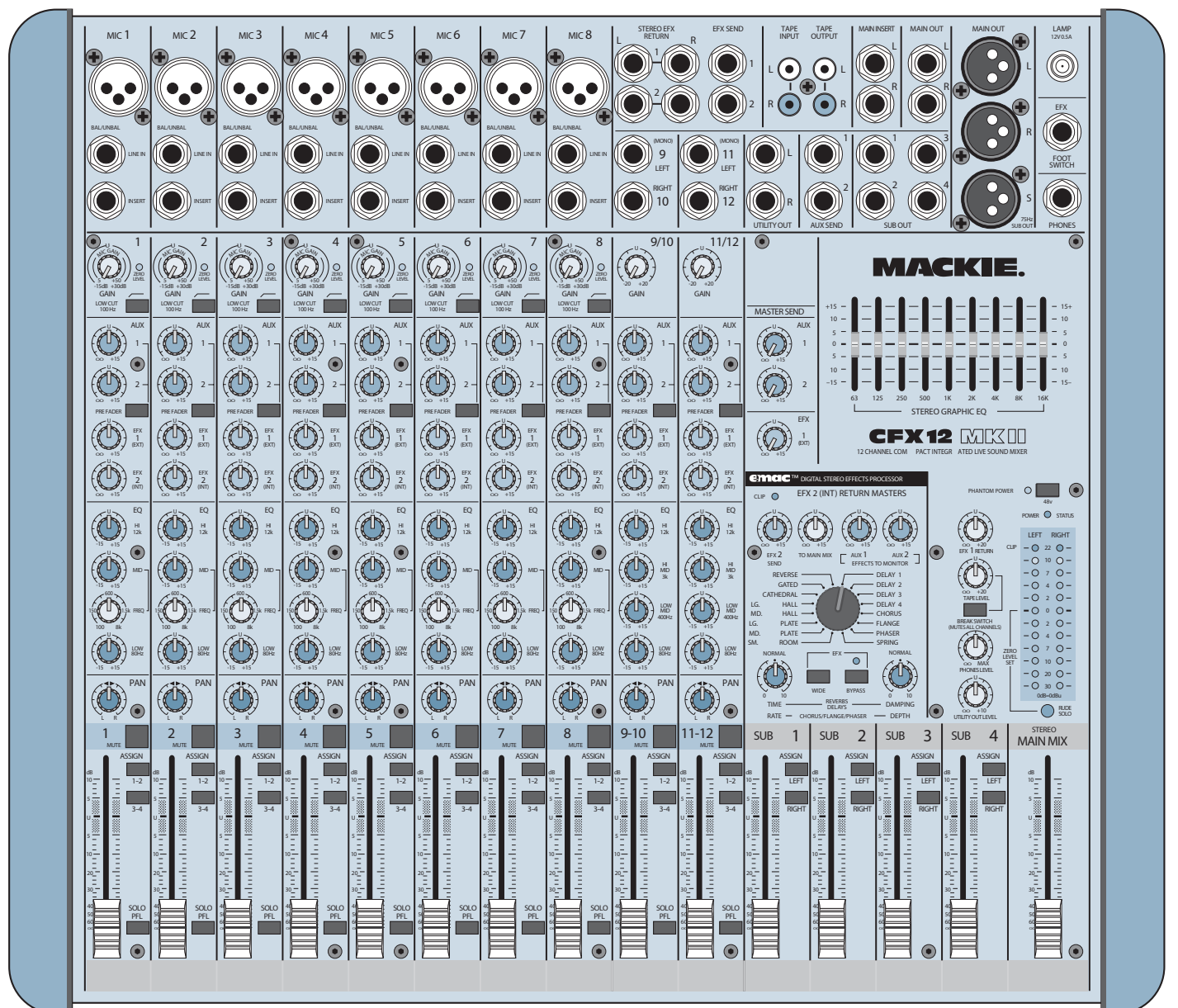
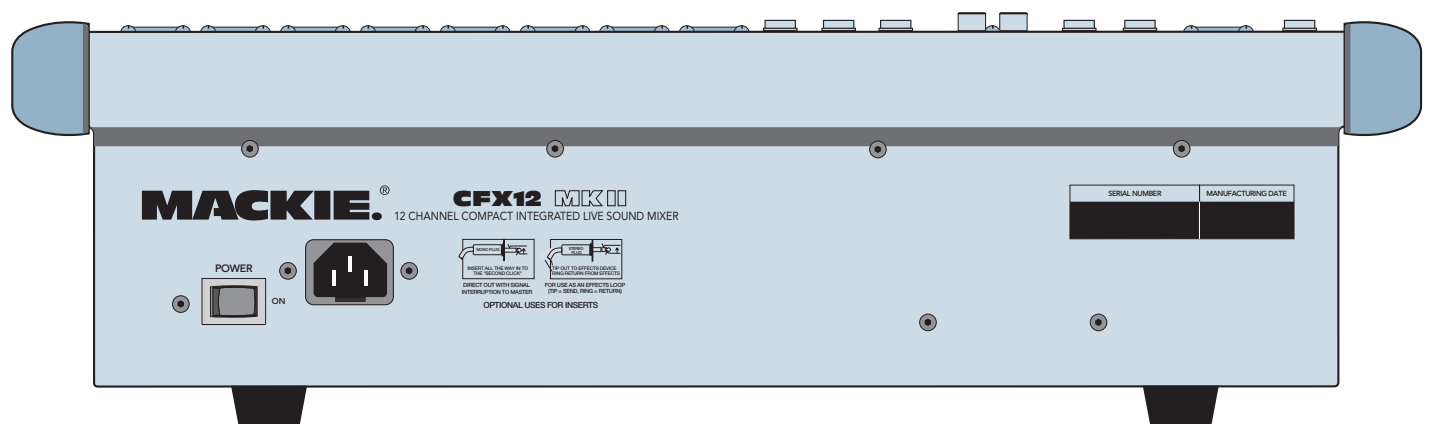


®  
**MACKIE**

# CFX MKII SERIES OWNER'S MANUAL

## 12, 16, AND 20-CHANNEL MIC/LINE MIXERS WITH DIGITAL EFFECTS



# IMPORTANT SAFETY INSTRUCTIONS

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong 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.

CAUTION AVIS

RISK OF ELECTRIC SHOCK  
DO NOT OPEN  
RISQUE DE CHOC ELECTRIQUE  
NE PAS OUVRIR

---

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

ATTENTION: POUR EVITER LES RISQUES DE CHOC  
ELECTRIQUE, NE PAS ENLEVER LE COUVERCLE. AUCUN  
ENTRETIEN DE PIECES INTERIEURES PAR L'USAGER. CONFIER  
L'ENTRETIEN AU PERSONNEL QUALIFIE.

AVIS: POUR EVITER LES RISQUES D'INCENDIE OU  
D'ELECTROCUTION, N'EXPOSEZ PAS CET ARTICLE  
A LA PLUIE OU A L'HUMIDITE

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.  
Le symbole éclair avec point de flèche à l'intérieur d'un triangle équilatéral est utilisé pour alerter l'utilisateur de la présence à l'intérieur du coffret de "voltage dangereux" non isolé d'ampleur suffisante pour constituer un risque d'électrocution.

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.  
Le point d'exclamation à l'intérieur d'un triangle équilatéral est employé pour alerter les utilisateurs de la présence d'instructions importantes pour le fonctionnement et l'entretien (service) dans le livret d'instruction accompagnant l'appareil.

15. This apparatus shall not be exposed to dripping or splashing, and no object filled with liquids, such as vases, shall be placed on the apparatus.
16. This apparatus has been designed with Class-I construction and must be connected to a mains socket outlet with a protective earthing connection (the third grounding prong).
17. This apparatus has been equipped with a rocker-style AC mains power switch. This switch is located on the rear panel and should remain readily accessible to the user.
18. 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.
19. The MAINS plug or an appliance coupler is used as the disconnect device, so the disconnect device shall remain readily operable.

**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.

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	Greg screaming at Troy about deadlines
0.5	110	
0.25 or less	115	Loudest parts at a rock concert

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.

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



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.

# INTRODUCTION

Thank you for choosing a Mackie CFX MKII mixer! These compact live-sound mixers are designed to meet the sound reinforcement needs of almost any small to medium-sized club, meeting room, sanctuary, or outdoor gathering.

Here's a quick glance at all the features you've acquired:

## 8, 12, or 16 mono channels, with:

- Variable input gain (+5 to +50 dB mic, -15 to +30 dB line)
- Phantom power (globally switched)
- Zero Level gain setting indicator LED
- Switchable 100 Hz low-cut filter
- TRS insert jack
- 2 pre/post-fader aux sends
- 2 post-fader effects sends
- 3-band mid-sweep EQ
- Pan, mute, and 1-2/3-4 busing
- PFL solo
- 60mm mono fader

## 2 stereo line channels, with:

- Variable input gain (-20 to +20 dB)
- 2 pre/post-fader aux sends
- 2 post-fader effects sends
- 4-band EQ
- Pan, mute, and 1-2/3-4 busing
- PFL solo
- 60mm stereo fader

## Comprehensive master section, with:

- Four 60mm submix mono faders
- Separate Left and Right assign for each sub
- 60mm main mix stereo fader
- TRS insert jacks for main mix
- Balanced XLR stereo main outputs
- Balanced XLR mono subwoofer output
- 12-segment stereo LED metering
- Mackie's (in)famous Rude Solo Light
- 9-band stereo graphic EQ (main mix)
- EMAC™ 32-bit digital stereo effects with footswitch jack
- 2 aux sends with master level controls
- 2 effects sends with master level controls
- Level controls for stereo effect returns
- Break switch for 'worry-free' intermissions
- RCA tape out
- RCA tape in with stereo level control
- Headphone output with level control
- Utility out with level control
- 12V BNC lamp socket

## ABOUT THIS MANUAL

### *Absolutely most important page:*

Before you start engineering, please read the "Quick Start" section on page 5. It's a list of steps that will familiarize you with the CFX mixer and help you set up a basic performance.

### *About those blue numbers:*

You'll notice numbers in blue circles, like this: ①. Every feature on the CFX mixer has one of these numbers assigned to it. Whenever a feature is mentioned, described or illustrated, its number will be right next to it.

***Please write your serial number here for future reference (i.e., insurance claims, tech support, return authorization, etc.):***

***Purchased at:***

***Date of purchase:***

# CONTENTS

IMPORTANT SAFETY INSTRUCTIONS .....	2
INTRODUCTION .....	3
ABOUT THIS MANUAL .....	3
QUICK START .....	5
APPLICATIONS DIAGRAMS .....	6

PATCHBAY FEATURES .....	8
1 MIC .....	8
2 LINE IN .....	8
3 INSERT .....	8
EFFECTS: SERIAL OR PARALLEL? .....	9
4 STEREO LINE IN .....	9
5 MAIN OUT .....	9
6 SUBWOOFER OUT .....	9
7 MAIN INSERT .....	9
8 UTILITY OUT .....	10
9 SUB OUT .....	10
10 AUX SEND .....	10
11 EFX SEND .....	10
12 STEREO EFX RETURN .....	10
13 TAPE INPUT .....	11
14 TAPE OUTPUT .....	11
15 PHONES .....	11
16 EFX FOOT SWITCH .....	11
17 LAMP .....	11
18 AC POWER INPUT .....	11
19 POWER SWITCH 20 POWER STATUS .....	11

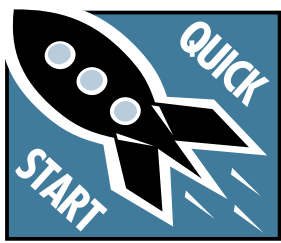
CHANNEL STRIP FEATURES .....	12
21 PHANTOM POWER .....	12
22 GAIN .....	12
23 ZERO LEVEL .....	12
24 LOW CUT .....	12
25 AUX .....	12
26 PRE FADER .....	13
27 EFX 1 (EXT) .....	13
28 EFX 2 (INT) .....	13
29 EQ .....	13
30 PAN .....	14
31 MUTE .....	14
32 ASSIGN .....	14
33 FADER .....	14
34 SOLO PFL .....	14

MASTER SECTION FEATURES .....	15
35 MAIN MIX FADER .....	15
36 METERS .....	15
37 RUDE SOLO .....	15
38 STEREO GRAPHIC EQ .....	15
39 TAPE LEVEL .....	16
40 BREAK SWITCH .....	16
41 PHONES LEVEL .....	16
42 UTILITY OUT LEVEL .....	16
43 SUB FADERS .....	16
44 LEFT/RIGHT SUB ASSIGN .....	16
45 AUX MASTER SEND .....	17
46 EFX 1 MASTER SEND .....	17
47 EFX 1 RETURN .....	17
48 EMAC EFFECTS PROCESSOR .....	17
49 EFX 2 SEND .....	17
50 TO MAIN MIX .....	17
51 EFFECTS TO MONITOR .....	18
52 PRESET SELECT .....	18
Preset Effects Descriptions .....	18
53 TIME/RATE .....	19
54 DAMPING/DEPTH .....	19
55 WIDE .....	19
56 BYPASS .....	19
57 CLIP .....	19

GENERAL PRECAUTIONS AND CONSIDERATIONS .....	20
APPENDIX A: Service Info .....	20
Troubleshooting .....	20
Repair .....	21
APPENDIX B: Technical Info .....	21
Specifications CFX12, CFX16, CFX20 MKII .....	21
CFX MKII SERIES LIMITED WARRANTY .....	22
BLOCK DIAGRAM .....	23

Don't forget to visit our website at [www.mackie.com](http://www.mackie.com)  
for more information about this and other Mackie products.

# QUICK START



We know you can't wait to get the show on the road. Who has time to read a booooring manual? That's fine — the CFX MKII mixer is designed to set up

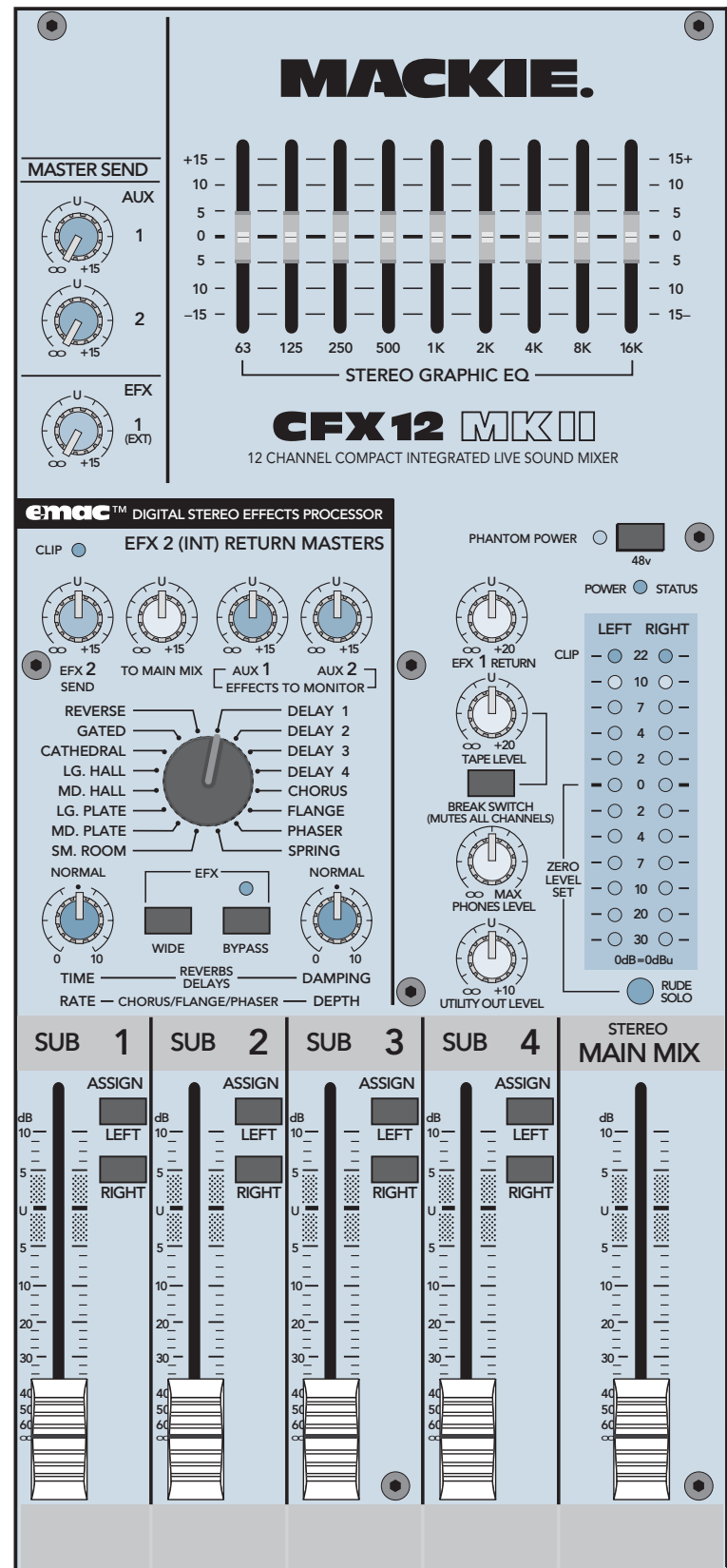
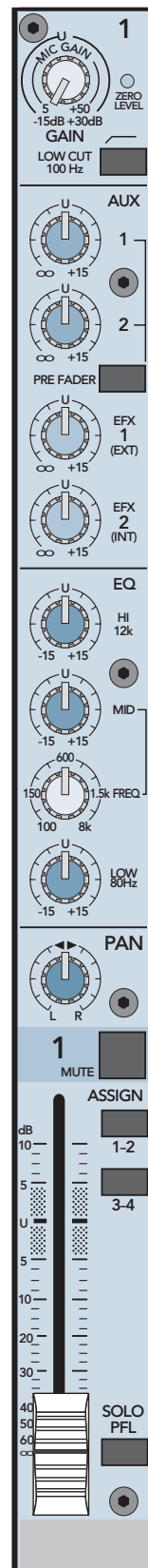
quickly and operate intuitively — but please, **READ THIS PAGE!**

## ZERO THE CONSOLE:

1. Turn everything off, including the mixer's **POWER** switch and **PHANTOM POWER** switch.
2. Channel strip **GAIN**, **AUX**, **EFX**, and **Fader** down.
3. **STEREO GRAPHIC EQ** sliders centered.
4. **MASTER AUX** and **EFX SENDS**, and **EFX RETURNS** down.
5. Channel strip **EQ** and **PAN** controls centered.
6. Channel strip **ASSIGN 1-2** and **MUTE** switches *down*.
7. Channel strip **LOW CUT**, **PRE FADER**, and **ASSIGN 3-4** switches up.
8. **SUB 1 ASSIGN LEFT**, **SUB 2 ASSIGN RIGHT** *down*; all other **SUB ASSIGN** switches up.
9. **MAIN MIX** and **SUB Faders** down.

## MAKE THE CONNECTIONS:

1. Connect your amp's outputs to your speaker inputs (unless, of course, you have powered loudspeakers).
2. Plug all the sound system components into suitable AC outlets, properly grounded and capable of delivering adequate current.
3. Using XLR or TRS cables, connect your mixer's **MAIN OUTS** to your powered speakers or amp's line inputs.
4. Make connections from your microphones and instruments to the mixer: Connect balanced microphones to the mono channel **MIC** jacks. (For condenser microphones, engage the **PHANTOM POWER** switch, located just above the meters.) Connect line-level instruments (synthesizers, guitar effects, direct boxes) to the mono or stereo channel **LINE IN** TRS jacks.
5. Turn all the power switches on, **leaving the amplifier's switch for last**.
6. Turn up the **MAIN MIX** Fader to the "–30" label, for now. We'll crank it up later on.
7. Turn up **SUB Faders 1 and 2** to unity gain ("U" label).



## SET THE LEVELS:

1. Choose one of the microphones or instruments you connected. Make some noise. If it's a microphone, sing at your normal singing volume. If it's a synthesizer, play it at its normal output level.
2. While making noise, turn up that channel's **GAIN** until the adjacent **ZERO LEVEL** starts blinking.
3. Disengage (up) that channel's **MUTE**.
4. Raise that channel's fader to unity gain ("U" label). You should be hearing your noise now.
5. If necessary, apply channel **EQ** changes. (You may need to compensate for level changes with the channel fader.)
6. Repeat steps 1 through 5 for the remaining active channels.
7. Stop making noise. Everyone: start making music.

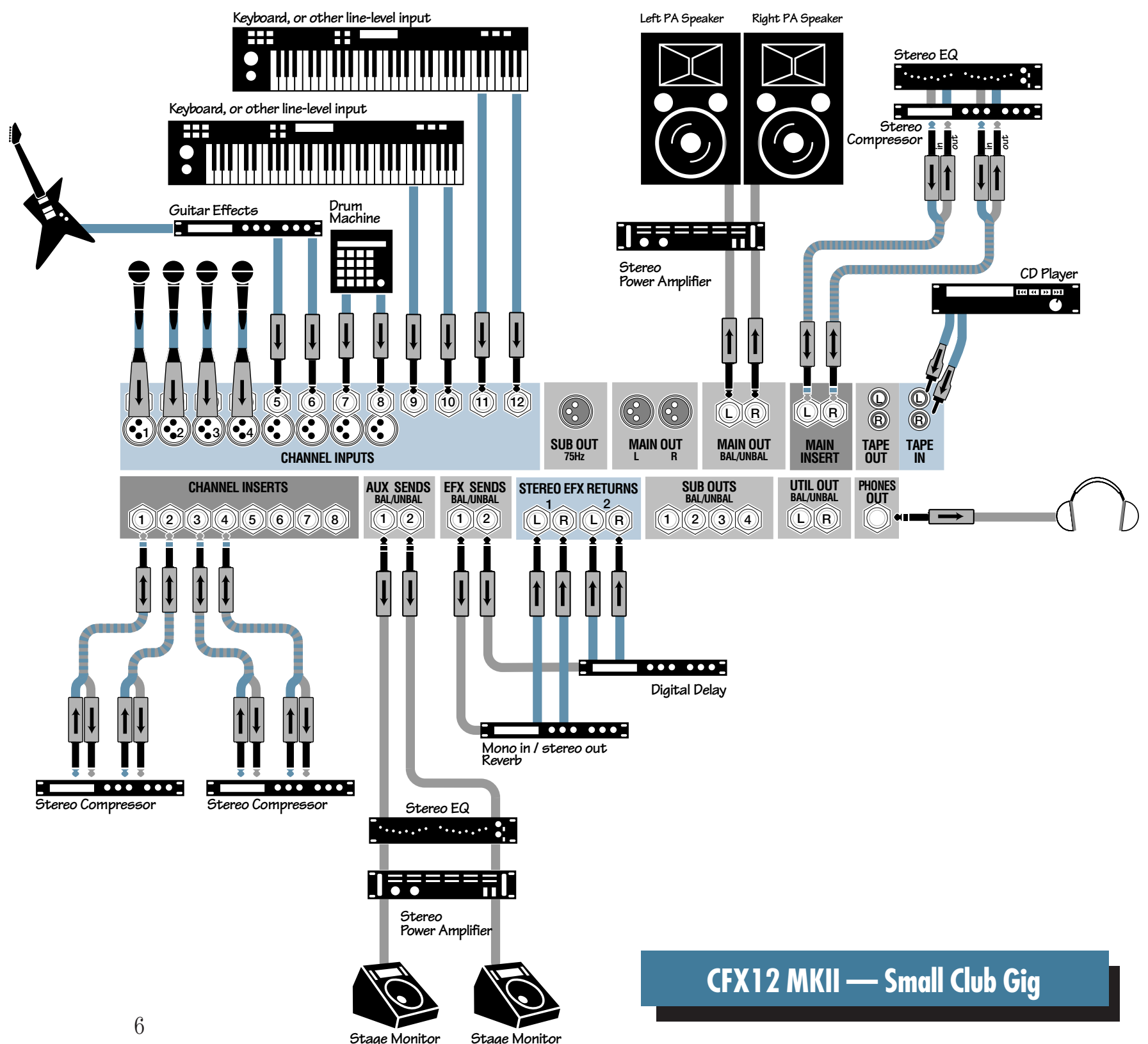
## TWEAK THE MIX:

1. Engage **MUTE** on all channels except your rhythm section (drums & bass).
2. Adjust the rhythm section's channel faders to get a good balance of levels.
3. Un-mute the other active channels and adjust their faders.
4. Now that you have a rough mix going, turn up the **MAIN MIX Fader** to a comfortable listening level.
5. If the overall mix has an equalization problem, make adjustments to the **STEREO GRAPHIC EQ**. If an individual channel is the problem, use its **EQ** instead.
6. Using channel **EFX 2 (INT)** and the **EMAC EFFECTS PROCESSOR**, experiment with adding some effects.
7. Depending on how much time you've got, keep tweaking. Walk the room to see how it sounds away from your mixer. Keep tweaking.

## KNOW THESE THINGS:

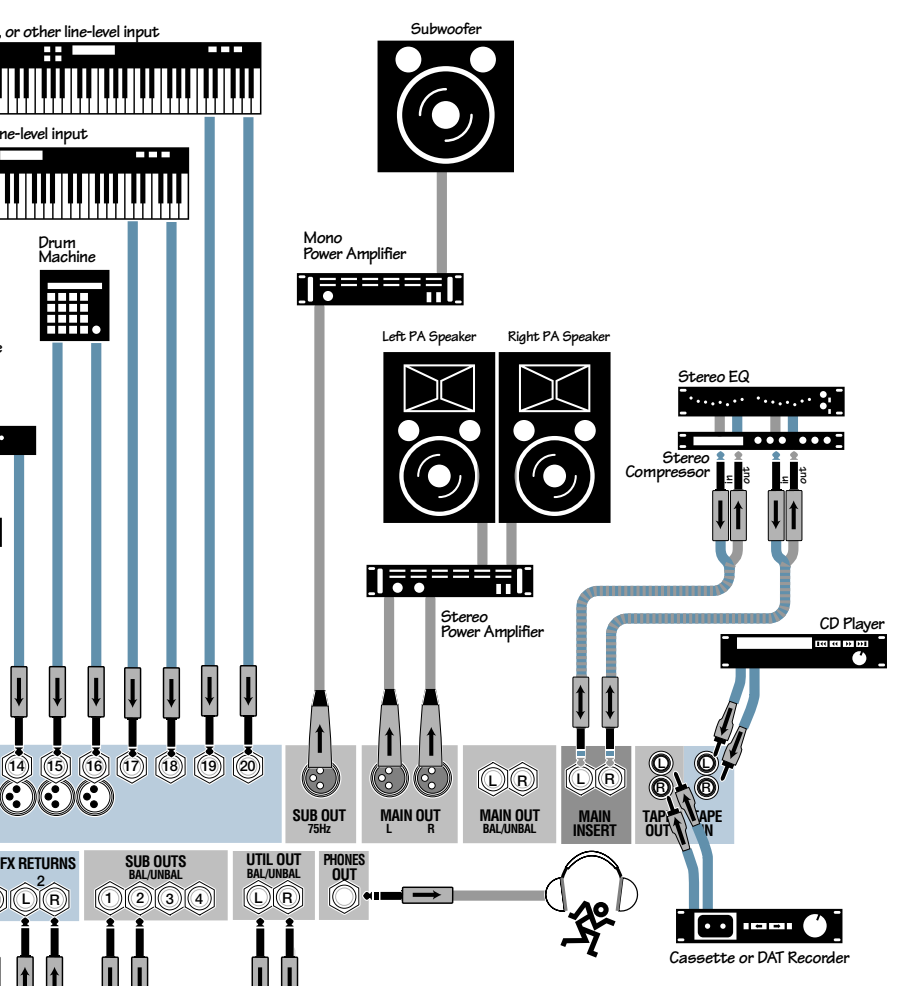
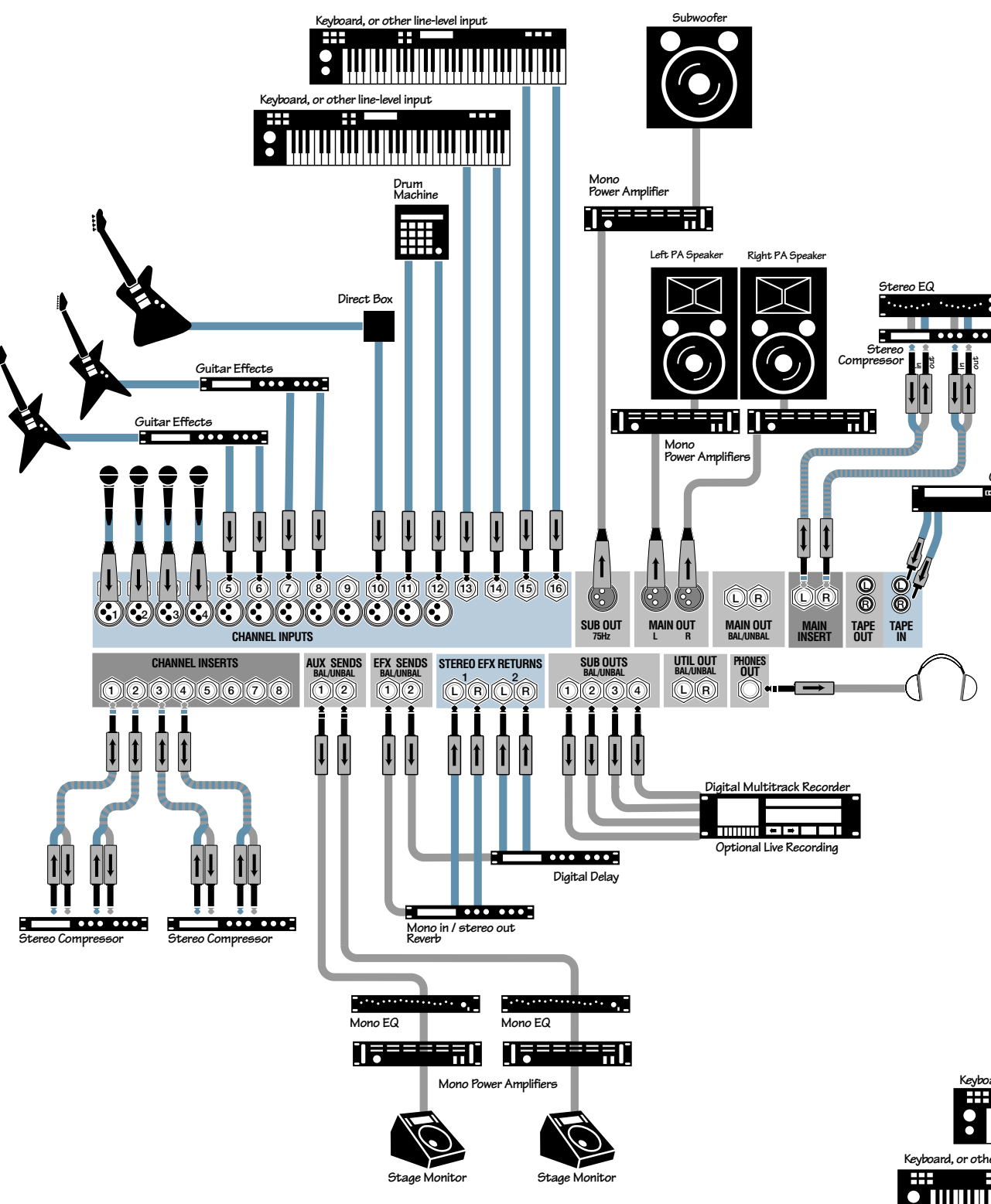
- Never listen to loud music for prolonged periods. Please see "Safety Instructions" on page 2 for information on hearing protection.
- Never plug amplifier outputs into anything except passive speakers.
- Never use guitar cables to connect amplifiers to speakers.
- Before making connections to an external amp or reconfiguring an amp's routing, turn the amp's level (gain) controls down, turn the power off, make the changes, turn the power back on, and then turn the level controls back up. The same is true for powered speakers.
- When you shut down your equipment, turn off any external amplifiers and/or powered speakers first. When powering up, turn on the amplifiers and/or speakers last.
- Save the shipping box and packing material! You may need them someday.

# APPLICATIONS DIAGRAMS



**CFX12 MKII — Small Club Gig**

# CFX16 MKII — Large Club Gig or Auditorium using a Subwoofer



# CFX20 MKII — Church Sound Reinforcement with Separate Utility Mix

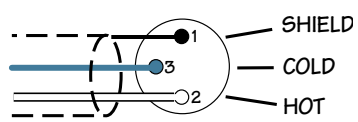
# PATCHBAY FEATURES

At the risk of stating the obvious, this is where you plug everything in: microphones, line-level instruments, effects, headphones and the ultimate destination for your sound: PA system, tape recorder, etc.

## 1 MIC

The CFX MKII mixer is equipped with rugged, low noise, phantom-powered microphone pre-amplifiers, providing up to 50 dB of crystal-clear amplification. Their balanced circuitry rejects all manner of extraneous interference. Professional condenser, dynamic, and ribbon mics will all sound excellent through these XLR inputs.

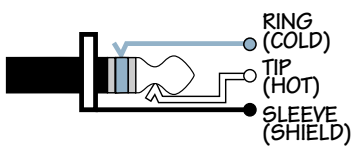
You can plug in almost any kind of balanced mic that has a standard XLR-type male mic connector.



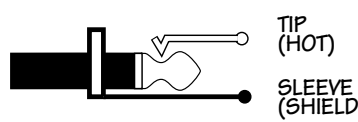
XLR BALANCED WIRING

## 2 LINE IN

The line inputs share circuitry (but not phantom power) with the mic preamps, and can be driven by balanced or unbalanced sources at almost any level. You can use these TRS inputs for virtually any signal you'll come across, from -25 dBu up to +38 dBu.



TRS BALANCED WIRING

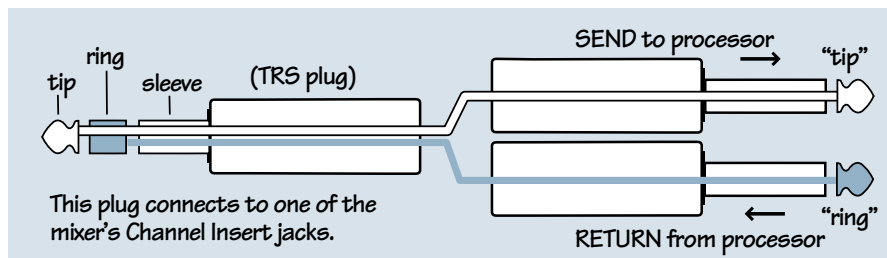


TS UNBALANCED WIRING

## 3 INSERT

This is where you connect serial effects such as compressors, equalizers, de-essers or filters. The send is low-impedance (150 ohms), capable of driving any line-level device. The return is high-impedance (10k ohms) and can be driven by almost any device.

These unbalanced jacks are configured thusly:



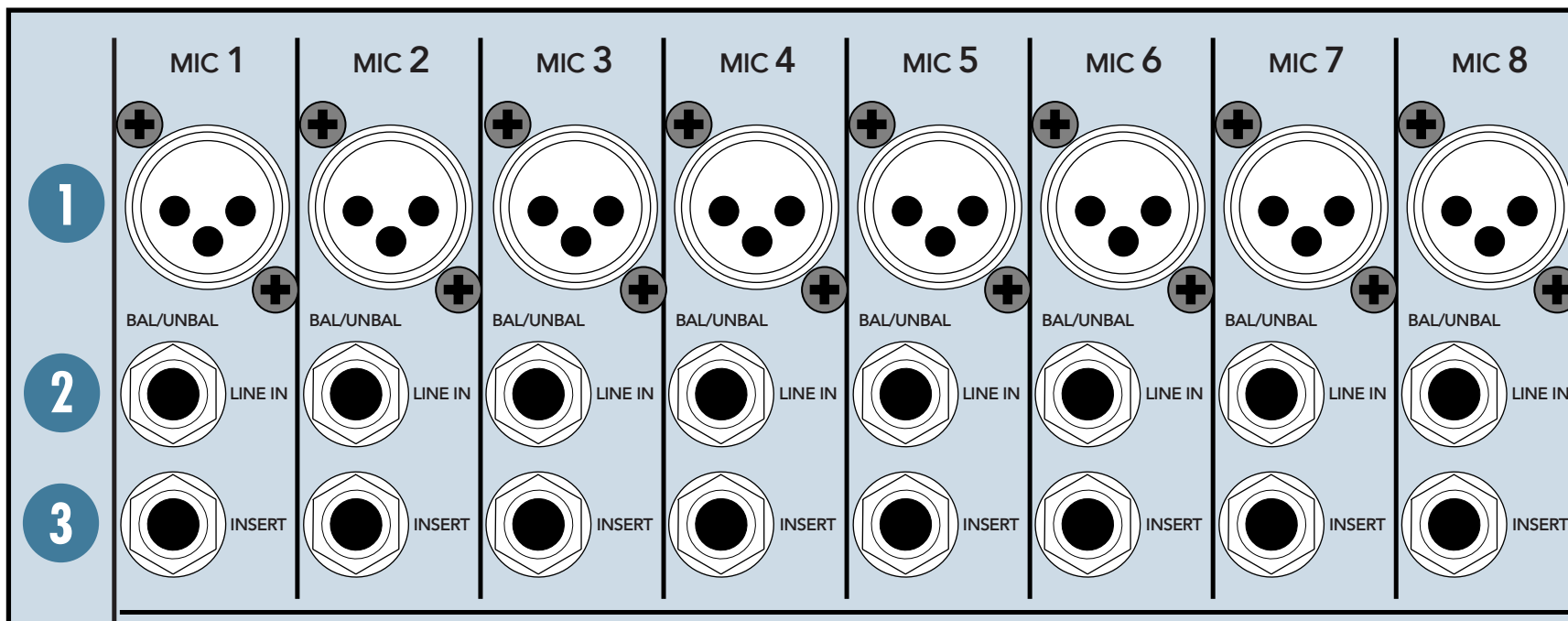
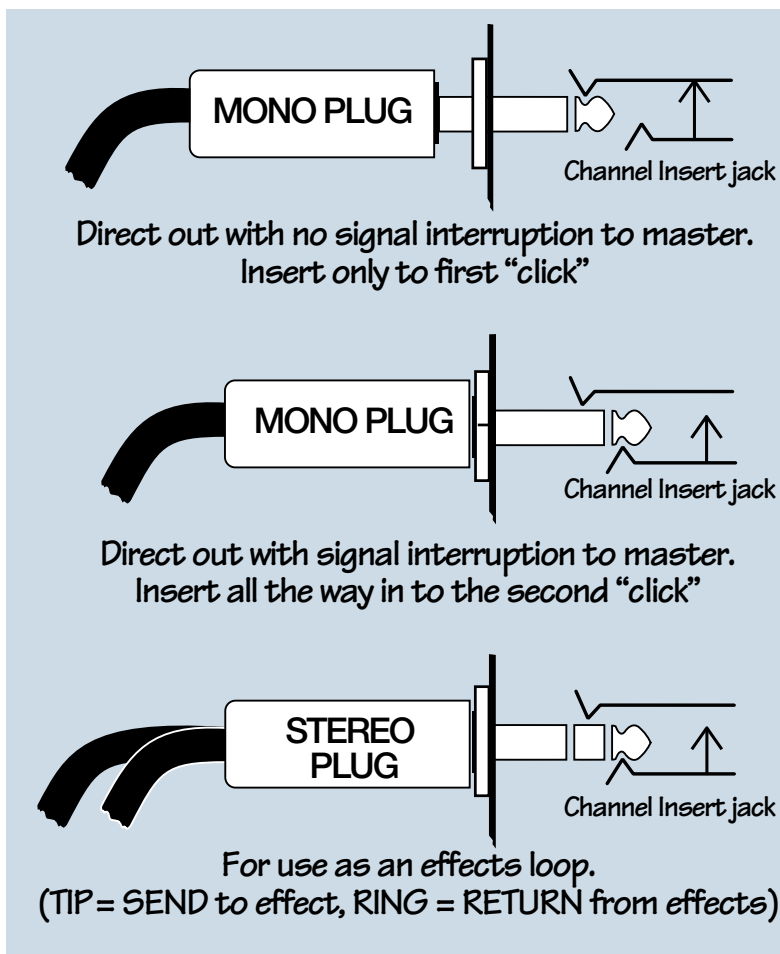
*Tip = Send (to effects device input)*

*Ring = Return (from effects device output)*

*Sleeve = Common ground (connect shield to all three sleeves)*

Specialty "Y" cables, developed just for these jacks, are widely available.

Besides being used for inserting external devices, these jacks can also be used as channel direct outputs; post-GAIN, post-LOW CUT, and pre-EQ. Here are three ways you can use the channel INSERT jacks:





## EFFECTS: SERIAL OR PARALLEL?

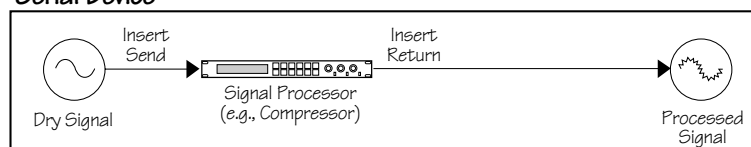


Effects devices are used either in serial or in parallel: “Serial” means that the entire signal is routed through the effects device.

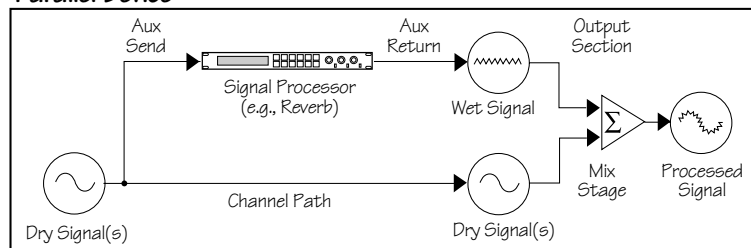
Examples: preamps, compressor/limiters, graphic equalizers.

“Parallel” means that a portion of the signal is tapped off to the device (usually via a mixer’s aux send), processed and returned (usually via a mixer’s aux return), to be mixed with the original “dry” signals. Multiple signals (via multiple mixer channels) can all make use of the same parallel effects device. Examples: reverb, digital delay, chorus. See diagrams below.

Serial Device



Parallel Device



## 4 STEREO LINE IN

These balanced inputs are designed for stereo or mono, balanced or unbalanced signals, from -20 dB to +20 dB. These TRS inputs can be used with just about any professional or semipro instrument, effect or tape player.

When connecting a mono device (just one cord), always use the LEFT (MONO) input and plug nothing into the RIGHT input. A trick called “jack normalling” will cause the signal to appear on both sides.

## 5 MAIN OUT

Coming in two flavors, XLR and TRS, the main output represents the end of the mixer chain, where your fully mixed and enhanced stereo signal enters the real world.

The XLR balanced outputs will add 6 dB when connected to balanced inputs, thereby elevating signal from the noise floor by that amount.

The TRS balanced outputs offer the advantage of having no 6 dB level change to deal with, while still providing extraneous noise rejection.

## 6 SUBWOOFER OUT

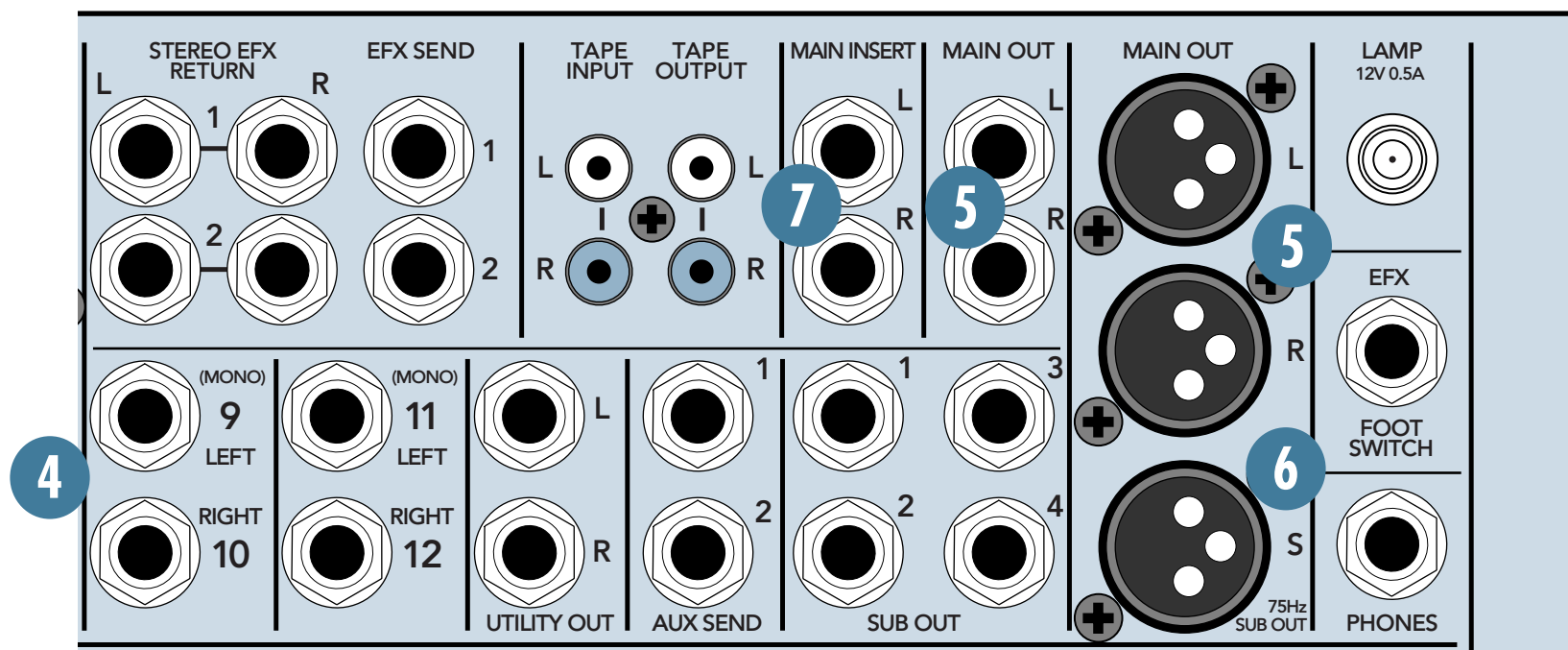
The CFX MKII mixer has an integrated mono-summing 75 Hz 3rd-order low-pass filter. It taps the left and right MAIN OUT 5 signals, mixes them into a mono signal, then removes all but the deepest bass information. Patch this balanced XLR output to a high-powered mono-summed amp and subwoofer (or a powered subwoofer), and the music police will be right over.

## 7 MAIN INSERT

With nothing plugged into these jacks, the mix signal goes from the mix amp straight through to the MAIN MIX 35 Faders. But when you plug a serial device into these jacks, the mix leaves the mixer, goes through the device and back into the mixer’s main mix faders.

If you want to send your main mix through a compressor/limiter or similar device, these are the jacks for you. Since the insert is before the mix faders, moving the fader will not alter the signal strength sent to the compressor, thereby preserving its compression characteristics.

These unbalanced jacks are configured the same as the channel strip insert jacks. See page 8 for wiring and usage information.



## 8 UTILITY OUT

The stereo signal at these TRS jacks is the same as at the MAIN OUT [5](#), but with one important difference:

After the MAIN MIX Fader [35](#), the mix is sent through the UTILITY OUT LEVEL [42](#) control, allowing you to set levels as desired without disturbing the main mix level.

## 9 SUB OUT

In live sound applications, these TRS jacks can be patched into one or two stereo amplifiers, thereby allowing you to control levels independently via the SUB Faders [43](#).

Alternatively, use the MAIN OUT [5](#) to feed the amplifiers and one stereo SUB OUT [9](#) pair to feed a recorder.

In studio applications, these outputs can be used as four separate paths to feed four tracks of a multitrack recorder.

See ASSIGN [32](#) and SUB ASSIGN [44](#) for more information.

## 10 AUX SEND

To create a stage monitor mix, with levels set independently from the main mix, patch these TRS jacks into your monitor amplifier inputs. These jacks can also be used to feed the inputs of an effects device.

See AUX [25](#) and PRE FADER [26](#) for more information.

## 11 EFX SEND

The signal at these TRS outputs is post-fader only, so they cannot be used as traditional stage monitor cues. They're intended to patch into effects device inputs; hence the name "EFX." See EFX 1 (EXT) [27](#) and EFX 2 (INT) [28](#) for more information.

**Note:** The EFX 2 signal path also feeds the CFX mixer's internal EMAC EFFECTS PROCESSOR [48](#) inputs. If you're using EMAC and just one outboard processor, patch that processor via EFX SEND 1 for independent control of the effects send level.

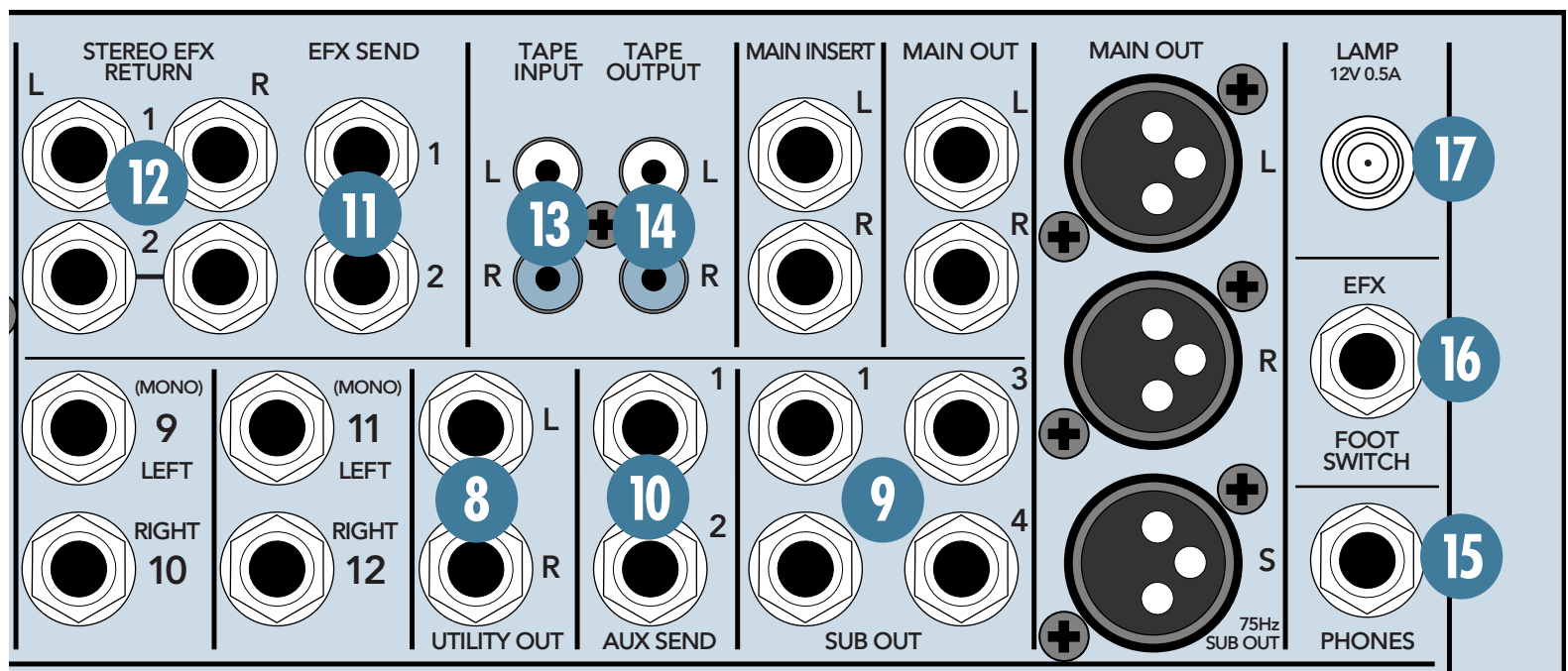
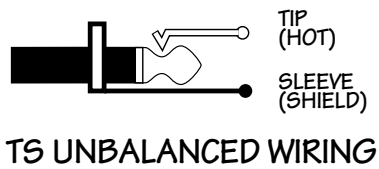
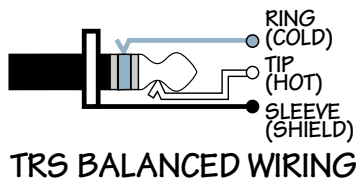
We recommend going into a stereo reverb in mono and returning in stereo. We have found that on most "stereo" reverbs the second input just ties up an extra EFX send and adds nothing to the sound. There are exceptions, so feel free to try it both ways. If your effects device is true stereo all the way through, use EFX SEND 1 to feed its left input and EFX SEND 2 to feed the right input.

## 12 STEREO EFX RETURN

Patch the outputs of external parallel effects devices to these inputs.

**Note:** The EFX 2 return signal is combined with the signal from the CFX mixer's internal EMAC EFFECTS PROCESSOR [48](#). If you're using EMAC and just one outboard processor, patch the outboard processor via EFX 1 RETURN for independent control of the effects return level.

When connecting a mono device (just one cord), always use the LEFT (MONO) input and plug nothing into the RIGHT input. A trick called "jack normalling" will cause the signal to appear on both sides.



### 13 TAPE INPUT

Patch the outputs of your intermission entertainment here. Any line-level mono or stereo device can be used: tape, CD player, television audio, etc. See **BREAK SWITCH** 40 for more information.

When connecting a mono device (just one cord), you'll need a "Y-splitter" RCA adapter. It turns a mono output cord into two cords; so both the left and right tape input jacks can be patched. This adapter is widely available.

### 14 TAPE OUTPUT

Use these jacks to capture the entire performance to tape. The signal at these jacks is the main mix, after the **MAIN INSERT** 7 but before the **MAIN MIX Fader** 35. The main mix signal will be present at these jacks regardless of the position of the **MAIN MIX Fader**.

### 15 PHONES

The stereo signal at these jacks is the same as at the **MAIN OUT** 5, but with two important differences:

After the **MAIN MIX Fader** 35, the mix is sent through the **PHONES LEVEL** 41 control, allowing you to set levels as desired, without disturbing the main mix level.

When a channel's **SOLO PFL** 34 is engaged, the main mix signal at this output will be replaced by the solo signal, allowing the engineer to audition channels without disturbing the main mix.

The stereo **PHONES** jack will drive any standard headphones to very loud levels. Walk-person-type phones can also be used with an appropriate adapter.

**Note:** Please see the "Safety Instructions" on page 2 for information on hearing protection.

### 16 EFX FOOT SWITCH

You can connect a normally-open foot switch to this connector to duplicate the function of the **BYPASS** 56 switch, located in the **EMAC EFFECTS PROCESSOR** 48. Closing the switch connection causes the **EFX BYPASS** indicator to light and mutes the effects.

**Note:** When a foot switch is plugged into the **FOOT SWITCH** jack, the **BYPASS** switch is disabled.

Just like the **BYPASS** 56 switch, this affects only the internal **EMAC EFFECTS PROCESSOR** and not any device plugged into **STEREO EFX RETURN 2** 12.

### 17 LAMP

This BNC-type connector will accept almost any of the widely available 12VDC 0.5 amp gooseneck lamps, made by **Littlite**® and others. If your work involves mixing in the back of dark theaters, this lamp will likely become your best friend.

### 18 AC POWER INPUT

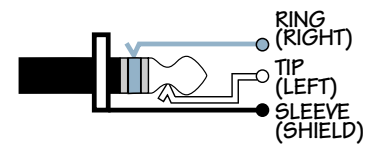
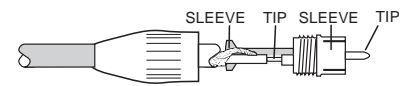
This IEC Socket is where you connect the supplied AC linecord to provide AC power to the CFX mixer. Plug the cord into a suitable AC outlet, properly grounded and capable of delivering adequate current.

If you happen to lose the AC linecord, replacements are available at any office/computer supply store.

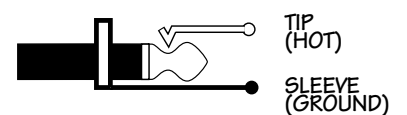
### 19 POWER SWITCH

### 20 POWER STATUS

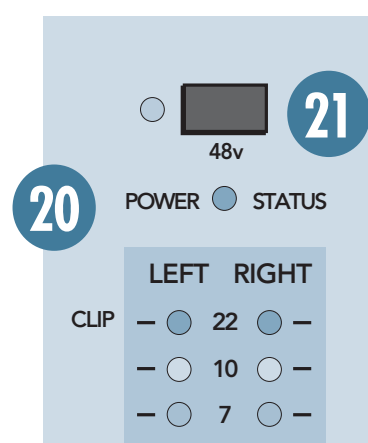
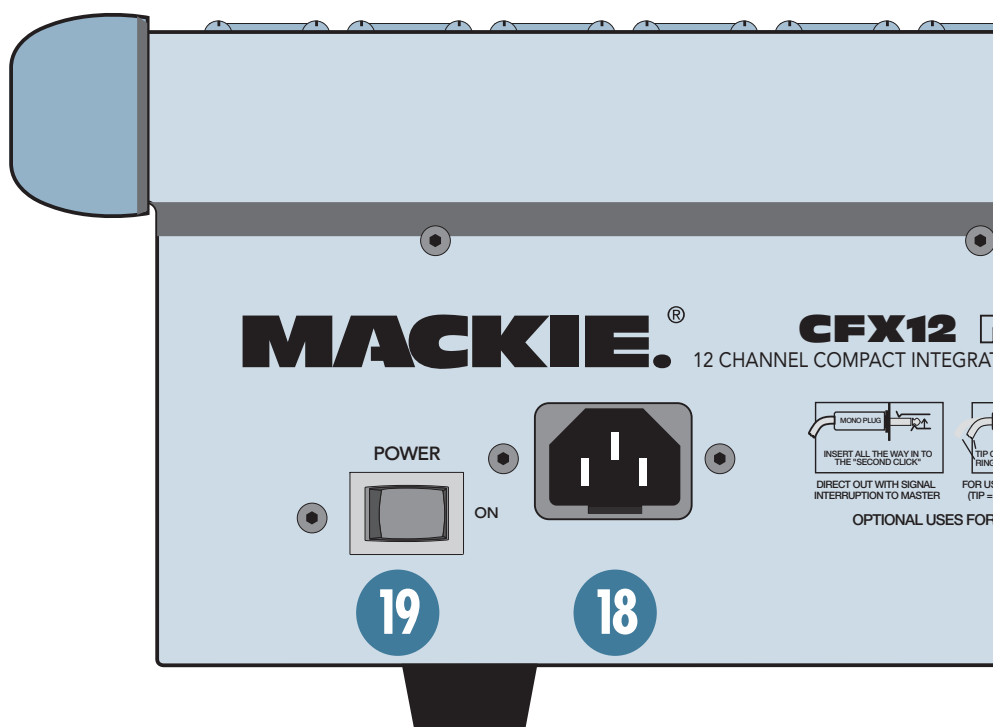
The **POWER** 19 switch is located on the rear panel, adjacent to the **AC Power Input** 18. Push the right side of the switch labeled "ON" to turn the mixer on; you should see the **POWER STATUS** 20 LED glow in confirmation. Press the left side of this switch to put the mixer into standby mode. It will not function, but the circuits are still live. To remove AC power, either turn off the AC mains supply, or unplug the power cord from the mixer and the AC mains supply.



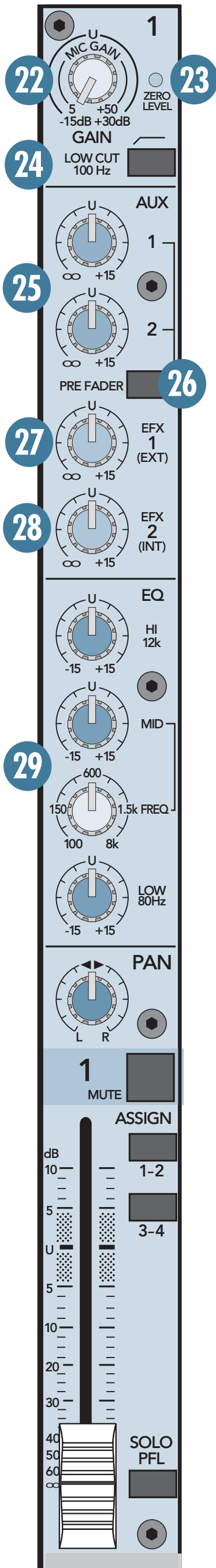
TRS HEADPHONE WIRING



TS FOOTSWITCH WIRING



# CHANNEL STRIP FEATURES



*Mono Channel*

## 21 PHANTOM POWER

Ha! We tricked you! The phantom power switch is not located in the channel strip section at all! It's way over on the right side of the mixer (see graphic on previous page). We're just mentioning it here since it applies to the channels; specifically, what type of microphones you have plugged into them.

Push in this switch to provide phantom power to the XLR MIC **1** input jacks. All of the XLR mic inputs are capable of providing phantom power. Phantom power is required to operate most condenser microphones (some condenser microphones are battery-powered). The CFX MKII mixers provide +48VDC phantom powering on pins 2 and 3 of the XLR connectors.

If you have dynamic, ribbon, or tube mics that do not require phantom power, leave the PHANTOM POWER switch out. If you are using both condenser and dynamic mics, don't worry. Phantom power will not hurt most dynamic mics. Check the microphone's user manual if you're not sure.



**Caution:** Turn all output levels down before operating this switch to avoid the possibility of a "pop" in your speakers.

Connecting an external line-level device to an XLR input connector with the phantom power switched on could damage the device. We recommend using the LINE IN **2** and STEREO LINE IN **4** jacks for connecting line-level signals.

## 22 GAIN

If you haven't already, please read the "SET THE LEVELS" portion of "QUICK START," on page 5.

GAIN adjusts the input sensitivity of the mic and line inputs connected to the channels, mono and stereo. This allows signals from the outside world to be adjusted to optimal internal operating levels.

If the signal originates through a mono channel's MIC **1** XLR jack, there will be 5 dB of gain with the knob fully down, ramping to 50 dB of gain fully up.

Through a mono channel's LINE IN **2** TRS input, there is 15 dB of attenuation fully down and 30 dB of gain fully up, with a "U" (unity gain) mark at 12:00 (knob halfway up).

Through a stereo channel's stereo LINE IN **4** TRS inputs, there is 20 dB of attenuation fully down and 20 dB of gain fully up, with a "U" (unity gain) mark at 12:00 (knob halfway up).

Having 20 dB of line-level attenuation can be very handy when you are injecting a signal that is very hot, when you want to add a lot of EQ boost, or both. Without this "virtual pad," it would be very difficult to control the signal and might lead to channel clipping.

## 23 ZERO LEVEL

This handy LED, which (we hope) you already read about in "QUICK START," is triggered to glow when it receives an audio signal at or above 0 dBu.

If the LED is glowing, as opposed to flickering, turn the GAIN **22** down. If the LED is doing almost nothing, turn the GAIN up.

For a more accurate method of setting gain levels, please see RUDE SOLO **37** (page 15), where a soloed signal will appear on the mixer's meters **36**.

## 24 LOW CUT

The LOW CUT switch, often referred to as a high pass filter (depends on how you look at it), cuts bass frequencies below 100 Hz at a rate of 18 dB per octave.

We recommend that you use LOW CUT on every microphone application except kick drum, bass guitar, or bass-heavy synth patches. LOW CUT can also help reduce the possibility of feedback in live situations and it helps to conserve amplifier power.

## 25 AUX

These knobs tap a portion of each channel signal and send it out, via the AUX SEND **10** jacks, to an external device for parallel effects processing or stage monitoring.

AUX levels are controlled by these AUX knobs and by the AUX MASTER SENDS **45**. These are more than mere effects and monitor sends: they can be used to generate separate mixes for recording or "mix-minuses" for broadcast.

Each AUX knob's level ranges from off through unity (the center detent position) on up to 15 dB of extra gain (fully clockwise).

The line-level stereo channels' AUX knobs control a mono sum of the channel's stereo signals. For instance, on the CFX20, channel 17 (L) and 18 (R) mix together to feed that channel's AUX send knobs.

## 26 PRE FADER

The aux send rule of thumb: For parallel effects processing, use aux sends in post-fader mode. For stage monitors, use pre-fader mode (see diagram below).

With this switch disengaged (up), **AUX 1** and **2** receive signals in post-fader mode: post-low cut, post-insert, post-EQ, post-mute, and POST-fader. Any changes made to the channel controls will affect the **AUX** signal.

With this switch engaged (down), **AUX 1** and **2** receive signals in pre-fader mode: post-low cut, post-insert, post-EQ, post-mute, and PRE-fader. Any changes made to the channel controls, EXCEPT the fader, will affect the **AUX** signal.

In pre-fader mode, you can take the drummer's vocals out of the main mix by turning his fader down, but since he still hears himself in the monitors, he's happy.

## 27 EFX 1 (EXT)

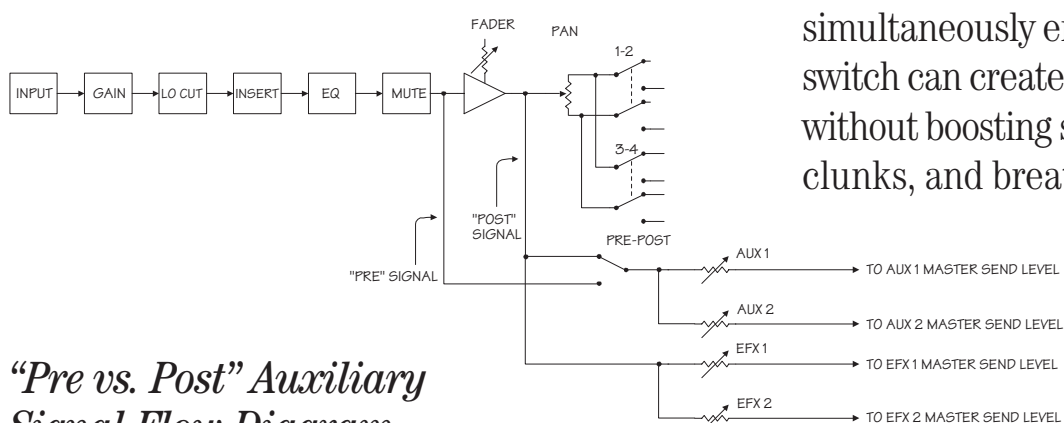
**EFX 1**, designed for feeding the inputs of parallel effects devices, behaves exactly like an **AUX 25** send, but it's always in post-fader mode: Any changes made to the channel controls will affect the **EFX** signal. The **PRE FADER 26** switch has no effect on the **EFX** sends.

## 28 EFX 2 (INT)

**EFX 2** is identical to **EFX 1** with one big difference: In addition to feeding the **EFX SEND 11** jacks, it also feeds the inputs to the **EMAC EFFECTS PROCESSOR 48**. If you're using **EMAC** and just one outboard processor, patch the outboard processor via **EFX RETURN 1**. You can use **EMAC** and an outboard device via **EFX 2**; just remember that the sends (**EFX 2 (INT) 28**, **EFX 2 SEND 49**) and returns (**TO MAIN MIX 50**) control two devices. The **PRE FADER 26** switch has no effect on the **EFX** sends; they're always post-fader.

## 29 EQ

The CFX MKII mixer has low shelving, mid peaking, and high shelving EQ. "Shelving" means that the circuitry boosts or cuts all frequencies past the specified frequency. For



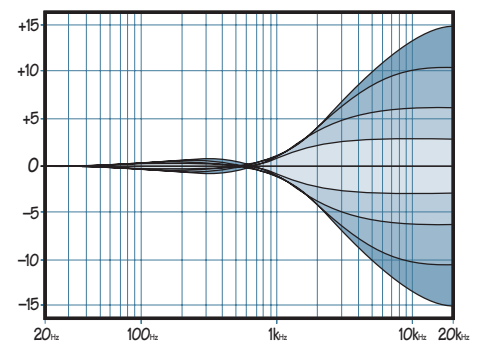
*"Pre vs. Post" Auxiliary Signal Flow Diagram*

example, boosting the **LOW EQ** knob boosts bass frequencies at 80 Hz and below. "Peaking" means that only a selected "hill" of frequencies surrounding a center "hilltop" frequency is affected by the EQ control.

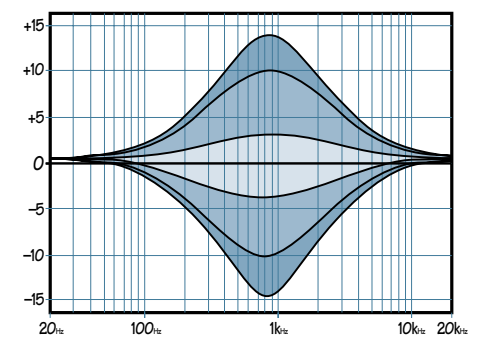
Everything in moderation (including moderation): with EQ, although you can bring a sound to life, you can also screw things up. If you max the EQs on every channel, you'll get mix mush, not to mention driving your mix levels near or beyond clipping. So equalize subtly; use the left sides of the knobs (cut) as well as the right (boost).

## HI EQ

This control provides up to 15 dB of boost or cut at 12 kHz and above, and it is also flat at the detent. Use it to add sizzle to cymbals or an overall sense of transparency or edge to keyboards, vocals, guitar, and bacon frying. Turn it down a little to reduce sibilance or hide hiss.



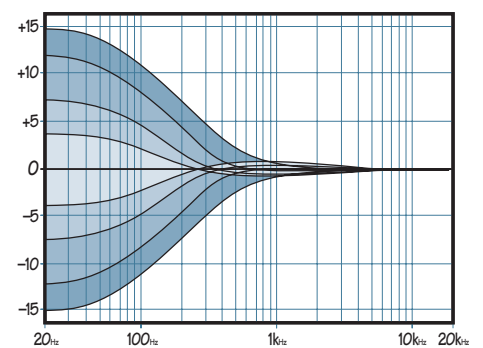
*Hi EQ*



*Mid EQ*

## MID EQ

Short for "midrange," this knob provides 15 dB of boost or cut, also flat at the center detent. Midrange EQ is often considered the most dynamic, because the frequencies that define any particular sound are almost always found in this range. You can create as many interesting and useful EQ changes by turning this knob down as well as up.



*Low EQ*

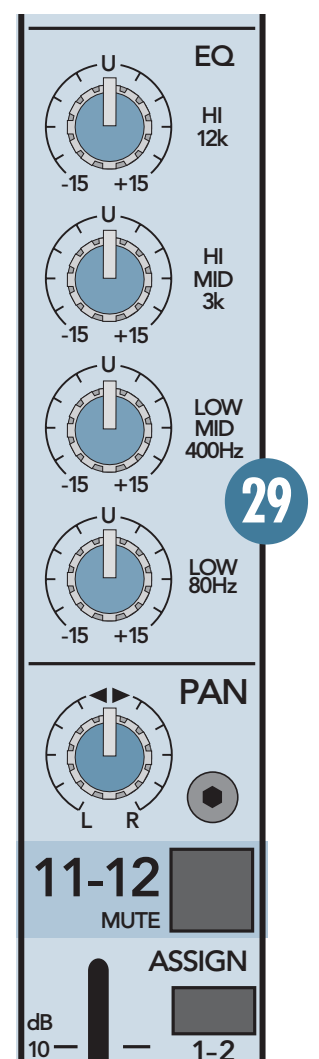
The mono channels employ a semi-parametric mid-sweep EQ. In addition to being able to set the amount of boost, you can "aim" that boost at a specific frequency; anywhere from 100 Hz to 8 kHz.

The stereo channels employ a 2-stage fixed-frequency **MID EQ**. **HI-MID** is centered at 3 kHz; **LOW-MID** is centered at 400 Hz.

## LOW EQ

This control provides up to 15 dB of boost or cut at 80 Hz and below. The circuit is flat (no boost or cut) at the center detent position. This frequency represents the punch in bass drums, bass guitar, fat synth patches, and high-testosterone male singers.

When adding boost to the channel's low EQ, simultaneously engaging the **LOW CUT 24** switch can create an audible low frequency boost without boosting stage rumble, mic handling clunks, and breath pops.



*Stereo Channel*

### 30 PAN

PAN adjusts the amount of channel signal sent, left versus right, to the SUB OUTs 9 (and ultimately the MAIN OUTs 5 via the SUB ASSIGN 44 switches). On mono channels, the knob places the signal somewhere between hard left and hard right. On stereo channels, it works like the balance control on your home stereo, by attenuating one side or the other.

With the PAN knob hard left, the signal will feed SUB 1 and SUB 3 (assuming the channel's ASSIGN 32 switches are engaged).

With the PAN knob hard right, the signal will feed SUB 2 and SUB 4 (assuming the channel's ASSIGN 32 switches are engaged).

With the PAN knob set somewhere in between, the signal will be shared across both sides of the mix.

### 31 MUTE

When you engage a channel's mute switch, its signal disappears from these outputs: MAIN OUT 5, MAIN INSERT 7, SUB OUT 1-4 9, AUX SEND 1 & 2 10, EFX SEND 1 & 2 11 (including the send to the EMAC EFFECTS PROCESSOR 48). The only thing it doesn't mute is the channel's SOLO PFL 34 switch, so you can audition channels, via headphones, without sending them to the main mix.

### 32 ASSIGN

Used in conjunction with the PAN 30 knob, ASSIGN determines the final destination of a channel's signal. Engaging ASSIGN 1-2, for instance, sends that channel's signal to the SUB 1 and 2 Faders 43 and, via their SUB ASSIGN 44 switches, the MAIN MIX Fader 35.

Typically, ASSIGN 1-2 will be engaged on all channels destined for the main mix. By configuring SUB 1 and 2 to feed the main mix, the channel ASSIGN 1-2 switches become the equivalent of being "Main Mix" switches.

Some channels can use ASSIGN 3-4 instead; creating a submix for a set of channels (all the drum channels, for instance). Then, by configuring SUB 3 and 4 to also feed the main mix, you can "ride" the SUB 3 and 4 Faders 43 independently of the rest of the mix.

SUB Faders 43, SUB ASSIGN 44, and MAIN MIX Fader 35 will explain this further.

### 33 FADER

Although the most self-explanatory item on a mixer, we'll explain it anyway: The fader is the master level control for the channel's sig-

nal. Subtle adjustment of the channels' fader positions is the key to a finely-tuned mix.

Typically (providing the GAIN 22 knob is set correctly) the fader position will be positioned somewhere between 0 dB ("U") and -30 dB.

If you have a fader set all the way up, adding 10 dB of gain, that's usually a sign that your GAIN 22 knob is set too low. Conversely, if the fader is set way down, your GAIN may be set too high.



#### "U" LIKE UNITY GAIN

Mackie mixers have a "U" symbol on almost every level control. This "U" stands for "unity gain," meaning no change in signal level. Once

you have adjusted the input signal to line-level, you can set every control at "U" and your signals will travel through the mixer at optimal levels. What's more, all the labels on our level controls are measured in decibels (dB), so you'll know what you're doing level-wise if you choose to change a control's settings.

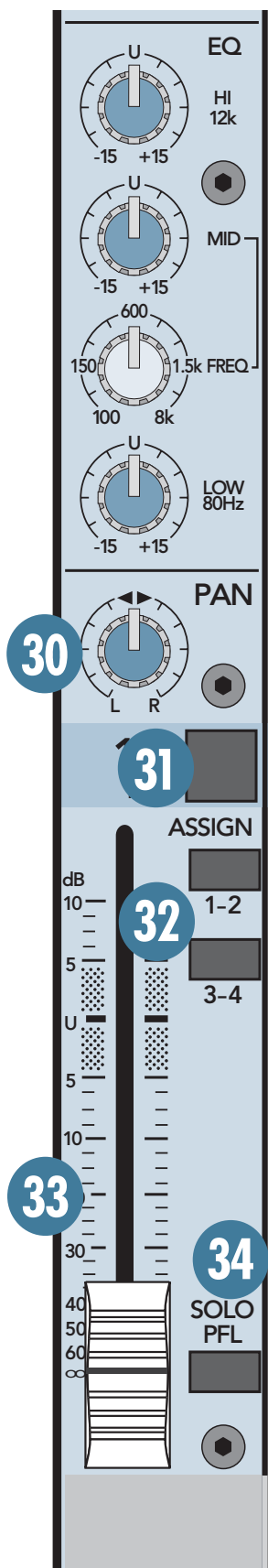
### 34 SOLO PFL

Engaging a channel's SOLO switch causes this dramatic turn of events: The PHONES 15 and Meters 36, which ordinarily receive the main mix signals, instead receive the SOLO PFL signal. PFL, being a mono signal, is sent to both sides of the PHONES outputs and to the LEFT meter. Additionally, the RUDE SOLO 37 LED flashes obnoxiously to remind you that "you're in solo."

The SOLO PFL signal is tapped before the channel's MUTE 31 and Fader 33 controls. It does, however, follow GAIN 22, LOW CUT 24, and EQ 29 settings, making it the perfect tool for quick inspections of individual or multiple channels. The channel's PAN 30, MUTE 31 and Fader 33 settings have no effect on the SOLO signal. See RUDE SOLO 37 for more information.



**WARNING:** Pre-fader SOLO taps the channel signal before the fader 33. If you have a channel's fader set well below "U" (unity gain), SOLO won't know that and will send a unity gain signal to the PHONES 15 output. That may result in a startling level boost in your headphones.



# MASTER SECTION FEATURES

We hope you've understood, if not memorized, the CHANNEL STRIP FEATURES you just read. If you're still confused, please look them over again before you tackle this section. Don't worry, it's easy to swallow as long as you take it a bite at a time.

## 35 MAIN MIX FADER

As the name implies, this stereo fader controls the levels of signals sent to the main outputs: XLR and TRS MAIN OUT **5**. The TAPE OUTPUT **14** RCA jacks also receive the main mix, but before the MAIN MIX Fader.

Signals feeding the MAIN MIX Fader, after passing through the STEREO GRAPHIC EQ **38**, include: SUB ASSIGN **44**, MAIN INSERT **7**, STEREO EFX RETURN 1 and 2 **12** (including the EMAC EFFECTS PROCESSOR **48**), and TAPE INPUT **13**. All assigned SUB Faders **43** and EFX RETURNS **47** **50** that are not turned fully down will appear in the MAIN MIX.

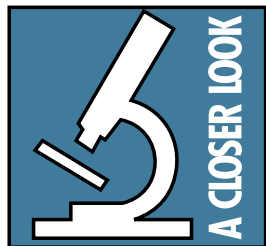
The fader, set fully up, provides 10 dB of gain. A "U" unity gain point is just below that. When set fully down, the main mix is effectively muted. This is the fader to pull down at the end of the song when you want The Great Fade-Out.

## 36 METERS

The CFX mixer's peak metering system is made up of two columns of twelve LEDs each, with thresholds ranging from -30 dB up to "CLIP" (+22 dBu at the TRS MAIN OUT **5**, +28 dBu at the XLR MAIN OUT). The meters display the main mix, post MAIN MIX Fader **35**, unless a SOLO PFL **34** switch is engaged.

When a SOLO PFL **34** switch is engaged, the meters will instead display the solo information, at unity gain (pre channel fader **33**). Why, you ask? The meters, being a tool for the engineer, must display what the engineer is listening to via the PHONES **15** output.

You can get a good mix with the meter's peaks flashing anywhere between -20 and +10 dB. Most amplifiers clip at about +10 dB, and some recorders aren't so forgiving either. For best real-world results, try to keep your peaks between "0" and "+7."



A CLOSER LOOK

You may already be familiar with "+4" (+4 dBu=1.23V) and "-10" (-10 dBV=0.32V) operating levels. Basically, what determines the operating level is the relative 0 dB VU (or 0VU) chosen for the meters.

A "+4" mixer, with a +4 dBu signal pouring out the back, will actually display 0 dB on its meters. A "-10" mixer, with a -10 dBV signal trickling out, will also display 0 dB. So ... when is 0 dB actually 0 dB? Right now!

At the risk of creating another standard, Mackie's compact mixers address the need of both crowds by calling things as they are: 0 dBu (0.775V) at the output shows as 0 dB VU on the meters. What could be easier? (By the way, the most wonderful thing about standards is that there are so many to choose from.)

## 37 RUDE SOLO

This infamous flashing LED (Light Emitting Diode) serves two purposes — to remind you that at least one SOLO PFL **34** switch is engaged, and to let you know that you're mixing on a Mackie.

Engaging a SOLO PFL **34** switch affects these features: PHONES **15** and Meters **36**. No other outputs are affected in any way.

Although the "SET THE LEVELS" section of "QUICK START" (page 5) will get your level-setting tasks accomplished, using the meters **36** in PFL SOLO mode lets you really tune in. Instead of one flickering LED, you can make use of the 12-segment VU display in the meters. How? Just engage a SOLO PFL **34** switch and watch the meters.



VERY IMPORTANT

**WARNING:** SOLO is pre-fader and taps the channel signal before the fader **33**. If you have a channel's fader set well below "U" (unity gain), SOLO won't know that and will send a unity gain signal to the PHONES **15** output. That may result in a startling level boost in your headphones.

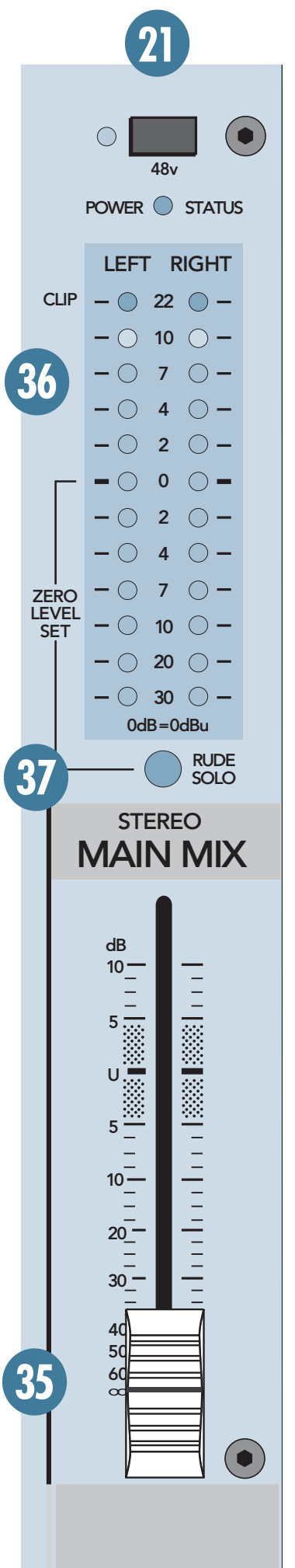
## 38 STEREO GRAPHIC EQ

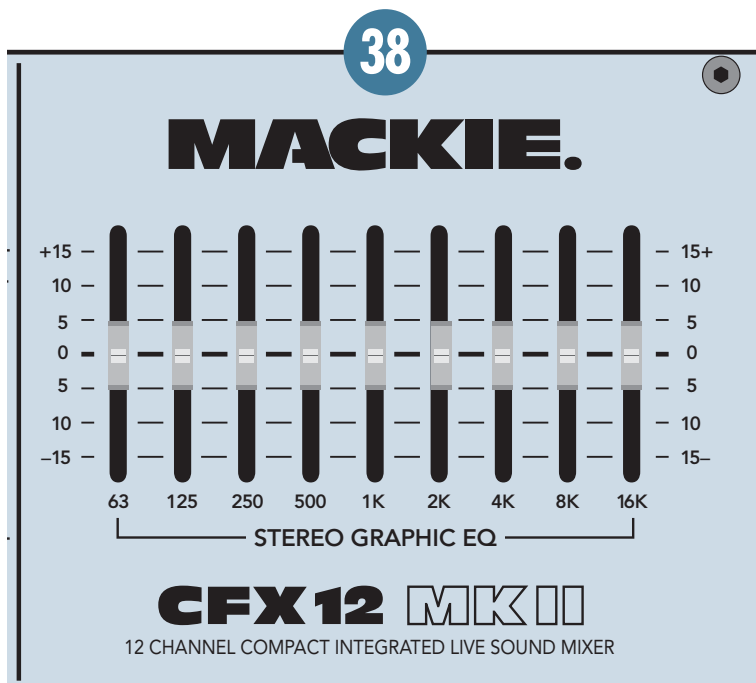
This equalizer, used to shape the frequency spectrum of the main mix, is the last thing in the chain prior to the MAIN MIX Fader **35** and MAIN OUT **5** XLR and TRS jacks.

Although there is no actual bypass switch for the STEREO GRAPHIC EQ, by setting all the sliders to zero (center) you'll effectively remove it from the signal path.

*How to find and reduce feedback:*

1. Set the GRAPHIC EQ sliders to zero (center).
2. Set the GAIN **22** levels, using the ZERO LEVEL **23** or SOLO PFL **34**.





jacks and engage the **BREAK SWITCH**. Instantly, the entire main mix is switched off and the intermission entertainment is switched on.

Even if you just want silence during the breaks, this switch can act as a “Master Mute” switch, simply by plugging nothing into **TAPE INPUT 13**.

### 41 PHONES LEVEL

After the **MAIN MIX Fader 35**, the mix is sent through this knob, allowing you to set headphone levels as desired without disturbing the main mix level.

When a channel’s **SOLO PFL 34** is engaged, the main mix will be replaced by the solo signal, allowing the engineer to audition channels without disturbing the main mix.

The stereo **PHONES jack 15** can drive any standard headphones to very loud levels. Walk-person-type phones can also be used with an appropriate adapter.

**Note:** Please see the “Safety Instructions” on page 2 for information on hearing protection.

### 42 UTILITY OUT LEVEL

After the **MAIN MIX Fader 35**, the mix is sent through this knob, allowing you to set the levels at the **UTILITY OUT 8** as desired without disturbing the main mix level.

### 43 SUB FADERS

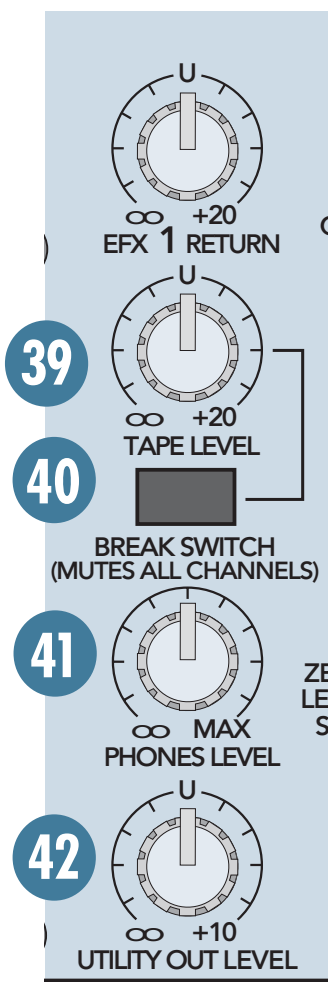
The typical exit for channel signals is through one or more sub mixes. The sub mix signal is first controlled by this fader, which provides 10 dB of gain fully up, unity gain at the “U” mark, and is effectively muted fully down.

From here, the signal goes to two very different locations: **SUB OUT 9** sends the sub mix directly out of the mixer via its TRS jacks; and **SUB ASSIGN 44** sends it to the **MAIN MIX Fader 35**.

### 44 LEFT/RIGHT SUB ASSIGN

As discussed in **ASSIGN 32**, the only way to get channel outputs to the main mix is via the sub mixes, and this switch is the key.

Continuing the assumption made in **ASSIGN 32**, Subs 1 and 2 are the left-right stereo path from the channels to **SUB Faders 43** 1 and 2, with **SUB 1** carrying the left signal and **SUB 2** carrying the right. Engage **SUB 1 ASSIGN LEFT** and **SUB 2 ASSIGN RIGHT**, and you’re done. Take a look at the block diagram on page 22 — it’ll explain this and more, but in hieroglyphics.



3. Slowly turn up the **MAIN MIX Fader 35** until feedback just begins to occur. **BE CAREFUL!** Feedback can occur quickly and become very **LOUD**, very fast.

4. Cut the appropriate slider until feedback stops.

#### Suggestions for better sound:

- For better vocal sound, set the 125, 250, and 16K sliders to +5.
- **Note:** Make sure the singer is within 3 to 6 inches of the microphone. No amount of EQ can save a wandering minstrel.
- For more presence, set the 4K and 8K sliders to +5.
- To warm up the overall sound, set the 2K slider to -5.
- **REMEMBER, LESS IS BETTER.**

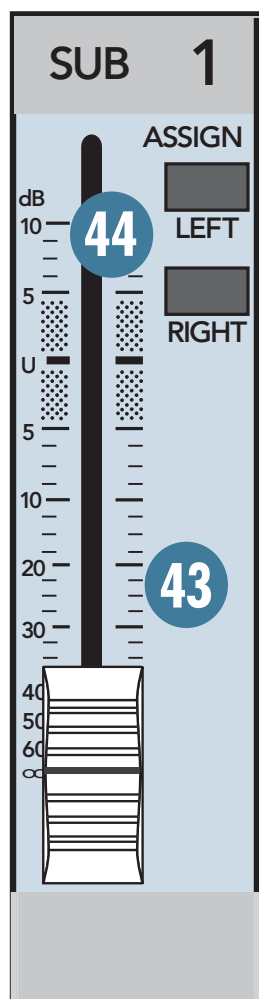
### 39 TAPE LEVEL

You can adjust the incoming level of your intermission entertainment, independent of the main mix level controls, via this feature. Here’s how: Patch the stereo device into the **TAPE INPUT 13**. Put the device in play. Engage the **BREAK SWITCH 40** and set the **TAPE LEVEL 39** knob as desired. Assuming the **MAIN MIX Fader 35** is set, you should hear the device.

### 40 BREAK SWITCH

No, when we say **BREAK SWITCH**, we’re not asking you to break the switch, we’re offering you a very handy feature. When it’s time for the talent to take a break, the engineer usually wants to stretch his legs. But walking away from a live mixer in a crowded club can be somewhat unnerving — what if some goon starts dinking around with the faders?

No problem. Just plug in your intermission entertainment device to the **TAPE INPUT 13**





## 45 AUX MASTER SEND

Aux send signals are derived by each channel's **AUX** 25 knob, mixed together, then sent through this **AUX MASTER SEND** knob. Turned fully up, it provides 15 dB of additional gain, the center "U" mark is unity gain, and fully down is off.

Typically, when the talent (or lack thereof) wants a louder monitor mix, this is the knob to crank up — watch out for feedback!

## 46 EFX 1 MASTER SEND

Effects send signals are derived by each channel's **EFX 1 (EXT)** 27 knob, mixed together, then sent through this **EFX 1 MASTER SEND** knob. Turned fully up, it provides 15 dB of additional gain, the center "U" mark is unity gain, and fully down is off.

Being that this controls only post-fader sends destined for outboard effects devices, you'll typically set this knob near the "U" mark and then leave it alone.

## 47 EFX 1 RETURN

Stereo signals come through the **EFX 1 RETURN** and continue on to the **MAIN MIX Fader** 35. They contain the effects' "wet" signals to be mixed together with the channels' "dry" original signals. Turned fully up, it provides 15 dB of additional gain, the center "U" mark is unity gain, and fully down is off.

Being that this controls only the return signals of external effects, with their levels already determined by the channels' **EFX 1 (EXT)** 27 knob, you'll typically set this knob near the "U" mark and then leave it alone.

## 48 EMAC EFFECTS PROCESSOR

FOR THE IMPATIENT:

Set **EFX 2 SEND** 49 and **TO MAIN MIX** 50 at the center "U" mark. Assuming you have your basic mix up and running, turn up the **EFX 2 (INT)** 28, per channel. This feeds in individual amounts of channel signals to the **EMAC** inputs — you should be hearing the effects as you do this.

Next, goof around with the various parameters: **Preset Select** 52

, **TIME/RATE** 53, **DAMPING/DEPTH** 54 and **WIDE** 55. When you find an effect you like, jot down the parameters, then goof around some more.

To mute these effects, engage **BYPASS** 56 (or your foot switch if connected to **EFX FOOT SWITCH** 16). To send these effects to the stage monitor cues, turn up the **EFFECTS TO MONITOR** 51 knobs.

FOR THE CURIOUS:

**EMAC™** stands for **Extended Multiply and Accumulate**, which is a proprietary 32-bit digital stereo processor developed by our Digital Engineering Group. It provides 16 preset digital effects algorithms for you to select. In addition to the presets, there are two parameter controls (53 54) you can adjust to change the sound and make it unique for your particular application.

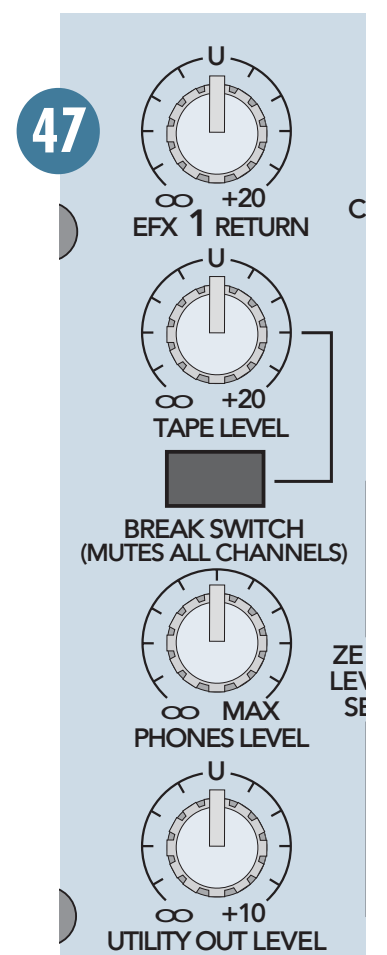
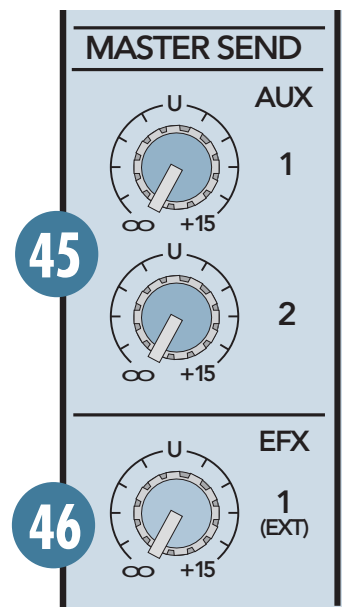
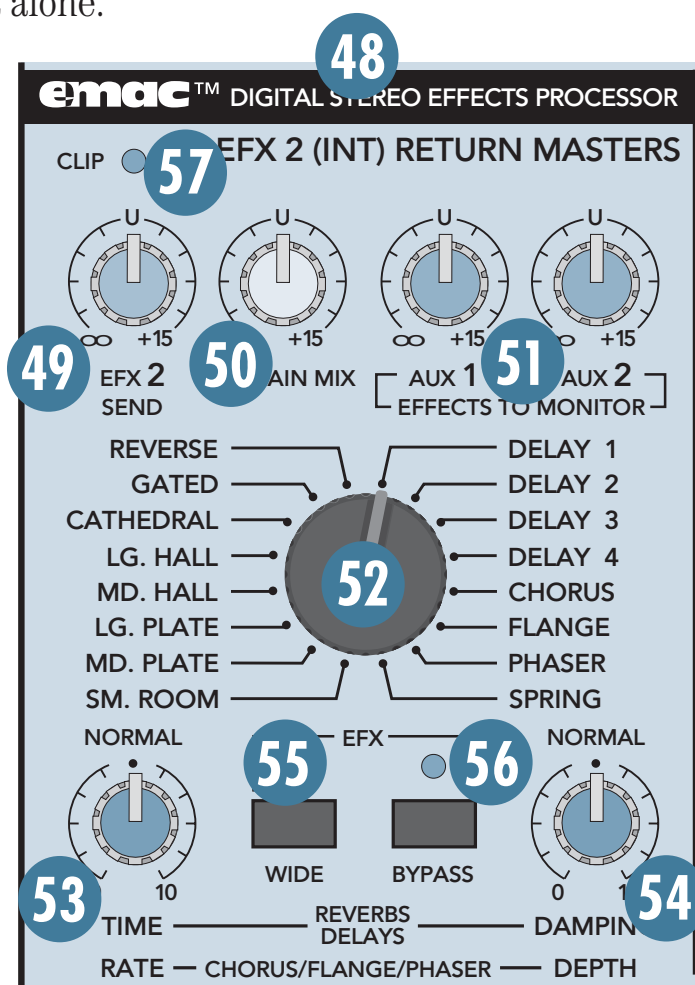
## 49 EFX 2 SEND

This controls the signal level being sent to the input of the **EMAC** module (and to the **EFX SEND 2** 11 jack). Use the **EFX 2 (INT)** 28 controls on the individual channels to adjust the amount of each channel's signal you want to go to the **EMAC**. Leave **EFX 2 SEND** set at the center "U" position. If you find that you're not getting enough of the effect in the main mix, make sure that the **TO MAIN MIX** 50 control is turned up at least to unity (the center detent position). It's okay to turn up the **EFX 2 SEND** some more if you need to. Just make sure the **ZERO LEVEL** 57 LED never lights more than occasionally. Read on to find out why.

## 50 TO MAIN MIX

Stereo signals (from **STEREO EFX RETURN 2** 12 and **EMAC EFFECTS PROCESSOR** 48) come through this **TO MAIN MIX** knob and continue on to the **MAIN MIX Fader** 35. They contain the effects' "wet" signals and are mixed together with the channels' "dry" original signals. Turned fully up, it provides 15 dB of additional gain, the center "U" mark is unity gain, and fully down is off.

Being that this controls only the return signals of external and



EMAC effects, with their levels already determined by the channels' EFX 2 (EXT) knob, you'll typically set this knob near the "U" mark and then leave it alone.

## 51 EFFECTS TO MONITOR

This works just like the channel AUX 25 knobs, but here, the source signal is the EFX 2 RETURN and the EMAC output. Typically, this knob is used to add effects to the stage monitors.

Turned fully up, it provides 15 dB of additional gain, the center "U" mark is unity gain, and fully down is off.

## 52 PRESET SELECT

Rotate this detented switch to select the preset effect you want to use.

### Preset Effects Descriptions

#### Reverbs

The reverbs are designed to provide a wide variety of reverb sounds for vocal and instrument applications. In the following description, *tail* refers to the reflections that follow the initial sound event, also referred to as *decay range*. *Pre-delay* is the amount of time between the initial sound event and the first reflection.

**TIME/RATE** 53 controls the length of the tail, with the shortest tail at the 0 position and the longest tail at 10. **DAMPING/DEPTH** 54 controls the damping, with the darkest tone at 0 and the brightest tone at 10. The **WIDE** 55 switch is very effective at increasing the stereo image of the reverb effect.

**REVERSE**: Standard reverse reverb, simulating a tail-first effect increasing to the original note. Decay range is adjustable from 35 ms to 515 ms. No pre-delay.

**GATED**: Standard gated reverb, where the reverb tail is cut off sharply after the preset decay length. Decay range is adjustable from 35 ms to 515 ms. No pre-delay.

**CATHEDRAL**: Dense, smooth reverb with very long tail, long pre-delay, and late reflections. Tails are very warm with some additional high-end reflections imitating the stone walls of a

cathedral. A very dramatic effect that works well with wind instruments such as flute, slow finger picking on acoustic guitar, and quiet vocal group harmony and choirs. Also works well with keyboards and drums using short decay. Decay range is adjustable from 2 seconds to 10 seconds. Pre-delay set at 75 ms.

**LG. HALL**: Dense, smooth reverb with long tail, long pre-delay, and some early reflections. Tails are warm with more apparent high end. Works well with vocals and electric and acoustic guitar. Decay range is adjustable from 1 second to 5 seconds. Pre-delay set at 75 ms.

**MD. HALL**: Dense, smooth reverb with normal tail, normal pre-delay, and increased early reflections. Tails are warm with more apparent high end. Works well with vocals and electric and acoustic guitar. Decay range is adjustable from 750 ms to 2.5 seconds. Pre-delay set at 65ms.

**LG. PLATE**: Good early reflections and no pre-delay. Tails are normal and warm with strong high end for increased presence. Perfect for vocals and snare. Decay range is adjustable from 1 second to 5 seconds. No pre-delay.

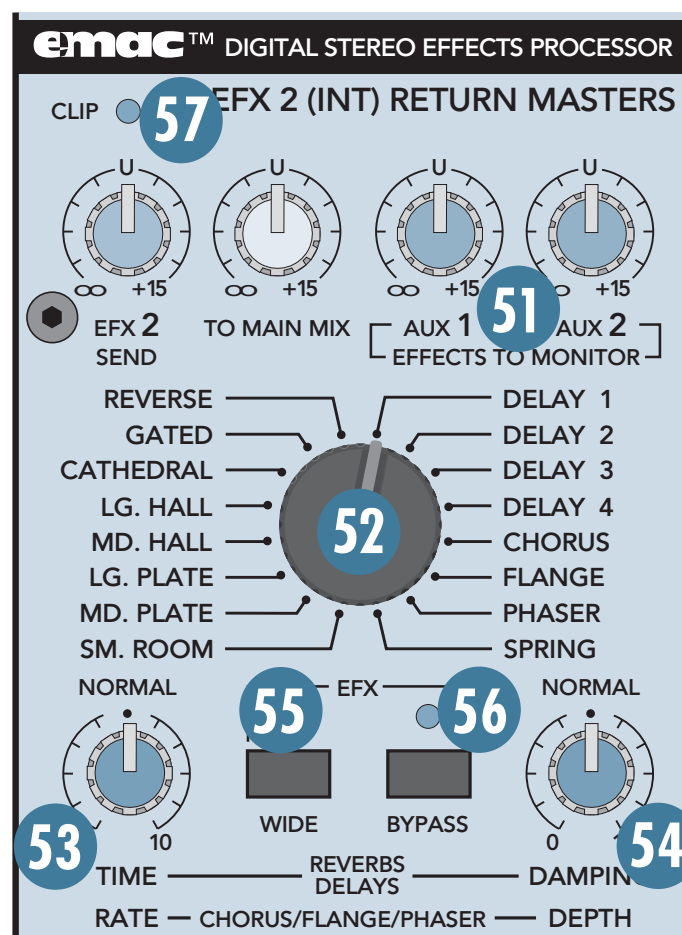
**MD. PLATE**: Good early reflections and no pre-delay. Tails are short and warm with strong high end for increased presence. Perfect for tight vocals and snare. Decay range is adjustable from 750 ms to 2.5 seconds. No pre-delay.

**SM. ROOM**: Reverb featuring very fast and scattered early reflections with a short pre-delay. Tails are very short and warm with normal high-end imitating absorbent wall materials and audience. Good for tight vocal effects. Decay range is adjustable from 250 ms to 1 second. Pre-delay set at 30 ms.

**SPRING**: Mimics the vintage 60's-style wet spring reverb effect. Tails are normal with strong high end and a slight waver imitating the slow flutter of the mechanical spring system. Very good with acoustic guitar. Decay range is adjustable from 1 second to 5 seconds. No pre-delay.

#### Delays

There are four delays available with one, two, three, and four repeats. **TIME/RATE** 53 controls the time between repeats, with the fastest repeats at the 0 position and the



slowest repeats at 10. **DAMPING/DEPTH** **54** controls the damping, with the darkest tone at 0 and the brightest tone at 10. Since the delay effect is not stereo, it is not affected by the **WIDE** **55** switch.

**DELAY 1:** One repeat. Works best for slap-back delay used in country and swing guitar, and for rockabilly and some country vocals. Delay range is adjustable from 5 ms to 524 ms.

**DELAY 2:** Two repeats. Provides a fuller, more dramatic effect for rock and gospel vocals, acoustic guitar, and wind instruments such as flute. Especially effective for some finger-picking styles. Delay range is adjustable from 5 ms to 524 ms.

**DELAY 3:** Three repeats. An excellent delay for slow, bluesy vocals and melodic flute music. This delay usually works best when the channel **EFX** send is set at less than halfway. Delay range is adjustable from 5 ms to 524 ms.

**DELAY 4:** Four repeats. This is for very dramatic delay effects, particularly for enhancing long vocal notes and dramatic instrumental note-chopping effects. Be sure to set the channel **EFX** send at about halfway. Delay range is adjustable from 5 ms to 524 ms.

### Modulation Effects

These include Chorus, Flange, and Phaser, and are generally used for enhancement of instrumental music. However, Chorus adds a dramatic effect to vocals as well. The **WIDE** **55** switch is very effective at dramatically increasing the strength and thickness of a modulation effect. For example, using **WIDE** on Chorus mimics a multi-voiced chorus effect.

**TIME/RATE** **53** controls the effect Rate, which is the speed of the sweeping effect. Fully counter-clockwise produces the slowest sweeps and fully clockwise produces the fastest. **DAMPING/DEPTH** **54** controls the effect depth, which is the strength of the sweeping effect. Fully counter-clockwise produces the lightest sweeping effect and fully clockwise produces the thickest.

**CHORUS:** Provides a soft, ethereal sweeping effect. Perfect for enhancement of electric and acoustic guitar and bass. Also adds a dramatic effect to vocals, particularly group harmonies and choirs. The channel's **EFX 2 (INT)** **28** should be set halfway or higher. Rate is adjustable from 0.5 Hz to 30 Hz. Depth is adjustable from 0% to 100%.

**FLANGE:** Creates a strong sweeping effect, particularly effective on rock electric guitar, lead and rhythm. The channel's **EFX 2 (INT)** **28**

should be set halfway or higher. Rate is adjustable from 0.5 Hz to 20 Hz. Depth is adjustable from 0% to 100%.

**PHASER:** This effect is perfect for enhancing strummed acoustic guitar or electric guitar power chords. The **PHASER** effectively duplicates the popular 70's phase shift effect used for guitar. Rate is adjustable from 0.5 Hz to 35 Hz. Depth is adjustable from 50% to 100%.

### **53** TIME/RATE

If you have a reverb effect selected, this control adjusts how long the reverberation lasts, with 0 being a short reverb time and 10 being the longest.

If you have a delay effect selected, this adjusts the amount of time between the original signal and the delayed signal, with 0 being a short delay time and 10 being the longest delay time.

If you have a chorus, flange, or phaser effect selected, this control adjusts the rate or speed of the modulation of the effect.

### **54** DAMPING/DEPTH

If you have a reverb or delay effect selected, this control adjusts how fast the higher frequencies roll off in the reverberation or delay, with 0 having little roll off and 10 having the most roll off.

If you have a chorus, flange, or phaser effect selected, this control adjusts the depth of the modulation of the effect.

### **55** WIDE

Depending on the effect selected, this switch adds more width or depth to the effect. Note that it doesn't work with the **DELAY** and **PHASER** effects because they are monophonic.

### **56** BYPASS

Pushing in this button causes the adjacent **EFX BYPASS** indicator to light and mutes the effects' output signal. It affects only the internal **EMAC** effects, not any external effects processor you may have connected to the **STEREO EFX RETURN 2** **12** jack.

### **57** CLIP

This indicates when the **EMAC** is 6 dB below clipping. Just like the channels' **ZERO LEVEL** **23** LED, this LED should only light occasionally. If it blinks frequently, you should turn down **EFX 2 SEND** **49** a little.

# GENERAL PRECAUTIONS AND CONSIDERATIONS



NEVER bypass the AC plug's ground pin. This is dangerous!

## AC Power Distribution

The majority of AC outlets encountered in homes and clubs (in the U.S.) are served by a 240VAC center-tapped service entrance transformer. This provides two phases of AC power on either side of the center tap, at 120V each.

If lighting is used in a show, it is preferable to power the lights from one leg of the service, and power the audio equipment from the other leg. This will help minimize noise from the lights coupling into the audio (particularly if SCRs, or light-dimmer switches, are used).

In order to minimize ground loops, the safety grounds for all the outlets should be connected to a common ("star") grounding point, and the distance between the outlets and the common grounding point should be as short as possible.

When setting up for a show, oftentimes you are plugging into an AC power distribution system you know nothing about. You may even be faced with 2-wire outlets that are missing the third safety ground pin. It's a good idea to have a three-wire AC outlet tester in your toolbox so you can check the outlets yourself to make sure they are wired correctly. These testers will tell you if the polarity of the hot and neutral wires is reversed and if the safety ground is disconnected. Don't use an outlet if it is wired improperly! This is to protect yourself as well as your equipment.

If you find that you must plug into a two-wire outlet, you will need to use a two-wire to three-wire adapter (cheater plug). These come with a metal tab that you put underneath the center screw that holds the AC outlet faceplate in place. This center screw *must* be grounded. You can check it by connecting the adapter to the outlet and then plugging in your handy-dandy AC outlet tester.

## APPENDIX A: Service Info

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/support](http://www.mackie.com/support)) where you will find lots of useful information such as FAQs and other documentation. You may find the answer to the problem without having to send your Mackie product away.

### Troubleshooting

#### Bad Channel

- Is the ASSIGN **32** switch set correctly?
- Is the channel Fader **33** turned up?
- On mono channels, try unplugging any INSERT devices.
- Try the same source signal in another channel, set up exactly like the suspect channel.

#### Bad Output

- Are the SUB ASSIGN **44** switches set correctly?

- Are the MAIN MIX Fader **35** and SUB Faders **43** turned up?
- If it's one of the MAIN OUTs **5**, try unplugging all the others. For example, if it's a TRS MAIN OUT, unplug the associated XLR outputs. If the problem goes away, it's not the mixer.
- If it's a stereo pair, try switching them around. For example, if a left output is presumed dead, switch the left and right cords, at the mixer end. If the left speaker is still dead, it's not the mixer.

#### Noise

- Turn the channel Faders **33**, EFX 1 RETURN **47** and EFX 2 SEND **49** down, one by one. If the sound disappears, it's either that channel or whatever is plugged into it, so unplug whatever that is. If the noise disappears, it's from your whatever.

#### Power

- Our favorite question: Is the POWER switch on?

## Repair

For warranty service, refer to the warranty information on page 22.

Non-warranty service for Mackie products is available at a factory-authorized service center. To locate your nearest service center, visit [www.mackie.com](http://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, 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: Technical Info

## Specifications CFX12, CFX16, CFX20 MKII

### Mixer Section

#### Frequency Response

---

Mic Input to any Output (Gain at 0 dB):  
+0, -1 dB, 32 Hz to 20 kHz

#### Distortion

##### THD and SMPTE IMD; 20 Hz to 20 kHz

---

Mic Input to Main Output:  
< 0.05% @ +4 dBu output

#### Noise

##### 20 Hz to 20 kHz BW (150Ω source impedance)

---

Equivalent Input Noise (EIN):  
-127 dBu

Residual Output Noise:  
Main, Monitor, and Effects outputs  
Channel & Master levels off  
-95 dBu

#### Common Mode Rejection Ratio (CMRR)

---

60 dB @ 1 kHz, Gain @ 0 dB

#### Crosstalk

---

Adjacent Inputs or Input to Output:  
-90 dB @ 1 kHz

Fader Off  
-90 dB @ 1 kHz

Mute Switch and Break Switch Mute  
-80 dB @ 1 kHz

#### Input Gain Control Range

---

Mono Channels	
Mic In:	+5 dB to +50 dB
Line In:	-15 to +30 dB
Stereo Channels	
Line In:	-20 to +20 dB

#### Phantom Power

---

+48V DC

#### Equalization

---

Low Cut:	100Hz, -18 dB/octave
Mono Channel EQ:	
High	±15 dB @ 12 kHz
Mid	±15 dB @ 100 Hz to 8 kHz
Low	±15 dB @ 80 Hz
Stereo Channel EQ:	
High	±15 dB @ 12 kHz
High Mid	±15 dB @ 3 kHz
Low Mid	±15 dB @ 400 Hz
Low	±15 dB @ 80 Hz
Graphic EQ (9 bands):	
Q = 1.414, ISO octave centers	
±15 dB @ 63, 125, 250, 500, 1k, 2k, 4k, 8k, 16k Hz	

#### Mixer Rated Output

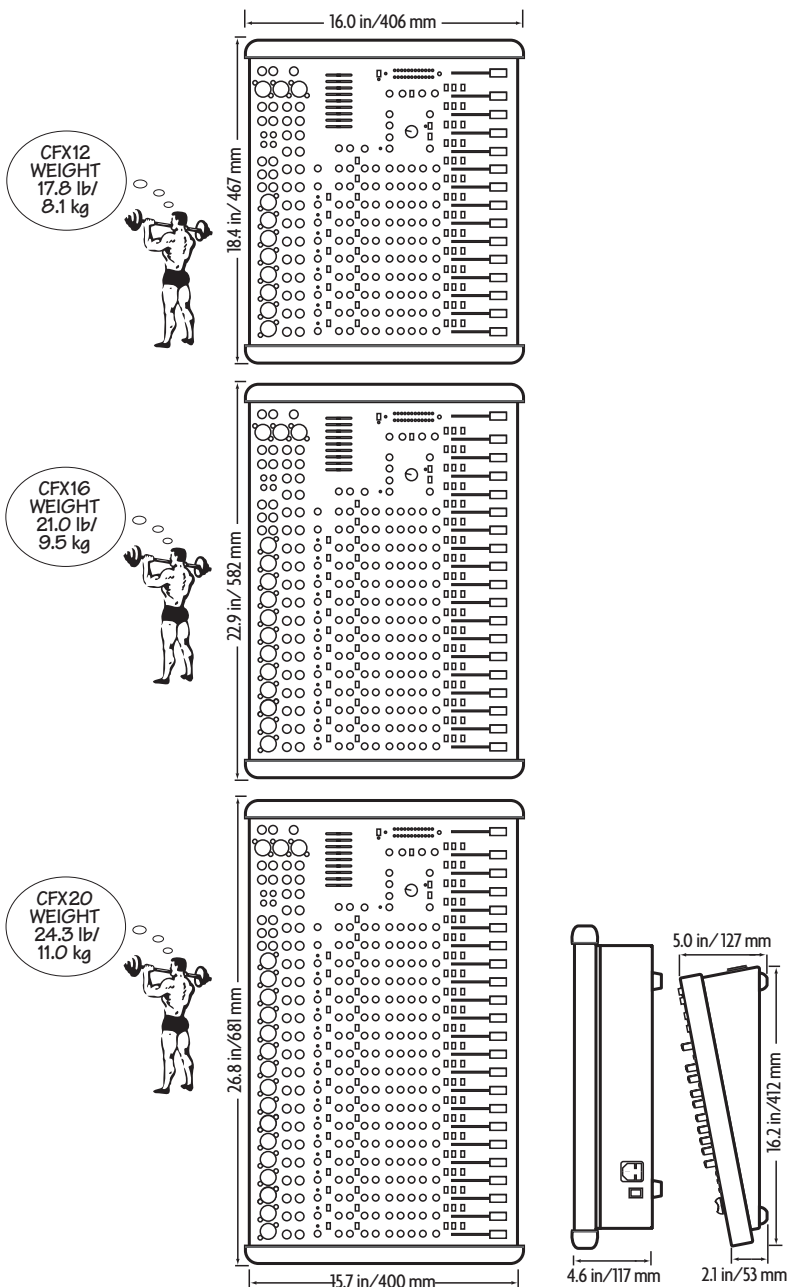
---

Main, Sub, Aux, & Efx:	+4 dBu
Maximum Rated Output:	+20 dBu

#### Maximum Input Levels

---

Mic Input:	-28 dBu, Gain @ +50 dB +18 dBu, Gain @ +6 dB
Line Input:	-8 dBu, Gain @ +30 dB +38 dBu, Gain @ -15 dB
Insert Input, Stereo Line Input, Tape Input, and Effects Return:	+20 dBu



### Maximum Voltage Gain

*Mic Input to*

Insert Output:	50 dB
Tape Output:	66 dB
Sub Output:	66 dB
Main Output:	76 dB
Aux Send:	71 dB

*Line Input to*

Insert Output:	30 dB
Tape Output:	46 dB
Sub Output:	46 dB
Main Output:	56 dB
Aux Send:	51 dB

*Stereo Line Input to*

Tape Output:	40 dB
Sub Output:	40 dB
Main Output:	50 dB
Aux Send:	45 dB

*Tape Input to*

Main Output:	30 dB
--------------	-------

*Effects Return to*

Main Output:	30 dB
--------------	-------

### Input Impedance

Mic Input:	3k $\Omega$ , balanced
Line Input:	40k $\Omega$ , balanced
Insert Input, Stereo Line Input, Tape Input, and Effects Returns:	10k $\Omega$ , unbalanced

### Output Impedance

Main Output, Insert Output, Tape Output, Sub Output, and Effects Sends: 150 $\Omega$

### Digital Effects

Resolution: 32-bit (16-bit, 2-channel)  
Number of Presets: 16

### Channel Level Set LED (Sensitivity)

0 dBu (normal operating level)

### VU Meters

Main L/R  
12 segments:  
Clip, +10, +7, +4, +2, 0, -2, -4, -7, -10, -20, -30

### Power Consumption

CFX12 MKII:	35 Watts
CFX16 MKII:	40 Watts
CFX20 MKII:	45 Watts

### Disclaimer

Since we are always striving to make our products better by incorporating new and improved materials, components, and manufacturing methods, we reserve the right to change these specifications at any time without notice.

## Mackie Limited Warranty

### 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](http://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](http://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](http://www.mackie.com/warranty).

The Product Warranty, together with your invoice or receipt, and the terms and conditions located at [www.mackie.com/warranty](http://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.



**MACKIE®**

---

**16220 Wood-Red Road NE • Woodinville, WA 98072 • USA**  
**United States and Canada: 800.898.3211**  
**Europe, Asia, Central and South America: 425.487.4333**  
**Middle East and Africa: 31.20.654.4000**  
**Fax: 425.487.4337 • [www.mackie.com](http://www.mackie.com)**  
**E-mail: [sales@mackie.com](mailto:sales@mackie.com)**