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2. Select the correct printer if necessary.
3. Select the pages you want to print – even if you want to print all of the document, you will probably not want to print this notice and help page, so start the printing at page 3.
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Please get in touch with me at archivist@vmarsmanuals.co.uk.

Richard Hankins, VMARS Archivist, Summer 2004

OPERATING INSTRUCTIONS FOR B2 Type, Mark 2.

Specifications.-

1. COMBINED POWER PACK for A.C. & Battery Operation.

size:- 10¼" X 4 1/16" X 5". Weight 12 lbs 8 ozs.

A. Mains Supply :- A.C.only. 97-140 Volts, 190-250 volts, 40-60 c/s.
consumption:- (a) transmit 57 watts.
(b) receive 25 watts.

B. Battery Supply :- 6 volt accumulator, automobile type of largest available ampere-hour capacity.
consumption:- (a) transmit 9½ amps (key down) 3.5 amps (key up)
(b) receive 4½ amps.

A spare vibrator, 6 volt non-synchronous, is fixed inside.

2. TRANSMITTER.

size :- 9½" X 6½" X 4⅞". Weight 7 lbs 2 ozs.
supply:- from the power pack - (a) 500v. at 60 Ma.
(b) 230v. at 18 Ma.
(c) 6.3V at 1.1 amps.

Circuit. :- Oscillator-doubler driving Class C amplifier, crystal controlled. Provision for frequency doubling. Plug-in tank coils to cover 3.0 to 16 Mc/sec. "Tune-send-receive" switch. Multi-range meter to read voltages and currents on transmitter and receiver. Plug in transmitting key.

Power output.

A. On A.C. Mains.
(a) Average fundamental power is 20 watts.
(b) The second harmonic power is 20 watts.
(c) The third harmonic power is 16-20 watts.

B. On Batteries.
(a) Average fundamental power is 20 watts.
(b) The second harmonic power is 18-20 watts.
(c) The third harmonic power is 15-18 watts.

3. RECEIVER.

size :- 9½" X 4 7/16" X 4⅞". Weight 6 lbs. 12 ozs.
supply :- from power pack - 230v at 28Ma.
6.3v at 1.2 amps
-12½v to -14v biac.

circuit :- 4 valve seven stage superheterodyne receiver essentially designed for CW receiption. 3 wave band switch selector 3.1 to 15.5 Mc/sec. Total coverage 50-1 slow motion vernier dial. B.F.O., pitch control incorporating ON/OFF switch. Volume control and phone jack.

Valves :- Frequency changer - 7Q7 Loctal pentagrid.
IF Amplifier - 7R7 Loctal double diode pentode.
2nd IF Amplifier and B.F.O. - 7Q7 Loctal pentagrid.
2nd Detector and L.F. Amplifier - 7R7 Loctal double diode, pentode

Intermediate Frequency: 470 Kc/sec. B.F.O. 470 Kc plus/minus 3 Kc.

Sensitivity:- 1-3 microvolts for 10 milliwatts output at 1000 C.P.S. (C.W. input and B.F.O. on)

Selectivity:- Bandwidth, 1 Kc/sec. 3 DB down from peak.
9 Kc/sec, 20 DB down from peak.

Max. output.:- 50 milliwatts into 120 ohm telephones (impedance 800 ohm at 800 c.p.s.)

INSTALLATION INSTRUCTIONS.

Before setting up to establish communication, the proposed site should be examined as to its suitability for the installation of an efficient Aerial and Earth system, and the question of a power supply considered. Where possible, A.C. mains should be used and a 6 volt large capacity accumulator obtained for emergency use.

The operator should study Appendix A on Aerials and make himself familiar with the method of adjusting the voltage selector on the Power Pack and tuning the receiver and transmitter.

Aerials.

100 feet of aerial wire is provided, as much of which as possible should be suspended as high as possible and not too close to earthed objects, in order to obtain maximum efficiency. One end will, when operating, be connected to the Aerial terminal on the Transmitter.

Earth

A good electrical connection must be made to an existing earth tube, a main water pipe or central heating system. If these are not available, a wire of the same length as the aerial should be suspended underneath it, preferably two or three feet above the ground. The earth wire or this counterpoise earth will be connected to the Earth terminal on the transmitter.

Power pack.

A. If mains are available, ascertain whether they are A.C. or D.C. This apparatus must NOT be used on D.C. Mains. If A.C. is available, ascertain the voltage by reference to the electric light meter, electrical apparatus in use, or the markings on electric light bulbs. Note the type of plug or connection required, and prepare your lead for future use.

B. To adjust the Power Plug to a known Voltage.

Insert the "Mains-Battery" plug to read "Mains" as in Fig. 1. The selection is made by inserting 4 small 2-pin plugs into the holes provided on panel A. (See Fig. 1). The plugs must be pushed well in and cover the numbers which add together to the voltage required. Two plugs must always cover either the "205v" or "102v". The other two plugs are used to cover "Plus 0v", "Plus 10v", or "Plus 20v". (see Figs. 1 to 9). Thus in Fig. 4 plugs (A) and (A) cover "205v", plug (C) covers "plus 20v" and plug (D) covers "plus 0v". The Power pack is now adjusted for a mains voltage of 205 plus 20 plus 0 equals 225 volts. In practice, this setting is used for any voltage between 220 and 234 volts. Similarly, in Fig. 9, the voltage is 102 plus 20 plus 10 equals 132 volts. This setting is used for any voltage between 127 and 140 volts.

C. To adjust the Power Pack when the Mains voltage is NOT known.

If the Mains are known to be A.C. but the voltage is not known, proceed as follows:-

(a) See that the "RX" 6-pin plug is not connected to the Power Pack.
(b) Plug the "TX" 6-pin plug into the Power Pack and set the "TSR" (Tune-Send-Receive) switch to "R" and the "Meter Selector" to Position 2.
(c) Set the "Battery-Mains" plug to "Mains" and adjust the voltage selector to the highest setting (235-250) Fig. 5.
(d) Switch on and the meter will give a reading.
(e) If this reading is less than $\frac{1}{2}$ scale (300) switch off, and reset the voltage selector to the next lower setting, (Fig.4) and recheck the meter reading.
(f) Proceed thus until a voltage setting is found in which the meter reads as nearly $\frac{1}{2}$ scale (300) as possible.
(g) Always use this voltage setting when working on these mains.

NOTE If the first meter reading (c) is only about 150, the mains are in the 100 volt range, so adjust the selector to 127 -140 volts, Figs. 9 and make checks progressivley as above.

D. To adjust Power Pack for Battery operation.

If mains are not available, or are unsuitable, a 6-volt accumulator must be procured. It is essential for satisfactory working that, in view of the heavy drain on the battery - up to 10 amperes when transmitting and 4 amps when receiving - this should be of the automobile type, fully charged and in good condition. Two such batteries may, with advantage, be used in parallel.

(a). With the "On-OFF" switch on the Power Pack in the "OFF" position, connect the lead provided to the battery terminals - polarity will not affect performance - and plug on to the large pins marked "B" Fig. 10.
(b). Set the "Battery-Mains" plug to "BATTERY".
(c). Switch to "ON". A voltage will be shown on the transmitter meter, in Position 2, and a faint hum heard in the Pack.

NOTE:- The position of the voltage selector plugs on Panel A is quite immaterial and has no effect when "Battery-Mains" plug is set to "Battery".

When the Power Pack is set for Battery operation, do not leave the switch in the "ON" position when not operating or the battery will be discharged unnecessarily.

E. To change from Battery to Mains operating and vice-versa.

If a rapid change-over from Mains to Battery operation is likely to be required, it is advisable to connect up as specified in paragraphs D & B - both battery and mains leads being connected to the Power Pack. Assuming A.C. mains are in use - should they fail, then:

(a). Move Power Pack switch to "OFF".
(b). Reverse "Battery-Mains" plug to read "Battery."
(c). Switch to "ON."

NOTE :- If the Apparatus is to be used with the battery still connected up to the electrical system of a car, the BLACK battery clip should be connected to the terminal which is earthed to the car chassis - irrespective of whether it is Positive or Negative.

It is absolutely essential that the voltage of the accumulator used should not exceed 6.3 volts, since otherwise the set may be damaged. The accumulator must not be charged whilst connected to the set.

If, when on battery operation, no hum is heard from the Power Pack and the battery and fuse are in order, the vibrator may be faulty. Disconnect and withdraw the Power Pack from the suitcase. Take out the 2 screws in each side of the metal case and remove the lid. Insert the spare vibrator into the red clip in place of the faulty vibrator.

F. TRANSMITTER AND RECEIVER connections:-

Normally, the 6-pin "TX" cable plug is fitted in the upper row of sockets on the Power Pack, marked "TX" or "RX". The 6-pin "RX" cable plug is fitted in the lower sockets marked "RX" only. In this position the receiver is automatically switched off when the transmitter "T.S.R." switch is at "S" (send). If it is required to operate the receiver alone, its cable plug must be fitted in the upper sockets, "TX" or "RX".

The Aerial and Earth terminals are on the Transmitter panel. The plug on the short yellow lead on the Transmitter should be inserted in the Aerial socket on the Receiver. If the Receiver alone is to be used, the Aerial wire may be removed from the transmitter aerial terminal and used in the receiver aerial socket.

2. THE TRANSMITTER.

The operator should make himself familiar with the function of the following controls.

A. "Crystal Selector." This switch adjusts the transmitter to suit different crystal frequencies and not the operating frequency. One position of the switch is for use on fundamental operation irrespective of crystal frequency.

B. "Wave Band." This switch sets the frequency of the oscillator valve to the band required. This will usually be the transmitting frequency, e.g. Using a 6.0 mc/s crystal on fundamental, set the "wave band" to "5 - 7" and the transmission is on 6.0 mc/s.
With the "crystal selector" set to "Harmonic 5.2-6" and the same crystal, the"wave band" would be set to 9 - 12 mc/s and the transmitted frequency would be 12.0 mc/s.

C. "T.S.R." This "Tune-send-receive" switch performs the following functions:-

(1). Position"T". In this position the transmitter is ready for tuning. The key is short circuited. The power to the P.A. (Power Amplifier) is removed to protect the valve. The aerial is disconnected so that no signal is transmitted until required. The receiver H.T. is switched off but the Receiver heaters are still on.

(2). Position "S". The receiver H.T. is still switched OFF,

The aerial is in circuit. When the key is depressed, the P.A. valve will transmit at full power. This is the operating position.

(3). Position "R". The Transmitter HT is now off and Receiver H.T. on. The aerial is now connected to the receiver. No other Transmitter controls should be altered in going from "Send to Receive".

NOTE:- So long as the "TX" and "RX" plugs are in the Power Pack sockets and the Power Pack switch on, the heaters of both transmitter and receiver are on.

D. "METER SELECTOR". This switches the moving coil meter into different circuits of the transmitter or receiver to measure either voltage or current. The positions of the switch are as tabulated on a later page.

E. "P.A. GRID TUNING". This knob controls a variable condenser which is a fine adjustment to the setting of the "Wave Band"switch. With the "Meter Selector" in Position 3 tuning is Accomplished by observing the deflection given by the P.A. Grid Current.

F. "ANODE TUNING". This controls the tuning condenser for the P.A. valve. It is always adjusted for minimum P.A. total current.

G. "AERIAL MATCHING". This knob controls a variable condenser and is used to adjust or match the transmitter to suit any particular aerial. It may be considered as a "load-increasing" control.

The two sockets above the "Crystal Selector" are for 2-pin quartz crystals (3,000 - 8,000 mc/s) and those below, for the 2-pin plug on the key lead. The Aerial terminal is above the "T.S.R." switch and the Earth below it.

METER SELECTOR. "T.S.R. switch in "T" or "S".

Position	Circuit Measured.	Full Scale Meter Reading.	Normal Reading.
1.	Receiver Voltage.	600 Volts	230 Volts.
2.	P.A. Voltage.	600(x2) Volts	260(x2) Volts.
3.	None.	-	-
4.	Receiver current.	15 m/a (x2)	12.5 m/a (x2).
5.	None.	-	-
6.	None.	-	-

With "T.S.R." switch on "R".

1.	Receiver Voltage.	600 volts	230 volts.
2.	P.A.Voltage.	600(x2) volts	260(x2) volts
3.	None.	-	-
4.	Receiver Current.	15 m/a (x2)	12.5 m/a(x2)
5.	None.	-	-
6.	None.	-	-

NOTE:- (1.) Normal readings are for the transmitter tuned up and working and for the receiver working at almost full volume.
(2) At Position 2. Full scale indicates 1200 volts, i.e. 600 (x2).

H. "THE METER". Unless other readings are required as when testing the apparatus, or tuning the transmitter, it is advisable to make a habit of leaving the "Meter Selector Switch" in Position 2 reading Anode volts. In this position, the Meter is an indication that the set is "ON" and that the Power Supply is in order. Should the mains fail, the meter will register this, an immediate change-over to battery operation should then be effected, when the meter will again read approximately half scale if all is in order.

TANK COILS. To obtain the highest efficiency over the wide wave band covered, each of the four coils can be plugged in in two ways A and B. The particular coil and its position will depend upon the installation - Aerial, Earth etc, but the following table will serve as a guide under average conditions with 40-50 ft. (13-17 metres) of aerial wire. The "A" position is that in which the letter A on the coil base faces the operator in the usual position.

TABLE OF TANK COILS

Coil	Position	Frequency (Mc/s) Minimum	Maximum
L1.	A.	3.0	4.0
L1.	B.	3.75	5.25
L2.	A.	4.5	6.25
L2.	B.	5.5	7.5
L3.	A.	6.5	9.0
L3.	B.	7.0	10.0
L4.	A.	9.0	13.0
L4.	B.	12.0	16.0

If the setting of either the "Anode Tuning" or the "Aerial Matching" knobs reaches "0" whilst tuning the transmitter, a smaller coil is required, e.g. L2B instead of L2Aor L4A instead of L3B. Similarly, if either knob reaches "10" then a larger coil is required.

OPERATING INSTRUCTIONS.

With an A.C. power supply, aerial and earth system installed, and, if possible, a 6v accumulator for emergency use available, proceed as follows:-

1. PRELIMINARIES.
   (a) Open the set and examine the apparatus.
   (b) Plug the 6-pin plugs marked "TX" and "RX" which will be found lying on the panel, into the sockets on the Power Pack marked "TX" and "RX" and "RX only" respectively.
   (c) Open the spares box, remove the mains and battery leads, plug them on to their appropriate pins. See that the "ON-OFF" switch on the Power Pack is to "OFF" then connect the Battery clips to the Battery terminals and plug in and switch on the mains.
   (d) Plug the key into the transmitter and the telephones into the receiver.
   (e) Attach the Aerial and Earth wires to the appropriate terminals.
   (f) Adjust the Power Pack voltage selector to the voltage of the mains and set the "Battery-Mains" plug to "Mains."
   (g) Insert the Aerial plug on the transmitter into the socket on the receiver.
   (h) The "Meter-Selector" switch should be in Position 2.
   (i) Select your crystal and the appropriate coil . Plug them in.
   (j) Set the "Crystal Selector" and "Wave Band" switches to the correct frequency.

2. TO TUNE THE RECEIVER.
   (a) Turn the "T.S.R." switch to "R" and switch on the Power Pack. There should be a deflection of about half scale on the meter (indicating anode volts) and in a few moments a faint hum heard in the telephones.
   (b) Set the "Wave Band" switch to the desired band.
   (c) If CW is to be received, set the B.F.O. knob to the "ON" position at "0".
   (d) Consult the chart or graph relating to frequency and dial settings and move the tuning control over the setting indicated for the frequency desired, and advance the volume control towards maximum until a comfortable volume is reached.
   (e) Should the station not be received at once, check the "T.S.R." "Wave Band" switch and the Graph reading, and then again search around the setting indicated by moving the tuning control slowly to and fro on either side of the number given on the chart or graph.
   (f) Beat Frequency Control. - Attention to the following points will ensure best reception. The beat oscillator is provided with a control for varying the pitch of the note received. This control is normally set to "0". When a station is received, the main tuning knob should be adjusted to give the lowest pitch possible, and then the "B.F.O." control set to give the desired note for morse reception. Setting the "B.F.O." control on either side of zero will provide the required note. If interference from another station is experienced, setting the control to the same number on the other side of the zero should be tried. This will give the same pitched note for the wanted station but a different note for the interfering station, thus permitting the operator to recognise easily his own station. When searching for a station, the "B.F.O." control should always be at "0". The receiver is designed to give maximum volume for a note of 1000 cycles per second and

3. TO TUNE THE TRANSMITTER.

(a). Transmitting on Fundamental.

(1) Connect up the Aerial, Earth, Key, Telephones and Power Pack as already described.
(2) Take Coil L1 and plug it into its socket with the figures L1A to the front.
(3) Plug the crystal into its socket and set the "Crystal Selector" knob to "Fundamental all Crystals."
(4) Set "Wave Band" knob to Position "3 - 4".
(5) Set "Meter Selector" to Position 2. (P.A. Voltage).
(6) Set the "T.S.R." switch to "T". (Tune).
(7) Set "Anode Tuning" and "Aerial Matching" knobs to "10".
(8) Switch on the power pack. The meter should read about 300.
(9) Switch "Meter Selector" to 3. Adjust "P.A. Grid Tuning" for maximum meter reading.
(10) Switch "Meter Selector" to 6. (P.A. total current. Meter reads about half scale.)
(11) Turn the Anode Tuning knob until the meter reading dips to a minimum value, this is usually about 100 with the Anode Tuning knob at about 2. The transmitter is now in tune and ready to be matched to the aerial.
(12) Turn the "T.S.R." switch to "S". The meter will now cease to register until the key is depressed.
(13) Depress the Key. The meter reading is now greater (about 200) as the aerial is beginning to take power from the transmitter.

Matching the Aerial. The key must be held down whilst matching.

(14) Turn the Aerial matching knob one division to "9". The reading increases because the load on the transmitter is increased. The Anode Tuning knob is now slightly adjusted to the dip as before - which, however, is now higher, perhaps up to 300.
(15) Turn the Aerial matching knob to "8" and again adjust "Anode Tuning" to dip of the needle. This may be just over 350. This is a little too much, as the transmitter delivers maximum power for a reading of 325 - 350 (i.e. 65/70 m/a), so bring back the "Aerial Matching" knob a little to between "8" and "9" and readjust "Anode Tuning" and the dip should be between 325 and 350. In this position the transmitter is putting out the full power of 20 watts into the aerial. The "Anode Tuning" knob may now be between 2 and 3. Transmission may now commence.

NOTES

The meter MUST DIP to the final reading. This is proof that the transmitter is tuning. The valve will take more current when off tune, but give out much less power.

With a bad earth or a too short aerial, it may not be possible to fully load up the transmitter. In this case the dip will be below 325 on the scale (65 m/a).

(b) TRANSMITTING ON HARMONIC.

It is assumed that the same crystal (3.755 mc/s) is to be used (in daylight) and that the signal is to be sent out on 7.510 mc/s which is the 2nd harmonic or double the crystal frequency. The transmitter is set up exactly as before except for the following details:-

(1) The tank coil used will now be L3A as given in the Coil Table.
(2) The "Crystal Selector" knob is now set to "Harmonic 3.6-4.6" since the crystal frequency falls between these two numbers.
(3) The "Wave Band" knob is now set to "7-9" since the harmonic (7.510) is between 7 and 9 mc/s.
(4) Everything else is done in the same order and the meter readings will be the same. The aerial is matched in the same way and the Anode Tuning control adjusted to give the same on harmonic as on fundamental frequency.

NOTE.

With the "Meter Selector" switch at Position 4, the meter measures the oscillator grid current, and proves whether or not the crystal is working. It need only be used if there is any doubt that the transmitter is working properly. It normally reads ½ - 7/8 on the 15 scale - that is .25 to .75 m/a.

AERIALS.

The most usual type of aerial is the so called Marconi aerial which consists of a length of wire, one end insulated and the other end attached to the aerial terminal of the transmitter. A second length of wire joins the earth terminal of the transmitter to a conductor entering the ground. In this type of aerial the main losses are due to the resistance of the earth connection and every effort must be made to obtain as good an earth connection as possible.

The rated power of a transmitter is the power it will deliver to a suitable aerial but the power delivered to the aerial is NOT the power radiated by the aerial, which is always less and unless the Aerial-earth system is efficient may be very considerably less. The remainder of the power is dissipated as heat in neighbouring objects such as walls, etc and in the ground.

Current distribution in Aerials.

If a long wire, insulated at one end, has the other end attached to the aerial terminal of the transmitter, an alternating current is produced in the wire, the amplitude of which varies along the wire. For a long wire the current reaches a maximum at a distance of a quarter wavelength along the wire and then decreases.

Since the power radiated is proportional to the square of the current, it is clearly desirable to have at least one current maximum occur somewhere along the aerial. The shortest aerial which can be considered reasonably efficient is a quarter wave aerial.

Frequency.	3 Mc/s.	6 Mc/s.	12 Mc/s.	16 Mc/s.
Wavelength.	100 Metres.	50 Metres.	25 Metres.	20 Metres.
Quarter Wavelength.	25 "	12½ "	6¼ "	5 "

Earth Resistance.

The resistance of the earth connection usually varies from about 10 ohms, obtained when the earth wire is soldered to a main water pipe near to the ground to about 100 ohms, obtained from a moderate earth connection.

Earth Resistance in Ohms.		10	50	100
Radiated power as a percentage of the power in the aerial.	¼ wave	80%	44%	29%
	⅛ wave	50%	16%	9%
	1/16 wave	20%	5%	2½%

The amount of power that can be afforded to be waster when using a B2 set is small, it is therefore never any use trying to use a shorter aerial than one-eighth wave and this only in conjection with a very good earth.

Erecting an Aerial.

It is not usually practicable to erect a vertical ¼ wave aerial although this would be very efficient, but at least this length of wire and more if possible should be erected with a long vertical or rising portion and the top bent in some way towards the horizontal as in an inverted letter "L". The exact length of wire is not critical as the transmitter is matched to the aerial in use during the tuning operations. The whole should be left well away from earthed objects such as buildings, cliff sides, surrounding trees, etc., and the end not attached to the transmitter should be insulated.

If it is impossible to use an outdoor aerial great care must be used to erect the most efficient indoor aerial possible. At least a ¼ wave length of wire should be used and this arranged high in the house possibly in zig-zag fashion in the space amongst the rafters under the roof. Should circumstances restrict activities to one room the aerial wire should be arranged in zig-zag fashion across the room about a foot below the ceiling, spacing the wires as widely as possible, paying special attention to the fact that no part of the wire should run parallel to metal girders, electric wires, water pipes or spouting, nor should the wire be doubled back on itself at any point.

The Earth.

An efficient earth is most important. The ideal would be to solder a short length of wire to a large sheet of copper buried in moist earth near to the transmitter and to attach the free end of the wire to the earth terminal of the transmitter. Failing this, a copper earth tube, a large coil of barbed wire, an old oil drum well scraped, or some such metal receptical could be buried instead, but it is most important that where it is attached to the earthwire should be clean metal, a good electrical contact, preferably soldered should be made and that the ground should be moist.

If indoors, a water pipe may be convenient. Choose a cold water pipe near to the ground if possible, rather than a hot pipe which may be loosely attached to dry walls in several places before finally making a good earth connection. Scrape the pipe clean before attaching the earth wire.

If no pipes are available a length of wire arrayed in zig-zag fashion or a piece of wire netting may be placed underneath the floor covering and attached to the transmitter by a short length of wire. An efficient counterpoise earth may be made by arranging a wire of about the same length as the aerial, and insulated from earthed objects underneath the aerial wire and 2 or 3 feet above the ground. If indoors the counterpoise earth should be on the floor perhaps under the carpet and well separated from the indoor aerial wire.

Additional Data for Power Output Control.

Power dissipated at the final Anode of the B2 Tx. (6L6) under normal operating conditions will often exceed 30 watts. Since the final anode dissipation of any transmitter operating under licence for 25 watts should not at any time exceed this figure, the following notes and instructions will enable the operator to comply with Post Office regulations concerning this matter.

(A). That the Crystal drive be reduced considerably at all frequencies.

(B). That the P.A. Total Current (at resonance) shall not exceed an approximately 260 on the Meter Scale.

(C). That the Aerial Matching Control be adjusted in such a manner as to give LOOSE AERIAL COUPLING.

It is suggested that an efficient mains suppressor unit be fitted in the mains lead (as close to the "Power pack unit" as possible) and also that the operating key be fitted with a suitable key click filter.

Details of Mains Suppressor Units and Key Filter Units can be obtained from any of the good Amateur Radio Handbooks. (obtainable from Crosland & Nowell Ltd., 24-25 Foley Street London, W.1. radio engineers.)

VOLTAGE SELECTOR

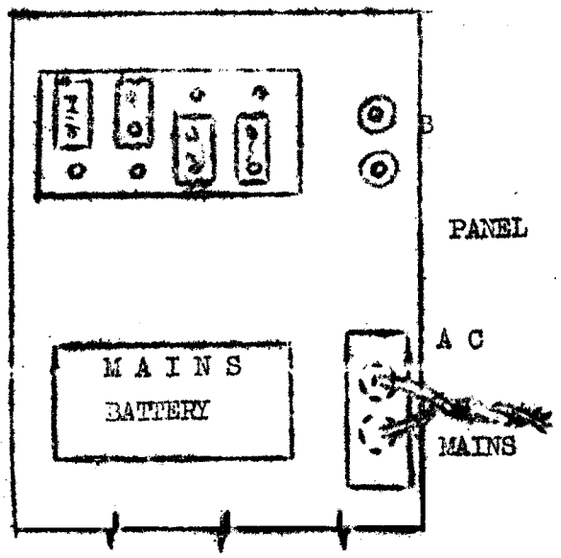


FIG 1

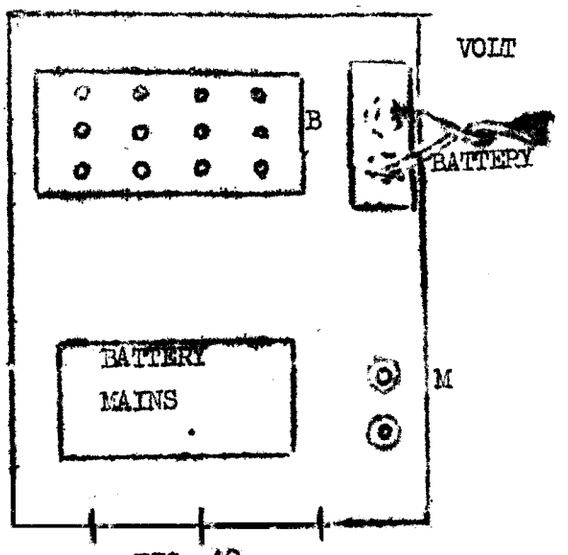


FIG 10

PANEL A

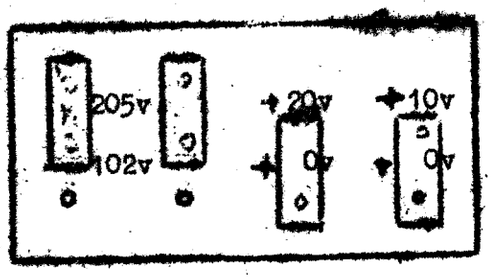


FIG 2 FOR 190 - 207v

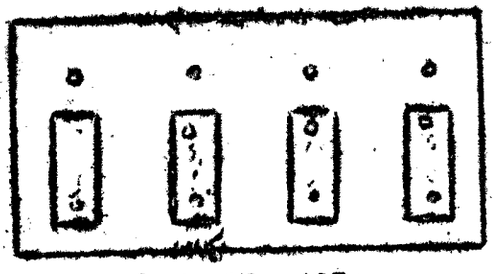


FIG 6 FOR 97 - 107v

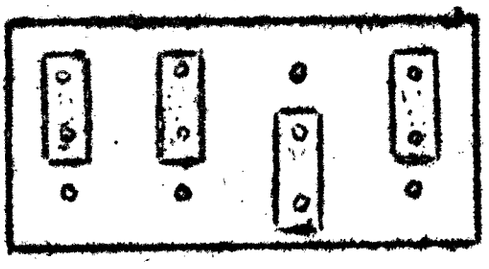


FIG 3 FOR 208 - 219v

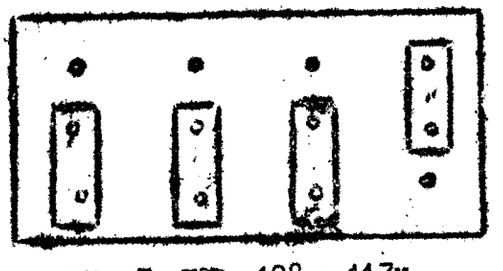


FIG 7 FOR 108 - 117v

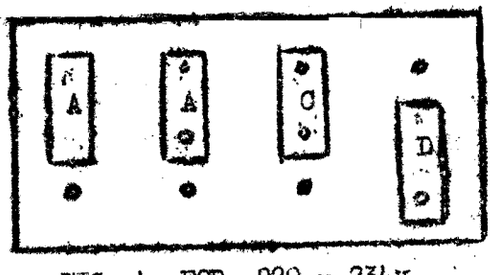


FIG 4 FOR 220 - 234v

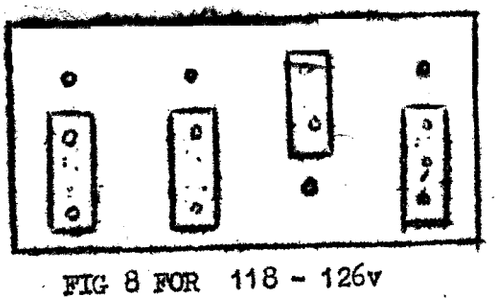


FIG 8 FOR 118 - 126v

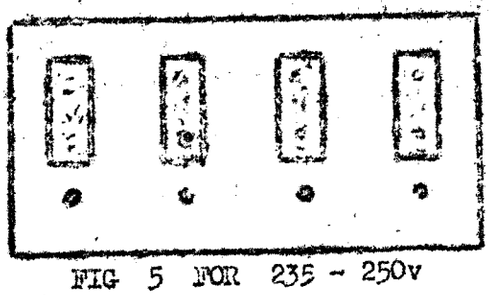


FIG 5 FOR 235 - 250v

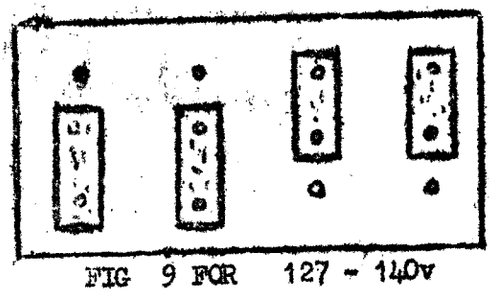
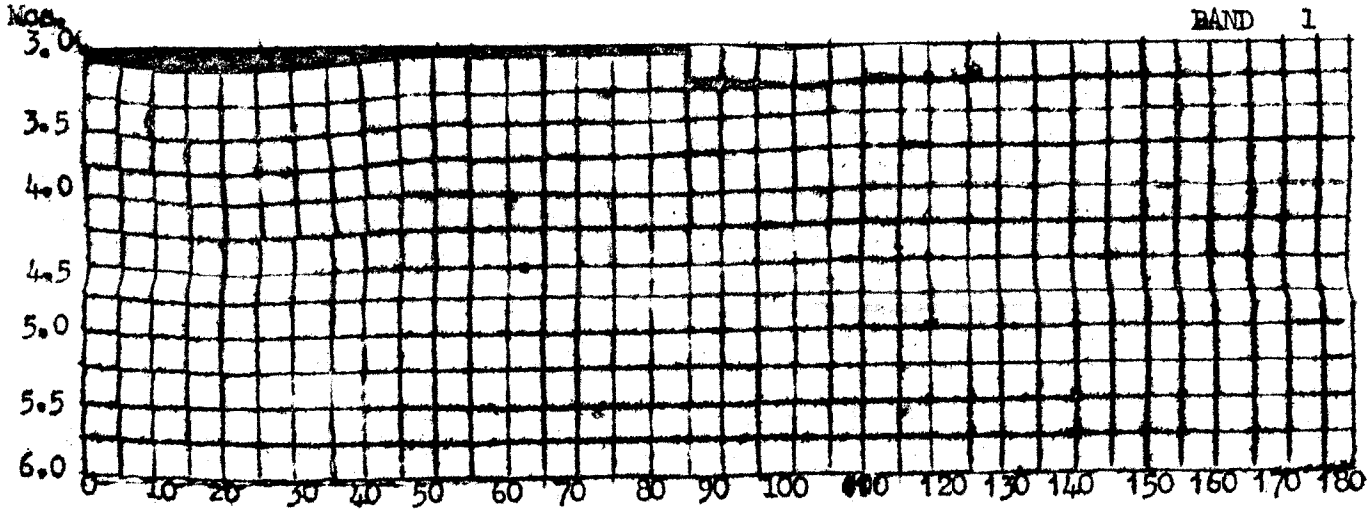
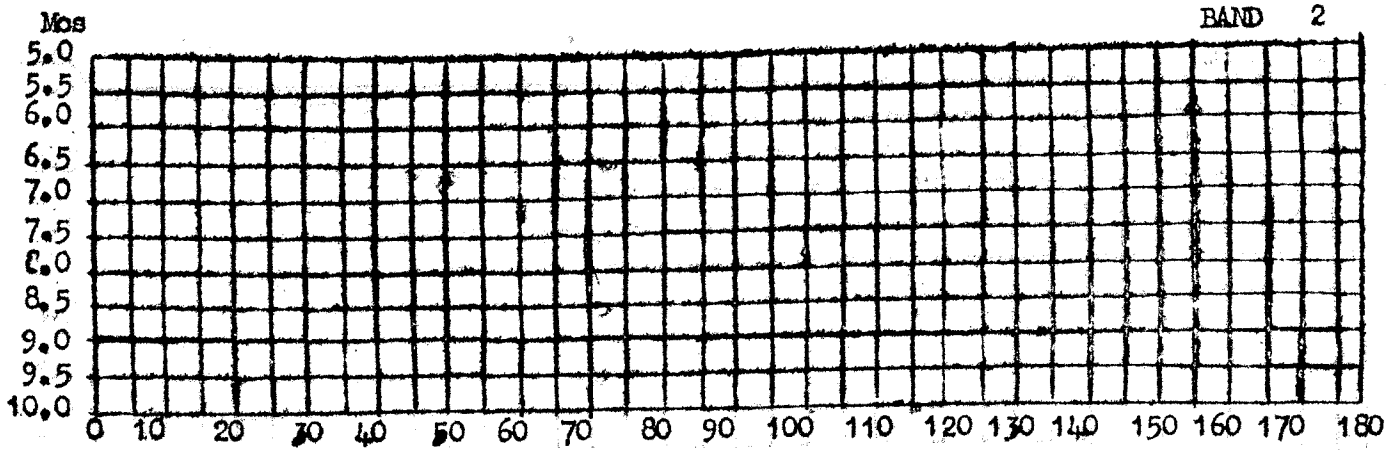


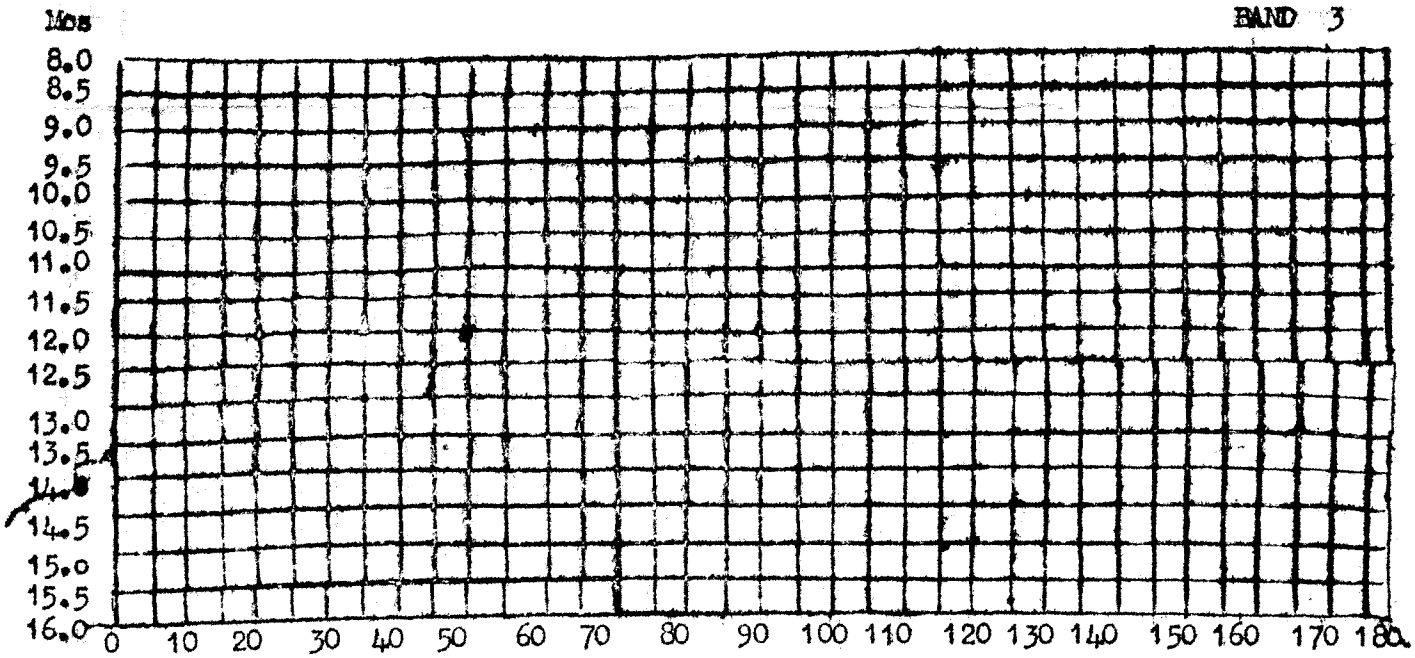
FIG 9 FOR 127 - 140v



Dial Readings



Dial Readings



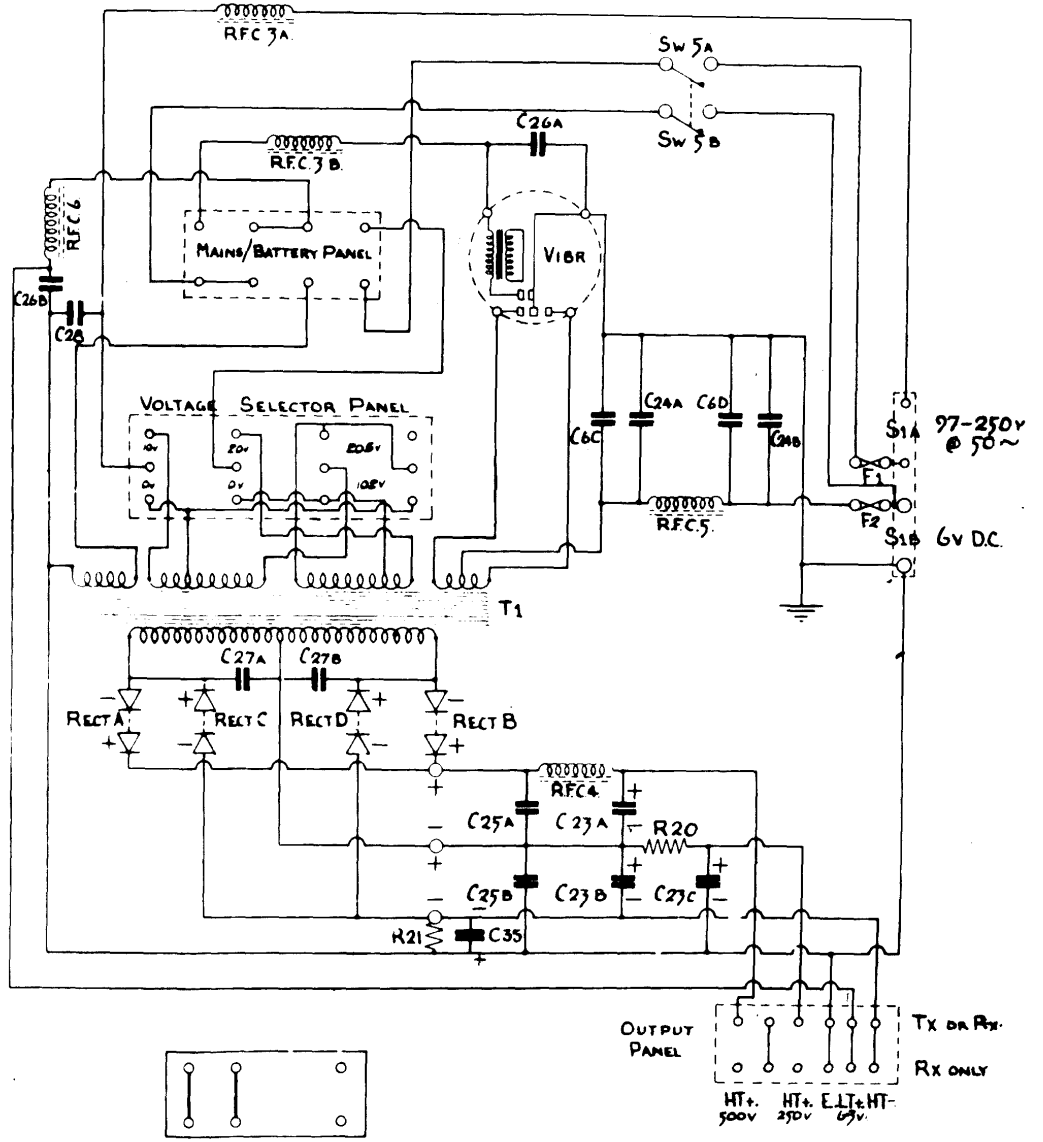
Dial Readings

CALIBRATION CURVES SERIAL No.

REV.	DATE	PC !	CHANGE
C	16 NOV 44	74	RFC 3A WAS AS RFC 3B

REF N° R 5080.

CODE	DESCRIPTION
T1	COMBINED TRANSFORMER.
VIBR	6 VOLT NON SYNCHRONOUS VIBRATOR.
RECT A-D	WESTALITE SELENIUM 30 DISC RECTIFIER.
C23 A-C	16 MFD 350 V, WORKING, ELECTROLYTIC.
C24 A & B	·5 MFD 50 V, DC WORKING. (PAPER)
C25 A & B	·1 MFD 450 V, DC WORKING. (PAPER)
C26 A & B	·1 MFD 350 V, DC WORKING. (PAPER)
C27 A & B	·04 MFD 300 V, AC WORKING, 115 c/s (PAPER)
C28	·006 MFD 300 V, AC WORKING, 115 c/s (PAPER)
C6 C & D	·001 MFD 250 V, DC WORKING (MICA)
R.F.C. 3A	IRON DUST CORED CHOKE (30 S.W.G. D.S.C.)
R.F.C. 4.	IRON DUST CORED CHOKE (38 S.W.G. D.S.C.)
R.F.C. 5.	IRON DUST CORED CHOKE (14 SWG ENAM)
R.F.C. 6.	IRON DUST CORED CHOKE (22 S.W.G. D.S.C.)
R.20.	1300 Ω ±5% 3 W WIREWOUND RESISTOR.
R.21.	500 Ω ±5% 1½ W WIREWOUND RESISTOR.
SW 5 A & B	DOUBLE POLE ON-OFF TOGGLE SWITCH
S1A	2 AMP MAINS PLUG PANEL
S1B	5 AMP BATTERY PLUG PANEL
F1	500 mA FUSE. BELLING LEE. L 338.
F2	10 AMP FUSE. BULGIN F 36.
R.F.C. 3B	IRON DUST CORED CHOKE (34 S.W.G. D.S.C.)
C35	25 mf. 25 V WKG "MICROPACK"



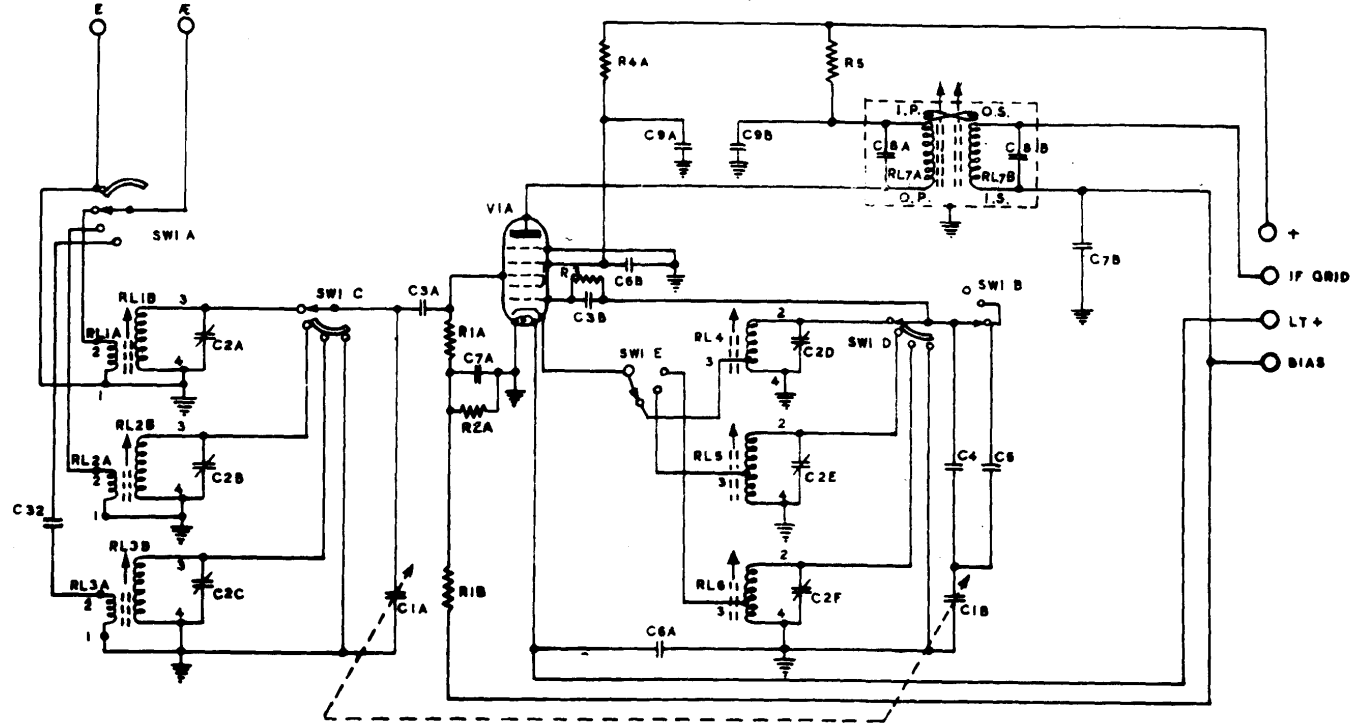
UNLESS OTHERWISE STATED TOLERANCES ON:- CONDENSERS ±25%
RESISTORS ±20%

NOTE: IN THIS CIRCUIT DIAGRAM ALL THE SOCKET PANELS ARE AS SEEN FROM THE UNDERSIDE.

MAINS/BATTERY CHANGE OVER PLUG SHOWING CONNECTIONS.

REV. E. F2 WAS 7½ AMP FUSE. BULGIN F 35. 9-5-44
REV. A. LEAD TO SW 3B WAS TAKEN FROM POWER PACK SIDE OF FUSE. 11.6.43
REV D. C 35 ADDED

DESCRIPTION	DRAWN	SCALE	DATE	DRAWING N°
MODEL 3/II CIRCUIT DIAGRAM FOR MODEL 3/II POWER PACK	G.H.R	—	27/1/42	CD 2037.



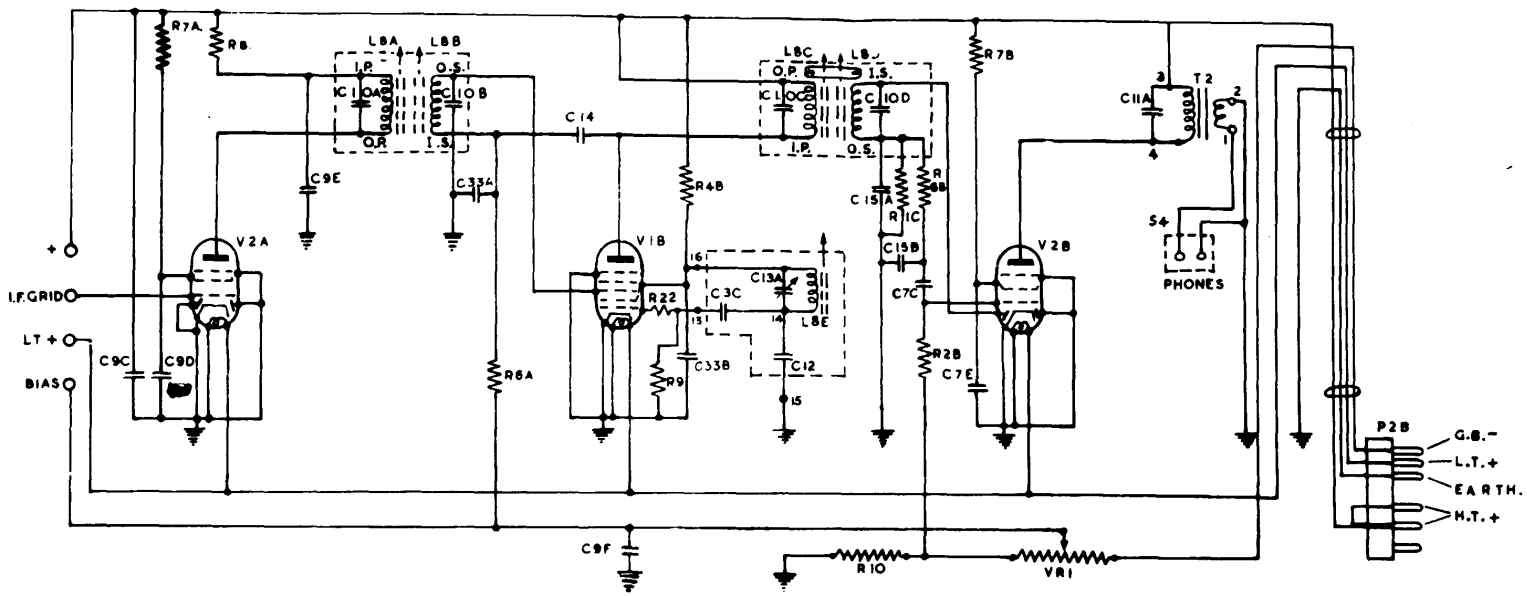
V1A	7Q7	C8 A–B	110 μμf. ± 2μμf SILVER MICA	R5	5,000 OHMS ½W. WIREWOUND
SWI A–E	3 DECK ROTARY. 5 POLE, 3 WAY	C9 A–B	·1 μf. A.M. 10C/4021. METAL CASED PAPER		
C1 A–B	2 GANG 90 μμf.			RL1 A–B	AERIAL COIL 8·7 – 15·2 MC/S.
C2 A–F	TRIMMER 4–21 μμf. KO 2496			RL2 A–B	,, ,, 5·2 – 9·04 ,,
C3 A–B	100 μμf. ± 10% TUBULAR CERAMIC			RL3 A–B	,, ,, 3·1 – 5·4 ,,
C4	700 μμf. – 2% + 1% SILVER MICA	R1A	1 MEGOHM 1/10 W.	RL4	OSCILLATOR COIL 8·7 – 15·2 ,,
C5	600 μμf. – 0% + 3% SILVER MICA	R1B	1 MEGOHM 1/10 W.	RL5	,, ,, 5·2 – 9·04 ,,
C6 A–B	·001 μf. 250V. D.C. WORKING MICA	R2A	470 K ¼ W ± 20%	RL6	,, ,, 3·1 – 5·4 ,,
C32	50 μμf. ± 10%	R3	20,000 1/10 W.	RL7 A–B	I.F. COIL 470 KC/S. 7/45 LITZ.
C7 A–B	·01 μf. 250V. D.C. WORKING	R4A	20,000 OHMS ± 5% WIREWOUND. 6 W.		

TOLERANCES ON CONDENSERS ± 25%
,, ,, RESISTANCES ± 20%
} UNLESS OTHERWISE STATED

REVISION A. SWI A-E WAS 6 POLE ; C2 A-F WAS 2-9 μμf. KO 2509 ; C31 A-B REMOVED. 9·5·44

REV 'B' : R6A REMOVED. R1B & R2A MOVED. R2A CHANGED TO 470 K

DESCRIPTION	DRAWN	SCALE	DATE	DRAWING NO.
RECEIVER – FREQUENCY CHANGER UNIT. 3 MK II	R.W.R.		4–11–48	CD 2038.



V1B	7Q7			R2B	470,000 OHMS 1/10 W. ± 20%
V2A-B	7R7			R22	47 OHMS 1/10 W. PARASITIC STOPPER.
C3C	100μμf ± 10% TUBULAR CERAMIC.				
		R1C	1 MEGOHM 1/10 W.	VR1	100,000 OHMS POTENTIOMETER. C.T. LOG LAW.
C33A-B	·01μf ± 10% 250V DC WORKING MICA.				
C7A-D	·01μf ± 25% 250V DC WORKING			T2	TRANSFORMER TYPE 210. RATIO 15-1
C9C-F	·1μf A.M. 10C/4021 METAL CASED PAPER.	R4B	20,000 OHMS ± 5% WIREWOUND. 6W.		
C10A-D	220 P.F. SILVER MICA ± 4 P.F.	R6A	150,000 OHMS 1/10 W.	L8A-E	IF COIL. 470 KC/S 7/45 LITZ.
C11A	·002μf 350V. D.C. WORKING MICA.	R6B	150,000 OHMS 1/10 W.		
C12	1000 P.F. SILVER MICA ± 20 PF	R7A-B	100,000 OHMS 1/4 W. INSULATED.	S4	TELEPHONE SOCKET.
C13	25 P.F. VARIABLE 3 POINT FIX.	R8	1,000 OHMS 1/2 W. WIREWOUND.		
C14	6P.F. ± 20%. CERAMIC.	R9	20,000 OHMS 1/10 W.	P2B	CABLE PLUG.
C15A-B	100μμf ± 20% SILVER MICA MOULDED	R10	39,000 OHMS 1/10 W. +0%-10%		

TOLERANCES ON CONDENSERS + 25% − } UNLESS OTHERWISE STATED
" " RESISTANCES ± 20% }

R9 IS NOW FITTED INSIDE THE B.F.O. CAN WITH C3C

REVISION B. 28:6:44.
ON BOTH I.F. TRANSFORMERS O.S. WAS I.S. & VICE VERSA.

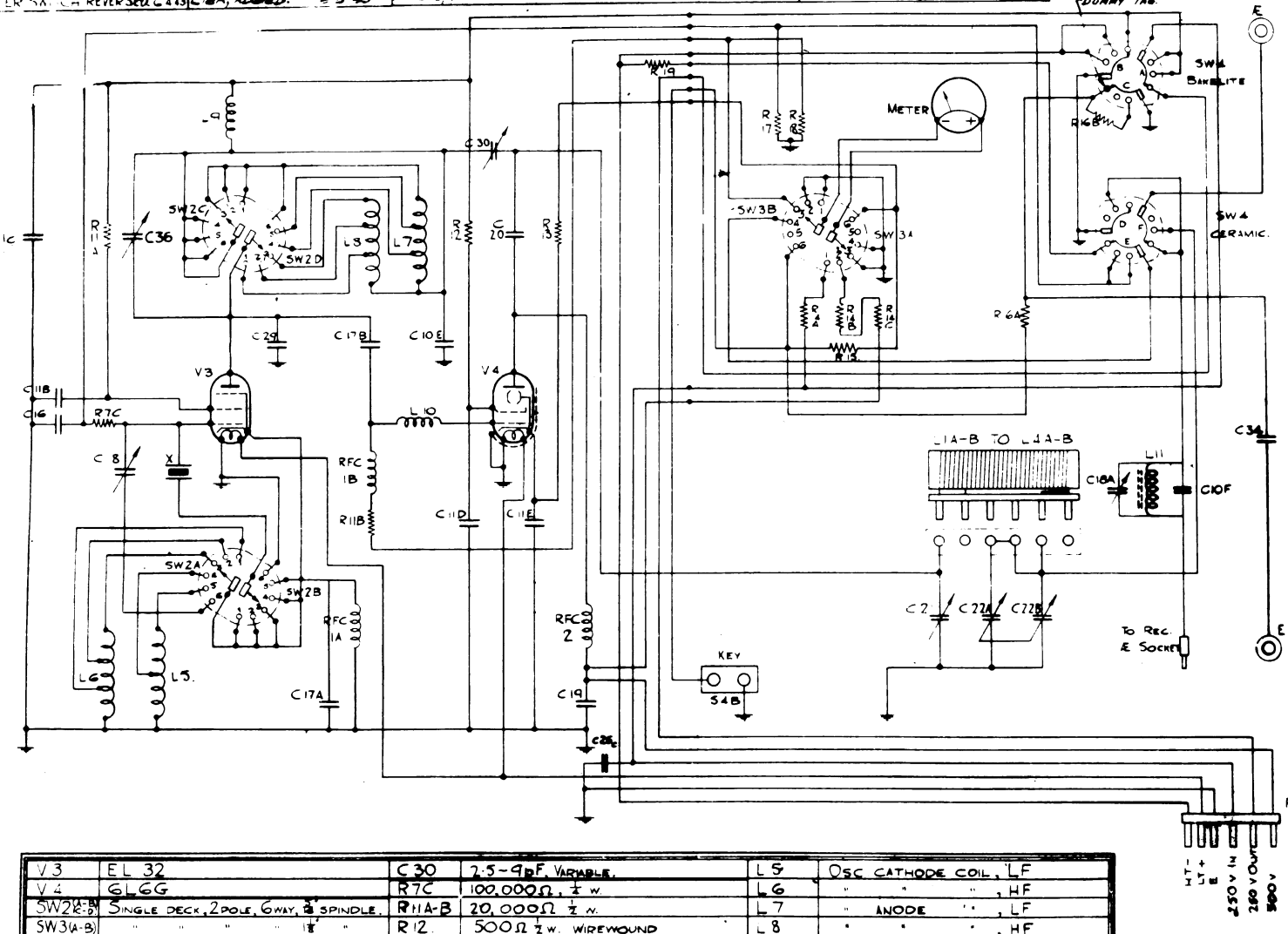
REVISION A. R 22 WAS 50Ω, NOTE R9 ADDED: R10 WAS 40,000Ω. VIEW, TOLERANCE ADDED; R6D TOLERANCE ADDED. 9:5:44.

REV. C. OLD R6D REMOVED
R6A WAS R6B
R6B " R6C
C33A " C7C
R1C " R1D (OLD R1C REMOVED)
R2B WAS 4 MEG.
C7C " C6C (·001) (OLD C7F REMOVED)

DESCRIPTION.	DRAWN	SCALE	DATE	DRAWING NO.
RECEIVER I.F. UNIT. 3 MK II	R.W.R.		17-11-45	CD 2045

REVISION A. CONTACTS 1. METER SWITCH REVERSED C.4.43 | REVISION B. CONDENSER C.18A, ADDED. 8.5.43 | REVISION C. CONDENSER C.26.C ADDED. SHORTING LINKS PINS 3/4 ON TANK COIL SOCKET WAS ON TANK COILS 1 & 2 | REV. D. RESISTORS R.14 B-C WERE ± 5% Tol. 15.4.44

REV E: C.36 was C.18 B; C.34 was C.23; R.15 was ± 2%



KEY TO SWITCH POSITIONS

CATHODE SWITCH.

1. 66 to 80 Mc/s
2. 56 to 66 "
3. 45 to 56 "
4. 36 to 45 "
5. 30 to 36 "
6. FUNDAMENTALS (ALL CRYSTALS)

ANODE SWITCH

1. 122 to 60 Mc/s
2. 93 to 22 "
3. 70 to 93 "
4. 53 to 70 "
5. 40 to 53 "
6. 30 to 40 "

METER SWITCH

6. PA 0-120 m/A.
5. OFF
4. OSCILLATOR GRID m.A / RECEIVER m/A
3. PA GRID m/A
2. PA. VOLTS 0-1200v
1. OSCILLATOR VOLTS / RECEIVER VOLTS } 0-600 v.

NOTE: ALL SWITCHES VIEWED FROM REAR OF TRANSMITTER

V3	EL 32	C30	2.5-9pF. VARIABLE.	L5	OSC CATHODE COIL, LF
V4	6L6G	R7C	100,000Ω, ½ w.	L6	" " , HF
SW2(A-B) E-F	SINGLE DECK, 2 POLE, 6 WAY, ⅜" SPINDLE.	R11A-B	20,000Ω ½ w.	L7	" ANODE " , LF
SW3(A-B)	" " " " ⅛" "	R12	500Ω ½ w. WIREWOUND	L8	" " " , HF
SW4(A-F)	TWO DECK, 1 CERAMIC, 1 BAKELITE, EA 3 POLE 3 WAY	R13	200Ω ± 5%, 3 w. WIREWOUND.	L9	NEUTRALISING COIL
C10 E-F	220pF, SILVERED MICA, ± 4pF	R14 A-C	1·2 MΩ. 1w.	L10	ANTI-PARASITIC COIL
C11B-E	·002mF, 350v. D.C WKG. MICA.	R15	2·08Ω ± 5% ½ w. WIREWOUND.	L11	WAVE-TRAP COIL
C 36	50pF, POLAR VARIABLE (3 POINT FIXING.)	R16A-B	200Ω ± 10% ½ w. WIREWOUND.	P2A	CABLE PLUG
C16	250pF, MICA	R17	250Ω ± 5% ½ w. WIREWOUND.	METER	500Ω 0·5 mA.
C17A-B	100pF ± 5%, 350v. D.C WKG. SILVERED MICA	R18	45·5Ω ± 2% ½ w. WIREWOUND.	X	CRYSTAL SOCKET.
C 18, C18A	TRIMMER 15-45pF.	R19	29,500Ω ± 2% ½ w.	S4B	KEY SOCKET
C 19	·002mF, ± 20% 750v. D.C. WKG.	RFC1A-B	4 SECTION CHOKE, ½ FORMER.		
C 20	·002mF ± 20% 2200v. D.C. TEST.	RFC 2	6 " " ½ "	C26.C	·1mF PAPER TUBULAR.
C 21	300pF, SINGLE SECTION.	L1A-B	TANK COIL 3-4 MCS 3½-5½ MCS		
C22A-B	300pF, 2 GANG.	L2A-B	" " 4½-6½ MCS 5½-7½ MCS		
C 34	1mF. METAL CASED PAPER	L3A-B	" " 6½-9 MCS 7-10 MCS		
C 29	25pF. ± 1·25pF. SILVERED MICA.	L4A-B	" " 9-15 MCS 12-18 MCS		

TOLERANCES ON CONDENSERS ± 25% UNLESS OTHERWISE STATED
" RESISTANCES ± 20%

DESCRIPTION	DRAWN	SCALE	DATE	DRAWING No.
MODEL 3/II CIRCUIT DIAGRAM FOR MODEL 3/II TRANSMITTER.	A.C.G	—	8.3.43	C.D 2038.