

Mix Rack Guide For VENUE Systems

Digidesign

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Product features, specifications, system requirements, and availability are subject to change without notice.

PN 9321-58463-00 REV A 01/08

Warning

This product contains chemicals, including lead, known to the State of California to cause cancer and birth defects or other reproductive harm. *Wash hands after handling.*

Communications & Safety Regulation Information

Compliance Statement

The model Mix Rack complies with the following standards regulating emissions and immunity:

- FCC Part 15 Class B
- EN55103 – 1, environment E3
- EN55103 – 2, environment E3
- AS/NZS 3548 Class B
- CISPR 22 Class B
- ICES-003 Class B

Radio and Television Interference

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules.

DECLARATION OF CONFORMITY

We, Digidesign,
2001 Junipero Serra Blvd.
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650-731-6100

declare under our sole responsibility that the product
Mix Rack
complies with Part 15 of FCC Rules.

Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Communications Statement

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

- Reorient or locate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Any modifications to the unit, unless expressly approved by Digidesign, could void the user's authority to operate the equipment.

Canadian Compliance Statement:

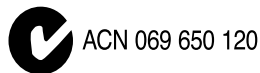
This Class B digital apparatus complies with Canadian ICES-003
Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

CE Compliance Statement:



Digidesign is authorized to apply the CE (Conformité Européenne) mark on this compliant equipment thereby declaring conformity to EMC Directive 89/336/EEC and Low Voltage Directive 73/23/EEC.

Australian Compliance:



Safety Statement

This equipment has been tested to comply with USA and Canadian safety certification in accordance with the specifications of UL Standards: UL60065 7th /IEC 60065 7th and Canadian CAN/CSA C22.2 60065:03. Digidesign Inc., has been authorized to apply the appropriate UL & CUL mark on its compliant equipment.

Warning



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 caution when replacing the Lithium battery in the Mix Rack unit. There is danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type.
- 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.

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Chapter 1: Introduction

The Mix Rack provides stage and front-of-house (FOH) I/O for Digidesign VENUE systems, in a single rack enclosure.

Mix Rack can be used with D-Show Profile or D-Show Main and Sidecar control surfaces, to form a complete VENUE system.

Mix Rack Features

Audio I/O

Stage I/O

- 48 inputs with mic preamps for stage inputs. Each fully recallable input provides individually selectable phantom power, input gain, polarity invert, and a high-pass filter.
- 16 output channels (expandable up to 32) to connect to mains and monitors.

FOH I/O

- 8 pairs of analog I/O for hardware inserts, or for input and output of line-level program material from the FOH position.
- Analog and Digital (AES or S/PDIF) 2-Track inputs and outputs.
- Com mic input, with gain control and phantom power.
- Monitor outputs to connect to near field monitor speakers at the mix position.

Synchronization and Control I/O

- MIDI In and Out ports, providing 16 channels of MIDI input and 16 channels of MIDI output.
- Word clock I/O for digital clock synchronization.
- USB 2.0 ports for USB disks, iLoks, and other USB devices.
- 100 BaseT Ethernet (ECx) port for Ethernet-based remote control.

CPU, DSP, and System Drives

Mix Rack houses the CPU, DSP, hard drive and CD-ROM drive that run the D-Show software on your VENUE system. D-Show software is installed at the factory. The CD-ROM drive lets you update or restore your D-Show system software, and install compatible plug-ins from their installer discs.

A standard Mix Rack includes two Mix Engine cards, which provide DSP for plug-ins and mixing. You can add an optional Mix Engine card, up to a maximum of three.

Redundant Power Supply Units (PSUs)

Each Mix Rack comes with two universal (100V to 240V nominal, 50–60 Hz) PSUs with auto redundant failover and LED status indication.

Included Components

The following components are included in a standard Mix Rack configuration:

- 1 Mix Rack unit with:
 - 3 AI16 Analog Mic/Line Input cards (16 channels each)
 - 1 AO16 Analog Output card (16 channels)
 - 2 Mix Engine cards
- 1 FOH Link cable (for connection to VENUE control surfaces)
- 2 IEC power cables
- D-Show system software and user guides
- VENUEPack plug-in bundle and iLok

Expansion Options

I/O Options

Each Mix Rack supports a maximum of 3 input cards and 2 output cards for a total of up to 48 inputs and up to 32 outputs. Mix Rack expansion I/O options include:

A116 Analog Mic/Line Input Card that provides 16 analog mic/line level inputs

A016 Analog Output Card that provides 16 analog line level outputs

X016 Analog and Digital Output Card that provides 8 analog line level outputs, and 8 AES digital outputs.

AT16 A-Net Output Card that provides 16 channels of A-Net output compatible with Aviom® Personal Mixers and other Pro16™ Series devices.


DSP Expansion

An additional Mix Engine card can be added to the Mix Rack (up to a maximum of three Mix Engine cards) to increase the amount of DSP available for mixer and plug-in processing.

Record and Playback Options

FWx Record/Playback Option This FireWire-based option lets you record or play back up to 18 channels of audio directly from Mix Rack with a Pro Tools LE™ system.

HDx Record/Playback Option This option lets you record or play back up to 64 channels of audio directly from Mix Rack with a Pro Tools|HD® system.

 *Only a single HDx Card can be installed in a Mix Rack. Only one Record and Playback Option can be installed at any one time (either HDx or FWx).*

Operational Requirements

Temperature and Ventilation

The Mix Rack unit should be operated away from heat sources and with adequate ventilation.

Storage

The Mix Rack unit should be stored and transported at temperatures not lower than 0 degrees F (–18 degrees C) and not exceeding 140 degrees F (60 degrees C).

Operation

The Mix Rack unit should be operated at temperatures not lower than 40 degrees F (4 degrees C) and not exceeding 115 degrees F (40 degrees C).

Water and Moisture

The Mix Rack unit should be operated away from sources of direct moisture and should be kept clear of liquids that might spill into the unit. If condensation is present on the unit, leave the unit to dry in ambient air for at least one hour before powering the unit on.

Cleaning and Maintenance

If you need to clean the surface of the Mix Rack unit, use a dry cloth. Do not apply any cleaning solutions, spray cleaners, or abrasives to the surface.

Power Connections

Each power supply in the Mix Rack requires its own power connection. Each power supply is auto voltage-selecting (100V to 240V). A modular IEC power cable is provided for each power supply in the unit.

Mix Rack Front Panel

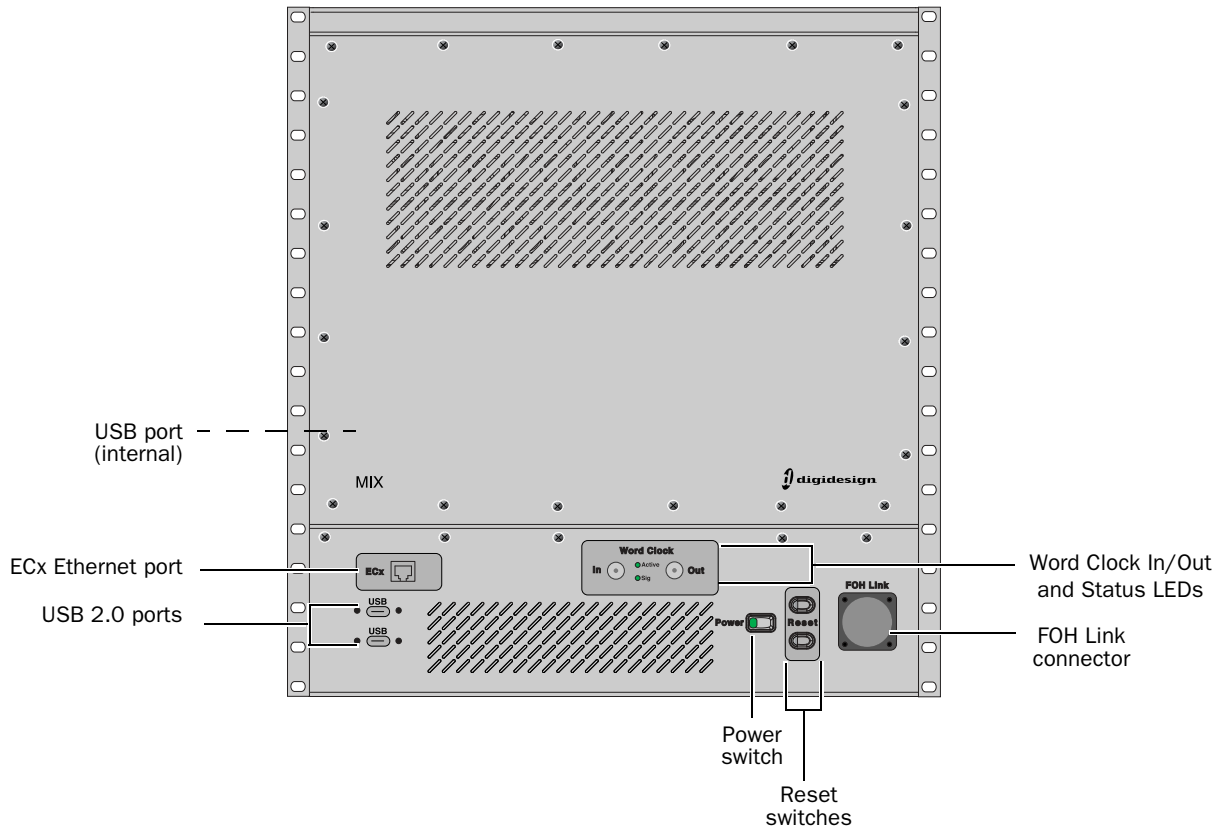


Figure 1. Mix Rack front panel

ECx Port

The ECx port lets you connect a laptop, tablet, or similar control device to the Mix Rack. (This port does not support networking or any communication other than ECx.) See the *ECx Ethernet Option Guide* for more information.

USB Ports


The USB ports on the front panel of the Mix Rack are USB 2.0 ports, letting you connect iLoks, USB key disks and other USB devices. (An additional, secure USB port is located inside the Mix Rack chassis.)

Power Switch

The Power switch applies power to the Mix Rack and starts the VENUE system.

Reset Buttons

The Reset buttons, when pressed simultaneously and held, restart the VENUE system.

 See the *Troubleshooting chapter of the D-Show or D-Show Profile guide for additional information.*

Word Clock I/O

The Word Clock In and Word Clock Out ports let you integrate external digital devices with Mix Rack.

Status LEDs

The Active and Sig LEDs indicate Word Clock status. Both the Active and Sig LEDs light green when the system is locked. Both LEDs blink red if there is a signal present but it cannot lock.

FOH Link Connector

The FOH Link connector accepts the FOH Link cable that connects to the control surface (whether D-Show Profile, or D-Show Main). This cable provides all the data and audio connections between the control surface and Mix Rack.

Mix Rack Back Panel

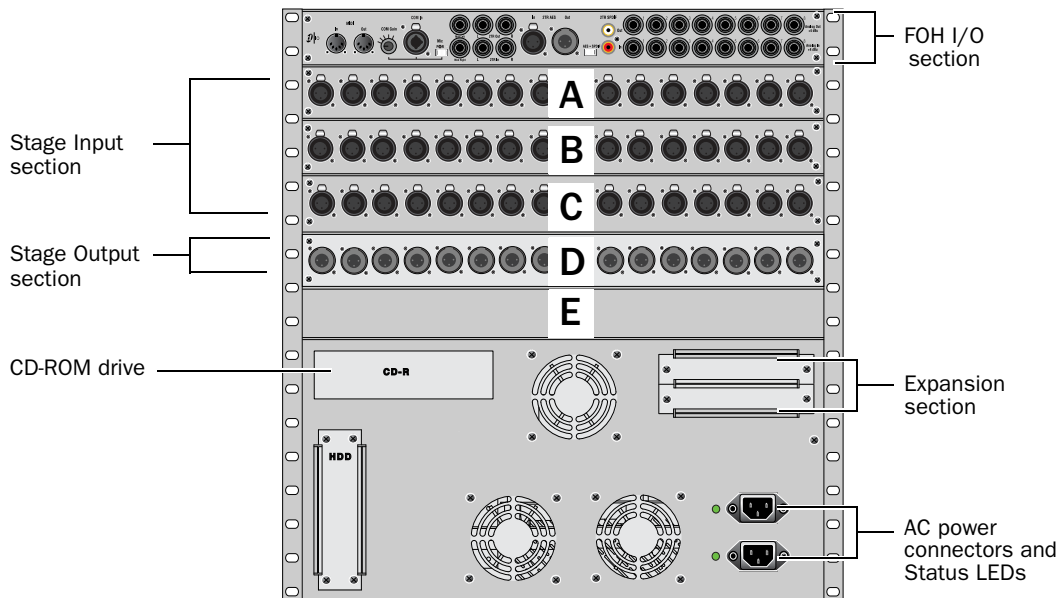


Figure 2. Mix Rack back panel, connectors, and I/O slots A-E

Stage Input Section

The Stage Input section provides 48 channels of audio input, arranged in three rows of 16 channels, to connect stage input sources. An analog multicore snake (not provided) is used to bring inputs from stage to the mix position.

Stage Output Section

The Stage Output Section provides 16 channels of stage output (expandable to 32) to connect to house/mains and stage monitors. Mix Rack can be expanded with other types of stage output (see “I/O Options” on page 2 for more information).

CD-ROM Drive

The built-in CD-ROM drive is for installing software updates, plug-ins, and other data.

FOH I/O

The FOH I/O section includes connectors for audio (analog inserts, analog and digital 2-track inputs), synchronization (MIDI), and communication (Com mic input, with gain). For more information, see “FOH I/O Section” on page 5.

Expansion Section

These slots let you add an FWx or HDx Pro Tools Record/Playback Option (see “Record and Playback Options” on page 2 for more information).

AC Power Connectors (2)

The AC Power connectors accept standard AC power cables, for powering each of the two internal Mix Rack power supply units. Mix Rack power supplies are auto-power selecting (100V to 240V, 50–60 Hz) and automatically work with a standard modular power cord when connected to an AC receptacle in any country.

FOH I/O Section

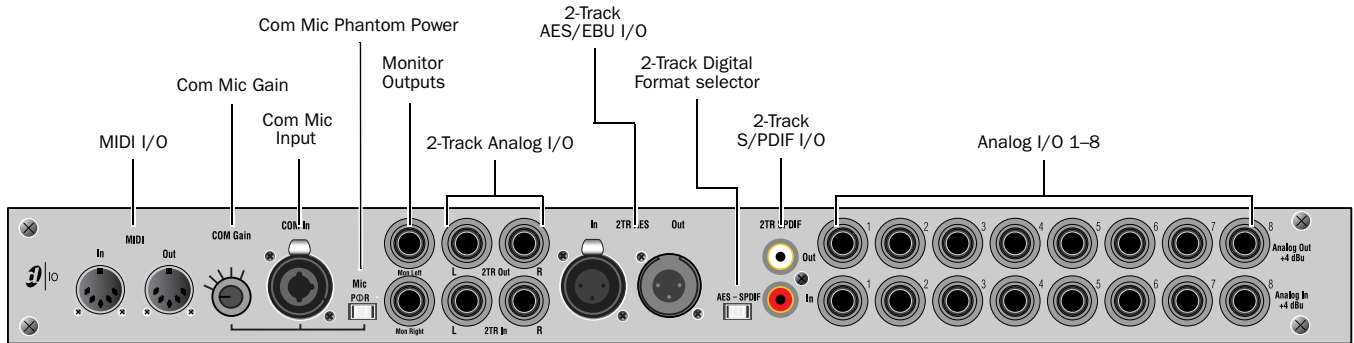


Figure 3. FOH I/O connectors on Mix Rack

MIDI I/O Ports

These MIDI In and Out Ports provide 16 channels of MIDI input and 16 channels of MIDI output to the system. The MIDI I/O ports are used in sending and receiving Snapshot MIDI messages, and in receiving MIDI Time Code from external devices.

Com Mic, Gain Control, and Phantom Power

The Com Mic connector and controls allow connection of a mic, or a line level source. The Com Mic input is a female XLR/TRS connector that accepts XLR or TRS jacks. The Gain control operates in steps of 3 dB. Phantom power may be applied to the Com mic with the Mic Power switch.

⚠ Do not connect an intercom system directly to the Com input, as some intercom systems use a signalling voltage which can damage the FOH IO card.

Monitor Outputs

These Monitor Outputs are used for output to a near-field monitors or a cue mix system (not included). These are 1/4-inch balanced TRS connectors.

2-Track Analog Inputs and Outputs

These 2-Track analog connections are used for input and output of analog audio material. These are balanced 1/4-inch TRS connectors.

2-Track Digital Inputs and Outputs

These 2-Track digital connections are used for input and output of digital audio material. Stereo AES/EBU or S/PDIF I/O connectors are selectable with the AES-SPDIF switch. These connectors support 24-bit, 48 kHz digital signals. Input signals with other sample rates are sample-rate converted to 48 kHz.

Analog I/O (1-8)

These 8 pairs of analog inputs and outputs are used for hardware inserts, or for input and output of program material from the mix position. These are balanced, 1/4-inch TRS connectors.

Chapter 2: Connecting the Mix Rack

Connecting D-Show to the Mix Rack

Mix Rack can be used with D-Show Profile, and D-Show Main/Sidecar control surfaces.

To connect D-Show Profile and the Mix Rack:

- Connect one end of the FOH Link cable to the FOH Link port on the back panel of the D-Show Profile control surface. Connect the other end of the FOH Link cable to the FOH Link port on the front panel Mix Rack. On each end, be sure to align the notch in the connector housing with the slot in the plug, and to rotate the collar until the connector is fully latched.

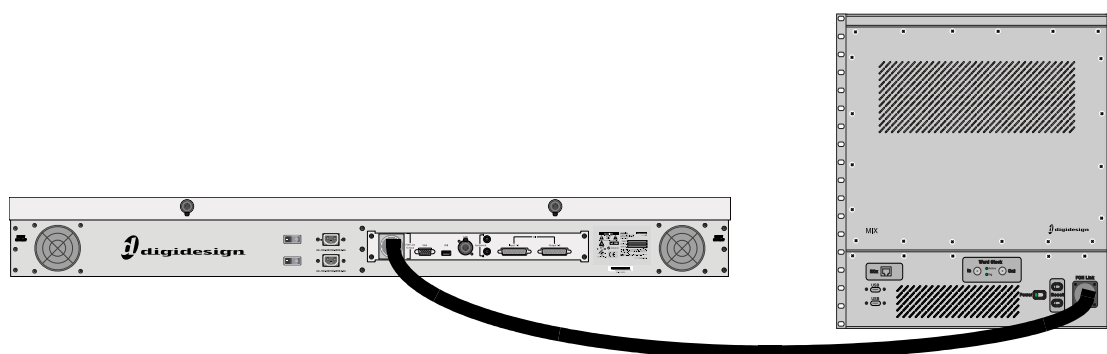


Figure 4. FOH Link connection between D-Show Profile (left) and Mix Rack (right)

To connect the D-Show Main Unit and the Mix Rack:

- Connect one end of the FOH Link cable to the FOH Link port on the back panel of the Main Unit. Connect the other end of the FOH Link cable to the FOH Link port on the front panel Mix Rack. On each end, be sure to align the notch in the connector housing with the slot in the plug, and to rotate the collar until the connector is fully latched.

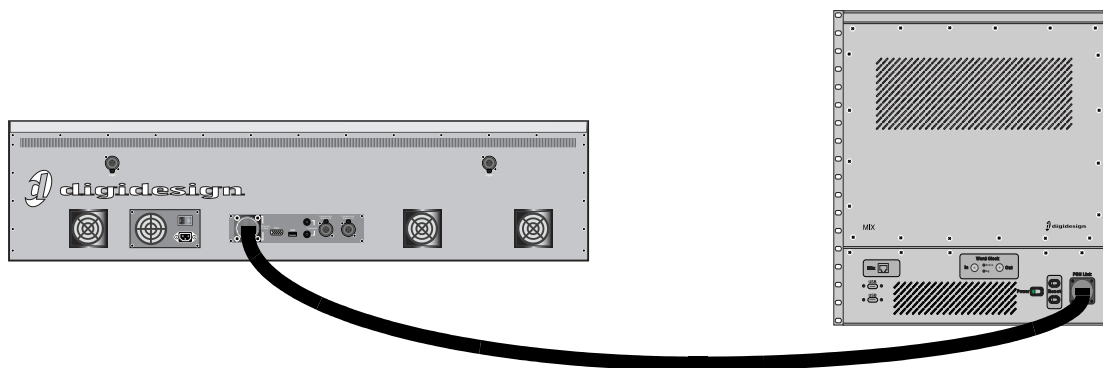


Figure 5. FOH Link connection between D-Show Main Unit (left) and Mix Rack (right)

Audio Connections

Mix Rack provides 48 analog mic/line inputs, up to 32 analog line outputs, and a variety of analog and digital audio inputs and outputs. You can use an analog multicore snake cable (not included) to carry multiple stage inputs and outputs to and from the Mix Rack, or you can connect mics, instruments and other sources directly to Mix Rack Stage inputs, and connect Mix Rack Stage outputs directly to the inputs on your house/mains systems, monitor systems, or other.

For outboard effects processors, communications, and similar needs, see “FOH I/O Section” on page 5.

Stage I/O

Use the following sections to identify where to connect stage and FOH I/O to Mix Rack.

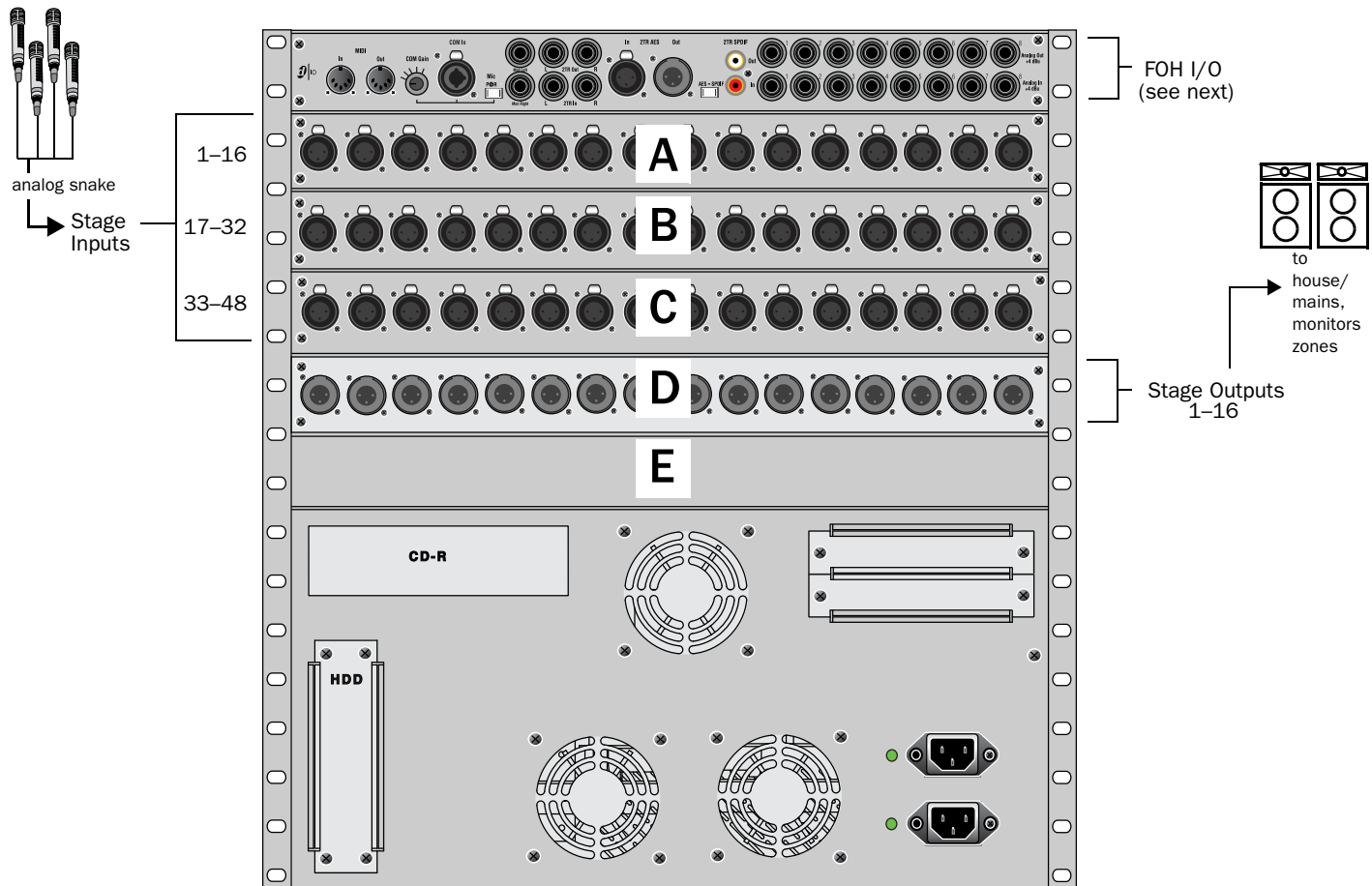


Figure 6. Mix Rack audio connectors and I/O slots (A-E) for stage inputs and outputs

Stage Inputs 1-48

(Analog Mic/Line XLR Inputs)

The Stage Input section provides 48 channels of analog mic/line inputs (XLR), to connect stage input sources. You can use a standard analog snake cable to run lines from the stage to the Mix Rack (analog snake cable not included). Then connect the snake to Stage inputs 1-48. (For instructions on applying phantom power and other settings, see the guide that came with your control surface.)

Stage Outputs 1-16

(Analog Line XLR Outputs)

The Stage Output Section provides up to 32 channels of stage output (XLR), to connect to house/mains, monitors, additional zones, or feeds to other devices.

Ancillary Connections

(AC Power, Synchronization and Optional Connections)

AC Power Connectors

The AC Power connectors accept standard AC power cable, for powering each of the two (redundant) internal Mix Rack power supply units. Mix Rack power supplies are auto-power selecting (100V to 240V, 50–60Hz) and automatically work with a standard modular power cord when connected to an AC receptacle in any country.

ECx Port

The ECx port lets you connect an RJ-45 Ethernet cable for remote control of the system from a laptop or tablet computer.

USB Ports

The USB ports on the front panel of the Mix Rack are USB 2.0 ports, letting you connect iLoks, USB key disks and other USB devices. (An additional, secure USB port is located inside the Mix Rack chassis as well; use this internal port to connect and secure a pre-loaded iLok to always be available to that Mix Rack system.)

FOH Link Connector


(See “Connecting D-Show to the Mix Rack” on page 7.)

Word Clock I/O

The Word Clock In and Word Clock Out ports let you integrate external digital devices with Mix Rack.


Powering the System Up and Down

Powering Up

 *Faders move when power is turned on. Before powering up the system, make sure all fader paths are clear of obstructions.*

Power up the system in the following sequence:

- 1 D-Show Profile, or D-Show Main/Sidecar(s) control surface
- 2 Mix Rack
- 3 Any connected computers for recording/playback options
- 4 Audio monitoring system

 *Each power supply has a separate power switch.*


Powering Down

Power down the system in the following sequence:

- 1 Audio monitoring system
- 2 Any connected computers for recording/playback options
- 3 Mix Rack
- 4 D-Show Profile, or D-Show Main/Sidecar(s) control surface

Restarting the System

If at any time during setup or performance it becomes necessary to restart the system, you can restart the entire system or reset individual hardware devices.

 *For more information on restarting D-Show and resetting system hardware, see the Troubleshooting chapter of the D-Show guide that came with your control surface (D-Show Profile Guide, or D-Show Guide).*

Configuring your System with a Mix Rack

When using a VENUE system with a Mix Rack, the following parameters will be different (or unavailable) than on systems that use the original D-Show Stage Rack and FOH Rack units.

Maximum System Configuration

Maximum Mix Rack Configuration

Parameter	Max
Mix Engines	3
Input Channels	48
FX Returns	16
Graphic EQs	24

How to Proceed

To learn how the Mix Rack appears in D-Show software, see the *What's New in D-Show 2.7* guide.

To learn how to operate the VENUE system, see the *D-Show Profile Guide* or *D-Show Guide* that came with your control surface.

Chapter 3: Mechanical Specifications

Mix Rack Mechanical Specifications

Mix Rack Specifications (Maximum Configuration)	
Dimensions (H x W x D)	19.25 x 19 x 18 inches (489 x 483 x 458 mm)
Rack Spaces	11 U
Weight	100 lbs (45.4 kg)
Power Requirements	AC 100–240V, 50–60 Hz, 360 W
Word Clock In/Out Connectors	BNC female (2)
USB Ports (3, including internal)	USB 2.0
FOH Link Connector	MIL connector
Max FOH Link Cable Length	11 ft. (3.35 m)

Environmental

Parameter	Specification	Limit	Units	Condition/Comment
Storage Temperature	0 to +140		deg F	-18 to +60 deg C
Operating Temperature	+40 to +115		deg F	+4 to +40 deg C
Storage humidity range	5 to 95		%	Non-condensing
Operating humidity range	20 to 80		%	Non-condensing

Chapter 4: Audio Specifications

Mix Rack General Audio Specifications

Audio, general

Parameter	Specification	Limit	Units	Condition/Comment
Internal Sample Rate	48		kHz	
External Sample Rate	48 +/- 10 ppm (word clock input)		kHz	
Processing Delay (latency)	Less than 2.3	max	ms	48 channels, stage input through L-R bus to stage output
Internal Processing	up to 48-bit, fixed point			288 dB internal dynamic range
Frequency Response	+/- 0.2		dB	20 Hz – 20 kHz BW, relative to 1 kHz
Dynamic Range	110	min	dB	Analog stage input to analog stage output, re +24 dBu, A-weighted, 20 Hz – 20 kHz BW
Crosstalk	-100	max	dB	Adjacent Stage inputs to L-R bus, @ 1 kHz
Residual Output Noise	-90	max	dBu	20 Hz – 20 kHz BW
Maximum Voltage Gain	84		dB	Stage input to L-R bus, channel & L-R faders @ max

All measurements at $F_s=48$ kHz with 150 Ohm source impedance and 600 Ohm load impedance, unless otherwise specified.

0 dBu = 0.775Vrms.

Stage Inputs and Outputs

Stage Inputs

AI16 Analog Mic/Line Inputs

Parameter	Specifications	Limit	Units	Condition/ Comment
Type	Balanced, XLR3-Female			
Gain	+10 to +60		dB	6 dB analog steps with 0.1 dB digital increments and crossfade at analog relay switch point
Max Input Level	+32		dBu	Pad ON
Pad	20		dB	
Input Impedance, pad OFF	5.5k		Ohm	Each leg to ground
Input Impedance, pad ON	3.8k		Ohm	Each leg to ground
Phantom Power	+48		VDC	10 mA max per channel
EIN	-126	max	dBu	Max gain, 150 ohm source, 20 Hz–20 kHz BW, unweighted
THD + N	0.003		%	Minimum gain, pad OFF, -1 dBFS output, 20 Hz–20 kHz BW
A/D Converter Latency	0.25		ms	Fs=48kHz

Stage Outputs

AO16 Analog Line Outputs

Parameter	Specifications	Limit	Units	Condition/ Comment
Type	Balanced, XLR3-Male			
Impedance	50		Ohm	Each leg to ground
Maximum Output Level	+24	max	dBu	
D/A Converter Latency	0.58		ms	Fs=48kHz

FOH Inputs and Outputs

FOH Input

Analog Line Inputs 1–8; 2-Track Analog Inputs

Parameter	Specification	Limit	Units	Condition/Comment
Type	Balanced, 1/4-inch TRS Female			
Maximum Input Level	+24	max	dBu	
Input Impedance	10k		Ohms	
THD+N	0.003	max	%	–1 dBFS output, 20 Hz to 20 kHz BW

2-Track AES Input

Parameter	Specification	Limit	Units	Condition/Comment
Type	XLR3-F			
Format	AES/EBU			
Termination	110		Ohm	
Word Length	24		bit	
Sample Rate	48		kHz	
Sample Rate Conversion (SRC)	32 to 96		kHz	Always active

2-Track S/PDIF Input

Parameter	Specification	Limit	Units	Condition/Comment
Type	Unbalanced, co-axial (RCA)			
Format	S/PDIF (IEC-60958 Type II)			
Termination	75		Ohm	
Word Length	24		bit	
Sample Rate	48	nom	kHz	
Sample Rate Conversion (SRC)	32 to 96		kHz	Always active

Com Input (XLR/TRS)

Parameter	Specification	Limit	Units	Condition/Comment
Type	Neutrik combi XLR/TRS			
Sensitivity	-2 to -32		dBu	Equals 0 dBFS. Switchable in 6 gain steps
Phantom Power	+15		VDC	6mA (switchable on Mix Rack back panel)
Input Impedance	20k		Ohms	

Talkback Mic Input (XLR)

Parameter	Specification	Limit	Units	Condition/Comment
Type	XLR3-F			
Sensitivity	-20		dBu	fixed
Phantom Power	+15		VDC	6mA (always on)
Input Impedance	20k		Ohms	

FOH Output

Analog Line Outputs 1-8; 2-Track Analog Outputs; Monitor L/R

Parameter	Specification	Limit	Units	Condition/Comment
Type	Balanced, 1/4-inch TRS Female			
Maximum Output Level	+24	max	dBu	
Output Impedance	50		Ohm	

2-Track AES Output

Parameter	Specification	Limit	Units	Condition/Comment
Type	XLR3-M			
Format	AES/EBU			
Word Length	24		bit	
Sample Rate	48		kHz	
Sample Rate Conversion (SRC)	None			
Dithering	None			
Channel Status Info	Pro, Audio 48K, No Emphasis			
Max Cable Length	100		meter	Without equalization, 110 ohm cable

2-Track S/PDIF Output

Parameter	Specification	Limit	Units	Condition/Comment
Type	Unbalanced, co-axial (RCA)			
Format	S/PDIF (IEC-60958 Type II)			
Output Impedance	75		Ohm	
Word Length	24		bit	
Sample Rate	48		kHz	
Sample Rate Conversion (SRC)	None			
Dithering	No			
Channel Status Info	Consumer, Audio, 48K, Non-copy, 2-Channel, General Category, Level 2 Clock			

Headphone Output

Parameter	Specification	Limit	Units	Condition/Comment
Type	Unbalanced, 1/4-inch TRS Female			Located on console
Output Impedance	50		Ohm	
Max RMS Power Output	20		mW	at +21 dBu with 32 Ohm headphones
	130		mW	at +21 dBu with 600 Ohm headphones

Synchronization and Control I/O

Ancillary	Connector	Count	Type
MIDI In	5-Pin DIN F	1	
MIDI Out	5-Pin DIN F	1	
Word Clock In	BNC-F	1	
Word Clock Out	BNC-F	1	
FOH Link	Multi-Pin	1	55-pin
Ethernet (ECx)	RJ-45	1	100BaseT