

**J. E. SUGDEN**

**R2I and R5I**

**STEREO VHF FM**

**TUNERS**



# CONTROLS AND CONNECTIONS

## FRONT PANEL

- push buttons:**
- 1 four combinations of two buttons for
  - 2 four pre-set tuning positions
  - 3 manual/pre-set selector
  - 4 interstation muting
  - 5 automatic frequency control
  - 6 stereo noise filter
  - 7 mono only
  - 8 mains on/off
- knobs:**
- i course tune
  - ii fine tune
- meter:** centre zero tuning meter
- lamp:** indicates stereo transmission.

## REAR PANEL

- aerial connections:** 75 ohm coaxial  
300 ohm twin terminal
- outputs:** 1 DIN socket  
4 phono sockets (2 for each channel to permit direct connection of auxiliary recorder).
- mains:** input plug  
outlet socket (provides additional outlet as one outlet in amplifier will be 'blocked' by tuner).

## PERFORMANCE DETAILS

- frequency range** 88 - 104MHz
- frequency response**  $\pm 1$ dB 30 Hz - 15 kHz
- sensitivity** 2.0  $\mu$ V for 30 dB quieting
- antenna impedance** 75 or 300 ohms
- separation** better than 30 dB
- switching residuals** negligible
- output** 0.5 volt
- distortion** less than 0.25% average modulation
- IF rejection** 80dB
- image rejection** 70dB
- alternate channel selectivity** 60dB
- AM suppression** 50dB
- capture ratio** 3.0dB
- AFC ratio** 5 : 1
- dimensions** R21 in wood case 12" x 9" x 5"  
(300 x 130 x 230 mm)  
R51: 11" x 3 $\frac{3}{4}$ " x 6 $\frac{3}{4}$ " (280 x 95 x 170 mm)

www.valve-radio.co.uk



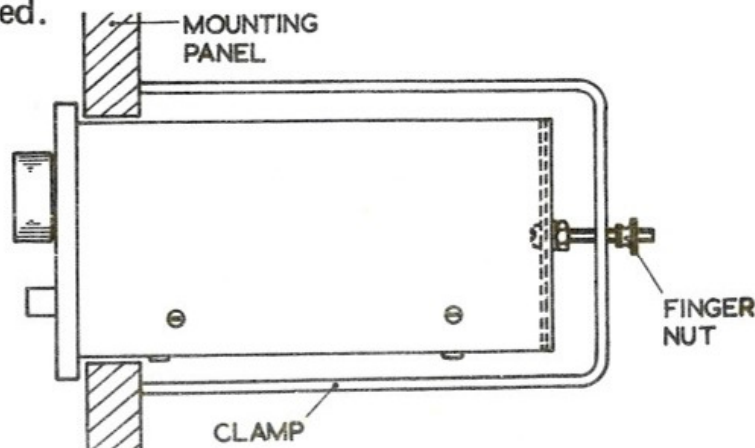
R51 Stereo FM Tuner

Front Cover Illustration. R21 Stereo FM Tuner

## Installation

The R21 is a free standing unit intended for shelf mounting. The R51 is primarily intended for cabinet mounting but may be shelf mounted by using the four plastic feet supplied. The four bottom screws should be removed one at a time and replaced together with a plastic foot. For panel mounting either vertical or horizontal the following procedure should be adopted:—

1. Cut aperture in panel  $10\frac{7}{8}'' \times 3\frac{1}{4}''$ .
2. Remove the outer cover by unscrewing the four chrome securing screws located at the sides.
3. Insert the 4BA x  $1\frac{1}{4}''$  screws provided into the two central holes in the rear flanges so the screws project rearwards. Secure firmly by means of the spring washers and nuts provided.
4. Replace the cover.
5. Insert the control unit through the aperture in the mounting panel.
6. Place the U shaped clamps over the projecting screws at each end and tighten up against the inside of the mounting panel with the knurled finger nuts provided.



In order to prevent hum loops when using the R21 tuner (this problem does not occur with the R51 used with a C51 control unit) with an integrated amplifier such as the A21 or A48 and yet still keep a safety earth to the mains transformer frame the R21 should be removed from its case and the two steel transit screws mounting the mains transformer removed and replaced with the nylon ones supplied. Care should be taken to ensure that the green wire makes contact via its solder tag to the mains transformer clamp by replacing this solder tag on the screw just before putting on the nut. Safety mains earth is now connected to the only item carrying mains and at risk — the transformer — but signal earth and chassis are isolated. To remove the teak case stand the tuner on its back panel remove the four feet and *carefully* slide off the cabinet. Do not force it off or damage to the fascia panel could result if it 'snags' on the cabinet.

Before connecting mains to the tuner the voltage selector should be set for the local mains voltage. Withdraw the selector plug, rotate it until the desired voltage is indicated by the arrow and re-insert the plug.

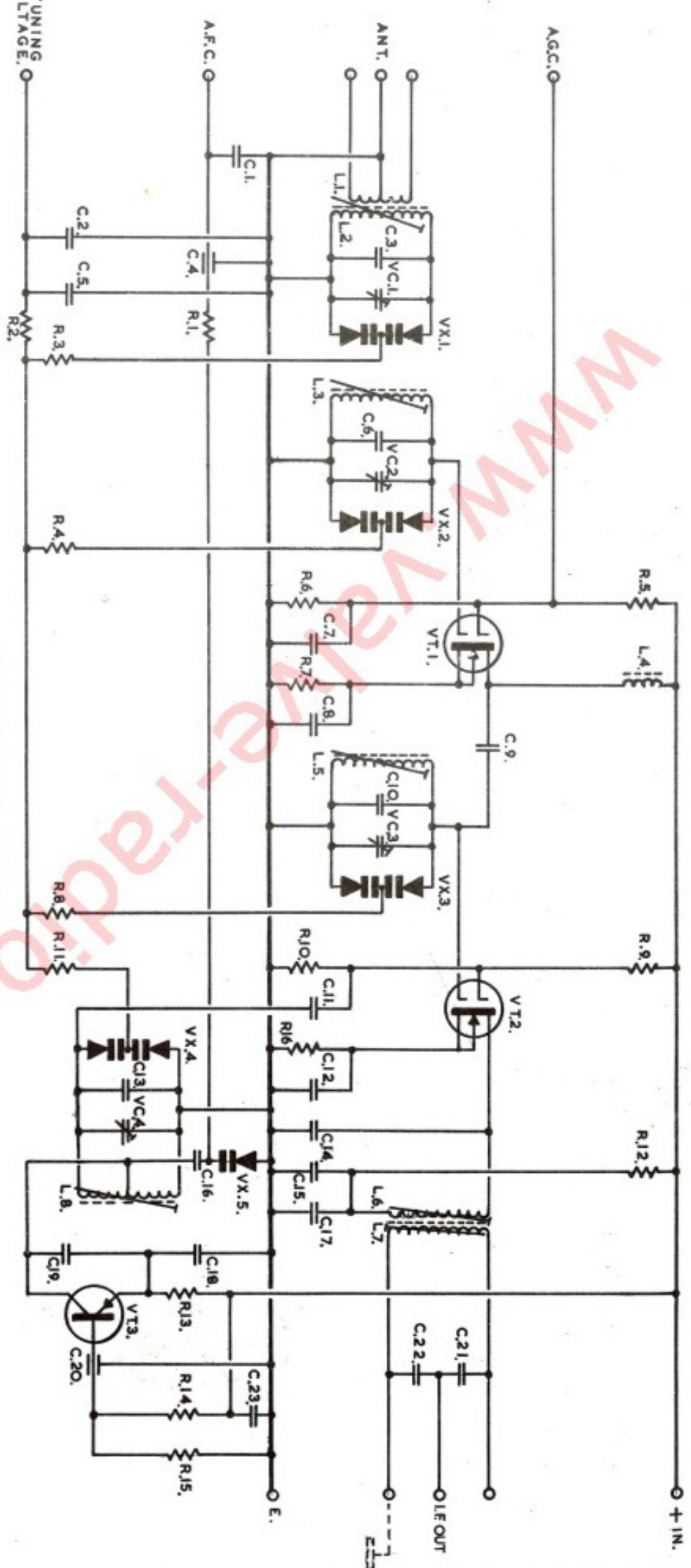
Two leads are supplied with the tuner each about 1 metre long. One is for mains and should be connected between tuner MAINS INPUT and amplifier or control unit MAINS OUTLET. The other lead is for signal. In the case of the R51 it is two phono-phono connections and with the R21 DIN to DIN. This lead should be connected between tuner OUTPUT and amplifier RADIO INPUT with the coloured marker end to the tuner in the case of the R21.

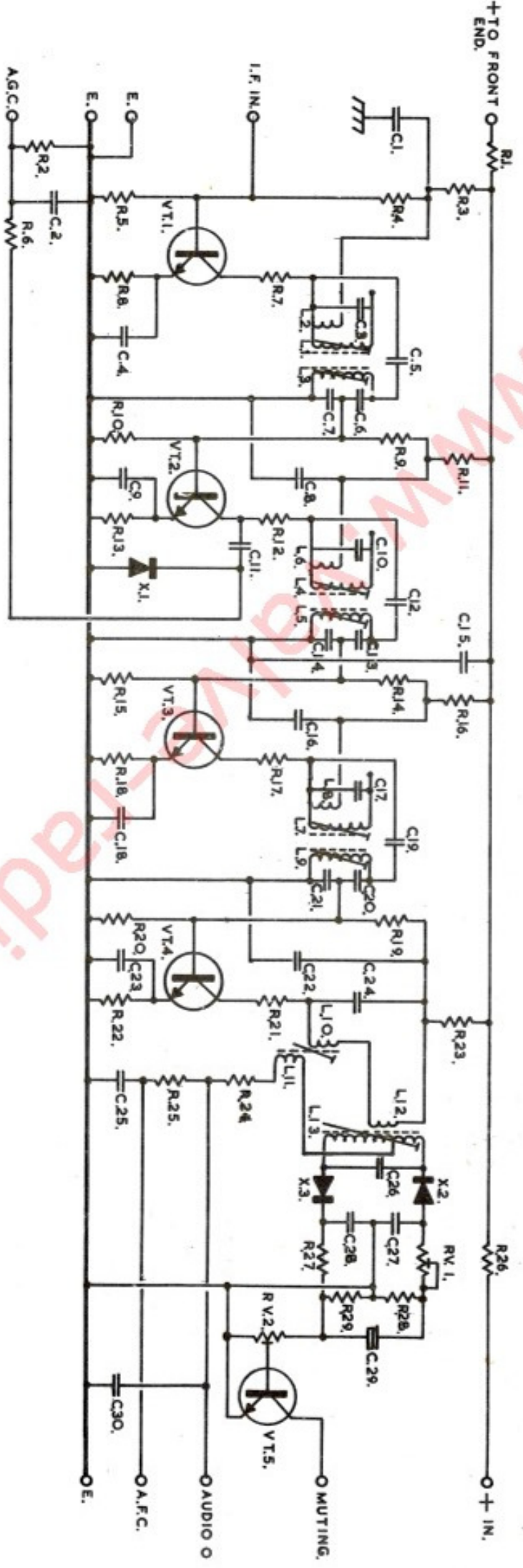
A 75 or 300 ohm aerial connection should be made to the appropriate ANTENNA connection. *A suitable VHF aerial MUST be used* if correct stereo operation is to be achieved and in some areas, even if correct mono operation is to be achieved. Two feet of wire down the back of the shelf *may* work but why waste a precision tuner on a useless aerial?

## Operation

Your dealer may have set the four pre-set positions — if not you may set them as follows (it is normal in the UK to set positions 2, 3 and 4 to Radios 2, 3 and 4 respectively and position 1 to your LOCAL radio station). With the case removed 11 pre-set potentiometers will be observed at the top front. The three righthand ones marked 88, 96 and 104 are for dial tracking and should not be touched. The other 8 are in 4 pairs of COARSE and FINE for positions 1, 2, 3 and 4. Set all the FINE ones in the centre *using a screwdriver of correct size* - one that is too large will permanently damage the control. Join together the two AFC pins with a crocodile clip or by wrapping a piece of wire round them (this kills the AFC which is selected automatically on PRE-SET). Now press PRE-SET and 1 and adjust 1 - COARSE until the desired station is roughly tuned in (fully clockwise corresponds to about 88MHz, half rotation to about 94MHz and full rotation to about 98MHz - these positions are approximate). Then adjust 1 FINE for exact centre tune on the tuning meter. Repeat this procedure in turn for 2, 3 and 4 and remove the AFC link and replace the case. For manual tuning the PRE-SET button should be released and tuning performed using the thermometer dial to the approximate position and listening for the desired station finally using the FINE tune for exact centre position of the tuning meter and for resolving very closely spaced transmissions. The legend by the two pre-set positions means exactly what it says, for position 1 - left hand button in only For position 3 - right hand button in only. For position 2 - both buttons *in*. For position 4 - both buttons *out*. If the range covered by the pre-set controls is insufficient facilities are available for extending the range - see later. The MUTING button when pressed kills all interstation noise when tuning and the tuner will then respond only to fairly strong signals. The AFC button should not be pressed while tuning but may be pressed after the station is tuned in to guarantee that the exact tune will not be lost. It should not be used as an "idle tuner" i.e. do not set approximate tune and then use the AFC button to tune you in exactly. The presence of a STEREO signal is indicated by illumination of the MPX lamp provided the MONO button is not depressed and the stereo signal will be processed by the tuner automatically to produce the correct stereo output. If the signal is very weak the noise level may be so high as to make stereo listening objectionable when the MONO button should be pressed. Any stereo signal may be made MONO by pressing the mono button. Some stereo signals which are weak but not excessively so or some broadcast may be noisy to start with which the multiplexing process makes worse such as to make a noise level which is just obtrusive - depressing the FILTER button may cut this noise level down to an acceptable level but when using the FILTER button some loss of channel separation may be noticed. The MAINS OUTLET socket is connected to the MAINS INPUT plug and provides a spare outlet for (say) the turntable when the one originally used viz. on the amplifier has become blocked by its use for the tuner. The tuner mains on/off switch does not affect this outlet.



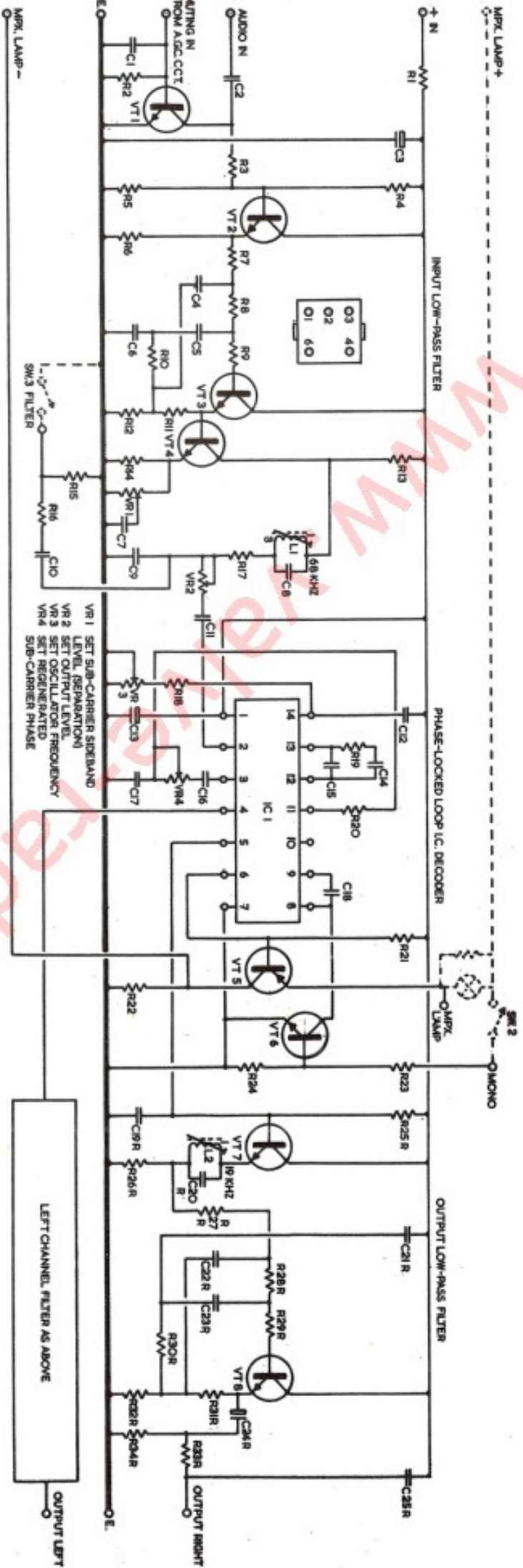




10.7 MHz I.F. AMPLIFIER

R 1	33	R 12	330	R 23	33	C 1	.01	C 12	3.9P	C 23	.01	VT 1	BF273
R 2	100K	R 13	680	R 24	100	C 2	.01	C 13	68P	C 24	68P	VT 2	or
R 3	33	R 14	33K	R 25	470K	C 3	68P	C 14	1500P	C 25	.47	VT 3	BF194
R 4	33K	R 15	18K	R 26	33	C 4	.01	C 15	.01	C 26	68P	VT 4	
R 5	18K	R 16	33	R 27	2.2K	C 5	3.9P	C 16	.01	C 27	1000P	VT 5	BC109
R 6	6.8K	R 17	330	R 28	6.8K	C 6	68P	C 17	68P	C 28	1000P		
R 7	330	R 18	680	R 29	6.8K	C 7	1500P	C 18	.01	C 29	10		
R 8	680	R 19	33K	R V 1	4.7K	C 8	.01	C 19	3.9P	C 30	330P	X 1	OA90
R 9	33K	R 20	18K	R V 2	220K	C 9	.01	C 20	68P			X 2	OA90
R 10	18K	R 21	390			C 10	68P	C 21	1800P			X 3	OA90
R 11	33	R 22	680			C 11	3.9P	C 22	.01				





STEREO MULTIPLEX DECODER  
(LATER MODELS)

R 1	100	R12	4.7K	R23	100K	R34	4.7K	C 9	270P	C20	.01	VR 4	10K
R 2	150K	R13	10K	R24	10K			C10	470P	C21	470P	VT 1	BC109C
R 3	4.7K	R14	10K	R25	8.2K			C11	0.1	C22	1000P	VT 2	BC109C
R 4	470K	R15	2.2M	R26	10K	C 1	0.47	C12	470P	C23	470P	VT 3	BC109C
R 5	220K	R16	15K	R27	22K	C 2	0.1	C13	2.5	C24	2.5	VT 4	BC109C
R 6	10K	R17	4.7K	R28	22K	C 3	400	C14	0.22	C25	4700P	VT 5	BC308
R 7	8.2K	R18	18K	R29	4.7K	C 4	470P	C15	0.22			VT 6	BC238
R 8	8.2K	R19	1.2K	R30	10K	C 5	270P	C16	0.22	VR 1	10K	VT 7	BC109C
R 9	4.7K	R20	10K	R31	1K	C 6	330P	C17	1000P	VR 2	220K	VT 8	BC109C
R10	3.9K	R21	22K	R32	4.7K	C 7	1000P	C18	0.22	VR 3	10K		
R11	1K	R22	100	R33	2.2K	C 8	270P	C19	4700P			IC1	MC1310P

### **Extension of pre-set range**

The upper and lower limits of the pre-set range are set by resistors R13 150K and R4 47K which are visible on the *top* of the printed circuit boards by the pre-set potentiometers. R13 is at the left and R4 behind and half way along the row of pre-sets. These resistors have been installed in such a way that they may be easily altered.

### **Attenuation of output**

Due to the output arrangements an attenuated output is very easy to achieve. One left hand and one right hand phono socket is fed by a white or red wire respectively. The other two output sockets are coupled via thin wire links. These thin links can be cut out and replaced by resistors for the attenuator series elements, the shunt elements being connected from the sockets (*not* having wire on them) to chassis (blackwires). The series element should preferably be not less than 20K ohms.

### **Disposition of pre-set potentiometers etc. within the instrument.**

The controls detailed below should not be adjusted by anyone other than one having complete technical knowledge.

- AM suppression — I.F. board small pre-set near to edge connector.
- Muting level — I.F. board small pre-set near to outside corner of board.
- Tuning meter centre zeroing — Discriminator coil is the BLUE one. If meter a little to left (as viewed normally - remember when working on it you are probably looking at it upside down) rotate core *slightly* anticlockwise and vice versa.
- Subcarrier sideband amplitude - separation — Pre-set on middle board.
- Signal output level — End pre-set on rearboard - this control should not need alteration in the normal course of events.
- Sub carrier phase — Second pre-set.
- Oscillator frequency — Third pre-set.

The above three controls refer to phase lock decoders only. On the earlier models sub carrier phase is adjusted by the YELLOW coil near the outside edge of the middle board.

The right is reserved to change the specification or design without notice.

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