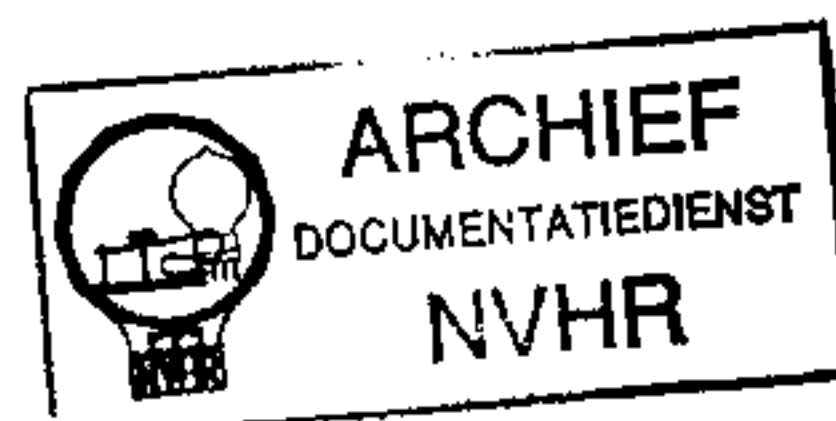


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The Information given in this document
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not authorized to receive it.



USER HANDBOOK
FOR
RECEPTION SET
EDDYSTONE 730/4

1958

WARNING

The voltages employed in this equipment are sufficiently high to endanger human life. Every reasonable precaution has been observed in design to safeguard operating personnel. The power **MUST** be switched off before changing valves and **GREAT CARE** taken when making internal adjustments.

In case of electric shock see inside this cover

*Published Under the Authority of
The Signal Officer - In - Chief
The War Office.*

SYNOPSIS

The Reception Set Eddystone 730/4 is a general purpose communication receiver for the reception of CW, MCW and VOICE (AM) signals within the frequency range 480 kc/s to 30 Mc/s. It is pan-climatic but the partially protected form of construction employed renders it unsuitable for use on an open site.

It can be operated from suitable AC supplies or from a separate HT/LT supply unit, but this must be provided by the user.

Output connections are provided for headphones, speaker and a 600 ohm line, and an IF output connection is available for use with CFS equipment.

ILLUSTRATIONS

		Page
	Frontispiece	(vi)
Fig.1	Front Panel and Internal Controls, etc.	5
Fig.2	Rear Controls, etc.	6
Fig.3	Receiver Block Schematic	7 & 8
Fig.4	Voltage Adjustment Panel	11
Fig.5	Rear View of 'External HT and LT Socket'	12
Fig.6	Location of Valves, etc.	20

CONTENTS

CHAPTER 1 GENERAL DESCRIPTION										Page
101.	Purpose and Facilities	..	..	..	..	..	..	..	..	1
102.	Frequency Range	..	..	..	..	..	..	..	..	1
103.	Performance	..	..	..	..	..	..	..	..	2
104.	Power Supply and Consumption	..	..	..	..	..	..	..	..	2
105.	Construction	..	..	..	..	..	..	..	..	3
106.	Weight and Dimensions	..	..	..	..	..	..	..	..	3
107.	Accessories	..	..	..	..	..	..	..	..	3
108.	Controls, etc.	..	..	..	..	..	..	..	..	4
CHAPTER 2 TECHNICAL DESCRIPTION										
201.	The RF Amplifier	..	..	..	..	..	..	..	..	7
202.	The Frequency Changer and Local Oscillator	..	..	..	..	..	..	..	..	7
203.	The Crystal Filter and IF Amplifier	..	..	..	..	..	..	..	..	8
204.	The Detector, BFO and Noise Limiter	..	..	..	..	..	..	..	..	9
205.	The AF Stages and Audio Filter	..	..	..	..	..	..	..	..	9
206.	The Crystal Calibrator	..	..	..	..	..	..	..	..	9
207.	The Power Supply Circuit	..	..	..	..	..	..	..	..	9
CHAPTER 3 SETTING UP AND OPERATING										
301.	Preliminary Setting Up	..	..	..	..	..	..	..	..	11
302.	Preliminary Checks and Adjustments	..	..	..	..	..	..	..	..	13
303.	Operating	..	..	..	..	..	..	..	..	15
CHAPTER 4 USER SERVICING										
401.	Introduction	..	..	..	..	..	..	..	..	19
402.	Routine Tasks	..	..	..	..	..	..	..	..	19
403.	Fault Location	..	..	..	..	..	..	..	..	20
404.	Valve and Crystal Data	..	..	..	..	..	..	..	..	21
405.	Fuse and Lamp Data	..	..	..	..	..	..	..	..	21

GENERAL DESCRIPTION

101 PURPOSE AND FACILITIES

The Reception Set Eddystone 730/4 is a general purpose communication receiver for the reception of CW, MCW and VOICE (AM) signals within the frequency range 480 kc/s to 30 Mc/s. It is pan-climatic and suitable for light building or vehicle installations.

Although primarily for use with AC supplies, a separate DC operated HT/LT power supply unit may be used, but this must be provided by the user.

The receiver incorporates a 500 kc/s crystal calibrator, signal strength meter, noise limiter, crystal and audio filters. Variable coupling is employed in the IF amplifier stages and four alternative degrees of selectivity are obtained by this means. The following facilities are also provided:-

RF Input: Two alternative type coaxial sockets, connected in parallel, for aerial feeder systems of 70-80 ohms impedance.

AF Input: A 100,000 ohm input connection to the AF amplifier.

IF Output: A 70-80 ohm output connection for use with carrier frequency shift equipment, if so desired.

AF Output: Three separate AF output connections for LR or HR headphones, 2.5 ohm speaker and 600 ohm (bal. or unbal.) line.

102 FREQUENCY RANGE

The receiver covers a frequency range of 480 kc/s to 30 Mc/s in five bands, as follows:-

Band 1	.....	12.3	-	30.0 Mc/s
" 2	.....	5.3	-	12.5 Mc/s
" 3	.....	2.5	-	5.7 Mc/s
" 4	.....	1.11	-	2.5 Mc/s
" 5	.....	480	-	1120 kc/s

103 PERFORMANCE

a. Sensitivity

(Based on signal to noise ratio of 15 dB, 30% modulation at 300 c/s, output 50 mW).

VOICE and MCW	-	Better than 5 μ V.
CW (Bands 1-4)	-	Better than 1 μ V.
CW (Band 5)	-	Better than 2 μ V.

b. Selectivity

(The figure quoted are at -6 dB).

(1) Four-position IF Selectivity Control giving bandwidths:-

Position 1	-	1.5 kc/s
" 2	-	3.0 kc/s
" 3	-	6.0 kc/s
" 4	-	12.0 kc/s

(2) Separately switched Crystal Filter with Phasing Control, nominal bandwidth 500 c/s.

(3) Separately switched AF Filter, centred on 1,000 c/s, nominal bandwidth 100 c/s.

c. Frequency Stability

After 30 minutes warm-up the total drift during the following hour will be in the order of:-

Below 10 Mc/s	-	50 cycles per megacycle
Above 10 Mc/s	-	20 cycles per megacycle

d. Audio Output

(Based on 50 μ V input at 4 Mc/s, modulated 30% at 1 kc/s. Noise Limiter and AVC switched off, Selectivity Control set for maximum bandwidth).

Output to 2.5 ohm speaker or 600 ohm line	-	1 W
Output to Phone Jack (with 4,000 ohm load)	-	20 mW

104 POWER SUPPLY AND CONSUMPTION

The receiver requires a single-phase AC supply of 100-125 or 200-250 volts at 40-60 c/s. The power consumption is approximately 80 watts.

A connection is provided to permit the use of a separate DC supply unit where AC supplies are not available. The DC requirements are:-

250 volts DC at 120 mA and 6.3 volts DC (or AC) at 5A.

105 CONSTRUCTION

The receiver is constructed on three chassis which are assembled together and bolted to the front panel. The front panel and the centre chassis containing the RF stages are aluminium diecastings and the two remaining chassis are pressed steel and brass respectively.

The tuning mechanism has spring-loaded, split-gears to prevent backlash and the reduction ratio is approximately 140 to 1. Mechanical bandspread is provided and an effective scale length of 34 feet is obtained by this means. Terylene cord is used to drive the perspex cursor on the main tuning dial.

The chassis and front panel assembly is housed in a 16 gauge steel cabinet and retained by means of four rear fixing bolts. BEFORE THE ASSEMBLY IS WITHDRAWN OR RE-INSERTED, THE TUNING CURSOR MUST BE SET TO THE CENTRE OF THE DIAL. The cabinet is provided with top and rear panels for ventilation, a hinged lid and side fixing flanges to permit rack mounting, if so desired.

The receiver is suitable for pan-climatic conditions, although the partially protected form of construction affords no protection against rain, etc.

106 WEIGHTS AND DIMENSIONS

The receiver weighs 57 lbs, and the dimensions are:-

Height	8 $\frac{3}{4}$ in.
Width	19 in.
Depth (overall)	13 $\frac{3}{4}$ in.
Depth (behind panel)	11 $\frac{1}{2}$ in.
Projection from face of panel	2 $\frac{1}{4}$ in.

107 ACCESSORIES

The following are provided:-

- (1) 6 ft. mains lead fitted with receiver connecting socket only.
 - (2) 12 point socket for connecting separate HT/LT supplies. (Used to link internal heater circuits when operating from AC supplies).
 - (3) 2 coaxial plugs for aerial sockets.
 - (4) 2 spare fuses
 - (5) Trimming tool
- } Fastened to top of centre chassis.

108 CONTROLS, ETC.

All controls, etc., with which the operator is concerned in the normal use of the receiver are listed below. The function of each control is briefly described, and a reference number is given which is used throughout Chapter 3 (Setting-Up and Operating), both in the text and in the accompanying illustrations. The titles employed are as close as possible to the markings on the receiver.

Loc. Ref.	Control, etc.	Function
1	CALIBRATOR SWITCH	Self-restoring, press-button switch controlling the HT supply to the internal 500 kc/s crystal calibrator. An auxiliary contact mutes the 1st RF stage to avoid confusion between incoming signals and the check points.
2	SIGNAL STRENGTH METER	Indicates relative strength of incoming signals when SELECTIVITY CONTROL (7) is set to position 1 (fully anti-clockwise), RF GAIN CONTROL (17) to maximum and AVC SWITCH (14) to 'on'. Scale engraved 0-9 (in 'R' points) 6 dB, 12 dB, 18 dB. (one 'R' point = 6 dB).
3	TUNING DIAL	Indicates the frequency to which the receiver is tuned. Bands 1-4 are calibrated in Mc/s and band 5 in kc/s. A logging scale marked 0-2,500 in steps of 100 is provided.
4	VERNIER SCALE	Used for logging and re-setting to an exact tuning point in conjunction with logging scale on TUNING DIAL (3).
5	CURSOR ADJUSTER	Re-sets cursor line on TUNING DIAL (3) to correct for errors in calibration.
6	AF GAIN CONTROL	Controls audio output level.
7	SELECTIVITY CONTROL	Controls receiver band-width as follows:- <div style="margin-left: 40px;"> Position 1 - 1.5 kc/s " 2 - 3.0 kc/s " 3 - 6.0 kc/s " 4 - 12.0 kc/s </div> (Position 1 is fully anti-clockwise).
8	AF FILTER SWITCH	Connects AF Filter in circuit when required. (On CW the filter may be used to reduce interference; for certain methods of CFS reception it may be used to suppress either the 'Mark' or 'Space' output).

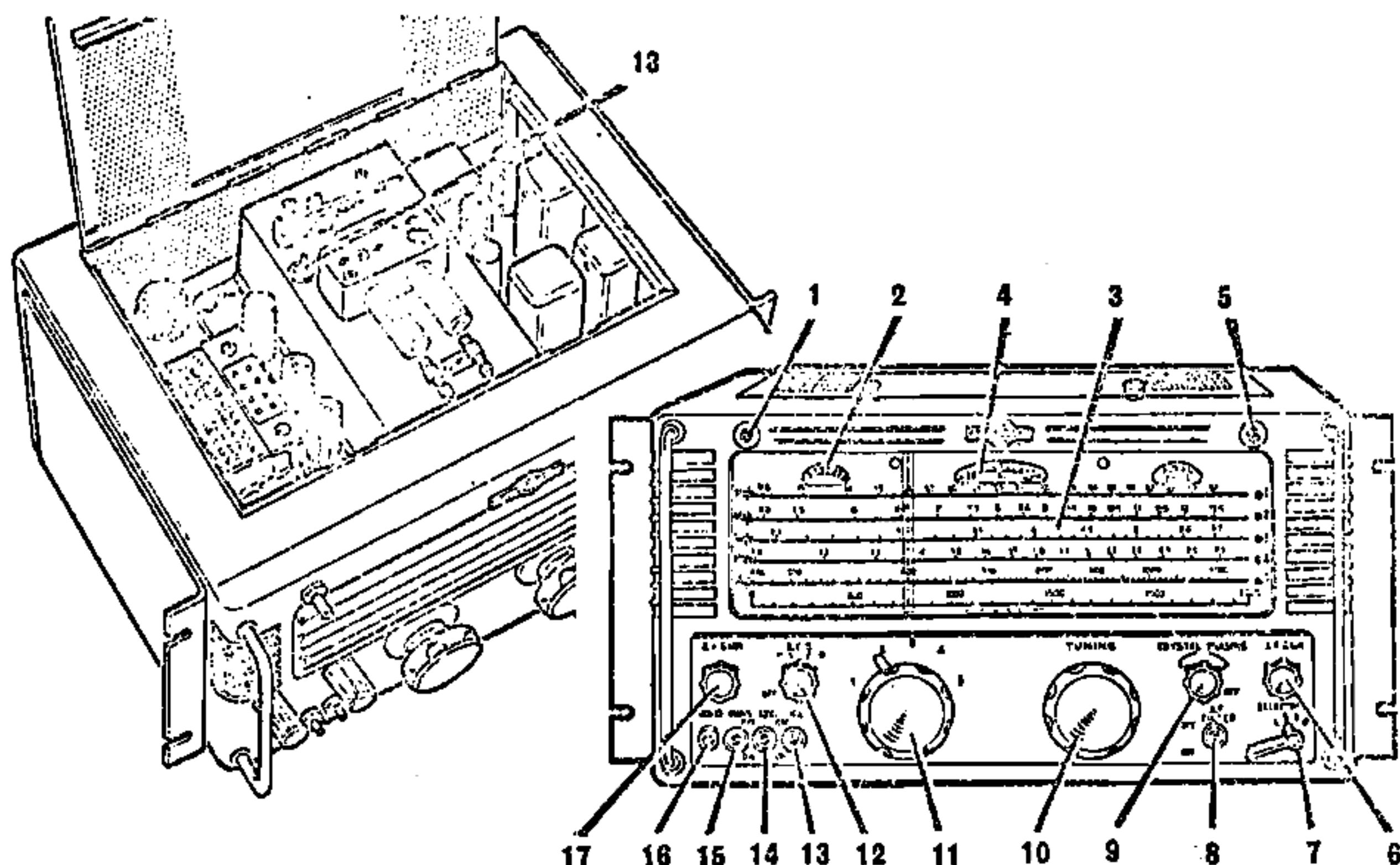


Fig. 1

Front Panel and Internal Controls, etc.

9	CRYSTAL PHASING CONTROL	Controls response of crystal filter to obtain extreme selectivity when receiving CW signals. Filter inoperative when rotated fully anti-clockwise.
10	TUNING CONTROL	Main tuning control.
11	RANGE SWITCH	Selects the five alternative frequency bands and also the appropriate scale indicator lamps.
12	BFO CONTROL	Switches BFO into circuit and varies pitch of CW beat note.
13	NL SWITCH	Switches noise limiter into circuit when required.
14	AVC SWITCH	Switches AVC into circuit when required.
15	MAINS SWITCH	Switches the AC supply to the receiver.
16	PHONES JACK	For LR or HR headphones. Disconnects loudspeaker when engaged.
17	RF GAIN CONTROL	Controls gain of the RF amplifier and 2nd IF amplifier stages.
18	HT SWITCH	For disconnecting HT supply when carrying out internal adjustments.

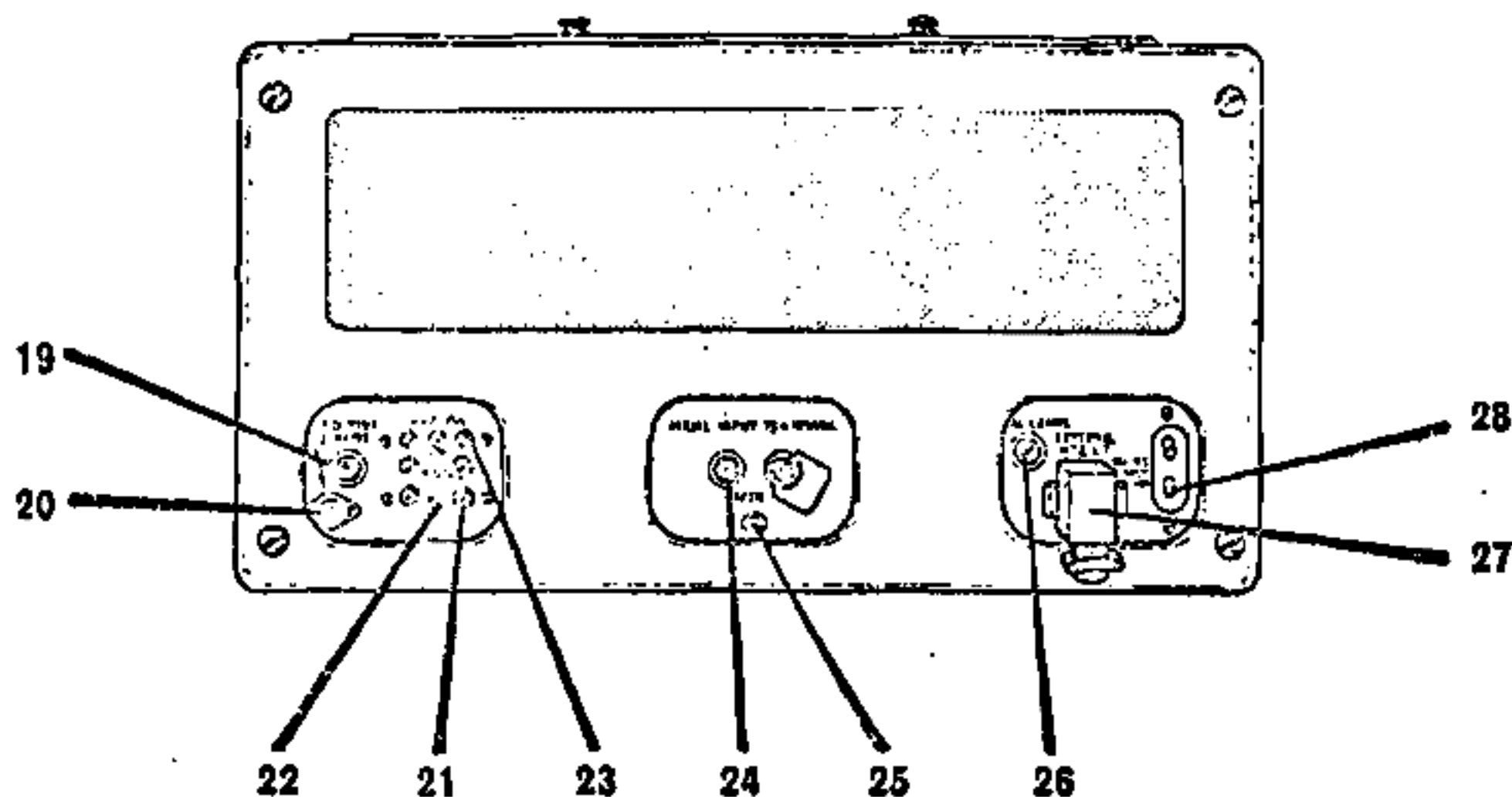


Fig. 2

Rear Controls, etc.

19	'S' METER CONTROL	For zero adjustment of 'S' meter. (When making this adjustment the aerial socket and earth terminal must be connected together and the RF GAIN CONTROL (17) set to maximum).
20	IF OUTPUT SOCKET	Connection point for carrier frequency shift equipment.
21	PU TERMINALS	Audio input connection. (The noise limiter and audio filter should not be left in circuit if this facility is used).
22	2.5 Ω TERMINALS	Audio output connection for 2.5 ohm loudspeaker.
23	600 Ω TERMINALS	Audio output connection for 600 ohm line.
24	AERIAL INPUT SOCKETS	Alternative type sockets, connected in parallel, for 70-80 ohm coaxial aerial feeders.
25	EARTH TERMINAL	Earth connection.
26	DIAL LAMPS CONTROL	Controls brilliancy of the three dial lamps.
27	EXTERNAL HT & LT PLUG AND SOCKET	Connection point for external DC supplies. (The socket must be left in position for AC operation as it is also used to link the internal heater circuits).
28	MAINS INPUT PLUG	Connection point for AC supply.

TECHNICAL DESCRIPTION

201 THE RF AMPLIFIER

The basic arrangement for the receiver is as shown in Fig. 3. The signal from the aerial passes through two RF amplifier stages (V1 and V2) which provide a degree of amplification and selectivity before the frequency changer. The aerial input circuit is designed for unbalanced feeder systems of 70-80 ohms impedance, and alternative type sockets, arranged in parallel, are provided to suit two types of coaxial plugs used in the Service. Amplification is controlled by means of a variable resistance (RF Gain Control) which varies the voltage at the cathodes of V1 and V2 (and also of V6).

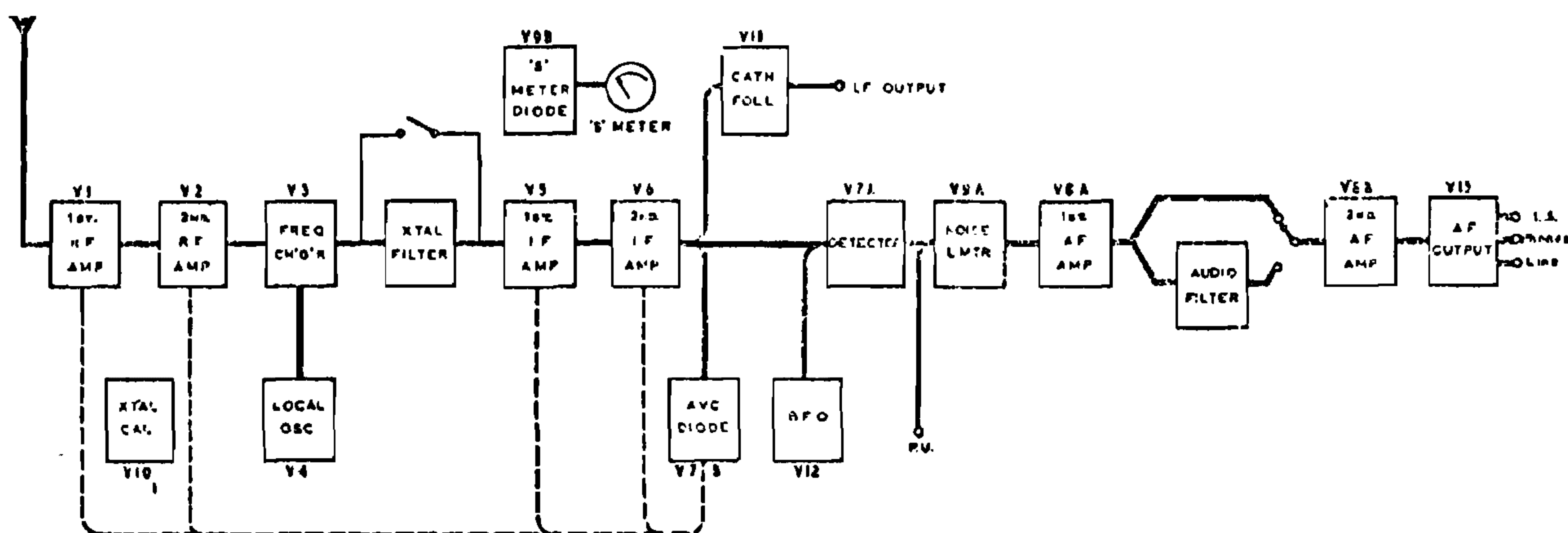


Fig. 3

Receiver Block Schematic

202 THE FREQUENCY CHANGER AND LOCAL OSCILLATOR

The RF amplifier and local oscillator (V4) outputs are combined in the frequency changer stage (V3) to obtain an intermediate frequency of 450 kc/s, and the alignment of the oscillator circuit is such that, throughout the tuning range, its frequency is 450 kc/s above that of the signal. The HT supply to the oscillator and the frequency changer screen is stabilised by means of a neon type regulator.

203 THE CRYSTAL FILTER AND IF AMPLIFIER

The crystal filter operates at the nominal IF frequency and is used to obtain a high degree of selectivity when receiving CW signals. It is fitted with a Crystal Phasing Control, by adjustment of which most interfering signals can be eliminated or minimised. When this control is rotated fully anti-clockwise, the crystal is short-circuited and the filter is inoperative.

The two-stage IF amplifier (V5 and V6) employs permeability tuned transformers, the coupling of which can be mechanically varied in four steps by means of the Selectivity Control. When this control is set for maximum selectivity the 'S' meter is brought into operation. This meter is operated by changes of screen current in V5 resulting from variations of AVC voltage. Zero adjustment is effected by means of a potentiometer ('S' Meter Control) which balances a bridge circuit across which the meter is connected. This is done with aerial and earth shorted and the RF Gain Control at maximum. A diode (V9B) is included in the meter circuit to prevent reverse indication. The gain of the second IF stage is controlled by means of the RF Gain Control, which varies the cathode voltage, as in the case of the two RF amplifiers.

Output to the AVC diode (V7B) is rectified and applied to the grid circuits of V1, V2, V5 and V6 to minimise variations of output during periods of fading, etc. The AVC line is connected to chassis when the AVC Switch is set to 'Off'.

The cathode follower stage (V11) provides a low-impedance (70-80 ohms) IF output connection to enable the receiver to be used with carrier frequency shift equipment, if so desired.

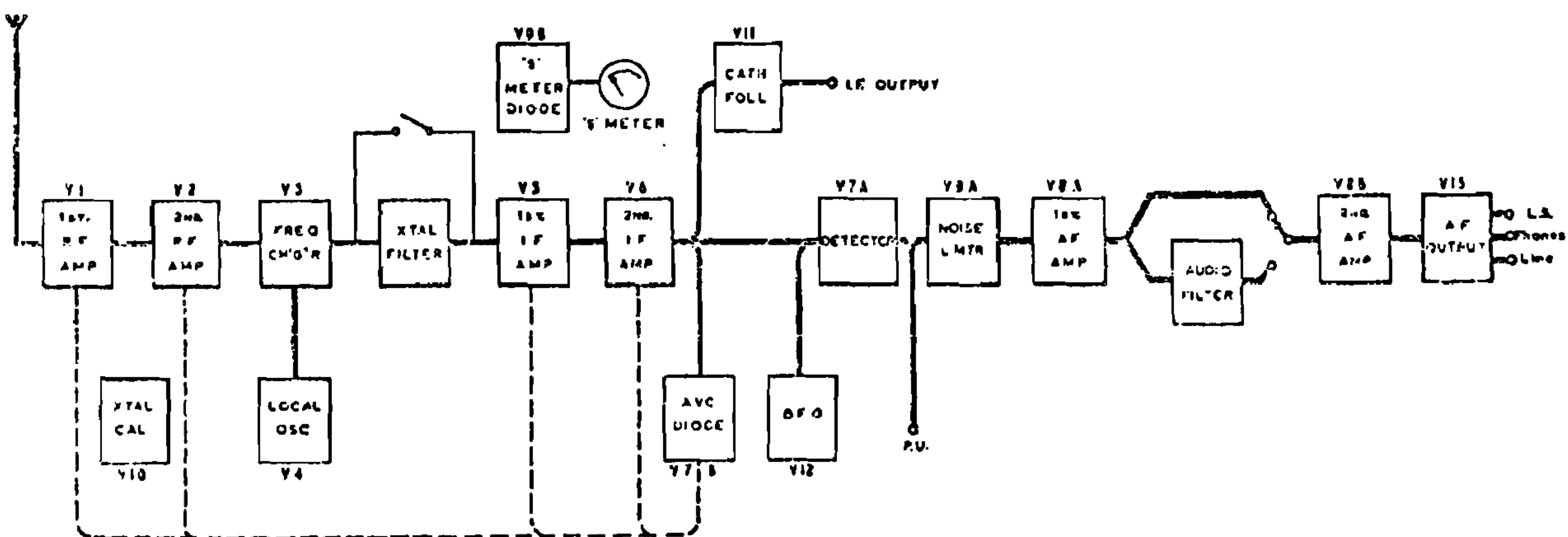


Fig. 3

Receiver Block Schematic

204 THE DETECTOR, BFO AND NOISE LIMITER

The normal output of the IF amplifier is demodulated in the diode detector stage (V7A). The output of the beat-frequency oscillator stage (V12) is capacity coupled to the input circuit of the detector to produce an audible beat note when receiving CW signals. The pitch of the beat note can be varied ± 2 kc/s by means of the BFO Control and when this is turned fully anti-clockwise, the BFO tuning elements are short-circuited.

The noise limiter stage (V9A) employs a diode in a conventional series circuit. It is self-adjusting for varying carrier levels and serves to cut off noise peaks in excess of maximum modulation. A high-impedance (100,000 ohms) AF input connection is provided by the 'P.U.' terminals which are connected to the input circuit of the noise limiter.

205 THE AF STAGES AND AUDIO FILTER

The 1st and 2nd AF amplifier stages each employ one half of a double-triode (V8). The two stages are resistance-capacity coupled and input to the first stage is controlled by means of the AF Gain Control. To reduce background noise and interfering signals on CW reception, the audio filter may be placed into circuit by means of the AF Filter Switch. This filter is tuned to approximately 1,000 c/s and has a pass-band of 100 c/s at -6dB.

The AF output stage (V15) employs a pentode. The output transformer has a centre-tapped 600 ohm winding for balanced lines and a 2.5 ohm winding for a loudspeaker. Output for high or low resistance headphones is taken from a potential divider network between anode and chassis. When the Phones Jack is engaged the loudspeaker is inoperative.

206 THE CRYSTAL CALIBRATOR

The crystal calibrator stage (V18) provides 500 kc/s check points throughout the tuning range of the receiver so that the accuracy of the tuning dial calibration may be checked and, if necessary, corrected by means of the adjustable cursor. It is brought into operation by means of a press-button switch on the top left-hand corner of the dial which applies the full HT to the valve and also mutes the first RF stage to avoid confusion between incoming signals and the check points.

207 THE POWER SUPPLY CIRCUIT

The mains transformer in the power supply circuit has tapped primary windings for operation on 110, 125, 200, 220, 240 or 250 V AC, 40-60 c/s supplies. The input circuit is protected by two 750 mA mag-nickel, anti-

surge type fuses. An indirectly heated full-wave rectifier (V13) is employed and the HT supply to the BFO, local oscillator and frequency changer screen is stabilised by means of a neon type regulator (V14). The HT Switch situated on top of the centre chassis is connected in series with the HT smoothing choke and is used to isolate the supply when carrying-out internal adjustments, etc.

In addition to the HT and LT Secondary windings for the rectifier, two other LT windings are provided. One winding supplies the common heater of the 'S' meter and noise limiter diodes (V9A and B) and the other supplies the heaters of all remaining valves, together with the three dial lamps and the five scale indicator lamps. A Dial Lamps Control situated at the rear of the chassis can be used to vary the brilliancy of the three dial lamps.

The External HT and LT Plug at the rear of the chassis facilitates the use of a separate HT/LT power supply unit when AC supplies are not available. The socket is used for linking the internal heater circuits and must be left in position for AC operation.

SETTING UP AND OPERATING

WARNING: The voltages employed in this equipment are sufficiently high to endanger human life. Every reasonable precaution has been observed in design to safeguard operating personnel. The power **MUST** be switched off before changing valves or making internal adjustments. In case of electric shock see inside this cover.

301 PRELIMINARY SETTING UP

a. For AC Supplies

- (1) With the supply disconnected, locate the voltage adjustment panel shown in Fig.4 and remove the transparent cover plate.

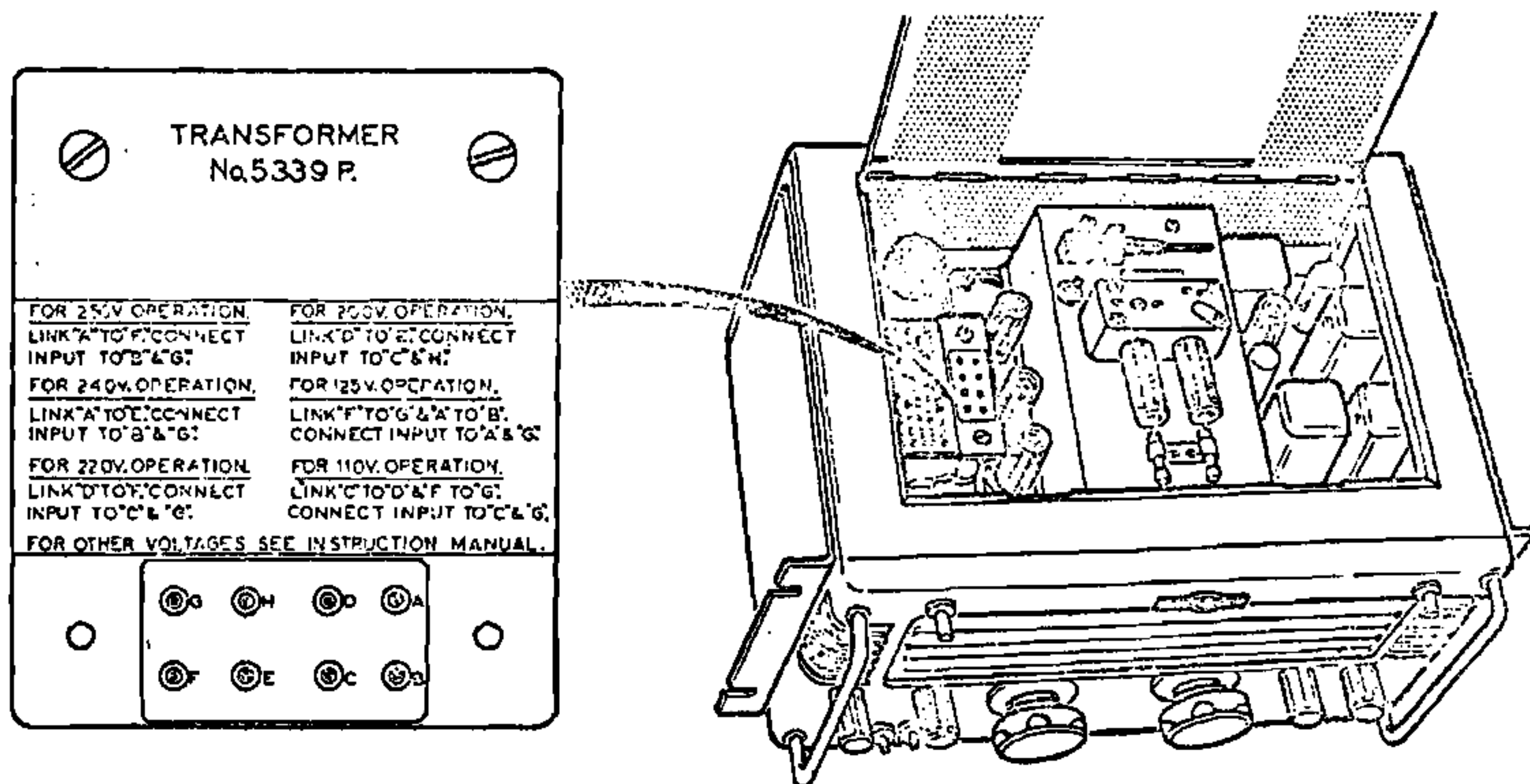


Fig. 4

Voltage Adjustment Panel

- (2) Ascertain the voltage of the supply and then ensure that the connections to the panel are in accordance with those specified on the top plate of the mains transformer.

NOTE: If the supply voltage lies between the values given on the plate, but not between 125 and 200 volts, always connect for the nearer value. If the voltage lies mid-way, connect for the higher value.

- (3) Replace the cover plate.

(4) Ensure that the External HT and LT Socket (27) is correctly strapped for AC operation, as shown in Fig. 5(a), and makes good contact with the plug.

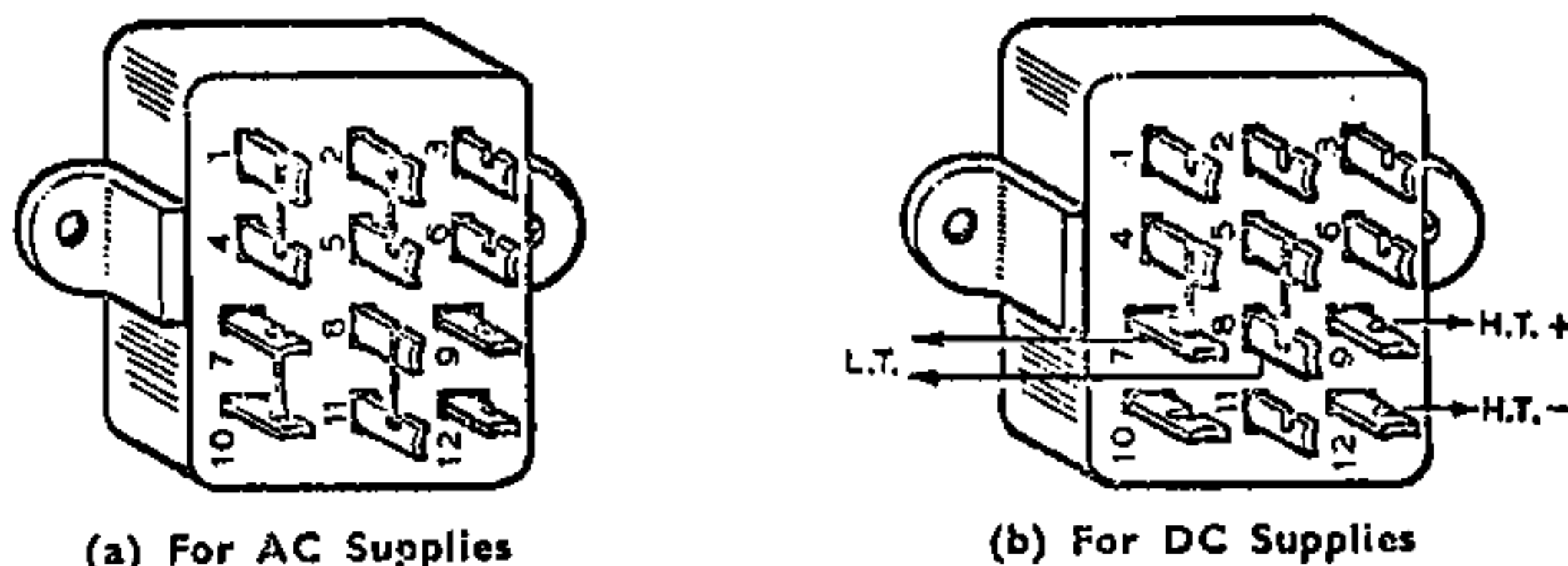


Fig. 5 Rear View of External HT and LT Socket (Showing connections)

(5) Ensure that the Mains Plug (15) and the switch at the supply source are both set to OFF.

(6) Attach a suitable plug to the mains lead and connect this between the local power point and the Mains Input Plug (28).

b. For Separate HT/LT Supplies

(1) Make certain that the supply to be used conforms with the DC power requirements listed on page 2 of this Handbook.

(2) Remove the four straps on the External HT and LT Socket (27). Ensure that the DC supply leads are not live and then connect them to the socket as shown in Fig. 5(b).

(3) Replace the socket and ensure that it makes good contact with the plug.

c. Aerial and Earth Connections

(1) Connect the plug on the aerial feeder to the appropriate Aerial Input Socket (24).

(2) Connect the earth lead to the Earth Terminal (25).

d. AF and IF Output Connections

(1) LR and HR headphones may be plugged into the Phones Jack (16).

(2) A 2.5 ohm loudspeaker may be connected to the 2.5 Ω Terminals (22).

(3) A 600 ohm line may be connected to the 600 Ω Terminals (23).

(4) Carrier frequency shift equipment may be connected to the IF Output Socket (20).

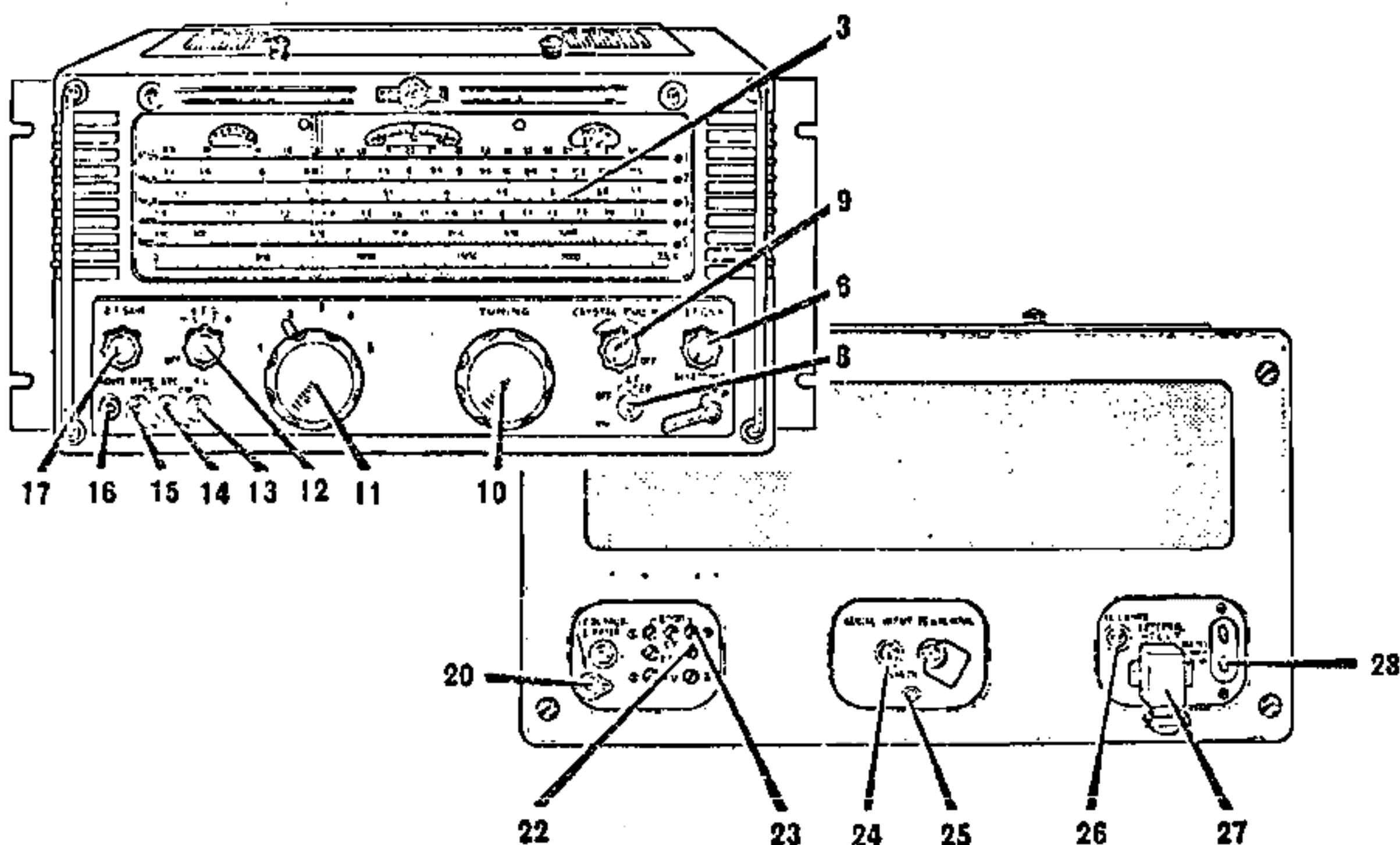
302 PRELIMINARY CHECKS AND ADJUSTMENTS

a. Switching On Checks

- (1) Switch on the AC or DC supply at the source.
- (2) Set the following controls as stated:-

RF Gain Control (17)	Max. Position
AF Gain Control (6)	Mid. Position
AVC Switch (14)	'On'
BFO Control (12)	'Off'
Crystal Phasing Control (9)	'Off'
AF Filter Switch (8)	'Off'
NL Switch (13)	'Off'
Mains Switch (15)	'On' (For AC only)

- (3) Check that the Tuning Dial (3) is illuminated. (The degree of illumination may be adjusted by means of the Dial Lamps Control - 26).
- (4) With the Range Switch (11) set to each position in turn, check the receiver for satisfactory operation over the full range of the Tuning Control (10) and check that the appropriate scale indicator lamp lights.
- (5) Turn the BFO Control (12) to the mid-position and tune in a station. Then vary the setting of the BFO Control (12) and check that the pitch of the beat note changes accordingly, and finally turn the control fully anti-clockwise to 'Off'.



b. Adjusting the Signal Strength Meter

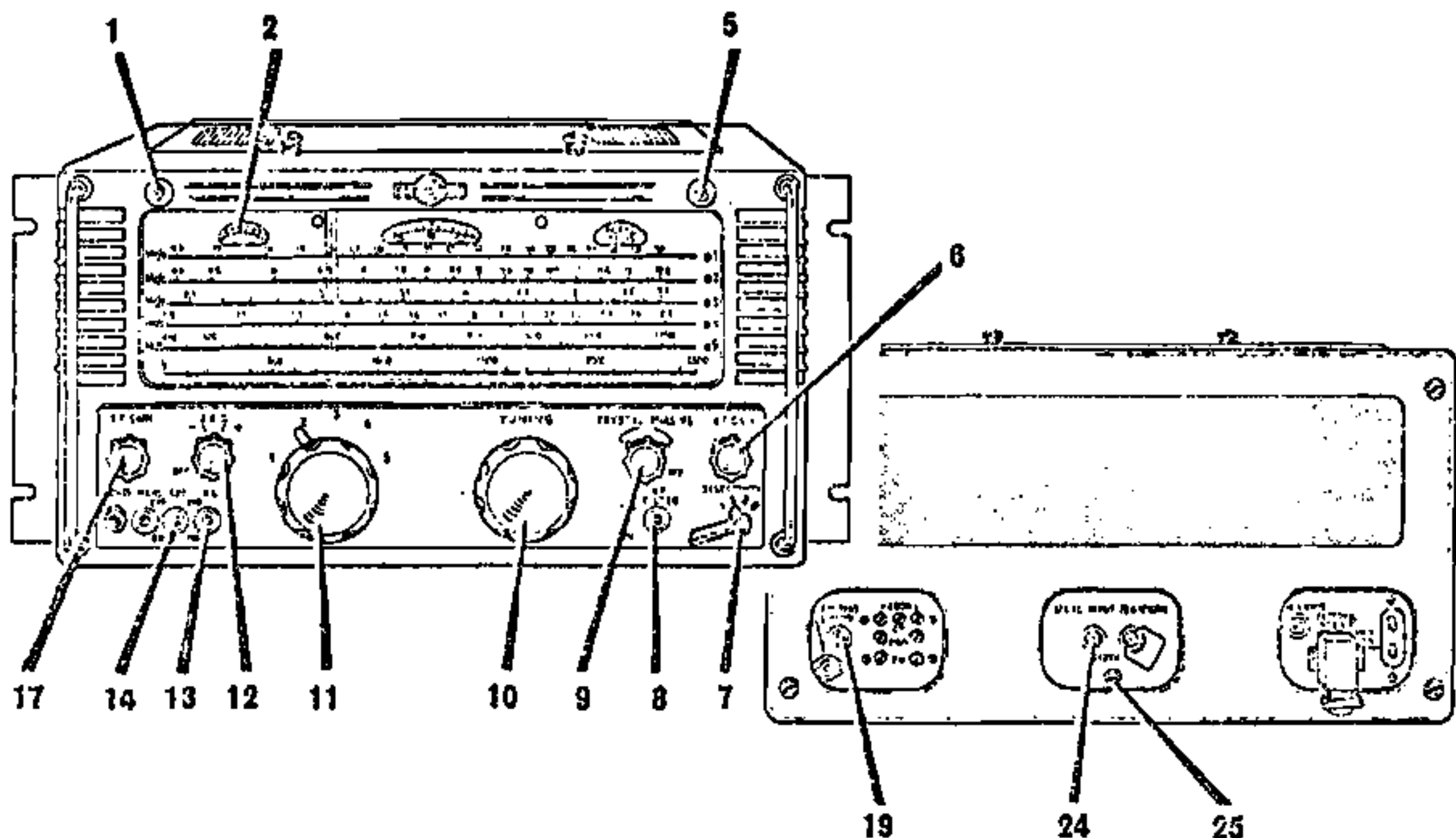
(1) Set the following controls as stated:-

RF Gain Control (17) Max. Position
AVC Switch (14) 'On'
Selectivity Control (7) Fully Anti-Clockwise
BFO Control (12) 'Off'
Crystal Phasing Control (9) 'Off'

(2) Remove the aerial feeder from the Aerial Input Socket (24) and connect a short piece of wire between the centre conductor of the socket and the Earth Terminal (25).

(3) With a screwdriver, adjust the 'S' Meter Control (19) to obtain zero indication on the Signal Strength Meter (2).

(4) Remove the piece of wire and replace the aerial feeder.



c. Adjusting the Calibration of the Tuning Dial

(1) Set the following controls as stated:-

Range Switch (11) Band 1
RF Gain Control (17) Max. Position
Selectivity Control (7) Fully Anti-Clockwise
AVC Switch (14) 'Off'
Crystal Phasing Control (9) 'Off'
NL Switch (13) 'Off'
AF Filter Switch (8) 'Off'

(2) Set the Tuning Control (10) to a frequency on which no signals are being received and adjust the AF Gain Control (6) until background noise is at a comfortable listening level.

(3) Rotate the BFO Control (12) to the point between the two BFO scale markers at which the noise level is at a minimum. Note this for future reference as being the 'zero beat position'.

(4) Set the Selectivity Control (7) to either of the two centre positions, the AF Gain Control (6) to the mid position and the RF Gain Control (17) to a suitable position at which background noise is heard.

(5) Set the Range Switch (11) and the Tuning Control (10) for the required frequency or the mean if covering a band of frequencies.

(6) With the BFO Control (12) in the 'zero beat position', depress the Calibrator Switch (1) and carefully rotate the Tuning Control (10) towards the nearest red graduation on the appropriate frequency scale until a beat note is heard.

(7) Tune for zero beat, re-adjusting the RF Gain Control (17), if necessary, to ensure a critical null point. Release the Calibrator Switch.

(8) Check whether the cursor line is immediately above the red graduation and, if not, rotate the Cursor Adjuster (5) accordingly.

303 OPERATING

a. Introduction

These instructions describe the basic methods of operation, but do not attempt to cover all the optional procedures which are possible in connection with RF and AF Gain Controls, AVC and Signal Strength Meter facilities. These following notes may help to summarise the position:-

RF and AF Gain Controls: Generally it is better to use only one of these controls, depending on whether AVC is in use. With AVC the RF Gain Control is usually set to maximum and the required adjustment obtained by means of the AF Gain Control; without AVC the AF Gain Control should be left somewhere near the mid position and the necessary adjustment obtained on the RF Gain Control.

AVC: Whilst AVC should obviously be used when the wanted station is fading, it may also be used to avoid overloading from strong stations when searching for weak ones. In some circumstances, however, this may make a weak station more difficult to detect, and on CW it may introduce distortion at slow keying speeds.

Signal Strength Meter: To bring this into operation the Selectivity Control must be turned fully anti-clockwise, the AVC switched on and the RF Gain Control set to maximum; this will naturally override any contrary instructions given in the following sections.

b. Tuning Procedure for VOICE and MCW

- (1) Carry out the instructions for 'Adjusting the Calibration of the Tuning Dial' as given in para. 302c.
- (2) Set the BFO Control (12) to 'Off' and rotate the Tuning Control (10) about the required frequency until the wanted signal is heard.
- (3) Adjust the RF Gain Control (17) to obtain the required signal level.
- (4) If adjacent channel interference is experienced, turn the Selectivity Control (7) anti-clockwise to a narrower bandwidth position.
- (5) If interference is experienced from ignition and similar impulsive noises some improvement may be obtained by setting the NL Switch (13) to 'On'.
- (6) If conditions of fading are experienced the output of the receiver may be maintained at a reasonably constant level by setting the AVC Switch (14) to 'On', turning the RF Gain Control (17) fully clockwise and adjusting the AF Gain Control (6) to give a suitable output level.

c. Tuning Procedure for CW

- (1) Carry out the instructions for 'Adjusting the Calibration of the Tuning Dial' as given in para. 302c.
- (2) With the BFO Control (12) in the 'zero beat position', rotate the Tuning Control (10) about the required frequency until the wanted signal is heard and then carefully adjust for zero beat.
- (3) Turn the BFO Control (12) to the left or right of the 'zero beat position' until the required beat note is obtained.
- (4) Adjust the RF Gain Control (17) to obtain the required signal level.
- (5) If adjacent channel interference is experienced, turn the Selectivity Control (7) anti-clockwise to a narrower bandwidth position. If this is not satisfactory, turn the Crystal Phasing Control (9) anti-clockwise to switch on the Crystal Filter and then carefully adjust for maximum rejection of the unwanted signal. If this fails, rotate the BFO Control (12) through the 'zero beat position' until a suitable beat note is again obtained.

c. If the interference still persists, set the AF Filter Switch (8) to 'On' and adjust the BFO Control (12) until the wanted signal is at maximum strength.

NOTE: If the keying speed of the transmission is greater than 100 words per minute the introduction of the AF Filter may result in a distorted output due to the narrow pass-band of the filter.

d. Tuning Procedure for CFS (Carrier Frequency Shift Keying)

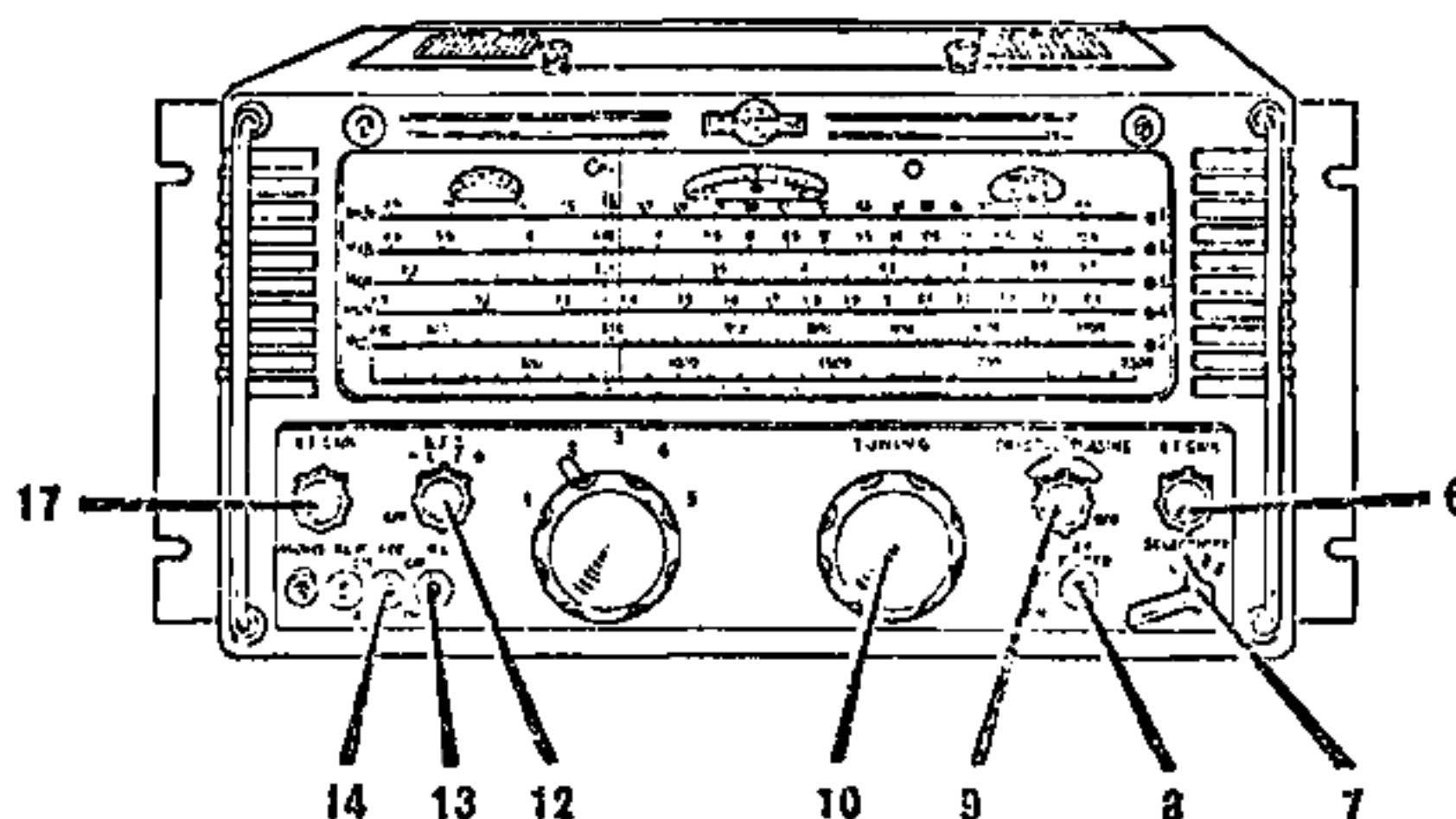
Normally the reception of CFS signals would be carried out in conjunction with a Receiver Adaptor which would be fed from the IF output socket. Operating instructions for this would depend largely on the equipment used and would be included in the relevant handbook.

In certain applications it may be convenient to use a DC Recorder or some similar equipment connected to the AF output terminals of the receiver. As a rule the technique in these cases is to use the audio filter in the receiver to select the beat note corresponding to either the 'Mark' or 'Space' frequency and feed it to the bridge as an ordinary CW signal. Instructions for doing this are as follows:-

(1) Carry out the instructions for 'Adjusting the Calibration of the Tuning Dial' as given in para. 302c.

(2) With the BFO Control (12) in the 'zero beat position', rotate the Tuning Control (10) about the required frequency until the wanted signal is heard and then carefully adjust so that the 'Mark' element of the CFS signal is at zero beat.

NOTE: Assuming the 'Mark' element to be radiated on the higher frequency, this will involve tuning the receiver to the higher of the two frequencies at which a zero beat note can be distinguished.



(3) Turn the BFO Control (12) to the left of the 'zero beat position' (or to the right, for 'Space' elements) until a beat note of medium pitch is obtained.

(4) Turn the Selectivity Control (7) fully anti-clockwise to the narrowest bandwidth position and set the AF Filter Switch (8) to 'On'.

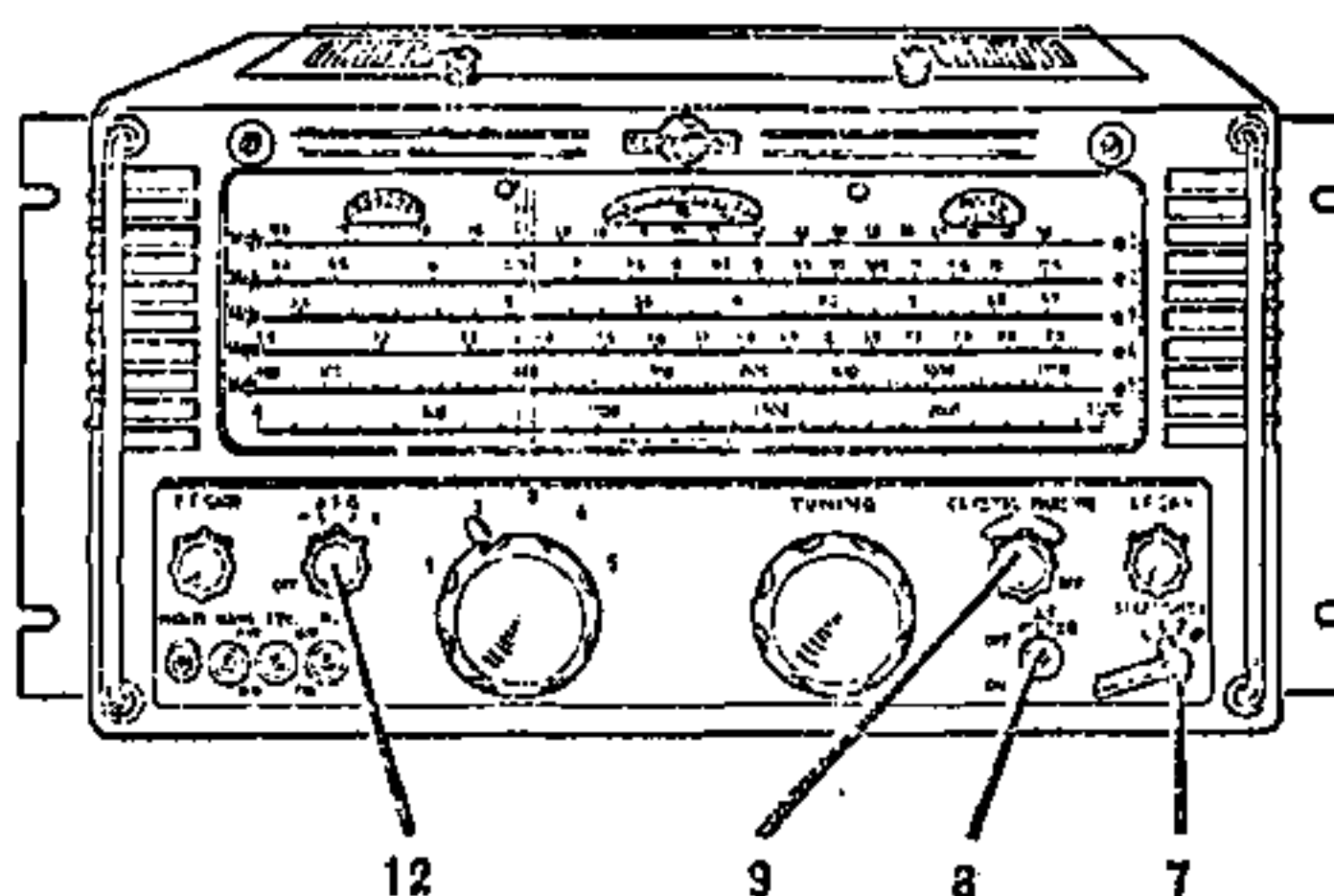
(5) Carefully adjust the BFO Control (12) until the beat note is at maximum strength.

NOTE: If the keying speed of the transmission is greater than 100 words per minute the introduction of the AF Filter may result in a distorted output due to the narrow pass-band of the filter.

(6) If severe interference is present on the 'Mark' element, repeat the above procedure but this time tune for the 'Space' element.

NOTE: It should be appreciated that this will provide a REVERSED signal at the receiver output compared with the original.

(7) If adjacent channel interference is experienced, turn the Crystal Phasing Control (9) anti-clockwise to switch on the Crystal Filter and then carefully adjust for maximum rejection of the unwanted signal.



USE & SERVICING

WARNING: The voltages employed in this equipment are sufficiently high to endanger human life. Every reasonable precaution has been observed in design to safeguard operating personnel. The power MUST be switched off before changing valves or making internal adjustments. In case of electric shock see inside this cover.

401 INTRODUCTION

No equipment or installation can be expected to work properly unless it is kept in first class condition by regular servicing, conscientiously carried out. This servicing is the ultimate responsibility of the NCO or man who is in direct charge of the equipment and responsible for its operation, NOT of workshop or repair staffs, though workshop personnel may be called upon to carry out certain servicing tasks.

To guide the NCO or man responsible for servicing, and to ensure that it has been done, it has been laid down that Signal Equipment will be serviced on the task system, and that the completion of each task will be recorded on Army Form B2661 - Unit Servicing Log.

This log is reproduced on page 22. Completion of servicing tasks will be recorded by initialling in the space provided on the front of the form, all minor repairs and replacements will be recorded on the reverse.

402 ROUTINE TASKS

- (1) Ensure that the receiver is kept free from dust and damp by regular cleaning with a dry, clean cloth.
- (2) Ensure that all removeable items such as the crystal and valves, etc, are firmly in position, especially if the receiver has been moved to a new site.
- (3) Check over all external connections and ensure that plugs and sockets are clean and make good contact. Report any frayed or badly worn leads.
- (4) Check that the three dial lamps and the five scale indicator lamps light. Replace any that are defective.
- (5) Check the action of all controls and report any that are not electrically or mechanically sound.
- (6) Check the performance of the receiver, as judged by signals or background noise.

403 FAULT LOCATION

The user's responsibility for rectifying faults will normally be restricted to replacing removeable items such as valves, etc. The following information therefore is only appropriate to such tasks. In the first instance make certain that the trouble is not due to the incorrect setting of a control or to a faulty connection. The HT ON/OFF Switch mounted on top of the centre chassis may have been left in the 'OFF' position or the External HT and LT Socket which is used to link the internal heater circuits when operating from AC supplies, may have been removed.

a. No Output to Speaker or Phones

- (1) If the dial lamps are not working examine:-
 - (i) The two fuses in the receiver.
 - (ii) The mains connector.
 - (iii) The switch and fuses at the supply source.
- (2) Examine the speaker or phones.
- (3) Touch the P.U. Terminals with the finger and if nothing is heard in the speaker or phones suspect V8, V9, V13 or V15.
- (4) Check whether the 'S' Meter is functioning and if so suspect V7. If not, suspect V1, V2, V3, V4, V5, V6, V7 or V9.

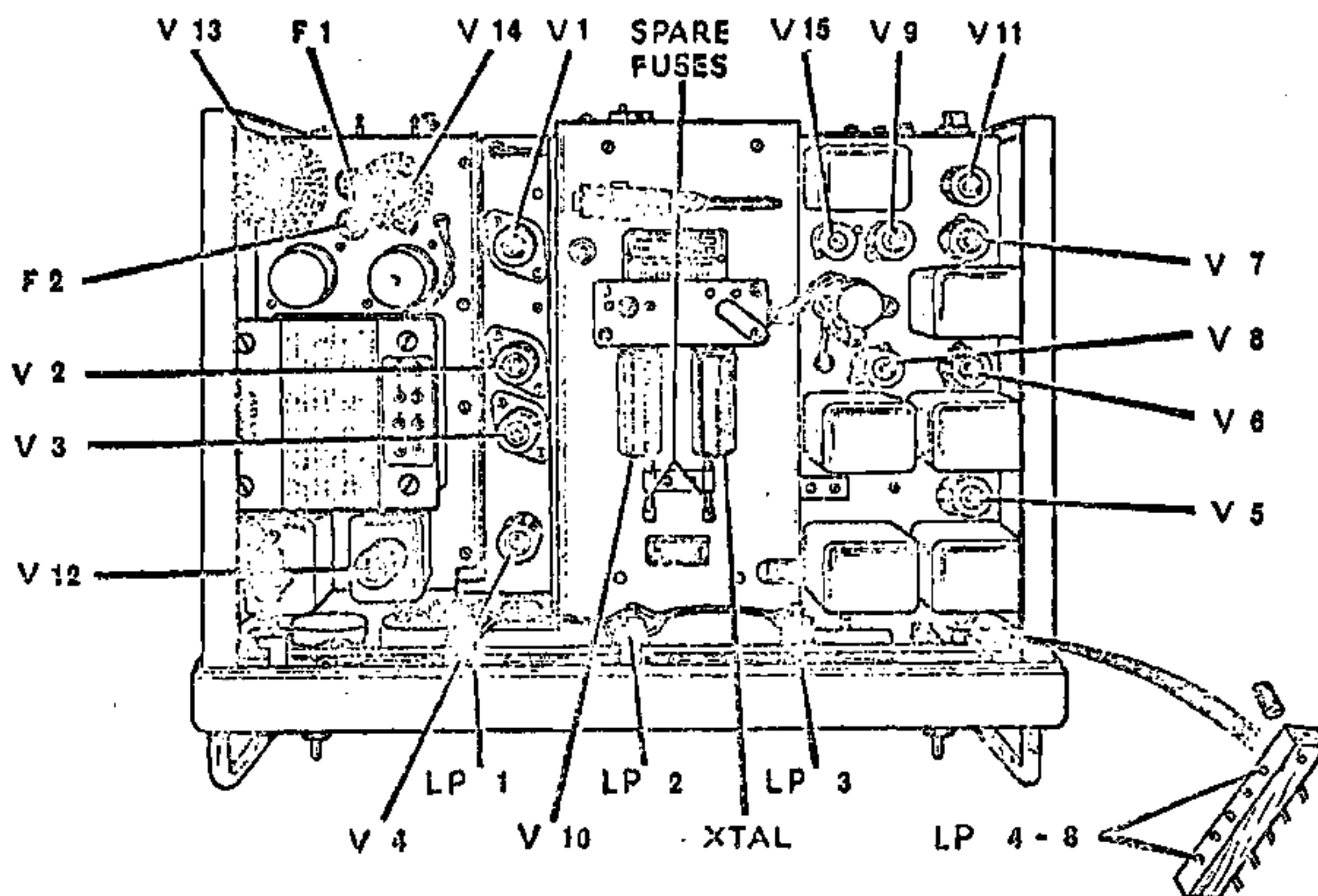


Fig. 6

Location of Valves, etc.

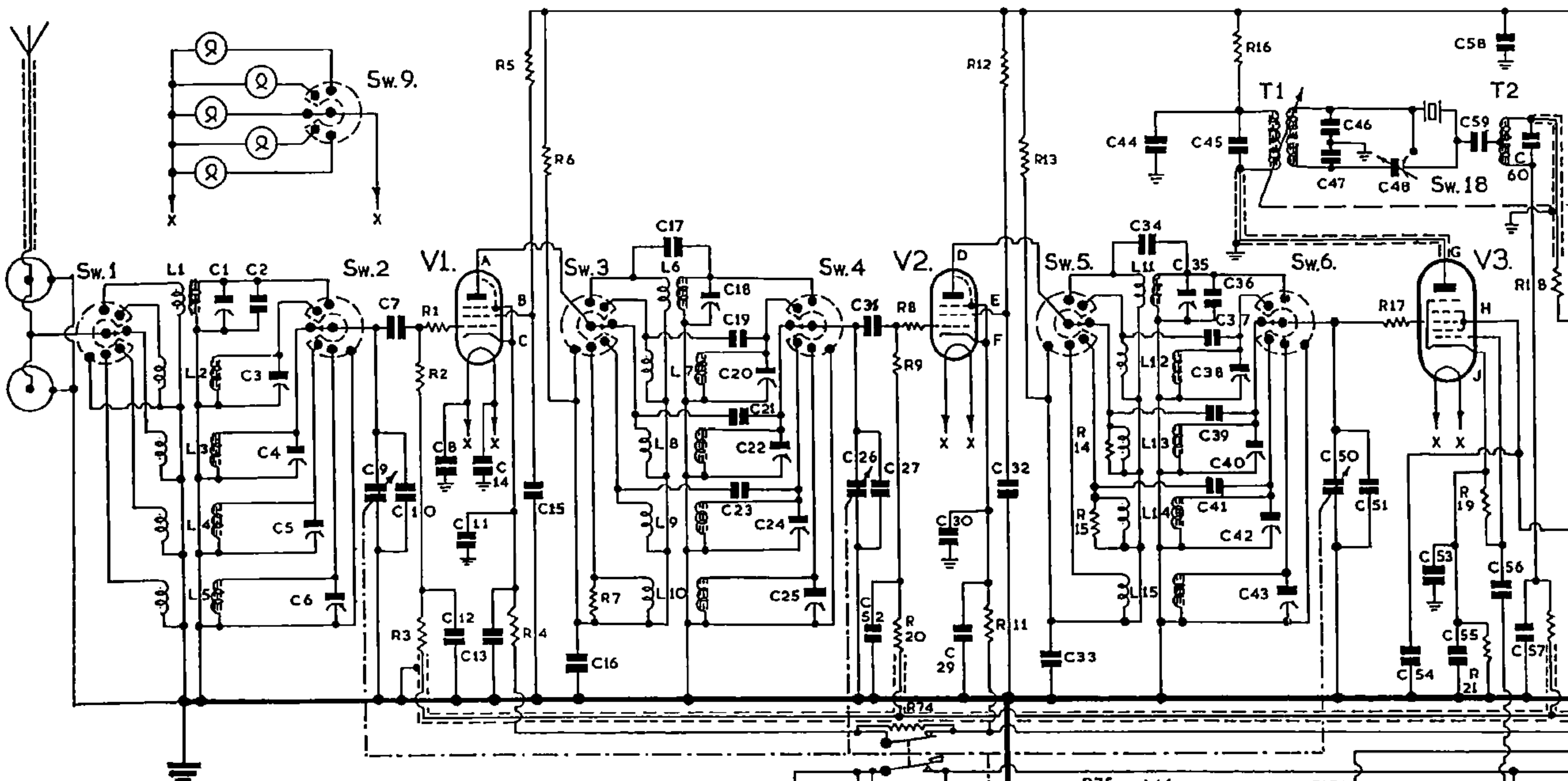
- b. No Output at IF Socket but Reception Otherwise Normal
Suspect V11.
- c. No Beat Note on CW but Reception Otherwise Normal
Suspect V12.
- d. 'S' Meter Not Working but Reception Otherwise Normal
Suspect V7 or V9.
- e. Crystal Calibrator Not Working but Reception Otherwise Normal
Suspect crystal or V10.

404 VALVE AND CRYSTAL DATA

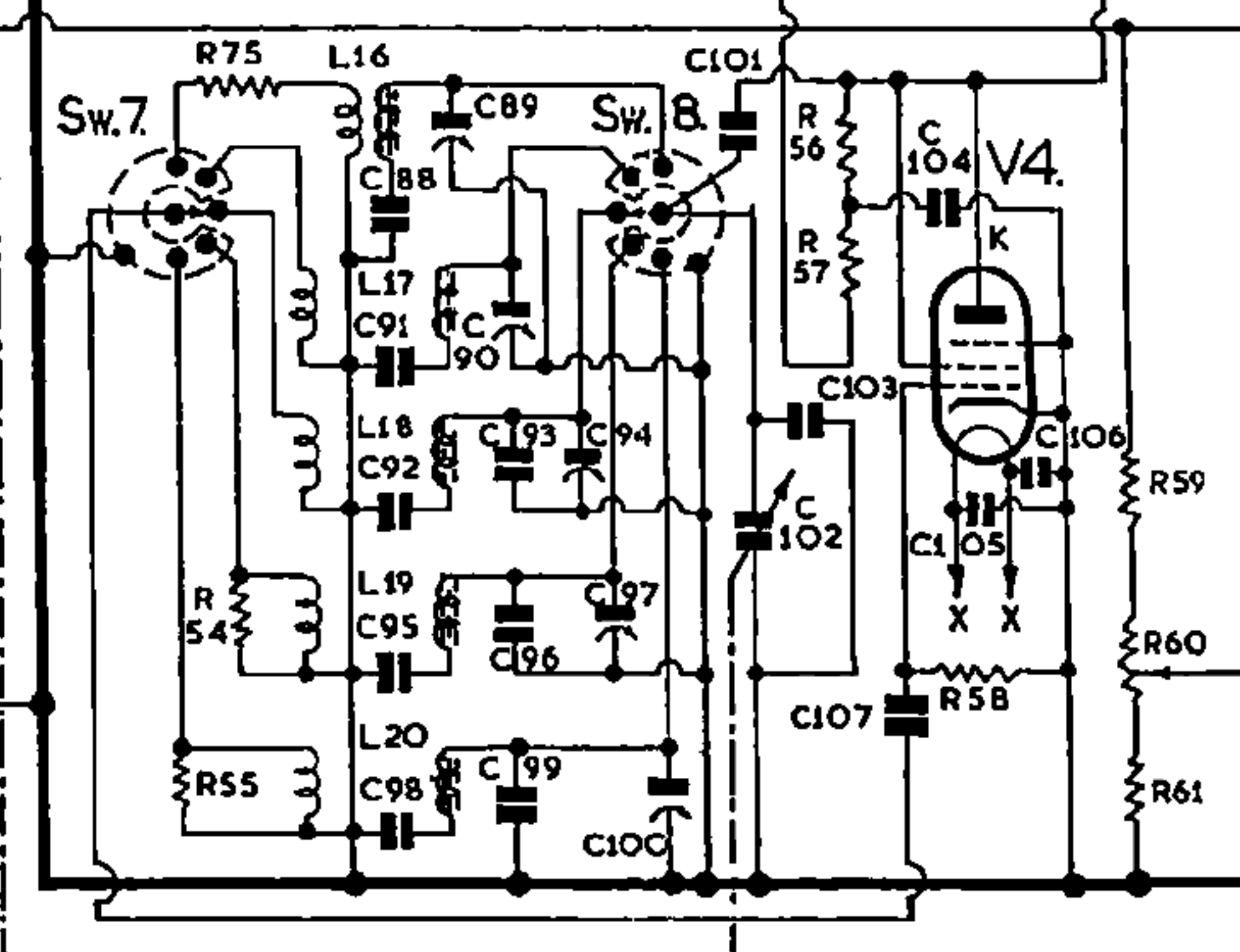
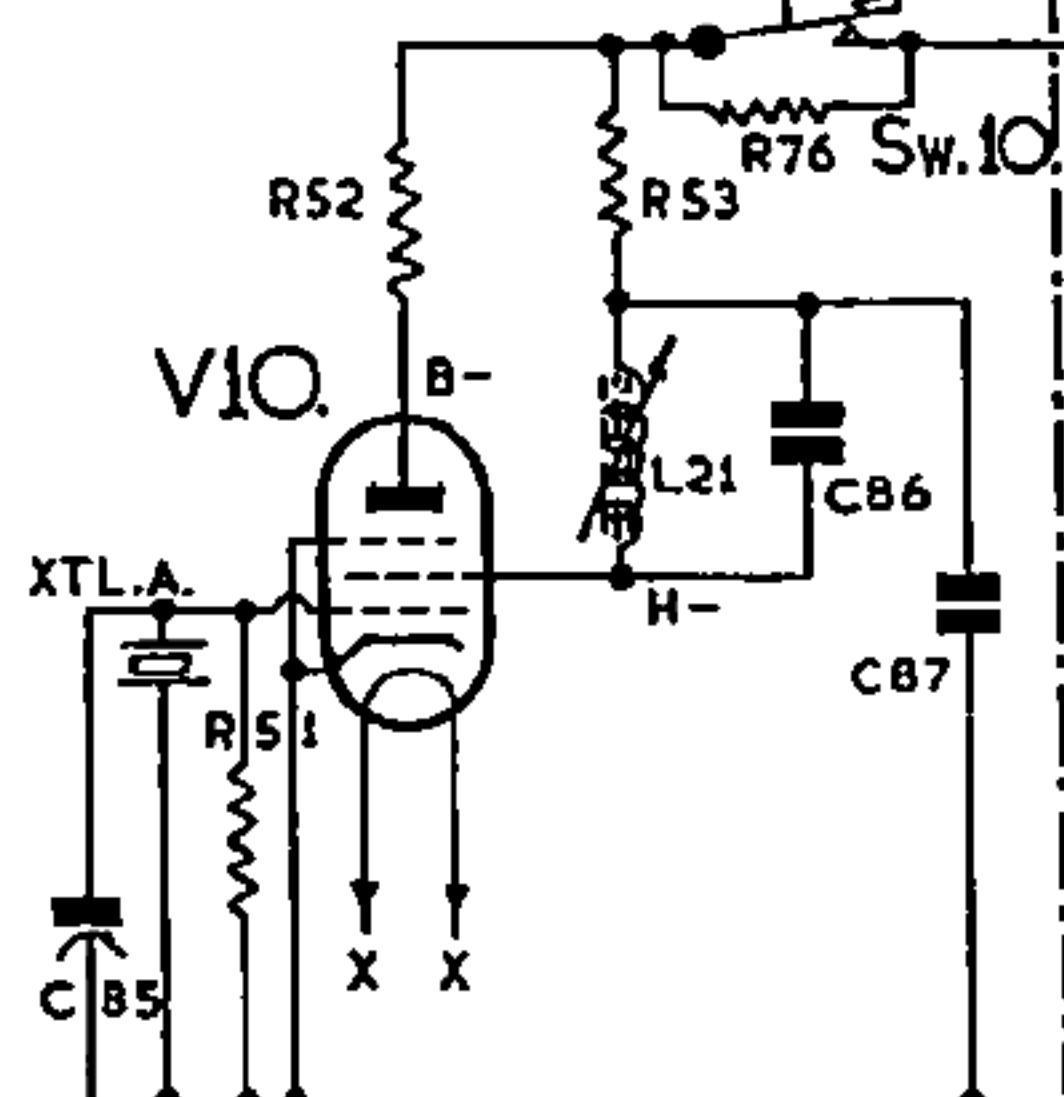
Circuit Ref.	Service Cat. No.	Commercial Type No.	Function
V1	CV 454	6BA6	1st RF Amplifier
V2	CV 454	6BA6	2nd RF Amplifier
V3	CV 453	6BE6	Frequency Changer
V4	CV 138	6AM6	Local Oscillator
V5	CV 454	6BA6	1st IF Amplifier
V6	CV 454	6BA6	2nd IF Amplifier
V7	CV 140	6AL5	Detector and AVC Diodes
V8	CV 491	12AU7	Double-Triode AF Amplifier
V9	CV 140	6AL5	Noise Limiter and 'S' Meter Diodes
V10	CV 138	6AM6	Crystal Calibrator
V11	CV 2524	6AU6	Cathode Follower
V12	CV 454	6BA6	Beat Frequency Oscillator
V13	CV 1863	5Z4G	HT Rectifier
V14	CV 216	VR150/30	Voltage Regulator
V15	CV 136	6AM5	AF Output
XTAL	ZA 51326	-	Crystal Calibrator (500 kc/s)

405 FUSE AND LAMP DATA

Circuit Ref.	Service Cat. No.	Type	Function
F1 & 2	ZA. 46532	Fuse Cartridge No. 1, delayed action, 750 mA.	AC Input Fuses
LP1-3	X2/6240-99-995-1168	6.3V, 0.15A M.C.C. Clear	Dial Lamps
LP4-8	X2/6240-99-995-1904	6.3V, 0.15A L.F.S. Clear	Scale Indicator Lamps



VALVE	V.No.	PIN CONNECTIONS.									SERIES	SERVICE NUMBERS
		1	2	3	4	5	6	7	8	9		
6BA6	V1,2,5 6 & 12	G1	G3	H	H	A	G2	K	-	-	B7G	CV 454.
6BE6	V3	G1	K	H	H	A	G2	G3	-	-	B7G	CV 453.
12AU7	V8	A2	G2	K2	H	H	A1	G1	K1	H	B9A (NOVAL)	CV 491.
8D3 (6AM6)	V4 & 10	G1	K	H	H	A	G3	G2	-	-	B7G	CV 138.
7D9 (6AM5)	V15	G1	K	H	H	A	-	G2	-	-	B7G	CV 136.
5Z4G	V13	-	H	-	A2	-	A1	-	K	-	OCTAL	CV 1863
VR150/30	V14	-	K	-	-	A	-	-	-	-	OCTAL	CV 216
6AL5	V7 & 9	K1	A2	H	H	K2	S	A1	-	-	B7G.	CV 140.
XTLA.	-	G1	G1	G1	-	E	E	E	-	-	B7G.	
6AU6	V11	G1	G3	H	H	A	G2	K	-	-	B7G.	CV 2524

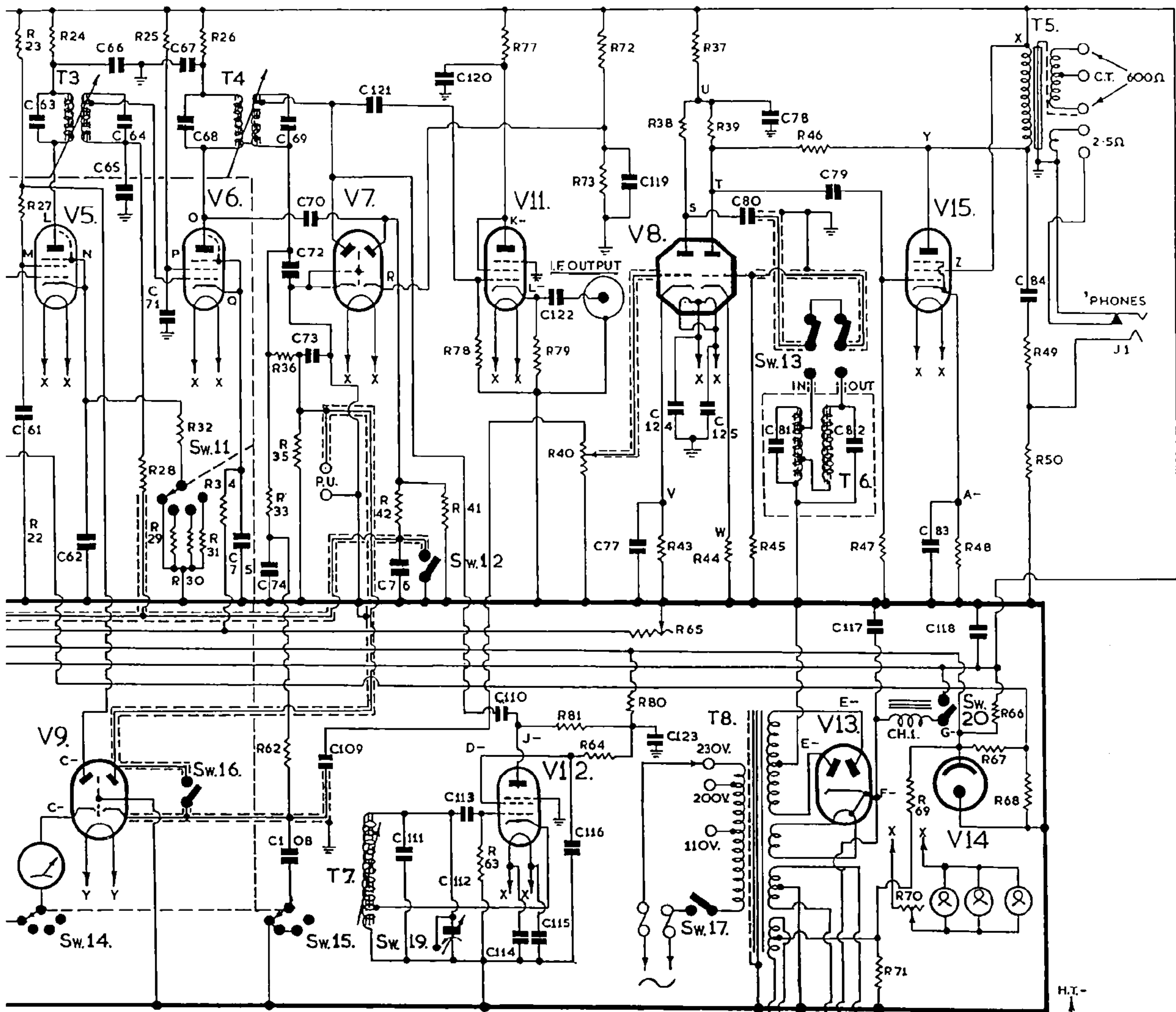


COMMUNICATIONS RECEIVER

R1. 12 ohms
 R2. -47 Megohm
 R3. -47 Megohm
 R4. 68 ohms
 R5. 33,000 ohms 1W
 R6. 1,000 ohms
 R7. 150 ohms
 R8. 12 ohms
 R9. -47 Megohm
 R11. 68 ohms
 R12. 33,000 ohms 1W
 R13. 1,000 ohms
 R14. 1,000 ohms
 R15. 150 ohms
 R16. 1,000 ohms
 R17. 12 ohms
 R18. 12 ohms
 R19. -1 Megohm
 R20. -47 Megohm
 R21. 150 ohms
 R22. -47 Megohm
 R23. 15,000 ohms
 R24. 1,000 ohms
 R25. 33,000 ohms 1W
 R26. 1,000 ohms
 R27. 15,000 ohms
 R28. -47 Megohm
 R29. 820 ohms
 R30. 3,300 ohms
 R31. 1,200 ohms
 R32. 68 ohms
 R33. 1 Megohm
 R34. 68 ohms
 R35. -1 Megohm
 R36. -1 Megohm
 R37. 10,000 ohms
 R38. -22 Megohm
 R39. -1 Megohm
 R40. -5 Megohm Potentiometer
 R41. 1 Megohm

R42. -47 Megohm
 R43. 6,800 ohms
 R44. 2,200 ohms
 R45. 1 Megohm
 R46. 1 Megohm
 R47. -47 Megohm
 R48. 680 ohms
 R49. 47,000 ohms
 R50. 4,700 ohms
 R51. 1 Megohm
 R52. -1 Megohm
 R53. 22,000 ohms
 R54. 2,200 ohms
 R55. 2,200 ohms
 R56. 10,000 ohms
 R57. 1,000 ohms
 R58. 22,000 ohms
 R59. 10,000 ohms
 R60. 5,000 ohms Potentiometer
 R61. 27,000 ohms 1W
 R62. 2 Megohm
 R63. 22,000 ohms
 R64. 68,000 ohms
 R65. 10,000 ohms Potentiometer
 R66. 2,700 ohms Wire Wound
 R67. 4,700 ohms
 R68. 22,000 ohms 1W
 R69. -27 Megohm
 R70. 5 ohms Potentiometer
 R71. 6,800 ohms
 R72. -1 Megohm
 R73. 6,800 ohms
 R74. -1 Megohm
 R75. 47 ohms
 R76. 3 Megohms
 R77. 22,000 ohms
 R78. -47 Megohm
 R79. 68 ohms
 R80. 10,000 ohms
 R81. 68,000 ohms

C1. 3-23 pF Air Trimmer
 C2. 10 pF Silvered Mica
 C3. 3-23 pF Air Trimmer
 C4. 3-23 pF Air Trimmer
 C5. 3-23 pF Air Trimmer
 C6. 3-23 pF Air Trimmer
 C7. 100 pF Silvered Mica
 C8. -0005 mfd Moulded Mica
 C9. 10-367.75 pF 1st R.F. Sect. 4 Gang
 C10. 25 pF Silvered Mica
 C11. -01 mfd Tub. paper
 C12. -01 mfd Tub. paper
 C13. -1 mfd Tub. paper
 C14. -0005 mfd Moulded Mica
 C1



TYPE 730/4.

- C42. 3-23 pF Air Trimmer
 C43. 3-23 pF Air Trimmer
 C44. .1 mfd Tub. paper
 C45. 400 pF Silvered Mica $\pm 2\%$
 C46. 800 pF Silvered Mica $\pm 2\%$
 C47. 800 pF Silvered Mica $\pm 2\%$
 C48. Crystal Phasing Cond.
 C50. 10-367.75 pF Frq. change sect. 4 Gang
 C51. 25 pF Silvered Mica
 C52. .01 mfd Tub. Paper
 C53. .01 mfd Tub. paper
 C54. .1 mfd Tub. paper
 C55. .1 mfd Tub. paper
 C56. 10 pF Ceramic
 C57. .01 mfd Tub. paper
 C58. .01 mfd Moulded Mica
 C59. 20 pF Silvered Mica
 C60. 500 pF Silvered Mica $\pm 2\%$
 C61. .1 mfd Tub. paper
 C62. .1 mfd Tub. paper
 C63. 400 pF Silvered Mica $\pm 2\%$
 C64. 400 pF Silvered Mica $\pm 2\%$
 C65. .01 mfd Tub. paper
 C66. .1 mfd Tub. paper
 C67. .1 mfd Tub. paper
 C68. 400 pF Silvered Mica $\pm 2\%$
 C69. 400 pF Silvered Mica $\pm 2\%$
 C70. 20 pF Silvered Mica
 C71. .1 mfd Tub. paper
 C72. 100 pF Silvered Mica
 C73. 100 pF Silvered Mica
 C74. .1 mfd Tub. paper
 C75. .1 mfd Tub. paper
 C76. .01 mfd Tub. paper
 C77. 30 mfd Tub. Elect. 15V. D.C. Wkg.
 C78. 8 mfd Tub. Elect.
 C79. .01 mfd Moulded Mica
 C80. .01 mfd Moulded Mica
 C81. 7,000 pF Silvered Mica $\pm 1\%$
 C82. 7,000 pF Silvered Mica $\pm 1\%$
 C83. 30 mfd Tub. Elect. 15V. D.C. Wkg.

- C84. .01 mfd Moulded Mica
 C85. 3-23 pF Air Trimmer
 C86. 20 pF Silvered Mica
 C87. .01 mfd Moulded Mica
 C88. 7,000 pF Silvered Mica $\pm 1\%$
 C89. 3-23 pF Air Trimmer
 C90. 3-23 pF Air Trimmer
 C91. 3,625 pF Silvered Mica $\pm 1\%$
 C92. 1,625 pF Silvered Mica $\pm 1\%$
 C93. 10 pF Silvered Mica
 C94. 3-23 pF Air Trimmer
 C95. 900 pF Silvered Mica $\pm 1\%$
 C96. 20 pF Silvered Mica $\pm 1\%$
 C97. 3-23 pF Air Trimmer
 C98. 440 pF Silvered Mica $\pm 1\%$
 C99. 20 pF Silvered Mica $\pm 1\%$
 C100. 3-23 pF Air Trimmer
 C101. 200 pF Ceramic
 C102. 10-367.75 pF Osc. Sect. 4 Gang
 C103. 12 pF Ceramic
 C104. .1 mfd Tub. paper
 C105. .0005 mfd Moulded Mica
 C106. .0005 mfd Moulded Mica
 C107. 50 pF Ceramic
 C108. .002 mfd Moulded Mica
 C109. .01 mfd Moulded Mica
 C110. 8 pF Silvered Mica
 C111. 100 pF Silvered Mica
 C112. B.F.O. Pitch Cond.
 C113. 100 pF Silvered Mica
 C114. .5 mfd Tub. paper
 C115. .5 mfd Tub. paper
 C116. .01 mfd Tub. paper
 C117. 16 mfd Tub. Elect. 450V. D.C. Wkg.
 C118. 40 mfd Tub. Elect. 350V. D.C. Wkg.
 C119. .01 mfd Tub. paper
 C120. .01 mfd Tub. paper
 C121. 6pF Ceramic
 C122. .04 mfd Tub. paper
 C123. .01 mfd Tub. paper
 C124. .01 mfd Tub. paper
 C125. .01 mfd Tub. paper

VOLTAGE VALUES.

POINT.	WESTON (20,000 ohms/volt.)	AVO (Model 40).
A.	218	215
B.	90	85
C.	1	1
D.	218	215
E.	95	88
F.	1	1
G.	226	224
H.	100	100
I.	1	1
K.	100	92
L.	218	216
M.	96	90
N.	1	1
O.	218	216
P.	90	85
Q.	1	1
R.	14	14
S.	80	21
T.	80	32
U.	225	206
V.	4.2	1.5
W.	4	2
X.	242	246
Y.	235	241
Z.	242	246
A.-	10	9.4
B.-	25	15
C.-	160	150
D.-	20	7
E.-	255 A.C.	252 A.C.
F.-	275	272
G.-	148	148
H.-	140	125
J.-	90	50

