M-16DX 16-Channel Digital Mixer



Basic Signal-Flow Tutorial

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M16DXWS03

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

When working with a mixer, there's nothing more fundamental than gaining an understanding of how audio signals flow through the mixer. This booklet explains signal flow in the M-16DX by walking you through the steps for taking a mic's signal from a mic all the way to the M-16DX's main stereo mix outputs. (If you'd rather use a guitar or bass for our tutorial, that's okay, too.) You can take what you learn here and apply it to any signal you want to work with in the M-16DX.

We'll assume you've read the *Getting Started with the M-16DX* Workshop booklet, or that you've set up your M-16DX system and a way to listen to it on your own. We'll also assume you've plugged a pair of headphones into the M-16DX's PHONES jack or have connected speakers to the CONTROL ROOM L and R OUT jacks so you can hear what you're doing.

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, your data, or yourself.

Getting the Mic's Signal Into Channel 1

In this tutorial, we'll use the M-16DX's Channel 1. Channels 1 and 2 function identically, and, if you're using a mic, Channels 3 and 4 do, too. We'll explain the differences with other channels as we go along.

We'll assume you're working with a low-impedance mic whose cable has XLR jacks on either end. This type of connector is required if your mic needs phantom power, which we'll get into in a bit.



1 Connect one end of your XLR cable to your mic, and the other end to Channel 1's XLR jack on the front of the M-16DX I/O module.



If your mic's cable uses a 1/4" phono jack, you can plug it into Channel 1's LINE IN jack. If it has a mini plug, you'll need a mini-to-1/4" adaptor.

If you'd rather do this tutorial with an electric guitar or bass, plug the cable from your guitar or bass into Channel 1's LINE IN jack, and push in the HI-Z button above the jack. Channels 1 and 2 both have HI-Z buttons.

Turning on Phantom Power

If you're using a condenser mic that requires phantom power—current supplied by an external source like the M-16DX—press in the PHANTOM +48V switch on the front of the M-16DX's I/O module.



If your mic doesn't require phantom power, don't turn it on—phantom power can damage a mic that doesn't need it.

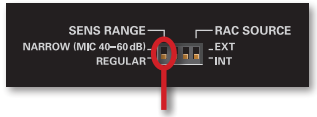
Normally, phantom power is supplied to all four XLR input jacks. If you have a mix of condenser and non-condenser mics, you can connect your condenser mics to XLR Inputs 3 and 4 and send phantom power only to those jacks, as explained in "Configuring the M-16DX's Phantom Power" on Page 3 of the *Input and Outputs on the M-16DX* Workshop booklet.

Adjusting the Preamp Level

Input Channels 1-4 have SENS knobs that allow you to adjust their preamp levels—this sets the volume of signals as they enter Channels 1-4. (For the remaining channels, adjust incoming signal levels at their sources.)

The Channel 1-4 preamps can be set to adjust levels in wide or fine increments. The M-16DX is set by default to the wide, or "Regular," range that's a good general-purpose level-setting. When you're working with a mic, use the finer, or "Narrow," range for making more subtle, precise level adjustments to your incoming signal.

Setting the Preamp Sensitivity



On the back of the mixer is the SENS RANGE switch that sets the preamp range. To set the preamp to its

- *regular range*—flip the SENS RANGE switch down to its REGULAR position.
- *narrow range*—flip the SENS RANGE switch up to its NARROW position.

For now, set the SENS RANGE switch to narrow for your mic.

If you're doing this tutorial with an electric guitar or bass, set the SENS RANGE switch to REGULAR.

Setting the SENS Knob

1. Set Channel 1's LEVEL knob to its center position—when you move the knob close to this position, you can feel it snap into place.
2. Press DISPLAY•EXIT to view the meters for the M-16DX's 16 channels.
3. Turn Channel 1's SENS knob all the way down.
4. Speak or sing into your mic as you turn the Channel 1 SENS knob up as high as you can before your loudest volume causes the channel's meter in the display to light its top, overload, bar.





Optimal level



The overload indicator lights —it's too loud

Of course, as you set your preamp level, you can turn the PHONES/CTR ROOM knob to adjust your listening level as desired.

Traveling Through the Channel Strip

As we noted in the *Getting Started with the M-16DX* Workshop booklet, the mic's signal now travels pretty much from top to bottom down the Channel 1 strip on the M-16DX's mixer.



EQ

The first place the signal gets to is the EQ section where you to adjust the signal's tonal quality. To learn more about the M-16DX EQ, see the *M-16DX EQ* Workshop booklet.

PAN

The PAN knob allows you to set the signal's left/right position when it gets to the main stereo mix.

When you're working with stereo Channels 5-12, the PAN knob shifts the channel's entire stereo image leftward or rightward in the main mix.

AUX

In the AUX area, you can send a copy of the signal to the Aux 1 bus and/or the Aux 2 bus.

Both busses can be connected to external devices, including

- *headphone amplifiers or stage monitors*—to create a separate performer mix.
- *an external effect processor*—for outboard effect processing that can be returned to the M-16DX's Channels 13-16 inputs.

Aux 2 also sends its signal copy into the built-in loop effect from where the effected copy goes into the main mix alongside the original dry signal.

We'll explain creating separate performer mixes in the *Live Mixing with the M-16DX* Workshop booklet. *The M-16DX Effects* explains effects in detail.

INSERT FX

When the signal reaches the INSERT FX button, you can divert it through the M-16DX's insert effect for processing. For details on using effects, see the Workshop booklet *The M-16DX Effects*.

Insert-effect processing is available on Channels 1 and 2.

If you need a refresher on what the SOLO and MUTE buttons do, see the *Getting Started with the M-16DX* Workshop booklet.

When you're sending a channel's signal into a DAW via USB, this marks the end of its journey through the channel strip. The signal goes to the DAW from here, ahead of the LEVEL knob at the bottom of the strip.

Controlling the Signal's Level in the Mix

At the bottom of the channel strip, the signal at last reaches the LEVEL knob, which sets its volume going from Channel 1 into the main mix.

Looking Ahead—Working with Other Channels

Our signal's now made it safely into the main mix. Though we've discussed just a single channel, you'll find that all of the M-16DX's other channels work essentially the same way with the following exceptions:

- *SENS knobs*—are available only for Channels 1-4.
- *Insert effects*—are available only on Channels 1 and 2.
- *Channel 13/14 has a DIGITAL button*—explained in the *Getting Started with the M-16DX* Workshop booklet.
- *Channel 15/16 is a simple channel with a USB button*—that receives audio coming from a computer when you're working with a DAW, as explained in the *Using the M-16DX with a DAW* Workshop booklet.

Controlling the Main Mix's Level

Use the MAIN MIX LEVEL knob to set the overall volume of the main mix, consulting the M-16DX's big main meters to make sure the signal's as loud as possible without lighting either red LED.

Signal Flow and Troubleshooting



Probably the most practical reason to understand a mixer's signal flow is the help that such an understanding can provide when you're troubleshooting a signal you should be hearing, but you're not.

For example, let's say you've plugged a mic in, and you're listening to the main mix but you don't hear the mic's signal. By following the signal path, you can figure out where the problem is.

1. Start by at the beginning: Make sure the mic's turned on if it has a switch.
2. Is the mic plugged into the M-16DX?
3. Press DISPLAY—when you speak or sing into the mic, can you see its signal level on the M-16DX's display? If you can, you know the mic's signal is successfully making it into the M-16DX. If you don't see the signal
   - *have a look at the SENS knob*—to make sure it's not turned all the way down.
   - *check the channel's MUTE (ALT) button*—to make sure it's not pressed in, removing the signal from the main mix and sending it to the Alt bus.
   - *try another mic cable*—since it's possible yours isn't working.
4. If the signal is only slightly moving the channel's meter on the display, turn up the SENS knob until the meter's responding properly.



If turning up the SENS knob doesn't get you enough level, try setting the SENS RANGE switch to its REGULAR setting.

5. If you've got a good level on the meter, you know the signal's getting into its channel strip, so it must be getting lost on its way out of the strip—check the channel's LEVEL knob to make sure it's turned up.
6. Now you know that the signal's being sent as it should be into the main mix. If you still can't hear it, make sure the MAIN MIX LEVEL knob is turned up to its center position.
7. Finally—if you *still* can't hear your signal—make sure the PHONES/CTRL ROOM knob is turned up and that your headphones are plugged in or your speaker system is set up correctly.

There are only very few mixing problems that can't be solved by tracing a signal's signal path until you figure out where the problem is.



If you've done everything we've described above and are still having a problem, take a look at the MUTE MAIN MIX button—if it's flashing, you've inadvertently soloed some channel that's silencing the signal you want to hear. Find the soloed channel and un-solo it.

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*.