



⋮ Digitech

VTP-1

**DUAL VACUUM-TUBE
PREAMP/EO/CONVERTER**

OWNERS MANUAL



The symbols shown above are internationally accepted symbols that warn of potential hazards with electrical products. The lightning flash with arrowpoint in an equilateral triangle means that there are dangerous voltages present within the unit. The exclamation point in an equilateral triangle indicates that it is necessary for the user to refer to the owner's manual.

These symbols warn that there are no user serviceable parts inside the unit. Do not open the unit. Do not attempt to service the unit yourself. Refer all servicing to qualified personnel. Opening the chassis for any reason will void the manufacturer's warranty. Do not get the unit wet. If liquid is spilled on the unit, shut it off immediately and take it to a dealer for service. Disconnect the unit during storms to prevent damage.

U.K. MAINS PLUG WARNING

A moulded mains plug that has been cut off from the cord is unsafe. Discard the mains plug at a suitable disposal facility. NEVER UNDER ANY CIRCUMSTANCES SHOULD YOU INSERT A DAMAGED OR CUT MAINS PLUG INTO A 13 AMP POWER SOCKET. Do not use the mains plug without the fuse cover in place. Replacement fuse covers can be obtained from your local retailer. Replacement fuses are 13 amps and MUST be ASTA approved to BS1362.

ELECTROMAGNETIC COMPATIBILITY

This unit conforms to the Product Specifications noted on the Declaration of Conformity. Operation is subject to the following two conditions:

- this device may not cause harmful interference, and
- this device must accept any interference received, including interference that may cause undesired operation. Operation of this unit within significant electromagnetic fields should be avoided.
- use only shielded interconnecting cables.

FCC COMPLIANCE

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver that may cause undesired operation.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help.

DECLARATION OF CONFORMITY

Manufacturer's Name: IVL Technologies Ltd.
per DigiTech specifications
#108-721 Vanalman Ave
Victoria, B.C.
Canada V8Z 3B6

declares that the products:
DigiTech VTP-1 Dual Vacuum Tube Preamp

conform to the following product specifications:

Safety: EN 60065 IEC 65 (1993)
Amendment 1 (1987)
Amendment 2 (1989)
Amendment 3 (1992)

EMC: EN 55022 (1987):
CISPR 22 (1993) Class B
EN 50082-1 (1992)

Supplementary Information:

The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC (1989) as amended by the CE Marking Directive 93/68/EEC (1993).

IVL Technologies Ltd.
#108-721 Vanalman Ave.
Victoria, B.C.
Canada V8Z 3B6
March 4, 1996 Peter George
Vice President of Engineering

European Contact: Your local DigiTech Sales and Service Office
International Sales Office
3 Overlook Drive Unit #4
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WARNING

FOR YOUR PROTECTION, PLEASE READ THE FOLLOWING:

Water and Moisture: Appliance should not be used near water (e.g. near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool, etc). Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.

POWER SOURCES: The appliance should be connected to a power supply only of the type described in the operating instructions or as marked on the appliance.

GROUNDING OR POLARIZATION: Precautions should be taken so that the grounding or polarization means of an appliance is not defeated.

POWER CORD PROTECTION: Power supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the appliance.

SERVICING: To reduce the risk of fire or electric shock, the user should not attempt to service the appliance beyond that described in the operating instructions. All other servicing should be referred to qualified service personnel.

CAUTION: To reduce the risk of fire replace only with same type fuse.
ATTENTION: Utiliser un fusible de recharge de même type.

CAUTION: To reduce the risk of fire replace LAMP with manufacturers recommended part (Refer to service literature)

SAFETY INSTRUCTIONS

Notice For Customers If Your Unit Is Equipped With A Power Cord.

WARNING: THIS APPLIANCE MUST BE EARTHED.

The cores in the mains lead are coloured in accordance with the following code:

GREEN and YELLOW - Earth BLUE - Neutral BROWN - Live

As colours of the cores in the mains lead of this appliance may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:

- The core which is coloured green and yellow must be connected to the terminal in the plug marked with the letter E, or with the earth symbol, or coloured green, or green and yellow.
- The core which is coloured blue must be connected to the terminal marked N or coloured black.
- The core which is coloured brown must be connected to the terminal marked L or coloured red.

This equipment may require the use of a different line cord, attachment plug, or both, depending on the available power source at installation. Connect this equipment only to the power source indicated on the equipment rear panel. If the attachment plug needs to be changed, refer servicing to qualified service personnel who should refer to the table below. The green/yellow wire shall be connected directly to the unit's chassis.

CONDUCTOR		WIRE COLOUR	
		Normal	Alt.
L	LIVE	BROWN	BLACK
N	NEUTRAL	BLUE	WHITE
E	EARTH GND	GREEN/YEL	GREEN

WARNING: If the ground is defeated, certain fault conditions in the unit or in the system to which it is connected can result in full line voltage between chassis and earth ground. Severe injury or death can then result if the chassis and earth ground are touched simultaneously.

Digitech VTP-1 Owner's Manual

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Introduction

Thank you for purchasing the Digitech VTP-1 vacuum tube preamplifier. This product was developed to help you improve the sound of your digital recording, analog recording, and live performance.

The VTP-1 offers a better alternative to using the average quality microphone preamps found in the typical multi-input console. For economic reasons, these console preamps are typically of lower quality than a single, dedicated unit. You can use the VTP-1 to get your basic tracks sounding great and then you can run the finished mix through it for final “tube” treatment and equalization.

The VTP-1’s preamplifier circuit is a hybrid design consisting of a high-voltage class A vacuum tube amplification stage, coupled with an ultralow noise, low distortion solid-state driver stage. In the VTP-1’s base configuration, the solid-state driver stage provides 40 dB of gain to the microphone inputs. With the optional input transformers installed, the driver stage gain is reduced to 20 dB, with 20 dB of virtually “noiseless” self-gain provided by the transformers.

Please contact DOD Electronics at 801-566-8800 to order the transformer installation instructions and parts kit.

The vacuum tube amplification stage is a classic, high plate-voltage design utilizing a pure class A topology. A parallel-triode arrangement is employed, in addition to a fully-regulated 235V plate supply to maximize signal-to-noise performance and transient response. Only premium-grade 12AX7A vacuum tubes are used in the VTP-1 which are hand-tested and graded specifically for the VTP-1 by Audio Glassic in the USA.

Precision 1% metal-film resistors are used throughout the audio path to ensure performance stability and low noise. In addition to precision resistors, all filter and equalization circuits utilize high quality plastic-film capacitors to maintain spectral accuracy and minimize the long-term effects of component drift. To ensure years of trouble-free operation, each VTP-1 must pass a rigorous set of performance tests and a 24-hour burn-in period before it is shipped from the factory

Features

- Low noise, pure Class A vacuum tube preamplifier stage
- Line level input that accepts -10 dBv and +4 dBu signals
- Single vacuum tube per channel with adjustable gain and trim controls
- Four band semi-parametric equalization with EQ bypass switch
- 75 Hz low cut filter with steep 12 dB/octave
- 18 bit digital output to AES/EBU and S/PDIF digital protocols
- XLR and TRS 1/4” balanced analog inputs and outputs
- Post EQ insert loop
- Combined VU metering and multisource peak indication
- Switches for 48 volt phantom power, phase reversal, 20 dB gain pad and input select

Warranty

1. The warranty registration card must be mailed within ten days after purchase date to validate the warranty.
2. DigiTech warrants this product, when used solely within the U.S., to be free from defects in materials and workmanship under normal use and service.
3. DigiTech liability under this warranty is limited to repairing or replacing defective materials that show evidence of defect, provided the product is returned to DigiTech WITH RETURN AUTHORIZATION, where all parts and labor will be covered up to a period of one year. A Return Authorization number may be obtained from DigiTech by telephone. The company shall not be liable for any consequential damage as a result of the product's use in any circuit or assembly.
4. Proof-of-purchase is considered to be the burden of the consumer.
5. DigiTech reserves the right to make changes in design, and make additions or improvements to this product without incurring any obligation to install the same on products previously manufactured.
6. The foregoing is in lieu of all other warranties, expressed or implied, and DigiTech neither assumes nor authorizes any person to assume any obligation or liability in connection with the sale of this product. In no event shall DigiTech or its dealers be liable for special or consequential damages, or from any delay in the performance of this warranty due to causes beyond their control.

DigiTech™ and VTP-1 are registered trademarks of DOD Electronics Corporation.

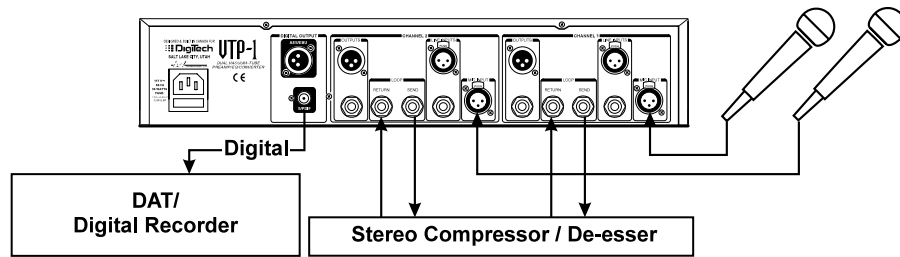
IMPORTANT:

The information contained in this manual is subject to change at any time without notification. Some information in this manual may also be inaccurate due to undocumented changes in the product or operating system since this version of the manual was completed. The information contained in this version of the manual supersedes all previous versions.

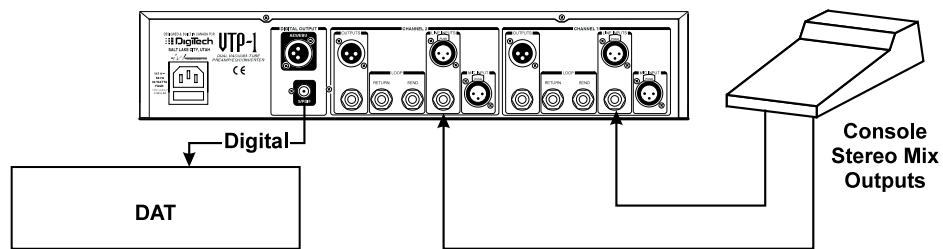
Connection Examples

The following diagrams show a few of the ways in which the VTP-1 can be used. Please note that not all digital recorders have direct digital interfacing via AES/EBU and S/PDIF. These may require a translator box.

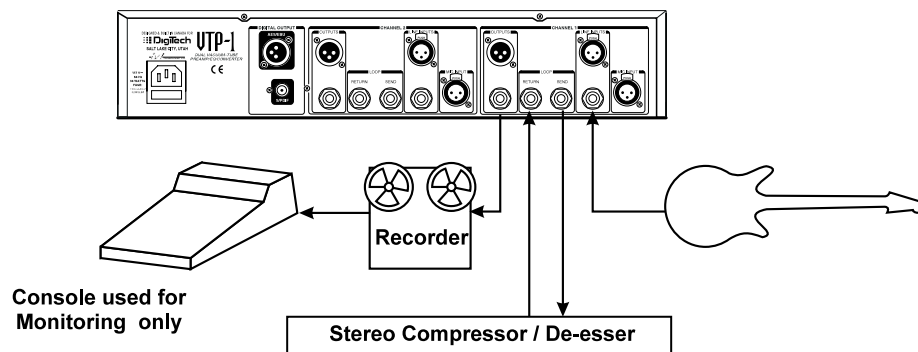
As a microphone preamplifier direct to DAT



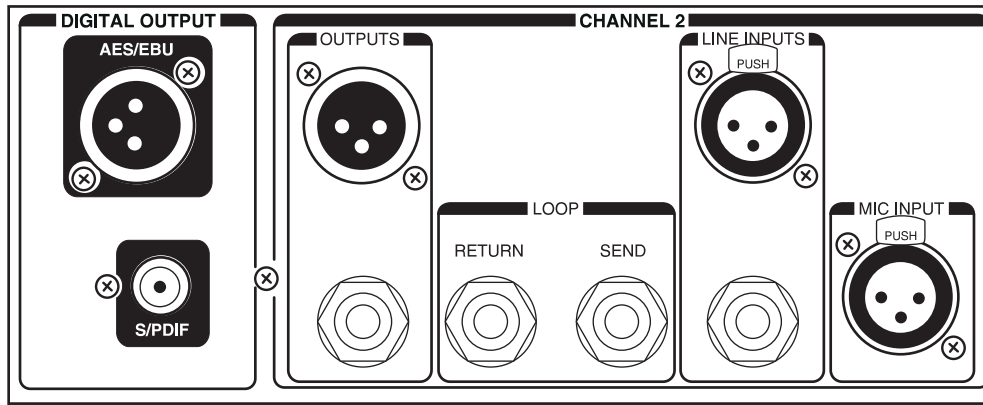
To add "Tube Warmth" to your mixes



For instrument recording



REAR PANEL



WIRING SCHEME

All of the input and output connectors are “pin 2 hot” meaning that pin number 2 on the XLR connecting cables carries the positive side of the balanced signal. Pin number 3 is “cold”, carrying the negative polarity and pin 1 is the shield.

The 1/4” TRS (Tip/Ring/Sleeve) jacks are wired so that when you use 3 conductor cables and balanced signals, the tip is hot, the ring is cold and the sleeve is the shield. The 1/4” jacks can also be used with 2 conductor unbalanced cables. In this case, the tip is hot and the ring and sleeve are grounded.

MIC INPUT

Connect the cable from your microphone here. If your mic requires phantom power, ensure that the phantom power switch on the front panel is turned off before connecting your mic. Flip the front panel Input Select switch to Mic to activate this input.

LINE INPUTS

There are two line inputs to allow you to run a variety of connecting cables from your line level sources. The XLR connector on the top is a balanced input capable of receiving +4 dBu or -10 dBv signals. The input level sensitivity is adjusted with the PRE GAIN control.

The 1/4” phone connector on the bottom is also a balanced +4/-10 input using the TRS connecting scheme. This requires a cable with “stereo” phone jacks to be used as a balanced input. It can also be used with an unbalanced source using a standard two conductor cable. If you plug a connector into the phone jack input, this will override anything plugged into the XLR input.

INSERT LOOP

These connectors allow you to insert another processor such as a compressor or de-esser into the signal path. You would insert the processor into this loop to place it in the path leading to the digital output of the VTP-1. Both the SEND and RETURN are balanced TRS jacks with +4 dBu nominal sensitivity.

SEND

The audio signal produced at the SEND output is taken from a point in the circuit after the VTP-1's tube and EQ stages. You can run a cable from this jack to the input of the external processor. Inserting a jack here will not interrupt the analog or digital audio output. This is to allow the SEND to be used as a direct post-preamp output that bypasses the main output stage of the VTP-1.

RETURN

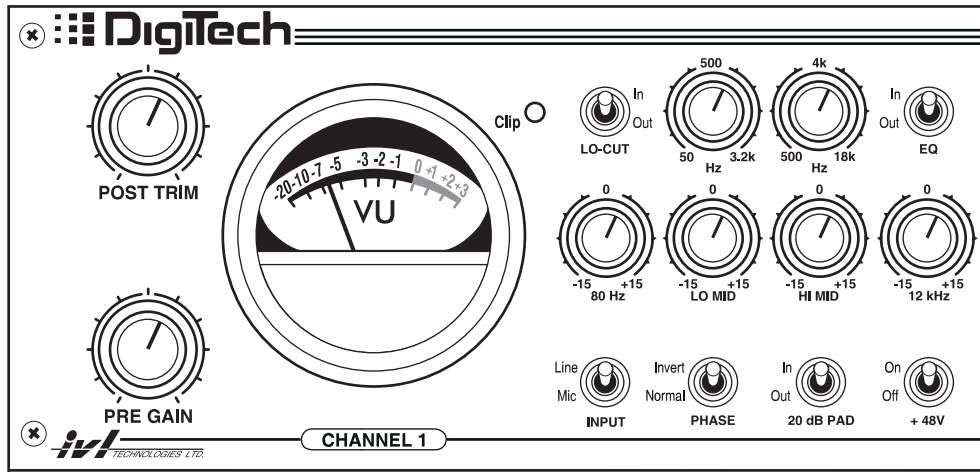
Connect the output of the external processor back to the VTP-1 through this jack. An audio signal returning here is passed along to both the analog and digital outputs.

DIGITAL OUTPUTS

The VTP-1's digital output allows you to connect directly to a DAT recorder or digital multitrack via their digital input. You can completely bypass your mixing console when recording a voice or instrument through the VTP-1. By connecting a microphone or line level instrument to the input of the VTP-1, then from the digital output directly to your recorder you keep the signal path as pure as possible. If you have digital effects in your system and digital mixdown, your audio signal will only have to be converted back to analog when it's finally played on a CD player in someone's home.

The VTP-1's digital output is offered in two standard stereo formats: AES/EBU and S/PDIF. Channel 1 of the VTP-1 drives the digital left output and Channel 2 drives digital right. You have a choice of 44.1 kHz or 48 kHz sampling rates. The controls to select Format and Sample Rate are on the front panel of the unit. (See the discussion of front panel controls for more details.)

Front Panel



POST TRIM Control

This control determines the output level presented at the analog and digital outputs. This and the PRE GAIN control work together to allow you to dial in the amount of tube saturation you would like while maintaining a nominal output level.

NOTE: *The POST TRIM control should generally be set to the fully clockwise position unless you want tube saturation.*

A reduction in POST TRIM level will reduce the amount of VU meter deflection.

The POST TRIM is an attenuator-type control in that it does not add gain when it is turned all the way up. Bring up the PRE GAIN control until the meter needle deflects with no clips registering on the CLIP LED.

You'll want to reduce the output level with the POST TRIM control when the analog output of the VTP-1 is connected to a semi pro mixer or recorder with -10dB input sensitivity. The output level should be reduced because the VTP-1 has sufficient output level to cause distortion.

PRE GAIN Control

This determines the amount of gain the tube amplifier will apply to the input signal. It is also used to adjust the input sensitivity to -10 dbv and +4 dBu signals. There is up to 66dB of gain available to amplify even the weakest of microphone signals and up to 26 dB for the line inputs. As you increase this gain control you will increase the amount of tube saturation that, in moderate amounts, enhances pleasant, even-order harmonics, but in greater amounts, can cause audible distortion.

If you have the PRE GAIN control set to a level causing tube saturation, you will need to bring the POST TRIM level down so as not to overdrive the outputs.

The VU Meter and CLIP LED

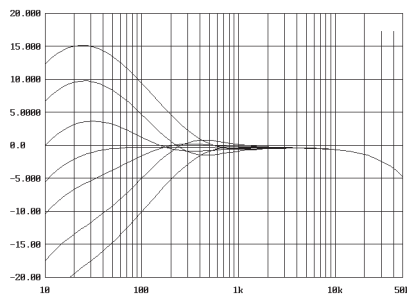
These two components give you a combined and highly accurate reading of the amount of level at the analog and digital outputs. The VU meter is calibrated in Volume Units which give an average signal level reading. The key word here is “average” because VU meters show the average difference between the peaks and valleys in the level of the program material. While VU meters generally show an accurate level for a synthesizer pad sound where the dynamic differences are slight, they will let brief peaks through that don’t register on the needle such as those from an energetic Bass guitar track.

The CLIP LED is a fast-acting indicator to warn you of peaks that are causing audible distortion at the output stage. It will light when you are 6 dB before the onset of clipping in the analog output and 3 dB before clipping in the digital output. Because there are several stages in the VTP-1, each with their own input and output, the CLIP LED has sensing at each stage to help you gauge your levels more accurately.

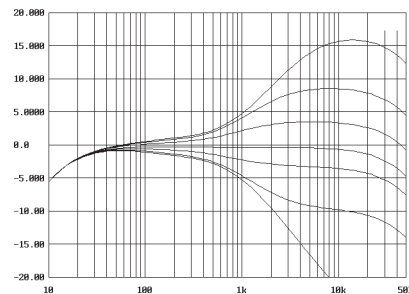
The EQ section

The EQ section is a high quality solid state equalization circuit that offers you creative and problem-solving control of your input signal. There are two shelving bands and two semi-parametric bands.

The **80 Hz** and **12 kHz** have a maximum boost or cut of 15 dB at their respective knee frequencies. The following graphs show the equalization curves at of the 80 Hz and 12 kHz bands at various cut and boost settings.

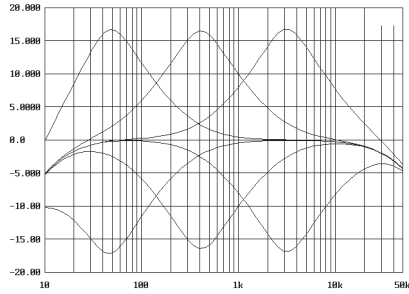


80 Hz Shelving EQ plot

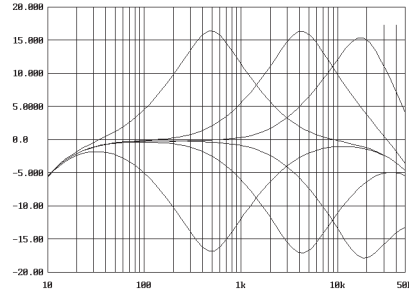


12 kHz Shelving EQ plot

The **LO MID** and **HI MID** are variable bandpass filters which allow control of specific frequency bands. The “Q” or width of the frequency band is fixed. These filters also have a maximum boost or cut of 15 dB at their specified center frequency. The following graphs illustrate the Lo Mid and Hi Mid equalization curves at various cut, boost and center frequency settings.



LO MID EQ plot



HI MID EQ plot

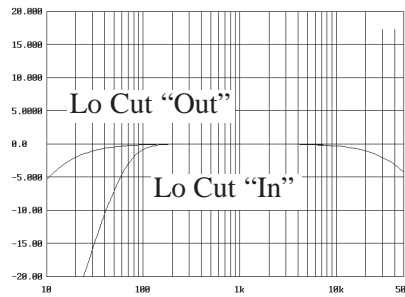
Boosting frequencies adds gain and you may find that this lights the CLIP LED. If this occurs, reduce the level with the PRE GAIN control or POST TRIM.

EQ In/Out switch

This switch removes the entire EQ circuit from the signal path. This is useful if you want to confirm that your EQ modifications are an improvement on the non-EQ'd signal. If you are not planning on using the EQ, this switch should be left in the "Out" position.

LO-CUT switch

This switch places a steep 12 dB per octave shelving circuit in the signal path with a knee frequency of 75 Hz. The LO-CUT filter can be engaged independently of the EQ In/Out switch. This is useful for removing rumble from a microphone input signal. It is also good for reducing the very low frequency harmonics in signals that cause a muddy low end or sap amplifier power unnecessarily. The following graphic shows the frequency response of the VTP-1 with the LO-CUT filter in and out.



Lo Cut Filter Plot

Mic/Line INPUT switch

This activates either the Microphone or Line input.

PHASE reversal switch

You can invert the phase of the incoming signal. This may be required when you have two mics coming into both channels of the VTP-1 and the distance between the mics is at a critical point where they cause frequency cancellation. Flipping the phase of one of the input channels can overcome the notchy, comb filtering effects caused by multiple mics on a single source.

20 dB PAD switch

This inserts a gain reduction circuit into the signal path from the microphone input. The pad is inserted before the signal is passed on to the tube and it is used to prevent overload distortion from high output microphones.

+48V phantom power switch

This switch activates phantom power for condenser microphones on pins 2 and 3 of the XLR mic input. Connect your microphone to the VTP-1 *before* turning on the phantom power. This will prevent high voltage arcing that may damage your mic.

WARNING: Do not connect unbalanced sources to this input. The voltage on these pins is sufficient to cause damage if connected directly to a transducer.

DIGITAL OUTPUT Section

FORMAT Switch

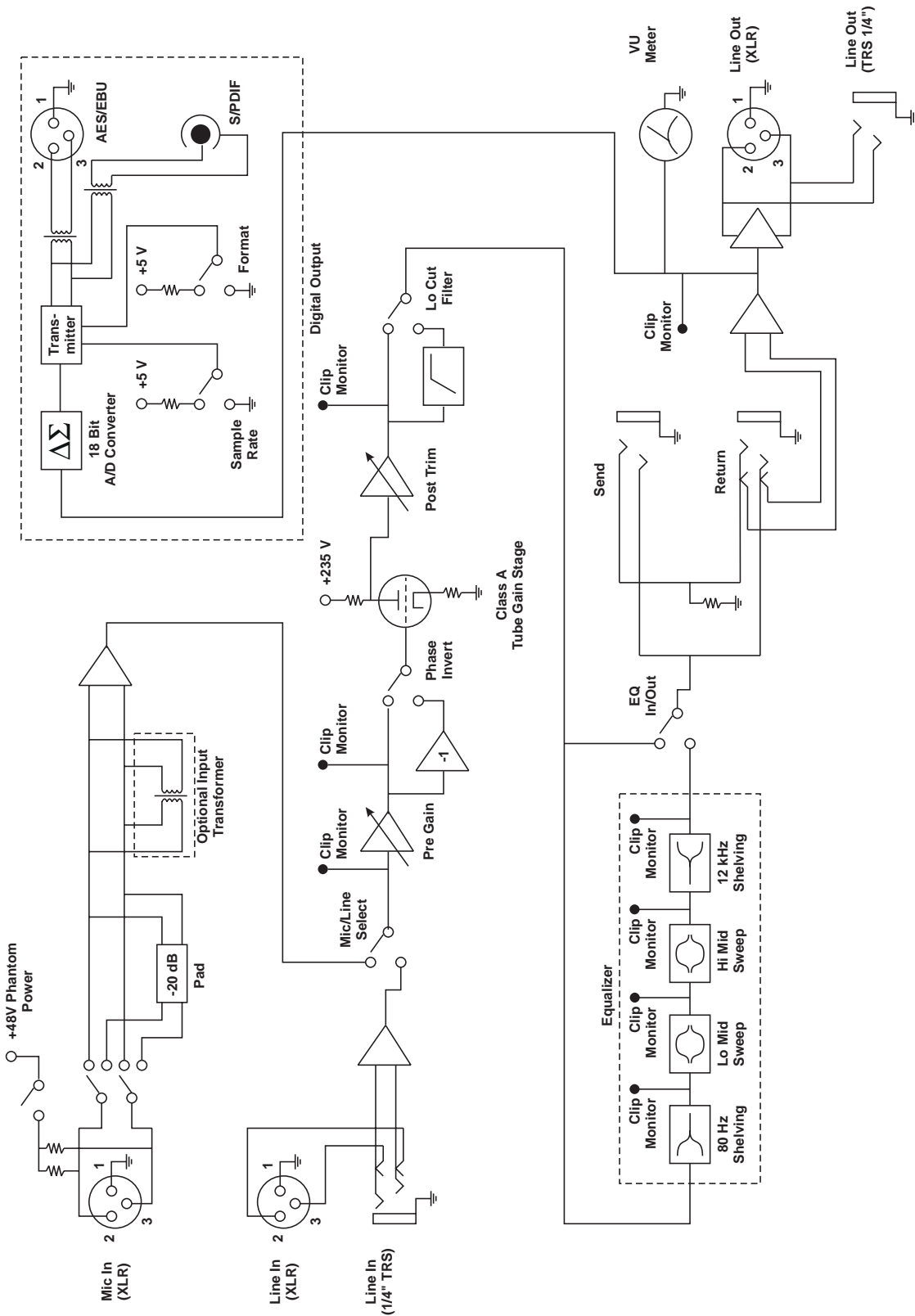
The FORMAT switch selects between the industry-standard AES/EBU and S/PDIF stereo digital audio formats. You should set this switch to the same format as the one your receiving device requires.

SAMPLE RATE Switch

When using the digital output, the VTP-1 becomes the master clock device and as such, determines the clock frequency (sample rate) for any digital devices connected to it. You have the choice of 44.1 kHz which is the standard for Compact Disc duplication, and 48 kHz, which is the sample rate for many DAT machines. If your recorder allows you an option, you are better off to stay with 44.1 kHz if your recording stands any chance of being duplicated on CD. If you have recorded a project at 48 kHz and will be putting it out on CD, you will require sample rate conversion that may effect the sound of your recording.

Your recorder should automatically sense any change in sample rate even when no audio is present. If it doesn't, you will have to set it manually. You must also ensure that your recorder is set to synchronize its sample rate to an external digital device.

DIGITECH VTP-1 SIGNAL FLOW DIAGRAM



VTP-1 SPECIFICATIONS

Equivalent Input Noise:	-127 dBu @ 150 Ω
Signal-to-Noise Ratio:	> 102 dB, A weighted
Total Harmonic Distortion + Noise:	< 0.1% typical, user-variable
Frequency Response:	+0, -1 dB from 20 Hz to 20 kHz +0, -3 dB from 15 Hz to 40 kHz
Equalization:	+/- 15 dB @ 80 Hz (shelving) +/- 15 dB @ 50 Hz to 3.2 kHz +/- 15 dB @ 500 Hz to 18 kHz +/- 15 dB @ 12 kHz (shelving)
Lo-cut Filter:	-12 dB/octave @ 75 Hz
Input Impedance:	microphone inputs: standard: 10k Ω with transformer option: 1.5k Ω line inputs: 20k Ω
Output Impedance:	XLR: < 200 Ω 1/4" TRS: < 1k Ω
Maximum Gain:	microphone inputs: +66 dB line inputs: +26 dB
Maximum Input Level:	microphone inputs: pad out: -22 dBu pad in: -2 dBu line inputs: +19 dBu
Nominal Output Level:	balanced: +12 dBu unbalanced: +6 dBu
Maximum Output Level:	balanced: +23 dBu unbalanced: +17 dBu
Digital Output:	format: AES/EBU or S/PDIF sampling rate: 44.1 or 48 kHz
Power Requirements:	120 V AC, 50/60 Hz, 30 W or as specified on rear panel
Fuse:	315 mA, slo-blo
Lamp bulb:	Manufacturer: Shogyo P/N: 7152 5 VDC @ 115 mA 0.15 Candle Power
Dimensions:	48 cm W x 8.9 cm H x 14.6 cm D (19" W x 3.5" H x 5.75" D)
Weight:	3.6 kg (8 lbs.)

Specifications subject to change without notice

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