



MULTI PROCESSOR

OPERATION MANUAL



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The MPX10 is a single channel processor designed for one step processing of vocal or solo instruments where the highest quality signal path is required. The MPX10 combines a Mic/Line preamplifier with DI input, Noise Reduction, 4 mode Auto Compressor and Equaliser in a compact 1U case.

The MPX10 is an ideal front end for direct to tape or hard disk recorders and as a superior analogue input stage for digital work stations. The MPX10 is equally at home in sound reinforcement applications where it can provide feedback suppression, vocal levelling and comprehensive tone shaping.

Features include -

- Balanced Line and Microphone inputs (with +48V phantom power)
- High impedance (0.5M) DI input
- High and low pass filtering
- Downward expander Noise Reduction
- Auto Compressor with variable Threshold, Ratio and Gain
- In-built De-ess function
- HF and LF shelving EQ
- 2 parametric mid range sections with Gain, Frequency and Q controls
- Output level adjust
- Gain Reduction and Output metering
- Ground compensated outputs at +4dBu and -10dBV
- Input and output break jacks for the Input, Compressor, EQ and output sections

This last feature allows the user to re-configure the MPX10's signal path such as putting the EQ before the Compressor. It also means that the MPX10 can be used as 4 separate signal processors -

- High quality, low noise Mic, Line, DI preamplifier
- Downward expander and auto Attack/Release compressor
- 4 band Equaliser
- Variable gain line driver with level metering

IMPORTANT: PLEASE READ THIS SECTION BEFORE USING THE MPX10

2.1 INSPECTION AND UNPACKING

The MPX10 has been carefully packed at our factory in a carton designed to withstand handling in transit. Should the unit appear to have been damaged in transit notify your dealer immediately and do not discard any of the packing. The carton should contain -

- The MPX10 unit
- Power cord
- Operator Manual (this book)

2.2 OPERATING ENVIRONMENT

The MPX10 is designed to operate between 0 and 50°C (32-122°F) with relative humidity no more than 80%. Should the unit be installed in an equipment rack, ensure that the ambient temperature conforms to these levels.

2.3 CE STANDARDS AND THE LOW VOLTAGE DIRECTIVE (LVD)

The MPX10 has been designed to meet the latest Electromagnetic Compatibility (EMC) regulations. However we recommend you do not operate the unit close to strong emitters of electromagnetic radiation such as power transformers, motors, mobile telephones or radio transmitters.

The unit should only be connected to a power supply of the type described in 2.4 POWER REQUIREMENTS or as marked on the unit. The unit must be earthed for safe operation. Disconnect the mains supply before removing any cover.

2.4 POWER REQUIREMENTS

There is a mains fuse located inside the unit which is accessed by removing the cover. This fuse is for protection against unit faults and as such will not normally need replacing. If you think you have a power related problem please refer to your dealer.

The voltage and fuse rating have been factory set for -

230V	50mA	UK and Europe
220V	100mA	Republic of Korea

110V

100mA

North America

- **The correct voltage and fuse rating is indicated on the rear panel.**
- **Please check that your unit is correctly rated for the voltage of the country of operation.**

If the fuse requires changing at any time please ensure the correct fuse is fitted. An incorrect fuse could cause damage to the unit and may constitute a fire hazard.

If you carry your MPX10 from one country to another it is very important to ensure the voltage is compatible.

For your information the unit can be internally rewired for use in 230V, or 110-125V countries - contact your dealer for information. A special 100V version is available for Japan and a 220V version for Republic of Korea.

The mains lead connections to the appliance are coloured in accordance with the following code:

Green-and-Yellow	Earth
Blue	Neutral
Brown	Live

- **WARNING: THIS APPLIANCE MUST BE EARTHED**

2.5 SIGNAL LEVELS

For input level ranges see GAIN control in the Description of Controls section.

The MPX10 outputs both -10dBV and +4dBu operating levels without the need for level switching.



IMPORTANT NOTE: the XLRs are set for +4dBu and the TRS jacks for -10dBV operating levels. Use the appropriate connector/level to interface between your equipment and the MPX10.

The OUTPUT control on the MPX10 allows -20dB to +20dB of level adjustment which should allow the MPX10 to interface to most equipment types.

Signals in excess of +20dB will cause the unit to distort.

2.6 EXTERNAL CONNECTIONS

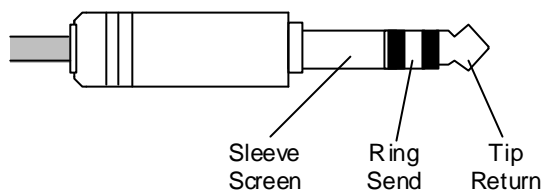
COMPRESSOR SECTION

INPUT jack Tip Hot (signal +)
 Sleeve Screen (signal ground)

This is the input to the Compressor section and is normally connected to the 'output' of the Mic/Line/DI preamplifier. Plugging a jack into this connector breaks the signal path and the Tip of the inserted jack becomes the input to the compressor (Half-Normalled). All the 'Input' and 'Output' connectors between each of the processing sections on the MPX10 work in this way.

'Input' is unbalanced, however the connector is wired in such a way as to be compatible with un-balanced (mono) and balanced (stereo/TRS) jacks.

SIDCHAIN jack Tip Return
 Ring Send
 Sleeve Screen (signal ground)



Plugging into the MPX10's side chain automatically breaks the signal path to the side chain circuitry. This path must be completed by the external connected equipment.

The side chain in-out signal path affects both the Compressor and the Expander response.

Commonly used to insert an equaliser into the sidechain to produce frequency conscious compression such as de-essing.

Because each section of the MPX10 has Input and Output break jacks it is possible to plug the EQ of the MPX10 into the Compressor sidechain to allow more advanced Frequency Conscious Compression.

LINK jack Tip Control voltage
 Sleeve Screen (Control voltage ground)

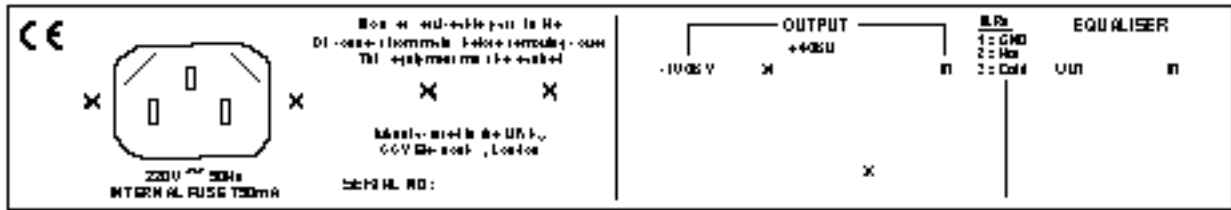
Link provides a means of joining the sidechain detectors of two MPX10s for stereo operation. To ensure accurate stereo tracking the NR and Compressor controls on both MPX10s should be set the same. Linking and setting-up MPX10s in this way also ensures that signals from either MPX10 cause compression.

Please note that the Link output is a DC control voltage and should not be connected into any audio signal path.

OUTPUT jack

Tip Hot (signal +)
Sleeve Screen (signal ground)

An unbalanced output from the Compressor section.



EQUALISER SECTION

INPUT jack Tip Hot (signal +)
 Sleeve Screen (signal ground)

Unbalanced input to the EQ section. Half-Normalled to the output of the Compressor section

OUTPUT jack Tip Hot (signal +)
 Sleeve Screen (signal ground)

Unbalanced output from the EQ section.

OUTPUT SECTION

INPUT jack Tip Hot (signal +)
 Sleeve Screen (signal ground)

Unbalanced input to the Output section. Half-Normalled to the output of the EQ section.

+4dBu XLR Pin 1 Screen (Signal ground)
 Pin 2 Hot (+ve)
 Pin 3 Cold (-ve)

For un-balanced operation join Pins 1 and 3 on your connecting cable.

-10dBV TRS Tip Hot (signal +)
 Ring Cold (signal -)
 Sleeve Screen (signal ground)

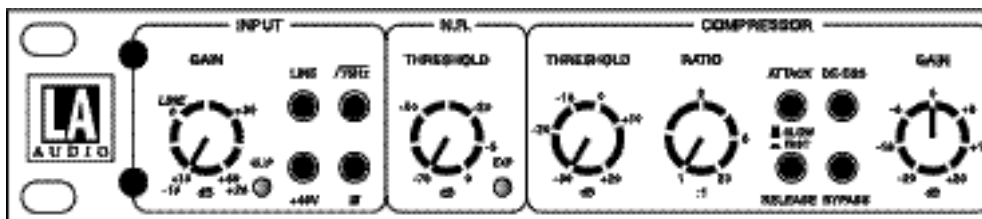
For un-balanced operation join Ring and Sleeve on your connecting cable.

Your LA Audio MPX10 has been manufactured to a high standard using quality components. If correctly installed and operated the unit should give years of problem free operation.

However in the event of a defect in material or workmanship causing failure of the unit within five years of the date of original purchase we will agree to repair, or at our discretion replace, any defective item without charge for labour or parts. To receive service under this warranty it is necessary to return the unit to an LA Audio authorised service centre or to the factory with a dated receipt as proof of purchase. After repair the unit will be returned to you free of charge.

Limitations:

This warranty does not cover damage resulting from accident or misuse. The warranty is void unless repairs are carried out by an authorised service centre. The warranty is void if the unit has been modified other than at the manufacturers instruction. The warranty does not cover components which have a limited life, and which are expected to be periodically replaced for optimal performance. We do not warrant that the unit shall operate in any way other than as described in this manual.



4.1 INPUT SECTION

GAIN control

This control adjusts the sensitivity of the MPX10's input amplifier. GAIN has different ranges depending on which input is selected -

- MIC +10dB CCW (counter clockwise)
 +60dB CW (clockwise)

- LINE -10dB CCW
 +20dB CW

- DI 0dB CCW
 +30dB CW

The LINE 0 mark on the GAIN control gives a unity gain setting for the Line input.

CLIP led

Lights 3dB before maximum signal level to show transient peaks approaching clipping.

Signals which cause the CLIP led to light briefly do not generally produce audible distortion. However if the CLIP led lights continuously, reduce the GAIN control (ccw) until CLIP led only lights occasionally.

LINE switch

This switch selects between Microphone input (switch out) or Line/DI input (switch in) depending on the position of the Line/DI switch on the rear of the unit.

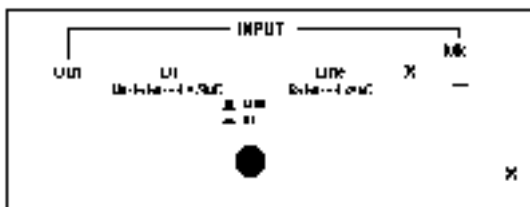


Fig 4.1.1 Input section rear panel showing the Line/DI switch

+48V switch

Pressing this switch applies +48V to both pins 2 and 3 of the Microphone input connector. This Phantom Power voltage is commonly used to power

capacitor microphones and DI (direct injection) boxes via the input signal cable.

To prevent the chance of damage to any external pieces of equipment, do not use the +48V power option with unbalanced input sources ie. those where pins 1 and 3 are connected together.

To avoid loud and potentially damaging electrical noise always turn down monitor speakers and connect your microphone before switching phantom power on.

PHASE switch

Reverses the phase of the input signal.

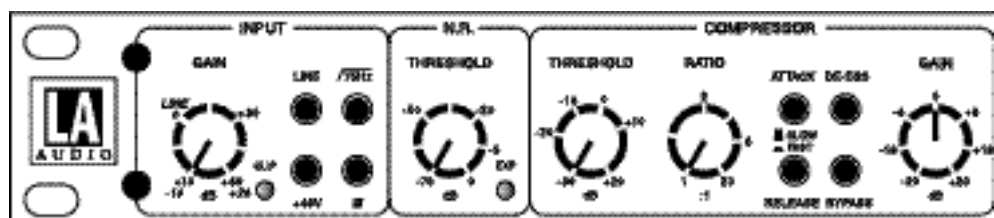
Mostly used for correcting out-of-phase connecting cables although there are certain acoustic problems and specialised miking techniques which use phase reversal.

FILTER switch

This switch inserts a 75Hz (-3dB frequency), 12dB/octave high pass filter into the signal path after the input amplifier.

Useful for removing low frequency sounds such as rumble and stage noise. Can also be used in conjunction with the EQ section to fatten bass sounds without producing excessive low frequency energy.

4.2 NOISE REDUCTION & COMPRESSOR SECTION



NR (Noise Reduction) on the MPX10 is provided by a downward expander which operates exactly opposite to a compressor. Signals falling below the set Threshold are progressively attenuated rather than abruptly switched off as with a noise gate. Also with a gate if the signal is a constant level and just below threshold the gate will stay closed (no signal passes). With the Expander there will be an output but at a reduced level. The further the input

level falls the more the gain is reduced. Expander response is soft knee around the onset of attenuation which combined with a low ratio (2:1) and slow decay (similar to 'release' on a gate) time ensures transparent operation.

The fast recovery (similar to 'attack' on a gate) time ensures that leading transient edges are not lost.

NR THRESHOLD control

Sets the point at which the expander starts to attenuate. Threshold range is 0dB (reference +4dBu), CW to -70dB, fully CCW.

With the control fully CCW (-70dB) the expander will effectively remain open.

EXP. led

Illuminates to show the onset of expansion i.e. signal has fallen below Threshold.

Please note unlike a gate led which shows that the gate is fully open or closed, the EXP led lights to show the signal has fallen below the set Threshold. The actual amount of signal attenuation is displayed on the GR (Gain Reduction) meter.

COMPRESSOR THRESHOLD control

This control sets the signal level above which compression starts. The Threshold range is -30dBu (CCW) to +20dBu (CW).

RATIO control

Ratio defines the amount of compression applied to the input signal once it has exceeded the Threshold level. A Ratio setting of 2:1, for example means that for every 2dB that the input exceeds the Threshold, the output will increase by 1dB. The following graph shows the relationship between input and output levels for various Ratios -

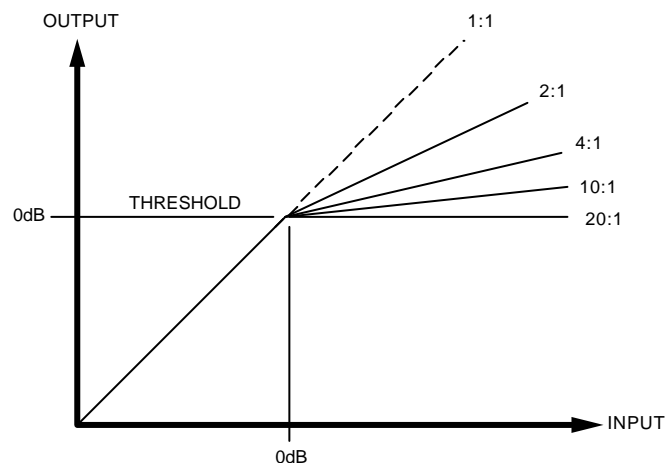


Fig: 4.3.1 Effect of Ratio control on O/P levels.

A RATIO of 1:1 gives no compression and 20:1 causes effectively no increase in output level no matter how far the signal increases above Threshold. This is referred to as Limiting.

The ratio curves shown in Fig 4.3.1 are Hard-knee where the change in gain is abrupt. The MPX10 has a Soft-knee control system which provides a gradual change between compression levels.

ATTACK & RELEASE switch

The MPX10 compressor has 4 program dependant Auto Attack and Release settings -

SLOW mode (switches 'out')

Attack = 20mS to 100mS Release = 2S

FAST mode (switches 'in')

Attack = 5mS to 70mS Release = 0.5S

In SLOW mode the compressor reacts to the average level of the input signal and is the normal setting for most signal types. Fast transient signal peaks will pass unaffected.

Using FAST attack, the compressor reacts more to signal peaks and will control all but the fastest transients.

DS switch

Pressing DS introduces a sibilant filter into the sidechain of the compressor. This makes the compressor more sensitive to high frequency 'S' sounds. DS provides 8dB of compression at 8kHz (relative to 1kHz).

Please note this is broad-band de-essing and all frequencies are compressed when an 'S' sound is detected. However this method works well as most sibilant sounds occur at the beginning or end of words. Use fast Attack and Release modes for de-essing.

BYPASS switch

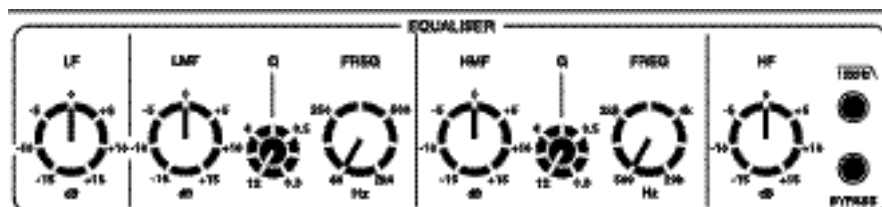
Switches the compressor in and out of the signal path so that comparisons can be made between compressed and un-compressed signals.

GAIN control

Because compression is a gain reduction process, the output of the compressor is often at a lower level than the normal operating level.

Some way of restoring the signal to its pre-compressed level is required. The Gain control provides adjustment to restore output level after compression.

4.3 EQUALISER SECTION



The 4 band equaliser has fixed high and low frequency shelving sections and two fully parametric mid sections.

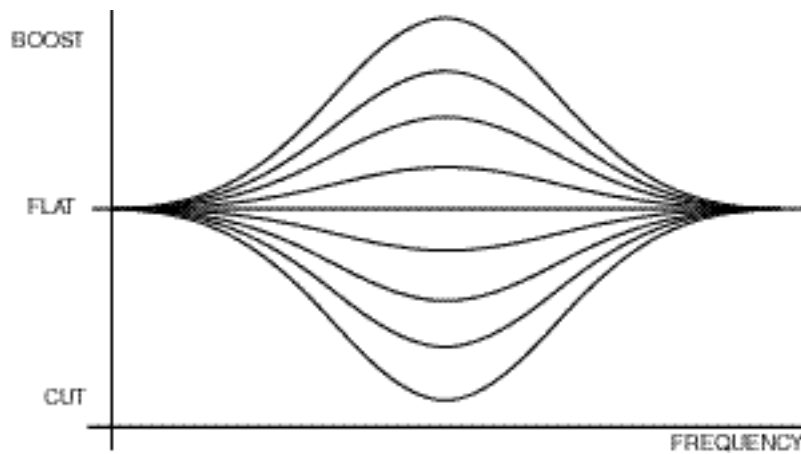
LF control

Low frequency shelving equaliser. Provides ± 15 dB of cut or boost at 80Hz

LMF control

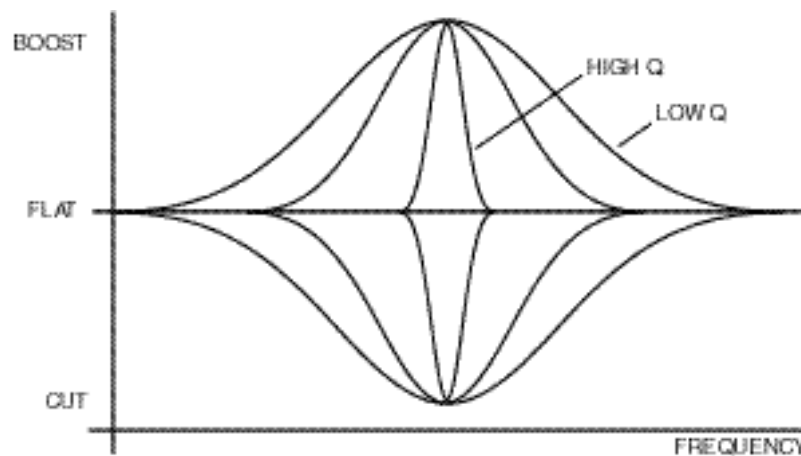
This control sets the amount of cut or boost for the LMF (Low Mid Frequency) section. The Gain range on the MPX10 is ± 15 dB. The diagram on the following page shows the effect of different cut and boost settings.

Maximum cut or boost occurs at the centre frequency set by the **FREQUENCY** control.



Q control

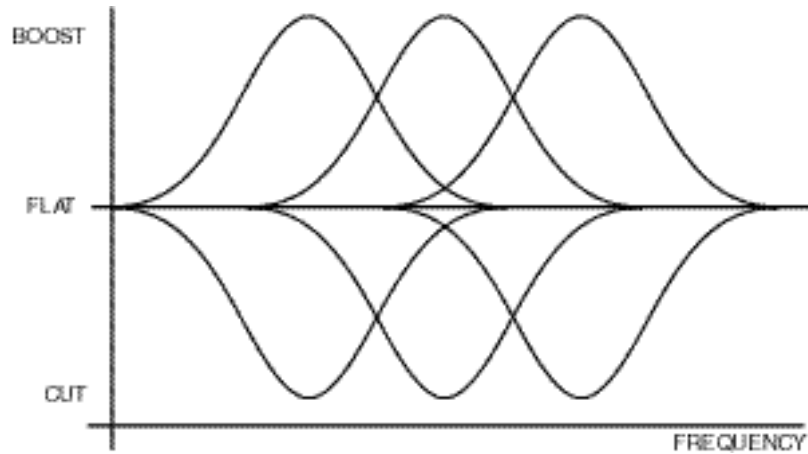
Varies the 'Q' (bandwidth) of the cut or boost region. A low Q, CW (clock wise) affects a wide band of frequencies whilst a high Q, CCW affects a very small band. The Q control on the MPX10 has a range of 0.3 (3 octaves) to 12 (1/12th octave) - see the following diagram.



In general lower Qs are used when boosting and higher Qs when cutting - see applications

FREQUENCY control

This control adjusts the centre frequency for LMF (Low Mid Frequency) cut or boost. The LMF **FREQUENCY** control has a 40:1 range and is adjustable from 60Hz, CCW to 2k4Hz (2.4kHz), CW - see the following diagram.



HMF control

Sets the amount of cut or boost for the HMF (High Mid Frequency) section.

FREQUENCY control

This control varies the cut or boost centre frequency for the HMF section. Control range is 500Hz, CCW to 20kHz, CW.

Q control

Varies the 'Q' of the cut or boost region for the HMF section.

HF control

High frequency shelving equaliser. Provides ± 15 dB cut or boost at 12kHz.

12kHz switch

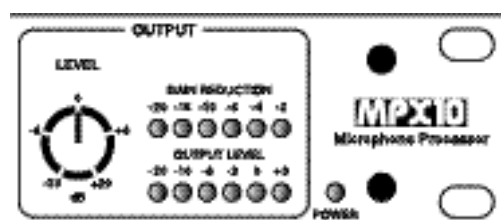
Inserts a 12kHz, -6dB/octave filter into the post EQ signal path. The filter is switched separately from the 4 band EQ and is available when the EQ is bypassed.

BYPASS switch

Switches the 4 band equaliser in and out of circuit allowing A-B comparisons on EQ settings.

Please note that the EQ 'output' on the rear of the unit is post BYPASS and FILTER.

4.4 OUTPUT SECTION



OUTPUT control

The OUTPUT adjusts the final level from the MPX10. It can be used to level match between equipment connected to the MPX10. Adjustment range is -20dB to +20dB.

GAIN REDUCTION meter

The led meter displays the applied gain reduction (GR) in dBs.

In BYPASS the display is dimmed but still displays the amount of gain reduction which would be applied if the compressor were to be switched in.

OUTPUT LEVEL meter

The led meter displays the overall output level of the MPX10. The 0dB led corresponds to +4dBu or -10dBV at the associated output connector.

POWER indicator

The green POWER indicator is lit whenever power is applied to the unit.

Using the MPX10 to record direct to tape, rather than through a mixing console and associated cabling, will result in a cleaner, less cluttered recorded sound which has more definition.

5.1 INPUT

The Microphone input is optimised for low impedance microphones (600 types) however the low gain settings available allow plenty of headroom for high output capacitor and condenser mics.



If you intend using +48V Phantom Power please observe the warning in the Description of Controls section, +48V switch.

The Line input can provide gain (up to 20dB, x10) or attenuation (up to -10dB, ÷3) making it ideal as a level matching device. Conversion between +4dBu and -10dBV levels is easily achieved by using the Line input, setting the GAIN to '0' and using the appropriate output connector. Or use the +4dBu output (XLR) and adjust the OUTPUT level for -10dBV (-8dBu) output.

The DI input, on the rear of the unit, is a high impedance (0.5M Ω) input for electric guitars, basses and other instruments with passive pickups. The high input impedance uses an FET device to ensure that the instruments pickups are not loaded thus preserving the instruments tonal quality and signal level. The DI gain range is designed to cope with the high output of 'active' basses.

If your mixing console doesn't have a instrument input use the DI on the MPX10 and patch into the line input on the console. Use the 'Output' connector on the rear panel as a line level DI output into your console line input. This 'Output' can also be used as a 'split' output for parallel console feeds etc.

5.2 COMPRESSOR

A compressor works by applying increasing levels of attenuation (compression) to signals which exceed a set volume level. The level above which the compression occurs is called the Threshold and the amount by which the signal is compressed is governed by the Ratio. So for example -

With an input signal at nominal level ('0' led on the output meter), Threshold set to -10dB and Ratio set to 2:1, the signal will be compressed by 5dB.

And the **RATIO** setting of 2:1 ratio means that for every 2dB the input signal increases above the **Threshold**, the output will increase by only 1dB.

By enabling low level signals to be increased without a corresponding increase in the high level signals, a compressor is able to increase the average sound level without risk of high level distortion. This fundamental principle of compression can be used for many applications.

Preventing tape and digital overload

Analogue tape is quite tolerant to overloading, producing its own tape

compression effect. However sending too much level to tape will result in tape saturation distortion and track bleeding. This can be effectively controlled with the MPX10.

*Use the MPX10s compressor with a **RATIO** setting of 10:1 or higher and **THRESHOLD** set to produce compression just below clipping.*

Digital recorders, although handling a much wider dynamic range, are highly intolerant to excessive levels and produce unpleasant distortion when overdriven.

*Use a **RATIO** of 20:1 and **THRESHOLD** set to reduce signal levels just before the recorder reaches clipping. Start with **AUTO** set to fast mode.*

Signal levelling

Signal level variations can occur when the distance between the vocalist and microphone changes. The MPX10 compressor can be used to level out the result of poor microphone technique, producing an even sound.

*Set **RATIO** to around 4:1 and adjust **THRESHOLD** for a gain reduction of 6 to 10 dBs at maximum signal level.*

N.B. If vocals sound thin after being compressed as described, use an external Hi pass filter, patched into the Sidechain insert, set to reduce the sensitivity of the compressor to low frequencies. This allows more low frequency signals to pass unaffected and fattens the sound.

This technique can also be used to reduce level variations in bass, lead guitars, and horns.

Bringing sounds forward in the mix

The use of a compressor to reduce the dynamic range of a sound source increases the average level of the sound. This principle can be used to accentuate a vocal or other lead track in a multitrack recording.

*Use a gentle **RATIO** of around 2:1 and a **THRESHOLD** of approximately -20dB to achieve gain reduction of no more than 6dB. Restore the compressed signal to its original level using the **GAIN** control.*

- ☞ Avoid over compression as this may produce a dull sound. It is better to apply gentle compression twice, once during recording which has the benefit of increasing signal headroom and then again on replay/mix down.

Vocal de-essing

Some microphone/vocalist combinations produce significant 'ess' sounds (sibilance). The MPX10 compressor can be used to reduce these sounds by making the compressor more sensitive to these frequencies.

Press in the 'DS' switch on the compressor section. Use moderate to high THRESHOLD and RATIO settings and FAST mode.

For more advanced de-essing patch an external parametric EQ (via Sidechain insert), set to around 3-6kHz and adjust the EQ's gain and bandwidth controls to make the compressor more sensitive to the 'ess' frequencies. This method can also be used to tune-in to a particular fret buzz on a guitar. The Millenium EQX20 or the EQ section of the MPX10 is ideal for this application.

5.3 EXPANDER

The fundamental application of an Expander is to eliminate unwanted ambient noise from the recording or PA signal path by progressively attenuating the signal level when it drops below a defined level. The progressive action, low ratio and relatively long release time makes the audible operation of the expander far less obtrusive than a noise gate.

Basic set up - reducing background noise

Start with the THRESHOLD set CCW to its most sensitive (-70dB) which effectively keeps the expander off (EXP led OFF, no attenuation). Listen to the natural decay of the signal to be processed and adjust Threshold so the expander starts to attenuate just as background noise begins to become apparent. Its worth checking that this signal is the quietest part of the track otherwise signal decays may be lost. Although the ratio and release times have been optimised for vocals the MPX10 will work equally well with miked instruments, guitars and basses.

- ☞ **Remember the EXP led goes out as signals exceed the Threshold level.**

Improving mic separation

In multitrack recording it is most important to maintain good mic separation. Microphones in close proximity, handling high energy sounds such as in the recording of a drum kit, are bound to suffer from overspill from one mic to another. Although this application is normally handled by a noise gate the expander section of the MPX10 can be used to good effect.

The technique for reducing mic leakage is similar to the one above.

5.4 EQUALISER

The MPX10 offers High and Low shelving equalisers and two fully variable parametric Mid sections. In general the shelving EQs are easy to use and have a smooth, musical character.

HF (12kHz) is used to add sparkle and zing to vocals and guitars. The LF control (80Hz) is used to fatten and add warmth to bass sounds.

More LF boost can be added if the 75Hz filter (INPUT section) is used to cut sub-sonic frequencies which can cause signal overload.

Unless you are familiar with operating parametric equalisers a good starting point for setting LMF and HMF controls is -

Set all Q controls to 0.5, this gives a bandwidth of around 2 octaves which is similar to that found on mixers fitted with fixed Q, swept frequency mid range controls. Use maximum (or nearly) boost so the effect of the EQ can be clearly heard and now sweep through the frequency range to find the area that needs attention. This is good practise even if the final solution involves cutting rather than boosting as boosting produces a more apparent effect of highlighting the hum, noise, boom or whatever. Gain and Q should then be adjusted to give the best subjective result.

In general low Qs (wide bandwidth) are useful for boosting without producing too much peaking or phasing effects. High and Low shelving type

equalisation can be simulated by setting the HF and LF section Qs fully CW (0.3) and sweeping their associated FREQUENCY controls out towards the high and low frequency extremes.

High Qs are normally used for cutting sounds such as mains hum or certain feedback frequencies. In this application Q should be set as high as possible (narrow bandwidth). Lower Qs and cutting can be used for reducing boominess found with some acoustic guitars.

A good example of low Q cutting is reducing the 1kHz content of guitars and snare drums to leave a 'space' for the vocals to sit in. Often cutting in this way gives a better result than trying to boost the vocals to cut through. This usually has an added bonus that guitars can stay louder in the mix.

The compressor section may also be used together with equalisation to bring a hidden vocal forward in the mix.

AUDIO SWEETENING and PRECISION EQUALISATION

The following are a few practical examples which should be treated as clues, with personal taste, source sounds and material you are creating deciding the final settings. There are no hard and fast rules, the most important tools in any equalisation process are your ears.

INSTRUMENT	BOOSTING	CUTTING
Kick drum	Slap at 3-5kHz Bass at 40-125Hz	Floppy around 600-650Hz Boomy below 80Hz
Snare drum	Crack at 2-3kHz Body at 125Hz to 300Hz Bottom 80Hz	'In the way' 1kHz
Hi-Hat and Cymbals	Sparkle above 5kHz Ring around 250Hz	'In the way' at 1kHz
Toms	Slap at 3.5-5kHz Bass 600-250Hz	Boomy around 300-350Hz
Bass guitar	Slap at 1kHz Bite at 2.5kHz Bass 40-100Hz	String noise at 1kHz Boomy at 125-220Hz
Acoustic guitar	Sparkle above 4kHz Body at 125Hz	Boomy at 200-250Hz Tinny at 2-3.5kHz
Electric guitar	Sex 600-900Hz Bass 125-250Hz Bite 2.5kHz Sparkle at 3-5kHz	Boomy below 80Hz 'In the way' 1-3kHz
Piano	Bass below 125Hz Presence at 5kHz	Tinny around 1-2kHz Boomy at 320Hz It's a sample above 6kHz!
Vocals	Presence 3-5kHz Cut through 8kHz Body 150-400Hz	Nasal at 1kHz Sibilance 7-10kHz Popping below 80Hz

Those who have been paying proper attention will have noticed that on the same instrument there are suggestions for both cut and boost at the same frequencies! Well there's no accounting for taste.

REMOVING SUB-SONICS

The 75Hz high pass filter is useful for removing subsonics such as wind and stage noise and will help produce a much tighter bass and vocal sound.

MAKING A COMPRESSOR FREQUENCY CONSCIOUS

Inserting an equaliser such as the Millenium EQX20 (or even the EQ from the MPX10) into the side chain of the compressor will make it more sensitive to certain frequencies. Examples of this technique are De-Essing and De-Popping.

SPECIAL EFFECTS

A passable telephone voice can be created by cutting frequencies below 300Hz and above 3kHz. Use the LMF and HMF sections, lowest Q (CW) setting and adjust their respective FREQUENCY controls accordingly.

ENHANCING THE FACILITIES ON YOUR MIXING CONSOLE

Patch any or all of the sections of the MPX10 into a channel or Group insert on your console to add Expander, Compressor and EQ processing to your signal path.

5.5 OUTPUT

The Output section of the MPX10 provides output level adjust and signal level metering. In general the OUTPUT control will be kept at '0' (12 o'clock) whilst setting-up and then only adjusted if the following equipment is being under or over driven.

Remember when using OUTPUT to reduce signal levels there is a danger of the MPX10 clipping internally.

The '0' led on the OUTPUT LEVEL meter lights when +4dBu (at the XLR) or -10dBV (at the TRS jack) is present at the output connectors.

6.0 CIRCUIT DESCRIPTION

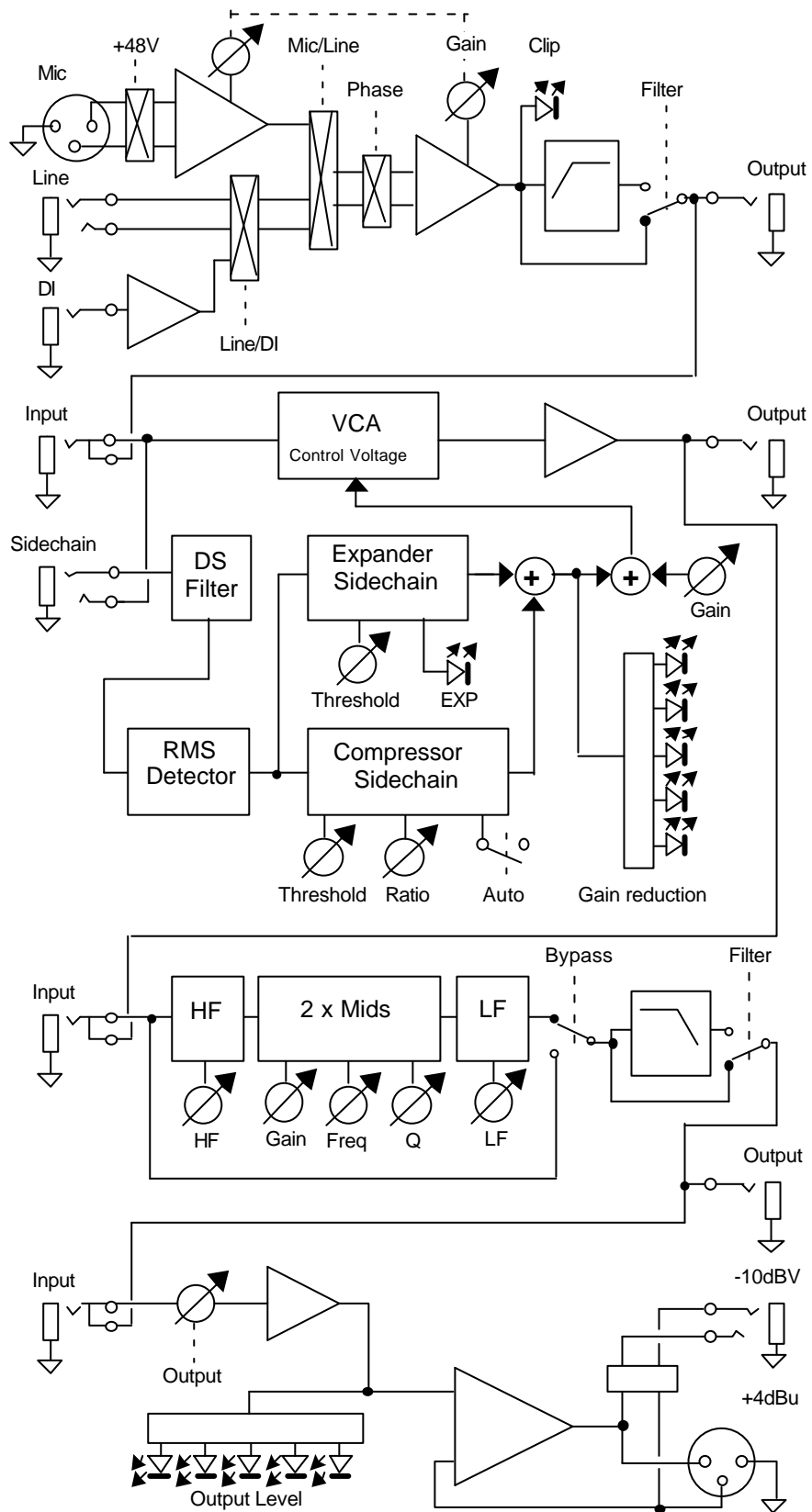


Fig: 6.0.1 Block diagram of the LA MPX10 showing the main signal paths

6.1 INPUTS

The Mic input has a dedicated amplifier stage which is optimised for low noise, impedance matching and common mode rejection. This amplifier is protected against RFI and excessive input levels. The GAIN control for this stage is ganged to the Line amplifier to ensure maximum signal headroom. The +48V phantom power is supplied to pins 2 and 3 of the XLR connector via 6k8 resistors.

The Line input feeds a separate variable gain differential amplifier which also provides all of the gain for the DI input.

The DI Input is buffered by a high input impedance FET amplifier prior to being switched into the Line amplifier.

The Phase switch swaps the inputs to the Line amplifier thereby reversing the phase of the incoming signal. The Mic, Line and DI inputs are all affected by the Phase switch.

Peak detector circuitry monitors the signal level from the Line amplifier and is arranged to light 3dB before clipping.

The Filter is a 2nd order (12dB/Oct.) highpass optimised for maximally flat response above the cutoff frequency. The -3dB frequency is 75Hz.

6.1 EXPANDER & COMPRESSOR

Gain reduction for the Expander and Compressor is provide by a single VCA (voltage controlled amplifier) which responds to the combined control voltage produced by the Expander and Compressor sidechains. This parallel control topology prevents interaction problems commonly associated with series connected Expanders and Compressors.

After the sidechain insert jack the control signal feeds the DS filter. This is a high pass filter with a 6dB slope starting around 1kHz. Following this is the RMS detector which produces a DC output voltage proportional to the RMS value of the input signal.

EXPANDER

Threshold adjusts the reference level for the expander which is compared with the RMS voltage. For input signals falling below Threshold the expander sidechain produces an output proportional to the Ratio and the amount the signal is below Threshold. The EXP led lights when the input signal is below Threshold ie. at the onset of attenuation.

Attack (<1mS) and Release (0.5S) are fixed.

COMPRESSOR

The Threshold control sets a DC reference level above which compression can start. This is compared to the RMS voltage and when this exceeds the reference the difference is forwarded to the Ratio control.

RATIO

The difference voltage from the Threshold stage is amplified or attenuated depending on the setting of Ratio. This control voltage defines the amount of compression once Threshold has been exceeded.

ATTACK-RELEASE

Attack and Release are based around two time constants. An initially short time which reacts to lower level and/or short duration signals, and a longer time constant for higher levels and/or longer duration.

The outputs of the Expander and Compressor sidechains are combined and drive both the VCA control port and the Gain Reduction meter.

LINK

The LINK connector allows the RMS detectors of two MPX10s to be joined together for stereo operation.

GAIN

The GAIN control adds a DC offset voltage to the combined Expander Compressor sidechain control voltage.

6.3 OUTPUT

The Output level control provides $\pm 20\text{dB}$ gain adjustment. The level meter displays the output of this stage.

The final output stage is a balanced impedance, ground sensing amplifier which provides a high degree of noise elimination and prevents signal loss when using long cable runs.

7.0 SPECIFICATIONS

INPUTS

MIC	electronically balanced, 1.2k Ω , XLR-F, pin 2 = hot
LINE	electronically balanced, 20k Ω , 1/4" TRS, Tip = hot
DI	unbalanced, 0.5M Ω , 1/4" jack, wired Tip = hot

OUTPUTS

Type	Ground sensing, balanced impedance
XLR-M	+4dBu, wired pin 2 = hot
1/4" TRS jack	-10dBV, wired Tip = hot
Impedance	<100
Max. output	+20dBu

PERFORMANCE

THD	< 0.05%, Mic input at 50dB gain
Noise	Mic < -127dBu EIN, 20Hz to 20kHz Line < -90dBu (at unity gain), 20Hz to 20kHz DI < -80dBu (at +20dB gain), 20Hz to 20kHz
Frequency response	\pm 0.5dB @ 20kHz

CONTROLS

Gain	Mic = +6dB to +60dB, Line = -10dB to +20dB DI = 0dB to +30dB
Clip led	Lights 3dB before clipping (+18dB typical)
Phantom Power	+48V
Input select	Mic, Line or DI
Phase	0 $^\circ$ or -180 $^\circ$
Highpass filter	-12dB/Oct below 25Hz to 250Hz
NR Threshold	-70dB to 0dB
NR ratio	2:1
NR Attack/Release	Attack = <1mS, Release = 0.5S
Comp Threshold	-30dB to +20dB
Ratio	1:1 to 20:1
Attack	5mS (fast), 20mS (slow)
Release	0.5S (fast), 2S (slow)
Equaliser	LF: \pm 15dB, 80Hz LMF: \pm 15dB, 60Hz to 2.4kHz HMF: \pm 15dB, 500Hz to 20kHz HF: \pm 15dB, 12kHz
Bandwidth (Q)	1/12th octave to 3 octaves
Lowpass Filter	12kHz, -6dB/octave
Output level	\pm 20dB
Meter	-20, -10, -6, -4, -2, 0, +2, +4

POWER SUPPLY

Mains voltages	230VAC, 50Hz, 6VA	Europe
	115VAC, 60Hz, 6VA	North America
	220VAC, 60Hz, 6VA	ROK
Mains connector	Standard IEC receptacle	

MECHANICAL

Dimensions	1.75" (44mm)H x 19" (482mm)W x 6.5" (165mm)D
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Weight

Unit = 2.2kg, Shipping = 2.85kg

LA Audio reserves the right to alter any feature or specification without prior notice E&OE.

AUBITE Microphone Processor

INPUT

- GAIN: 0dB, -20dB, -40dB, -60dB, -80dB, -100dB
- LINK: OFF, ON
- LINK /PHASE: OFF, ON
- THRESHOLD: -40dB, -30dB, -20dB, -10dB, 0dB, 10dB, 20dB, 30dB, 40dB
- N/A

COMPRESSOR

- THRESHOLD: -40dB, -30dB, -20dB, -10dB, 0dB, 10dB, 20dB, 30dB, 40dB
- AUTO: OFF, ON
- AF/PAH: OFF, ON
- RELEASE: OFF, ON
- RELEASE PHASE: OFF, ON
- GAIN: -20dB, -10dB, 0dB, 10dB, 20dB, 30dB, 40dB, 50dB, 60dB, 70dB, 80dB, 90dB, 100dB

EQUALIZER

- LF: -10dB, -5dB, 0dB, 5dB, 10dB
- LMF: -10dB, -5dB, 0dB, 5dB, 10dB
- HF: -10dB, -5dB, 0dB, 5dB, 10dB
- PHASE: OFF, ON

OUTPUT

- LEVEL: -10dB, -5dB, 0dB, 5dB, 10dB
- LINK: OFF, ON
- LINK /PHASE: OFF, ON
- THRESHOLD: -40dB, -30dB, -20dB, -10dB, 0dB, 10dB, 20dB, 30dB, 40dB
- N/A

AUBITE Microphone Processor

INPUT

- GAIN: -20dB
- LINK: OFF, ON
- LINK /PHASE: OFF, ON
- THRESHOLD: -40dB, -30dB, -20dB, -10dB, 0dB, 10dB, 20dB, 30dB, 40dB
- N/A

COMPRESSOR

- THRESHOLD: -40dB, -30dB, -20dB, -10dB, 0dB, 10dB, 20dB, 30dB, 40dB
- AUTO: OFF, ON
- AF/PAH: OFF, ON
- RELEASE: OFF, ON
- RELEASE PHASE: OFF, ON
- GAIN: -20dB, -10dB, 0dB, 10dB, 20dB, 30dB, 40dB, 50dB, 60dB, 70dB, 80dB, 90dB, 100dB

EQUALIZER

- LF: -10dB, -5dB, 0dB, 5dB, 10dB
- LMF: -10dB, -5dB, 0dB, 5dB, 10dB
- HF: -10dB, -5dB, 0dB, 5dB, 10dB
- PHASE: OFF, ON

OUTPUT

- LEVEL: -10dB, -5dB, 0dB, 5dB, 10dB
- LINK: OFF, ON
- LINK /PHASE: OFF, ON
- THRESHOLD: -40dB, -30dB, -20dB, -10dB, 0dB, 10dB, 20dB, 30dB, 40dB
- N/A

AUBITE Microphone Processor

INPUT

- GAIN: -40dB
- LINK: OFF, ON
- LINK /PHASE: OFF, ON
- THRESHOLD: -40dB, -30dB, -20dB, -10dB, 0dB, 10dB, 20dB, 30dB, 40dB
- N/A

COMPRESSOR

- THRESHOLD: -40dB, -30dB, -20dB, -10dB, 0dB, 10dB, 20dB, 30dB, 40dB
- AUTO: OFF, ON
- AF/PAH: OFF, ON
- RELEASE: OFF, ON
- RELEASE PHASE: OFF, ON
- GAIN: -20dB, -10dB, 0dB, 10dB, 20dB, 30dB, 40dB, 50dB, 60dB, 70dB, 80dB, 90dB, 100dB

EQUALIZER

- LF: -10dB, -5dB, 0dB, 5dB, 10dB
- LMF: -10dB, -5dB, 0dB, 5dB, 10dB
- HF: -10dB, -5dB, 0dB, 5dB, 10dB
- PHASE: OFF, ON

OUTPUT

- LEVEL: -10dB, -5dB, 0dB, 5dB, 10dB
- LINK: OFF, ON
- LINK /PHASE: OFF, ON
- THRESHOLD: -40dB, -30dB, -20dB, -10dB, 0dB, 10dB, 20dB, 30dB, 40dB
- N/A

AUBITE Microphone Processor

INPUT

- GAIN: -60dB
- LINK: OFF, ON
- LINK /PHASE: OFF, ON
- THRESHOLD: -40dB, -30dB, -20dB, -10dB, 0dB, 10dB, 20dB, 30dB, 40dB
- N/A

COMPRESSOR

- THRESHOLD: -40dB, -30dB, -20dB, -10dB, 0dB, 10dB, 20dB, 30dB, 40dB
- AUTO: OFF, ON
- AF/PAH: OFF, ON
- RELEASE: OFF, ON
- RELEASE PHASE: OFF, ON
- GAIN: -20dB, -10dB, 0dB, 10dB, 20dB, 30dB, 40dB, 50dB, 60dB, 70dB, 80dB, 90dB, 100dB

EQUALIZER

- LF: -10dB, -5dB, 0dB, 5dB, 10dB
- LMF: -10dB, -5dB, 0dB, 5dB, 10dB
- HF: -10dB, -5dB, 0dB, 5dB, 10dB
- PHASE: OFF, ON

OUTPUT

- LEVEL: -10dB, -5dB, 0dB, 5dB, 10dB
- LINK: OFF, ON
- LINK /PHASE: OFF, ON
- THRESHOLD: -40dB, -30dB, -20dB, -10dB, 0dB, 10dB, 20dB, 30dB, 40dB
- N/A