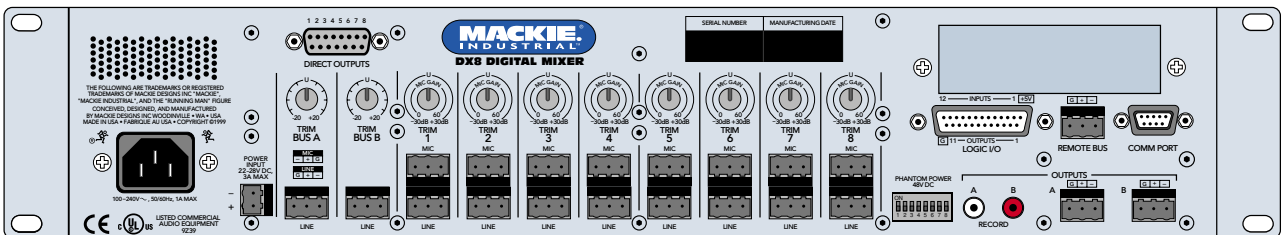
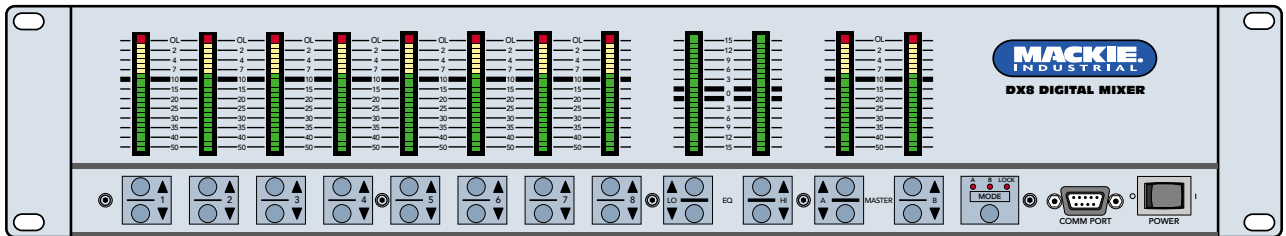


# DX8 DIGITAL AUDIO MIXER/ SIGNAL PROCESSOR WITH AUTOMIXING

## INSTRUCTION MANUAL



# MACKIE®

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.*

## SAFETY INSTRUCTIONS

1. Read Instructions — Read all the safety and operation instructions before operating the DX8.
2. Retain Instructions — The safety and operating instructions should be kept for future reference.
3. HEED ALL WARNINGS — Follow all warnings on the DX8 and in these operating instructions.
4. FOLLOW ALL INSTRUCTIONS — Follow all operating and other instructions.
5. Water and Moisture — Do not use the DX8 near water — for example, near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, near a swimming pool, etc.
6. Ventilation — This DX8 should be situated so that its location or position does not interfere with its proper ventilation. For example, it should not be situated on a bed, sofa, rug, or similar surface that may block any ventilation openings, or placed in a built-in installation such as a bookcase or cabinet that may impede the flow of air through ventilation openings.
7. Heat — Locate the DX8 away from heat sources such as radiators, or other devices which produce heat.

8. Power Sources — Connect the DX8 to a power supply only of the type described in these operation instructions or as marked on the rear panel. If using an external DC power supply or battery pack, be sure the voltage corresponds to the range indicated on the rear panel, and that it is connected with the correct polarity.

9. Power Cord Protection — Route power supply cords so that they are not likely to be walked upon or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit the DX8.

10. Object and Liquid Entry — Do not drop objects into or spill liquids into the inside of the DX8.

11. Damage Requiring Service — The DX8 should be serviced only by qualified service personnel when:

- A. The power-supply cord or the plug has been damaged; or
- B. Objects have fallen, or liquid has spilled into the DX8; or
- C. The DX8 has been exposed to rain; or
- D. The DX8 does not appear to operate normally or exhibits a marked change in performance; or
- E. The DX8 has been dropped, or its chassis damaged.

12. Servicing — The user should not attempt to service the DX8 beyond those means described in this operating manual. All other servicing should be referred to the Mackie Service Department.

13. To prevent electric shock, do not use this polarized plug with an extension cord, receptacle or other outlet unless the blades can be fully inserted to prevent blade exposure.

*Pour prévenir les chocs électriques ne pas utiliser cette fiche polarisée avec un prolongateur, un prise de courant ou une autre sortie de courant, sauf si les lames peuvent être insérées à fond sans laisser aucune partie à découvert.*

14. Grounding or Polarization — Precautions should be taken so that the grounding or polarization means of the DX8 is not defeated.

15. 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.

**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.*

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

**CAUTION** — Internal lithium battery.  
Danger of explosion if battery is incorrectly replaced.  
Replace only with the same or equivalent type.

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## 2. INTRODUCTION

The DX8 is a DSP-based digital audio mixer and signal processor designed for use in a variety of installations such as churches, courtrooms, convention centers, and hotels. It provides eight universal inputs and two balanced outputs allowing true 8x2 mixing for stereo or dual-zone applications. The DX8 includes powerful signal processing software to complement the 8x2 mixing structure. Automixing capability allows the DX8 to be setup for applications where a human operator is not available.

Each of the eight input channels is terminated to two Phoenix-type detachable connectors. Each connector is optimized to accept either microphone or line-level signals. Microphone preamplifiers employ Mackie's proprietary XDR™ technology to offer studio-class audio performance. Phantom power of 48 VDC is switchable individually on each input. Two auxiliary line-level inputs with trim are provided, allowing analog signals to be mixed with the A and B master mixes. Master outputs deliver balanced line-level signals to detachable Phoenix-type connectors as well as buffered unbalanced signals to RCA connectors intended for recording.

The DX8 offers an intuitive front panel user interface, consisting of dual-function LED bar graph meters for each input and output. Input meters indicate the presence of signal before signal processing (pre-fader), while output meters indicate actual level at the output (post-fader). Levels are set by means of UP/DOWN pushbuttons dedicated to each input and output. A MODE button is used to select between Mix A and B, allowing adjustment of levels to both mix outputs from the same set of input controls. A third function of the MODE button allows the user to LOCK the front panel controls until a security unlock code is entered.

The DX8 offers flexible interface options through dedicated inputs and outputs for control and programming purposes. Two independent RS232 connectors are provided, one on the front panel and one on the rear, for connection to a computer or control system. A multi-pin (DB25F) connector on the rear panel allows interface among the 10 Logic Inputs and 10 Logic Outputs. This interface connects to switches, LEDs, and other devices, enabling hardware control and indication from custom control panels. All logic inputs and outputs are fully programmable in software. A proprietary remote control bus allows connection of the optional wired remotes over three-conductor cable. Remotes are available in Volume Control (DX-RVC)

and 4-Switch (DX-SW4) versions and may be combined in any configuration.

The DX8 is supplied with PC software that allows access to all of the system's settings and configurations. The software offers access to the Automixing controls, two 1/3-octave equalizers, two 5-band parametric equalizers, and two compressors dedicated to the two master outputs. In addition, it allows configuration and recall of up to 16 Presets, 8 input Priority Levels, 8 Mute Groups, and 8 Control Groups. Force ON and OFF functions are provided, with a selection of Relative or Absolute changes, which can be used with the Priority settings to create sophisticated audio management systems. All settings and text labels are retained in the DX8, and can be saved on the computer's local drive.

The DX8 is UL and CE approved and designed for continuous use in professional fixed installation systems. An internal auto-ranging power supply allows connection to mains voltages from 90-240V AC at 50/60 Hz without requiring jumper or switch setting changes. A 24 VDC input is provided for applications where backup power is required. Switchover to backup power is automatic and silent.

### KEY FEATURES

- 32-bit DSP and 24-bit Analog/Digital Conversion
- 8 balanced XDR™ Mic/Line inputs with trim
- 2 balanced Line inputs direct to mix buses A and B
- 2 Independent Mix Buses and balanced Outputs
- 2 unbalanced Record Outputs
- 8 unbalanced Direct Channel Outputs
- Individual Level/Peak (PPM) metering on each Input and Output
- 3-band sweepable Hi/Lo shelving and mid-peaking EQ on each Input
- 2-band sweepable shelving EQ on each Output
- 31-band Graphic EQ on each Output
- 5-band Parametric EQ on each Output
- One fully variable Compressor on each Output
- Independent Automixing function for each Output to maximize acoustic gain and prevent feedback
- 10 Programmable Logic Inputs
- 10 Programmable Logic Outputs
- 2 independent RS-232 interface ports
- 48 VDC Phantom Power switch per input
- 24 VDC Backup Power input
- Hardware Expansion Port accepts optional modules
- PC Software application included

# FRONT PANEL FEATURES

## 1 INPUT UP/DOWN BUTTONS

Use these buttons to adjust the mix level for each input channel.

## 2 INPUT LED DISPLAY

This indicates the signal level after the mic preamp stage, just after the A/D converter, but prior to any digital signal processing. When any input UP/DOWN button is pressed, all the meters (except EQ) switch from level metering to level setting indication. After five seconds, the meters switch back to normal peak program metering (PPM).

When the 10 and 7 LEDs are both lit, the gain is set to unity (0 dB).

## 3 EQ LO/HI UP/DOWN BUTTONS

Use these buttons to adjust the gain of the 2-band shelving EQ on the outputs. The range is  $\pm 15$  dB.

## 4 EQ LED DISPLAY

When an EQ UP/DOWN button is pressed, the EQ meter indicates the amount of boost or cut of the LO and HI frequencies in decibels ( $\pm 15$  dB).

When both "0" LEDs are lit, the gain is set to unity (flat response).

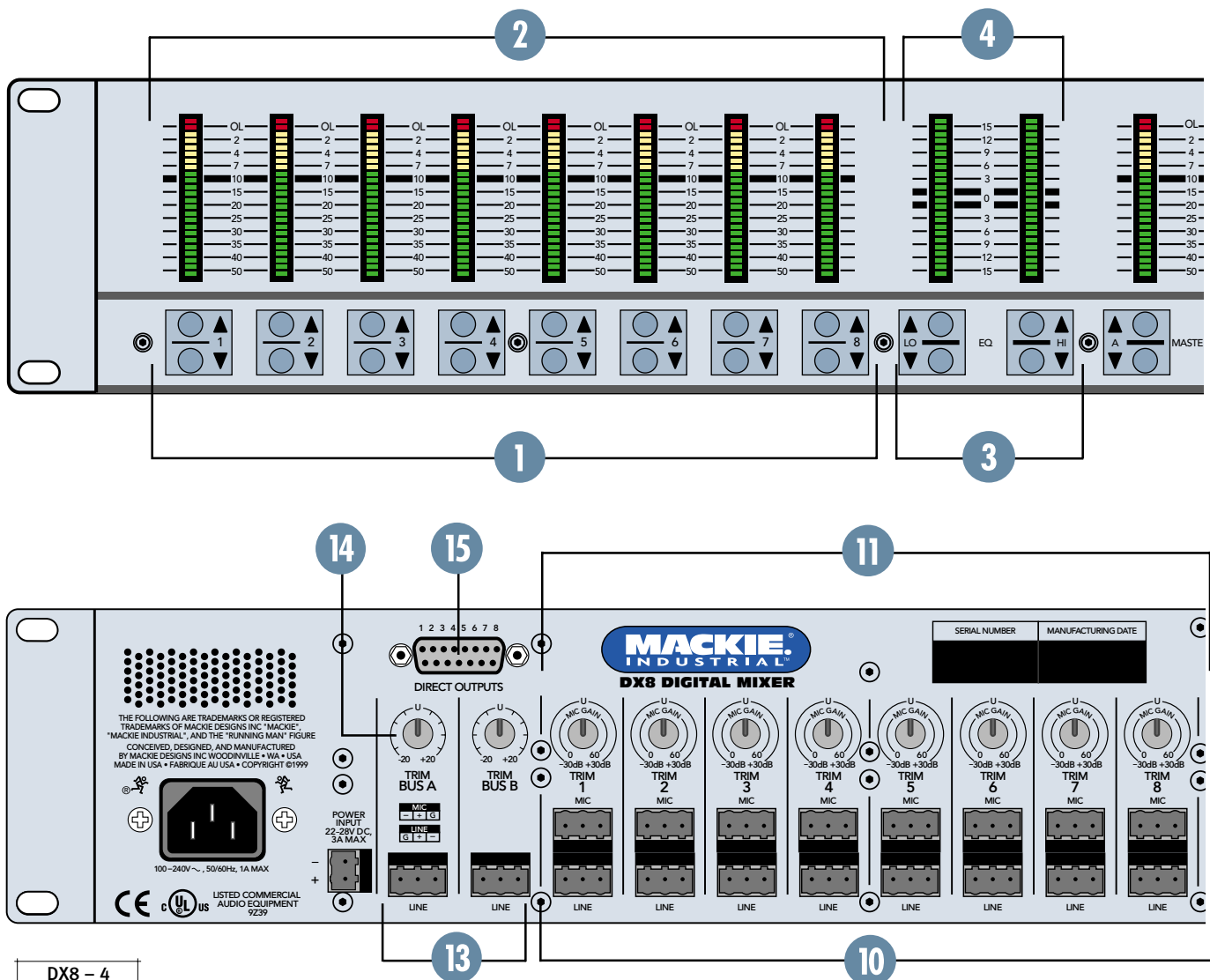
**Note:** The EQ meters do not indicate signal level.

## 5 MASTER A/B UP/DOWN BUTTONS

These buttons adjust the output level for each output bus.

## 6 MASTER OUTPUT LED DISPLAY

This indicates the signal level after the digital signal processing and MASTER gain stage, just prior to the D/A converter. When any MASTER UP/DOWN button is pressed, all the meters (except EQ) switch from level metering to level setting indication. After five seconds, the meters switch back to normal peak program metering (PPM).



## 7 MODE

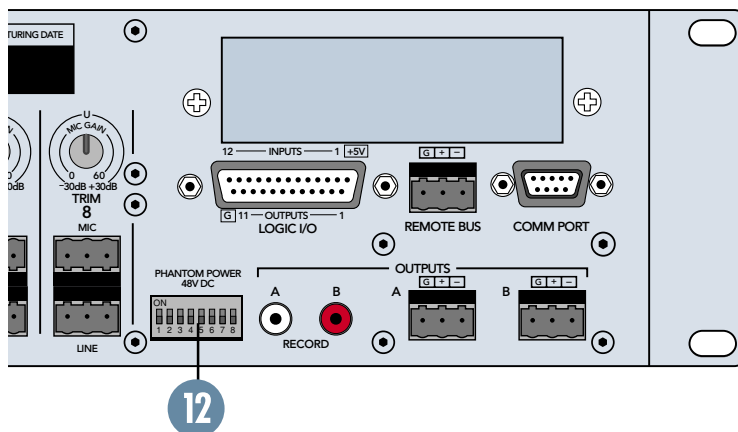
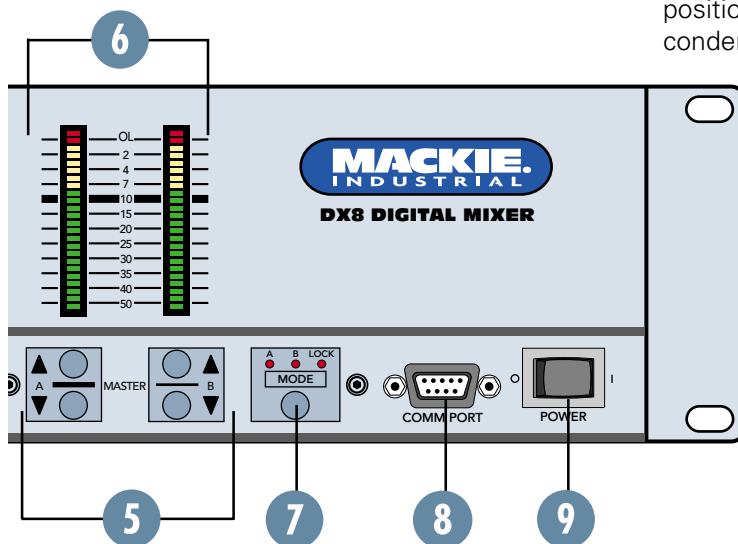
This switch changes the front panel operation between Bus A and Bus B operation. In addition, the **LOCK** position disables the front panel controls to prevent unauthorized changes to the settings. A security code must be entered to enable the front panel controls when the DX8 is locked. See page 17 for more information on locking and unlocking the DX8.

## 8 COMM PORT

This is an RS-232 port on a 9-pin D-Sub connector, which connects to a personal computer or other compatible control system for external control of the DX8 settings. A second **COMM** port on the rear panel duplicates this function, for permanent connection to an installed controller.

## 9 POWER

Use the **POWER** switch to turn the DX8 on and off.



## REAR PANEL FEATURES

### 10 INPUTS 1-8

Each of the eight analog inputs has separate balanced mic and line input connectors that use Mackie's acclaimed XDR mic preamps. These are 3-pin Phoenix-type connectors. Use either the **MIC** or **LINE** input, but only one can be used per channel.

### 11 TRIM

This rotary analog control is used to trim the gain of the input signal for optimum signal-to-noise ratio in the preamp stage. For mic-level signals, it provides from 0 to +60 dB of gain. For line-level signals, it provides from -30 dB to +30 dB of gain, with unity (0 dB) at the center position. This control accepts a maximum input signal of +18 dBu before clipping (at unity gain).

### 12 PHANTOM POWER

These switches apply phantom power (+48 VDC) to pins 2 and 3 of the selected mic input connectors. Switch the **PHANTOM POWER** switch in the UP position for an individual channel when using a condenser microphone.

### 13 BUS A/B INPUTS

These analog inputs accept balanced line-level signals and route the signal to the internal buses. These inputs may serve as additional zone inputs for program devices, or to connect the **BUS A** and **BUS B** outputs from another DX8. There is no DSP processing on these inputs.

### 14 BUS A and B TRIM

These rotary analog controls are used to trim the gain of the inputs to the buses. This trim control provides from -20 dB to +20 dB of gain, with unity (0 dB) at the center-detent position.

### 15 DIRECT OUTPUTS

This 15-pin D-Sub connector supplies an analog, unbalanced line-level signal from each of the eight program inputs, post-preamp and pre-processing. Use these outputs to connect to another mixing console for additional zone coverage, to a telephone system for music-on-hold, or to a multi-track recorder. See page 12 for the Direct Output pinouts.

## 16 RECORD Out

These RCA connectors supply unbalanced line-level signals from the **BUS A** and **BUS B** outputs. Use these outputs to connect to the inputs of a recorder, or as additional line-level outputs to connect to an external power amplifier. The signals are the same as the main outputs.

## 17 OUTPUTS A/B

These 3-pin Phoenix-type connectors supply a balanced line-level signal from **BUS A** and **BUS B**.

## 18 LOGIC I/O

This 25-pin D-Sub connector provides 10 logic control inputs and 10 logic control outputs (open-collector). These inputs can be used to control a wide variety of DX8 functions via external switching. The outputs can be used to provide logic for external indicators for a number of internal settings and conditions. The function of each logic input and output can be programmed via software to suit individual applications. See page 13 for the Logic I/O pinouts.

## 19 REMOTE BUS

This 3-pin Phoenix-type connector can be used to attach optional remote controls to the DX8. Several

remote controls can be connected to each other in a daisy-chain fashion to extend the remote control functionality of the DX8.

## 20 COMM PORT

This is identical to the **COMM PORT** on the front panel. Use this to connect to an RS-232 serial port on a personal computer or third-party controller (i.e., show controller) for external control of the DX8.

## 21 EXPANSION SLOT

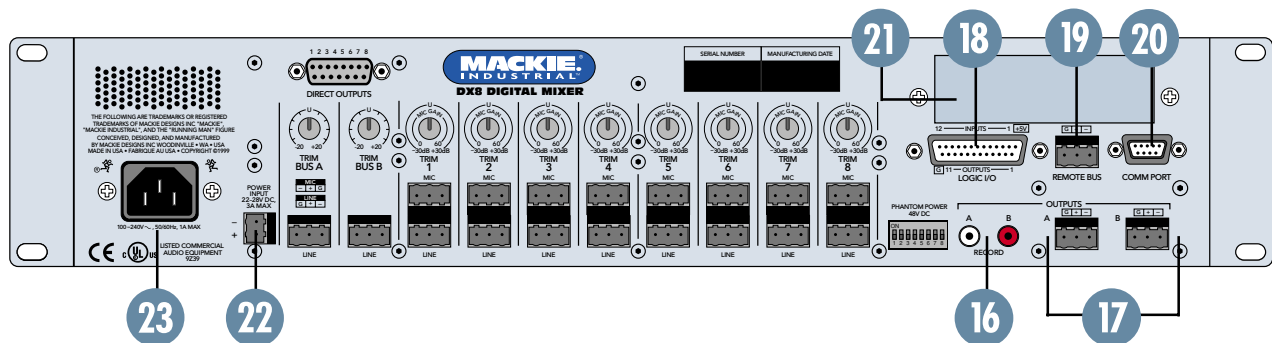
The optional DX10e card can be installed here. It provides eight additional independent balanced output mixes.

## 22 24 VDC POWER

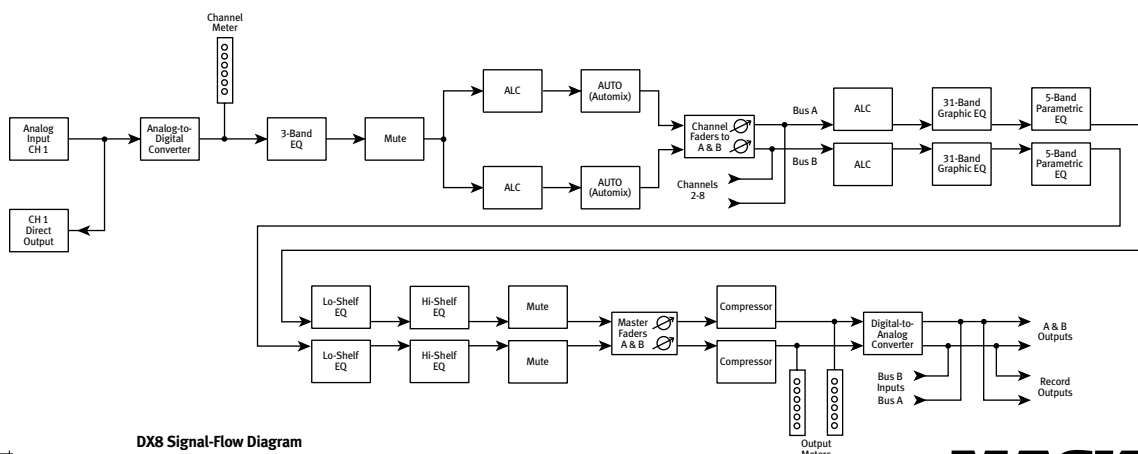
The DX8 can be powered using a 24 VDC power supply. This can serve as the primary power supply for the DX8, or as a backup supply in case of an AC power failure. The DX8 seamlessly switches to the backup supply if there's a power loss. When both AC power and 24V DC power are connected, the AC power is used and no current is drawn from the DC supply.

## 23 IEC AC Socket

Connect the supplied AC linecord to the IEC AC socket.



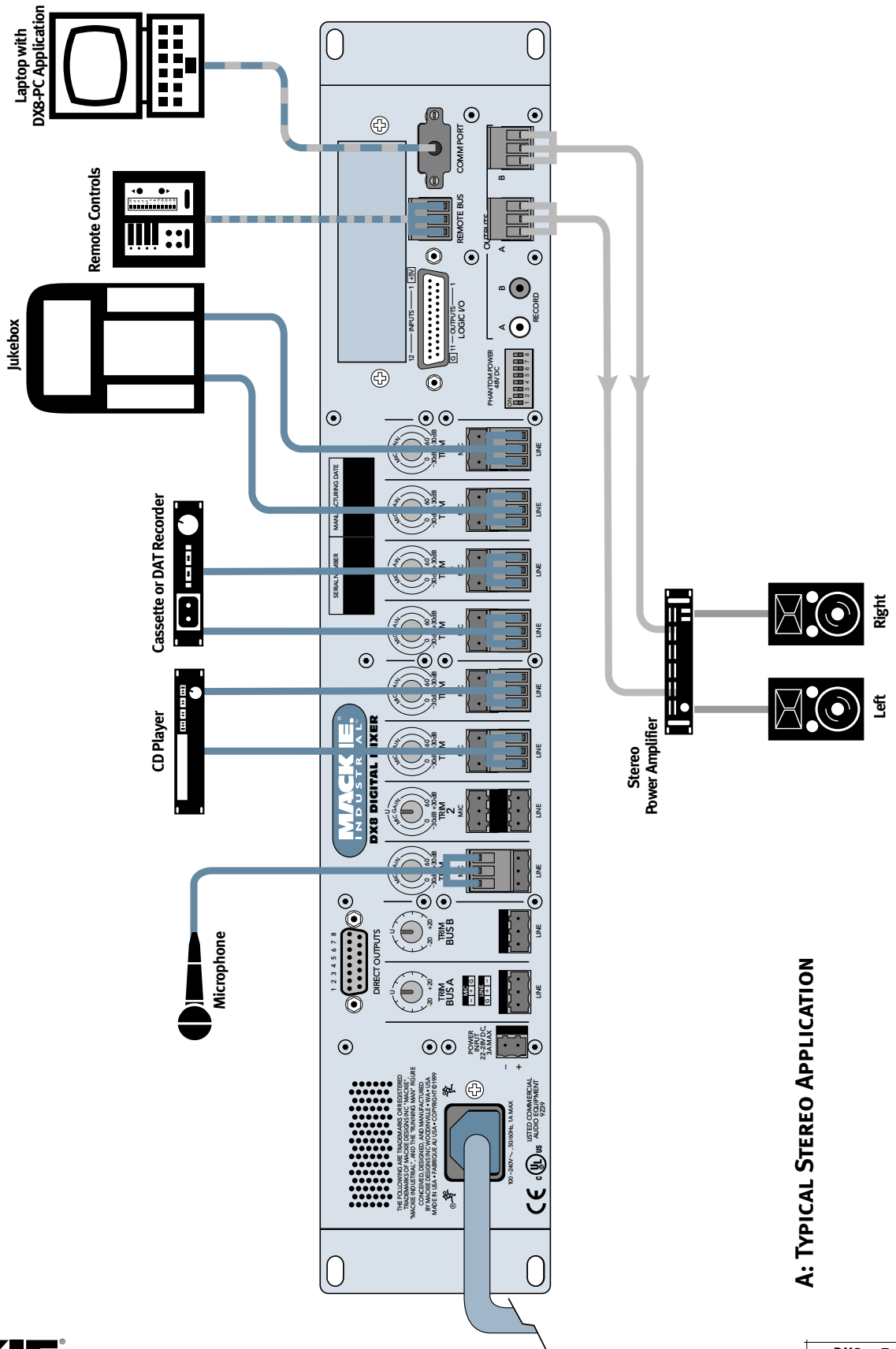
## SIGNAL-FLOW DIAGRAM

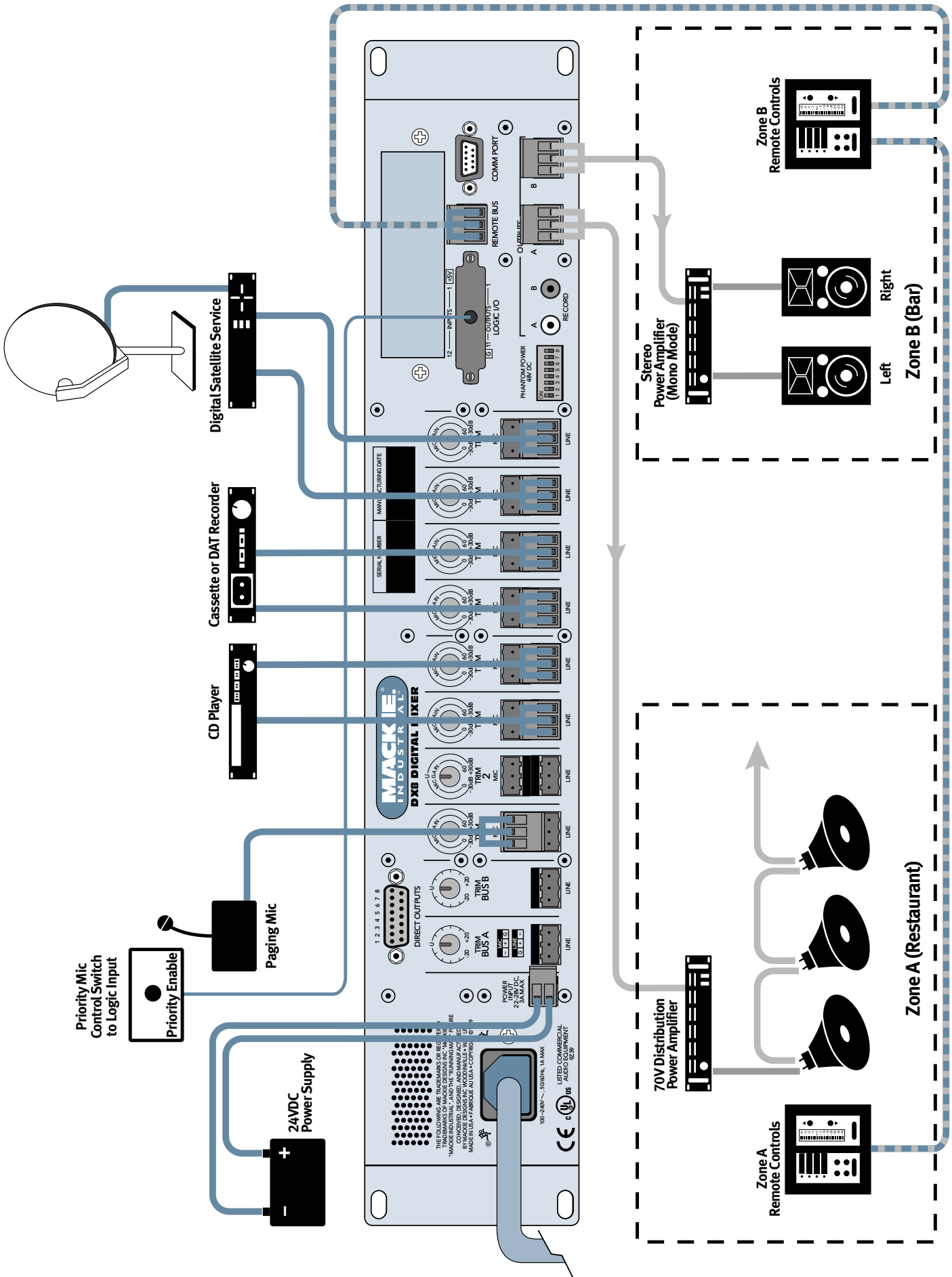


DX8 Signal-Flow Diagram

# 3. INSTALLATION

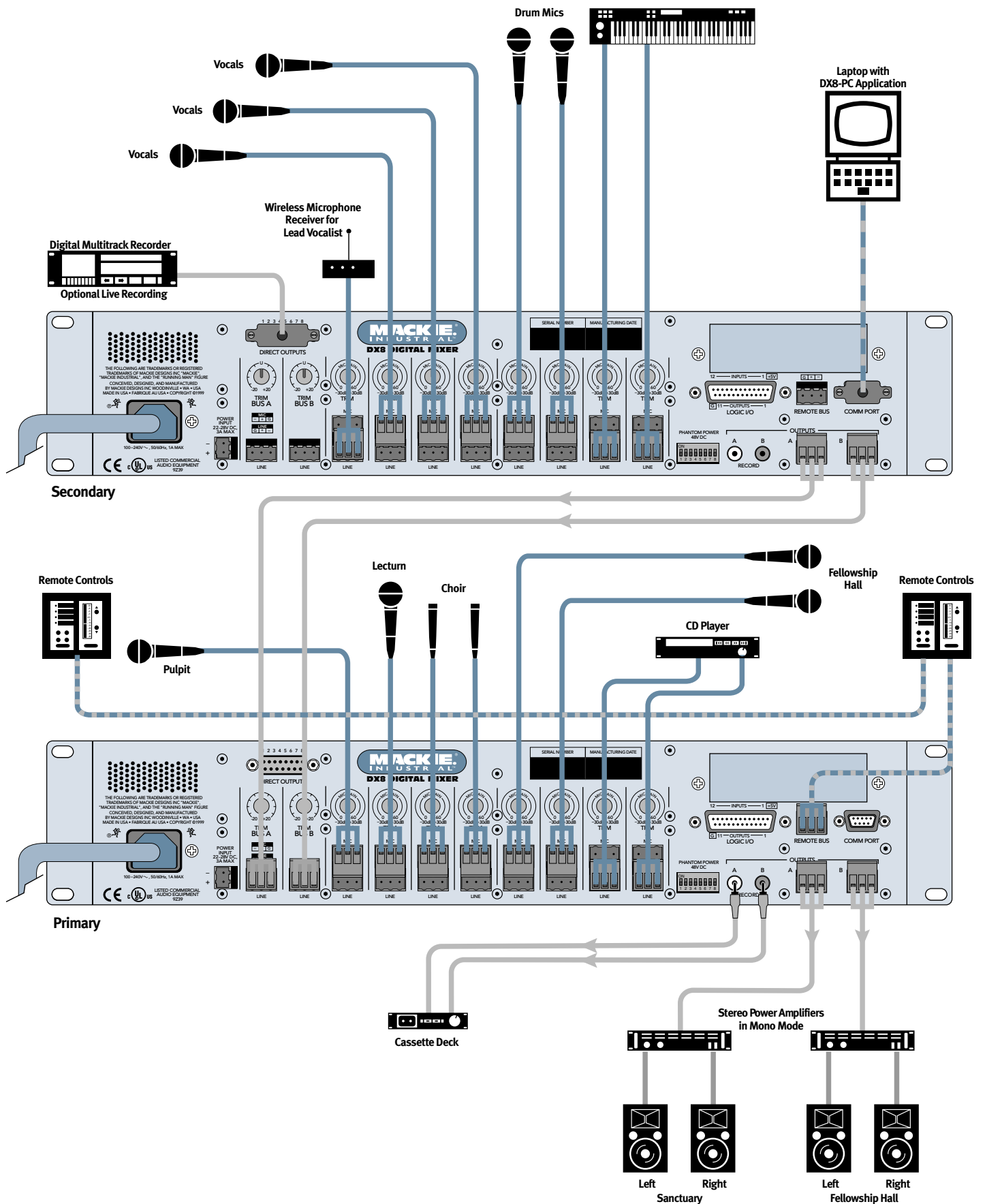
## APPLICATION DIAGRAMS





B: TYPICAL TWO-ZONE APPLICATION

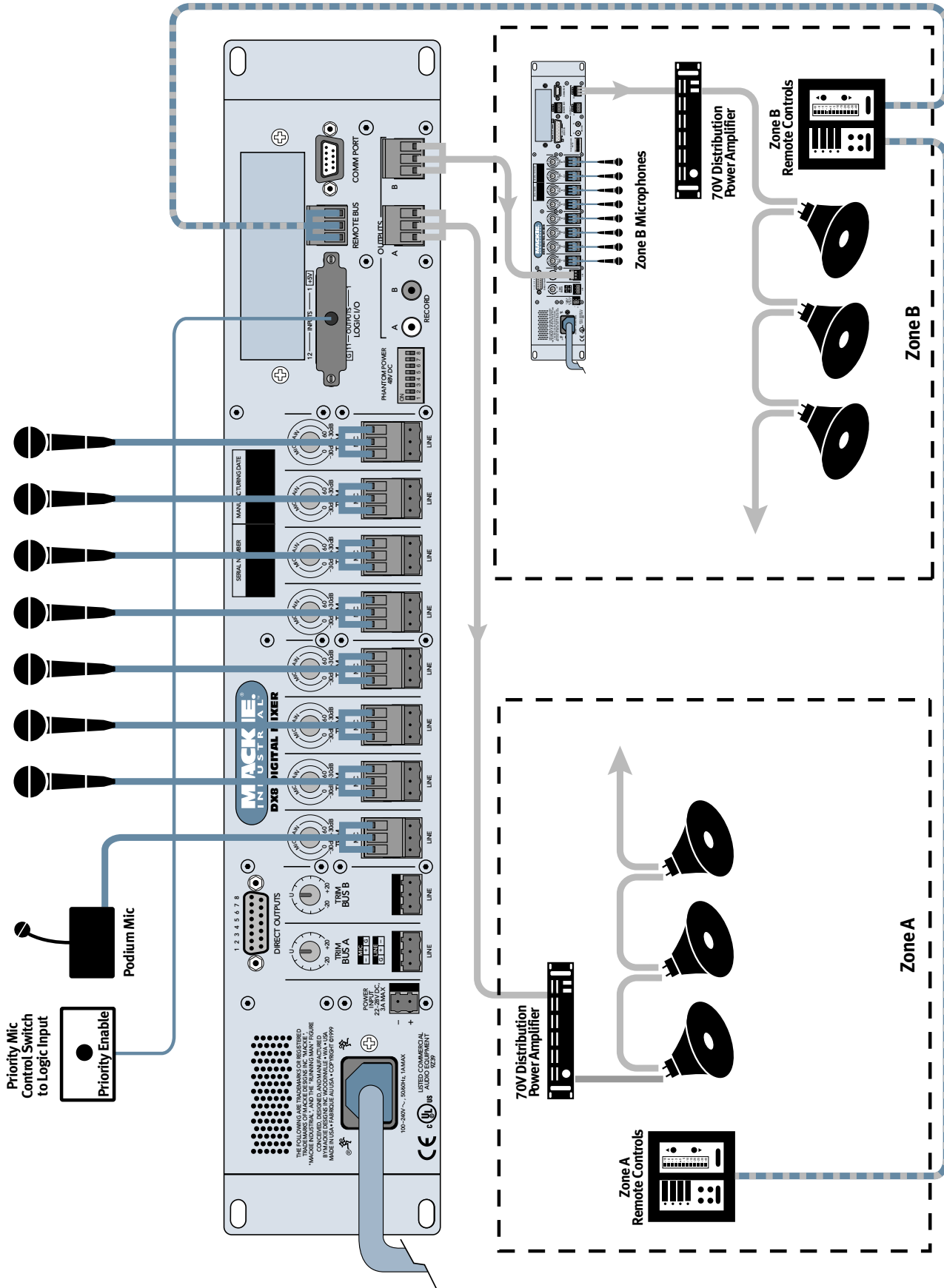




**C: Two DX8s in Church Application**



Table Microphones



D: BOARD ROOM APPLICATION WITH TWO-ZONES

## APPLICATION DIAGRAMS

### A: TYPICAL STEREO APPLICATION

This diagram depicts a simple setup, using the DX8 in a stereo application. A microphone is connected to the **MIC** input on channel 1 for paging purposes, and several program sources are connected to the **LINE** inputs on channels 3 through 8.

### B: TYPICAL TWO-ZONE APPLICATION

This configuration demonstrates how the DX8 might be used in a restaurant/bar application. A paging mic is connected to the **MIC** input on channel 1. Notice the priority enable switch near the paging mic, which causes the other inputs to either turn off or reduce their volume levels, depending on how the Force-On/Off function is set up in the **Audio Input** window.

Zone A uses a 70V distribution system for broad coverage using multiple speakers throughout the restaurant area.

Zone B uses a stereo power amplifier configured for mono operation to power two or four speakers in the bar area. Each zone has a pair of remote controls, allowing access to predefined functions such as level control and program source selection in each zone.

A 24V DC power supply is connected to the **POWER INPUT** connector on the DX8, for backup operation in case of an AC power failure.

### C: TWO DX8s IN CHURCH APPLICATION

This illustrates using two DX8s to meet the many requirements in this church application. The primary DX8 is used to connect the various microphones located at the pulpit, lecturn, and choir loft. Two additional microphones from the Fellowship Hall are connected to **MIC** inputs 5 and 6. A CD player is connected to **LINE** inputs 7 and 8 for playback of prerecorded music for soloists when required.

A pair of remote controls is located at the pulpit, primarily for selecting presets for various events such as Sunday morning service, Monday evening Bible study, and Saturday afternoon weddings. Another pair of remotes is located in the Fellowship Hall to control the level for the microphones (assigned to a Fader B Control Group) in the Fellowship Hall, and to choose whether the Sanctuary mics are heard in the Fellowship Hall and whether the Fellowship Hall mics are heard in the Sanctuary.

A cassette deck is connected to the **RECORD** output jacks for recording the service.

The **A OUTPUT** is connected to a stereo power amplifier configured for mono operation that drives a pair of loudspeakers that cover the sanctuary. The **B OUTPUT** is connected to an additional power amplifier configured for mono operation that provides power for a pair of speakers in the Fellowship Hall.

The secondary DX8 is used to connect the microphones and instruments for the band. The **A** and **B OUTPUTS** are connected to the **BUS A** and **B LINE** inputs on the primary DX8, where the signal is mixed with the program sources connected to the primary DX8.

A digital multitrack recorder is connected to the **DIRECT OUTPUTS** on the secondary DX8 for tracking the vocals and instruments for later mixdown to 2-track.

A laptop is connected to the front panel **COMM PORT** on the secondary DX8, using a standard 9-pin RS-232 computer cable. This gives the band remote control over the entire mix of the instruments and vocals connected to the secondary DX8.

### D: BOARD ROOM APPLICATION WITH TWO-ZONES

In this configuration, eight microphones are connected to a DX8. The podium mic is connected to channel 1, and has a priority enable switch near it connected to a logic input for the moderator to use to mute or duck the other microphones, if required.

Two zones are covered using 70V distribution. Zone B can be partitioned off, and has a second DX8 for selecting either the board room source (connected to **BUS B LINE** input), or the microphones in Zone B (for a separate meeting going on simultaneously).

Each zone has a pair of remote controls for configuring the system as needed.

## CONNECTIONS

### CONNECTING BALANCED SOURCES

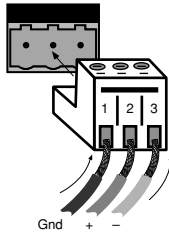
Use high-quality three-conductor cable for balanced connections, such as Star Quad by Belden, Canare, Mogami, etc. The better the shield, the better the audio signal is protected from induced EMI and RFI.

**Note:** With screw-down connectors, it's best to use stranded wire that is not tinned. Solder can "flow" under the pressure of the screw-down terminal and cause the connection to become loose.

*To connect a balanced mic or line-level signal:*

Strip the wire back about 1/4" inch, insert the wire as far as it will go into the appropriate hole in the supplied Phoenix-type connector, and tighten down the screw with a small slot-head screwdriver. It is recommended that you use 20 or 22 gauge wire with the Phoenix-type connectors. The connectors are wired as follows:

- Pin 1 = Ground (Shield)
- Pin 2 = Hot (+)
- Pin 3 = Cold (-)



*Balanced Connection (Line Input Shown)*

**Note:** To connect to the MIC inputs, turn the connector upside-down relative to the LINE input connector. Double check the wiring with the wiring graphics indicated on the rear panel.

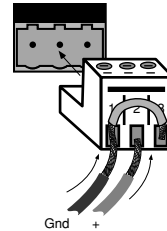
### CONNECTING UNBALANCED SOURCES

It may be necessary to connect a 2-conductor unbalanced input to a balanced input on the DX8.

*To connect an unbalanced line-level signal:*

Follow the instructions for connecting a balanced line-level signal above, but wire the connector as follows:

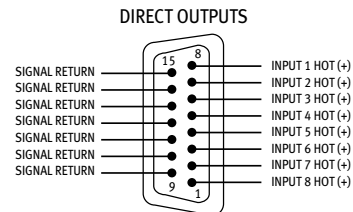
- Pin 1 = Ground (Shield)
- Pin 2 = Hot (+)
- Pin 3 = Ground



*Unbalanced Connection*

### CONNECTING THE DIRECT OUTPUTS

This is a 15-pin D-Sub connector. The signals on the DIRECT OUTPUT are unbalanced. Use shielded, twisted pairs for the DIRECT OUTPUT cable to ensure the best rejection of external noise (EMI and RFI). The DIRECT OUTPUT connector is wired as follows:



*DIRECT OUTPUTS Pinout Connection*

### CONNECTING THE RECORD OUTPUTS

These are RCA-type unbalanced connectors. Use high-quality shielded cable with RCA-type plugs for these connections.

### CONNECTING THE BUS A AND B OUTPUTS

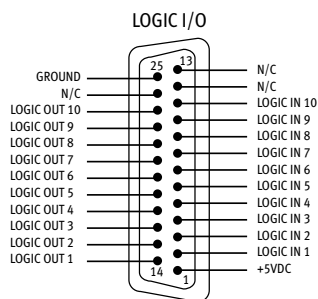
These are 3-pin Phoenix-type connectors that provide a balanced line-level output signal from Bus A and Bus B. Use high-quality, three-conductor shielded cable for these connections.

Strip the wire back about 1/4" inch, insert the wire as far as it will go into the appropriate hole in the supplied Phoenix-type connector, and tighten down the screw with a small slot-head screwdriver. It is recommended that you use 20 or 22 gauge wire with the Phoenix-type connectors. The **OUTPUT** connectors are wired as follows:

- Pin 1 = Ground (Shield)
- Pin 2 = Hot (+)
- Pin 3 = Cold (-)

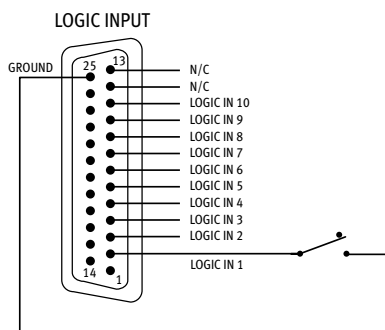
### CONNECTING THE LOGIC I/O

This is a 25-pin D-Sub connector. There are 10 logic inputs and 10 logic outputs. They are all active-low circuits. Use 22 gauge wire for these connections.



#### LOGIC I/O Pinout Connection

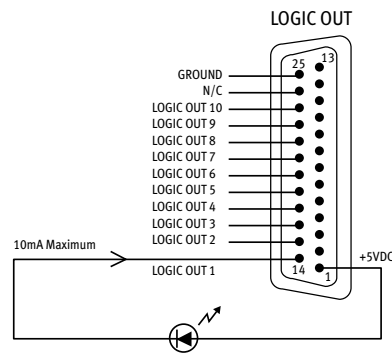
The **logic inputs** are active-low with internal pull-up resistors connected to +5 VDC. Use a normally open switch connected between the logic input and ground (pin 25). When the switch is closed, the logic input is active. Depending on the function assigned to the logic input, a toggle switch or a momentary switch may be used.



#### LOGIC INPUT Connection

The **logic outputs** are active-low, open-collector outputs with internal pull-up resistors. Connect the indicator or activation circuit between the logic output and +5 VDC (pin 1). When the output is

active, the output is 0 VDC. The logic outputs can supply up to 10 mA of current each.



#### LOGIC OUTPUT Connection

**Note:** Pins 12, 13, and 24 are not used at this time. They are reserved for future updates. **Do not connect anything to these pins.**

### CONNECTING THE REMOTE BUS

This is a 3-pin Phoenix-type connector specifically for connecting the optional remote control peripherals. Use a high-quality three-conductor shielded cable to make this connection, such as Belden 8451, 9451, or equivalent. The lower the nominal capacitance of the wire, the more distance you can have between the remote control and the DX8 before suffering transmission losses.

Strip the wire back about 1/4" inch, insert the wire as far as it will go into the appropriate hole in the supplied Phoenix-type connector, and tighten down the screw with a small slot-head screwdriver. It is recommended that you use 18, 20, 22, or 24 gauge wire for the remote control connections, depending on the distance between the DX8 and the remotes.

The **REMOTE BUS** connector is wired as follows:

- Pin 1 = Ground (Shield)
- Pin 2 = Data + (with +24 VDC power)
- Pin 3 = Data - (with +24 VDC power)

**Note:** See the instructions with the remote control for more information.

### AC POWER CONSIDERATIONS

The DX8 can accept an AC voltage ranging from 90 V to 240 V without having to reconfigure the primary wiring, due to the sophisticated design of the switching power supply. Each DX8 draws an average of 1 amp of AC line current at 120 VAC.

**Warning:** Always use a 3-conductor AC power cord with a safety ground connection. Never remove the ground pin or attempt to bypass it. This is very dangerous.

## 4. OPERATION

### QUICK START

Reading the instruction manual is the only way to fully understand the features and functions of the DX8. However, the Quick Start provides a quick overview to get the DX8 set up and working fast.

Make sure the power switch is off while setting up and making connections to the DX8.

#### MAKE THE CONNECTIONS

Determine which inputs to use for program sources and which to use for microphones. Follow the wiring diagram on the rear panel to make the connections.

Make use of the **PHANTOM POWER** switches if any of the microphones require phantom power. Phantom power is present when the switch is in the UP position.

Make use of the supplied Phoenix connectors with appropriate wiring to connect to the amplifier inputs. Connect the power amplifier outputs to speakers appropriate for the amplifier's specified output power.

Connect a personal computer loaded with the DX8-PC control software to the **COMM PORT** on the DX8. The RS-232 serial port from the computer can be connected to either **COMM PORT** on the DX8 (front panel or rear panel).

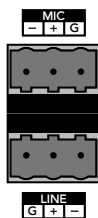
#### START UP

Before turning on the DX8, set the **TRIM** controls all the way down.

Turn on the DX8 power switch. Open the DX8-PC control software on the computer and click **On Line**. This begins the communication between the DX8 and the computer.

Configure the DX8 for the current application. Set all the **EQ** controls flat. Adjust the input faders and the output faders all the way down.

**Note:** When the UP/DOWN buttons are pressed, the meters indicate the gain of the channel relative to its maximum gain. After five seconds, the meters revert to normal peak program metering.



### SET THE LEVELS

#### MIC AND LINE INPUT TRIM

The analog trim controls on the rear panel are not adjustable via the control software since these are in the analog domain, prior to the A/D converters. To adjust the **MIC** and **LINE TRIM** controls:

1. Start the program source playback for Input 1 or, if a microphone is connected, have someone speak into the microphone at a normal volume.
2. Adjust the Input 1 TRIM control so the meter indication is at or around  $-10$  dB. The peaks should regularly hit, and occasionally exceed the  $-10$  dB level. This provides plenty of headroom for transient peaks.

#### INPUT MIX LEVELS

After setting the **MIC** and **LINE TRIM** controls as instructed above, adjust the input mix levels to unity gain (Ctrl+click on the fader to set it to unity gain). The control is at unity gain when both the  $-10$  and  $-7$  LEDs are lit. Adjust the input faders on the eight input channels individually to achieve a balanced mix.

#### MASTER A AND B OUTPUT LEVELS

Before adjusting the **MASTER A** and **B** output faders, turn on the power amplifier.

*If the power amplifier has level controls:*

1. Turn the amplifier level controls all the way down.
2. Adjust the output faders to unity "U" on-screen. Have the program sources playing. The peaks on the master output meter should regularly hit, and occasionally exceed the  $-10$  dB level. This provides a nominal  $+4$  dBu level at the **OUTPUTS**.
3. Slowly increase the amplifier level controls to attain the volume level desired. If the volume gets too loud too fast, adjust the **MASTER A** and **B** output level controls to  $-15$  dB or  $-20$  dB. If the volume level isn't loud enough, adjust the **MASTER A** and **B** output level controls to  $-5$  or  $-10$ . Be careful that the peak level doesn't hit the **OL** (overload) indicator on the meter, which may run the risk of driving the output into clipping.

*If the power amplifier doesn't have level controls:*

1. Slowly adjust the **MASTER A** and **B** output level controls until the  $-10$  and  $-7$  dB LED indicators light (or to unity "U" on-screen), or until the desired volume level is attained. If the volume level isn't loud enough, adjust the **MASTER A** and **B** output level controls to  $-5$  or  $-10$ . Be careful that the peak level doesn't hit the **OL** (overload) indicator on the meter, which may run the risk of driving the output into clipping.

### **BUS A AND B INPUT TRIM**

There is no metering after the **BUS A** and **B** input **TRIM** controls. These controls must be adjusted by ear. Start the program source playback for all sources connected to the **BUS A** or **BUS B** input. Slowly increase the **TRIM** control to the center position (12 o'clock), which is unity gain. Then adjust the **TRIM** control up or down to attain a balance within the total mix.

### **USING THE DIGITAL SIGNAL PROCESSORS**

The DX8 has five powerful floating-point 32-bit digital signal processors (DSPs) to implement the digital audio processing functions.

#### **CHANNEL 3-BAND EQ**

Each of the inputs is equipped with a 3-band equalizer. Use this to adjust the overall tonal quality of the input signal.

**Note:** The channel EQ gain and frequency are adjustable from the PC only.

#### **OUTPUT 2-BAND SHELVING EQ**

Each of the outputs is equipped with a 2-band shelving equalizer. Use this to make broad equalization adjustments to the output signals of the DX8. The output EQ gain can be adjusted from the front panel, and the EQ gain and corner frequency can be adjusted from the PC.

The center gain position (0 dB) is indicated when both "0" LEDs are lit on the meter.

#### **OUTPUT 31-BAND 1/3 OCTAVE GRAPHIC EQ/ 5-BAND PARAMETRIC EQ/COMPRESSOR**

Each of the outputs is also equipped with a 31-band 1/3 octave graphic EQ. In addition, a 5-band true parametric EQ and a compressor are available on each output.

**Note:** These functions are adjustable from the PC only.

#### **SOFTWARE UPDATES**

Check the Mackie website at [www.mackie.com](http://www.mackie.com) for new information and updates to the DX8 software and firmware.

## **USING INPUTS 1-8**

Connect the microphones or program sources to Inputs 1-8. Examples of program sources include a CD player, tape deck, tuner, satellite feed, TV audio, jukebox, or other audio source. Each input has a separate Phoenix-type connector for a mic or line-level input.

#### **TRIM**

Use the **TRIM** control to adjust the gain of the input preamp stage according to the level of the input signal. Refer to the "Quick-Start" section (Set the Levels) for instructions on how to set the **TRIM** controls.

#### **LEVEL**

The up/down arrow buttons on each channel are used to adjust the mix level for each channel. Use these to fine tune the mix or relative loudness of each input signal that is connected to the DX8.

When adjusting these buttons, the channel meter indicates the gain of the channel relative to the maximum gain of +10 dB. After 5 seconds, the meter reverts back to indicating the actual input signal level of the channel. This metering is pre-EQ and pre-LEVEL control.

Unity gain is indicated when the -10 and -7 dB LEDs are both lit on the meter (or "U" on-screen).

#### **EQ**

Each Input 1-8 has a 3-band EQ. This is adjustable from the PC only. It provides 15 dB of boost or cut with user selectable corner and center frequencies (LO: 20Hz-500Hz; MID: 20Hz-20kHz; HI: 500Hz-20kHz).

## **USING THE BUS A AND B INPUTS**

These inputs provide a direct analog connection to the **BUS A** and **B** buses. These input points are post-DSP and post-D/A converter, and accept a balanced analog line-level signal. Use these to connect an additional program source to a zone, or to connect the Zone A and B outputs from another DX8.

#### **TRIM**

Use the **TRIM** control to adjust the signal level at the **BUS A** and **B** inputs. Typically, this control would be set to the center detent position (unity gain). However, it can be adjusted up or down by 20 dB to achieve a balance between the signal at the **BUS A** and **B** inputs, and the signal on the internal **A** and **B** buses.

## DIRECT OUTPUTS

The **DIRECT OUTPUTS** provide an unbalanced line-level signal from each of the 8 Input channels. This signal comes from the output of the preamplifier stage on each input channel, prior to the A/D converter and subsequent digital signal processing.

Use the **DIRECT OUTPUTS** to connect a continuous music source (e.g., satellite feed, prerecorded background music, multi-disc CD player). This may connect to a telephone system music-on-hold input, or to provide a feed to a multi-track recorder (for recording) or a mixing console (for additional zone coverage).

## OUTPUTS A AND B

These outputs provide a balanced line-level signal. Connect these outputs to the inputs of a power amplifier.

## USING THE RECORD OUTPUT

The **A** and **B** output signals are provided at the **RECORD** output jacks, which are industry standard unbalanced RCA connectors. Connect these to the Tape Input jacks on a tape deck or other recording device to record the mix at the **BUS A** and **B** outputs.

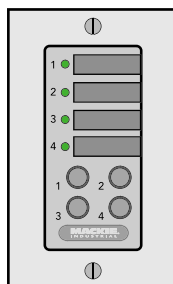
## USING THE REMOTE BUS CONNECTION

Connect one or up to nine remote controls to the **REMOTE BUS** connection. Each remote control has an 8-position DIP switch that must be set to a unique ID. When the DX8 is first turned on, it polls the **REMOTE BUS** and identifies the remote controls connected to it by each unique ID.

Many of the predefined functions have two ID addresses assigned to it to accommodate situations where two remote controls are required to control the same function on a single DX8.

There are two remote control versions available:

### DX-SW4 SELECTION REMOTE (4-BUTTON/4-LED)

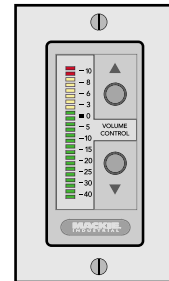


This remote device is designed to select functions such as preset selection, mute, and force-

on/off. Each of the four buttons controls a single function and its associated LED displays the current state of the function.

Refer to Appendix C for a list of the predefined functions available for the Selection Remote Control.

### DX-RVC LEVEL REMOTE (2-BUTTON/12-LED)



This remote device can control a level, preselected via the 8-position DIP switch, and display the selected level on the LED meter. The predefined functions include Input 1-8 level, **OUTPUT A** or **B MASTER** level, **OUTPUT A** and **B** Group level, and Group 1-8 level. Note that the remote control indicates the gain setting of the channel, and not the signal level in real time.

Refer to Appendix D for a list of the predefined functions available for the Level Remote Control.

### CONNECTING ONE OR MORE REMOTE CONTROLS

The remote control devices are connected to the DX8 using a 3-wire half-duplex interface with +24 VDC phantom power. The **REMOTE BUS** connection can provide power for up to nine remotes. Provision is made to connect local power to the remote controls if required in certain applications.

The maximum distance between the DX8 and the remotes varies, depending on the type of cable selected and the type of remote controls used. As a general rule, using 22 gauge wire (at 0.014  $\Omega$ /ft. and 34 pF/ft), one remote can be up to 3000 feet away, five remotes can be up to 2500 feet away, and eight remotes can be up to 500 feet away before transmission losses become a factor (see the instructions with the remote control for more information).

## USING THE LOGIC I/O

The DX8 has 10 programmable general-purpose logic inputs and 10 programmable general-purpose logic outputs. The inputs are active low with internal pull-up resistors. The outputs are active low open-collectors with internal pull-up resistors. With the inputs or outputs unconnected or inactive, the logic voltage level is high (+5 V). The active state is defined as voltage low (0 V or ground).



The logic functions assigned to each individual logic input and output are configured using the DX8-PC application. In addition, each logic input and output can be assigned a descriptive name (up to 32 characters) for easier identification within the PC application.

**Note:** Logic I/O functions are set from the PC application only.

## LOGIC INPUTS

The following functions can be activated by the logic inputs:

*Force On*  
*Force Off*  
*Input Mute*  
*Output Mute*  
*Group Mute*  
*Preset Recall*

## FORCE-ON/FORCE-OFF

This provides a means to temporarily increase or decrease the gain of a channel with an external switch, remote control, or through the priority function. This is defined in the Audio Input window in the DX8-PC software application. These are momentary functions and are active only when the logic input pin is active (held low). It forces the input fader level to the **Force On Level** or **Force Off Level** selected for that channel.

See "Audio In" on page 25 for more information about the Force-on and Force-off function.

## MUTE

An input, output, or group can be muted with a Logic Input. This function can be activated in one of four ways:

- **Momentary:** The mute/enable function is continuously active while the logic input is continuously active.
- **Latch On:** The mute function is activated when the logic input goes from inactive to active.
- **Latch Off:** The mute function is deactivated when the logic input goes from inactive to active.
- **Toggling:** The mute function toggles its state when the logic input goes from inactive to active.

## PRESET RECALL

This function can be activated as a momentary function or as a latching function. When activated as a momentary function, the preset state is recalled only when the logic input is active. When the logic input is inactive, the DX8 returns to its base state as long as no other momentary function is in force. Normally, the base state is the state the DX8 was in prior to activating the preset state.

When activated as a latching function, the preset state is recalled when the logic input goes from inactive to active. See "Presets" on pages 22 and 29 for more information about the preset recall function.

## LOGIC OUTPUTS

The logic outputs indicate the state of the following conditions, selectable in software:

*Input Signal Present*  
*Output Signal Present*  
*Input Channel Open*  
*Output Channel Open*  
*Preset Active*  
*Priority Inactive*  
*Auto-gate Status*

## SIGNAL PRESENT

A logic output can indicate whether a signal greater than  $-40$  dBFS is present on an input or an output. Select the channel from the DX8-PC application.

## CHANNEL OPEN

A logic output can indicate when a channel or mix output gain is greater than  $-40$  dBFS. For an input, this includes either the Bus A or B mix level. For the output, it is either the A or B mix output. Select the channel from the DX8-PC application.

## PRESET ACTIVE

A logic output can indicate when a particular preset is active. Choose the preset indicated by the logic output from the DX8-PC application.

## PRIORITY INACTIVE

A logic output can indicate whether an Input Force-on Priority is active, as selected from the DX8-PC application.

## AUTO-GATE STATUS

A logic output can indicate when an Input Gate is active. Auto-gate is selected in the Automix window (see "Automix" on page 24 for more information about the Auto-gate function).

## FRONT PANEL LOCK

The **MODE** button on the front panel is used to disable the front panel controls by selecting **LOCK**. The **LOCK** LED blinks for about five seconds before it engages. When the LED lights steadily, the front panel controls are disabled.

The Lock Code is set using the DX8-PC application (see page 20, "Set Lock Code"). To unlock the DX8 from the front panel, press the bottom "Down" buttons on the front panel in the correct numerical sequence, according to the following chart:

|                  |
|------------------|
| Input 1 Down = 1 |
| Input 2 Down = 2 |
| Input 3 Down = 3 |
| Input 4 Down = 4 |
| Input 5 Down = 5 |
| Input 6 Down = 6 |
| Input 7 Down = 7 |
| Input 8 Down = 8 |
| Low EQ Down = 9  |
| Hi EQ Down = 0   |

**Note:** The default Lock Code is "1234."

## 5. DX8-PC SOFTWARE (v 2.0)

### INSTALLING THE SOFTWARE

A PC-based Windows-style graphical interface software application is provided on a CD-ROM to control and configure the DX8 at the point of installation. Check our website at [www.mackie.com/install/dx8](http://www.mackie.com/install/dx8) for software upgrades as they become available.

*To install the software on a PC:*

It is necessary to install the DX8-PC software on your PC.

1. Make sure no other applications are running.
2. Insert the DX8 CD-ROM into your PC's CD drive, or download the software from [www.mackie.com/install/dx8](http://www.mackie.com/install/dx8).
3. The CD should begin the installation automatically. If not, click **Start**, then click **Run**.
4. Type <drive>:\DX8-PC\Setup in the command line (where <drive> is the letter assigned to the CD drive, i.e., D drive, or the location on your hard drive where the file was downloaded).
5. Setup will install the DX8-PC application onto your PC. You can accept the default directory, or specify a different location to install the application.

### UPGRADING THE SOFTWARE

From time to time, Mackie Designs will release upgrades for the internal operating software in the DX8. This can be downloaded from our website ([www.mackie.com](http://www.mackie.com)) to a PC-compatible computer. Use the serial port on the computer to connect to the **COMM PORT** on the DX8 to transfer the data to the on-board flash memory with the DX8-PC software.

### CONNECTING A PC

Use a standard DB9 (male/female) computer cable to connect a PC to the DX8. The DX8-PC application uses COM 1 on the PC by default. Connect the COM port on the PC to a **COMM PORT** on the DX8.

View the installed "ReadMe" file for more information about running the PC application and how to configure the DX8-PC application to use a different serial port on the PC.

### UPGRADING THE FIRMWARE

Before attempting to go "Online" with the DX8, you must upgrade the firmware in the DX8's flash memory.

1. Connect the PC to the DX8 as described above.
2. Open the DX8 v2.0 software. **DO NOT** click the **On Line** button yet.
3. Click **Advanced** in the top menu bar and select **Firmware Upgrade**.
4. Click **Select File** in the Firmware Upgrade window and the **Select OS Upgrade File** dialog box opens. Browse to the location of the OS upgrade file (with .pkt extension) on your hard drive, CD, or floppy drive and click **Open**, then click **Upgrade**. You can monitor the progress in the Firmware Upgrade window.
5. **Upgrade Successful** appears in the Status window when it is complete.
6. Close the Firmware Upgrade window and click the **On Line** button to connect to the DX8.

## OVERVIEW

The DX8-PC software application provides real-time control and configuration editing for the DX8 using a laptop or other PC-compatible computer.

In addition to input and output level control and output EQ gain control, which is available on the front panel, the DX8-PC application provides control over each individual channel EQ gain and corner frequency, Bus A and Bus B output EQ gain and corner frequency, output graphic EQ gain, output parametric EQ gain, frequency, and bandwidth, output compressor controls, Automix controls, preset save and recall, panel lock code, logic input and output assignments, force-on and force-off levels and priority, mute group assign, and control group assign.

Changes made in the PC software are immediately executed in the DX8. Also, changes made by controls on or connected to the DX8 are immediately displayed in the PC software.

The graphical user interface is divided into four sections:

1. Menu Bar
2. Indicators and Presets
3. Buttons
4. Input/Output

**Caution:** To adjust a fader, click on the fader knob to select it. Ctrl+click to set the fader to unity. If you click above or below the knob, it will jump to the point where you clicked. This is useful to move the fader quickly to where you want it to be. However, be careful not to inadvertently click above a fader knob. A sudden jump in volume will occur.

## MENU BAR

The following menus are available in the Menu bar at the top of the screen:

### FILE

#### QUIT (CTRL+Q)

Select this to close the DX8-PC application. The DX8 will continue to operate with the current settings.

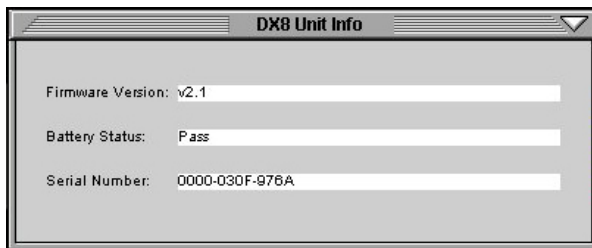


## ADVANCED



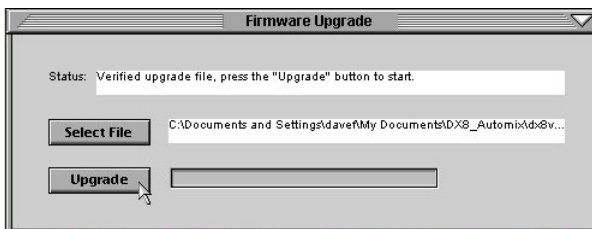
### DX8 UNIT INFO

This opens a dialog box that contains the following information about the DX8 that is currently connected:



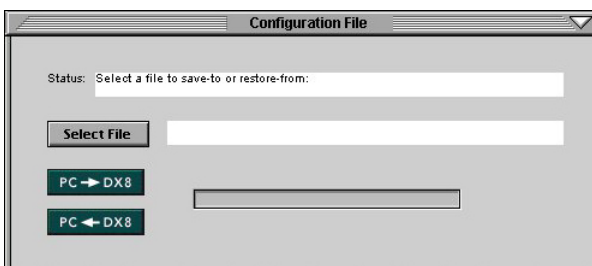
### FIRMWARE UPGRADE

This allows you to select an OS Upgrade File to upload to the DX8 as they become available. Click on the **Select File** button in the **Firmware Upgrade** window and the **Select OS Upgrade File** window opens. Browse to the location of the OS Upgrade File (with a .pkt extension) on your hard drive or floppy drive and click **Open**, then click **Upgrade**. You can monitor the progress in the **Firmware Upgrade** window.



### CONFIGURATION FILE

Select this menu to open or save a configuration file to your hard drive or floppy drive. A configuration file includes all presets and names, all Audio In, Logic In, Logic Out settings, and the Lock Code.



*To save a configuration file:*

1. Click **Select File** in the **Configuration File** window.
2. Browse to the location where you want to save the file in the **Select Configuration File** window.
3. Enter a new name in the **File Name** box and click **Open**.
4. Click **PC ← DX8** to save all the current settings of the DX8 to the PC. The **Status** box will indicate if the file was successfully saved to the selected location.

*To open a configuration file:*

1. Click **Select File** in the **Configuration File** window.
2. Browse to the location where the file is located in the **Select Configuration File** window.
3. Click on the file name to select it, and then click **Open**.
4. Click **PC → DX8** to upload the configuration data to the DX8. The **Status** box will indicate if the configuration was successfully loaded from the selected file.

### SET LOCK CODE

This option allows you to view and change the four-digit locking code for the DX8. The code must consist of four digits. Use the **Panel Lock** button in the **Main Window** to lock and unlock the front panel controls, or use the **MODE** button on the front panel to lock the controls, and the **Down** buttons to enter the four-digit code to unlock it (see "Front Panel Lock" on page 17). The default Lock Code is "1234."

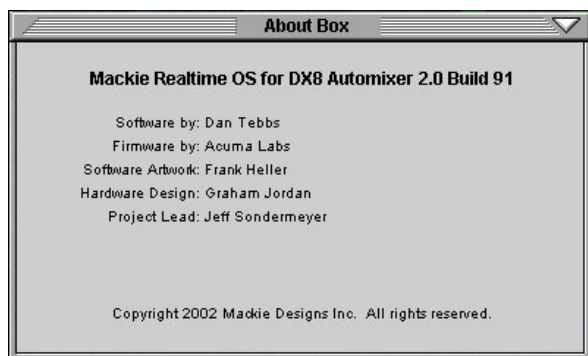


## WINDOWS



### ABOUT

This provides information about the DX8-PC software application, including the version and personnel credits.



### CLOSE WINDOW (ESC)

This closes the window that is currently selected (front-most) on-screen.

### CLOSE ALL (CTRL+)

This closes all windows that are currently open on the screen, leaving just the main window open.

### GRAPHIC EQ

This toggles the Graphic EQ window open and closed. It duplicates the function of the Graphic EQ button under DSP on the right side of the screen.

### PARAMETRIC EQ

This toggles the Parametric EQ window open and closed. It duplicates the function of the Parametric button under DSP on the right side of the screen.

### COMPRESSOR

This toggles the Compressor window open and closed. It duplicates the function of the Compress button under DSP on the right side of the screen.

### AUDIO INPUT

This toggles the Audio Input window open and closed. It duplicates the function of the Audio In button under Setups on the right side of the screen.

### LOGIC INPUT

This toggles the Logic Input window open and closed. It duplicates the function of the Logic In button under Setups on the right side of the screen.

### LOGIC OUTPUT

This toggles the Logic Output window open and closed. It duplicates the function of the Logic Out button under Setups on the right side of the screen.

## INDICATORS AND PRESETS

This section describes the various boxes and buttons that are available on-screen.

### ACTIVE LOGIC INPUTS

These light to indicate active logic inputs (e.g., contact closure).



### ACTIVE MUTE GROUPS

These light to indicate when a Mute Group is active via either a logic input or a remote control.



## PRESETS

The DX8 stores up to 16 presets, which can be recalled via the Presets drop-down box. Select a preset in the drop-down box and the settings are instantly recalled from the DX8 memory.

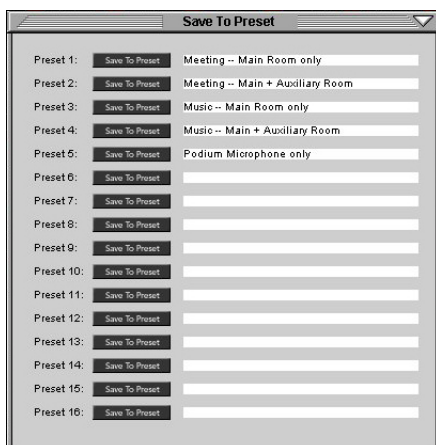


## SAVE TO PRESET

Click this button to save the current mixer settings on the DX8 to a preset.



The "Save To Preset" window opens. Enter a name for each preset in this window, then click on the Save To Preset button to save it.



## CLEAR EDITS

Click this button to restore the DX8 settings to the currently selected preset.



## ON LINE

Click this button to initiate communication with the DX8. This button lights to indicate when there is active communication between a DX8 and the PC. Click this button again to terminate communication.



## PANEL LOCK

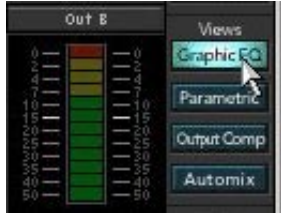
Indicates front panel lock status. Click this button to lock and unlock front panel control. Note that the lock code is not required to use this control.



# BUTTONS

## VIEWS

These four buttons open the Graphic EQ, Parametric EQ, Output Compressor, and Automix views, overlaid across the input section.



## GRAPHIC EQ

Click this button to open the 31-Band Graphic Equalizer window for the A and B outputs. Click and drag on a slider knob to adjust the EQ. The selected band's **GAIN** and **BAND** (frequency) are displayed at the top of the window. Click the **ON** button to turn each Graphic EQ on and off. The Graphic EQ can also be turned on and off with the buttons on the output strip. Click the **RESET** button to return all the sliders to 0 dB (center).

The **A to B** button (and corresponding **B to A** button on the B side) copy the settings of the A Graphic EQ to the B Graphic EQ (and vice versa). Use the Graphic EQ to make adjustments for the response of the room and smooth the frequency response.



## PARAMETRIC EQ

Click this button to open the 5-Band Parametric Equalizer window for the A and B outputs. Each band has three knobs: Gain ( $\pm 15$  dB), Center Frequency (20Hz-20kHz), and Bandwidth (0.1 to 6 octaves). Click and drag on the individual knobs to adjust each parameter. A graphical display on the left-hand side of the window indicates the current response of the EQ.



If two bands are set to the same frequency, the gain settings are additive and the response curve may go off the display. The response is not limited to the display scale, and the 32-bit floating-point processors accurately calculate the combined response of all five bands.

The bandwidth is calculated as the 1/2 gain bandwidth in octaves. For example, if the center frequency is 1kHz with a gain of 10 dB and 2 octave bandwidth, the response is down to 5 dB (1/2 gain) at 500Hz and 2kHz (a span of two octaves).

Click the **ON** button to turn each Parametric EQ on and off. The Parametric EQ can also be turned on and off with the buttons on the output strip. Click the **RESET** button to return all the knobs to their default settings (flat response).

The **A to B** button (and corresponding **B to A** button on the B side) copy the settings of the A Parametric EQ to the B Parametric EQ (and vice versa). Use the Parametric EQ to help eliminate specific troublesome peaks and dips in the room response.

## COMPRESS



Click this button to open the Compressor window for the A and B outputs. Each compressor has five knobs: Attack, Release, Threshold, Ratio, and Output. Click and drag on the individual knobs to adjust each parameter. An analog-style meter indicates the amount of compression applied in decibels.

Click the **ON** button to turn each Compressor on and off. The Compressor can also be turned on and off with the buttons on the output strip. Click the **RESET** button to return all the knobs to their default settings.

The **A to B** button (and corresponding **B to A** button on the B side) copy the settings of the A Compressor to the B Compressor (and vice versa).

### About Compression:

A compressor is used to reduce or limit transient peaks in a signal. As the input level to the compressor increases, the output level increases linearly until the threshold point is reached. After that point, the output level no longer increases linearly, but increases at a reduced rate that is determined by the ratio setting.

- **Threshold:** This control determines the level at which the compressor begins to act on the incoming signal. It is calibrated in decibels, with a range from -60.0 dB to -1.0 dB.
- **Attack:** This determines how fast the compressor reacts once the threshold has been exceeded. It is calibrated in milliseconds, with a range from 1 ms to 2500 ms (2.5 seconds).
- **Release:** This determines how fast the compressor turns off once the signal falls below the threshold. It is calibrated in milliseconds, with a range from 10 ms to 2500 ms (2.5 seconds).

- **Ratio:** This determines the change in output level as a function of the change in input level, once the threshold has been exceeded. It is calibrated in decibels, with a range from 1:1 (off) to 20:1. Thus, if it is set to 10:1, an increase in input level of 10 dB (assuming the input is above the threshold level), results in a 1 dB increase in output level.

As a general rule, use ratio settings from 1:1.5 to 1:5 for compressor use. Settings from 1:10 to 1:20 are more useful for limiting purposes, because in that range the output level changes very little as the input increases.

- **Output:** This determines the overall gain of the compressor from input to output (as measured with the signal below the threshold level). You can use this control to compensate for the loss of gain caused by the action of the compressor. It is calibrated in decibels, with a range from unity (0 dB) to +20.0 dB.

## AUTOMIX



One of the dangers of using a conventional mixer in a sound system operated by an untrained sound technician is the occurrence of feedback. The more open channels there are, the greater the overall system gain and the lower the potential acoustic gain (gain before feedback).

A trained operator knows that when a single microphone is on, the gain of the single channel can be turned up to a point just before feedback starts to occur, and then backed off a little to provide a safety margin (feedback stability margin). But if a second microphone is turned on, the first microphone's gain must be reduced to compensate for the additional gain provided by the second microphone. If the first microphone isn't turned down, feedback could occur.

The Automix feature automatically adjusts the input gains, depending on how many open channels there are at any given time. This number of open microphones (NOM) is used to calculate the gain adjustment (attenuation) for each channel.



Each individual channel is attenuated by an amount, in dB, equal to the difference, in dB, between that channel's level and the sum of all the channel levels. This keeps the overall system gain constant, and allows the system to deliver maximum acoustic gain without feedback.

There are three parts to the automixing feature in the DX8.

**AUTO:** This button turns Automixing on or off for an individual channel in the Mix A or Mix B output. This also enables the automatic gating feature. When the signal level drops below a threshold (determined by the automix algorithm), the gate activates (closes) and reduces the gain by an amount determined by the control just above the **AUTO** button, and ranges from 0 dB (no gate) to -60 dB (full gating). This control is sometimes called attenuation depth.

The release time of the gate (how fast the gate closes once the signal falls below the threshold) can be set to 0.5 seconds or 1.5 seconds with the buttons just below the **AUTO** button. The attack time is preset with a very quick response so the instant a signal appears at the input, the channel opens. This prevents the first word from being cutoff when someone begins to speak.

**NOM:** Each channel can be configured independently for each of the two mix outputs. The **NOM** button determines whether that channel is included in the automix calculations for the mix output. If the **NOM** button is selected on a channel (lit), then its gain is automatically and continuously adjusted by the automix algorithm.

**ALC:** This is an Automatic Level Control, and works like a "smart" compressor. The threshold is automatically calculated, and the release time is deliberately set to be very long to avoid the perception of "pumping." The range control, located just above the **ALC** button, sets the range through which the ALC circuit works on the signal. It can be adjusted from 0 dB (no action), to -20 dB (the channel's output level remains constant from the threshold to 20 dB above the threshold). This provides a safety net in the event that a very loud signal should suddenly appear at the input.



## MIX A and B Automixing Controls

The Mix A and Mix B outputs also each have an **ALC** control. Click on the **ALC** button to turn it on, and adjust the range from 0 dB to -20 dB.

Each of the outputs have a **MAX NOM** selection, from one to eight. When **8** is selected, all eight of the inputs are included in the automixing calculations when **NOM** and **AUTO** is enabled. If **4** is selected, only four inputs are included in the automixing calculations. The first four active channels are included, and the remaining channels are gated off until one of the first four active channels turns off.

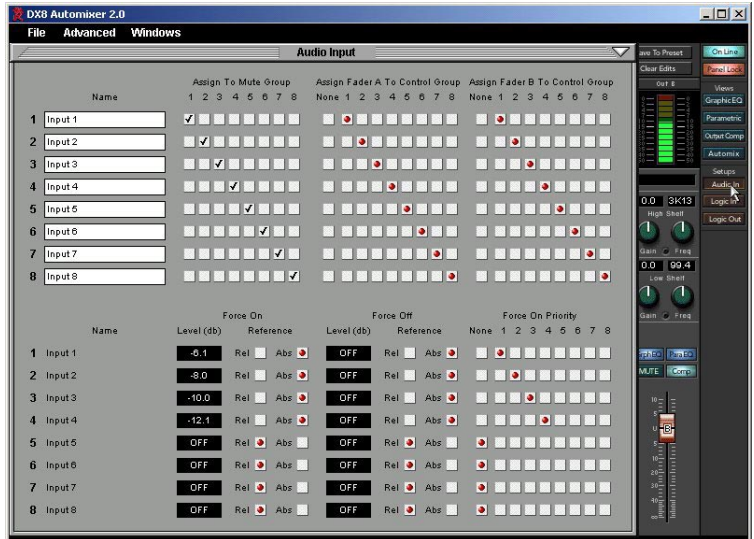
You can also choose whether to have the last active channel remain open (**LAST**), to have Input 1 remain open (**INP 1**), or to have no channels remain open (**NONE**) when there is no signal appearing at any of the inputs. This can be set independently for Mix A and Mix B outputs.



## SETUPS

### AUDIO IN

Click this button to open the **Audio Input** window. Make the following settings and assignments in the **Audio Input** window:



**Name:** Enter a name for each channel with the keyboard. It will accept up to 32 characters.

**Mute Groups:** Assign each input to one of 8 mute groups. Use a Mute Group to turn off (mute) two or more channels at the same time. Mute Groups are controlled by either a Logic Input or a Selection Remote Control configured to operate a Mute Group.

**Assign Fader A to Control Group:** Assign input Bus A faders to one of 8 control groups.

**Assign Fader B to Control Group:** Assign input Bus B faders to one of 8 control groups.

Use a control group to adjust the volume of two or more channels at the same time. All faders that are assigned to a control group will have their gain settings modified by the amount the control group fader is increased or decreased. For example, a control group might be used to adjust the overall volume for all the choir mics in a church by configuring a Level Remote Control to adjust the volume on a control group to which all the choir mics are assigned.

**Note:** Control Groups are controlled by Level Remote Control only.

**Force-on:** Assign a Force-on level to each input, from OFF to +10 dB. The Force-on setting can be set to either absolute or relative. In absolute mode, the fader level is set to the exact setting defined by the Force-on function. In relative mode, the current fader level is modified by the amount specified by the Force-on function.

**Force-off:** Assign a Force-off level to each input, from OFF to +10 dB. The Force-off setting can be set to either absolute or relative. In absolute mode, the fader level is set to the exact setting defined by the Force-off function. In relative mode, the current fader level is modified by the amount specified by the Force-off function.

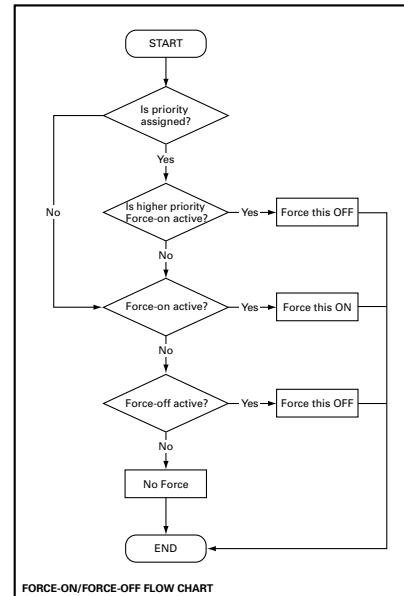
**Force-on Priority:** Assign a priority level from 1 (highest) to 8 (lowest) for each channel's Force-on function. The default setting is None. Higher priority Force-on commands override lower priority Force-on commands. For example, if Input 4 is assigned a Force-on priority of 4, which is activated, and Input 1 is assigned a Force-on priority of 1 and is activated, the Force-on command is removed from Input 4, and it is forced-off, along with all other lower-priority inputs (note that inputs with no priority assigned are not affected). If the Force-on command for Input 1 is removed, and the Force-on command for Input 4 is still present, Input 4 Force-on command is activated.

If Input 1 and Input 4 are both assigned a priority of 4, neither input overrides the other and Force-on commands can be active concurrently.

This rule implies that inputs are never forced-off by inputs with equal or lower priorities. It also implies that if force-on functions are active for several inputs with equal priorities, and there are no higher priorities active, then they are all forced-on. Inputs that do not have an assigned priority have no effect on, and are not affected by, the priority rule.

The Force-off function is not affected by priority. The priority rule is applied continuously to all active Force-on functions, i.e., at any time the active Force-on functions actually having an effect are those that are applied to inputs with the highest or no priority.

The following flow chart demonstrates the Force-on/off operation for any particular input:



## LOGIC IN

Click this button to open the Logic Input window. Make the following settings and assignments in the Logic Input window:



**Name:** Enter a name for each Logic Input, up to 32 characters.

**Function:** Select one of 7 different functions in this drop-down box, including Inactive, Force-on, Force-off, Mute Input, Mute Output, Mute Group, and Preset Recall.

**Action:** Select whether the particular function selected is momentary, latch on, latch off, or toggling. The selections will vary depending on the function selected for the Logic Input.

**Affected I/O:** Select which Input or Output is affected by the Logic function. The selections will vary depending on the function and action selected for the Logic Input.

See Appendix A for a chart of the Logic Input functional combinations available.

## Action Definitions

*Momentary* means that the logic function is active as long as the Logic Input is held active. When the Logic Input is inactive, the logic function is inactive.

*Latch On* means that the logic function is active and stays active once the Logic Input changes from inactive to active (logic high to logic low). Changing the Logic Input from active to inactive does not affect the logic function—it stays latched on.

*Latch Off* means that the logic function turns off (inactive) and stays off when the Logic Input changes from a logic high to a logic low. Changing the Logic Input from active to inactive does not affect the logic function—it stays latched off.

*Toggling* means that the logic function toggles between the inactive and active states when the Logic Input changes from inactive to active.

## LOGIC OUT

Click this button to open the Logic Output window. Make the following settings and assignments in the Logic Output window:



**Name:** Enter a name for each Logic Output, up to 32 characters.

**Function:** Select one of 7 different functions in this drop-down box, including Inactive, Input Signal Present, Output Signal Present, Input Channel Open, Output Channel Open, Preset Active, and Priority Inactive.

**Parameter:** Select the input, output, or other parameter that is being monitored by the Logic Output. The selections will vary depending on the function selected for the Logic Output.

**Condition:** Displays the particular condition that must be satisfied for the Logic Output to become active. The condition will vary depending on the function and parameter selected for the Logic Output.

See Appendix B for a chart of the Logic Output functional combinations available.

## APPLICATIONS FOR LOGIC INPUTS AND OUTPUTS

### Logic Inputs

**Mute Groups:** This function makes it easy to "turn off" some or all inputs instantly with a single command (either with a Logic Input command or a remote control) without affecting preset levels. For example, instead of using the priority function on a paging microphone, a Selection Remote Control can be configured to mute all program sources momentarily while a button is pressed to make an announcement. Or all the choir mics in a church application could be muted when the choir is not singing (or, in some applications, when the choir *is* singing).

**Force-on:** Use this function as a priority override for a microphone and to force-off lower priority microphones. This might be useful in a board-room application for a moderator or speaker to use, or in a restaurant application for a paging microphone.

**Force-off:** Use this to "duck" an input signal rather than completely mute it, as with the mute input function. For example, when the telephone rings in a bar, the bartender can momentarily lower the volume of the jukebox with the press of a button while he talks on the phone.

**Mute Input:** Useful where it is necessary to temporarily mute an input signal from a remote location. For example, in a board room a mute button could be provided for each microphone.

**Mute Output:** This function could be used to mute a particular zone in a restaurant or office building.

**Preset Recall:** In applications where the configuration of the system must change at various times throughout the day or week, this function provides an easy way to quickly change the system configuration. For example, in a church application there might be a preset for Sunday morning worship service, and a different preset for Monday evening Bible study.

### Logic Outputs

**Input Signal Present:** Use this logic signal to light an LED to indicate the presence of a signal on a microphone or line input. This could be particularly useful when routing an input signal through multiple DX8s, to verify the signal is present at all intended locations.

Another example might be in a church application where the pastor has a lavalier mic. As he approaches the pulpit, the pulpit mic begins to pick up his voice, triggering the Input Signal Present to go active. This is connected to a Logic Input pin, which forces off the lavalier mic.

**Output Signal Present:** Use this logic signal to light an LED to indicate the presence of a signal at one of the outputs.

Another application might be to turn on an amplifier when an output signal is present. Connect the Output Signal Present logic output to a power controller or power-up sequencer that switches AC power to the amplifier's AC line cord.

*Input Channel Open:* This can be used to provide a visual indication (via an LED) that a microphone's gain is turned up and ready to use. Note that if a channel is muted, the Input Channel Open logic pin will become inactive (logic high).

*Output Channel Open:* This can be used to provide a visual indication (via an LED) that an output's gain is turned up. Note that if an output is muted, the Output Channel Open logic pin will become inactive.

*Preset Active:* This can be used to remotely indicate when a specific preset is active. For example, in a restaurant/bar, one preset may be used during the dinner hours and another preset for later in the evening. Use the Preset Active logic on two output pins to indicate which preset is selected.

*Priority Inactive:* This is active when there is no priority asserted by forced-on inputs. This can be used in a location where an input might be forced-off by a priority function, to indicate when a priority is activated and the input is being forced off.

## CHANNEL STRIP

### 1 METER

The input channel meter indicates the input signal level just after the mic preamp and A/D converter stages. These meters indicate the signal level in real time relative to maximum level (+18 dBu with TRIM at unity) and follow the meters on the front panel, with the exception that they don't indicate gain when the Up/Down buttons are pressed, as the front panel meters do.

### 2 CHANNEL NAME

This box displays the name assigned to each channel. These names are entered in the **Audio Input** window.

**Note:** The output strip names are entered directly in the boxes above the **High Shelf EQ**. Click in the box and the I-beam text tool appears. Double-click the box to select all the text. Type in the new name.

### 3 HIGH SHELF EQ

These two knobs control the gain ( $\pm 15$  dB) and the corner frequency (500Hz-20kHz) of the channel high-frequency shelving EQ. Click and drag up or down to increase or decrease the settings of these controls.

### 4 MID PEAKING EQ

These two knobs control the gain ( $\pm 15$  dB) and the center frequency (20Hz-20kHz) of the channel mid-frequency peaking EQ. Click and drag up or down to increase or decrease the settings of these controls. The actual settings are displayed in the two boxes above the knobs.

### 5 LOW SHELF EQ

These two knobs control the gain ( $\pm 15$  dB) and the corner frequency (20Hz-500Hz) of the channel low-frequency shelving EQ. Click and drag up or down to increase or decrease the settings of these controls. The actual settings are displayed in the two boxes above the knobs.

### 6 MUTE BUTTON

Click this button to mute the channel's signal. Channel muting occurs after the input meter, so if signal is present at the input, the meter continues to indicate the signal level even though it is not getting through to the outputs.

The output mute buttons mute the signal just before the output faders and meters. Channel and output muting can also be accomplished by a logic input or a Selection Remote Control.

### 7 GAIN

Two faders are used to control the levels individually to Bus A and B. Click on the fader knob and drag up or down to increase or decrease the channel gain.

**Tip:** Press the Ctrl key while clicking on a fader or knob to reset the control to unity or its default value.



## OUTPUT STRIP

### 8 METER

The output meter indicates the output signal level just after the output gain control and just prior to the D/A converter stage. These meters indicate the signal level in real time relative to maximum output level (+18 dBu) and follow the meters on the front panel, with the exception that they don't indicate gain when the Up/Down buttons are pressed, as the front panel meters do.

### 9 HIGH SHELF EQ

These two knobs control the gain ( $\pm 15$  dB) and the corner frequency (500Hz-20kHz) of the channel high-frequency shelving EQ. Click and drag up or down to increase or decrease the settings of these controls.

### 10 LOW SHELF EQ

These two knobs control the gain ( $\pm 15$  dB) and the corner frequency (20Hz-500Hz) of the channel low-frequency shelving EQ. Click and drag up or down to increase or decrease the settings of these controls. The actual settings are displayed in the two boxes above the knobs.

### 11 OUTPUT DSP ON/OFF BUTTONS

These buttons duplicate the function of the On buttons in each of the three output DSP windows, Graphic EQ, Parametric EQ, and Compressor. Click each button to toggle the DSP function on and off. When the button is lit, the function is on.

### NOTEWORTHY DETAILS

Here are a few notable details of some of the functions available with the DX8-PC application:

**Mute Groups:** The Mute Group function is used to assign two or more inputs to one of eight Mute Groups, which can be activated with a Logic Input or a Selection Remote Control.

When a Mute Group is activated, all channels assigned to that Mute Group are muted simultaneously. Assign the inputs to Mute Groups in the **Audio In** window. Any input can be assigned to any Mute Group.

**Control Groups:** The Control Group function is used to assign two or more input level controls to one of eight Control Groups, which can be controlled with a Level Remote Control. When a Control Group level is modified with a Level Remote Control, the gain of each channel assigned to that Control Group is increased or decreased relative to its existing gain setting by the amount the Control Group level is increased or decreased. Assign the inputs to Control Groups in the **Audio In** window. A Control Group level defaults to 0 dB. An input level control can only be assigned to one Control Group, but the A and B level controls of an input can be assigned independently to different Control Groups. For example, the Bus A level control on Input 1 can be assigned to Control Group 8, while the Bus B level control on Input 1 can be assigned to Control Group 5.

Note that the actual level settings for inputs assigned to Control Groups do not change on the front panel meter or the DX8-PC application main window when a Control Group level is modified. Think of a Control Group as a virtual fader whose gain value is added to the real faders assigned to it.

**Presets:** The Preset function is used to save all the mixer settings to the DX8's internal nonvolatile memory for later recall. There are 16 presets available, which are saved using the **Save To Preset** button in the DX8-PC application main window, and recalled with the **Presets** box in the main window, by a logic input, or with a Selection Remote Control.

*Settings saved to a preset:*

**Input and Output Levels**

**Input Shelving EQ Gain and Frequency**

**Output Shelving EQ Gain and Frequency**

**Output Graphic EQ Gain (including On/Off)**

**Parametric EQ Gain, Frequency, and Bandwidth (including On/Off)**

**Compressor Threshold, Attack, Release, Ratio, and Output (including On/Off)**

**Automix NOM, ALC Range, Auto Gate Range, Last Mic On, Max NOM**

*Settings not saved to presets:*

**Settings in the Audio In, Logic In, and Logic Out windows**

**Mutes**

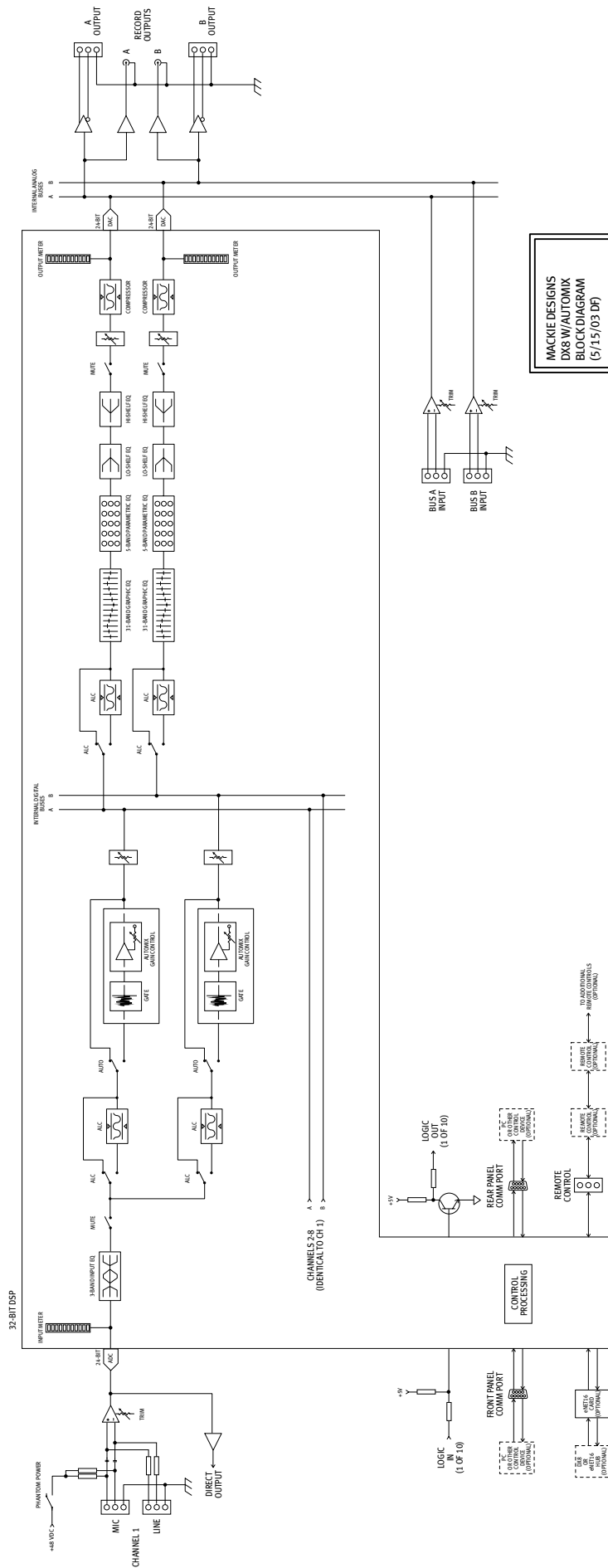
**Lock Code**

Control Group levels are not saved to presets. Recalling a preset resets the Control Group levels to unity gain (default), and unmutes all mutes and Mute Groups.



# 6. SPECIFICATIONS

## DX8 BLOCK DIAGRAM



MACKIE DESIGNS  
DX8 W/AUTOMIX  
BLOCK DIAGRAM  
(5/15/03 DF)

# DX8 SPECIFICATIONS

## INPUTS / OUTPUTS

|                            |  |
|----------------------------|--|
| <b>Inputs 1-8:</b>         | Balanced, Phoenix-type terminals   |
| <b>Bus A and B:</b>        | Balanced, Phoenix-type terminals, Direct to Mix Buses  |
| <b>Master Outputs:</b>     | Balanced, Phoenix-type terminals   |
| <b>Record Outputs A/B:</b> | Unbalanced, RCA  |
| <b>Direct Outputs 1-8:</b> | Unbalanced on DB15<br>(bottom row is signal return)  |
| <b>Logic Inputs:</b>       | 10 Inputs on DB25<br>Series resistance: 570Ω<br>Internal pull-up: 47kΩ to +5V DC<br>Input voltage: +5.5V DC maximum<br>Active voltage: +1.0V DC maximum                |
| <b>Logic Outputs:</b>      | 10 open-collector Outputs on DB25<br>Series resistance: 550Ω<br>Internal pull-up: 10kΩ to +5V DC<br>Active current: 10mA maximum<br>Active voltage: +0.8V DC max @ 1mA |
| <b>Serial Ports:</b>       | 2 RS-232C on DB9 (COMM PORTS)  |

## CONTROLS

|                              |                                   |
|------------------------------|-----------------------------------|
| <b>Input Trim:</b>           | 8 Rotary Potentiometers           |
| <b>Input Gain:</b>           | 2 Pushbuttons per Input           |
| <b>EQ:</b>                   | 2 Pushbuttons for Low, 2 for High |
| <b>Master Output Gain:</b>   | 2 Pushbuttons per Output          |
| <b>Mode Select:</b>          | 1 Pushbutton                      |
| <b>Power:</b>                | Rocker Switch                     |
| <b>Phantom Power Select:</b> | 8 DIP Switches                    |

## INDICATORS

|                          |                          |
|--------------------------|--------------------------|
| <b>Input Levels:</b>     | 12-segment LEDs per ch.  |
| <b>Output EQ Levels:</b> | 12-segment LEDs per ch.  |
| <b>Mode Status:</b>      | 3 LEDs; A/B/LOCK         |
| <b>Output Levels:</b>    | 12-segment LEDs per ch.  |
| <b>Volume Setting:</b>   | 12-segment LED Bar Graph |

## LED METER VALUES

|                        |                                 |
|------------------------|---------------------------------|
| 1. Red (scale: 0L):    | > -2 dB full-scale (> 16 dBu)   |
| 2. Yellow (scale: 2):  | > -4 dB full-scale (> 14 dBu)   |
| 3. Yellow (scale: 4):  | > -7 dB full-scale (> 11 dBu)   |
| 4. Yellow (scale: 7):  | > -10 dB full-scale (> 8 dBu)   |
| 5. Green (scale: 10):  | > -15 dB full-scale (> 3 dBu)   |
| 6. Green (scale: 15):  | > -20 dB full-scale (> -2 dBu)  |
| 7. Green (scale: 20):  | > -25 dB full-scale (> -7 dBu)  |
| 8. Green (scale: 25):  | > -30 dB full-scale (> -12 dBu) |
| 9. Green (scale: 30):  | > -35 dB full-scale (> -17 dBu) |
| 10. Green (scale: 35): | > -40 dB full-scale (> -22 dBu) |
| 11. Green (scale: 40): | > -50 dB full-scale (> -32 dBu) |
| 12. Green (scale: 50): | > -60 dB full-scale (> -42 dBu) |

## SIGNAL PROCESSING

|                 |  |
|-----------------|--|
| <b>General:</b> | Five 32-bit floating-point DSPs<br>24-bit A/D and D/A converters<br>512Kx16 Flash ROM<br>128Kx32 SRAM (with battery backup)  |
| <b>Inputs:</b>  | 3-band shelving/peaking EQ<br>Gain: ±15 dB<br>Frequency:<br>LO Shelving: 20Hz-500Hz variable<br>MID Peaking: 20Hz-20kHz variable<br>HI Shelving: 500Hz-20kHz variable<br><br>Automatic Level Control (ALC)<br>Range: 0 dB to -20 dB<br><br>Automix<br>NOM On/Off<br>Gate Attenuation Depth: 0 dB to -60 dB<br>Gate Release Time: 0.5 s or 1.5 s  |
| <b>Outputs:</b> | Automatic Level Control (ALC) on each Output<br>Range: 0 dB to -20 dB<br><br>Automix MAX NOM: 1-8<br><br>Automix Last Mic On: None, Last, Input 1<br><br>2-band shelving EQ on each Output<br>Gain: ±15 dB<br>Corner Frequency:<br>LO: 20Hz-500Hz variable<br>HI: 500Hz-20kHz variable<br><br>1/3-Octave Graphic EQ on each Output<br>Gain: ±15 dB<br>ISO-Centered Frequencies: 20, 25, 31.5, 40, 50, 63, 80, 100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1k, 1.25k, 1.6k, 2k, 2.5k, 3.15k, 4k, 5k, 6.3k, 8k, 10k, 12.5k, 16k, 20k<br><br>5-Band Parametric EQ on each Output<br>Gain: ±15 dB<br>Center Frequency:<br>20Hz-20kHz variable<br>Bandwidth: 0.1 octave to 6 octaves<br><br>Compressor/Limiter on each Output<br>Threshold: -60.0 dB to -1.0 dB<br>Attack: 1 ms to 2500 ms<br>Release: 10 ms to 2500 ms<br>Ratio: 1:1 to 20:1<br>Output: 0 dB to +20.0 dB |

## AUDIO

### Noise

(20Hz-20kHz bandwidth, Master Out, channel Trims @ unity gain, channel EQs flat, all odd channels panned left, even channels panned right):

|   |                                      |
|---|--------------------------------------|
| Master level @ unity, channel levels @ unity: | -82 dBu                              |
| Single channel to Master Out:                 | -100 dBu<br>(referenced to 1% THD+N) |

### Total Harmonic Distortion (THD+N)

(1kHz @ +10 dBu (unity level) 20Hz-20kHz):

|                       |          |
|-----------------------|----------|
| Mic in to Master Out: | < 0.005% |
|-----------------------|----------|

### Crosstalk

(1kHz relative to 0 dBu, 20Hz-20kHz bandwidth, any line input to adjacent Direct Out):

Trim to unity: < -90 dB

### Frequency Response

Mic input to any output: 20Hz-20kHz,  $\pm 0.5$  dB

### Equivalent Input Noise (EIN)

Mic in to Direct out, max gain, 150 ohm termination:  
-129.5 dBm unweighted

### Common Mode Rejection (CMR)

Mic in to Direct out, max gain, 1kHz signal: better than 80 dB

### Maximum and Nominal Levels and Ranges

Mic inputs: +18 dBu, +4 dBu,  
0 to 60 dB gain

Line inputs: +18 dBu, +4 dBu,  
-30 to +30 dB gain

Bus A/B inputs: +18 dBu, +4 dBu,  
-20 to +20 dB gain

All outputs: +18 dBu, +4 dBu

### Impedances

Mic inputs: 1.3K ohms  
Line inputs: 40K ohms  
All other inputs: 10K ohms or greater  
All outputs: 120 ohms

### PHYSICAL

**Dimensions (HxWxD):** 3.5"/2RU (89mm) x 19" (483mm) x 13.25" (337mm)

**Net Weight:** 17 lbs. (7.7 kg)

### ELECTRICAL

**AC Power:** 90-240V AC, 50/60Hz, 1.0A

**DC Power:** 24V DC, 3A

**Phantom Power:** +48V DC, current limited to 7mA per input channel

**Fuse Ratings:** 1.6A Slo Blo, 250V

### PC SYSTEM REQUIREMENTS

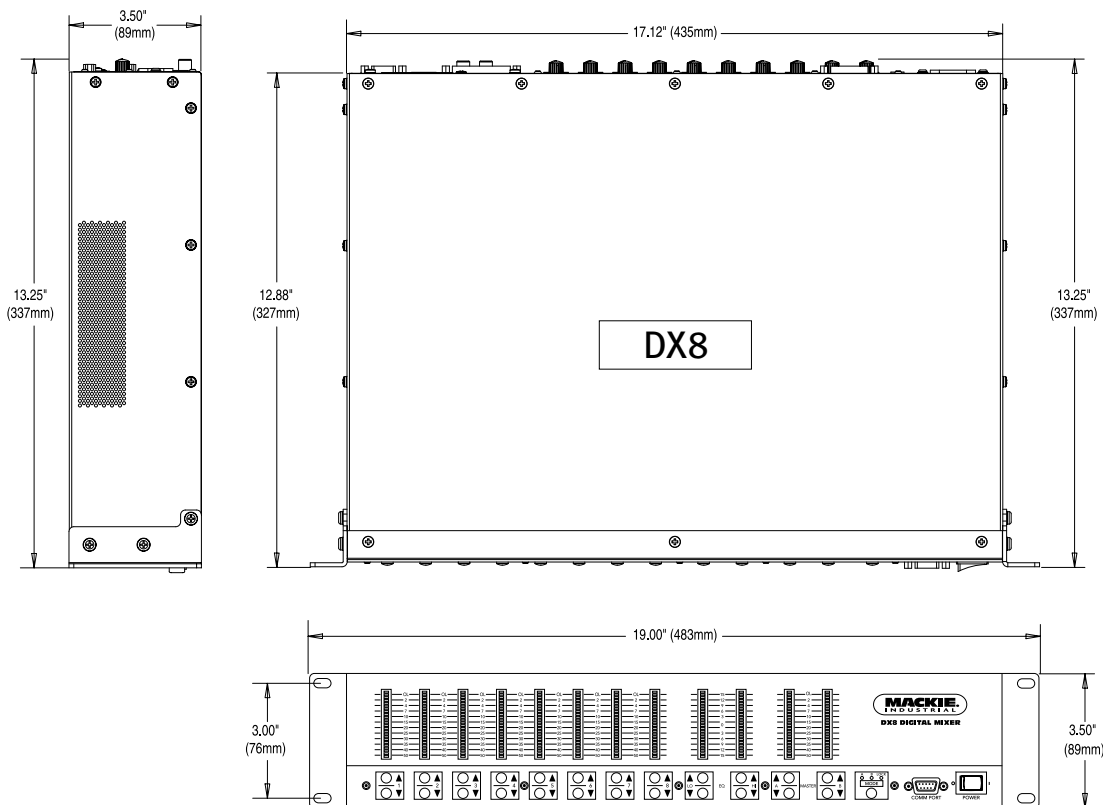
**OS:** Windows® 95, 98 or NT®

**Processor:** Pentium® or faster

**RAM:** 16MB minimum  
32MB recommended

**Storage:** 10MB free disk space

**Display:** 800x600 pixels, 256 colors minimum





## DISCLAIMER

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## 6. SERVICE INFORMATION

In the event that your DX8 should require servicing, please follow these instructions:

1. Call Mackie Tech Support at 1-888-337-7404, 8 am to 5 pm PST (Monday-Friday), to verify the problem and obtain a Return Authorization (RA) Number. Be sure to have the serial number of the unit when you call. You must have a Return Authorization Number in order to obtain warranty service at the factory or at an authorized service center.
2. Pack the unit in its original packaging. *This is very important.* Mackie Industrial is not responsible for any damage that occurs during shipping due to non-conventional packaging. Original packaging helps to minimize the possibility of shipping damage.
3. Include a legible note stating your name, return shipping address, (no P.O. boxes), daytime phone number, Return Authorization Number, and a detailed description of the problem, including how we can duplicate it.
4. Write the Return Authorization Number in BIG BOLD PRINT on the top of the box.
5. Ship the unit to us. We suggest insurance for all forms of cartage. Ship to this address:

Mackie Designs  
Service Department  
16220 Wood-Red Road NE  
Woodinville, WA 98072

## APPENDIX A: LOGIC INPUT FUNCTIONS

| Logic Input   |           |                              |
|---------------|-----------|------------------------------|
| Function      | Action    | Affected I/O                 |
| Inactive      | None      | None                         |
| Force-On      | Momentary | Input 1 to Input 8           |
|               | None      | Input 1 to Input 8           |
| Force-Off     | Momentary | Input 1 to Input 8           |
|               | None      | Input 1 to Input 8           |
| Mute Input    | Momentary | Input 1 to Input 8           |
|               | Latch On  | Input 1 to Input 8           |
|               | Latch Off | Input 1 to Input 8           |
|               | Toggling  | Input 1 to Input 8           |
| Mute Output   | Momentary | Output A                     |
|               |           | Output B                     |
|               |           | Output A&B                   |
|               | Latch On  | Output A                     |
|               |           | Output B                     |
|               |           | Output A&B                   |
|               | Latch Off | Output A                     |
|               |           | Output B                     |
|               |           | Output A&B                   |
|               | Toggling  | Output A                     |
| Output B      |           |                              |
| Output A&B    |           |                              |
| Mute Group    | Momentary | Mute Group 1 to Mute Group 8 |
|               | Latch On  | Mute Group 1 to Mute Group 8 |
|               | Latch Off | Mute Group 1 to Mute Group 8 |
|               | Toggling  | Mute Group 1 to Mute Group 8 |
| Preset Recall | Momentary | Preset 1 to Preset 16        |
|               | Latch On  | Preset 1 to Preset 16        |

## APPENDIX B: LOGIC OUTPUT FUNCTIONS

| Logic Output      |             |                             |
|-------------------|-------------|-----------------------------|
| Function          | Parameter   | Condition                   |
| Inactive          | None        | None                        |
| Inp Sig Present   | Input 1-8   | Input Signal > -40 dB       |
| Out Sig Present   | Output A    | Output A Signal > -40 dB    |
|                   | Output B    | Output B Signal > -40 dB    |
| Input Chan Open   | Input 1-8   | Input Gain > -40 dB         |
| Output Chan Open  | Output A    | Output A Signal > -40 dB    |
|                   | Output B    | Output B Signal > -40 dB    |
| Preset Active     | Preset 1-16 | Preset Active               |
| Priority Inactive | None        | No priority input forced on |
| Auto-gate Status  | Input 1A-8A | LED on if gate active       |
|                   | Input 1B-8B | LED on if gate active       |

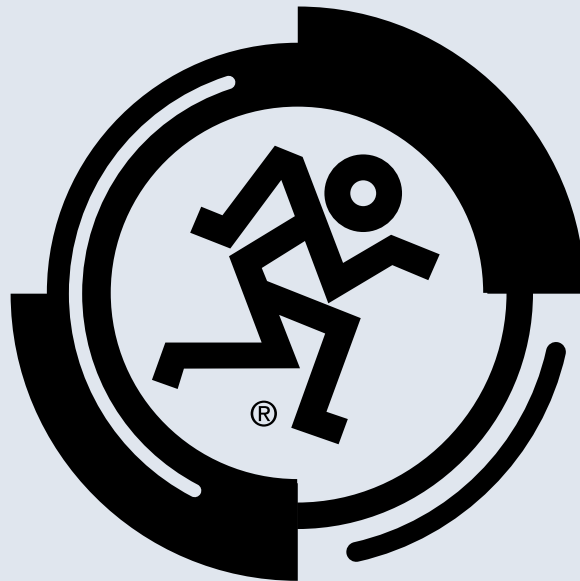
## APPENDIX C: SELECTION REMOTE PREDEFINED FUNCTIONS

| DX-SW4 Remote Switch Control (4-button/4-LED) |             |                       |                 |                 |                 |                 |
|---|-------------|-----------------------|-----------------|-----------------|-----------------|-----------------|
| Switch Positions                              |             |                       | Control 1       | Control 2       | Control 3       | Control 4       |
| ID  | 1 through 8 | Function              |                 |                 |                 |                 |
| 0   | 00000000    | Mute Input 1-4 (1)    | Mute Input 1    | Mute Input 2    | Mute Input 3    | Mute Input 4    |
| 1   | 10000000    | Mute Input 1-4 (2)    | Mute Input 1    | Mute Input 2    | Mute Input 3    | Mute Input 4    |
| 2   | 01000000    | Mute Input 5-8 (1)    | Mute Input 5    | Mute Input 6    | Mute Input 7    | Mute Input 8    |
| 3   | 11000000    | Mute Input 5-8 (2)    | Mute Input 5    | Mute Input 6    | Mute Input 7    | Mute Input 8    |
| 4   | 00100000    | Mute Group 1-4 (1)    | Mute Group 1    | Mute Group 2    | Mute Group 3    | Mute Group 4    |
| 5   | 10100000    | Mute Group 1-4 (2)    | Mute Group 1    | Mute Group 2    | Mute Group 3    | Mute Group 4    |
| 6   | 01100000    | Mute Group 5-8 (1)    | Mute Group 5    | Mute Group 6    | Mute Group 7    | Mute Group 8    |
| 7   | 11100000    | Mute Group 5-8 (2)    | Mute Group 5    | Mute Group 6    | Mute Group 7    | Mute Group 8    |
| 8   | 00010000    | Force On 1-4 (1)      | Force On 1      | Force On 2      | Force On 3      | Force On 4      |
| 9   | 10010000    | Force On 1-4 (2)      | Force On 1      | Force On 2      | Force On 3      | Force On 4      |
| 10  | 01010000    | Force On 5-8 (1)      | Force On 5      | Force On 6      | Force On 7      | Force On 8      |
| 11  | 11010000    | Force On 5-8 (2)      | Force On 5      | Force On 6      | Force On 7      | Force On 8      |
| 12  | 00110000    | Force Off 1-4 (1)     | Force Off 1     | Force Off 2     | Force Off 3     | Force Off 4     |
| 13  | 10110000    | Force Off 1-4 (2)     | Force Off 1     | Force Off 2     | Force Off 3     | Force Off 4     |
| 14  | 01110000    | Force Off 5-8 (1)     | Force Off 5     | Force Off 6     | Force Off 7     | Force Off 8     |
| 15  | 11110000    | Force Off 5-8 (2)     | Force Off 5     | Force Off 6     | Force Off 7     | Force Off 8     |
| 16  | 00001000    | Preset Recall 1-4 (1) | Preset Recall 1 | Preset Recall 2 | Preset Recall 3 | Preset Recall 4 |
| 17  | 10001000    | Preset Recall 1-4 (2) | Preset Recall 1 | Preset Recall 2 | Preset Recall 3 | Preset Recall 4 |
| 18  | 01001000    | Preset Recall 5-8 (1) | Preset Recall 5 | Preset Recall 6 | Preset Recall 7 | Preset Recall 8 |
| 19  | 11001000    | Preset Recall 5-8 (2) | Preset Recall 5 | Preset Recall 6 | Preset Recall 7 | Preset Recall 8 |
| 20-255  |             | For Future Updates    |                 |                 |                 |                 |

## APPENDIX D: LEVEL REMOTE PREDEFINED FUNCTIONS

| DX-RVC Remote Volume Control (2-button/12-LED) |             |                    |                  |             |                             |
|--|-------------|--------------------|------------------|-------------|-----------------------------|
| Switch Positions                               |             |                    | Switch Positions |             |                             |
| ID   | 1 through 8 | Function           | ID               | 1 through 8 | Function                    |
| 0  | 00000000    | Input Level 1A (1) | 32               | 00000100    | Output Level A (1)          |
| 1  | 10000000    | Input Level 1A (2) | 33               | 10000100    | Output Level A (2)          |
| 2  | 01000000    | Input Level 1B (1) | 34               | 01000100    | Output Level B (1)          |
| 3  | 11000000    | Input Level 1B (2) | 35               | 11000100    | Output Level B (2)          |
| 4  | 00100000    | Input Level 2A (1) | 36               | 00100100    | Output Level A&B (1)        |
| 5  | 10100000    | Input Level 2A (2) | 37               | 10100100    | Output Level A&B (2)        |
| 6  | 01100000    | Input Level 2B (1) | 38               | 01100100    | Group Level 1 (1)           |
| 7  | 11100000    | Input Level 2B (2) | 39               | 11100100    | Group Level 1 (2)           |
| 8  | 00010000    | Input Level 3A (1) | 40               | 00010100    | Group Level 2 (1)           |
| 9  | 10010000    | Input Level 3A (2) | 41               | 10010100    | Group Level 2 (2)           |
| 10   | 01010000    | Input Level 3B (1) | 42               | 01010100    | Group Level 3 (1)           |
| 11   | 11010000    | Input Level 3B (2) | 43               | 11010100    | Group Level 3 (2)           |
| 12   | 00110000    | Input Level 4A (1) | 44               | 00110100    | Group Level 4 (1)           |
| 13   | 10110000    | Input Level 4A (2) | 45               | 10110100    | Group Level 4 (2)           |
| 14   | 01110000    | Input Level 4B (1) | 46               | 01110100    | Group Level 5 (1)           |
| 15   | 11110000    | Input Level 4B (2) | 47               | 11110100    | Group Level 5 (2)           |
| 16   | 00001000    | Input Level 5A (1) | 48               | 00001100    | Group Level 6 (1)           |
| 17   | 10001000    | Input Level 5A (2) | 49               | 10001100    | Group Level 6 (2)           |
| 18   | 01001000    | Input Level 5B (1) | 50               | 01001100    | Group Level 7 (1)           |
| 19   | 11001000    | Input Level 5B (2) | 51               | 11001100    | Group Level 7 (2)           |
| 20   | 00101000    | Input Level 6A (1) | 52               | 00101100    | Group Level 8 (1)           |
| 21   | 10101000    | Input Level 6A (2) | 53               | 10101100    | Group Level 8 (2)           |
| 22   | 01101000    | Input Level 6B (1) | 54-255           |             | Reserved for future updates |
| 23   | 11101000    | Input Level 6B (2) |                  |             |                             |
| 24   | 00011000    | Input Level 7A (1) |                  |             |                             |
| 25   | 10011000    | Input Level 7A (2) |                  |             |                             |
| 26   | 01011000    | Input Level 7B (1) |                  |             |                             |
| 27   | 11011000    | Input Level 7B (2) |                  |             |                             |
| 28   | 00111000    | Input Level 8A (1) |                  |             |                             |
| 29   | 10111000    | Input Level 8A (2) |                  |             |                             |
| 30   | 01111000    | Input Level 8B (1) |                  |             |                             |
| 31   | 11111000    | Input Level 8B (2) |                  |             |                             |

Each of the predefined functions has two IDs (1) and (2) to allow two remote controls to perform the same function.



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