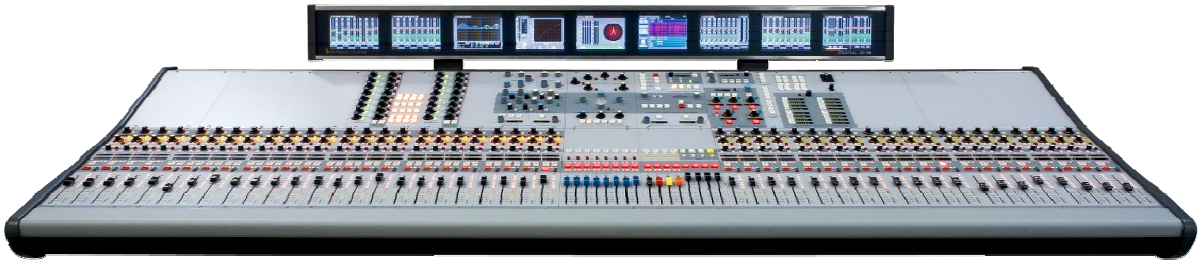
D-12 / D-16 / D-32
Digital Control Surfaces

TECHNICAL GUIDE



Wheatstone Corporation

600 Industrial Drive, New Bern, North Carolina, USA 28562

Wheatstone D-12 / D-16 / D-32

Introduction

The Wheatstone D-12, D-16, & D-32 are a family of digital television audio control surfaces that are compact (64 channels in 50 inches) and fully loaded with all the functions and control capability needed by most television broadcast facilities: 5.1 digital surround plus three stereo masters, a host of mix-minus clean feed outputs, individual channel bus-minus outputs, 7-band digital equalization, digital dynamic processing, and integrated routing that can access literally thousands of sources and feed thousands of destinations. In addition it can be ordered with paging, allowing you to get 48 channels worth of mixing in a 24 channel footprint. The D-12 gives your operators the added convenience of eight stereo subgroups, eight stereo auxiliary busses, four additional DCM/MUTE busses, and a full event/memory front panel storage and recall system that doesn't require an external computer to operate. The D-16 doubles the stereo auxiliary sends to 16, perfect for those variety shows requiring multiple foldback feeds as well as effects sends. The D-32 doubles the mix-minus busses to 16 in addition to the 16 auxiliary sends. Between the 16 mix-minus busses and direct mix-minus feed from every input channel, there are no limitations for IFB. And because it's a live television console, it has extensive communication capability. If there is a mix, you can talk to it. It even has twelve programmable talkback buttons.

Designed to integrate flawlessly with the Wheatstone BRIDGE digital audio network router, the D-12, D-16, & D-32 control surfaces allow you to easily create large or small platform-based systems that are exceptionally user-friendly and flexible. Wheatstone BRIDGE network cages house all I/O ports and engine cards, and may be wired in tandem within a single equipment room or interconnected to separate remote locations by means of fiber-optic or CAT-5 cables to provide single wire studio integration schemes.

Once configured, the system operates entirely independently of external computers. Configuration itself is intuitive and carried out onsite by means of user-friendly graphic interfaces provided by Wheatstone desktop software. The system also takes full advantage of Wheatstone's exclusive VDip configuration software, so that studio functions (like mutes, fader and timer starts, tally, etc.) are easily accomplished right at your desktop. Once completed, all settings are retained in non-volatile storage, allowing the entire system to run independently. Ethernet protocol is built in, providing interface with automation, scheduling, and hardware controllers as you require.

Control Surface Placement

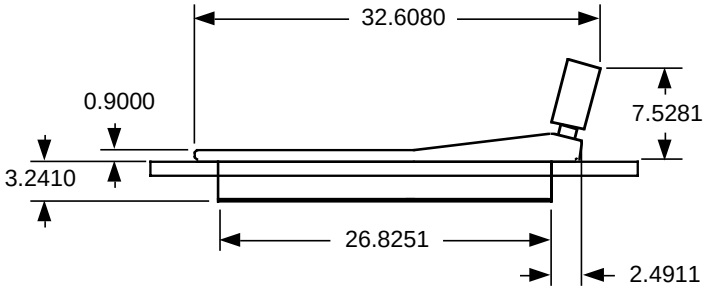
The D-12, D-16, & D-32 digital audio control surfaces are designed for simple drop-in installation in a countertop. Mainframes are available in a variety of sizes, from the compact 32-position up to the larger 52-position frames shown below. Cutout dimentions (in inches) are shown in the drawings below for two of the available frame sizes.

Please consult with Wheatstone Sales for other mainframe sizes and dimensional details.

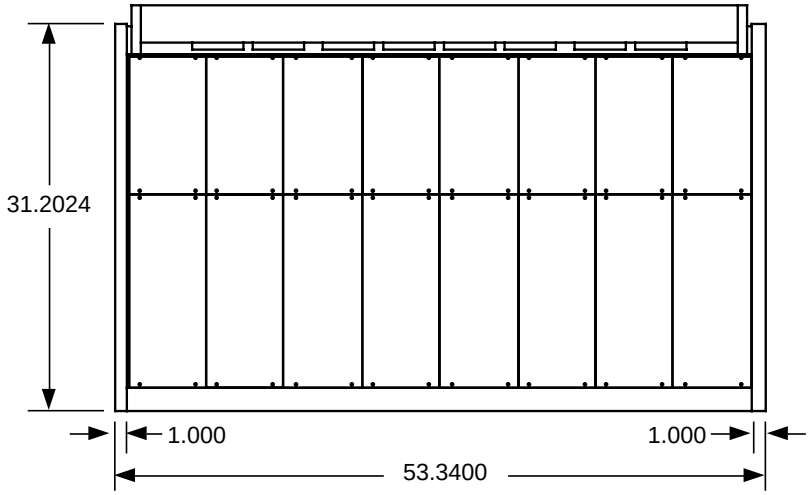
CUTOUT DIMENSIONS

32 INPUT FRAME - 27.5" x 50.75"

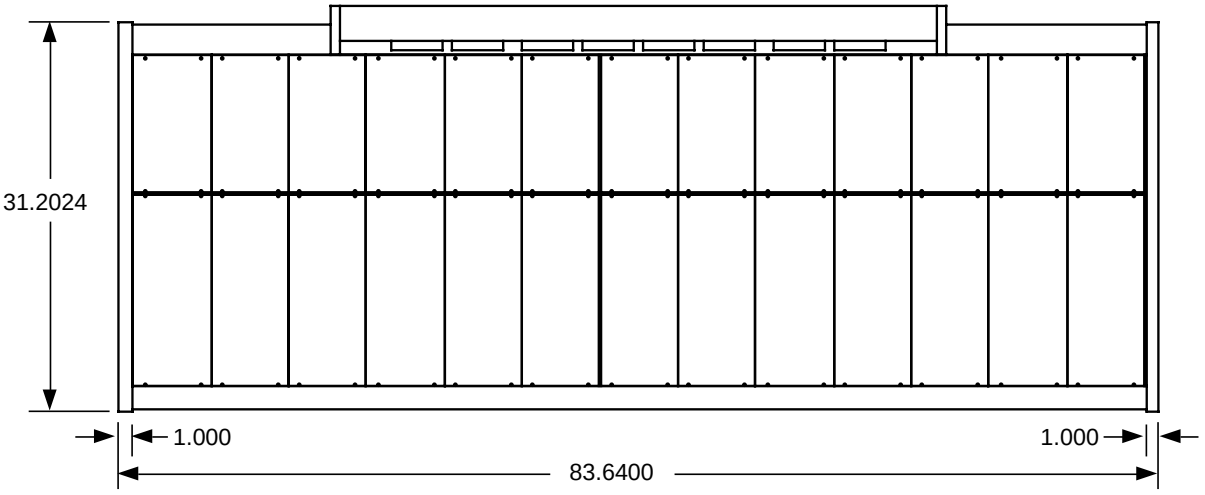
52 INPUT FRAME - 27.5" x 82.00"



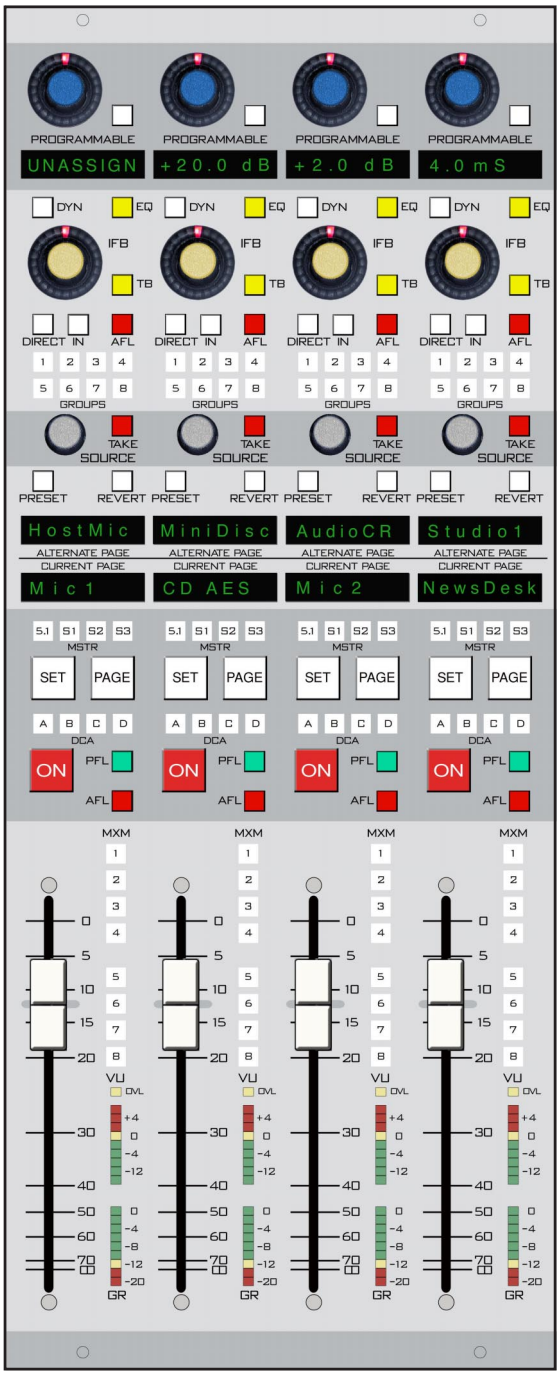
D-12 32 INPUT FRAME



D-12 52 INPUT FRAME



Input Panel (IS-D12)



Controls and Functions

Each input panel of the D-12 digital audio control surface has four identical strips representing four input channels.

Programmable Section

Each input has a programmable encoder, 8 character display, and switch. The user may map any centrally located function included in the function "list" to this rotary knob/display/switch. The function mapped to the Programmable section is mirrored in the central section when the input SET button is pressed.

A list of available functions (see table on the page 2-8) is accessed by pressing and holding the Programmable Encoder for 3 seconds. After 3 sec, the user scrolls through the available functions until the desired function is displayed, and selects it by pressing the Programmable switch. The Programmable switch will light if the displayed function is already assigned to the channel, or otherwise will flash. To change to a new function, repeat the process.

Programming Example: Setting up a Gain control knob with Phantom Power switch.

1 - Press an input fader SET button.

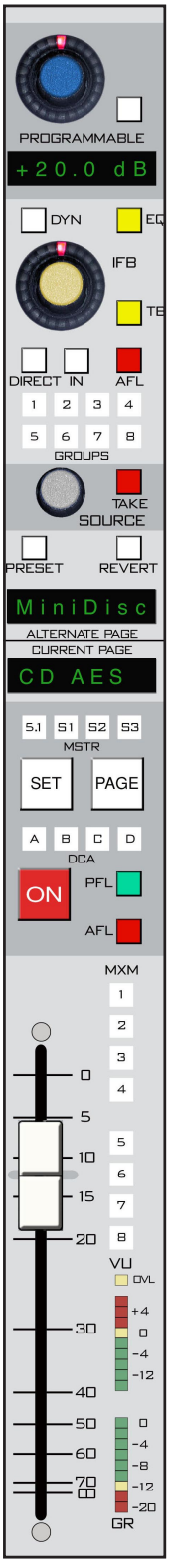
2 - Press and HOLD the programmable encoder for 3 sec.

3 - Rotate the encoder through the list until GAIN is displayed.

4 - Press the Programmable switch.

5 - The current gain setting in dB is displayed. Rotating the programmable encoder adjusts line or mic gain depending on the input source. Pressing the programmable switch turns on/off phantom power if the source is a mic; otherwise the switch is inactive.

Standalone Switches



The following switches directly access certain input functions.

DYN - activates dynamics settings stored for the input strip. Use the SET switch on the strip to access the centralized DYN controls on the EQD-D12 panel.

EQ - activates equalizer settings stored for the input strip. Use the SET switch on the strip to access the centralized EQ controls on the EQD-D12 panel.

SET - press an input's SET switch to access centralized controls associated with the input channel strip. Central controls include PAN/BAL, MODE, EQ, Dynamics, Source Select and IFB output Routing, Delay, Phase Reverse, and Source Gain.

PAGE - Press PAGE to access the second layer of a channel strip (essentially another full input channel). Each layer is totally independent.

ON - turns the input channel ON. All Bus assignments mapped as POST ON feeds will receive audio from the input channel. Certain logic signals may be mapped.

PFL - puts the input channel's signal into the PFL (CUE) mix pre-fader/pre-on, and post gain, EQ, and DYN.

AFL - puts the input channel's post fader/post ON signal into the AFL mix.

NOTE: If both AFL and PFL are on, they are summed by default to the PFL output. This summing option can be defeated if desired in the OPTIONS text file (see sample file in Appendix 2).

IFB (Interruptible Fold-back)

There is one common IFB bus. Users add any or all input channels to the bus via the IN switch on each individual channel. The channel's IFB encoder adjusts the level of that particular channel's IFB output (designated here in as IFBx to indicate the IFB output of channel x). The IFBx signal may be routed to any physical audio output on the router by pressing the input channel's SET switch, then using the Destination router on the XYE-D12 panel. AFL and TB switches allow the surface operator to monitor and interrupt the IFB, respectively.

IN - puts the input channel post fader/post ON audio onto the IFB bus.

IFB encoder – adjusts the output level of the IFBx feed.

TB - momentary switch interrupts the IFB feed with Talkback audio. Talkback audio may be any source on the router that is cross-connected to the D-12's TB input.

AFL - puts the IFBx audio into the AFL/SOLO/PFL mix.

Source Selection

This section allows the user to select any source visible to its X controller. A Preset memory location stores a single source signal for recall via the PRESET switch. The REVERT switch causes the previously selected input to be recalled. **Sources may be taken at any time regardless of the input fader ON status.**

SOURCE - this encoder (X controller) scrolls through the available sources. The source list may be limited through the D-12 Visibility – X Controller settings in the XPoint GUI.

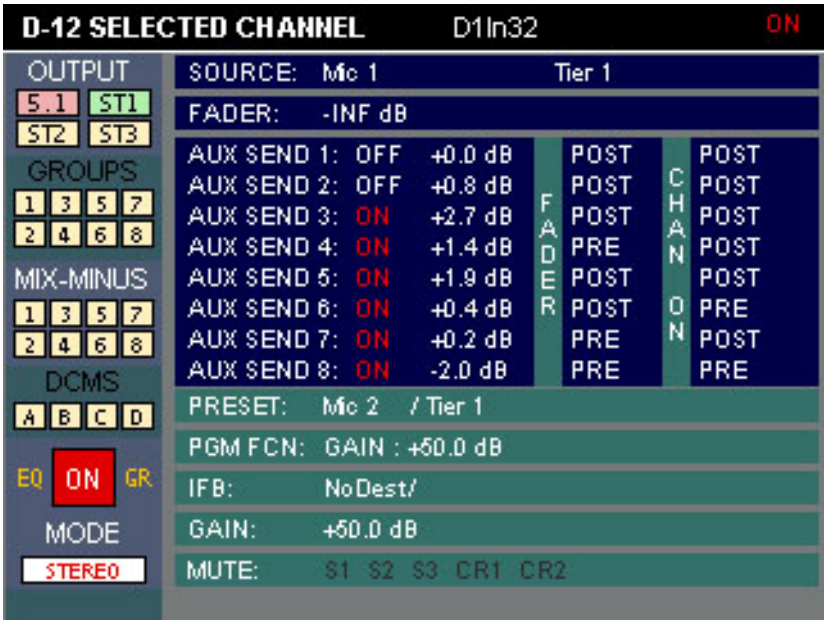
TAKE - press this switch to assign the source displayed in the lower source window to this input channel strip.

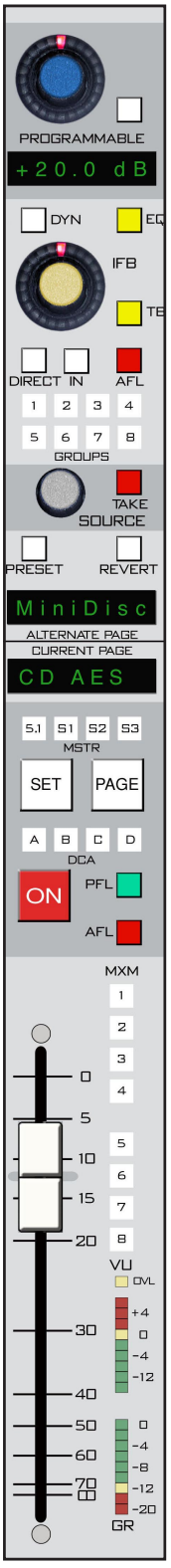
REVERT - press this switch to go back to the previously selected source. Acts as an A/B source selector that toggles between the PRESET and the selected source.

PRESET - used to store a source in PRESET memory. Spin the SOURCES encoder until the desired source is displayed in the CURRENT PAGE display. Then *PRESS* and *HOLD* the PRESET switch until the PRESET button goes off and the CURRENT PAGE display reverts to the actual current source. The PRESET source name is shown on the channel's LCD display.

ALTERNATE PAGE Display - top display shows the source for the alternate page (see discussion of PAGE button on page 2-3)

CURRENT PAGE Display - lower display shows the channel strip's active source.





VU and Gain Reduction Metering

Each input fader has two independent 9-segment LED vertical columns to provide input signal metering. The top column handles pre-fader post/ gain control signal presence VU metering. The lower column handles Gain Reduction as determined by the dynamics settings for the input channel strip, and follows the state of the channel's DYN switch.

Motorized Fader

The fader controls the channel strip's signal level to all post fader busses. The nominal unity gain level is at the -12dB mark on the scale. Note that EVENT recall includes the fader setting.

NOTE that input channels configured for 5.1 sources have fader knobs engraved with "5.1".

Bus Assign LED's

Each input strip has four sets of LED indicators which display the state of the channels bus assignments. An illuminated LED indicates:

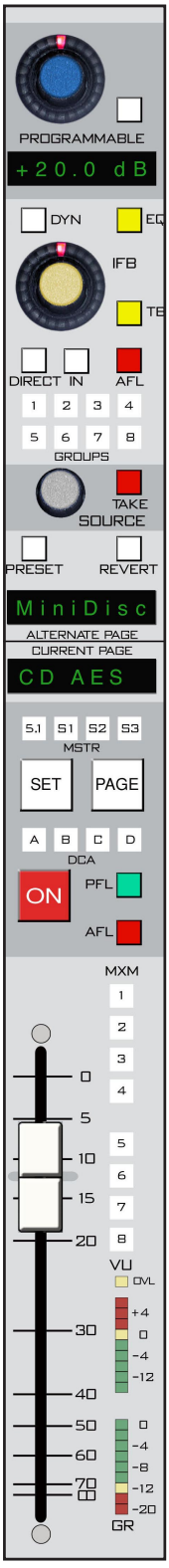
GROUPS – shows which Groups the input is assigned to: 1 through 8.

MSTR – shows which Masters the input is assigned to; 5.1, S1, S2, and S3.

DCA – shows which DCA masters the input is assigned to: A, B, C, and D. If lit, the DCA assign LED(s) will flash if the DCA master is turned OFF or if the DCA master fader reaches a threshold setting of approximately -60.

MXM – shows which MXM the input is subtracted from. An Xpoint GUI setting, MXM POLARITY, forces the MXM LED logic to flip. In the flipped state, lit MXM assign LED's mean that the channel is ADDED to the MXM mix.

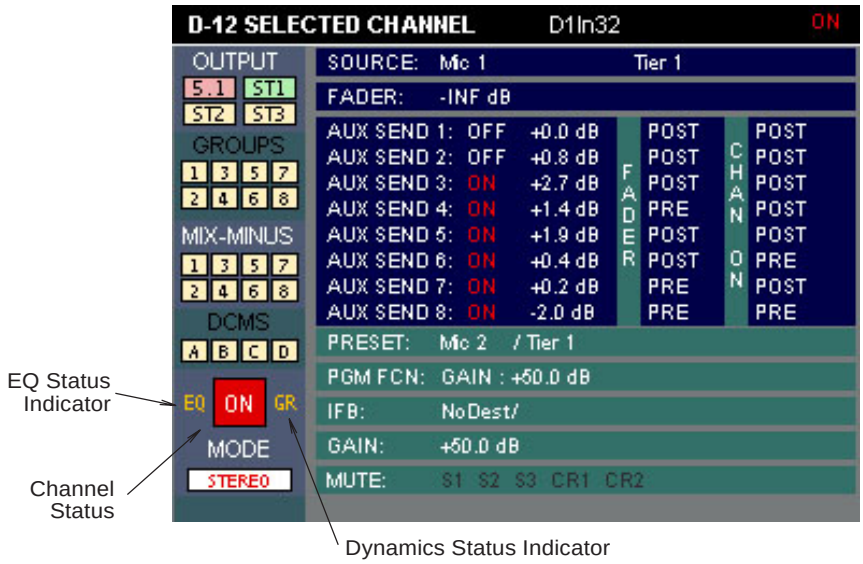
Channel assignments to these busses are made by first pressing the channel SET button and then pressing the appropriate ASSIGN button on the MXM-D12 panel.

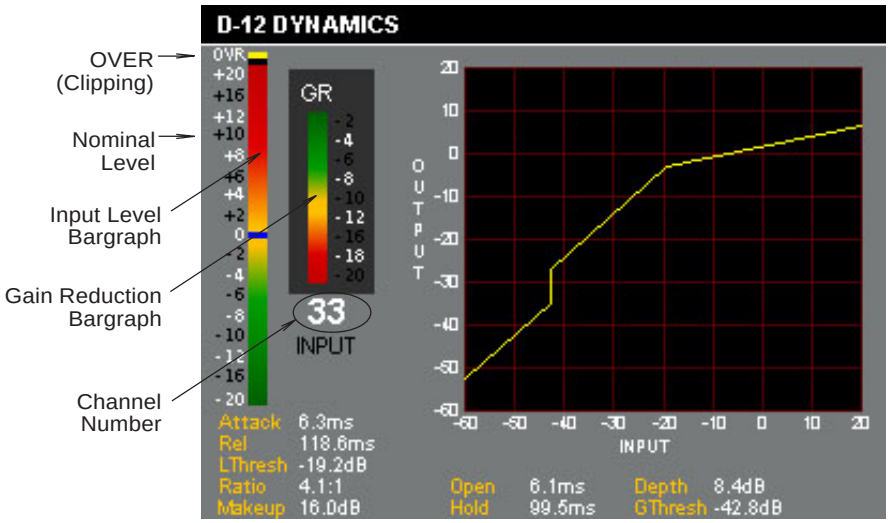


LCD Displays

Channel Status

The selected input channel status information shows on one of the LCD displays in the control surface meterbridge. The display show input level, selected source, channel number, preset source, channel status, gain reduction, and other information.





Input Level

The pre-fader level of the input signal is shown on a different LCD display by a large vertical bargraph. The level is indicated in dB on a calibrated scale beside the bargraph. If the channel is stereo, the bargraph shows the sum of the left and right signals. The bargraph is colored, with green indicating lower levels and red indicating high levels. The nominal level position is in the middle of the range at the “0” scale marking, and shows as a thin blue band in the bargraph. The bargraph itself consists of a moving “DOT” over a solid “COLUMN” where the “DOT” indicates the peak value of the signal, and the “COLUMN” indicates the average value.

On the D-12 control surface the average value column has been set to VU timing characteristics. In addition, a bright yellow rectangle will light at the top of the column if digital "OVER" or clipping is detected.

Nominal Level 0dB = +4dBu analog and -20dBFS digital.

Selected Source

The currently selected source name shows on the Channel Status LCD display underneath the channel description. This name is the 8-character name as defined in the Wheatstone Bridge Router configuration.

Preset Source

The currently loaded preset source name shows on the Channel Status LCD display underneath the AUX SEND information. Once again, this 8-character name is as defined in the Wheatstone Bridge Router.

Channel Status

Various indicators on the Channel Status LCD display will show status information for the associated channel. Above the level bargraph the words "ON", "OFF", "ON AIR", or "MUTING" will appear as the channel status changes. "MUTING" indicates that the channel is turned ON and has a mute set. "ON AIR" indicates that the channel is ON and the fader is up. The letters "EQ" will show in the Input Level display if equalizer functions are active for the channel, and "GR" will appear if signal dynamics functions (compression, limiting) are engaged.

Channel Number

A large white number shows under the GR meter on the Input Level display to indicate the channel number.

Available Functions Table

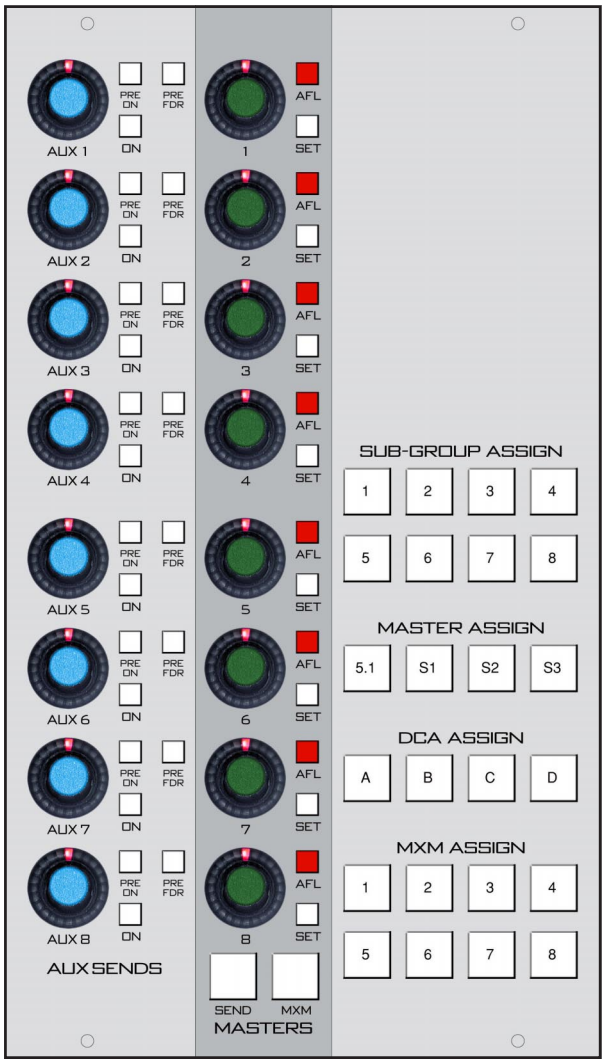
Function Name	Encoder	Dobby	Switch ON/OFF	Display
UNASSIGN				UNASSIGN
GAIN	Gain Control		Phantom Power	Gain in dB units
DELAY mS	Delay Control		IN/OUT	Delay in mS units
DELAY Fr	Delay Control		IN/OUT	Delay in frames
BLEND	Cross-Fader	Center	Blend / Centered	BLEND IN or BLENDOFF
WIDTH	Width Control	Center	IN/OUT	Stereo Width
MODE	PAN/BAL	Center	MODE Select	Selected MODE
AUX1 (to 8)	Send Level		IN/OUT	AUX x
HPF	HPF Freq		IN/OUT	HPF Frequency
NOTCH	Notch Freq		IN/OUT	Notch Frequency
LPF	LPF Freq		IN/OUT	LPF Frequency
LOW F	Low Band Freq		SHELF	Low Band Frequency
LOW Q	Low Band BW		SHELF	Low Band Q or SHELF
LOW L	Low Band +/-		SHELF	Low Band Level
LOMID F	Low Mid Band Freq			Low Mid Band Frequency
LOWMID Q	Low Mid Band BW			Low Mid Band Q
LOWMID L	Low Mid Band +/-			Low Mid Band Level
HIMID F	High Mid Band Freq			High Mid Band Frequency
HIMID Q	High Mid Band BW			High Mid Band Q
HIMID L	High Mid Band +/-			High Mid Band Level
HIGH F	High Band Freq		SHELF	High Band Frequency
HIGH Q	High Band BW		SHELF	High Band Q or SHELF
HIGH L	High Band +/-		SHELF	High Band Level
LIM TRSH	Limiter THRESH			Limiter Threshold
LIM RAT	Limiter RATIO			Limiter Ratio
LIM ATCK	Limiter ATTACK			Limiter Attack
LIM REL	Limiter RELEASE			Limiter Release
LIM GAIN	Limiter MAKEUP GAIN			Limiter Makeup Gain
GT TRSH	Gate THRESH			Gate Threshold
GT OPEN	Gate OPEN			Gate Open
GT HOLD	Gate HOLD			Gate Hold
GT DPTH	Gate DEPTH			Gate Depth
TRIM LFE	5.1 LFE Trim			5.1 LFE Trim
TRIM LF	5.1 LT FRONT Trim			5.1 LT FRONT Trim
TRIM CTR	5.1 CENTER Trim			5.1 CENTER Trim
TRIM RF	5.1 RT FRONT Trim			5.1 RT FRONT Trim
TRIM LR	5.1 LT REAR Trim			5.1 LT REAR Trim
TRIM RR	5.1 RT REAR Trim			5.1 RT REAR Trim
LFE LVL	5.1 LFE Level			5.1 LFE Level
LEFT/RGT	5.1 LT/RT			5.1 LT/RT
FNT/REAR	5.1 FRONT/REAR			5.1 FRONT/REAR
SRND/CTR	5.1 SURROUND/CENTER			5.1 SURROUND/CENTER

Mix-Minus Panel (MXM-D12)

Controls and Functions

The D-12 digital audio control surface is equipped with one Mix-Minus Panel.

This panel houses AUX SENDS, MXM MASTER OUTPUTS, and SUB-GROUP, MASTER, DCA, and MXM ASSIGN.



AUX Sends

There are a total of eight AUX SENDs available in the D-12 control surface. A brief comment on the controls is called for before diving into the details.

The column of 8 knobs ("1" through "8") labeled MASTERS, and their associated SET and AFL switches, have a dual-purpose. If the MXM button in that section is lit, the control operation applies to the surface's MXM outputs, which are dealt with later in this chapter. But if the SEND button is lit, the control operation applies to the AUX SENDs, which is the current topic. For the present discussion on AUX SENDs we assume the SEND button is lit, and we will freely discuss controls in both the AUX SENDS and MASTERS sections of the panel without qualifying which panel section the control being discussed is located in.

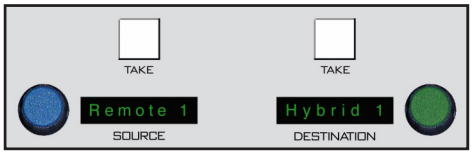
We will begin by explaining the operation for AUX SEND 1. The same discussion can be applied to any of the 8 AUX SENDs.

Any surface input channel can feed AUX SEND 1. To do so, press the SET button on the input channel, then press the MXM-D12 panel ON button for AUX 1. If the button is already lit when you press the channel SET button, then that channel is already feeding AUX SEND 1.

Channels normally feed the AUX SEND a post fader signal that follows the channel's ON button (post on). If you press the MXM-D12 PRE ON button for AUX 1, that channel will feed the AUX SEND regardless of its ON button status. In a similar fashion, the channel can be made to feed a constant signal level to the AUX SEND regardless of its fader position by pressing the PRE FDR button. PRE ON and PRE FDR can be used in any combination.

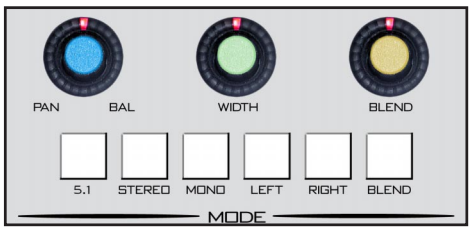
You can set the level of each channel feeding AUX SEND 1 independently. The AUX 1 control affects the signal level to AUX SEND 1 of the channel that currently has its SET button lit. Thus you can generate a mix to AUX SEND 1 from several channels if desired.

Once you have the desired channel(s) feeding AUX SEND 1, you can adjust the output level of AUX SEND 1 by using the AUX SEND 1 MASTER, the knob labeled "1" in the MASTERS area. The actual destination that AUX SEND 1 is routed to is assigned by first pressing the AUX SEND 1 SET button, then dialing up the desired destination on the DESTINATION knob on the XYE-D12 panel and pressing the associated TAKE button.



XYE-D12 Panel

AUX SEND 1 can be mono or stereo. Press the AUX SEND 1 button, then press the appropriate MODE button on the SUR-D12 panel. If AUX SEND 1 is in STEREO mode, and if the selected channel is in STEREO mode as well, the AUX 1 control will act as a BAL control if it is pressed down while being turned. If the selected channel is in MONO, the pressed action of AUX 1 is as a PAN. If the AUX SEND 1 is in MONO mode, the AUX 1 knob does nothing if you press it while turning. NOTE that surround sends are not created. A surround source will send a desired stereo to a stereo AUX SEND.

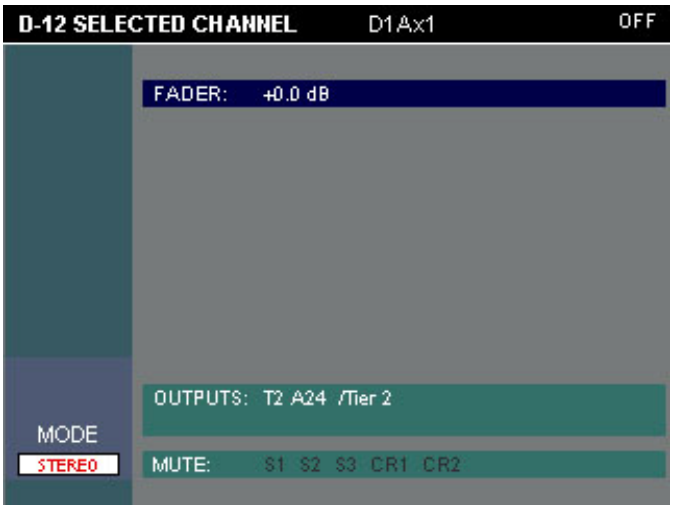


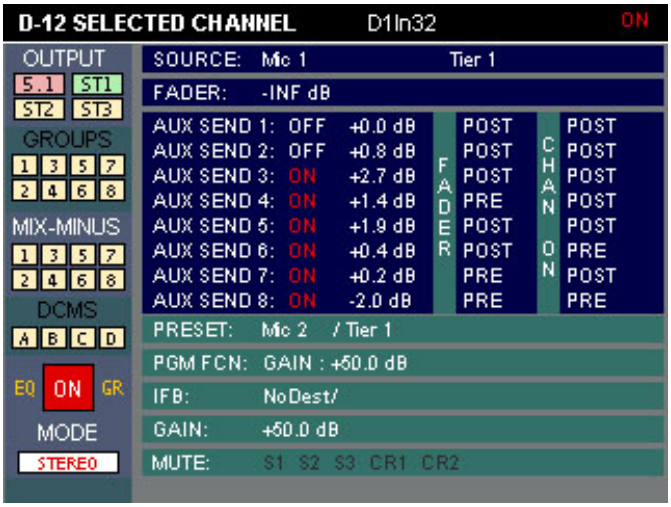
SUR-D12 Panel

The AUX SEND 1 AFL switch routes a post AUX 1 level control signal to the SOLO mix.

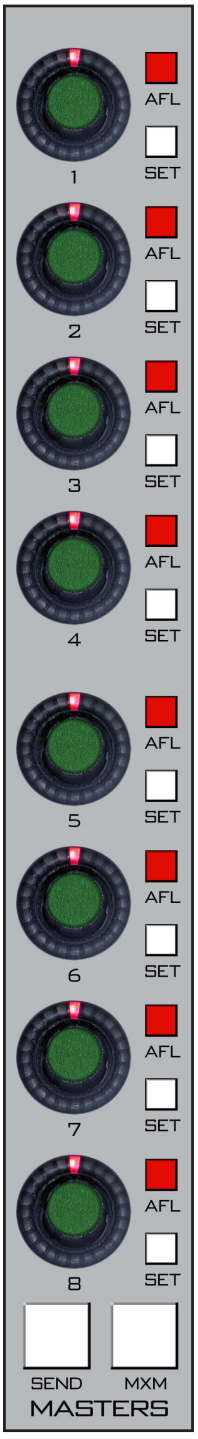
AUX SEND settings are shown on the LCD displays.

AUX SENDs 2 - 8 work in the same manner as AUX SEND 1.





MXM Master Outputs

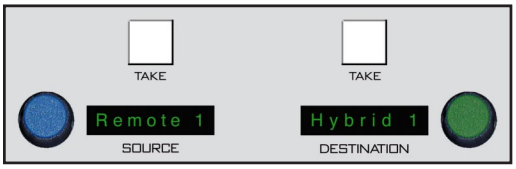


There are a total of eight MXM's (mix-minuses) available in the D-12 control surface. For this discussion on MXM's we assume the MXM button in the MASTERS section of the panel is lit. MXM 1 is discussed but the remaining MXMs work in the same fashion.

As mentioned in the chapter on the IS-D12 Input panel, channels may be assigned to an MXM by pressing the channel's SET button, then pressing the appropriate MXM ASSIGN button in the BUS ASSIGN section of this panel. Subgroups may also be assigned to MXMs in a similar manner.

Global settings may be made in the Options Text file (see Appendix 2) to determine if the channel assignments to the MXMs are pre or post fade and pre or post ON. Settings are made individually to each of the 8 MXMs, but are global in the sense that, once they are made, the settings apply equally to all MXM sources.

Once you have the desired sources feeding MXM 1, you can adjust its output level by using MXM 1 MASTER, the knob labeled "1" in the MASTERS section. The actual destination that MXM 1 is routed to is assigned by first pressing the MXM 1 SET button (next to the level control, and, yes, this is the same button that serves for AUX SEND 1 SET), then dialing up the desired destination on the DESTINATION knob on the XYE-D12 panel and pressing the associated TAKE button.

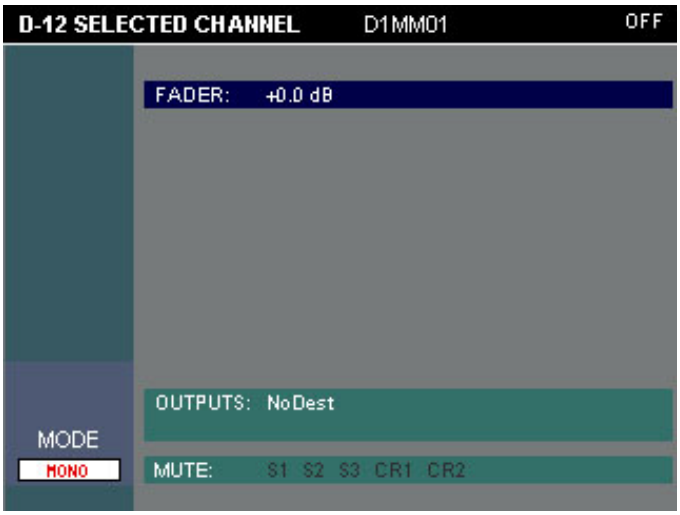


XYE-D12 Panel

The MXM 1 AFL switch (also known as the AUX SEND 1 AFL switch) routes a post MXM 1 level control signal to the SOLO mix.

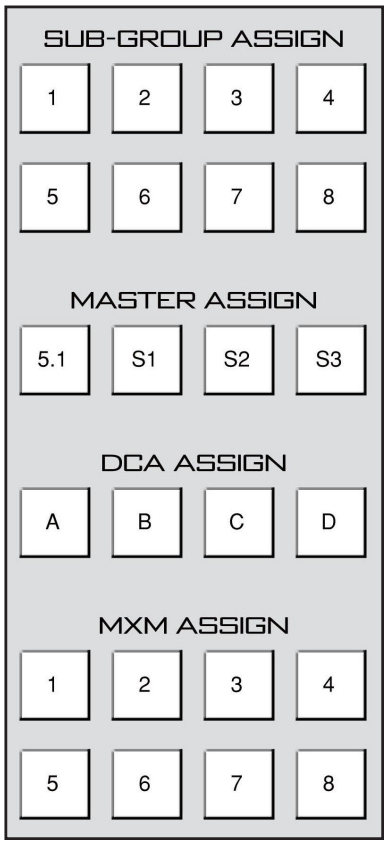
The MXM 1 level and output assign are shown on one of the LCD displays when the MXM 1 SET button is lit.

MXMs 2 - 8 work in the same manner as MXM 1.



Bus Assign Section

All bus assignment is accomplished through the four sets of ASSIGN switches, consisting of eight sub-group, four master, four DCA, and eight mix-minus assign switches. The switches illuminate to indicate the assign status of the input channel or group whose SET switch is currently active. Indicator windows on the input, group, and master panels show the assign status for each individual source.



Bus assignment is accomplished by first pressing the SET button on the desired input channel (IS-D12), group (GRP-D12 panel), or master (MSTR-D12 panel). The assign switches illuminate to show the source's current bus assignment. Press required switches to create the desired set of bus assigns. The local indicators on the IS-D12, GRP-D12 or MSTR-D12 panel will change to reflect the new bus assignment.

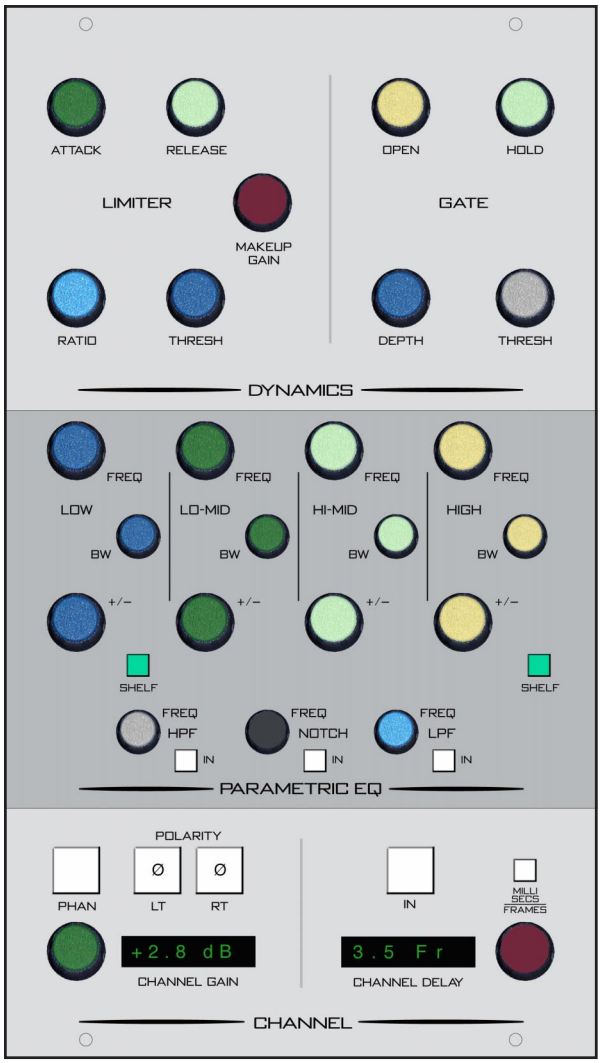
Input channels may be assigned to any group, master, DCA, or MXM in any combination. The situation is similar for groups, except that groups may not be assigned to groups. Masters may be assigned only to DCAs, but in any combination.

Pressing an input fader SET button will activate the bank of MXM ASSIGN switches and allow the user to assign or minus an input from each MXM bus. Pressing a switch (1-8) toggles the input channel assignment to the MXM bus. The Mix-minus polarity setting, accessed through the XPoint GUI, determines whether the channel is added to (positive polarity) or subtracted from (negative polarity) the chosen MXM bus. With positive polarity setting the LED lights when the signal is added to the MXM bus. With negative polarity setting the LED lights when the signal subtracted from the MXM bus. MXM polarity is set globally for all 8 MXM busses. Appropriate MXM LED indicator on the input panel also lights.

EQ / Dynamics Panel (EQD-D12)

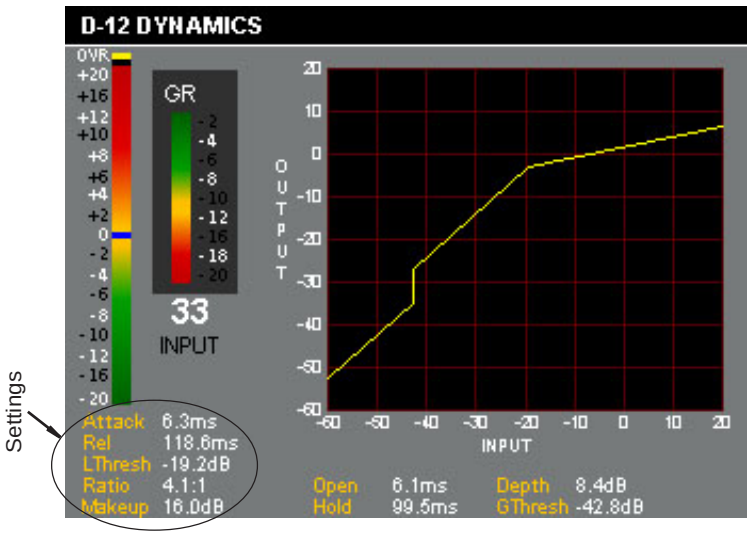
Controls and Functions

The D-12 digital audio control surface is equipped with one EQ / Dynamics Panel. This panel houses EQ, DYNAMICS, PHANTOM POWER, CHANNEL GAIN, DELAY, and POLARITY sections.

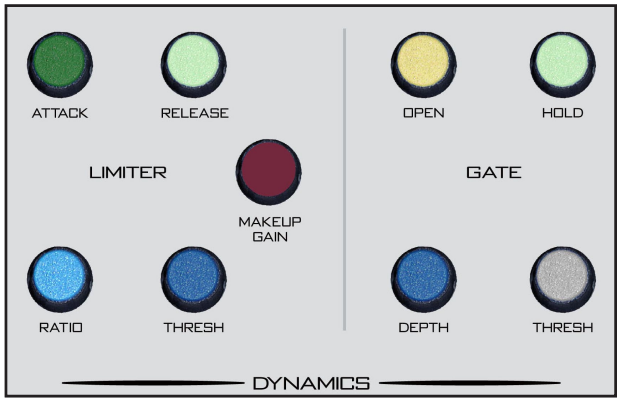


Dynamics Section

This section provides compression, limiting, expansion and gating functions for individual input channels. DSP based dynamics control is simultaneously available for all input faders and output masters. Dynamics controls are accessible by selecting an input or master fader SET button. Dynamics may be switched in/out directly from the input fader and master fader DYN switches without having to press the SET button. Dynamics width follows the width of the selected source (i.e., stereo or 5.1). An integral meterbridge LCD display draws a real-time composite dynamics curve based on the compressor/limiter and gate knob and switch settings. The setting of each knob is shown in the display. Gain reduction is displayed on a LED ladder next to each input fader and on the dynamics LCD meter. The dynamics curve LCD screen also includes a GR meter.



Compressor/Limiter



The compressor algorithm used in the D-12 control surface is designed to:

- allow smooth, inaudible, and unobtrusive level control on uneven sources;

- be able to act as a peak limiter for inadvertent overload control;

- enable deep effects if required.

The compressor section is a compound of many diverse dynamics elements.

The level detector is a pseudo-RMS averaging type with its own symmetrical-in-time attack-and-release characteristic adjustable between 0.1mS and 330mS ("Attack" control). At the slower end of its range, by itself it achieves a nouveau-classic "dbx" style syllabic-rate level control. As the time-constant is shortened, it becomes progressively shorter in relation to the lower audio frequencies themselves; the effect is to turn the detector into more of a peak-level detector, necessary for limiting or wilder effects. A secondary effect at intermediate to fast attack-times is that low frequencies are peak sensed while high frequencies are average sensed resulting in an effective high-frequency bias (up to as much as 6dB differential) which helps to mitigate the detrimental limiting effect of the resulting audio seeming "bottom heavy" normal to most compressors.

While the overall gain-reduction scheme is "feed-forward", the heart of the detector stage itself is a feedback limiter; this allows for this carefully-contrived loosely-damped servo-loop to permit far more interesting dynamic effects.

The compressor is "soft-knee", meaning the compression ratio increases slowly with increasing applied level, greatly easing the sonic transition into full compression; it helps avoid the "snatching" and "pumping" at threshold that many "hard-knee" dynamics units exhibit.

A full range of controls is available over the compressor's behavior:

Threshold

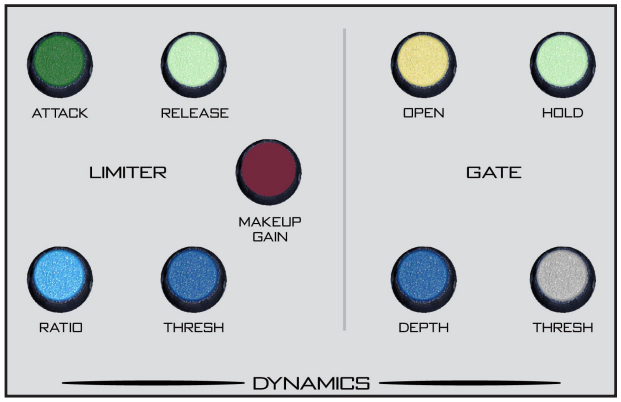
The THRES knob sets the level at which the compressor is fully into compression of whatever ratio is set. This can be set anywhere in the range of -30dB to +10dB, unless the lower range is limited by the GATE THRES setting (see below).

Attack

This control determines how quickly (between nominally 0.1mS and 330mS) the compressor reacts to signals. Faster attack times result in "tighter" and more obvious control; longer attack times lend themselves well to gentler automatic volume control.

Ratio

This control determines how much the compressor's gain is reduced in relation to the applied signal. For instance, if the ratio is set at 3:1 and the input level above threshold changes by 12dB, the output level will changed by 4dB. Normal usage is between approximately 2:1 and 4:1; anything greater than, say, 7:1 may be considered "limiting". The ratio can be set anywhere from 1.0:1 to 20.0:1.



Release

This knob determines the nominal time the compressor takes to recover after excitation (between 50.0mS and 3.0 Seconds). Short release times make for more intense, denser, obvious processing; longer release times are better suited to automatic gain control.

Makeup Gain

When fairly deep compression is invoked (large gain reduction) it can be necessary to increase the compressor's output level back up to nominal system signal level; up to 20dB of output gain is available to allow this.

Gate

The Dynamics section also contains a noise gate, useful for reducing sounds below a certain threshold.

The GATE THRES control determines the signal level at which the gate operates. This level be anywhere between -60.0dB and +10.0dB. This setting will determine the minimum available setting of the LIMITER THRES knob; the LIMITER THRES cannot be set lower then the GATE THRES.

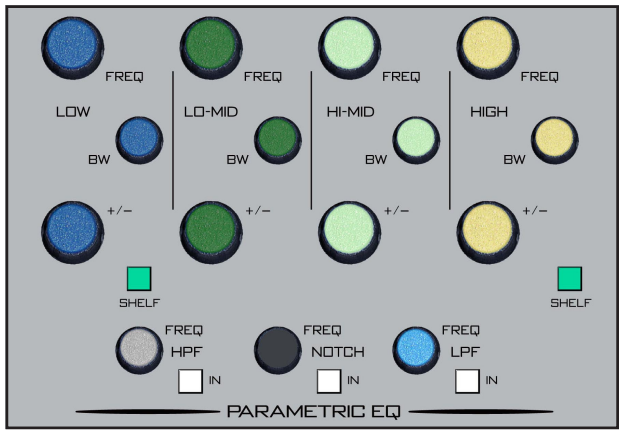
The OPEN knob determines how quickly the gate opens to allow signal passage once the threshold is reached. It can be set anywhere in the range of 0.1mS to 330.0mS. The gate close time is fixed at 200mS.

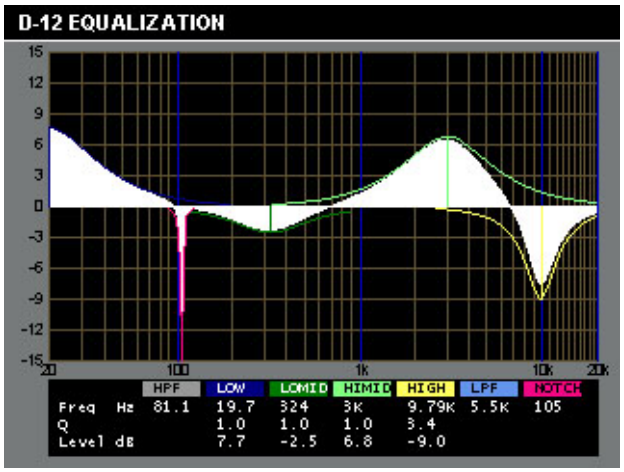
The DEPTH knob sets the amount of attenuation given to signals below the GATE THRES setting, and can be adjusted to be between 0dB and 30.0dB.

The HOLD knob determines how long the gate will stay open after the signal falls below the GATE THRES level before it begins to close, and can be adjusted between 50.0mS and 3.0 Seconds.

EQ Section

The EQ section consist of a bank of knobs and switches that operate the equalizer, a four band, parametric design with sweepable center frequency, bandwidth, and boost/cut controls. Shelving curves may be independently selected for low and high bands. Separate High Pass, Notch, and Low Pass filters may also be inserted. EQ control is accessible by selecting an input or master fader SET button. EQ width follows the width of the selected source (i.e., stereo or 5.1). An integral meterbridge LCD display draws a real-time composite equalization curve based on the knob and switch settings. Dobbying any boost/cut (+/-) knob will toggle the parameter between flat and the current value.





To access EQ on an individual input channels, press the appropriate channel's SET button and make the desired adjustments in the EQ Section. To actually place the adjusted EQ in the signal chain, press the channel's EQ button in the IS-D12 panel. The input channel's EQ button will light, and its LCD display will show "EQ".

High-Pass Filter

This is a 24dB/octave variable high-pass filter with Butterworth characteristics, tunable between 16.1Hz and 500Hz, and with a separate in/out switch ("HPF" switch). The relatively high order of filter is necessary to allow definite and decisive removal of unwanted low-frequency artifacts (air-conditioning rumble, line hum, traffic or footstep impacts) with minimal effect on the required program. The display indicates the filter's frequency, and the filter may be clicked in and out by way of the IN switch.

Note: Butterworth Filters typically yield excellent flatness, no ripple in the pass band, and a rounded amplitude response near the cutoff frequency.

Notch Filter

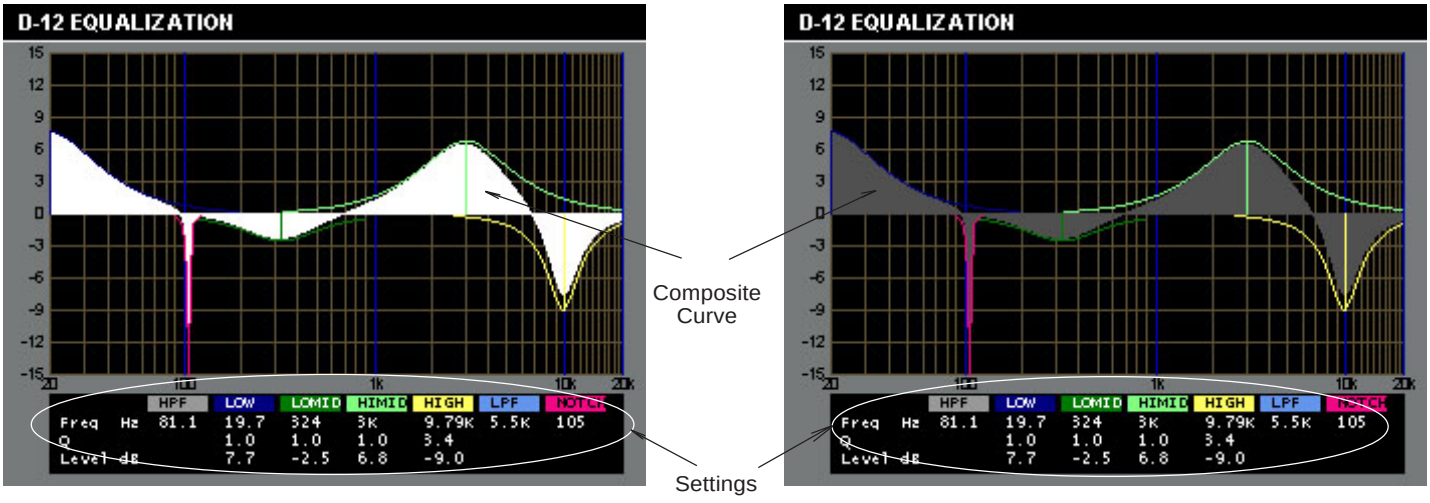
This 1/10th octave, variable center frequency notch filter is tunable between 16.1Hz and 20.2KHz. This filter is used to remove specific audio frequencies, such as 60Hz or 120Hz for an AC power line hum or buzz, or perhaps a horizontal scanning interference from a monitor. The display indicates the filter's center frequency, and the filter may be clicked in and out by way of the IN switch.

Low-Pass Filter

This is a 24dB/octave variable low-pass filter with Butterworth characteristics, tunable between 1KHz and 20.2KHz. This filter is used to remove unwanted high frequency artifacts (noise, squeaks, etc.) with minimal effect on the required program. The display indicates the filter's frequency, and the filter may be clicked in and out by way of the IN switch.

Equalizer

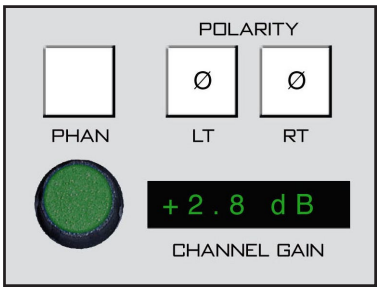
This consists of four bands of parametric control used for modifying the sonic qualities of a signal. Each band has +/-14dB of BOOST/CUT capabilities (+/- knob; "double click" the knob to return to 0.0dB), sweepable center frequency over the range of 16.1Hz to 20.2kHz, and with a filter "Q" or sharpness [BW(BandWidth) knob] sweepable between 0.3 and 5.0. The LOW and HIGH bands also have a switchable shelving function. The composite effect of any EQ adjustments, as well as text describing the equalizer settings, is shown on the screen.



EQ IN **EQ OUT**

Polarity

A pair of switches, one for left and one for right, are provided to allow for the reversal of absolute phase of the signal path.



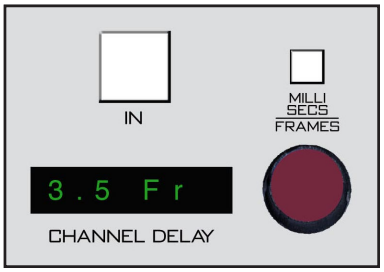
Channel Gain

The CHANNEL GAIN level adjusts the input fader's selected source gain. Line inputs are adjusted in a -18dB to +12dB range; mics are adjusted in a +20dB to +80dB range. Relative gain is shown in its attendant 8-character display.

The input channel's PROGRAMMABLE level control and button on the top of the IS-D12 panel can be programmed to duplicate the gain control function.

Audio Delay

Audio delay is shown in the CHANNEL DELAY display. Delay is accomplished for inputs, submixes, master mixes, aux sends, and mix-minuses by means of activating their corresponding SET button and simply dialing in the audio delay. Delay may be set in milliseconds (0.0 to 667.0) or frames (0.0 to 20.0 in 0.5 frame steps) by means of the MILLI SECS/FRAMES button.



The IN switch inserts the delay on the currently selected input or output signal.

Delay settings are vitally important, permitting audio time delay adjustments to allow for video processor delays or satellite-to-terrestrial link audio/video timing discrepancies.

The input channel's PROGRAMMABLE level control and button on the top of the IS-D12 panel can be programmed to duplicate the delay function.

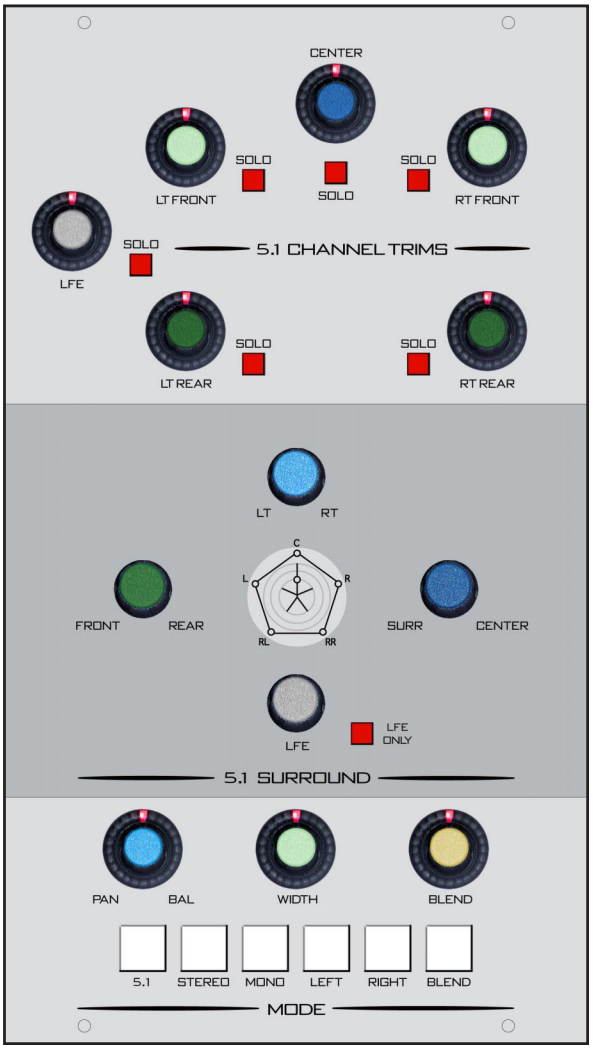
Surround Panel (SUR-D12)

Controls and Functions

The D-12 digital audio control surface is equipped with one SURROUND Panel. This panel houses 5.1 CHANNEL TRIMS, 5.1 SURROUND, and MODE sections.

5.1 Channel Trims

This section includes independent rotary level controls and Solo switches for each component of a 5.1 signal (i.e. LT FRONT, CENTER, RT FRONT, LT REAR, RT REAR, and LFE). The 5.1 trims work with surround input faders, the 5.1 master, and the CR1 and CR2 monitors. Trims are accessed by pressing the input channel or output mix SET button.



Each rotary trim control allows for +12/-60dB boost/cut. Dobbying the trim knob will reset it to 0dB. SOLO switches allow for monitoring of each component.

The 5.1 trims are gain offsets independently applied to the current gain setting of each component the 5.1 signal. Conversely, the input fader's GAIN control will affect all 6 channels equally.

LT FRONT - rotary knob; centered at 0db, provides +/- 12dB boost/cut.

CENTER - rotary knob; centered at 0db, provides +/- 12dB boost/cut.

RT FRONT - rotary knob; centered at 0db, provides +/- 12dB boost/cut.

LFE – rotary knob; centered at 0db, provides +/- 12dB boost/cut.

LT REAR - rotary knob; centered at 0db, provides +/- 12dB boost/cut.

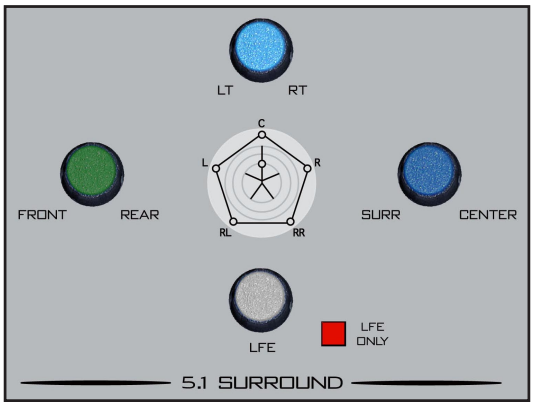
RT REAR - rotary knob; centered at 0db, provides +/- 12dB boost/cut.

SOLO Switches – puts the selected component signal in Solo monitor. This SOLO section assumes the CR is set to SURROUND mode and works a bit differently from other SOLO switches on the surface.

Each signal is a single channel and effectively mutes all of the CR output mix channels except for the SOLO'd component. Example, if you SOLO the CENTER, only the CENTER speaker is heard. If you SOLO the R-Rear, only the right rear speaker is heard.

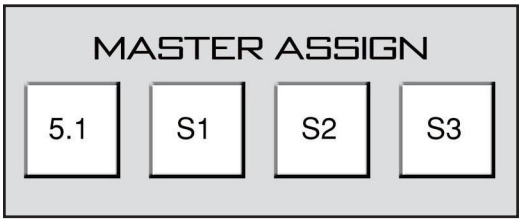
Surround Pan System

This section provides a set of controls to pan an input fader signal anywhere in the 5.1 Mix bus. Input fader signals may be mono, stereo, or 5.1 signals. The surround panner is accessed by pressing an input SET button.



Note: Normally 5.1 source signals are routed to input faders that have been configured as surround inputs. Routing a 5.1 signal to a stereo input fader will get just the L-R front signals.

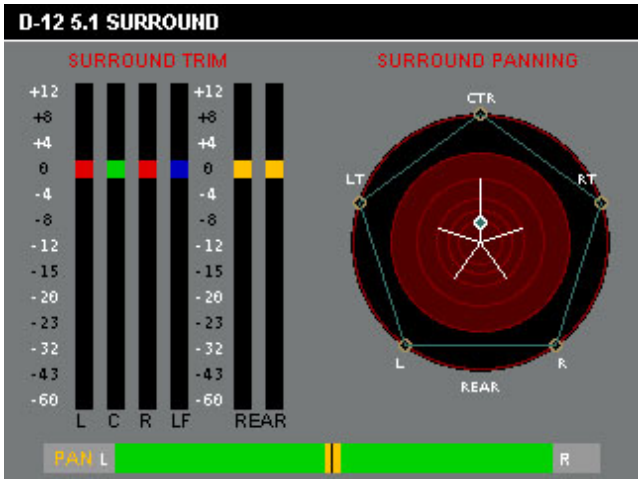
PROGRAMMING A CHANNEL FOR SURROUND SOUND: Select the channel you with to program by pressing its SET button. Assign it to the 5.1 destination by means of the ASSIGN switchbank on the MXM-D12 panel.



MXM-D12 Panel

The 5.1 SURROUND section will indicate the current settings of the encoder LT/RT, FRONT/REAR, SURR/CENTER, and LFE knobs.

The meterbridge display will also show a multi-color graphic representation of this system. The system can generate 5.1 signals from MONO or STEREO sources, and can modify the 5.1 signal of existing 5.1 input sources. Double-clicking any of the encoders will return that parameter to its default setting (for example, LT/RT returns to center).



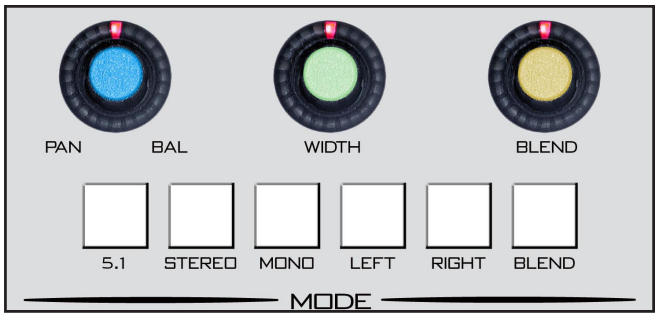
LT/RT - rotary knob moves the signal left to right; dobbying the knob centers signal.

FRONT/REAR - rotary knob moves the signal front to back, dobbying the knob centers signal.

SURR/CENTER - rotary knob controls the ratio of CENTER imaging. Full left removes signal from CENTER and is applied to the LT/RT and FRONT/REAR panner, full right pans signal to CENTER only.

LFE - rotary knob controls level of signal sent to subwoofer channel.

Mode Section



The mode selector switchbank includes 5.1, STEREO, MONO, LEFT, RIGHT, and BLEND buttons. When pressed, the switch will light up to indicate the selected mode and it will be displayed in the SELECTED CHANNEL LCD display.

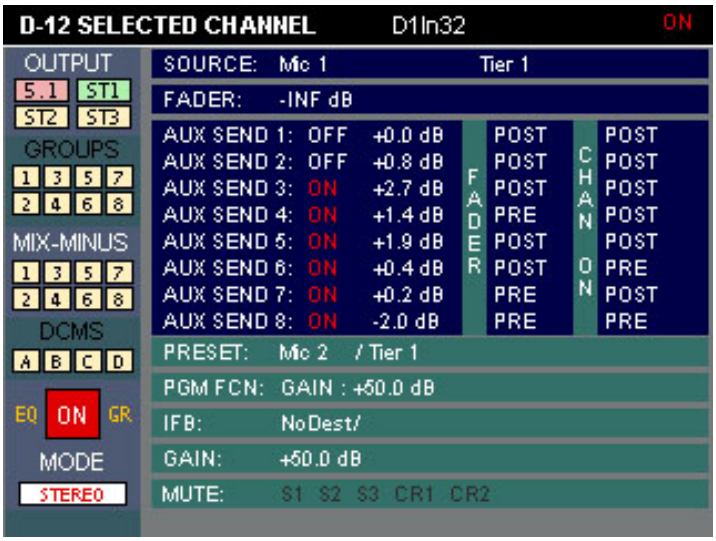
Access this section by pressing an input, subgroup, master, or monitor SET button. The functions available depend on which SET button is pressed. PAN and BLEND rotary controls only work with inputs.

INPUT SET PRESSED:

The PAN/BAL mode knob acts as a balance control in STEREO mode and as a panpot in MONO, LT-ONLY, and RT-ONLY modes.

WIDTH - an effect that changes the apparent distance between the speaker - applies to stereo signals only.

The BLEND mode sends both the left and right input signals to both the left and right sides of assigned stereo destinations. The BLEND knob acts as a cross-fader between the left and right source channels. Used for correcting the edited mix of split track sources like news packages. The voice and "nat" tracks feed BOTH LT and RT master outputs.



MODE - row of six interlocked switches (only one selected at a time). Affects which channels of the source signal are passed to the rest of the input signal path.

5.1 (surround) – sets the input fader to be a surround channel. Only input fader channels configured in hardware as 5.1 channels may be put in this mode. Put channel in 5.1 when selecting 5.1 surround sources.

STEREO – selects stereo mode; LT feeds left, right feeds RT; used for stereo music, normal mixing applications. If a mono source is selected, it will feed both LT and RT. A 5.1 source will be down-mixed to stereo.

MONO - selects mono mode; If a stereo source is selected it is summed to mono and reduced by 6dB. A 5.1 source will be down-mixed to mono.

LEFT (left only) – passes only the left channel of a stereo source.

RIGHT (right only) – passes only the right channel of a stereo source.

BLEND – sends the left and right channels to the rotary BLEND control for cross fading. The output of the BLEND control is summed.

MODE can be reconfigured by pressing any allowable button. In most cases pressing a disallowed button has no effect. The exception to this is when you press the BLEND button and BLEND is not a valid choice but STEREO is; in that case pressing BLEND will automatically select STEREO.

MSTR AUX or MSTR MXM SET BUTTON PRESSED:

Press STEREO, MONO, LEFT, or RIGHT to put the AUX send in stereo, mono, left only, or right only mode.

MXM's are always MONO

SUB-GROUPS or STEREO MASTER SET PRESSED:

5.1 master is permanently set to 5.1 mode.

Press STEREO, MONO, LEFT, or RIGHT to put the subgroup or master in stereo, mono, left only or right only mode.

MONITOR SET PRESSED:

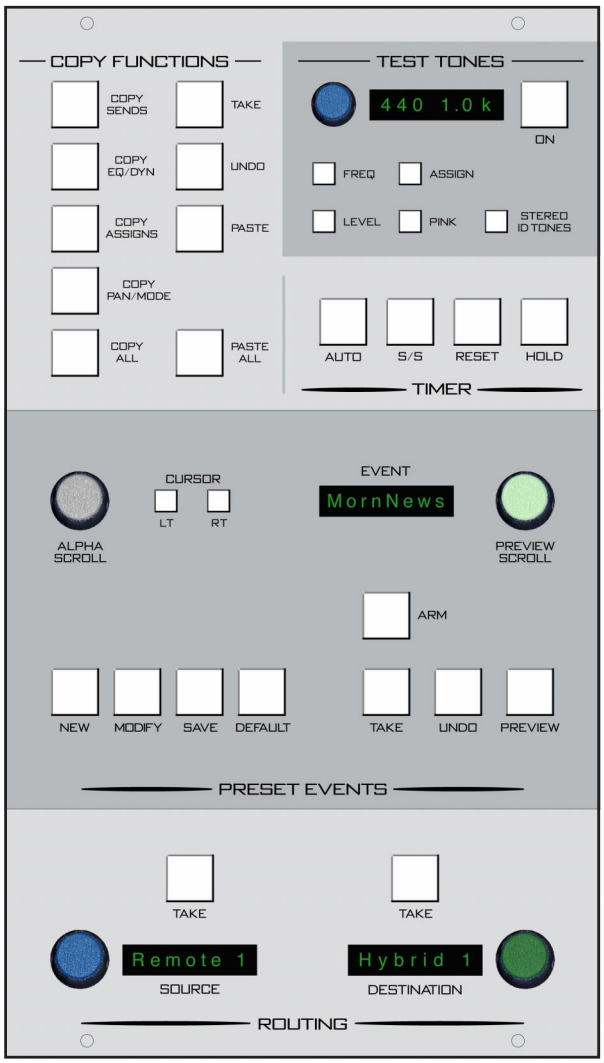
Press 5.1, STEREO, MONO, LEFT, or RIGHT to put the monitor in surround, stereo, mono, left only or right only mode.

Only the CR1 and CR2 monitor mixes can be 5.1.

Events Panel (XYE-D12)

Controls and Functions

The D-12 digital audio control surface is equipped with one EVENTS Panel. This panel contains COPY FUNCTIONS, TEST TONES, TIMER, PRESET EVENTS, and XY CONTROLLER sections.



Copy Functions Section

This system provides a convenient means of copying input channel settings (SENDS, EQ/DYN, ASSIGNS, PAN/MODE, or ALL) and duplicating them to other input channels. The process involves choosing a ***copy type*** switch first. It will flash.

Copy Type Switches:

COPY SENDS - initiates a copy of AUX send settings only.

COPY EQ/DYN - initiates a copy of Eq and dynamics settings only.

COPY ASSIGNS - initiates a copy of bus assigns only (master, group, MXM, & DCA).

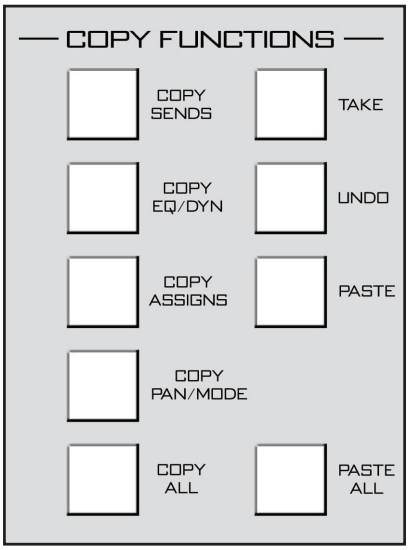
COPY PAN/MODE - initiates a copy of PAN and MODE select settings only.

COPY ALL - copies all settings from the source fader except Source & Preset.

Choose the desired channel to be copied by pressing its SET button (IS-D12 panel). The SET button will then flash in concert with the COPY button and the PASTE and PASTE ALL buttons will light. To go into PASTE mode, press the PASTE button. It will flash, and the COPY and PASTE ALL buttons will go out. Then press the SET button of the target module you wish to copy to. It will begin to flash in concert with the PASTE button, and the TAKE button will light. To accomplish the copy, press the TAKE button. See the section “To Copy One To All” for an explanation of the PASTE ALL button.

The UNDO button is used to undo a TAKE copy. Simply press UNDO and then TAKE to return the modified channel to its pre-TAKE status. There is only one level of UNDO. If you do a copy operation, then do another copy operation, then press UNDO to go back to the status before the last copy, pressing UNDO again will have no effect.

To Copy Groups



It is possible to take a bank of channels and duplicate it to another channel bank of equal number. Press the COPY button, then press the desired SET buttons on the source bank. The COPY button and the source bank SET buttons will flash in concert. Then press the PASTE button, which will begin flashing; press the desired target channel SET buttons, which will flash in concert with the PASTE button. To execute, press the TAKE button.

This function can be used to copy the settings from any number of channels to an equal size group of channels. The channels in each group do not have to be consecutive, and channels within a group can be a mixture from each PAGE if desired. There can even be overlap; for example, you can choose to copy from channels 1, 2, and 3 to channels 2, 4, and 5. After this copy, channels 1 and 3 would not have changed, channel 2 would be set as channel 1 had been, channel 4 would be set as channel 2 had been, and channel 5 would be set as channel 3 had been.

When selecting channels for the COPY and PASTE sets, the order in which you press the buttons matters. For example, if you selected, in order, channels 1, 2, 4 and 3 for COPY, and then selected, in order, channels 5, 7, 6, and 8 for PASTE, the end result would be that channel 5 would have channel 1 settings, channel 6 would have channel 4 settings, channel 7 would have channel 2 settings, and channel 8 would have channel 3 settings. Not that this is something you would necessarily want to do, but that's what would happen. To reiterate, order matters when selecting the COPY and PASTE sets.

If the size of the COPY and PASTE groups are different, TAKE will not effect the change, except for the special case of Copy One and Paste Many, described next.

To Copy One and Paste Many

Press the COPY button, and then the desired source channel SET button; both will flash in concert. Then press the PASTE button and the target channel SET buttons, which will flash in concert with the PASTE button. To execute, press the TAKE button.

To Copy One To All

Press the COPY button, and then the desired source channel SET button; both will flash in concert. Then press PASTE ALL, which will commence flashing. To execute the global paste, press TAKE.

NOTE: If the TAKE button is not pressed within a timeout period of 10 seconds, the entire copy/paste operation will cancel out.

Test Tones Section

The TEST TONES section provides adjustable frequency test signals, a pink noise source, and a stereo ID tones source.

The multi function oscillator may be assigned to any mix bus output or input fader. Press the SET button on the input or mix bus output to begin.

Operate as follows: The encoder knob operates as both a frequency knob and a level control knob. By pressing the FREQ button, the encoder will now adjust the oscillator frequency designated in the TEST TONES display. Its level can then be adjusted by pressing the LEVEL button and using the encoder to adjust the level as displayed in the TEST TONES display. If a pink noise is desired, press the PINK button and adjust its level by pressing the LEVEL button. For STEREO ID tones, press the STEREO ID TONES button and adjust the level by pressing the LEVEL button. The test tone destination is chosen by pressing the SET button at the desired destination location and then the ASSIGN button in the test tone section. To use any of the test tones, press the ON button. When it is lit the selected test tone is available; when not lit the tones are off.

Frequency Select Switches:

STEREO ID TONES - generates 440Hz on the left channel and 1kHz on the right channel. The TEST TONES display shows both frequencies.

PINK - generates pink noise on both channels. The TEST TONES display shows **PinkNoiz**.

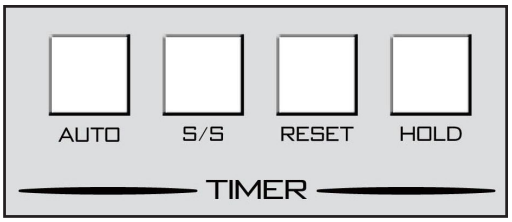
FREQ - defaults to 440Hz; the rotary encoder adjust the frequency in the range of 20Hz to 20kHz and updates the display.

LEVEL Switch - puts encoder and display in level setting mode. Default is -20dBFS. Encoder sweeps in 1dB steps in a range from 0dBFS down to OFF. Dobbying the encoder sets a nominal -20dBFS level.

ASSIGN Switch - assigns the oscillator to the selected mix output or input fader.

ON Switch - turns the oscillator ON.

Timer Section



The control surface timer is provided with an AUTO-RESTART function so programmed (via GUI) input modules can automatically reset the timer display (located on the button of the MASTERS LCD screen) to zero and start a new count (if the timer is currently running), allowing the announcer to easily track his own pace.

The S/S (start/stop) button halts the timer, holds the last count, and then restarts and accumulates the count when depressed again—perfect for compiling tapes of desired duration.

RESET has a dual-mode capability:

- if you depress it while the timer is counting, the display will instantly reset to zero and start a fresh count;

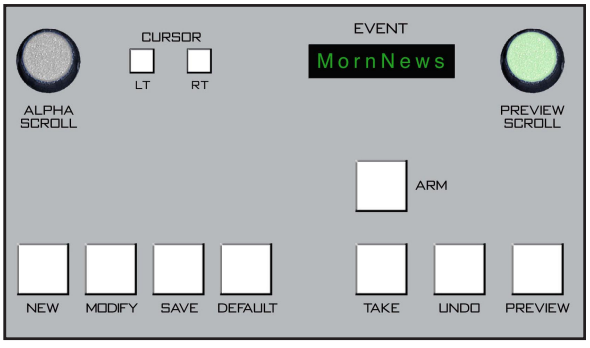
- if the timer is already stopped, depressing this button will reset the timer to zero, where it will hold until start is pressed.

The HOLD button allows you to hold the display for a longer viewing duration, while still allowing the counter to continue in the background. Releasing the button will then display the current count.

Time of Day Clock

The MASTER LCD screen includes the display of a time of day clock. To set the time on this clock you run a Wheatstone utility program, WSTimeSet.exe, on a network computer. The program allows you to set the clocks on multiple control surfaces by specifying the IP addresses of the control surfaces in a list. A single command then updates all specified clocks. Program options allow auto updating at midnight or at the top of the hour. See Appendix 1 for details.

Preset Events Section

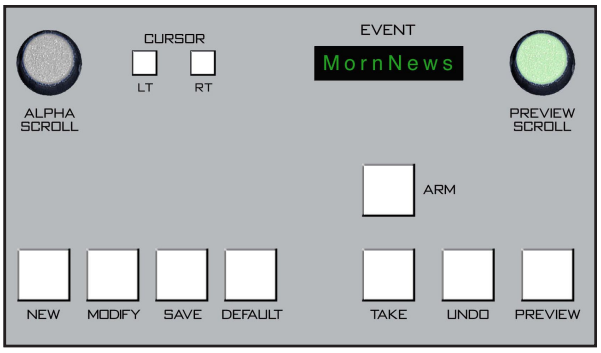


This section provides a means for storage and retrieval of control surface settings, and naming those settings as "events". In this manner complete configuration and setting information that is used repeatedly (for example, morning show) can be saved and recalled. Event names may be re-titled by the user. Up to 99 different events can be stored. A special DEFAULT event stores a user defined setup. Events may be triggered by the PROGRAMMABLE buttons on the IS-D12 panel.

Storing an Event

When an event is stored, all of the control surface's current settings are saved and will be recalled when that event is executed through the TAKE command. To create a new event from current control surface

settings, hit the NEW button, and then hit the SAVE button. To overwrite an existing event with the current settings, turn the PREVIEW SCROLL knob until the desired event is displayed in the EVENT window, then quickly press MODIFY, then SAVE.



Taking an Event

Rotate the PREVIEW SCROLL encoder until the desired event is shown in the EVENT display. To prevent accidental takes, the ARM button must be pressed to arm the function. The TAKE button will now flash indicating that the panel is ready to act on a take. Then press the TAKE button to execute the EVENT.

Undoing an Event

To recover from a premature or erroneous EVENT take, press the ARM and UNDO buttons. This will return the system to its status prior to the last take, with the last program event being once again the current program event, and the last preview event (the one just taken) becoming the preview event once again. There is only one level of undo. If undo has been done and a subsequent take has not been done, pressing the undo button again will do nothing.

Modifying the Currently Selected Event

It is presumed an event has already been executed on the control surface. Modifications to that event can be accomplished by simply adjusting the controls and switches as desired and then pressing the MODIFY button, then the SAVE button. In this way the modified event will overwrite the old event setting and be saved, with the same name, in its place.

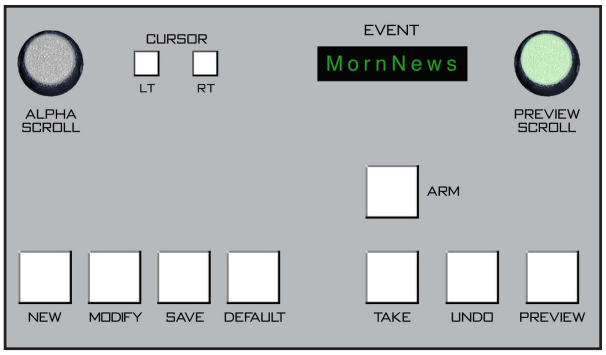
Deleting an Event

Rotate the PREVIEW SCROLL encoder until the Event to be deleted is shown in the EVENT display. Press the Modify button, then press the PREVIEW SCROLL knob; the display will ask “DELETE?”. Press the TAKE button to delete the previously displayed Event. Do nothing and Delete mode will time out after approximately 7 seconds. ***Deleted Events may NOT be restored.***

Previewing an Event

Rotate the PREVIEW SCROLL encoder and available EVENT names will be shown in the 8-character EVENT display. When the desired event is shown in the display, press the ARM button, then press the PREVIEW button. This will cause the entire control surface to display all settings associated with that event, without disturbing the current operative event. The preview status will be indicated by illumination of the PREVIEW

button and flashing of all source and destination displays, to remind the operator that these would be the intended settings when the change is made. Pressing the PREVIEW button a second time will cancel the preview. ***It should be noted that no audio signals are changed in any way by the preview feature.***



Event Default Button

This control allows rapid access to a default or home control surface setting. Push it, and the TAKE button in the Preview section will flash. Hit the TAKE button and the default setting will be executed.

Establishing the Default Setting

This setting would normally be set only once. For example, it may be desirable to have all controls set to zero, or everything programmed to typical nominal settings. To establish the default setting, adjust all the control surface controls to their desired settings, press the MODIFY button and then the DEFAULT button. The default setting is stored.

Naming an Event

When events are saved, they receive a default event designation number. This way events can be saved quickly without having to name them. However, an event may be custom named when saved, or at a later time. To rename the displayed event, press the ALPHA SCROLL knob. The CURSOR LT and CURSOR RT buttons will light and the cursor, indicated by a flashing character, will be at the beginning of the name. Also, the SAVE button will begin to flash. At any time you can use CURSOR LT and CURSOR RT to move to a character you want to change. Once the cursor is at the desired character, rotate the ALPHA SCROLL encoder until the desired new character is displayed. Once all desired characters have been changed, simply press SAVE to save your changes. The event is stored with the desired name. At any time you can cancel the name edit by pressing the ALPHA SCROLL knob. Also, if you stop making name changes but fail to press the SAVE button, the name edit process will automatically cancel after a delay of several seconds.

Control Modes

The D-12 control surface is operated in one of three modes. In Administrator mode access is allowed to all surface functions. In User mode a limited set of user functions is allowed. The set of functions allowed in User mode is set independently for each console using the Bridge XPoint software (see the Bridge Router manual for details). The third mode, Guest, blocks out MXM level, MXM assign, Event takes, and visibility changes from being controlled by the surface.

To change the control mode, begin by pressing and holding the PREVIEW SCROLL knob until the display reads “Admin” and the TAKE button lights (if the surface is currently in Admin mode the ARM button will also light). Turn PREVIEW SCROLL until the desired new mode (Admin, User, or Guest) is showing in the display and press TAKE. Turn PREVIEW SCROLL again to select the first digit of the password. Default passwords, which may be changed in XPoint, are “1234” for Admin, “2222” for User, and “0000” for Guest. After dialing up the first character of the password, press TAKE. Then dial up the second digit. Continue this procedure until the four characters have been entered. Upon pressing TAKE after entering the fourth character, the display will read “Okay...” if you were successful and “Sorry...” if you were not. When finished, turn PREVIEW SCROLL until the display reads “<<Exit” and press TAKE to finish the mode select operation.

The ARM button lights as you select the mode that the surface is currently in. If you press TAKE when displaying the current mode, the display will switch to “Okay...” and you will not need to enter the password. If you stop partway through the procedure, the mode selection process will time out after about 15 seconds.

Once a given control mode is selected for a surface, that setting will persist through a power cycle or surface reset.

Routing (XY Controller) Section

This section is a multi-use X-Y controller. Rotary knobs are provided for selecting Sources and Destinations. TAKE buttons are provided for both sources and destinations.

The information displayed in the eight character SOURCE and DESTINATION windows depends on which SET button is pressed. Signal source and destination visibility is set in the XPoint GUI. Dobby the DESTINATION knob to step through a list of routes where the mixer signal is routed to multiple destinations.

Control variations:

Input SET switch pressed:

SOURCE acts as source selector for input fader.

DESTINATION controls IFB (BUS MINUS) routing.

AUXx master SET switch pressed (MSTR SEND pressed):

SOURCE - not used

DESTINATION – used to route AUX bus to an output.

MXMx Master SET switch pressed (MSTR MXM pressed):

SOURCE – displays/routes Confidence feed source.

DESTINATION – used to route MXM x bus to an output.

Group or Master SET button pressed -

SOURCE - not used

DESTINATION – used to route Group or Master mix to an output.

Monitor SET button pressed -

SOURCE - displays/routes monitor EXT source.

DESTINATION – used to route monitor mix to an output.

Selecting Input Channel Sources

The operator designates the desired input channel by pressing its SET button in the Input section. Its current input source is shown in the SOURCE display. Input channel meterbridge LCD displays will mirror that same information. A different input source may be chosen by rotating the SOURCE knob. When the desired source is shown in the SOURCE display, pressing the TAKE button will execute the take command on the downstroke, and the new input will be shown in the SOURCE display and in the meterbridge LCD display. This function operates the same as the SOURCE knob on the input panels. To remove the input source from the input channel and leave nothing connected TAKE the source named "NOSOURCE".

Selecting Output Mix Destinations

When a SET button on an output mix channel (i.e., any of the auxes, monitors, or MXM masters) is pressed, its most current destination will be shown in the DESTINATION display. A mix is capable of being sent to one or many outputs. To see all the destinations that the mix feeds, rotate the DESTINATION knob. If the mix doesn't feed the displayed destination the TAKE button will light. You may also "dobby" the DESTINATION knob to step through all of the currently routed destinations.

Tip: The CR monitor SPKR A and SPKR B buttons act as SET buttons to program the SPKR A and SPKR B destination(s) separately.

Tip: DOBBY (pronounce dah-bee) - means to quickly press and release an encoder knob.

EXAMPLE: An example might be a MXM feed routed to several listeners participating in the program, or an AUD bus routed to multiple recording devices.

Changing Output Mix Destinations

Rotate the DESTINATION knob until the desired destination is shown in the DESTINATION display. When the knob is rotated, the TAKE button will light if the displayed destination is not being fed by the mix. If the operator wishes to add the destination shown, press the TAKE button to execute the command and the new destination will become the current destination, shown in available displays elsewhere on the control surface. Disallowed destinations (established in the configuration software) will not be shown.

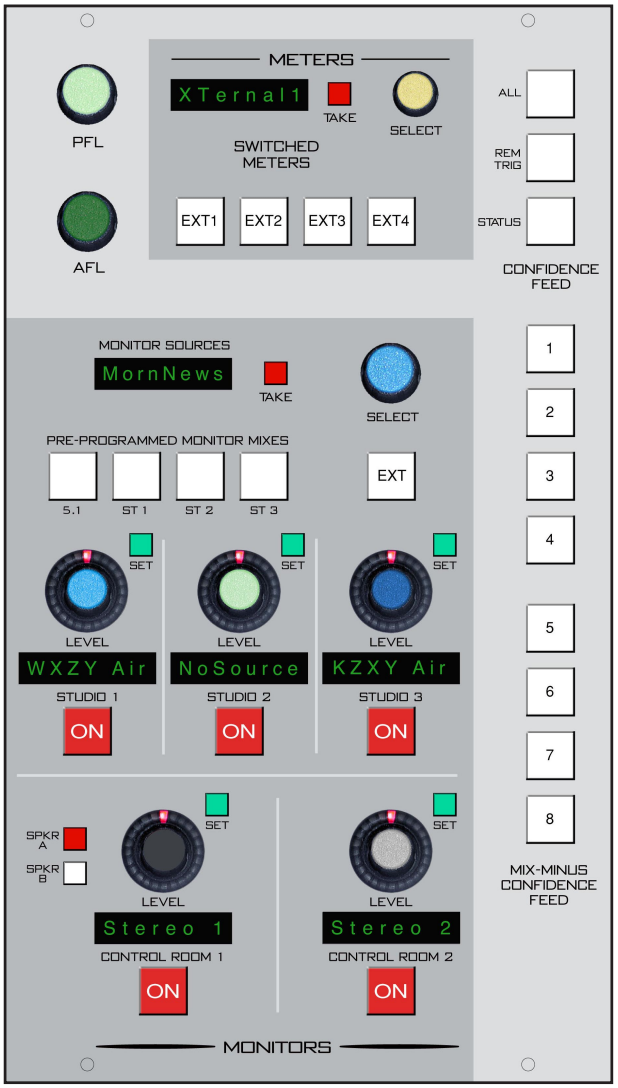
Monitor Panel (MON-D12)

Controls and Functions

The D-12 digital audio control surface is equipped with one MONITOR Panel. This panel houses MONITORS, AFL & PFL levels, SWITCHED METERS, and CONFIDENCE FEED sections.

PFL(Cue)/AFL(Solo) Section

The PFL(CUE) and AFL(SOLO) master level controls are located on the left top section of the MONITOR panel.



These rotary controls provide volume control of the PFL (CUE) and AFL mixes respectively. PFL is “pre-fader listen “, AFL is “after fader listen”. Monitors may optionally be interrupted with the PFL/AFL signal. This interrupt action is defined in the OPTIONS.txt file stored on the D-12 surface (see sample in Appendix 2). The default is no interrupt.

Input faders put into the PFL mix are summed and output on a PFL mix signal, which may be mono or stereo. The PFL mix is sent to the switched meters whenever a PFL switch is lit. Likewise, input faders put into the AFL mix are summed and output on the AFL mix signal (mono or stereo) which is sent to the switched meters when any AFL switch is lit. IFB, Groups, and AUX and MXM masters may also be switched to AFL.

Switched Meters Section

This section has a dedicated source control knob, eight character display, and TAKE button to route any signal on the router to the switched meter. There are four “hot” buttons: EXT1, EXT2, EXT3, and EXT4.

To select a signal to meter, rotate the encoder SELECT. Available sources will be displayed in the eight character SWITCHED METERS display. When the desired signal is displayed, press the TAKE button. The switched meter array will then display the signal level. If, however, after a timeout period of 5 seconds, the TAKE button is not pressed, the array will revert back to its previous selected program.

The four interlocked switches (EXT 1 - 4) act as source selects for the switched meter. Program a meter hot button by scrolling through the

available source signals with the rotary control until the desired source is displayed. Press and hold the EXTx switch for 3 sec to load the signal.

Any time a channel AFL/PFL button is pressed, the SOLO/CUE level will be temporarily shown in the switched meter display until the AFL/PFL button is deactivated.

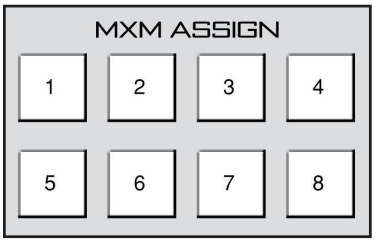
Confidence Feed Section

This system provides a means of sending an external signal to any or all of the 8 MXM outputs. This is typically used during show setup or airtime operations so talent can remain confident that their MXM feeds are active and working. (A typical confidence feed signal might be master control audio.)

A bank of 8 buttons allows user to individually route confidence audio to a MXM output. Each feed can be unique. Additionally, all 8 outputs can be put into confidence mode by means of a CONFIDENCE FEED ALL switch. Also, the CONFIDENCE FEED ALL feed function can be triggered from an external contact closure and armed for such action by means of the REM TRIG button. To trigger the ALL function the user defines an LIO Only input signal in the XPoint destination column with the CONFIDENCE FEED ALL LED function. This input is cross connected to an auto-generated mixer signal with the CONFIDENCE FEED LED (CFLED1, for example) function attached (the signal name will be DxCF1 for confidence feeds 1 - 6 or DxCF2 for confidence feeds 7 - 12, where the "x" represents a surface number in multi-surface systems). The remote closure is wired to the defined logic I/O port. This allows remote control of CONFIDENCE FEED ALL by master control switcher as the console goes to and from air and breaks. As a result, reporters can hear the off-air programming when dialing in and when station is in a break

All Confidence Feed programming is included in the EVENT storage.

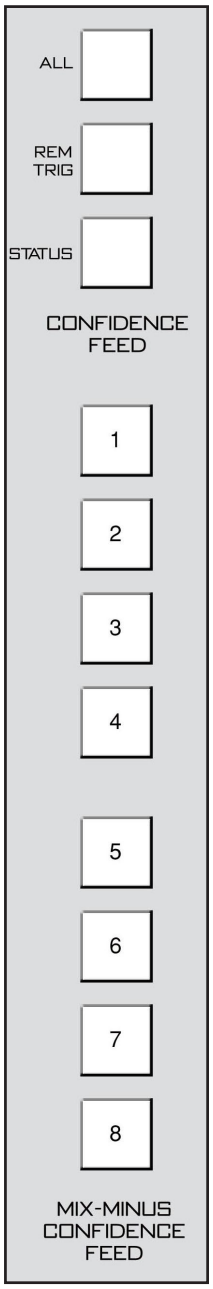
To set and store a confidence feed signal, go to the MIX-MINUS ASSIGN section of the MXM-D12 panel and hit the corresponding button to establish a programming mode. Select the desired source in the XY Controller section of the XYE-D12 panel by rotating the SOURCE knob until the desired signal is shown in the SOURCE display, at which time the TAKE button will flash. Pressing that TAKE button will now program the corresponding MXM to receive the selected source. Repeat the procedure for each of the 8 MXM outputs in the MIX-MINUS ASSIGN section on the MXM-D12 panel.



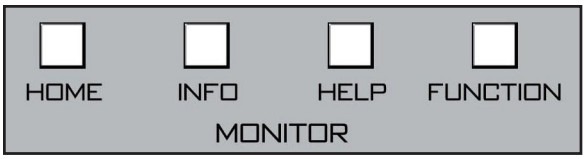
MXM-D12 Panel

XYE-D12 Panel

To remove the source for an MXM, TAKE the source named "NOSOURCE".



The STATUS button, when pressed, lights, and a list of MXM sources and destinations appears on one of the LCD displays. After viewing the MXM status, press the desired MONITOR button (MSTR-D12 panel) to revert the display to normal operation and turn off the STATUS light.



MSTR-D12 Panel

Monitors

There are five monitor outputs available: STUDIO 1 through 3, and CONTROL ROOM 1 and 2.

Each monitor has a LEVEL control, a SET button, an ON switch, and a display.

The CONTROL ROOM 1 monitor section also has the two speaker select switches.

Pressing a monitor SET button gains access to the monitor source encoder and master mix hot buttons. Displays below each monitor pot show the selected source.

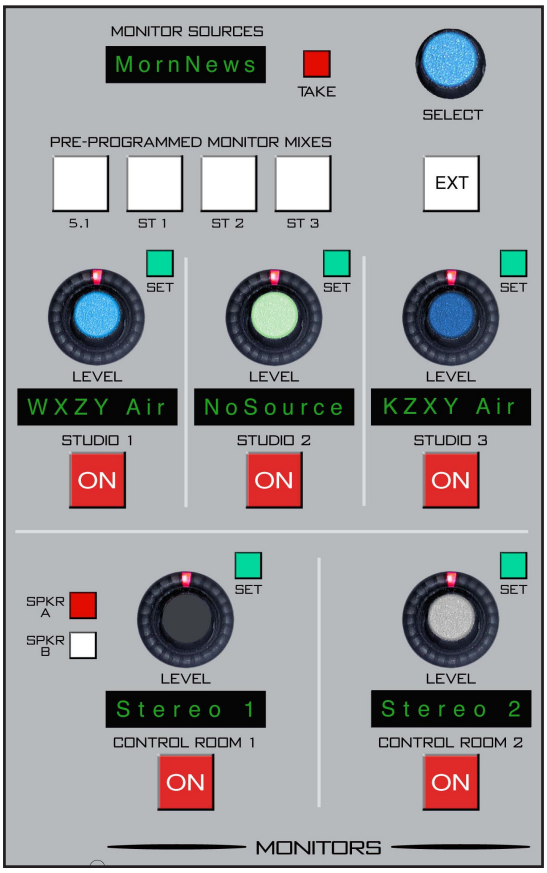
MONITOR SOURCE display – shows the currently programmed source. Use rotary encoder and TAKE to select a new source.

Monitor sources can be selected several ways:

• Four PRE-PROGRAMMED MONITOR MIXES switches (5.1, ST1, ST2 and ST3) allow direct access to the main mixes most frequently monitored.

• Sources can be randomly selected with the SELECT knob and its attendant SOURCE display and TAKE button.

• The EXT switch selects the pre-programmed EXT source. To program this, press and hold the EXT button until it lights (approx. 3 seconds), then dial up the desired source with the SELECT knob and press TAKE. The source is stored. NOTE that to do this, all monitor SET buttons must be OFF (unlit).



To select a source for a monitor by one of the above methods, first press the SET button next to the knob for the desired monitor.

The knob controls the level of the monitor signal.

Control Room Section

In a typical radio or television application the control surface is located in the audio control room. Speakers in the control room allow the control surface operator to listen to the various control surface bus outputs to be assured that the control surface is performing as desired. These speakers are fed by a stereo or 5.1 signal routed from the control surface's control room output.

In some instances the control surface operator may also be performing talent whose voice will be heard over the radio. The operator's microphone may thus provide a part of the signal that is going out over the air. If that signal is the one being monitored with the control room speakers, there is the potential for feedback. The amplified signal from the control room speakers is picked up by the microphone and reamplified to a new, higher, level, which then is once again picked up by the microphone. The signal quickly rises to an ear-splitting screech. To prevent this, the operator's microphone is normally set in the configuration software to MUTE the control room output to prevent the occurrence of feedback.

CR SET BUTTON - lets the operator select the source to be listened to in the control room speakers using the XY Controller on the XYE-D12 panel. Source/ Destination visibility is set in XPoint.

CR DISPLAY - the eight character display shows the source, that is selected for monitoring in the control room.

CR LEVEL CONTROL - determines the overall loudness of the signal being monitored as it appears in the control room speakers.

ON SWITCH - turns the control room signal ON and OFF. The switch LED lights to indicate the signal is ON.

SPKR A, SPKR B - these two switches are used to determine which of two outputs will be fed by the CR signal. Each feed may have its mode programmed separately (see Selecting Output Mix Destinations on page 6-9). A/B state is stored with an EVENT.

A/B Switch Destination Mapping (Set once)

1 - Press CR SET switch

2 - Press CR SPKR A switch

3 - Use XY controller on the XYE-D12 panel to route CR to an output.

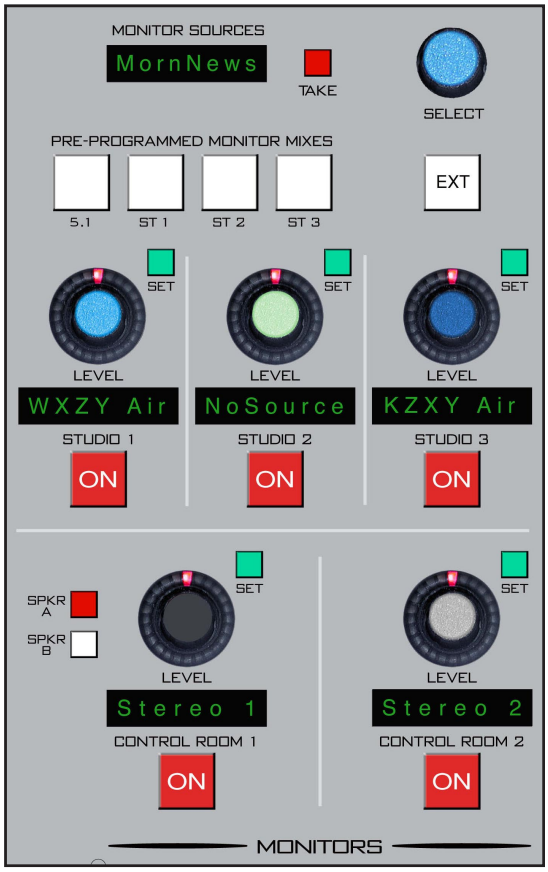
4 - Use the XYE-D12 TAKE button to store the destination.

5 - Press CR SPKR B switch

6 - Use XY controller on the XYE-D12 panel to route CR to an output.

7 - Use the XYE-D12 TAKE button to store the destination.

Studio Section



In addition to the control room, there may be one or more studios (the D-12 supports three studios) in which one or more performers will be assembled, usually with microphones so that their voices can become part of the mix. Speakers may be provided in the studio to allow the talent to listen to the various control surface bus outputs at times that they are not actually on air. These speakers are fed from one of the control surface's stereo studio outputs.

As in the control room, the potential for feedback also exists in the studio. The talent microphones will usually provide a part of the signal that is going out over the air. If that signal is the one being monitored with the studio speakers, feedback will occur. To prevent this, the studio mic faders are usually set to MUTE the studio output in the configuration software to prevent the occurrence of feedback.

ST SET BUTTON - lets the operator select the source to be listened to in the studio using the XY Controller on the XYE-D12 panel. Source/Destination visibility is set in XPoint.

ST DISPLAY - the eight character display shows the source, that is selected for monitoring in the studio.

ST LEVEL CONTROL - determines the overall loudness of the signal being monitored as it appears in the studio speakers.

ON SWITCH - turns the studio monitor signal ON and OFF. The switch LED lights to indicate the signal is ON.

TB / MIC Panel (TBM-D12)

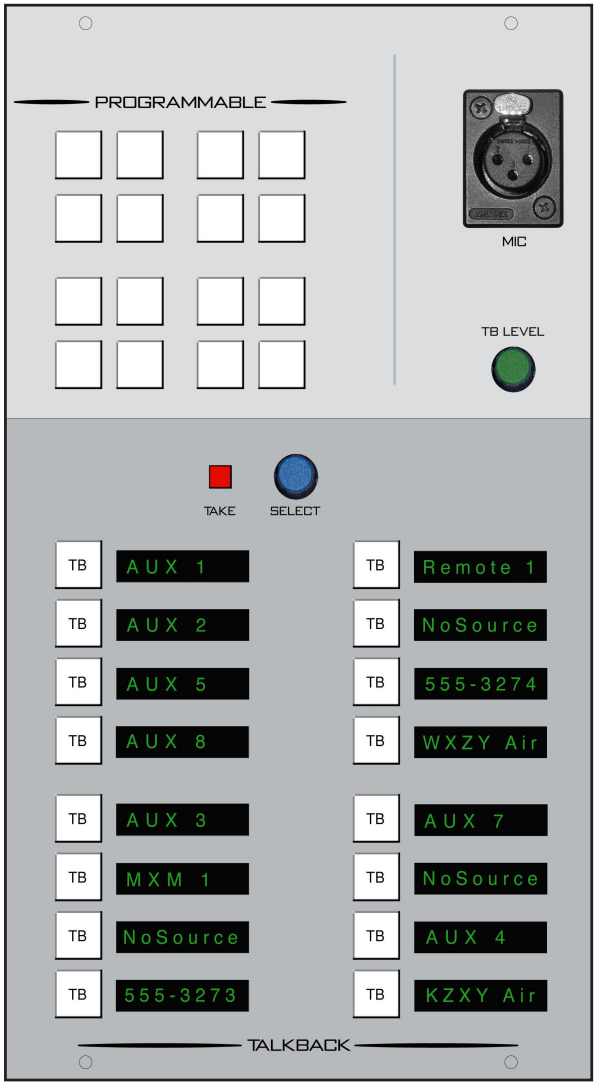
Controls and Functions

The D-12 digital audio control surface is equipped with one TALKBACK/MIC Panel. This panel houses the TALKBACK MIC, the TALKBACK preselects, and the PROGRAMMABLE buttons sections.

Programmable Buttons

These (16) momentary switches and indicating LEDs are designed for user accessible external functions (GPIs). Users modify behavior of the switches/leds in the OPTIONS.TXT file for the surface (see sample in Appendix 2). The XPoint GUI is used to map Salvo or Preset takes or Temporary Connections to these switches.

These switches may also be mapped to control physical Logic card output ports, and the LEDs on the Spare buttons may also be lit by a remote device connected to a Logic card input port. See the Bridge Router manual for details.



Talkback Mic

The operator's talkback mic plugs into the panel mounted XLR connector located on the upper-right corner of the panel. This a jack only with no preamplifier built into the D-12 control surface. This signal is then available for the various TALKBACK functions of the control surface. The XLR-M connector is wired to the "TB MIC" DB-9 connector located on the control surface's rear panel. This DB-9 connector must be wired out to a destination, such as a Bridge Router mic input (phantom power is supported), to be usable by the system.

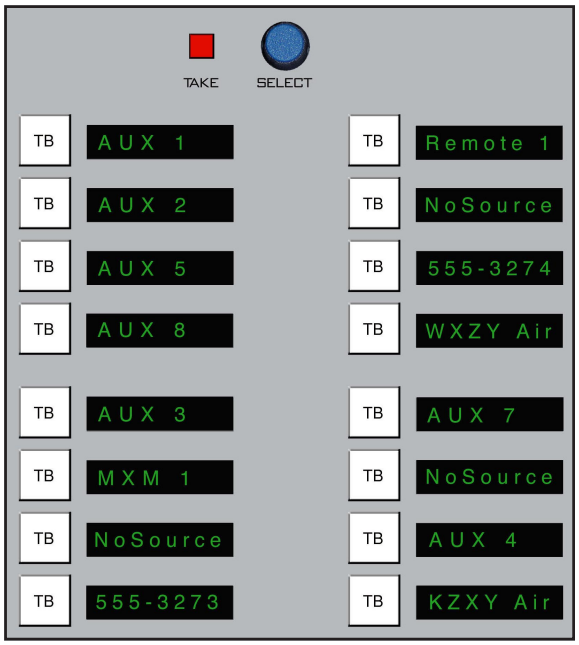
Pin 1 XLR SH – Pin 4 "TB MIC" DB-9 SH
Pin 2 XLR HI – Pin 5 "TB MIC" DB-9 HI
Pin 3 XLR LO – Pin 9 "TB MIC" DB-9 LO

XPoint software is used to route the user defined TB MIC source signal to the D-12's auto generated TBACK input signal. Note that any source on the router can be the TB source.

Other external microphones may also be connected to the engine system and talk to destinations or mixes and be triggered through the system's logic LIO-2001 I/O card (Bridge Router). This function would be mapped through the GUI.

The TB LEVEL rotary knob is used to trim the level of the TB signal.

Talkback Preselects



These sixteen programmable switches allow for a dedicated Bridge Router output to be designated as a destination for the talkback signal. Once a specific output has been programmed into the preselector, the talkback signal can be sent to that output at any time by pressing the corresponding switch.

Each individual TB button is programmed as follows:

1 - Press and hold the TAKE button (this button will light) to enter programming mode.

2 - Press the TB button you want to program (the TB button will flash).

3 - Rotate the SELECT rotary encoder until the desired mix is displayed.

4 - Press the TAKE button to write the mix name into TB switch display.

Repeat this procedure for each of the sixteen TB buttons. The procedure will time out after about 5 seconds if you fail to complete one of the steps.

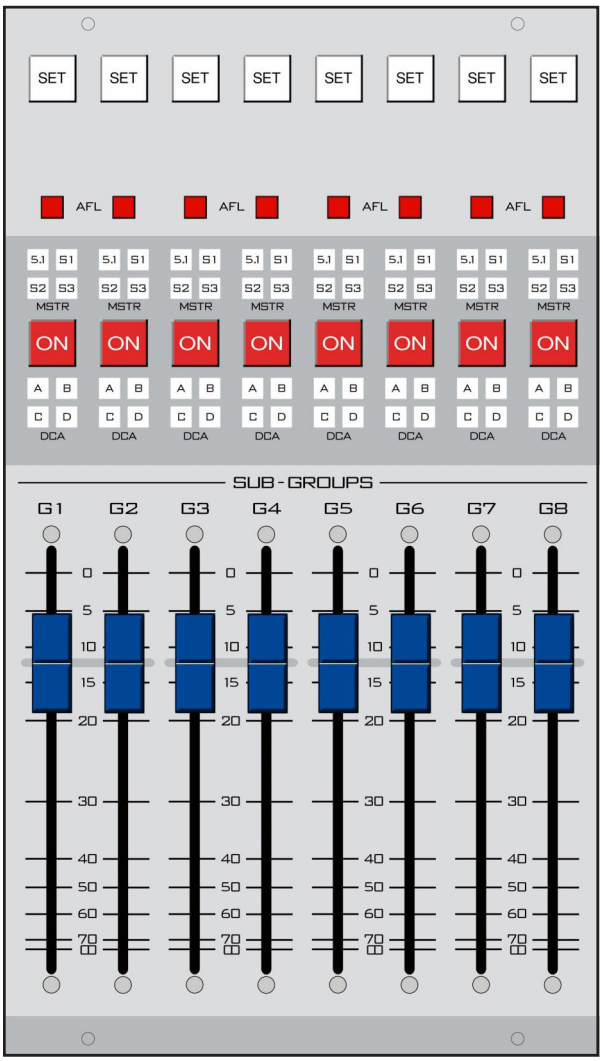
When EVENTS are stored, the sixteen TB preselects as displayed at the time of the EVENT SAVE action will be also stored and can be recalled with that EVENT.

Available mixes are AUX, MXM, Studios, Masters, IFB's, AFL, PFL, and Sub-Groups. A TB visibility setting in the XPoint GUI allows the user to limit what users "see" when they rotate the SELECT knob.

Sub-Groups Panel (GRP-D12)

Controls and Functions

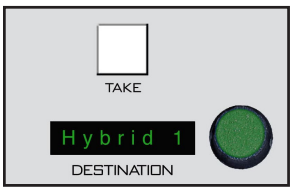
The D-12 digital audio control surface is equipped with one SUB-GROUPS Panel. This panel houses eight sub-group outputs. Each sub-group has identical set of controls: SET, ON, and AFL buttons, and MSTR and DCA assign displays.



Output Destinations, Sub-Group 1 Example

Press a groups's SET switch to access centralized controls associated with the group. Central controls include PAN/BAL, MODE, EQ, Dynamics, Test Tone assign, and Routing. The group may be in Surround Mode (if configured as a surround group), Stereo, LEFT, RIGHT, or MONO modes. The group MODE settings affects the group output but does not affect the group signal as assigned to masters.

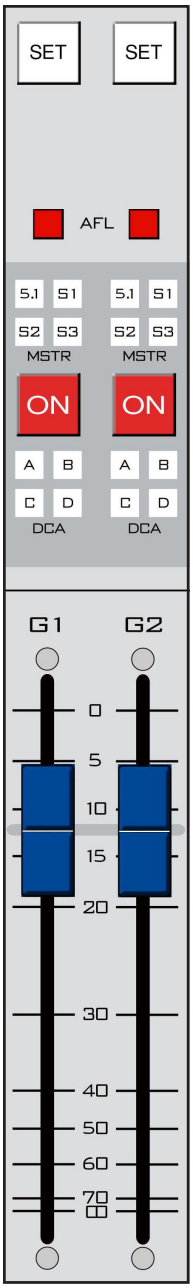
The DESTINATION display (XYE-D12 panel) will show the most *recent* output destination assigned. It should be noted, however, that a mix channel can go to multiple destinations, and for this reason the entire list of destinations that channel is assigned to is displayed in the LCD display when that channel's SET button is active. If the mix is not assigned anywhere the display will show "NoDest".



XYE-D12 Panel

As you rotate the DESTINATION knob in the XYE-D12 panel the names of allowable destinations will appear in the DESTINATION display. If G1 is not currently routed to the displayed output, the TAKE button will be lit. Press the TAKE button when lit to add the currently displayed output as a G1 destination.

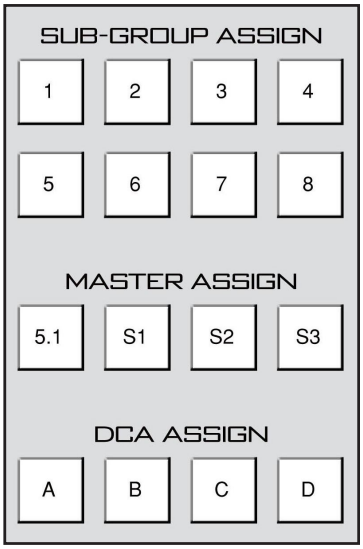
Destinations for the remaining sub-group outputs are handled in a like manner.



Groups Output Display

Each group can be assigned to any of the four main output buses using the MASTER ASSIGN buttons in the MXM-D12 panel. The assigned setting is displayed by the four indicators of the MSTR display group.

Groups can also be assigned to MXM masters, but this assignment is not indicated on the GRP-D12 panel, but only on the MXM-D12 panel.



MXM-D12 Panel

DCA Group Displays

Each sub-group channel can be assigned to any combination of the four DCA masters using the DCA ASSIGN buttons in the MXM-D12 panel. The assigned setting is displayed by the four indicators of the DCA display group.

ON Switch

The ON switch turns the group channel signal ON, pressing it again turns the group channel signal OFF. The switch LED lights when the group is ON.

AFL(Solo)

This switch activates After Fader Listen (SOLO) and puts the post fader group audio into the AFL monitor section and meter.

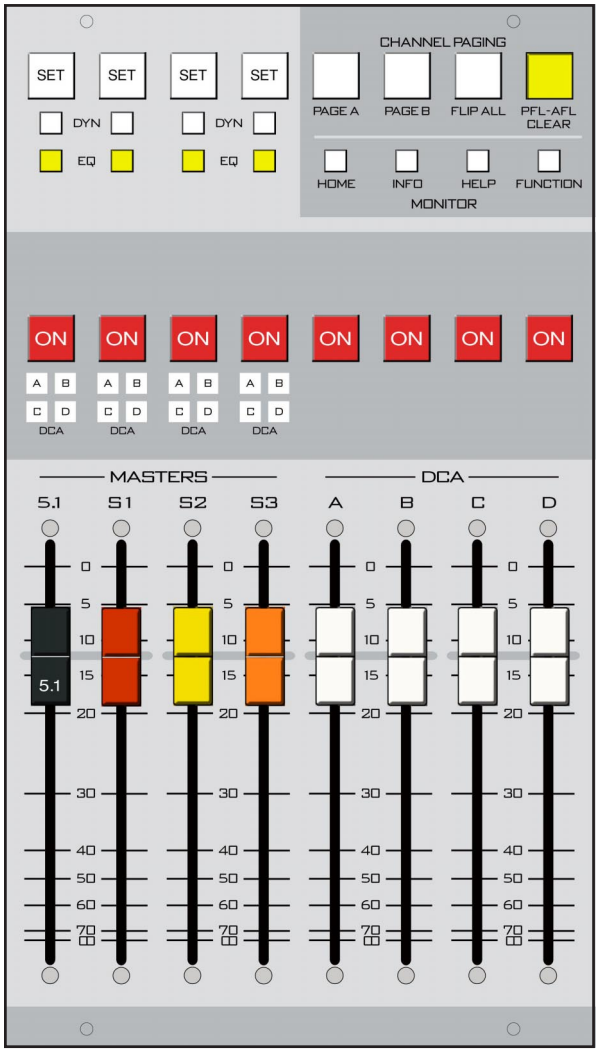
Sub-Groups Faders

These linear controls set the output levels of the sub-groups channels. Nominal unity gain setting is at the -12dB point on the fader scale.

Master Panel (MSTR-D12)

Controls and Functions

The D-12 digital audio control surface is equipped with one MASTER panel. This panel houses four MASTER program outputs, four DCA outputs, CHANNEL PAGING buttons, the master PFL-AFL CLEAR button, and four MONITOR mode buttons.



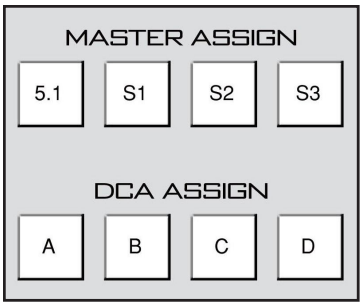
Masters Section

Each master mix, 5.1, S1, S2, and S3, has SET, ON, DYN, and EQ assign switches, and a DCA assign display.

NOTE: There are four different mix destinations: Surround (5.1), Stereo 1 (S1), Stereo 2 (S2) and Stereo 3 (S3). For descriptive purposes we will be discussing the controls for one section only, 5.1 Surround, with occasional references to other sections. Control descriptions for one section also apply to identical controls at the other three destinations on the MSTR-D12 panel.

Mix Destination 5.1 Surround

Input channels are assigned to the 5.1 Surround master by means of BUS ASSIGN button "5.1" (MASTER ASSIGN section on the MXM-D12 panel).



MXM-D12 Panel

Mono input sources would pan between the left front and right front. Stereo inputs would route to left front/right front.

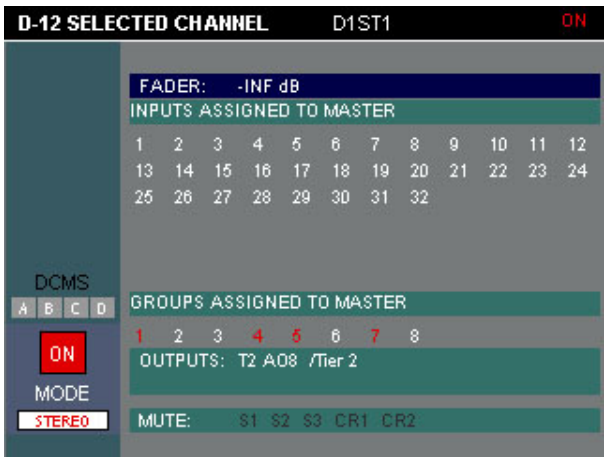
Mono and stereo inputs may be processed into 5.1 Surround signals by means of the 5.1 SURROUND section on the SUR-D12 panel. 5.1 input sources would preferably route to the SURROUND output unmodified. Groups may also be routed to the masters (including the 5.1).

Master Mix Destinations

Press a master's SET switch to access centralized controls associated with the master. Central controls include MODE, EQ, Dynamics, Test Tone assign, and Routing. The 5.1 master may be in Surround mode only. Stereo masters S1, S2, and S3 may be in STEREO, LEFT, RIGHT, or MONO modes.

The DESTINATION display (XYE-D12 panel) will show the most *recent* output destination assigned. It should be noted, however, that a mix channel can go to multiple destinations, and for this reason the entire list of destinations that channel is assigned to is displayed in the LCD display when that channel's SET button is active. If the mix is not assigned anywhere the display will show "NoDest".

XYE-D12 Panel



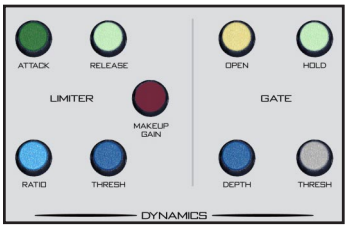
As you rotate the DESTINATION knob in the XYE-D12 panel the names of allowable destinations will appear in the DESTINATION display. If 5.1 is not currently routed to the displayed output, the TAKE button will be lit.

Destinations for the remaining master outputs are handled in a like manner.

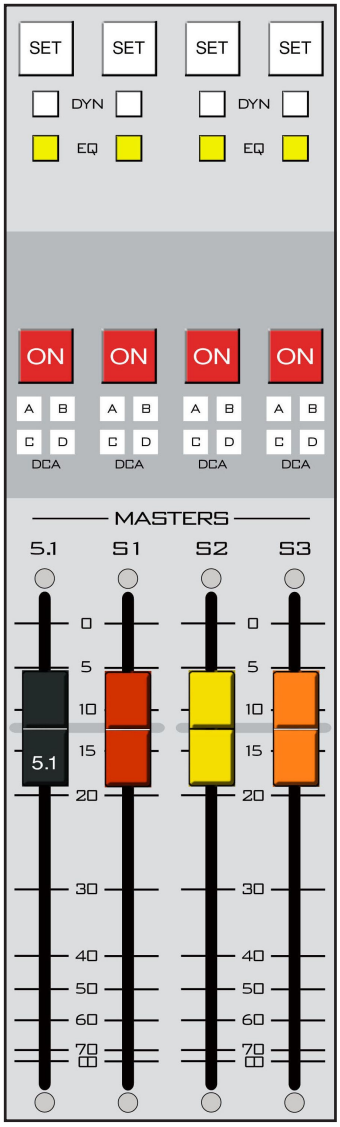
DYN

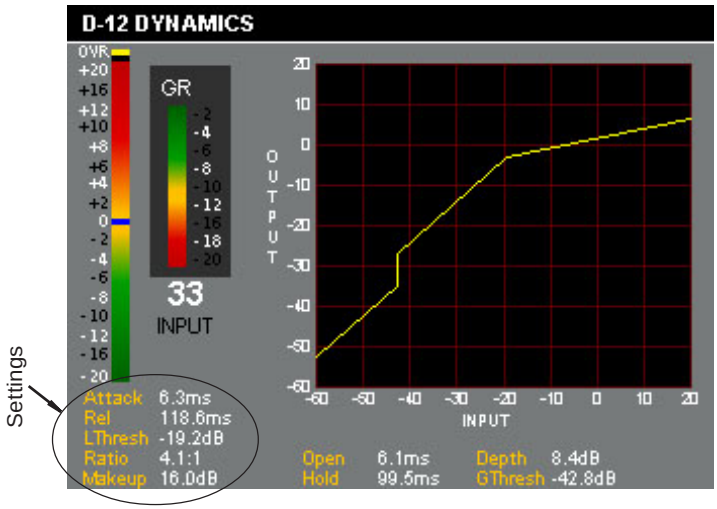
This switch inserts dynamic functions that have been preset by the operator in the DYNAMICS section in the EQD-D12 panel. The LED is lit when dynamics are engaged.

The DYNAMICS LCD screen shows the knob settings along with a graphical representation of the applied dynamics.

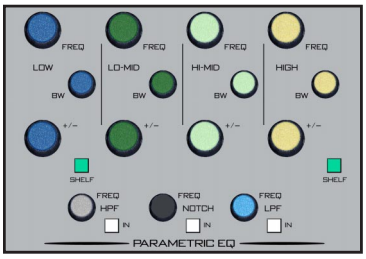


EQD-D12 Panel





This switch inserts EQ functions that have been preset by the operator in the PARAMETRIC EQ section of the EQD-D12 panel. The LED is lit when EQ is engaged. When any knob of the EQ section is rotated, the LCD displays a graphical representation of the EQ settings, as well as the actual knob settings.



EQD-D12 Panel

Channel Master ON/OFF

The ON switch turns the channel signal ON; pressing it again turns the channel signal OFF. The switch LED lights to indicate the channel is ON.

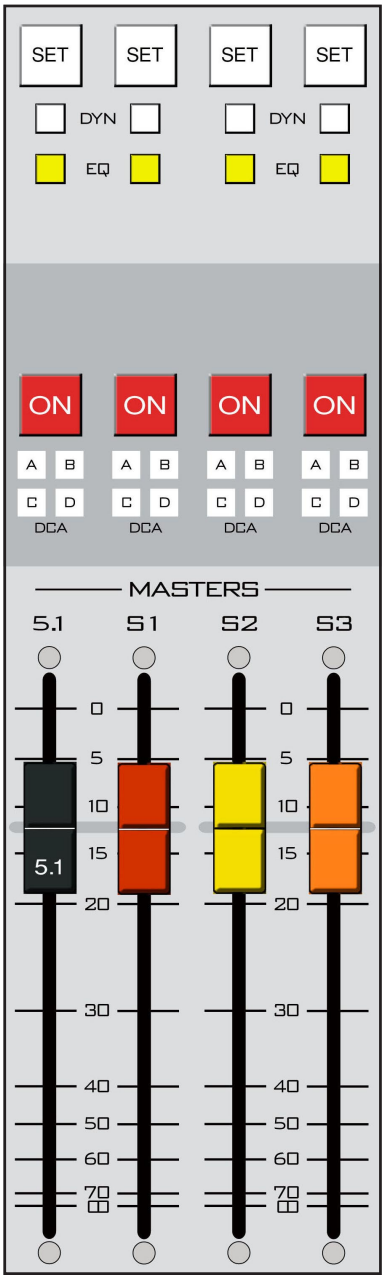
DCA Master Displays

Each channel can be assigned to any combination of the four DCA masters using the DCA ASSIGN buttons in the MXM-D12 panel. The assigned setting is displayed by the four indicators of the DCA display group.

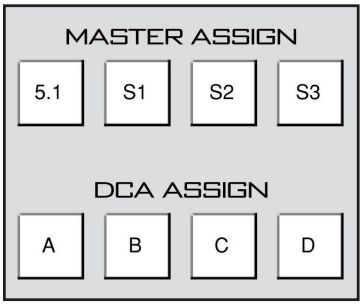
Master Faders

These linear controls set the levels of the master channels. Nominal unity gain setting is at the -12dB point on the fader scale.

NOTE that 5.1 MASTERS fader's knob engraved with "5.1".



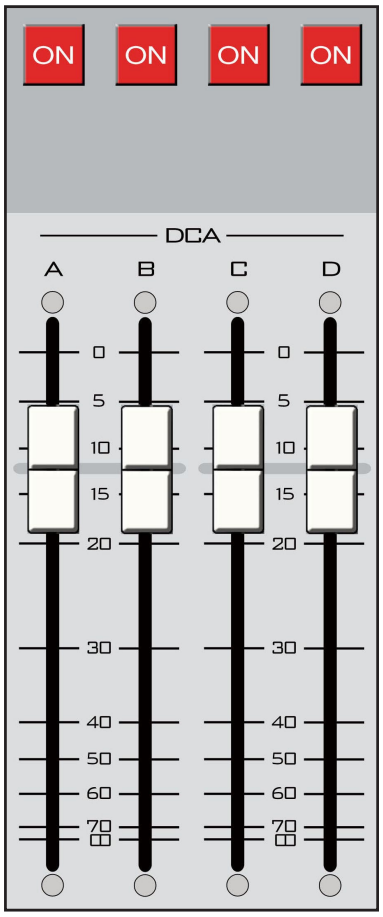
DCA Master Section



MXM-D12 Panel

The DCA (Digitally Controlled Amplifier) faders allow the user to control a cluster of Input, Sub-group, and Master faders from a single DCA fader and ON switch. Faders assigned to a DCA will track the position of the DCA master. If an input or output is "muted" by a DCA master then the corresponding DCA assign LED (A, B, C, or D) flashes to indicate the DCA has control.

To assign a DCA to an input, sub-group or master, place the input, sub-group or master channel in the SET MODE and press any combination of the DCA ASSIGN buttons on the MXM-D12 panel. The appropriate DCA display cluster on the input, sub-group, or master panel, will be illuminated, as well as the assign buttons.



DCA ON

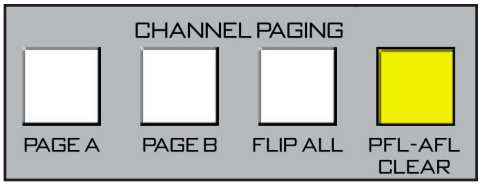
The ON switch turns the DCA master ON; faders assigned to the master will also be turned ON.

FADER

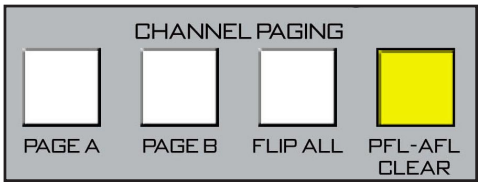
A long-throw fader controls the relative fader level of all inputs, groups, and masters assigned to DCA. The fader range is 0dB (no attenuation) at the top to full attenuation (OFF) at the bottom. When a DCA master is full OFF the ON LEDs remain lit on the cluster.

Clear PFL/AFL

When any PFL (Cue) or AFL (Solo) button on the control surface is pressed, its light will be illuminated and flash slowly. The PFL/AFL CLEAR button will also flash synchronously with any active PFL/AFL buttons. Any signal can be released from cue/solo by pressing its individual PFL/AFL button a second time. All PFL/AFL activated buttons can be cleared at once by pressing the PFL/AFL CLEAR button.



Channel Paging Section



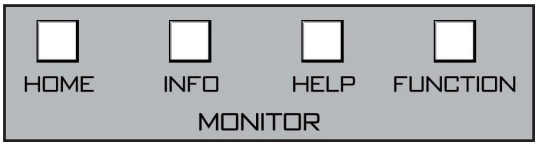
This section provides global page controls for the surfaces two "pages". Each page includes all input channel strip knob, switch, and fader settings. D-12 control surfaces may be configured with optional PAGE switches fitted above the input faders. A control surface with 24 physical faders will be able to control 48 input channels strips (i.e., PAGE A controls channels 1 - 24; PAGE B controls channels 25 - 48). Each PAGE is always active, meaning input audio from a channel may be ON and playing out a master even while its fader is switched to the opposite page.

The PAGE A forces all input channel strips to display the top page knob, switch, and fader settings.

The PAGE B forces all input channel strips to display the second page knob, switch, and fader settings.

The FLIP ALL button flips the currently selected PAGE to the opposite PAGE on all input faders (i.e., A becomes B, B becomes A). Useful for instant LIVE to BREAK setups.

Display Monitor Controls



These switches change what information is displayed on the CHAN SET INFO LCD monitor.

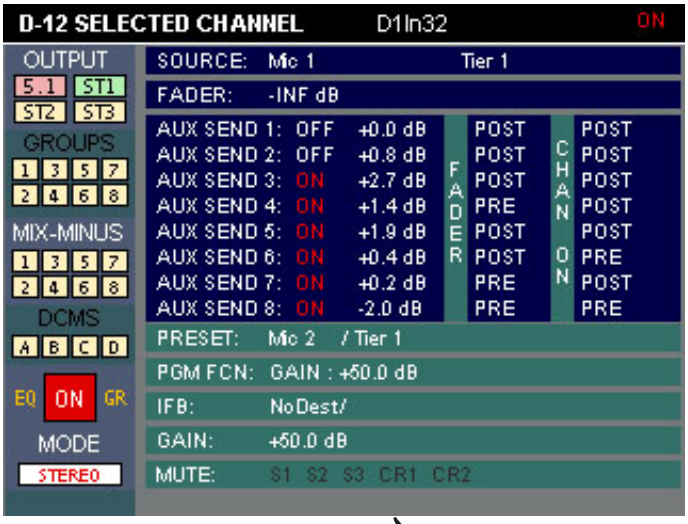
There are four MONITOR buttons on the MSTR-D12 panel. These buttons access various VGA display modes. To revert to normal panel display, press the left HOME button.

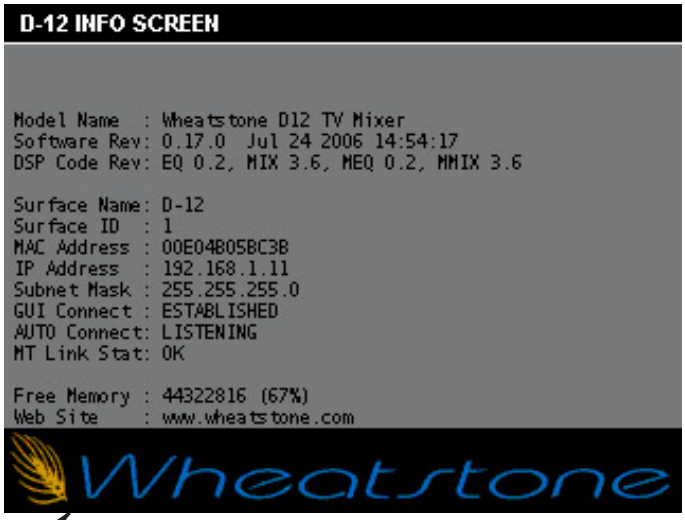
HOME - Default selection; displays the "normal" pertinent channel information as determined by which SET button is pressed.

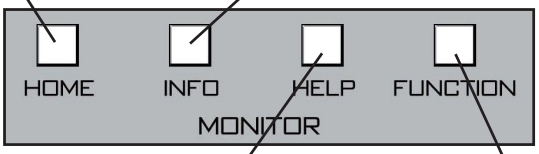
INFO - displays technical information about the surface's software versions and connection status to its companion rack MT link, Ethernet link, and automation interface.

HELP - displays the TOP level of the built in user help system. The user navigates the help system using the TB LEVEL knob (on the TBM-D12 panel). Hyper links to help topics are selected by "dobbying" the TB LEVEL knob; rotating the knob advances the cursor through the available hyperlinks. When the user exits HELP (by pressing HOME or INFO) the cursor resets to the TOP help level.

FUNCTION - this button is reserved for future use.







RESERVED FOR FUTURE USE