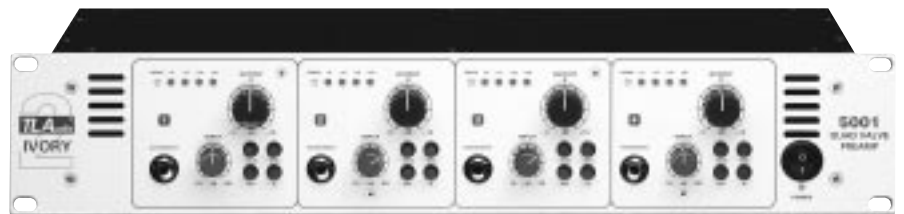


TLAudio[®]

user manual

Ivory 2 Series

5001



QUAD VALVE PREAMP

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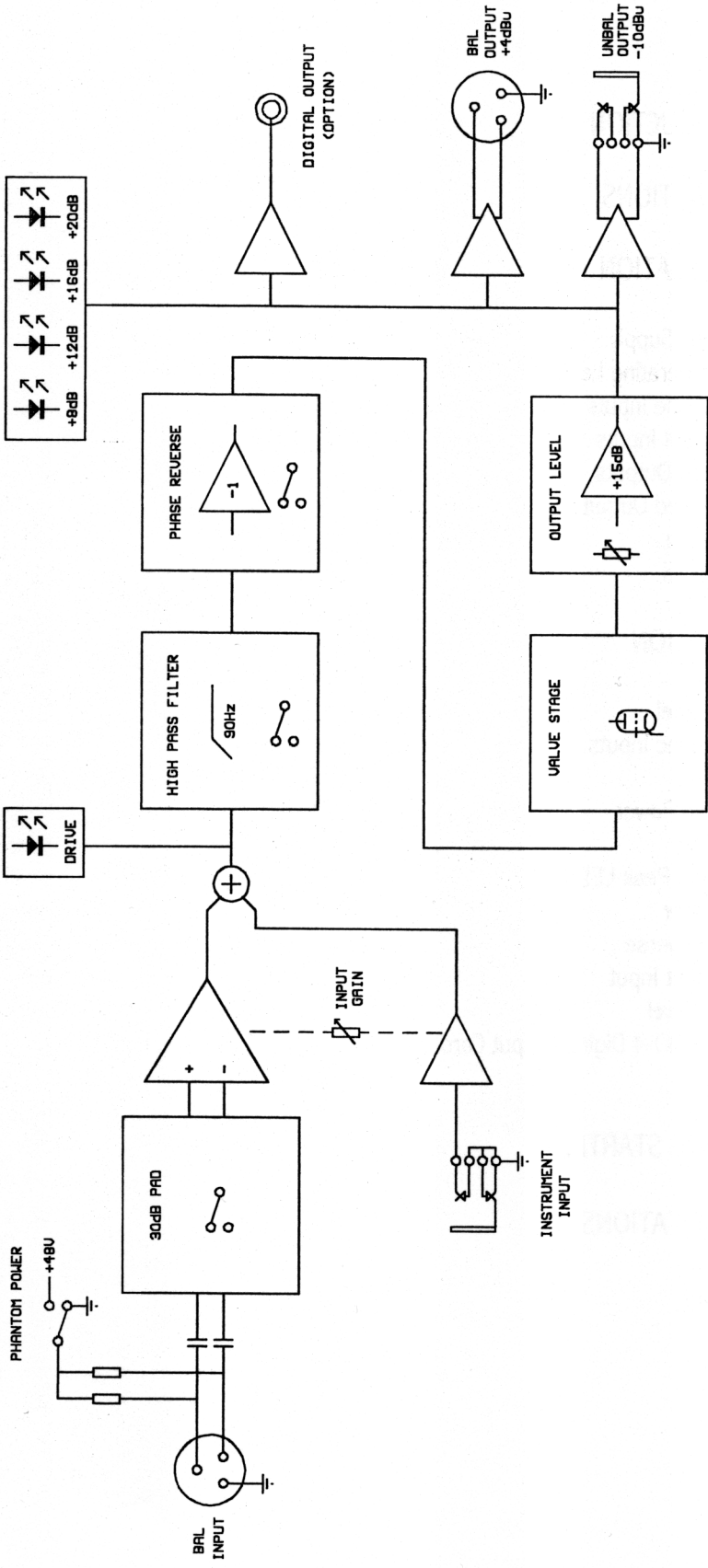
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FIG. 1: BLOCK DIAGRAM (ONE CHANNEL).



1. INTRODUCTION

Congratulations on purchasing the Ivory 5001 Quad Valve Preamp by TL Audio!

The T L Audio 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 Ivory 2 Series units offer comprehensive control facilities, whilst remaining straightforward to operate, and represent excellent value for money.

The 5001 Quad Valve Preamp is a four channel discrete valve microphone preamplifier that also offers an instrument DI input on each channel. Featuring very low noise and an exceptionally wide bandwidth, the 5001 provides continuously variable input and output gain controls, 30dB pad, 90Hz high pass filter, phase reverse and independently switched +48V phantom power.

The block diagram of one channel of the unit is shown in Fig.1. The microphone input is via a balanced XLR connector, with phantom power applied via a front panel switch. The gain of the input stages is controlled by a continuously variable rotary control, providing between 16 and 60dB of gain on the mic input. A switchable 90Hz high pass filter (12dB per octave) is provided to reduce unwanted background low frequency noise, such as traffic rumble or wind effects.

The second stage of the 5001 consists of a twin triode valve (vacuum tube) circuit. The characteristic valve sound may be subtly introduced or used to effect by increasing the input gain. A variable intensity yellow "Drive" LED monitors the input to the triode circuit to indicate the degree of valve "warming" that is being introduced. Four red LEDs show peak levels and are calibrated for +8dB, +12dB, +16dB and +20dB of output, making them ideal for monitoring levels into a digital recorder.

Phase reverse may be applied, before the output level control. The output level control allows gain matching to other integrated equipment (e.g. a mixing console or tape machine). The combination of input and output gain controls allows a degree of variation in the sound characteristics based on the operating level through the valve stages. Keeping the input gain low will produce a clean uncoloured sound, alternatively pushing the input gain will drive the valves and add the characteristic valve warmth to the signal. The output gain can be set accordingly without affecting the sound characteristics of the signal.

Each channel has a balanced XLR line level output at a nominal level of +4dBu, and an unbalanced jack output at a nominal level of -10dBu. Both are buffered from each other and may be used simultaneously.

Finally, the optional DO-4 digital output card may be fitted which provides high quality A-D conversion of each channel output. The digital output is 24 bit SPDIF format (via two RCA phono connectors), with switchable sample rate between 44.1 & 48kHz. An external BNC wordclock input is also provided.

Please read this manual fully before installing or operating the 5001.

2. PRECAUTIONS

The TL Audio 5001 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 selected 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.

3. INSTALLATION

3.1 AC Mains Supply.

The unit is fitted with an internationally approved 3 pin IEC connector. A mating socket with power cord is provided with the unit, wired as follows:

Brown: Live.

Blue: Neutral.

Green/Yellow: Earth (Ground).

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 unit 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, 1AT rated at 250V. If it ever necessary to replace the fuse, only the same type and rating must be used. The power consumption of the equipment is 20VA.

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

3.2 Audio Operating Level.

The 5001 is equipped with outputs suitable for connection to a wide variety of other audio equipment. Generally, the balanced XLR connections will be required for interfacing to other professional equipment, where the operating level (line-up level or nominal level) will be +4dBu, or about 1.2V rms. The

unbalanced jack connectors are generally intended for interfacing to semi-professional equipment and have an operating level of -10dBu, or about 225mV rms.

Both outputs of each channel may be used simultaneously if required. Balanced interconnection is always preferable to obtain the best headroom and noise rejection, but can only be used if the other equipment in the chain - e.g. the mixing console - also has provision for balanced connections.

3.3 Microphone Inputs.

Each channel has a female, 3 pin XLR connector, suitable for balanced low impedance (150 to 600 ohm) microphones. The mating connector should be wired as follows:

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

3.4 Instrument Inputs.

Each channel has a mono 0.25” jack connector on the front panel suitable for low level instruments such as guitars, bass guitars, keyboards etc. The impedance of this input is 1M Ω , making it suitable for a wide range of instruments, including guitars with high impedance pick-ups. Connecting an instrument to this input will automatically disable the mic input on that particular channel.

3.5 Balanced Outputs.

The output is via a balanced, 3 pin male XLR connector. The mating connector should be wired as follows:

- Pin 1 = Ground (screen).
- Pin 2 = Signal Phase (“+” or “hot”).

- Pin 3 = Signal Non-Phase (“-” or “cold”).

3.6 Unbalanced Outputs.

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

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

This output functions simultaneously with the balanced output, and it is quite possible to use the balanced output as the main feed to tape, while using the unbalanced output for monitoring purposes.

3.7 Ventilation.

The unit generates a small amount of heat internally. This heat should be allowed to dissipate by convection through the grills in the side panels and front panel, which must not be obstructed. Do not locate the unit where it will be subject to external heating, for example in the hot air flow from a power amplifier, or on a radiator. If used free standing, ensure that the equipment is protected against rain and spillage of liquid. The 5001 may be free standing, or mounted in a standard 19” rack.

3.8 Rear Panel.

The rear panel connectors are identified in Fig.3. Make sure that all settings, mains and audio connections have been made as described above before attempting to operate the equipment.

4. OPERATION

4.1 Front Panel.

The front panel controls are identified in Fig.2. Each of the four sections is identical.

When connecting instruments or microphones, always have the output gain set to the minimum position i.e. fully anticlockwise, to avoid sudden “thumps” that could potentially damage speakers.

4.2 Microphone Inputs.

The 4 XLR mic inputs are at the rear of the 5001. Virtually any low impedance professional microphone can be used. Condenser microphones will require the 48V phantom power to be engaged for correct operation, but before using Dynamic and Ribbon microphones ensure that the phantom power is switched off.

4.3 30dB Pad Switch.

Occasionally - when using sensitive condenser microphones - the source signal may be too loud for the input preamp. In this situation, to avoid any overloading or distortion of the mic preamp stage, the 30dB pad can be used to reduce the input gain to a more manageable level. The 30dB pad only applies to the microphone input.

4.4 Phantom Power.

Phantom power may be applied to the microphone socket by depressing the +48V switch. Do not attempt to connect any microphone that does not require phantom power, or any other equipment such as a DI box, to an input socket that has phantom power switched on, as damage may result.

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 Input Gain.

The gain of the mic preamp stage is variable from +16 to +60dB. This is a very wide range, to cater for all types of microphone and recording situations, but care must be taken not to apply large, sudden changes in gain which may result in unexpectedly large output signals. It is quite normal to have to apply larger amounts of gain for less sensitive microphones, such as dynamic types, and similarly apply much less input gain for high output condenser mics: some of which may even need the 30dB pad activated when recording very loud sources.

4.6 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 0dB to +12dB: this should be accompanied by a 'thickening' and 'warming' of the audio signal, as more harmonic distortion is introduced.

The red signal LEDs operate as a visual indication of output level, and are calibrated at +8dB, +12dB, +16dB and +20dB respectively, making them suitable for monitoring high level output signals such as those required to drive a digital recorder or soundcard.

It is possible to cause the red LEDs to illuminate even if the Drive LED is not lit. This situation can occur if the input gain is relatively low but the output gain is relatively high.

4.7 90Hz Filter.

The 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 both mic and instrument inputs.

4.8 Phase Reverse.

The phase reverse switch allows correction of a phase error, which may have occurred in microphone wiring or placement. Phase errors can be due to two microphones picking up the same signal at the same time. An example of this problem is when recording a snare drum with one microphone on the top snare skin and a second microphone on the underside skin of the snare drum. Because the two microphones are picking up the same signal at the same time, phase cancellation can occur. By inverting the phase of one of the microphones this problem can be rectified. A phase mis-match will probably manifest itself as an apparent loss of bass content when two microphone signals are mixed together or fed to a stereo pair of loudspeakers. If an error is suspected, it is a simple operation to check by phase reversing each channel in turn. The phase reverse is active on both mic and instrument inputs.

4.9 Instrument Input.

On each channel there is a front panel 0.25" instrument jack connector. This is for connecting low level instruments such as electric guitars, basses, synths, samplers, drum machines and acoustic pickups. The instrument input

eliminates the need for an external DI (Direct Injection) box since the high impedance instrument input will convert the signal to a high quality balanced or unbalanced output from the 5001. The instrument input is capable of dealing with a wide variety of instruments and by varying the input gain a choice of valve effect can be employed. A low input gain will keep the instrument clean and a higher input will drive the valve stages and add the characteristic valve warmth and second harmonic distortion.

Connecting an instrument to this input will automatically disable the mic input on that particular channel.

4.10 Output Level.

The output level control acts as a continuously variable fader at the output stage of each channel.

The centre point of the level control is the 0dB unity gain setting, with up to 15dB of additional gain available. The balanced line output of the 5001 is capable of +26dBu, which is sufficient to fully modulate a digital multitrack for direct-to-tape recording. This technique is gaining in popularity as a means of recording a very high quality signal directly to the recording device - completely avoiding the degradation and colouration added by recording through a mixing console.

In other applications, such as feeding into a console or signal processor, a much lower output level will normally be required. The output level control allows precise control and fading of the signal without affecting the operating level, signal character and quality in the preamp.

4.11 Optional DO-4 Digital Output Card.

The 5001 is designed to accept the optional DO-4 24 bit digital A to D converter card to allow easy interfacing of the 5001 with devices such as sound cards and digital recorders. The card feeds the converted output signals of channels 1 and 2 to the first SPDIF phono output, and channels 3 and 4 to the second 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-4 to an external source the sample rate setting on the DO-4 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-4 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 5001.

FIG 2: FRONT PANEL

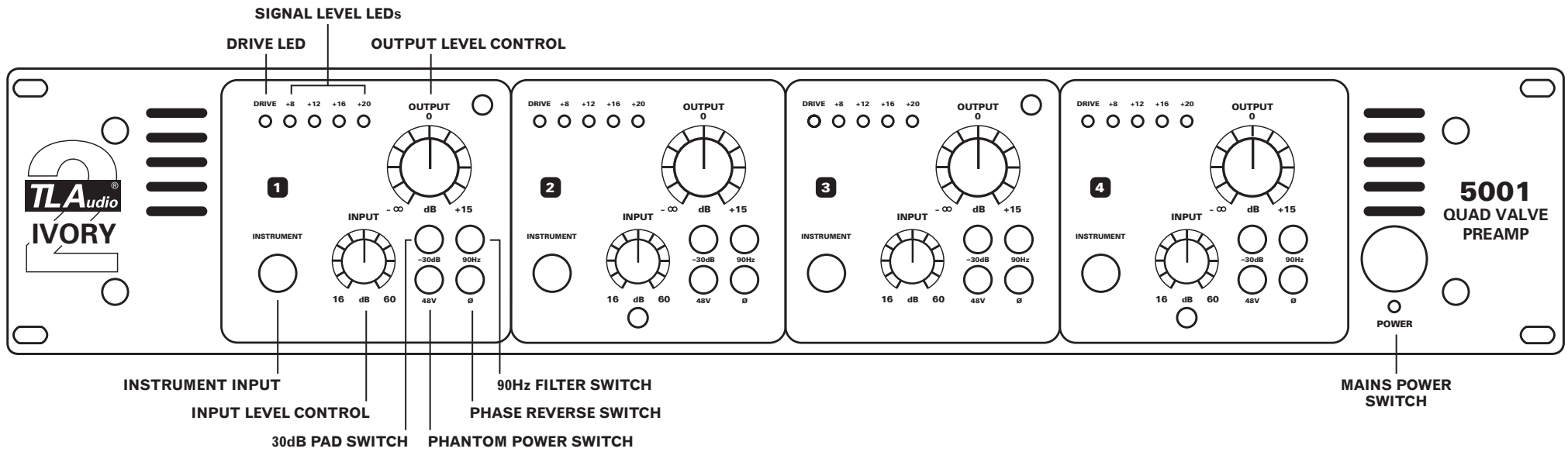
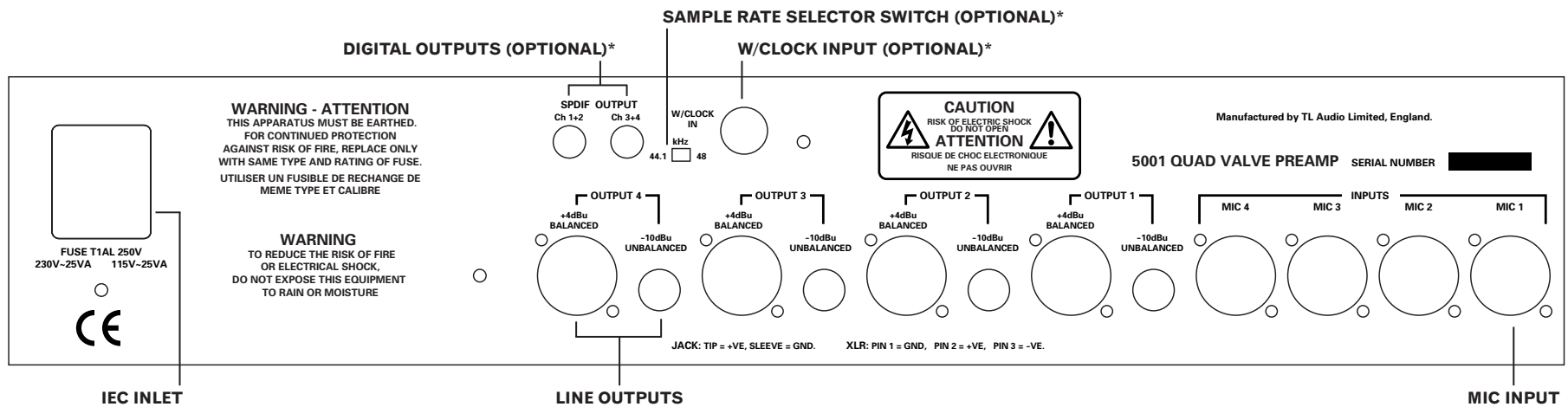


FIG 3: REAR PANEL



* VIA DO-4 DIGITAL OUTPUT CARD

5. GETTING STARTED

1. Having powered up the 5001 and ensured all the gain controls are at minimum, connect its line output to the desired line input on your console, recorder or sound card. If these devices have balanced inputs, then it is preferable to use the balanced XLR output of the 5001 for maximum signal quality. Avoid connecting the line output of the 5001 to the microphone input of a console or soundcard - this could well result in level and impedance mismatches, with a resultant loss of quality (but is easy to do in error since both normally use the same type of 3 pin XLR connector!)
2. Ensure that the console, recorder or sound card has its input gain set to a sensible level (0dB is a good starting point).
3. Then connect the desired mic or instrument source to the relevant 5001 input (microphones will use the rear panel XLR and instruments will use the front panel 0.25" jack).
4. If a condenser microphone is the sound source, then depress the +48V phantom power switch. You may see a transient thump register on the 5001 meters as you do this (which is why it is important to have the gains at minimum). Then gradually bring up the 5001 input gain level until the Drive LED starts to glow as the mic or instrument are used.
5. Now bring up the 5001 output level control - you should now start to hear some sound, and as the output is increased the red signal LEDs will start to illuminate. Set the output level to a comfortable level so that you are getting a good metered level on the piece of equipment the 5001 is driving into. Remember that some digital recorders and sound cards require a large amount of level to fully modulate their meters, so you may need to apply a significant amount of output gain to do this successfully. By contrast a standard analogue console will require much less level.
6. Experiment with the 90Hz filter - you should notice how it removes extreme LF content (particularly noticeable on close-miked male voices) and the 30dB pad will reduce the signal level quite markedly. The pad is only normally used on very loud sources where even minimum gain settings will drive the 5001 preamp into distortion. The phase reverse switch should have no real effect

unless you are using multiple mics through the 5001 and some phase cancellation is occurring.

7. Try backing off the input gain and then steadily bringing its level up so that the Drive LED glows brighter - you should notice an audible change in sound character as the valve stage is driven harder. This variation in tone is one of the great strengths of the 5001 - you have the option of running it very clean, or nice and warm as you increase the valve drive.

6. SPECIFICATIONS

Mic Gain Range: +16dB to +60dB
(-14dB to +30dB with pad).

Input Noise (EIN): -127dB (20Hz to 22KHz, maximum gain, 150 ohm termination).

Maximum Mic Input Level: +4dBu (+30dBu with pad).

Mic Frequency Response: 20Hz to 40KHz, +0, -2dB (40dB gain).

Instrument Gain Range: +10dB to +40dB.

Maximum Instrument Input Level: +10dBu.

Instrument Input Impedance: 1Mohm.

Instrument Input Frequency Response: 20Hz to 40KHz, +0, -2dB.

| | |
|------------------------------|--|
| Crosstalk: | Better than -70dB at 10KHz. (Mic inputs). |
| Drive LED: | Increasing intensity to reflect valve drive, commencing at +4dBu to full brightness at +14dBu (Output level control at 0dB). |
| Level LEDs: | Four LEDs, illuminating at +8dBu, +12dBu, +16dBu and +20dBu output level. |
| Outputs: | Balanced XLR, +4dBu nominal level. Unbalanced jack, -10dB nominal level. |
| Output Gain Control: | Rotary fader, +15dB maximum. |
| Maximum Output Level: | +26dBu (XLR), +12dBu (Jack). |
| Distortion: | Predominately second harmonic, increasing with "Drive" level. Typically 0.5% @ 0dBu. |
| Power Requirements: | Internally set to 230V 50Hz or 115V 60Hz operation. Detachable IEC power cord. Consumption 25VA. |
| Dimensions: | 19" Rack mounting, 2U high. W x D x H = 483 x 200 x 88mm (19.0" x 7.9" x 3.5"). |
| Shipping Weight: | 6Kg. |

The above specifications are subject to change without notice.

7. SERVICE

Should the 5001 require service, it must be taken or posted to an authorised dealer. 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 5001 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, 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. If claiming repair under warranty, please enclose proof of purchase date.

Please record the following details:

Serial Number.....

Date purchased.....

Dealer.....