M-16DX 16-Channel Digital Mixer



Getting Started with the M-16DX

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M16DXWS01

About the Workshop Booklets

The EDIROL M-16DX 16-Channel Digital Mixer delivers the power of digital mixing to musicians at an incredibly affordable price. This crystal-clear 24-bit digital mixer supports sample rates up to 96 kHz, and it's extremely flexible, with a wide range of analog and digital inputs and outputs, and effects. The M-16DX's USB connectivity makes it an ideal partner for a computer-based digital audio workstation, and features such its pro EQ and the innovative Room Acoustic Control make it an excellent live mixer as well.

Each M-16DX Workshop Series booklet focuses on one M-16DX topic, and is intended as a companion to the *M-16DX Owner's Manual*.

The M-16DX Workshop booklets require M-16DX O.S. Version 2.00 or higher. You can download the latest O.S. for free from *www.RolandUS.com/EDIROL*.

About This Booklet

This booklet introduces you to the M-16DX, providing an overview and explaining some important underlying concepts. We'll explain how both you and your audio can get around on the M-16DX. We'll also describe how to set up the M-16DX system.

Understanding the Symbols in This Booklet

Throughout this booklet, you'll come across information that deserves special attention—that's the reason it's labeled with one of the following symbols.



A note is something that adds information about the topic at hand.



A tip offers suggestions for using the feature being discussed.



Warnings contain important information that can help you avoid possible damage to your equipment or yourself.

Hot Links

Each Workshop booklet is meant to be read in order from beginning to end. However, if we mention an upcoming section—and you see this arrow—you can click the arrow to jump there immediately.



Where You'll Use the M-16DX

You'll most likely use the M-16DX for



1. delivering the sounds of mics and instruments into DAW software you use for recording, playing back, and mixing music on a computer. ("DAW" stands for "Digital Audio Workstation.")
2. mixing a small musical group in live performance, and creating monitor mixes for the musicians.





3. creating a submix of your instruments and/or mics to be fed into the overall house mix—and a personal monitor mix—when you're playing onstage with a band. (You can also use the M-16DX as a submixer in a studio.)
4. mixing voices, music, and sound effects in a stereo broadcast or audio/video production environment.



The M-16DX has a number of special features that allow it to do all of these things and more, including its

- *versatile input/output ("I/O") module*—that provides a wide range of inputs for all sorts of mics, instruments, and other audio devices.



The front and back of the M-16DX I/O module

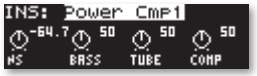
- *full-featured EQ*—which allows you to shape the sonic characteristics of sounds you bring into the M-16DX.



- *RAC, or Room Acoustic Control*—that can analyze any room you're working in and customize the M-16DX's output to compensate for any acoustic problems if discovers.



- *built-in effects*—for optimizing guitar and vocal sounds, and delays and reverbs for enhancing mixes.



An insert effect



A loop effect

Before going into more detail in the other M-16DX Workshop booklets, this booklet presents things you need to know to get the most out of the other booklets and your M-16DX. We'll also help you get your M-16DX set up and ready for listening so you can hear what you're doing as you go through the other booklets.

To jump to the M-16DX setup instructions, click here.

To jump to the instructions for listening to the M-16DX, click here.

If you plan on using the M-16DX

- *with a DAW*—check out the *Using the M-16DX with a DAW* Workshop booklet to start with. From there, you can move onto the booklet that provides details on working with your DAW.
- *for mixing live sound*—see the *Live Mixing with the M-16DX* booklet.
- *for creating an submix onstage*—see the *Using the M-16DX as an Onstage Submixer* booklet.

Using the M-16DX in a broadcast or production environment mirrors the basic scenario described in most of the M-16DX Workshop booklets.

Three Important Terms for the Mixing Newbie

If you're experienced with audio and mixing, you'll know these terms, so feel free to skip ahead to the next page. But since we don't want to leave anyone behind...

Audio Signal

When you sing into a mic, or play an instrument, the mic or instrument produces and electrical signal that's sent to the M-16DX. For this reason, when we talk about a sound in the M-16DX, we talk about an "audio signal."

Signal Flow

We describe the journey that an audio signal takes traveling from its source to its destination as its "signal flow." We'll be using this term especially as we discuss the M-16DX's internal architecture.

Bus

A bus is a pathway that can carry multiple signals to a common destination. The M-16DX has a few different buses. The most important of these is the main mix bus, which is a stereo bus that delivers signals to the M-16DX's MAIN and CONTROL ROOM outputs, and to your ears. We'll touch on all of these busses in this booklet, and get into their details in later booklets.

The M-16DX Display

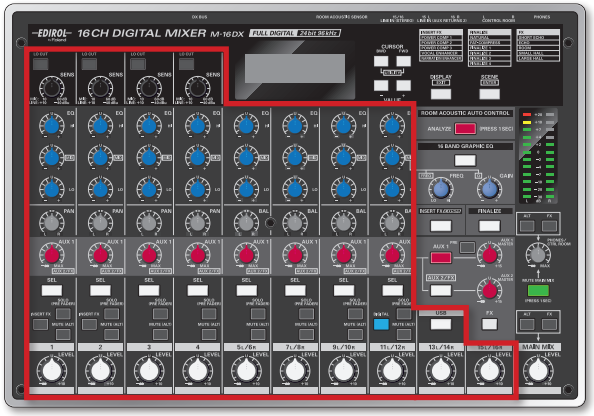


The M-16DX's display provides access to all sorts of settings, which are called "parameters." It also helps you see what you're doing as you adjust them.

The Channel Strip Area

When an audio signal arrives at one of the M-16DX's input jacks, it automatically gets sent into the channel automatically associated with that jack. A channel on a mixer is a set of tools dedicated to the handling of a single mono or stereo audio signal. Typically, a channel's tools are arranged vertically in a "channel strip."

The M-16DX has ten channel strips, four of which handle mono signals. The other six handle stereo signals. (The last two of these have special jobs, and are so simple they barely qualify as strips.)

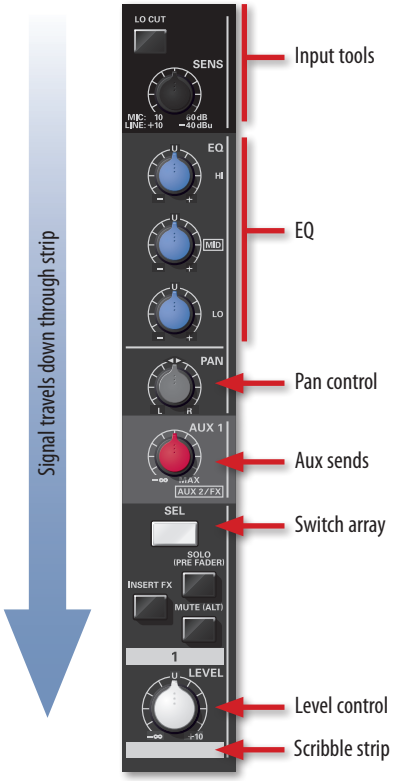


On any mixer, most of the channel strips are similar. If you're new to mixing, this should be comforting, since if you can get around in one channel strip, you can get around most of the mixer's surface area.

The Channel Strip Tools

The signal comes into a strip at the top, and then travels down the strip until it reaches the level control at the bottom. On its way down the strip, the signal passes through the

- *input section*—that lets you set the way the signal comes into the channel. We'll talk about these tools in the *Basic Signal-Flow Tutorial* Workshop booklet.
- *EQ*—where you can shape the signal's tone by adjusting its frequency balance. We'll discuss EQ in detail in the *M-16DX EQ* Workshop booklet.
- *pan control*—where you can set its position in the M-16DX's main stereo mix. In the *Basic Signal-Flow Tutorial* booklet, we'll talk about panning.
- *Aux sends*—that allow you to send a copy of the signal to the M-16DX's two Aux busses. We'll discuss the Auxes later on.
- *level control*—where you set the signal's level coming out of the channel, on its way to the M-16DX's main mix. We'll also talk about the LEVEL knob *Basic Signal-Flow Tutorial* booklet.



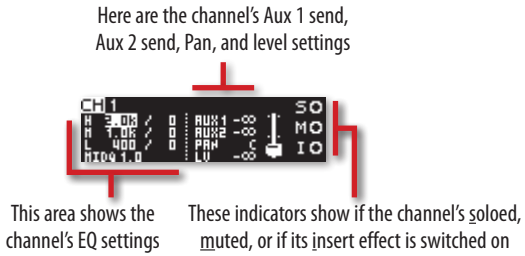
The switch array and scribble strip aren't really part of the top-to-bottom signal flow. The switch array contains options for the channel's signal—we'll get into these on the next page. The scribble strip is for writing the name of the channel's signal if you like.

The Channel Strip Switch Array



The Channel SEL Button

"SEL" is short for "SELECT." Press a channel's SEL button to select the channel, which means that its settings then appear on the M-16DX's display, where you can see what you're doing as you adjust its settings.



Press SEL a second time to display the channel's current EQ settings graphically. To return to the view above, press SEL once more.

To return the display to its default state—where it simultaneously shows the levels for all of the channels—press the DISPLAY button.

The SOLO (PRE FADER) Button

SO

You can isolate, or "solo," any single channel for careful listening by pressing its channel's SOLO (PRE FADER) button. When you do this, you hear the channel's signal "pre-fader": This is the way it sounds after it's passed through its EQ, but before it's reached its LEVEL control, or "fader."

The M-16DX's MUTE MAIN MIX button flashes when there's a channel soloed. If you're ever not hearing what you should be hearing, look at this button to see if something's soloed you've forgotten about.

When a channel's soloed, its pre-fader level is shown on the M-16DX's main meters.

The MUTE (ALT) Button

MO

If you'd like to quickly remove a channel's signal from the main mix, press its MUTE (ALT) button.

Since muting only removes a signal from the main mix bus, it has no effect on a soloed channel's signal.

When you mute a signal, it gets sent to the M-16DX's Alt bus, which you can use for creating submixes of signals you'd like to control as a group. We'll discuss how to do this in the *Creating Submixes Using the Mute/Alt Bus* Workshop booklet.

The Channel 1 and 2 INSERT FX Button

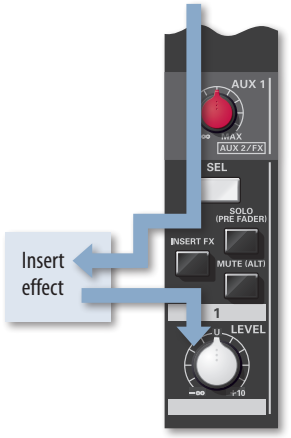
IO

An effect is an audio process that changes the sound of a signal in some desired way. While the M-16DX provides a loop effect for processing any audio signal you're using in the main mix—as well as a finalize effect for the entire mix—you can also "insert" an effect on Channels 1 and 2.

When you insert an effect, you grab the signal as it passes through the strip, send it to the insert effect processor for processing, and then return the effected signal back to the channel strip.

Insert effects are good for adding compression to a signal, since you always want the compressed version of the signal to completely replace its original version.

The INSERT FX switch in the switch array for Channels 1 and 2 turns the insert effect on or off for each channel.



For more on using M-16DX insert effects, see the Workshop booklet *The M-16DX Effects*.

The Channel 11/12 DIGITAL Button



Stereo Channel 11/12 can handle either analog or digital stereo signals. The DIGITAL button in Channel 11/12's switch array selects the kind you want:

- *When the DIGITAL button's up and unlit*—Channel 11/12 controls analog audio signal sent into the LINE IN 11 (L/MONO) and 12 jacks on the M-16DX I/O module.



- *When the DIGITAL button's down and lit*—Channel 11/12 controls the stereo digital signal sent into one of the two DIGITAL IN (11/12) jacks on the front of the I/O module.



The M-16DX provides both an optical and a coaxial DIGITAL IN (11/12) jack. You can use either jack, but not both at once.

About Digital Clocking on the M-16DX

In order for two digital audio devices to communicate successfully, they have to both use the same timing reference, or "master clock." If they don't, their audio is likely to wind up at the wrong pitch or contain clicks and pops.

The rule of thumb is that the device sending audio to the other should provide the master clock for both devices. It does this by sending a "word clock" signal alongside its digital audio to the receiving device.

When you press the Channel 11/12 DIGITAL button, the M-16DX checks its DIGITAL IN (11/12) jack to see if there's any word clock there. If there is, the M-16DX "slaves" itself to that word clock, and the DIGITAL button lights red.

If the M-16DX doesn't find any valid word clock, it reverts to its own internal word clock, and the DIGITAL button flashes red. If this happens, check the connection to your digital device and make sure it's turned on.

Changing the M-16DX's Sample Rate

The M-16DX can operate at 44.1 kHz, 48 kHz, or 96 kHz sampling rates.

1 On the M-16DX, hold down the CURSOR BWD and FWD buttons at the same time to display the UTILITY menu.



2 Press the CURSOR FWD or BWD button to highlight the Sample Freq value.



3 Use the CURSOR - or + button to select the desired sample rate.

If you change the M-16DX's sample rate when it's connected via USB to a computer, power the M-16DX off and back for the sample rate change to take effect, or disconnect and reconnect either end of the USB cable connecting the M-16DX and the computer.

Channel 13/14: USB



The Channel 13/14 strip is tiny since it has a very specific, simple job: It handles audio coming into the M-16DX from a computer via a USB connection. Once you've connected the M-16DX to a computer via USB, you activate the connection by pressing—and lighting—the channel's USB button. You control the computer audio's level in the M-16DX main mix using the channel's LEVEL knob.

We'll talk about preparing your computer for an M-16DX USB connection in the *Using the M-16DX with a DAW* Workshop booklet.

The EQ Area



In the M-16DX's EQ area, you'll find

- *the 16 BAND GRAPHIC EQ button*—that allows you to turn on a 16-band graphic EQ with which you can shape the overall tonal characteristics of the entire main mix's output. When the button's lit, the 16-band graphic EQ is turned on.
- *FREQ/FREQ and Q/GAIN knobs*—that provide hands-on control of the
  - *the currently selected channel's Mid EQ frequency and Q settings*—when the 16-band graphic EQ is turned off.
  - *the 16-band graphic EQ's frequency and gain settings*—when the 16-band graphic EQ is turned on.

The 16-band graphic EQ is available whenever the M-16DX's RAC feature is not in use. RAC is discussed in the *Tuning Your Room with RAC* Workshop booklet.

We'll discuss all of the M-16DX's EQ tools in the Workshop booklet *The M-16DX EQ*.

The INSERT FX COSM Button

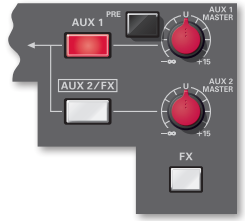
When you press the INSERT FX COSM button, you see a screen on which you can select and edit the M-16DX insert effect.



The Workshop booklet called *The M-16DX Effects* explains in detail how to use the M-16DX's effects.

The Aux 1 and 2 Area

The Aux 1 and 2 area contains the master controls for the M-16DX's two Aux busses. These two busses allow you to do several useful things.



- *Aux 1*—can feed M-16DX signals to an external effect processor. It can also carry a separate mix to a headphone amp or onstage monitor used by a performer onstage or during recording.
- *Aux 2*—can send channel signals to the M-16DX's loop effect, or "FX," processor. The output of the FX processor goes into the main mix bus, allowing you to add its reverb or delay/echo effects to signals you're sending into the main mix.

In a digital mixer—as we mentioned earlier—when you send a channel's signal to an Aux bus, you're really sending a perfect digital copy of that signal while the original continues on its way down its channel strip. An Aux send control determines the level of that copy as it goes into the Aux bus.

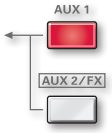
We'll talk about all of these effect operations in the Workshop booklet called *The M-16DX Effects*.

We'll discuss creating a separate mix for performers in the *Live Mixing with the M-16DX* Workshop booklet. The instructions you'll find there for creating a separate performer's mix apply equally to recording sessions.

The AUX 1 and AUX 2/FX Buttons

You may have noticed that each channel strip has a single red knob that's labeled "AUX 1" on top, and "AUX 2/FX" on the bottom. That's because this knob has two modes of operation: In one mode, it controls the amount of signal that's sent to the Aux 1 bus; in the other mode it sets the amount of signal sent to Aux 2.

It's the Aux area's AUX 1 or AUX 2 buttons that determine the current mode of the channels' red knobs. When you press the



- *AUX 1 button*—the red knobs control the amount of each channel's signal that's sent to the Aux 1 bus.
- *AUX 2 button*—the red knobs control the amount of each channel's signal that's sent to the Aux 2 bus, and then carried to the M-16DX FX processor.

The AUX 1 and AUX 2 MASTER Knobs



While Aux sends on each channel determine the level of that channel's own signal going into each Aux bus, the AUX 1 MASTER and AUX 2 MASTER knobs in the Aux area set the overall level of each Aux bus.

The Aux 1 PRE Button



With the Aux 1 PRE button, you can send a channel's signal to the Aux 1 bus from either of two places within a channel strip. You can send it

- *pre-fader*—so that the Aux send isn't affected by any changes you make to the channel's signal using its LEVEL knob. This can be useful for separate performer mixes, since it spares the performer from being distracted by main mix level changes you make to the channel's signal.
- *post-fader*—so the Aux send follows changes you make to the channel's main mix level using its LEVEL knob. This is the setting you'd typically want to use when an Aux send is carrying channel signals to an effect as part of the overall stereo mix.

When the PRE button is pressed in, AUX 1 receives pre-fader signals from your channels.

The FX Button

The FX button allows you to select and edit the M-16DX's loop effect to which Aux 2 carries signals.



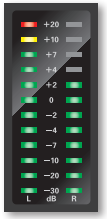
The MAIN MIX Area

In the MAIN MIX area, you can



- *send the Alt bus into the main mix*—by pressing the MAIN MIX ALT button. When the button's pressed in, signals routed to the Alt bus are fed into the main mix. You'd send the Alt bus into the main mix when you're using the bus for a submix you want to include in the main mix, as described in the *Creating Submixes Using the Mute/Alt Bus* Workshop booklet.
- *send the M-16DX's loop effect into the main mix*—by pressing the MAIN MIX FX button. When the button's pressed in, the output of the loop effect is fed into the main mix. You'll do this in any situation where you want your loop effect to be part of the main mix.
- *control the main mix bus's level*—by turning the MAIN MIX LEVEL knob.

The Main Meters



The large stereo LED meters on the right side of the M-16DX ordinarily show you the stereo main mix's level.

When you solo a channel, however, the meters show the level of the soloed channel's signal as it comes into the channel from its input jack.



You can adjust this level on Channels 1-4 by turning the channel's SENS knob. For other channels, adjust the level at the instrument or sound source.



Channels 1-4 are mono channels. When you solo any of these channels, its signal is shown equally in both the left and right LED meters.

The FINALIZE Button



When you're using the M-16DX's MAIN OUT, 2 TRACK OUT, or DIGITAL OUT jacks in broadcast/production or live mixing, you can "finalize" your stereo mix. Finalizing uses compression and/or an enhancer to smooth out and tighten-up the sound of the main mix bus.

There are six types of finalize effects in the M-16DX. They're described in detail in the *Using the M-16DX's Finalize Tools* Workshop booklet.

Since the CONTROL ROOM and PHONES jacks typically carry the main mix bus, you can also apply finalizing to smooth out your mix for listening purposes when you're working with a DAW. However, since finalizing changes the sound, you won't really be hearing what you're sending the DAW or what the DAW's output really sounds like. This can be misleading, so it's best not to use finalizing when you're using the M-16DX with a DAW and merely listening to the main mix bus.

The Monitoring Area



In the monitoring area, you control how you listen to, or "monitor," the M-16DX, whether you've connected an amp and speakers to the CONTROL ROOM jacks or plugged a pair of headphones into the PHONES jack.

The PHONES/CTRL ROOM knob sets your listening level.

The ALT and FX buttons allow you to

- *send the Alt bus into the control room mix*—by pressing the ALT button so it's depressed. This lets you monitor the signals you've sent to the ALT bus without actually sending the Alt bus into the main mix bus.
- *send the M-16DX's loop effect into the control room mix*—by pressing the FX button when you'd like to hear the loop effect on a signal without actually sending the effect to the main mix bus. This can be especially handy when you'd like to hear a little reverb during recording, but capture the signal without the effect, or "dry."

The Monitoring Area's MUTE MAIN MIX Button

You can listen to the Alt bus or FX without hearing the main mix by muting the mix. To do this, hold down the MUTE MAIN MIX button for one second until it lights. To return the main mix to the CONTROL ROOM and PHONES jacks, hold down the button again until it un-lights.

Just a reminder: Whenever a channel is soloed, the MUTE MAIN MIX button flashes and only the soloed channel is heard.

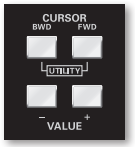
The ROOM ACOUSTIC CONTROL Button



The ROOM ACOUSTIC CONTROL button turns on the M-16DX's RAC feature, which we'll explain in detail in the *Tuning Your Room with RAC* Workshop booklet.

The M-16DX Controls

The CURSOR and VALUE Buttons

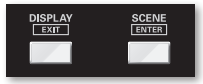


Use the CURSOR and VALUE buttons to navigate the M-16DX's display and to adjust parameter values. The

- *CURSOR BWD and FWD buttons*—allow you to move backward and forward, respectively, through displayed parameters.
- *VALUE - and + buttons*—allow you to lower or raise, respectively, the value of the currently selected parameter.

To display the M-16DX's Utility parameters, hold down the CURSOR BWD and FWD buttons at the same time.

The DISPLAY•EXIT and SCENE•ENTER Buttons



These two buttons have dual personalities.

During onscreen operations, they act as EXIT and ENTER buttons:

- *If an operation must be cancelled, or you want to leave the current screen*—press the DISPLAY•EXIT button.
- *To confirm an onscreen procedure*—press SCENE•ENTER.

Other times

- *the DISPLAY•EXIT button*—acts as your home base, taking you back to the M-16DX's original startup screen, or toggling between that screen and a channel-parameter screen.
- *the SCENE•ENTER button*—turns Scene mode on or off. (Scenes are described in the *Using Scenes on the M-16DX* Workshop booklet.)

Setting Up Your M-16DX System

As with any audio equipment, before setting up the M-16DX, make sure its POWER button isn't pressed in. We'll discuss powering-up later.

Hooking Up the I/O Module

Connecting the M-16DX mixer and module is simple. Here's how:

1. Insert one end of the included six-foot connector cable to the DX BUS jack on the back of the M-16DX mixer, and tighten the connector's two screws into the screw holes on either side of the DX BUS jack.



2. Insert the other end of the connector cable into the DX BUS jack on the front of the I/O module. Tighten the connector's two screws to lock the connector in place.

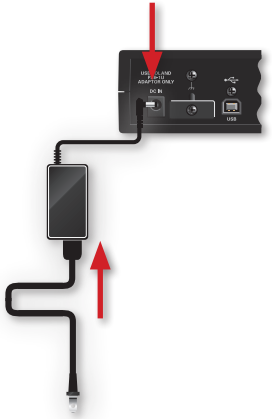


If your setup requires a longer connector cable, you can purchase a 23-foot-long EDIROL DXC-7 cable. We recommend using only the included connector cable or a DXC-7.

Connecting the M-16DX's Power

To supply power to the M-16DX

1. Assemble the two pieces of the included power adaptor by attaching the AC cable to the adaptor brick.
2. Connect the AC plug to a grounded wall outlet or power strip.
3. Connect the wire from the adaptor brick to the DC ADAPTOR jack on the back of the M-16DX I/O module.

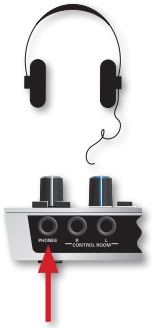


To help prevent an accidental disconnection of your AC adaptor, wrap any slack wire coming from the brick around the cord hook to the right of the DC ADAPTOR jack on the I/O module.

Listening to the M-16DX

Using Headphones

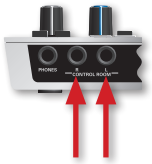
The simplest—and often most convenient—way to listen to the M-16DX is by using headphones. The M-16DX's PHONES jack on the back of the mixer accepts a 1/4" stereo plug. If you've got headphones with a mini plug, you'll need to purchase an adaptor.



Once you're plugged into the PHONES jack, you'll be listening to the M-16DX's control room mix. Use the PHONES/CTRL knob to control the level of the audio in your headphones. And as we noted on Page 9, you can determine what you'll hear using the buttons in the monitoring area.

Using Speakers

If You're Using Speakers with Analog Inputs



You can listen to the M-16DX through speakers by connecting its CONTROL ROOM L and R jacks on the back of the mixer to the

- *left and right inputs of a speaker amplifier connected to a pair of speakers.*
- *inputs of your left and right powered speakers.*

Since you're using the CONTROL ROOM L and R outputs, your volume is controlled by the PHONES/CTRL knob. Again, what you hear depends on the settings of the buttons in the monitoring area as noted on Page 9.

If You're Using Speakers with Digital Inputs



Some speakers—such as EDIROL's MA-15D/BK, and Roland's DS-90A, DS-5, DS-7, and DS-8 speakers—have digital inputs that allow you to send audio from M-16DX digitally for optimally clean sound.

To do this, connect the coaxial or optical DIGITAL OUT jack on the front of the M-16DX mixer to the coaxial or optical digital input of your left speaker.



Each DIGITAL OUT jack sends the main mix bus to your speakers, so you control your listening volume with the MAIN MIX LEVEL knob.

Powering up the M-16DX System

It's important to power-up your M-16DX system in the proper order to avoid doing damage to your speakers, other equipment, or your ears.

Before powering up

1. Turn all of the channel LEVEL knobs down to their -∞ positions.
2. Turn down the M-16DX's MAIN MIX LEVEL to its -∞ position.
3. If you're using headphones or speakers with analog inputs, turn down the PHONES/CTRL knob to its -∞ position.

Power up your system in the following order:

1. Turn on any digital equipment connected to one of the M-16DX's DIGITAL IN jacks.
2. Turn on any analog gear—such as instruments or audio devices—connected to other M-16DX input jacks.
3. Turn on the POWER switch located on the M-16DX's I/O module.
4. Turn on your speaker amplifier if you're using one.
5. Turn on your speakers if you're using speakers.

After powering up

1. If you're using headphones or speakers with analog inputs, turn up the PHONES/CTRL knob about a third of the way as a starting point.
2. If you're using headphones or speakers with analog inputs, turn up the MAIN MIX LEVEL knob to its center, U (for "Unity") position.

3. If you're using speakers with digital inputs, turn up the MAIN MIX LEVEL knob about a third of the way as a starting point.
4. Bring up the level of each channel you're using as desired.
5. If you're using headphones or speakers with analog inputs, turn the PHONES/CTRL knob to adjust your listening level as desired.
6. If you're using speakers with digital inputs, turn the MAIN MIX LEVEL knob to adjust your listening level as desired.

Turning Off the M-16DX

Turn off the M-16DX by reversing the power-up sequence:

1. Turn off your speakers if you're using speakers.
2. Turn off your speaker amplifier if you're using one.
3. Turn off the M-16DX's POWER switch.
4. Turn off analog equipment connected to M-16DX inputs.
5. Turn off digital equipment connected to the M-16DX.

The End

We hope you've found this workshop helpful. You'll find other M-16DX Workshop booklets available for downloading at *www.RolandUS.com/EDIROL*.