

# TRACE ELLIOT

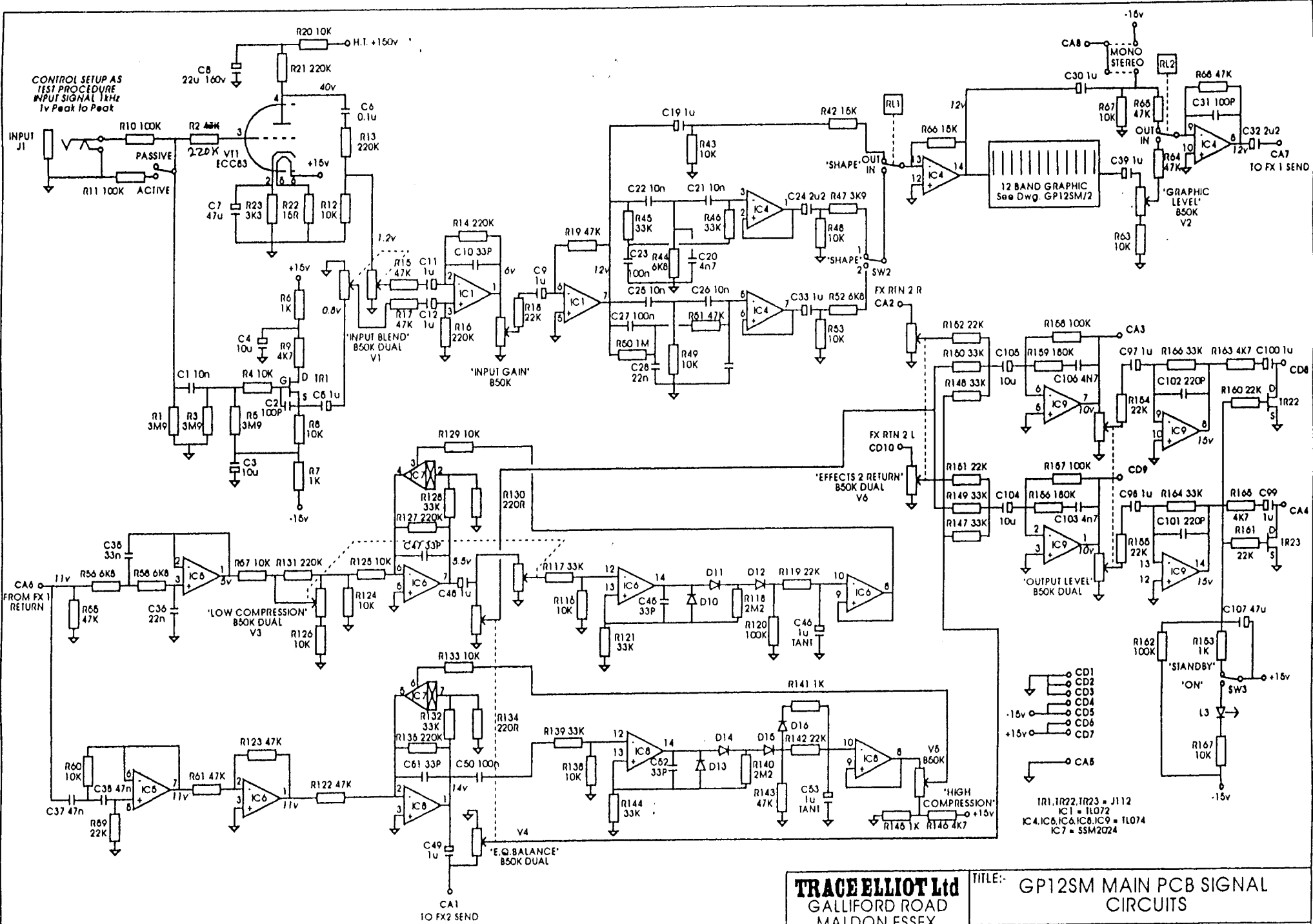
## SERVICE MANUAL

**DATE :** December 29, 1999

**Product Code:** T0600

**Model Number :** GP12SMX pre-amp

Issued by:  
**Trace Elliot Limited**  
**Blackwater Trading Estate**  
**The Causeway**  
**Maldon**  
**Essex**  
**England**  
**CM4 4GG**

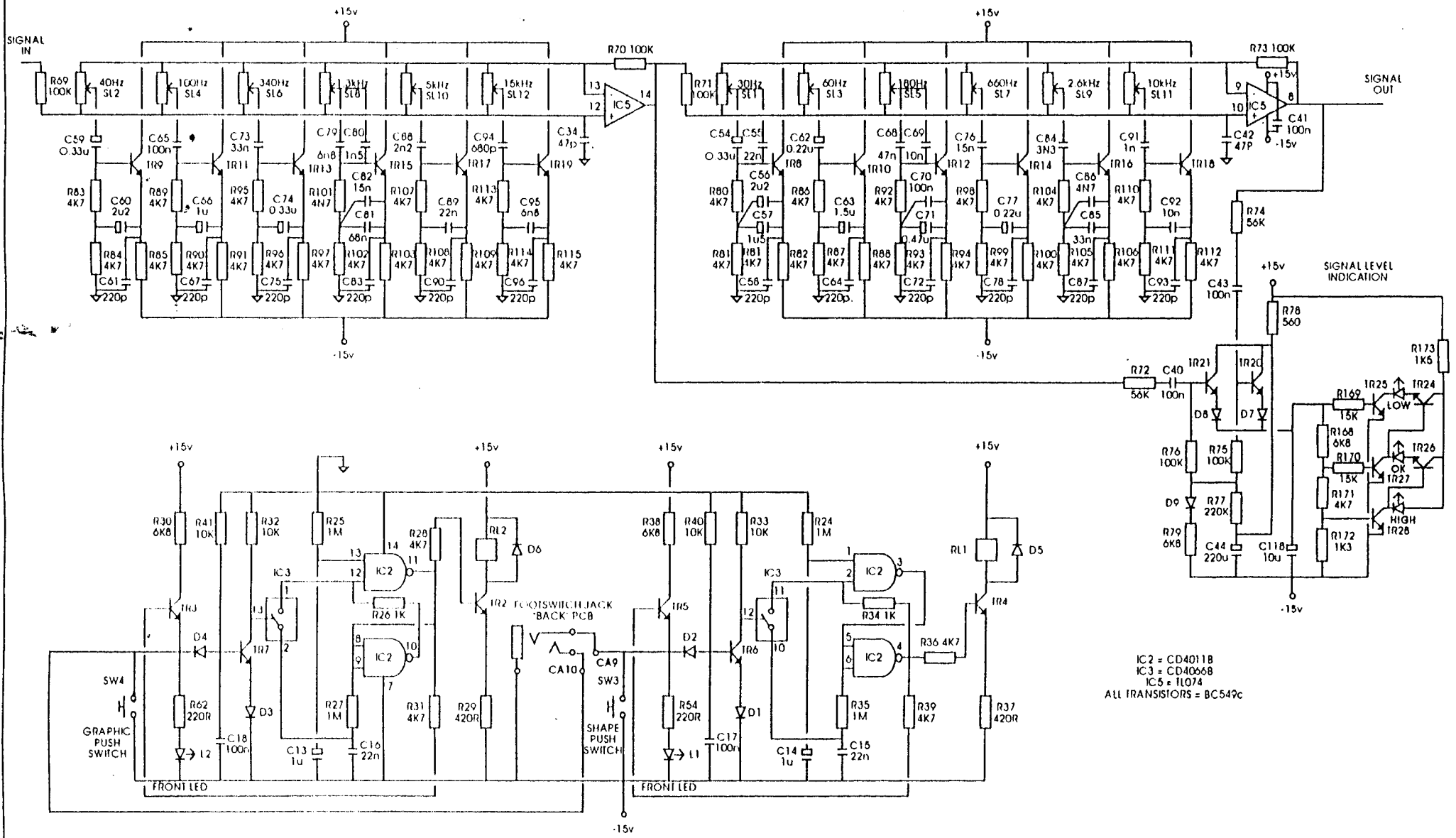


CONTROL SETUP AS TEST PROCEDURE  
INPUT SIGNAL 1kHz  
1v Peak to Peak

IR1, IR2, IR3 = J112  
IC1 = TL072  
IC4, IC6, IC8, IC9 = TL074  
IC7 = 55M2024

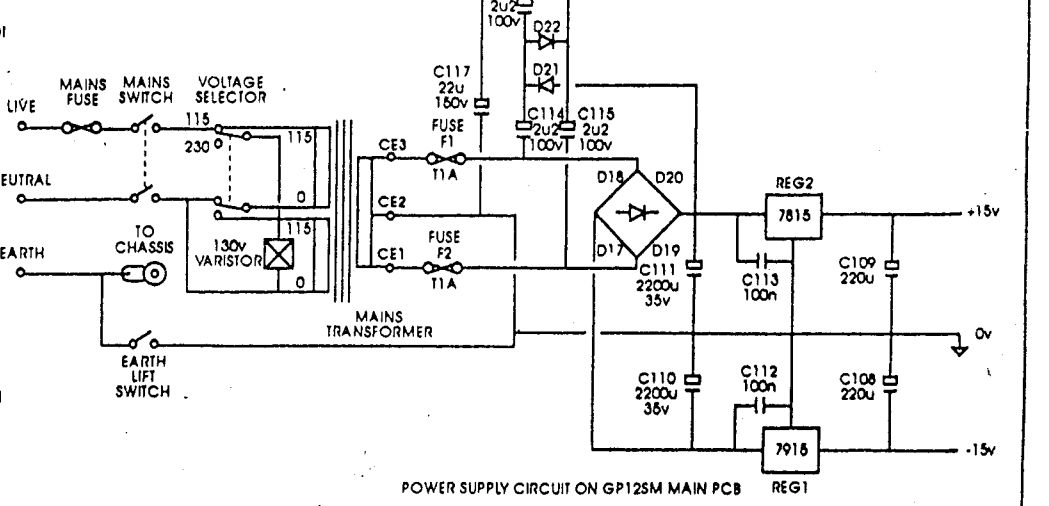
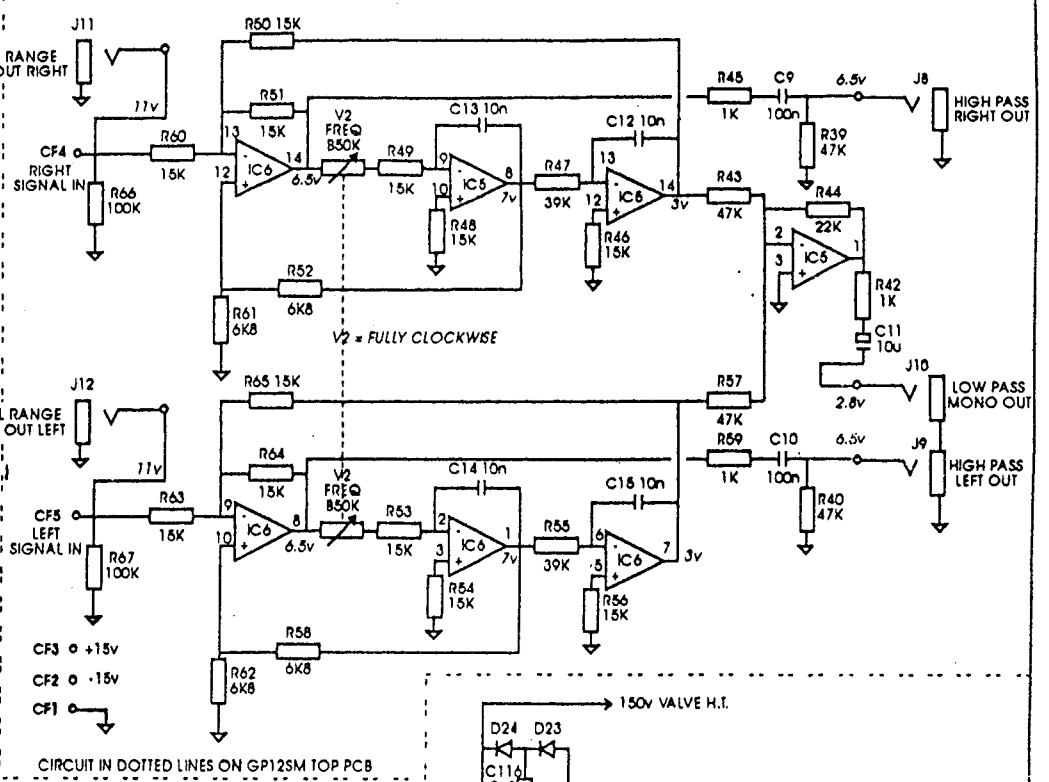
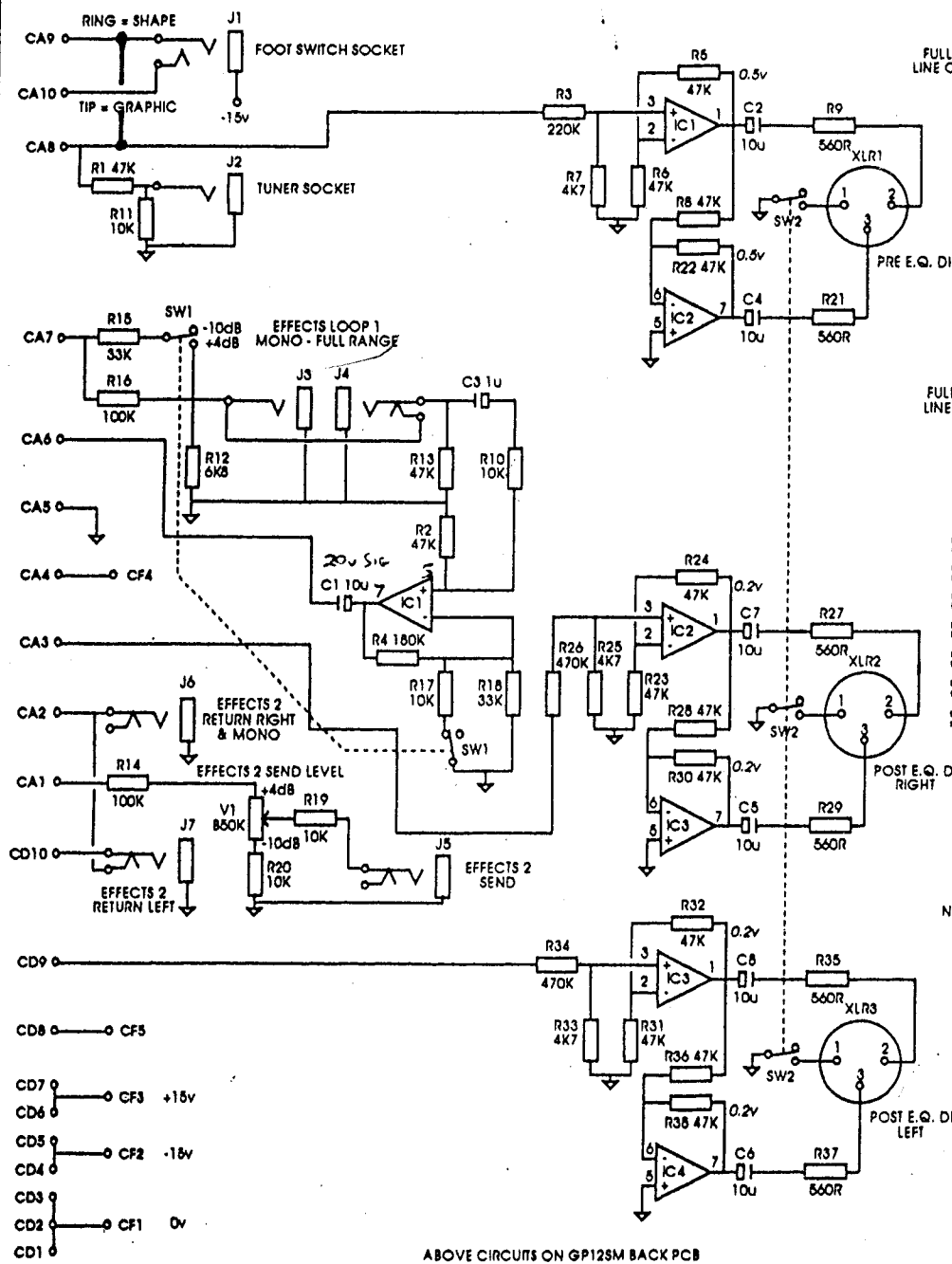
**TRACEELLIOT Ltd**  
GALLIFORD ROAD  
MALDON, ESSEX,  
CM9 7XD, ENGLAND

TITLE:- GP12SM MAIN PCB SIGNAL CIRCUITS  
DRAWN C. BUTTON DATE 21.9.92 DRG No GP12SM/1



IC2 = CD4011B  
 IC3 = CD4066B  
 IC5 = 1LQ74  
 ALL TRANSISTORS = BC549c

<b>TRACE ELLIOT Ltd</b> GALLIFORD ROAD MALDON, ESSEX, CM9 7XD, ENGLAND		TITLE:- GP12SM MAIN, GRAPHIC E.Q. & SWITCHING CIRCUITS	
		DRAWN C. BUITON DATE 22.9.92 DRG No. GP12SM/2	



# **GP12 SMX CIRCUIT DESCRIPTION**

**February 21, 1997**

## **Input**

J1 is the instrument input to the pre-amp.

The passive / active switch connects R10 to R11 and acts as a potential divider to effectively half the amplitude of the input signal sent to the valve and FET input stages.

## **Valve Input Stage**

This uses half a twin triode valve ( ECC83 / 12AX7 ) and has a voltage gain of around 40. R12 and R13 form a potential divider to bring the voltage down to about 1.2 volts, which is sent to one half of the 'Input Blend' pot.

## **FET Input Stage**

The FET is configured as a common drain or source follower circuit to provide a low impedance output to feed the 'Input Blend' pot.

## **Input Blend and Input Gain**

This is a dual gang potentiometer which is used as a balance control between the valve and FET input stages. As these two stages are out of phase, IC1, which is configured as a differential amplifier, mixes these two signals as well as amplifying them to around 6 volts.

## **Mid Pre-Shape**

Pre-Shape 1 is determined by the first op-amp stage in IC4 and discrete components C20 to C23 and R44 to R46.

Pre-Shape 2 is determined by the second op-amp stage in IC4 and discrete components C25 to C28 and R49 to R51.

Each pre-shape is selected with SW2.

RL1 is used to switch between 'straight' and 'pre-shape' sounds.

## **Graphic Section**

The graphic equalisation section is configured around IC5.

The graphic is split into two halves with each covering six frequency bands.

After the graphic section the signal is sent to effects loop one, ( except on mono versions - AH300SMX / RAH300SMX and all SMX combos ) and then into the dual compressor section.

## **Dual Compressor Section**

First of all the signal is split, one half goes through a low pass filter, while the other goes through a high pass filter.

Each signal then goes into separate compression circuits whose ratios are set by V3 and V5 for low and high respectively.

The 'High Compression' signal is then sent to effects loop 2, while the 'EQ Balance' pot sets the balance between the two compression stages to be sent to the output stage of the pre-amp.

IC's 5,6,7 and 8 with their associated components make up the compression section, including filtering.

### **Output Stage**

The signals from the dual gang 'EQ Balance' pot and from the effects return are mixed and amplified by the four op-amp stages in IC9. The output level being set by another dual gang pot.

A FET is connected between the output signals and ground, when this is switched on, by SW3, the drain is effectively at the same voltage as the source thereby shorting the output to ground for 'Standby' mode.

### **Signal Level Indication**

TR21 and TR20 are fed from two points in the graphic section of the pre-amp, these then develop a DC voltage across C118 feeding the potential dividing network R168, R171 and R172.

As the DC voltage rises the corresponding LED's will be switched on.

### **Graphic and Pre-Shape Switching**

This is all performed by IC2 ( 4011 Quad 2 input nand gate ), IC3 ( 4066 analogue switch ) and relays 1 and 2, as well as the associated discrete components.

### **Pre-Amp Supply Regulation**

The mains transformer for each unit in the SMX range, regardless of size, has a low current 18-0-18 volt secondary tapping, as well as the main higher current power board tapping.

The centre of this tapping is connected to the 0 volt rail on the pre-amp, while the other two are fed firstly through F1 and F2 before being connected to a bridge rectifier to give full wave rectification. This is then filtered by C110 and C111 and then regulated by REG 1 ( 7815 ) and REG 2 ( 7915 ).

This then provides the +15, 0 and -15 volt rails which are used in the majority of the pre-amp.

The 150 volt HT supply for the valve is generated by the circuit consisting of D21 to D24 and C114 to C117.

This is a simple voltage quadruplar circuit that derives 150 volts from the 18-0-18 volt AC supply.

# PARTS LIST FOR GP12SM FRONT BOARD

Description	Part Code	Qty	Where Used
RESISTORS			
15K ¼WATT	72-RM15K	2	R169 R170
1K ¼WATT	72-RM1K	2	R174 R176
1K3 ¼WATT	72-RM1K3	1	R172
1K5 ½WATT	72-RM1K5-.5W	1	R173
4K7 ¼WATT	72-RM4K7	1	R171
6K8 ¼WATT	72-RM6K8	1	R168
430R 2.5 WATT	72-RWW430R-2.5W	2	R175 R177
CAPACITORS			
10µF 35V AXIAL	72-C10-35VEA	1	C118
SEMI-CONDUCTORS			
GREEN LED	72-LED-GRN-REC	1	G
RED LED	72-LED-RED-TEG	1	O
YELLOW LED	72-LED-YEL-REC	1	Y
BC549C TRANSISTOR	72-TBC549C	5	TR24-28
OTHERS			
BULB	73-FLUOR-TUBE	2	A
SLIDER	73-SLIDER-B100KC	12	SL1-12
10 WAY LINK	72-LK-10W150TEG	2	2
PLASTIC SPACER	71-SPA-LED-TEG2	3	G,O,Y

**Rik Daniels**  
**February 24, 1997**

## PARTS LIST FOR GP12SM MAIN PCB

Description	Part Code	Qty	Where Used
RESISTORS			
3M9 ¼Watt	72-RM3M9	3	R1 R3 R5
47K ¼Watt	72-RM47K	11	R15 R17 R51 R55 R61 R64 R65 R68 R122 R123 R143
10K ¼Watt	72-RM10K	23	R4 R8 R12 R20 R32 R33 R40 R41 R43 R48 R49 R53 R57 R60 R63 R67 R116 R124 R125 R126 R129 R133 R138
1K ¼Watt	72-RM1K	7	R6 R7 R26 R34 R141 R145 R153
4K7 ¼Watt	72-RM4K7	44	R9 R28 R31 R36 R39 R80-115 R146 R163 R165
100K ¼Watt	72-RM100K	13	R10 R11 R69 R70 R71 R73 R75 R76 R120 R157 R158 R162 R19
220K ¼Watt	72-RM220K	9	R13 R14 R16 R21 R77 R127 R131 R135 R2
22K ¼Watt	72-RM22K	10	R18 R59 R119 R142 R151 R152 R154 R155 R160 R161
3K3 ¼Watt	72-RM3K3	1	R23
3K8 ¼Watt	72-RM3K8	8	R30 R38 R44 R52 R56 R58 R79 R167
1M ¼Watt	72-RM1M	5	R24 R25 R27 R35 R50
15K ¼Watt	72-RM15K	2	R42 R66
33K ¼Watt	72-RM33K	14	R45 R46 R117 R121 R128 R132 R139 R144 R148 R149 R150 R164 R166 R147
56K ¼Watt	72-RM56K	2	R72 R74
2M2 ¼Watt	72-RM2M2	2	R118 R140
180K ¼Watt	72-RM180K	2	R156 R159
15R ¼Watt	72-RM15R	1	R22
470R 1 Watt	72-RM470R-1WATT	2	R29 R37
220R ¼Watt	72-RM220R	6	R54 R62 R130 R134 R136 R137
560R ¼Watt	72-RM560R	1	R78
3K9 ¼Watt	72-RM3K9	1	R47
LINKS	72-RCZERO	56	
CAPACITORS			



## PARTS LIST FOR GP12SM BACK

Description	Part Code	Qty	Where Used
RESISTORS			
ZERO OHM LINK	72-RCZERO	9	
100K ¼WATT	72-RM100K	2	R14 R16
10K ¼WATT	72-RM10K	5	R10 R11 R17 R19 R20
180K ¼WATT	72-RM180K	1	R4
220K ¼WATT	72-RM220K	1	R3
22K ¼WATT	72-RM22K	3	R68 R69 R70
33K ¼WATT	72-RM33K	2	R15 R18
470K ¼WATT	72-RM470K	2	R26 R34
47K ¼WATT	72-RM47K	14	R1 R2 R5 R6 R13 R23 R24 R22 R28 R30 R31 R32 R36 R38
4K7 ¼WATT	72-RM4K7	3	R7 R25 R33
560R ¼WATT	72-RM560R	6	R9 R21 R27 R29 R35 R37
6K8 ¼WATT	72-RM6K8	1	R12
CAPACITORS			
1µF 63V RADIAL	72-C1-63VER	1	C3
10µF 63V RADIAL	72-C10-63VER	7	C1 C2 C4 C5 C6 C7 C8
POTS & SWITCHES			
50K PCB MOUNT POT	73-POT-50KB	1	V1
LATCHING SWITCH	73-SWT-F2UEE	2	SW1 SW2
SEMI-CONDUCTORS			
J112 FET	72-FET-J-112	3	TR1-3
TL072 OP-AMP	72-IC-TL072	4	IC1-4
SOCKETS			
XLR SOCKET	73-XLR-PCB-M	3	XLR1-3
10 WAY 100MM LINK	72-LK-10W100TEG	1	CA
10 WAY 300MM LINK	72-LK-10W300TEG	1	CD
JACK SOCKET	72-SKT-JCKBBBG	1	J1
JACK SOCKET	73-JCKBNBG	6	J2-7

**Rik Daniels**  
**February 26, 1997**