MIDAS

Designed for a Pure Performance

An Introduction to the Midas XL-3 Console

Prepared by,

Bob Doyle
Dana Roun
Bradford Benn

Contents

Introduction

NOTES FROM BOB DOYLE of MIDAS:

Practical House and Monitor Operation- When first addressing the XL-3, you will notice that the general layout is quite familiar and until it's functions are firmly established in the engineers mind it should initially be approached as he or she would a conventional console and set up as a 16 aux/8 stereo sub group (VCA section)/2 format. The description below is to help the engineer grasp the full design philosophy and operation of the XL-3.

Mix Outputs - The 16 mix outputs (or auxiliaries) per input channel differ from conventional consoles in so much as the master send controls are situated on the output section are sliding faders as opposed to rotary controls. When used as auxiliaries, the outputs are conventional in operation allowing outboard processing equipment to the driven directly from the mix output XLR connectors on the rear panel. This layout is also suitable for stage monitoring functions as it is intrinsically (in the case of an XL340) a 40x16 matrix.

Analog Subgroups - Any combination of mix outputs can be routed directly into the stereo master output by way of the "ON" push switches situated below the panpots on each output. Once this function is assigned, the output can be placed into the stereo image via these panpots and also the gain structure adjusted if necessary via the level to master rotary faders above. The "pre" switches in this section will route the output to masters pre or post fader. Once this assign is chosen, a stereo routing can be selected from the input channel mix outputs which once setup, will configure those selected outputs into the subgroup format.

NOTES FROM DANA ROUN*:   When introducing an avid audio enthusiast like yourself to a
console of this caliber, I hope to add to the experience. To me the world of show equipment is part of daily life and a good latch that fits snug is somehow helping to win the battle! The first time I saw an XL-3 was several years ago at an A.E.S. trade show. Did it have the famous sound of the earlier Midas Consoles? I knew somehow I had to get on *that* console and mix! As I walked away from the trade show booth my mind was filled with my brief encounter with excellence.... the room went dim as I imagined engineering a live show behind the controls! Several moments of shear bliss only to be interrupted when I bumped into a sharp corner of a neighboring booth. Since that day I have pursued this console and today I have the opportunity to give you the chance to share my dream! Let's look and listen and judge for ourselves as we learn the many features this console has to offer!

* The following overview of the Midas XL-3 console was originally written by Bob Doyle of Midas. This document assembled and edited by Dana Roun (Director of Sound Reinforcement @ Full Sail, Winter Park, Fl.) and Bradford Benn (Full Sail "Live Sound" Intern). Console graphics by Bradford Benn.

MIDAS XL-3
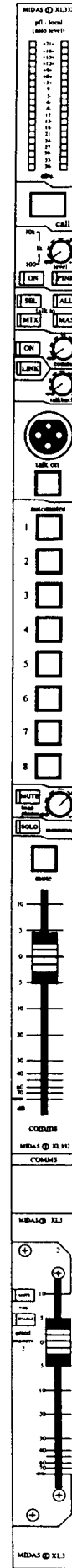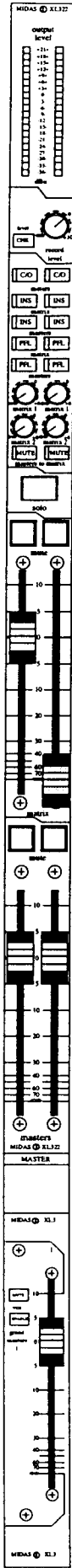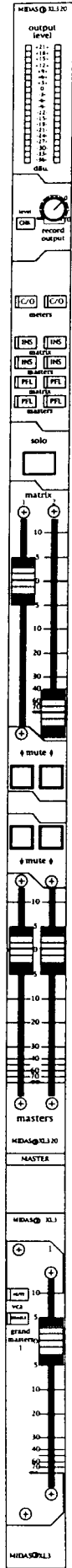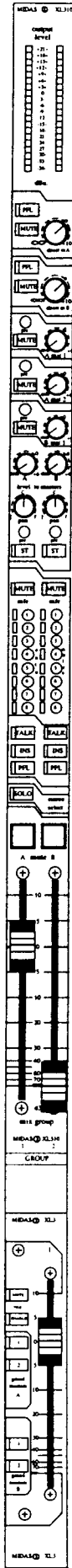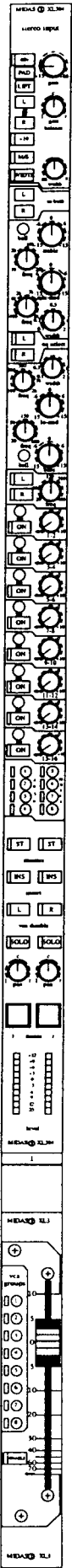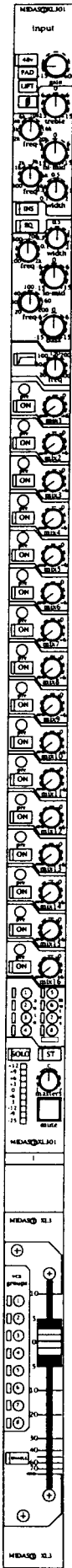
MIDAS XL-301
INPUT MODULE

XL-301 Input Module

MIDAS ⓪ XL301
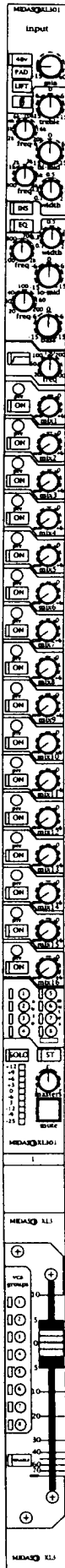
input

48V Phantom Power for condenser mics, this is DC power.

Mic/Line **PAD** switch provides 30dB of attenuation

Earth Lift (Ground Lift) switch eliminates pin 1 input XLR.

Phase Reversal (Ø) switch reverses the phase of the input XLR by switching pins 2 and 3.

Insert Signal is always available through the insert send patchpoint on the TT patchbay, however to be able to receive this button must engaged. The insert send and return is electronically balanced.

EQ this switch engages or bypasses the equaliser.

HPF Engage This button must be pushed in order to engage the high pass filter.
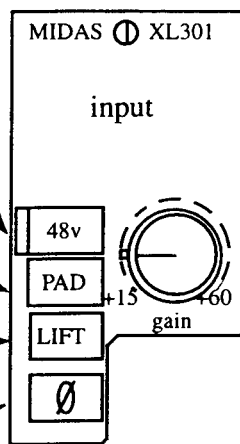
Gain Program input via an XLR connector on rear panel. Rotary fader attenuates or boosts the input signal over a range of +60dB to -15dB
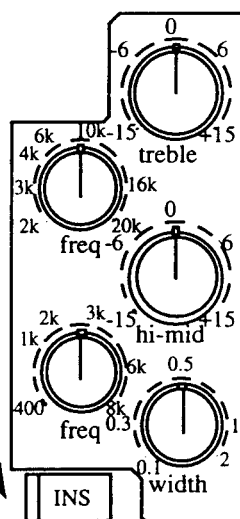
Treble Band equaliser displays "Butterworth" shelving characteristics with a frequency select of 2KHz to 20KHz and a cut and boost of -15dB to +15dB.

Hi-Mid band equaliser Fully parametric frequency select (400Hz to 8KHz), bandwidth control of 0.1 to 2 octaves and a cut and boost of -15dB to +15dB

Lo-Mid band equaliser Fully parametric frequency select (100Hz to 2KHz), bandwidth control of 0.1 to 2 octaves and a cut and boost of -15dB to +15dB
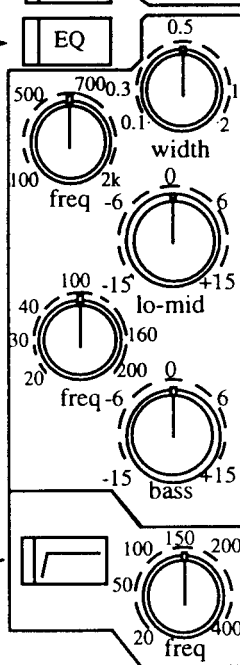
Bass band equaliser also displays "Butterworth" shelving characteristics with a frequency select of 20Hz to 200Hz and a cut and boost of -15dB to +15dB.

High Pass Filter The assignable high pass filter rotary fader control is continuously variable from 20Hz to 400Hz. It has a slope of 12dB per octave

XL-301 Input Module continued

Mix Send On This button allows signal from that module to be sent to the corresponding mix buss.
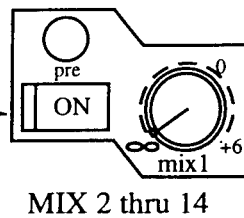
Mix Sends 1-16 This rotary fader controls the amount of signal being sent to the corresponding mix buss, it has a range of from infinity to +6dBu.

MIX 2 thru 14

Pre Button allows one to send signal to the mix buss pre VCA fader.
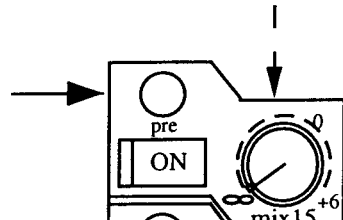
Auto Mute Group Scenes eight pushbutton switches assign the input channel mute function to any combination of eight mute group masters.
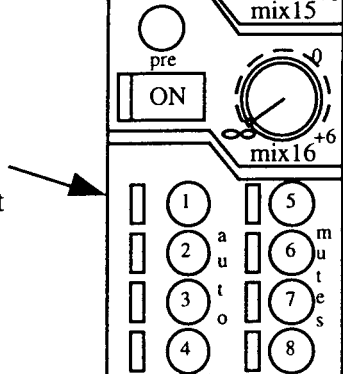
Solo/PFL assigns either pre fader listen or stereo after fader listen (solo/AFL) functions to headphones (which are in mono) and the solo buss outputs on the rear panel.
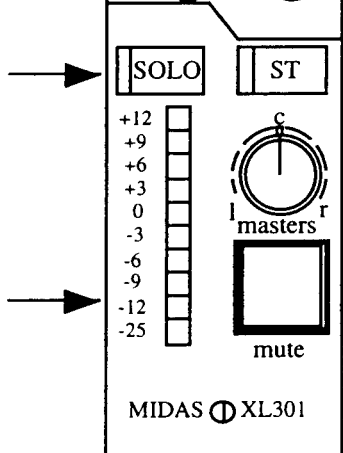
"ST" pushbutton switch assigns that module to the stereo buss.

Panpot places the signal assigned to the stereo buss within the 180° stereo image.

Input Metering a 10 segment LED meter. The bottom (red) LED at -25dB serves as a signal present indicator. The remaining LED's track the level up to +12dB *Note: Channel Clip is +21dBU thus giving a further 9dB of headroom above the metered +12dB maximum.*

Input Channel Mute this factory preset mute, mutes all channel functions.

MIDAS ⊕ XL3

VCA Group these pushbuttons assign that module to one of eight Voltage Controlled Amplifier groups.

vca groups

1
2
3
4
5
6
7
8

Channel Fader a long throw Penny and Giles fader. This fader controls the amount of signal that is sent to the stereo buss or to the mix groups depending on the configuration the user has set on the module.

10
5
0
5
10
20
30
40
60
70
∞

VCA Enable this button allows that module to be placed into a VCA Group.

ENABLE

☞ *Note: No analogue audio signal is present in the fader at all, gain control is achieved by VCA's.*
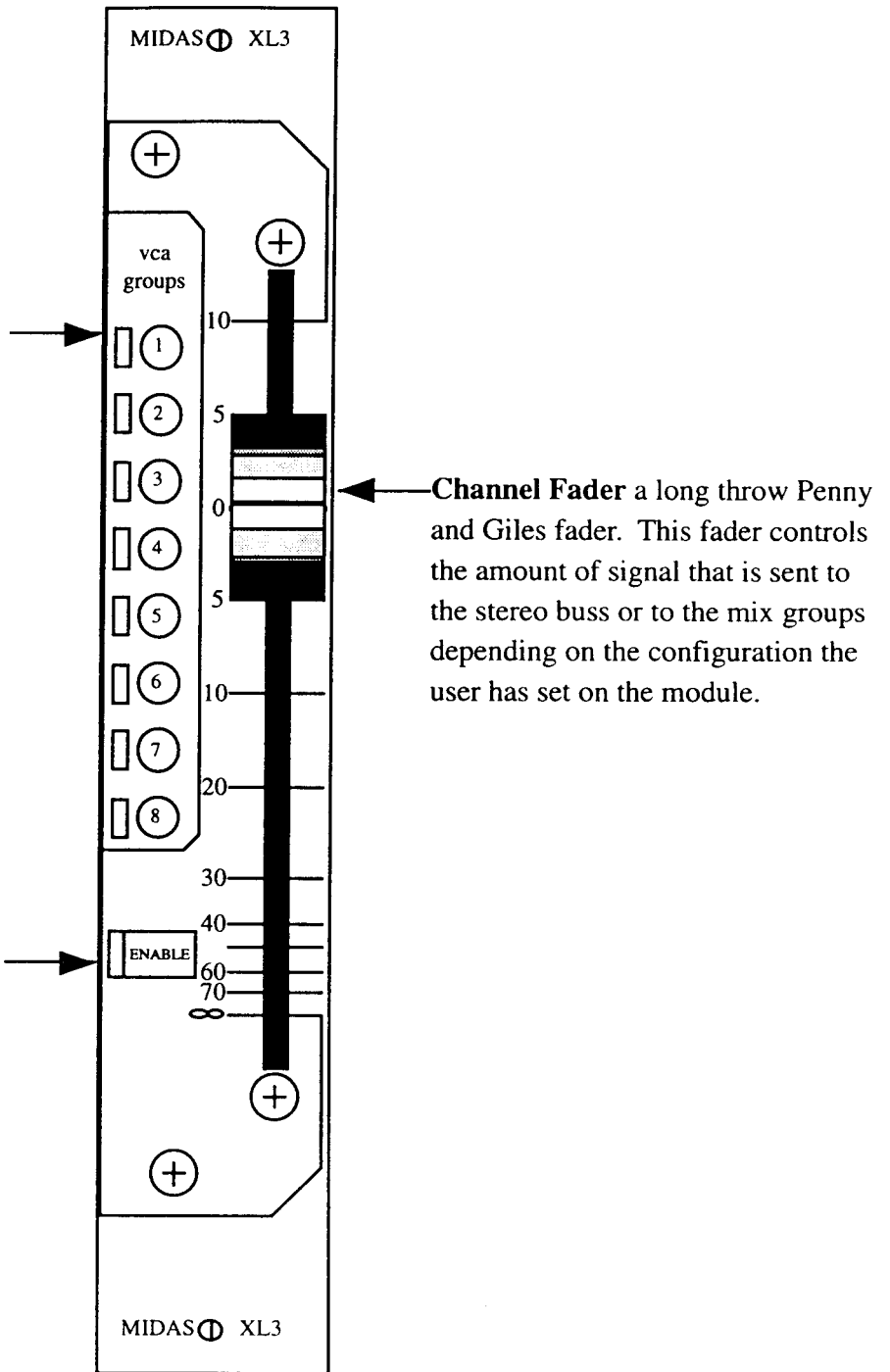
MIDAS ⊕ XL3

MIDAS XL-304 STEREO INPUT MODULE
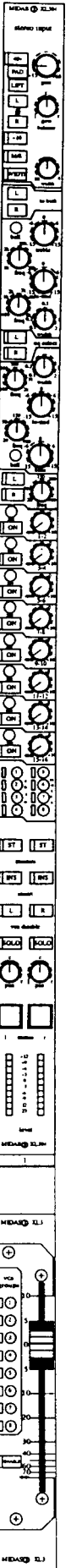
XL-304 Input Module

Phase Reversal (Ø) switch reverses the phase of the input XLR by switching pins 2 and 3. One can change the phase on each input independently.

+10 switch adds an extra 10dB of gain to the channel. This can come in handy when working in simulcast situations.

M/S switch enables one to easily accept a Mid Side (M/S) microphone. An M/S mic has two capsules, a bidirectional and cardioid position so that the pickup patterns are perpendicular to each other, in a single case this allows you to obtain a true stereo image from a single mic position. (see diagram) Another advantage is that the signal retains its mono compatibility. However you must decode this signal properly for it to be heard. When the two mic signals are connected to the module and M/S assigned, one channel is phase reversed and the two out of phase signals then fed through an electronic matrix which enables the stereo source to be spread across the stereo spectrum via the width control. After this treatment, the channels are re-matrixed and phased together for their return down the remainder of the module. This signal can then be spread as desired across the stereo spectrum.

☞ The stereo input module is very similar to the mono module, the major differences and new controls are pointed out in this section. A stereo module is very helpful for such things as CD players, DAT players, stereo MIDI modules, sub mixers, etc. The XL-340 console is typically shipped with 48 insert send and return patchpoints so that one may "short load" the console and add stereo modules easily at a later date.
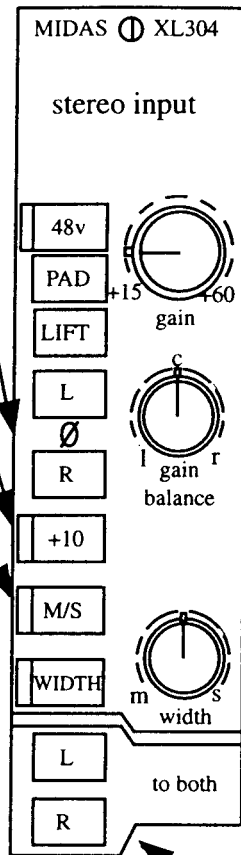
Gain Balance This rotary fader allows one to compensate for uneven signal level. One can add more gain to one side or another as needed.

Width This potentiometer allows one to control how much of the stereo spectrum the Mid Side signal will take up. The Width button next to it must be engaged to make the pot active. One can choose between the range of stereo and mono.

L & R switch allows one to use a mono source to feed both sides of the module.
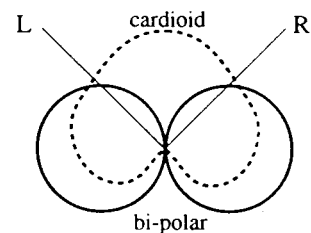
☞ This figure represents the basic polar pattern of a M/S mic system.

☞ The main difference between the stereo equaliser and the mono version is the frequency ranges for each bandwidth. However it is still operated in the same manner.

Bell this switch changes the treble bandwidth between bell and shelving.

L & R these buttons assign the equaliser to affect the corresponding channel.

Bell this switch changes the bass bandwidth between bell and shelving.

L & R these buttons assign the high pass filter to affect the corresponding channel.
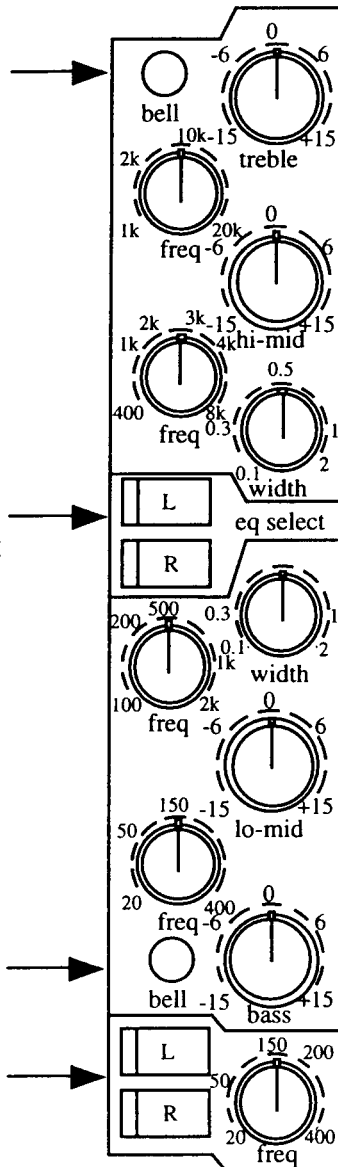
☞ A bell curve on an equaliser will have a peak at the center frequency and then will roll off on both sides, The amount the equaliser affects the signal is rated in dB per octave, this is the slope of each side of the curve.
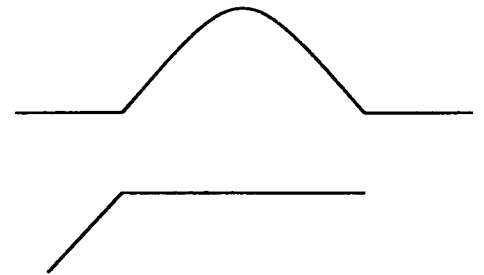
☞ A shelving equaliser is described by the frequency where the plateau starts, or knee frequency. It affects all frequencies the same amount above the knee frequency, it has a slope rated in dB/octave which is how much the equaliser affects the sound before the plateau. After the knee frequency the amount of boost or cut is simply measured in dB.

XL-304 Input Module _{continued}

Aux Sends this section works like the mono module, except for the fact that the left channel feeds the odd and the right feeds the even.
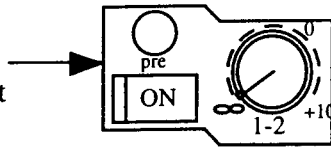
MIX 3 thru 14

ST this button assigns that side of the channel to the stereo buss.
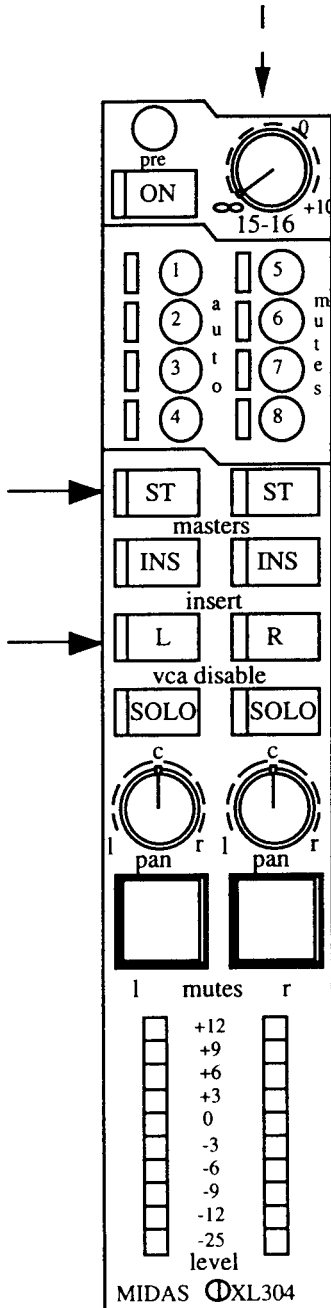
L & R these switches are used to control the VCA grouping. As one channel fader controls signal, the VCA enable assign will effect both channels. This VCA disable function de-assigns individual channels from VCA controls

INS this button engages the insert return for that channel of the module.

Pan this pot also allows one to pan the signal in the stereo spectrum to offer even more control over placement.

VCA Group these pushbuttons assign that module to one of eight Voltage Controlled Amplifier groups.

MIDAS ⊕ XL3

vca groups

1 2 3 4 5 6 7 8

ENABLE

10 5 0 5 10 20 30 40 60 70 ∞

Channel Fader a long throw Penny and Giles fader. This fader controls the amount of signal that is sent to the stereo buss or to the mix groups depending on the configuration the user has set on the module.

VCA Enable this button allows that module to be placed into a VCA Group.

☞ *Note: No analogue audio signal is present in the fader at all, gain control is achieved by VCA's.*

MIDAS ⊕ XL3

MIDAS ⊕ XL3

VCA Group these pushbuttons assign that module to one of eight Voltage Controlled Amplifier groups.

vca groups

Channel Fader a long throw Penny and Giles fader. This fader controls the amount of signal that is sent to the stereo buss or to the mix groups depending on the configuration the user has set on the module.

VCA Enable this button allows that module to be placed into a VCA Group.

ENABLE

☞ *Note: No analogue audio signal is present in the fader at all, gain control is achieved by VCA's.*

MIDAS ⊕ XL3

MIDAS XL-310
MIX GROUP
OUTPUT MODULE

XL-310 Group Output Module

☞ Signals routed from input channel mix sends 1 through 16 are summed in corresponding order in mix group modules 1 through 8, each output being fader controlled and each module containing two mix groups, or busses. Signal can be routed either pre or post fader to the stereo buss or to the output XLR connectors on the rear panel in order to drive outboard processing gear (like an auxiliary send), for stage monitor mixes, or routed via the onboard 2 by 16 matrix section. Matrix master output controls are located on the Master Output Module.

MIDAS ⓄXL310

output
level

```
+21+
+18+
+15+
+12+
 +9+
 +6+
 +3+
  0
 -3-
 -6-
 -9-
-12-
-15-
-18-
-21-
-24-
-27-
-30-
-33-
-36-
```

dBu.

PFL

MUTE

direct in A

PFL

MUTE

direct in B

pre

MUTE

A mat 1

pre

MUTE

A mat 2

pre

MUTE

B mat 1
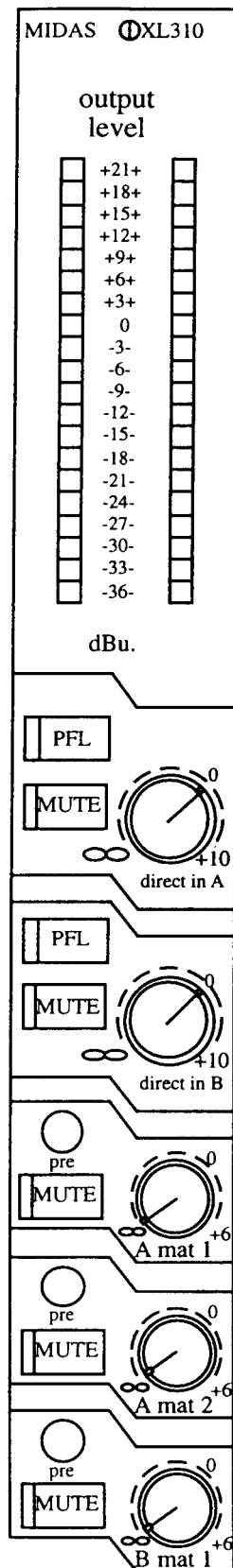
Dual Output Meters 20 segment output meters track the level from -36dBu to +21 dBu.

Direct Inputs Each Direct Input has its own PFL and Mute capability and are controlled by rotary faders. This facility allows one easy access of external program sources to be fed into the mix group. Once the additional signal has been added it can then be processed and assigned in the same way as an internal program source. This point is useful for auxiliary returns.

Stereo Matrix These rotary faders allow one to route signal to the two matrixes (A and B). Each fader has its own mute control, and can also be bypassed entirely by using the pre button. The "A mat 1" pot feeds the odd group to Matrix A, the "A mat 2" pot feeds the even group to Matrix A, the "B mat 1" pot feeds the odd group to Matrix B, and the "B mat 2" (which is not shown) pot feeds the even group to Matrix B. The matrixes are summed and controlled in the Master Module.

Level to Masters These control the level to the stereo buss. A is the odd group of the module and B is the even one. These allow one to set up groups on the console in addition to the VCA groups in the fader trays. This control must be set above infinity if one is using the direct in as an auxiliary return, as well as the direct in level.

Pre These buttons allow one to assign the output of the group to the stereo buss prefader.

Mute Safe this button allows one to make place a group in mute safe. In this mode the group can not be muted, this is mainly a safety measure. This function is useful for auxiliary returns, this allows you to mute the original source and still allow the effect die away naturally.

Talk This button allows the operator to send signal from the communications module to the selected outputs. This button allows you to route either the talkback, oscillator, or pink noise to the group output.

PFL When depressed, this function routes a prefader post insert signal to the headphone output socket located in the communications module. The signal is also routed to the Solo Output XLR's on the rear panel.
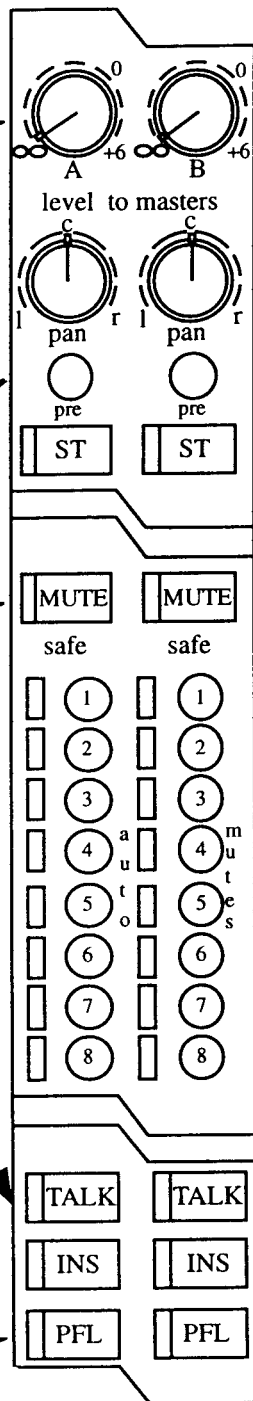
Pan to masters These pan pots allow one to place the subgroup anywhere in the stereo field. For these pots to be active the signal must first be assigned to the stereo buss.

ST The ST buttons allow one to assign the Mix Group output to the master stereo output buss. By using the controls in this cluster one can place the Mix Group module in *subgroup operation.*

Auto Mute Group Scenes eight pushbutton switches assign the group to any of the eight mute group or scene masters.

INS this button is how one engages the insert return for the group. The insert send and return are accessed via the TT patchbay on the rear, each send and return is electronically balanced.

XL-310 Group Output Module

Solo (Stereo Select) When depressed in conjunction with the solo listen pushbutton switch located to the left of the "local" rotary fader on the communications module, configures the group mix PFL signal together with the input channel solo select signal from mono (L&R) prefader to a post fader stereo. This signal appears at the headphone output jack (in mono) and at the solo output XLR's on the rear panel.

Mix Group Mute This switch, in the factory preset mode, mutes the Mix Group post output metering. Pre output metering muting can be accomplished by relocating jumper switches on the circuit board.

Mix Group Output Faders These faders control the mix group signal output to the XLR connectors on the rear panel. The signal can also be routed to the master stereo buss selected via pushbutton switches labelled ST.

VCA Mute Group This button mutes all signals that have been routed through that VCA Group.

VCA Group Enable This button must be depressed in order to make the VCA group active. With this button depressed the fader to its right now acts as a master for the VCA Group.

Grandmaster Buttons These buttons allow one to assign the Mix Group Output Faders (not the fader to the right of the buttons) to either VCA Grandmaster A or B. Once again 1 represents the odd channel of that module and 2 the even channel.

VCA Group Fader This fader is the master fader for the VCA group. It has no affect until the VCA Group Enable button is pressed.

MIDAS XL3

MUTE
vca

ENABLE

1

2
grand masters A

1

2
grand masters B
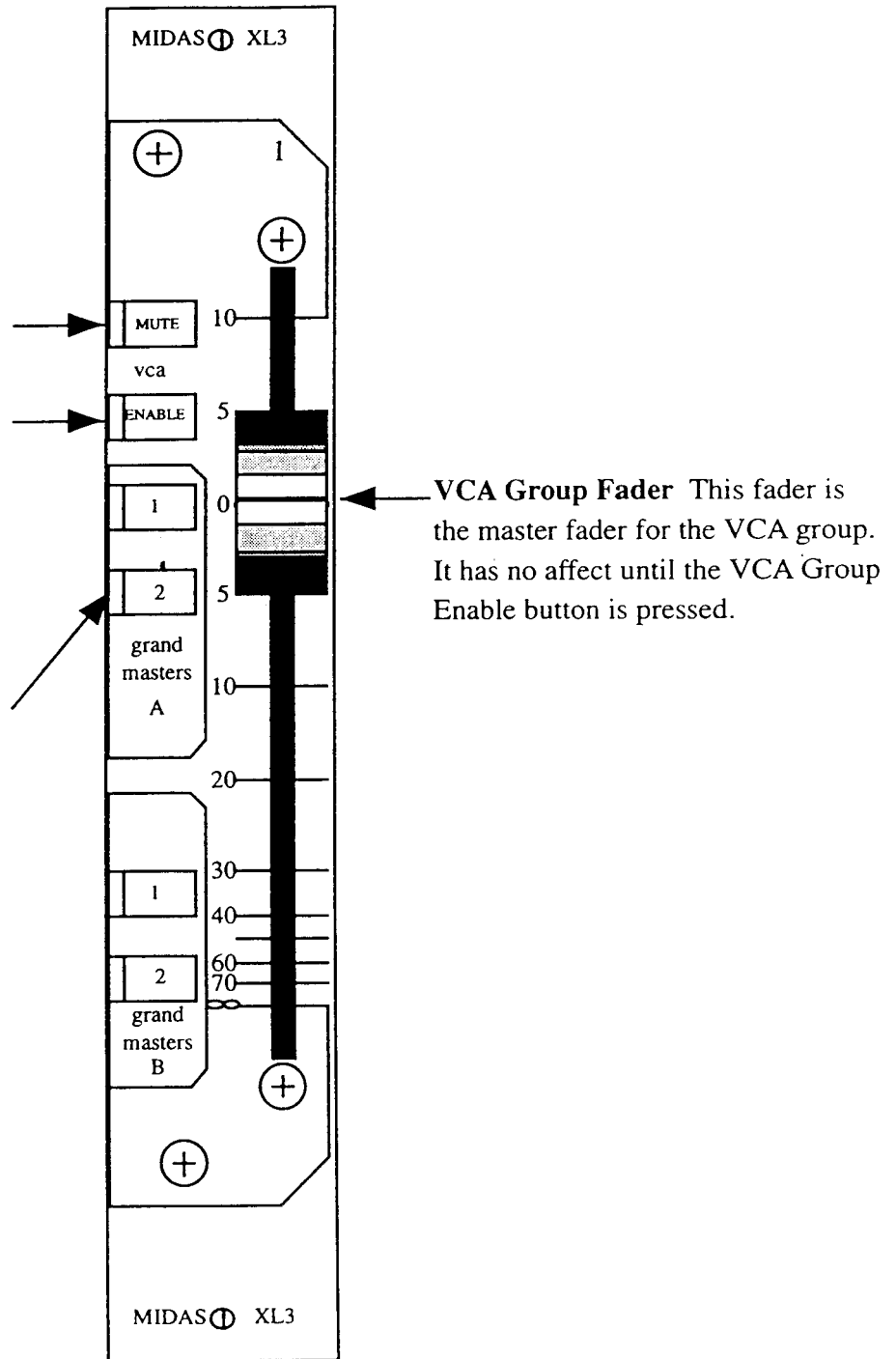
MIDAS XL3

MIDAS XL-322
MASTER MIX
OUTPUT MODULE
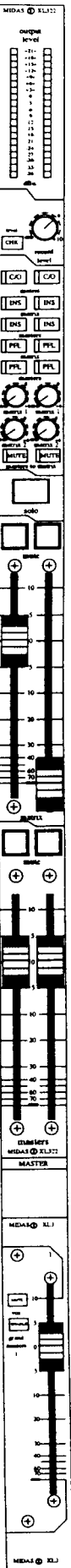
XL-322 Master Module
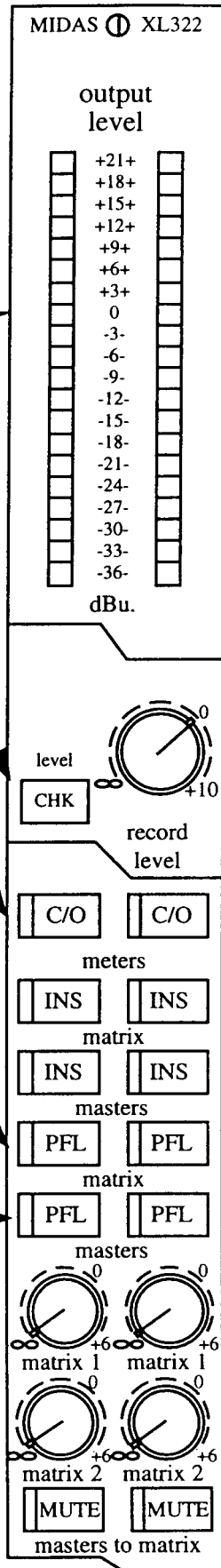
20 Segment Meters These meters track from -36dBu to +21dBu and can perform many functions via the switches on this module.

CHK The Check button allows you to check the Stereo Record Output using the 20 segment meters.

Changeover (C/O) Switches typically the meters display the *master stereo outputs.* When the button is depressed the meters display *the master matrix outputs.*

PFL These switches will send the matrix (as a mono L&R) to the headphone amplifier.

PFL/Solo These switches perform two functions in conjunction with the solo monitoring switch farther down the module. When assigned, the headphone and local solo busses will default to the stereo mix. When unassigned, the headphone and local PFL/Solo busses will default to silence.

MIDAS ① XL322

output level

+21+
+18+
+15+
+12+
+9+
+6+
+3+
0
-3-
-6-
-9-
-12-
-15-
-18-
-21-
-24-
-27-
-30-
-33-
-36-
dBu.

level
CHK
record level

C/O   C/O
meters
INS   INS
matrix
INS   INS
masters
PFL   PFL
matrix
PFL   PFL
masters

matrix 1   matrix 1
matrix 2   matrix 2
MUTE   MUTE
masters to matrix

Record Level This fader follows the stereo buss, and allows one to easily record the output of the console. There are separate XLR's on the rear panel where this signal can be accessed

INS These switches allow the insert return to receive signal. The top ones introduces the insert into the matrix, and the bottom ones are for the stereo buss.

Master to Matrix This section of the master section is new in the XL-322 module. It allows one to route either master buss to either matrix. The level is controlled by the rotary fader, and can be muted entirely by pressing the **Mute** button below the rotary faders.

Solo This is a latching switch with a protective cover. When it is depressed it routes whatever signal is soloed/cued to the stereo buss. *This will override the master mix!* It truly solos an instrument when active. When it is not depressed soloed modules are routed to the headphone amplifier.

Matrix Mutes These mute buttons allow one to easily mute the output of the matrix XLR's. The meters are still able to show the matrix output level though.

Matrix Output Faders These faders control the overall output level for each of the matrixes. The output is available as XLR's on the rear panel.

solo

mute

matrix

Stereo Buss Mutes These mutes affect either the Left or Right channel of the stereo buss. These mutes are post meter and fader.

mute

10

5

0

5

10

20

30

40

60

70

∞
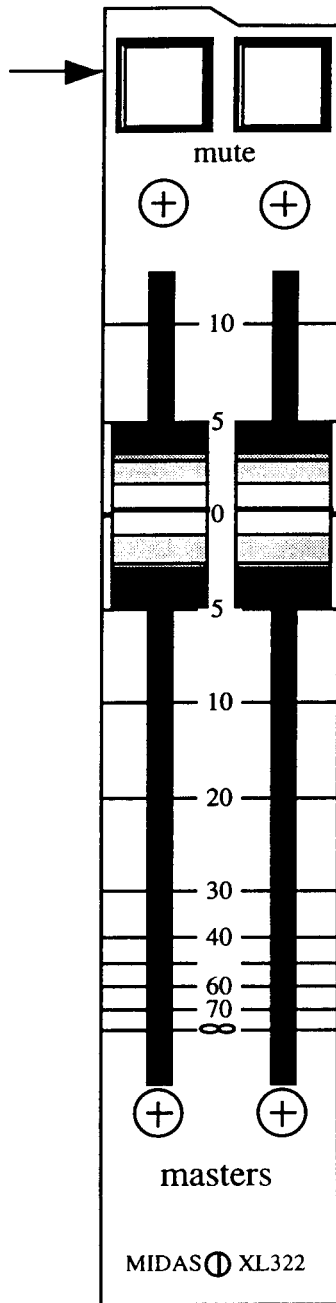
Stereo Buss Output Faders These faders provide overall control of the master output level. The output is available at two XLR's on the rear panel.

masters

MIDAS ⊕ XL322

☞ **Grand Master VCA Operation**
Two separate VCA control systems are operating in the XL-3, the first system controls input channels. The second system, Grand Masters, controls the actual mix group outputs. The two VCA grand masters can be used to control any combination of mix outputs when for example, multiple stereo outputs are created in the mix outputs to drive balcony fills, delay systems, etc.

Grand Master VCA Mute This button will mute the output of that VCA group.

Grand Master VCA Enable This button must be pressed to make the Grand Master active and control the VCA's in that group.
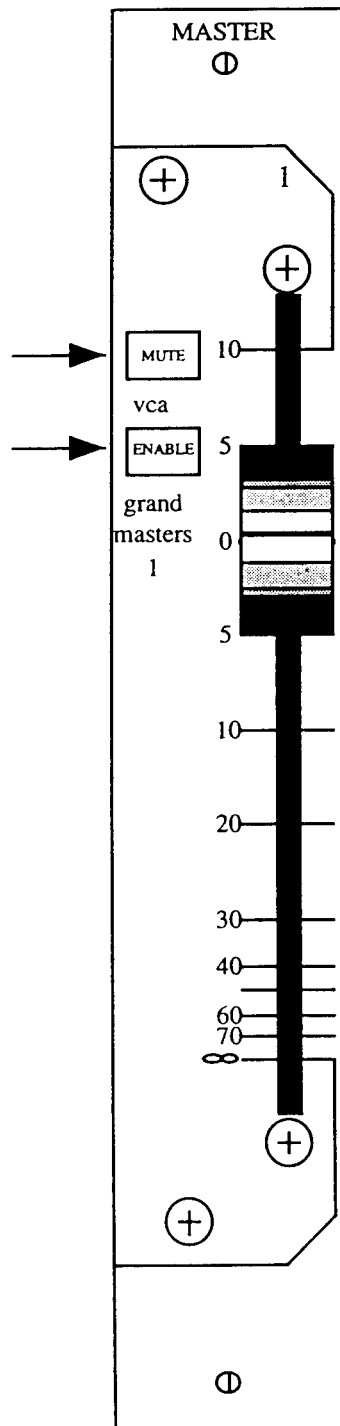
Grand Master VCA Fader This fader is used to control the overall level of the VCA group. In order to make it active, the Enable button must be pressed.

MASTER

MUTE   10
vca
ENABLE   5
grand
masters   0
1
5

10
20

30
40
60
70
∞

MIDAS XL-332
COMMUNICATIONS
MODULE
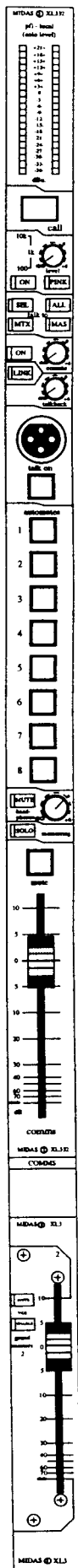
XL-332 Communications Module

Output Metering Two 20 segment output meters track level from -36 to +21 dBu. The meters perform a dual function and in the default mode the left meter will track any PFL level selected while the right meter tracks local output level. In the meter change over mode (see below) both meters will track stereo solo level output.

ON This button engages the onboard oscillator. The tone will appear via rotary level control prefader and premeter on the matrix and stereo outputs. It will also be present at 0dB prefader and post meter at the mix group functions. The tone is also available at the "Talk External" XLR on the rear panel and can be routed to console functions via the SEL, ALL, MTX, and MAS switches.

"Talk to" These buttons allow you to assign the talkback, oscillator, or pink noise to various outputs of the console. One can assign it to all outputs, stereo masters, matrices, or the selected group buss. The mix group is assigned by having their TALK switch assigned.

MIDAS ⓪ XL332

pfl - local
(solo level)

+21+
+18+
+15+
+12+
+9+
+6+
+3+
0
-3-
-6-
-9-
-12-
-15-
-18-
-21-
-24-
-27-
-30-
-33-
-36-
dBu.

call

10k
1k
100
level
0
+6

ON   PINK

SEL   ALL

talk to

MTX   MAS

Call Light & Switch A white call light will illuminate to attract attention when a call signal is being sent on the headset communication system. One also uses this button to call other stations of the communication system.

Pink This button causes pink noise to be generated by the console. Pink noise will appear at 0dB prefader and premeter on the matrix and stereo outputs. It will also be present at 0dB prefader and post meter at the mix group functions. Pink noise is also available at the "Talk External" XLR on the rear panel.

XL-332 Communications Module

Mute This button cuts the signal to the headphone jack.

Solo Listen This button reconfigures all console prefader listen (PFL) functions into stereo post fader listen mode.

Mute This button cuts the local output.
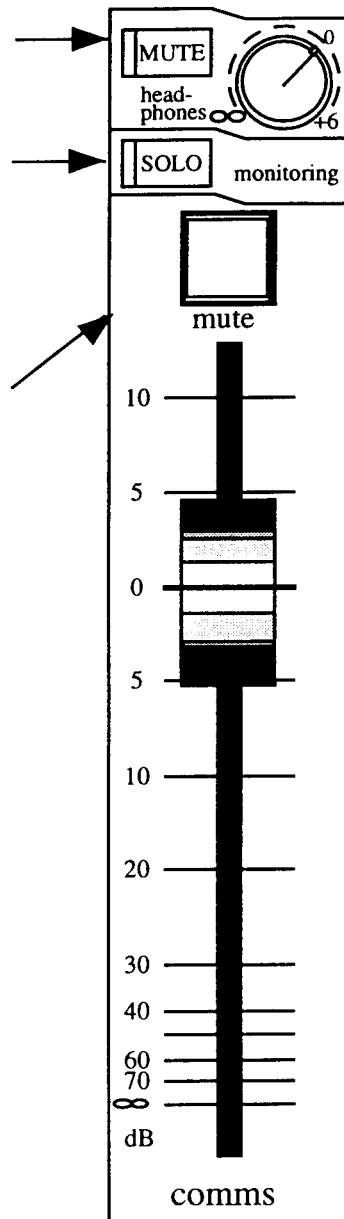
Headphones This rotary fader controls the program level in the headphones. This is useful for cueing a source up and making sure that it is working properly.

Local This fader controls the output level of the local XLR outputs on the rear panel. Anything that has been routed to the solo buss is also routed to the local outputs.
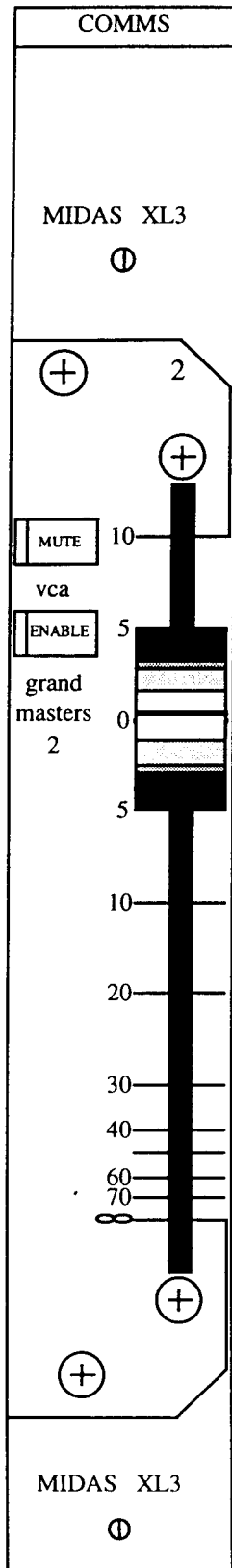
MUTE
head-
phones

SOLO   monitoring

mute

10

5

0

5

10

20

30

40

60
70
∞

dB

comms

COMMS

MIDAS XL3

2

MUTE   10

vca

ENABLE   5

grand
masters   0

2

5

10

20

30

40

60
70
∞

MIDAS XL3

☞ **Grand Master VCA Operation**
Two separate VCA control systems
are operating in the XL-3, the first
system controls input channels. The
second system, Grand Masters,
controls the actual mix group
outputs. The two VCA grand
masters can be used to control any
combination of mix outputs when
for example, multiple stereo outputs
are created in the mix outputs to
drive balcony fills, delay systems,
etc.

Grand Master VCA Fader This
fader is used to control the overall
level of the VCA group. In order to
make it active, the Enable button
must be pressed.

XL-332 Communications Module

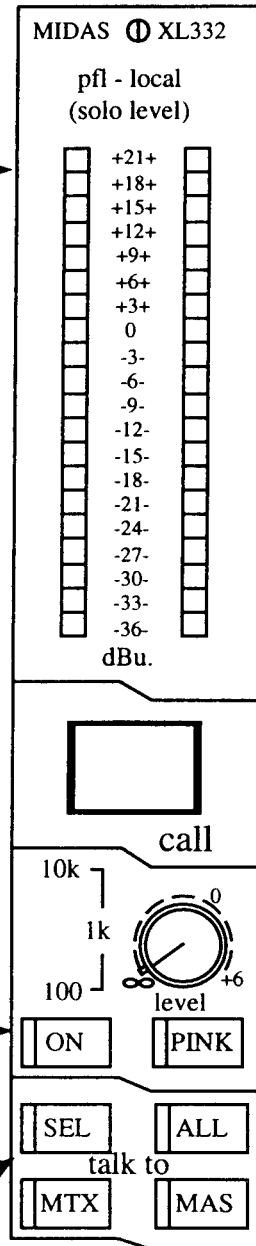This panel is located in the armrest.
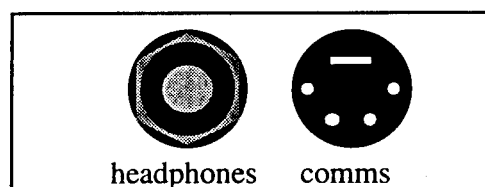
Headphone This 1/4" jack is where you would plug in headphones to be able to listen to selected, soloed, items. Keep in mind that this is a mono output

Communication This XLR4 jack is where one is able to plug in a headset for communication systems.

MIDAS XL-3 ADDITIONAL DRAWINGS

Technical Specifications

SYSTEM TOTAL HARMONIC DISTORTION

Microphone @ -60dB Input, 60dB Output .... <0.03%

Line @ -30dB Input, 0dB Output .... <0.03%

CROSSTALK

Channel to Channel @ 1KHz .... >100dB

Group to Group @ 1KHz .... >90dB

Channel muting @ 1KHz .... >100dB

Maximum fader attentuation @ 1KHz .... >70dB

NOISE

(measured 22Hz - 22KHz bandwidth unweighted)

Mic. Input @ max gain ref. 150 Ohms .... -128.5dB

Line Input @ 10dB gain ref 50 Ohms .... -100dB

SYSTEM NOISE

All faders at minimum postion .... <-98dB

1 input and 1 master fader @ 0dB .... <-92dB

12 inputs and 1 master fader @ 0dB .... <-88dB

24 inputs and 1 master fader @ 0dB .... <-84dB

FREQUENCY RESPONSE

Mic or Line input to any output (20Hz-20KHz) .... +0,-1dB

Technical Specifications

INPUT AND OUTPUT LEVELS

Microphone (variable) (nominal) .... -60 to -15dB

       maximum Pad off .... +5dB

       maximum Pad on .... +25dB

Line (variable) .... -10 to +21dB

All Outputs (nominal) 0dBu

All Outputs (maximum) .... +21dBu

Headphones (nominal) .... +10dBu

Headphones (maximum) .... +21dBu

INPUT AND OUTPUT IMPEDANCES

Microphone .... >3 Kohms

Line Inputs .... >10 Kohms

Insert Sends .... >60 Ohms

Insert Returns .... >10 Kohms

All Outputs .... >60 Ohms

Headphones (minimum) .... 4 Ohms

EQUALISER

Treble (shelving variable 2-20KHz) .... +/-15dB

High Mid (peaking variable 400Hz-8KHz)

    (bandwidth variable 0.1 - 2 octaves) .... +/-15dB

LowMid (peaking variable 100Hz-2KHz)

    (bandwidth variable 0.1 - 2 octaves) .... +/-15dB

Bass (shelving variable 20-200Hz) .... +/-15dB

Lo-Cut (variable 20Hz-400Hz) 12dB/octave

Prepared by Bob Doyle; Friday, May 8, 1992

SIZE & WEIGHT SPECIFICATIONS

1032 mm
40.6 inches

1860 mm
73.2 inches

130 mm
12.2 inches

260 mm
10.2 inches

130 mm
5.1 inches

1032 mm
40.6 inches
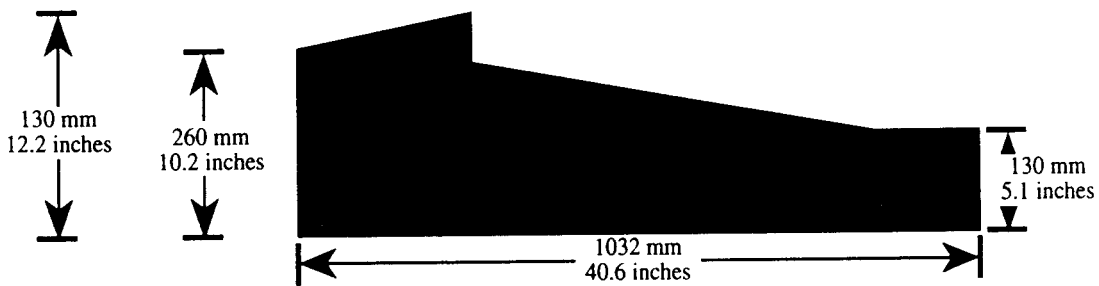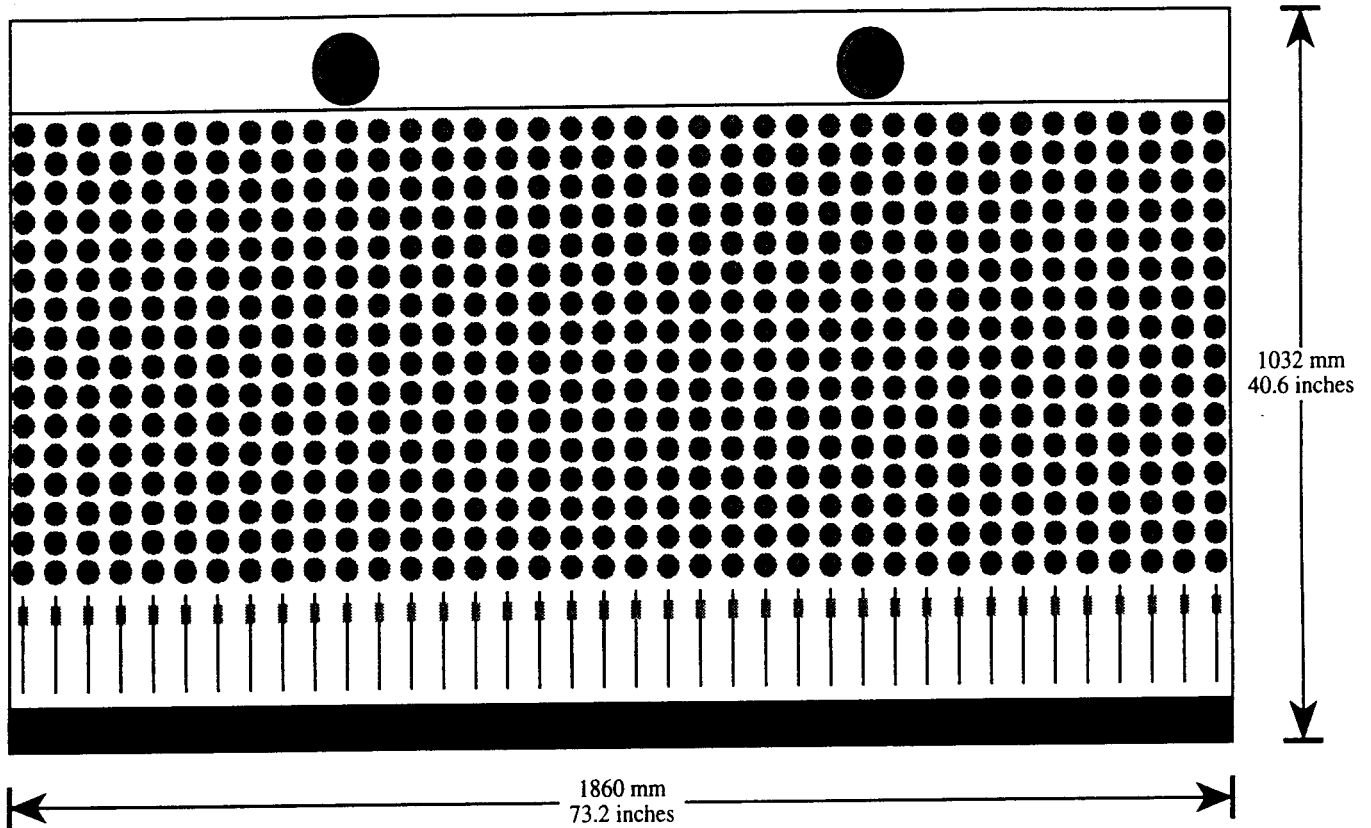
Weight (in case): 350kg/771.75 lbs.