R.A.A.F. PUBLICATION No. **820**

REBECCA MARK IIB (AUST.)

ISSUED FOR THE INFORMATION AND GUIDANCE OF ALL CONCERNED

By Command of the Air Board,

Secretary.

AIR FORCE HEAD-QUARTERS,
MELBOURNE, S.C.1

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The AMENDMENTS promulgated in the undermentioned Amendment Lists have been made in this publication.

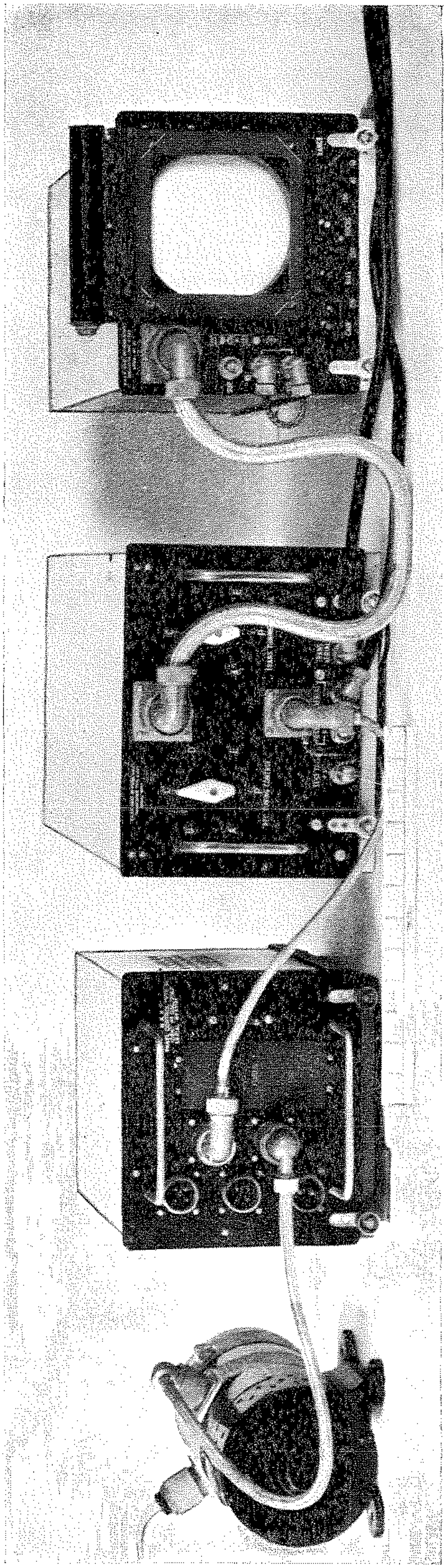
Amendment List		Amendments Made By	Date
No.	Date		

REBECCA MK. IIB (AUST.)

CONTENTS

LIST OF ILLUSTRATIONS

checked. 3/11/64.



Rebecca Mk. IIB. Complete Assembly.

REBECCA MK. II B (AUST.)

Introduction

1. Rebecca is an airborne Radar device to enable aircraft to home on to both ground and airborne responder beacons of the Eureka type. In addition, "air to air" homing is also possible when the equipment is operating on 176 megacycles and interrogating I.F.F. Mk. III.

2. A further function of the device is homing on to light transportable beacons for supply dropping in close support of ground troops. In this case the beacon is operated by ground forces. Another function of a similar nature occurs for marking "targets" on the ground, in this instance, however, the beacon is dropped by parachute.

3. As a navigation aid, Rebecca is used against fixed ground responder beacons of the Eureka type or Civil Aviation beacons operating on similar frequencies in the distance measuring network. When employed against such beacons the "200" megacycles band is used exclusively. These frequencies will be used internationally for the purpose, thus ensuring universal facilities for Rebecca equipments.

4. In its present form presentation is made on a cathode ray tube in a similar manner to A.S.V. Mk. II. When Rebecca is used against A.S.V. beacons some loss in range may be expected since the latter type beacons are horizontally polarized while Rebecca is vertically polarized. This applies also to "Walter", but it is anticipated that this device will soon be converted to vertical polarization.

5. Employment of the "200 megacycles band", as in the case of Rebecca, possesses the advantage of pre-selection of five spot frequencies within the band, both for transmitting and receiving. With this arrangement it is possible to transmit on one spot frequency and receive on another the four frequencies. When transmitting on one of the frequencies the beacon being interrogated will, of course, be tuned to receive on that frequency, but the transmitter of the beacon will transmit on the frequency to which the Rebecca receiver is tuned or frequency selected. Transmitting and receiving frequencies of the various beacons are known beforehand, thus the frequencies required to operate a particular beacon can be readily pre-selected by the navigator.

6. The reason for employing different frequencies for transmitting and receiving is important since complete eradication of ground returns results, thus enabling the operator to follow the beacon to zero miles on the indicator. Formerly, with A.S.V. equipment where transmitting and receiving on the same frequency was employed ground returns "swamped" the ten mile timebase making homing at the crucial moment difficult.

7. Conversely, Rebecca may be used as "search" equipment by transmitting and receiving on the same frequency. Its application in this field is limited, however.

8. Another advantage to be gained by using separate frequencies in the Rebecca-Eureka system is that it permits several ground beacons operating in close proximity without the undesirable effect of triggering unwanted beacons. Each beacon is set to receive and transmit on different frequencies to each other thus avoiding overloading of unwanted beacons.

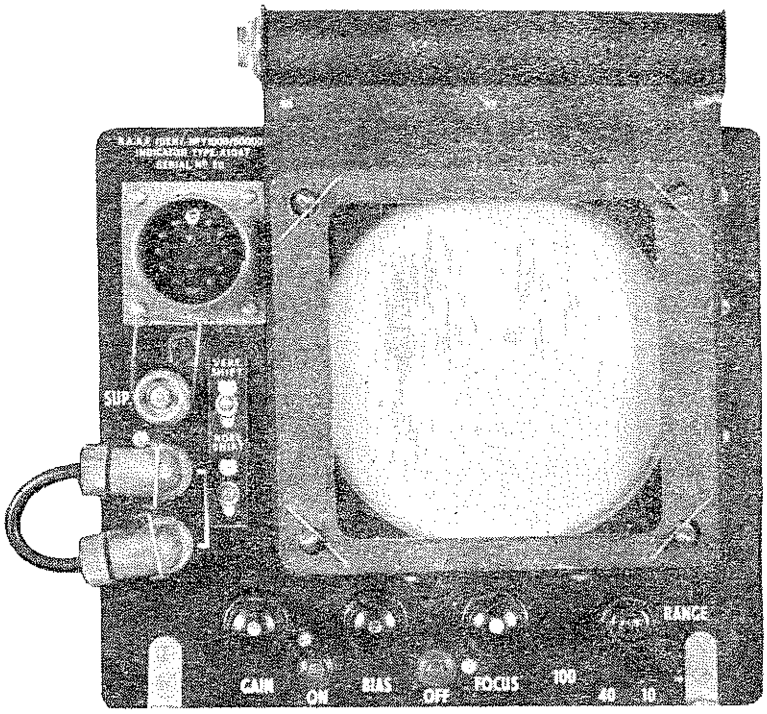
9. Still another facility available to Rebecca is blind approach homing to R.A.F. BABS beacons operating in the 200 megacycles band. These beacons are mobile and positioned at the end of the runway in use. Indications on the Rebecca indicator take the form of dot and dash pulses of relative amplitudes transmitted from the BABS beacon. As in previous instances, separate frequencies are employed for transmitting and receiving, thus obviating ground returns. When Rebecca is used for this class of work the switch motor inside the receiver unit is stopped in order to obtain perfectly steady signals. A separate receiving aerial is used for BABS and is usually located on the fuselage well clear of the aircraft propellors in order to avoid propellor modulation of the signals. An electromagnetic switch remotely operated, selects either homing or blind approach aerials.

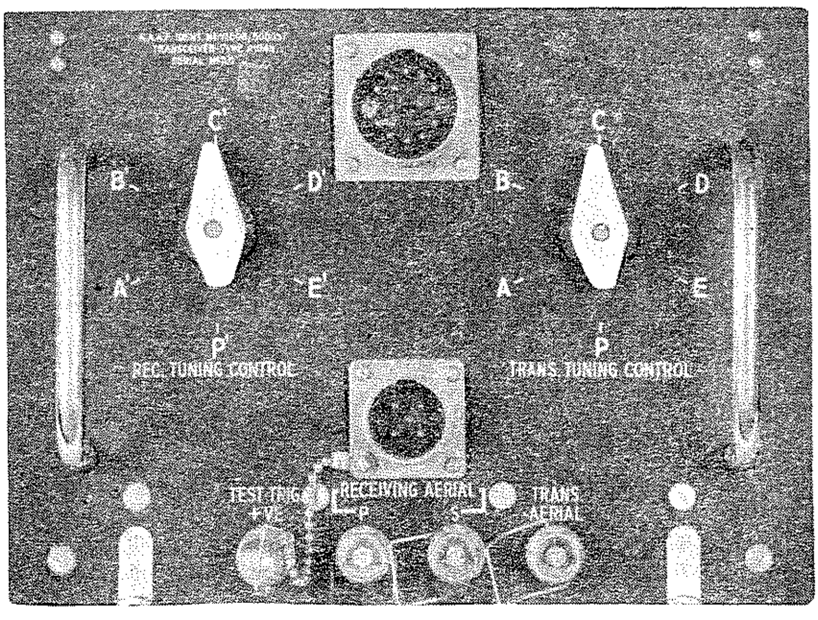
General Description

10. Rebecca Mk. IIB (Aust.) comprises a Transceiver Unit type A.1045, Indicator Unit type A.1047, a Control Panel type RD.21 or type 11 (according to the load requirements of other Radar equipment). Supply of power will be from an invertor operated from the 24 volt D.C. supply. The type of invertor used will again depend upon load requirements. An aerial system depending upon the type of aircraft will complete the installation.

11. Metal skinned aircraft of the Lincoln or Dakota types follow similar installation details so far as aerials are concerned, inasmuch as the receiving aerials are positioned one on each side of the fuselage near the cockpit and the transmitting aerials mounted beneath the "nose" of the aircraft.

12. Wooden aircraft of the Mosquito type follow a different installation since the characteristics of the hull of the aircraft do not lend to a suitable polar diagram. In these aircraft the receiving aerials are positioned on the wing tips and mounted upon a metal sheet to aid reflection. Aerials for this class of installation are quite different to those employed for metal skinned aircraft.





(Top) Indicator Type A.1047. (Lower) Transceiver Type A.1045.

13. The transmitting aerial consists of a quarter wave aerial and director whilst the receiving aerials for homing purposes are dipole and director combinations. For BABS receiving aerial a vertical quarter wave rod is used.

14. In all installations the receiver unit is to be positioned adjacent to the operator to enable control of the frequency selection switch.

15. On the front of the indicator unit, a scale calibrated in nautical miles appears beneath the glass visor. A four position switch selects the following ranges:—0-4, 0-8, 0-40 and 0-80 mile ranges. Other controls on the front panel are Brillaince, Focus and Gain, the latter control remotely regulating receiver gain by medium of connexions through the large interconnecting cable.

16. For manipulation details of the equipment, the reader should refer to Misc. 551.

Summary of Rebecca Mk. IIB

Frequencies employed:—	176 megacycles, 214-234 megacycles.
Pulse Recurrence Frequency:—	350 cps.
Output Power (Peak):—	Average 300 Watts.
Pulse Width:—	2½ microseconds.
Power Consumption:—	186.5 Watts.

Size and Weight of Components

Unit	Ident No.	Size	Weight
Transceiver type A. 1045	Y10DB/500057	10¾ × 18¼ × 7⅞	35 lbs.
Indicator type A. 1047	Y10QB/500007	8½ × 18 × 7⅞	27 lbs.
Control Panel type RD21	Y10LB/500009	8½ × 10½ × 7⅞	51 lbs.
Motor Alternator type MA6	G5V/53422	5½ × 11 × 6	25 lbs.

Aerials for Fuselage Installation

Type	Ident No.	Frequency Range
Receiving (2) type 184	Y10BB/2171	176 — 214 — 234 Megacycles
Transmitting (1) type 308	Y10BB/2172	176 — 214 — 234 Megacycles

Aerials for Wing Tip Installation

Type	Ident No.	Frequency Range
Director (1) type 54	Y10BB/6436	176 — 214 — 234 Megacycles Starboard Wing
Reflector (1) type 320	Y10BB/6438	
Dipole Aerial (1) type 53	Y10BB/6434	
Impedance Matching Unit (1) type 261	Y10AB/8550	
Director (1) type 53	Y10BB/6435	176 — 214 — 234 Megacycles Port Wing
Reflector type 319	Y10BB/6437	
Dipole Aerial type 53	Y10BB/6434	
Impedance Matching Unit type 256	Y10AB/6689	

Test Equipment

17. The Test Set type RE.1 has been designed for testing all the various functions of Rebecca. It will provide the following information:—

(a) Receiver and Transmitter frequencies.

(b) Transmitter power output.

(c) Pulse recurrence frequency.

(d) Waveforms, pulse shape and pulse lengths.

(e) Range calibration.

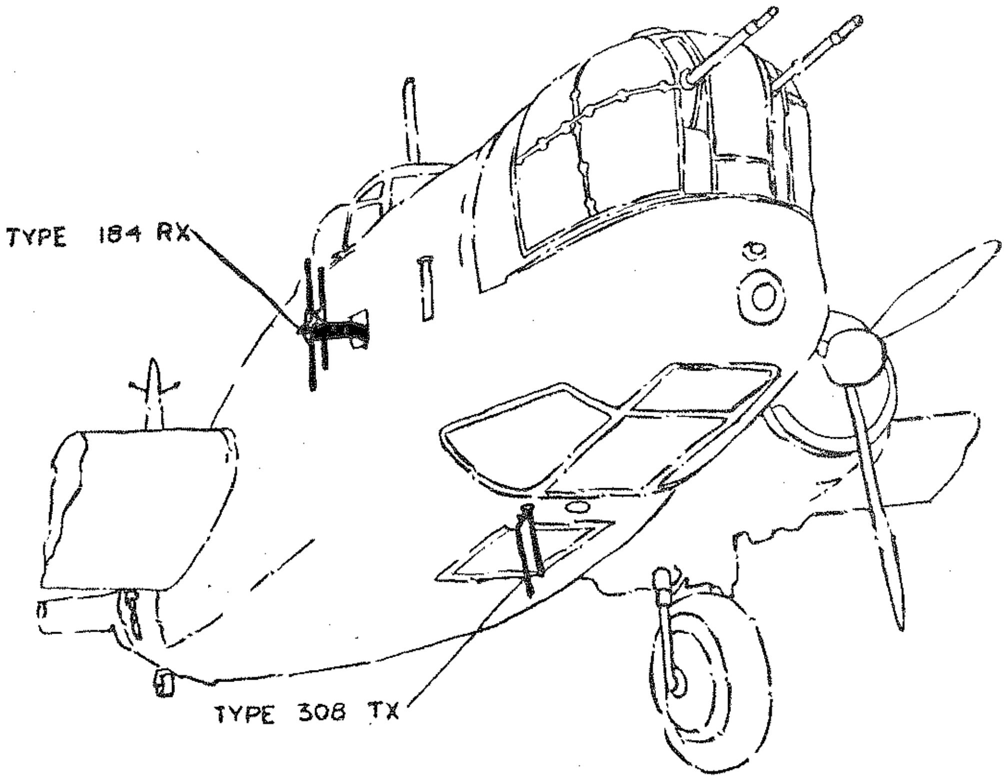
(f) Squint tests and aerial directional properties.

(g) Receiver performance.

18. In addition to the main test set a separate oscilloscope is provided, also an aerial system mounted on a tripod for carrying out certain tests included in (a) to (g) above. Full technical and manipulation details will be found in R.A.A.F. Publication No. (to be issued later).

Maintenance

19. Complete maintenance instructions will be issued by Air Force Head-Quarters in the appropriate publication. Bench setting-up procedure for Rebecca Mk. IIB will be found in R.A.A.F. Publication No. (to be issued later) describing the use of Test Set type RE.1.



A Typical Rebecca Aerial Installation.

The Transceiver Unit A.1045

20. The function of the Transceiver type A.1045 is to transmit R.F. pulses for the purpose of triggering a radar beacon, to receive the response pulses from the beacon and to convert them into video pulses. These video pulses are then fed to the C.R.T. Indicator type A.1047 where they are displayed in such a manner that the range and approximate bearing of the beacon with respect to the aircraft, in which the Rebecca equipment is installed, can be determined.

21. The transceiver consists of five sub-units mounted on a main assembly chassis to form an integral unit. The five sub-units being Transmitter, Receiver, Pre-amplifier and Frequency Converter, Receiver I.F., Amplifier and Video Stages, Switch Unit Power Supply. Inter-sub-unit wiring is brought to a series of "M" type contacts on ceramic strips and these mate with male prongs mounted on the individual units. This wiring is contained in a channel running the length of the chassis. On the under side of the main chassis are mounted the marker pulse delay line, filament wiring filter chokes, by-pass condensers and bias developing network for receiver and local oscilator. See Fig. 5 for main chassis wiring.

22. External connexions are the A.C. power input 4 pin socket which is mounted at bottom centre of the front panel and a 12 pin socket mounted at the top centre of the front panel for the output connexions to the indicator type A.1047. Four pye connexions for port and starboard receiving aerials, transmitting aerial and positive test triggering pulse.

23. Two controls are fitted to the transceiver, viz., Transmitter Tuning Turret Control and Receiver Tuning-Turret Control. The transmitter tuning-turret and the receiver tuning-turret are mounted in their respective units, but when these units are assembled on the main chassis the turret shafts protrude through the fornt panel of the combined transceiver unit, the transmitter control at the right-hand side and the receiver control at the left.

24. The transceiver works on the following six frequencies:—

Transmitter		*Receiver*	
Frequency Band Designation	*Frequency in Megacycles per second*	*Frequency Band Designation*	*Frequency in Megacycles per second*
P	176	P′	176
A	214	A′	214
B	219	B′	219
C	224	C′	224
D	229	D′	229
E	234	E′	234

25. When the Rebecca equipment is being used in conjunction with Eureka, a combination of any one of the frequencies A, B, C, D, E and one of the frequencies A′, B′, C′, D′, E′ may be used.

The Transmitter

General — Circuit Description — The Oscillator — Modulator and Pulse Forming Network — Band Switching and Remote Control

26. The transmitter sub-unit contains an oscillator section consisting of two U.H.F. triodes operating in a push-pull circuit with Anode Lecher tuning (see Fig. 2 (A1)) and a modulator section consisting of a Thyratron valve with a pulse-forming network in its anode circuit (see Fig. 3A).

27. The function of the transmitter unit is to generate R.F. pulses of 2½ microseconds duration at a repetition frequency of 350 cycles per second. A secondary function is to develop voltage pulses which are used to trigger the zero range-marker pulse generator, to provide a means for synchronizing test equipment and for suppression of Mk. III I.F.F. equipment.

28. The transmitter circuit may be divided into the following sections:—

(a) Oscillator Valves.

(b) Modulator Valve.

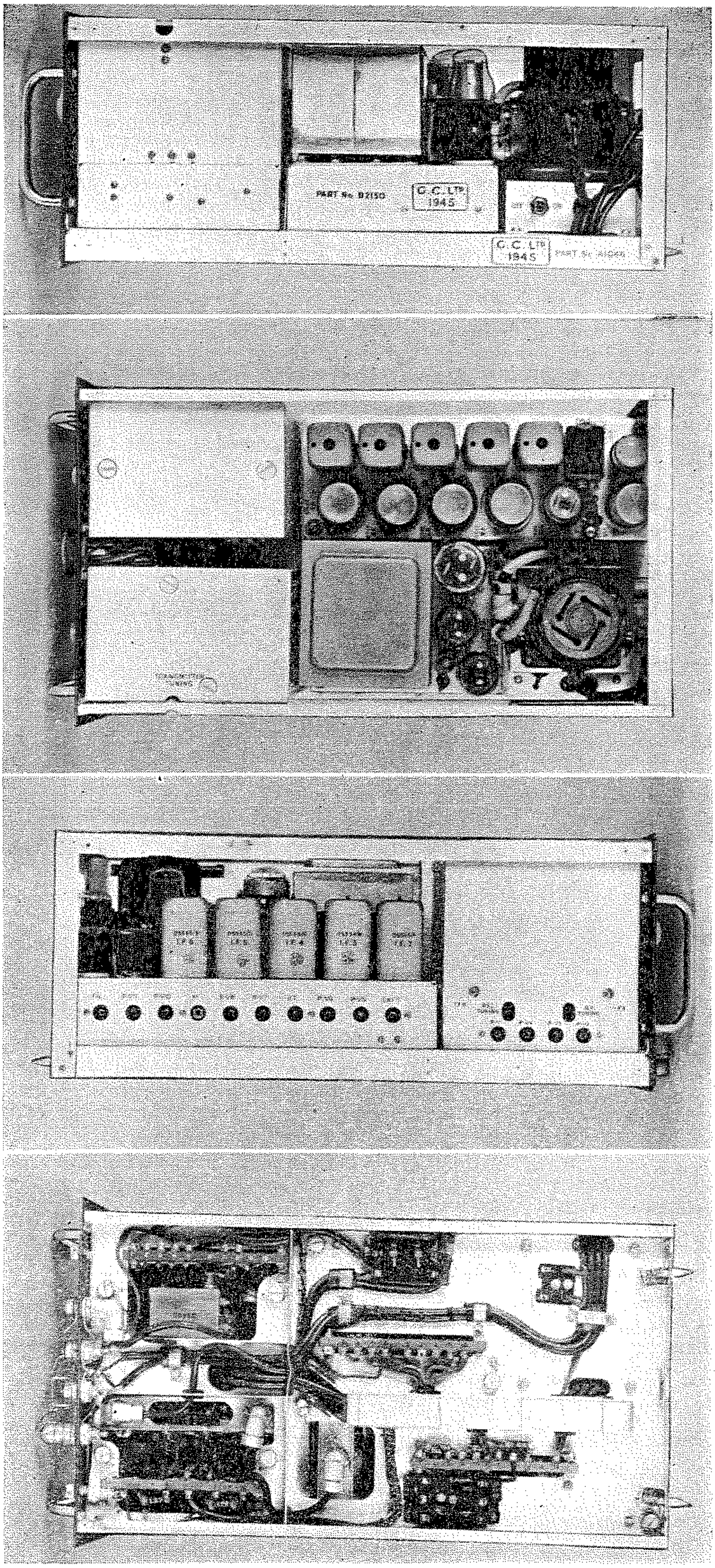
(c) Pulse-forming network and associated pulse transformer.

(d) Bandswitching control.

(e) Remote control.

29. The operation of the above sections is as follows:—

(a) The oscillator U.H.F. triodes operate in a modified type of Colpitts circuit and provide an R.F. peak power output to the transmitting aerial, of not less than 300 watts over all frequency bands. The oscillator valves are anode modulated by a high voltage pulse developed by the modulator section. The occurrence of this pulse is controlled by a pulse generated in the timing-multi-vibrator at the same moment as the time base sweep commences. Thus the propagation



General Layout of Transceiver Type A.1045.

of the R.F. pulses and the commencement of the trace occur almost simultaneously.

(b) The modulator used is a Thyratron gaseous discharge valve operating with an anode voltage supply of 300 volts and a gri dbias of approximately 40 volts. This valve is triggered by the positive triggering pulse developed by the timing multi-vibrator. In the anode circuit of the thyratron is a network which in conjunction with a pulse transformer generates an anode modulating pulse each time the Thyratron is triggered.

(c) The pulse forming network in the anode circuit of the Thyratron, in association with the pulse transformer, generates a 2½ microsecond pulse with a potential of about 2000 volts positive. This pulse in effect constitutes the anode H.T. supply for the oscillator valve and obviates the necessity of providing a transmitter high voltage supply additional to the 320 volt receiver supply. The secondary of the pulse transformer is tapped to provide a positive triggering pulse of approximately 150 volts to synchronize test equipment and to trigger a zero-range marker pulse generator located in the receiver I.F. amplifier sub-unit. The 150 volt triggering pulse can also be used for suppression of Mk. III I.F.F. equipment.

(d) The transmitter is designed to operate on any one of six frequencies, viz., 176, 214, 219, 224, 229, 234 megacycles. To enable any one of these pre-set frequencies to be selected in flight, one of six condensers assembled in the form of a tuning turret is switched across the anode lechers. On the 176 megacycle band a small inductance is also connected across the anode lechers.

(e) The H.T. supply to the transmitter is remotely controlled by press button ON/OFF switches mounted on the front panel of Indicator type A.1047.

Circuit Description

30. *Oscillator* (Fig. 2(a)).—The oscillator has two U.H.F. triodes V13 and V14 operating in a push-pull circuit of a modified Colpitts type in which the tuned circuit is the "High Q" lecher line in the anode circuit. The cathodes of V13 and V14 as far as R.F. is concerned are isolated from ground by the high impedance chokes L33 and L38 and the circuit to ground is completed through inter-electrode capacities. The filaments are supplied with heating current through R.F. filter networks consisting of L34, L35 and L70 for V13 and L39, L40 and C77 for V14. The operation of this circuit depends upon the effects of the inter-electrode capacities of V13 and V14 for complete circuit diagram of the transmitter set (Fig. 4).

31. The extent to which oscillations are maintained by the effect of inter-electrode capacities is more easily understood by examining the operation of the oscillatory circuit on the highest frequency band, i.e., 234 megacycles. The equivalent circuit is shown at Fig. 2C. In this circuit the grid inductance L37 is not shown as the circuit will oscillate on 234 megacycles without this inductance. The function of the grid resistor is to fix the operating position on the grid-voltage/anode-current curve and therefore it has not been shown.

32. On Fig. 2d one-half of the circuit at Fig. 2c is shown. In this circuit that portion of the anode lecher line which forms the anode load of the valve shown in the circuit has been represented by a symbol, thus:—

AL

The inter-electrode capacities anode-grid (Cag), grid-cathode (Cgc) and anode-cathode (Cac) have been shown in the circuit. The cathode has been shown as open circuit with respect to ground because the cathode inductance is so designed that the cathode presents a high impedance with respect to ground.

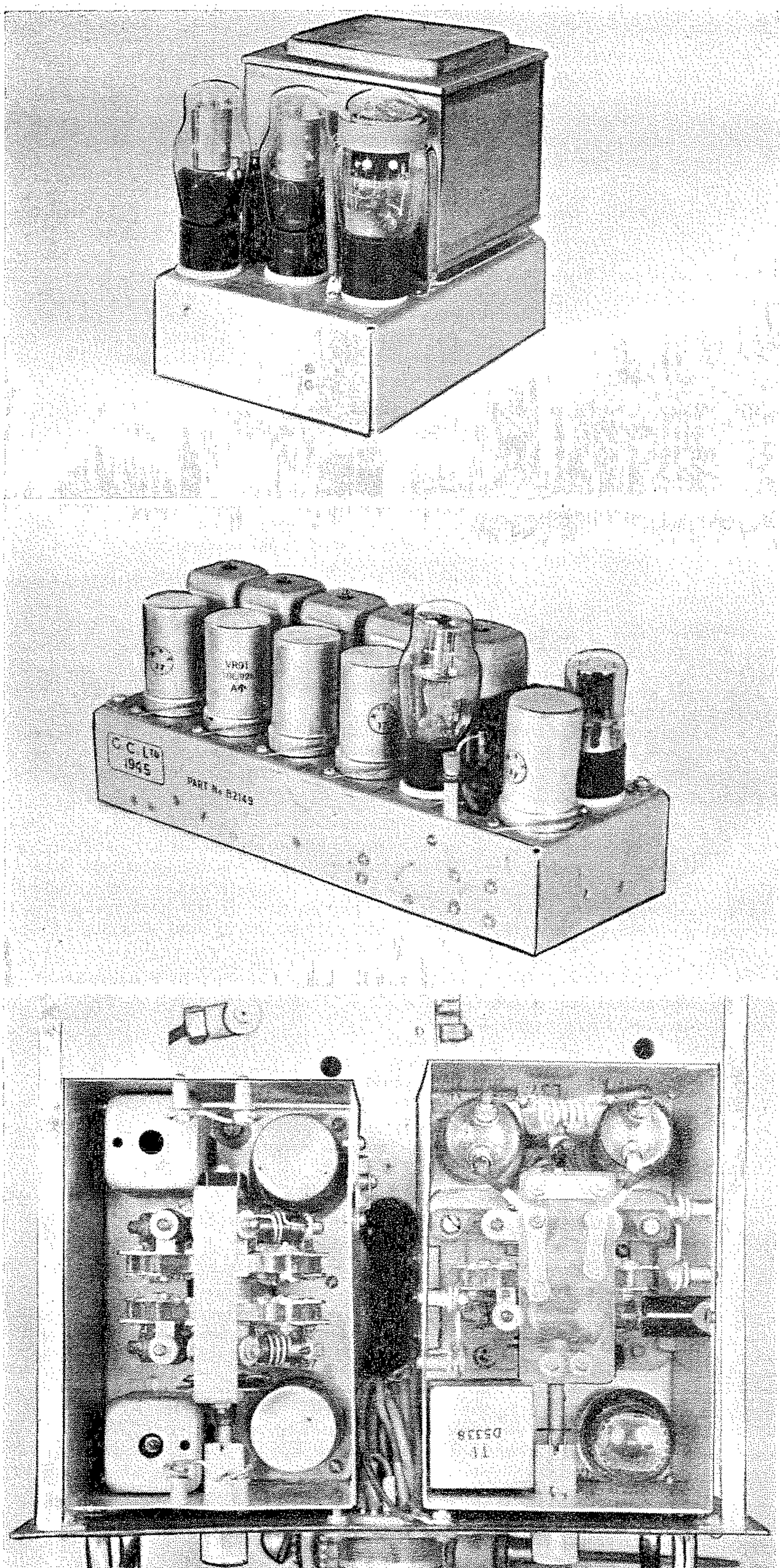
33. The inter-electrode capacity, Cag, forms portion of the capacity that tunes the anode inductance, and the voltage developed across this capacity is split into two components appearing across Cac, and Cgc. The voltage across Cgc forms the feedback voltage which maintains oscillation.

34. On the lower frequency bands the inter-electrode capacities, by reason of losses are not capable of sustaining oscillations, and so a small inductance, L37, has been inserted in the grid circuit. On the 176 megacycles band it is necessary to add a further inductance, and this is accomplished by switching the inductance L36 across the anode lechers on this band only.

35. The anode lechers are tuned to any one of six frequencies by action of a six position turret which connects any one of six trimming condensers C71-2-3-4-5 across the anode end of the anode lechers. The inductance L36 is shorted by the action of this turret on all frequency bands except P frequency.

36. Transfer of R.F. energy from the oscillator circuit to the coaxial transmission line is achieved by a pick-up loop spaced ⅛ in. distant from the anode lechers. This spacing of ⅛ in. is critical to ensure that not less than 300 watts R.F. power is transferred to the transmission line overall frequency bands.

37. During the quiescent period between mutli-vibrator pulses, H.T. is not applied to the anodes of V13 and V14. To cause the valves to oscillate a H.T. pulse is developed



Transceiver Type A.1045 showing Brick Construction of the Power Supply (top).
I. F. Strip (middle), Transmitter and R.F. Head (lower).

across the secondary winding of the pulse transformer T1 and fed to V13 and V14, this pulse lasts for approximately 2½ microseconds, and at the cessation of this pulse the oscillator returns to its normal non-oscillatory state. The R.F. pulses generated are of the same duration and repetition frequency at the modulating pulses.

38. Modulator and Pulse-Forming Network.—The modulator and pulse-forming network (Fig. 3a) consists of a gaseous discharge valve V15, a pulse shaping network, L42-3-4, C78-9-80 in the anode circuit of V15. The primary of T1 forms the inductive load through which the network is discharged to form a 20 volt pulse. The pulse in the primary of T1 develops an oscillator-modulating pulse of approximately 2000 volts positive in the secondary winding. A tapping on the secondary of T1 provides an additional voltage of 150 volts ± 20% and this is used for synchronizing test equipment and also to trigger the gaseous discharge valve used as a zero range marker pulse generator.

39. Fig. 3b shows the circuit of the modulator section with V15 de-ionized and the pulse network charging through CK1. The circuit in effect becomes a series resonant circuit; the values of L42-3-4 are smaller in comparison with CK1 and are not shown. In the diagram L is CK1 and C is C78-9-80, the resonant frequency being 175 c.p.s. which is half the P.R.F. of the pulses generated by the multi-vibrator.

40. In a series resonant circuit if a voltage pulse of short duration is impressed at the points A, A′ the circuit wil be forced into damped oscillations. In Fig. 1c the frequency is 175 cycles per second. The maximum voltage reached by the peak of the first cycles is theoretically twice the exciting voltage but circuit losses will prevent the theoretical maximum being reached.

41. In Fig. 3c at the instant the thyratron is triggered by the positive pulse from the multivibrator the voltage across C is almost 600 volts.

42. When the thyratron fires the circuit is as shown in Fig. 3d. The charged line L42-3-4, C78-9-80, is in effect an open ended transmission line charged to a potential of approximately 600 volts. The impedance of CK1 is so much larger than the characteristic impedance of the network (33 ohms) that this end of the line may be considered to be effectively open.

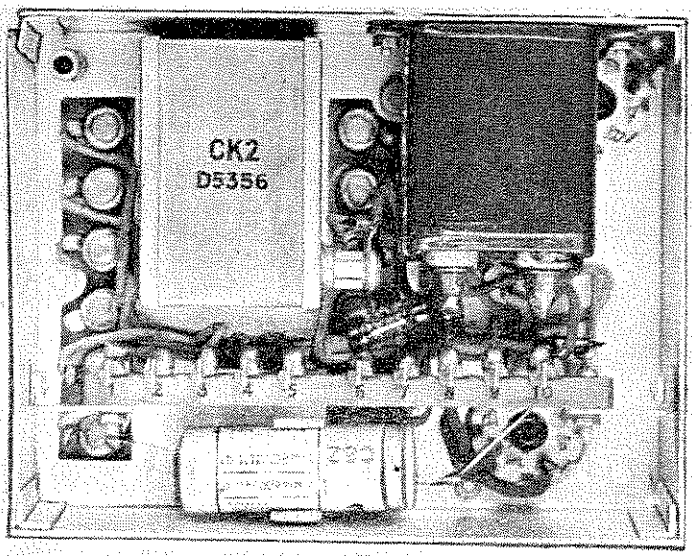
43. If a transmission line is charged to a voltage E and is connected across a load resistance RL the line acts as a voltage source E, in series with a resistor RO when RO is the characteristic impedance of the line. Therefore if RL = RO the voltage across RL is $\frac{E}{2}$. In Fig. 3e RL is the impedance reflected into the primary of T1, RO is the characteristic impedance of the pulse shaping network and E is approximately 600 volts. The line is switched to its load resistance RL when a positive trigger pulse drives the thyratron into conduction. The voltage drop across V15 is only 15 volts and therefore almost all of the available voltage is applied across RL.

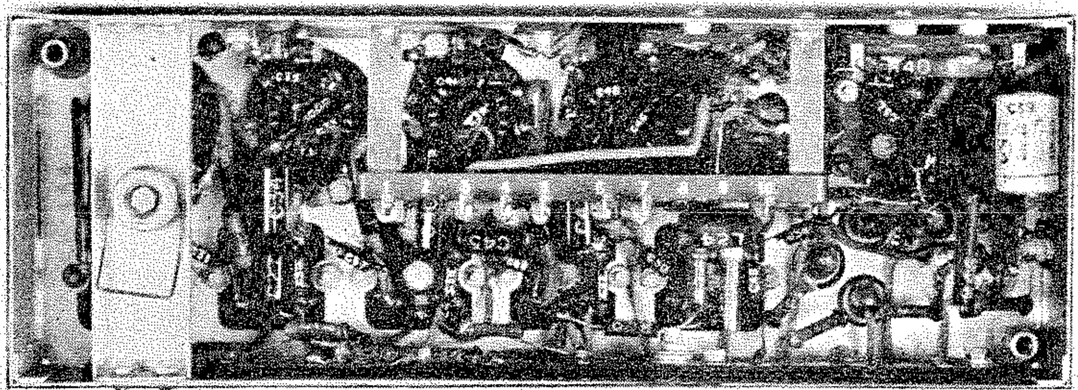
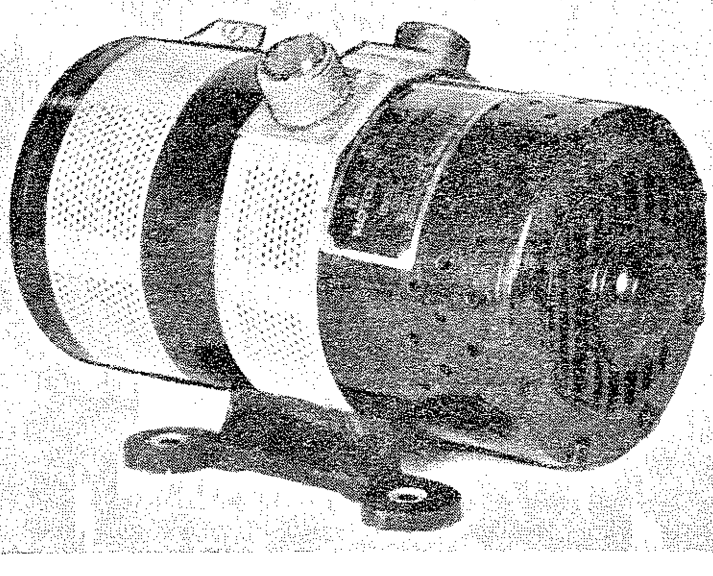
44. The pulse which is actually impressed on the grid of the thyratron is a narrow pulse, the duration of which is constant irrespective of the setting of the range switch in the indicator. This is achieved by differentiating the triggering pulse from the indicator by the time constant of C81, R59, R60. The resistor R60 also serves to limit the grid current of the thyratron.

45. When the line is switched to discharge through RL a voltage of $\frac{E}{2}$ will appear across RL and the voltage at A will drop to $\frac{E}{2}$ causing a wave of value $\frac{-E}{2}$ to start down the line and be reflected back from the open B in phase. When the reflected wave returns it will add a potential of $\frac{-E}{2}$ to the voltage at A, reducing it to zero, and since the load RL matches the line there will be no more waves on the line. Hence there will be a pulse of voltage equal to $\frac{E}{2}$ across the load resistor RL and the duration of the pulse will be the time taken for the voltage wave to travel the length of the transmission line and return.

46. The action of the transmission line is to abruptly begin to discharge through RL at a constant rate. If the network consisted of only C78-9-80 the discharge curve would be exponential. However, by using a well designed artificial line which contains both inductance and capacity the discharge rate can be held to a substantially constant value as long as the line is discharging. As the line becomes completely discharged, the anode voltage of V15 falls below the ionization point and the valve becomes non-conductive, since the choke CK1 momentarily prevents the supply of sufficient current to maintain the anode voltage. After the valve has ceased to conduct the line again charges up to potential of nearly 600 volts at the time the thyratron fires again.

47. In Fig. 3e, E is approximately 600 volts, RL is 33 ohms, RO = 33 ohms, and delay of line = 1 microsecond. Thus theoretically, a 2½ microsecond pulse of 300 volts should be obtained but owing to losses, a 2½ microsecond pulse of approximately 280 volts is ob-



(Top) Sub-Chassis View of Power Unit. (Middle) I.F. Strip.

tained across the primary of T1. The voltage developed in the secondary of this transformer is approximately 2000 volts and this is the modulating pulse applied to the anodes of V13 and V14.

48. *Bandswitching Control.*—The anode lechers of the oscillator valves are tuned to any one of the six frequencies by a six position turret carrying six trimmer condensers. As the turret is rotated the condensers are switched, in sequence, across the lechers by a series of "knife blade" contacts and wiper contacts. The ends of the condensers are connected to the knife blades and the anode lechers are connected to the wiper springs. A metal disc, out of which a segment has been cut, is fitted to the turret and this makes contact with a pair of wiper springs connected to the inductance L35 except on the 176 megacycles band when the bridge is removed from the inductance since the gap in the shorting disc is set to coincide with this position.

49. The high tension to the transmitter, i.e., the anode of V15, is remote controlled by two spring loaded press button ON/OFF switches mounted on the indicator front panel.

CHAPTER 2

Receiver

General — Circuit Description — R.F. — Amplifier — Local Oscillator and Mixer — I.F. Amplifier — Detection — Video Amplifier — Zero Range — Marker Pulse Generator Cathode Follower — Switch Motor — Setting Up the Receiver — Monitoring Points — Test Voltages and Continuity Check

General

50. The function of the receiver is to provide a means of admitting the response pulses picked up by the receiving aerials and to transform these R.F. pulses into voltage pulses suitable for display on the screen of a cathode ray tube. A further function is to generate a voltage pulse to act on the C.R.T. trace in such a manner that it provides a zero range marker.

51. The receiver circuit is basically a conventional superheterodyne and consists of the following sections:—

(a) R.F. unit consisting of a grounded grid R.F. stage, local oscillator, mixed and 1st I.F. amplifier stage.

(b) Amplifier sub-unit consisting of I.F. channel, detector, video amplifier and cathode follower.

(c) Zero range marker pulse generator and associated delay line.

(d) Switch unit.

(e) Tuning turret.

52. The R.F. frequency conversion circuits of the unit are designed so that an intermediate frequency of 30 megacycles is obtained from any one of the six frequency bands to which the receiver is required to tune.

53. The requirements of the R.F. amplifier stage of the R.F. unit are that it should provide for effective aerial matching and even gain on all six frequencies with the minimum development of random noise. A further requirement is that R.F. amplifier should act as a frequency rejector circuit with respect to the intermediate frequency.

54. A grounded grid triode buffer amplifier is used to fulfil these requirements inasmuch as:—

(a) The input resistance of this type of amplifier is low and effectively matches the aerial load, and the resonant frequency curve of its input circuit is reasonably flat over the six frequency bands.

(b) One of the causes of random noise voltage developed in R.F. amplifiers is partition noise caused by the irregularity of the division of current between anode and screen. This noise is inherent in pentodes and tetrodes. The reduction in noise level by using a grounded-grid triode in the input stage instead of a pentode is approximately 4 db.

55. The anode circuit of V2 (see Fig. 6) is tuned to any one of the six frequencies by a turret carrying six pre-tuned inductances. The local oscillator is tuned by a second bank of six pre-tuned inductances carried in the tuning turret. The local oscillator frequencies corresponding to the six input signal frequencies are:—

Frequency Band Designation	*Frequency in megacycles per second*	*Local Oscillator Frequency in megacycles per second*
P′	176	206
A′	214	184
B′	219	189
C′	224	194
D′	229	199
E′	234	204

On P′ band the local oscillator frequency is 30 megacycles above that of the corresponding input frequency in order that the physical dimensions of the local oscillator inductance be kept as small as practicable.

56. A five stage I.F. amplifier channel (see Fig. 7) is used with an intermediate frequency of 30 megacycles and an overall bandwidth of 2.2 megacycles for 3 db. down. To achieve this bandwidth, stagger-tuning of the IFT's has been adopted in preference to isochronous tuning, the reason being that higher overall gain is possible with stagger tuning than that obtained with isochronous tuning for the same bandwidth. In addition to the staggering of the I.F.T. tuning the bandwidth is governed by the "Q" of the tuned circuits. This has been obtained in this case by the values of the anode load resistors used. The I.F. grid inductances are tuned to the following frequencies:—

I.F.T.1	30.0 megacycles	I.F.T.4	32.0 megacycles
I.F.T.2	32.0 „	I.F.T.5	28.25 „
I.F.T.3	28.25 „	I.F.T.6	30.0 „

57. The output from the I.F. channel is rectified by a diode detector. The rectified video signals are then amplified by the video amplifier V10 and fed to the inidcator through a cathode follower V11.

58. Receiver gain is controlled by earthing the grids of the I.F. amplifier valves through the respective tuned circuit and returning the cathodes of the first three I.F. stages to a point at a variable potential above earth. The gain control is a 2000 ohm potentiometer mounted on the front panel of the indicator. Connexion between this control and the valve cathodes is by the shielded cable connecting the transceiver and indicator units.

58. The optimum flying height of an aircraft for dropping supplies is 500 feet. To provide an indication that the aircraft flying at this height is directly above the Eureka a marker pulse is displayed on the C.R.T. to denote the position which the Eureka signal will occupy at this instant.

60. The zero marker pulse generator is a gaseous discharge valve with a load resistance in its cathode. The positive pulse developed across this resistor is fed to the grid of a cathode follower. This cathode follower is one-half of a twin-triode, the other half of this valve is used on the cathode follower for the video amplifier. The cathodes of both halves are joined, thus the video signals and the marker pulses are combined.

61. To give a bearing sense to the received signals a switch motor is used to connect the port and starboard aerial feeders alternatively to the receiver input about 30 times per second and is synchronized with the aerial switching to connect the receiver output to the cathode ray tube port and starboard deflection plates respectively.

62. Tuning of the input circuit of the mixer valve and the anode circuit of local oscillator to any one of the six frequency bands is accomplished by a two-bank six position tuning turret similar in construction and operation to the transmitter tuning turret. In place of the pre-set trimmer condensers, however, are two blanks each of six inductances. These inductances are adjustable, within limits, by means of brass tuning slugs. To ensure stability, the inductances are wound on glass formers, the tuning slugs being held firmly inside the formers.

Circuit Description R.F. Unit (Fig. 6)

63. The received signal is impressed on the cathode of the grounded-grid triode amplifier V2 through blocking condenser C7 and condenser C8, which bypasses R5. The cathode of V2 is held above earth potential for R.F. voltages by choke L9 and the D.C. path to earth is through bias-resistor R5. The output from V2 is impressed on the tuned input circuit of V3. This circuit consists of C11, one of the inductances L11-12-13-14-15-16, C12 and the input capacity of V3. The H.T. supply to anode of V2 is through anode load L10 which is bypassed by C10, decoupling resistor R7 and metering resistor R6. One filament connexion is earthed and the other is connected direct to the filament supply.

64. The tuned circuit of the local oscillator V1 consists of one of the inductances L1-2-3-4-5-6 of the receiver turret and the inter-electrode capacity Cag of V1, the resonant frequency being 206, 184, 189, 194, 199 or 204 megacycles, depending upon the setting of the tuning turret. Oscillations are maintained by the feedback voltage developed across C1 and Cgc of V1. The high tension supply to anode of V1 is through anode load R2, decoupling resistor R3 and metering resistor R4 and the load R2, decoupling resistor R3 and metering resistor R4 and the network is decoupled by C6. One filament connexion is earthed and the other is fed through R.F. choke L8.

65. V1 does not oscillate continuously but is normally biassed to quiescence and brought to an oscillatory condition for the duration of the time-base sweep. The grid of V1 is returned to the junction of R55 and R56. This point is approximately 12 volts negative with respect to earth, and is also connected to the modulator pulse line through limiting resistor R54 and blocking condenser R53. The positive triggering pulse is used to overcome the bias on V1 and cause it to oscillate for the duration of the time-base sweep. This pulse is fed to the grid of V1 through filter choke L7 and grid resistor R1. R.F. bypassing is effected by C2 and C3.

66. The local oscillator frequency is fed through coupling condenser C5 to the grid of the mixer valve V3 where it mixes with the signal frequency. The output from V3 is fed to the 1st I.F. stage through coupling condenser C17. The H.T. supply to V3 is through anode load R11 and metering resistor R10, the anode is by-passed by C15, and the anode load resistor by C14.

67. V4 is a pentode operating as the 1 I.F. amplifier. The grid of V4 is tuned to 30 megacycles by permeability tuned inductance IFT.1 and resonates to a beat frequency of 30 megacycles per second derived from the difference of the local oscillator frequency and

the signal frequency. The output of V4 is coupled by C23 to a co-axial line connecting the R.F. unit to the input terminal of the amplifier unit. The anode high tension of V4 is obtained through anode load decoupling resistor R14, metering resistor R13, and decoupled by C20. The screen voltage is obtained from the junction of R14 and R15 and bypassed by C24. The suppressor grid is connected to earth and the cathode is returned to earth through the gain control and bypassed by C18 and C21.

68. The high tension and filament supplies for the R.F. unit are developed in the transceiver power-upply unit. The + 320 volt high tension enters the R.F. unit via pin 8 of the "M" type connector strip. R.F. filtering is effected by L28 and C64. Inside the R.F. unit the H.T. line is bypassed by C16 and C19. One connexion of the filament L.T. supply is provided by earthing one side of the filament L.T. supply is provided by earthing one side of the filament winding on T2 to earth and earthing one side of the valve filament connexions. The other filament connexion is via pin 5 on the connector strip and R.F. choke L27. Inside the R.F. unit it is bypassed by C9.

Circuit Description — Amplifier Sub-Unit (Fig. 7)

68. The output of the R.F. sub-unit is fed to the grid circuit of the second I.F. valve V5. The first I.F. valve V4 is located in the R.F. sub-unit. The grid circuit of V5 is tuned to 32 megacycles by I.F.T.2.* The anode voltage is supplied from the sub-unit H.T. through metering resistor R18, bypassed by C30, decoupling resistor R19, bypassed by C31, and the anode load R17 and R20. The screen potential is obtained from the junction of R18 and R19 and bypassed by C25. The cathode is returned to a point at a variable potential above earth through R16 and the gain control, located in the indicator. The minimum bias is developed across the cathode resistor R16 and the cathode is bypassed to earth by C26. The suppressor and one side of the filament are earthed, the other filament connexion is through a filament choke L18, bypassed by C29, to the sub-unit filament supply.

70. The anode of V5 is coupled to the grid circuit of the third I.F. amplifier V6 through blocking condenser C32. Circuit constants in this stage are identical with the second stage with the following exceptions:—

(a) The inductance of IFT3 is lower than that of IFT2 and the grid circuit is resonant at 28.25 megacycles.

(b) The anode load resistors R22, R25 are of lower resistance than the load resistors of V5.

71. The fourth and fifth stages, i.e., V7 and V8, are similar to those of the second and third stages, except that:—

(a) Fixed bias is obtained by returning the cathodes to earth through R26 and R31, respectively.

(b) The V7 anode load resistors R27 and R30 are the same values as V5 anode load ,R17 and R20.

(c) The anode load resistors R32, R35 of V8 are of higher resistance value than the anode loads of the preceding stages in order to raise the effective value of the "Q" of IFT6 above that of IFT2, IFT3, IFT4 and IFT5.

(d) The grid circuit of V7 is tuned to 32 megacycles an dthat of V8 to 28.25 megacycles.

73. The diode V9 is used to rectify the output of the I.F. amplifier channel. The input circuit of the diode is tuned to 30 megacycles by permeability-tuned inductance I.F.T.6. The rectified output from V9 is developed across the diode load resistor R36. Portion of the diode output is developed across the metering resistor R37. To prevent intermediate frequencies appearing in the video output, an I.F. filter consisting of L22 and C53 is included in the anode circuit of V9. One side of the filament of V9 is earthed and the other side is fed through L23 and bypassed by C52.

74. The output from V9 is fed through C56 to the grid of the pentode video amplifier V10. The screen dropping resistor R40 is much lower in value than the anode load resistor R43. This results in V10 operating with a higher screen potential than anode potential and a steep grid-voltage anode-current curve with sharp cut-off characteristics. The value of C57 is such that the static operating condition of V10, is near the top of the straight portion of the vg:ia curve. .The diode V9 conducts on the negative half of the waveform impressed on its cathode and the subsequent excursions of its anode are impressed on the grid of V10, driving this valve towards cut-off and resultin gin a positive going video signal output. The anode voltage of V10 is supplied from the sub-unit H.T. through metering resistor R41, decoupling resistor R42 and anode load resistor R43 which is bypassed by C58. The screen voltage is supplied through R40 from the junction of R42 and R43. The junction of these resistors is bypassed by C58, and the screen is bypassed by C57. The suppressor and one side of the filament is earthed, and the other side of the filament is connected directly to the L.T. supply. The output from V10 is coupled to the grid of one section of a twin triode V11, each section of which is connected as a cathode follower. The input to the video section of V11 is through C59 and grid damping resistor R45.

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* It should be noted that additional factors influencing the resonant frequency of the input circuit of each I.F. amplifier stage are (a) the grid-cathode capacity of the valve (b) the distributed capacities of the interstage wiring and (c) capacity of the output circuit of the preceeding stage. Further, with respect to V5, the dominant capacities are the distributed capacity of the co-axial cable connecting the R.F. and amplifier sub-units, and the capacity Cgc of V5.

75. The gaseous discharge valve V12 is normally held in a non-conducting state by a grid potential of aproximately —40 volts, which is developed in the power unit and brought to the grid of V12 through pin 4 of the ten pin connecting strip and R51. While V12 is in this non-conducting state, a pulse-forming network L25, L26, C61 and C62 in its anode circuit is charged to approximately 200 volts from the junction of the voltage divider R49 and R50. The valve is fired by a +150 volt pulse which is developed in the transmitter pulse transformer, T1, at the instant the transmitter is modulated. The +150 volt pulse is applied to the grid of V12, through differentiating circuit C60 and R53, causing it to conduct and connect the cathode resistor R44 across the charged pulse forming line and so discharge it. The retardation time of the pulse line is very short and a correspondingly short pulse is developed across R44. The resistor R53 serves to limit the grid cur rent of V12. The cathode end of the resistorR44 is directly coupled to the grid of one-half of V11. The two cathodes of V11 are connected to the common cathode resistor R46 and thus the output from each section of V11 appear across this resistor. The output from the common cathodes of V11 is taken via pin 10 of the connecting strip to the input of the video switching bank of the switch motor whence it is fed to the appropriate cathode ray tube deflection plates .

75. The firing of V12 is not coincident with the pulsing of the transmitter, but is delayed for approximately 2½ microseconds by delay line L29, L30, L31, L32, C66, C67, C68 and R57 mounted on the underside of the main chassis. This delay line is an artificial transmission line simulating the path of a transmitted pulse from a Rebecca transmitter, in an aircraft flying at 500 feet, to a Eureka, the time taken for the Eureka to respond, the return path of the Eureka pulse and finally the delay in the Rebecca receiver. Thus on the C.R.T. screen, the zero-range marker pulse will provide a calibrating marking to indicate the position at which a "blip" from a Eureka will appear when the aircraft flying at 500 feet is directly above it.

76. The high tension and filament supplies for the amplifier unit are developed in the transceiver power supply unit. The +300 volt H.T. is brought to the amplifier unit via pin 6 of the connector strip. Filament wiring is similar to that of the R.F. unit, one filament connexion being earthed, and the other filament connexion is via pin 3 of the connector strip. This lead is bypassed by C65 mounted on the main chassis.

77. Monitoring points have been provided for determining the operating condition of various circuit elements and are set out in the circuit diagram attached.

Alignment of Rebecca Receiver

78. Couple I.F. signal generator to mixer grid. (Signal generator output to be terminated in 80 ohm load.) The oscillator plate lead is to be lifted off the valve. All leads are to be as short as possible, and shielded as near as possible to the connecting point. This is most important. The earth connexion should be near the mixer grid.

79. Set the I.F. signal generator to 30 megacycles. Adjust the attenuator until about ½ scale reading is obtained on the meter (0-1 m.a.) connected across the Receiver output monitoring terminal (meter to be approximately 100 ohm resistance — not critical).

The I.F. Stagger Frequencies are as follow:—

Transformer	I.F.1 — 30.0	megacycles	
,,	I.F.2 — 32.0	,,	± 0.1 megacycles.
,,	I.F.3 — 28.25	,,	± 0.1 megacycles.
,,	I.F.4 — 32.0	,,	± 0.1 megacycles.
,,	I.F.5 — 28.25	,,	± 0.1 megacycles.
,,	I.F.6 — 30.0	,,	

The procedure is as follows:—

(i) Set signal generator to 30 megacycles.
(ii) Tune I.F.1 and I.F.6 for maximum output on meter.
(iii) Set signal generator to 32 megacycles.
(iv) Tune I.F.2 and I.F.4 for maximum output on meter.
(v) Set signal generator to 28.25 megacycles.
(vi) Tune I.F.3 and I.F.5 for maximum output on meter.
(vii) Repeat (i) to (vi).
(viii) Tune signal generator across the band to see whether double peaks occur. If so, it is usually possible to get rid of this by changing valves. This is only necessary if the double peak is very marked.
(ix) Find the actual peak by tuning signal generator. If *not* on 30 megacycles adjust the I.F.6 until this is so. In doing this, make the adjustment to the trimmer first, then check again by tuning signal generator. Do *not* set signal generator to 30 megacycles and peak, as this introduces errors. At this stage, the sensitivity should be —58db. for ½ scale reading on meter (i.e., approximately 5 v .output) (0-1 m.a.).

I.F. Bandwidth for 3 db. down

(i) Set signal generator to 30 megacycles.
(ii) Set attenuator to give ½ scale on meter.
(iii) Turn attenuator 3 db. up.
(iv) Tune signal generator ± to get ½ scale again and note readings, which should be approximately ± 1.4 megacycles.

80. If unit is not operating, overload with signal generator and tune over band with meter on monitoring point for each stage. A dip should be noted if stage is working correctly when tuned through its particular stagger frequency.

R.F. Unit

Select "A" band.

Loosely couple 30 microseconds signal generator into input to Transceiver I.F.2—no direct connection required.

Directly couple R.F. signal generator to one aerial terminal and stop switching motor.

Set signal generator to "A" frequency.

Tune "oscillator" and obtain the following on indicator:—

(a)

When exactly on frequency beat note shows thus:—

(b)

81. This will change when tuning tool is taken out, hence the adjustment must be made so that the beat note appears as at Fig. b when tuning tool is removed.

82. Then switch off I.F. signal generator and peak "R.F." adjustment to meter in receiver output and repeat until no interaction is present. Proceed similarly for all other bands.

Overall Sensitivity

Signal = double noise on output meter.

—85 db.

—65 lb. for ½ scale reading, *always with switching motor off.*

Noise level is to be as convenient.

Overall bandwidth 2.2 megacycles should be obtained for 3 db. down.

Note.—These precautions to be observed in all this procedure:—

(1) Gain control must be full on.

(2) Switching motor must be off.

(3) Indicator is to be on 100 mile range.

(4) Input is to be 80 v. exactly. (The above figures taken on 1250 cycles per second but it probably does not make much difference.)

(5) Keep carrier adjustment on signal generator always on 0.1 volt when moving signal generator frequency control, as this changes signal generator frequency slightly.

Transceiver Power Supply *(Fig. 8)*

General

83. The Transceiver-power supply sub-unit develops the high tension voltages for the transmitter, receiver and the indicator (excluding the C.R.T.) and the filament voltages for the transmitter and receiver.

84. The primary source of power is a motor driven alternator, type MA6, having an output of 80 volts and 2000 cycles per second. The power supply sub-unit is designed to operate from this source of power and also, by a tap on the primary of the transformer T2, an input voltage of 115 volts can be used.

85. Three secondary windings are wound on the transformer T2.—

(a) A centre tapped high voltage winding which in conjunction with the rectifier valve V18 and associated filter circuit develops the 320 volt high tension supply.

(b) A 5 volt winding for the filament of the rectifier.

(c) The third winding develops 6.9 volts for the oscillator valve filaments, and a tap on this winding provides 6.3 volts for the filaments of the remainder of the transceiver valves.

86. The high tension centre tapped winding, in conjunction with V18, forms a full wave rectifier circuit and develops the high tension voltage for the transmitter, receiver and indicator valves, with the exception of the cathode ray tube, which has its power supply incorporated in the indicator, type A.1047 (see Fig. 9). The high tension supply to the transmitter, receiver and valves V1, V3, V5, V7 of the indicator is filtered by CK2 and C82, C83, C84, plus a R.F. bypass condenser C85. The voltage at the output of the power supply sub-unit is 320 volts positive and is distributed to the receiver by the inter-sub-unit cabling and to the transmitter control switches and indicator by pin No. 7 of the 12 pin plug, which is in turn connected to the indicator by the 11 core shielded cable. The transmitter high tension is taken from the control switches located in the indicator through the shielded cable and pin No. 8 of the 12 pin socket.

87. The centre tap of the high tension secondary is returned to earth through R62 and the resulting voltage drop of 40 volts across this resistor is used for bias purposes in the transmitter and receiver sub-units.

88. The valves V16 and V17 are used to regulate the supply to the anodes of the multi-vibrator and pulse amplifier valves of indicator, type A.1047. The regulation of this supply is sufficient to prevent motorboating in these stages and further, by keeping this supply voltage to exactly 300 volts eliminates changes in P.R.F. caused by voltage fluctuations. This supply is not filtered by the CK2, C82-83-84 combination, but is smoothed by CK1 located in the indicator unit. The resistor R61 in conjunction with CK1 provides the necessary series resistance to ensure correct operation of the regulator valves V16, V17.

89. The various voltage outputs from the power supply sub-unit are brought to a 10 pin connecting strip, which mates with a 10 pin "M" type connecting strip on the main chassis assembly, and are distributed to the respective sub-units. One side of the power input line from the 4 pin power input socket is connected to pin 9 of the "M" type connecting strip, the other connexion being to pin 7 or 8 of this strip for 115 volts or 80 volts input, respectively.

CHAPTER 3

Indicator Type A.1047 *(Fig. 9)*

General — Circuit Description — Multi-vibrator — Time Base Circuit — Development of Shift Voltages — Cathode Ray Tube and Power Supplies — Remote Control and Relay for Transmitter High Tension

General

90. The function of the indicator is to provide a means of display for determining the range and approximate bearing of the ground beacon with respect to the aircraft in which the Rebecca equipment is installed. A further function of the indicator is to provide a pulse which is used to control the pulsing of the transmitter, which in turn controls the generation of a zero range marker pulse for impression on the indicator trace.

91. The indicator circuit may be divided into the following sections:—

(a) Multi-vibrator.

(b) Time base circuit.

(c) Shift voltage.

(d) Cathode ray tube.

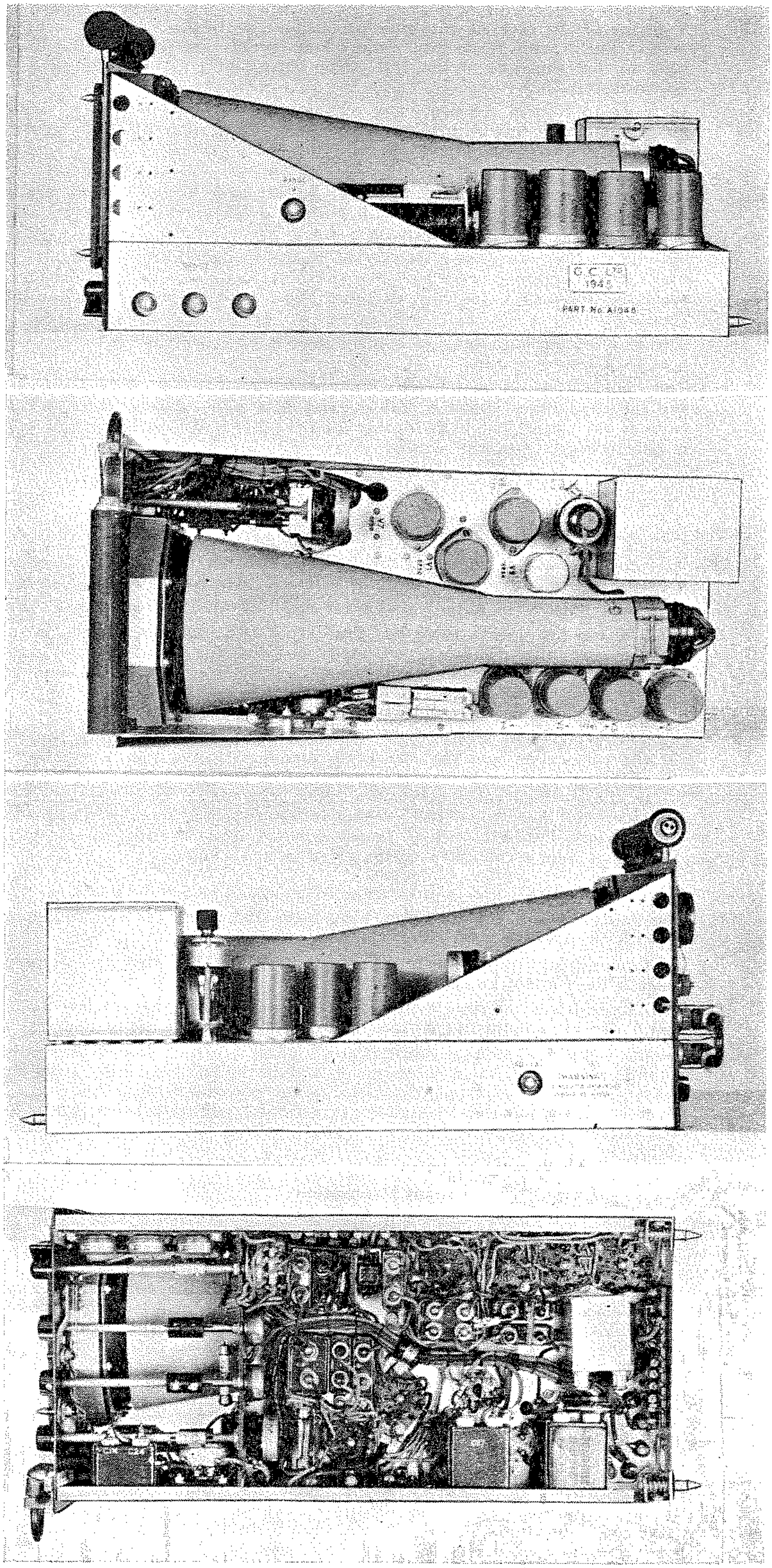
(e) Pulse amplifier.

(f) Remote control of transmitter high tension.

(g) Cathode ray tube power supply.

92. The operation of the above sections is as follows:—

(a) The multi-vibrator circuit is the timing control for the whole sequence of events occurring in the Rebecca-Eureka system. Two square pulses, one of which is negative and the other positive, are generated simultaneously at a repetition frequency of 350 cycles per second. The duration of each pulse is varied according to the particular range setting of the indicator. The positive pulse is fed to the grid of the cathode ray tube and "lights up" the trace for the duration of the sweep. The negative pulse is used to control the time base valve, and a portion of this pulse is also fed to the pulse amplifier, the output of which serves to trigger the transmitter modulator and simultaneously suppress the receiver.



General Layout of Indicator Type A.1047

(b) The time base circuit develops a saw-tooth waveform which is applied to the Y plates of the cathode ray tube producing a vertical trace which is approximately linear with respect to time. Four speeds are provided for the time base so that the time of the full sweep corresponds to ranges of 4, 8, 40 or 80 nautical miles.

(c) In order to control the centering of the trace and the position of its commencement adjustments are provided for the variation of the potential on one each of the X and Y plates.

(d) The cathode ray tube is used to provide "A" scan presentation, that is, the trace commences at the bottom centre of the screen and travels vertically, while the echoes are displayed as horizontal deflections of the trace.

(e) The function of the pulse amplifier valve is to amplify and phase-change portion of the negative pulse developed by the multi-vibrator so that it can be used as a triggering pulse for the transmitter modulator. The output from the pulse amplifier is fed to a cathode follower which provides a low impedance output.

(f) The transmitter high tension control switch is located in the indicator and acts as a remote control.

(g) The indicator power supply circuit develops filament voltages for the cathode ray tube and other indicator valves, and also high tension voltage for the cathode ray tube. The high tension for the other indicator valves is developed in the transceiver power supply.

Physical Details of the Indicator Unit

93. The external connections consist of:—

(a) A twelve pin socket, mounted on the top left hand corner of the front panel, provides the input terminal for the shielded cable from the transceiver unit.

(b) Three pye sockets mounted on the left hand side of the front panel.

(i) The top pye socket furnishes the output terminal for the negative suppression pulse. This was originally intended for I.F.F. Mk. III suppression but a suppression modification now incorporated in these units requires the use of a positive suppression pulse as obtainable at the + triggering pulse socket of the transceiver.

(ii) The centre and bottom pye sockets are the starboard video output for the transceiver and the starboard video input to the indicator. The "video out" socket is connected internally to the starboard video lead contained in the shielded cable connecting transceiver and indicator units. The video "in" and video "out" sockets are normally bridge dby a short length of co-axial cable which is removed when it is required to connect the output from a calibrator to the video input socket.

94. The operating controls and adjustments are mounted as follows:—

(a) The control knobs for the gain, bias, focus and range controls are mounted beneath the cathode ray tube.

(b) The two push button transmitter remote control ON/OFF switches are mounted beneath the control knobs.

(c) Two screwdriver adjusted potentiometers constituting the vertical and horizontal deflection adjustments are mounted to the left of the cathode ray tube.

(d) On the right hand side of the indicator chassis are four screwdriver adjusted potentiometers for range adjustments and on the left hand side of the chassis is the screwdriver adjusted trace calibration potentiometer. When the dust cover is in position these controls are accessible through holes drilled in the dust cover.

Circuit Description

Multi-vibrator (Fig. 9)

95. The multi-vibrator V2, V4 generates a positive pulse at the cathode and a negative pulse at the anode circuit of V4. The components are so proportioned that square pulses with sharp fronts are generated. The operation is essentially similar to that of a conventional multi-vibrator except that a resistance load R21, R22 is inserted in the common cathodes of V2 and V4. The resistor R15 and condenser C3 serves to decouple the anode circuit of V2.

96. Referring to the waveforms in Fig. 10, when V2 cuts off due to a negative impulse applied to its grid from the anode of V4, a positive impulse is generated at its anode and applied to the grid of V4, causing it to conduct. The current surge through V4 produces a sharp fronted positive pulse at its cathode and simultaneously a negative pulse at its anode. V4 is held in this conducting state until V2 conducts again, i.e., for a period determined by the time constant of C9 and the grid resistor of V2.

97. Four grid resistors R6, R7, R8, R9 for V2 are selected by bank "B" of range switch S1 to give pulse durations slightly greater than 1000, 500, 100, 50 u/seconds, respectively corresponding to ranges of 80, 40, 8, 4 nautical miles.

98. During the other phase of the MV cycle V4 is cut off and V2 conducts for a time determined by the grid circuit time constant of V4. Bank C of SW1 selects V4 grid resistors R10, R11, R12, R13 in the same sequence as bank B selects R6, R7, R8, R9. The combinations of the time constants of the circuit are such that the total repetition period of the MV on all ranges is approximately 2900 u/seconds corresponding to a P.R.F. of 350 + 50 cycles per second under all circumstances. Approximately 10% of the exponential charging curve of each condenser is used, thus a fairly linear sweep voltage is obtained.

99. *Development of Push-Pull Deflection.*—The output positive going waveform from V1 is fed to cathode coupled push pull amplifiers V3 (see Fig. 11) and V5, which in turn are direct coupled to the time base deflection plates of the cathode ray tube.

100. The grid of V3 is direct coupled to the anode of time-base grid V1 and assumes the same potential as the anode. The cathodes of V3 and V5 are returned to earth through common cathode resistor R29 and the voltage developed across this resistor is sufficient to cause V3 to operate at a point near cut-off. The grid of V5 is held at a positive potential with respect to earth developed at the junction of R35 and VR7. This voltage is sufficient to overcome the voltage developed across the cathode resistor R29, thus V5 normally draws current.

101. When the positive going waveform from V1 is impressed on the grid of V3 this valve conducts to a greater extent thus drawing increasing current through the common cathode resistor R29. This increases in current causes the voltage developed across R29 to rise and eventually overcome the positive potential on the grid of V5 causing this valve to reach cut-off point. Thus, as the potential at the anode of V3 is falling that at the anode of V5 is rising and a push-pull output is impressed across the deflection plates of the cathode ray tube.

Trace Calibration Control

102. The factors governing the actual velocity of the trace are:—

(a) the charging curve of the time-base condenser, C5, C7, C8 or C10.

(b) the amplification factor of the push-pull amplifier valves V3 and V5, and

(c) the sensitivity of the cathode ray tube. The adjustments provided for by VR1, VR2, VR3 or VR4 control the charging curves of the time base condensers but do not cover variations of (b) and (c).

To allow for variations in the amplification factor of valves used in positions V3 and V5 and variations in sensitivity of cathode ray tubes, a pre-set potentiometer VR5 is incorporated in the anode circuit of V3 and by controlling the amplification factor of V3 provides a compensating adjustment.

103. *Elimination of "Flyback".*—Coincident with the development of the time base pulse at the anode of V4, a positive going pulse is generated at its cathode. Portion of this pulse is taken from the junction of R21 and R22 and applied to the grid of cathode ray tube through a coupling condenser C18. This positive pulse decreases the negative potential on the grid of the cathode ray tube brightening up the trace for the duration of the pulse. As this pulse is of the same duration as the time base sweep time the cathode ray tube at the cessation of the pulse returns to its normal "blacked out" condition, until the beginning of the next sweep so that no flyback or stationary spots appear on the screen.

104. *Video Deflection.*—The positive video signal impulses from the switching motor are impressed upon the "X" plates of the cathode ray tube via the switching motor port output to port deflection plate through coupling condenser C22; starboard output to starboard deflection plate through C23. As the coupling condensers C22 and C23 will destroy the unidirectional form of the positive video signals, it is necessary to connect a diode D.C. restorer, i.e., one-half of V9, to each deflection plate in order to restore the signals to their former positive going waveform.

105. *Vertical and Horizontal Shift Controls.*—The potentiometer VR7 forms the vertical shift control and acts in the following manner:—The anodes of V3 and V5 are direct coupled to bottom and top deflection plates respectively. Normally V5 is conducting and V3 is operating with a very low value of anode current, thus the bottom deflection plate has a high positive potential with respect to the electron stream which, as a result, is drawn down to the bottom of the cathode ray tube screen.

106. The steady D.C. potential on the cathode of V1 is variable by means of VR7 and accordingly the minimum potential to which the condenser (C5, C7, C8 or C10) falls when discharged is variable with respect to earth. The potential across this condenser is direct coupled to the grid of V3 and the lower this potential falls the higher the positive potential at the anode of V3 and vice versa. Therefore any variation of the potential at the cathode of V1 is reflected at the cathode ray tube as a variation in the commencement of the trace.

107 .The potentiometer VR6 forms the horizontal shift control and acts in the following manner:—The "X" plates of the cathode ray tube form the video deflection plates. The port deflection plate is held at a steady positive potential by the voltage drop across voltage divider R40 and R41. The positive potential on the starboard deflection plate can be varied between limits above and below the port X plate potential by the action of VR6. In normal operation when the moving contact of the VR6 is in the centre position the

accelerating anode and the port and starboard deflection plates assume equal potentials with respect to earth.

107. *Cathode Ray Tube.*—The cathode ray tube V8, type 1802 or 5BP1 operates with a high tension negative supply of approximately 1350 volts. This voltage is applied across the voltage divider network consisting of R42, VR8, R43, VR9. The moving arm of VR8 is connected to the focussing anode and operates as a focus control. VR9 operates as the brilliance control.

109. The "Y" plates during each time base sweep cycle assume high positive potential with respect to the accelerating anode the speed of the electrons would be further accelerating anode the speed of the electrons would be further accelerated by the "Y" plates, causing poor focussing qualities. To reduce the potential dieffrence between the deflection plates and the accelerating anode the latter is connected to a + 250 volt source at the junction of R33 and R34. A further effect is that this voltage is complementary to the —1350 volt supply and therefore the total potential between accelerating anode and earth is —1600 volts.

109. *Pulse Amplifier.*—Portion of the negative pulse developed at the anode of V4 is taken from the junction of R19 and R20 and fed through coupling condenser C12 to grid of V6 which operates as a voltage amplifier. A negative pulse impressed on the gri dof V6 will appear as a positive pulse of greater magnitude at its anode. A cathode follower V7 is used to match the anode impedance of V6 to the low impedance cable output.

110. *Remote Control of Transmitter High Tension.* — Two spring loaded press-button switches SW3 and SW4 and relay Rel.1 form the remote control switch for the transmitter high tension. Normally SW4 is open and SW3 is closed. The high tension circuit is then completed through SW2 and SW4 is out of circuit. To switch off the transmitter SW3 is pressed, thus breaking the circuit through Rel.1 which releases SW2.

111. *Power Supply.*—The indicator power supply section consists of transformer T1, ½ wave rectifier valve V10, and associated filter circuit. The primary of transformer T1 is designed for operation off 80 v. A.C. 200° C.P.S., a tap being provided for operation off 115 v. A.C. T1 has a high tension secondary to give a filtered output of —1350 volts, a rectifier filament winding 2.5 v. 1.75 amps, a cathode ray tube filament winding 6.3 v. 0.6 amps and a 6.3 v. 2.5 winding for the indicator valve filaments. C20 and C21, are filter condensers in conjunction with filter resistor R44, forming the filter network for the cathode ray tube high tension. The high tension +320 volts for the remaining indicator valves is obtained from the transceiver power supply. All power supply input connections are via the 12 pin socket S4.

112. Socket connections for all valves used in Rebecca IIB appear in Fig. 13.

CHAPTER 4

Aircraft Power Supplies

General — Motor Alternator Type MA6 — Control Panel Type RD-21

Introduction

114. The Rebecca transceiver and indicator uints are designed to operate from an alternating current power supply of 80 volts at a frequency of 2000 cycles per second.

115. To provide a power supply for Rebecca equipment when used in C.47 aircraft, a motor alternator type MA-6 is used. The motive power for the motor portion of the MA-6 is obtained from the aircraft D.C. supply.

116. To ensure that the correct voltage is maintained at the input terminals of the Rebecca units, under all load conditions, the output from the alternator is kept constant at 80 volts by a carbon pile regulator located in the control panel type RD.21. The front panel of this unit serves as a distribution panel for the power supplies to the various Rebecca units.

Motor Alternator MA-6

117. The motor alternator type MA-6 consists of a D.C. motor which drives an alternator having a rated output of 250 watts at 80 volts and a frequency of 2000 cycles per second. The motor and alternator are constructed as an integral unit and mounted on a cast mounting base as shown in (lower) page 14.

118. The physical dimensions of the complete unit are: length, 11 ins.; diameter, 5½ ins.; weight, 25 lbs. The motor is designed to operate from the 28.5 volt D.C. aircraft supply with a rated input of 18 amps. The alternator rotor, motor armature and ventilating fan are all mounted on one shaft, the shaft bearings being located in the end plates of the housing assembly. The shaft speed on full load is approximately 5000 r.p.m. and the frequency of the alternator output at this speed is 2000 cycles per second. This supply frequency is normal radar practice as it enables the power transformer and filter chokes in the various units to be constructed with small sized cores and windings.

Control Panel Type RD-21

120. The function of the control panel is to regulate the output from the alternator, to provide a distribution panel for branching the power supply to the Rebecca units, and also to control the alternator-field energizing voltage.

121. The control panel comprises the following sections:—

(a) Voltage regulator.

(b) Power factor correction condenser.

(c) R.F. filter circuit.

(d) Power distribution panel.

122. The voltage regulator type E as used in the control panel consists of:—

(i) a pile of carbon discs under pressure, the resistance of which varies inversely as the pressure varies; and

(ii) a solenoid assembly energized by a voltage obtained from the output of the alternator, and rectified by a selenium rectifier. The armature of the solenoid is so linked to the carbon pile that changes of the magnetic field of the solenoid caused by fluctuations in the alternator output are inversely reflected in the carbon pile as changes of pressure.

123. The regulator is adjusted so that under normal load conditions and alternator rotor speed the output from the alternator is 80 volts. Should this output voltage rise, either as a result of reduced load or increased rotor speed the rectified voltage in the solenoid will likewise rise. The increased field in the solenoid will further attract the armature and cause the pressure on the carbon pile to be reduced with the result that the resistance of the carbon pile is increased. The carbon pile is in series with the alternator field, and the increased voltage drop across the pile reduces the field excitation so that the alternator output falls to the required 80 volts. On the other hand, should increased load or reduced rotor speed cause the alternator output to fall, the pull exerted by the solenoid on the armature is relaxed allowing a spring to exert increaesd pressure on the carbon pile. This results in a decrease in the resistance of the carbon pile and consequently a lower voltage drop across it. As a result of this reduced voltage drop the field excitation voltage is increased and the alternator output rises to 80 volts.

124. To provide a means of introducing sufficient capacity into the power supply circuit as compensation for inefficient values of power factor two condensers can be connected in circuit either singly or in parallel, providing three values of capacity.

125. A filter circuit comprising four R.F. chokes and four bypass condensers, the whole being enclosed in a metal box, is included in the D.C. input circuit of the control panel. The input socket, on the front panel, and the leads from this socket to the filter unit are effectively shielded. This shielding and filter circuit is necessary to preventing the following forms of interference being superimposed on the aircraft D.C. supply; (a) 2000 cycles per second ripple from the alternator; (b) 350 cycles per second pulse note or any R.F. component.

126. The output from the alternator is required to be supplied to several units at the one time and to facilitate this, three 4-pin sockets are mounted on the front panel. Pins Nos. 1 and 2 are the 80 volt A.C. output connection and pins Nos. 3 and 4 are the D.C. output connections. A 5 amp fuse is connected in one 80 volt lead to each socket. These fuses are fitted on a fuse panel which holds a total of six fuses, three of which are spares. In addition to the three power supply sockets the following sockets are fitted to the control panel; (a) a 2-pin socket for the D.C. input to the control panel; (b) a 6-pin socket for connection to the motor-alternator MA-6; and (c) a 2-pin amphenol socket which permits of remote control of the 28.5 volt D.C. input to the control panel by a switch box. The latter is located conveniently near the operator.

CHAPTER 5

Spares for Rebecca

Details of Components

Item No.	Ident No.	Nomenclature	Detail	HMV Part No.	Quantity per Unit
1	Y10AB/500149	Clip, grid type D4420	For EA50 Valve	D4420	4
2	Y10AB/500217	Trays, mounting type RD21	For Control panel		1
3	Y10AB/500218	Trays, mounting type B2141	For Indicator	B2142	1
4	Y10AB/500219	Trays, mounting type B2143	For Transceiver	B2143	1
5	Y10AB/500254	Turret, support type C3193	Cast aluminium receiver	C3193	1
6	Y10AB/500255	Turret, support type C3194	Cast aluminium transmitter	C3194	1
7	Y10AB/500256	Knob, type D5053/A	Modified MIK6 Including D5407 Captive Screw (Cream Bakelite)	D5053/A	2
8	Y10AB/500257	Guide, tuning tool type D5370	Tuning tool guide	D5370	3
9	Y10AB/500258	Panel, (contact mounting type D5335)		D5335	1
10	Y10AB/500259	Knob, type D5417	Modified MIK 9	D5417	2
11	Y10AB/500260	Coupling, moulded type D4187		D4187	4
12	Y10AB/500261	Knob, type D5647/A	Moulded Bakelite R3d dot PK screw	D5647/A	1
13	Y10AB/500262	Knob, type D5647/B	Moulded Bakelite blue dot	D5647/B	1
14	Y10AB/500263	Knob, type D5647/C	Moulded Bakelite yellow dot	D5647/C	1
15	Y10AB/500264	Grommet, type D5424		D5424	1
16	Y10AB/500265	Grommet, type D5425		D5425	1
17	Y10AB/500266	Grommet, type D1748		D1748	2
18	Y10AB/500267	Spring, type D4201		D4201	4
19	Y10AB/500268	Spring, type D5365		D5365	18
20	Y10AB/500269	Panel, front type C3191	Transceiver	C3191	1
21	Y10AB/500270	Panel, front type C3190	Indicator	C3190	1
22	Y10AB/500271	Screen, perspex type O3195	For indicator A1047	C3195	1
23	Y10AB/500272	Escutcheon, type D4170/B	For covering V & H shift controls on indicator	D4170/B	1
24	Y10AB/500273	Clip, retaining type D5427	For A50 valve	D5427	1
25	Y10AB/500274	Nut, knurled type D4379	For A50 valve retaining clip	D4379	1
26	Y10AB/500275	Guide, assembly type D3544/X	Consists of guide tube washers guide post captive screw, screw 2BA½ CHSP washer $\frac{3}{16}$ in.	D5344/X	8
27	Y10AB/500276	Cover, dust indicator type B2144		B2144	1
28	Y10AB/500277	Cover, dust trans-receiver type B2145		B2145	1
29	Y10AB/500278	Shield, for G.R.O. type C3164		C3184	1
30	Y10AB/500279	Mounting, anti-vibration type 118/60	Ormiston		8
31	Y10AB/500280	Retainer, valve type D4320/A		D4320/A	1
32	Y10AB/500281	Retainer, valve type D/4320/B		D4320/B	1
33	Y10AB/500282	Retainer, valve type D5315		D5315	14
34	Y10AB/500283	Retainer, valve type D5373		D5373	2
35	Y10AB/500284	Spanners, type D5374		D5374	2
36	Y10AB/500285	Hood, visor retaining type D5543		D5543	1
37	Y10AB/500286	Base, Mounting type D5334		D5334	1
38	Y10AB/500287	Panel, (grid coil) type D5333		D5333	1
39	Y10AB/500288	Washer, belt type D5554		D5554	2
40	Y10AB/500289	Tool, tuning type D5376		D5376	1
41	Y10AB/500290	Clip, grid type D0959		D0959	4
42	Y10AB/500291	Ring, packing type D4199		D4199	1
43	Y10AB/500292	Ring, retaining rubber type D4200		D4200	1
44	Y10AB/500293	Clamp, support CR valve type D5318		D5318	
45	Y10C/65758	Resistor, 150,000 ohms 1 watt	Ducon ± 10%	D0244/K3X	6
46	Y10C/65161	Resistor, 500 ohms ¼ watt carbon	Ducon	B1X	11
47	Y10C/65730	Resistor, 10,000 ohms ½ watt carbon	IRC	F2X	5
48	Y10C/67201	Resistor, 15,000 ohms ½ watt carbon	Ducon	D2X	1
49	Y10C/66014	Resistor, 35,000 ohms ½ watt carbon	Ducon	G2X	1
50	Y10C/67202	Resistor, 750 ohms ¼ watt carbon	Ducon	C1X	1
51	Y10C/65718	Resistor, 100 ohms ½ watt carbon	Ducon	T1X	3
52	Y10C/65944	Resistor, 200 ohms ¼ watt carbon	Ducon	XH1X	5
53	Y10C/65670	Resistor, 1,000 ohms ¼ watt carbon	Ducon	D1X	9
54	Y10C/67203	Resistor, 1,200 ohms ½ watt carbon	IRC ± 5%	BU2V	1
55	Y10C/65183	Resistor, 2,000 ohms ¼ watt carbon		AJ1X	1
56	Y10C/67204	Resistor, 2,200 ohms ½ watt carbon	Ducon ± 5%	DD2V	1
57	Y10C/66379	Resistor, 10,000 ohms 1 watt carbon	IRC	F3X	6
58	Y10C/65163	Resistor, 20,000 ohms ¼ watt carbon		V1X	1
59	Y10C/65160	Resistor, 50,000 ohms ¼ watt carbon		H1X	2
60	Y10C/66273	Resistor, 5,000 ohms 1 watt carbon		X3X	4
61	Y10C/67205	Resistor, 8,000 ohms ½ watt carbon	IRC ± 5%	BJ2V	2
62	Y10C/67206	Resistor, 10,000 ohms ½ watt carbon	IRC ± 5%	F2V	2
63	Y10C/66942	Resistor, 15,000 ohms ½ watt carbon	IRC ± 5%	AD2V	4
64	Y10C/65575	Resistor, 20,000 ohms 1 watt carbon		V3X	3
65	Y10C/66339	Resistor, 30,000 ohms 2 watt carbon	IRC — T or mills	W4X	1
66	Y10C/65169	Resistor, 50,000 ohms ½ watt carbon	Ducon	L1X	1
67	Y10C/66269	Resistor, 250,000 ohms ½ watt carbon	IRC	N2X	1
68	Y10C/65165	Resistor, 500,000 ohms ¼ watt carbon		D1X	1
69	Y10C/65750	Resistor, 500 ohms 1 watt carbon	Ducon	B3X	1
70	Y10C/66214	Resistor, 600 ohms 1 watt carbon	Ducon	BA3X	2
71	Y10C/65159	Resistor, 2,000 ohms 1 watt carbon		AJ3X	1
72	Y10C/65662	Resistor, 3,000 ohms, 1 watt carbon	IRC	AF3X	1
73	Y10C/67207	Resistor, 10,000 ohms 1 watt carbon	Ducon ±2%	F3T	1
74	Y10C/65576	Resistor, 25,000 ohms 1 watt carbon		AE3X	3
75	Y10C/67208	Resistor, 25,000 ohms 2 watt carbon	IRC B.T. or mills ± 2%	AE4T	4
76	Y10C/65577	Resistor, 40,000 ohms 1 watt carbon		S3X	1
77	Y10C/67209	Resistor, 40,000 ohms 1 watt carbon	Ducon ± 2%	S3T	1
78	Y10C/66381	Resistor, 50,000 ohms 1 watt carbon		H3X	1
79	Y10C/66826	Resistor, 60,000 ohms 1 watt carbon		AT3X	1
80	Y10C/67210	Resistor, 60,000 ohms 2 watt carbon	IRC B.T. or mills	AT4X	2
81	Y10C/65441	Resistor, 100,000 ohms 2 watt carbon	IRC B.T. or mills	J4X	1
82	Y10C/66635	Resistor, 200,000 ohms 1 watt carbon		L3X	2

Item No.	Ident No.	Nomenclature	Detail	HMV Part No.	Quantity per Unit
83	Y10C/67211	Resistor, 200,000 ohms 1 watt carbon	Ducon ± 2%	L3T	1
84	Y10C/65299	Resistor, 250,000 ohms 1 watt carbon		N3X	1
85	Y10C/66472	Resistor, 250,000 ohms 2 watt carbon	IRC B.T. or mills	N4X	1
86	Y10C/67212	Resistor, 400,000 ohms 1 watt carbon	Ducon ± 2%	AU3T	5
87	Y10C/66310	Resistor, 500,000 ohms ½ watt carbon	I.R.C.	O2X	2
88	Y10C/65580	Resistor, 500,000 ohms 1 watt carbon	IRC ± 10	O3X	1
89	Y10C/67213	Resistor, 500,000 ohms 1 watt carbon	Ducon ± 2%	O3T	1
90	Y10C/67214	Resistor, 800,000 ohms 1 watt carbon	Ducon ± 2%	D0244/ DC3T	1
91	Y10C/65244	Resistor, 1 megohm 1 watt carbon	Ducon ± 10%	P3X	4
92	Y10C/67215	Resistor, 1·1 megohm 1 watt carbon	Ducon ± 2%	DB3T	1
93	Y10C/67216	Resistor, 1·25 megohm 1 watt carbon	Ducon ± 2%	AX3T	1
94	Y10C/65582	Resistor, 2 megohm 1 watt carbon	± 10%	AA3X	1
95	Y10C/67218	Condensor, 4mmfd tubular ceramic ± ·5 mmfd	Ducon style B N.P.O.	D5411/B	2
96	Y10C/67219	Condensor, 10 mmfd tubular ceramic ± 1 mmfd	Ducon style B N.P.O.	D5411/C	5
97	Y10C/67220	Condenser ·25 mmfd tubular ceramic ± 1 mmfd	Ducon style B N.P.O.	D5411/D	1
98	Y10C/65222	Condenser, 40 mmfd tubular ceramic ± 4 mmfd	Ducon style B N. 750	D5411/E	1
99	Y10C–66366	Condenser, 1,000 mmfd mica uncased ± 10%	Simplex A/S	D4405/A	29
100	Y10C/66199	Condenser, 200 mmfd mica uncased ± 10%	Simplex A/S	D4405/H	1
101	Y10C/66363	Condenser, 50 mmfd mica uncased ± 10%	Simplex A/S	D4405/F	1
102	Y10C/66365	Condenser, 100 mmfd	Simplex A/S	D4405/B	98
103	Y10C/67221	Condenser 100 mmfd mica uncased ± 2%	Simplex A/S	D4405/S	3
104	Y10C/67222	Condenser, 20 mfd mica uncased ± 10%	Simplex A/S	D4405/E	1
105	Y10C/67223	Condenser, 500 mfd mica uncased ± 10%	Simplex A/S	D4405/G	2
106	Y10C/67224	Condenser 1,000 mfd mica uncased ± 1%	Simplex A/S	D4405/R	2
107	Y10C/67225	Condenser, 1,670 mfd mica moulded ± 2%	Simplex P/T	D0243/CO	3
108	Y10C/66329	Condenser, ·002 mfd mica moulded ± 10%	Simplex P/T	D0243/H	3
109	Y10C/65968	Condenser, ·005 mfd mica moulded ± 10% wire ends	Simplex S/E	D0243/C	9
110	Y10C/67226	Condenser, ·0025 mfd mica moulded ± 1%	Simplex P/T	D0243/CM	1
111	Y10C/67227	Condenser, ·005 mfd wire moulded ± 1% wire ends	Simplex S/E	D0243/CT	1
112	Y10C/67228	Condenser, ·01 mfd mica moulded ± 2% wire ends	Simplex S/E	D0243/CL	3
113	Y10C/65002	Condenser, ·01 mfd mica moulded ± 10% wire ends	Simplex S/E	D0243/BD	1
114	Y10C/66244	Condenser, ·01 mfd mica moulded ± 10% (2,000v)	Simplex M	D0243/CK	1
115	Y10C/67229	Condenser, ·025 mfd mica moulded ± 1%	Simplex M	D0243/CN	1
116	Y10C/66676	Condenser, 3x mfd paper metal cased 600 volt	Ducon Part No. P.S.T. 30	C3005/SS	1
117	Y10C/67230	Condenser, 2x ·5 mfd paper metal cased 600 volt	Ducon Part No. P.S.T. 31	3C005/BH	1
118	Y10C/67231	Condenser, 2x ·01 mfd paper metal cased 2,000 volt	Ducon Part No. P.S.T. 26	C3005/SAC	1
119	Y10C/67232	Condenser, ·05 mfd paper metal cased 600 volt	Ducon Part No. P.S.T. 82	C3005/SQ	4
120	Y10C/67233	Condenser, ·05 mfd paper metal cased 600 volt ± 2%	Ducon Part No. P.S.T. 82	C3005/BJ	1
121	Y10C/67234	Condenser, ·05 mfd paper metal cased 2,000 volt	Ducon Part No. P.S.T. 23	C3005/BG	1
122	Y10C/67235	Condenser, 2x ·05 mfd paper metal cased 400 volt	Ducon Part No. P.S.T. 40	3C005/SK	1
123	Y10C/66516	Condenser, ·1 mfd paper metal cased 400 volt	Ducon Part No. P.S.T. 83	C3005/SJ	1
124	Y10C/65363	Condenser, ·25 mfd paper metal cased 400 volt	Ducon Part No. P.S.T. 86	C3005/BE	1
125	Y10C/65210	Condenser, ·5 mfd paper metal cased 400 volt	Ducon Part No. P.S.T. 71A	C3005/SO	1
126	Y10C/67236	Condenser, 2x ·5 mfd paper metal cased 400 volt	Ducon Part No. P.S.T. 31	C3005/BF	1
127	Y10C/65883	Condenser, ·1 mfd paper tubular 400 volt		C0013/E	1
128	Y10C/65738	Condenser, ·05 mfd paper tubular 400 volt		C0013/G	2
129	Y10C/67237	Condenser, 8 mfd electrolytic 600 volt type EG		C0014/BT	1
130	Y10C/67238	Condenser, (·25 mfd 200v) + (1·8 mfd 130v paper metal cased ± 10%	Ducon type P.S.T. 2156 (in one can)	C3005/BL	1
131	Y10C/67258	Condenser, tuner assembly transmitter type D5359		D5359	6
132	Y10C/67239	Potentiometer 250,000 ohms Allen-Bradley type J (Modified)		D5665	1
133	Y10C/67240	Potentiometer, 100,000 ohms Allen-Bradley type J (Modified)		D566A	1
134	Y10C/67241	Potentiometer, 50,000 ohms Allen-Bradley type J		D5667	1
135	Y10C/67242	Potentiometer, 100,000 ohms Allen-Bradley type J (Modified) (+ 20% −0)		D55666B	4
136	Y10C/67243	Potentiometer, 5,000 ohms airzone w—w (Modified)		D5406	1
137	Y10C/67244	Potentiometer, 2,000 ohms airzone w—w (Modified)		D4194	1
138	Y10C/67245	Potentiometer, 15,000 ohms marquis w—w (Modified)		D5591	1
139	Y10C/67249	Choke, RF type D5660A 208UH		L5660A	2
140	Y10C/67250	Choke, RF type D5660B 417UH		L5660B	2
141	Y10C/67251	Choke RF type B5660C 211UH		D5660C	2
142	Y10C/67252	Choke RF type D5660D 15UH		D5660D	2
143	Y10C/67253	Choke RF type D5660E 310UH		D5660E	3
144	Y10C/67254	Choke, RF type D5660F 155UH		D5660F	1
145	Y10C/67255	Choke, transmitter pulse type D5405		D5405	1
146	Y10C/67256	Choke, power supply 2 Henry type D5456	Circuit ref. No. CK2	D5456	1
147	Y10C/67257	Choke, indicator 3 Henry type D5372	Circuit ref. No. CK1	D5372	1
148	Y10DB/500074	Coil U.H.F. type D5661/A		D566A1	11
149	Y10DB/500075	Coil, U.H.F. yype D5661/B		D5661B	18
150	Y10DB/500076	Coil, U.H.F. type D5661/C		D5661C	1
151	Y10DB/500077	Coil, U.H.F. type D5661/D		D5661D	5
152	Y10DB/500078	Coil set for transmitter turret type D5663	Set of 12 coils D5663 to D5663M "I" excluded	D5663A to /M	1 each
153	Y10DB/500079	Coil, transmitter grid type D5664A		D5664A	1
154	Y10DB/500080	Coil, transmitter plate type D5664B		D5664B	1
155	Y10DB/500081	Coil, aerial (RF unit) type D5664C		D5664C	1
156	Y10DB/500082	Transmitter, unit	Complete	B2147	1
157	Y10DB/500083	Receiver, unit type B2148	Complete	B2148	1
158	Y10DB/500084	I.F., channel unit type B2149	Complete	B2149	1
159	Y10DB/500085	Main, chassis unit type A1046	Complete with front panel	A1046	1
160	Y10DB/500086	Turret assembly, (transmitter type C3192)	Complete	C3192	1
161	Y10DB/500087	Turret assembly, receiver type C3296	Complete	C3296	
162	Y10DB/500088	Coil, set for receiver turret type D5662	Set of 12 coils D5662A to D5662M excluding "I"	D5662A to /M	1 set
163	Y10F/80214	Switch, toggle alpha S.P.D.T.	Tropic-proofed	D1109	1
164	Y10FB/155	Switching, motor type 35A			1
165	Y10FB/500063	Switch, 3 pole 4 pos. shorting ceramic 2 bank type D5325	Slotted shaft 1 3/16 in. long		1
166	Y10FB/500064	Switch, push button type D5307A	Normally open	D5307A	1
167	Y10FB/500065	Switch, push button type D5307B	Normally closed	D5307B	1

Item No.	Ident No.	Nomenclature	Detail	HMV Part No.	Quantity per Unit
168	Y10FB/500066	Relay, type D5423	S.T.C.	D5423	1
169	Y10H/379	Socket valve, 9 in. wafer type CXS265	E.F. 50/CXS265		14
170	Y10H/391	Plug, type W198	4 pin chassis mounting	D4114/S	1
171	Y10H/395	Plug, type W202	12 pin chassis mounting	D5109/S	2
172	Y10H/90186	Socket valve, 4 pin steatite type RSS4	Type RSS4		1
173	Y10H/90218	Socket valve, octal steatite type SS8	Type SS8		9
174	Y10H/90359	Socket valve, EA50			3
175	Y10H/90371	Socket, amphenol type P.C. 2F.		D4258	1
176	Y10H/90372	Socket, type D4020A	Coaxial pye type	D4020/A	10
177	Y10H/90373	Socket, type D4020B	Coaxial pye type	D4020/B	1
178	Y10H/90436	Socket, valve 11 pin magnal			1
179	Y10H/90572	Socket, type W162A		D5110/P	2
180	Y10H/90587	Socket, type D4020/F	Coaxial pye type	D4020/F	13
181	Y10H/90588	Socket, type H158	Miniature BC		2
182	Y10HB/500025	Strips, terminal 4 tag type D0042/A		D0042/A	1
183	Y10HB/500026	Strips, terminal 4 tag and bush type D0042/D		D0042/D	1
184	Y10HB/500027	Strips, terminal 8 tag type D0045/A		D0045/A	1
185	Y10HB/500028	Strips, terminal 1 tag type D0581		D0581	11
186	Y10HB/500029	Strips, terminal 2 tag and bush type D1248/B		D1248/B	2
187	Y10HB/500030	Strips, terminal 6 tag type D1283		D1283	2
188	Y10HB/500031	Strips, terminal 3 lug type D5428		D5428	1
189	Y10HB/500032	Strips, terminal 11 tag standard type D4183/11		D4183/11	2
190	Y10HB/500033	Strips, terminal 28 tag standard type D/4183/28		D4183/28	1
191	Y10HB/500034	Strips, terminal 2x 3 lug with bracket type D5541		D5541	3
192	Y10HB/500035	Strips, terminal I.F. channel		D5413	1
193	Y10HB/500036	Strips, contact male type C3200/A		C3200/A	1
194	Y10HB/500037	Strips, contact male type C3200/B		C3200/B	1
195	Y10HB/500038	Strips, contact male type C3200/C		C3200/C	1
196	Y10HB/500039	Strips, contact male type C3200/D		C3200/D	1
197	Y10HB/500040	Strips, contact female type C3201/A		C3201/A	1
198	Y10HB/500041	Strips, contact female type C3201/B		C3201/B	1
199	Y10HB/500042	Strips, contact female type C3201/C		C3201/C	1
200	Y10HB/500043	Strips, contact female type C3201/D		C3201/D	1
201	Y10HB/500086	Transformer, I.F. type D5535/A	No. 2	D5535/A	1
202	Y10HB/500087	Transformer, I.F. type D5535/B	No. 3	D5535/B	1
203	Y10HB/500088	Transformer, I.F. type D5535/C	No. 4	D5535/C	1
204	Y10HB/500089	Transformer, I.F. type D5535/D	No. 5	D5535/D	1
205	Y10HB/500090	Transformer, I.F. type D5535/E	No. 6	D5535/E	1
206	Y10HB/500091	Transformer, I.F. type D5535/F	No. 7	D5535/F	1
207	H28/26201	Grommet, type D5	$\frac{11}{16}$" × $\frac{7}{16}$" Dunlop		9
208	H28/26203	Grommet, type 118	$\frac{1}{16}$" × $\frac{3}{4}$" Dunlop		5
209	H28/26204	Grommet, type 133	$\frac{15}{16}$" × $\frac{1}{8}$" Dunlop		1
210	H29/26205	Grommet, type 154	$\frac{7}{16}$" × $\frac{1}{8}$" Dyunlop		1
211	H28/26206	Grommet, type 151	$\frac{7}{16}$" × $\frac{7}{32}$" Dunlop		1
212	H28/26207	Grommet, type 148	" × $\frac{3}{8}$" Dunlop		1
213	H28/26208	Grommet, type ·1	$\frac{7}{16}$" × $\frac{7}{32}$" Dunlop		2
214	G5A/25084	Lamp, 28 volt ·17 amp. 651 base	Mazda 313		2
215	G105C/2274	Clip, fuse type D4012		4012	2
216	Y110M/2611	Clip, grid type 550/7/1			1
217	Y110H/1908	Plug, type C2K		4259	1
218	Y10E/75099	Valves, type VR150/30	Pretested for this equipment		2
219	Y10E/75094	Valves, type 5V4G			1
220	Y10E/92	Valves, type EF50			13
221	Y10E/599	Valves, type RL18			2
222	Y10E/75269	Valves, type CV66			1
223	Y10E/392	Valves, type VR135			2
224	Y10E/7511	Valves, type GL2050			1
225	Y19E/11400	Valves, type VR54			1
226	Y10E/75095	Valves, type 879			1
227	Y10E/75182	Valves, type 6SN7G			1
228	Y10E/75119	Valves, type 884			1
229	Y10E/105	Valves, type EA50			1
230	Y10E/75114	Valves, type 1802/5BP1	C.R. Tube		1

ISSUE No	ALTERATION	DATE	D.I.L.	CHK'D

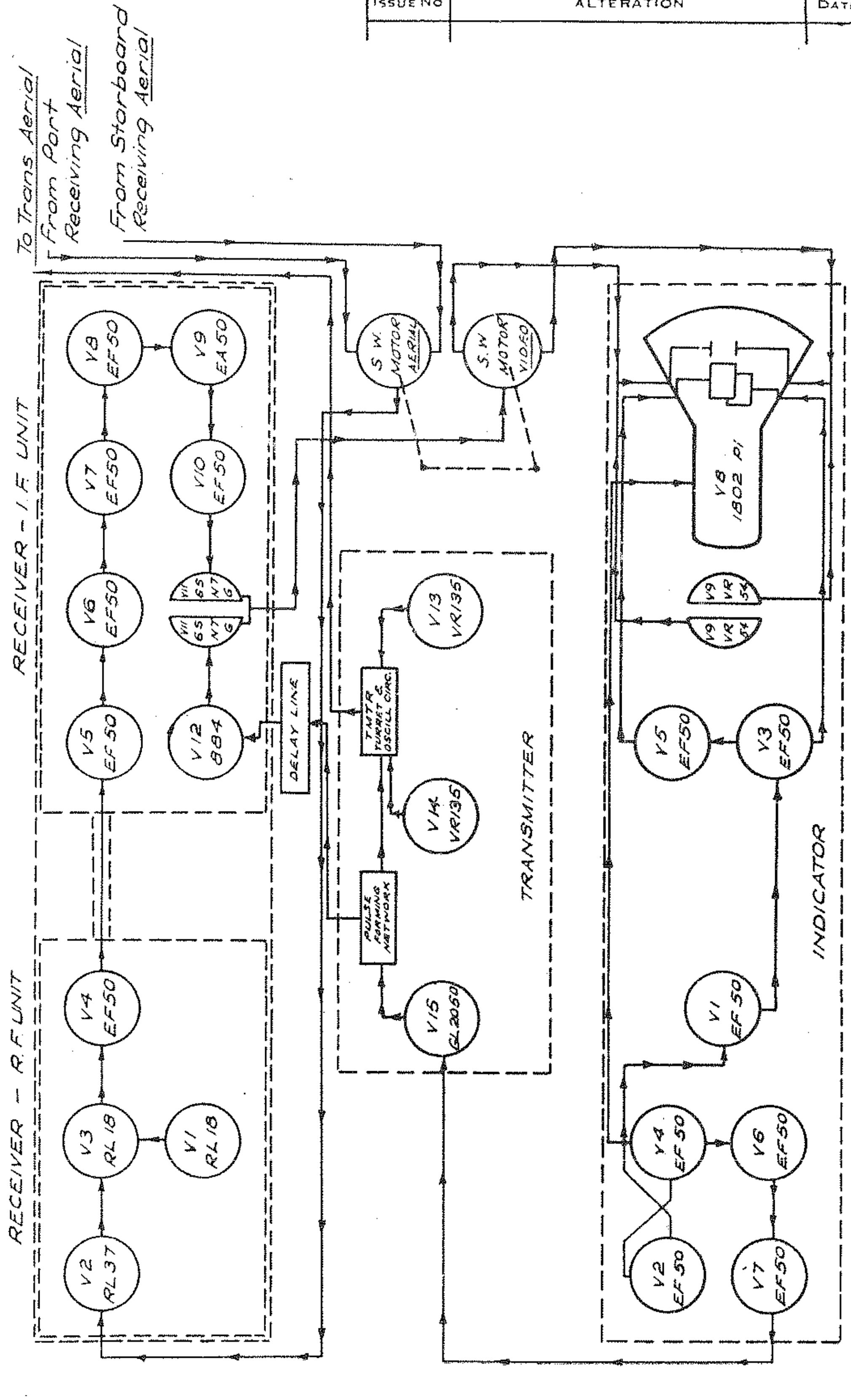


Fig. 1.

MATERIAL	SPEC	TREATMENT	
NO. OFF		FINISH	
BREAK ALL SHARP EDGES	TOLERANCES	ON DECIMALS	ON FRACTIONS } OR AS NOTED

ISSUED BY	TITLE	BEBECCA MK II B (AUST.) BLOCK DIAGRAM OF TRANSCEIVER AND INDICATOR UNITS.	DATE: 24.11.48
DIRECTORATE OF TECHNICAL SERVICES R.A.A.F.			SCALE
	ASSEMBLY		
	MACHINE		DRAWING NO.
	ISSUE NO	DRAWN | TRACED G.G.J.	TELS.

ISSUE No.	ALTERATION	DATE	D.I.L.	CHK'D

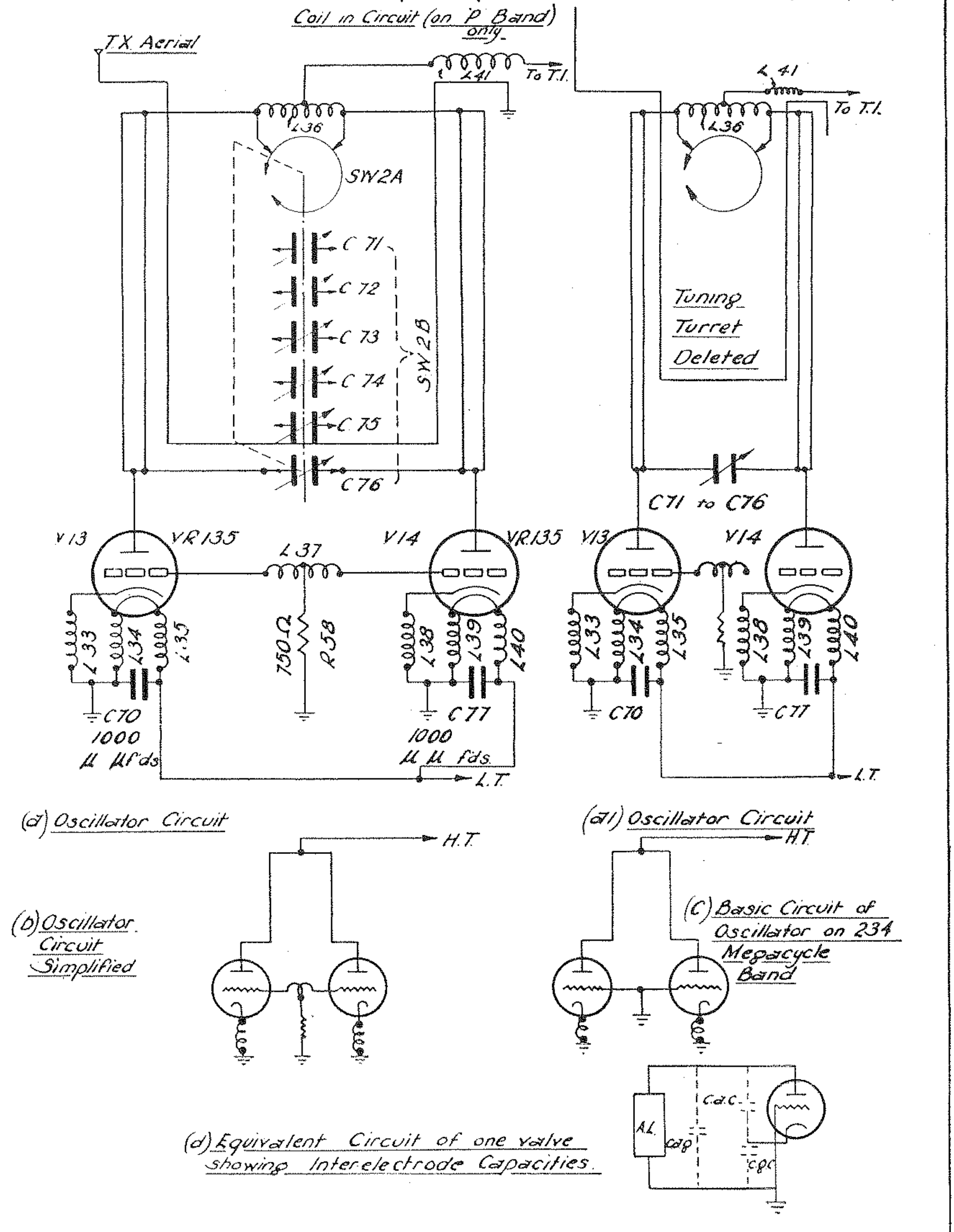


Fig. 2

MATERIAL	SPEC.	TREATMENT	
NO OFF		FINISH	
BREAK ALL SHARP EDGES	TOLERANCES ON DECIMALS	ON FRACTIONS } OR AS NOTED	

ISSUED BY	ITEM	REBECCA MK II B (AUST)	DATE : 10·11·48
DIRECTORATE	SUB ASSEMBLY	EXPLANATORY DIAGRAMS of OSCILLATOR CIRCUIT	SCALE
	ASSEMBLY		
AIR BOARD R.A.A.F.	MACHINE		DRAWING NO.
	ISSUE NO	DRAWN — TRACED H.L.B.	Tels. 4/448
		CHECKED [signature] — APPROVED [signature]	

ISSUE No	ALTERATION	DATE	D.I.L.	CHK'D

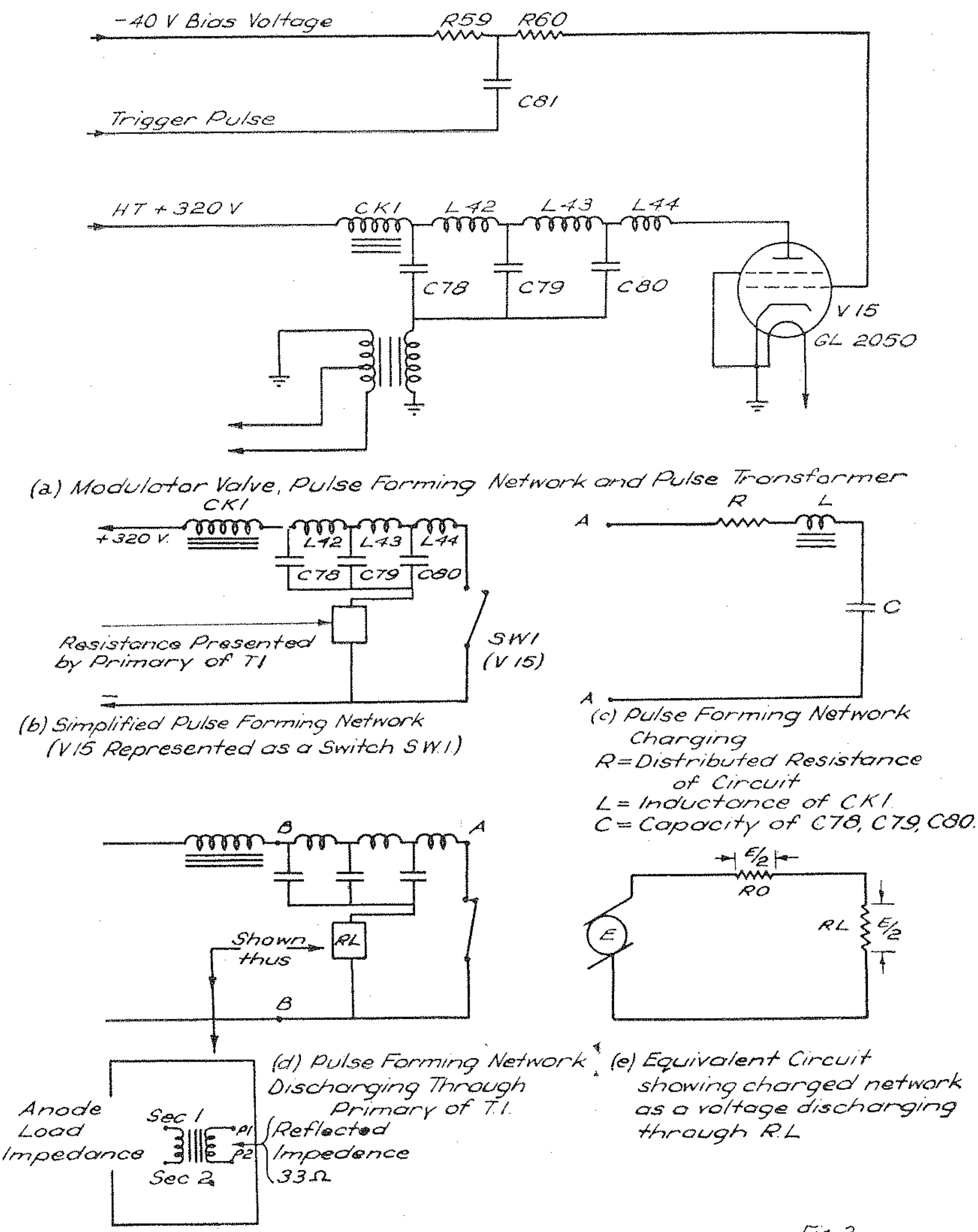


Fig 3

MATERIAL	SPEC	TREATMENT	
NO. OFF		FINISH	

BREAK ALL SHARP EDGES	TOLERANCES	ON DECIMALS	ON FRACTIONS	OR AS NOTED

ISSUED BY	TITLE	REBECCA MK II B. (AUST) EXPLANATORY DIAGRAMS FOR PULSE FORMING NETWORK			DATE : 24 · 11 · 48
DIRECTORATE OF TECHNICAL SERVICES R.A.A.F					SCALE
	ASSEMBLY				
	MACHINE				DRAWING NO.
	ISSUE NO.	DRAWN	TRACED	G.G.J.	TELS 4/447
		CHECKED	APPROVED	[signature]	

RESISTORS.	R58 R59 R60
CONDENSERS	C70 C71 C74 C72 C75 C73 C76 C77 C78 C79 C80 C81
MISCELLANEOUS	P4 S8 L33 V13 L34 L35 SW 2A SW 2B L36 L37 C5.5 L38 V14 L39 L40 L41 T1 V15 CK1 L42 L43 L44

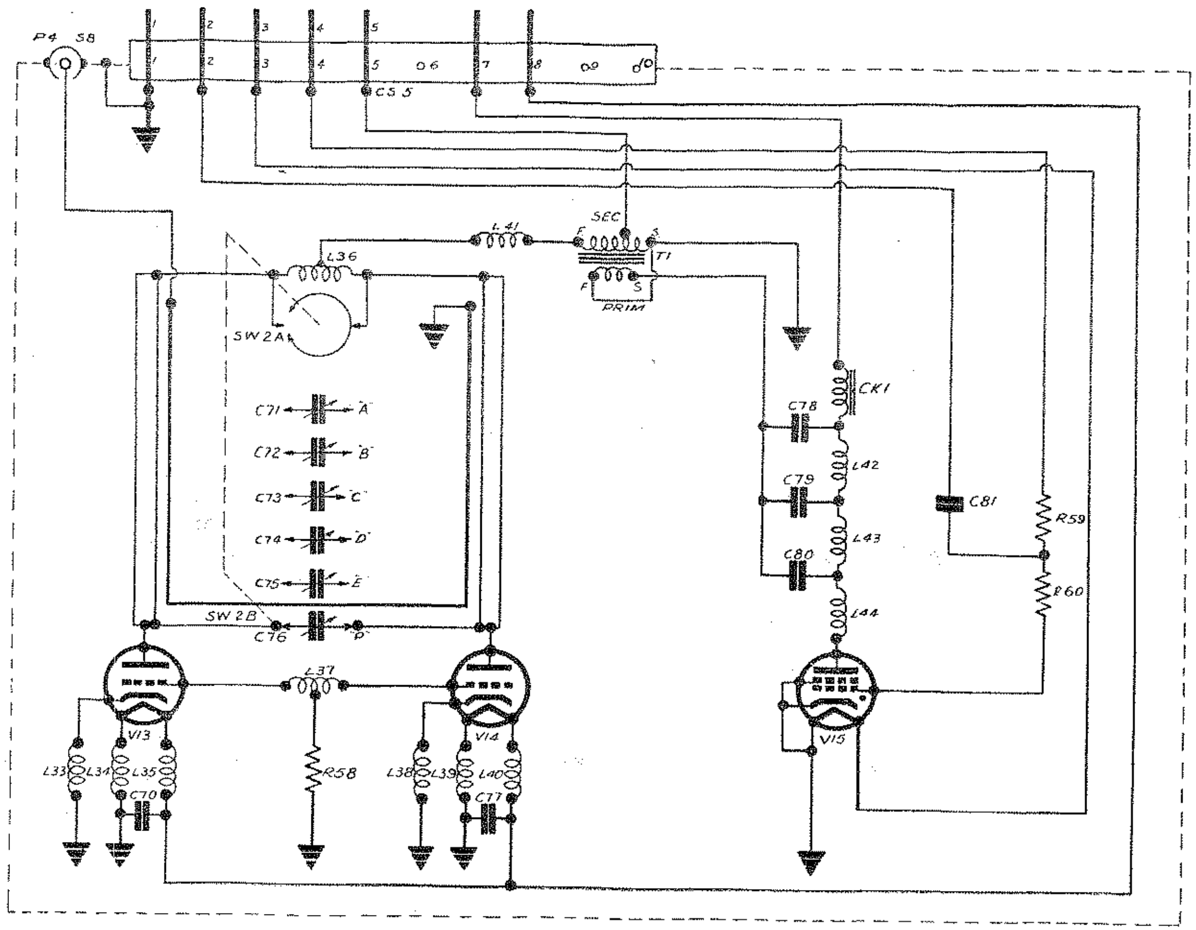


Fig. 4

FIG	H.M.V. PART N°	DESCRIPTION	SERVICE PART N°	SERVICE IDENT N°
C70	04405 A.	0·001 MFD. 10%		Y10C/66366
C71	05359.	0·8-6·8 MMFD. PRESET "A" BAND		Y10C/67258
C72	05359	0·8-6·8 MMFD. PRESET "B" BAND		Y10C/67258
C73	05359	0·8-6·8 MMFD. PRESET "C" BAND		Y10C/67258
C74	05359	0·8-6·8 MMFD. PRESET "D" BAND		Y10C/67258
C75	05359	0·8-6·8 MMFD. PRESET "E" BAND		Y10C/67258
C76	05359	0·8-6·8 MMFD PRESET "P" BAND		Y10C/67258
C77	04405 A	0·001 MFD 10%		Y10C/66366
C78	00243 CL	0·01 MFD 2%		Y10C/67226
C79	00243 CL	0·01 MFD 2%		Y10C/67226
C80	00243 CL	0·01 MFD 2%		Y10C/67226
C81	04405 G	0·0005 MFD 10%		Y10C/67229

FIG	HMV PART N°	DESCRIPTION	SERVICE PART N°	SERVICE IDENT N°
L33	D5661A	FILAMENT CHOKE		Y10B/500074
L34	D5661A	FILAMENT CHOKE		Y10B/500074
L35	D5661A	FILAMENT CHOKE		Y10B/500074
L36	D5661A	PLATE COIL "P" BAND ONLY		Y10B/500074
L37	D5661A	GRID COIL		Y10B/500074
L38	D5661A	FILAMENT CHOKE		Y10B/500074
L39	D5661A	FILAMENT CHOKE		Y10B/500074
L40	D5661A	FILAMENT CHOKE		Y10B/500074
L41	D5661B	R.F. CHOKE		Y10B/500075
L42	D5660C	PULSE LINE CHOKE 11 µH		Y10C/67251
L43	D5660C	PULSE LINE CHOKE 11 µH		Y10C/67251
L44	D5660D	PULSE LINE CHOKE 15 µH		Y10C/67252

FIG.	HMV PART N°	DESCRIPTION	SERVICE PART N°	SERVICE IDENT N°
V13		VR 135 VALVE		Y10E/392
V14		VR 135 VALVE		Y10E/392
V15		GL 2050 VALVE.		Y10E/7511
T1	D5338	PULSE TRANSFORMER		Y10K8/500092
CK1	D5405	MODULATOR CHOKE.		Y10C/67255
SW 2A		REF. C3192. TURRET ASSY.		
SW 2B				
P4	D4020 F.	PLUG		
S8	D4020 A	SOCKET		Y10H/90372
R58	D0244 C1X	750 OHMS 1/4 W. DUCON		
R59	D0244 F2X	10,000 OHMS 1/2 W. I.R.C.		
R60	D0244 F2X	10,000 OHMS. 1/2 W. I.R.C		
C5.5.	C3200 A.	CONTACT STRIP		Y10 K8/500036

DIRECTORATE OF TELS. & RADAR		R.A.A.F. HDQUARTERS	
DRAWN		TITLE	R.S.4056-A
TRACED	PT	REBECCA TRANSMITTER	
CHECKED	[signature]		ISSUE N°
APPROVD	[signature]		
DATE			REFERENCE
SCALE			

C63	C64 C88	C66 C67 C68	C86 C87	C65 C69 C89 C90.	
R54 R55 R56	R57	R57			
L27	L28	L29 L30 L31 L32	L46 L47.		
S4. S5. S6. S7. P1. P4.	C52. C56.	P2.	C58.	P3. SM1.	SW3. C54. S9 S10

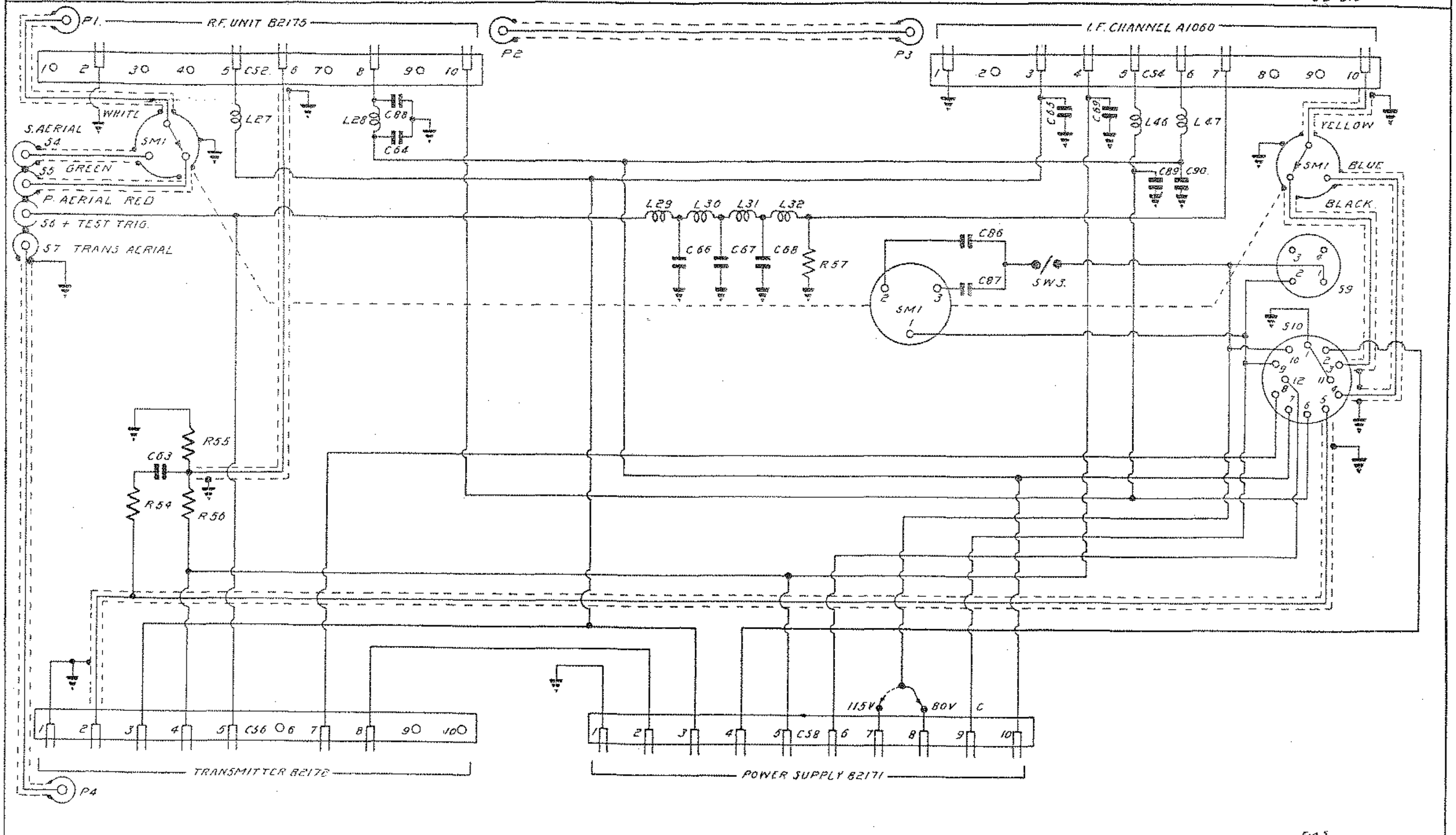


Fig 5

FIG	H.M.V. PART No	DESCRIPTION	SERVICE PART No	SERVICE IDENT No
C 63	C0013E	0.1 MFD. 400V		Y10C/65869
C 64	D4405A	1000 MMFD		Y10C/66366
C 65	D4405A	1000 MMFD		Y10C/66366
C 66	D4405V	1670 MMFD. 2%		
C 67	D4405V	1670 MMFD 2%		
C 68	D4405V	1670 MMFD 2%		
C 69	D4405A	1000 MMFD		Y10C/66366
C 86	C3005 BL.	1·8 MFD		Y10C/65363
C 87		0·25 MFD		
C 88	D4405A	1000 MMFD		Y10C/66366
C 89	D4405A	1000 MMFD		Y10C/66366
C 90	D4405A	1000 MMFD		Y10C/66366
L 27	D5661A	FILAMENT CHOKE		Y10D8/500074
L 28	D5661G.	R.F. H.T. CHOKE		

FIG.	H.M.V. PART No	DESCRIPTION	SERVICE PART No	SERVICE IDENT No
L 29	D5660 A	DELAY LINE CHOKE		Y10C/67249
L 30	D5660 B	DELAY LINE CHOKE		Y10C/67260
L 31	D5660 B	DELAY LINE CHOKE		Y10C/67250
L 32	D5660 A	DELAY LINE CHOKE		Y10C/67249
L 46	D5661 D.	CATHODE CHOKE		Y10D8/50007
L 47	D5661 G	R.F. H.T. CHOKE		
R 54	F2 X	10000 OHMS 1/2 W		Y10C/65730
R 55	AD2 X	15000 OHMS 1/2 W		Y10C/67201
R 56	G2 X	35000 OHMS 1/2 W		Y10C/66014
R 57	B1 X	500 OHMS 1/4 CARBON		Y10C/65161
C52.	C3201 B	CONTACT STRIP		Y10E8/500041
C54	C3201 C	CONTACT STRIP		Y10A8/500042
C56	C3201 A	CONTACT STRIP		Y10A8/500042
C58	C3201 D	CONTACT STRIP.		Y10A8/500043

FIG.	H.M.V. PART No	DESCRIPTION	SERVICE PART No	SERVICE IDENT No
P 1.	D4020F	PLUG		Y10H/90587
P 2	D4020F	PLUG		Y10H/90587
P 3	D4020F	PLUG		Y10H/90587
P 4	D4020F	PLUG		Y10H/90587
P 5	D4020F	PLUG.		Y10H/90587
S 4	D4020A	SOCKET		Y10H/96372
S 5	D4020A	SOCKET		Y10H/96372
S 6	D4020A	SOCKET		Y10H/96372
S 7	D4020B	SOCKET & D4020F PLUG.		Y10H/96373
S 9	D4114 S	SOCKET 4 PIN		Y10H/391
S 10	D5109 S	SOCKET 12 PIN		Y10H/395
SWJ	D1109.	S.P.S.T. SWITCH		Y10F/80214
SM.1.		SWITCHING MOTOR. TYPE 35A REF. C3220.		Y10FB/155

DIRECTORATE OF TELS. & RADAR.			RAAF HEADQUARTERS
DRAWN		TITLE:	RS4052A
TRACED	D.M.O.	REBECCA MAIN CHASSIS.	
CHECKED	[illegible]		ISSUE No
APPROVED	[illegible]		
DATE	2-5-47		REFERENCE
SCALE			

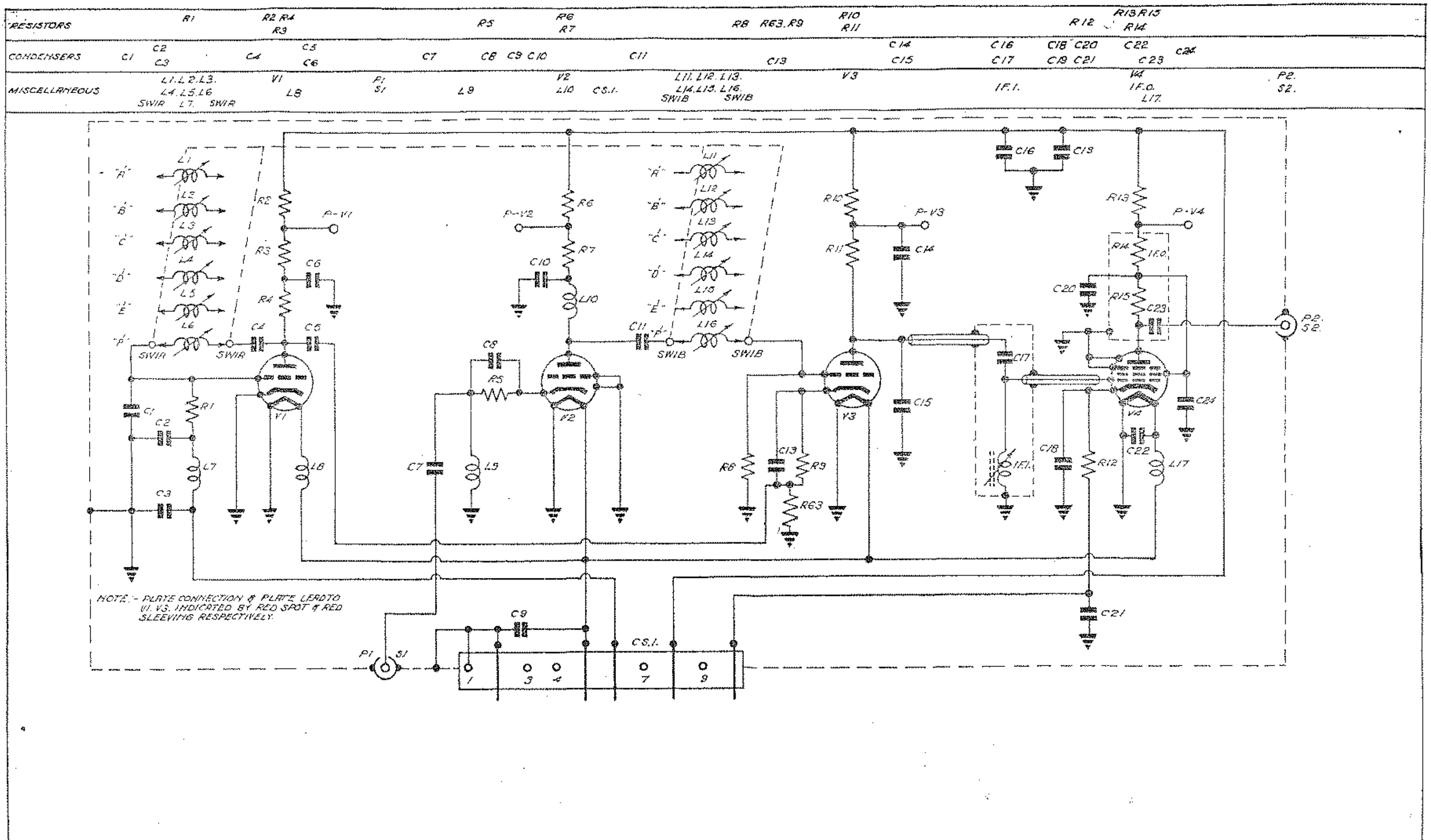


FIG.	H.M.V. PART Nº	DESCRIPTION	SERVICE PART Nº	SERVICE IDENT Nº
R1	V1X	20,000 OHMS 1/4W.		[illegible]
R2	B1X	500 OHMS 1/4W.		[illegible]
R3.	F3X	10,000 OHMS 1W. I.R.C.		[illegible]
R4	F3X	10,000 OHMS 1W.		[illegible]
R5	T1X	100 OHMS 1/4W		[illegible]
R6	B1X	600 OHMS 1/4W.		[illegible]
R7.	D1X	1,000 OHMS 1/4W.		[illegible]
R8.	H2X	50,000 OHMS 1/2W		[illegible]
R9.	FJ1X	2,000 OHMS 1/4W		[illegible]
R10	B1X	500 OHMS 1/4W		[illegible]
R11.	BU2V	1,200 OHMS 1/2W. I.R.C.		[illegible]
R12.	RH1X	200 OHMS 1/4W		
R13	B1X	500 OHMS 1/4W		[illegible]
R14	D1X	1,000 OHMS 1/4W.		[illegible]
R15	FF2V	3,000 OHMS 1/2W		
R63	Z2V	250 OHMS 1/2W		
CS1	C3200B	CONTACT STRIP		[illegible]
IFO	03335G	Nº O.I.F. TRANSFORMER		
I.F.I.	05535F	1ST I.F. TRANSFORMER		[illegible]
SWIA SWIB		REF C3216 TURRET ASS'Y.		
P1	04020F	PLUG		[illegible]
S1	04020A	SOCKET		[illegible]
P2	04020F	PLUG		[illegible]
S2	04020A	SOCKET		[illegible]

FIG.	H.M.V. PART Nº	DESCRIPTION	SERVICE PART Nº	SERVICE IDENT Nº
C1.	D5411G.	0·000007 MFD "CERAMICON"		
C2.	D5411C.	0·00001 MFD "CERAMICON"		10C/67219
C3.	D5411C	0·00001 MFD "CERAMICON"		10C/67219
C4.	D5411H	0·00007 MFD "CERAMICON"		
C5.	D5411J	0·000003 MFD "CERAMICON"		
C6.	D4405A	0·001 MFD. MICA		10C/65966
C7.	D5411E.	0·00004 MFD "CERAMICON"		10C/65222
C8.	D4405S	0·0001 MFD. MICA		10C/67221
C9.	D0243C.	0·005 MFD. MICA		10C/65961
C10.	D4405A	0·001 MFD. MICA		10C/66366
C11.	D5411B.	0·000004 MFD "CERAMICON"		10C/67218
C13	D4405S	0·0001 MFD. MICA		10C/67221
C14	D4405A	0·001 MFD. MICA		10C/66366
C15	D5411C.	0·00001 MFD "CERAMICON"		10C/67219
C16	C0013G	0·05 MFD. 400V. PAPER		10C/65738
C17	D4405B	0·0001 MFD. MICA		10C/64665
C18	D0243C	0·005 MFD. MICA		10C/65969
C19	D0243A	0·002 MFD. MICA		10C/66329
C20	D4405A	0·001 MFD. MICA		10C/66366
C21	D0243A	0·002 MFD. MICA		10C/66329
C22	D4405K	0·00005 MFD. MICA		10C/66363
C23	D4405B	0·0001 MFD. MICA		10C/66365
C24	D4405A	0·001 MFD. MICA		10C/66366

FIG.	H.M.V. PART Nº	DESCRIPTION	SERVICE PART Nº	SERVICE IDENT Nº
L1.	D5663A	OSC. COIL 'A' BAND		[illegible]
L2.	D5663B.	OSC. COIL 'B' BAND		[illegible]
L3.	D5663C	OSC. COIL 'C' BAND		[illegible]
L4.	D5663D	OSC. COIL 'D' BAND		[illegible]
L5.	D5663E.	OSC. COIL 'E' BAND		[illegible]
L6	D5663F.	OSC. COIL 'F' BAND		[illegible]
L7.	D5661A.	GRID R.F. CHOKE		[illegible]
L8.	D5661A.	FILAMENT CHOKE		[illegible]
L9.	D5664C.	AERIAL COIL		[illegible]
L10.	D5661C.	PLATE RF. COIL		[illegible]
L11.	D5663G	R.F. COIL 'A' BAND		[illegible]
L12	D5663H.	R.F. COIL 'B' BAND		[illegible]
L13.	D5663J.	R.F. COIL 'C' BAND		[illegible]
L14.	D5663K.	R.F. COIL 'D' BAND		[illegible]
L15.	D5663L.	R.F. COIL 'E' BAND		[illegible]
L16.	D5663M.	R.F. COIL 'F' BAND		[illegible]
L17.	D5661A.	FILAMENT CHOKE		[illegible]
V1.		RL 18 VALVE		
V2.		RL 37 VALVE		
V3.		RL 18 VALVE		
V4.		RL 50 VALVE		

Fig. 6

DIRECTORATE OF TELS. & RADAR		RAAF HEADQUARTERS
DRAWN		TITLE:- REBECCA R.F. UNIT
TRACED	R. R. B.	RS4053-A
CHECKED	[illegible]	
APPROVED		ISSUE Nº
DATE	1-5-47	
SCALE		REF.

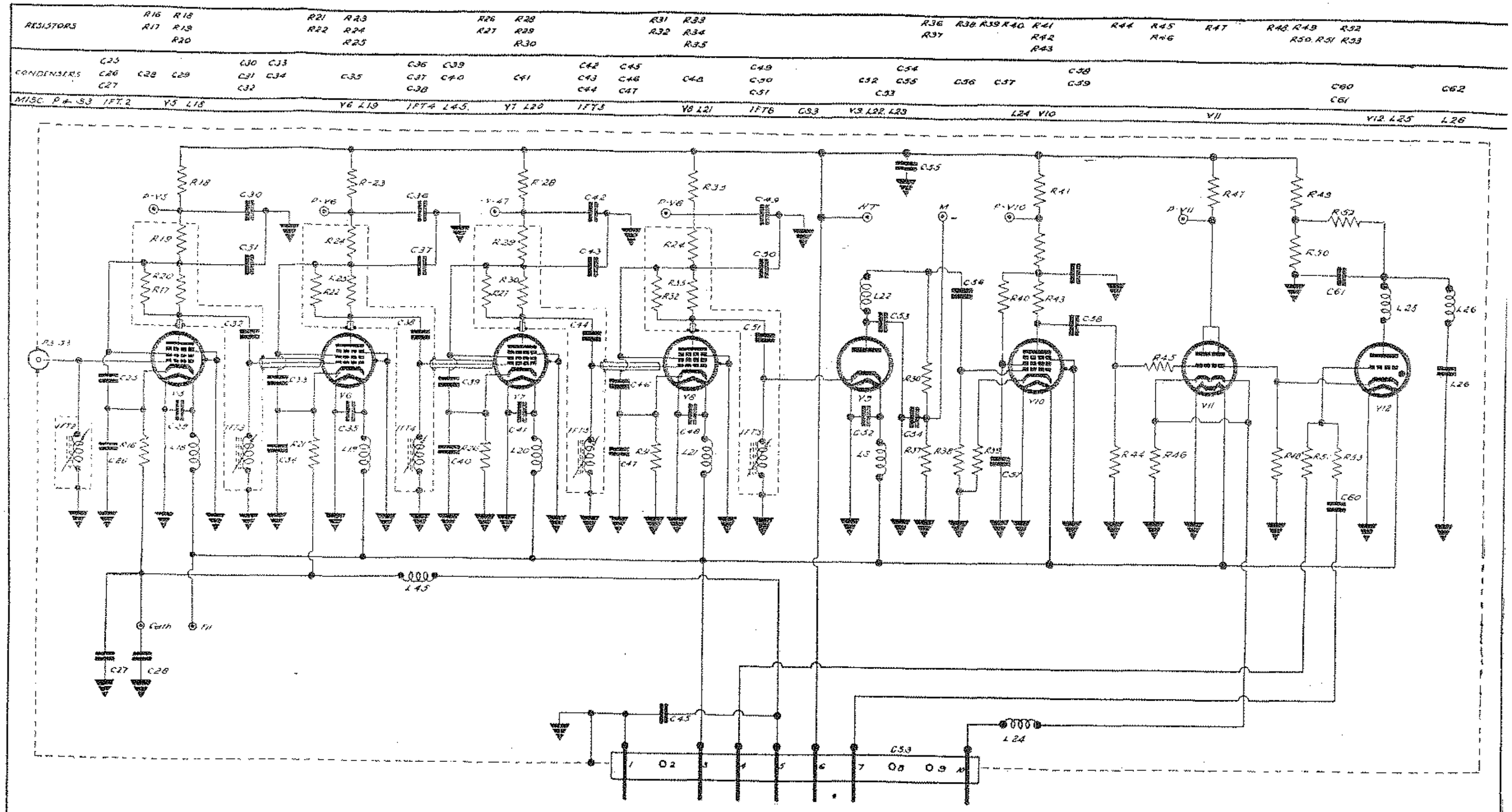


Fig. 7

FIG	H.M.V. Part No	DESCRIPTION					SERVICE PART No	SERVICE IDENT No
R16	AH1X	200	OHMS	1/4	W			[illegible]
R17	F2Y	10000	OHMS	1/2	W	IRC		[illegible]
R18	B1X	500	OHMS	1/4	W			[illegible]
R19	D1X	1,000	OHMS	1/4	W			[illegible]
R20	AD2Y	15,000	OHMS	1/2	W	IRC		[illegible]
R21	AH1X	200	OHMS	1/4	W			
R22	BJ2Y	6000	OHMS	1/2	W			[illegible]
R23	B1X	500	OHMS	1/4	W			[illegible]
R24	D1X	1,000	OHMS	1/4	W			[illegible]
R25	BJ2Y	8,000	OHMS	1/2	W	IRC		[illegible]
R26	AH1X	200	OHMS	1/4	W			
R27	F2Y	10,000	OHMS	1/2	W	IRC		[illegible]
R28	B1X	500	OHMS	1/4	W			[illegible]
R29	D1X	1000	OHMS	1/4	W			[illegible]
R30	AD2Y	15,000	OHMS	1/2	W	IRC		[illegible]
R31	AH1X	200	OHMS	1/4	W			
R32	AD2Y	15,000	OHMS	1/2	W	IRC		[illegible]
R33	B1X	500	OHMS	1/4	W			[illegible]
R34	D1X	1,000	OHMS	1/4	W			[illegible]
R35	AD2Y	15,000	OHMS	1/2	W	IRC		[illegible]
R36	F2X	10,000	OHMS	1/2	W			[illegible]
R37	B1X	500	OHMS	1/4	W			[illegible]
R38	N2X	250,000	OHMS	1/2	W			[illegible]
R39	T1X	100	OHMS	1/4	W			[illegible]
R40	Y3X	20,000	OHMS	1	W			[illegible]
R41	B1X	500	OHMS	1/4	W			[illegible]
R42	D1X	1,000	OHMS	1/4	W			[illegible]
R43	W4X	30,000	OHMS	2W	W			[illegible]
R44	D1X	500,000	OHMS	1/4 W	W			[illegible]

FIG	H.M.V. Part No	DESCRIPTION				SERVICE PART No	SERVICE IDENT No
R45	T1X	100	OHMS	1/4 W			[illegible]
R46	X3X	5000	OHMS.	1 W			[illegible]
R47	D1X	1000	OHMS.	1/4 W			[illegible]
R48	D1X	1000	OHMS.	1/4 W			[illegible]
R49	H2X	50,000	OHMS.	1/2 W			[illegible]
R50	K3X	150,000	OHMS	1 W			[illegible]
R51	H2X	50,000	OHMS	1/2 W	IRC		[illegible]
R52	L1X	200,000	OHMS	1/4 W			[illegible]
R53	F2X	10,000	OHMS	1/2 W			[illegible]
C25	D4405A	0 001	MFD	10%			[illegible]
C26	D0243C	0·005	MFD.	10%			
C27	D0243H	0 002	MFD	10%			[illegible]
C28	D0243C	0 005	MFD.	10%			
C29	D4405A	0 001	MFD.	10%			[illegible]
C30	D4405A	0 001	MFD.	10%			[illegible]
C31	D4405A	0 001	MFD	10%			[illegible]
C32	D4405B	0 0001	MFD.	10%			[illegible]
C33	D4405A	0·001	MFD	10%			[illegible]
C34	D0243C	0 005	MFD.	10%			[illegible]
C35	D4405A	0·001	MFD	10%			
C36	D4405A	0 001	MFD	10%			[illegible]
C37	D4405A	0 001	MFD.	10%			[illegible]
C38	D4405B	0 0001	MFD.	10%			[illegible]
C39	D4405A	0·001	MFD	10%			[illegible]

FIG	H.M.V. Part No	DESCRIPTION			SERVICE PART No	SERVICE IDENT No
C40	D0243C	0·005	MFD	10%		[illegible]
C41	D4405A	0·001	MFD.	10%		[illegible]
C42	D4405A	0·001	MFD.	10%		[illegible]
C43	D4405A	0·001	MFD	10%		[illegible]
C44	D4405B	0·0001	MFD	10%		[illegible]
C45	D0243C	0·005	MFD.	10%		[illegible]
C46	D4405A	0·001	MFD.	10%		[illegible]
C47	D0243C	0·005	MFD	10%		[illegible]
C48	D4405A	0·001	MFD.	10%		[illegible]
C49	D4405A	0·001	MFD.	10%		[illegible]
C50	D4405A	0·001	MFD	10%		[illegible]
C51	D4405B	0·0001	MFD.	10%		[illegible]
C52	D4405A	0·001	MFD	10%		[illegible]
C53	D4405K	0·00002	MFD	10%		[illegible]
C54	D4405A	0·001	MFD	10%		[illegible]
C55		Ref. C58				
C56	D0243C	0 005	MFD	10%		[illegible]
C57		Ref. C58				
C58	C300553	0 1+0·1+0·1 MFD(C55+C57+C58)				[illegible]
C59	C0013G	0·05	MFD 400 V			[illegible]
C60	D4405B	0·0001	MFD	10%		[illegible]
C61	D4405B	0·0001	MFD	10%		[illegible]
C62	D4405B	0 0001	MFD	10%		[illegible]

FIG	H.M.V. Part No	DESCRIPTION	SERVICE PART No	SERVICE IDENT No
L18	D5661D	Filament Choke		[illegible]
L19	D5661D	Filament Choke		[illegible]
L20	D5661D	Filament Choke		[illegible]
L21	D5661D	Filament Choke		[illegible]
L22	D5660L	Plate R.F Choke		[illegible]
L23	D5661D	Filament Choke		[illegible]
L24	D5660E	Cathode Choke		[illegible]
L25	D5660L	Pulse Line Choke		[illegible]
L26	D5660F	Pulse Line Choke		[illegible]
L45	D5660E	Cathode Choke		[illegible]
IFT2	D5535A	2ND I.F. Transformer		[illegible]
IFT3	D5535B	3RD. I.F. Transformer		[illegible]
IFT4	D5535C	4TH. I.F. Transformer		[illegible]
IFT5	D5535D	5TH I.F. Transformer		[illegible]
IFT6	D5535E	6TH I.F. Transformer		[illegible]
V5		EF50 Valve		10E/92
V6		EF50 Valve		10E/92
V7		EF50 Valve		10E/92
V8		EF50 Valve		10E/92
V9		EA50 Valve		10E/92
V10		EF50 Valve		10E/92
V11		6SN7GT Valve		[illegible]
V12		884 Valve		[illegible]
P3	D4020F	Plug		[illegible]
C93	C3200C	Contact Strip		[illegible]

DIRECTORATE of TELS and RADAR — RAAF HEADQUARTERS

Drawn		TITLE	RS 4054·A
Traced	H.L.A.	B2149	
Checked	[illegible]	REBECCA I.F. CHANNEL	
Approved	[illegible]		Issue No
Date	7.5.47		
Scale			Reference

Resistors		R61 R62				
Condensers		C82 C83	C84		C85	
Miscellaneous	Y16 Y17	CK2	C57	Y18		T2

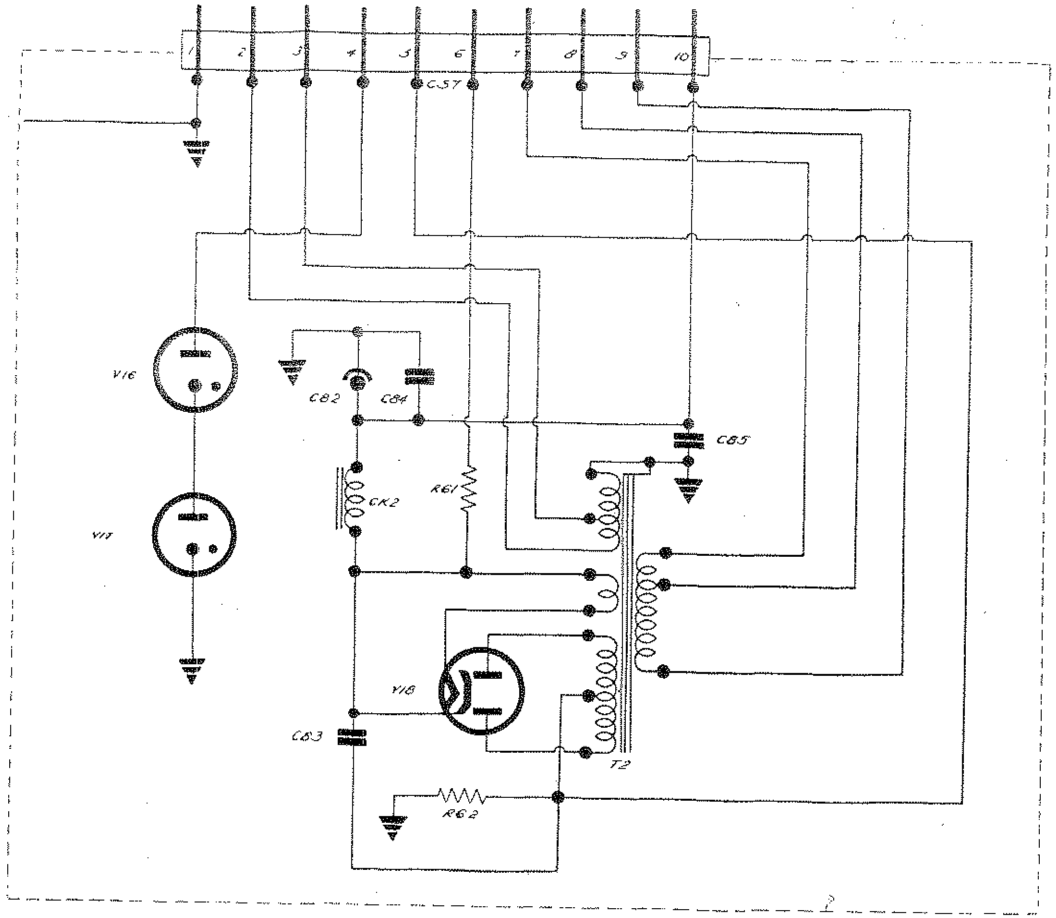


Fig 8

FIG	HMV PART N°	DESCRIPTION	SERVICE PART N°	SERVICE IDENT N°
R61	IRC	1500 OHMS 3W TYPE 'AA'		
R62	IRC	250 OHMS 8W TYPE 'DG'		

FIG	HMV PART N°	DESCRIPTION	SERVICE PART N°	SERVICE IDENT N°
C82	C0014 BT	8·0 MFD. 600V		Y1CC/67237
C83 C84	C3005BH	0·5+0·5 MFD 600V		Y1CC/67230
C85	D4405 A	0·001 MFD		Y10C/66366

FIG	HMV PART N°	DESCRIPTION	SERVICE PART N°	SERVICE IDENT N°
V16		VR 150/30		Y10E/75099
V17		VR 150/30		Y10E/75099
V18		5V4G		Y1CC/75094
T2	D3400	Mains Transformer		Y1CXB/500093
CK2	D3396	Filter Choke		Y1CC/67256
C57	C3200 D	Contact Strip		Y10HB/500039

DIRECTORATE of TELS & RADAR			RAAF HEADQUARTERS
Drawn		TITLE	RS 4057-A
Traced	HLB	REBECCA POWER SUPPLY	
Checked	[illegible]		
Approved	[illegible]		Issue N°
Date	29.4.47		
Scale			Reference

RESISTORS	R6 R7 R8 R3 R4 R9 R2 R10 R5 R1 R11 R14 R12 R13 R16 R17 R8 R18 R21 R22 R26 R23 R19 R20 R24 R25 R27 R30 R28 R31 R32 R29 R33 R37 R34 R35 R38 R36 R39 R41 R42 R43 R40 R44 R47 R46 R45 R48 R49
CONDENSERS	C4 C3 C2 C5 C6 C7 C8 C1 C9 C10 C11 C12 C13 C15 C14 C16 C17 C18 C19 C20 C21 C22 C23 C24
VALVES	V1 V2 V3 V4 V5 V6 V7 V8 V9 V10
MISCELLANEOUS	SW1A SW1B VR1 SW1C VR2 VR3 VR4 VR5 VR6 VR7 VR8 VR9 T1 CK REL.1 SW2 SW3 SW4 VR10 S4 PL/S1 CK1 PL/S2 S3

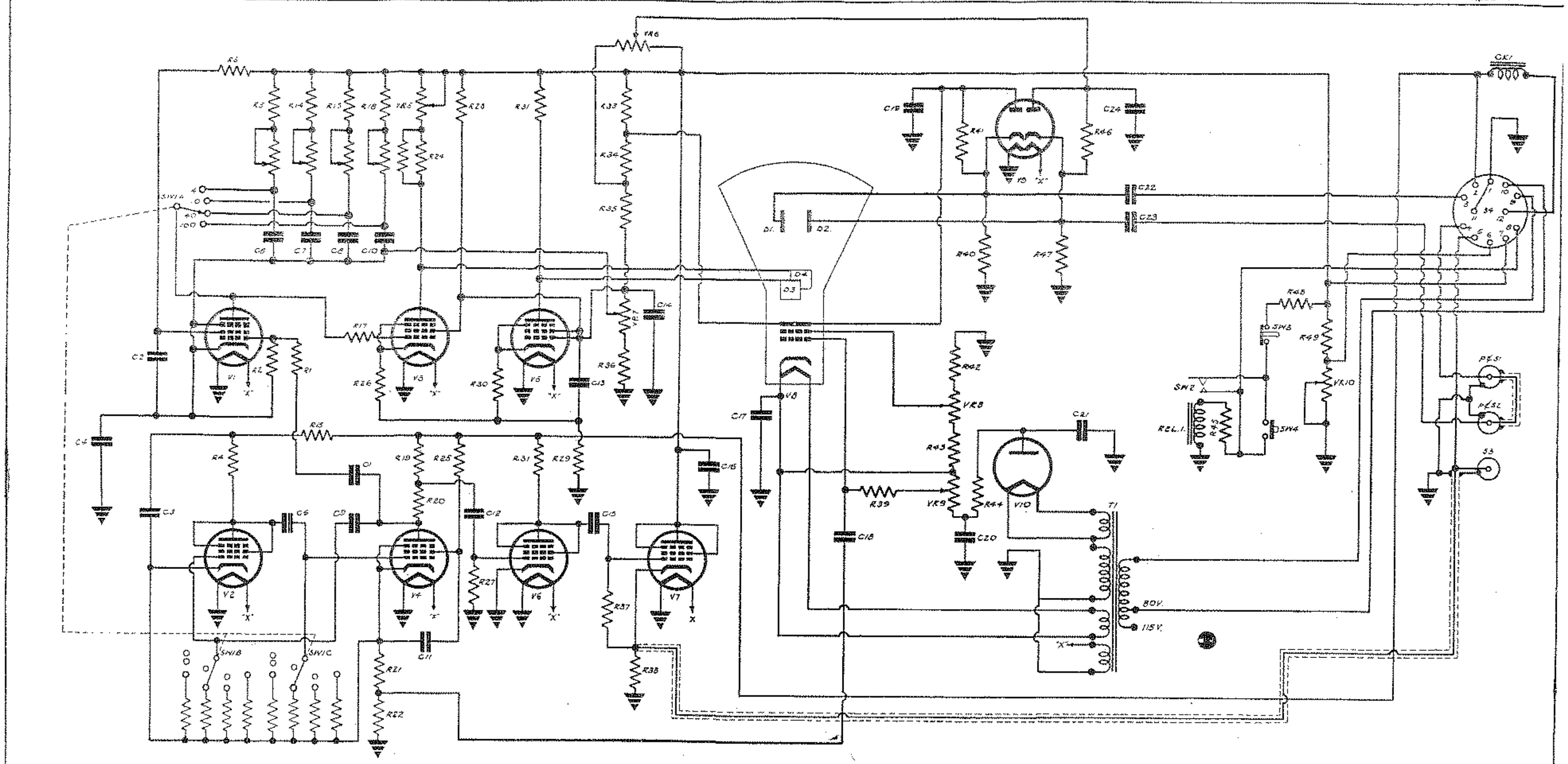


FIG	H.M.V. PART Nº	DESCRIPTION	SERVICE PART Nº	SERVICE IDENT Nº
R1	C3X	500,000 OHMS 1W		Y10C/65580
R2	H3X	50,000 OHMS 1W		Y10C/66351
R3	K3X	250000 OHMS 1W		Y10C/65299
R4	AE3X	25,000 OHMS 1W		Y10C/65576
R5	AU3T	400,000 OHMS 1W 2%		Y10C/67212
R6	AU3T	400,000 OHMS 1W 2%		Y10C/67212
R7	L3T	200,000 OHMS 1W 2%		Y10C/67211
R8	S3T	40,000 OHMS 1W 2%		Y10C/67209
R9	F3T	10,000 OHMS 1W 2%		Y10C/67207
R10	O3T	500,000 OHMS 1W 2%		Y10C/67213
R11	DC3T	300,000 OHMS 1W 2%		Y10C/67214
R12	DB3T	1·1 MEGOHM 1W 2%		Y10C/67215
R13	AX3T	1·25 MEGOHM 1W 2%		Y10C/67216
R14	AU3T	400,000 OHMS 1W 2%		Y10C/67212
R15	AE3X	25,000 OHMS 1W		Y10C/65576
R16	AU3T	400,000 OHMS 1W 2%		Y10C/67212
R17	F3X	10,000 OHMS 1W		Y10C/66379
R18	AU3T	400,000 OHMS 1W 2%		Y10C/67212
R19	AJ3X	2,000 OHMS 1W		Y10C/65139
R20	V3X	20,000 OHMS 1W		Y10C/65575
R21	F3X	10,000 OHMS 1W		Y10C/66379
R22	F3X	10,000 OHMS 1W		Y10C/66378
R23	AT3X	60,000 OHMS 1W		Y10C/66828
R24	AE4T	25,000 OHMS 2W 2%		Y10C/67208
		2X50,000 OHMS 1W TYPE H3T		
R25	AE3X	25000 OHMS 1W		Y10C/65576
R26	BA3X	600 OHMS 1W		Y10C/66214
R27	P3X	1·0 MEGOHM 1W		Y10C/65244
R28	S3X	40,000 OHMS 1W		Y10C/65577

FIG.	H.M.V. PART Nº	DESCRIPTION	SERVICE PART Nº	SERVICE IDENT Nº
R29	X3X	5,000 OHMS 1W		Y10C/66273
R30	BA3X	600 OHMS 1W		Y10C/6214
R31		25,000 OHMS 2W 2%		
		2X50,000 OHMS 1W TYPE H3T		
R32	AE4X	25,000 OHMS 2W		
R33	V3X	20,000 OHMS 1W		Y10C/66575
R34	AE4X	25,000 OHMS 2W		
R35	X3X	5,000 OHMS 1W		Y10C/66275
R36	AF3X	3,000 OHMS 1W		Y10C/65662
R37	P3X	1·0 MEGOHM 1W		Y10C/65244
R38	F3X	10,000 OHMS 1W		Y10C/66379
R39	AA3X	2·0 MEGOHMS 1W		Y10C/65587
R40	P3X	1·0 MEGOHM 1W		Y10C/65244
R41	O2X	500,000 OHMS ½W		Y10C/66310
R42	K3X	750,000 OHMS 5W		Y10C/65355
		3X150,000 OHMS 1W TYPE K3X		
R43	L4X	200,000 OHMS 2W 5%		
R44	L3X	100,000 OHMS 2W		Y10C/65435
		2X100,000 OHMS 1W TYPE L3X		
R45	AT4X	30,000 OHMS 4W		Y10C/67210
		2X60,000 OHMS 2W TYPE AT4X		
R46	O2X	500,000 OHMS ½W		Y10C/66310
R47	P3X	1·0 MEGOHM 1W		Y10C/65244
R48	B3X	500 OHMS 1W		Y10C/65750
R49	J4X	100,000 OHMS 2W		Y10C/65441
C1	3005SQ	0·05 MFD. 600 V.		Y10C/67232
C2	3005SQ	0·05 MFD. 600 V.		Y10C/67232
C3	3005SE	0·25 MFD. 400 V.		Y10C/65363
C4	3005SO	0·5 MFD. 400 V.		Y10C/65210

FIG.	H.M.V. PART Nº	DESCRIPTION	SERVICE PART Nº	SERVICE IDENT Nº
C5	0243CM	0·0025 MFD. 1%		
C6	4405K	0·001 MFD. 1%		Y10C/67054
C7	0243CT	0·005 MFD. 1%		Y10C/67227
C8	0243CN	0·025 MFD. 1%		Y10C/67229
C9	4405K	0·001 MFD. 1%		Y10C/67224
C10	3005SJ	0·05 MFD. 2%		Y10C/67233
C11		0·5 MFD. 400V. (REF. C16)		
C12	0243BO	0·01 MFD.		Y10C/55008
C13	3005SQ	0·05 MFD. 600V.		Y10C/67232
C14		0·05 MFD. 400V. (REF. C24)		
C15	3005SJ	0·1 MFD. 600V.		Y10C/66816
C16	3005SF	0·5 MFD. 400V. (C11 + C16)		Y10C/67236
C17	3005BG	0·05 MFD. 2000V.		Y10C/67234
C18	0243CK	0·01 MFD. 2000V.		Y10C/68244
C19	3005SQ	0·05 MFD. 600V.		Y10C/67232
C20		0·01 MFD. 2000V. (REF. C21)		
C21	3005BK	0·01 MFD. 2000V. (C20 + C21)		Y10C/67231
C22	4405G	0·0005 MFD.		Y10C/67223
C23	4405G	0·0005 MFD.		Y10C/67223
C24	3005SC	0·05 MFD. 400V. (C14 + C24)		Y10C/67235
VR1	05666B	100,000 OHMS CARBON POT. +20% −0%		Y10C/67242
VR2	05666B	100,000 OHMS CARBON POT. +20% −0%		Y10C/67242
VR3	05666B	100,000 OHMS. CARBON POT. +20% −0%		Y10C/67242
VR4	05666B	100,000 OHMS. CARBON POT. +20% −0%		Y10C/67242
VR5	05591	15,000 OHMS. W.W. POT.		Y10C/67245
VR6	05665	250,000 OHMS. CARBON POT.		Y10C/67239
VR7	05406	5,000 OHMS. W.W. POT.		Y10C/67243
VR8	05666A	100,000 OHMS. CARBON POT.		Y10C/67240
VR9	05667	50,000 OHMS. CARBON POT.		Y10C/67241
VR10	04184	2,000 OHMS W.W. POT.		Y10C/67244

FIG	H.M.V. PART Nº	DESCRIPTION	SERVICE PART Nº	SERVICE IDENT Nº
V1		EF50 VALVE		Y10E/92
V2		EF50 VALVE		Y10E/92
V3		EF50 VALVE		Y10E/92
V4		EF50 VALVE		Y10E/92
V5		EF50 VALVE		Y10E/92
V6		EF50 VALVE		Y10E/92
V7		EF50 VALVE		Y10E/92
V8		5BP1 OR (802P1) VALVE		Y10E/75114
V9		VR54 VALVE		Y10E/11400
V10		879 VALVE		Y10E/75095
T1	05402	MAINS TRANSFORMER		[illegible]
CK1	05372	FILTER CHOKE		Y10C/67257
PL/S1	D4020F	PLUG		Y10H/30587
	D4020A	SOCKET		Y10H/30372
PL/S2	D4020F	PLUG		Y10H/30587
	D4020A	SOCKET		Y10H/30372
S3	D4020A	SOCKET		Y10H/30372
S4	051093	12 PIN SOCKET		Y10H/385
REL 1	05423	RELAY 2000 OHMS & SWITCH SW2		Y10FB/500066
SW1A				
SW1B	05325	3 POLE 4 POSITION SWITCH		Y10FB/500063
SW1C				
SW2		REF REL 1.		
SW3	05307A	PUSH "OFF" SWITCH		
SW4	05307B	PUSH "ON" SWITCH		
		Ident Nºs: A - Y10FB/500064, B - Y10FB/500065		

Fig. 9

DIRECTORATE OF TELS & RADAR R.A.A.F. HEADQUARTERS			
DRAWN		TITLE	R.S. 4055-A
TRACED	CLN	REBECCA INDICATOR	
CHECKED	[signature]		ISSUE Nº
APPROVED	[signature]		
DATE	12-5-47		
SCALE	-		REFERENCE

ISSUE NO	ALTERATION	DATE	D.I.L.	CHK'D

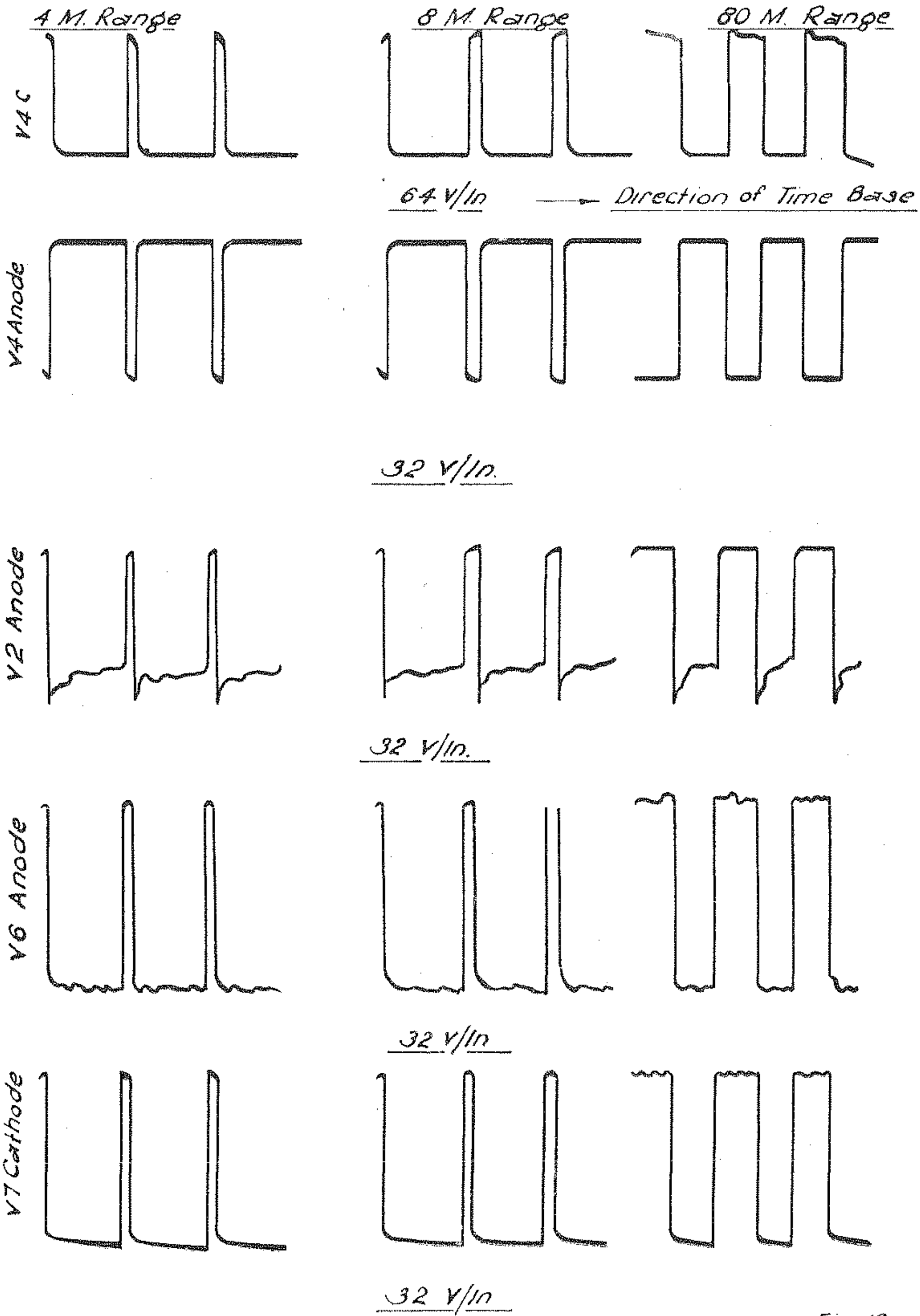


Fig. 10

MATERIAL	SPEC.	TREATMENT	
NO. OFF		FINISH	
BREAK ALL SHARP EDGES	TOLERANCES	ON DECIMALS	ON FRACTIONS } OR AS NOTED

ISSUED BY	ITEM	REBECCA MK II B (AUS) WAVEFORMS-INDICATOR AN41	DATE
DIRECTORATE OF TELECOMMUNICATIONS AIR BOARD R.A.A.F.	SUB ASSEMBLY	MULTIVIBRATOR PULSE-AMPLIFIER & CATHODE FOLLR	SCALE
	ASSEMBLY		
	MACHINE		DRAWING NO.
	ISSUE NO.	DRAWN: — TRACED: H.L.B CHECKED: EAR APPROVED: EAR	Tels. 4/444

ISSUE No	ALTERATION	DATE	D.I.L.	CHK'D

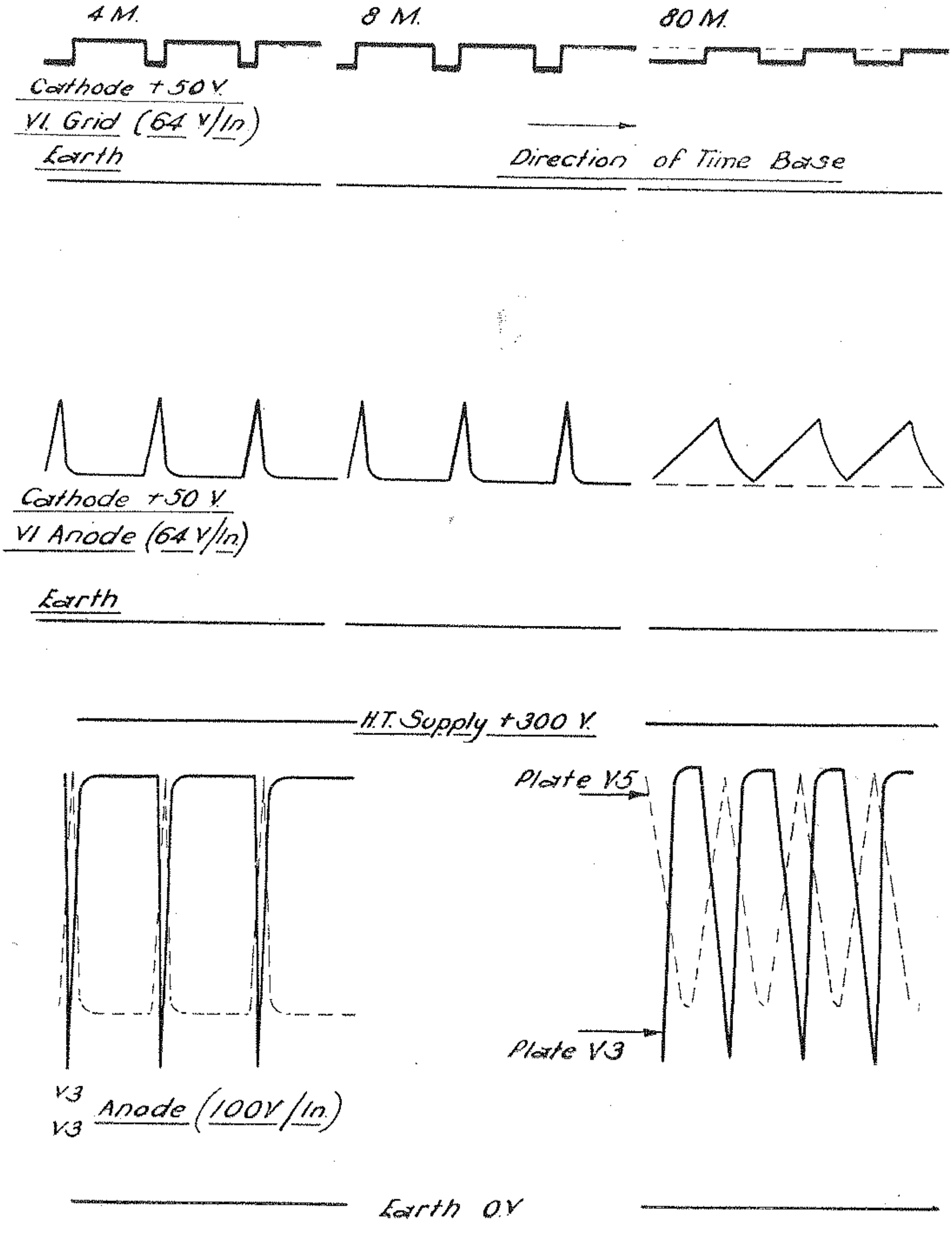
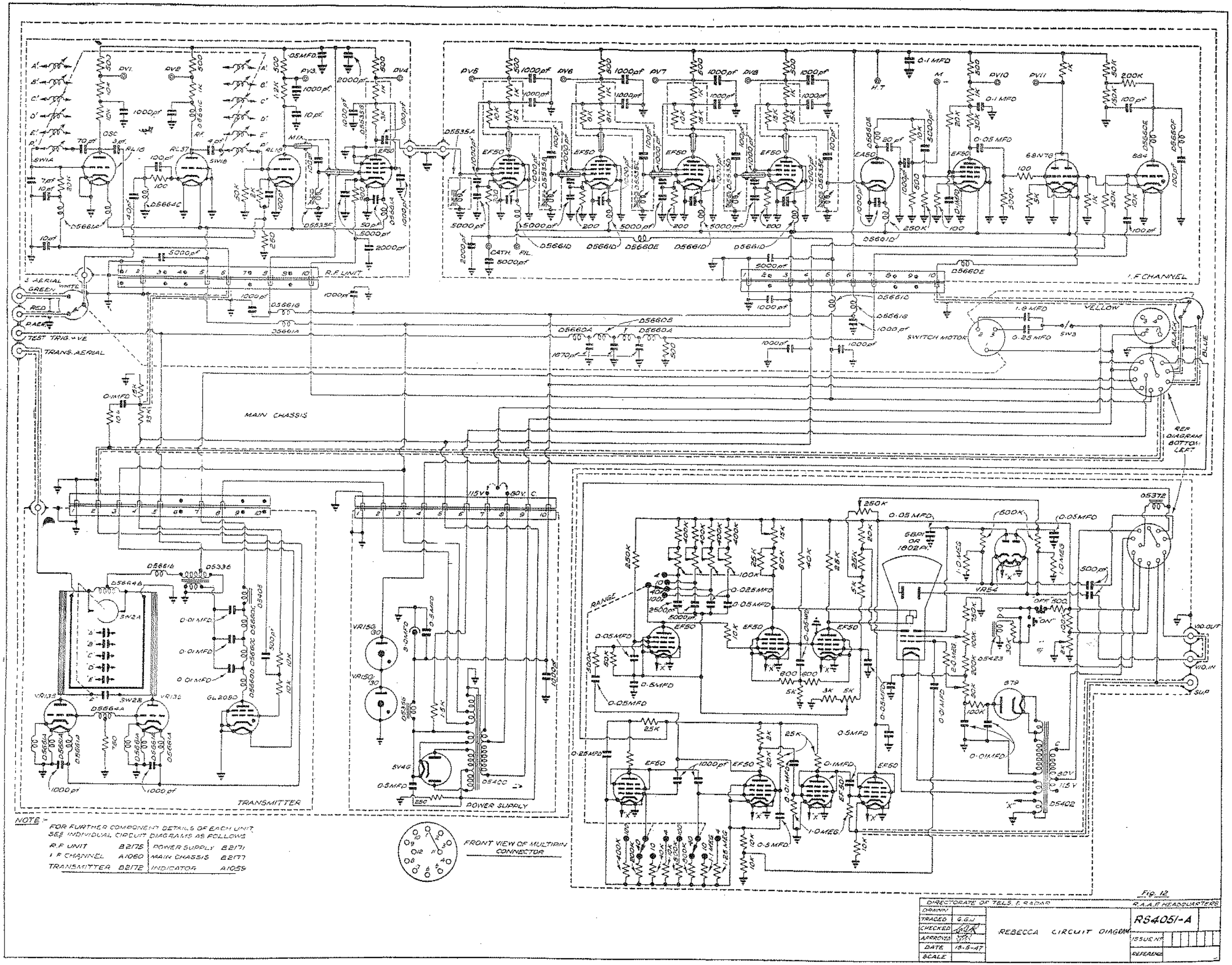


Fig 11.

MATERIAL	SPEC.	TREATMENT	
NO. OFF		FINISH	

BREAK ALL SHARP EDGES TOLERANCES ON DECIMALS ON FRACTIONS } OR AS NOTED

ISSUED BY	ITEM	REBECCA MK IIB (AUST) WAVEFORMS-INDICATOR	DATE : 4.11.48
DIRECTORATE OF TELECOMMUNICATIONS AIR BOARD R.A.A.F.	SUB ASSEMBLY	A1047. TIME BASE VALVE & PUSH PULL AMPLIFIER	SCALE
	ASSEMBLY		
	MACHINE		DRAWING NO.
	ISSUE NO.	DRAWN — TRACED H.L.B.	TELS 4/448
		CHECKED BOR — APPROVED CAR	


R.F. UNIT
I.F CHANNEL
MAIN CHASSIS
TRANSMITTER
POWER SUPPLY
SWITCH MOTOR
3 AERIAL
GREEN
WHITE
RED
TEST TRIG. +VE
TRANS. AERIAL
YELLOW
BLACK
BLUE
REF DIAGRAM BOTTOM LEFT
RANGE
100 OUT
100 IN
SUP
FRONT VIEW OF MULTIPIN CONNECTOR
NOTE:- FOR FURTHER COMPONENT DETAILS OF EACH UNIT SEE INDIVIDUAL CIRCUIT DIAGRAMS AS FOLLOWS
R.F. UNIT B2175
I.F. CHANNEL A1060
TRANSMITTER B2172
POWER SUPPLY B2171
MAIN CHASSIS B2177
INDICATOR A1059
Fig. 12
DIRECTORATE OF TELS. & RADAR
R.A.A.F. HEADQUARTERS
DRAWN
TRACED G.G.J.
CHECKED
APPROVED
DATE 15-5-47
SCALE
REBECCA CIRCUIT DIAGRAM
RS4051-A
ISSUE No.
REFERENCE

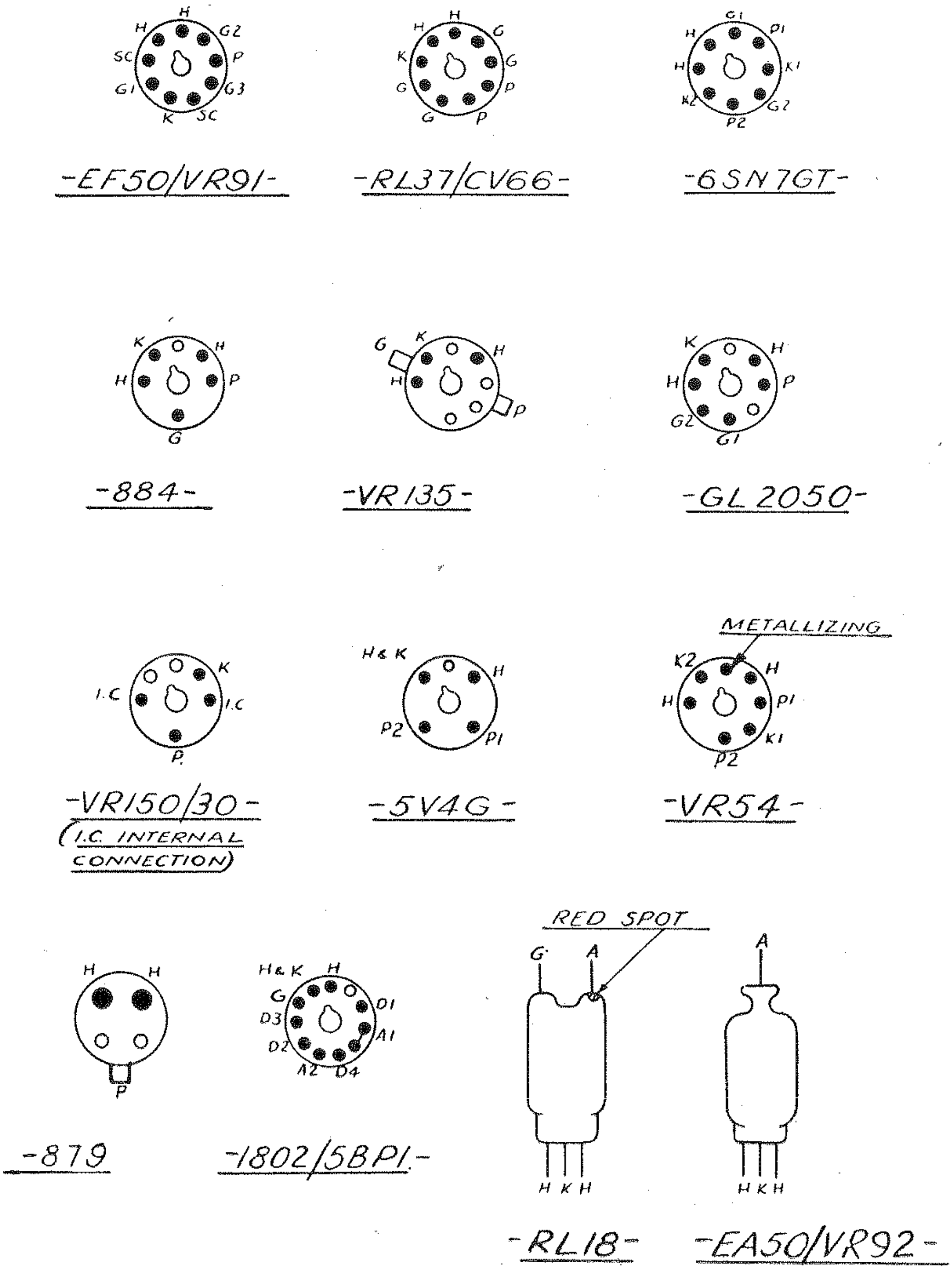


Fig 13

DIRECTORATE OF TELS. & RADAR			R.A.A.F. HEADQUARTERS
DRAWN		TITLE: SOCKET CONNECTIONS REBECCA MK 2B	RS.4050A Z
TRACED	P.T.		
CHECKED	[signature]		
APPROVED	[signature]		ISSUE No
DATE	18.4.47		
SCALE			REFERENCE