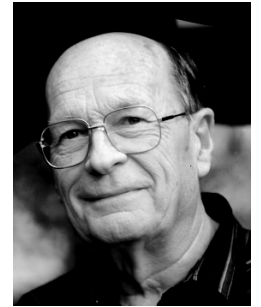


"The 'digital age' imposes completely new considerations for high performance analogue audio design and brings both advantages and disadvantages with it. These considerations cause us to completely re-think how to get the very best out of each new design, such as the specifically designed transformers I have incorporated into *Pure Path*TM technology.



"The *Pure Path*TM "Dual Mic Amp Compressor/Limiter" - or DMCL - is the result of these careful considerations and designed to meet the changing needs of engineers and producers for a powerful yet compact outboard unit combining the features they might wish for in their console of choice.

The DMCL comprises of two identical, closely matched Microphone and Line amplifiers followed by a high resolution Compressor-Limiter with pre/post High and Low Pass Filters.

The Microphone Amplifier makes use of "TLA" techniques which provide many of the advantages of a transformer without the penalty of weight and cost. In common with my previous designs for the 9098i Console and SYSTEM 9098 outboard equipment, it features very low noise even at mid gain settings and can accept a full + 26 dBu input signal at unity gain.

Because of the increasing use of outboard equipment in the Control Room, I have added a balanced "INSTRUMENT" input to each of the Microphone Amplifiers. These are accessible by a 1/4 stereo jack on the front panel and have a very high input impedance, 2.2 Megohms.

"The Compressor is an all analogue design which musically emulates the best of my past designs and includes a control of the "knee" shape ranging from "HARD" to a very gentle transition which I have called "tMM" (and Much More!) the description a friend gave it!"

A handwritten signature in cursive script, appearing to read "Rupert".



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PART No: MANDMCL Issue 2



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Contents

Channel Crosstalk

Unity gain path, level +20dBu.

Unused inputs terminated with 150 ohm

A-B	-120dBu @ 1kHz
	-100dBu @ 15kHz
B-A	-120dBu @ 1kHz
	-100dBu @ 15kHz

Main Output

Maximum Output Level

Unity gain +26dBu

Output Impedance

@ 1kHz <100 ohms

Harmonic Distortion

Input/Output level at +20dBu

THD measured @ 1kHz

10k ohms load 0.0007%

600 ohms load 0.0007%

Output Balance

Unity gain @ 1kHz -40dBu

Power Consumption

Analogue only version 20W max.

With digital option fitted 30W max.

Digital Output Specifications

All digital measurements are made with a sine wave signal of 997Hz @ 48kHz internal sampling frequency, unless otherwise stated.

0dB F.S.D. = +26dBu

Frequency Response

Unity gain, sampling frequency - frequency - 48kHz 10Hz to 23kHz (-3dB)

Unity gain, sampling frequency - 96kHz 10Hz to 45kHz (-3dB)

Sampling Frequency Range

Internal Sync - 44.1kHz, 48kHz, 88.2kHz, 96kHz

External Sync - 30kHz to 96kHz

Word Length

24Bit

Dynamic Range

112dB

Harmonic Distortion

Input level at +20dBu (-6dB F.S.D.)

THD measured @ 997Hz <0.001%

Channel Status

The unit applies the following channel status settings:

Professional Format,

Linear PCM,

No Emphasis,

Two Channel Mode,

Byte 0 (bits 6&7) and Byte 4 (bits 3-6) are programmed according to the relevant sampling frequency.

Note: The channel status settings in the AES data stream ALWAYS follow the switch setting of the unit, even if the unit is "synced" to an external source.

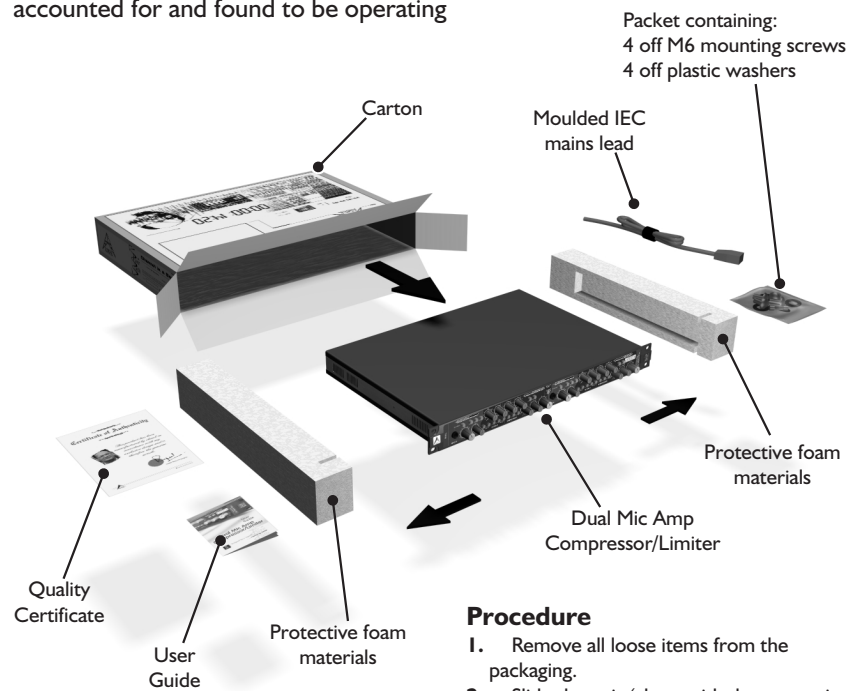
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Unpacking

Check List

The following items are included with the product. Please retain all packaging materials until all expected items are accounted for and found to be operating



Procedure

1. Remove all loose items from the packaging.
2. Slide the unit (along with the protective foam parts) out of the box.
3. Slide the protective foam parts away from the unit.

Specifications

Filters

High Pass Filter

Frequency Range (-3dB points)

Unity gain 20Hz to 300Hz

Slope

18 or 24dB per octave

Noise DIN

Measured at the output, unity gain -99dBu

Harmonic Distortion

Input/Output level at +20dBu
THD measured @ 1kHz Typically 0.0007%

Low Pass Filter

Frequency Range (-3dB points)

Unity gain 2.5kHz to 28 kHz

Slope

12 or 18dB per octave

Noise DIN

Measured at the output, unity gain -98dBu

Harmonic Distortion

Input/Output level at +20dBu
THD measured @ 1kHz Typically 0.0007%

Compressor

Gain range -10dB to +24dB

Threshold range -40dB to +22dB

Ratio range 1:1 to 40:1

Attack range 0.3ms to 300ms

Release range 0.1Sec to 10Sec

Frequency Response

Unity gain 10Hz to 200kHz (-3dBu)

Noise DIN

Measured at the output, gain unity.
Threshold @ 0dBu. -92dBu

Compressor Cont.

Distortion

Setting as for Noise above
Input signal +10dBu @ 1kHz 0.02%
Unity gain 0.02%

Compressor Key Insert Send

Frequency Response 10Hz to 200kHz (-3dBu)

Noise DIN

Measured at the output, gain unity. -93dBu

Distortion

Output signal +20dBu @ 1kHz 0.0007%

Output Balance

Unity gain @ 1kHz -40dBu

Maximum Output Level

Unity gain +26dBu

Output Impedance

@ 1kHz <75 ohms

Compressor Key Insert Return

Frequency Response 10Hz to 200kHz (-3dBu)

Noise DIN

Measured at the output, gain unity. -105dBu

Distortion

Output signal +20dBu @ 1kHz 0.0007%

Output Balance

Unity gain @ 1kHz -60dBu

Maximum Output Level

Unity gain +26dBu

Output Impedance

@ 1kHz >10k ohms

Specifications

Mic Input

Frequency Response

Unity gain setting, 150 ohm source 10Hz to 200kHz (-3dBu)

Gain Range

Unity to +66dB, in 6dB steps, and +/-12dB variable trim

Input Impedance

T.L.A. Input Impedance >5,000 ohms

Input Balance

@1kHz -60dBu

Equivalent Input Noise DIN

(Bandwidth 22Hz-22kHz)
 (Measurement with gain at 66dB) -128dBu
 Input terminated with 150 ohms
 (Measured with gain at 36dB) -127dBu
 Input terminated with 150 ohms
 (Measured at unity gain) -100dBu
 Input terminated with 150 ohms

Harmonic Distortion

Unity gain setting
 Input/Output level +20dBu
 THD measured @ 1kHz 0.0007%

Maximum Input Level

T.L.A. @ Unity gain +26dBu

Line Input

Frequency Response

Unity Gain 10Hz to 200kHz (-3dB)

Gain Range

-12dB to +12dB

Input Impedance

Bridging Input Impedance >10,000 ohms

Input Balance

Unity gain @1kHz -60dBu

Overall Noise DIN

Measured at the output -102dBu

Line Input Cont.

Harmonic Distortion

Unity gain setting, input/output level +20dBu
 THD measured @ 1kHz 0.0007%

Maximum Input Level

Balanced and floating transformer
 Input @ unity gain +26dBu

Instrument Input

Frequency Response

Unity gain setting, 150 ohm source 10Hz to 200kHz (-3dB)

Gain Range

Unity to +66dB

Equivalent Input Noise DIN

(Bandwidth 22Hz-22kHz)
 (Measurement with gain at 66dB) -109dBu
 Input terminated with 150 ohms
 (Measured at unity gain) -100dBu
 Input terminated with 150 ohms

Input Balance

@1kHz -60dBu

Harmonic Distortion

Unity gain setting
 Input/Output level +20dBu
 THD measured @ 1kHz 0.0007%

Maximum Input Level

Unity gain +26dBu

Input Impedance

Input Impedance >2M0 ohms

Important Safety Instructions / Instructions de Sécurité Importances

Cautions Warnings and Notes

Please read this manual carefully before connecting this apparatus to the mains for the first time! For your own safety and to avoid invalidation of warranty, all text marked with these Safety Symbols should be read carefully! Please keep this information!



Cautions

Hazards or unsafe practices which could result in severe personal injury or death.

Avis

Dangers ou pratiques dangereuses pouvant résulter en des blessures graves ou causant la mort.



Warnings

Hazards or unsafe practices which could result in minor personal injury or product or property damage.

Avertissements

Dangers ou pratiques dangereuses pouvant résulter en blessures personnelles mineures légères ou en dommages à la propriété.



Notes

Contain important information and useful tips on the operation of your equipment.

Notes

Contiennent l'information de important et les pointes utiles sur l'opération de votre équipement.



Earthing / Terre

This apparatus MUST be earthed. Under no circumstances should the mains earth be disconnected from the mains lead.

Cet appareil DOIT être mis à la terre. La mise à terre ne doit pas être débranchée du terminal principal sous aucune circonstance.

Important Safety Instructions / Instructions de Sécurité Importances



Mains Cable / Cable de Secteur

The supplied IEC mains cable must be terminated correctly to the AC mains supply before use. Use only an approved AC plug or power distribution device. The Green/Yellow core in the mains cable is a safety ground and must be connected at all times!

The three cores are colour coded as follows:

Safety Earth	=	Green/Yellow (Green/Yellow USA)
Live	=	Brown (White USA)
Neutral	=	Blue (Black USA)

Le câble de secteur IEC fourni doit être correctement au câble d'alimentation avant l'utilisation. Utiliser seulement une prise de courant conforme. Le câble vert/jaune à l'intérieur du câble d'alimentation est la sécurité terre et doit être toujours connecté!

Les 3 câbles à l'intérieur du câble d'alimentation sont de couleurs suivantes:

Prise de Terre	=	Vert/Jaune (Vert/Jaune USA)
Phase	=	Marron (Blanc USA)
Neutre	=	Bleu (Noire USA)



Changing the Fuse / Changer le Fusible

To avoid the risk of fire replace only with same value and type of fuse as marked on the unit.

Before changing the fuse, always switch off the unit and remove the AC power cable! Using a flat blade screwdriver, press the fuse cap inwards gently and twist anti-clockwise to release the cap. Fit the new fuse to the cap and replace it in the fuseholder by reversing the procedure.

Afin d'éviter un risque de feu, remplacer seulement avec fusible de la même valeur et type tel qu'indiqué sur l'appareil, 1A (100-230V T). Les fusibles sont de type IEC 20mm protection-surtension (pour fusibles).

Operational Guide

Word Clock Output

The Word Clock output jack is a standard 75 Ohm BNC type connector that outputs word clock for slaving and synchronising other units.

Digital Outputs

The Digital signal is simultaneously applied to the three output connectors, providing the following formats.

Phono - S/PDIF (The Sony Philips Digital Interface Format).

Opto - TOSLINK .

XLR. - AES-3

Note: The channel status settings in the AES data stream ALWAYS follow the switch setting of the unit, even if the unit is "sync'd" to an external source.

Key / Insert Option - (Internal switch)

The Key/Insert internal option switches (S37 CHA, S38 CHB) allows the Compressor Key inserts to be used as Main signal path inserts when selected.

In the Insert mode, the insert point is always pre-compressor.

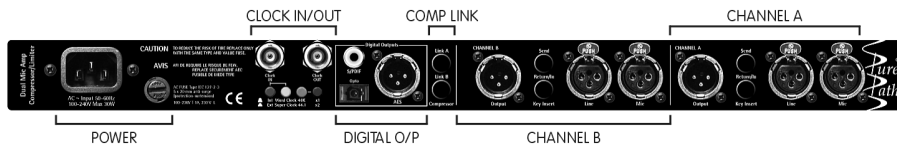
The PRE-FLT switch moves the insert with the compressor pre or post Filters.

The KEY switch acts as the insert in/out switch.

The Insert Send is always active, and can be used as a Direct output pre or post Filters.

Insert Send and Return are electronically balanced and can operate up to +26dBu.

Operational Guide



Digital Output (Option)

Clock In

The Clock in jack is a standard 75 Ohm BNC connector that connects to an external sync source, either Word Clock or Pro Tools® Superclock.

Int / Ext – Wclk / Sclk

Int / Ext switches between internal or external sync modes. When the unit is set to external the Wclk / Sclk switch can be used to switch between Word Clock or Pro Tools® Superclock as the sync source.

Sampling Rates

Internal sampling rates of 44.1kHz, 48kHz, 88.2kHz and 96kHz can be selected by the appropriate switches located on the rear panel.

Digital Output Leds

The 44.1kHz, 48kHz, 88.2kHz and 96kHz Leds indicate which internal sampling rate has been selected.

The Lock Led, when illuminated, indicates a stable lock condition.

The External led, when illuminated, indicates an external sync source has been selected.

Important Safety Instructions / Instructions de Sécurité Importances

Avant de changer le fusible, éteindre l'appareil et enlever la prise d'alimentation! Utiliser un tourne vis à tête plate, appuyer sur le capuchon du fusible doucement vers l'intérieur et tourner dans le sens contraire des aiguilles d'une montre pour dégager le capuchon. Mettre le nouveau fusible dans le capuchon et remettre en place en faisant la procédure inverse.



100V/230V Operation / Fonctionnement

This apparatus does not require any operating voltage adjustment. Cet appareil n'exige pas l'ajustement de tension qui opérant.



Servicing / Services

The servicing instructions in this manual are for use by qualified personnel only. To reduce the risk of electric shock, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.

Les instructions de services contenues dans ce manuel sont pour utilisation seulement par des professionnels. Pour réduire le risque de choc électrique, ne tenez aucune opération de service sauf celles contenues dans le manuel d'opération a moins d'être qualifié pour le faire. Référez toute réparation à un agent de service professionnel.



AVIS: RISQUE DE CHOC ELECTRIQUE
NE PAS OUVRIR



WARNING – For your own safety and to avoid invalidation of the warranty, please read this section carefully.

- Do not place the apparatus on an unstable surface.
- Do not insert objects through any apertures.
- Do not use this apparatus near water.
- Unplug the unit before cleaning. Clean only with a damp cloth.
- Do not block any of the ventilation openings. Install in accordance with the manufacturer's instructions.
- Do not install near any heat sources such as radiators, heat registers, stoves or other apparatus including amplifiers or power supplies that produce heat.
- Do not defeat the safety purpose of the polarised or grounding-type plug. A polarised plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wider blade or the third prong are provided for your safety. When the plug provided does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles and the point where they exit from the apparatus.
- Avoid using mains outlets on the same circuits as air control systems or other equipment that regularly switches on and off.
- Only use attachments /accessories specified by the manufacturer.
- Unplug this apparatus during lightning storms or when unused for long periods of time.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as the power supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, the apparatus does not operate normally or the apparatus has been dropped. Unplug the unit under these circumstances.
- Adjust only those controls that are covered by the operating instructions.
- Use only the mains lead provided with the equipment . Other leads may not have sufficient current rating.
- Do not operate this unit with the cover removed.

Operational Guide

Key

The Key switch enables the compressor insert.

Compressor Link

When enabled, identical gain reduction can take place when two or more units are linked together. The applied gain reduction is derived from whichever path has the greatest signal. If you want identical compression using two or more units the controls on each separate unit have to be set up in a similar manner.

If you wish to use EtMM in a link situation, all the EtMM buttons have to be enabled on the other units involved in the link, otherwise identical gain reduction will be lost.

Compressor A link switch, when activated, allows Compressor A to be linked to Compressor B. This enables it , for example, to be used as a stereo pair, ie: track each other.

Compressor B link switch activates the Channel B link jack socket (located on the rear panel) to allow linking to other units.

Compressor A link jack socket is permanently active, ready to receive a signal from another pure path unit.

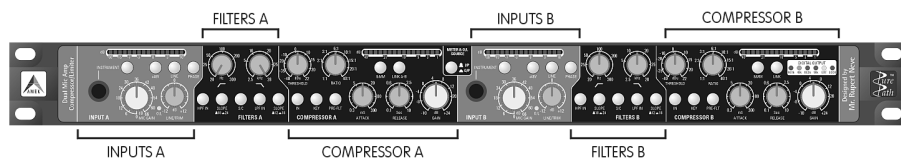
Pre Filter

The Compressors are normally post filter, the PRE FLT switch allows the Compressors to be pre filters.

Gain Reduction Meter

If the signal exceeds the compression threshold, the amount of gain reduction is displayed.

Operational Guide



Compressor

Threshold

Adjusts the level setting at which gain reduction begins to occur. The range is -40dB to +22dB.

Attack

Changes the time over which compression begins to occur. The range is 0.3 to 300mS.

Release

Determines the time taken for the gain reduction to stop being applied. The range is 0.1 to 10 Seconds.

Ratio

Changes the severity of the gain reduction once the signal exceeds the threshold setting. The range is 1:1 (no compression) to 40:1 (limiting).

EMM (and Much More!)

Selects a different shape to the compression curve which musically emulates the best of my past designs.

Output Gain

Using compression causes the output signal level to be reduced. This drop in the output level is therefore compensated for using the output gain control. The gain range is -10dB to +24dB.

In

Switches the Compressor into the signal path.

Installation

Location

This product is designed and screened to minimise internal electromagnetic emissions and provide immunity to external electromagnetic fields.

To reduce the risk of performance degradation due to external interference, do not site this unit close to sources of strong magnetic fields such as power supplies, power amplifiers, loudspeakers etc.

Rack Mounting

This product is designed to be rack mounted using the screws and washers supplied to help preserve the finish of the fascia panel.

The fascia graphic layer is under-surface printed to provide a robust hard wearing surface designed to last the life of the product in virtually any operating environment.

It is recommended that additional rear or side supports are used in conjunction with the fascia panel fixings, particularly when the unit is mounted in a flight-case or vehicle where vibration and transit shocks can be expected.

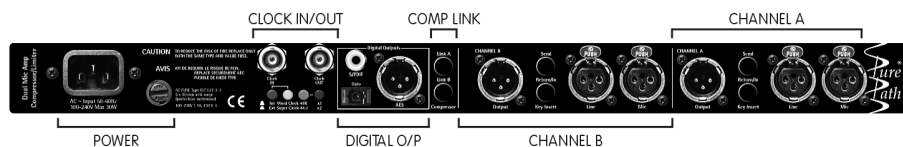
Powering up and Clicks

Clicks may be heard from in/out switches when the product is powered up, these will dissipate after approximately 10 minutes. This is perfectly normal.

Cleaning

Unplug the unit before cleaning. The product should be cleaned with a soft brush around the controls. If the fascia becomes dirty, use a damp cloth with a little household soap to remove the dirt. DO NOT use solvent cleaners under any circumstances or the fascia may be permanently damaged and warranty invalidated!

Connections



Audio Connections

Inputs

The Mic input is electronically balanced via a standard 3 pin female XLR connector and employs Rupert Neve's TLA (transformer like amplifier). The Line input uses a transformer balanced arrangement via a female XLR. The Instrument input is electronically balanced via a standard 1/4 inch Jack Socket located on the front panel.

Outputs

The outputs are transformer balanced via standard 3 pin XLR male connectors.

Inserts

The Send is electronically balanced via a 1/4 jack. This is half normalled to the compressor return. The return is electronically balanced via a 1/4 inch jack. The inserts also allow you to input an external device into the compressor side chain.

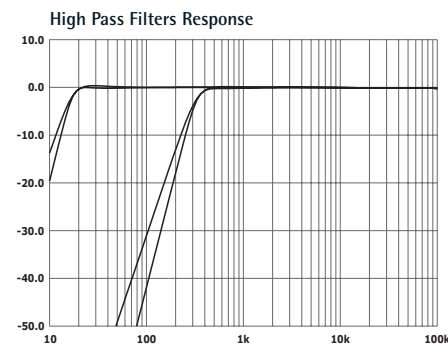
Wiring Conventions

The audio connectors are wired as follows:
 XLR: Pin 1 = Screen; Pin 2 = Hot (+); Pin 3 = Cold (-)
 1/4 Jack: Sleeve = Screen; Tip = Hot (+); Ring = Cold (-)

Operational Guide

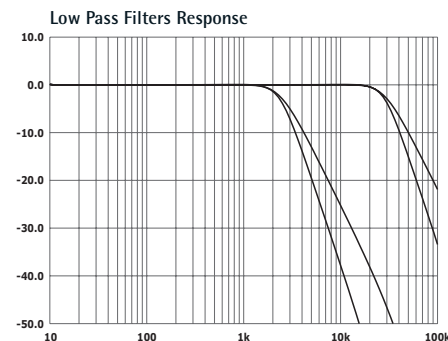
High Pass

The High Pass filter operates over a frequency range of 20Hz to 300Hz with a switchable slope of 18dB or 24dB/Octave allowing the removal of unwanted low frequency noise components such as rumble and hum.

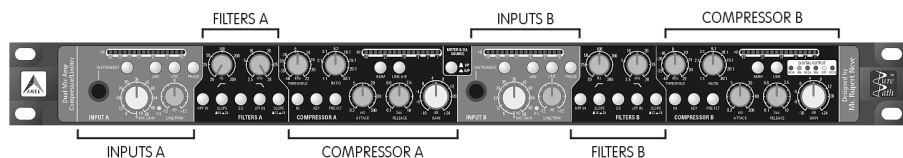


Low Pass

The Low Pass filter operates over a frequency range of 2.5kHz to 28kHz with a switchable slope of 12dB or 18dB/Octave. The extended range allows the filter to remove unwanted harmonic distortion in the conventional audio band caused by audio components in the inaudible upper frequency bands.



Operational Guide



Filters

Two attenuation slopes are provided for the High Pass variable frequency filter, giving a choice of 18 or 24 dB/Octave.

Similarly two attenuation slopes are provided for the variable frequency Low Pass filter, with a choice of 12 or 18 dB/Octave.

A steep filter at the low frequencies can be extremely useful to remove building rumble or excessive low frequency ambience without affecting the musical spectrum.

At the high frequencies the 18 dB/Octave slope can effectively remove interference or help shape the signal for digital recording, but the 12 dB/Octave slope is more useful as a shaping tool to adjust musical harmonic content.

Filters In

Each filter can be switched in and out independently or together and are only active when their relevant switches are operated. These switches operate irrespective of the audio path they are resident in: Main Signal or Side-Chain.

Side-chain Switch

Switches the High Pass and Low Pass filters into the side-chain path.

Operational Guide

Compressor Link

The Compressor sections of two or more units may be linked via the Link A and Link B connections. When connected, identical gain reduction can take place across the connected units. The applied gain reduction is derived from whichever path has the greatest signal.

The units are linked together using a mono or stereo 1/4 inch jack lead via the connector on the rear panel. For more than two units, create a daisy-chain lead with all the tip contacts wired together and with all the sleeve contacts wired together (the ring contact is not used).

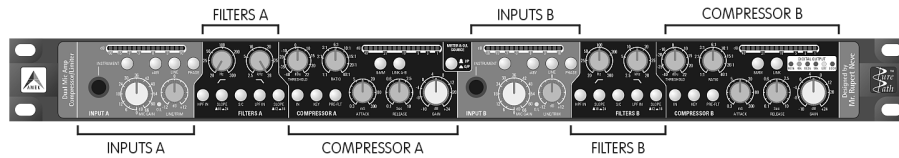
See also section entitled "Compressor Link" for operation of this facility.

Signal Paths

There are two audio signal paths within DMCL, Chan A and Chan B. The side-chains are sourced from the relevant selected inputs.

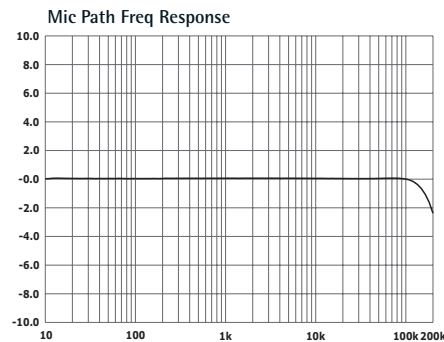
Selecting "Side-Chain" allows filter settings to be inserted into the Compressor side-chain allowing gain reduction to be frequency dependent. LF cut can be applied to the side-chain to prevent a bass line "pumping" the overall signal level.

Operational Guide



Mic Input

The microphone input circuit is a T.L.A. (Transformer-Like-Amplifier). It behaves like a transformer in that if a signal is applied to one input leg only, no (or very little) output is the result. A common mode input coil rejects common mode signals and acts as a Low Pass Filter for differential inputs.



A high quality rotary switch provides a gain range from 0dB (unity) to +66dB in 6dB steps. Mic gain trim is continuously variable ± 12 dB. The mic input impedance is 5k Ω ohms thus producing extremely low loss from a 150 or 200 ohm microphone.

At unity gain, the "microphone" amplifier can handle a balanced input signal of more than + 26dBu without an attenuator pad (this is a unique feature amongst "microphone" amplifiers), it could therefore double as an additional high performance Line Input.

Operational Guide

Level Meter

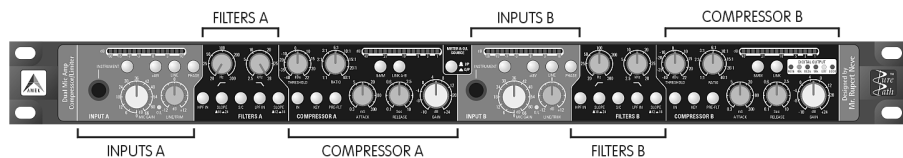
Each path is equipped with its own level meter, which can display the input or output levels as selected by the Meter & O/L Source switch.

The meter is calibrated to read 0 for levels of +4dB.

O/L LEDs

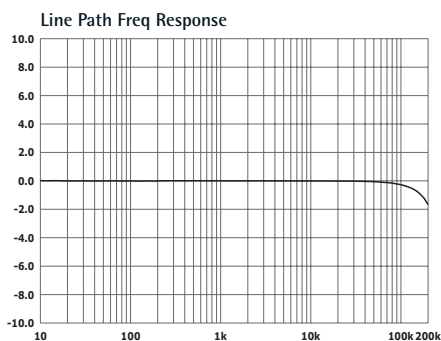
There are two overload LEDs monitoring signal levels on the DMCL. All LEDs are set to illuminate 4dB before clipping. The O/L LEDs are sourced from either post the input amplifiers or pre the output driver.

Operational Guide



Line Input

The Line input is a 10kΩ ohm (bridging) balanced and floating transformer design which provides uncompromising isolation and protection against ground currents and any unwanted signals.



Unlike traditional transformers the frequency response and distortion are independent of the source impedance of the preceding equipment.

Full low frequency performance is maintained even with input levels higher than +20dBu. Gain is provided on a variable control covering a ± 12 dB range.

The Line Input features a new high performance transformer with exceptional low frequency performance... as with any genuine transformer input, this Line Input may be used with either balanced or unbalanced sources without having to allow for change of gain due to grounding one leg of a so-called 'electronically balanced' circuit.

Operational Guide

Instrument Input

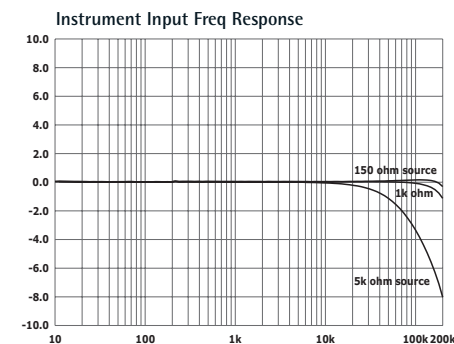
The Instrument input is a secondary input to the Mic amp. It utilises a high impedance input amplifier, 2.2 Megohms. The Mic rotary gain and Mic trim provide gain control over the Instrument input. The gain range remains the same as the Mic input.

To activate the Instrument input, the Mic input and the Instrument buttons have to be selected.

Note: The LINE button overrides the Mic or Instrument inputs

The Instrument input is protected from the 48V and can be used balanced or unbalanced.

Keep the instrument lead short to avoid high frequency loss especially with high impedance guitar pickups.

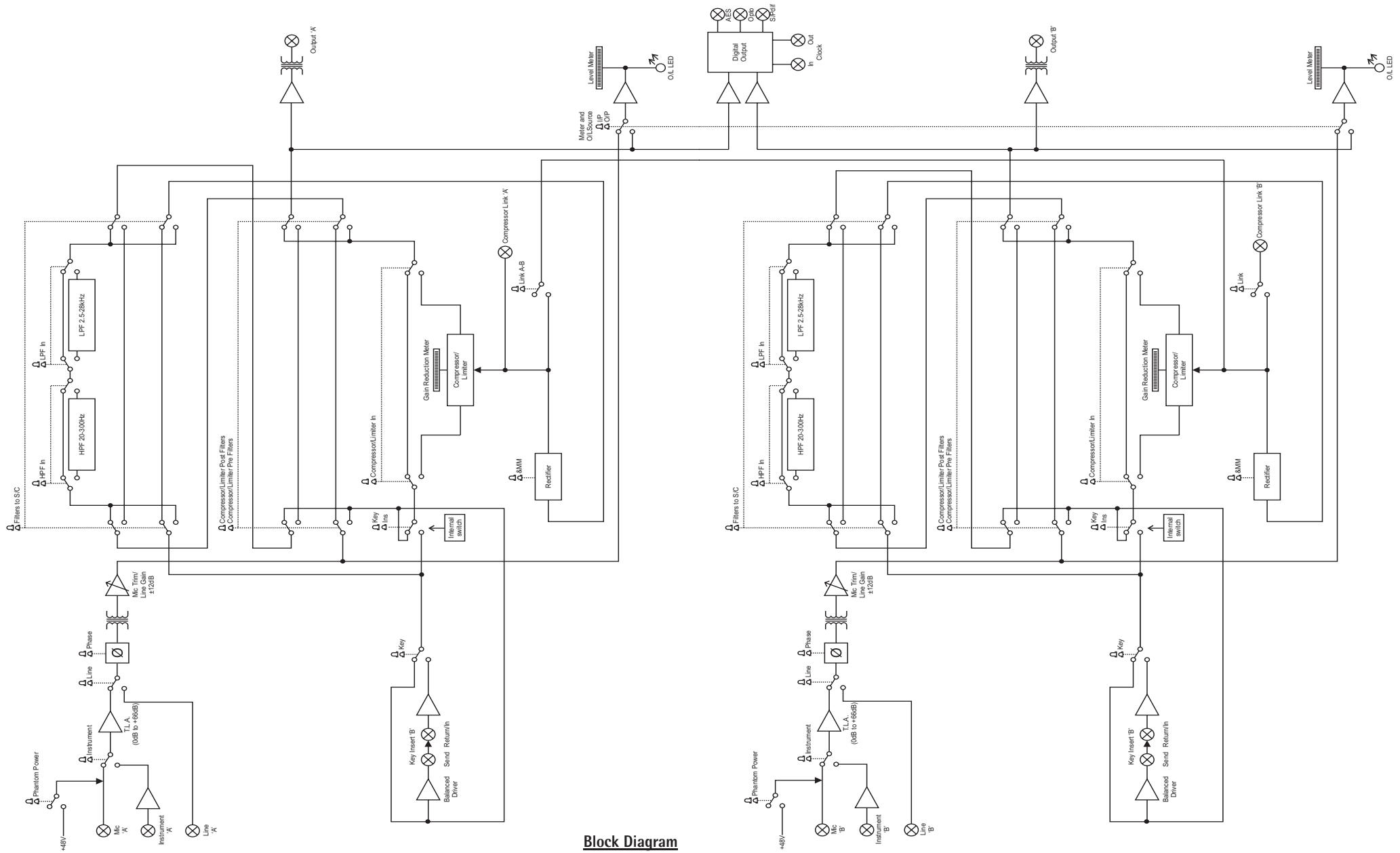


Phantom Power

The 48V switch applies 48V phantom power to the Mic input XLR. Note: Under no circumstances press the 48V switch if an unbalanced source is connected to the XLR.

Phase Switch

The \emptyset (phase) switch allows phase inversion of the selected input. The switch should normally be released.



Block Diagram