good idea to enable the phantom power unless it is actually needed. Line-level sources may be particularly unhappy when they are subjected to 48V phantom powering. Many musical instrument amps and keyboards with "direct outputs" fit this description.



It takes approximately 15 seconds for the phantom power to shut off completely. Do not add or remove any inputs until the phantom power LED is completely off or mics could be ruined.

Phantom Power LED

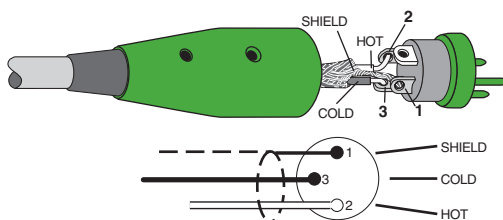
This LED will illuminate red when phantom power is engaged. If it does not turn on, confirm that the phantom power switch is on, that The Power Block and line cord are connected correctly (to each other, the mixer and the AC outlet), the local AC mains supply is active and that the power switch is on.



It takes approximately 15 seconds for the phantom power to shut off completely. Do not add or remove any inputs until the phantom power LED is completely off or mics could be ruined.

XLR and 1/4" Inputs

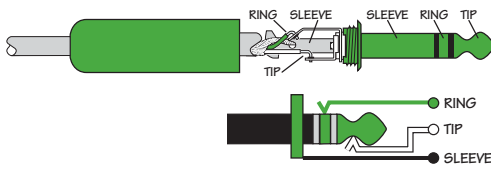
All 16 channels may accept a balanced mic or line-level signal using an XLR connector, while channels 13-16 also accept 1/4" line-level signals. They are wired as follows, according to standards specified by the AES (Audio Engineering Society).



XLR Balanced Wiring:
 Pin 1 = Shield (ground)
 Pin 2 = Positive (+ or hot)
 Pin 3 = Negative (- or cold)

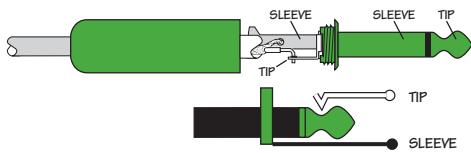
In addition to accepting balanced mic or line-level signals using an XLR connector, channels 13-16 may also accept 1/4" line-level signals driven by balanced or unbalanced sources.

To connect balanced lines to these inputs, use a 1/4" Tip-Ring-Sleeve (TRS) plug. "TRS" stands for Tip-Ring-Sleeve, the three connection points available on a stereo 1/4" or balanced phone jack or plug. TRS jacks and plugs are used for balanced signals and stereo headphones and are wired as follows:



1/4" TRS Balanced Mono Wiring:
 Sleeve = Shield
 Tip = Hot (+)
 Ring = Cold (-)

To connect unbalanced lines to these inputs, use a 1/4" mono (TS) phone plug, wired as follows:



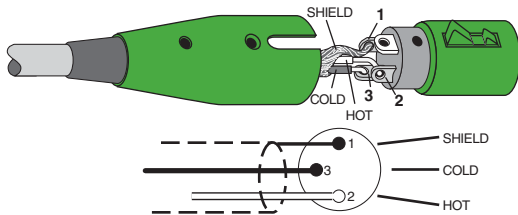
1/4" TS Unbalanced Mono Wiring:
 Sleeve = Shield
 Tip = Hot (+)



You may be well-versed in setting levels on most analog and/or digital consoles, but the DL1608 is quite unique. It would be wise to check out "Chapter 8: Level Setting Procedure" (pages 49-50) the first time you set levels on this mixer. Thanks in advance!

L/R Main Outs

The male XLR connectors provide a balanced line-level signal that represent the end of the DL1608, where the fully mixed stereo signal enters the real world. Connect these to the left and right line-level inputs of powered speakers or to the left and right line-level inputs of an amplifier (with speakers already attached).



XLR Balanced Wiring:
 Pin 1 = Shield (ground)
 Pin 2 = Positive (+ or hot)
 Pin 3 = Negative (- or cold)

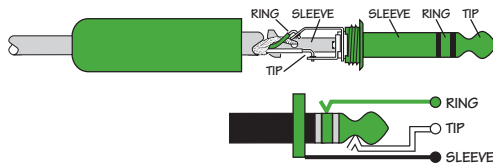


You may be well-versed in setting levels on most analog and/or digital consoles, but the DL1608 is quite unique. It would be wise to check out "Chapter 8: Level Setting Procedure" (pages 49-50) the first time you set levels on this mixer. Thanks in advance!

Aux Sends 1-6

These 1/4" connectors allow you to send balanced and unbalanced line-level outputs to external effects devices, headphone amplifiers, or stage monitors. These could either be passive stage monitors powered by an external amplifier, or powered stage monitors with built-in power amplifiers. All six auxes are independent of each other, so you may run up to six separate aux mixes.

To connect balanced lines to these inputs, use a 1/4" Tip-Ring-Sleeve (TRS) plug. "TRS" stands for Tip-Ring-Sleeve, the three connection points available on a stereo 1/4" or balanced phone jack or plug. TRS jacks and plugs are used for balanced signals and stereo headphones and are wired as follows:



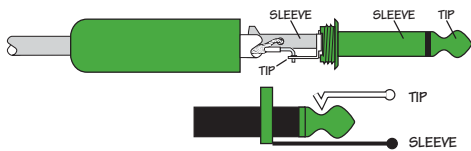
1/4" TRS Balanced Mono Wiring:

Sleeve = Shield

Tip = Hot (+)

Ring = Cold (-)

To connect unbalanced lines to these inputs, use a 1/4" mono (TS) phone plug, wired as follows:



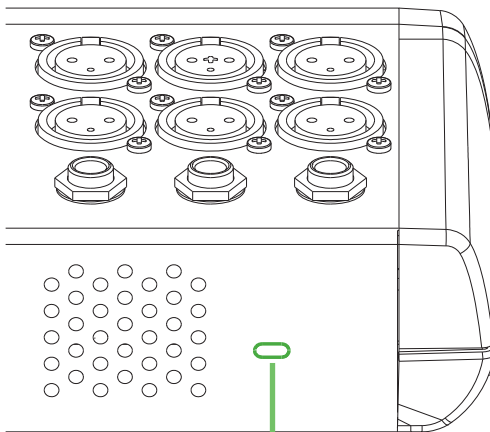
1/4" TS Unbalanced Mono Wiring:

Sleeve = Shield

Tip = Hot (+)

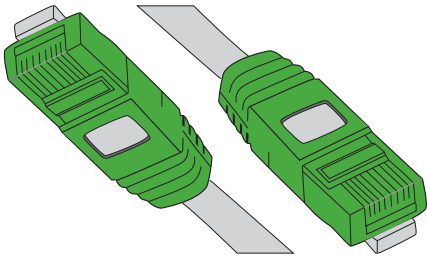
Kensington Lock

An optional Kensington Lock provides an extra level of security should the DL1608 be left alone, unwatched. There are a wide variety of cable apparatuses to choose from to secure your DL1608 via the Kensington Lock security slot. Feel free to decide on what type works best for you by perusing the Kensington website: <http://www.kensington.com/>



While the Kensington cable and lock provide some level of security, it is NOT foolproof or guaranteed protection. LOUD Technologies Inc. is not responsible for the loss, theft, damage or destruction of your DL1608 mixer whether a Kensington Lock has been used or not.

Network Connector



The 100MB network connector is conveniently located between the power connector and aux send jack 6. Its purpose in life is to connect the DL1608 to a Wi-Fi router via CAT5 Ethernet cable, thus enabling wireless control.

Plug one end of the CAT5 Ethernet cable into the DL1608 network connector and the other end of the CAT5 Ethernet cable into a LAN port on the router, NOT a WAN port. Most routers allow the use of either a straight-wired cable or crossover cable, but if you have a choice, a straight-wired CAT5 Ethernet cable is the way to go to ensure smooth operation with any router.

This is all we're giving you for now. Directions for setting up the rest of the router begin on chapter 4. That seems like such a long way off, but it starts on the next page!

Force Update Button

The force update button is tucked in right between the power connector and network connector. In a perfect world, this button would just sit there without a care in the world, umbrella drink in hand, beach, surf and sun on a daily basis. In all likelihood, this button will live his / her dream out, while the rest of us can only dream of such a life.

The DL1608 and Master Fader app do a great job at letting you know when either (or both) the software and firmware need updating, but this button here forces a complete firmware update *if the need ever arrives*.

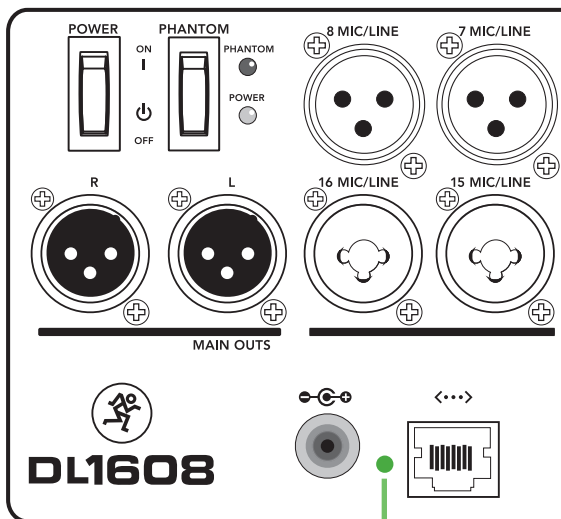
Here's how to force a firmware update: first, turn the mixer off. Now, with a ballpoint pen or a paperclip, poke the force update button, then power up the mixer with the button depressed. The DL1608 will boot and you will be prompted with an update bubble the next time an iPad (with the Master Fader app) is connected to the mixer.



Now that you know how to force an update, here's a friendly reminder that you should let the button remain peaceful, calm and tranquil, only forcing a firmware update if instructed by Mackie Tech Support. Thank you for listening!



Save any current show before forcing an update or you may lose it. The show and your sanity!



Chapter 4: DL1608 Hardware : Wireless Setup

Introduction

Do you want wireless control of your mixer? Of course you do! Let's dig in and get the router set up, as this is quite an important feature of the DL1608. Up to 10 iPads may be connected to the network, and therefore control the DL1608 wirelessly [via Wi-Fi] or wired.

Wi-Fi Router

For wireless control, all that's necessary is to connect the DL1608 to a Wi-Fi router. While it is possible to utilize an existing wireless network, a dedicated Wi-Fi router will give you complete control, resulting in the best possible performance.

If you don't already have a Wi-Fi router, nearly any Wi-Fi router found at a reputable office supply store (or other similar business) will work. When selecting a new router (or checking out your current router) please make sure it has ALL of the following features:

(1) CAT5 Connection — Make sure the Wi-Fi router connects via CAT5 Ethernet cable, not USB.

Most routers allow the use of either a straight-wired cable or crossover cable, but if you have a choice, a straight-wired CAT5 Ethernet cable is the way to go to ensure smooth operation with any router.

(2) DHCP — The router needs to be able to assign an IP address to a device [the DL1608, for example] connected to the Ethernet port. In most cases, the router will handle this task. However, there are some routers that can't complete this simple assignment and should not be used. Routers with a single Ethernet port often will not work well with the DL1608 for this reason.

(3) 802.11n / 5GHz — Believe it or not, those numbers are not just a bunch of mumbo jumbo. Those numbers reflect a Wi-Fi mode [802.11n] and band [5GHz] that we prefer and strongly suggest. Wi-Fi mode 802.11g and band 2.4GHz also work, but all the cool kids are using 802.11n and 5GHz. This is often packaged as "Dual Band".

(4) Brand — We are not in the business of suggesting what Wi-Fi router to go with, but choosing one with an instantly recognizable, quality, trustworthy name doesn't hurt.

Some examples we've heard of:

- Apple
- Belkin
- D-Link
- Linksys
- NETGEAR

The Mackie website displays a list of tested and approved routers.

Network Connectivity

Now it's time to connect to the network. Here are the steps to get some connectivity. Connectivity before creativity!

(1) CAT5 Connection — Plug one end of the CAT5 Ethernet cable into the network connector on the DL1608 and the other end into a LAN port on the router, NOT a WAN port. Read that sentence again.

(2) Power to the Router — The router needs to be powered up first before anything else. Plug it in and flip the power switch to the "on" position. <--ok, that might have been a cruel trick. Wireless routers often power up when plugged in with no power switch to flip.

(3) The Waiting — Give the router a little time to boot up and do its thing. We know, we know, the waiting is the hardest part. Somehow I don't think Tom Petty was singing about wireless router boot up times. This shouldn't take more than 5-10 seconds.

(3) Power to the Mixer — Go ahead and power up the DL1608.

Connect

At this point in time, we're ready to dial in the settings of the iPad. Start by turning the iPad on (if it's not already).

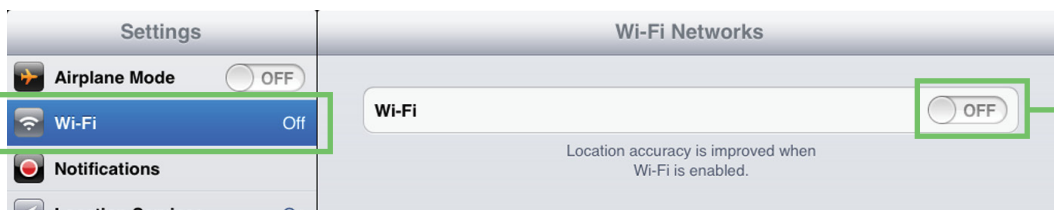


You should have to follow these instructions only once for each iPad connected to the router. After that they should connect automatically.

Now tap "Settings" on the iPad.

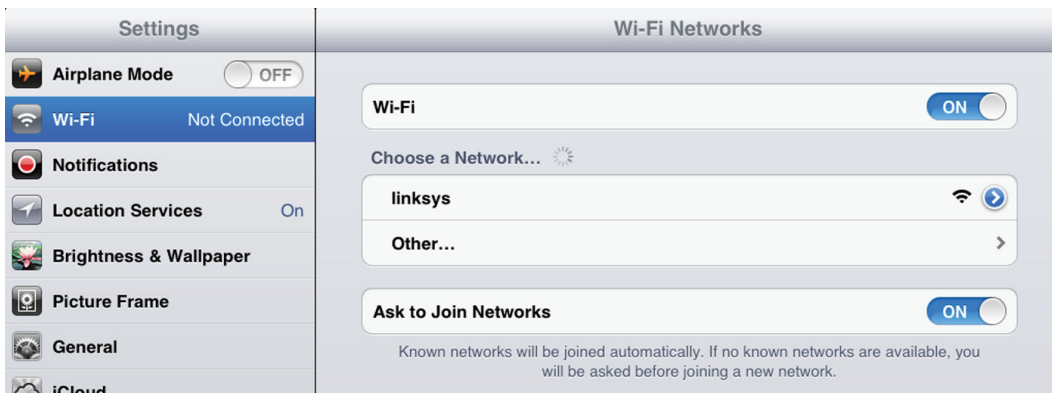


Settings lands you here. Select Wi-Fi by touching it. Notice that Wi-Fi is "Off" at this point, but we're going to fix that.

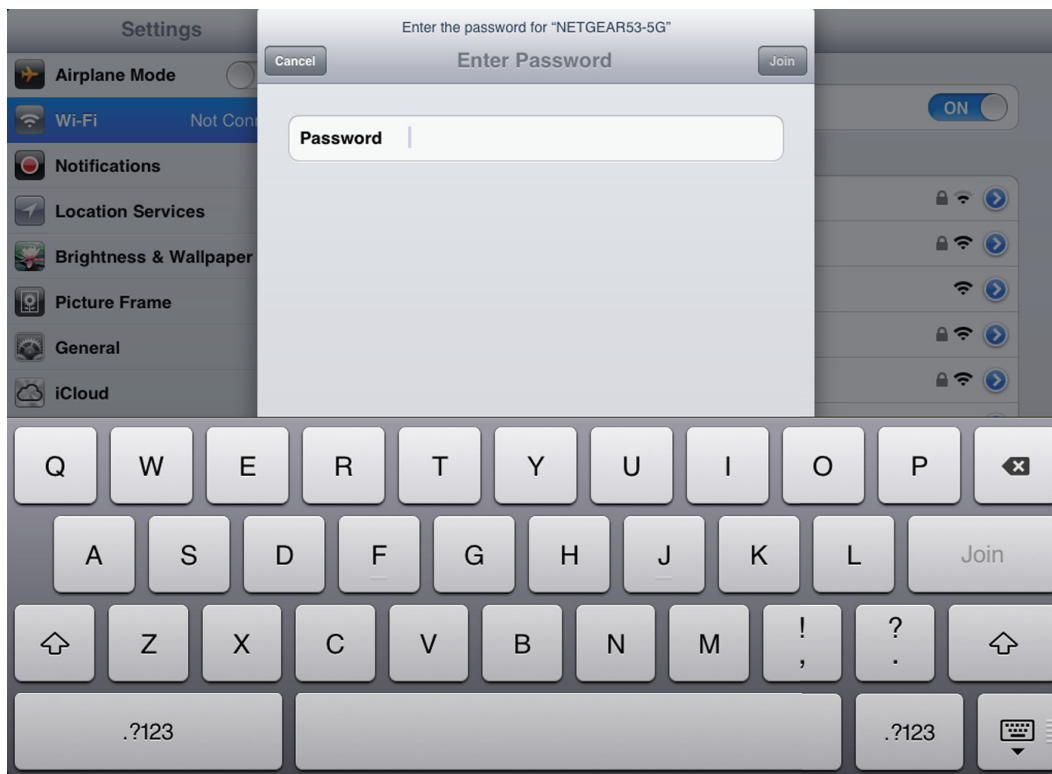


Drag the Wi-Fi on/off slider right to the on position.

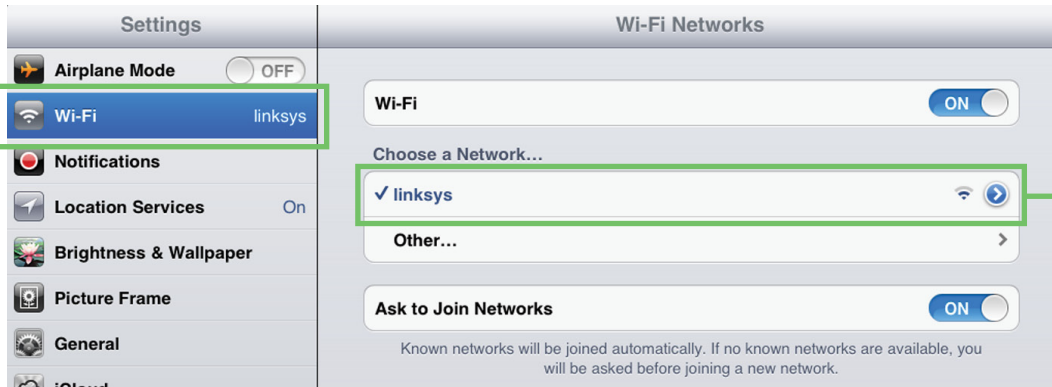
Check out the view below. The iPad is searching for (and setting up the connection to) the router.



It should be noted here that (by default) many routers will NOT be password protected. In the occurrence that yours has a pre configured password from the factory, you should be able to locate it on the bottom of the wireless router and type it in the space provided on the iPad.



Check it out...you're good to go! With your assistance, the iPad found the router and dialed in the Wi-Fi connection!



Now go back and launch the Master Fader app. It's that easy!

Router Settings

Default router settings are typically fine, but most Wi-Fi routers may be customized to ensure high performance and a secure network. We'll outline some common router settings to adjust, but since each brand is different, refer to its manual to learn how to adjust these settings.

(1) SSID — SSID stands for Service Set Identification. Create a name for the Wi-Fi network here.

(2) Security — You will need to select a security mode and password. We suggest using WPA [Wi-Fi Protected Access] for security purposes and a password that is easy for you to recall, but difficult for others to hack.



This prevents strangers from joining your network and controlling the DL1608, so pick a good password!

(3) Band — No, we're not here to talk about your favorite rock band. Rather, we are here to choose the Wi-Fi band. If you are in Wi-Fi mode 802.11n, you might be requested to choose a Wi-Fi band. Here, we prefer and strongly suggest 5GHz. However, 2.4GHz also works.

(4) Enable Auto Channel Selection⁴ — Look for a setting named "Auto Channel Selection" (or similar) and enable it. The Wi-Fi channel with the least interference will be selected automatically.

This should set you up nicely with no issues at all, so feel free to exit out of settings at this point. If you desire more information, refer to the Troubleshooting section in Appendix A: Service Information on pages 93-94.

⁴ Enable Auto Channel Selection is an advanced option that is usually automatically enabled. If you see it, ensure that it is enabled.

Chapter 5: Mackie Master Fader Software

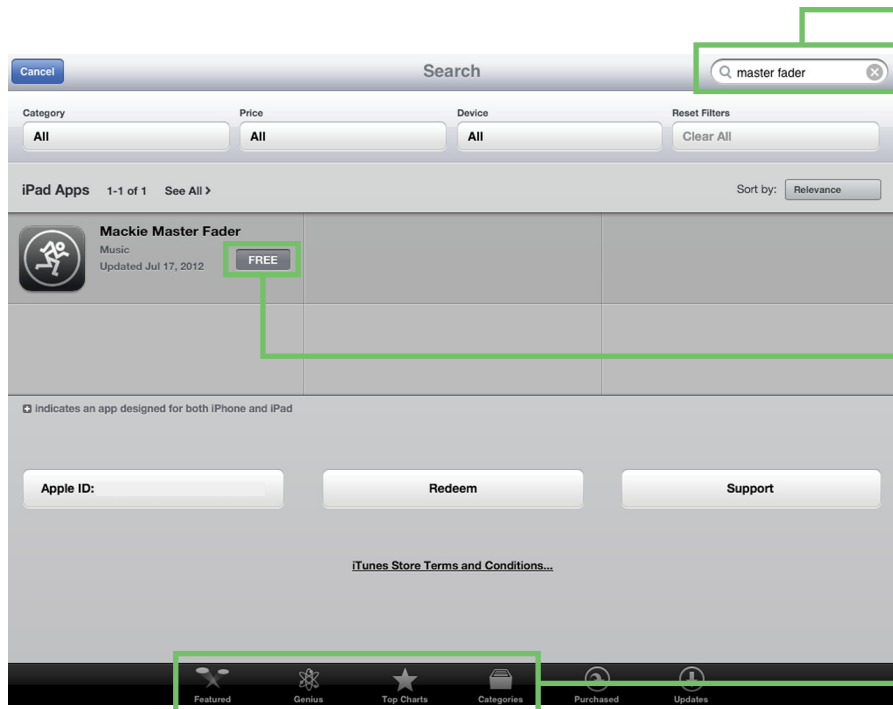
Introduction

As mentioned earlier, the DL1608 is the digital mixer, and one or more iPads control it. All DSP processing and routing take place in the mixer itself, meaning it's not just a "dock". The Master Fader app is where to "control" the mix.

Downloading and Installing the Master Fader App

There are a couple of ways to download and install the Master Fader app. Via iTunes on Mac or PC, for example. However, the easiest and fastest way to download and install it is directly from the iPad. You've downloaded apps on an iPad before and it's the same method to download this one, as well. Here's how:

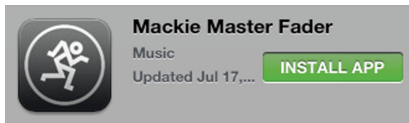
With a good internet connection via Wi-Fi, 3G or LTE, turn on the iPad and open up the App Store.



Type "master fader" in the search box located near the top-right corner of the screen followed by a carriage return.

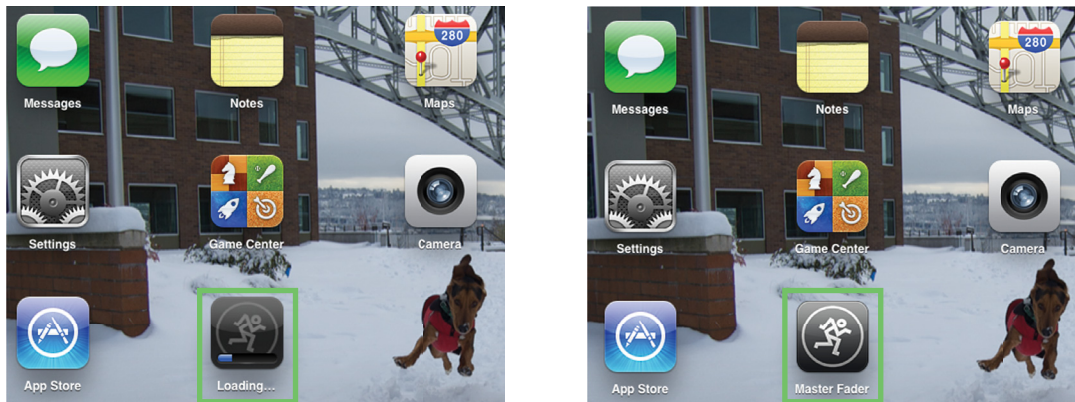
The search box is available in "Featured", "Genius", "Top Charts" and "Categories", but NOT "Purchased" or "Updates".

Now tap the FREE button.



This then turns into a green INSTALL APP button. To install the Master Fader app to an iPad, tap the green INSTALL APP button and enter your Apple ID password when prompted.

The blue line underneath the Master Fader app icon shows the progress of the download. Once the blue progress line disappears, the download is complete and the Master Fader app is ready for use.



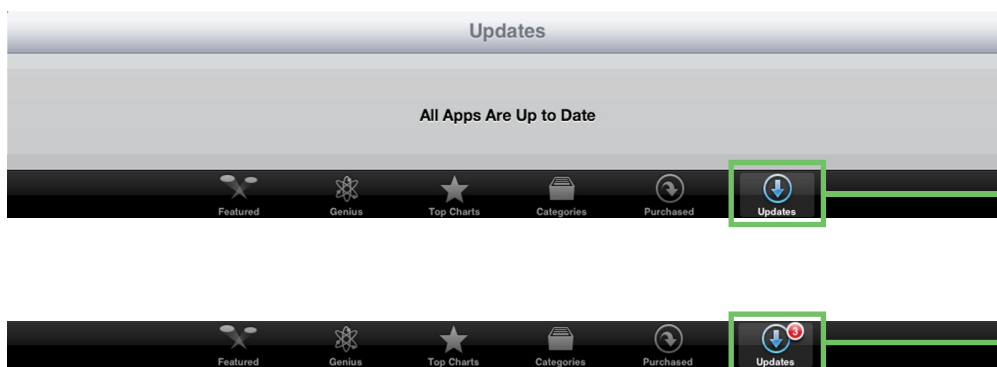
The item located directly to the right of the Master Fader icon (and just below the camera) is another app that we're currently working on; it's called 'Angry Dogs'. Aaaah, just kidding! It's actually DL1608 Product Manager, Ben's dog – Rocky – playing in the Seattle snow...and people thought it only rained here. Sheesh!

Updating the Master Fader App

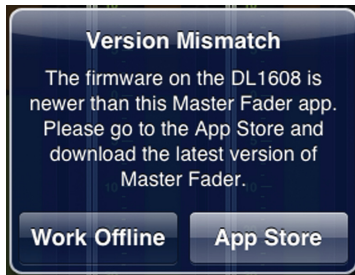
It is possible that the Master Fader app has already been downloaded and installed. In this case, you're *probably* good to go. However, it is a good idea to go to the App Store to check for updates. You will want the latest and greatest version for the absolute best in functionality and versatility.

Once in the App Store, tap the Update button located near the bottom-right of the iPad.

The first screen shot below shows an iPad with all apps up to date. The second screen shot below displays three apps that need updating (which may or may not include the Master Fader app). Tapping the Update button here will horizontally display the icon, name and description of changes of each app needing an update. If you see Master Fader listed, tap the gray UPDATE button on the far right, followed by typing in your password. Or better yet, tap the gray Update All button in the upper-right corner of the screen. The updates will commence. Don't do anything until the downloads have completed.



Updating the DL1608 Firmware



Software [Master Fader App]

Needs an Update

The Master Fader app automatically compares the software and DL1608 firmware versions each time the app connects to the mixer. In order to operate properly, the firmware and software versions must match. If the Master Fader app is older than the firmware version in the mixer, you will be prompted to update the software. Tap the App Store button on the popup and update as described on the previous page.

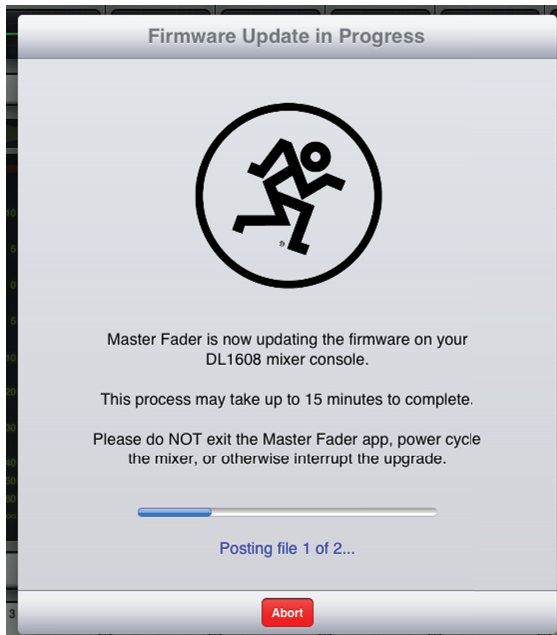
If the firmware version in the mixer is older than the Master Fader app, you will be prompted to update the firmware. The latest firmware is built into the Master Fader app, so there is nothing additional to download. Just follow the on-screen prompts. Be sure you have up to 15 minutes to spare, as the firmware update sometimes takes that long.



Firmware [DL1608 Mixer]

Needs an Update

Once you've made the decision to update the firmware, an image similar to what is shown below will appear on the iPad.



“Please do NOT exit the Master Fader app, power cycle the mixer, or otherwise interrupt the upgrade” has several meanings. For example: (1) taking a snapshot of the screen, (2) checking email, (3) updating apps, calendar, notes, (4) checking the score of the game, (5) updating the status of your favorite social networking site, etc. Instead, wait until after the update has completed to tweet “Just updated my @MackieGear #DL1608 firmware, #my life is complete!” I learned the hard way so you don’t have to. Eat a sandwich, quaff a beer, or whatever else you need to do to occupy your time during the firmware upgrade.



The firmware upgrade may occur wired or wirelessly. Choose one or the other and go with it; do NOT change from one to the other halfway through the upgrade.



See that red button centered at the bottom of the screen that reads “Abort”? Yeah, you’re going to want to go ahead and leave that alone. There should be no reason to abort the firmware upgrade. Frankly, I’m not even sure why it’s there if we don’t want anyone to touch it. Leave it off, right? Alas, I digress...

Lingo

Before diving into the features and functions of the Master Fader app, let's take a few minutes to get acquainted with the wording that will be used throughout this Reference Guide. Doing so will minimize confusion and increase productivity, a great combination!

Tapping, Dragging, Flicking, Swiping, and Pinching

You already have an iPad...you wouldn't be using this mixer otherwise! Getting around the Master Fader app is similar to getting around the iPad and many of the other apps you currently utilize. Let's go over the functions you will be using:

Gesture	Action	Examples
Tap	To press or touch a control or item (analogous to a single mouse click)	Adjust tools, mute, polarity, ID buttons, etc.
Drag	To press down and slowly drag the feature to the desired spot (that is, move side-to-side and up and down)	Adjust faders, pans, channel view sliders, etc. and to view a different set of channels
Flick	A very fast drag	View a different set of channels
Swipe	To make a sweeping motion with your finger side-to-side or up and down	Navigate between channel views; refer to The Swipe Zone on page 33
Pinch	Use two fingers to pinch open [zoom in] or close [zoom out]	Adjust EQ Q

There are a multitude of things to tap: mute and solo buttons, the presets and snapshots buttons and other buttons scattered throughout the channel view [EQ, gate and compressor, and many more]. In fact, you have already tapped a few things: the App Store icon, the FREE and INSTALL buttons, etc. The Master Fader app works in similar fashion. In most cases, it is tap to engage, tap again to disengage.

Some things may be double-tapped to reset to their default settings. For example, pans will be centered, EQ will be set to 0 dB gain, etc.

Dragging is how to adjust faders, pans, EQ, gate, compressor and FX settings, graphic EQ and the output selector to name just a few. Keep a finger on the iPad and drag the selected item to the desired destination. You will become a master dragger of the master fader in no time!

Flicking is similar to dragging, but "faster". In fact, flicking could be compared to a slap shot in hockey. Flicking will be used mostly to view a different set of channels or in a mixer view swipe zone when a "slower" drag just isn't fast enough. We get it. You have places to go, people to see. Flick away.

Swiping will become second nature, as this is how to switch between channel views. Swiping may be compared to the aforementioned flick, but instead of being like a slap shot in hockey, a swipe is more like sweeping. That's an easy way to remember it: swiping = sweeping! There is a whole page dedicated to swiping, appropriately titled "The Swipe Zone". Read all about it on page 33.

Pinching is the only function you probably will not use a whole lot. The only things that get pinched are the EQ balls to adjust their Q and a loaf to get rid of waste and relieve tension.

Two Main Views



Throughout this Reference Guide we will be talking quite a bit about views. The good thing, though, is that there are only two main views in the Master Fader app: mixer view and channel view. This is just an overview of what you can accomplish with each view. Soon enough we will go through each of these in detail in the upcoming sections.

Let's take a quick peek at what each one looks like and what each represents.
This is important so focus!

Mixer View

The mixer view is exactly what it sounds like; it's a view of the mixer! The key mixing controls of every input and output for the DL1608 exist here. All 16 channel strips (plus the reverb, delay and iPad channel strips) are present along with a thumbnail view of each channel's EQ curve, mute, pan slider, gain reduction meter, fader level, input meters, selected output indicator, solo and channel name and image.



Mixer View

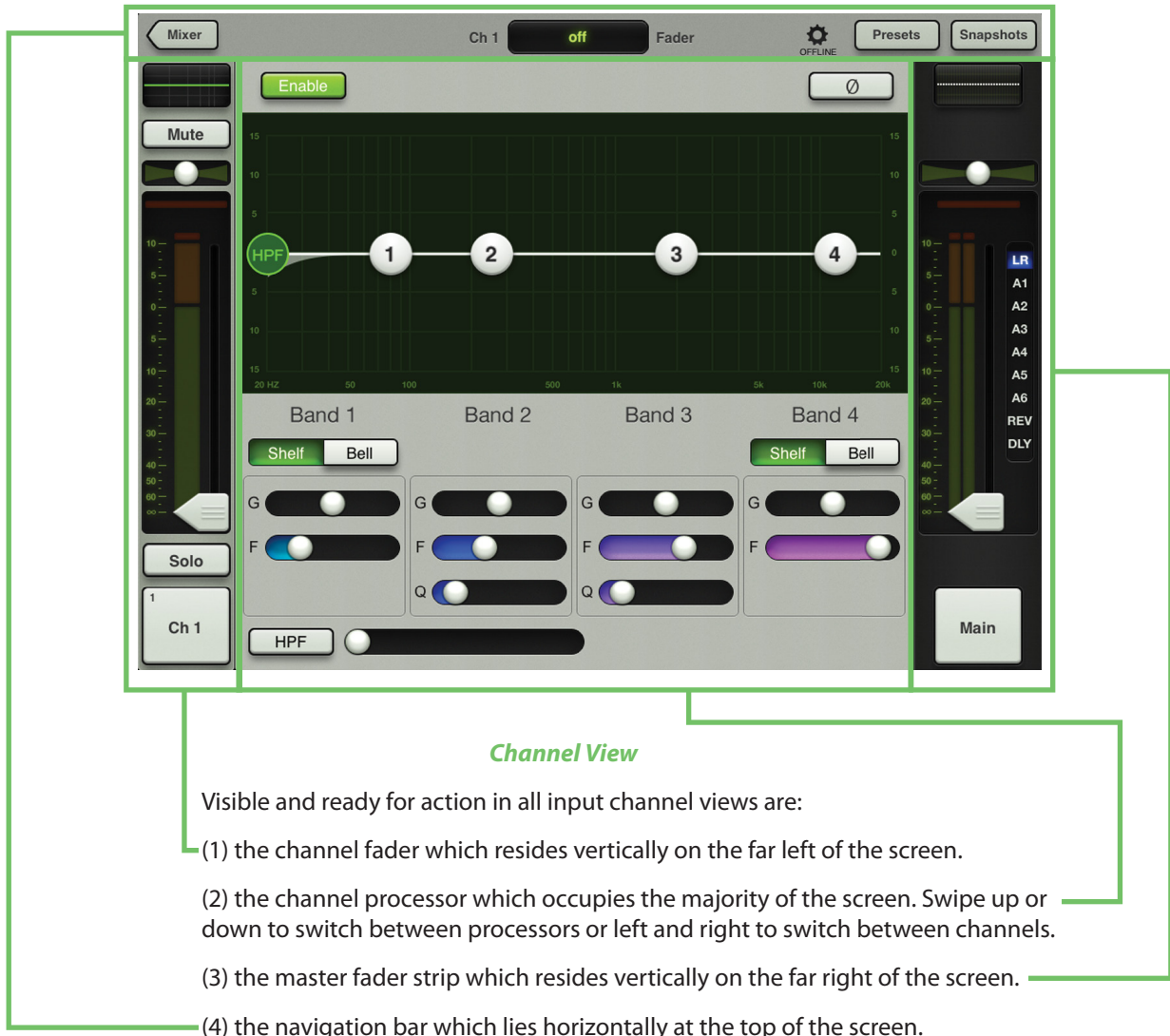
Visible and ready for action in the mixer view are:

- (1) the channel strips which occupy the majority of the screen.
- (2) the master fader strip which resides vertically on the far right of the screen.
- (3) the navigation bar which lies horizontally at the top of the screen.

So the mixer view is where you adjust the key mixing controls for all channels at once. If you would like to adjust the individual channel processing, you need to go to the channel view. Tapping the EQ curve at the top of any channel leads you there.

Channel View

The channel view handles all DSP-related activities. It is in the channel view where all plug-in processing is adjusted on individual channel inputs and outputs. This includes channel EQ, channel gate and compression, FX, graphic EQ and output compression and limiting.



Channel View

Visible and ready for action in all input channel views are:

- (1) the channel fader which resides vertically on the far left of the screen.
- (2) the channel processor which occupies the majority of the screen. Swipe up or down to switch between processors or left and right to switch between channels.
- (3) the master fader strip which resides vertically on the far right of the screen.
- (4) the navigation bar which lies horizontally at the top of the screen.

Speaking of the navigation bar...



There is an easy way to determine which view you're in. Look in the upper-left corner of the iPad. If it is nothing but gray, then you are in the mixer view. But if you see a button with the word "Mixer" in it (as in this case), then you are in the channel view. You may tap the mixer button to return to the mixer view.

Now that you know the basics of the mixer view and channel view, there are just a few more things to cover before we look at every single screen and control in thoroughly exhaustive detail.

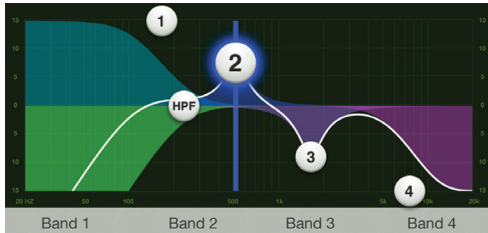
Grow & Glow, Current Parameter Display and The Swipe Zone

The following are key paradigms built into the Master Fader app to help simplify your mixing world. These exist on all screens and are important concepts to understand.



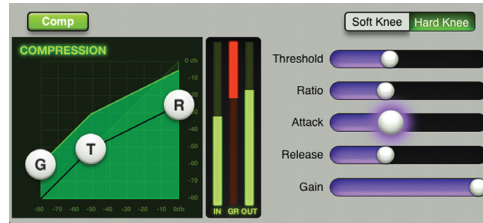
Pan Grow & Glow

Grow & Glow — When making changes to the mix, certain controls “Grow & Glow” to indicate that they are being adjusted. This builds your confidence in that the controls you are adjusting are under your power, including faders, EQ balls, gate and compressor balls, graphic EQ sliders and more. There are multiple examples of the “Grow & Glow” feature displayed on this page.



Band 2 Grow & Glow [EQ]

(Also of note here is the vertical line; it helps determine the band’s current frequency).

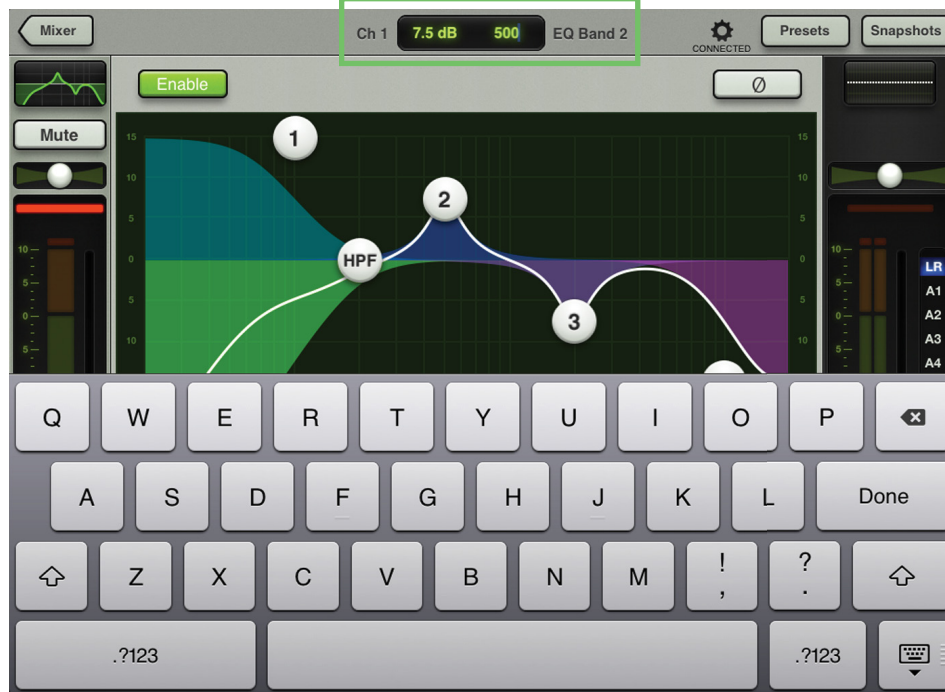


Attack Slider Grow & Glow [Compressor]



Fader Grow & Glow

Current Parameter Display — The current parameter display is conveniently located dead-center on the navigation bar at the top of whatever view is open. It constantly updates to display the channel and the value of the current parameter being adjusted. However, this is not just a point of reference. Tap the current parameter value and a keyboard appears. Here you may enter the exact value you would like for that parameter. Sometimes multiple parameters may be changed. For example, both the gain and frequency may be updated on each EQ band, as seen below.

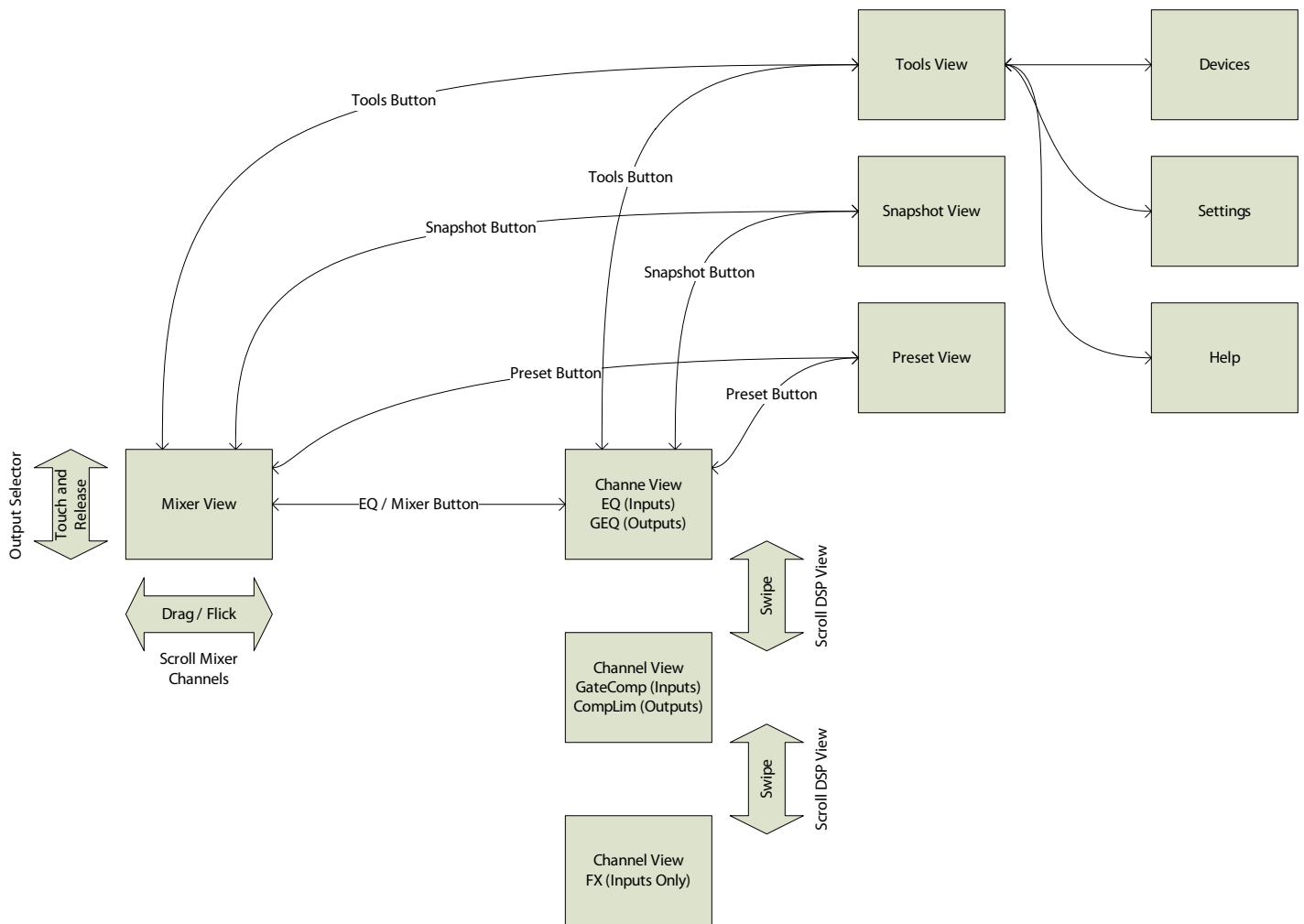


The Swipe Zone — Swiping, dragging and flicking are the keys to navigating the Master Fader app and the swipe zone exists in nearly every single view. While in the mixer view, the swipe zone exists anywhere on the black background of a channel. Swipe left or right to display any of the 16 input channels, the two FX channels and iPad channel. A maximum of nine channels (including the master fader) may be displayed at a single time.

In a channel view, the swipe zone exists anywhere on the gray background. On input channels, swipe up and down to switch between the EQ, gate and compressor and FX views and left and right to stay on the same view, but switch between input channels. Swipe up and down on the output channels to switch between graphic EQ and the output compressor / limiter.

There is no swipe zone in tools, presets and snapshots.

The screen flow shown below [say that ten times fast!] displays what is described above and gives you an overview of all the different views on the Master Fader app. We'll cover the swipe zone for each view in detail, but wanted you to have an overview of what you can expect from the coming pages.



Master Fader app Screen Flow

Chapter 6: Mixer View : Channel Strips

Introduction

The mixer view contains 16 channel faders, two FX channel faders [one reverb, one delay] and one iPad channel fader. Each channel strip looks and functions exactly like the others except for the FX and iPad channels.

These faders may be seen in both the mixer view and channel view. In the mixer view, all faders are readily available, while in the channel view it is the current channel's fader strip that is displayed along with whatever digital signal processing is taking place for that channel.

The mixer view displays eight channels at a time, as well as the navigation bar and master fader.

Take a look at the image below. It is the first visual you will see when booting up the Master Fader app for the first time.

The Swipe Zone

Here in the mixer view, drag or flick left or right anywhere in the background of the outlined area [below the pans and above the solo buttons] to view all 16 channel faders, the two FX channel faders and one iPad channel fader.



Let's look at one of the channel faders first, discussing each of its features top to bottom. We will then take a look at the FX and iPad channels and go over how and why they're different than the 16 channel faders.

EQ Curve

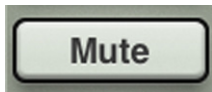
At the top of each channel fader is a thumbnail view of the current EQ processing that's applied to each channel (*whether the EQ is currently engaged or not*). Tapping a channel's EQ curve will change the outlook from the mixer view to that channel's channel view. The EQ curve will illuminate green when engaged and is gray when disengaged.

As seen below, there are four possible scenarios regarding the EQ curve depending on whether the EQ and/or HPF are enabled. Each one may look unique, but it is the same exact EQ in each of the four different scenarios.



To learn more about EQ and HPF, check out chapter 9 starting on page 51.

Mute

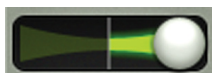


Mute buttons do just what they sound like they do. They mute – turn off – the signal on the channel(s). Engaging a channel's mute switch provides the same results as sliding the channel fader all the way down.



Mute buttons illuminate red when engaged and are gray when disengaged.

Pan



Pan allows you to adjust how much of the signal channel is sent to the left versus the right outputs. Touch and drag a channel's pan slider left or right to make adjustments. Touched pans will "grow & glow" to indicate that they are being adjusted.

Pan is only available when LR is the selected output, as the auxes and FX outputs have mono outputs, not stereo. The pan may be centered by double-tapping the pan ball.

The pan control employs a design called "Constant Loudness." If a channel is panned hard left (or right) and then panned to the center, the signal is attenuated 3 dB to maintain the same apparent loudness. Otherwise, the sound would appear much louder when panned center.

Gain Reduction Meter



The gain reduction meter displays the input channel gain reduction from the gate and compressor. The single meter shows the sum of the total reduction applied by the gate and compressor. It illuminates from right to left and is 20 dB when fully lit.

To learn more about dynamics, check out chapter 10 starting on page 58.

Channel Faders and Input Meters



The touch sensitive faders adjust the level of each channel going to the selected output. Adjustments are made by touching and dragging channel faders up and down. Touched channel faders will “grow & glow” to indicate that they are being adjusted. The fader level ranges from $-\infty$ to +10 dB as indicated by the scale on the left.

The input meters (next to each channel fader) display the input signal level to the channel before all channel processing. Changes made to the EQ, mute and fader do not affect these meters. This meter should remain green with the occasional bump into the yellow zone. Turn down the gain knob if the input meter remains consistently yellow. If the input is too high [overloading], a clip indicator at the top of the meter will illuminate red. If clipping occurs, reduce the gain.

- Red [clipping] = -3 dBFS
- Green to yellow = -18 dBFS
- Green [bottom] = -90 dBFS

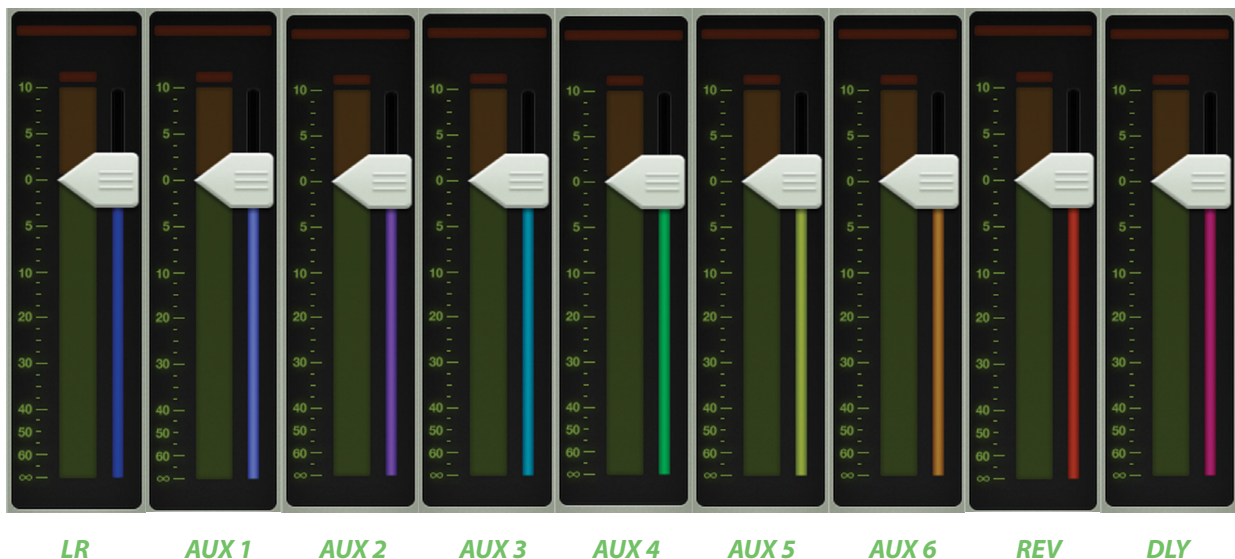
Selected Output Indicators

Directly to the right of each input meter (and underneath each fader cap) are the selected output indicators. These vary by color for clear indication of which output type is currently selected.

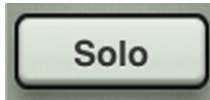
The output type will be discussed in greater detail in the master fader section, starting on page 42.



There is no way you would ever see the image as shown below. It is just a point of reference. As mentioned above, each selected output has a different color for clear indication of which output type is currently selected. This is especially useful in the mixer view.



Solo



Solo offers the opportunity to audition channel(s) before they are added to the mix. Whenever a channel's solo button is engaged, only the soloed channel(s) may be heard in the headphones.



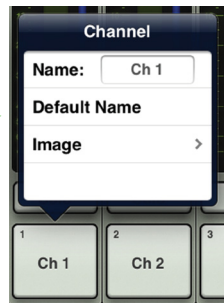
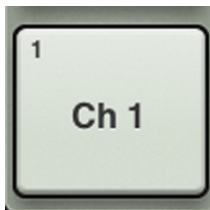
Solo buttons illuminate orange when engaged and are gray when disengaged.

Input channel solo buttons are PFL which stands for pre-fader listen. Therefore, the level of the channel fader does not affect the level heard in the headphones.

Solo is also post-EQ, so if a soloed channel's EQ is engaged, the EQ settings will be heard. But, solo is unaffected by the position of the mute button.

If no channels are soloed, you will hear the LR signal through the headphones.

Channel ID Button



Each channel ID button name and image is user-editable. Simply tap the button at the very bottom of the channel strip to reveal a popover that allows editing of the name and image.

Let's start with the name. Tap in the name box to bring up the blinking cursor and keyboard (as seen in the image below). Simply type in the name you want for that channel followed by a carriage return. Note the text change between the channel 1 button shown above ["Ch 1"] versus the one as shown below ["Kick"].

For familiarity, this is the same keyboard that is used for messaging or emailing from the iPad.

It goes without saying that tapping "Default Name" changes that channel's name back to its default name. True story.



An open gray box with only the channel's name works, but let's spice it up with an image. There are several options in this department. From the channel popover, tap "Image" to reveal a new popover as seen below [Image Source]. You will be presented with four choices:

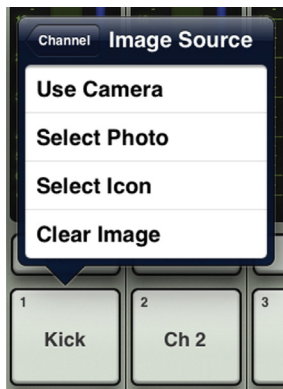
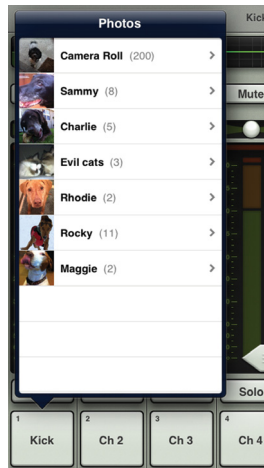


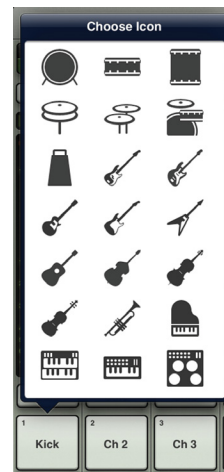
Image Source



Use Camera



Select Photo



Select Icon

Use Camera — If you're familiar with how the camera on the iPad works, then you're in luck...this one works the exact same way! The encircled camera icon in the middle of the gray bar snaps the picture and the icon in the upper-right corner selects between the front and back camera on the iPad. [Camera is unavailable on the first generation iPad].

Select Photo — Here you may select from all the photos that currently reside on your iPad.

Select Icon — Or select from a multitude of built-in icons at your disposal.

Clear Image — Believe it or not, tapping here will clear the image for that channel.



Since we already named channel 1 the kick drum, we might as well go with the kick drum icon to boot, right? Tap the kick drum icon in the upper-left corner. Channel 1 is set: name and image.

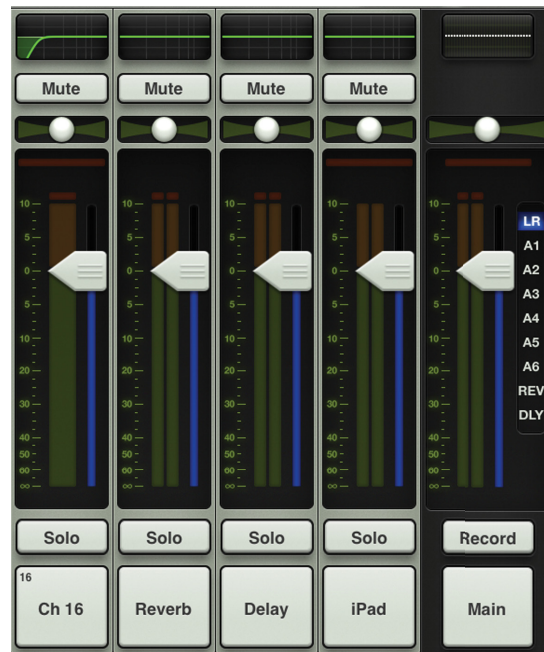
As seen in all of these images, a small number resides in the upper-left corner regardless of name and/or image. This number represents each channel and it cannot be changed or removed. Trust us, it's for the best, as it is for easy identification of each mic pre.



Images are current state only. They are not recalled with snapshots or shows. However, they may be stored and recalled with channel presets. Read more about this in "Chapter 14: Mixer View : Navigation Bar", starting on page 74.

FX [Reverb / Delay]

Now let's take a look at the reverb and delay channel strips since they operate slightly different than channel strips 1-16. To get here, flick or drag left anywhere in the mixer view swipe zone until the FX channels appear. The differences between the input channel strips and FX channel strips are noted below. Channel 16 was left in the image on purpose to easily see the side-by-side difference between an input channel strip and an FX channel strip.



Balance Slider — The pan slider becomes a balance slider on these two channels, now acting as a stereo balance. It allows you to adjust how much of the left or right output signals are heard. Touch and drag the sliders left or right to make adjustments. Center it to hear the output equally from the left and right sides. The balance may be centered by double-tapping the balance ball.

No Gain Reduction Meters — There are no dynamics on FX channels, so the gain reduction meters are not shown.

No High-Pass Filter — There is no high-pass filter on FX channels, so it will be absent in the EQ view for these two channels.

Stereo Meters — Because the FX channels are stereo returns, the meters are shown in stereo, not mono.

To learn more about FX, check out chapter 11 starting on page 62.

iPad / Playback

Now let's take a look at the iPad channel strip since it operates slightly different than channel strips 1-16. To get here, flick or drag left anywhere in the mixer view swipe zone until the iPad channel appears. The differences between the input channel strips and iPad channel strip are noted below. Channel 16 was left in the image on purpose to easily see the side-by-side difference between an input channel strip and the iPad channel strip. The only difference between the iPad channel and the FX channels is that the iPad channel has a gain reduction meter. Otherwise, they are totally the same. Take a look below:



Balance Slider — The pan slider becomes a balance slider on the iPad channel, now acting as a stereo balance. It allows you to adjust how much of the left or right output signals are heard. Touch and drag the sliders left or right to make adjustments. Center it to hear the output equally from the left and right sides. The balance may be centered by double-tapping the balance ball.

No High-Pass Filter — There is no high-pass filter on the iPad channel, so it will be absent in the EQ view for this channel.

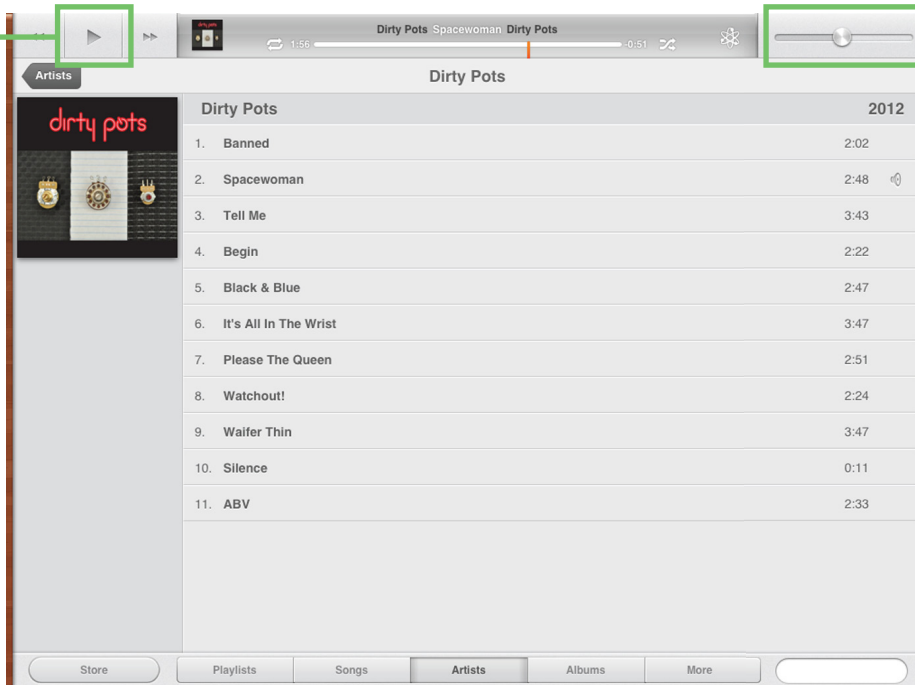
Stereo Meters — Since the iPad channel is a stereo channel, the meters are shown in stereo, not mono.

The iPad channel controls the level and EQ from the iPad music library (or any other audio app on the iPad that supports background audio playback). It's easy, just follow these instructions:

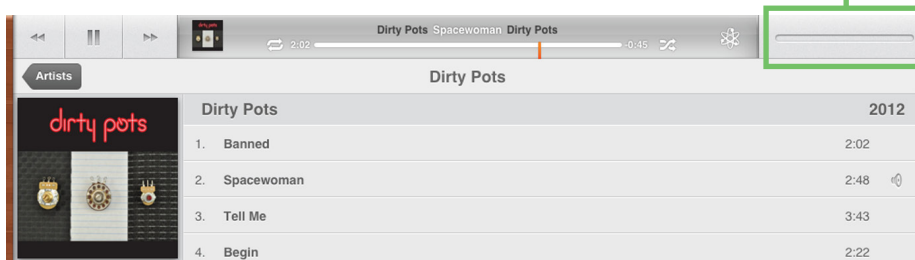
- (1) — Make sure that the iPad is attached to the DL1608 for playback, as it will not work in Wi-Fi mode.
- (2) — Open the audio app of your choice on the iPad by tapping its icon; this could be the music app, your favorite multitrack DAW, Spotify and more.
- (3) — Continue on to the next page for further instructions.

(4) — Tap the play button to begin playback (if it's not already playing).

Notice that the volume slider IS available. This is because the iPad is NOT yet attached to the DL1608.



Once attached, the volume slider disappears.



The volume is now changed with the Master Fader app.

(5) — Press the home button on the iPad to exit the app.

(6) — Tap the Master Fader app to relaunch the program and control the source in the mix.

Everything will be just as you left it. This is where you control the volume and EQ.

Heed our advice and raise the iPad channel fader slowly. Most mastered music coming off the iPad is loud.

As the fader rises, so should the music in your speakers and headphones.



Audio Engine Note: it is **impossible** to play and record simultaneously from two (or more) iPad apps. In other words, if audio from a music app is playing, tapping the record button in the Master Fader app will automatically stop playback. The opposite is also true: if you are recording in the Master Fader app and start playback from a different music app, the Master Fader app will automatically stop the recording process.

Chapter 7: Mixer View : Master Fader

Introduction



The master fader is arguably the most important tool of the mixer. So much so, in fact, that the master fader is always displayed no matter what view is shown. As seen in the image on the left, the master fader has three different views based on what type of output is selected. Please note that there is no way you would ever see the image as shown, as only one output may be selected at any given time. The image is just a point of reference.

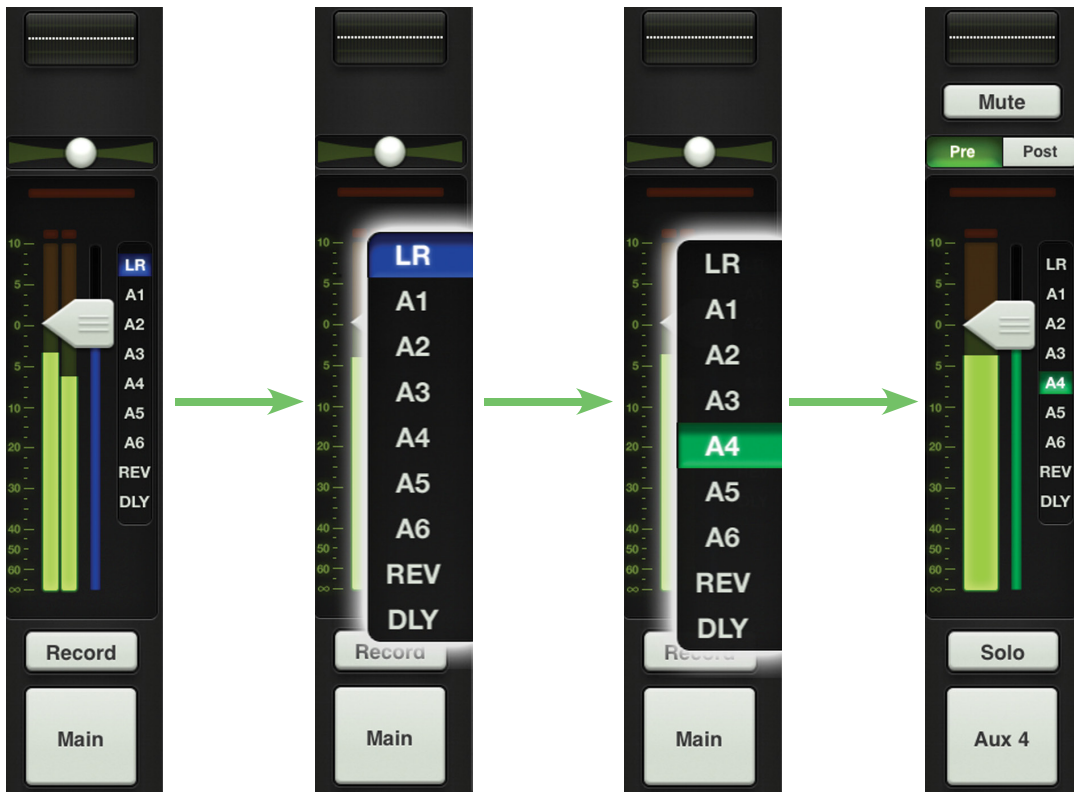
The output selector has the most important role (and we just showed an image with three different outputs selected), so we'll start there. After that, we will head back to the top of the master fader and work our way down.

Output Selector / Output Channels

The mixer view shows a fader for each channel. Initially, this fader controls the level to the LR output. But how do you control the level going to the aux sends? Or how about the aux master level? Simple. Use the output selector to switch between outputs.

There are nine possible outputs to select: LR, A1-A6, reverb and delay.

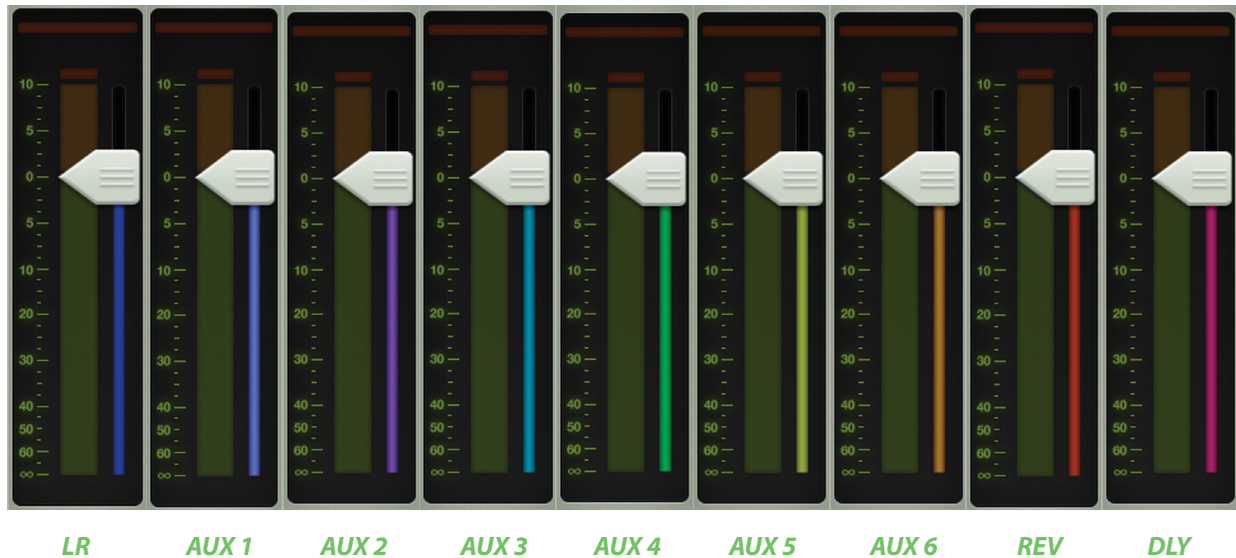
The currently selected output is illuminated, but changing the selected output is easy. Simply touch the output selector and it will immediately grow & glow. Move your finger to the desired output and release. Or you could just tap the output you desire and it will change just like that <snaps fingers>. See the image below for an example of changing outputs from LR to aux 4. Notice also how the output selector really "pops" for easy-to-change access.



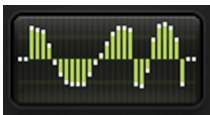
Once a different output has been selected, the channel faders will change to show the level going to the newly selected output. Similarly, the master fader will change to show the controls of the newly selected output.

Here, the mixer view acts like a window where you may view and change one output's mix at a time. No matter which output is currently selected, the others are still there, as they were.

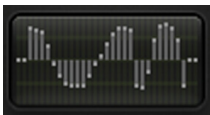
The thin illuminated strip underneath the master fader cap also helps indicate which output type is currently selected; the color varies and is dependent on the selected output. This is the same indicator that is also on display underneath the fader cap of each input fader. See below for the various colors that represent each selected output, but know that there is no way you would ever see the image as shown below, as only one output may be selected at any given time. The image is just a point of reference.



Graphic EQ



The master fader EQ displays the current graphic EQ settings. The graphic EQ display illuminates green when engaged and is gray when disengaged.



Tapping the master fader's graphic EQ display will change the view from the mixer view to the channel view for the currently selected output. The graphic EQ is available with all selected outputs, except reverb and delay.

To learn more about the graphic EQ, check out chapter 12 starting on page 69.

Mute



The master fader mute button works exactly like a channel mute, except it mutes the output. Use it as a break switch to mute monitors when the band takes a break, for example. The mute button is available when any output is selected, *except* LR.



The mute button illuminates red when engaged and is gray when disengaged.

Balance and Pre / Post



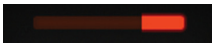
When LR is the selected output, the balance slider controls how much of the output signal is sent to the left versus the right outputs. Touch and drag the slider left or right to make adjustments. Tapping the master fader's balance ball twice will center it.



When an aux send is the selected output, the balance control is replaced with a pre / post toggle button. Here, the aux send may be configured as pre-fader [left] or post-fader [right]. Simply tap which setting you prefer.

There is no balance control or pre / post button for reverb or delay, so this spot will be blank when reverb or delay is the selected output.

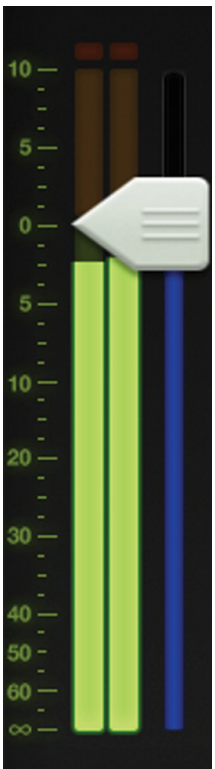
Output Gain Reduction Meter



Like channel faders, the output gain reduction meter shows the amount of gain reduction applied to the output by the compressor / limiter. Output channels do not contain gates. Anyone else think of KITT from *Knight Rider* when looking at the gain reduction meter?

To learn more about the output compressor / limiter, check out chapter 13 starting on page 72.

Master Fader and Output Meters



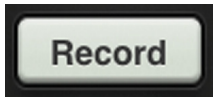
As discussed, the master fader adjusts the output level of the LR, aux masters 1-6 and the reverb and delay master sends, depending on which output is selected. While one fader controls the output level of each output, each output is independent of the others. Once the selected output has been chosen, touch and drag the master fader up and down to make adjustments.

The output meter displays the output signal level. The output meter is presented in mono or stereo depending on the selected output. It is stereo for LR, while the auxes and FX sends are presented in mono.

Speaking of FX, if reverb or delay is selected, the fader controls the master send into the corresponding FX processor.

This meter should remain green with the occasional bump into the yellow zone. The output meters are post-fader, so if there is too much yellow (or any red clipping), lower the master fader until it's gone and check the input channels, as well.

Record and Solo



If the selected output is LR (and the iPad is attached to the mixer), a record button resides below the master fader. This allows you to easily record the LR output on the iPad. Record is unavailable in Wi-Fi mode.



Pressing record will begin recording immediately. The record button illuminates red when engaged and is gray when disengaged.

Pressing the button a second time asks you to confirm your wish to stop the recording, then asks you to name this masterpiece. If you would prefer to think this recording never occurred – it happens, we know – it may be discarded at this point.

The stereo recording is automatically saved as a .wav file within the application. In addition to the name, this .wav file also includes the date and time the recording started.

No worries if the selected output is changed during recording. Recording will continue on as if nothing happened until recording is stopped manually.



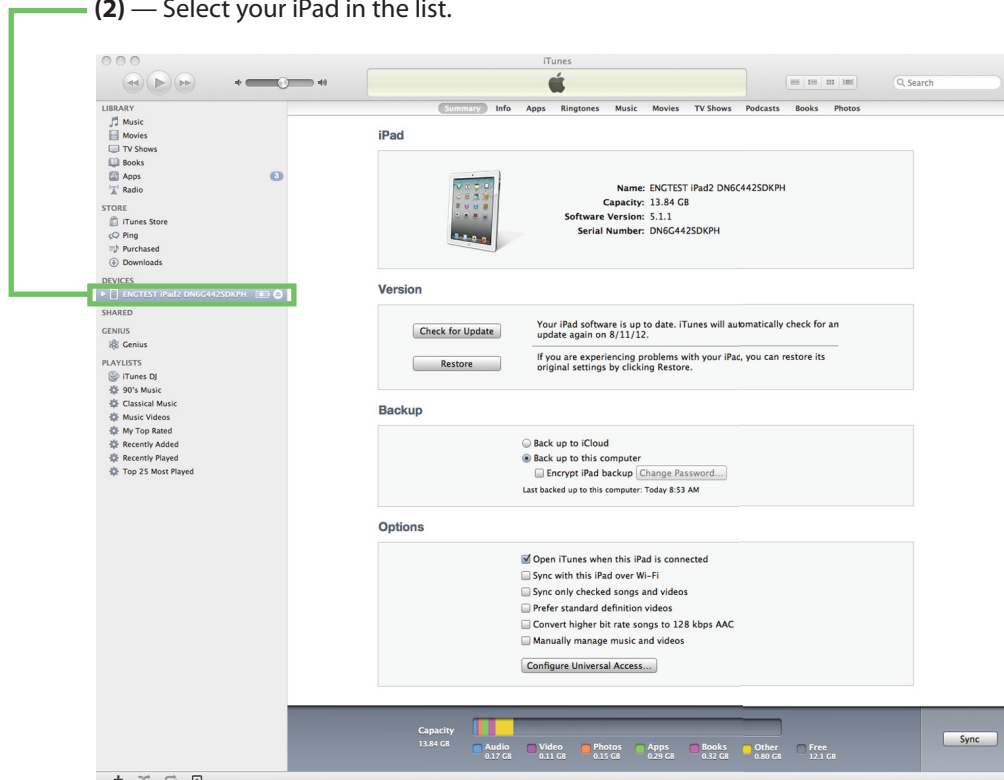
Master Fader supports background recording. This means that you may press the iPad's home button to leave the app or switch to another app while Master Fader continues to record. So go ahead and check your email or tweet about the show to your heart's content.



Generally speaking, master fader can be used for recording while other audio apps are used for playback. Because every app is different, testing your desired combination of apps before using them on a mission critical show is strongly suggested! Also, you should NOT record in multiple apps simultaneously; strange things might happen with the recorded files.

Use iTunes to retrieve recordings off of the iPad by following the instructions below:

- (1) — Connect the iPad to your iTunes account via Mac or PC.
- (2) — Select your iPad in the list.



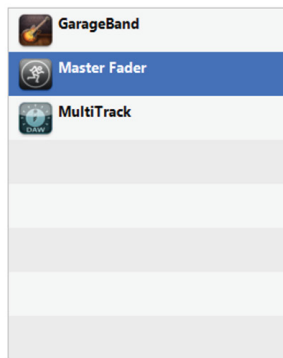
(3) — Go to the apps tab.



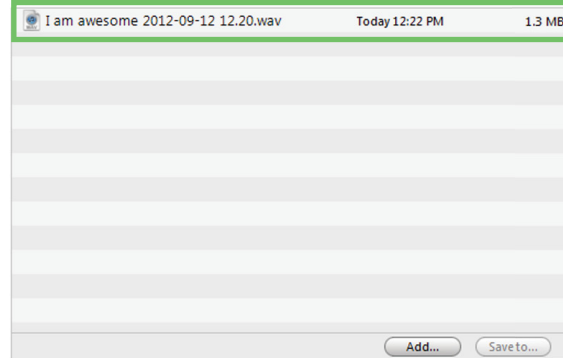
File Sharing

The apps listed below can transfer documents between your iPad and this computer.

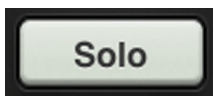
Apps



Master Fader Documents



(4) — Drag and drop the recordings from the list to your hard drive.

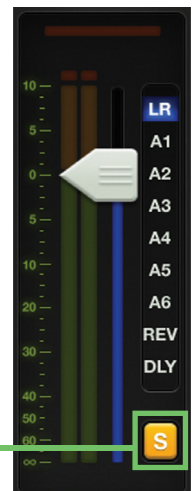


If the selected output is any aux, the record button will be replaced with a solo button. Soloing offers the opportunity to audition the selected output and make any necessary level adjustments to the inputs. The output solo is AFL, so the fader level will affect the signal you hear in the headphones.

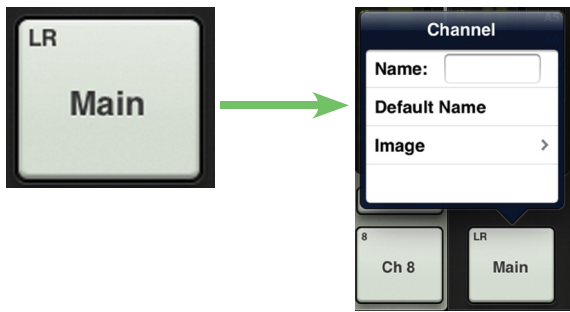


The solo button illuminates orange when engaged and is gray when disengaged.

When any input or output is soloed, a rude solo button will appear below the master fader's output selector. This serves as a reminder that a soloed channel exists somewhere. This is especially useful when an output is soloed and you switch to adjust a different channel on a different output. Tapping the rude solo button will clear all solos on all inputs and outputs, including the ones you can't see.



Master ID Button



The master fader's name and image is similar to that of a channel strip's name and image.

Like the channel faders, the master fader's name and image is also user-editable. Simply tap the button at the bottom of the master fader and a popover allows editing a name or selecting an image.

Let's start with the name. Tap in the name box to bring up the blinking cursor and keyboard (as seen in the image below). Simply type in the name you want followed by a carriage return. Note the text change between the button shown to the left ["Main"] versus the one as shown below ["PA"].

For familiarity, this is the same keyboard that is used for messaging or emailing from the iPad.

It goes without saying that tapping "Default Name" changes the master fader's name back to its default name.



As seen in all of these images, a small name resides in the upper-left corner of the master ID button regardless of the name and/or image. This system name represents each output and it cannot be changed or removed. Trust us, it's for the best, as it is for easy identification of each output, even after you rename it something goofy.

An open gray box with only the master fader's name works, but let's spice it up with an image. There are several options in this department. From the popover, tap "Image" to reveal a new popover as seen below [Image Source]. You will be presented with four choices:

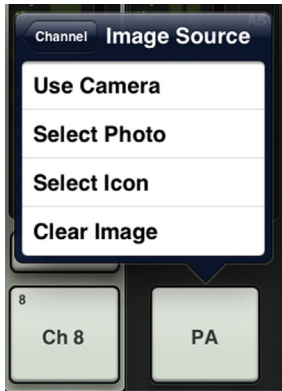
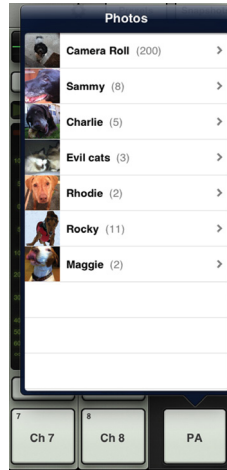


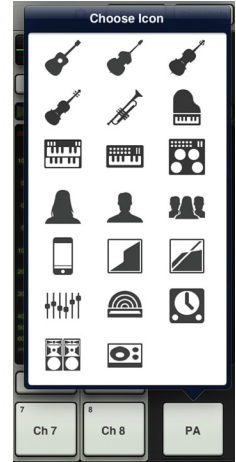
Image Source



Use Camera



Select Photo



Select Icon

Use Camera — If you're familiar with how the camera on the iPad works, then you're in luck...this one works the exact same way! The encircled camera icon in the middle of the gray bar snaps the picture and the icon in the upper-right corner selects between the front and back camera on the iPad. [Camera is unavailable on the first generation iPad].

Select Photo — Here you may select from all the photos that currently reside on your iPad.

Select Icon — Or select from a multitude of built-in icons at your disposal.

Clear Image — Believe it or not, tapping here will clear the image for that channel.



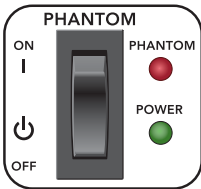
Since we already named the master fader the PA, we might as well go with the PA icon to boot, right? Tap the PA icon in the lower-left corner. The master fader is set: name and image.

Chapter 8: Level Setting Procedure

Introduction

If you're reading this front to back, now seems like a great time to discuss how to set the levels, as we just completed chapters 3 and 4 (which dealt with the hardware) and chapters 7 and 8 (which detailed the channels strips and master fader). However, if you didn't read those chapters, already have a grip on the mixer and Master Fader app and just want to learn how to set the levels, this is the place...either way, let's go!

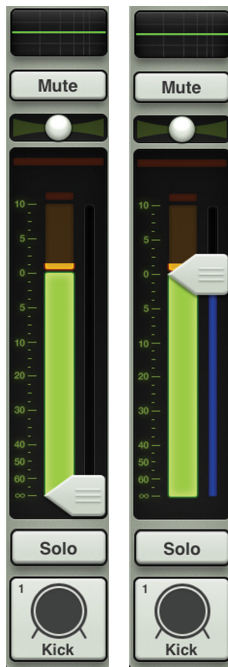
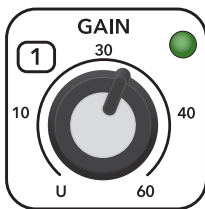
Level Setting Procedure



(1) Phantom Power — If any connected mics require an extra 48V of power, engage the phantom power switch on the rear panel of the mixer.



(2) Let There Be Rock — Use your voice, play the instrument, or play the line-level source at the same volume as it would be during normal use...and keep it going!



Step 3

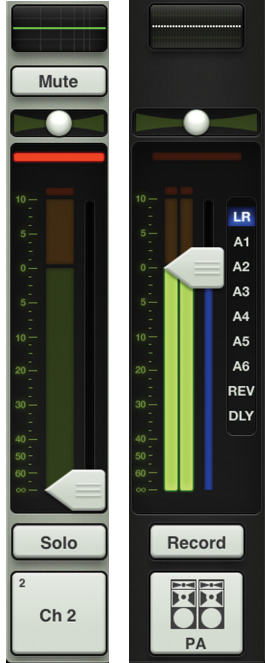
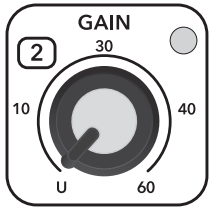
Step 4

(3) Raising Gain and Watching Meters — Turn the gain knob clockwise until the input meters bounce between green and yellow, the colors of our beloved hometown Seattle Supersonics [RIP]. The accompanying LED will illuminate green (to indicate signal).

This same LED may illuminate red (to indicate clipping). Clipping creates undesirable distortion and should be avoided at all costs. If this LED illuminates red frequently, turn the gain down.

(4) The Raising of the Fader, Part I — Raise the channel fader to 0 dB.

(5) Rinse and Repeat — Repeat steps 2-4 for each channel with signal.



Step 6

Step 7

(6) Less Than Zero — The gain knob should be completely counter-clockwise and channel fader all the way down for each channel not in use.

(7) The Raising of the Fader, Part II — Slowly raise the master fader to the desired amount. You should now see output meters and hear signal through the speakers. Hopefully it's music to your ears...otherwise it's going to be a long night.

Headphones

Here is how to get the same sound to a pair of cans...and by cans we mean headphones. Pervert.

(1) First Things First — Follow the level setting procedure starting on the previous page.



(2) Hearing Aid — We like your ears and are quite sure that you do, too. Make sure the phones knob is fully counter-clockwise before continuing.



(3) Cover Thy Ears — Release yourself from the outside world by putting on the headphones.



(4) As the Knob Turns — Turn the phones knob clockwise until you hear music through the cans.



(5) The Obligatory Warning — The headphone amp is loud and could cause permanent hearing damage. Even intermediate levels may be painfully loud with some headphones. BE CAREFUL! Always turn the phones knob all the way down before connecting headphones, soloing a channel or doing anything new that may affect the headphone volume. Then turn it up slowly as you listen carefully.

Chapter 9: Channel View : EQ

Introduction

The equalizer area accesses all EQ-related parameters such as EQ for the selected channel (including gain, frequency and Q), a shelf / bell option, high-pass filter (HPF) and polarity invert.

The 16 input channels, reverb, delay and iPad channels all have 4-band EQ with high shelving, high-mid peaking, low-mid peaking and low shelving. Shelving means that the circuitry boosts or cuts all frequencies past the specified frequency. For example, the low EQ boosts bass frequencies below 80 Hz and continuing down to the lowest note you never heard. Peaking means that certain frequencies form a “hill” around the center frequency. All 16 inputs also have a high-pass filter [HPF].

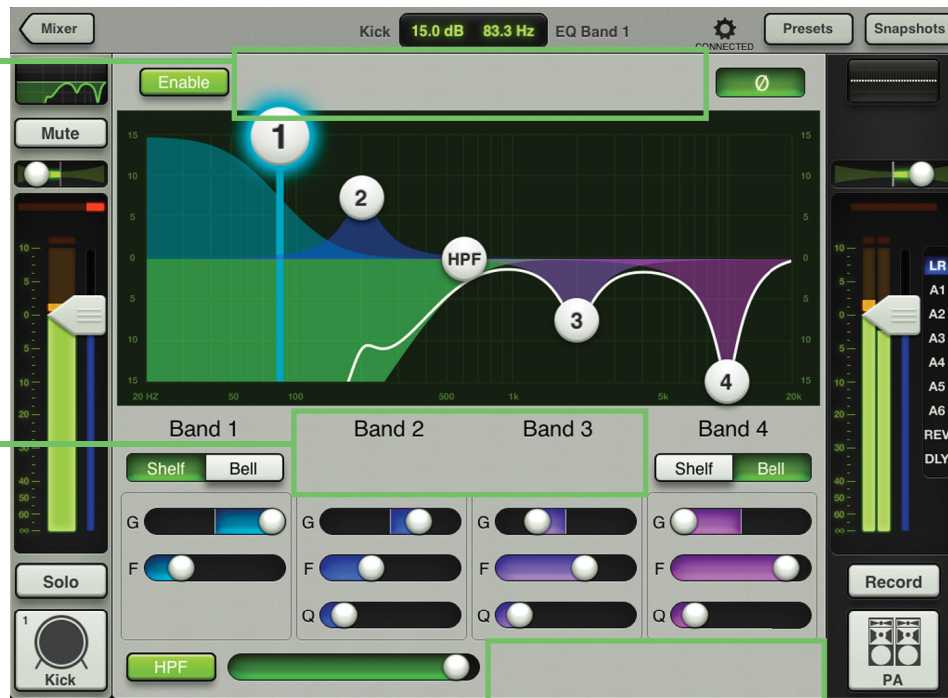
Each of the four bands has adjustable gain and frequency, while bands 2 and 3 also have adjustable Q (bandwidth). [Bands 1 and 4 also have adjustable Q (bandwidth) when in 'Bell' mode]. Bands 1 and 4 may be independently switched to shelving bands using the switches located between the EQ graph and band sliders. The shelves have adjustable gain and frequency, which is the -3 dB point from the shelf.



You can really upset things with too much EQ. Each EQ band has a lot of boost and cut because that is needed on occasion. But if the EQ is maxed on every channel, the mix turns to mush. Equalize subtly, using cut, as well as boost. If you find yourself repeatedly using a lot of boost or cut, consider altering the sound source, such as placing a mic differently, trying a different kind of mic, a different vocalist, changing the strings, gargling, or all of the above.

The Swipe Zone

Here in the EQ view, swipe anywhere in the gray areas outlined below. Swiping up displays that channel's gate and compressor view. Swiping down displays that channel's FX view. And swiping left and right changes channels.

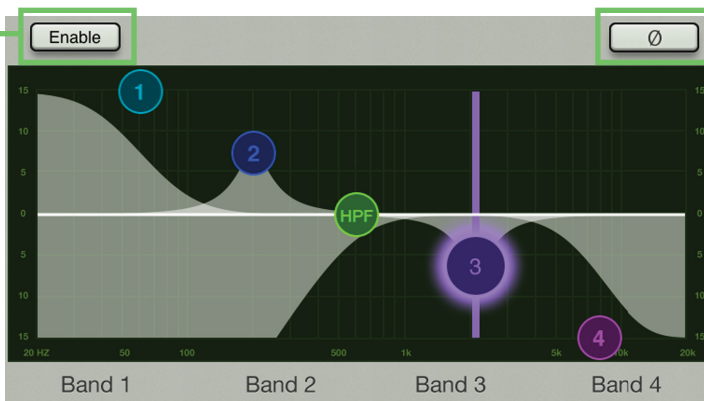


EQ On / Off

The enable button – near the upper-left corner of the screen – allows for true bypass of the EQ circuitry to ensure that there is no coloration of the signal if the EQ is not needed. When this button is disengaged, the EQ controls have no effect on the signal. You may use this button to make an A/B comparison between the EQ'd signal and the signal without EQ. Press the enable button to turn EQ on or off. It will illuminate green when engaged (as seen on the previous page) and is gray when disengaged (as seen below). Additionally, the EQ curve at the top of the channel fader switches between green [engaged] and gray [disengaged].

Polarity Invert

The polarity invert button [Ø] – located in the upper right hand corner of the screen, just below the tools and presets buttons – allows for individual channel activation of 180° polarity inversion; it is available on all input channels. Press the polarity invert button to turn polarity invert on or off. It will illuminate green when engaged and is gray when disengaged.

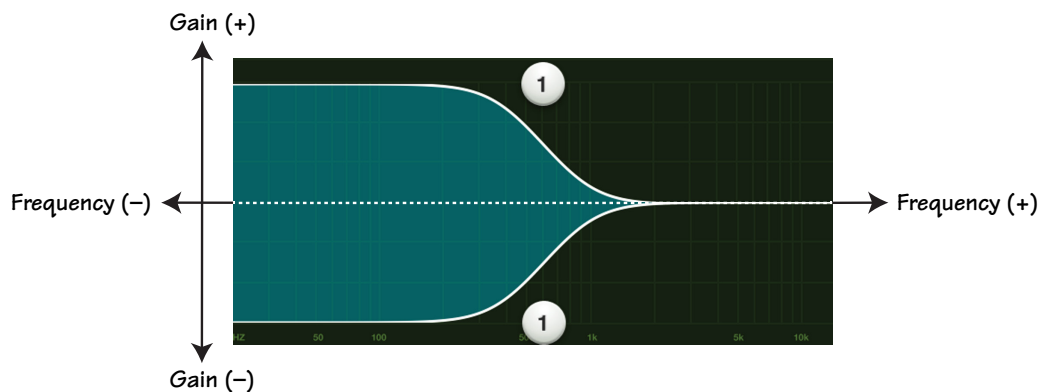


Gain, Frequency and Q [Bandwidth]

The gain and frequency may be changed by moving any of the four numbered balls (representing each band) until the desired sound has been achieved. Moving a ball horizontally changes the gain by up to ± 15 dB. Moving a ball vertically changes the frequency, ranging from 20 Hz to 20 kHz. There is a Shelf / Bell option for bands 1 and 4 and it is described in detail on the next page. Q [bandwidth] is changed by pinching the ball. Double-tap an EQ ball to reset its gain to zero.

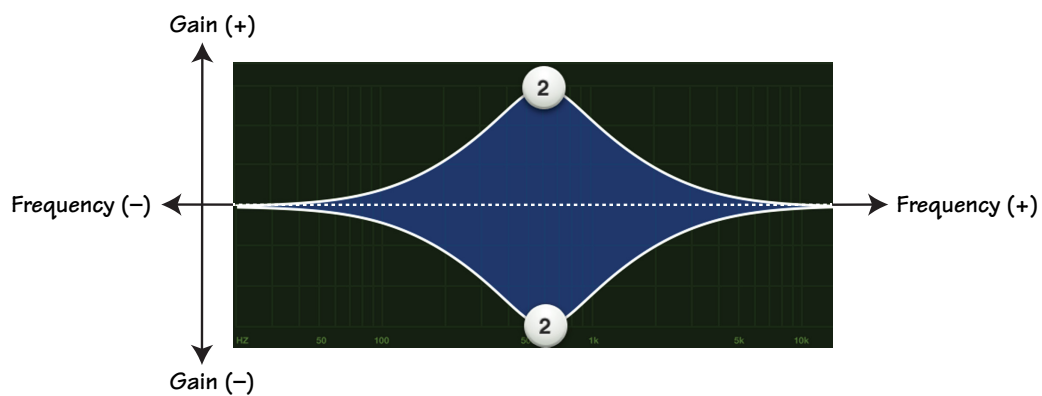
Low Shelving – Band 1

The low EQ provides up to 15 dB of boost or cut from 20 Hz to 20 kHz. This frequency represents the punch in bass drums, bass guitar, fat synth patches, and some really serious male singers who eat raw beef for breakfast.



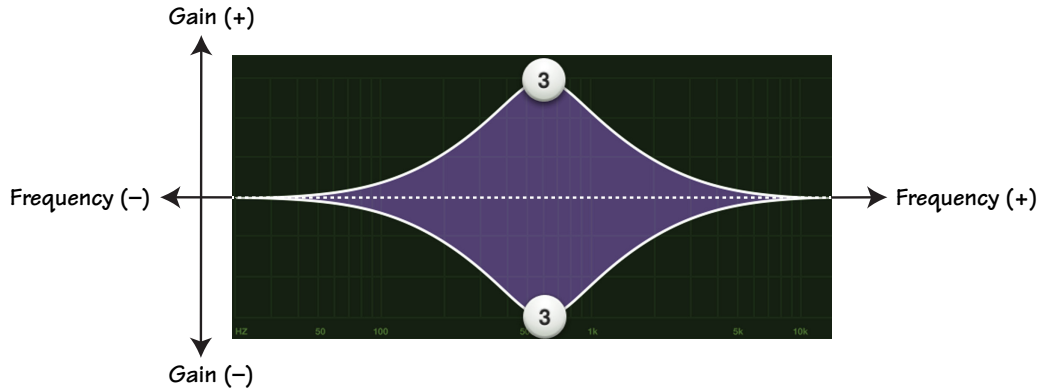
Low-Mid Peaking – Band 2

The low-mid EQ provides up to 15 dB of boost or cut from 20 Hz to 20 kHz. Frequencies affected typically include the male vocal range as well as the fundamentals and harmonics of many lower-timbred instruments.



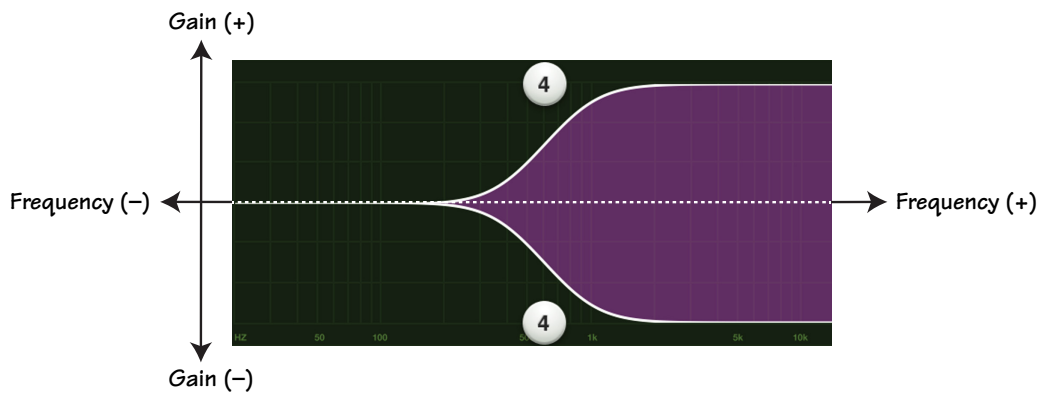
High-Mid Peaking – Band 3

The high-mid EQ provides up to 15 dB of boost or cut from 20 Hz to 20 kHz. Midrange EQ is often thought of as the most dynamic because the frequencies that define any particular sound are almost always found within this range. For example, the female vocal range as well as the fundamentals and harmonics of many higher-timbred instruments.



High Shelving – Band 4

The high EQ provides up to 15 dB of boost or cut from 20 Hz to 20 kHz. Use it to add sizzle to cymbals, an overall sense of transparency, or an edge to keyboards, vocals, guitar and bacon frying. Turn it down a little to reduce sibilance or harsh treble.



Although the Q control does adjust the bandwidth of a filter, the Q value itself is dimensionless; it has no unit of measurement. Some equalizers use the fractional bandwidth of the filter, measured in octaves, to express this parameter. The two parameters are inversely related; a high Q value corresponds to a small fractional bandwidth. The following table lists some equivalent Q and fractional bandwidth values.

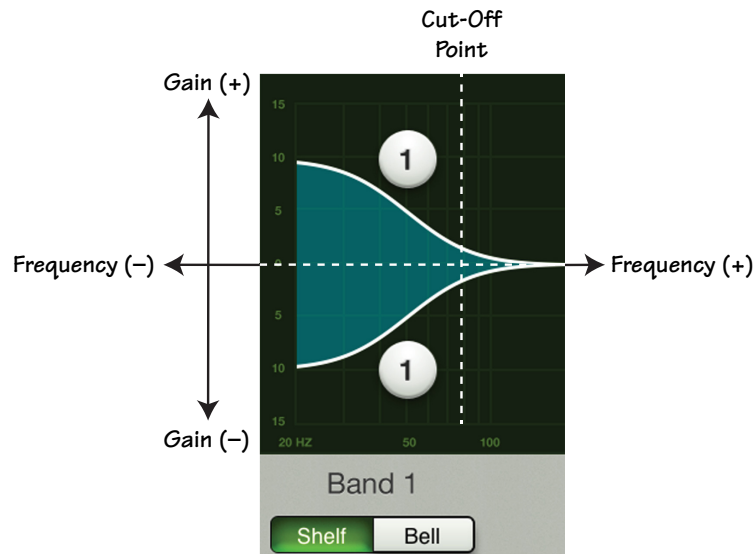
Q	BW (oct)		Q	BW (oct)
0.7	2		2.871	1/2
1.414	1		4.318	1/3
2.145	2/3		15	1/10

Shelf / Bell

A Shelf / Bell option is available on bands 1 and 4. Simply tap which setting you prefer. The chosen setting will illuminate green when engaged, while the other option will be grayed out.

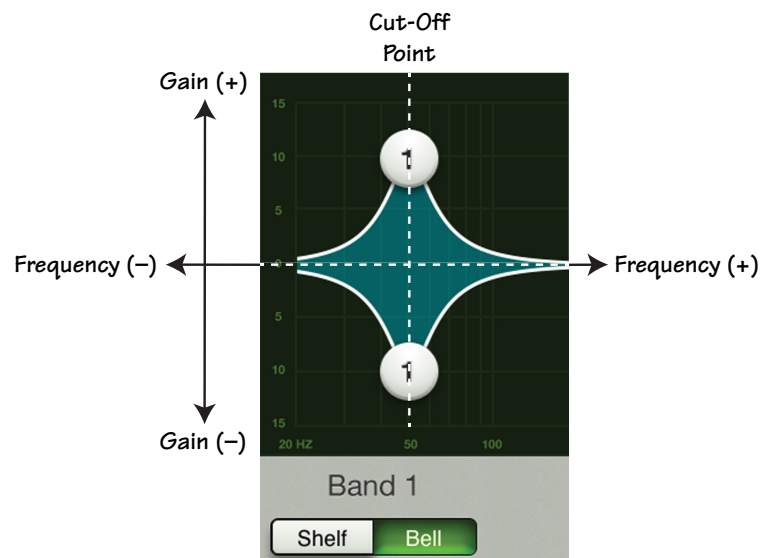
When engaged, the EQ becomes a shelving filter rather than a parametric filter. Shelf boosts frequencies from the cut-off point upwards. A gentle roll-off may be assumed with shelf.

The Q control becomes inactive when shelf is engaged.



Shelf EQ

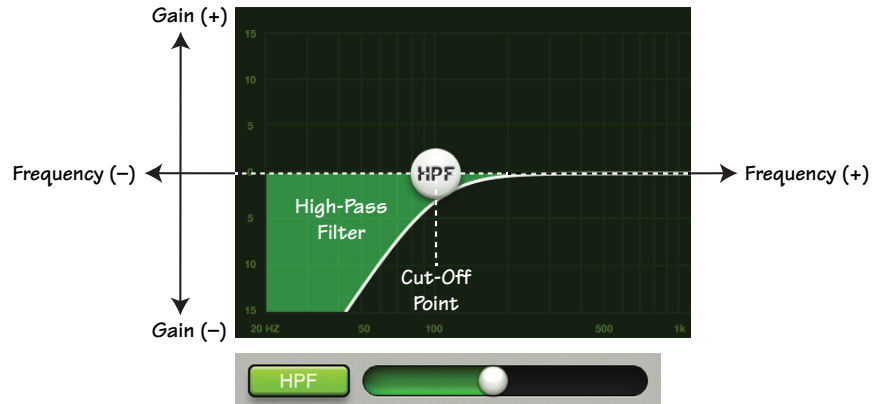
Bell boosts frequencies near the cut-off point then slowly decreases until it reaches a gain of zero. When engaged, the EQ becomes a parametric filter rather than a shelving filter. The Q control becomes active when bell is engaged. In fact, a smaller Q value results in a wider curve, while a larger Q value results in a narrower curve where frequencies may be zoomed in on more precisely. A smaller Q is generally intended for more musical purposes, while a larger Q is generally used when decreasing problem frequencies.



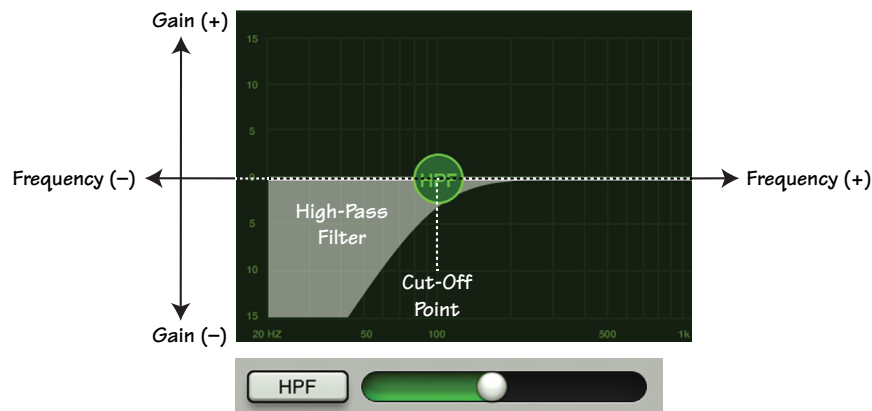
Bell EQ

HPF On / Off and Frequency

High-pass filters are utilized to cut out low frequencies. The high-pass filter control adjusts the cut-off frequency for the filter. Frequencies below the cut-off frequency are attenuated at a rate of 12 dB/octave. The slope for the HPF is adjustable by sliding the HPF ball or HPF slider left and right. Simply tap the HPF button – near the lower-left corner of the screen – to engage the high-pass filter. It will illuminate green when engaged and is gray when disengaged.



High-Pass Filter (Engaged)



High-Pass Filter (Disengaged)

DL1608 EQ at a Glance

Parameter	Low Value Limit	High Value Limit	Default
Polarity Invert	Off	On	Off
HPF Enable	Off	On	On
HPF Frequency	20 Hz	700 Hz	100 Hz
HPF Slope	–	–	18 dB/octave
EQ Enable	Off	On	On
High Band Type	Parametric	Shelf	Shelf
Low Band Type	Parametric	Shelf	Shelf
High Gain	–15 dB	+15 dB	0 dB
High Freq	20 Hz	20 kHz	12 kHz
High Q / Shelf Slope	0.5	16	2
High Mid Gain	–15 dB	+15 dB	0 dB
High Mid Freq	20 Hz	20 kHz	2 kHz
High Mid Q	0.5	16	2
Low Mid Gain	–15 dB	+15 dB	0 dB
Low Mid Freq	20 Hz	20 kHz	250 Hz
Low Mid Q	0.5	16	2
Low Gain	–15 dB	+15 dB	0 dB
Low Freq	20 Hz	20 kHz	80 Hz
Low Q / Shelf Slope	0.5	16	2

Chapter 10: Channel View : Gate and Compression

Introduction

Gates are typically used to reduce leakage from open microphones. Signals below the threshold level are muted, while signals above the threshold get to pass through. The range control changes the rule slightly. Signals below the threshold are attenuated by the amount of the range setting, while signals above the threshold get to pass through.

The operation of the gate is further modified by the attack, hold, and release controls. In order to open the gate, the trigger signal must exceed the threshold for at least the duration of the attack time. This is useful for helping the gate discriminate between something that is short duration and long duration, such as hi-hat leakage into one of the tom-tom mikes.

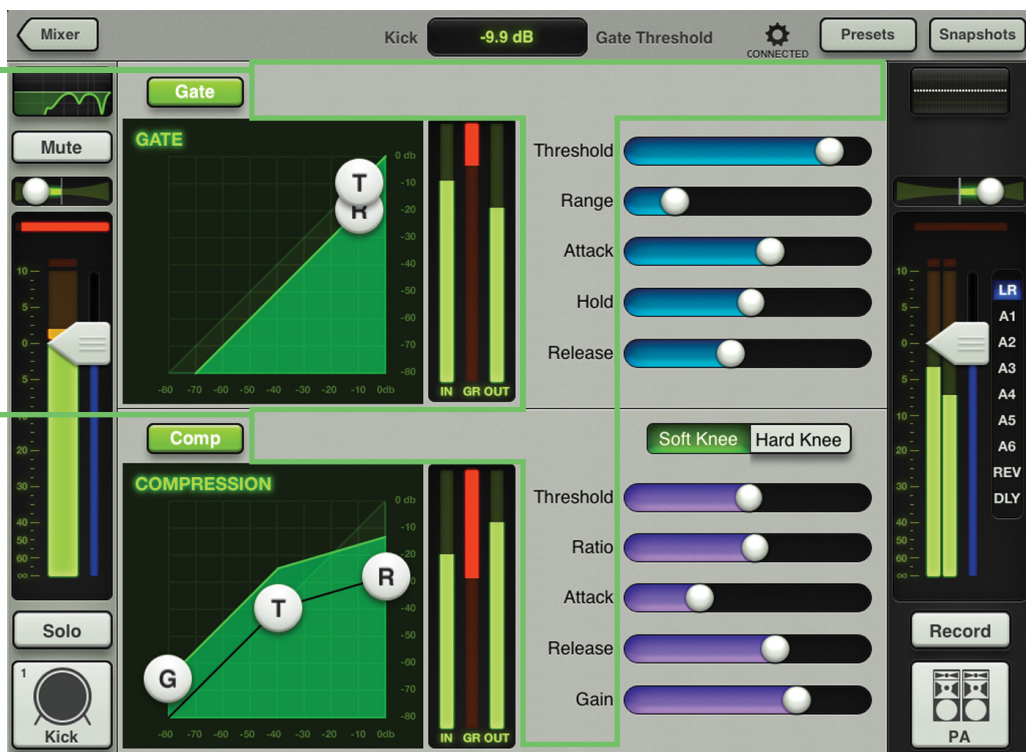
Once the gate has opened, the hold time begins. The hold timer resets any time the input signal crosses the threshold again, as long as it remains above the threshold for longer than the attack setting. After the hold time passes, the gain falls at a rate determined by the release setting. The range control allows the gate to remain partly open, even if the input is below the threshold.

Compressors are used to reduce or limit transient peaks in a signal. If the signal is too hot, turn it down, otherwise leave it alone. As the input level to the compressor increases, the output level increases linearly until the threshold point is reached. After that point, the output level no longer increases linearly. Instead, it increases at a reduced rate determined by the ratio setting.

The attack and release controls affect the rate of the gain change; attack affects the rate of the onset of gain reduction and release affects the recovery rate once the transient has passed.

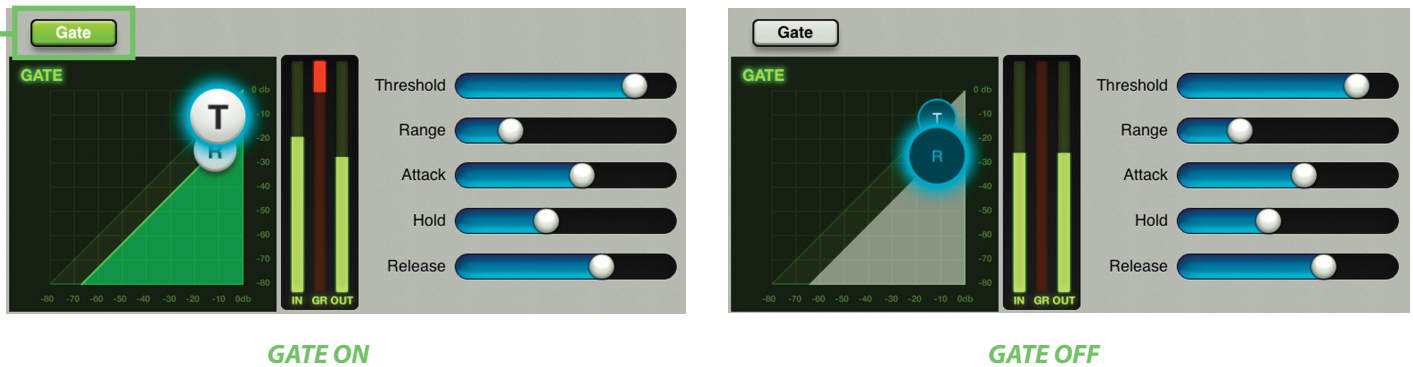
The Swipe Zone

Here in the gate and compression view, swipe anywhere in the gray areas outlined below. Swiping up displays that channel's FX view. Swiping down displays that channel's EQ view. And swiping left and right changes channels.



Gate On / Off

Press the Gate button to turn the gate on or off. It will illuminate green when engaged and is gray when disengaged.



GATE ON

GATE OFF

Gate Display and Settings

The gate for each channel may be adjusted by moving the threshold and range balls or moving any of the five sliders left and right. Additionally, exact settings may be entered into the current parameter value. The gate may be adjusted whether the gate is on or off. The iPad channel only has a compressor, not a gate.

Threshold

Threshold determines the level at which the gate acts on the incoming signal. The range of the threshold setting varies from -80 dBFS to 0 dBFS.

Range

Range determines how far the gain drops once the signal is below threshold. Setting the range control to something in the 10 - 20 dB range allows some amount of signal leakage when the gate is closed, which may make its action more subtle (less abrupt) and therefore less noticeable. The range of the gated signal varies from 0 dB to 60 dB.

Attack

Attack determines how quickly the gate opens once the signal is above threshold. Short attack times allow triggering on short transients, while longer attack times cause these transients to be ignored. The range of the attack time varies from 0 ms to 300 ms.

Hold

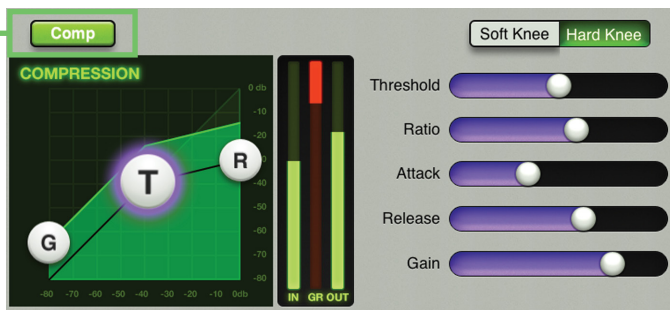
Hold sets a fixed time that the gate remains open once the signal drops below the threshold setting. During the hold time, the gain is held constant, whereas during the release time, the gain is falling at the release rate. The range of the hold time varies from 0 seconds to 5 seconds.

Release

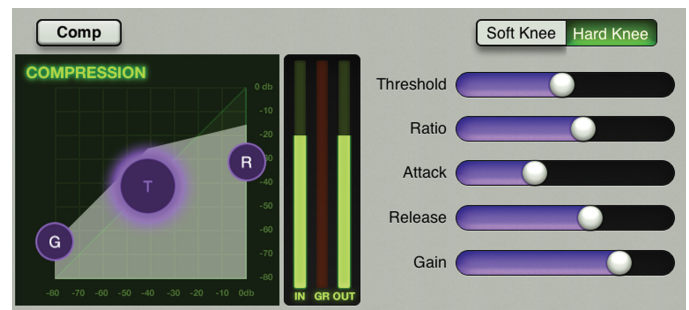
Release determines how long it takes for the gain to fall to the setting of the range control once the signal falls below threshold and the hold time elapses. The range of the release speed varies from 50 ms to 3 seconds.

Compressor On / Off

Press the Comp button to turn the compressor on or off. It will illuminate green when engaged and is gray when disengaged.



COMPRESSOR ON



COMPRESSOR OFF

Compressor Display and Settings

The compressor for each channel may be adjusted by moving the gain, threshold and ratio balls or moving any of the five sliders left and right. Additionally, exact settings may be entered into the current parameter value. The compressor may be adjusted whether the compressor is on or off. The iPad channel only has a compressor, not a gate.

Threshold

Threshold sets the threshold of the compressor in dB below 0 dBFS. The range of the threshold setting varies from -80 dBFS to 0 dBFS.

Ratio

Ratio sets the amount of gain reduction applied as the signal exceeds the threshold level. The range of the ratio of the compressor varies from 1:1 to inf:1.

Attack

Attack determines how quickly the compressor reacts once the signal is above threshold. Short attack times allow compressing on short transients, while longer attack times cause these transients to be ignored. The range of the attack time varies from 0 ms to 300 ms.

Release

Release determines how long it takes for the compressor to end gain reduction once the signal drops back below the threshold. The range of the release speed varies from 50 ms to 3 seconds.

Gain

Gain adds make-up gain to the output of the compressor. This is useful to make the apparent volume of the signal the same with the compressor in and out of the signal chain. The range of the make-up gain varies from 0 dB to 20 dB.

Soft Knee / Hard Knee Compression

This switch sets the shape of the gain reduction curve at the threshold level. When set to hard, the gain reduction curve changes abruptly at the threshold level. When set to soft, the gain reduction curve changes gently as it transitions to the final ratio amount.

Gate / Compressor Meters

These three meters show the input level, amount of gain reduction and output level. The input and output meters range from -90 dBFS to 0 dBFS. The reduction meter of the gate ranges from 0 to 60 dB, while the reduction meter of the compressor ranges from 0 to 20 dB.

DL1608 Gate at a Glance

Parameter	Low Value	High Value	Default
Gate Enable	Off	On	On
Threshold	-80 dBFS	0 dBFS	-80 dBFS
Attack	0 ms	300 ms	0.1 ms
Release	50 ms	3 s	250 ms
Range	0 dB	60 dB	60 dB
Hold	0 ms	5 s	0 ms

DL1608 Compression at a Glance

Parameter	Low Value	High Value	Default
Comp Enable	Off	On	On
Threshold	-80 dBFS	0 dBFS	0 dBFS
Ratio	$1 : 1$	INF : 1	$2 : 1$
Gain	0 dB	20 dB	0 dB
Attack	0 ms	300 ms	0.1 ms
Release	50 ms	3 s	250 ms
Knee	Soft	Hard	Soft

Chapter 11: Channel View : FX

Introduction

The DL1608 has one reverb and one delay and these may be fed from any combination of channels. There are a wide variety of reverb and delay types at your disposal on the Master Fader app. As seen in the image below, the Master Fader app follows standard FX send and return configuration so the learning curve is kept to a minimum.

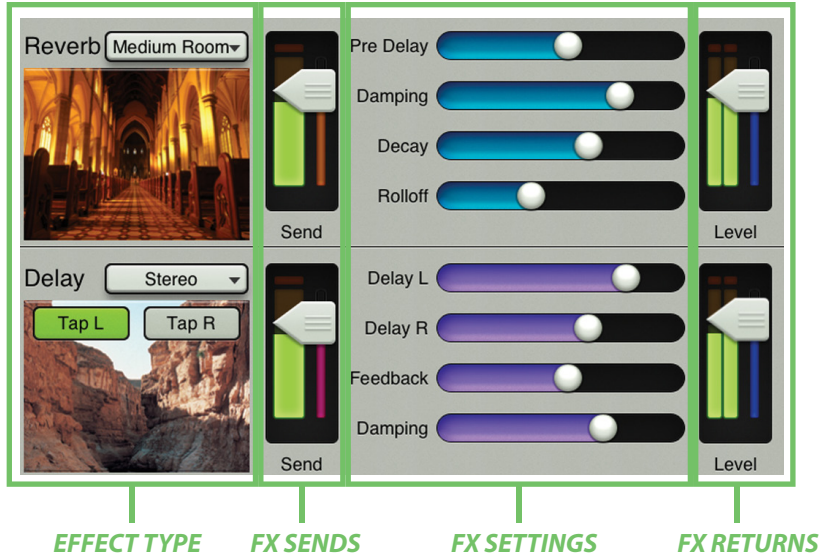
The FX are essentially conjoined, reverb on top, delay just below. The sends and returns for the current channel are displayed here. This allows you to easily adjust both FX in one convenient location for each selected channel; channel 1 in this example.



The Swipe Zone

Here in the FX view, swipe anywhere in the gray area outlined above. Swiping up displays that channel's EQ view. Swiping down displays that channel's gate and compression view. And swiping left and right changes channels.

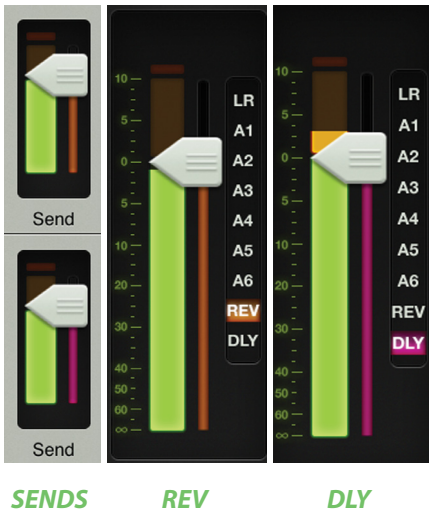
FX View



From left to right, each effect displays the following:

Effect Type — The reverb and delay each display the currently selected effect type (as a button which reveals a popover when tapped) and an accompanying image. These selections are global and affect all channels sent to the effects as there is only one reverb and one delay on the DL1608. Effect types are described in more detail in a few pages.

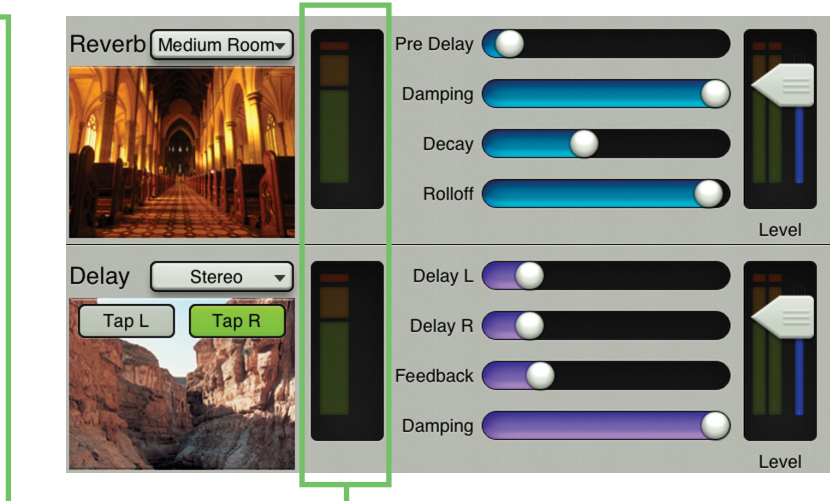
FX Sends — There are two vertical send channel faders and meters, one for each effect. These control the level being sent to the effect from the current channel.



Notice in the image to the left that the color of each send fader matches the color of the reverb and delay output selector.

The reverb and delay send meters display the summed signals from all channel sends post-send master. Put another way, this shows the total signal going into the FX processor regardless of the current channel being adjusted.

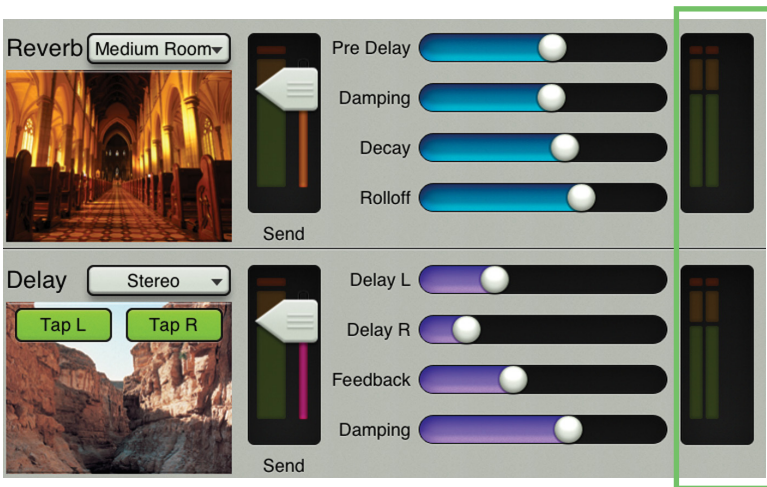
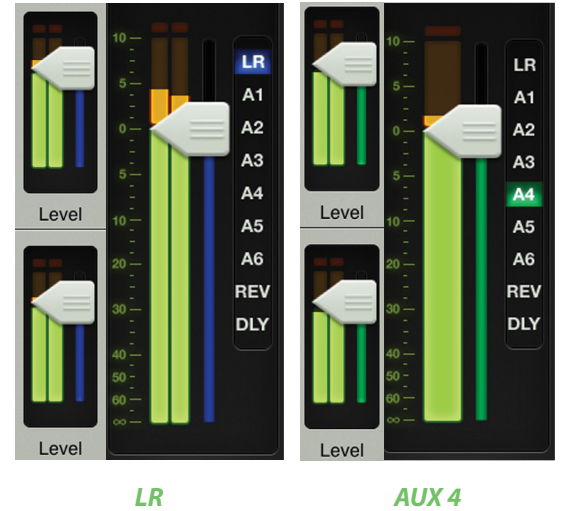
There are no reverb or delay sends from the reverb and delay returns, so when either the reverb or delay is the current channel, there are no send faders shown as seen in the image to the right.



FX Settings — The reverb and delay have multiple sliders which are used to alter the selected effect. These sliders change dependent on which effect type is chosen for each channel. These sliders are global and affect all channels sent to the effects as there is only one reverb and one delay on the DL1608. The various FX controls for each FX type are described in more detail in a few pages.

FX Returns — There are two vertical return channel faders and meters, one for each effect. These control the return level from the effect to the selected output. You have seen these before, as they are the same faders displayed in the mixer view. A pair exists [one for reverb, one for delay] for each selected output. Unlike the FX sends, the color of the selected output indicator will change based on the selected output for the FX returns. See the image to the right for one example.

Navigate to the reverb return channel, then move the channel fader up and down. Notice that it also moves the reverb return fader up and down. This is because they are both showing the same level. As such, moving the return reverb fader up and down also moves the reverb channel fader up and down. This works with the delay return channel and delay return fader, as well.



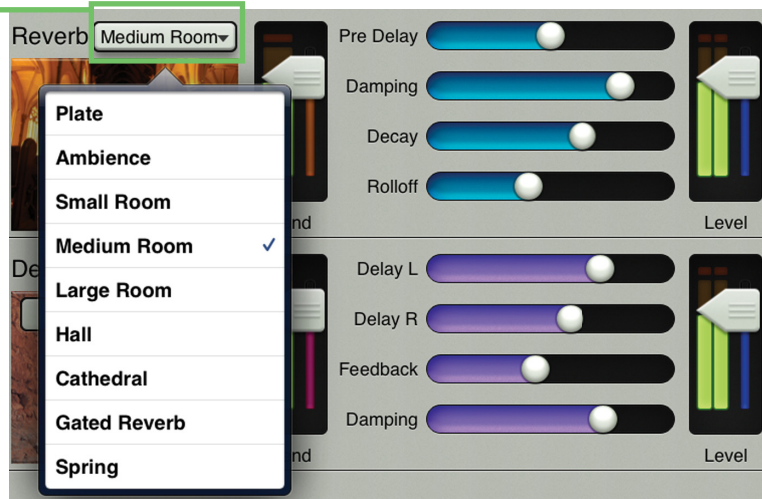
There are no reverb or delay returns to the reverb and delay sends (which would be crazy...and it avoids a feedback loop), so when either the reverb or delay send is the selected output, there are no return faders as seen in the image to the left.



The astute reader may ask if there are no sends from returns and no returns from sends, what if one selects an effect return as the current channel and an effect send as the selected output. Good question! The image on the left shows the FX with no sends and no returns. Of course you may still adjust the global controls. If you want to witness this for yourself here's how in two simple steps: (1) go to either the reverb channel or delay channel and (2), select reverb or delay as the output. Done!

Reverb Type

Reverb simulates the effect of room variations. The Master Fader app comes with nine reverb types to choose from: plate, ambience, small room, medium room, large room, hall, cathedral, gated reverb and spring. A button displaying the current reverb type may be tapped to reveal the other reverb types. Tap the reverb you would like for the selected channel.



Reverb Type	Description	Examples
Plate	Plate reverbs emulate vintage mechanical reverberation that is generated with a metal plate. Its sound is characterized by lots of early reflections and no pre-delay.	Perfect for thickening percussive instruments, such as a snare drum, or tight vocal arrangements.
Ambience	Ambience is the surrounding sound field. This reverb adds depth and space.	Ambience is good for scoring movie soundtracks and post-rock bands utilizing a lot of depth in their sound.
Small Room	The small room reverb simulates the reverberation (persistence of sound) in a typical small room. Small rooms are typically coined "dead" rooms with little to no reverb.	Some artists record guitars (and/or bass) from a bathroom to get a "punchier" sound out of their amp.
Medium Room	The medium room reverb simulates the reverberation (persistence of sound) in a typical medium room.	A medium room would be good for thickening up a bass sound without it sounding muddy.
Large Room	The large room reverb simulates the reverberation (persistence of sound) in a typical large room. Large rooms are typically coined "live" rooms since they have a lot of reverb.	Sound tends to carry in large rooms with a lot of open space. This works well for a good, boomy kick sound.
Hall	This reverb is characterized by its large, spacious sound, long pre delay and vibrant tone.	Adds life to acoustic instruments and vocals from solos to full-on symphonies and choirs.
Cathedral	This reverb emulates the extremely long tails, dense diffusion and long pre-delays and reflections that would be found in a very large, stone-walled house of worship.	Gives amazing depth to choirs, wind instruments, organs and soft acoustic guitars.
Gated Reverb	Gated reverbs incorporate an age-old trick whereby an extremely dense reverb is processed through a fast gate for an interesting, albeit artificial, sound.	Most often used to fatten snare drums and toms without clutter.
Spring	A spring reverb uses a transducer at one end of a spring and a pickup at the other end to create and capture vibrations in a metal spring. The longer the spring, the longer the decay time of the reverberation.	Spring reverbs are typically used on guitar amplifiers or organs in a rock band format.

Reverb Sliders

The following is a list of sliders available for each selected reverb. Slide left to decrease the reverb time and slide right to increase the reverb time.

Pre Delay (All)

When listening to a live performance, direct sounds are reached first, followed by reverberation caused by room reflections. The pre delay is the amount of time between when the direct sounds arrive and when the reflections arrive. The range is 0 ms to 300 ms.

The speed of sound is approximately 340 meters per second (1100 feet per second). This means that in one millisecond, it travels 0.34 meters (110 feet). As a rough idea, think of 1 ms as the time it takes for sound to travel one foot.

Damping (All)

Damping increases or decreases the decay time of the higher frequencies relative to the overall decay time. That is, the amount of sound reflections that make up the reverb. Lower values sound “thinner,” while higher values give a smoother-sounding decay. The range is 500 Hz to 20 kHz.

Decay (All)

This represents the decay time of the reverb. The range will vary depending on the reverb chosen.

Rolloff (All except Gated Reverb)

This provides a 24 dB/octave low-pass filter at the output of the reverb. This allows the level of the audio range to be rolled off above the frequency set by this slider. The range is 500 Hz to 20 kHz.

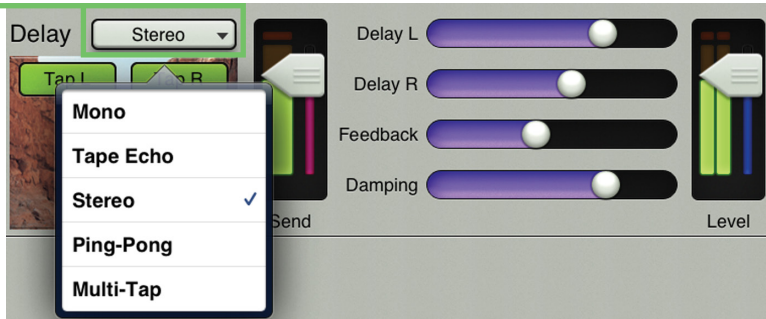
Release (Gated Reverb)

Release is the amount of time it takes for attenuation to happen. The range is 50 ms to 3000 ms.

Parameter	Low Value	High Value	Default
Pre Delay	0 ms	300 ms	0 ms
Damping	500 Hz	20 kHz	20 kHz
Decay	0.1 s – 4.0 s	1.3 s – 10.0 s	2.00 s
Rolloff	500 Hz	20 kHz	20 kHz
Release	50 ms	3000 ms	250 ms

Delay Type

Delay allows adjustment of the effect delay. The Master Fader app comes with five delays to choose from: mono, tape echo, stereo, ping-pong and multi-tap. A button displaying the current delay type may be tapped to reveal the other delay types. Tap the delay you would like for the selected channel.



Delay Type	Description	Examples
Mono	The mono delay provides an echo effect with a mono delay line.	Mono delay is great for added depth and space. Pink Floyd guitarist David Gilmour is one of the kings of delay.
Tape Echo	Tape Echo provides a single, relatively rapid delay of the original signal, with the added warmth that vintage tape-based echo units provided.	Often used on vocals for a 1950's-era feel, or on guitars for a surf-type tone.
Stereo	The stereo delay is a stereo version of the mono delay, with a left and right input and a left and right output. Each side (left and right) has its own set of controls.	A guitarist with dual outputs (or A/B switcher) can create interesting stereo delays, setting each amp's delay times independent of the other one.
Ping-Pong	The ping pong delay works the same as the stereo delay, with the exception that the feedback is routed to the opposite channel, producing a bouncing sound as the delayed signal bounces from left to right.	Similar to the stereo delay example, but instead of each delay being set independently of the other, this creates a steady ping-pong delay with varying speed.
Multi-Tap	This allows you to create two delays with different lengths.	With added feedback, you can create very interesting effects on a guitar solo.

Delay Sliders

The following is a list of sliders available for each selected delay. Slide left to decrease the delay time and slide right to increase the delay time. Some delays have a 'tap' function in which case you tap the 'tap' button at the rate you would like the delay.

Delay (Mono, Tape Echo)

This slider sets the current delay time in milliseconds, from 10 ms to 1600 ms. A tap button resides in the upper-left corner of the delay image if you would rather tap the preferred delay tempo.

Delay L (Stereo, Ping-Pong)

This slider sets the left side current delay time in milliseconds, from 10 ms to 1600 ms. A tap l button resides in the upper-left corner of the delay image if you would rather tap the preferred delay tempo.

Delay R (Stereo, Ping-Pong)

This slider sets the right side current delay time in milliseconds, from 10 ms to 1600 ms. A tap r button resides in the upper-right corner of the delay image if you would rather tap the preferred delay tempo.

Delay 1 (Multi-Tap)

This slider sets one delay time in milliseconds, from 10 ms to 1600 ms. A tap 1 button resides in the upper-left corner of the delay image if you would rather tap the preferred delay tempo.

Delay 2 (Multi-Tap)

This slider sets a second delay time in milliseconds, from 10 ms to 1600 ms. A tap 2 button resides in the upper-right corner of the delay image if you would rather tap the preferred delay tempo.

Feedback (All)

This controls how much of the delayed signal is routed back to the input of the delay section, to create multiple echoes. The feedback gain is less than one, so each time the signal is fed back, the delayed signal becomes quieter (so the echo won't go on forever). It ranges from 0% to 100%.

Damping (All)

This applies a low-pass filter to the delayed signal and rolls off the higher frequencies. It ranges from 500 Hz to 20 kHz.

Parameter	Low Value	High Value	Default
Delay	10 ms	1.6 s	250 ms
Delay L	10 ms	1.6 s	250 ms
Delay R	10 ms	1.6 s	250 ms
Delay 1	10 ms	1.6 s	250 ms
Delay 2	10 ms	1.6 s	250 ms
Feedback	0%	100%	20%
Damping	500 Hz	20 kHz	20 kHz

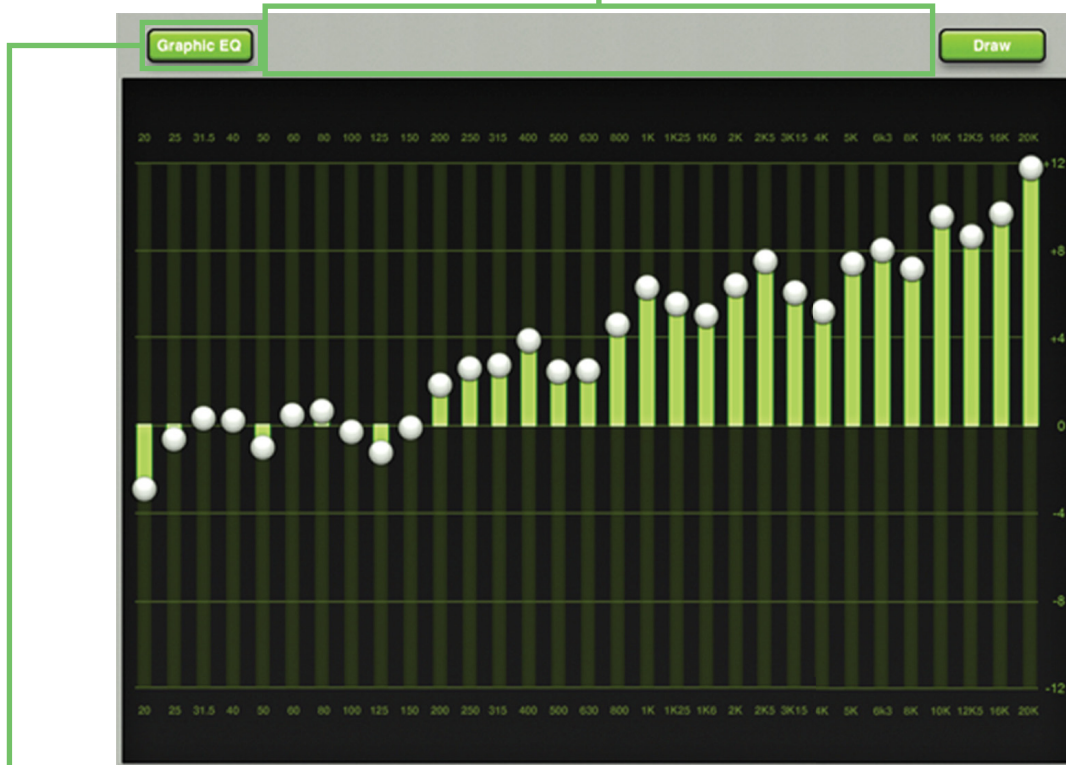
Chapter 12: Channel View : Graphic EQ

Introduction

Graphic EQ is a great tool for really dialing in the sound you're looking for or to squelch feedback from monitors. Arrival is easy. Simply tap the graphic EQ curve at the top of the master fader channel from the mixer view or from any input channel view. The graphic EQ looks and works similarly to that of a typical 31-band graphic EQ.

The Swipe Zone

Here in the graphic EQ view, swipe anywhere in the gray area outlined below. Swiping up or down displays the output compressor / limiter view. Swiping left and right does nothing.



Graphic EQ On / Off

The graphic EQ button is located near the upper-left corner of the screen. This allows for true bypass of the graphic EQ circuitry to ensure that there is no coloration of the signal if the graphic EQ is not needed. When this button is disengaged, the graphic EQ controls have no effect on the signal. You may use this button to make an A/B comparison between the EQ'd signal and the signal without graphic EQ. Press the graphic EQ button to turn graphic EQ on or off. It will illuminate green when engaged and is gray when disengaged.

31-Band EQ

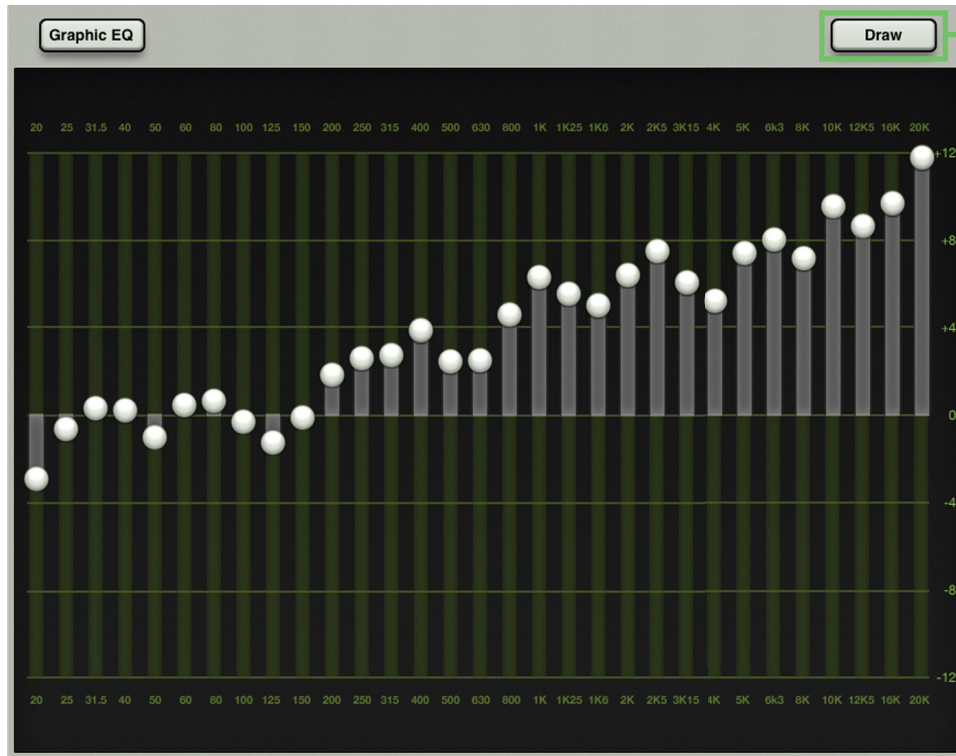
There are 31 graphic EQ balls ranging from 20 Hz to 20 kHz. Moving a ball vertically changes that frequency's gain by up to ± 12 dB. Drag these sliders up or down until the desired sound has been achieved. Tapping a band's graphic EQ ball twice will zero it.

Draw

The draw button is located near the upper-right corner of the screen. This allows you to draw an EQ curve over the display (regardless of where the slider balls currently reside) and the sliders will snap to the corresponding position.

Engage draw to quickly create a basic GEQ outline, then disengage draw to fine-tune any of the 31 bands one-by-one, as needed.

Press the draw button to turn the draw function on or off. It will illuminate green when engaged (as seen on the previous page) and is gray when disengaged (as seen below).



DL1608 Graphic EQ at a Glance

Parameter	Low Value	High Value	Default
GEQ ENABLE	OFF	ON	OFF
20 Hz Gain	-12 dB	12 dB	0 dB
25 Hz Gain	-12 dB	12 dB	0 dB
31.5 Hz Gain	-12 dB	12 dB	0 dB
40 Hz Gain	-12 dB	12 dB	0 dB
50 Hz Gain	-12 dB	12 dB	0 dB
63 Hz Gain	-12 dB	12 dB	0 dB
80 Hz Gain	-12 dB	12 dB	0 dB
100 Hz Gain	-12 dB	12 dB	0 dB
125 Hz Gain	-12 dB	12 dB	0 dB
160 Hz Gain	-12 dB	12 dB	0 dB
200 Hz Gain	-12 dB	12 dB	0 dB
250 Hz Gain	-12 dB	12 dB	0 dB
315 Hz Gain	-12 dB	12 dB	0 dB
400 Hz Gain	-12 dB	12 dB	0 dB
500 Hz Gain	-12 dB	12 dB	0 dB
630 Hz Gain	-12 dB	12 dB	0 dB
800 Hz Gain	-12 dB	12 dB	0 dB
1 kHz Gain	-12 dB	12 dB	0 dB
1.25 kHz Gain	-12 dB	12 dB	0 dB
1.6 kHz Gain	-12 dB	12 dB	0 dB
2 kHz Gain	-12 dB	12 dB	0 dB
2.5 kHz Gain	-12 dB	12 dB	0 dB
3.15 kHz Gain	-12 dB	12 dB	0 dB
4 kHz Gain	-12 dB	12 dB	0 dB
5 kHz Gain	-12 dB	12 dB	0 dB
6.3 kHz Gain	-12 dB	12 dB	0 dB
8 kHz Gain	-12 dB	12 dB	0 dB
10 kHz Gain	-12 dB	12 dB	0 dB
12.5 kHz Gain	-12 dB	12 dB	0 dB
16 kHz Gain	-12 dB	12 dB	0 dB
20 kHz Gain	-12 dB	12 dB	0 dB
Master	-12 dB	12 dB	0 dB

Chapter 13: Channel View : Output Compressor / Limiter

Introduction

The output compressor / limiter looks and functions similar to that of the channel compressor, except (1) the output compressor / limiter affects and alters the sound of *everything* passing through the selected output and (2) the output compressor / limiter output is in stereo.

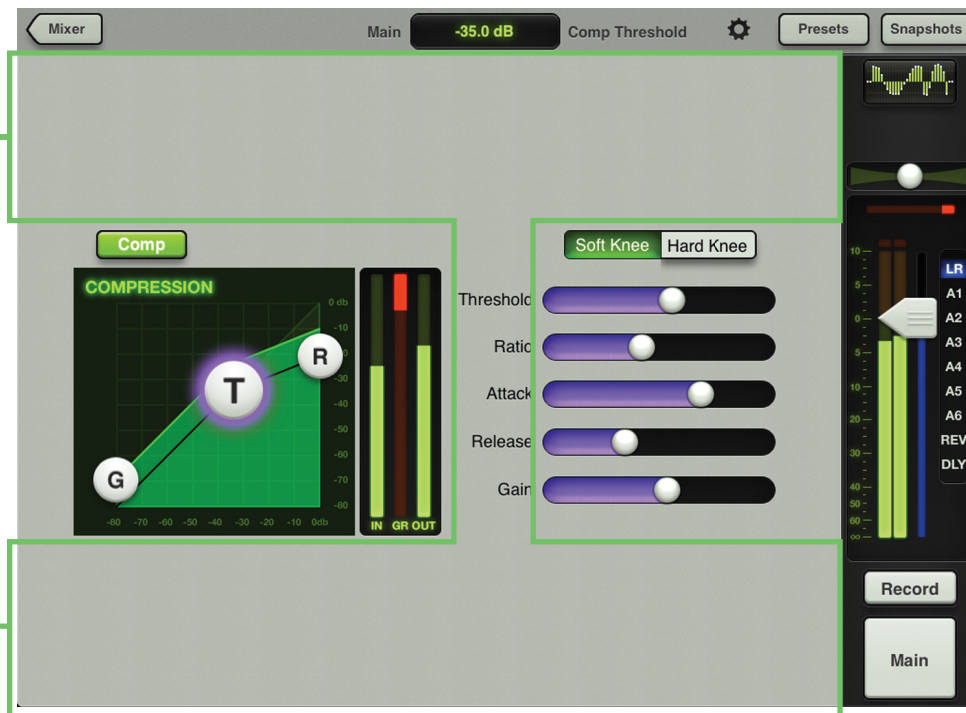
Compressors are used to reduce or limit transient peaks in a signal. If the signal is too hot, turn it down, otherwise leave it alone. As the input level to the compressor increases, the output level increases linearly until the threshold point is reached. After that point, the output level no longer increases linearly. Instead, it increases at a reduced rate determined by the ratio setting.

With limiters, signals below a specified input level are allowed to pass unaffected while attenuating the peaks of stronger signals that exceed the input levels.

The attack and release controls affect the rate of the gain change; attack affects the rate of the onset of gain reduction and release affects the recovery rate once the transient has passed.

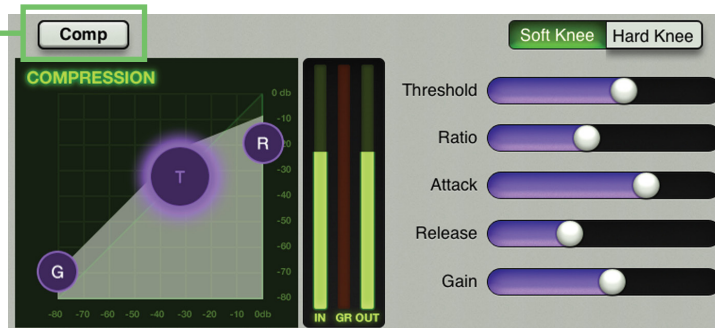
The Swipe Zone

Here in the output compressor / limiter view, swipe anywhere in the gray areas outlined below. Swiping up or down displays the graphic EQ view. Swiping left and right does nothing.



Compressor On / Off

Press the Comp button to turn the compressor on or off. It will illuminate green when engaged (as seen on the previous page) and is gray when disengaged (as seen below).



Compressor Display and Settings

The output compressor for each selected output may be adjusted by moving the gain, threshold and ratio balls or moving any of the five sliders left and right. Additionally, exact settings may be entered into the current parameter value. The output compressor may be adjusted whether the output compressor is on or off. There is no output compressor for the reverb and delay outputs.

Threshold

Threshold sets the threshold of the compressor in dB below 0 dBFS. The range of the threshold setting varies from -60 dBFS to 0 dBFS.

Ratio

Ratio sets the amount of gain reduction applied as the signal exceeds the threshold level. The range of the ratio of the compressor varies from 1:1 to inf:1.

Attack

Attack determines how quickly the compressor reacts once the signal is above threshold. Short attack times allow compressing on short transients, while longer attack times cause these transients to be ignored. The range of the attack time varies from 0.1 ms to 300 ms.

Release

Release determines how long it takes for the compressor to end gain reduction once the signal drops back below the threshold. The range of the release speed varies from 50 ms to 3 seconds.

Gain

Gain adds make-up gain to the output of the compressor. This is useful to make the apparent volume of the signal the same with the compressor in and out of the signal chain. The range of the make-up gain varies from 0 dB to 20 dB.

Soft Knee / Hard Knee Compression

This switch sets the shape of the gain reduction curve at the threshold level. When set to hard, the gain reduction curve changes abruptly at the threshold level. When set to soft, the gain reduction curve changes gently as it transitions to the final ratio amount.

Output Compressor / Limiter Meters

These three meters show the input level, amount of gain reduction and output level.

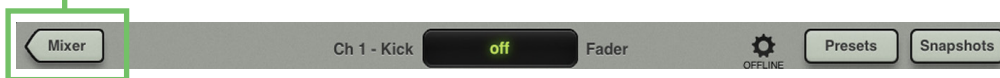
Chapter 14: Mixer View : Navigation Bar

Introduction

Just how important is the navigation bar? It's so important that it is always available regardless of what view is currently displayed. Want more? Not only is it always available, but it is right on top in plain sight! Not at the bottom or tucked away in some corner. It's a banner announcing (and awaiting) your choice.

Interestingly, though, there are no faders here, EQ, gates and compressors and FX live elsewhere, etc. Think of the navigation bar as the brains *behind* the operation. A mixer button takes you back to the mixer view, there are a wide variety of options to choose from in the tools section and the navigation bar also hosts snapshots, shows, recall safe channel selection and presets, too.

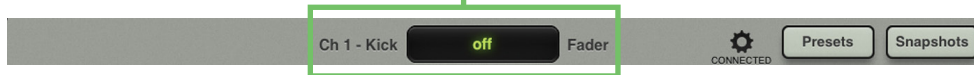
Mixer



The mixer button is only displayed when working within a channel view [EQ, gate and compressor, FX, graphic EQ and compressor / limiter]. Simply tap the mixer button to return to the mixer view.

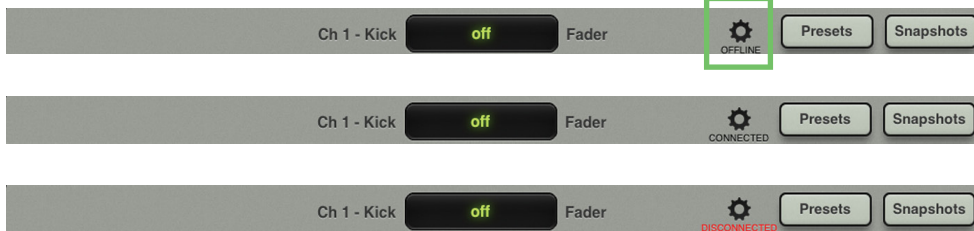
If a mixer button is not displayed (as displayed in the image below), then you are already in the mixer view.

Current Parameter Display



Here, the current parameter display shows the current channel system name [Ch 1], followed by the custom user name [Kick], the current parameter value [off] and current parameter name [Fader] for just about every control or parameter as it is adjusted. Also, if you want to type in an exact value for a parameter, touch the channel's parameter you would like to update so it appears in the current parameter display. Next, tap the current parameter value; a keyboard appears. Simply type in the exact value you would like for that channel's parameter followed by a carriage return.

Tools



The gear icon is where you access the tools. Think of it as a “settings”-type area. But before we get into those settings, let's talk about one more very important thing the tools button does. Text will always be located underneath the icon and it will state the current connection status of the Master Fader app. As seen in the images above, it could state one of three statuses:

Offline — The Master Fader app is NOT communicating with a DL1608 because it has been configured as such. Offline could even be displayed when an iPad is physically connected to a DL1608.

Connected — The Master Fader app is connected to the DL1608 mixer, either wired or wirelessly.

Disconnected — The Master Fader app is trying to connect wirelessly to the DL1608 mixer, but is unable to connect.

These will make more sense when we discuss devices, starting on the next page.

When tapped, the tools menu will appear and the tools icon will illuminate green. When tools is disengaged, the icon is gray.

Tap the tools icon to reveal the following options:

(1) Devices

(2) Settings

(3) Help

As we go through each of these sections, notice that the current selection illuminates green. When finished, tap the tools button again to return to the previous view, be it the mixer view or a channel view.

Devices

Devices is where you select a DL1608 to control from the Master Fader app on this iPad, whether wired or wirelessly. Or you may choose to work offline. This could be to demo the Master Fader app or prepare a mix prior to the next gig. Simply select from a list of all discovered consoles available for control. The list of available devices to select from is divided into three sections: Offline, Wired and Wireless.

Offline — Select “Work Offline/Demo” to sever all control from a DL1608. An iPad that is offline will not control a DL1608, whether physically connected to the mixer or not. In fact, the iPad need not be anywhere near the mixer. You could be 35,000 feet up in the air traveling to your next gig setting up snapshots, shows and presets. Offline, of course! Offline is also where you test drive the Master Fader app [for free!] before purchasing a DL1608.

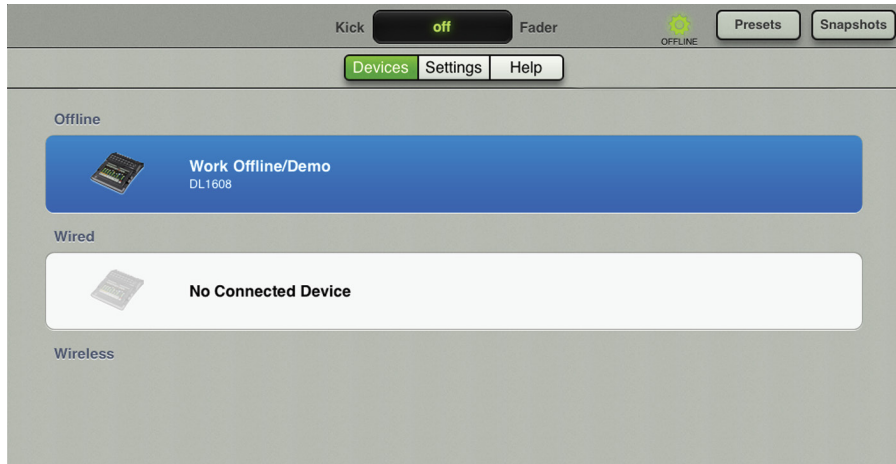
Wired — A wired iPad is using the wired connection to control the mixer. Only one iPad may be wired per DL1608. Therefore, only one item will ever be shown in the wired list. If the iPad is not docked with a DL1608, the words “No Connected Device” will be displayed.

Wireless — The wireless list will display all DL1608 consoles available for wireless control from the Master Fader app. Choose one DL1608 console to connect to and then control it from the iPad. A wireless iPad is connected to the mixer (via Wi-Fi), but not physically docked with the mixer. If it is, the device will change automatically to wired. Up to 10 iPads may select the device to connect to wirelessly.

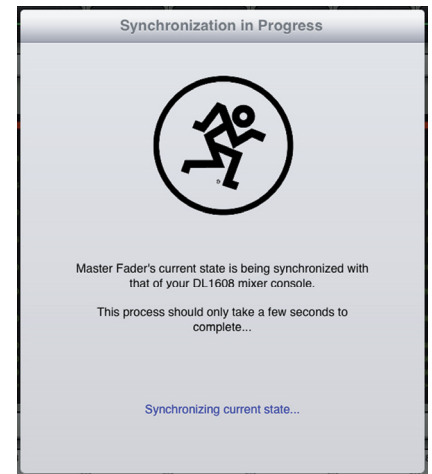
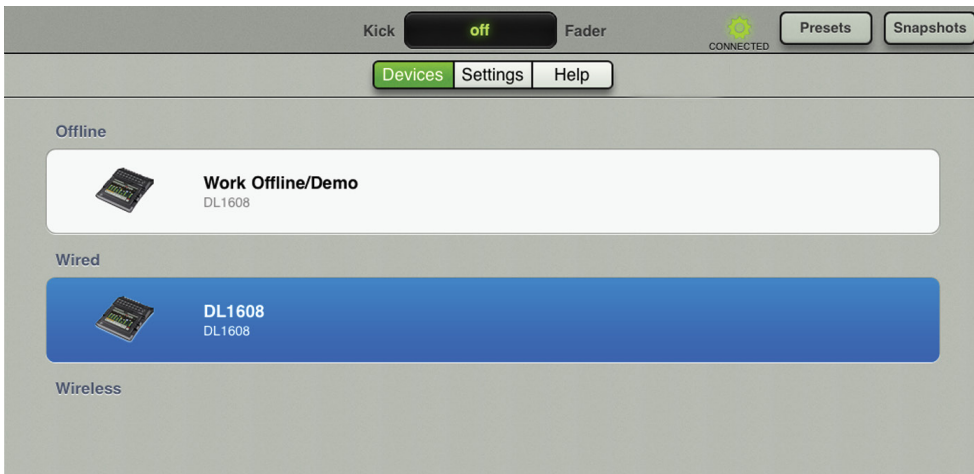
The Master Fader app recalls the last device you selected for wireless control. If it is not available, it will be shown as disconnected and will try to reconnect until it becomes available or you select to work offline or dock the iPad.

Let's walk through the various ways to connect an iPad to a DL1608. The first step is easy...turn the page!

Offline — This is what the devices list displays when you first fire up the Master Fader app (before the iPad is connected to the DL1608 and prior to the mixer being connected to the Wi-Fi router). The "Work Offline/Demo" device is selected and highlighted blue. This is about as basic as the devices screen gets, so it seems like a great place to start! In this particular case, there is nothing else to choose from; in fact, try to select the wired connection by tapping it. Notice that it just bounces back to offline. The wired mixer is grayed out indicating that it is not available for selection. This is because there is no wired device, nor any wireless options at this point. This mode is perfect for configuring a complete show offline or to test drive the Master Fader app before buying the accompanying DL1608.



Wired I — Slide the iPad into the mixer. You will see that the wired device changes to display the name of the DL1608 console and it is automatically selected. When this happens, a pop-up appears indicating that the console is connecting and synchronizing the current show and then the current state.



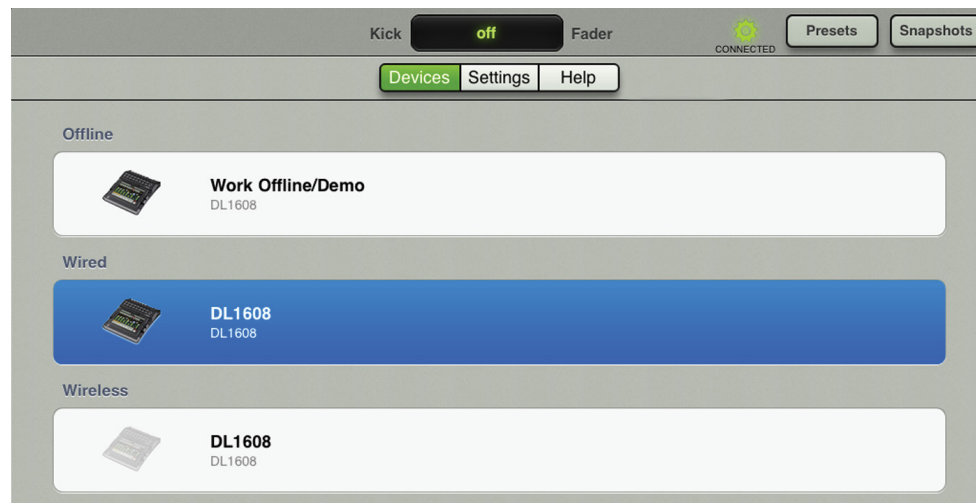
If the current show on the Master Fader app differs from the show on the DL1608, they must be synchronized. You will be prompted to choose between using the current show on the DL1608 or the iPad (as shown in the image to the right). Or you may choose to go offline to figure things out before deciding which show to use. Pulling FROM the **DL1608** will copy the current show TO the iPad – if it isn't already present in the show list – and make it the current show. Note that the previous current show on the iPad is replaced, so be sure you have a saved copy of it first by going offline. Then reconnect and pull the show at the pop-up. If you decide to push the current show FROM the **iPad** TO the DL1608, the current show in the DL1608 will be replaced. Either choice will take about two seconds per snapshot to synchronize the shows. See pages 84-85 for more about the current show.



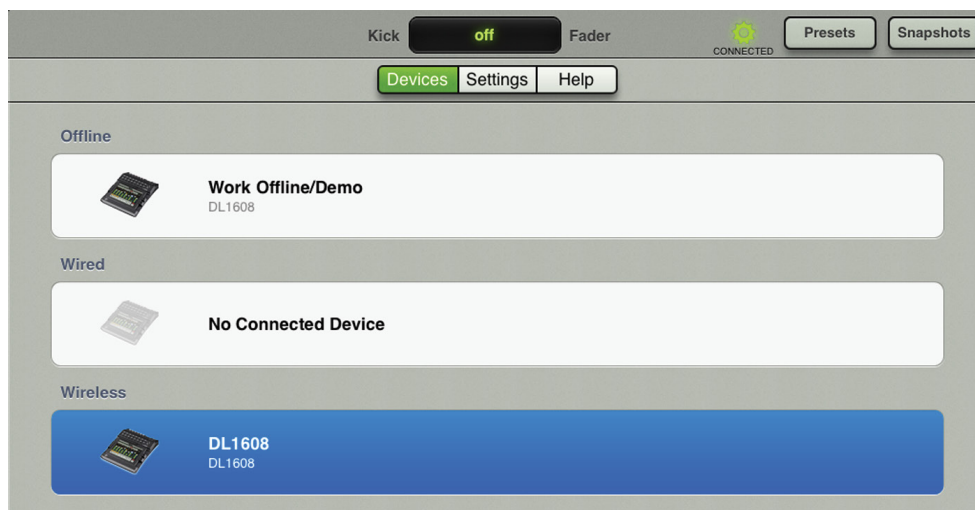
Switch between the offline and wired device selections and notice that the Master Fader app re syncs with the console's current state every time you reconnect. The DL1608 is shown in full color in both

devices [offline and wired] indicating that either may be selected. The router hasn't been set up yet, so there aren't any wireless options at this point.

Wired II — If you connect the Wi-Fi router, power cycle the console [remember that the console needs to be powered on AFTER the router] and connect the iPad to the wireless network as described in chapter 4 [“DL1608 Hardware : Wireless Setup”, pages 22-25], you will see the DL1608 appear in the wireless section available for wireless control. This may take a few moments to appear. Again, though, since the iPad is wired, you will be unable to change over to wireless control. Try to select the wireless DL1608 by tapping it. Notice that it just bounces back to the wired device. This is indicated by a grayed out DL1608 icon in the wireless selection. However, the offline icon is not grayed out, indicating that it is available for selection. You might decide to work offline so your changes don't affect the mix of the gig currently taking place.



Wireless — Remove the iPad from the mixer and select “DL1608” from the wireless list so it highlights blue. Feel free to wander the venue and mix with this wireless iPad. Because the iPad is wireless, working wired is not an option until the iPad is reattached to the mixer. As such, the DL1608 icon in the wired list is grayed out. However, the offline selection is not grayed out, indicating that it is available for selection. You might decide to work offline so your changes don't affect the mix of the gig currently taking place.



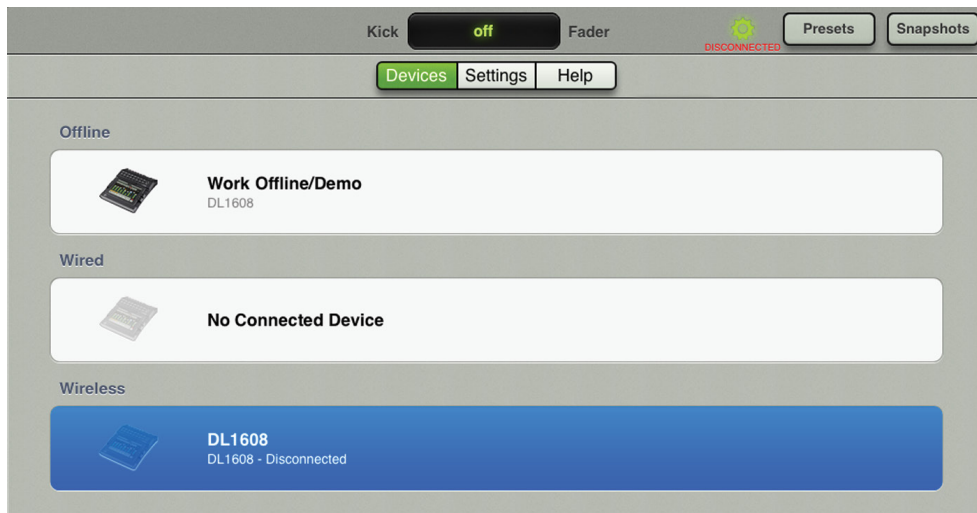
Disconnected — Let's try something. Turn off the DL1608 and see what changes. Notice that the DL1608 is listed as "Disconnected" in the wireless list. Additionally, a red "disconnected" appears under the tools icon.

So how does disconnected differ from offline? Glad you asked! Disconnected means that you are trying to connect to a DL1608 wirelessly, but can't at this time. The most likely cause for this in the real world is that you have wandered just out of range of the wireless router. However, it could also be caused by some kids moshing in the pit accidentally unplugging the mixer from its power source. Oops! But the Master Fader app remembers that you were once connected and it is trying to reconnect. We know because the DL1608 icon is still there and the wireless selection is highlighted blue. If you would prefer to stay permanently disconnected (even when the DL1608 returns to the wireless network) simply select "Work Offline/Demo" from the devices list. If you do this, you will eventually see the DL1608 disappear from the wireless list. This is because it is not currently available AND you are no longer trying to connect to it.



Be patient. The wireless device will not immediately disappear after it is powered off. This is one of the safety features of the iPad auto-discovery. It is normal to see devices hang around longer than you might expect.

Obviously, since we are walking around the room mixing wirelessly, there is no wired device available. This is indicated with a grayed out DL1608 icon and text explaining that there is "No Connected Device".



You should now know how to set up your iPad in devices. Go ahead and experiment with it, switching between the three selections. The more you do it, the more familiar it becomes. Plus, it's software: you can't break it!

Also, notice in all of the examples that the text underneath the tools icon displays exactly what the state of the iPad is in...*and will be no matter what view you are in*. Tools > Devices is just the place to set up each iPad.

If you believe that the iPad should be connected when wireless, please follow the steps outlined below in order:

- (1) Connect the iPad wired just to ensure that the app works.
- (2) Follow the directions again as listed in "Chapter 4: DL1608 Hardware : Wireless Setup" (pages 22-25), step-by-step. Did that work?
- (3) You're here, so that didn't work. Now review the devices section which we just detailed (pages 75-78). Are you good to go now?
- (4) Well shoot, let's try something else out. Head over to the Troubleshooting section in Appendix A: Service Information on page 95. That worked, right?
- (5) Darn, we've run out of options. Time to contact our splendid Technical Support Heroes. The contact information is built right into the Master Fader app! Just go to: Tools > Help > Support. Page 80 explains this in greater detail.

Settings

There are two types of settings available:

- (1) Settings that only affect the iPad.
- (2) Settings that are transferred to the console and affect every iPad connected to it.

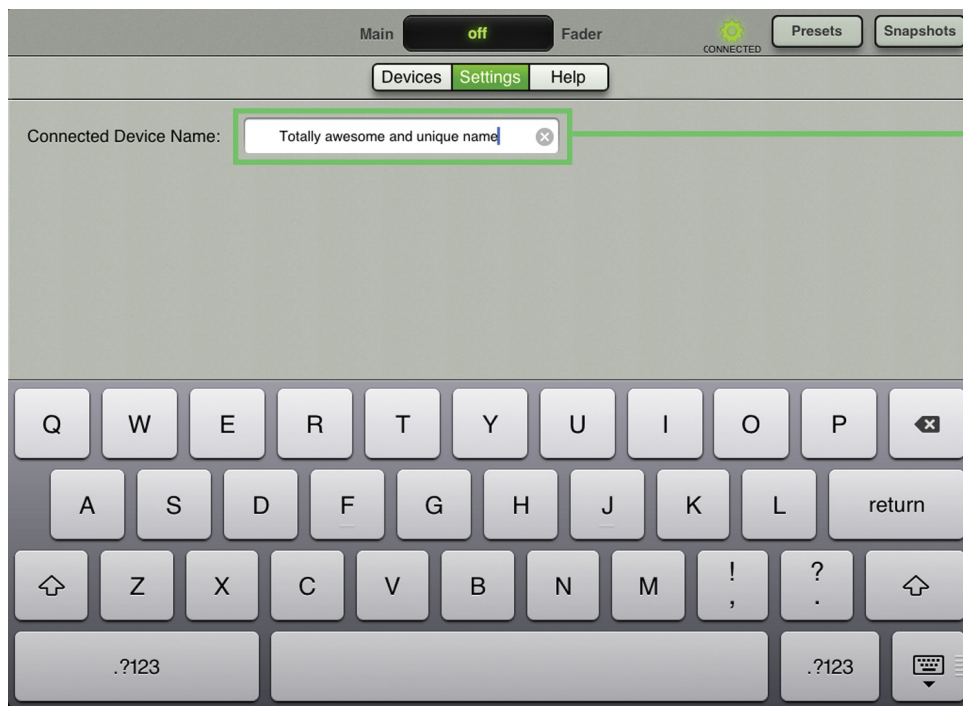
At this time, there is only one setting available, but there are more to come...stay tuned!

Connected Device Name — Rename the *mixer* here. Yes, you are physically changing the name on the iPad, but it is indeed the mixer you're naming. Why name the mixer anything else other than "DL1608"? Well, you might have two DL1608s and want to identify between them on the wireless network. The mixer may be named from either a wired or wireless iPad.

As a hardware setting, the name is stored in the DL1608, is global to the mixer and therefore affects all connected iPads. It is not changed by show or snapshot changes. DL1608 is the default name.

Renaming from a wired iPad:

- (1) Type in the name you want to call the mixer followed by tapping the "return" button.



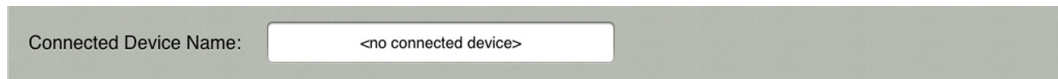
- (2) The wired iPad stays connected with the new name. However, all wireless iPads become disconnected and you will need to reconnect them as discussed previously in the devices section (on pages 75-78).

Renaming from a wireless iPad:

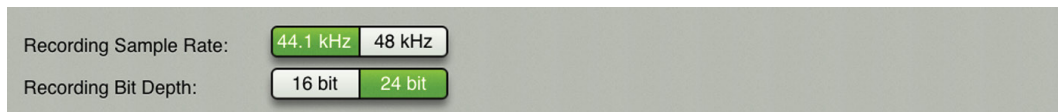


- (1) Type in the name you want to call the mixer followed by tapping the “return” button.
- (2) A confirmation dialog will appear.
- (3) If there is a wired iPad, it stays connected and receives the new name. However, all wireless iPads become disconnected and you will need to reconnect them as discussed previously in the devices section (on pages 75-78).

To be clear, this is the name of the mixer you are currently connected to; if you are not connected to a DL1608, the connected device name is “<no connected device>” as seen in the image below.



Recording Sample Rate and Bit Depth — You are able to choose the quality of the recording sample rate [44.1 kHz or 48 kHz] and recording bit depth settings [16 bit or 24 bit]. The current settings are located underneath the ‘Connected Device Name’. Simply tap which settings you prefer. The chosen settings will illuminate green when engaged, while the other option will be grayed out. Note that these settings cannot be changed while recording is in progress. See the recording section on pages 45-46 for more information about recording a show to an iPad.



Help

We're with you every step of the way and here's where to go if you need further assistance or simply want to seek additional information about the DL1608. There is plenty enough to go around for everyone and we share nice!



The list below describes all of the goodies as shown in the image above:

About — About displays the Master Fader App version that is currently installed on the iPad.



Documentation — Need a little information? Tap the Quick Start Guide link to open it (as seen in the image to the left). Or maybe you need A LOT of information. In this case, tap the Reference Guide link instead. If you prefer to view either (and/or save either) in iBooks, GoodReader, Adobe Reader, etc., just tap the curved right arrow in the upper-right corner of the document.

Printing the documents from here is also an option.

Podcast — Tap the Podcast link to open the iTunes podcast page in iTunes or on the Podcast app if it has been downloaded and installed on your iPad. You will have access to all of the DL1608 podcast videos right here at your fingertips. This a great way to familiarize yourself with all aspects regarding the DL1608 mixer and Master Fader app.

Support — So you need to talk to someone and your psychiatrist doesn't know the first thing about pro audio? We've got your back! Support provides all the phone numbers, email addresses, forum links and other URLs that you could ever need.

Social — Well, all the kids are doing it and we are, too. If you have a Facebook account you should 'like' us. If you have a Twitter account, you should 'follow' us. And if you like watching awesome videos, check out some of our YouTube videos. Social shows you the way.

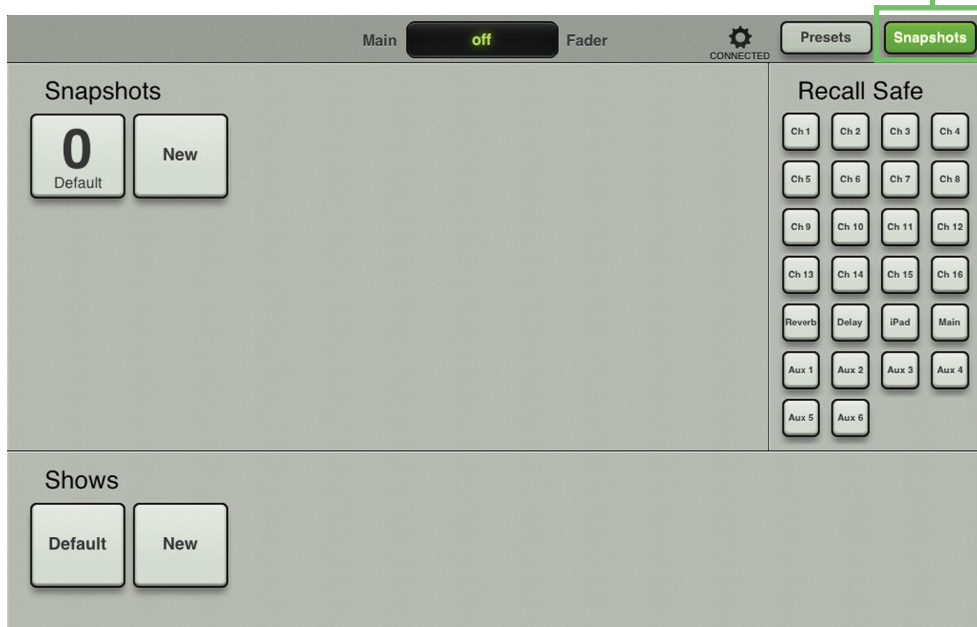
File System

The DL1608 saves every parameter associated with its operation with the exception of the power switch, gain and phone knobs. The current state of all parameters is constantly stored so the console powers on in the same state as when it was turned off, just like an analog console.

The file system consists of the following:

- (1) **Current State** — When the DL1608 is turned on, it wakes in the state that it was in when it was powered off, including channel images and solo.
- (2) **Snapshots (and Recall Safe)** — A snapshot is just that: a “photograph” of the current state of the DL1608. Recall Safe allow channels to be removed from snapshot recall, leaving them unchanged. Snapshots are stored and recalled from the console, but are accessed via the Master Fader app.
- (3) **Shows** — A show is made up of multiple snapshots in order. Multiple shows may be created, but only one show is loaded at a time on the DL1608 hardware.
- (4) **Presets** — Presets save input and output parameters on individual channels and on particular DSP blocks such as EQ, dynamics, input, output, FX, etc. Presets are stored on the iPad, not the mixer.

Snapshots



As mentioned above, a snapshot is just that: a “photograph” of the current state of the DL1608 (except channel images and solo). That’s right, you get the full monty. The whole kit and caboodle. The full ball of wax. The whole shebang. The full nine yards. Enough? Bottom line: a snapshot gives you everything but the kitchen sink (and channel images and solo). Let’s move on.

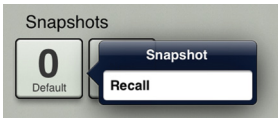
Snapshots may be used to store cues for a complex show, settings for the opening act, settings for the headliner, or for something as personal as a favorite starting point for using the console. There are 99 possible snapshots per show.

The following is a list of features that may be snapshot:

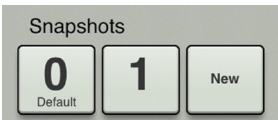
- Input channel settings
- FX channel settings
- Aux channel settings
- Main LR channel settings

Snapshot List

The snapshot list shows a grid with an icon with a number and name for each snapshot. The number corresponds to the order of each snapshot in the currently loaded show.



At the beginning of the snapshot list is a button labeled “0”. Tap this button to release a popover as seen in the image to the left. Recall will set the Master Fader app to its default (which – for all intents and purposes – is a zeroed out board). Only channel images and the state of the solo button won’t be recalled. Snapshot 0 is always listed first, cannot be replaced, renamed or deleted.



At the end of the snapshot list is a button labeled “New”. Tapping this button will store the current state of the console into a new snapshot and add another “New” button to the end of the snapshot list. This is similar to a “Store” button on other consoles. Touching a snapshot button (other than “0” or “New”) will display a popover with the following options:

Recall — Pressing the recall button recalls snapshots. On recall, all appropriate console parameters change to match the stored snapshot. Only channel images and the state of the solo button won’t be recalled. Recall is the only available option with the Default snapshots. A confirmation dialog will appear.

Replace — Saves the current state of the console over the selected snapshot. A confirmation dialog will appear.

Name — When the name button is pressed, use the onscreen keyboard to name the currently selected item. Simply type a name in the box and tap the “return” key when finished.



Delete — The delete button deletes the currently selected snapshot. This is a permanent deletion with no undo, so a confirmation dialog helps prevent accidents.



Recall Safe

On the right-hand side of the snapshots view are 26 small recall safe buttons. When engaged for a channel, it will be removed from snapshot recall, leaving it unchanged. These will illuminate green when engaged and are gray when disengaged. The following are available for recall safe:

- Channels 1-16
- Reverb [Controls reverb send and return]
- Delay [Controls delay send and return]
- iPad
- Main LR
- Aux sends 1-6

When recalling a snapshot (including snapshot 0), the Master Fader app will not change any parameters on safe channels. Channel safe settings are global and applied to all snapshots in the show. They are saved and recalled with the show and recalled via power cycle.



Shows

A show is a group of up to 99 snapshots that also contains additional information including snapshot order and recall safes. For example, a touring band’s engineers (FOH and monitors) could create and save shows from the set list. A theater might create and save shows for each play. These are just two of a wide variety of examples in which shows are useful. Shows are stored and recalled from the console, but are accessed via the Master Fader app.

At all times, there is a single show loaded on the DL1608. This is called the current show. The snapshot list (described on page 82) displays all snapshots of the current show.

The iPad can store multiple shows – limited only by the available space on your iPad – and allows you to load them into the DL1608 as the current show. These additional shows are displayed as a grid of icons with a number and name for each show and are stored locally on the iPad.



At the beginning of the show list is a button labeled “Default”. This is the factory default show. It’s an easy way to create new shows, as this is a blank slate to start from. It is always listed first, cannot be replaced, renamed or deleted. Tap this button to release a popover as seen in the image to the left. Load will load the factory default show into the DL1608.



At the end of the show list is a button labeled “New”. Tapping this button reveals a keyboard. Simply type in a name you would like to call this show. This will store the current show on the console into a new show on the iPad and add another “New” button to the end of the show list.

Touching a show button (other than “Default” or “New”) will display a popover with the following options:

Load — Loads the show and the snapshots contained in the show onto the console. It also updates recall safes to those stored on the show. When loading, the entire snapshot / show screen will gray out so no changes may take place while a show is loading. Load time is all dependent on the number of stored snapshots on the show. The current state of the console is not changed on a show load and audio still passes and you can still adjust all mix controls. A confirmation dialog will appear.



Loading a show will replace the current show on the DL1608 with the new show. If you ever need to load the current show again, be sure to back it up first by using the “New” button to make a new show.



When loading a show, all other iPads will automatically disconnect and you will need to reconnect them via devices after the show finishes loading. This prevents any iPad from getting out of sync or making changes to the new show before it finishes loading. Wait until the show completely loads before making any adjustments or loading other snapshots, shows, or presets from the remaining iPads.

Replace — Saves the current state of the console snapshots over the selected show. This is useful if you have made changes to the current show and need to update the copy on the iPad. A confirmation dialog will appear.

Name — When the name button is pressed, use the onscreen keyboard to rename the show. Simply begin typing to replace the existing name.



Delete — The delete button deletes the currently selected show. This is a permanent deletion with no undo, so a confirmation dialog helps prevent accidents.

Presets



Presets save parameters on individual input or output channels and on particular DSP blocks such as EQ, dynamics, FX, graphic EQ, etc. For example, a favorite kick drum EQ setting may be saved as a preset and recalled as needed. Presets are not associated with a particular show, snapshot or channel. In other words, a preset may be created while one show is active and recalled again into a different show.

The DL1608 comes with a library of factory presets. Only 18 factory presets will be displayed at one time. Just scroll up to view the other factory presets, if available. There are also user presets. These may be created for each preset type. The number of user presets available is limited only by the available space on the iPad. Presets are generally set ahead time, not as an event is taking place. Presets are stored on the iPad, not the mixer.

The following preset types are available:

- Input channel (as seen in the image above)
- Output channel
- Gate
- Compressor
- EQ
- Graphic EQ (user presets only)
- Reverb
- Delay

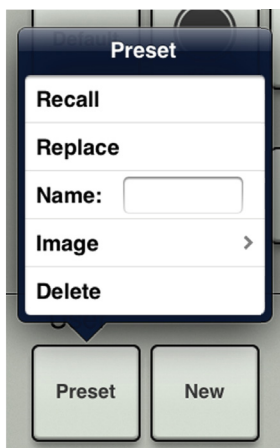
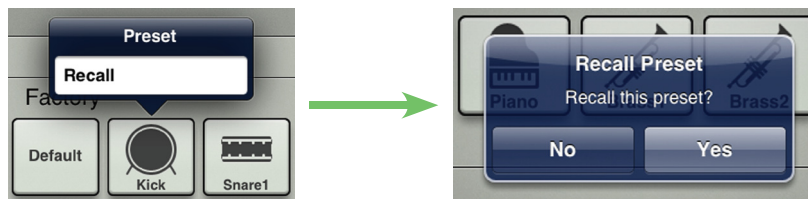
The first thing we will do is take a look at factory presets vs user presets. From there, channel presets and DSP presets may be selected [factory] or created [user].

Factory Presets vs User Presets

There are factory presets and user presets on all channel and DSP settings that may be set ahead of time. Feel free to start with a factory preset, manipulate to your liking, then save as a user preset. We will start with what each one looks like and how they work. The next section will discuss the differences between channel presets and DSP presets.

At the beginning of each factory preset list is a button labeled “Default”. Default will zero out the current selection. For example, imagine how long it might take to reset each of the 31 bands on the graphic EQ to ± 0 dB. The factory default for graphic EQ will do that for you in three easy steps. From the graphic EQ presets page: (1) tap the factory default button, (2) tap recall, and (3) tap the yes button. Done! Factory presets may only be recalled; they cannot be replaced, renamed or deleted... that’s what user presets are for!

Beyond “Default” lies a wide variety of other factory presets to choose from. These are graced with an icon and name of said factory preset. Simply tap the preferred preset, recall and yes. This will update the current selection. For example, selecting “Kick” from the list will update the EQ, gate and compressor settings to standard kick settings. It’s certainly easier to make updates from a factory preset versus updating parameters from a zeroed out board!



User presets are shown below the factory presets and each name and image is user-editable. At the end of the user preset list is a button labeled “New”. Tapping this button reveals a keyboard. Simply type in a name you would like to call this preset. This stores the new preset and adds another “New” button to the end of the preset list. This is similar to a “Store” button on other consoles.

Touching a preset button (other than a factory preset or “New” user preset) will display a popover with the following options:

Recall — Pressing the recall button recalls presets. On recall, all appropriate console parameters change to match the stored preset. Recall is the only available option with factory presets. A confirmation dialog will appear.



Replace — Saves the current preset over the selected preset. A confirmation dialog will appear.

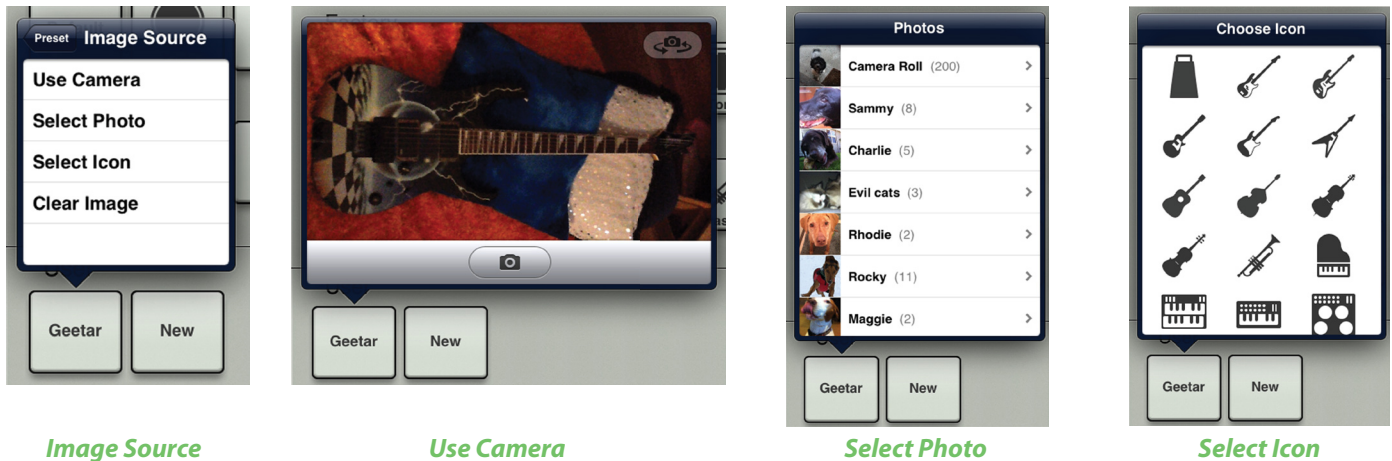


Name — When the name button is pressed, use the onscreen keyboard to name the currently selected item. Simply type a name in the box and tap the “return” key when finished.

For familiarity, this is the same keyboard that is used for messaging or emailing from the iPad.



An open gray box with only the preset’s name works, but let’s spice it up with an image. There are several options in this department. From the preset popover, tap “Image” to reveal a new popover as seen below [Image Source]. You will be presented with four choices:



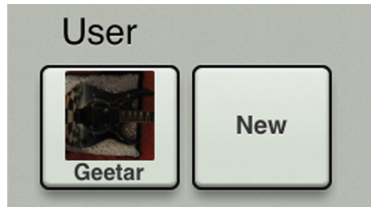
Use Camera — If you’re familiar with how the camera on the iPad works, then you’re in luck...this one works the exact same way! The encircled camera icon in the middle of the gray bar snaps the picture and the icon in the upper-right corner selects between the front and back camera on the iPad. [Camera is unavailable on the first generation iPad]. Apparently the 80’s called and they want their checkerboard mirror ball-with-lightning guitar back.

Select Photo — Here you may select from all the photos that currently reside on your iPad.

Select Icon — Or select from a multitude of built-in icons at your disposal.

Clear Image — Believe it or not, tapping here will clear the image for that preset.

Since we already named this preset geetar, we might as well use the geetar picture to boot, right? Select the photo from the camera roll in select photo. This preset is set: name, image and most importantly...settings.



Delete — The delete button deletes the currently selected preset. This is a permanent deletion with no undo, so a confirmation dialog helps prevent accidents.



Let's move on and take a look at channel presets versus DSP presets.

Channel Presets vs DSP Presets

There are channel presets and DSP presets. Also, there are factory presets for both or you may create your own user presets for each. So many options! Let's take a look at each:

Input and Output Channel Presets — Channel presets change virtually all controls on the channel. There are both input and output channel presets. Input channel presets do **NOT** change pan, mute, fader, solo or polarity. Output channel presets do **NOT** change balance, level or pre / post. This allows you to easily audition presets on a channel one after another.

Channel names and images are stored in the preset if present on the same channel. When recalled – if a name or image is present – it will be updated on the destination channel.

DSP Presets — DSP presets change only a portion of an input or output channel. This includes EQ and HPF, gate, compressor, and graphic EQ. DSP presets do **NOT** change the on / off state. This allows a user to audition presets with the processor on or off, as desired.

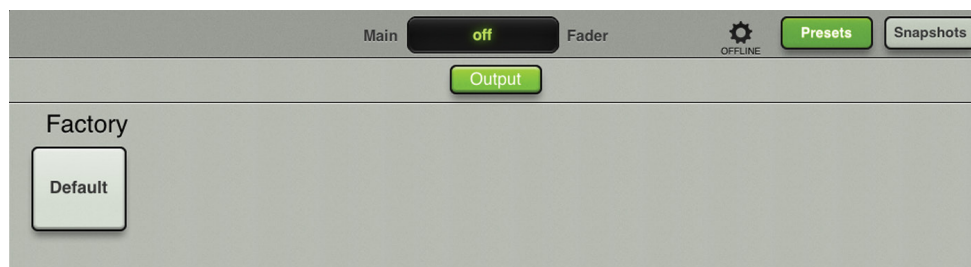
So how do you get to these various preset types? Easy! The preset button is smart and knows what screen you are currently viewing and what is shown in the current parameter display. In turn, it will display the correct preset window when the presets button is tapped. From the mixer view, you may access the input or output channel presets depending on what is showing in the current parameter display.

Below are two images. The first displays the input channel presets and the second displays the output channel presets. Notice that the output channel presets only displays the factory default button. That zeroes out the settings of the output channel, the master fader. Any settings that you may want for the output channel can be created and stored as a user preset.

**INPUT
CHANNEL
PRESETS**



**OUTPUT
CHANNEL
PRESETS**



From the EQ channel view you are able to choose between setting a preset for the entire input channel or just the channel's EQ. Don't forget to scroll up to access more factory presets, if going that route. EQ presets do **NOT** recall either the HPF on/off or the EQ on/off.

**EQ
PRESETS**



From the gate / compressor channel view there are three preset choices to choose from: the entire input channel, just the channel's gate or just the channel's compressor. Tap which one you prefer.

**GATE & COMP
PRESETS**

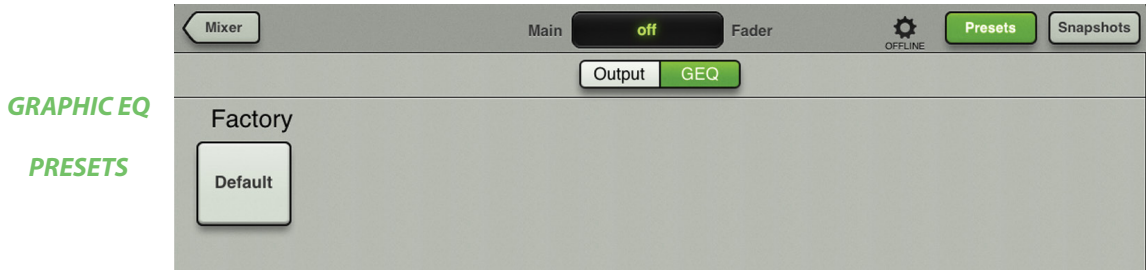


From the reverb / delay channel view you are able to choose between setting a preset for the just the channel's reverb or just the channel's delay. Tap which one you prefer. Note that the reverb and delay presets do **NOT** change the send or return level.

**FX
PRESETS**



From the graphic EQ channel view you are able to choose between setting a preset for the entire output channel or just the graphic EQ. Tap which one you prefer.



And from the compressor / limiter channel view you are able to choose between setting a preset for the entire output channel or just the output compressor / limiter. Tap which one you prefer.



Appendix A : Service Information

Troubleshooting

If you think your Mackie product has a problem, please check out the following troubleshooting tips and do your best to confirm the problem. Visit the Support section of our website (www.mackie.com) to get some ideas or contact our technical support heroes. You may find the answer to the problem without having to send your Mackie product away.

Here are three useful tips that could correct any of the issues outlined below (or possibly any other issue that we haven't yet discovered):

(1) — Restart the iPad. Don't just restart the Master Fader app. *Restart the iPad!* Completely power it down, then power it back up.

(2) — Restart the DL1608 mixer. This is especially useful after firmware and software updates where the mixer and iPad aren't quite on the same page. A simple reboot can sometimes work great wonders.

(3) — Restart the router. Internet disconnectivity got you down? Unplug and re-plug the router. This may resolve any connection issues.

(4) — Level setting procedure. If you are having any sound (or non-sound) issues, try following the level setting procedure as outlined in chapter 8 [pages 49-50] to verify that all of the volume controls in the system are properly adjusted.

There are no user serviceable parts. If none of these tips work, please refer to "Repair" on the next page to find out how to proceed.

No Power

- Our favorite question. Is it plugged in? Make sure that the female end of the line cord is securely seated in the IEC socket of The Power Block and the male end plugged all the way into a live grounded AC outlet. Make sure the locking barrel connector at the end of the cord attached to The Power Block is attached to the power connector on the DL1608 and securely tightened. An LED on The Power Block will illuminate green to indicate success (whether the mixer is powered on or not).
- Our second favorite question. Is the rear panel power switch in the ON position?
- Are all the lights out in town? If so, contact the local power company to get power restored.

No Sound

- Are all the connections good and sound? Make sure all of the connecting cables work and are securely connected at both ends. Try the same source signal in another channel, set up *exactly* like the suspect channel.
- Is the signal source powered on? Is it working (and making union scale)?

Noise / Hum

- Are all the connections good and sound? Make sure all of the connecting cables work and are securely connected at both ends. Try the same source signal in another channel, set up *exactly* like the suspect channel.
- Turn the input gains down one-by-one. If the offending noise disappears, it's either that input or whatever is plugged into it. If you unplug the whatever-is-plugged-into-it and turn the input gain back up and the noise is gone, it's from your whatever.
- Is phantom power required for the microphone?
- Sometimes it helps to plug all the audio equipment into the same AC circuit so they share a common ground. Make it so.
- Has the band been together long?

No Interwebs

- Re-read "Chapter 4: DL1608 Hardware : Wireless Setup" [pages 22-25]. This section is very important and reading it cover-to-cover is the best troubleshooting.
- Is your iPad connected to the correct wireless network? Go to iPad Settings > Wi-Fi and ensure that it didn't hop onto to a different wireless network.
- Did you select the wireless DL1608 from the tools > devices screen?
- Are you running the latest and greatest master fader and DL1608 firmware. Go to the App Store and check for an update as described on pages 27-28.
- Did you connect the Ethernet cable to the correct port on the router? Be sure to use the LAN port and not the WAN port.
- Did you connect and then power on the Wi-Fi router BEFORE turning on the DL1608?
- Leave the Master Fader and then return by pressing the Home button on the iPad.
- Force quit the Master Fader app.
- Try another Ethernet cable.
- Try another Wi-Fi router.

Repair

For warranty service, refer to the warranty information on page 120.

Non-warranty service for Mackie products is available at a factory-authorized service center. To locate the nearest service center, visit www.mackie.com, click "Support" and select "Locate a Service Center." Service for Mackie products living outside the United States can be obtained through local dealers or distributors.

If you do not have access to our website, you can call our Tech Support department at 1-800-898-3211, Monday-Friday during normal business hours, Pacific Time, to explain the problem. Tech Support will tell you where the nearest factory-authorized service center is located in your area.

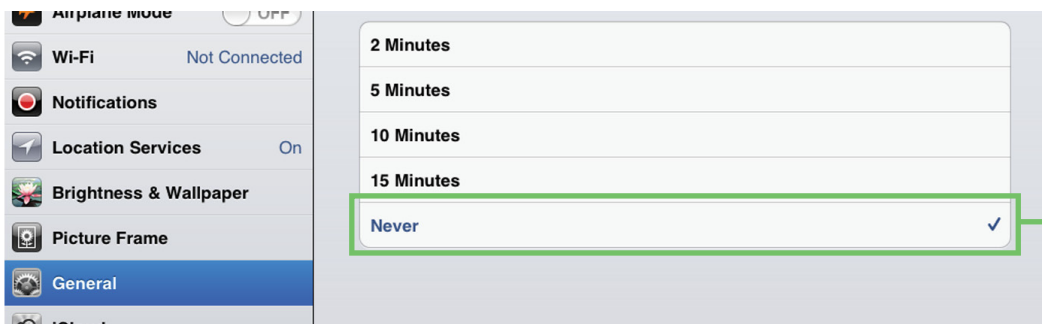
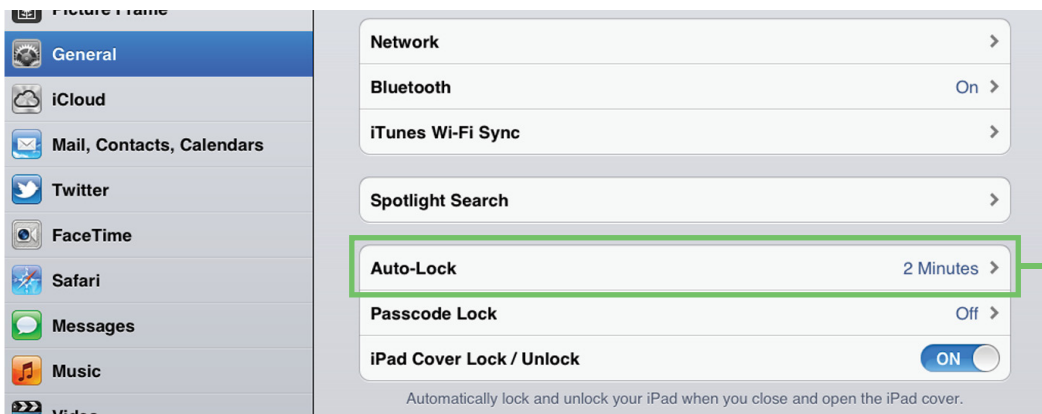
Appendix B : iPad Optimizations



Below is a list of ways to trick out your iPad to optimize its use with the DL1608. When you have some additional time, use your favorite search engine to Google “trick out your iPad” for other ways to optimize your iPad. All of the following tips and tricks may be found by going to Settings > General on the iPad.

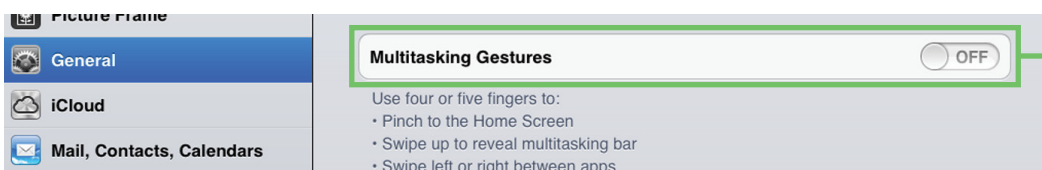
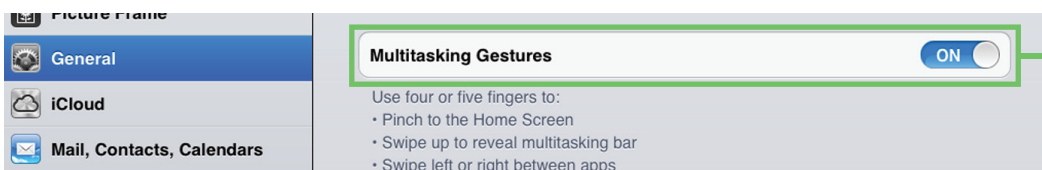
iPad Optimization #1 : Lock the iPad so it doesn't turn off in the middle of a show.

Simply change the Auto-Lock from its current selection to “Never” (or 15 minutes, at least).



iPad Optimization #2 : Allows you to change the level on more than three faders simultaneously.

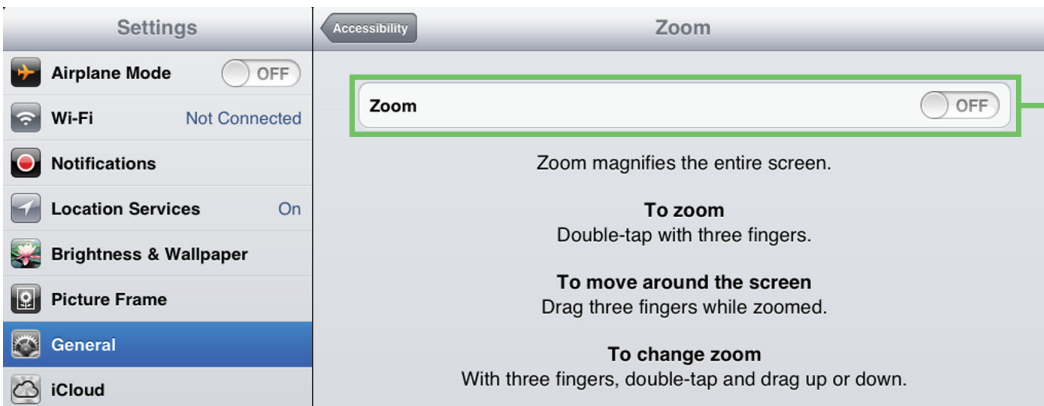
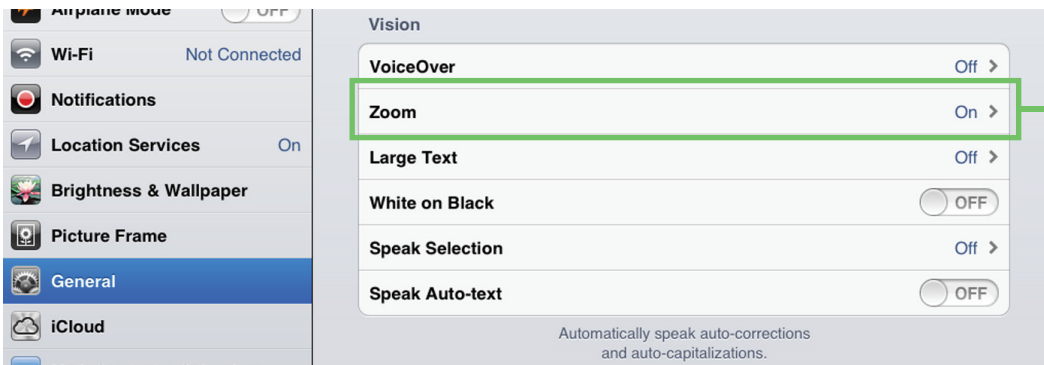
Simply turn Multitasking Gestures off.



iPad Optimization #3 : Allows you to press three faders simultaneously.

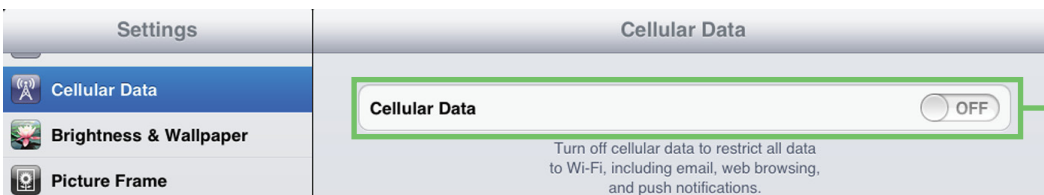
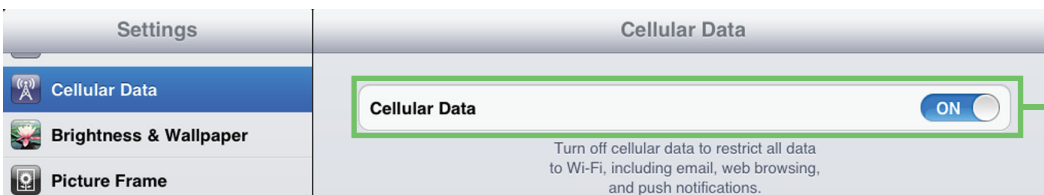
Go to Settings > General >Accessibility.

Simply turn Zoom off.



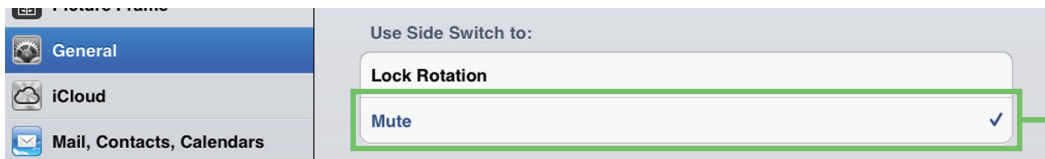
iPad Optimization #4 : Disable 3G Data [TDMA] so the iPad is Wi-Fi only.

Simply turn Cellular Data off.



iPad Optimization #5 : Mute keyboard clicks, sent and received email alerts, calendar event warnings, alarms and other extraneous iPad noises (except music apps; those will continue to play). There are two methods to optimize your iPad here. It's just a matter of preference.

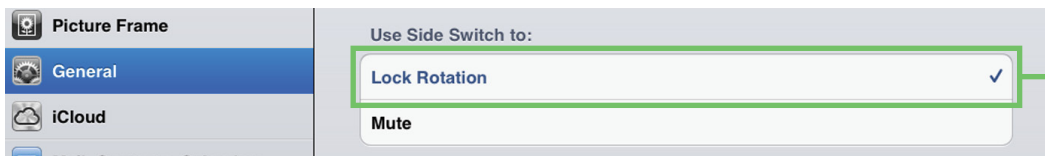
Use Side Switch to: **Mute**



Now flip the side switch on the iPad (next to the volume up/down switch) so that the orange dot is visible. It indicates that the iPad is indeed muted (except for the music apps).

OR

Use Side Switch to: **Lock Rotation**



Double-tap the home button on the iPad to reveal the tool bar at the bottom of the iPad.

Now swipe it right to reveal the iPad's audio play bar.

On the far left is a mute/un-mute button. Mute it.

The speaker will be crossed out to indicate that the iPad is indeed muted (except for the music apps).



Appendix C : Technical Information

DL1608 Specifications

General Digital

Sample Rate:.....	48 kHz
A/D/A Bit Depth:	24-bit
System Latency:	1.5 ms

Frequency Response

All inputs to all outputs:	± 0 , -1 dB, 20 Hz to 20 kHz
----------------------------------	----------------------------------

Distortion

THD (mic input to main output, 1 kHz, -1 dBFS):.....	<0.005%
--	---------

Noise / Dynamic Range / Signal-to-Noise Ratio

EIN (150 Ω termination):.....	-128 dBu
Mic input to Main Output (A-weighted)	
Channel and main faders at unity:	-79 dBu
Faders down:	-90 dBu
Crosstalk (adjacent inputs):.....	<-120 dB @1 kHz
Crosstalk (outputs):.....	<-105 dB @1 kHz
Phones level pot feedthrough @ minimum travel:	<-75 dB
Signal-to-Noise Ratio (ref +4 dBu, one channel and main fader at unity, A-weighted):.....	92 dB
Dynamic Range (One channel and main fader at unity, A-weighted):.....	109 dB
CMRR:.....	>70 dB @1 kHz (60 dB gain)

DL1608 Specifications Continued...

Analog Inputs 1–16

Connectors:.....	1-12: XLR Balanced 13-16: Combo XLR / TRS Balanced
XLR Mic Pre:	Onyx
Input Impedance:	1-12: 3k Ω 13-16: 3 k Ω mic [XLR], 30 k Ω line [1/4"]
Max Input Level:.....	XLR: +21 dBu 1/4": +30 dBu
Gain:	XLR: 0 to 60 dB 1/4": –20 to 40 dB
48V Phantom Power (XLR):.....	48 VDC, 10 mA max per mic, with up to eight simultaneously. 5 mA max per mic, with up to 16 simultaneously.

Analog Main Out L/R

Connectors:.....	XLR Balanced
Output Impedance:	600 Ω
Max Output Level:	+21 dBu

Analog Aux Sends 1 – 6

Connectors:.....	1/4" TRS Impedance Balanced (Supports balanced / unbalanced operation)
Output Impedance:	240 Ω Balanced, 120 Ω Unbalanced
Max Output Level:	+21 dBu

DL1608 Specifications Continued...

Analog Headphone Out

Connector:..... 1/4" TRS Stereo

Max Output Level: +18.0 dBu into 600 Ω
+19.5 dBu max into 100 k Ω

Networking

Connector:..... 100 MB Ethernet

Control:..... Complete

Simultaneous Control: 10 iPad Devices

iPad Support

iOS Version Requirement: 5.0 or greater

iPad Version Requirement: Original iPad, iPad 2, iPad (3rd generation)

Power

External Supply: Yes

External Supply Power: 100-240 VAC, 50-60 Hz, Universal Supply

Output Voltage: 12 VDC

Current: 4A

DC Connector: 5.5 mm x 2.5 mm barrel with locking ring

Line Cord: User-replaceable IEC

Power Consumption: 48 W max

DL1608 Specifications Continued...

Dimensions

Width:.....	11.5 in / 291 mm
Height (Front):.....	1.6 in / 40 mm
Height (Rear):	3.7 in / 95 mm
Depth:	15.4 in / 391 mm
Weight:	6.9 lb / 3.1 kg
Rack:	Nine Rack Spaces [Needs an additional space or two above to allow for connections]

Environment

Operating Temperature [extended ambient temperature]:.....	32-104 °F 0- 40 °C
--	-----------------------

Accessories

DL1608 Rackmount Kit:.....	Part #2036840
DL1608 Mixer Bag:.....	Part #2036809-16
DL1608 Mixer Cover:.....	Part #2036809-17

About

Reference Guide Version: V1.2

Part Number, Rev and Date:..... SW0938, Rev B, August, 2012

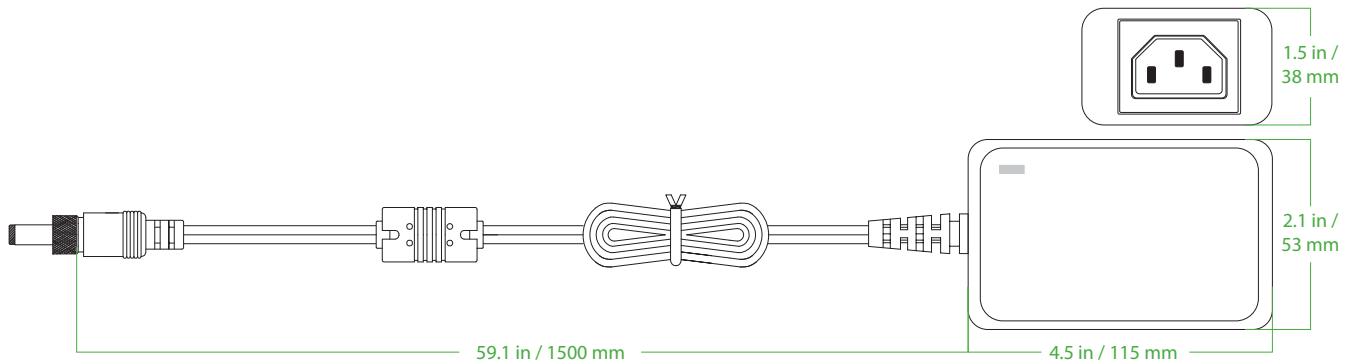
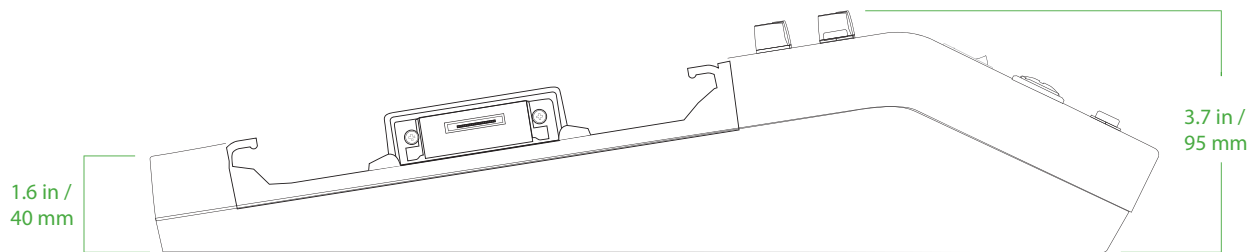
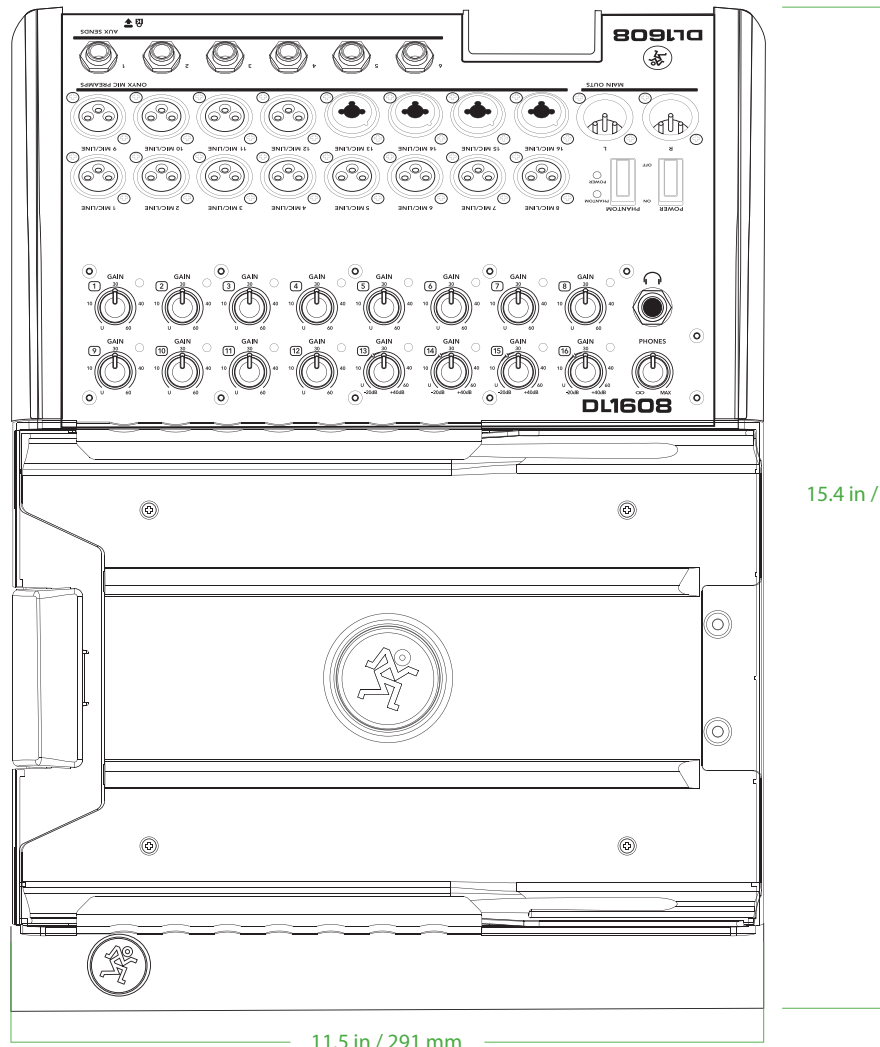
©2012 LOUD Technologies Inc. All rights reserved. Apple and iPad are trademarks of Apple Inc., registered in the U.S. and other countries. All other marks are Registered Trademarks, or Trademarks, of LOUD Technologies in the United States and other countries. DL1608 Patent Pending.

"Made for iPad" means that an electronic accessory has been designed to connect specifically to iPad and has been certified by the developer to meet Apple performance standards. Apple is not responsible for the operation of this device or its compliance with safety and regulatory standards. Please note that the use of this accessory with iPad may affect wireless performance.

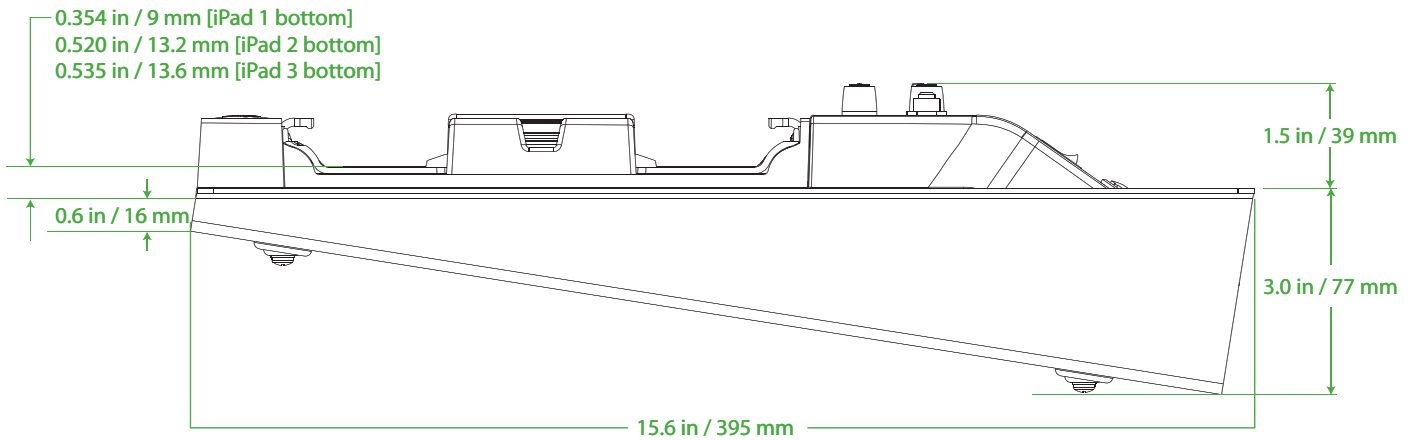
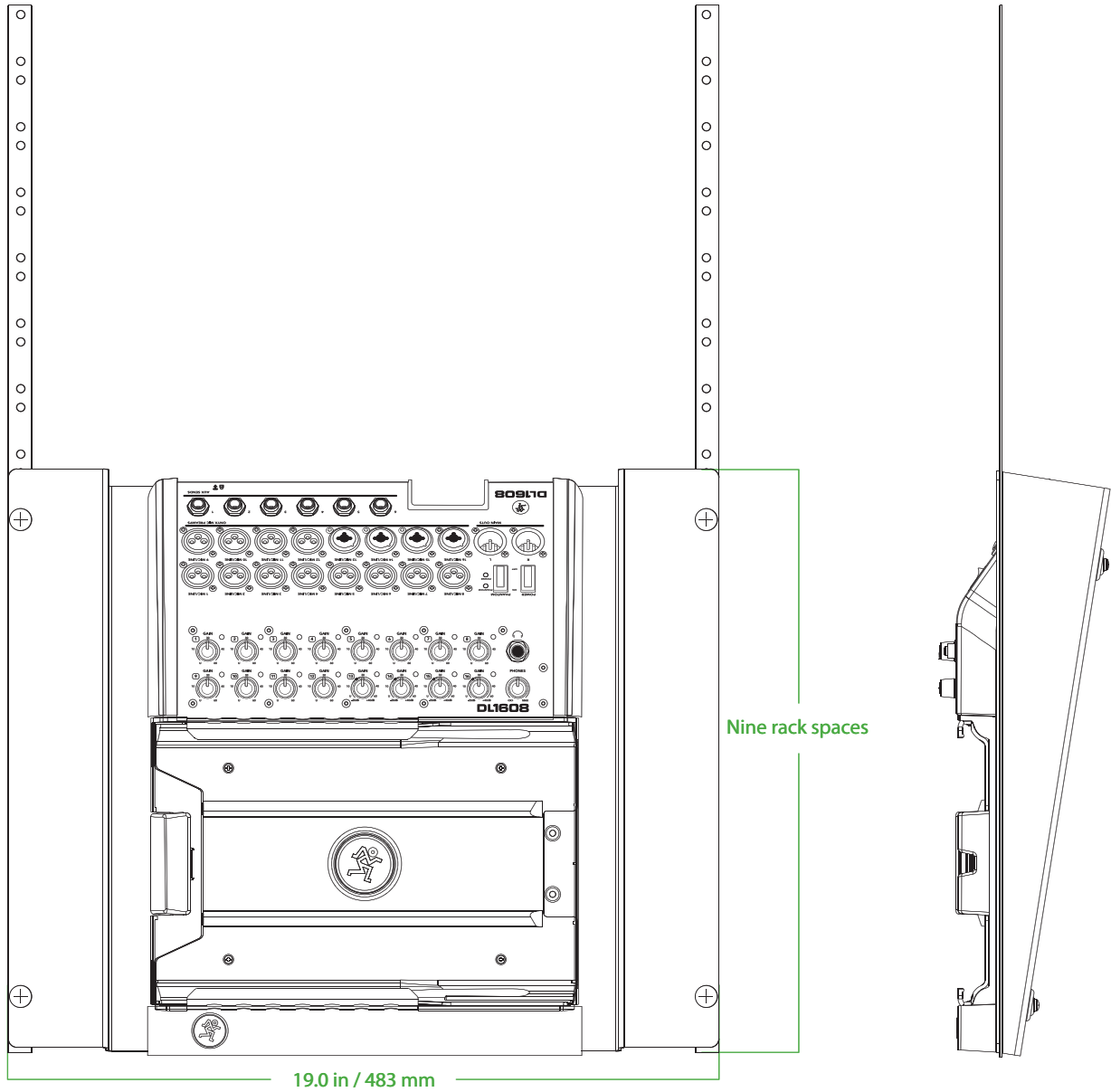
LOUD Technologies Inc. is always striving to improve our products by incorporating new and improved materials, components, and manufacturing methods. Therefore, we reserve the right to change these specifications at any time without notice.

Please check our website for any updates to this Reference Guide: www.mackie.com.

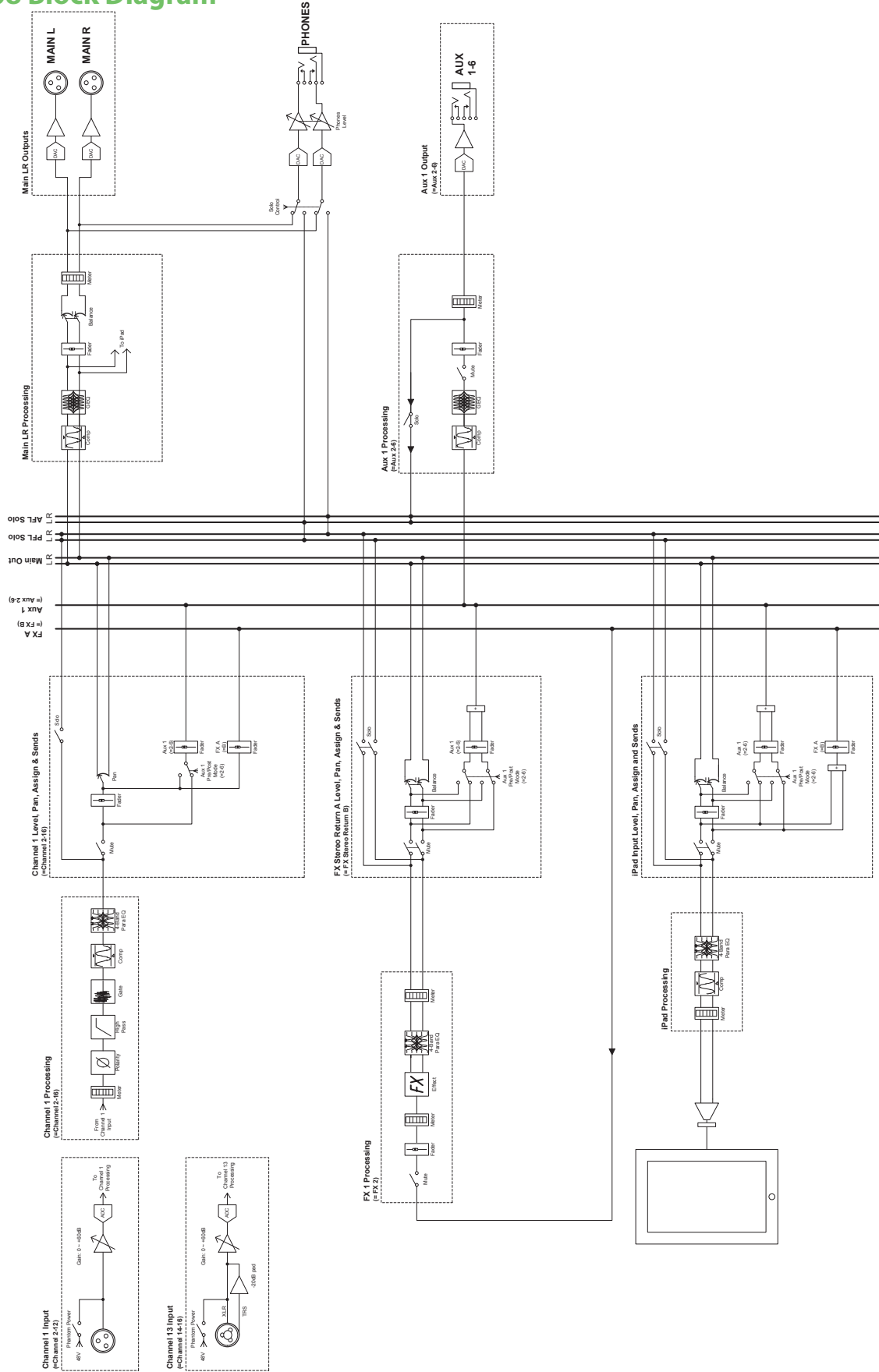
DL1608 Dimensions



DL1608 Dimensions Continued...

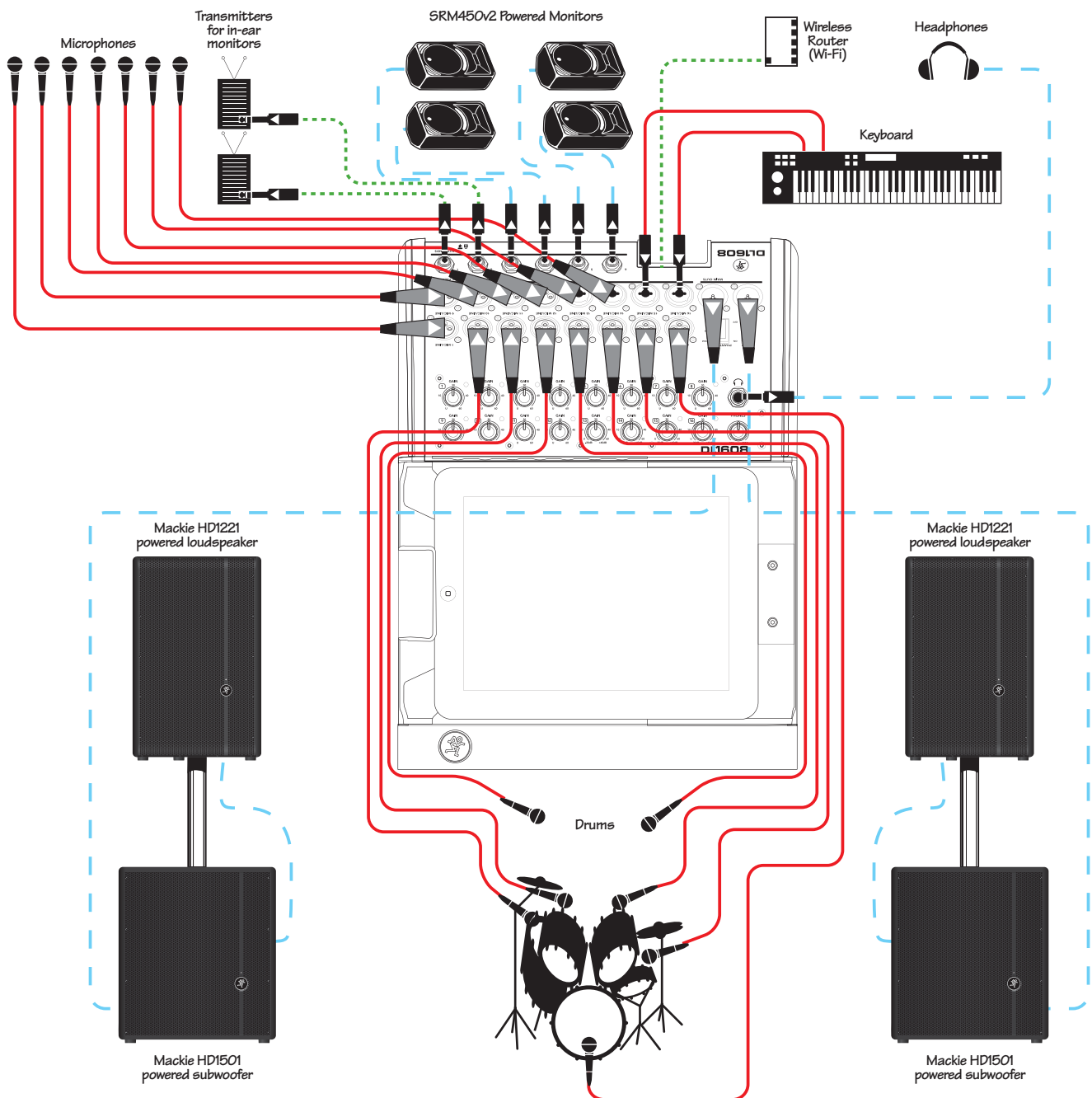


DL1608 Block Diagram



Appendix D : Hookup Diagrams

Live Sound: House Engineer

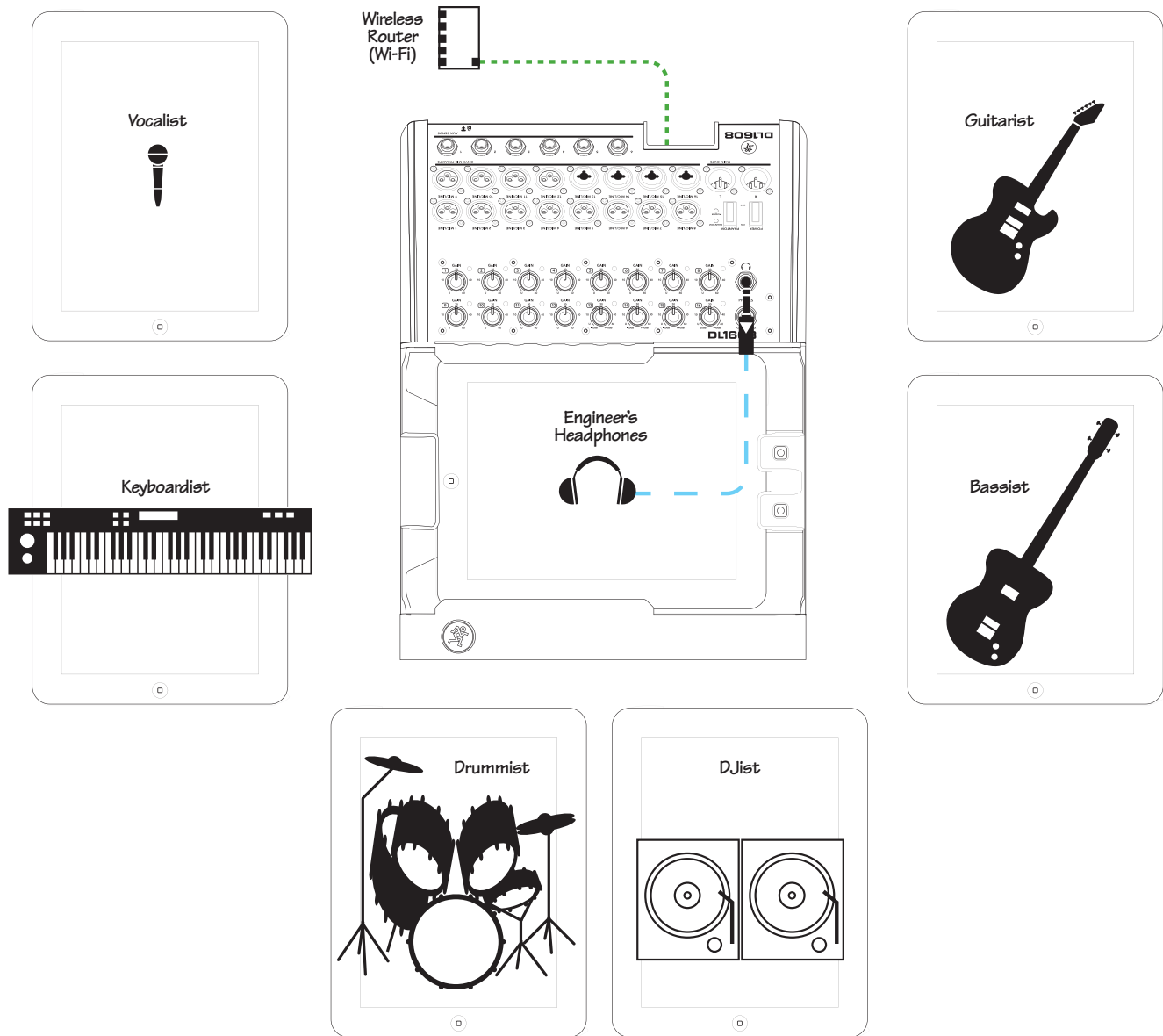


Here's a pretty common setup utilizing the DL1608. Drums are mic'd up and sent to input channels 1-7. An additional seven mics are connected to input channels 8-14. These may be used to mic guitar and bass cabinets, acoustic guitar, lead and background vocals, a horn section, etc. A keyboard is connected to channels 15-16 via 1/4" input jacks.

The L/R main outs of the DL1608 connect directly to a pair of Mackie HD1501 powered subwoofers which are connected to a pair of Mackie HD1221 powered loudspeakers. Aux sends 1-4 are sent to four separate SRM450v2 powered loudspeakers set up as monitors for the band. Aux sends 5-6 are sent to transmitters for in-ear monitors.

The house engineer's iPad is connected (but not locked) to the DL1608 where he/she will set the LR main mix, as well as get the 2-track recording of the band's live show.

Live Sound: Self-Engineered

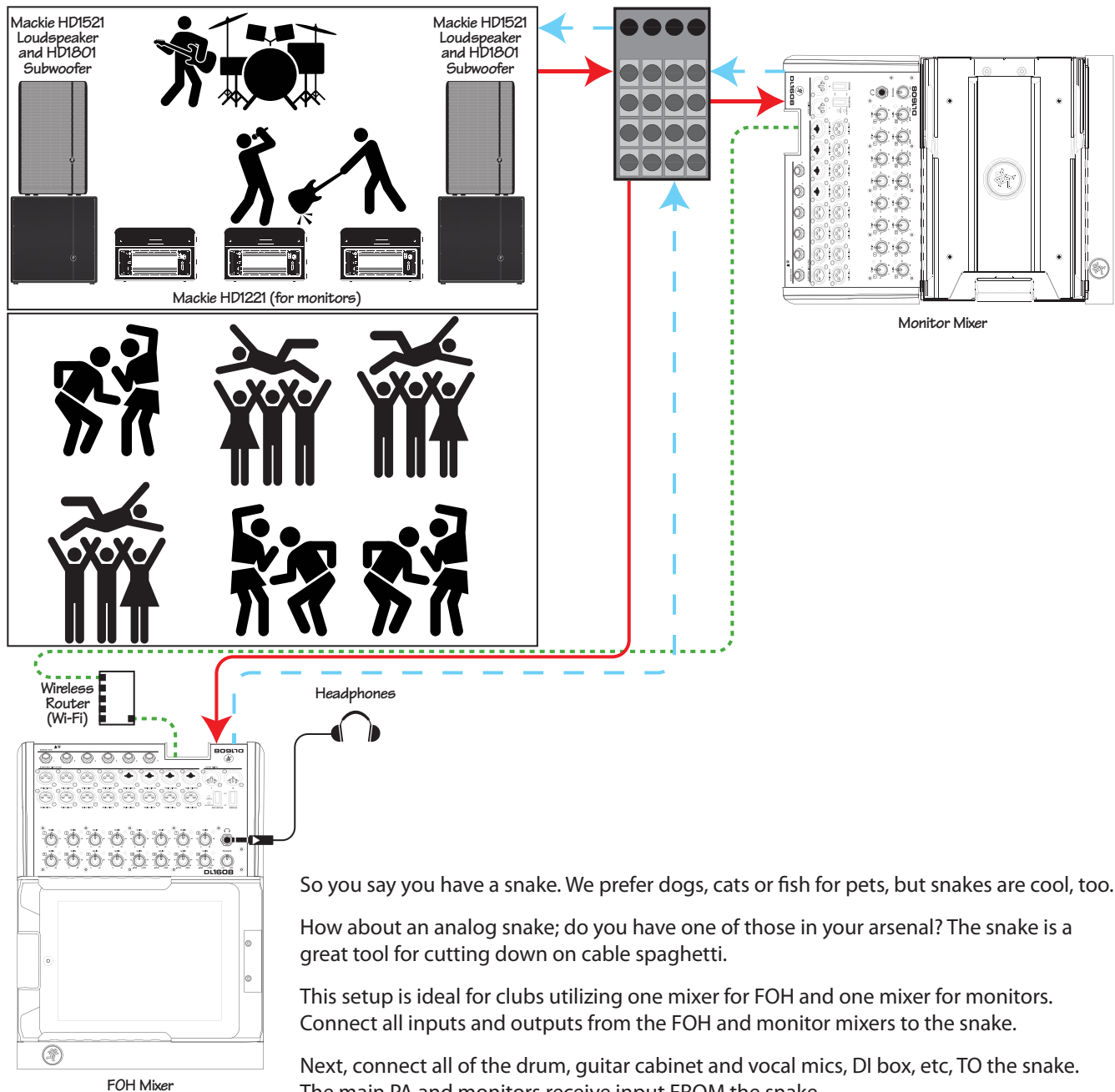


Here's a setup for all the musicians out there who whine for "more me" in the mix. Set up and connect each musician's instrument, the PA and monitors just like they would be in any other live situation.

The house engineer's iPad is connected and locked to the DL1608 where he/she will set the LR main mix, as well as get the 2-track recording of the band's live show.

Up to 10 iPads may be connected to the DL1608 wirelessly. As such, each band member may control their own mix from their own "station". As seen in the illustration above, the vocalist, guitarist, bassist, keyboardist, drummer and DJist each have an iPad. Six musicians, six iPads, six axes. Coincidence? We think not. Whining problem solved!

Live Sound: Two Mixers, One iPad



So you say you have a snake. We prefer dogs, cats or fish for pets, but snakes are cool, too.

How about an analog snake; do you have one of those in your arsenal? The snake is a great tool for cutting down on cable spaghetti.

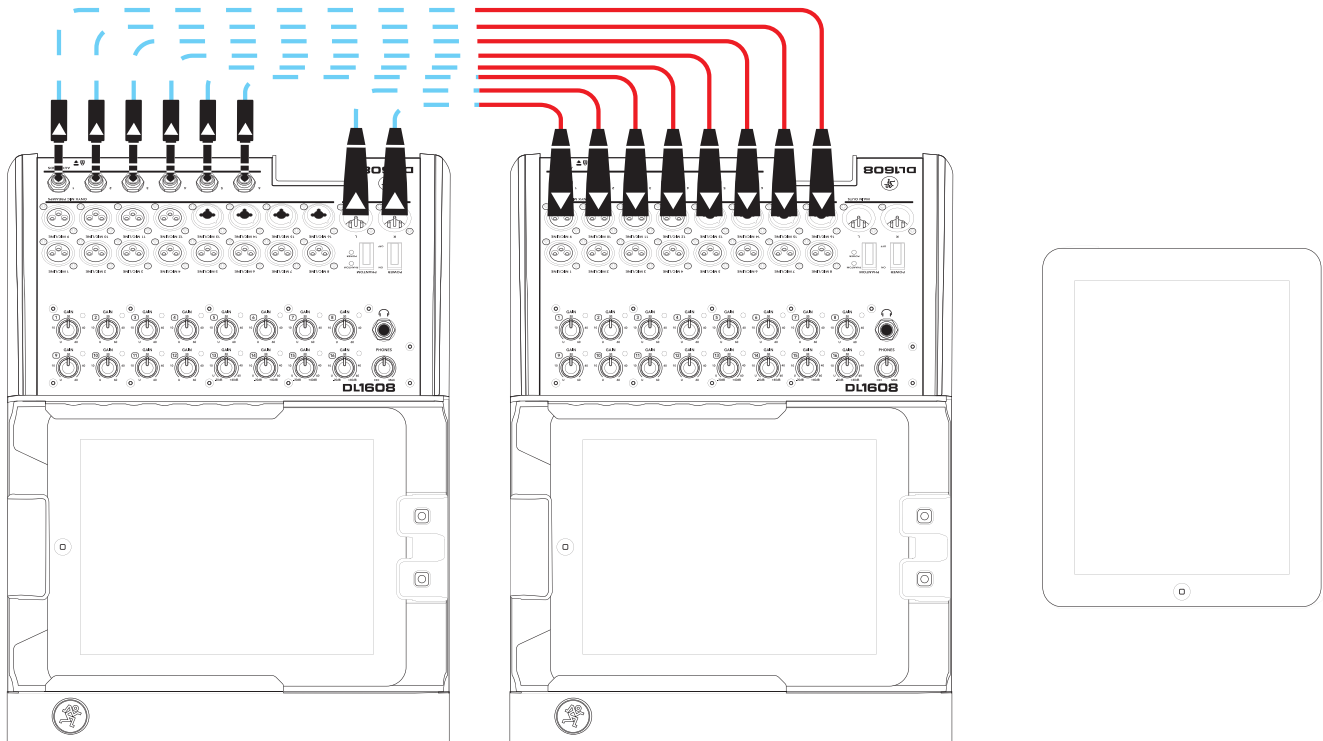
This setup is ideal for clubs utilizing one mixer for FOH and one mixer for monitors. Connect all inputs and outputs from the FOH and monitor mixers to the snake.

Next, connect all of the drum, guitar cabinet and vocal mics, DI box, etc, TO the snake. The main PA and monitors receive input FROM the snake.

Also notice that there is only one iPad in this illustration. It only takes one engineer and one iPad to run both mains and monitors at this particular venue.

The last thing to notice is the crowd...they're going crazy for this band! This must be some weird, underground, cult club since no one there [band or fans] has any feet or hands, not to mention hair, facial features, etc. There may be a lot missing, but what's not missing is the energy...the place is rockin'!

Live Sound: Two Mixers Linked



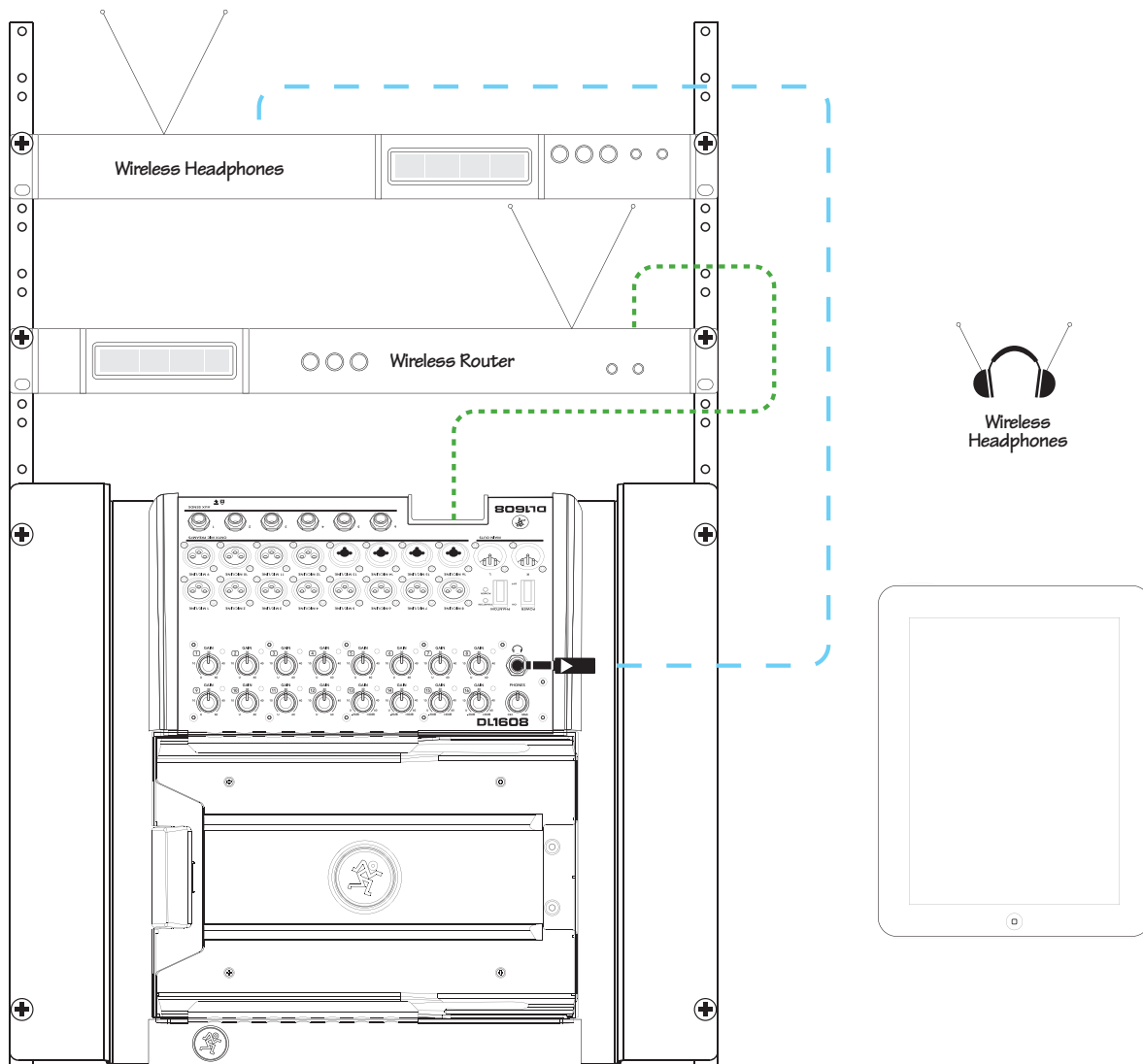
So the club down the street is running sound through a DL1608 and you want to one-up them? That's easy! How about running sound through TWO DL1608's?! No, it won't be twice as loud, but you will have nearly twice as many inputs which means you'll probably have twice the talent playing at your venue in no time.

Start by setting up and connecting each musician's instrument just like they would be in any other live situation. When you run out of inputs on the first DL1608, start using inputs on the second DL1608.

All you need to do is leave eight inputs open on the second DL1608. Then make the connection from the outputs and auxes of DL1608 #1 to the inputs of DL1608 #2. The outputs of DL1608 #2 are then sent to the inputs of the PA.

An iPad is connected and locked to each DL1608, while a third (wireless) iPad is available for wandering the venue and creating an awesome mix.

DL1608 Rack Mounted



This hookup diagram illustrates that the DL1608 doesn't just have to eat up desk space...rack mount it instead! Before doing so, though, it would be a good idea to review the Rack Mount Kit Installation Instructions that were included with the Rack Mount Kit. The dog ate them, you say? Likely story, actually. You know why? The DL1608 has actually been ready to be unleashed to the world for eons, but my girlfriend's dogs kept eating copies of the Reference Guide. Anyway, back to the Rack Mount Kit Installation Instructions. Click [here](#) to retrieve them.

Appendix E: Glossary Of Terms

The glossary contains brief definitions of many of the audio and electronic terms and acronyms used in discussions of sound mixing and recording. If you would like more information, we recommend the following:

The Audio Dictionary — Glenn White

Tech Terms — Peterson & Oppenheimer

Handbook For Sound Engineers — Glen Ballou

Pro Audio Reference — Dennis Bohn

Sound Reinforcement Handbook — Gary Davis

A/D Converter — Analog-to-digital converter. A device that transforms incoming analog signals into digital form.

AFL — An acronym for After Fade Listen, which is another way of saying post-fader solo function.

Attenuate — To reduce or make quieter.

Aux — Short for auxiliary.

Auxiliary — Long for aux. In sound mixers, supplemental equipment or features that provide additional capabilities to the basic system.

Aux Send — A mixer bus output designed to send a signal to an auxiliary processor or monitor system.

Balanced Input — An input consists of two leads, neither of which is common to the circuit ground. This is a “differential pair”, where the signal consists of the *difference* in voltage between the two leads. Balanced input circuits can offer excellent rejection of common-mode noise induced into the line.

Balanced Output — In a classic balanced audio circuit, the output is carried on two leads (high or + and low or -) which are isolated from the circuit ground by exactly the same impedance.

A symmetrical balanced output carries the same signal at exactly the same level but of opposite polarity with respect to ground.

A special case of a balanced output carries the signal on only one lead, with the other lead being at zero voltage with respect to ground, but at the same impedance as the signal-carrying lead. This is sometimes called *impedance balanced*.

Bandwidth — The band of frequencies that pass through a device with a loss of less than 3 dB, expressed in Hertz [Hz] or in musical octaves. Also see Q.

Channel — A functional path in an audio circuit: an input channel, an output channel, the iPad channel, an FX channel and so on.

Channel Strip — An audio channel consisting of a long, vertical strip.

Clipping — A form of severe audio distortion that results from peaks of the audio signal attempting to rise above the capabilities of the amplifier circuit. Seen on an oscilloscope, the audio peaks appear clipped off. To avoid clipping, reduce the system gain in or before the gain stage in which the clipping occurs. Also see headroom.

Compressor — This is a dynamic processor used to smooth out any large transient peaks in an audio signal that might otherwise overload your system or cause distortion. The amplitude threshold and other parameters such as attack time, release time, and tire pressure are adjustable.

Glossary Of Terms Continued...

Condenser — Another term for the electronic component generally known as a capacitor. In audio, condenser often refers to a type of microphone that uses a capacitor as the sound pickup element. Condenser microphones require electrical power to run internal amplifiers and maintain an electrical charge on the capacitor. They are typically powered by internal batteries or phantom power supplied by the DL1608.

Console — Another term for mixer. DL1608 mixer = DL1608 console.

D/A Converter — Digital-to-analog converter. A device that transforms incoming digital signals into analog form.

dB — See decibel.

dBu — A unit of measurement of audio signal voltage in an electrical circuit, expressed in decibels referenced to 0.775 VRMS into any impedance. Commonly used to describe signal levels within a modern audio system.

Decibel (dB) — The dB is a ratio of quantities measured in similar terms using a logarithmic scale. Many audio system parameters measure over such a large range of values that the dB is used to simplify the numbers. A ratio of 1000:1 = 60 dB. Since dB is a unitless quantity, it doesn't matter if it's volts or dollars. (Just try asking the chief engineer for a 3 dB raise). When one of the terms in the ratio is an agreed upon standard value, such as 1.23 V, 1 V or 1 mw, the ratio becomes an absolute value. For example, +4 dBu, -10 dBV or 0 dBm.

Delay — Delay "delays" the audio signal for a short period of time. Delay can refer to one short repeat, a series of repeats or the complex interactions of delay used in chorusing or reverb.

Dipping — The opposite of peaking, of course, used in audio to describe the shape of a frequency response curve. A dip in an EQ curve looks like a valley, or a dip. Dipping with an equalizer reduces a range of frequencies. (See guacamole).

Doubling — A delay effect where the original signal is mixed with a medium (20 to 50 ms) delayed copy of itself. When used carefully, this effect can simulate double-tracking [recording a voice or instrument twice].

Dry — Dry means without effects. It is just the signal alone; no reverb, no delay, etc.

DSP — Digital Signal Processing accomplishes the same functions found in analog signal processors, but performs them mathematically in the digital domain, with more precision and accuracy than its analog counterpart. Since DSP is a software-based process, parameters and processing functions are easily changed and updated by revising the Master Fader app.

Dynamic Microphone — The class of microphones that generate electrical signals by the movement of a coil in a magnetic field. Dynamic microphones are rugged, relatively inexpensive, capable of very good performance and do not require external power.

Dynamics Processor — A type of processor that only affects the overall amplitude level of the signal (sometimes as a function of its frequency content), such as a gate, compressor, or limiter.

Dynamic Range — The range between the maximum and minimum sound levels that a sound system can handle. It is usually expressed in decibels as the difference between the level at peak clipping and the level of the noise floor.

Echo — The reflection of sound from a surface such as a wall or floor. Reverberation and echo are terms that are often used interchangeably, but in audio parlance a distinction is usually made: echo is considered to be a distinct, recognizable repetition (or series of repetitions) of a word, note, phrase or sound, whereas reverberation is a diffuse, continuously smooth decay of sound.

Glossary Of Terms Continued...

EIN — Equivalent Input Noise. A specification that helps measure the “quietness” of a gain stage by deriving the equivalent input noise voltage necessary to obtain a given preamp’s output noise. Numerically, it’s the output noise at a given gain setting minus the gain. EIN is usually measured at a maximum gain and typically ranges from -125 to -130 dBu.

EQ — Short for equalization.

EQ Curve — A graph of the response of an equalizer, with frequency on the x (horizontal) axis and amplitude (level) on the y (vertical) axis. Equalizer types and effects are often named after the shape of the graphed response curve, such as peak, dip, bell and shelf.

Equalization — Long for EQ. Equalization refers to purposefully changing the frequency response of a circuit, sometimes to correct for previous unequal response (hence the term, equalization), and more often to boost or cut the level at certain frequencies for sound enhancement, to remove extraneous sounds, or to create completely new and different sounds.

A lot of how we refer to equalization has to do with what a graph of the frequency response looks like. A flat response (no EQ) is a straight line; a peak looks like a hill, a dip is a valley, a notch is a really skinny valley, and a shelf looks like a plateau (or shelf). The slope is the grade of the hill on the graph.

Fader — Another name for an audio level control.

Filter — A simple equalizer designed to remove certain ranges of frequencies. The high-pass filter attenuates frequencies below its cutoff frequency.

FOH — Front Of House. See house and main (house) speakers. No engineer ever goes to the BOH because there’s never enough time to drink beer.

Frequency — The number of times an event repeats itself in a given period of time. Generally, the time period for audio frequencies is one second, and frequency is measured in cycles per second, abbreviated Hz, honoring Dr. Heinrich Hertz (who did not invent the rental car company). One Hz is one cycle per second. One kHz (kilohertz) is 1000 cycles per second.

The audio frequency range is generally considered to be 20 Hz to 20,000 Hz (or 20 kHz). This covers the fundamental pitch and most overtones of musical instruments.

Gain — The measure of how much a circuit amplifies a signal. Gain may be stated as a ratio of input to output voltage, current or power, such as a voltage gain of 4, or a power gain of 1.5, or it may be expressed in decibels, such as a line amplifier with a gain of 10 dB.

Gain Stage — An amplification point in a signal path, either within a system or a single device. Overall system gain is distributed between the various gain stages.

Gate — A dynamics processor that automatically turns off an input signal when it drops below a certain level. This can reduce the overall noise level of your mix by turning off inputs when they are not in use. Threshold, attack time, hold, and release time are some of the adjustable gate parameters.

Graphic EQ — The graphic equalizer uses sliders for its boost / cut controls, with its operating frequencies evenly spaced through the audio spectrum. In a perfect world, a line drawn through the centers of the control shafts would form a graph of the frequency response curve. Or, the positions of the sliders give a graphic representation of boost or cut levels across the frequency spectrum.

Glossary Of Terms Continued...

Ground — Also called earth. Ground is defined as the point of zero voltage in a circuit or system, the reference point from which all other voltages are measured.

In electrical power systems, ground connections are used for safety purposes, to keep equipment chassis and controls at zero voltage and to provide a safe path for errant currents. This is called a *safety ground*. Maintaining a good safety ground is essential to preventing electrical shock. Follow manufacturer's suggestions and good electrical practices to ensure a safely grounded system. Never remove or disable the grounding pin on the power cord.

In sensitive electronic equipment, tiny currents and voltages riding on the ground (so it's not truly zero volts) can cause noise in the circuits and hamper operation. Often a ground separate from the power ground is used as the reference point for the electronics, isolating the sensitive electronics from the dirty power ground. This is called a *technical ground*.

Quality audio equipment is designed to maintain a good technical ground and also operate safely with a good safety ground.

Ground Loop — A ground loop occurs when the technical ground within an audio system is connected to the safety ground at more than one place. This forms a loop around which unwanted current flows, causing noise in the audio system. Never disable the safety ground in an attempt to solve hum problems.

Guacamole — A delicious dip comprised mostly of avocados. Speaking of dips, refer to dipping.

Hertz — The unit of frequency, equal to 1 cycle per second. 1000 Hz equals 1 kHz.

House — In audio-land, the house refers to the systems (and even persons) responsible for the primary sound reinforcement in a given venue. Hence, we have the house mixer or house engineer, the house mix, house mix amps, main house speakers, etc.

Hz — Short for Hertz.

Impedance — The A.C. resistance, capacitance, and inductance in an electrical circuit, measured in ohms [Ω]. In audio circuits (and other AC circuits) the impedance in ohms may often be much different from the circuit resistance as measured by a DC ohmmeter.

Maintaining proper circuit impedance relationships is important to avoid distortion and minimize added noise. Mackie input and output impedances are set to work well with the vast majority of audio equipment.

Knee — A knee is a sharp bend in a compressor gain curve, not unlike a sharp bend in your leg.

Level — Another word for signal, voltage, power, strength or volume. Audio signals are sometimes classified according to their level. Commonly used levels are: microphone level (–40 dBu or lower), instrument level (–20 to –10 dBu), and line level (–10 to +30 dBu).

Line Level — A signal whose level falls between –10 dBu and +30 dBu.

Main (House) Speakers — The main loudspeakers for a sound reinforcement system. These are usually the largest and loudest loudspeakers, positioned facing the audience; the sound is typically delivered from the stage. This is also called the PA.

Mains — Short for *main* or *house* speakers in a sound reinforcement system.

Master — Me. I am your master. Obey! The master on the Master Fader app, though, refers to the master fader. It affects the total level of the selected output in which one or more signals are mixed together.

Glossary Of Terms Continued...

Mic Amp — See *Mic Preamp*.

Mic Level — The typical level of a signal from a microphone. A mic level signal (usually – but not always – coming from a microphone) is generally lower than –30 dBu. With a very quiet source [a pin dropping?] the signal may be –70 dBu or lower.

Some microphones, notably vintage or vintage-style condenser mics, deliver a higher signal level than this for the same sound pressure level. A “hot” mic output level isn’t necessarily a measure of the microphone’s quality; it’s just an option that the designer(s) chose.

Mic Pre — Short for *Mic Preamp*.

Mic Preamp — Short for microphone preamplifier. An amplifier whose job is to bring the very low microphone level signal up to line level, or in the case of a mic preamp built into a mixer, the mixer’s internal operating level [approximately 0 dBu].

Mic preamps often have their own volume control, called gain, to properly set the gain for a particular source. Setting the mic preamp gain correctly is an essential step in establishing good signal-to-noise ratio and sufficient headroom. The DL1608 is outfitted with Onyx mic preamps.

Mixer — An electronic device used to combine various audio signals into a common output. Different from a blender, which combines various fruits and alcohol into a common libation.

Monaural — Long for mono. Literally, pertaining to or having the use of only one ear.

In the audio field, monaural describes a signal or system which carries audio information on a single channel with the intent of reproducing it from a single source. One microphone is a mono source; many microphones mixed to one channel is a mono mix; a stereo (or – to be picky – a two-channel) mix of many microphones panned left and right is a stereo mix of mono sources.

Monaural listening, and therefore mono compatibility of a stereo mix, is more important than you might realize. Most people hear television audio and clock radios in mono.

Monitor — In sound reinforcement, monitor speakers [or monitor headphones or in-ear monitors] are used by performers to hear themselves. In the video and broadcast world, monitor speakers are often called foldback speakers. In recording, the monitors speakers are those used by the engineer and production staff to listen to the recording as it progresses. In zoology, the monitor lizard is the lizard that observes the production staff as the recording progresses. Keep the lizard out of the mixer.

Mono — Short for *monaural* (and mononucleosis for that matter).

Noise — Whatever you don’t want to hear. This could be hum, buzz or hiss; or it could be crosstalk, digital hash, or your neighbor’s stereo; or it could be white noise, pink noise or brown noise. It’s also how your parents describe your band. After all, it’s what *they* don’t want to hear.

Noise Floor — The residual level of noise in any system. In a well-designed mixer (such as the Mackie DL1608), the noise floor will be a quiet hiss, which is the thermal noise generated by electrons bouncing around in resistors and semiconductor junctions. The lower the noise floor and the higher the headroom, the more usable dynamic range a system has.

Nyquist Sampling Theorem — This theorem states that, when an analog signal is converted to a digital signal, it must be sampled at a frequency that is at least twice the highest audio frequency present in the analog signal. If the audio frequency should exceed one-half the sampling frequency, aliasing may result. Thus, if an analog-to-digital converter is sampling at 44.1 kHz, the audio signal should not exceed 22.05 kHz.

Glossary Of Terms Continued...

PA — Acronym for Public Address. Today, people who work with PA systems like to say they're working in "sound reinforcement". See SR.

Pan — Pan sliders are used to position (or even dynamically move) a monaural sound source in a stereo mixing field by adjusting the source's volume between the left and right channels. Our brains sense stereo position by hearing this difference in loudness when the sound strikes each ear, taking into account time delay, spectrum, ambient reverberation and other cues.

Peaking — The opposite of dipping. A peak is an EQ curve that looks like a hill, or a peak. Peaking with an equalizer amplifies a band of frequencies.

PFL — An acronym for Pre-Fade Listen. Broadcasters call it cueing. Sound folks call it being able to solo a channel with the fader down.

Phantom Power — A system of providing electrical power for condenser microphones (and some electronic pickup devices) from the microphone input jack. The system is called phantom because the power is carried on a standard microphone audio wiring in a way that is "invisible" to ordinary dynamic microphones. The DL1608 uses standard +48 volt DC power, switchable on or off.

Generally, phantom power is safe to use with non-condenser microphones, as well, especially dynamic microphones. However, unbalanced microphones, some electronic equipment (such as some wireless microphone receivers) and some ribbon microphones can short out the phantom power and be severely damaged.

Phase — The time relationship between two signals, expressed in degrees around a circle. 0° and 360° represent an in-phase relationship. Both signals change in the same way at the same time. Anything else is out of phase.

180° out-of-phase is a special case which, for a continuous waveform, means that at any given time the two signals have the same amplitude but are opposite in polarity. The two legs of a differential output are 180° out-of-phase. The polarity invert button (found in the EQ view) reverses the signal polarity.

When out-of-phase signals are mixed, there will be some cancellation at certain frequencies, the frequencies and the degree of cancellation being a function of the amount of phase shift and the relative amplitude of the signals. Attention to mic placement and careful listening will allow you to use this effect creatively.

Post-Fader — A term used to describe an aux send (or other output) that is connected so that it is affected by the setting of the associated channel fader. Sends connected this way are typically (but not always) used for effects. A post-fader output from a mixer channel is usually post-EQ.

Pre-Fader — A term used to describe an aux send (or other output) that is connected so that it is not affected by the setting of the associated channel fader. Sends connected this way are typically (but not always) used for monitors.

Q — A way of stating the bandwidth of a filter or equalizer section. An EQ with a Q of .75 is broad and smooth, while a Q of 10 gives a narrow, pointed response curve. To calculate the value of Q, you must know the center frequency of the EQ section and the frequencies at which the upper and lower skirts fall 3 dB below the level of the center frequency. Q equals the center frequency divided by the difference between the upper and lower 3 dB-down frequencies. A peaking EQ centered at 10 kHz whose -3 dB points are 7.5 kHz and 12.5 kHz has a Q of 2.

Glossary Of Terms Continued...

Reverberation, Reverb — The sound remaining in a room after the source of sound is stopped. It's what you hear in a large tiled room immediately after you've clapped your hands.

Reverberation and echo are terms that are often used interchangeably, but in audio parlance, a distinction is usually made: reverberation is considered to be a diffuse, continuously smooth decay of sound, whereas echo is one or more distinct, recognizable repetitions of a word, note, phrase or sound which decreases in amplitude with every repeat.

Highly reverberant rooms are called live; rooms with very little reverberation are called dead. A sound source without added reverb is dry; one with reverb added is wet.

RFI — Radio Frequency Interference. High frequency radiation that often results from sparking circuits. This may be manifested in a number of ways in audio systems, but is usually evident as a high-frequency buzz or harsh sound.

RMS — An acronym for root mean square, a conventional way to measure the effective average value of an audio signal or other AC voltage. Most AC voltmeters are calibrated to read RMS volts, though on many meters that calibration is accurate only if the waveform is sinusoidal.

Sampling Frequency — This is the rate at which an analog signal is sampled during the analog-to-digital conversion process. The sampling rate used for CDs is 44.1 kHz, but professional recordings are often sampled at higher sample rates.

Send — A term used to describe the output of a secondary mix of the input signals, typically used for monitors, headphone amp or effects devices. These are the aux sends on the DL1608.

Shelving — A term used to describe the shape of an equalizer's frequency response. A shelving equalizer's response begins to rise (or fall) at some frequency and continues to rise (or fall) until it reaches the shelf frequency, at which point the response curve flattens out and remains flat to the limits of audibility. If you were to graph the response, it would look like a shelf. Or more like a shelf than a hiking boot. See also peaking and dipping.

Signal-to-Noise (S/N) — This is a specification that describes how much noise an audio component has compared to the signal. It is usually expressed in dB below a given output level. The S/N of the DL1608 is 92 dB.

Solo — Italian for alone. Solo allows you to listen to individual channels singly or in combination with other soloed signals.

Sound Reinforcement — A system of amplifying acoustic and electronic sounds from a performance or speech so that a large audience can hear clearly. Or, in popular music, so that a (hopefully) large audience can be excited, stunned, or even partially deafened by the tremendous amplification. Sound reinforcement means essentially the same thing as PA [Public Address].

Spaghetti — That mess of wires and cables in the back of your rack and/or console. You really can tame this beast.

SR — An acronym for Sound Reinforcement, which refers to the process (or a system for) amplifying acoustic and electronic sounds from a performance or speech so that a large audience can hear clearly. Or, in popular music, so that a (hopefully) large audience can be excited, stunned, or even partially deafened by the tremendous amplification. Sound reinforcement means essentially the same thing as PA [Public Address].

Glossary Of Terms Continued...

Stereo — Believe it or not, stereo comes from a Greek word that means solid. We use stereo or stereophony to describe the illusion of a continuous, spacious sound field that is seemingly spread around the listener by two or more related audio signals. In practice, stereo often is taken to simply mean two channels.

Tinnitus — The ringing in the ears that often results from prolonged exposure to very loud sound levels.

TRS — Acronym for Tip-Ring-Sleeve, the three parts of a two conductor (plus shield) phone plug. Since the plug or jack can carry two signals and a common ground, TRS connectors are often referred to as stereo or balanced plugs or jacks.

TS — Acronym for Tip-Sleeve, the two parts of a single conductor (plus shield) phone plug. TS connectors are sometimes called mono or unbalanced plugs or jacks. A ¼" TS phone plug or jack is also called a standard phone plug or jack.

Unbalanced — An electrical circuit in which the two legs of the circuit do not have the identical impedance to ground. Often one leg is also at ground potential. Unbalanced circuit connections require only two conductors (signal "hot" and ground). Unbalanced audio circuitry is less expensive to build, but under certain circumstances is more susceptible to noise pickup.

Volume — The sound level in an audio system. Perhaps the only thing that some bands have too much of.

VRMS — Acronym for Volts Root Mean Square. See *RMS*.

Wet — A signal with added reverberation or other effect like echo, delay or chorusing.

XLR Connector — Three-pin connectors now universally used for balanced microphone connections. Also known as Cannon, as Cannon was the original manufacturer of this type of connector. In sound work, a Cannon connector is taken to mean a Cannon XLR-3 connector or any compatible connector. You can tell who the audio geezers are when they refer to XLR connectors as Cannon connectors.

Z — The electrical symbol for *impedance*.

Zymurgy — The science of brewing, an important part of Mackie technology and history since we are located less than one mile from the Red Hook brewery. Besides, we need something other than just a plain 'ol "Z" to end the glossary.

DL1608 Warranty Statement

Please keep your sales receipt in a safe place.

This Limited Product Warranty (“Product Warranty”) is provided by LOUD Technologies Inc. (“LOUD”) and is applicable to products purchased in the United States or Canada through a LOUD-authorized reseller or dealer. The Product Warranty will not extend to anyone other than the original purchaser of the product (hereinafter, “Customer,” “you” or “your”).

For products purchased outside the U.S. or Canada, please visit www.mackie.com/warranty to find contact information for your local distributor, and information on any warranty coverage provided by the distributor in your local market.

LOUD warrants to Customer that the product will be free from defects in materials and workmanship under normal use during the Warranty Period. If the product fails to conform to the warranty then LOUD or its authorized service representative will at its option, either repair or replace any such nonconforming product, provided that Customer gives notice of the noncompliance within the Warranty Period to the Company at: www.mackie.com/support or by calling LOUD technical support at 1.800.898.3211 (toll-free in the U.S. and Canada) during normal business hours Pacific Time, excluding weekends or LOUD holidays. Please retain the original dated sales receipt as evidence of the date of purchase. You will need it to obtain any warranty service.

For full terms and conditions, as well as the specific duration of the Warranty for this product, please visit www.mackie.com/warranty.

The Product Warranty, together with your invoice or receipt, and the terms and conditions located at www.mackie.com/warranty constitutes the entire agreement, and supersedes any and all prior agreements between LOUD and Customer related to the subject matter hereof. No amendment, modification or waiver of any of the provisions of this Product Warranty will be valid unless set forth in a written instrument signed by the party to be bound thereby.

GPL Statement

This Mackie product includes software code developed by third parties, including software code subject to the GNU General Public License (“GPL”) Version 2. Where such specific license terms entitle you to the source code of such software, Loud Technologies Inc. will provide upon written request via email or traditional paper mail the applicable GPL source code files via CD-ROM for a nominal cost to cover media, shipping and handling charges as allowed under the GPL.

The GPL code used in this product is distributed WITHOUT ANY WARRANTY and is subject to the copyrights of one or more authors. For details, see the GPL code and the terms of the GPL. For a copy of the GPL please write to the Free Software Foundation, Inc., 51 Franklin Street, Fifth Floor, Boston, MA 02110-1301, USA.

Please direct all GPL Source Requests to the following email/address.

Attn: GPL Source Request
Loud Technologies, Inc.
16220 Woodinville-Redmond Rd. N.E.
Woodinville, WA 98072

or

techmail@mackie.com



MACKIE®

16220 Wood-Red Road NE • Woodinville, WA 98072 • USA
Phone: 425.487.4333 • Toll-free: 800.898.3211
Fax: 425.487.4337 • www.mackie.com