

# **TRACE ELLIOT**

## **SERVICE MANUAL NO. SM00018**

### **ISSUE 1**

**Date:** October 28, 1996  
**Product Code :** T0135  
**Model No :** V-Type V6 Head  
**Technical File No :** TE00018

**Issued by:**

**Trace Elliot Limited.  
Blackwater Trading Estate  
The Causeway, Maldon  
Essex CM4 4GG.**



# V-Type

## V TYPE PREAMPLIFIER

V Type preamplifier is used in the following units:-

V-type head - 220 watt all valve amp. head.

V-type combo - 250 watt hybrid 15" combo.

V-type rack mount 1u all valve preamplifier.

### TECHNICAL SPECIFICATIONS

|                    |                                 |  |
|--------------------|---------------------------------|--|
| Inputs             | Passive bass                    | Impedance 1M OHM<br>Input range 25mV to 1.5V (peak-peak)                               |
|                    | Active bass                     | Impedance 100K OHMS<br>Input range 25mV to 6.0V (peak-peak)                            |
|                    | Effects return                  | Impedance greater than 1M OHM<br>Nominal input level 0dBu (0.775VRMS)                  |
| Outputs            | Effects send                    | Impedance less than 1K OHM<br>Nominal level 0dBu                                       |
|                    | Line output<br>(Head and combo) | Impedance 8K OHMS<br>Nominal level 0dBu (0.775VRMS)<br>Maximum level +4dBu (3V RMS)    |
|                    | Line output<br>(Rack mount)     | Impedance 25K OHMS<br>Nominal level 0dBu (0.775V RMS)<br>Maximum level +20dBu (14VRMS) |
|                    | DI output                       | 600ohms balanced<br>Nominal level 0dBu (pins 2 and 3)                                  |
| Frequency response |                                 | -3dB at 22Hz and 25kHz   |
| Sensitivity        | Passive input                   | 13mV   |
|                    | Active input                    | 56mV   |

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# V-Type

## V TYPE CIRCUIT DESCRIPTION

### Input SK1/SK2

SK1 and SK2 are the instrument inputs to the V type pre-amplifier. A signal entering SK1 is passed to the first stage via R1 with R2 in parallel. Resistor R3 is to decouple any D.C. appearing on the input to ground.

A signal entering SK2 is passed to the first stage via R2, again with R3 as a D.C. path to ground. This time, however, R1 has one end connected to ground via the switched contact on SK1. This provides a high degree of attenuation to input 2 for use with active or high output basses, with the combination of R2 and R1 acting as a potential divider across the input.

### First stage (effects loop).

The first stage consists of one half of V1 which is a "cathode follower" stage to provide a low impedance output to feed the effects loop. R7 is there to decouple any D.C. to ground. SKBB1 and SKBB2 form a serial effects loop with the switching contacts on SKBB2 (effects return) providing the "break" into the circuit. Therefore SKBB2 can also be used as a "line in".

The signal from the effects return is passed via C27 (D.C. blocking) to the second half of V1.

### Second stage (Tone network).

The tone circuit forms the anode load for the second half of V1. C3 and RV4 form the treble circuit, C4 and RV2 form the bass circuit and C5 and RV3 form the mid range circuit. RV3 incorporates a pull switch which switches C6 into the mid circuit and C5 out. This alters the point at which the mid range circuit works, upwards to about 2kHz. R12 and R13 provide D.C. paths to ground from the mid-shift contacts to reduce switching noise.

# V-Type

## Deep and bright switches.

The deep switch (SW1) provides a MID and TREBLE cut to accentuate the bass response by shorting out R11 and bringing C7 into the tone network.

The bright switch (SW3) brings C8 into circuit placing it in parallel with the top half of the gain control RV1. This creates a high-pass filter with a shallow roll off to accentuate the high frequency response. This function is disabled when the gain control is at a maximum as the capacitor is then by-passed. R14 is used to decouple any D.C. on the switch to ground.

## Third stage.

The output from the tone network is fed from RV4 to RV1 (gain control) and then directly into the first half of V2. This is a gain stage to bring the signal up to a suitable level to drive a power amplifier.

The signal is then fed directly into the second half of V2 which is a "cathode follower" stage. This provides slightly less than unity gain but is designed to give a low impedance output to drive a power amplifier. The output signal is passed via C11 to the volume control RV5 and then onto the output jack socket SKBB3. This is only true for the rack mount version. In the head and combo the signal from RV5 pin 2 is passed directly to the power-amp. section, and a fixed level signal is taken from RV5 pin 3 to the line out socket. This is attenuated by a potential divider network of R38 and R39 to give a line level signal output.

## D.I. output

A pre-eq D.I. signal is taken from the junction of R8 and R9 in the anode circuit of the second half of V1 before the signal is passed through the tone network, via C13.

The post-eq D.I. signal is passed via C12 from the output (cathode) of V2.

SW4 selects each of these signals with R21 and R22 providing a D.C. path to ground. The signal is then attenuated by the potential divider of R23 and R24 to provide a suitable level for the I.C.. The signal enters the inverting input of I.C. 1 via C14 and R25. The output on pin 1 of this half of the I.C. is passed via C16 and R33 to provide the negative or anti-phase D.I. signal on pin 3 of the XLR (SK5). The signal from pin 1 also enters the inverting input of the second half of I.C. 1 which re-inverts it to give the inphase (positive) D.I. signal on pin 2 of SK5. C18 is present for high frequency stability.

D.C. biasing for I.C. 1 comes from the potential dividers of R29 and R27 and R8 with R26 which halve the +33V supply to provide the reference points for the signals. SW5 isolates the ground connection pin 1 on SK5 to eliminate earth loops when connected to external equipment.

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# V-Type

## **Pre-amp power supply.**

In the rack mount version all supplies are derived from a single torroidal transformer. This provides 250V A.C. for the HT lines, bridge rectified and smoothed by C19, C20 and C21. R36 is present to stop any signal from HT2 getting onto HT1 which could cause feedback problems. It also provides 6.3V AC for the valve heaters and 40V A.C rectified and smoothed by C22 for the I.C. supply. This is regulated by a BC549 transistor, a 33v zener diode and a 5K6 resistor with C23 for smoothing purposes.

The same transformer is used in the combo version in conjunction with a larger torroidal to supply power to the output stage.

In the Head version the large mains transformer used for the phase splitter and output valves is also used for all the pre-amp. supplies.

## **Mains on indication**

For the head and combo versions a 6.5V A.C. lamp is used for "mains on" indication. Power for this is derived directly from the 6.3V heater supply.

For the rack mount version, the 6.3V heater supply is rectified by D9 and D10 to supply a D.C. voltage to the LED built into the mains on switch. R40 is used as the current limiting resistor.

## C12-PCB-VTYP-C/Hx1.

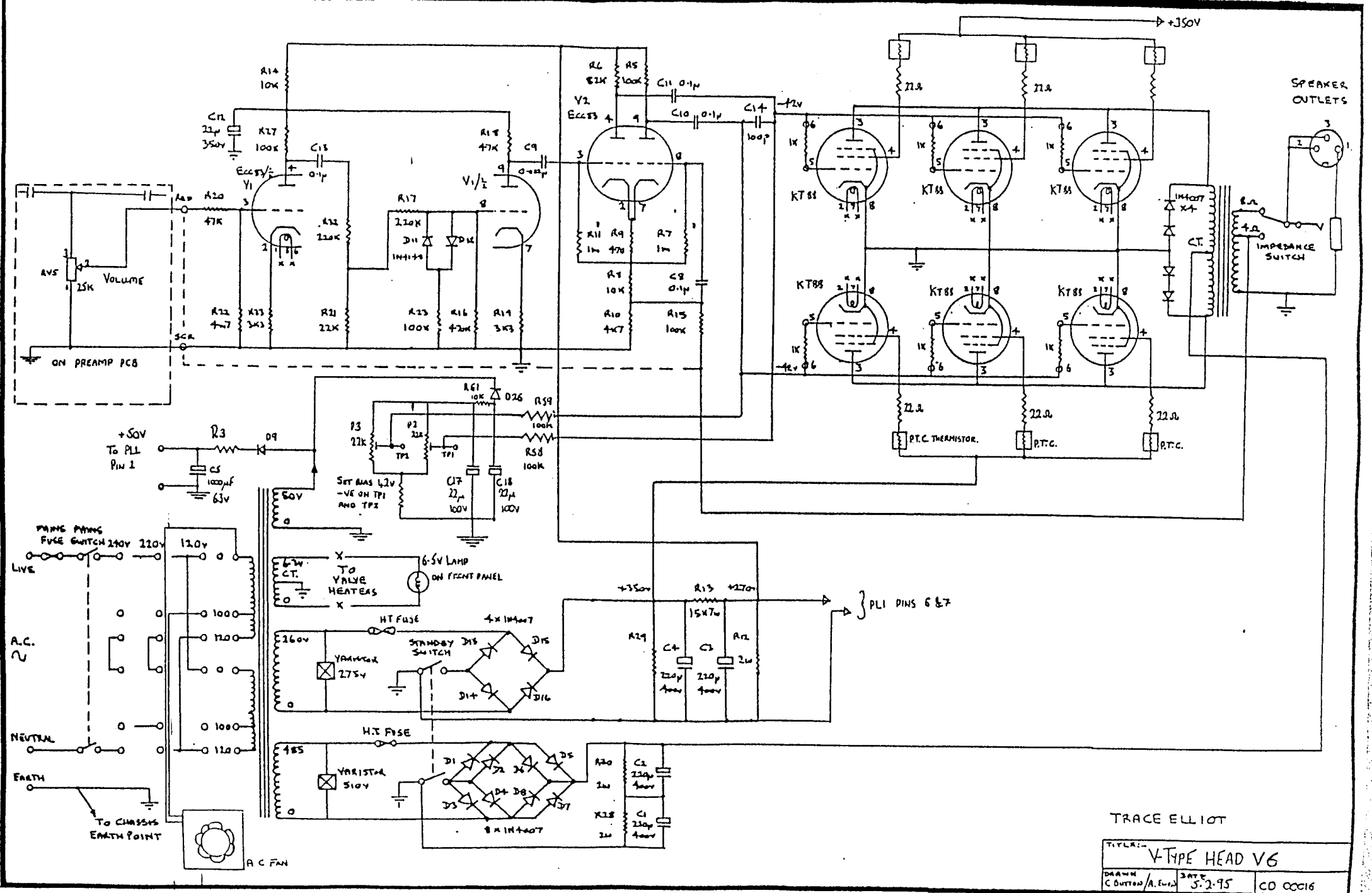
V-TYPE COMBO/HEAD PREAMP MAIN BOARD.  
ISSUE 1 INSERTION LIST. ANDY EWEN 11/8/98.

| DESCRIPTION          | PART CODE        | QTY | WHERE USED                                    |
|----------------------|------------------|-----|---|
| PCB PC00008 ISSUE 2  | 73-PCB-PC00008   | 1   |   |
| ZENER DIODE 27V      | 72-D-BZX55C27V   | 1   | ZD1   |
| DIODE                | 72-D-IN4007      | 10  | D1-D10  |
| RES 2.5W 4K7         | 72-RWW4K7-2.5W   | 1   | R35   |
| RES 2W 100K          | 72-RC100K-2W     | 4   | R8 R10 R17 R20                                |
| RES 1/2W 10K         | 72-RC10K-.5W     | 2   | R9 R36  |
| ZERO OHM LINK        | 72-RCZERO        | 28  | AS MARKED                                     |
| RES 1/4W 100K        | 72-RM100K        | 2   | R2 R5   |
| RES 1/4W 100R        | 72-RM100R        | 1   | R40   |
| RES 1/4W 10K         | 72-RM10K         | 1   | R24   |
| RES 1/4W 10M         | 72-RM10M         | 1   | R14   |
| RES 1/4W 150K        | 72-RM150K        | 1   | R23   |
| RES 1/4W 1K5         | 72-RM1K5         | 3   | R6 R16 R18                                    |
| RES 1/4W 1M          | 72-RM1M          | 7   | R3 R4 R7 R12 R15 R21 R22                      |
| RES 1/4W 27K         | 72-RM27K         | 1   | R1  |
| RES 1/4W 330K        | 72-RM330K        | 1   | R13   |
| RES 1/4W 47K         | 72-RM47K         | 8   | R25-R32                                       |
| RES 1/4W 560K        | 72-RM560K        | 1   | R11   |
| RES 1/4W 560R        | 72-RM560R        | 2   | R33 R34                                       |
| RES 1/4W 5K6         | 72-RM5K6         | 1   | R37   |
| RES 1/4W 8K2         | 72-RM8K2         | 1   | R19   |
|                      |                  |     |   |
| CAP 1uF POLY BOX     | 72-C1-250VP      | 1   | C2  |
| CAP 1uF ELEC RADIAL  | 72-C1-63VER      | 2   | C14 C15                                       |
| CAP 10uF ELEC RADIAL | 72-C10-35VER     | 2   | MOD ACROSS R28 & R29<br>+ve legs nearest IC1. |
| CAP 10uF ELEC RADIAL | 72-C10-63VER     | 2   | C16 C17                                       |
| CAP 1000uF ELEC RAD. | 72-C1000-63VER   | 1   | C22   |
| CAP 100N POLY BOX    | 72-C100N-250VP   | 5   | C4 C24 C25 C26 C27                            |
| CAP 100P CER DISC    | 72-C100P-100VCD2 | 2   | C18 C28                                       |
| CAP 150P CER DISC    | 72-C150P-50VCD   | 1   | C8  |
| CAP 200P Polystyrene | 72-C200P-630VPA  | 1   | C3  |
| CAP 22uF ELEC AXIAL  | 72-C22-450VEA    | 2   | C20 C21                                       |
| CAP 22N POLY BOX     | 72-C22N-400VP    | 2   | C12 C13                                       |
| CAP 47uF ELEC RADIAL | 72-C47-63VER     | 2   | C9 C10  |
| CAP 470uF ELEC RAD.  | 72-C470-63VER    | 1   | C23   |
| CAP 470N POLY BOX    | 72-C470N-250VP   | 1   | C11   |
| CAP 47N POLY BOX     | 72-C47N-100VP    | 1   | C1  |
| CAP 47N POLY BOX     | 72-C47N-400VP    | 2   | C5 C7   |
| CAP 4N7 POLY BOX     | 72-C4N7-400VP    | 1   | C6  |
| CAP 100uF ELEC RAD.  | 72-CAP-100400V   | 1   | C19   |

|                             |                         |          |                                    |
|-----------------------------|-------------------------|----------|------------------------------------|
| <b>TRANSISTOR BC549C</b>    | <b>72-TBC549C</b>       | <b>1</b> | <b>TR1</b>                         |
| <b>8-WAY SOCKET</b>         | <b>72-SOCKET-8W</b>     | <b>1</b> | <b>FOR IC1</b>                     |
| <b>IC RC4558P</b>           | <b>72-IC-RC4558P</b>    | <b>1</b> | <b>IC1</b>                         |
|                             |                         |          |                                    |
| <b>POT A 1MEG</b>           | <b>73-POT-A1M</b>       | <b>1</b> | <b>P1</b>                          |
| <b>POT A 250K</b>           | <b>73-POT-A250K</b>     | <b>2</b> | <b>P2 P4</b>                       |
| <b>POT A 25K</b>            | <b>73-POT-A25K</b>      | <b>1</b> | <b>P5</b>                          |
| <b>POT A25K PULL SWITCH</b> | <b>73-POT-A25K-PS</b>   | <b>1</b> | <b>P3</b>                          |
|                             |                         |          |                                    |
| <b>MINI TOGGLE SWITCH</b>   | <b>73-SWT-M-TGL-PCB</b> | <b>4</b> | <b>SW1 SW3 SW4 SW5</b>             |
|                             |                         |          |                                    |
| <b>2-WAY HEADER 0.1"</b>    | <b>72-HEAD-2W</b>       | <b>4</b> | <b>HP1-HP4 (SEE NB1)</b>           |
| <b>8-WAY HEADER 0.2"</b>    | <b>72-HEAD-8W</b>       | <b>1</b> | <b>PL1</b>                         |
| <b>VALVE BASE 9-WAY</b>     | <b>73-VAL-SOCKET</b>    | <b>2</b> | <b>VT1 VT2</b>                     |
| <b>XLR PLUG NEUTRIK</b>     | <b>73-XLR-PCB-M-N</b>   | <b>1</b> | <b>XLR1</b>                        |
| <b>JACK SOCKETS</b>         | <b>72-SKT-JCKBNBG</b>   | <b>2</b> | <b>SK1 SK2</b>                     |
|                             |                         |          |                                    |
| <b>FLYLEAD</b>              | <b>C00-FLY-HEATER</b>   | <b>1</b> | <b>ACROSS HP1-HP4</b>              |
| <b>SIGNAL LEAD</b>          | <b>LOOM-00275</b>       | <b>1</b> | <b>From L/0(F) to PC00009</b>      |
| <b>SIGNAL LEAD</b>          | <b>LOOM-00276</b>       | <b>1</b> | <b>From send/return to PC00009</b> |
| <b>LEAD FOR LAMP</b>        | <b>LOOM-00277</b>       | <b>1</b> | <b>From PL3 to 6.3V lamp</b>       |
|                             |                         |          |                                    |

**N.B.1** The four 2-way headers are fitted with their small face to the left. This is with the pots facing you.





TRACE ELLIOT

|         |                     |                |        |
|---------|---------------------|----------------|--------|
| TITLE:- |                     | V-TYPE HEAD V6 |        |
| DRAWN   | C. BUTTON/A. ELLIOT | DATE           | 5.2.95 |
|         |                     | CO             | C0016  |

## PARTS LIST FOR VA250 POWER MODULE FOR V-TYPE HEADS

| Description       | Part Code      | Qty | Where Used      |
|-------------------|----------------|-----|-----------------|
| DIODES            |                |     |                 |
| IN4007            | 72-D-IN4007    | 13  | D1-D9 D13-D16   |
| IN4148            | 72-D-IN4148    | 2   | D11 D12         |
| RESISTORS         |                |     |                 |
| ZERO OHM LINK     | 72-RCZERO      | 2   |                 |
| 22R 2.5W          | 72-RWW22R-2.5W | 4   | R39 R40 R41 R42 |
| 470R 1/2W         | 72-RC470R-.5W  | 1   | R9              |
| 2K2 1/2W          | 72-RC2K2-.5W   | 1   | R21             |
| 3K3 1/2W          | 72-RC3K3-.5W   | 2   | R19 R33         |
| 4K7 1/2W          | 72-RC4K7-.5W   | 1   | R10             |
| 6K8 4W            | 72-RWW6K8-4W   | 1   | R3              |
| 10K 1/2W          | 72-RC10K-.5W   | 2   | R8 R14          |
| 15K 7W            | 72-RWW15K-7W   | 1   | R13             |
| 47K 1/2W          | 72-RC47K-.5W   | 2   | R18 R20         |
| 82K 1/2W          | 72-RC82K-.5W   | 1   | R6              |
| 100K 1/2W         | 72-RC100K-.5W  | 4   | R5 R15 R23 R27  |
| 220K 1/2W         | 72-RC220K-.5W  | 2   | R17 R32         |
| 220K 2.5W         | 72-RC220K-2W   | 4   | R12 R28 R29 R30 |
| 470K 1/2W         | 72-RC470K-.5W  | 1   | R16             |
| 1M 1/2W           | 72-RC1MEG-.5W  | 2   | R7 R11          |
| 4M7 1/2W          | 72-RC4M7-.5W   | 1   | R22             |
| THERMISTOR        |                |     |                 |
| PTC THERMISTOR    | 72-THERMISTOR  | 4   | R24 R25 R35 R36 |
| CAPACITORS        |                |     |                 |
| 22nF 400V POLY    | 72-C22N-400VP  | 1   | C9              |
| 100nF 250V POLY   | 72-C100N-250VP | 4   | C8 C10 C11 C13  |
| 22μF 450V AXIAL   | 72-C22-450VEA  | 1   | C12             |
| 220μF 400V RADIAL | 72-CAP-220400V | 4   | C1 C2 C3 C4     |
| 1000μF 63V AXIAL  | 72-C1000-63VEA | 1   | C5              |
| SOCKETS           |                |     |                 |
| VALVE BASE        | 73-VAL-SOCKET  | 2   | VB1 VB2         |

RIK DANIELS  
February 10, 1997

# **PROCEDURE FOR BIASING V4/V6**

ISSUE 1 PS 31/8/99

- 1) Connect 'BIAS KING' valve plug/sockets to rear middle two valve sockets on amplifier chassis.
- 2) Insert matched set of KT88's into all positions.
- 3) Switch unit to Standby mode and allow valves to warm up for at least 1 minute.
- 4) During this time connect unit to appropriate load and set all controls to minimum.
- 5) Switch unit from Standby to fully On.
- 6) By observing the current read out on the LCD display of the BIAS KING and switching between the two valves, adjust the quiescent cathode current to give 30mA (+/- 2mA) on each valve. The trim pots are accessible from the top of the chassis and can be adjusted using a trimmer tool.
- 7) Switch unit to Standby and then Off.
- 8) When cool enough remove BIAS KING from between valves and re-insert them into bases.
- 9) Turn to Standby again, warm up and then switch on.
- 10) Connect a signal generator to the INPUT and set up controls to give maximum power output.
- 11) Check that this is an acceptable power for the unit in question and that there is no excessive distortion.

12) Gently tap each valve with a screwdriver, signal on scope should remain stable.