



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.



Intended to alert the user of the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

**CAUTION:** Risk of electrical shock — DO NOT OPEN!

**CAUTION:** To reduce the risk of electric shock, do not remove cover. No user serviceable parts inside. Refer servicing to qualified service personnel.

**WARNING:** To prevent electrical shock or fire hazard, do not expose this appliance to rain or moisture. Before using this appliance, read the operating guide for further warnings.



Este símbolo tiene el propósito, de alertar al usuario de la presencia de “(voltaje) peligroso” sin aislamiento dentro de la caja del producto y que puede tener una magnitud suficiente como para constituir riesgo de descarga eléctrica.



Este símbolo tiene el propósito de alertar al usuario de la presencia de instrucciones importantes sobre la operación y mantenimiento en la información que viene con el producto.

**PRECAUCION:** Riesgo de descarga eléctrica ¡NO ABRIR!

**PRECAUCION:** Para disminuir el riesgo de descarga eléctrica, no abra la cubierta. No hay piezas útiles dentro. Deje todo mantenimiento en manos del personal técnico cualificado.

**ADVERTENCIA:** Para evitar descargas eléctricas o peligro de incendio, no deje expuesto a la lluvia o humedad este aparato. Antes de usar este aparato, lea más advertencias en la guía de operación.



Ce symbole est utilisé dans ce manuel pour indiquer à l'utilisateur la présence d'une tension dangereuse pouvant être d'amplitude suffisante pour constituer un risque de choc électrique.



Ce symbole est utilisé dans ce manuel pour indiquer à l'utilisateur qu'il ou qu'elle trouvera d'importantes instructions concernant l'utilisation et l'entretien de l'appareil dans le paragraphe signalé.

**ATTENTION:** Risques de choc électrique — NE PAS OUVRIR!

**ATTENTION:** Afin de réduire le risque de choc électrique, ne pas enlever le couvercle. Il ne se trouve à l'intérieur aucune pièce pouvant être réparée par l'utilisateur. Confiez l'entretien et la réparation de l'appareil à un réparateur Peavey agréé.

**AVERTISSEMENT:** Afin de prévenir les risques de décharge électrique ou de feu, n'exposez pas cet appareil à la pluie ou à l'humidité. Avant d'utiliser cet appareil, lisez attentivement les avertissements supplémentaires de ce manuel.



Dieses Symbol soll den Anwender vor unisolierten gefährlichen Spannungen innerhalb des Gehäuses warnen, die von Ausreichender Stärke sind, um einen elektrischen Schlag verursachen zu können.



Dieses Symbol soll den Benutzer auf wichtige Instruktionen in der Bedienungsanleitung aufmerksam machen, die Handhabung und Wartung des Produkts betreffen.

**VORSICHT:** Risiko — Elektrischer Schlag! Nicht öffnen!

**VORSICHT:** Um das Risiko eines elektrischen Schlages zu vermeiden, nicht die Abdeckung entfernen. Es befinden sich keine Teile darin, die vom Anwender repariert werden könnten. Reparaturen nur von qualifiziertem Fachpersonal durchführen lassen.

**ACHTUNG:** Um einen elektrischen Schlag oder Feuergefahr zu vermeiden, sollte dieses Gerät nicht dem Regen oder Feuchtigkeit ausgesetzt werden. Vor Inbetriebnahme unbedingt die Bedienungsanleitung lesen.

**IMPORTANT SAFETY INSTRUCTIONS**

**WARNING:** When using electric products, basic cautions should always be followed, including the following:

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water. For example, near or in a bathtub, swimming pool, sink, wet basement, etc.
6. Clean only with a dry cloth.
7. Do not block any of the ventilation openings. Install in accordance with manufacturer's instructions. It should not be placed flat against a wall or placed in a built-in enclosure that will impede the flow of cooling air.
8. Do not install near any heat sources such as radiators, heat registers, stoves or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or third prong is provided for your safety. When the provided plug does not fit into your inlet, consult an electrician for replacement of the obsolete outlet. Never break off the grounding. Write for our free booklet "Shock Hazard and Grounding." Connect only to a power supply of the type marked on the unit adjacent to the power supply cord.
10. Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point they exit from the apparatus.
11. Only use attachments/accessories provided by the manufacturer.
12.  Use only with a cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
15. If this product is to be mounted in an equipment rack, rear support should be provided.
16. Exposure to extremely high noise levels may cause a permanent hearing loss. Individuals vary considerably in susceptibility to noise-induced hearing loss, but nearly everyone will lose some hearing if exposed to sufficiently intense noise for a sufficient time. The U.S. Government's Occupational and Health Administration (OSHA) has specified the following permissible noise level exposures:

Sound Duration Per Day In Hours	Sound Level dBA, Slow Response
8	90
6	92
4	95
3	97
2	100
1 1/2	102
1	105
1/2	110
1/4 or less	115

According to OSHA, any exposure in excess of the above permissible limits could result in some hearing loss. Ear plugs or protectors to the ear canals or over the ears must be worn when operating this amplification system in order to prevent a permanent hearing loss, if exposure is in excess of the limits as set forth above. To ensure against potentially dangerous exposure to high sound pressure levels, it is recommended that all persons exposed to equipment capable of producing high sound pressure levels such as this amplification system be protected by hearing protectors while this unit is in operation.

**SAVE THESE INSTRUCTIONS!**

## Description

The Digitool™ MX is a fully programmable audio processing and control system. It includes advanced parallel DSP processing, a multi-layer front panel display, and multiple interface and control options. Signal processing is accomplished using two 32-bit parallel SHARC processors with a combined power of 132 Mips. The Digitool MX gives the system designer an economical alternative to design, and is considerably more powerful than similarly priced components.

The Digitool MX's host processor and non-volatile flash memory maintain user-defined configurations and allow interface via the unit's front panel control and optional external control interfaces. Completely upgradable through a standard serial connection to a PC, the Digitool MX allows the system designer to upgrade to the latest version without removing the unit from the rack and disassembling the chassis.

The graphic display is capable of displaying real-time audio signal activity, active presets, and control information for audio processes, as well as monitoring critical variables such as internal cabinet temperature and power presence.

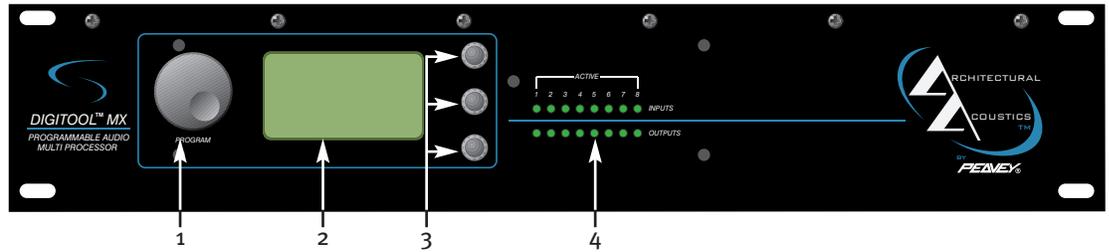
## Features

- Eight balanced analog line/mic inputs
- Phantom power
- Eight balanced analog line outputs
- 24-bit A/D and D/A converters
- Up to 96 kHz sample rate
- Sixteen front panel dual-color LED indicators (eight input, eight output)
- Three front panel parameter controls
- Large 64 x 128 pixel display with back light
- Jog/select control encoder for navigating the display
- 32-bit parallel processing performed by two ADI SHARC DSPs
- RS-232 connection for easy set-up and operation
- RS-485 connection for remote serial functions
- Four assignable control input ports(analog) with 0-10 VDC range for external potentiometers
- Worldwide-compatible power supply

## Applications

- Stadiums
- Auditoriums
- Civic Centers
- Performing Arts Centers
- Theaters
- Courts of Law
- Houses of Worship
- Theme Parks
- Arenas
- University Campus Buildings
- Music Clubs
- Hotel Meeting Rooms
- Conference Centers
- Schools
- Sports Bars
- Cruise Ships
- Teleconferencing
- Paging Systems
- Any facility requiring distribution of multiple line-level signals

## Front Panel



### 1. PROGRAM WHEEL:

This control navigates the display as well as performing parameter changes on functions with more than three settable parameters. It is used to scroll through the various functions, and to select among items such as inputs/outputs and hardware configuration.

### 2. LCD DISPLAY:

This screen gives a graphical representation of unit configuration and parameter settings. The layout of the screen and the information conveyed will depend on the function being monitored or set.

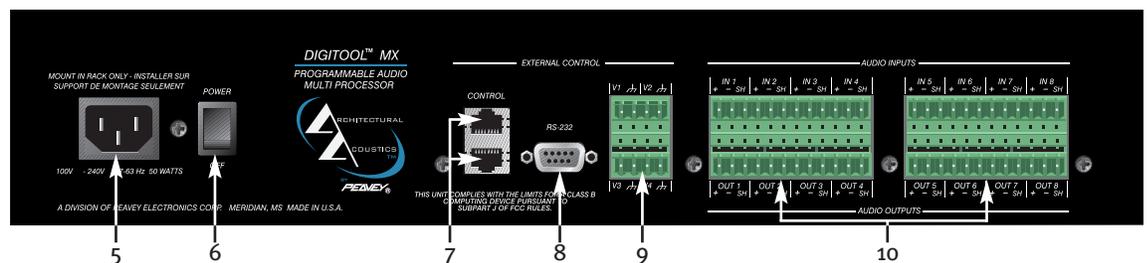
### 3. PARAMETER CONTROLS:

These controls are used to adjust the settings of the displayed effect. Their individual function will depend on the effect being displayed.

### 4. ACTIVE LEDs:

These LEDs (eight input and eight output) will illuminate as an indication of the active inputs and outputs.

## Rear Panel



### 5. IEC CONNECTOR:

This receptacle is for the IEC line cord (included) that provides AC power to the unit.

*Never break off the ground pin on any equipment. It is provided for your safety.*

If the outlet used does not have a ground pin, a suitable grounding adapter should be used and the third wire should be grounded properly. To prevent the risk of shock or fire hazard, always be sure that the mixer and all associated equipment is properly grounded.

#### Note for UK only

If the colors of the wires in the mains lead of this unit do not correspond with the colored markings identifying the terminals in your plug, proceed as follows: (1) The wire that is colored green and yellow must be connected to the terminal that is marked by the letter E, the earth symbol, colored green, or colored green and yellow. (2) The wire that is colored blue must be connected to the terminal that is marked with the letter N or the color black. (3) The wire that is colored brown must be connected to the terminal that is marked with the letter L or the color red.

## NAVIGATING THE DISPLAY

### 6. **POWER SWITCH:**

This rocker switch applies mains power to the unit.

### 7. **RJ-45 INPUT / OUTPUT CONNECTORS:**

These standard, eight-connector jacks allow connection to a multi-drop RS-485 bus.

### 8. **RS-232 CONNECTOR:**

This standard DB-9 serial cable connector allows interface between the Digitool™ and a PC.

### 9. **CONTROL VOLTAGE CONNECTORS:**

These four-control, removable Euro-style input ports (analog) have a 0-10 V DC range to accommodate assignable external potentiometers.

### 10. **INPUTS AND OUTPUTS:**

These detachable, Euro-style connectors allow analog input to and output from the unit.

The layout of the front panel is designed to simplify navigation and editing of internal processes. The PROGRAM WHEEL, which is located to the left of the display, controls all cursor movements within the display. The PROGRAM WHEEL has 32 detented positions per full rotation. Clockwise rotation results in left-to-right or top-to-bottom motion while counterclockwise motion reverses this order. Each detent results in the cursor moving by one position. In some view panels, the cursor location remains in a fixed location on the screen while each detent of the wheel results in a view change. This allows the user to navigate through multiple screens in just a few clicks of the PROGRAM WHEEL.

### **SELECTING DISPLAY OBJECTS**

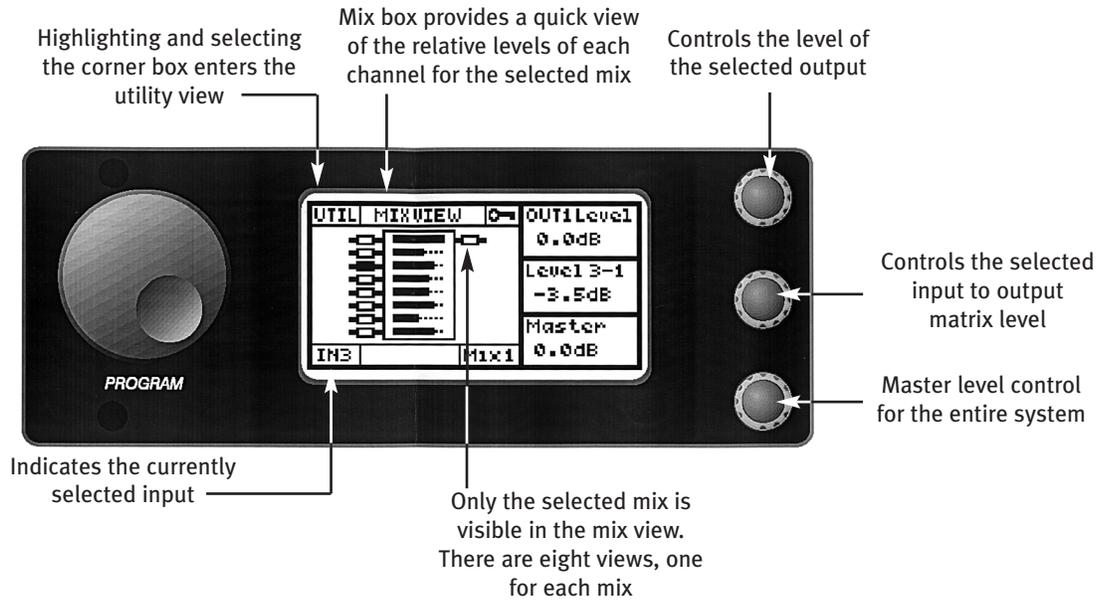
The PROGRAM WHEEL also functions to select items on the screen. If the cursor is over an object on the screen, it may be selected by pressing the PROGRAM WHEEL. This will either take you to an appropriate screen or enable additional options within the display.

### **PARAMETER CONTROLS**

To the right of the display are three undefined encoder controls. The function for these controls are indicated in the display along the right side of the screen, adjacent to the encoders. Figure 1 illustrates the function for each control within the Mix View panel, which is described in the next section.

## Panel Screens

The front panel screen consists of four primary views. They are: Mix, Route, Edit and Utilities. The Mix View is the default view. Edit, Route and Utilities are accessed through the Mix view.



**Figure 1. The Mix View is the primary view from which all other functions are accessed.**

## Mix View

The Mix View is considered to be the main view from which other views and controls are accessed. The Mix View provides a symbolic layout of each of eight output mixes. Figure 1 illustrates the components of this display and identifies the controllable functions. Rotating the PROGRAM WHEEL highlights each input or output channel object, indicated by small rectangles on the left and right sides of the Mix Box. The Mix Box contains bar graphs indicating the levels of all eight inputs that contribute to the selected mix. Along the left side of the Mix Box are the eight inputs. Similar to the input objects in the display are the output objects which represent 1 of 8 mixes. These appear on the right side of the Mix Box. Notice in figure 1 that only one output mix is visible at a time.

### MIX VIEW CONTROLS

The three controls for the Mix View are Output Level, Matrix Level and Master Level controls.

**OUTPUT LEVEL:** The top encoder affects the Output Level for one of eight outputs. This level corresponds to the selected mix along the right side of the Mix Box.

**MATRIX LEVEL:** The middle encoder controls 1 of 64 levels. This control corresponds to a combination of the selected input channel and output mix. In the illustration of figure 1, channel 3 is highlighted and therefore enables the Matrix Level of channel 3 to be visible for the selected mix. Notice that the nomenclature of the label for this control, which appears in the display adjacent to the encoder, indicates a level control within the 8X8 matrix. That is "Level 3-1" identifies the Input-3 to Mix-1 level. There are 64 active levels within the matrix. All are accessible from the Mix panel view.

**MASTER LEVEL:** The third or bottom encoder functions as the Master Level for the entire system. When this Level is changed, all eight outputs are changed by an equivalent amount.

## Route View

The Route View is an alternative presentation to the Mix View (Figure 2). In the Route View, a single input channel is selected. The display then shows the routing of the selected input channel to each output. Each output level can be changed in the same manner as is done in the Mix View. It should be noted that in either view, routing and mixing can be accomplished. The Route View is handy when you need to route a selected channel to multiple outputs. The three parameter knobs perform the same function as in the Mix View. The top knob controls the highlighted output mix, the second knob controls the selected Matrix Level and the bottom knob controls the Master Volume for all outputs.

Access to the Digitool's settings may be restricted by clicking on the key icon at the upper right portion of the Mix View screen. An option menu will appear which allows the user to either set the unit's password or to lock the screen.

In order to set a new password, the user is first asked to enter the old password using the program knob and the displayed graphical numeric keypad. When shipped from the factory, the Digitool's default password is '1234'. After correct entry of the old password, the user will be prompted to enter the new password (up to four digits long), and then to confirm this new password again.

The Digitool will enter secure mode by choosing Lock Screen from the key option menu. In this mode, a banner will appear in the graphics display, and any movements of the front panel controls will cause a password entry screen to appear. A user must type the correct password before they can gain access to the Digitool's settings via the front panel.

If the unit is powered down while in secure mode, then it will power up in secure mode. Similarly, if it was powered down unsecure, it will power up unsecure.

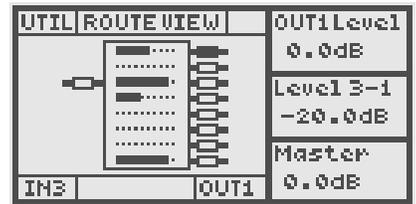
Pressing the **PROGRAM** knob while an input or output object is selected will open the edit window for the selected channel. These panels are used to access and control filters, gates, compressors and other signal processes. Refer to these sections in the following pages of this manual for a detailed description.

Once Edit is selected the Edit View panel will be activated. The Edit View panel is actually a series of views that are presented in the same manner that the signal path follows. The views are described below.

**INPUT CHANNEL HARDWARE**

The first panel that is visible in Edit View is the Input Channel Hardware page (figures 4a and 4b). This panel allows for configuration of the input hardware. There are two different views depending upon whether Mic or Line is selected.

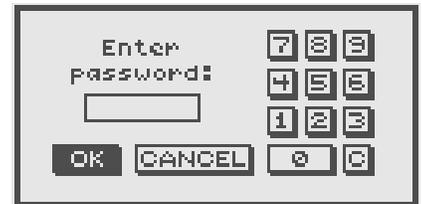
**LINE MODE:** The control options for Line mode are Sensitivity and Trim. Sensitivity can be adjusted for one of four settings: 30, 24, 18 and 12 dBu. Each setting scales the full digital range to the specified sensitivity setting. For example, if an input signal has a nominal level of +4 dBu, then a sensitivity setting of 24 dBu provides 20 dB of digital headroom before clip. A compact disc player has a nominal level of -10 dBV (-7.79 dBu) therefore a sensitivity setting of +12 dBu provides 19.8 dB of headroom before clip. Trim provides +/- 6 dB of gain or attenuation in the input hardware.



**Figure 2.** The Route View allows the user to quickly determine the signals that are mixed to a particular output channel.



(a)



(b)

**Figures 3a and 3b.** Security options and password entry views.



**Figures 4a and 4b.** Input Channel Hardware views for Line mode (a) and Mic mode (b).

**MIC MODE:** The control options are Phantom On/Off and Gain. The Mic gain is adjustable from +15 to +50 dB in 0.5 dB steps.

### INPUT CHANNEL LPF-HPF

The first DSP process for the input signal chain is the filter. The filter parameters are as follows: Frequency, Q and Type (see figures 5a and 5b). The user can select either a low-pass filter (LPF) or high-pass filter (HPF). In general this filter is intended to be used as a high pass type for the purpose of removing unwanted low frequencies at the input, particularly when used for high-gain microphone applications. This will tend to stabilize dynamic processing such as gates and compressors that appear later in the chain. In addition, the user has control over the Q of the filter.

**Q ADJUSTMENT:** The Q is a primitive component of the filter and is usually fixed in most HPF or LPF implementations. Figure 5b illustrates the effect of the Q adjustment on the frequency response of the filter. The illustration shows the filter in high-pass mode with the corner frequency set for 100 Hz. There are five sweeps shown, each with a different Q value. The normal setting for Q is typically 0.707 which is shown in the illustration as the 2nd sweep from the bottom. At this value, the filter is considered to be critically damped and has a monotonic response throughout the attenuation band. The attenuation at the corner frequency is -3 dB.

Higher Q values result in corner frequency gain rather than attenuation. Lower Q values result in more attenuation at the corner frequency. Note that in either case, the filter still achieves a 12 dB/oct slope below the corner frequency and is ultimately unattenuated above the corner frequency. Notice also that the value of Q specifies the gain at the specified frequency. Therefore a Q of 2 provides a +6 dB boost at the specified corner while a Q of 0.5 attenuates by 6 dB. It is important to observe that the Q value does not specify the maximum boost or cut level of the filter. For example, notice the middle curve which has a Q of 1.0. This curve is 0 dB at the corner frequency yet has slight gain above the corner. One application for this control is to simultaneously roll off the low end and add warmth to the input signal which could serve to free up one of the two parametric equalizers in later stages.

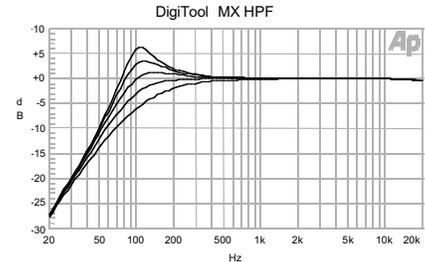
### NOISE GATE

The next process in the input signal chain is the Noise Gate. There are four parameter controls for the noise gate. See figures 6a & 6b for the control view and transfer function graph.

**THRESHOLD:** The top encoder sets the gate's turn-on threshold. This control is specified in dBFS. The range of the control is from 0 to -100 dBFS.



(a)

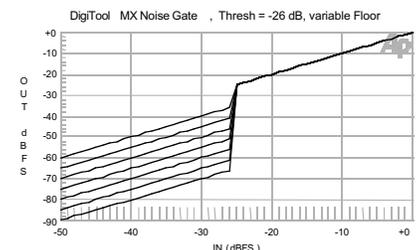


(b)

Figures 5a and 5b. Filter control panel (a) and varying Q values (b).



(a)



(b)

Figures 6a and 6b. Panel view (a) and transfer function (b) for the noise gate.

**ATTACK:** The middle control adjusts the attack time of the gate. The value range is from 1 to 1000 ms in 1 ms steps.

**DECAY:** The bottom control adjusts the decay time of the gate. The value range is from 1 to 1000 ms in 1 ms steps.

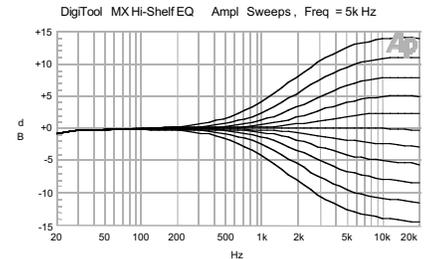
**FLOOR:** The floor specifies the level to which the gate attenuates when off. This parameter must be accessed and modified using the PROGRAM WHEEL to navigate and select. The range of this control is 0 to -100 dBFS.

### HIGH SHELF EQ

This is the first of four shaping EQs for the input signal chain. The top encoder adjusts the Gain (boost/cut) and has a range of -15 dB to +15 dB. The corner frequency is adjustable down to 3 kHz. The corner frequency is positioned 3 dB below the shelf level with a 6 dB/oct slope between the shelf point and 0 dB. The graph of figure 7b shows multiple curves for varying gain settings with the frequency set for 5 kHz.



(a)



(b)

**Figures 7a and 7b.** High Shelving EQ panel view (a) and boost/cut response curves.

### PARAMETRIC EQ 1 & 2

The next two processes in the signal chain are fully parametric equalizers. The control functions are Gain (boost/cut), Frequency and Bandwidth. The Gain control is adjustable from -20 to +15 dB in 1/2 dB steps. Frequency is adjustable for the full audio range. Bandwidth is specified per octave and is adjustable from 3.0 to 0.004 octaves. Figure 8 illustrates the panel view and Figures 9a, 9b and 9c show response curves for a range of parametric sweeps.



**Figure 8.** Panel view for one of two parametric equalizers.

### LOW SHELF EQ

The response of this EQ has a shelf level that is determined by the boost or cut value. The top encoder adjusts the Gain (boost/cut) and has a range of -15 dB to +15 dB. The corner frequency is adjustable up to 200 Hz. The corner frequency is positioned 3 dB below the shelf level with a 6 dB/oct slope between the shelf point and 0 dB. Figures 10a and 10b show the panel view and frequency response sweeps for several values of gain.

### COMPRESSOR

The compressor is the last process in the input chain. The output of this process feeds the matrix for the associated channel. The compressor has a total of five functions available. They are: Threshold, Ratio, Gain, Attack and Decay. Refer to figures 11a, 11b, and 11c for panel views and performance graphs.

**THRESHOLD:** The threshold is adjusted via the top encoder. The range is 0 to -100 dBFS in 1/2 dB steps. This control

determines when the compressor begins to limit the dynamic range of the input signal. The signal strength measured at the input to the compressor is constantly monitored. The compressor has no effect upon the signal as long as the measured signal strength is below the threshold point. Once the signal strength reaches and surpasses the threshold point, the compressor will begin limiting the dynamic range of the output. The amount of dynamic compression is determined by the Ratio control.

**RATIO:** The Ratio of the compression is adjusted using the middle encoder. The range of control is from 1 to 20. Though it is not specified in the panel view, the ratio is referenced to 1 dB. Therefore a Ratio setting of eight is an 8 to 1 ratio. This particular setting for example means that as the input signal increases its level by 8 dB, the compressor allows only 1 dB of increase at its output.

**GAIN:** The output gain of the compressor is adjusted via the bottom encoder. The range of this control is -100 to +30 dB in 1/2 dB steps. This adjustment can serve to compensate for the loss in average signal strength due to the dynamic compression. If the user desires to optimally set the gain in order to maintain digital full scale and therefore maximum dynamic range, the following formula can be used:

$$Gain_{dB} = |Threshold_{dB}| * \left(1 - \frac{1}{Ratio}\right)$$

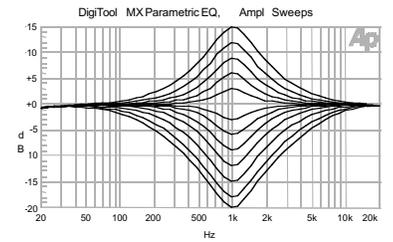
For example, given a threshold of -20 dB and a ratio of 4:1, the calculation is:

$$Gain_{dB} = 20 * \left(1 - \frac{1}{4}\right) = 15_{dB}$$

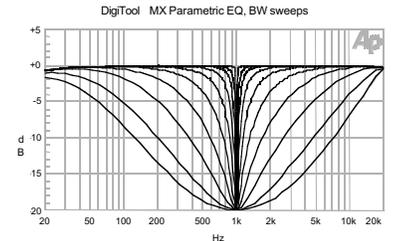
Therefore the above gain setting will result in the output level reaching maximum full scale just as the input signal reaches full scale. Note that this formula is given only to provide a mechanism to maximize dynamic range. It is not intended to compensate for average signal loss due to the compression.

**ATTACK & DECAY:** The Attack and Decay functions are accessed via the PROGRAM WHEEL. Attack sets the amount of time for the compressor to respond once the threshold has been met. Decay determines the amount of time for the compressor to recover from a compressed state once the input signal strength falls below the threshold. The adjustment range for each control is 1 to 1000 ms.

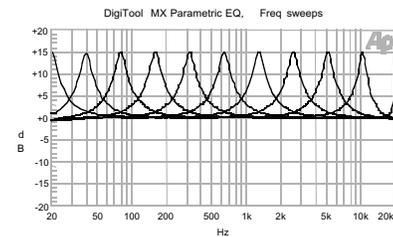
Editing of an output channel object is identical to editing an input process. The following signal processes are:



(a)



(b)

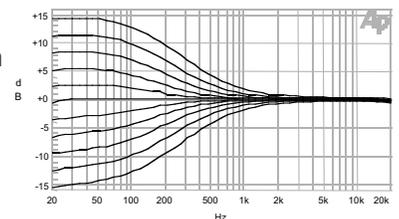


(c)

Figures 9a, 9b and 9c. Frequency response curves for a range of parametric sweeps.



(a)



(b)

Figures 10a and 10b. Low shelving EQ panel view (a) and boost/cut response curves.

Edit View - Output Channel

## 5-BAND PARAGRAPHIC

There is a five-band paragraphic equalizer for each output channel. Functionally, each band operates identically to the parametrics of the input stage. Paragraphics are named as such to differentiate their control facility from a graphic equalizer, which has fixed bandwidth and frequency. From the Digitool™ front panel, they are presented as parametric equalizers with their frequencies centered on five octaves. They are 40, 160, 640, 2.56k and 10.25 kHz, each with 1 octave bandwidths. Figure 12 displays the boost/cut response curves. For detailed operation, refer to the parametric EQ description in the “EDIT VIEW-Input Channel” section.

## COMPRESSOR

Refer to the “EDIT VIEW – Input Channel” section for a description of the operation of the compressor.

## OUTPUT CHANNEL FILTERS 1 & 2

Each output channel provides two general purpose filters for low-pass, band-pass or high-pass functions. Each filter is a 2nd order hi-pass or low-pass function (12 dB/oct. slope). A 24 dB/oct slope is possible by configuring both filters to be either low-pass or hi-pass types. Configuring both filters for a band-pass response (filter 1 = HP, filter 2 = LP), will result in response that is limited to a 12 dB/octave slope. Each filter operates identically to the input-section filter. Refer to the "EDIT VIEW – Input channel" section for a description of the operation of the LPF-HPF filter function.

## OUTPUT CHANNEL DELAY

Each output channel provides an alignment delay for up to 5 seconds. The delay is specified in milliseconds and  $\mu$ seconds and can be resolved to samples periods. Figure 13 provides the panel view for the delay control.

Selecting ‘UTIL’ in the upper left-hand corner of the Mix View panel will enable the Utility View panel. The Utility View allows the user to store and save presets, enable the internal generator and turn on the priority function.

## SAVE PRESET

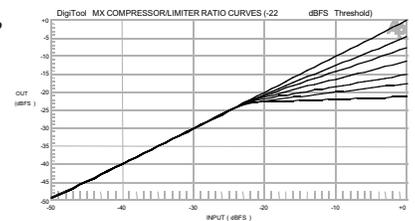
Parameters for a given configuration can be saved into 1 of 8 preset locations. All hardware and software variables are saved. Figure 14 illustrates the Panel View for the save function.

## LOAD PRESET

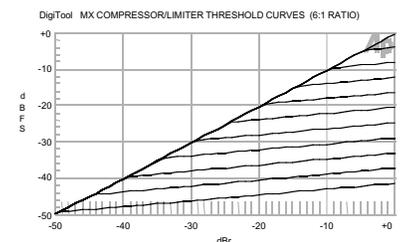
Parameters for a given configuration can be reloaded from 1 of 8 previously saved preset locations. All hardware and software variables are reloaded. Figure 15 illustrates the panel view for the save function.



(a)



(b)



(c)

Figures 11a, 11b and 11c. Panel view for the compressor parameter controls.

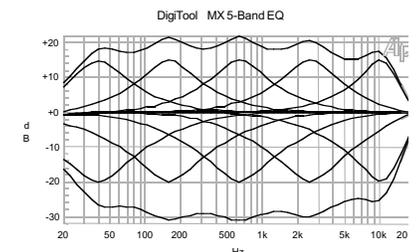


Figure 12. Response curves for the 5-band paragraphic EQ.



Figure 13. Panel view for the output delay controls.

Utility View

The user also has the option to reload the factory default configuration. This configuration has all functions bypassed and each input channel routed to its corresponding output.

### SIGNAL GENERATOR

An internal signal generator may be accessed from the Utility View. The generator output signal is positioned prior to the paragraphic equalizers in each of the output stages. The signal can be routed to one or more output channels. This signal, when enabled, is mixed with the normal audio signal flow for each channel. The generator provides three functions - Sine, Pink Noise and White Noise. The frequency range of the sine wave generator is 10 to 20 kHz. The attenuation range is -127 to 0 dBFS. Refer to Figure 16 for the panel view.

### PRIORITY OVERRIDE

Channel one provides a priority override of channels two through eight. The Priority View provides the user with the ability to enable and select any or all channels for override (Figure 17). The Priority function is implemented via the channel one gate. When the channel one gate threshold is reached and Priority is enabled, the selected override channels will be attenuated by an envelope set by the channel one gate attack, decay and floor settings. That is, if the channel one gate attack is set for 10 ms, then slave channels will attenuate with the same attack time. Similarly, the decay and floor settings for channel one will determine the attenuation floor and decay recovery of the slave channels. The Priority Override acts on the gates of the slave channels. The gates for each slave channel still operate normally as gates until the Priority condition becomes true. In addition, the Priority Override acts on the slave channel gates even if the gate function is disabled (assuming that priority override is enabled for that channel).

### UPGRADING DIGITOOL

DigiTool firmware and DSP code can be upgraded using a Flash utility which is available from the Peavey web site. The Flash utility is a Windows-based application that allows the user to connect to the DigiTool via the back-panel serial port, using a standard PC running Win95, 98 or NT. The user must select the proper comm port channel number in the utility's 'Options' pull-down menu. Once the proper communications port is selected, you can open a source file for download from the PC to DigiTool. The download process takes approximately 4 minutes. At the end of the download, the Flash utility will report a successful download and instruct the user to cycle power for the new program to take affect.



Figure 14. Panel view for the utility save function.

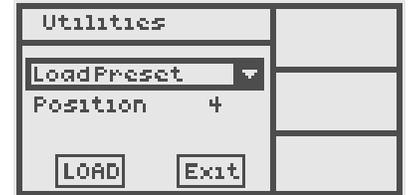


Figure 15. Panel view for the utility load function.

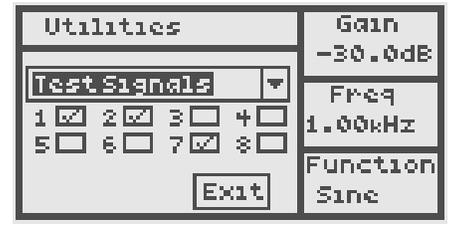


Figure 16. Panel view for the utility signal generator.



Figure 17 Channel 1 priority override view.

**CAUTION:** Once the download is in progress, it should not be interrupted. Digitool usually detects bad data or communication errors. Under some circumstances Digitool may attempt to load a corrupt file and become unresponsive. To recover from this condition, the user must load the upgrade using the hardware method, described below.

#### **LOADING FIRMWARE VIA HARDWARE RESET**

To download new firmware and DSP code from the PC to Digitool using the hardware method, the user must use a terminal emulator. Hyperterminal is a terminal emulation program provided by Windows which is intended for connection to a modem. It is often found in the Accessories folder under Communications. Hyperterminal should be setup as follows:

Connection name:       Digitool  
Area code:             Not applicable for this connection,  
                              but you must provide one anyway  
Connect using:         Com1, Com2, Com3, etc., (Select the  
                              PC communications port that is  
                              connected to Digitool)

#### **Port Settings:**

Bits per second (baudrate):   57.6k  
Data bits:                    8  
Parity:                        None  
Stop bits:                     1  
Flow control:                 None

Once you have a hyperterminal window, open the 'File' pull-down menu and select 'Properties'. Select the 'Settings' tab and change the emulation type to 'VT 100'. Select save to keep this configuration.

Next, turn the Digitool unit off and remove the top cover.

Locate the 'Flash' pads which is between U1705 and U1708 (see figure 18). The steps are as follows:

1. While the unit is still off, short across the two Flash pads using a small flat head screwdriver.
2. While still shorting the pads, turn the unit on.
3. Digttool will respond with all front panel LEDs brightly lit Green. If Digttool does not respond this way, repeat steps 1 and 2.
4. Once the LEDs are all green you may release the short.
5. In the Hyperterminal 'Transfer' pull-down menu, select 'Send Text file..'
6. Browse to the directory containing the upgrade file, select the file and press 'Open'.
7. Digttool will report 'GDone' to the emulator screen if the download was successful. If not, the message 'BDone' will appear, and therefore the process will need to be repeated.
8. If successful, cycle power on the unit to enable the new program.

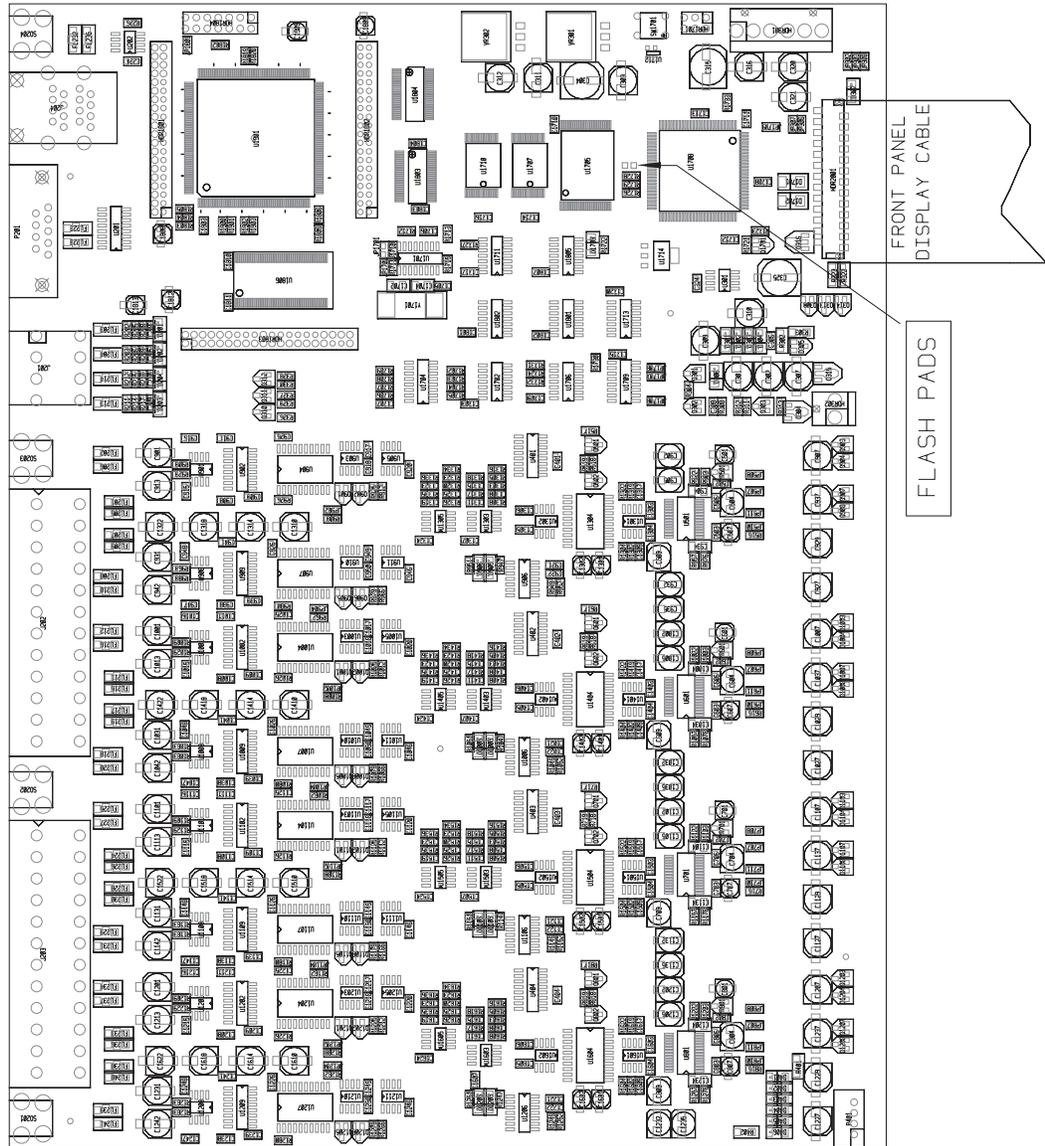
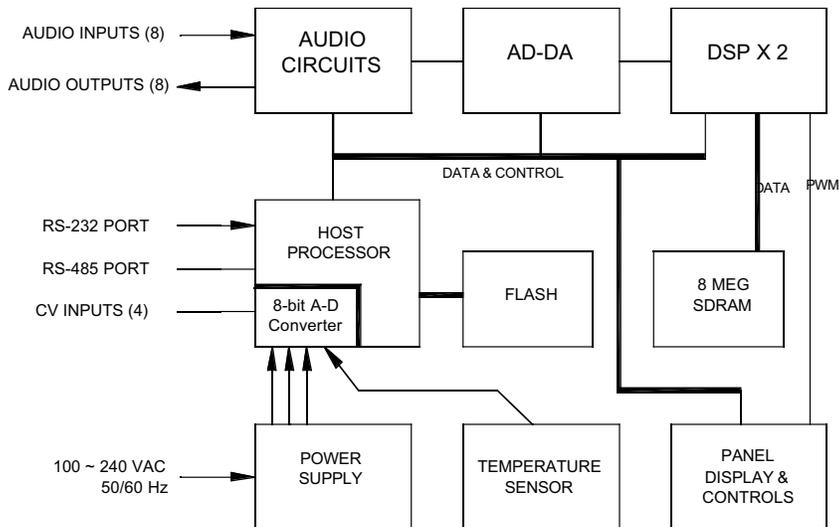
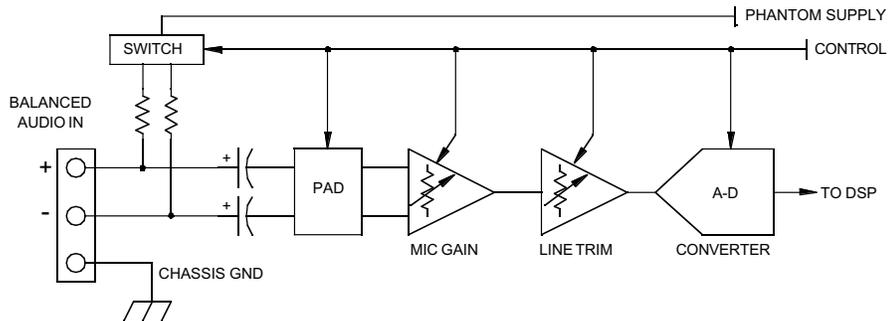


Figure 48 Location of shorting pads for hardware-reset download operation.

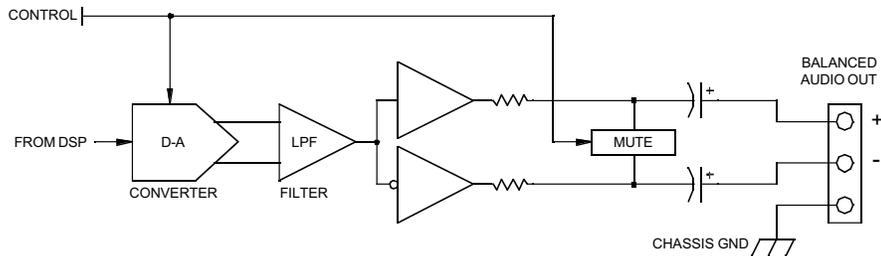
DIGITOOL MX SYSTEM LEVEL BLOCK DIAGRAM



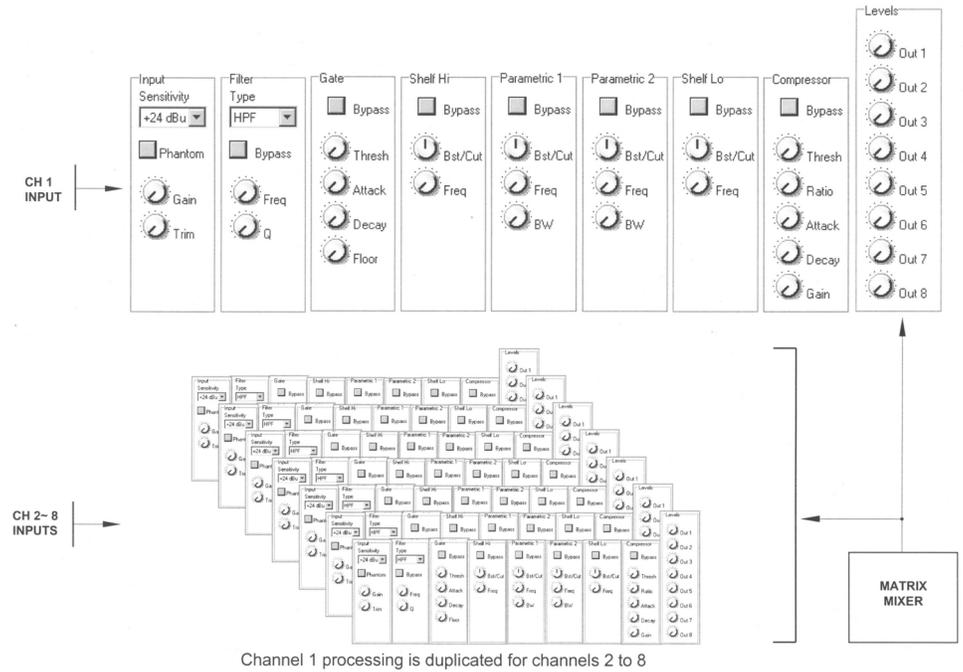
DIGITOOL MX ANALOG INPUT SIGNAL PATH - EACH CHANNEL



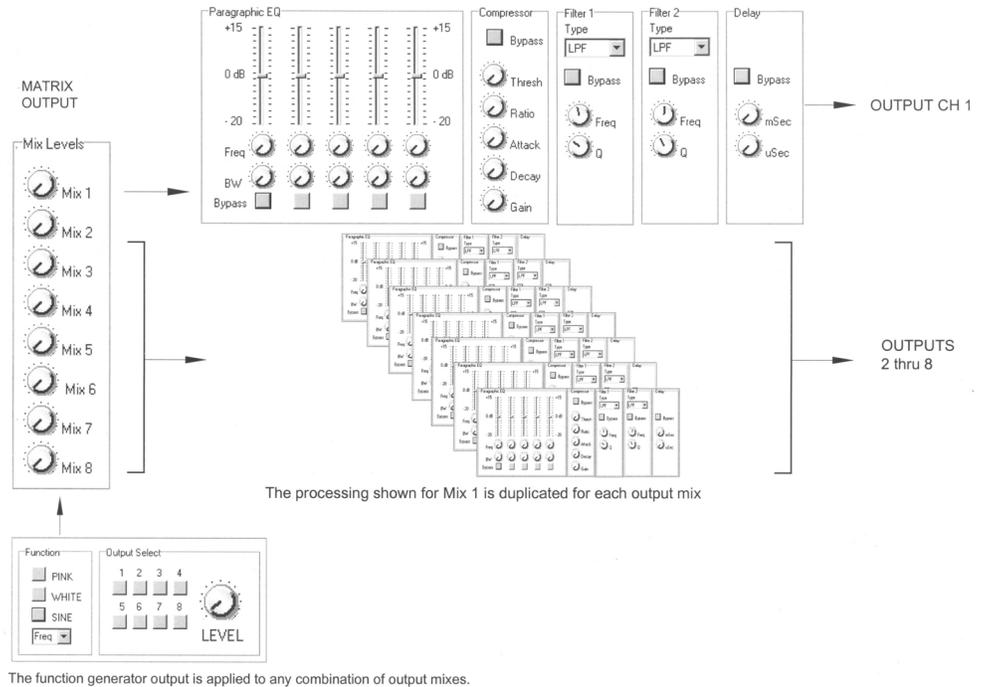
DIGITOOL MX ANALOG OUTPUT SIGNAL PATH - EACH CHANNEL



# DIGITOOL MX INPUT & DSP SIGNAL PATH (Symbolic)



# DIGITOOL MX DSP OUTPUT SIGNAL PATH (Symbolic)



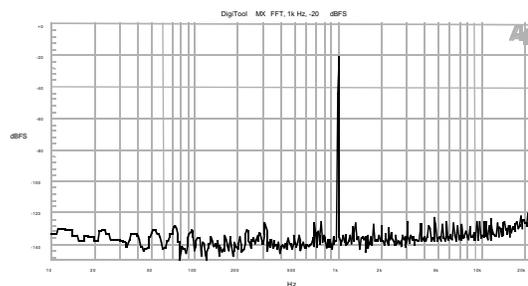
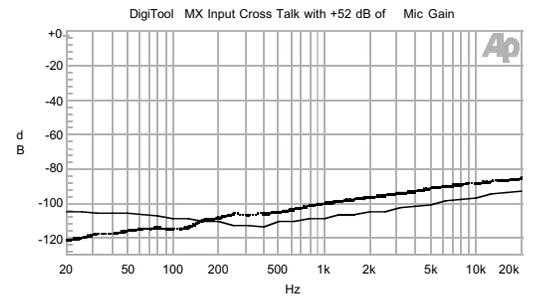
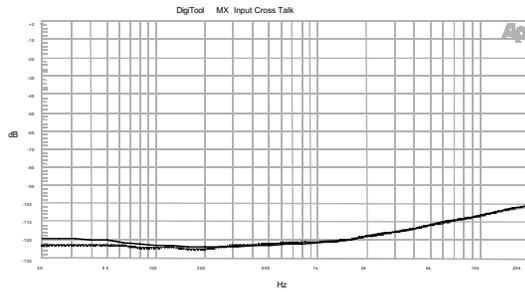
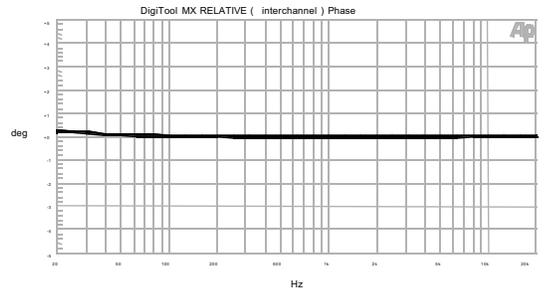
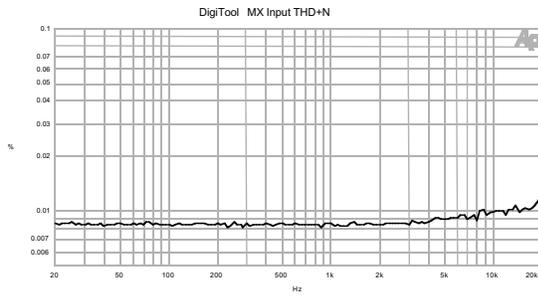
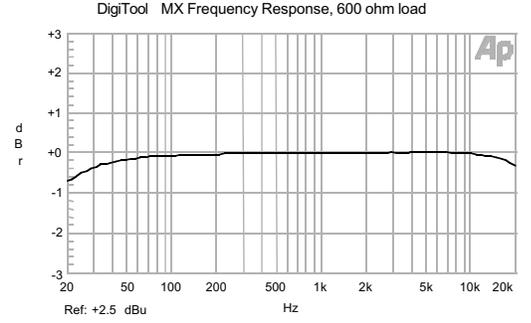
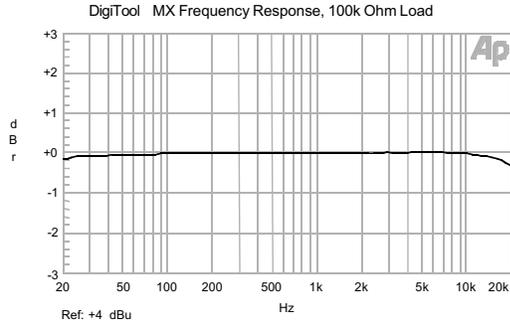
## Specifications

SPECIFICATIONS	MEASURE	COMMENTS
AUDIO CHANNELS	8 inputs/8 outputs	Line or Mic level inputs
LED METERING	8 input / 8 output peak-reading Dual color LEDs	LED STATUS: Red = -0.5 dBFS and higher (Clip) Red & Green = -4 to -0.5 dBFS Green = -4 to -40 dBFS Off = below -40 dBFS
<b>INPUT</b>		
ANALOG TRIM RANGE	-6 to +6 dB	Software controlled
LINE SENSITIVITY SETTINGS	+30 dBu, +24 dBu, +18 dBu, +12 dBu	Software selectable The sensitivity setting determines the maximum input signal that results in a full-scale digital input (0 dBFS ). 1/2 dB steps
MIC GAIN RANGE	+15 to +50 dB	Electronically balanced
INPUT IMPEDANCE	6.6 k $\Omega$	
PHANTOM POWER	+24 Volts	
CMRR	55 dB	
CROSSTALK	>90 dB	@ 1 kHz
DYNAMIC RANGE	104 dB	A-weighted, 150 Ohm input termination
<b>OUTPUT</b>		
OUTPUT FULL SCALE SETTINGS	+24 dBu, +18 dBu, +12 dBu, 6 dBu	Software selectable The sensitivity setting determines the maximum output signal that results from a full-scale digital signal (0 dBFS). Electronically balanced
OUTPUT IMPEDANCE	102 $\Omega$	Maximum output @ 600 $\Omega$ = 22.5 dBu
MINIMUM LOAD IMPEDANCE	600 $\Omega$	A-weighted
DYNAMIC RANGE	109 dB	
<b>ANALOG INPUT-TO-OUTPUT</b>		
TOTAL HARMONIC DISTORTION (+ NOISE)	0.01 %	20 Hz to 20 kHz, 22 kHz BW filter +4 dBu signal with 20 dB headroom $\pm$ 0.5 dB referenced at 1 kHz A-weighted, 150 Ohm input termination
FREQUENCY RESPONSE	20 Hz to 20 kHz	
DYNAMIC RANGE	103 dB	
LATENCY	1.4 mS	Propagation delay from input to output
<b>DIGITAL</b>		
SAMPLE RATE	44.1 kHz, 48 kHz, 96 kHz	
QUANTIZATION	24-bit	256 x-over-sampled Delta-sigma Analog-to-Digital and Digital-to-Analog Uses two ADI SHARC processors
DIGITAL PROCESSING	132 Mips 48-bit accumulators	
MASTER CPU CLOCK SPEED	6 MHz	
DSP CYCLE SPEED	66 MHz	
<b>CONTROL</b>		
RS-485	half-duplex 57.6 kbaud	1 port with 2 multi-drop RJ-45 connections
RS-232	56.7 kbaud	Standard dB-9 serial cable connector (female)
CV Inputs	0 to 10 V	Operates with either an external voltage applied or using a remote passive potentiometer connection
<b>GENERAL</b>		
DIMENSIONS	19" (48.26 cm) W x 12.25" (31.12 cm) D x 3.5" (8.89 cm) H	without connectors
NET WEIGHT	11.6 lbs. (5.26 kg)	
AC POWER INPUT VOLTAGE	100 VAC to 240 VAC	47 Hz to 63 Hz Universal Power Supply
POWER CONSUMPTION	20.7 Watts @100 V 20.5 Watts @120 V 22.7 Watts @240 V	330 mA 321 mA 206 mA
POWER DISSIPATION	70.7 BTU (17.7 kcal) 70.0 BTU (17.6 kcal) 77.5 BTU (19.5 kcal)	@100 V @120 V @240 V
AGENCY COMPLIANCE LISTINGS	UL, CUL, CE, FCC part 15 Class B	Pending

### Notes:

1. All specifications are typical for any channel(s).
2. All measurements are made in the digital domain.
3. All specifications are for an AC line input of 120 Volts RMS.
4. All input measurements are made using a 40  $\Omega$  balanced source impedance at +24 dBu full scale unless otherwise noted.
5. All measurements are made with gain/attenuation set for unity unless otherwise noted.

# Performance Graphs



**Architectural Acoustics®**  
**PEAVEY ELECTRONICS CORPORATION LIMITED WARRANTY**  
*Effective Date: July 1, 1998*

**What This Warranty Covers**

Your Peavey Warranty covers defects in material and workmanship in Peavey products purchased and serviced in the U.S.A. and Canada.

**What This Warranty Does Not Cover**

The Warranty does not cover: (1) damage caused by accident, misuse, abuse, improper installation or operation, rental, product modification or neglect; (2) damage occurring during shipment; (3) damage caused by repair or service performed by persons not authorized by Peavey; (4) products on which the serial number has been altered, defaced or removed; (5) products not purchased from an Authorized Peavey Dealer.

**Who This Warranty Protects**

This Warranty protects only the original retail purchaser of the product.

**How Long This Warranty Lasts**

The Warranty begins on the date of purchase by the original retail purchaser. The duration of the Warranty is as follows:

<b>Product Category</b>	<b>Duration</b>
MediaMatrix® DPU (Excluding Frames), Cinema Processors, Power Amplifiers, Pre-Amplifiers, Mixers, Electronic Crossovers and Equalizers	5 years
Loudspeakers	5 years
Microphones	2 years
Frames	1 year
Speaker Components (incl. speakers, baskets, drivers, diaphragm replacement kits and passive crossovers) and all Accessories	1 year

**What Peavey Will Do**

We will repair or replace (at Peavey's discretion) products covered by warranty at no charge for labor or materials. If the product or component must be shipped to Peavey for warranty service, the consumer must pay initial shipping charges. If the repairs are covered by warranty, Peavey will pay the return shipping charges.

**How To Get Warranty Service**

- (1) Take the defective item and your sales receipt or other proof of date of purchase to your Authorized Peavey Dealer or Authorized Peavey Service Center.  
OR
- (2) Ship the defective item, prepaid, to Peavey Electronics Corporation, International Service Center, 412 Highway 11 & 80 East, Meridian, MS 39301 or Peavey Canada Ltd., 95 Shields Court, Markham, Ontario, Canada L3R 9T5. Include a detailed description of the problem, together with a copy of your sales receipt or other proof of date of purchase as evidence of warranty coverage. Also provide a complete return address.  
OR
- (3) All MediaMatrix® Frames needing repair, should be shipped prepaid to Peavey Electronics Corporation, International Service Center, 412 Highway 11 & 80 East, Meridian, MS 39301

**Limitation of Implied Warranties**

ANY IMPLIED WARRANTIES, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO THE LENGTH OF THIS WARRANTY.  
 Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

**Exclusions of Damages**

PEAVEY'S LIABILITY FOR ANY DEFECTIVE PRODUCT IS LIMITED TO THE REPAIR OR REPLACEMENT OF THE PRODUCT, AT PEAVEY'S OPTION. IF WE ELECT TO REPLACE THE PRODUCT, THE REPLACEMENT MAY BE A RECONDITIONED UNIT. PEAVEY SHALL NOT BE LIABLE FOR DAMAGES BASED ON INCONVENIENCE, LOSS OF USE, LOST PROFITS, LOST SAVINGS, DAMAGE TO ANY OTHER EQUIPMENT OR OTHER ITEMS AT THE SITE OF USE, OR ANY OTHER DAMAGES WHETHER INCIDENTAL, CONSEQUENTIAL OR OTHERWISE, EVEN IF PEAVEY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.  
 Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This Warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

If you have any questions about this warranty or service received or if you need assistance in locating an Authorized Service Center, please contact the Peavey International Service Center at (601) 483-5365 / Peavey Canada Ltd. at (905) 475-2578.

*Features and specifications subject to change without notice.*



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