

## M-16DX 16-Channel Digital Mixer



## Live Mixing with the M-16DX

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**M16DXWS04**

## 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 as 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](http://www.RolandUS.com/EDIROL).

## About This Booklet

The M-16DX makes an excellent compact mixer for live performances, with a range of inputs for all sorts of performers, and flexible output options for delivering music to audiences, creating onstage monitor mixes, and for recording. The digital connection between the I/O module and mixer also makes for totally noise-free transmission of signals from the stage to the mixer. This booklet talks about using the M-16DX for live mixing.

## 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.

## General Strategy

### Front and Center



Since the M-16DX mixer's so small, it's easy to position it in a central audience location so you can hear what the rest of the audience hears through the house system. This also allows you to use the M-16DX's RAC (Room Acoustic Control) feature to tune the room during setup, which can help you keep feedback issues to a minimum during the performance.



To learn about RAC, see the *Tuning Your Room with RAC* Workshop booklet.

### Why Not Record the Show?

While your main concern at a performance is mixing for the audience, the M-16DX makes it easy to record the show at the same time. You can

- *use the M-16DX's USB output*—to record the show into a laptop, either as a multitrack DAW recording of the M-16DX's inputs, or as a stereo recording of the entire mix in any recording program.



- *connect the M-16DX's 2-TRACK OUT jacks*—to a portable recorder such as the EDIROL R-09.



## Cabling

While the M-16DX's inputs can work with balanced or unbalanced cables, they're designed to work with balanced cables. Balanced cables provide optimal noise-rejection, so if you can use them, do—they'll help you avoid problems at a gig.



Balanced cables split their signal into two copies that travel up the cable out of phase with each other. If any noise gets into the cable, it's added to both copies. When the copies reach the M-16DX's input jack, they're flipped back into phase and added to each other. And, as the audio copies are flipped *into* phase, any noise they carry gets flipped *out* of phase, with each noise copy cancelling the other one out, thus automatically removing the noise from the signal.



## Setting Up

### Keep the I/O Module with the Performers



For the best sound, we recommend keeping your I/O module on or near the stage—you may want to purchase an optional 23-foot-long EDIROL DXC-7 DX BUS cable. Keeping the module onstage accomplishes a few things:

- You can have short cable runs from your mics and instruments to the I/O module—reducing the chances of RF and other noises making their way into your signals. The module's signal then takes the longer trip to the mixer carried over the M-16DX's absolutely noise-free digital DX BUS connection.
- You'll save money—by not having to buy long cables that stretch from the stage to the mixer.

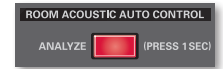
## Connecting to the House System



Typically, you'll want to send audio from the M-16DX to your front-of-house speaker system by connecting the M-16DX's MAIN OUT L and R jacks to inputs on your PA's power amp. If you want to mix in mono, use only the M-16DX's L MAIN OUT jack.

### Use RAC to Smooth Out the Room

Before you sound-check your performers, use RAC to deal with any sonic irregularities in the room that may lead to feedback or other problems later on.



RAC does this by analyzing the frequency curve of an acoustic space and automatically adjusting the frequency curve of the M-16DX's output to compensate for any problems it finds in the room. Because it smooths out trouble spots, it allows you to run your sound system at a louder level than would otherwise be possible without a lot of work.



RAC uses noise to analyze the room, so it's not something your audience will want to hear. Be sure to analyze your room before they arrive.

While the specific steps for using RAC are provided in the *Tuning Your Room with RAC* Workshop booklet, here's the general procedure for a performance space. (We're assuming you've set up the M-16DX mixer in a central audience position, as mentioned earlier.)

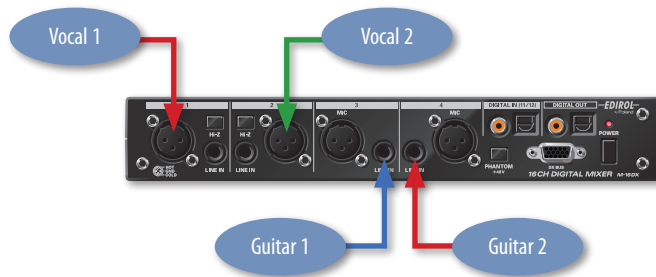
- 1 Before soundcheck, perform an RAC analysis at as loud a level as you're likely to want to use during the performance, and select the best resulting RAC curve.
- 2 Sound-check your performers, paying attention to the overall volume to make sure it's not going to be *too* loud.
- 3 If there are any surprise frequency-related issues such as feedback or boominess, make final manual adjustments to the RAC frequency curve, as explained in *Tuning Your Room with RAC*.

## Performer Hookup Example

To give you an idea of how you can use the M-16DX's inputs, let's talk about how you'd hook up a small group with two singing acoustic guitarists with pickups on their guitars, a keyboard player, a bass player, and a beatbox rhythm backing.

On the front of the I/O module, connect

- *the two vocal mics*—to XLR MIC 1 and 2 jacks. These two jacks feed Input Channels 1 and 2, whose SENS knobs allow for precise level control.
- *the two guitars*—to the LINE IN 3 and 4 jacks.



If you're using an acoustic guitar with a pickup that lacks a built-in preamp, we recommend inserting a preamp between the guitar and the M-16DX to get the best sound from the guitar.

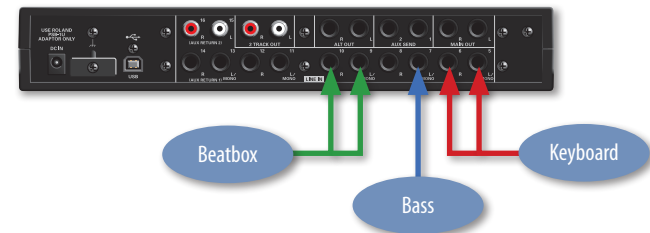
On the back of the I/O module, connect

- *the keyboard*—in stereo or mono as desired. To use it in
  - *stereo*—connect the keyboard's left and right outputs to the M-16DX's LINE IN jacks 5 (L/MONO) and 6 (R), respectively.
  - *mono*—connect the keyboard's mono output to the M-16DX's LINE IN 5 (L/MONO) jack.
- *the bass*—to a direct box, and then connect the output of the direct box, or "DI," to the M-16DX's LINE IN 7 (L/MONO) jack.



If you want to connect a bass directly to the M-16DX without a direct box—and you're not using Inputs 1 and 2 for something else as we are here—you can connect it to the I/O module's front-panel LINE IN 1 or 2 jack, and then push in the selected jack's Hi-Z switch.

- *the beatbox*—in stereo or mono as desired. To use it in
  - *stereo*—connect the beatbox's left and right outputs to the M-16DX LINE IN jacks 9 (L/MONO) and 10 (R), respectively.
  - *mono*—connect the beatbox's mono output to the M-16DX LINE IN 9 (L/MONO) jack.



## Creating a Monitor Mix

While you'll use the M-16DX's main stereo mix for your audience, your performers may want to hear a somewhat different mix as they play and sing. This performer-only mix is called a "monitor mix," and can be delivered through onstage monitor speakers, or through in-ear monitors or headphones. The M-16DX offers a few ways to create monitor mixes.

You can use

- *Aux Bus 1*—to create a monitor mix in which you have individual level control over all of the sounds coming through the M-16DX. This is the most common way to create a monitor mix.
- *Aux Bus 2*—to create a second monitor mix with individual control over each signal's level. This option is available in situations where you're not already using Aux 2 for the M-16DX's internal effects. Effects—including how to use external effects instead of internal effects in order to free up Aux 2 for a monitor mix—are discussed in the *The M-16DX Effects Workshop* booklet.

- the *Alt bus*—to create a few different types of mixes. You can make
  - a *click-track feed*—that allows your rhythm-keeper to play to a metronome click only he/she can hear.
  - a *main mix with added performer-only elements*—such as spoken cues from one musician to another.
  - a *main mix with elements the performers don't want to hear*—in cases where the performers want to hear a stripped-down mix.

## Creating a Monitor Mix with Aux Bus 1

### Sending the Aux 1 Signal to the Stage

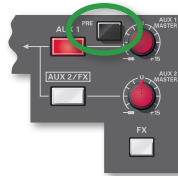
The Aux 1 bus is a mono bus. Connect the M-16DX's rear-panel AUX SEND 1 output jack to the input of the power amp you're using for onstage monitor speakers, or to the amp you're using for in-ear or headphone monitors.



### Pre or Post

The Aux 1 bus can operate in your choice of “pre” or “post” mode. When it's set to

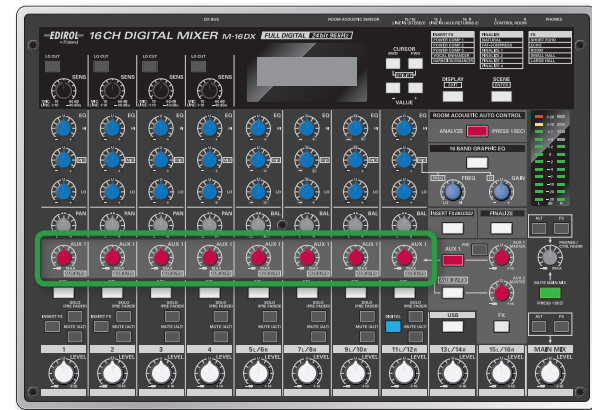
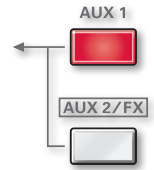
- *pre*—each input channel's signal is sent to Aux 1 before it goes through its channel strip. (“Pre” is short for “pre-fader.”) Adjustments you make to the signal using its channel EQ, insert effect, or LEVEL knob have no effect on the sound sent to your monitor mix. A pre send is a good choice when you'll be making mix changes that may distract your performers. To configure Aux 1 as a pre send, press down the AUX 1 PRE button so it locks in.
- *post*—each input channel's signal is sent to Aux 1 after going through its channel strip. (“Post” is short for “post-fader.”) Changes you make with channel EQ, insert effects, and LEVEL knob will be heard in the monitor mix. This lets the performers hear a more finished sound as they sing and play, with their monitor mix following changes you make during



the performance. To configure Aux 1 as a post send, set the AUX 1 PRE switch to its up position.

### Creating an Aux 1 Monitor Mix

- Press the **AUX 1** button so it lights—to set the channel-strip AUX 1 knobs so that they send signals to Aux Bus 1.
- Adjust each input channel's level in the Aux 1 mix—using its AUX 1 knob.



When the AUX 1 button is lit, each channel's AUX 1 knob sends the channel's signal to the Aux 1 bus.

- Control the overall level of the Aux 1 mix—using the AUX 1 MASTER knob.



The channel-strip AUX SEND 1 knobs do double-duty as Aux 1 or 2 sends. You can assign them to the desired job at any time by pressing the AUX 1 or AUX 2 button.

## Creating a Monitor Mix with Aux Bus 2



The Aux 2 bus normally sends input channel signals to the M-16DX's internal effects. When you use it instead for a monitor mix, turn off the internal effect processor by pressing the FX button so it's not lit.

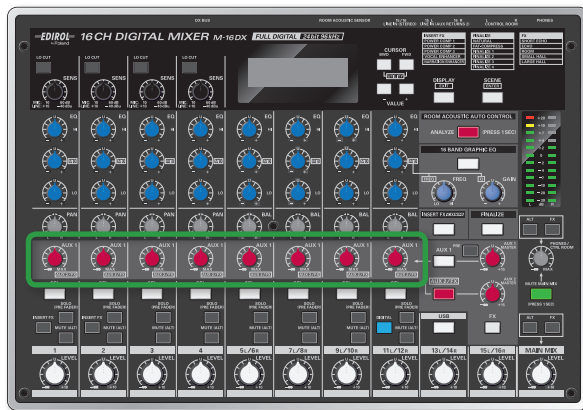
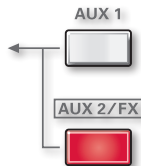
### Sending the Aux 2 Signal to the Stage

The Aux 2 bus is a mono bus, like Aux Bus 1. Connect the AUX SEND 2 output jack to your monitor speaker power amp or in-ear/headphone amp.



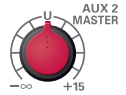
### Creating an Aux 2 Monitor Mix

- Press AUC 2 so it lights—designating the channel-strip AUX 1 knobs as sends to the Aux 2 bus.
- Adjust each input level—using its AUX 1 knob.



When the AUX 2 button is lit, each channel's AUX 1 knob sends the channel's signal to the Aux 2 bus.

- Control the overall level of the monitor mix—with the AUX 2 MASTER knob.



A reminder: You can configure the channel-strip AUX SEND 1 knobs as Aux 1 sends or Aux 2 sends at any time by pressing the AUX 1 or AUX 2 button, as desired.

## Creating a Monitor Mix with the Alt Bus

### The Basic Idea

The basic idea of the Alt bus is that you can remove input signals from the main mix by muting them, which re-routes them to the Alt bus. You can add the signals on the Alt bus back to the main mix, or not, as your needs dictate, or use them as a separate feed. The applications on Page 7 demonstrate what we mean.



### The Alt Bus is a Post-Style Bus

The Alt bus gets its signal post-fader, so each of its signals

- can be EQ'd—using its channel strip's EQ.
- can use an insert effect—if it's going through Input Channel 1 and 2.
- can be positioned in the Alt bus stereo image—using its channel strip's PAN or BALANCE knob.
- has its volume set—by the channel-strip LEVEL knob.

### Connecting to the Alt Bus

You can send the Alt bus to a monitor power amp or in-ear/headphone amp directly from the M-16DX rear-panel ALT OUT L and R jacks if you like.

A better option for live mixing—where you don't need a separate control-room feed as you would in a studio context—is to use the CONTROL ROOM L and R jacks for your Alt bus monitor mix instead, for a few reasons.

Using the CONTROL ROOM outputs for an Alt bus monitor mix gives you:

- *an overall Alt bus gain control*—using the PHONES/CONTROL ROOM knob.
- *routing flexibility*—using the MUTE MAIN MIX button and the PHONES/CONTROL ROOM ALT and FX buttons.

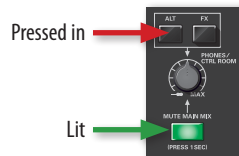
Therefore, we recommend connecting the CONTROL ROOM L and R jacks to your monitor-speaker power amp or in-ear/headphone amp when you're setting up an Alt bus monitor mix.

## Creating a Click-Track-Only Feed



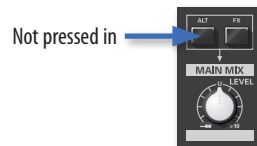
When you're using a click-track, it's best to do it via in-ears/headphones to ensure the audience doesn't hear the click.

- 1 If you've got a digital metronome with a line out jack, connect it to an unused input jack on the M-16DX to create a click-track your rhythm-keeper can follow in performance.
- 2 Press in the MUTE (ALT) button on the selected input's channel strip.
- 3 In the PHONES/CONTROL ROOM area of the mixer, press in the ALT button, and hold down the MUTE MAIN MIX button so it lights, removing the main mix from the monitor mix.

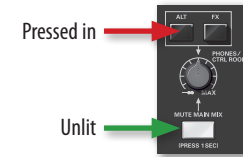


## Creating a Unique Performer-Only Mix

- 1 Press the MUTE (ALT) button in for each input signal you want to send only to your performers. Leave all other MUTE (ALT) buttons up.
- 2 In the MAIN MIX area of the M-16DX mixer, make sure that the ALT button isn't pressed in.

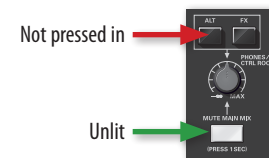
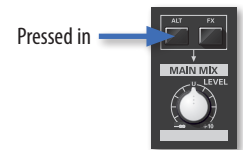


- 3 In the PHONES/CONTROL ROOM area of the mixer, press in the ALT button, and make sure the MUTE MAIN MIX button isn't lit so that both the Alt bus and main mix travel through the CONTROL ROOM L and R outputs to your performers.



## Creating a Stripped-Down Main Mix for Performers

- 1 Press the MUTE (ALT) button in for each input signal you don't want to send to your performers. Leave all other channel-strip MUTE (ALT) buttons in their up position.
- 2 In the MAIN MIX area of the M-16DX mixer, press in the ALT button so that all of the Alt bus signals go to main mix and to the audience.
- 3 In the PHONES/CONTROL ROOM area of the mixer, make sure the ALT button isn't pressed in—removing its signals from the monitor mix—and make sure the MUTE MAIN MIX button isn't lit.



## Some Live-Mixing Thoughts

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Here are some tips for building a successful live mix with the M-16DX.

- *Keep onstage volumes to a minimum*—When onstage amps are turned up too high, you'll have little chance of getting the mix under control, with quieter elements such as vocals being hard to bring out in the mix. Talk to your performers about keeping their onstage amps down to the lowest possible level so you can more effectively control the audience's mix, which is what counts most of all.
- *Keep headroom in mind*—As you set up the mix during soundcheck, start with the instruments, but don't go for maximum volume yet. Leave some room, called "headroom," for vocals and solo instruments. Once you've got the vocals and solo instruments where you want them, you can raise the level of the whole mix.



After you've set up your mix as desired, you may be able to pump up its apparent volume even further using the M-16DX's Finalize feature, as described in the *Using the M-16DX's Finalize Tools* Workshop booklet.

- *Use the M-16DX's internal effects*—The M-16DX contains reverb and delay effects that you can add to various input signals to add depth and polish. If you're not already using Aux 2 for monitor purposes, consider using the built-in effects to complete the aural picture you're painting.
- *Stereo mixing*—If you're working with a stereo PA, consider taking advantage of the M-16DX's stereo capabilities and effects. Stereo can make the performers' sounds that much bigger and clearer. To connect the M-16DX to the power amp of a stereo sound system, use the MAIN OUT L and R jacks on the back of the I/O module.
- *Mono mixing*—If you decide to mix in mono, or are working with a mono sound system, connect the MAIN OUT L jack on the back of the M-16DX I/O module, and pan each input channel all the way left to get the most signal out of the M-16DX.

## The End

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