RECEPTION SET R 206, MK.2 AND POWER SUPPLY UNIT NO.33

GENERAL DESCRIPTION

Note: This information is provisional and is supplied for guidance pending the issue of more complete instructions. All errors of a technical nature should be notified in accordance with Tels. A 009.

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MAIN FEATURES

1. The Reception set R 206, Mk.2 is a high-grade, eleven-valve superheterodyne receiver designed for special services and also for use in direction-finding stations. It employs tropical components and finishes. It is suitable for the reception of R/T (A.M.), M.C.W. and C.W. signals, and capable of high resetting accuracy. The circuit and layout follows closely that of the Reception set R 206, Mk.1 but there are certain electrical and mechanical differences; the coding of the components is entirely different.

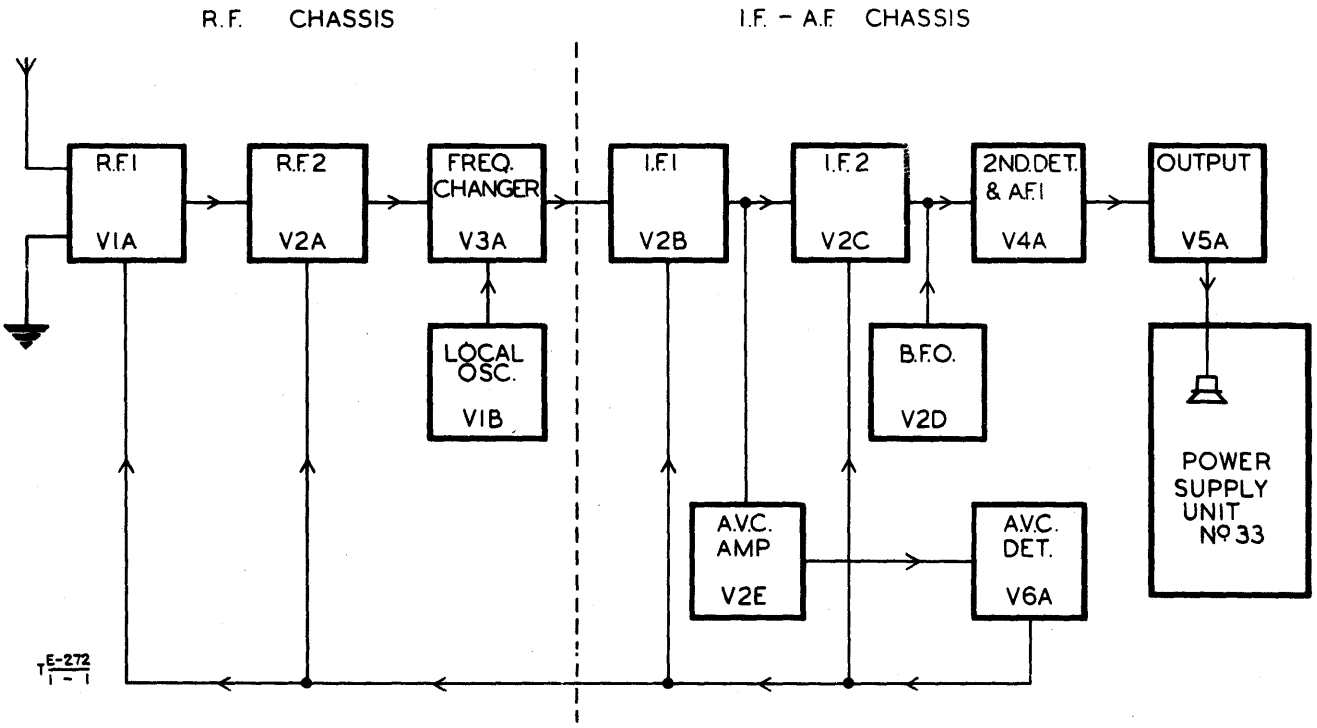

Fig.1 - Block diagram

2. The frequency range coverage is 0.55 to 30 Mc/s in the following ranges:-

Range 1: 30 - 20 Mc/s
Range 2: 20 - 10 Mc/s
Range 3: 10.1 - 4.8 Mc/s
Range 4: 4.8 - 2.2 Mc/s
Range 5: 2.2 - 1.1 Mc/s
Range 6: 1.1 - 0.55 Mc/s

This coverage can be extended down to 50 kc/s by using an Adaptor, frequency range, No.1 or No.1 (T). This gives the three following extra ranges:-

Range 7: 600 - 260 kc/s
Range 8: 260 - 115 kc/s
Range 9: 115 - 50 kc/s

Three output jacks are provided on the receiver for 600Ω, 150Ω and 10Ω loads.

POWER SUPPLY

3. The supplies are derived from a separate unit - Power supply unit No.33 - which is provided with an additional output socket for the Adaptor, frequency range, No.1. Separate non-interchangeable input sockets are fitted to the power unit for the A.C. mains and 12V D.C. battery leads, the required input being selected by means of a 7-pole, 2-way switch. A small moving coil L.S. is incorporated in the power unit and may be switched on or off as required. This L.S. is connected in parallel with the 10Ω output jack of the receiver.

MECHANICAL DETAILS

4. The R.F. and I.F./A.F. units of the receiver are built on separate chassis which are secured to the common front panel (Fig.2). Range switching is accomplished by means of a rotating turret at the rear of the R.F. chassis, which is driven through worm gearing from the RANGE CONTROL handle on the front panel. Each coil and its associated trimmer is built into a separate copper box of segment shape, thus ensuring good R.F. screening as well as easy servicing. The turret to R.F. chassis contact strips are of beryllium copper, silver-plated with gold-silver tips, and make contact to rhodium-plated brass blocks on each coil box. A chain drive from the turret turns the range number drum so that the number of the range in operation is seen as a luminous figure in the RANGE window on the front panel.

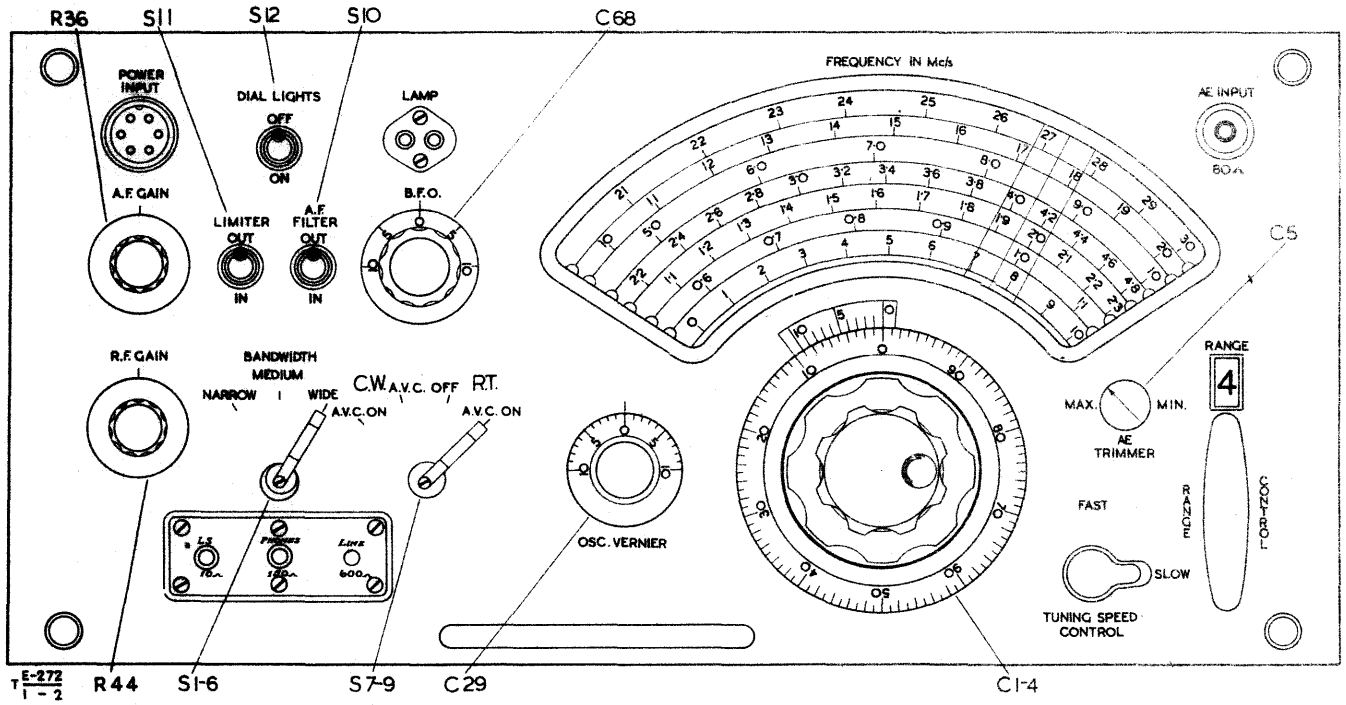

Fig.2 - Receiver front panel layout

5. The 4-gang tuning condenser has its axis parallel to the front panel the drive from the main tuning controls being through a pinion and split anti-backlash gear, giving a 25 : 1 reduction ratio free of backlash. An epicyclic ball drive gives a further reduction of 5 : 1, this drive being brought into action by the TUNING SPEED CONTROL. Two concentric tuning knobs are provided, the larger being used with TUNING SPEED CONTROL at FAST and the smaller knob when the control is at SLOW. The fast-motion knob, which allows spin tuning, is provided with a slipping clutch to prevent damage to the gang condenser. The knobs rotate a circular dial graduated in 100 divisions, and also a cursor with hair line which traverses six scales corresponding to the frequency ranges.

6. The I.F./A.F. chassis carries the first I.F. grid-tuned portion of the 1st I.F. transformer, the 2nd and 3rd I.F. transformers, the two crystal filters, the audio filter box, the beat oscillator box and A.F. output transformer, together with the associated valves and components. I.F. band-width switching and A.V.C. switching are carried out by means of wafer switches, using double contacts.

7. The receiver is housed in a metal case in which it is secured by means of four bolts with coin-slotted heads passing through the front panel. A handle on the front panel is provided for withdrawing the receiver from its case for inspection purposes. A metal lid covers and protects the front panel when the receiver is not in use.

8. The power supply unit (Fig.3) is housed in a separate metal case, access to plugs at the rear of the unit being gained through openings in the back of the case. The bolts through the rear of the case hold the unit in position.

RECEPTION SET R 206, MK.2 CONTROLS AND CONNECTIONS (Figs.2, 1001 and 1002)

9. All controls and connecting points of the receiver are located on the front panel. These are:-

(a) Main tuning controls, fast and slow. These are concentric knobs which drive the 4-gang condenser (C1-4) and also the tuning dial and cursor.

(b) TUNING SPEED CONTROL - This has two positions, FAST and SLOW. In the FAST position the larger knob of the main tuning control is used, giving a tuning speed reduction of 25 : 1 and in the slow position the smaller knob is used, giving a reduction of 125 : 1.

(c) RANGE CONTROL rotates the turret to the range required.

(d) AE TRIMMER (C5) trims the aerial coil to the particular aerial in use.

(e) OSC. VERNIER (C29) is a variable condenser in parallel with the local oscillator section of the tuning condenser C4. This control

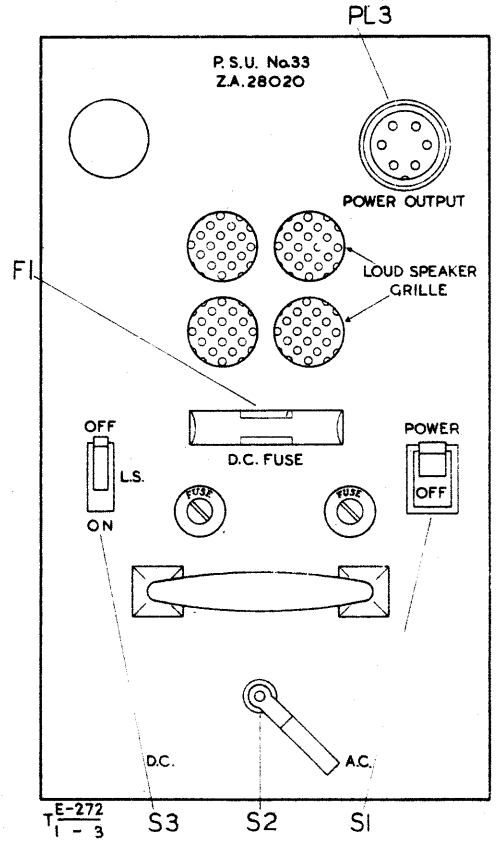

Fig.3 - Front panel layout, P.S.U. 33

may be used to follow slight transmitter or receiver drift.

(f) A.F. GAIN (R36) varies the proportion of signal fed from the detecting diodes of V4A to the triode section of the same valve.

(g) R.F. GAIN (R44) varies the bias applied to valves V1A, V2A, V2B and V2C. This control is inoperative when the A.V.C. system is in use.

(h) BAND-WIDTH (S1-6) is a 3-way switch which selects the following nominal I.F. pass band-widths:-

Narrow	0.7 kc/s
Medium	2.5 kc/s
Wide	8.0 kc/s

In the first two cases, crystal filters are used to obtain the necessary selectivity.

(j) C.W. - R/T switch (S7-9) - This is a 4-way switch having the following positions:-

C.W. (A.V.C. ON - Beat oscillator on, A.V.C. on.
C.W. (A.V.C. OFF - Beat oscillator on, A.V.C. off.

R/T (A.V.C. OFF - Beat oscillator off, A.V.C. off.
R/T (A.V.C. ON - Beat oscillator off, A.V.C. on.

(k) B.F.O. (C68) varies the beat oscillator frequency (5 kc/s approx.) above or below the I.F. of 465 kc/s.

(l) A.F. FILTER IN/OUT switch (S10) by means of which the A.F. filter may be brought into use.

(m) LIMITER IN/OUT (S11) switches the rectifiers MR1 across the output to reduce transient interference surges.

(n) DIAL LIGHTS OFF/ON switch (S12) switches dial lights on or off. There are the following connecting points:-

(i) POWER INPUT plug for connection to the supply unit.
(ii) L.S. 10Ω jack.
(iii) PHONES 150Ω jack.
(iv) LINE 600Ω jack.
(v) LAMP, 2-point socket giving a 12V supply for Lamps, operator, No.6A.
(vi) AE INPUT 80Ω, a coaxial socket for direct connection of an aerial feeder on ranges 1 - 6, and of a coaxial feeder to the Adaptor, frequency range, No.1 on ranges 7 - 9.

POWER SUPPLY UNIT NO.33, CONTROLS AND CONNECTIONS (Figs.3 and 1003)

10. On the front panel there are:-

(a) POWER ON/OFF switch (S1).
(b) L.S. ON/OFF switch (S3).
(c) A.C./D.C. switch (S2).
(d) POWER OUTPUT plug PL3, from which power is supplied to the receiver by means of Connector, 6-point, No.21.

(e) D.C. FUSE (F1) 5A fitted in the D.C. lead to the vibrator.
(f) Two 250mA cartridge type fuses (F2, F3) mounted below the 5A fuse, one in each power rectifier anode circuit.

On the rear panel:-

(g) A.C. input plug PL4.
(h) D.C. input plug PL1.
(j) A.F.R. No.1 plug PL2, from which power is supplied to the Adaptor, frequency range, No.1, when this is in use.

On the mains transformer a panel is fitted for the adjustment of the A.C. mains voltage tappings.

TECHNICAL DESCRIPTION

11. The reception set R 206 is a high-performance superheterodyne receiver, having eleven valves, including a separate local oscillator valve, beat oscillator valve and two valves (amplifier and detector) in the A.V.C. system.

R.F. unit (Figs. 1001, 1005 and 1006)

12. On ranges 2 to 6 the aerial input of 80Ω impedance is obtained with a coupling coil, while on range 1 a tapped coil is used to obtain the correct coupling. At the higher-frequency end of each range, trimming of the tuned circuit is accomplished by means of trimming condensers located with the tuning coils in the turret cans; at the low-frequency end iron-dust inductance trimmers are used. The frequency coverage of range 1 is restricted by a padding condenser, C80, in series with the main tuning condenser C1, which is common to all ranges. Variable condenser C5 (AE TRIMMER) is used for trimming the aerial coil to the particular aerial in use.

13. The signal is fed to the grid of the first R.F. amplifier V1A, which is a low-noise, high-slope R.F. pentode (ARP35), via C6, the grid condenser, and L52. This valve is biased, either by the A.V.C. system or manually by R44 the R.F. GAIN control, through R1 decoupled to earth by C7. R2 is connected from the grid end of R1 to the cathode bias line so that only a part of the total A.V.C. voltage is used to control this valve. Standing cathode bias is applied to the valve by R3.

14. After amplification by the valve, the signal is fed through R4 to the coupling coil of the 1st R.F. transformer located in the turret. The function of R4 and L52 is to supress any tendency to parasitic oscillations of V1A.

2nd R.F. amplifier V2A

15. On all ranges the secondary winding of the 1st R.F. transformer is in the grid circuit of V2A, and is tuned by C2. On range 1, a padding condenser, C83, is included in series with C2. On the low-frequency ranges, only low gain is required from this stage, hence in ranges 4 to 6 only a portion of the voltage generated across the tuning coil is passed on to V2A. This is arranged by tapping the grid of V2A down the coil.

16. The signal is now fed to the grid of V2A through C13, the grid condenser, and L53 which prevents parasitic oscillation. V2A is a normal R.F. pentode biased, either by the A.V.C. system or manually by R44, the R.F. GAIN control, through R8, decoupled to earth by C14. Standing cathode bias is applied to the valve by R9.

Frequency changer V3A

17. Coupling between V2A and V3A is by means of an R.F. transformer (2nd R.F.) contained in the coil turret. The primary winding is in the anode circuit of V2A while the secondary winding, tuned by C3 on all ranges, is in the signal grid circuit of V3A, a triode-hexode frequency changer. On range 1 a padding condenser C85 is included in series with C3. Only the hexode portion of V3A is used, there being a separate local oscillator valve. The anode of the triode section has H.T. supplied to it through R21 to ensure that a steady D.C. is passed. If this is not done, then, on A.C. operation, a capacitance change occurs between grid and cathode of this section due to magnetic variation of the space charge present, which change is reflected back across the local oscillator section of the receiver, causing frequency modulation of the oscillator. C21 by-passes R.F. current from the triode anode to earth.

Local oscillator V1B

18. The local oscillator voltage is fed from a suitable tap on the oscillator coil through C22 to the triode grid of V3A, bias for which is obtained by grid current, through R16. Standing cathode bias to this valve is obtained by R15.

19. The oscillator valve V1B is used in a parallel-fed Hartley circuit, the grid condenser C27 having a negative temperature coefficient to minimize drift due to changes in ambient temperature. The H.T. supply to the anode of this valve is obtained direct from the main H.T. line, R23 and C26 acting as a filter network. The supply to the screen is approximately 100V, stabilized by the neon valve V3 in the power supply unit, C28 effectively earthing this electrode and forming part of the oscillatory circuit. The screen of the valve is in fact the anode of the oscillator. The OSC. VERNIER control C29 is a variable condenser with a small capacity swing connected across the section of the main tuning condenser C4, and provides a very fine tuning control.

1st I.F. transformer

20. The first I.F. transformer (L42 and L43) is split into two sections, the mixer anode tuned circuit L42 and C24 being mounted on the R.F. chassis, and the first I.F. grid tuned circuit L43 and C30 mounted on the I.F./A.F. chassis. Capacity coupling between the two sections is effected by condenser C25. A screened cable, terminating in a plug (PL4) which fits into a socket (SO4) on the I.F./A.F. chassis, provides a low-impedance link between the two circuits.

I.F./A.F. unit (Fig.1002)

21. The R.F. unit is electrically connected to the I.F./A.F. unit by a 7-way cable-form, terminated in a 6-point plug PL3, the socket for which (SO3) is situated on top of the beat oscillator box on the I.F./A.F. unit. The seventh lead (earth connection) is secured underneath one of the four screws that secure this socket to the beat oscillator box. Three nominal band-widths of 8 kc/s, 2.5 kc/s and 0.7 kc/s are available by the use of the I.F. transformers only, or the I.F. transformers in conjunction with the wide or narrow crystal filters, switching being accomplished by the BAND-WIDTH switch. When the BAND-WIDTH switch is set to WIDE, no crystal filter is in circuit; the output from the 1st I.F. transformer is fed to the grid of the 1st I.F. valve V2B via C32 and C34 in series, and the 2nd and 3rd I.F. transformers (L44,-L45, L46,-L47) are over-coupled, by the use of common-coupling condensers C41, C51 (bottom coupling) in addition to the mutual inductance coupling.

With the BAND-WIDTH switch set at either MEDIUM or NARROW, crystal filters of nominal band-width, 2.5 kc/s or 0.7 kc/s, are introduced into circuit; the signal from the 1st I.F. transformer is fed to the grid of V2B via C34 only, C32 being earthed, and the 2nd and 3rd I.F. transformers are critically coupled by the introduction of condensers C40 and C50. In these two positions of the switch, the crystal filters control the band-width and cut-off slope, the I.F. transformers being mainly used to suppress the return peaks of these filters.

22. The I.F. amplifying valves V2B and V2C are biased either by the A.V.C. system or manually by the R.F. GAIN control.

Detector and first A.F. amplifier V4A

23. V4A is a double-diode-triode, the diodes being strapped together and used in a parallel diode circuit for detection. R67 is the diode load, R35 and C56 forming an I.F. filter network. Cathode bias for the triode section is provided by R33.

24. The rectified signal is fed from R36, the A.F. GAIN control, to the grid of the triode section of V4A, R34 being the anode load of this section of the valve. When the A.F. FILTER switch is put to IN, the A.F. filter is brought into circuit. This filter has a peak frequency of approximately 900 c/s, a pass band-width of approximately 200 c/s at 6 db. down and an insertion loss or gain of the order of ± 2 db. With the filter switch to OUT, the A.F. output is fed to the primary winding of T1 through C62 and R37, which introduce an artifical insertion loss into the circuit to equalize the over-all gain with the filter switch at either IN or OUT. The aural effect is that the A.F. filter appears to have practically no insertion loss.

Output stage V5A

25. The signal is fed from the secondary of the parallel-fed A.F. transformer T1, which is damped by R39 to flatten the frequency response characteristic, to the grid of V5A through R38, a grid stopper. Negative voltage feedback is applied to this valve by C66, R40 and R41. L54 and C65 filter out any I.F. voltage remaining in the output of this valve. The output transformer T2 is connected to three output sockets labelled 600Ω, 150Ω and 10Ω. Actually the 150Ω and 600Ω outputs are in parallel and are both 600Ω. The L.S. located in the power supply unit is connected across the 10Ω output. A full-wave metal rectifier MR1 may be shunted across the 10Ω output by putting the LIMITER switch to IN, to act as a crash limiter.

Beat oscillator V2D

26. The beat oscillator valve V2D is a Hartley oscillator. C68 is the B.F.O. pitch control, C69 being a preset trimmer which allows the oscillator to be set accurately to the I.F. of 465 kc/s; the B.F.O. control dial is set to 0 when this trimmer is adjusted. R46 is the anode load resistor. The oscillator voltage is fed direct to the anode of V2C, the second I.F. amplifier. The screen supply to this valve is cut off by S7, part of the C.W. - R/T switch, when this switch is in either of the R/T positions.

A.V.C. system V2E and V6A

27. A portion of the output from the first I.F. amplifier V2B is fed through C119 to V2E where the signal is amplified. This valve operates with fixed bias provided by R49. L51 and C74 are tuned to the I.F. of 465 kc/s by means of a pre-set parallel condenser C73, and form the anode impedance. V6A, a double-diode which has its diodes strapped together, rectifies the output from V2E. A.V.C. is supplied to V1A, V2A, V2B and V2C when C.W.-R/T switch (S8) is at either of the A.V.C. ON positions. At the same time S9 short-circuits R43 and R44 so that the R.F. GAIN control R44 is inoperative and the cathode bias resistors R3, R9, R28 and R30 are returned to earth.

28. With the C.W.-R/T switch (S7-9) at either of the A.V.C. OFF positions, the R.F. GAIN control R44 becomes operative. The cathode currents of V1A, V2A, V2B, V2C and V5A flow through R44 shunted by R43 and develop a potential drop across them. The slider of R44 is connected through relevant resistors to the grids of the above valves (except V5A, the output valve) so that the amount of bias applied to these valves may be varied. The position of maximum R.F. gain, i.e., minimum bias, is when the slider is away from the earthed end of R44.

Valve heating

29. All the valves are heated from the 12V supply from the supply unit by a series-parallel arrangement. Thus, if one heater burns out, in most cases two valves will be rendered inoperative.

Valve test points

30. The valve test points on the R.F. chassis as viewed from the front of the set are shown in Fig.4.

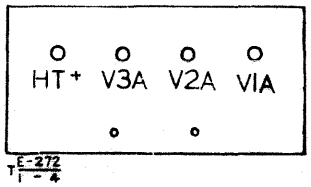

Fig.4 - R.F. Chassis valve test points

Tests between H.T.+ and V1A, V2A or V3A give various voltages from which the anode current of each valve may be calculated, bearing in mind the fact that the readings are taken across resistors of 1kΩ, 470Ω and 1kΩ respectively. The valve test points on the I.F./A.F. chassis as viewed from the front of the set are shown in Fig.5.

Tests between H.T.+ and V2B, V2C, V4A, V5A and V2E measure the respective anode currents, and between H.T.+ and V2D give the screen current. A test between H.T.+ (Osc) and V1B measures the screen current of V1B.

Crystal Filters

31. These are of conventional design and technical information is given in Tels. Z 140-149.

POWER SUPPLY UNIT NO.33 (Fig.1003)

A.C. operation

32. The power transformer T1 has a tapped primary which permits the use of an A.C. supply voltage of from 100 to 250V, 40 to 60 c/s. Full-wave rectification is

employed, each rectifier (V1-V2) having its anodes strapped together to work as a half-wave rectifier. The cathodes and heaters are operated at a potential difference equal to the full H.T. voltage, and fuses F2 and F3 are included in each anode circuit to protect the power transformer in the event of a heater/cathode breakdown. C23 is the reservoir condenser and smoothing is accomplished by L8, L12, C24 and C29. The H.T. D.C. output is fed to the R 206, Mk.2 via PL3 and, when it is in use, to the Adaptor, frequency range, No.1 via PL2. The screen supply for the R 206, Mk.2 local oscillator (V1B) is stabilized at 100V (approx.) by V3 fed by dropping resistors R1 and R2. The heaters of the rectifiers, all valves in the R 206, Mk.2 and those in the Adaptor, frequency range, No.1, when in use, are supplied from one 12.6V centre-tapped winding on T1. The power consumption is of the order of 60VA at a power factor not worse than 0.8.

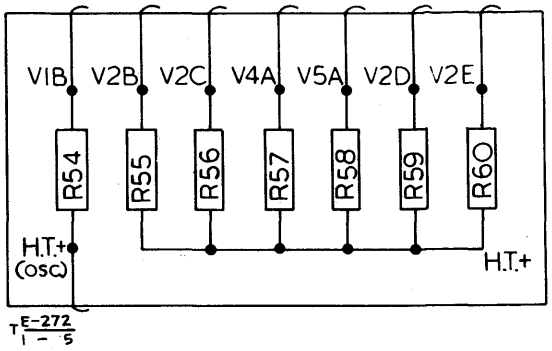

Fig.5 - I.F./A.F. chassis, valve test points

D.C. operation

33. The unit is also designed to work from a 12V accumulator and, when this is in use, a second primary winding on T1 is used in conjunction with a non-synchronous vibrator VB1. Comprehensive filtering and screening is included, and the unit is substantially free from vibrator noise over the whole frequency band of 0.55 to 30 Mc/s. A fuse, F1, is included in the L.T.+ lead to protect the power unit in the event of a breakdown. The H.T. D.C. supply and smoothing is the same for D.C. as for A.C. The entire heater supply is switched from the secondary of T1 to the battery supply. The power consumption is of the order of 50W.

Note: The next page is Page 1001

Table 1001 - Details of components of R.F. unit (see Fig.1001)

Circuit reference	Value	Tolerance	Remarks
		RESISTORS	
R1	2.2MΩ	±20%	
R2	220kΩ	20%	
R3	390Ω	±10%	
R4	100Ω	20%	
R5	1kΩ	20%	
R6	470Ω	20%	
R7	1kΩ	20%	
R8	220kΩ	20%	
R9	390Ω	±10%	
R10	68kΩ	20%	
R11)	470Ω	20%	
R12)			
R13)	27kΩ	±20%	
R14)			
R15	330Ω	±10%	
R16	47kΩ	20%	
R17	3.3kΩ	20%	
R18	2.2kΩ	20%	
R19	1kΩ	20%	
R21	10kΩ	20%	
R22	47kΩ	20%	
R23	470Ω	20%	
R65	60Ω		2 in series. 30Ω ± 5%, ½W special wire-wcund
		CONDENSERS	
C1-4	240pF		Main tuning gang
C5	10pF max.		AE. TRIMMER
C6	200pF	20%	
C7-12	0.01μF	20%	Moulded mica
C13	200pF	20%	
C14-21	0.01μF	20%	
C22	200pF	20%	
C23	50pF max.		Preset
C24	470pF	±20%	
C25	0.02μF	±10%	
C26	0.01μF	20%	Moulded mica
C27	50pF		Special type negative temp. coefft.
C28	0.01μF	20%	Moulded mica
C29	approx. 3pF		OSC. VERNIER can be varied
C113-114	0.01μF	20%	through 0.5pF
C121-122	0.1μF	20%	
		INDUCTORS	
L42			Primary of 1st I.F. transformer
L52-53	0.5μH		
		VALVES	
V1A-B			ARP35
V2A			ARP34
V3A			ARTH2

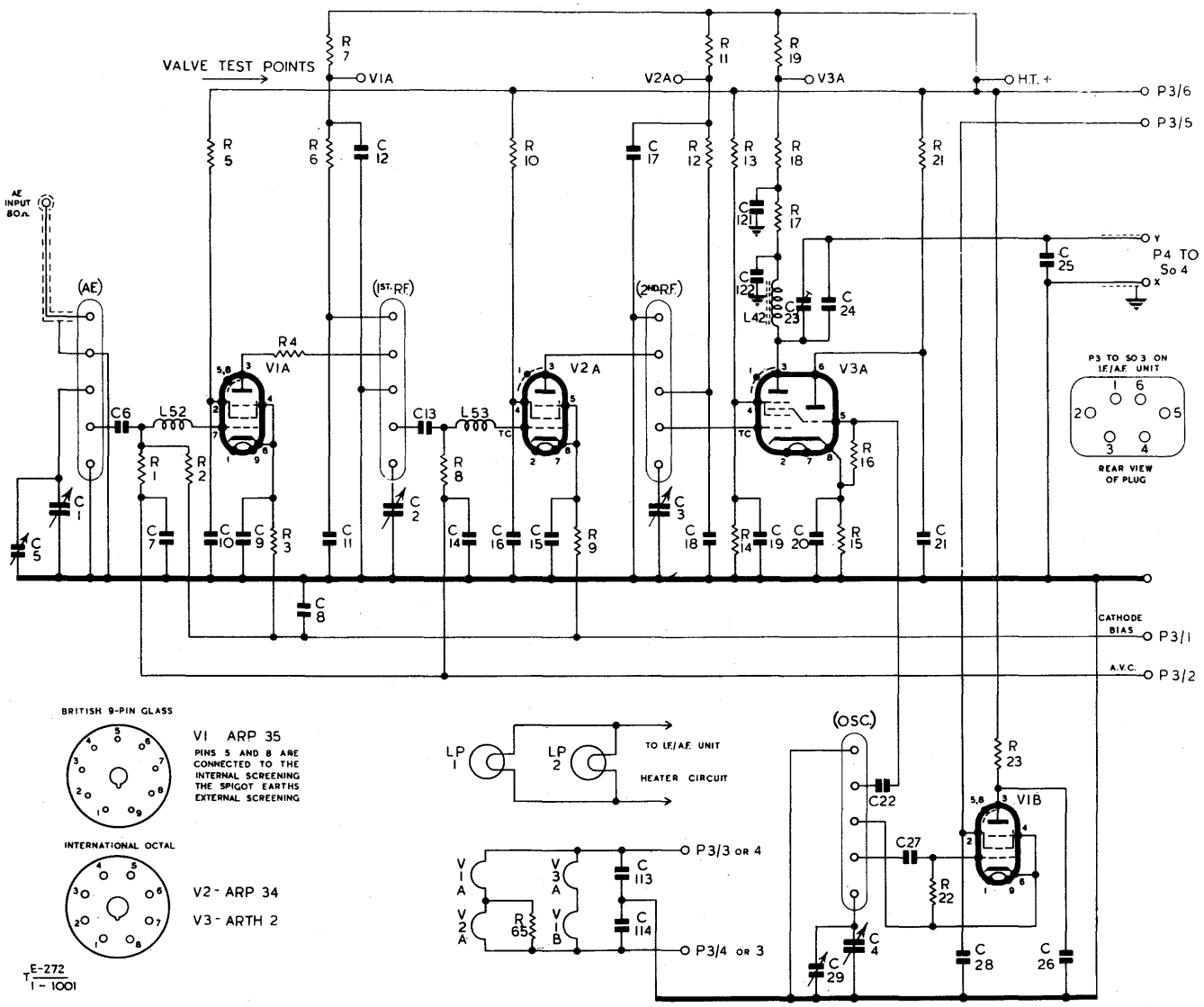

Fig. 1001 - Circuit diagram of R.F. unit

Table 1002 - Details of components of I.F./A.F. unit (see Fig. 1002)

Circuit reference	Value	Tolerance	Remarks
		RESISTORS	
R24	100kΩ	±20%	
R25	10kΩ	"	
R26-27	220kΩ	"	
R28	390Ω	10%	
R29	220kΩ	20%	
R30	390Ω	10%	
R31	100kΩ	20%	
R32	10kΩ	"	
R33	1kΩ	"	
R34	47kΩ	"	
R35	680kΩ	"	
R36	1MΩ Pot.	"	A.F. GAIN
R37	15kΩ	"	
R38	220Ω	"	
R39	100kΩ	"	
R40	47kΩ	"	
R41	2.2kΩ	"	
R42-43	1kΩ	"	
R44	10kΩ Pot.	"	R.F. GAIN
R45	47kΩ	"	
R46	22kΩ	"	
R47	220kΩ	"	
R48	470kΩ	"	
R49	390Ω	10%	
R50	10kΩ	20%	
R51	100kΩ	"	
R52	470kΩ	"	
R53	220kΩ	"	
R54-57	1kΩ	"	
R58	470Ω	"	
R59	1kΩ	"	
R60	470Ω	"	
R66	30Ω	"	Special wire-wound
R67	330kΩ	"	
R68	2.2MΩ	"	
R69	10kΩ	"	
		CONDENSERS	
C30	68pF	±10%	
C31	50pF max.		Preset
C32	5pF		
C33	0.01 pF		
C34	50pF		
C35-37	0.1μF		
C38	470pF	±5%	
C39	50pF max.		Preset
C40-41	0.05μF	±10%	
C42	470pF	±5%	
C43	50pF max.		Preset
C44-47	0.1μF		
C48	470pF	"	
C49	50pF max.		Preset

Table 1002 - (contd.)

Circuit reference	Value	Tolerance	Remarks
		CONDENSERS - (contd.)	
C50-51	0.05µF	±10%	
C52	470pF	±5%	
C53	50pF max.		Preset
C54	100pF		
C55	25µF	+50% -20%	Electrolytic
C56	100pF		
C57	0.1µF		
C58	0.1µF	±5%	
C59	0.01µF	"	
C60-61	0.02µF	"	
C62	0.1µF		
C63	0.1µF	"	
C64	25µF		Electrolytic
C65	1,000pF		
C66	0.1µF		
C67	1,000pF	"	
C68	50pF max.		B.F.O.
C69	100pF max.		Preset
C70	100pF		
C71-72	0.1µF		
C73	30pF max.		Preset
C74	100pF	"	
C75-77	0.1µF		
C78	0.5µF		
C79	0.1µF		
C117-118	0.01µF	±20%	
C119	5pF	"	
C120	100pF	SNP ±10%	
C123	4µF		Electrolytic
		INDUCTORS	
L43			Secondary of 1st I.F. transformer
L44-45			2nd I.F. transformer
L46-47			3rd I.F. transformer
L48	0.265H	±2%	
L49	0.265H	"	
L50			
L51			
L54	10mH		
Circuit reference			Remarks
		VALVES	
V2B-E			ARP34
V4A			AR21
V5A			VT52
V6A			ARDD5

Table 1002 - (contd.)

Circuit reference		Remarks
	TRANSFORMERS	
T1 T2		Ratio 1 : 4 Ratios 4 : 1 (600Ω: 150Ω) 33 : 1 10Ω Primary current 20mA
	SWITCHES	
S1-6 S7-9 S10 S11		6-bank, 3-way 3-bank, 4-way Double-pole, change-over Single-pole, ON/OFF
	RECTIFER	
MR1		4-section, copper oxide 10mA

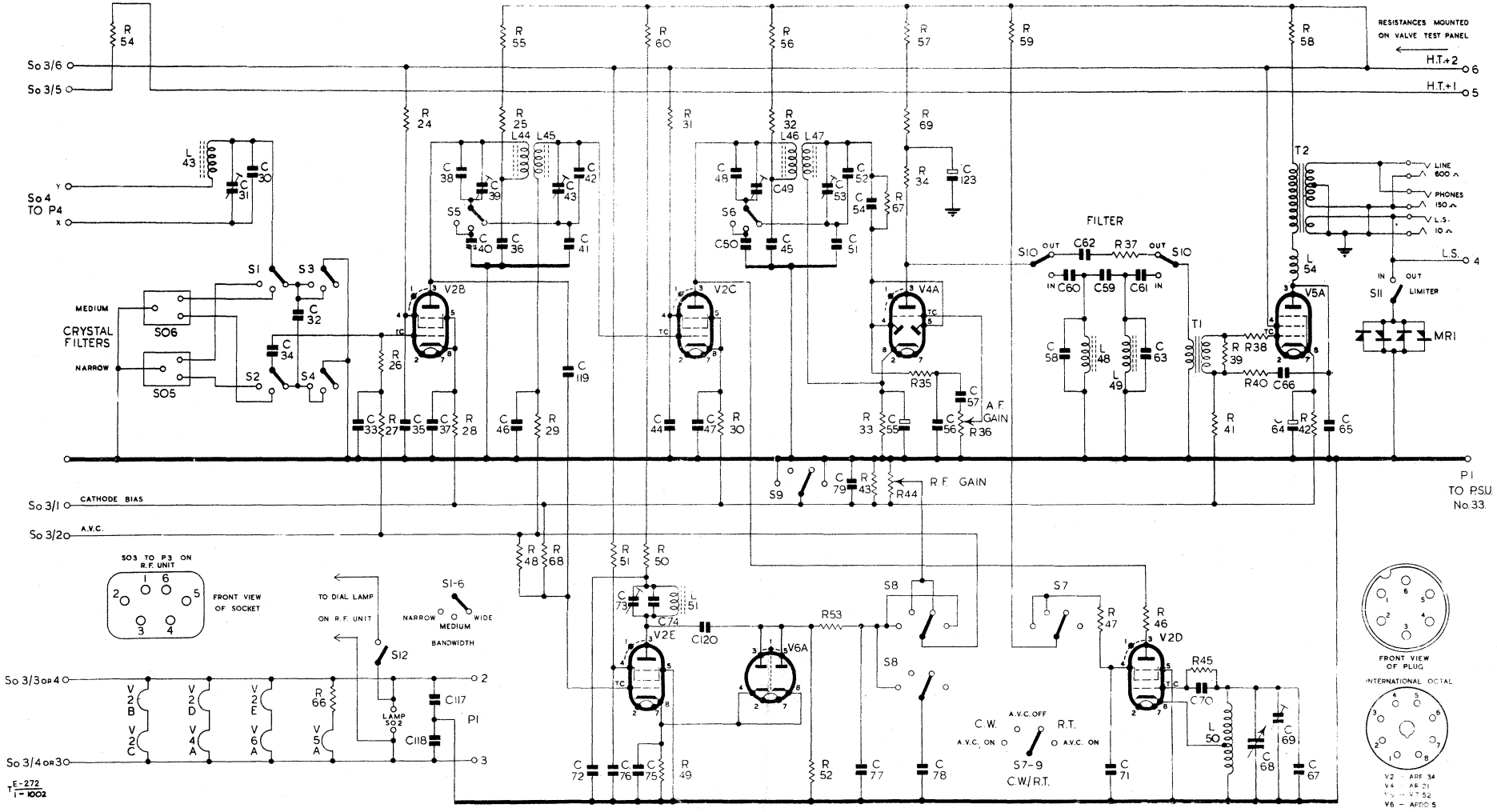

Fig.1002 - Circuit diagram of I.F./A.F. unit

Table 1003 - Details of components of Power supply unit No.33 (see Fig. 1003)

Circuit reference	Value	Tolerance	Rating	Remarks
		RESISTORS		
R1-2	27kΩ	±10%	½W	
		CONDENSERS		
C1-2	0.01μF		350V	Mica
C3	0.5μF		50V	Paper
C4-6	1μF		500V	Paper
C7	0.01μF		350V	Mica
C8	0.01μF		1,000V	Aluminium case
C9	0.1μF		630V	Aluminium case
C10	0.01μF		1,000V	Aluminium case
C11-12	0.1μF		630V	Aluminium case
C13-14	0.01μF		350V	Mica
C15-16	0.5μF		50V	Paper
C17-18	0.01μF		1,000V	Aluminium case
C19-20	2μF		250V	Paper
C21	1000μF		25V peak	Electrolytic
C22	0.01μF		4,000V	Bakelite case
C23-24	4μF		400V	Paper
C25	2μF		250V	Paper
C26	0.1μF		630V	Aluminium case
C27	2μF		250V	Paper
C28	0.5μF		50V	Paper
C29	4μF		400V	Paper
C30-31	0.01μF		350V	Mica

Circuit reference	Value	Remarks
	INDUCTORS	
L1		20 turns 16 S.W.G., R.F. choke
L2	0.6mH (0.75Ω)	R.F. choke
L3-5		36 turns 18 S.W.G., R.F. choke
L6	(each half) 0.06mH at 0mA, (0.16Ω)	Double-wound
L7	9mH at 3.75A	A.F. choke
L8	10H at 0.1A (220Ω)	A.F. choke
L9	250mH at 1 kc/s (0.16Ω)	R.F. choke
L10		20 turns 16 S.W.G., R.F. choke
L11	400mH at 1 kc/s (0.32Ω)	R.F. choke
L12	10H at 0.1A (220Ω)	A.F. choke
L13	2.2mH	R.F. choke
	VALVES	
V1-2		6X5G
V3		AW2 or CV188

Table 1003 - (contd.)

Circuit reference	Value	Remarks
	VIBRATOR	
VB1		No. 4T (or No.5) T = tropical. No.5 is non-tropical and should not be used unless No. 4T is unavailable
	TRANSFORMER	
T1A	Mains transformer	
	FUSES	
F1 F2-3	5.0A 250mA	

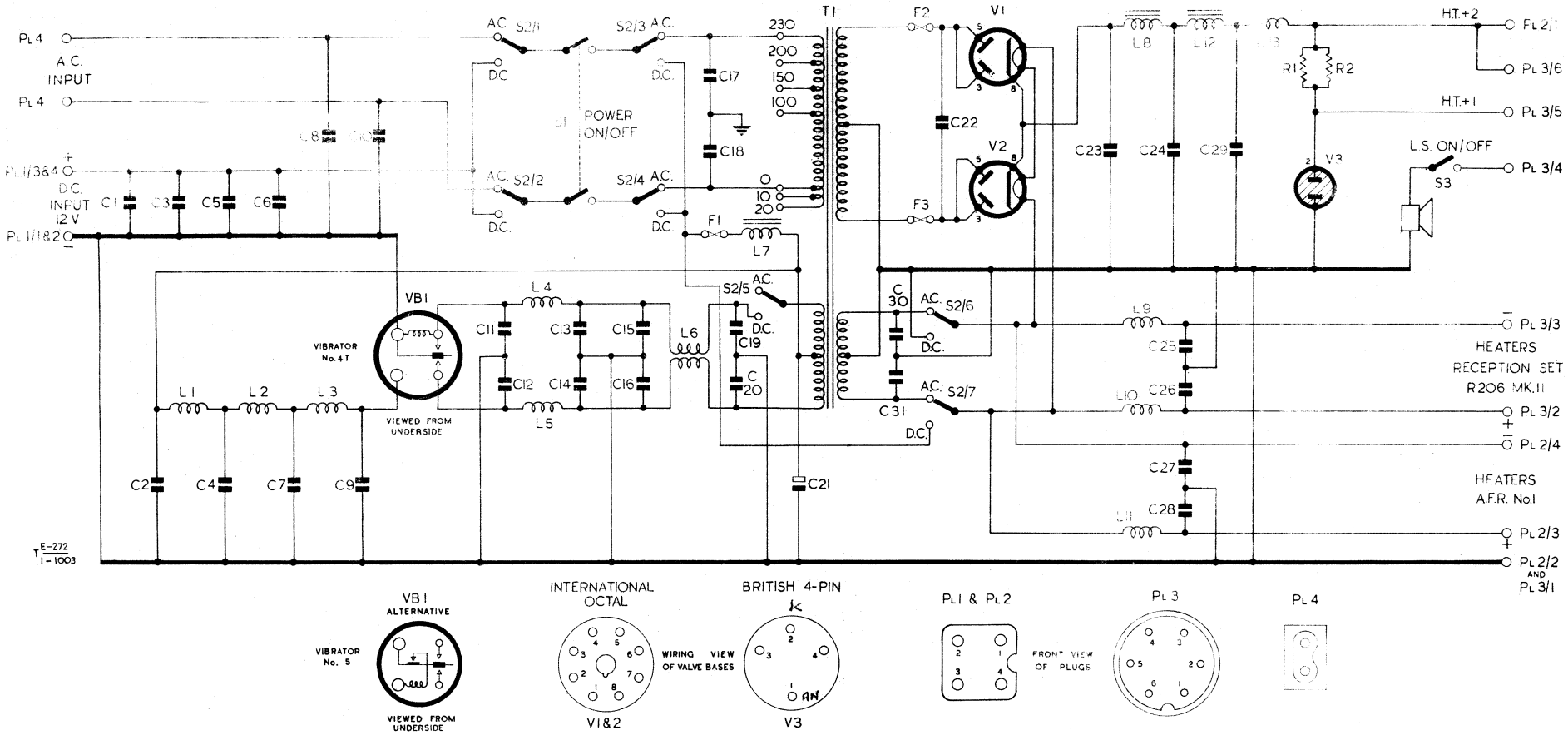

Fig.1003 - Circuit diagram of Power supply unit No.33

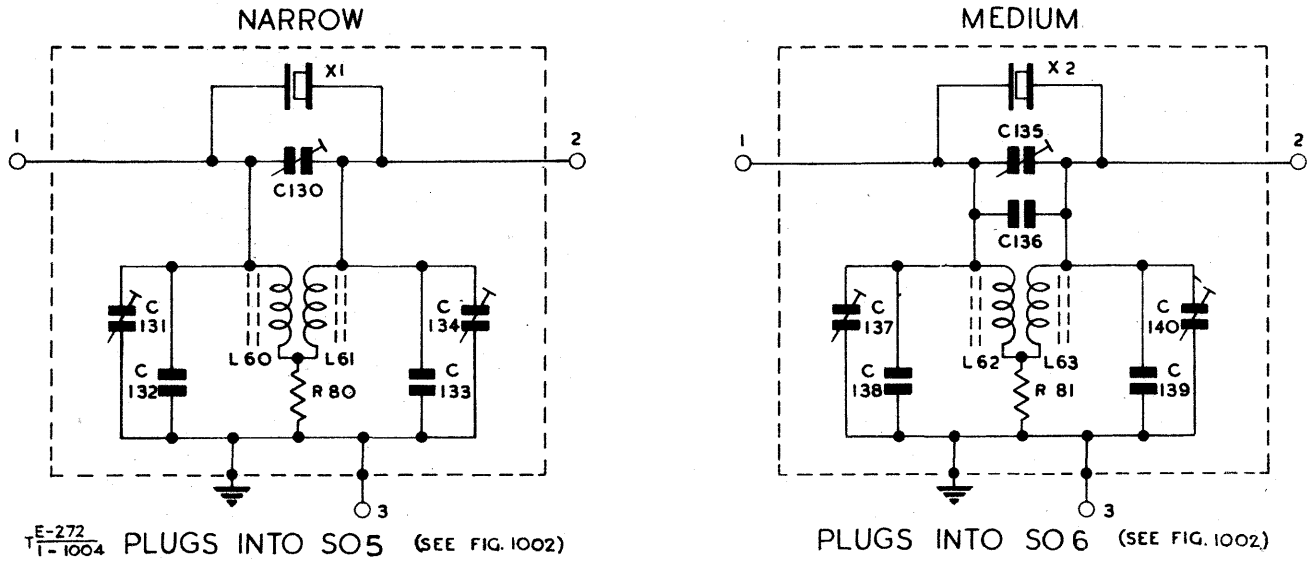

Fig. 1004 - Circuit diagram of crystal filters

Table 1005 - Details of components of R.F. turret (see Fig. 1005)

Circuit reference	Value	Tolerance		Remarks
		RESISTORS		
R62-63	4.7kΩ	±20%		
R64	10kΩ	"		
R70	22kΩ	"		
R71	47kΩ	"		
R72	47kΩ	"		
R73	27kΩ	"		
		CONDENSERS		
C80	150pF	±2%	preset	
C81	3.3-25 pF	±10%		
C82	3.3-25pF	"		
C83	150pF	±2%		
C84	3.3-25pF	±10%	preset	
C85	150pF	±2%		
C86	3.8-50pF	±10%	preset	
C87	140pF	±2%		
C88	3.3-25pF	±10%	trimmer	
C89	3.8-50pF	"	"	
C90	3.8-50pF	"	"	
C91	3.3-25pF	"	"	
C92	3,000pF	±2%	"	
C93	3-10 pF	±10%	trimmer	
C94	3.8-50pF	"	"	
C95	3.8-50pF	"	"	
C96	3.3-25pF	"	"	
C97	2,500pF	±2%	"	
C98	3-10pF	±10%	trimmer	
C99	3.3-25pF	"	"	
C100	3.3-25pF	"	"	
C101	3.3-25pF	"	"	
C102	1150pF	±2%	"	
C103	3-10pF	±10%	trimmer	
C104	3.3-25pF	"	"	
C105	3.3-25pF	"	"	
C106	3.3-25pF	"	"	
C107	610pF	±2%	"	
C108	3.3-25pF	±10%	trimmer	
C109	3.8-50pF	"	"	
C110	3.8-50pF	"	"	
C111	3.8-50pF	"	"	
C112	360pF	±2%	"	
C124	15pF	±5%	"	
C125	15pF	"		
C126	15pF	"		
C127	15pF	"		
C128	15pF	"		

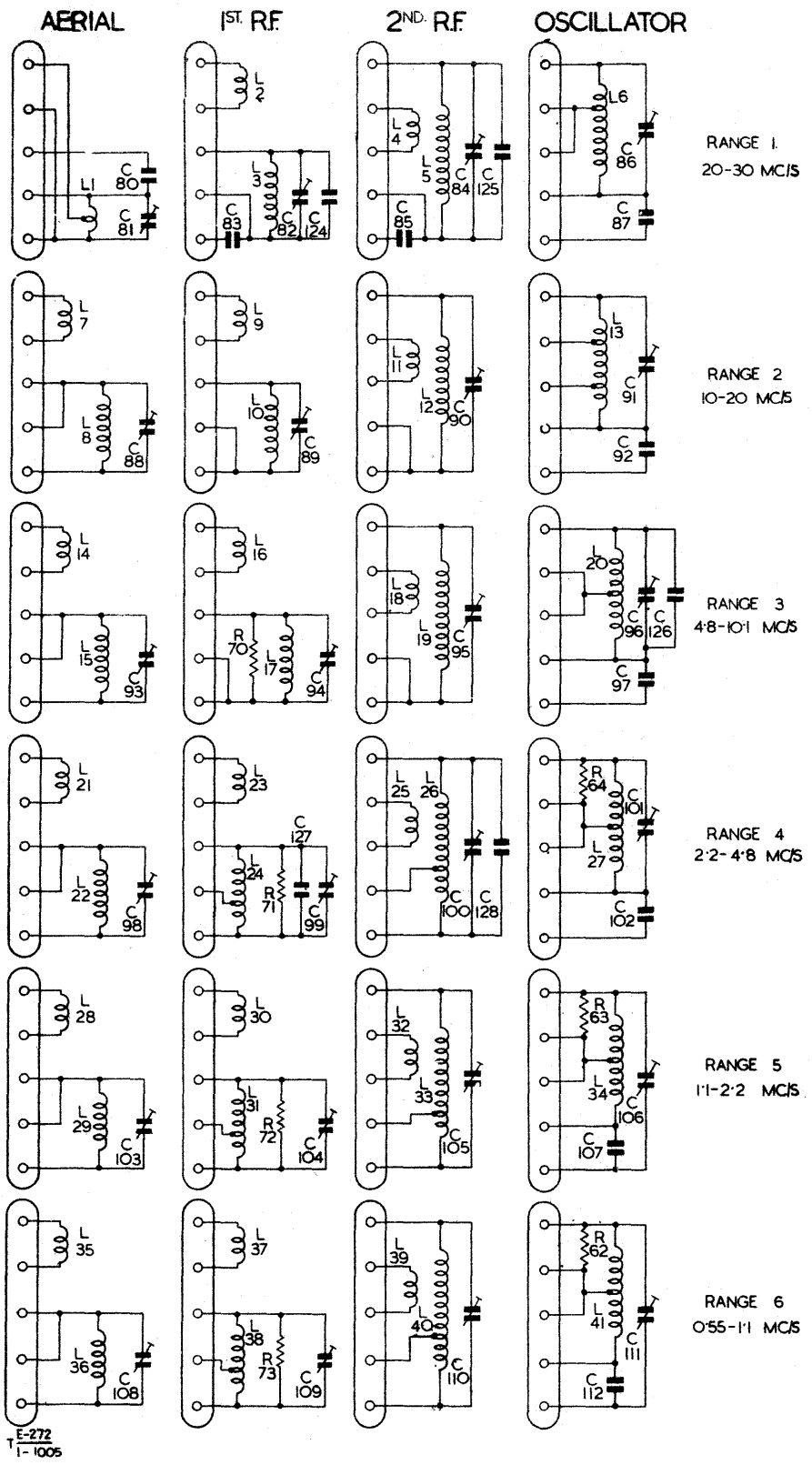

Fig. 1005 - Circuit diagram of R.F. turret

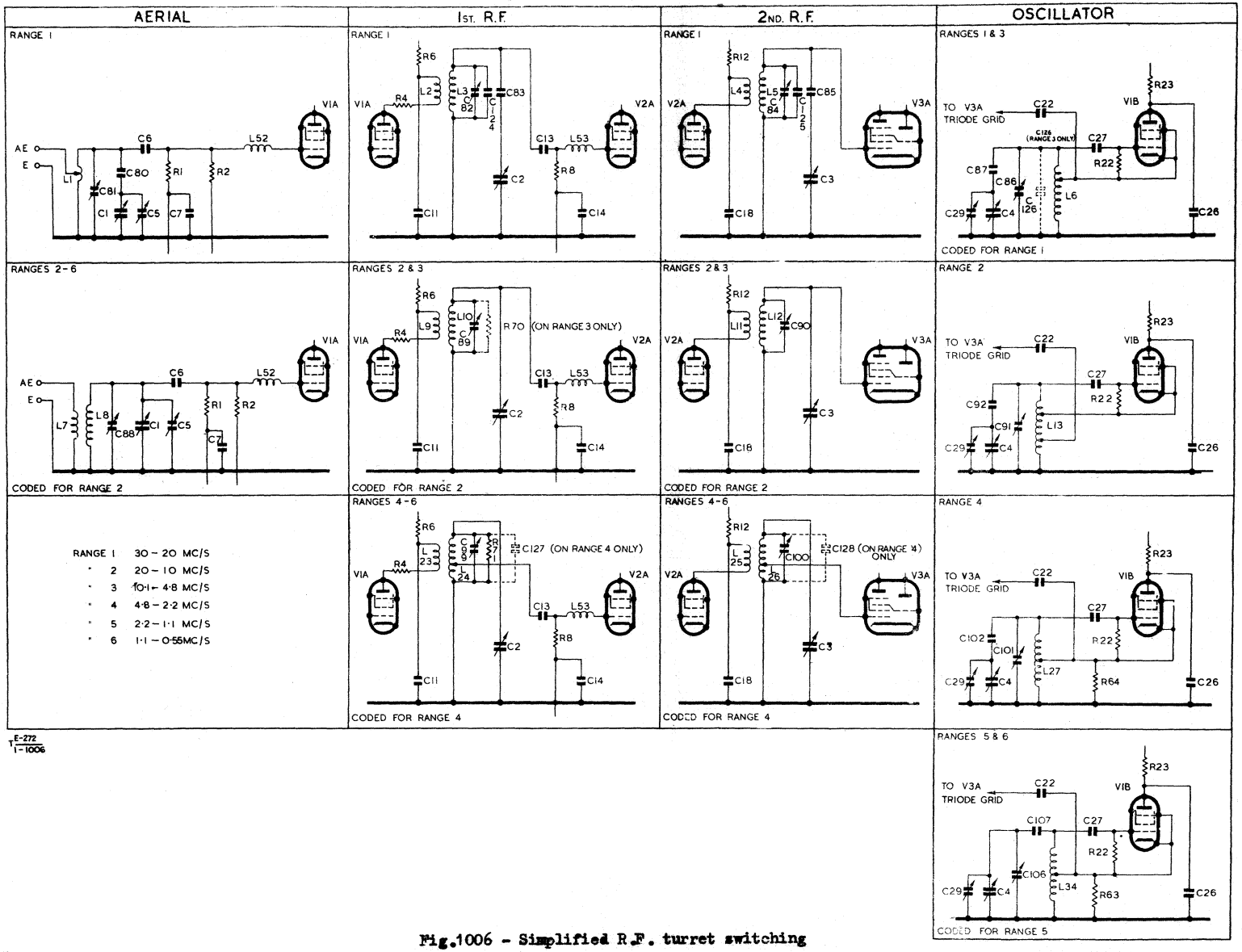

Fig.1006 - Simplified R.F. turret switching

E N D