

TLAudio[®]

user manual

Ivory 2 Series

5060

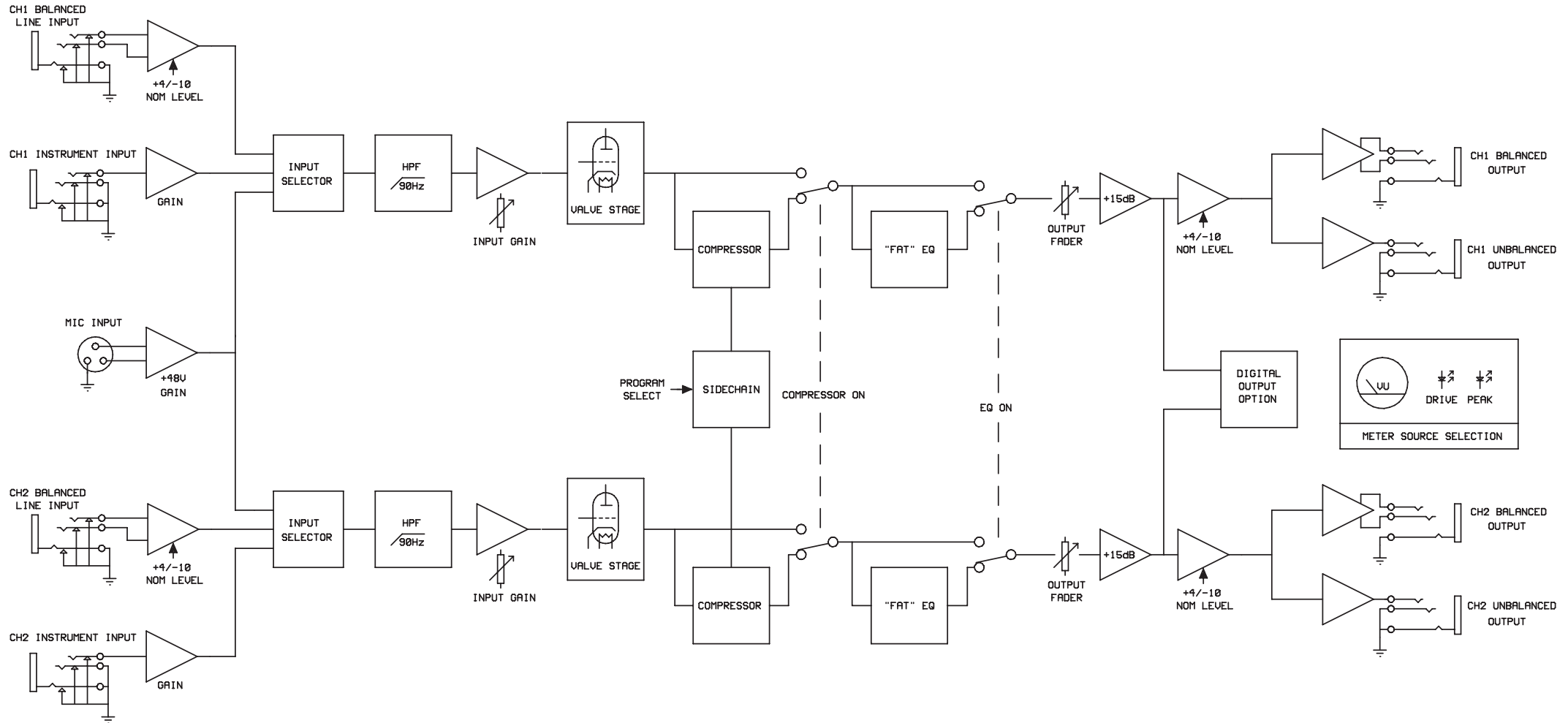


PRESET VALVE COMPRESSOR

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FIG 1: BLOCK DIAGRAM



I. INTRODUCTION

Congratulations on purchasing the Ivory 5060 Preset Valve Compressor by TL Audio!

The Ivory 2 Series consists of a range of hybrid valve signal processors, which utilise low noise solid-state electronics in conjunction with classic valve circuitry to produce audio processing units offering very high quality signal paths with the unique valve audio character. The units offer comprehensive control facilities, whilst remaining straightforward to operate, and represent excellent value for money.

The 5060 is a dual channel processor with a single balanced mic input and stereo line inputs/outputs on the rear panel, and stereo instrument inputs on the front panel. The 5060 features a compressor section with 15 presets and a 'manual' mode, plus a "Fat EQ" switch that, when active, applies an EQ contour to both channels. The two channels of the 5060 work in 'linked stereo' mode, but a mono signal can be applied to channel 1 only, making the 5060 equally powerful for both mono/stereo tracking and final stereo mix processing. A single illuminated VU meter monitors the output level or the compressor gain reduction for both the channels. The optional DO-2 digital output card allows 24-bit A to D conversion via an RCA phono type SPDIF output, with selectable 44.1 or 48 kHz sample rates and an external word clock connection.

The block diagram of the 5060 is shown in Figure 1. A solid state, electronically balanced input amplifier is used to achieve state of the art performance with very low noise, low distortion and wide bandwidth. An ECC83/12AX7A triode valve stage (run from a stabilised 100v DC supply) is used as a second stage voltage amplifier, to obtain the classic valve sound and gradual overdrive characteristics. The preamp stage also features 48V phantom power and a high pass 90Hz filter. A Drive LED gives a visual indication of the signal level through valve stages (and thus the amount of 'warming' taking place) while a Peak LED warns that clipping is about to occur.

The compressor section offers 15 carefully prepared presets designed to work with a variety of suggested signal sources. The compressor also has a manual mode, in which the dedicated compressor controls become active. In preset mode these controls are disabled with the exception of the "Compressor On" switch and the "Gain Make-Up" control. Manual mode features fully variable control of threshold, ratio and gain make-up with switchable fast/slow attack and release settings and hard/soft knee options. Like all other TL Audio compressors, the gain control element of the 5060 is based around a special transconductance amplifier, which avoids the use of VCAs and helps contribute to the smooth, open sound of the unit, along with the valve stage that forms part of the preamp circuit.

After the compressor section - but prior to the output gain control - the Fat EQ facility adds a gentle boost to the low and high-end frequencies while introducing a slight dip in the mid range frequencies. The effect of this is to add a subtle "sweetening" or "fattening", similar to the 'Loudness' button on Hi-Fi systems, thus adding a touch of "weight" to the signal.

The 5060 Mic input is provided on an electronically balanced XLR connector, and the line inputs are provided on balanced TRS stereo 0.25" jack connectors. Balanced and unbalanced line outputs are provided (again on TRS 0.25" jack connectors) and these can be used simultaneously. The operating level of both the line input and outputs can be shifted from -10dB to +4dB via a rear panel switch, allowing the 5060 to easily integrate into any system. A pair of high impedance front panel instrument inputs allow guitars, basses and keyboards to feed directly into the 5060, removing the need for a separate DI box.

Please read this manual fully before installing or operating the 5060.

2. PRECAUTIONS

The 5060 Preset Valve Compressor requires very little installation, but like all electrical equipment, care must be taken to ensure reliable, safe operation. The following points should always be observed:

- All mains wiring should be installed and checked by a qualified electrician,
- Ensure the correct operating voltage is indicated on the rear panel before connecting to the mains supply,
- Never operate the unit with any cover removed,
- Do not expose to rain or moisture, as this may present an electric shock hazard,
- Replace the fuse with the correct type and rating only.

Warning: This equipment must be earthed.

FIG 2: FRONT PANEL

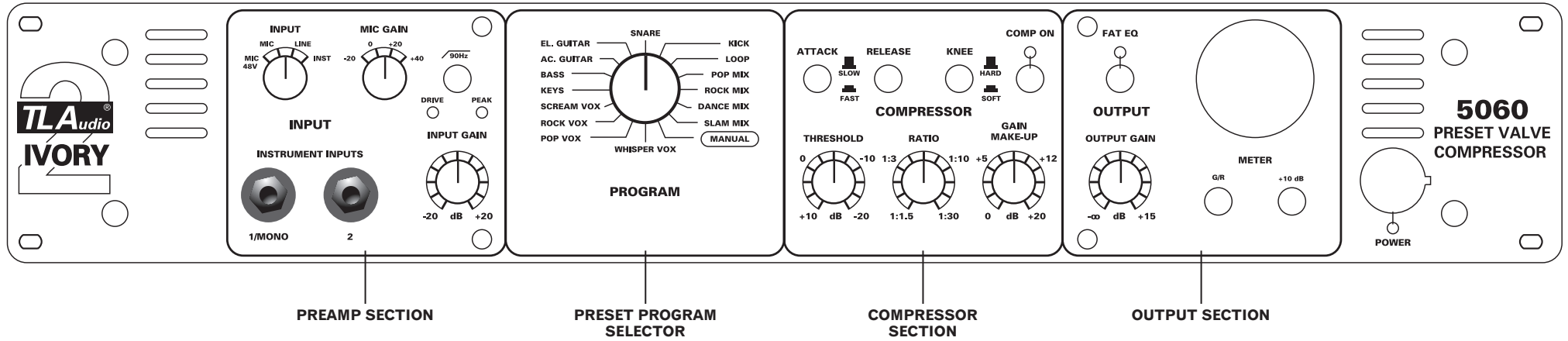
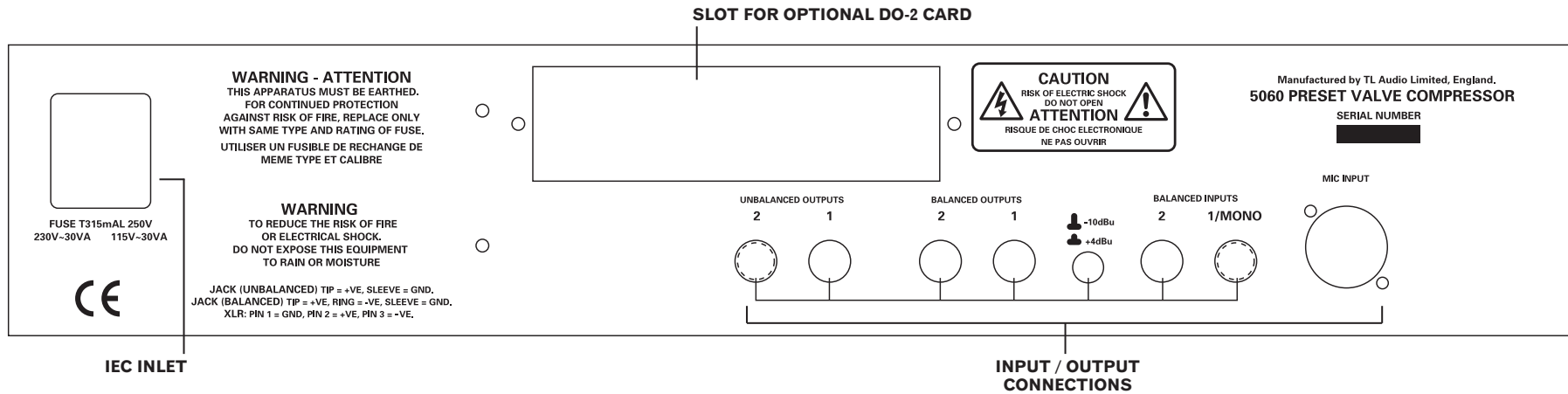


FIG 3: REAR PANEL



3. INSTALLATION

3.1 AC Mains Supply.

The 5060 is fitted with an internationally approved 3-pin IEC connector. A mating socket with power cord and mains plug is supplied. All mains wiring should be performed by a qualified electrician with all power switched off, and the earth connection must be used.

Before connecting the unit to the supply, check that the 5060 is set for the correct mains voltage. The unit is internally set for 110-120V 60Hz or 220-240V 50Hz operation, and should only be changed by an authorised service centre. The mains fuse required is 20mm anti-surge, 315mA rated at 250V. If it is ever necessary to replace the fuse, only the same type and rating must be used. The power consumption of the equipment is 30VA.

Warning: attempted operation on the wrong voltage setting, or with an incorrect fuse, will invalidate the warranty.

3.2 Microphone Input.

The microphone input is via 3 pin female XLR connector, suitable for balanced microphones. The mating connector should be appropriately wired as follows:

Balanced inputs:

- Pin 1 = Ground (screen).
- Pin 2 = Signal Phase (also known as “+” or “hot”).
- Pin 3 = Signal Non-Phase (“-” or “cold”).

The single microphone input of the 5060 is automatically routed to both channels of the unit.

3.3 Line Inputs.

Each channel has a 3 pin TRS jack socket on the rear panel, which will accept balanced or unbalanced line inputs providing the mating plug is suitably wired:

Balanced inputs:

- Screen = Ground,
- Tip = Signal Phase (“+” or “hot”),
- Ring = Signal Non-Phase (“-” or “cold”).

Unbalanced inputs:

- Screen = Ground,
- Tip = Signal Phase (“+” or “hot”),
- Ring = Ground.

Good quality screened cable should be used, particularly for microphone or low level sources, to prevent hum or noise pickup. Refer to Figure 3 for rear panel connector identification.

Please note that if a mono source is connected to line input 1 only, it will be automatically routed to both channels of the 5060.

3.4 Instrument Inputs.

Each channel has a high impedance (1Mohm) 0.25” instrument jack socket on the front panel (see Figure 2). A 2 pin (mono) jack plug is required, which should be wired as follows:

- Tip = Signal Phase (“+” or “hot”),
- Screen = Ground.

Please note that if a mono source is connected to instrument input 1 only, it will be automatically routed to both channels of the 5060.

3.5 Balanced Line Outputs.

The line outputs are via 3 pin TRS jack sockets on the rear panel, and may be configured for balanced or unbalanced connection. Balanced operation is always preferable to maintain maximum headroom and signal to noise ratio, but can only be used if the following equipment is also capable of balanced operation:

Balanced outputs:

- Screen = Ground,
- Tip = Signal Phase (“+” or “hot”),
- Ring = Signal Non-Phase (“-” or “cold”).

Unbalanced outputs:

- Screen = Ground,
- Tip = Signal Phase (“+” or “hot”),

- Ring = Ground.

3.6 Unbalanced Line Outputs.

An dedicated unbalanced line output is provided for each channel, on a 0.25" mono jack socket.

- Tip = Signal Phase ("+" or "hot").

- Screen = Ground.

These outputs may be used simultaneously to the balanced line outputs, and are useful for monitoring purposes particularly in a computer based system where latency free monitoring is necessary.

3.7 Nominal Operating Level.

A switch on the rear panel allows the line inputs and outputs to be matched to equipment at a nominal operating level of +4dBu or -10dBu. Most professional equipment requires +4dBu (approximately 1.2V rms), but some small mixing consoles, portable tape recorders or domestic audio equipment require -10dBu (approximately 225mV rms). If the operating level is not known, the switch should be set to the position which results in the best signal to noise ratio, whilst preserving sufficient headroom.

3.8 Ventilation.

The 5060 generates a small amount of heat internally, mainly due to the valve heater. Do not locate the compressor where it will be subject to external heating, for example, in the hot air flow from a power amplifier or on a radiator.

4. OPERATION

4.1 What is Compression?

Compression is an essential but often misunderstood process in modern recording. Put simply, compression reduces the ratio between the loudest and the quietest levels of an audio signal, which is known as reducing the "dynamic range" of that signal. Before the introduction of compressors the only way this could be achieved was by "gain riding", whereby an engineer would control the fader manually in order to try and anticipate very large levels (which might distort the signal) or very low levels (which may get lost in noise). The introduction of compression devices meant that this process could be controlled automatically, allowing the engineer to get on with more productive jobs!

Many instruments and voices have a very wide dynamic range, which needs to be controlled. A singer, for instance, may be singing quietly one moment and very loudly the next, and unless compression is applied the vocal won't "sit" correctly in the mix, in addition to the problems of distortion on loud passages and noise on quiet ones. Thus with compression you are effectively turning down the loud bits and turning up the quiet bits, to achieve a more even and controllable level.

But there are other benefits of compression as well - applied properly, it can add punch and excitement to music, as well as fattening up sounds and creating a more professional sounding recording. With the 5060, you have the added benefit of valve stages in the signal path, which create a warmth and presence just not obtainable with solid state or digital products.

4.2 Why Valve Compression?

Valve compression yields a particularly special sound, which has become very sought after, particularly with the widespread use of digital products. The reason valve equipment sounds special is due to two things: harmonic distortion and natural compression. When the signal through a valve is increased, it tends to generate a particular type of subtle and desirable distortion, called “second harmonic” distortion. This has the effect of thickening and warming the sound, and the more the level you feed to the valve stages, the more of this harmonic distortion will be produced. You should be able to hear this effect as you increase the Input Gain on the 5060.

Secondly, valves will tend to naturally compress an audio signal, again particularly as the signal level is increased. This itself also contributes to the warmth produced by the 5060.

4.3 Overview of Compressor Operation.

The 5060 offers two distinct ways of working: manual or preset modes. In manual mode, all the compressor controls are active and adjustable, so that compression settings can be created from scratch to suit the user's taste. In the fifteen preset modes, the Threshold, Ratio, Attack, Release and Knee controls are disabled and each is fixed internally at a value that is selected to give the best results with that particular instrument (the presets are titled ‘vocal’, ‘bass’, ‘guitar’, ‘snare’ etc. to indicate the recommended application).

The 5060 functions by reducing the gain of the signal when it rises above a certain level, known as the Threshold. Any signal below the threshold passes through the unit unaffected. Above the threshold the gain of the signal is reduced, and the degree of gain reduction is determined by the Ratio control. The Ratio control is calibrated in dBs and is simply the change in output level that results from a given change in input level.

The Attack and Release switches are used to control how fast the compressor reacts to the audio signal. The Attack switch governs how quickly the 5060 acts to compress the signal once it has risen above the threshold, while the Release switch controls how quickly the signal returns to normal once it has dropped back below the threshold level.

The Knee switch controls the shape of the 5060 compression curve. In “Soft Knee” mode, the response curve of the compressor around the threshold is gentle, so that the compression effect is more subtle and musical. In “Hard Knee” mode, the curve is more severe, so that signals above the threshold are “squashed” more aggressively. This yields a more audible and pronounced compression effect.

The Gain Make-Up control is positioned at the output of the compressor stage, and allows the signal level to be brought back to the same loudness as the uncompressed signal.

4.4 Input Source Selection.

The input source and phantom power selection are controlled on a four position rotary switch. The selections are:

MIC +48V:	For condenser mics that require 48V phantom power
MIC:	For most dynamic or ribbon mics
LINE:	Line inputs
INST:	Front panel Instrument inputs

CAUTION: Never switch phantom power on or off, or plug/unplug a microphone with phantom power applied unless the output level control is turned down. Failure to do so may result in a thump in your monitor loudspeakers or PA system.

4.5 Mic Gain.

The Mic Gain control sets the level of the microphone input signal prior to the Input Gain control. There are 4-switched level positions: -20, 0, +20 and +40dB, with a further +/- 20dB available on the Input Gain control. For normal operation it is recommended to keep the Mic Gain setting at the +40dB position, with any fine adjustments to the input signal level made by either boosting or reducing the Input Gain control. Keeping the Mic Gain at its maximum setting (+40dB) helps to keep the noise figures as low as possible. For extremely high-level signal sources - such as close-mic'd drums - it may be necessary to reduce the Mic Gain position to prevent input overload.

4.6 Input Gain.

The Input Gain control sets the level of the signal fed to the input stage of the compressor, and is variable between -20dB and +20dB. This allows a wide range of signals to be fed into the 5060, and also allows the valve stages to be driven to a variable degree. Each channel of the 5060 has a triode valve stage positioned between the input circuit and the compression stage. Increasing the input gain pushes more signal level into the valve, thus generating more harmonic distortion and creating that special "valve sound". At the same time the output level can be turned down to preserve the same level at the outputs, so a choice of sounds is available. For a more pronounced valve sound, turn up the input gain and reduce the output gain, and vice versa for a cleaner sound. Don't be afraid to push the 5060 hard!

As well as driving the valves harder, increasing the Input Gain control setting will also tend to push the signal towards and possibly over the compression threshold setting, so this control will have a pronounced effect on the amount of compression taking place, even in the Preset modes.

The Input Gain control is active at all times, whether the Program control is set to Manual or Preset modes.

4.7 90 Hz Low Cut Filter.

The low cut (high pass) filter switch restricts the low frequency response of the preamp, to effectively remove rumble or LF noise from the signal. The filter can be useful in restricting "popping" on vocals or even low frequencies caused by contact with microphone stands or microphone cables. Popping is an undesirable thump that is caused by close-miking certain spoken or sung letters, namely "P" or "B". These particular letters cause a sudden expulsion of air that can result in an audible thump. As this thump has a lot of low frequency content the high pass filter can help to reduce the problem, as can using a pop filter (a device usually made out of nylon material similar to stockings) suspended in front of the microphone. The 90Hz filter is active on mic, line and instrument inputs.

4.8 Drive and Peak LEDs.

The yellow Drive LED provides a visual indication of the signal level through the valve stages, and therefore the extent of "warming" or valve character being introduced. The Drive LED will gradually illuminate as the input level or gain is increased, over the range 8dB to +18dB.

The red Peak LED operates as a conventional warning that clipping is about to occur. The operating level of the entire signal chain is monitored, and the LED illuminates when there is less than 6dB of headroom remaining. Normal operation would be to set the input gain so that the Drive LED is regularly illuminating, with occasional lighting of the Peak LED on transients.

However, it is possible to add gain further down the 5060 signal path which will cause the Peak LED to illuminate at a lower level of Drive. This situation implies that a high level of "clean" signal is present, without driving the valves hard.

4.9 Program Control.

This 16-way rotary switch enables factory preset compression settings to be selected for different types of audio signal. The 'Manual' mode enables the Threshold, Ratio, Attack, Release, and Knee controls to be adjusted, along with the Input Gain, Output Gain and Gain Make Up controls (which are active at all times). In this mode the 5060 works like a standard compressor in the sense that the user can create their own unique compression setting and have full control over it at all times.

In all the other 15 program settings, the Threshold, Ratio, Attack, Release and Knee controls are pre-selected and fixed within the 5060 to give optimum results for that given type of signal. Thus these controls are disabled and will have no effect when adjusted, unless the user returns to 'Manual' mode. In the Preset modes, all the user has to do is select the required preset and then adjust the Input Gain, Output Gain and Gain Make Up to taste (see particularly section 4.6 on Input Gain). The 15 presets are shown in Table I.

The way the Program control works is by using a digital switching circuit to replace the controls mentioned by a series of fixed components (in the case of Threshold and Ratio) and on/off switch values (in the case of Attack, Release and Knee). This doesn't mean that the signal itself is converted to digital format within the 5060: it simply means that the signal parameters are controlled digitally.

How did we create the Program settings? Simply by operating the unit in Manual mode and arriving at an optimum set of adjustments for vocals, keyboards, basses, guitars, drums and stereo mixes. These settings were then programmed into the 5060, and as a result we've detailed the settings for each preset in Figure 4, should you wish to re-create any of the presets in manual mode, and adjust them to suit your own application. The designated presets can work with other signal types, so don't be afraid to experiment.

4.10 Table I: Presets.

<i>Number</i>	<i>Preset Title</i>	<i>Typical Applications</i>
1	Whisper Vox	Subtle compression for softer vocal performances. Soft knee, fast attack and release.
2	Pop Vox	Medium compression for more obvious control. Soft knee, fast attack and slow release.
3	Rock Vox	Hard compression for powerful performances. Hard knee, fast attack and slow release.
4	Scream Vox	Even heavier settings for when your local rap metal band do their vocal takes. Hard knee, fast attack and release.
5	Keys	Medium compression for keyboards especially synth pads. Soft knee, slow attack and release.
6	Bass	Compression for electric, acoustic and synth basses. Soft knee, slow attack and release.
7	Acoustic Guitar	Soft knee, fast attack and fast release.
8	Electric Guitar	Medium compression for recorded or DI'd guitars. Soft knee, fast attack and release.
9	Snare	For tight control of snares. Hard knee, fast attack and release.
10	Kick	For tight control of kick drums. Hard knee, slow attack and release.
11	Loop	Ideal for compressing stereo acoustic drum kits, drum machines and sampler drum loops. Soft knee, fast attack and release.
12	Pop Mix	Lighter compression suitable for light pop, jazz or classical mixes. Soft knee, fast attack and release.
13	Rock Mix	Medium compression suitable for rock mixes. Soft knee, fast attack and slow release.
14	Dance Mix	Heavy compression suitable for dance mixes. Hard knee, fast attack and slow release.
15	Slam Mix	Even heavier compression for maximum-level, minimum- dynamics mixes. Fast attack and slow release.
16	Manual	For your own set-ups, using the compressor controls.

4.11 Threshold.

The 5060's compressor functions by reducing the gain of the signal when it rises above a certain level, known as the Threshold. Any signal below the Threshold passes through the unit unaffected, while signals above the Threshold have their gain reduced (and are thus 'compressed').

The 5060 has a variable Threshold control, adjustable between +10dBu and -20dBu. Unlike some compressors, the Threshold control on the 5060 starts at a 'plus' value in the counter-clockwise position, and decreases to a 'minus' value as you rotate the control clockwise. The reason for this is as you turn the Threshold control on the 5060 'clockwise (i.e. towards the negative region) then the degree of compression will increase. We think this is logical, whereas the common method of turning the control 'down' to achieve more compression is not - but beware, some other compressors may work in this way! The Threshold control is only active when the Program control is set to Manual mode. In all of the Preset modes it is disabled and the Threshold value is fixed internally.

Figure 4

PRESETS →	1. Whisper Vox	2. Pop Vox	3. Rock Vox	4. Scream Vox	5. Keys	6. Bass	7. Ac Guitar	8. El Guitar	9. Snare	10. Kick	11. Loop	12. Pop Mix	13. Rock Mix	14. Dance Mix	15. Slam Mix
CONTROLS ↓															
Input Gain															
Output Gain															
Gain Make-Up															
Threshold*															
Ratio*															
Knee*	Soft	Soft	Hard	Hard	Soft	Soft	Soft	Soft	Hard	Hard	Soft	Soft	Soft	Hard	Hard
Attack*	Fast	Fast	Fast	Fast	Slow	Slow	Fast	Fast	Fast	Slow	Fast	Fast	Fast	Fast	Fast
Release*	Fast	Slow	Slow	Fast	Slow	Slow	Fast	Fast	Fast	Slow	Fast	Fast	Slow	Slow	Slow

* The settings shown for these controls are fixed internally for each preset and are non-adjustable (except in manual mode). The Input Gain and Output Gain are user adjustable at all times, the Gain Make-up is user adjustable when the compressor is active.

4.12 Ratio.

Once the input signal has crossed the threshold, the degree of gain reduction is determined by the Ratio control. The Ratio control is calibrated in dBs and is simply the change in output level that results from a given change in input level. An uncompressed signal will have a 1:1 compression ratio - every 1dB change in input level results in the same 1dB change in output level. A compression ratio of 1:3, for instance, means that a 3dB change in input level will only give a 1dB change in output level. For more severe compression, simply turn up the Ratio control.

The 5060 offers a wide range of ratios from 1:1.5 (gentle compression) through to 1:30 (limiting). Limiting effectively clamps the input signal at the threshold level no matter how much the signal is increased: this can be useful when trying to ensure that the signal doesn't exceed a certain level - for instance to prevent a digital recorder distorting through overload.

The Ratio control is only active when the Program control is set to Manual mode. In all of the Preset modes it is disabled and the Ratio value is fixed internally.

4.13 Attack and Release.

The Attack time of the 5060 is switchable between 0.5mS ('Fast') and 5mS ('Slow'). At 0.5mS attack, the compressor is fast enough to compress a 1kHz signal in less than half a cycle, effectively preventing the overload of any following equipment which has limited headroom, such as a digital processor, tape machine or transmitter. Fast attack times are used to compress a signal quickly, so are suitable for audio signals with sharper transients such as drums. However, if you want the initial leading edge of the signal retained (for instance the initial click of a bass guitar or bass drum) then a slower attack time can be employed, and slow attack times can also be useful on sustained sounds like synth pads.

The Release time of the 5060 is switchable between 0.2S ('Fast') and 1.5S ('Slow'). The Release setting is important because if it is too short, the compressor gain recovers too quickly with the result that there is an audible 'pumping', 'breathing', and sometimes low frequency distortion. In these cases try using a slow release time.

Adjustment of the attack and release times allows unobtrusive compression to be applied to virtually any audio signal, but should very short transients occur the time constants become signal dependent, generally reduced, to prevent a slow release leaving a 'hole' in the signal after the transient. Also, a fast release setting will be extended by a slow attack setting. This type of automatic control means that the flexibility of the 5060 is greatly extended without the extra complication of fully variable attack and release controls.

The Attack and Release controls are only active when the Program control is set to Manual mode. In all of the Preset modes they are disabled and the Attack and Release values are fixed internally.

4.14 Gain Make Up.

While the subjective sound quality of the signal can be improved by compression, the overall signal level will be reduced when gain reduction is taking place. The Gain Make Up control is designed to boost the compressed signal by between 0 and +20dB, in order to bring back the level to the same loudness as the uncompressed signal. Without this control, comparing the original and compressed signals becomes difficult, since there would be a level drop each time the compressor is switched in: therefore it is normal to adjust the Gain Make Up control so that when the 'compressor on' switch is activated, the audio signal remains constant in level.

Unlike the Output Level control, the Gain Make Up control is active *only when the 'compressor on' switch is engaged*. Once the Gain Make Up has been adjusted, use the Output Level control to set the overall output level of the 5060.

Assuming the compressor is activated, the Gain Make Up control is active whether the Program control is set to Manual or Preset modes.

4.15 Knee.

The Knee switch enables the 5060 to be operated in two different modes - Soft Knee or Hard Knee. Soft Knee mode offers a gentle compression curve around the threshold point, and is traditionally employed to yield a more subtle, musical type of compression effect. The Hard Knee setting causes the full compression ratio to be applied immediately the signal has passed the threshold point, so tends to produce more pronounced and severe compression.

The Knee control is only active when the Program control is set to Manual mode. In all of the Preset modes it is disabled and the Knee setting is fixed internally.

4.16 Compressor On.

This switch enables or disables the compressor stage, thus allowing an A/B comparison to be made between the original untreated signal and the compressed signal. An associated status LED indicates when the compressor is active.

4.17 Output Gain.

This controls the level at the 5060 outputs, and is variable between $-\infty$ and +15dB. This control effectively acts like an output fader, and is very useful when recording direct to tape or hard disc through the 5060. You may find that some digital recorders require a good deal of input level in order to register a 0dB reading on their meters. This is normal, since many digital recorders are designed to preserve headroom and keep the signal well below the 0dB clip point - thus preventing the recorder distorting. The 5060 provides ample gain to drive digital recorders, but you may find that the Output Gain control has to be set to higher levels for this reason.

The Output Gain control is active at all times, whether the Program control is set to Manual or Preset modes.

4.18 Meter.

The 5060 is equipped with an illuminated VU meter. The Meter switch enables the 5060's VU meter to monitor one of two parameters. The normal mode allows the meter to read the audio output level, and is calibrated to read 0VU when a +4dBu signal is produced at the balanced line outputs of the 5060. Your dealer if required may internally adjust the reference point. Increasing the Output Level control on the 5060 towards the +15dB setting will cause the 5060's meter to move further towards the red area and possibly to the end of the scale if sufficient gain is applied. This is normal, particularly if driving a digital recorder where large input levels are required.

The meter may be switched to indicate the amount of compression occurring by selecting the 'G/R' setting. If the signal is below the threshold, the meter will indicate 0dB: i.e. no gain reduction. As the signal passes through the threshold, the meter will start to indicate the gain reduction at the compressor stage (this will be a *negative* value, so the meter will move to the left, away from 0VU). Note that this reading won't include any extra gain make-up applied.

4.19 Meter '+10dB'.

As referred to in the previous section, sometimes the output level of the 5060 may need to be set to a relatively high level, particularly when driving a digital recorder. The Meter '+10dB' setting reduces the normal meter reading by 10dB so that high output levels can be generated without the VU needle pressing constantly at its end stop. This doesn't affect the actual output level, but only the metered reading. This setting also has no effect when the G/R switch is engaged and the meter is reading the amount of gain reduction.

4.20 Fat EQ.

The Fat EQ switch introduces a set EQ contour to both channels of the 5060 after the compressor stage, but before the output stage. The contour provides a subtle boost in the low and high-end frequencies, with a slight dip in the mid frequencies, and has the following response:

+2dB @ 50Hz
-0.9dB @ 720Hz
+1.8dB @ 10KHz.

The effect of the Fat EQ is to add some depth and presence: essentially "fattening" the signal. An associated status LED indicates when the Fat EQ is active.

4.21 Optional DO-2 Digital Output Card.

The 5060 is designed to accept the optional DO-2 24 bit digital A to D converter card to allow easy interfacing with devices such as sound cards and digital recorders. The card feeds the converted output signals of channels 1 and 2 to the SPDIF phono output. The sample rate is switchable between either 44.1kHz or to 48kHz, and the card can be clocked to an external digital source via the BNC wordclock input. When clocking the DO-2 to an external source the sample rate setting on the DO-2 needs to be set to match the external sample rate, otherwise correct locking may not occur and audible clicking may appear on the digital output. In terms of gain, the DO-2 will generate a signal level of 0dBfs in the digital domain when +18dBu of output level is generated at the balanced line output of the 5060.

5. GETTING STARTED

5.1 Connections and where best to use the 5060 in the recording process.

The typical applications of the 5060 are as a mic, line or instrument front end or as a channel, group or master compressor at the mixdown stage. The various ways of connecting the 5060 are as follows:

- a) Connected ahead of the line inputs of a mixing desk/recording device
- b) Connected to a channel, group or master insert point
- c) Connected digitally by the SPDIF output if the optional DO-2 card is fitted

a) To use the 5060 as a mic preamp, line level or instrument front end, connect the output(s) of the 5060 directly to the line (not mic) input of your console, recorder or sound card. Connecting line level outputs to microphone inputs is not recommended (since both signal level and the impedance are incorrect) as this may affect the signal quality and can cause level overload on the mixer. The 5060 has balanced line outputs for professional sound quality, but can easily connect to an unbalanced line input (see Installation section 3.5). Once the outputs are connected, simply feed your chosen source into the

relevant input of the 5060 (mics will connect to the rear panel XLR input, line level signals such as mixer or tape machine outputs will connect to the 5060 line inputs, while guitars, basses and keyboards will use the 5060 front panel instrument inputs).

Select the relevant input source on the input selector switch at the top left of the 5060 front panel. 'Mic 48V' is necessary for condenser type microphones that require 48V phantom power. *When using dynamic and ribbon type microphones the 'Mic' position only should be selected. Take care not to select the Mic 48V position when using such microphones as potentially the 48 Volt feed could harm the microphone.* The 5060 will route the microphone signal to both the left and right output channels. If a mono instrument (or mono line level source) is connected to the left input (marked 1/mono) the signal will be routed to both left and right channels. Connecting a mono signal to the right input only will send the signal to the right hand output only. Recording direct to the multitrack recorder (thus bypassing the console) is a common technique these days as it keeps the signal path short, and of the highest quality. No unnecessary console stages are passed through, thus maintaining quality.

b) Many mixers have sockets called 'insert points', which allow processors such as dynamics devices and EQs to be patched in-line into the mixer signal path. Insert points are generally provided on a single TRS stereo jack socket, wired so that one of the pins is a 'send', one is a 'return' and the third pin is the earth. A special cable (called an 'insert' or 'Y' cable) is required to then patch in and out of the 5060 — this cable will have a stereo jack at one end (the end that connects to the mixer) and two mono jacks at the other end (the end that connects to the 5060). Of the two mono jacks, one will be a 'send' that connects to the 5060 line input, and the other will be a 'return' that connects to the 5060 line output. This way the signal path is routed out of the mixer, through the 5060 and back again, thus completing the signal path.

The channel insert point routes the channel signal out and then back into the desk directly after the preamp stage. This insert point send/return facility is usually before the EQ section on the desk ('pre EQ'), but some mixers allow for optional pre or post EQ insert points. There is understandably confusion between insert points and auxiliary sends/returns on mixers: essentially they both send and return signals from the mixer but are different in application. The auxiliary sends will split the channel signal, allowing it pass through the channel unaffected as well as being fed out to an effects device, allowing the original and processed signals to be mixed together to taste. This method is designed for processes such as reverb, echo and modulation effects such as chorusing.

With insert points it is typical to patch in dynamics processors/EQs rather than effects processors, since the entire channel signal would need to be processed by a compressor/EQ and then returned back to the mixer, thus ensuring that the whole signal is processed and leaving none of the original unprocessed signal still audible.

Group insert points are used to compress sub-grouped signals. It's common for an engineer to mix an entire drum kit or a number of tracks of backing vocals to a stereo group and then use a pair of group faders to control their overall level, rather than having to adjust each individual drum level. If you then wish to compress the overall stereo kit signal, you can connect the 5060 to the relevant group insert points, using the same 'send and return' technique as the channel insert.

Having compressed individual tracks while recording, it is common to apply compression to the stereo mix while mastering it to 2-track tape, DAT or CD. Doing this will help fatten the sound further and control levels. Like the channel and groups, the stereo L/R mix buss will normally have a pair of insert points to facilitate this. If not, the 5060 can be connected 'in-line' with the mixer's main stereo outputs, ahead of the master 2-track recorder. Using master insert points allows the 5060 to be monitored by the mixing desk's control room outputs, but to monitor it when using it 'in-line' mode, it is normal to put the 2-track recorder in 'record' or 'record ready' mode, and have the outputs of the recorder feeding back into the 2-track return inputs of the mixer. A mixer normally then has a 2-track monitor option where you can listen to the output of the 2-track recorder (and thus the effect of the 5060).

c) If the optional DO-2 card is fitted, the 5060 will convert the analogue output signal into 24-bit digital format. If the 5060 is used either at the front end stage of recording or at the mixdown stage, a high quality 24-bit signal can be fed directly into the mixer or recording device avoiding the use of possibly inferior quality converters. When using the DO-2 the analogue outputs of the 5060 are unaffected and can be used simultaneously. When connecting the DO-2 to the recording device the recording device would normally be set up as a “slave” to accept external digital sources. If however the recording device is required to remain as the “master” the DO-2 can be clocked by its word clock input and will automatically slave to the word clock input - as long as the same sample rate on the master device is also selected on the DO-2 card.

5.2 In Use.

Having connected the 5060, it's time to put it into action! Here's a simple step-by-step guide:

- a) The first stage is to set up the gains of the unit. With the Compressor switched out, start with the Input and Output Gains and Gain Make-Up at 0dB.
- b) With the Meter set to read 'Output', adjust the Input Gain to achieve a peak reading of around 0VU with the chosen source material.
- c) If more output is then required then adjust the Output Level control accordingly.
- d) Now depress the Compressor 'On' switch, and depress the Meter switch to read 'Gain Reduction'.
- e) Using the Program control, select a suitable preset to suit the instrument or mix you are listening to.
- f) The meter should now register that some gain reduction is taking place. If not, or you wish more gain reduction to occur, increase the setting of the Input Gain control.
- g) When gain reduction is taking place, you should notice that the output level is reduced. By toggling the Compressor On switch you can compare the levels and the subjective sound quality of the original and compressed signals. With the Compressor active, use the Gain Make-Up control to set the level so that when disabling the compressor, there is no level drop. This way you can A/B the signals without the levels changing.
- h) Switch to Manual mode. You will now find that the Threshold, Ratio, Attack, Release and Knee controls become active. Start with the Threshold at +10dB, Ratio at 1:3, Attack and Release at 'Fast', and Knee at 'Soft'.
- i) While continuing to meter gain reduction, gradually turn the Threshold clockwise towards -20dB. While doing this you'll notice that compression will start to take place and the meter will start to register some gain reduction. The further towards -20dB you move, the greater the gain reduction that occurs. Aim to get around a maximum 3-4dB of gain reduction occurring as a starting point. You should also notice that increasing the Ratio setting causes more gain reduction to occur.

By referring to Figure 4, you can see the settings that we have used to create the fifteen program presets, so you may want to manually duplicate these settings and use them as a starting point, and then adjust to suit your own tastes.

5.3 Frequently Asked Questions (FAQs).

Q: *5060 is a stereo unit yet there is only one set of controls, why is this?*

A: The 5060's single set of controls affect both channels simultaneously, since the unit always works in linked stereo mode. To operate in mono mode, simply run your mono signal through the left channel input/output (either the line input, or the instrument input if applicable).

Q: *The Threshold, Ratio, Attack, Release and Knee controls aren't working.*

A: This is because the Program control is not set to Manual mode, and these parameters are all fixed within the 5060.

Q: *Why is it I occasionally get some LF distortion on certain settings?*

A: This happens when a Fast Release time is selected on certain bass-heavy sources. The compressor is then forced in and out of gain reduction within an individual cycle, and thus distortion is caused on the lower frequencies. Selecting a slow attack/release time will cure the problem.

Q: *Can I use the preset settings on instruments other than those recommended?*

A: Absolutely. If it sounds good, use it!

Q: *The Gain Make-Up control isn't working.*

A: This control is only active when the 'Compressor On' switch is engaged.

Q: *The 5060 is a stereo unit but there is only one valve in it. Why?*

A: The unit employs a single ECC83/12AX7A dual triode valve, so called because it features two separate valve stages within one glass housing. Each channel of the 5060 employs one of these stages.

Q: *How long do the valves last before they need replacing?*

A: This very much depends on the valve itself, whether the unit is left switched on all the time and how much the unit is moved around. On average we'd say about four years. The valve itself is easily sourced and relatively inexpensive - contact your dealer for details.

6. SERVICE

Should the 5060 require service, it must be taken or posted to an authorised dealer with a description of the fault. Please retain the original packing for possible future use, and ensure the unit is suitably protected during transit. The manufacturer cannot accept responsibility for damage caused during transportation.

The 5060 is supported by a limited warranty for a period of one year from the date of purchase. During this period, any faults due to defective materials or workmanship will be repaired free of charge. The warranty excludes damage caused by deliberate or accidental misuse, tampering, operation on the incorrect mains voltage, or without the correct type and value of fuse fitted. It is the user's responsibility to ensure fitness for purpose in any particular application. The warranty is limited to the original purchase price of the equipment, and excludes any consequential damage or loss. When claiming service under warranty, proof of purchase date must be included with the equipment for repair.

Please record the following details, and retain proof of purchase:

Serial Number.....

Date purchased.....

Dealer.....

7. SPECIFICATIONS

Inputs:	Balanced line inputs, switchable for +4dBu / -10dBu nominal level. Unbalanced instrument inputs, input impedance 1Megohm. Balanced microphone input, common to both channels.
Outputs:	Balanced line outputs, switchable for +4dBu / -10dBu nominal level. Unbalanced line outputs, switchable for +4dBu / -10dBu nominal level.
Maximum Levels:	Line inputs +26dBu, Instrument inputs +10dBu, Mic input +30dBu, Balanced outputs +26dBu, Unbalanced outputs +20dBu.
Gain Range:	Line inputs +/-20dB, Instrument inputs 0 to +40dB, Mic input switchable -20dB to +40dB with +/-20dB trim. Output fader +15dB maximum gain.
Frequency Response:	All inputs 10Hz to 40KHz, +0/-2dB.
High Pass Filter:	-3dB @ 90Hz, -12dB per octave.
Distortion (THD+N):	Typically 0.1% @ 0dBu, rising to 0.3% @ +15dBu (1KHz).
Hum and Noise:	-84dBu, 22Hz - 22KHz, line input @ 0dB gain, -82dBu, 22Hz - 22KHz, instrument input @ +20dB gain, -122dBu (EIN) mic input at +60dB gain, 22Hz - 22KHz.
Compressor:	Stereo compressor with manual and programmed controls, Threshold continuously variable -20dBu to +10dBu, Ratio continuously variable 1:1.5 to 1:30, Attack switchable 0.5ms or 5ms, Release switchable 0.2s or 1.5s, Knee switchable "Hard" or "Soft".

"FAT EQ":	+2dB @ 50Hz, -0.9dB @ 720Hz, +1.8dB @ 10KHz.
Metering:	Illuminated VU meter displaying Channel 1 + 2 with 10dB pad, Meter switchable to display Compressor gain reduction, Variable intensity "Drive" LED, illuminating from +8dBu to +18dBu, "Peak" LED monitoring whole signal chain, illuminating 6dB before clip.
Power Requirements:	Internally set to 230V 50Hz or 115V 60Hz operation, Detachable IEC power cord, Power consumption 30VA.
Dimensions:	19" rack mounting, 2U high, W x H x D: 483 x 88 x 200mm (19.0" x 7.9" x 3.5").
Shipping Weight:	6 kgs.

The above specifications are typical figures, and are subject to change without notice.