R.A.A.F PUBLICATION No. 275

FOR OFFICIAL USE ONLY

INSTRUCTION MANUAL

FOR

GENERAL PURPOSES W/T EQUIPMENT TYPE AT5/AR8

Sydney: Alfred Henry Pettifer, Acting Government Printer—1943

*40876

VK3JII.
Ken Bridger

INSTRUCTION BOOK

No. 2-7730R

M.F./H.F. AIRCRAFT COMMUNICATION INSTALLATION AT5/AR8

INSTALLATION TYPE J7730

AMALGAMATED WIRELESS (A'SIA.) LIMITED
47 YORK STREET, SYDNEY

*40362—A

The amendments promulgated in the undermentioned Amendment Lists have been made in **this publication, amendments numbers 1 to 14 of previous manual having been included in the text.**

Amendment List		Amendments made by	Date
Number	Date		

IMPORTANT NOTE.

MODIFICATIONS

Units with the serial numbers listed below must not be operated in combination with other units of different serial numbers. Any of the units listed may be used in conjunction.

Receiver Serial Nos.	*Aerial Coup, Unit Serial Nos.*	*Power Unit Serial Nos.*	*Junction Box Serial Nos.*
1	1	3	1
2	2	4	2
3	3	25	3
4	4	26	4
5	5	27	6
6	7	28	7
8	8	29	8
9	10	30	9

Any transmitter may be used with any combination of other units without functional alteration.

Units of the above serial numbers have not been modified for quench keying on the receiver or for increased intercommunication level.

If a receiver listed above is employed with a power unit other than those listed, the positive terminal of the battery will be earthed. This will be the case because Tag No. 7 on the " Power " socket of the above receivers is connected to earth as is also Tag 7 on the " Rec." socket of the above power units.

If a junction box listed above is used with a receiver other than those listed, the cathode circuits of the receiver preliminary stages will be open-circuited and the receiver will be inoperative. The receiver could still be made operative by closing the intertuning switch, but then no tone adjustment would be possible. The junction boxes listed above have Tag 3 on the " receiver " group connected to Tag 4 on the " pulse " group instead of to Tag 9 on the " Aerial Coupling Unit " group. Tag 9 on the " A.C. Unit " group is earthed.

If one of the Aerial Coupling Units listed above is employed with a receiver and junction box combination not shown, the receiver will be operative but no quench keying will be possible. In the Coupling Units listed, Tag No. 9 is connected to earth instead of to the keying relay.

The microphone voltage from one of the above power units will be approximately half that obtained from any other power unit as the above have a different microphone bleeder resistance.

All drawings included in the Instruction Book embody the circuit modifications.

Modification to Allow Remote Control of C.W.

Transmitters and Junction Boxes with serial numbers 755 and upwards have been modified to allow remote control of C.W. Junction Boxes with these serial numbers may be used with any transmitter, but Junction Boxes with serial numbers below 755 must not be used with the modified transmitters as doing so will interfere with M.C.W. and R/T functions.

NOTE.—Wireless Order No. 244/A55 details modifications to transmitters and Junction Boxes serial number 1 to 754, rendering all transmitters and Junction Boxes interchangeable.

Restricted

AMENDMENT LIST No. 1
to
R.A.A.F. PUBLICATION No. 275
(2nd Edition, May, 1944)

INSTRUCTION MANUAL FOR GENERAL PURPOSES W/T. EQUIPMENT TYPE AT5/AR8

(1) **Index**
Section 5, para. 17.
Delete "Generates . . . precautions", *insert* "General Notes on Operational Procedures and Precautions".

(2) **Index**
Schedule of Drawings.
Figures "1" and "2".
After word "diagram", *delete* small "at" and *insert* capital "AT".

(3) **Section 3**
Para. 117 — Interchangeability of Parts.
Sub-Paragraph "Types MDD. 4622 and MDD. 4622-2."
Line 1.
Delete word "grushes", *insert* word "brushes."

(4) **Section 5**
Para. 8 — Adjustment of H.F. Circuit.
Line 3.
Delete word "valves", *insert* word "values".

(5) **Section 6**
Heading.
Delete "INST".

(6) **Section 6**
Para. 1 — Removing and Replacing.
Sub-Sentence (h).
Delete word "Tight", *insert* word "Tighten".

(7) **Section 6**
Para. 13 — Driver Stage.
Line 6.
Delete word "than", *insert* word "then".

(8) **Section 7**
Para. 6, Page 2.
Schedule of Components.
Delete "13V Power Supply Unit", *insert* "Remote Control Units".

(9) **Section 8**
Paragraph 3 — Mounting Control Panel.
Sub-Para. (iii). Line 3.
Delete word "to", *insert* word "the".

(10) **Section 8**
Paragraph 5 — Mounting . . . . . Fitting.
Sub-paragraph (vii).
Delete repetition of this sub-paragraph at bottom of page.

(11) **Section 9**
Paragraph 3.
Heading.
Delete "Installating", *insert* "Installation".

(12) **Photo. No. 2**
(a) *Reference (6).*
Delete "H.F.", *insert* "M.F.".
(b) *Reference (15).*
Delete word "Interwiring", *insert* word "Intertuning".

(13) **Photo. No. 22**
Delete "M.A.", *insert* "M.F.".

(14) When the above amendments have been effected, make the necessary record on the Amendment Certificate.

Reference: File R.A.A.F. 172/3/3729.

Date: 21st December, 1944.

Printed by R.A.A.F. Printing Unit, Melbourne. No. 1125/12/44.

AMENDMENT LIST No. 2

TO

R.A.A.F. PUBLICATION No. 275

(2nd Edition, *May*, 1944)

INSTRUCTION MANUAL FOR GENERAL PURPOSES W/T EQUIPMENT TYPE AT5/AR8

(1) **Receiver Section 7, Para. 1:**

(a) Items Nos. 17 and 18
C.17 and C.18

	Maker's Name	Maker's Designation	R.A.A.F. Ref. No.
Delete	A.W.A	IS7946	Y10C/65137
Insert	Simplex	PT.	Y10C/66325

(b) Item No. 208, R108

	Description	Maker's Name	Maker's Designation	R.A.A.F. Ref. No.
Delete	Resistor 3600 Ω Fixed 1 watt wire terminals, type 1	Chanex	RV 3621	Y10C/66024
Insert	Resistor 3200 Ω Fixed metallised pigtails	I.R.C.	BTI	Y10C/66703

(2) **26V Unit Power Supply Unit Type "G":**

(a) Item No. 4 C4

	Description	Maker's Designation	R.A.A.F. Ref. No.
Delete	Condenser 2.0 μF ± 10% fixed 350V. wkg. Paper Dielectric	IU3551	Y10C/65192
Insert	Condenser 1.0 μF 700V. wkg. Paper Dielectric	U3551	Y10C/65384

(b) Item No. 5 C5

Delete	Condenser 4.0 μF ± 10% fixed 350V. wkg. Paper Dielectric, less mounting feet	6U3551 (Less mtg. feet)	Y10C/65193
Insert	Condenser 2.5 μF 700V. wkg. Paper Dielectric	2U3551	Y10C/65191

(3) **Figure 29 Wiring Diagram Unit Power Supply Type "S":**

Remove and *destroy* existing drawing.

Insert new drawing attached hereto.

(4) When the above amendments have been made to the publication, make the necessary record on the amendment certificate.

Reference: File R.A.A.F. 172/3/3729.

Date of Issue: February, 1945.

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Restricted

AMENDMENT LIST No. 3
TO
R.A.A.F. PUBLICATION No. 275
(*2nd Edition, May,* 1944)

INSTRUCTION MANUAL FOR GENERAL PURPOSES W/T EQUIPMENT TYPE AT5/AR8

(1) **SECTION 9 — UNIT POWER SUPPLY TYPE "S"**
Schedule of Components

(a) *Insert* in by columns

Item No.	*Circuit Ref. No.*	*Description*	*Circuit Function*	*Maker's Ref. No.*	*R.A.A.F. Ref. No.*
8C	C11	Condenser, .005 ufd. 750W. Mica dielectric	Mains by-pass	13214	Y10C/ 67109
8D	C12				

(b) Item No. 45, Transformer,
Amend maker's designation Number "ITM9067" *to read* "7TM9067"

(2) **FIG. 29. WIRING DIAGRAM UNIT POWER SUPPLY TYPE "S"**

(a) *Amend* maker's designation Number "ITM9067" *to read* "7TM9067".

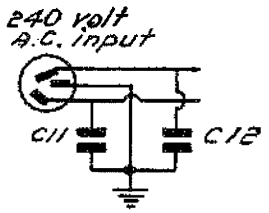
(b) *Cut out* the circuit diagram shown below, and affix it over Fig. 29, so that the two lines from the 240 volt A.C. Input Socket coincide with those existing.

(3) When the above amendment have been made to the publication, make the necessary record on the amendment certificate.

Reference: File R.A.A.F. 172/3/3729

Date: April, 1945.

Printed by R.A.A.F. Printing Unit, Melbourne. No. 599/4/45.



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INSTRUCTION BOOK No. 2-7730R.

AT5/AR8 EQUIPMENT.

SECTION 1.—BRIEF SPECIFICATION.

1. UNITS COMPRISING THE INSTALLATION.

All units of the installation and associated wiring are diagrammatically shown in Photo. No. 1704.

The Transmitter, Aerial Coupling Unit (A.C.U.) and Receiver are mounted on shock absorbers. The Power Unit is mounted on rubber washers which are intended only to eliminate machine vibration.

The Junction Box and Remote Control Unit are bolted direct to the aircraft.

2. SIZES OF UNITS.

The exact sizes and necessary clearances for sway and bounce are shown on the dimensioned diagrams enumerated below:—

Junction Box	7735D2
Aerial Coupling Unit (A.C.U.)	7732B2
Power Unit Type H7734, Serial Nos. 1–25	7734B2
Power Unit Type H7734, 1H7734, with MDD6719 machines	7734B1
Power Unit Type H7734, 1H7734, with MDD 4622 machines	7734B3
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Receiver	7733B1
Remote Control Unit (R.C.U.)	7755D3

3. WEIGHT OF EACH UNIT.

Receiver	31 lbs.
Transmitter	35 lbs.
Aerial Coupling Unit	22 lbs.
Power Unit (Serial Nos. 1–25)	65 lbs.
Power Unit with MDD6719 machines	73 lbs.
Power Unit with MDD4622 machines	58 lbs.
Junction Box and Cables	13 lbs.
Remote Control Unit	1 lb. 2 ozs.
Shock Bases for AT5, AR8, A.C.U.	3 lbs. each.
Shock Base for Power Supply	4 lbs.

The above figures are subject to slight change according to the length of cables employed and to the use of alternative insulating materials.

4. ELECTRICAL SPECIFICATION OF COMBINED EQUIPMENT.

(a) L.T. Supply.

24V to 28V D.C., 16 amps. approx. on C.W. with key down.
12–14V D.C., 35 amps., approx. on C.W. with key down.

(b) Summary of Signalling Modes and Frequency Coverages

Unit.	*Channel.*	*Freq. Range.*	*Signal Type.*
Trans. and A.C.U.	M.F.	140 kc.–500 kc.	C.W., M.C.W. and R/T Transmission.
	H.F.	2 Mc.–20 Mc.	C.W., M.C.W., R/T and Pulse Transmission.
H.F. Oscillator	.....	2 Mc.–5 Mc.	.....
Receiver	M.F.	140–740 kc. and 765–2 Mc.	Reception of C.W., M.C.W., R/T, Aural D.F. and Sense.
	H.F.	2 Mc.–20 Mc.	Reception of C.W., M.C.W. and R/T.

In addition to the above, the final stage of the receiver acts as an Intercommunication (I/C) amplifier capable of supplying from one to five pairs of service telephones in parallel, when driven from a service type carbon microphone.

5. TRANSMITTER SPECIFICATION.

The transmitter contains Master Oscillator (M.O.) frequency control on M.F., and crystal and M.O. control on H.F. Provision is made for mounting six standard plug-in crystals. The crystals are mounted in an accessible position and can be readily changed in flight, if required.

The modulation frequency on M.C.W. is within the range of 900 to 1,000 C.P.S. On C.W. and M.C.W. transmission, side tone at M.C.W. modulation frequency is supplied to the telephone circuits as a check on transmission. On R/T transmission, speech side-tone is similarly supplied to the telephone circuits.

On 26V operation, the anode input to the power amplifier is approximately 90 watts; on 13V operation, the power will be slightly less.

R.F. power delivered to the 100 Ω line is approximately 50 watts when operating on the fundamental of the drive frequency. The output power is reduced somewhat, at the higher frequencies, when doubling in either or both the B.A. and P.A. stages.

6. RECEIVER SPECIFICATION.

(a) On R/T, the receiver will deliver six milliwatts of output for the following signal inputs from the open aerial :—

Below 9.5 Mc. ... Not more than 3 microvolts.
Above 9.5 Mc. ... Not more than 10 microvolts.

On C.W. with a 400-cycle beat note, 6 milliwatts of output are obtained for the following signal inputs :—

Below 9·5 Mc. ... Not more than 2 microvolts.
Above 9.5 Mc. ... Not more than 6 microvolts.

(b) The following D.F. performance is obtained provided a loop and cable is employed having the specified characteristics :—

Self-inductance (at 1,000 C.P.S.) : 117–127 microhenry.
Resonant Frequency of loop and cable : 1·2 Mc. to 1·4 Mc.

With a 400-cycle beat note, the receiver will deliver 6 milliwatts of output for an induced voltage of less than 2F microvolts in the loop, where F is the frequency in megacycles.

The receiver is capable of giving good sense indications over a wide range of open aerials. A wide range of loop aerials may be used provided the electrical constants remain within the limits quoted.

(c) The I/C amplifier (Rec. Output Stage) will deliver at least 6 milliwatts output for a tone input of 0·2 volts at 400 cycles to the microphone terminals. This amplifier is capable of supplying normal I/C level to five pairs of service telephones connected in parallel, when supplied with speech signals from a standard service type carbon microphone.

INSTRUCTION BOOK No. 2-7730R.

AT5/AR8 EQUIPMENT.

SECTION 2.—GENERAL DESCRIPTION.

1. INTRODUCTION.

This section is limited to a discussion of those features and operational facilities which cannot be performed by individual units alone, but only when such units are grouped together to form an installation. In general, therefore, the functions described hereafter can only be explained by simultaneous reference to two or more units of the installation.

In Section 3, each unit is described in detail separately, and should be referred to for a discussion of the functions which any one unit can perform alone.

2. SIGNALLING CAPABILITIES.

The AT5/AR8 is a general purpose communication equipment with separate Medium Frequency (M.F.) and High Frequency (H.F.) channels, in which one M.F. and one H.F. frequency can be preset and subsequently selected by the operation of one switch on the transmitter and one on the receiver. The frequency coverages and signal types have been previously described, Section 1, paragraph 4.

The basic system is designed for control by an operator having access to the front panels of all units.

When required, the basic system can be expanded to provide any or all of the following :— Limited remote control on 1 preset frequency, I/C for 3 outlets in addition to the operator and the remote control point, and pulse transmission (H.F. only).

3. CONSTRUCTION AND LAYOUT OF EQUIPMENT.

In order to provide the greatest degree of adaptability to installation requirements in different aircraft, the basic equipment is constructed in four separate units carried on slides on mounting bases.

The bases for the transmitter, A.C.U., and receiver, are fitted with rubber shock mounts. Latch bars on the front of each base automatically lock each unit in position when it is inserted into its mounting base.

A small junction box and complete set of connecting cables are provided with each equipment. Several standard cable lengths are available to suit different aircraft. (Refer Section 3, paragraph 102.) All power and control cables excepting the main L.T. cable on the power unit are screened, Cabtyre-covered and fitted with multi-way sockets.

The junction box and all cables are intended to be removable items, and not a portion of the fixed wiring of the aircraft, so that, in the event of faults or damage occurring, the equipment as a whole can be readily removed from the aircraft and quickly reconnected on the test bench for complete checking.

4. OPERATION ON 12–14V OR 24–28V.

The equipment is designed to operate from a D.C. supply source of 12–14V or 24–28V. Employment of the correct type of power unit for the supply available, automatically effects the necessary changes in all other units (via the interwiring) by the manner in which the L.T. circuits are energised. By this means, all units, except the power supply, are kept strictly standard for either value of L.T. voltage.

The schematic interwiring diagram shows how the change is effected.

Filament circuits are arranged in series chains for 26V operation. To convert to 13V operation, these chains are centre-tapped and the outer ends joined together. The 13V supply is then connected between the outers and the centre point.

5. NORMAL AND ALTERNATIVE AERIAL AND LINE CONNECTIONS FOR M.F. AND H.F.

The normal arrangement of the equipment for communication service provides for, but is not limited to, common frequency working of the transmitter and receiver with listening-through.

Since the equipment contains separate H.F. and M.F. channels working into separate aerials, it is possible to preset both the Transmitter, A.C.U., and Receiver controls to 1 frequency on each channel, and change over the equipment to operation on either frequency by means of the H.F. M.F. switches on the Receiver and Transmitter.

With the aerials and lines connected as shown in Photo. No. 1704, the equipment is set up for " common aerial " operation. The aerial in use at any one time will depend on which channel M.F. or H.F. is employed.

Although the usual aerial arrangement employs the trailing aerial on M.F. and the fixed aerial on H.F. the connections can be interchanged. It is also possible to connect the receiver directly to one aerial, whilst the desired channel in the coupling unit is plugged to the remaining aerial for transmitting. Certain advantages and limitations result from each arrangement. Refer Section 2, paragraphs 6, 8.

6. FREE RECEIVER CONNECTION.

As the input circuits of the receiver are designed to work equally well from a low impedance line or standard aerial, the aerial and receiver line can be removed from the coupling unit and joined when circumstances require.

For the sake of clarity, this arrangement will be known as the " free receiver " connection, and is used whenever the receiver is operated on a different frequency to the transmitter and also when taking sense readings of the D.F. bearings.

Note that the facility for plugging an aerial straight through to the Receiver permits the transmitter to be operated on one aerial, whilst the receiver is operated on the other at the same, or on a different frequency. If the frequencies are the same, it will be seen later that the normal " common aerial " system offers advantages in reception conditions.

7. ACTION OF THE RELAYS IN THE COUPLING UNIT. *(Refer Drawing No. 7732D13.)*

Two relays are incorporated in the coupling unit. A two-pole two-way changeover relay REL1 selects the correct aerial tuning and metering circuit according to which band M.F. or H.F. is in operation in the transmitter. This relay is controlled by the M.F./H.F. switch on the transmitter.

A special keying relay REL2 performs all functions necessary for " break-in " or listening-through working. This relay is virtually a two-pole, two-way switch which is specially constructed to ensure that the switching operations occur in the correct order. One arm of the relay REL2 connects either the receiver or transmitter line to the changeover relay, which, in turn, connects to either the M.F. or H.F. aerial tuning circuit as described above. The other arm of relay REL2 keys the transmitter and the R.F. stages of the receiver. When the sending key is operated, the following functions occur in the order indicated.

On closing the sending key—

(a) The receiver line is disconnected from the aerial tuning circuits and the transmitter line connected in its place a short interval later.

(b) The keying contact opens the cathode circuit of the receiver R.F. stages, thereby de-sensitising it against incoming signals. A short interval later, the transmitter cathode circuits are closed and radiation ensues.

On opening the sending key—

(c) The transmitter cathode circuits are opened and radiation ceases. A short interval later, the receiver R.F. cathode circuits are made and normal sensitivity is restored.

(d) The transmitter line is disconnected from the aerial tuning circuits and the receiver line substituted.

For common aerial operation, this method has the advantage that only a low voltage relay is required to perform the line switching, and as this operation must be performed at normal sending speeds, correctly interlocked with the keying, it is possible to use a smaller and simpler relay than would be the case if the aerial itself were directly changed over. Moreover, during transmission the local signal input to the receiver comes mainly through the stray capacity of the relay from a comparatively low voltage source; the R.F. line to the transmitter. Thus at no time can the receiver absorb any measurable proportion of power from the transmitter. Such power as might be transferred to the receiver cannot do any damage since a limiting diode is connected across the aerial input inside the receiver. This tube limits the maximum pick-up voltage on the receiver line to 0.5 to 1.0 volts R.M.S. This signal cannot pass the 1st grid since the R.F. and I.F. stages of the receiver are quenched during all transmission periods by the action of the keying relay REL2 described previously. This latter result is important as the output stage of the receiver is used as an I/C amplifier and is not keyed. No interruption of I/C facilities can result from pick-up from the associated transmitter. It is important to note that the quenching method employed prevents inter-tuning between receiver and transmitter unless means are available for DELIBERATELY maintaining the receiver active during transmission. If the tone control on the receiver is turned fully anti-clockwise an "inter-tuning" switch closes, completing the cathode circuits to earth independently of the keying relay.

In the free receiver connection, the only modification to the foregoing is that the receiver aerial is not broken at any time. It is, therefore, possible to work duplex by closing the inter-tuning switch on the receiver assuming that the receiver is tuned to a different frequency to the transmitter and is, therefore, not responding to the local transmission.

8. COMMON FREQUENCY, COMMON AERIAL OPERATION.

The coupling unit contains separate circuits for matching and tuning the M.F. and H.F. aerial. These circuits perform two functions—tune the aerial, and match it to the transmission line. The transmitter contains no output or load adjustment, but merely a line "On, Off," switch. The loading on the transmitter can, however, be controlled by the matching or "input" adjustments of the coupling unit.

A particular advantage which accrues from the employment of line switching as described in Section 2, paragraph 7, becomes evident when "common frequency" operation of the transmitter and receiver is employed with the normal arrangement of common aerial for sending and receiving. Correct adjustment for transmission requires that firstly, the aerial be tuned correctly, and secondly, that the matching or "input" tuning is adjusted to terminate the transmitter line by the value of impedance which gives full transmitter output. It can be demonstrated theoretically and by experiment that the tuning of the aerial is inappreciably affected by the substitution of the receiver line for the transmitter line.

When receiving a signal on exactly the frequency for which the A.C.U. has been tuned, improved conditions result, if the combination of aerial and aerial tuning circuit is of low decrement. Added preselection and discrimination of signal to noise is then obtained. Also, the adjustments for correct matching of the aerial to the transmitter line ensure that the aerial is likewise matched to the receiver. By this means, the wide variations of electrical characteristics of S.W. Aerials are automatically reduced to a standard value as regards their effect on the input circuits of the receiver, and thus the performance of the receiver itself is kept consistent throughout the band.

9. SIDE TONE, LISTENING-THROUGH, I/C. (Refer Drawing No. 7730C3.)

By referring to the interwiring diagram, it will be observed that the output transformer of the receiver is connected in series with a side tone winding in the modulation transformer of the transmitter. All telephones associated with the installation are connected across these two windings, and must therefore respond to signals originating from either the receiver or the modulation system of the transmitter.

On R.T. transmission the modulator feeds side tone at full level into all telephones, in addition to modulating the transmitter.

On C.W. and M.C.W., the modulator is converted to an audio oscillator and feeds tone signals at reduced level into all phones. The operator and crew, therefore, hear all outgoing traffic.

During transmission periods the receiver is quenched as regards incoming signals from the aerial by the keying relay as described previously (Section 2, paragraph 7). Reception of incoming signals, is therefore interrupted, but is restored immediately the key is lifted. The property of the receiver being able to respond to incoming signals during transmission intervals is known as " listening-through " or " break-in ". The interconnection of the receiver output and the modulation side tone circuit ensures that signals from either source are fed to all telephones.

In the foregoing, no mention has been made as to the actual number of telephones connected to the circuit. Since all telephones are in parallel and not associated with any switching, the " side-tone " and " listening through " functions are not affected by the presence or absence of Remote Control and/or I/C.

However, in describing the microphone circuits, a distinction must be made owing to the action of associated switching. The general case will first be described in which Remote Control and I/C facilities are connected, in addition to the operator's telephones and microphone. The functions which are performed in the alternative cases when the operator alone, operator and I/C, or operator and remote control are connected will be readily seen.

The microphone supply is obtained from a dropping resistance in the Power Unit. This supply is then carried to the junction box where it passes through each of three filters in parallel.

One filter supplies the remote control microphones, a second supplies the operator's microphone, whilst the third supplies any microphones connected to the I/C. This filtering arrangement ensures that no audio voltage is developed across any one of the three groups of microphones due to speech currents taken by another group.

This arrangement is necessary to prevent for example, an I/C microphone radiating during R/T transmission from either the operator's or Remote Control microphone.

When the Transmitter emission switch is at stand-by and the " remote control unit " switch is at I/C, all microphones are connected in parallel to the grid of the final valve of the receiver. This is the normal " stand-by " condition of the equipment. All members of the crew have full I/C facilities without radiating, subject to interruption by received signals which can be controlled by the receiver volume control.

On the C.W. and M.C.W. positions of the transmitter emission switch, the transmitter is put into operation by the starting of the transmitter genemotor, but the I/C conditions are left unchanged with the exception that " side tone " signals are superimposed whenever the key is pressed.

On the R/T position of this switch, the operator's microphone is transferred to the modulator input. The operator's speech is radiated and also injected into the telephones via the side-tone circuits.

Note that the remaining members of the crew still have I/C subject to interruption by side tone (operator's speech) and any signals received during transmission intervals.

If the emission switch is returned to " stand-by " and the " remote control unit " switch is now placed to " receive," the I/C circuits remain unchanged, although the transmitter genemoter starts. Placing this switch to " send " places the transmitter in operation on R/T and also transfers the remote control microphone from the receiver to the modulator. Speech is radiated and also injected into the telephone circuit via the side tone.

As before, the remaining members of the crew still have I/C subject to interruption by side-tone, and any signals received in transmission intervals.

An important feature of the system is that the operator has over-riding control. If the remote control switch is on " send " and the operator places the emission switch to C.W., M.C.W. or R/T, the remote control microphone is immediately transferred back to the I/C connection of the receiver and the operating conditions indicated by the emission switch are established.

10. REMOTE CONTROL.

Two types of remote control unit are available—P7755 and 1P7755.

For operation from either type it is first necessary for the transmitter and receiver to be adjusted by the operator who must then return his " emission " control switch to the " stand-by " position (leaving the receiver operating and the transmitter off).

(a) Remote Control Unit type P7755.

When the above conditions are established, this control unit allows the equipment to be operated on R/T on the frequency for which it was adjusted by the operator. In the " receive " position of the control switch, the transmitter genemotor is started in readiness for instant changeover to transmission, which occurs when the remote control switch is placed in the " send " position.

(b) Remote Control Unit, type 1P7755.

This unit performs the same functions as the type P7755 unit, and in addition allows the transmitter to be operated on C.W. on the frequency for which it was adjusted by the operator. With the control switch in the " C.W." position the transmitter genemotor starts and C.W. operation is obtained. With the switch in the " R/T." position normal R/T transmission results.

The operator has overriding control in all cases except when the 1P7755 control switch is in the " C.W." position in which case he will be able to transmit on C.W. only.

INSTRUCTION BOOK No. 2-7730R.

AT5/AR8 EQUIPMENT.

SECTION 3—DETAILED DESCRIPTION.

RECEIVER.

Circuit diagram No. 7733 A1 (Wiring) 7733C1 (Schematic).

1. PRINCIPAL SUB-ASSEMBLIES.

Referring to the schematic diagram (Drawing No. 7733C1), it is seen that the C7733 Receiver consists of three separate units.

The C7748 M/F Tuning Unit handles the radio-frequency amplification of the range 140 to 2,000 kc., and its conversion to intermediate frequency, and includes direction-finding facilities.

The C7747 H/F Tuning Unit amplifies and converts the range 2 to 20 Mc. There are no D/F facilities in this frequency range.

Either of these units can be fed to the C7920 I-F/A-F Unit according to the position of the M-F/H-F range switch. The I-F/A-F Unit amplifies the incoming signal at intermediate frequency (755 kc.), demodulates it, and further amplifies it at audio frequency. It also contains the facilities for continuous-wave reception and for intercommunication.

2. HEATER AND PILOT LAMP CIRCUIT.

It will be convenient to consider the heater and pilot-lamp circuit first. This circuit is more complicated than usual, due to two factors. In the first place, neither side of the heater circuit is earthed, and secondly, the circuit is so wired as to be suitable for either 13 or 26-volt operation without internal alteration.

To comply with these conditions, it has been necessary to wire the heaters and pilot lamps in series-parallel banks, together with some balancing resistors and filtering components. The latter have been provided, where necessary, to prevent the introduction of radio-frequency disturbances via the L.T. wiring.

Considered as a 26-volt circuit, the negative side of the battery enters via pin 3 on the power socket. Filter condenser C34 by-passes this lead to earth.

The first parallel 6-volt bank consists of the heaters of V5 and V6, together with resistor R32. The positive sides of both heaters and R32 are connected together, and to the negative side of the second parallel bank, which consists of the heaters of V1, V4, V201, and V202.

The positive side of this bank connects to the negative side of the third bank, consisting of the heaters of V3, V101 and V102 and a pilot lamp, which will be either PL102 or PL201, according to the position of the M-F/H-F range switch. In series with the pilot lamp is one-half of resistor R113.

The junction of banks 2 and 3 is by-passed to earth by C32 in the I-F/A-F Unit and by C110 in the H/F Unit. It also goes to pin 1 on the power socket via filter choke L2. The purpose of this choke will be explained later.

The positive side of bank 3 connects to the negative side of bank 4, which consists of the heaters of V2 and V103, resistor R111 and one half of resistor R113 in series with PL101. It will be noted that the junction of the heaters of V2 and V3 is not connected to the common point of banks 3 and 4. This is due to wiring difficulties, and in any case, is of no great- consequence, since both the heaters concerned are of the same current rating.

The positive side of bank 4 connects to pin 4 on the power socket, and thence to the positive side of the battery. This point is by-passed to earth by C33 in the I-F/A-F Unit, and by C122 in the H/F Unit.

The commoning of the equi-potential points of each bank seems unnecessary, but slight variations in heater resistance are experienced even in normal valves, and under such circumstances, it will be found that a much better voltage distribution is obtained. Furthermore, the change in voltage distribution due to the failure of either a valve, resistor, or pilot lamp is minimised.

It will be noted that PL101, the power-indicator lamp, is alight during the whole time that the low tension is connected to the receiver. PL102 and PL201 are the lamps illuminating the H/F and M/F dials respectively. Only one of these is on at any particular time, depending on whether the H/F or M/F Units is operative, as determined by the position of the M-F/H-F range switch.

When the receiver is to be operated from a 13-volt supply, pins 3 and 4 on the power socket are connected together, and the supply then comes via pin 1 and pins 3 and 4 in parallel. This connection is automatically made in the power supply. No change is necessary in the receiver.

3. LIMITER DIODE.

The input from the aerial socket is connected to the paralleled plates of V6, the limiter diode. The cathodes of this valve go to earth via R30 and its associated r-f by-pass C40, and to the H.T. line via R31.

The combination R30-R31 supplies a standing bias of about two volts ot the cathodes of V6. Thus, for all aerial inputs up to approximately 0.7 volt R.M.S., V6 has no effect other than that due to the inter-electrode capacity, which is slight. For larger voltages, rectification occurs in V6, and some protection is thereby afforded to the input circuits of the receiver against the accidental application of large voltages from extraneous sources such as the associated transmitter.

4. M-F/H-F SWITCH.

The aerial input goes next to an arm on the M-F/H-F switch, S102, whence it may be routed to either the M/F or H/F units, according to the position of the switch.

The switch also connects into circuit the appropriate pilot lamp (as previously explained), and switches the A.V.C. and H.T. to the desired unit. The H.T. is by-passed at the switch by C101 and L3 decouples the H.T. for the tuning units from the main supply.

H/F UNIT :

5. AERIAL-INPUT CIRCUIT.

When S102 is in the H/F position, the aerial input goes next to the range selector S101 Section A (S101A), which routes it to the appropriate aerial-input-coil primary, according to the position of the switch. On Range D, it goes to the primary of L101, on Range E to L102, and on Range F to L103, the other side of the primaries being commoned to the aircraft earth via the receiver frame and the earth terminal. S101A also short-circuits the two primaries which are not in use. The short-circuiting sections of the switch are not shown on the schematic, to avoid unnecessary complication.

6. R-F AMPLIFIER STAGE.

The secondaries of the aerial input coils are adjusted to correct inductance by iron slugs, and are shunted by the preset trimmers C104, C105, and C106. The low-potential points of these circuits are commoned to the A.V.C. line, via r-f filter R102, C107.

The grid points of these circuits are connected to S101B, which routes the appropriate coil to the grid of V101—the r-f amplifier—at the same time short-circuiting the unused coils. C108 is the front section of the tuning-condenser gang, which is shunted by negative-temperature-coefficient condensers C109 and C135 for compensating purposes.

R103 supplies the minimum bias for the cathode circuit, the cathode being by-passed by C102. The screen voltage is supplied from the network R101–R104 and is by-passed by C103.

The plate of V101 goes to S101C, and thence to the primary of either L104, L105, or L106, as selected by the range selector. The low-potential points of the primaries go to H.T. line by way of decoupling network R105–C117. The two primaries not in use are short-circuited by S101C.

7. CONVERTER STAGE.

Mixed coupling is employed in the r-f transformers L104, L105 and L106, the capacity coupling being provided by C132, C133, and C134 respectively. The secondaries have iron slugs and trimmers C114, C115, and C116. A.V.C. is not used on the converter stage, therefore the low-potential terminals of the secondaries go to earth, and the high-potential points to S101D, and thence to the signal grid of V102, the converter valve. Coils not in use are short-circuited by S101D. C119 is the centre section of the tuning-condenser gang, and C120 and C136 are temperature-compensating condensers.

Minimum bias for the cathode circuit is provided by R110 which is by-passed by C112. The screen and oscillator plate are by-passed by C111 and supplied with H.T. through R106. The local-oscillator voltage is injected into the oscillator-grid circuit via C113, the grid leak being R107.

The plate circuit of V102 is in parallel with that of V202—the M/F converter—and goes to the primary of T201 (the first i-f transformer), the H.T. coming via decoupling network R215, C221. C222 is the primary-tuning condenser.

8. OSCILLATOR STAGE.

V103 is a separate Hartley oscillator for the H/F Unit. The pentode type valve is used as a triode by connecting plate and screen together, H.T. being fed through R108 with C121 as a by-pass. R112 is the grid leak, R116 is an "anti-parasite" resistor, and C123 is the grid condenser. C125 is the rear section of the tuning-condenser gang and C124 is a temperature-compensating condenser.

The grid and cathode of V103 are connected to the appropriate tuning coil by S101E, the unused coils being short-circuited by S101F. The oscillator circuits are conventional, the components being as in the table below :—

Range.	*Coil.*	*Trimmer.*	*Padder.*
D	L109	C128	C131
E	L108	C127	C130
F	L107	C126	C129

The plate is at earth potential for r-f, the cathode being above earth, and it is from the latter electrode that the drive is taken for the converter oscillator-grid. R114 and R115 are used to limit the amplitude of the oscillator voltages on Ranges D and E respectively.

M/F UNIT :

9. TRAFFIC-D/F-SENSE SWITCH.

When the M-F/H-F switch is in the M/F position, the aerial socket is connected through to the Traffic-D/F-Sense switch S203. The purpose of this switch is to provide the correct connections for the open aerial (fixed or trailing) for the three types of reception indicated, as will be explained in the succeeding paragraphs.

10. AERIAL-INPUT CIRCUIT. TRAFFIC RECEPTION.

When S203 is in the traffic position, the open aerial is merely connected through to S201B. From there, it goes to the appropriate primary on the aerial-input coils L201–L202–L203, provided that the range selector is in one or other of the traffic positions also.

The other sides of the primaries are earthed. Mixed coupling from the aerial is used, the capacity coupling to the secondary being through C203.

11. D/F RECEPTION.

The D/F position of S203 disconnects the open aerial from the receiver, since the loop aerial only is used for figure-of-eight bearings.

The loop aerial connects via the loop socket, S202 and S201A, to the appropriate primary on the loop-input coils L204, L205 and L206, the secondary of which will be connected to the r-f grid circuit, provided that the range selector is in one or other of the D/F positions also. The loop-input primaries are balanced to earth.

12. SENSE RECEPTION.

In the sense position, S203 again connects the aerial to S201B, but in this case via R201, R218 and C202. These components reduce the amplitude of the input from the open aerial to approximately the same value as the input from the loop. In addition, R218 ensures that the sense resistance is of sufficiently high a value that the open-aerial-circuit current is in phase with the voltage. These two conditions must be complied with to obtain good sense bearings.

R201, the other portion of the sense resistance is made variable so that the receiver will operate satisfactorily with all the likely combinations of open and loop aerials to be met with in practice.

As the range selector should now be in one or other of the D/F positions, the open-aerial input does not go to L201, L202 or L203, but direct to the appropriate secondary of the loop-input coils L204, L205 or L206, where it is mixed with the loop input in correct phase and amplitude.

The Bearing-Reciprocal switch S202 reverses the loop-input connections. This, in effect, rotates the loop through 180 degrees and avoids the necessity for performing this operation mechanically when taking sense bearings.

13. R-F AMPLIFIER STAGE. TRAFFIC RECEPTION.

The secondaries of the aerial-input coils are adjusted to correct inductance by iron slugs. C237 and C238 are range-adjusting and temperature compensating condensers. The low-potential points of these circuits go to the A.V.C. line via r-f filter R202–C206.

The grid connections of these coils go to S201C, which routes the appropriate coil to the grid of V201—the r-f amplifier. S201C also short-circuits unused coils. C207 is the front section of the tuning-condenser gang, shunted by C201, the M/F aerial tuning condenser on the front panel.

The minimum-bias resistor for V201 is R203, by-passed by C204. The screen voltage is supplied from the network R214–R204 by-passed by C205.

The plate of V201 goes via S201D to the primary of either L207, L208 or L209, as selected by the range selector. The low-potential points of the primaries go to H.T. line through the decoupling filter R210–C219. R205, R206 and R207 are primary-loading resistors. Unused primaries are short-circuited by S201D.

14. D/F AND SENSE RECEPTION.

With the range selector in one or other of the D/F positions, the appropriate loop-input-coil secondary is switched into the grid circuit by S201C, which also disconnects the aerial-input coils. Unused loop-input secondaries are short-circuited by S201B.

The low-potential points of the secondaries are commoned to earth, as A.V.C. is not used for D/F or Sense reception.

The voltage supplies and output circuit of the r-f stage remain unchanged when switching from Traffic to D/F or Sense.

15. CONVERTER STAGE.

The secondaries of L207, L208 and L209 have iron slugs, and trimmers C211, C213 and C215 respectively, while C212 and C214 are range-adjusting and temperature-compensating condensers. R217 is a loading resistor for L208. The low-potential ends go to A.V.C. line through r-f filter R208-C216, and the high-potential points to S201E, and from there to the signal grid of V202—the converter valve. The two secondaries not in use are short-circuited by S201E. C217 is the centre section of the tuning-condenser gang, shunted by temperature-compensating condenser C218.

The cathode-circuit minimum-bias resistor is R209, by-passed by C209. The screen voltage comes from H.T. through R213, by-passed by C210. The plate circuit of V202 is in parallel with that of V102—the H/F converter—and goes to the primary of T201—the first i-f transformer, the H.T. coming via decoupling network R215–C221. C222 is the primary-tuning condenser.

16. OSCILLATOR CIRCUIT.

The oscillator section of the converter valve is used in conventional fashion. R211 is the grid leak, and the oscillator grid goes via C233—the oscillator-grid condenser—to S201G, and thence to the appropriate oscillator coil L210, L211 or L212. C234 is the rear section of the tuning-condenser gang, and C235–C236 are temperature-compensating condensers.

The oscillator plate is coupled to the coil through C232 and S201H, and receives H.T. through R212.

The remaining oscillator circuit components are tabulated below :—

Range	*Coil*	*Fixed Trimmer*	*Variable Trimmer*	*Padder*
A	L210	C231	C224	C229
B	L211	C230	C225	C228
C	L212	—	C226	C227

The short-circuiting of the two unused oscillator coils is done by S201F and S201G.

17. I-F/A-F UNIT.

In the discussion on this unit, the C-W/R-T switch is considered to be in the R/T position, except for the section on the beat oscillator.

18. FIRST I-F STAGE.

The secondary of T201—the first i-f transformer—is shunted by the fixed tuning condenser C223, and is resonated to the desired frequency by the adjustable iron core. The grid return is via decoupling network R216–C220 to the A.V.C. line.

The minimum-bias resistor for V1—the first i-f amplifier—is R1 by-passed by C1. The screen-voltage network is R3–R2, the screen being by-passed to earth by C2.

The plate goes to the primary of T1—the second i-f transformer. C4 is the fixed shunt condenser and R4–C3 is the H.T. decoupling circuit.

19. SECOND I-F STAGE.

There are two i-f transformers between the first and second i-f amplifier valves, the secondary of T1 being coupled to the primary of T2 by a short shielded line.

The fixed shunt condenser for the secondary of T1 is C5, while C6 is the line-coupling condenser. Similar functions are performed for the primary of T2 by C10 and C9 respectively.

The grid of V3—the second i-f amplifier—goes to the secondary of T2, the low-potential point of which circuit goes to A.V.C. Line. C11 is the fixed shunt condenser for the secondary.

R10 is the minimum-bias resistor for V3, and C12 is the associated by-pass condenser. The screen is by-passed by C14, and receives H.T. via R11.

The plate of V3 goes to the primary of T3, and fourth i-f transformer, and also supplies the A.V.C. voltage through C19, as explained in the section on A.V.C. below. Decoupling of the plate circuit is provided by R12 and C13. C15 is the fixed shunt condenser.

20. DIODE-DETECTOR STAGE.

The secondary of T3, which is shunted by C16, feeds the signal diode of V4, which valve combines the functions of detection, audio-frequency amplification and automatic-volume-control supply.

The rectified signal passes via the r-f filter R13, C17, C18 and a shielded lead, to the a-f volume control R18. Portion of the audio-frequency component of the signal (according to the setting of the control) is then impressed on the grid of V4 through coupling condenser C28.

21. A-F AMPLIFIER STAGE.

The audio frequencies appearing on the grid of V4 are amplified by the pentode section of the valve. R20 is the grid resistor, and one-half of the A.V.C. voltage is applied to the grid via decoupling network R21, C27. Fixed bias is supplied by the cathode resistor R25 by-passed by C20. The screen voltage comes from the H.T. line through R26, the screen being by-passed to cathode by C22.

The plate load is R27 and the secondary of T5 in series (see section on intercommunication below), decoupling being performed by R14 and C26. C24 couples to the grid of the output valve V5. C23 is an r-f by-pass condenser.

22. OUTPUT STAGE.

R28 is the grid resistor for V5—the output valve—and R29 is the bias resistor. This valve is used in triode connection, therefore the screen and suppressor are connected to the plate, which receives H.T. through the primary of T4—the output transformer. C25 is an r-f by-pass, and C29 with variable resistor R16, constitutes the tone control. The H.T. line is by-passed to earth by C39.

The headphone output goes from the secondary of T4 to pins 1 and 4 on the junction box socket. Both 'phone lines are by-passed to earth by condensers C30 and C31.

23. AUTOMATIC VOLUME CONTROL.

The A.V.C. diode in V4 rectifies portion of the intermediate-frequency output of V3, which is supplied via C19. The rectified current flows through R22, R23 and R25 to the cathode.

The A.V.C.-delay voltage is, therefore, provided by the voltage drop across R25. The full A.V.C. voltage is supplied to all controlled valves, with the exception of V4, through the filter R24-C21. V4, as previously explained, has only one-half of the A.V.C. voltage, taken from the mid-point of R22-R23. Further information on the A.V.C. is given in the next section (C-W/R-T switch).

24. C-W/R-T SWITCH.

The C-W/R-T switch, S1, performs the operations necessary when changing from reception of radio-telephony to continuous-wave, whether modulated or not. The C.W. position is also used when taking D/F observations.

The various functions of the switch are set out in the table below :—

Function.	*Switch Position.*	
	C.W.-M.C.W.-D/F.	*R/T.*
Beat Oscillator H.T.	On.	Off.
A.V.C.	Off (earthed).	On.
A-F Volume Control R18.	Inoperative (slider disconnected).	Operative.
R-F Volume Control R17.	Operative.	Inoperative (short-circuited).

The two volume controls are mechanically linked, and are operated by the volume-control knob on the front panel.

When the A.V.C. is on, the pre-detector and a-f stage-gains are automatically varied by the amplitude of the incoming carrier, so that the receiver output is approximately independent of the incoming signal strength. The a-f volume control is then necessary to enable the operator to vary the output to suit individual requirements.

The A.V.C. must be disconnected when the beat oscillator is functioning, otherwise rectification of the beat-oscillator output by the A.V.C. diode will de-sensitise the receiver.

25. R-F VOLUME CONTROL.

When the A.V.C. is off, a pre-detector control is essential to avoid over-loading of the r-f and i-f stages, therefor the r-f control R17 is switched into circuit. This control reduces the gain of the pre-detector stages by increasing the cathode bias. It is by-passed by C36.

The control does not return to earth in the receiver, but goes through the interwiring to the keying relay in the aerial coupling unit, and is earthed there when the relay is not energised.

When the transmitter is on, the keying relay is energised, the earth return broken, and the receiver inoperative, except for intercommunication. Thus, it is not possible for the transmitter and receiver to be on together and the discomfort of large audio outputs from the receiver, due to the associated transmitter, is avoided.

26. INTER-TUNING SWITCH.

In order to permit the simultaneous operation of transmitter and receiver (as when setting up the transmitter to the frequency of a distant station for common-wave working), an inter-tuning switch, S2, is fitted to the tone control, and is operated by rotating the control to its extreme anti-clockwise position.

The r-f volume control is then earthed in the receiver, which continues to be operative regardless of the position of the keying relay.

27. BEAT OSCILLATOR.

The beat oscillator V2 functions at the intermediate frequency of 755 kc. The resonant circuit is L1-C37. L1 is variable by means of an iron slug, which is controlled from the beat-oscillator-tuning control on the front panel, thus permitting the operator to vary the oscillator frequency so as to provide an audible beat with the intermediate frequency.

The oscillator section of V2 is arranged as a Hartley circuit. The signal grid is unused, and is, therefore, short-circuited to earth. Bias is obtained from R6 by-passed by C35. The oscillator grid leak is R5 and the grid condenser C7. The screen and oscillator-plate supplies come from H.T. line via R7 and S1B, the associated by-pass condenser being C8.

The pentode section of V2 is used as an electron-coupled stage for the output of the oscillator section, the plate supply resistor being R8. The output is fed via a shielded line and C38 to the signal diode of V4, where it is mixed with the output of the i-f amplifier to give the audible beat.

28. INTERCOMMUNICATION AMPLIFIER.

The output stage of the receiver is arranged to provide continuous intercommunication facilities for the crew of the aircraft.

The audio output of the microphone comes via the interwiring to pin 9 on the junction box socket, the return lead being via pin 3 on the power socket, to the negative side of the battery. It is thus impressed across the primary of T5, the secondary of which transfers the stepped-up voltage to the grid circuit of V5.

The microphone output is thus in parallel with the receiver a-f amplifier output, and is transferred to the headphones output of the receiver in the normal manner.

TRANSMITTER.

(Circuit Diagram No. 7731A1—Wiring; 7731C1—Schematic).

51. GENERAL ELECTRICAL ARRANGEMENT.

The transmitter consists essentially of two separate sets of tuning circuits, one covering the range from 140 to 500 kc. (M/F bands) and the other the range from 2 to 20 Mc. (H/F bands). The two sets of circuits employ the same valves for their operation and changeover from one to the other is achieved by a single control operating the M/F H/F changeover switch S3-S5. C.W., M.C.W. or R/T operation is available on all bands. With this arrangement, the transmitter controls may be set for one frequency in the M/F range and one frequency in the H/F range and changeover from one to the other is then made simply by the operation of the M/F H/F switch.

On medium frequency operation, the transmitter employs a Radiotron 807 valve (V3) as master oscillator to cover the range from 140 to 500 kc. in four bands. This oscillator stage drives the power amplifier which employs two Radiotron 807 valves in parallel (V4, V5), the tuning unit for which covers the above range in three bands. On M.C.W. and R/T operation, the power amplifier stage is grid-modulated by a Radiotron 6V6G valve (V1) which operates as a tone oscillator on M.C.W. and as a microphone amplifier on R/T. The M.C.W. modulation level, at between 900 and 1,000 cycles per second, varies between 40 and 80% according to carrier frequency, no adjustment of this level being possible.

On high frequency operation, the transmitter employs a Radiotron 6V6G valve (V2) as either crystal or master oscillator. Provision is made for mounting six crystals with appropriate switching or the switch may be turned to the master oscillator positions, there being four bands to cover the range from 2 to 5 megacycles.

The oscillator output between 2 and 5 megacycles drives a Radiotron 807 valve (V3) operating as a buffer amplifier or frequency multiplier. The same tube is employed for this service as is used for the master oscillator on the medium frequency range. This stage operates at oscillator frequency between 2 and 5 megacycles and at twice oscillator frequency between 5 and 10 megacycles, covering the range from 2 to 10 megacycles in two bands.

This 807 buffer amplifier stage in turn drives the two 807 valves (V4-V5) in parallel in the power amplifier circuit. The anode circuit of this last stage operates at buffer amplifier frequency from 2 to 10 megacycles and at twice buffer amplifier frequency from 10 to 20 megacycles. The complete range from 2 to 20 megacycles is covered in five bands.

The 6V6G tone oscillator-amplifier valve, V1, is again employed to grid modulate the power amplifier stage on M.C.W. and R/T. The modulation level on M.C.W. may be increased by slightly detuning the buffer amplifier anode circuit, thus varying the P.A. grid current.

The output circuits of the transmitter are designed to load the power amplifier to full output into a 100 Ω pure resistive load.

52. GENERAL CONSTRUCTION.

Mechanically the transmitter consists of the main framework in which are mounted a number of removable sub-assemblies. The main framework is divided into four approximately equal sections by horizontal and vertical partitions and mounts the valves, mounting panels carrying small components, transformers, chokes, changeover switches, power sockets and H/F power amplifier tuning condensers and houses the other four sub-assemblies as follows:—

The High Frequency Master Oscillator Tuning Unit, which is mounted in the bottom left-hand corner of the framework, mounts the coils, trimmer condensers, tuning condenser, crystals and changeover switch employed in the master oscillator circuit. The unit is removed through the front of the transmitter. The six crystals plug into sockets behind a hinged panel on the front of the unit.

The High Frequency Buffer Amplifier and Medium Frequency Master Oscillator Unit contains the H/F buffer tuning condenser, coil and range switch and the M/F Master Oscillator tuning condenser, coils, trimmer condensers and changeover switch and a small globar panel mounting several fixed condensers and resistors. The unit is mounted in the top left-hand corner of the framework.

The Medium Frequency Power Amplifier Tuning Unit is situated in the bottom right-hand corner of the framework and is mounted on the horizontal partition. This unit mounts the variometer coil, fixed condensers, R.F. choke and range switch for the M/F power amplifier anode tuning circuit.

The High Frequency Power Amplifier Coarse Tuning Unit consists of a switch and inductance assembly which mounts on the top of the horizontal shelf in the right-hand side of the framework and comprises the H/F anode tuning coil.

All external connections, with the exception of the R.F. output and earth, are made by two multi-pin sockets mounted on the front of the unit in the bottom right-hand corner. The lower socket provides 8 connections and joins the transmitter to the power supply unit while the upper socket provides 12 connections for coupling to the junction box. The R.F. output lead terminates in a special socket in the top right-hand corner of the frame and an earth terminal at the bottom completes the external connections.

53. L.T. SUPPLY CIRCUITS.

The transmitter heater circuit is arranged for either 13 or 26 volt operation so that it may be employed without modification in aircraft with either 12 or 24 volt battery supplies. In neither case is any earth connection made to the battery supply.

Referring to the transmitter schematic diagram (Drawing No. 7731C1), it will be seen that the H.F. Master Oscillator valve (V2) and the modulator valve (V1) have their heaters connected in parallel and that this parallel pair is connected in series with the heaters of valves V3, V4 and V5. As the heater current for a 6V6G valve is exactly half that required for an 807 valve, this arrangement requires a nominal voltage of 25.2 volts and a current of 0.9 amps. The two ends of the chain are connected to the 26 volt input terminals 3 and 4 on the "Power" socket, giving 26 volt operation of the heater circuits.

For 13 volt operation of the heaters, the two ends of the above heater chain are joined together and the supply connected from this point to the centre of the chain between valves V3 and V4. To enable this changeover to be made in the Power Unit so that all transmitters remain standard, a connection is made from the centre of V3 and V4 to terminal number 1 on the "power" socket.

R.F. By-pass condensers are connected at various positions from heaters to earth to prevent interaction among the various valves in circuit.

The pilot light circuit employs a 3.5 volt torch globe and is operated from the 13 volt supply with the resistor R24 in series. When operating on a 26 volt supply, the resistor R23 is also in series with the pilot light and R24, limiting the current to the value required. This arrangement permits changeover from 13 to 26 volts to be made in the power unit as for the heater system. On 13V operation the resistor R23 is connected in parallel with R24 and PL1. The condenser C18 is connected across the pilot lamp to by-pass any R.F. currents present. The pilot indicates that the transmitter filaments are alight and that the transmitter machine is ready to start.

A further L.T. circuit in the transmitter controls the M/F H/F changeover relay in the Aerial Coupling Unit by means of contacts on the M/F H/F changeover switch, S5. This relay operates on 13V and when the set is connected to a 13 volt supply, this supply is connected directly to the relay. When the equipment operates on 26 volts, the resistor R15 is connected in series with the relay to limit the current to the correct value. The changeover from 13 to 26 volt operation is performed in the power unit as for the other L.T. circuits. On 13 volt operation, the resistor R15 is connected across the 13 volt supply.

54. METERING.

The meter mounted on the front panel of the transmitter, in conjunction with the meter switch S2, reads the current in all the important circuits. The meter switch has five positions, reading from left to right as follows :—

(a) B.A.
Buffer amplifier cathode current with a full scale deflection of 250 mA.

(b) P.A.
Power amplifier cathode current of both tubes with a full scale deflection of 250 mA.

(c) P.A. Grid.
Power amplifier grid current of both tubes with a full scale deflection of 15 mA.

(d) Xtl. Osc.
High frequency oscillator cathode current with a full scale deflection of 15 mA.

(e) Mod.
Modulator-tone-oscillator cathode current with a full scale deflection of 250 mA.

The meter movement requires 5 mA for full scale deflection and metering is performed with shunt and series resistors. All circuits to be metered have their individual shunt resistors which are all of the same value but all positions requiring the same scale factor use a common series resistor. That is, all positions requiring a full scale deflection of 250 mA employ the same series resistor R9 and all positions requiring a full scale deflection of 15 mA employ the same series resistor R10.

The shunt resistor designations for the various measuring positions are as follows :

(a) B.A. Cathode	R21.
(b) P.A. Cathode	R30.
(c) P.A. Grid	R8
(d) Xtl. Osc.	R11.
(e) Modulator	R4.

55. LINE SWITCH.

The line switch, S4, is provided to disconnect the load from the transmitter for tuning purposes. When this switch is in the " off " position, the 100 Ω line is disconnected and a second pole on the switch places the resistor R32 in series with the power amplifier screen grids. This reduces the voltage on these screens and thus protects them during tuning operations. With the switch S4 in the " on " position, the resistor R32 is short-circuited, thus applying full voltage to the P.A. screens and, at the same time, the 100 Ω line is connected to the P.A. output circuit in use.

When the switch is in the " off " position, only a small amount of power will be radiated from the transmitter due to the switch capacity and this position should be used when intertuning the equipment so that the receiver is not overloaded. This position may also be used for communication between aircraft in the same flight where only a very small amount of radiation is necessary.

56. KEYING CIRCUITS.

The transmitter is keyed by means of the keying relay in the aerial coupling unit (refer para. 82 below) and all valves, including the modulator are controlled. This is achieved by connecting the cathode return circuits of all valves together and passing them to earth through the 1 megohm resistor R20. A small amount of current passing through this resistor will generate sufficient cathode bias to practically cut-off all valves. When the key is pressed, the keying relay short-circuits this resistor and all valves pass current in the normal way. The modulator is keyed, together with the other valves so that side tone may be obtained on both C.W. and M.C.W. from this source.

57. M/F H/F CHANGEOVER.

The M/F H/F changeover switches in the transmitter perform all the operations necessary to change the valve connections from the medium frequency to the high frequency tuning circuits or vice versa. Contacts also operate a relay in the Aerial Coupling Unit for M/F H/F changeover there (refer para. 83 below).

The functions are performed by means of two switches S3 and S5 which are mechanically ganged together and which are operated by means of the same control knob. The switch S3 is mounted in the top right compartment at the front immediately behind the control knob and is coupled, through the vertical partition, to S5 which is mounted with its shaft vertical through the horizontal partition.

The switch S3 has two poles and performs all the power amplifier anode switching operations. One pole switches the anodes of the valves V4, V5 from the M/F tuning section to the H/F tuning section whilst the second pole switches the output loading connection between the same circuits.

The switch S5 is of the " Oak " type and has two wafers, one of which is above the horizontal shelf and the other below. The wafer above the panel carries contacts to changeover the anode circuit of the buffer amplifier valve V3 and also to operate the M/F H/F relay in the coupling unit as explained in paragraph 53 above. The bottom section of the switch below the panel switches the grid circuit of the buffer amplifier valve V3 and also removes the H.T. supply from the anode of the H/F oscillator valve V2 when changing over to M/F.

Some transmitters with low serial numbers may have different switching connections from those shown in Drawing No. 7731C1 on that portion of S5 which switches the H.T. supply to the H.F. oscillator valve. For modification details refer to paragraph 66 below.

58. M/F OSCILLATOR SECTION.

The medium frequency master oscillator employs the Radiotron 807 valve, V3, and is coupled to the power amplifier through the coupling condenser C15. The tube operates with 300V on the anode, the screen being supplied from the same source through the resistor R22. The oscillator has four bands to cover the range from 140 to 500 kc. and a single switch, S201, switches a coil and trimmer condenser for each range in parallel with the common tuning condenser C205. The fixed tuning condensers C206, C207 and C213 are also common to all bands. The frequency bands and corresponding coils and trimmer condensers are listed in the table below :—

Band	*Tuning Coil.*	*Trimmer Condenser.*
140 to 185 kc.	L201	C201
185 to 260 kc.	L202	C202
260 to 370 kc.	L203	C203
370 to 500 kc.	L204	C204

When operating on any particular band, coils not in use are short-circuited to prevent resonance effects.

The medium frequency oscillator tuning circuits, together with the high frequency buffer amplifier tuning circuit, are mounted on a small removable unit of spot-welded angle construction, mounted in the top left-hand corner of the framework. For instructions for the removal of this unit, refer to Section 6, Paragraph 71. In addition to the above, this unit also mounts, on a small globar panel, the anode coupling condenser C208, the grid feedback condenser C209 and the grid leak resistor R201. Referring to the circuit diagram, all components with reference numbers in the 200 group are mounted on this removable unit.

59. M/F POWER AMPLIFIER.

The medium frequency power amplifier employs the two Radiotron 807 valves connected in parallel (V4 and V5) and the tuning unit covers the range from 140 to 500 kc. in three bands. The valves operate at a nominal 550V on the anode, the screens being supplied from the 300V source. Tuning is performed by means of a variometer type coil L301 and the switch S301 switches taps on this coil and fixed tuning condensers for the various ranges; on the higher frequency ranges, that portion of the coil not used is short-circuited. The tapping arrangement for the three ranges is indicated on the diagram (7731C1) and the following table gives the tuning ranges with the appropriate condensers employed :

Range	*Tuning Condensers*	*Loading Condensers*
140 to 180 kc.	C301, C302	C303, C304
180 to 290 kc.	C301, C302	C303, C304
290 to 500 kc.	C302	C304

The condenser C305 is a D.C. blocking condenser and remains in circuit on all ranges.

The output coupling circuit, as indicated, is a capacity voltage-dividing network and the values are so designed to load the power amplifier to full power output into a 100 Ω pure resistance.

Cathode bias is employed in the power amplifier circuit and by-pass condensers in appropriate positions assure stable operation.

The tuning circuit, comprising coil, condensers and R.F. chokes, is mounted on a small folded chassis and forms a removable unit which is fastened to the underside of the horizontal partition on the right-hand side of the framework by means of four non-losable screws. For details of mounting and removal refer to Section 6, Servicing and Maintenance, para. 72. With reference to Drawing No. 7731C1, this unit mounts all components with circuit reference numbers in the 300 group.

60. H/F OSCILLATOR.

The high frequency oscillator employs the Radiotron 6V6G valve V2 and operates as either a crystal-controlled oscillator or self-excited master oscillator in the frequency range from 2 to 5 megacycles. The output of the oscillator is coupled through the condenser C10 to the Radiotron 807 valve V3 operating as buffer amplifier or frequency multiplier.

The oscillator valve V2 operates as a tetrode with approximately 60 volts on the screen and anode and the crystals are connected from anode to grid. Cathode bias is employed and the oscillator is keyed with the other stages of the transmitter as previously explained. The anode potential is obtained from the 300 volt supply through the potentiometer R13, R14. The screen grid is by-passed to earth through the condenser C9 and is isolated from the anode by the radio frequency choke RFC1.

The oscillator selector switch S101 has ten operating positions and two " off " positions. The operating positions are for six crystals, X1 to X6, and four master oscillator ranges. This switch is not fitted with any stops and complete rotation is possible in either direction. A short-circuiting rotor on the switch shorts crystals that are not in use to prevent their interaction with the master oscillator (refer to modification note below, Section 3, paragraph 66). Other shorting sections similarly short-circuit those master oscillator coils which are not in use at the time.

On the master oscillator circuit separate adjustable coils and trimmer condensers are used for each range and the common tuning gang C105 and temperature compensating condenser C106 are switched to the coil and trimmer in use. The following table gives the tunning ranges of the master oscillator with the corresponding coil and trimmer condenser :

Range	*Coil*	*Trimmer*
2 to 2.5 Mc.	L101	C101
2.5 to 3.2 Mc.	L102	C102
3.2 to 4.0 Mc.	L103	C103
4.0 to 5.0 Mc.	L104	C104

When operating on crystal control, the resistors R102 and R103 in series form the grid leak and the condenser C109 is short-circuited. When operating as a master oscillator, the condenser C108 is the grid coupling condenser and the resistor R102 is short-circuited. R101 is a D.C. voltage equalising resistor and C7 the anode coupling condenser.

All components with circuit reference numbers in the 100 group and including the six crystals, are mounted on a small removable unit of welded angle construction which may be readily withdrawn through the front of the transmitter. (Refer to Servicing Instructions, Section 6, Para. 67).

61. H/F BUFFER AMPLIFIER.

The High Frequency Buffer Amplifier or frequency multiplier which follows the oscillator, employs the Radiotron 807 valve V3 which, when operating on medium frequency, performs the duty of master oscillator as explained above. The tube operates as an amplifier on fundamental oscillator frequency between 2 and 5 megacycles and as a harmonic amplifier between 5 and 10 megacycles and is coupled to the Power Amplifier grid through the condenser C15. The tube operates as a tetrode with 300 volts on the anode and the screen supply is obtained from the 300 volt source through the dropping resistor R22 as on the medium frequency range. Audio and R.F. by-pass condensers are also provided.

The grid of the tube is connected, through the switch S5, to the oscillator output coupling condenser C10, the resistor R17 forming the grid leak. The resistor R16 and condenser C11 are provided as a decoupling filter to prevent R.F. currents from getting into the pulse unit connection, which is made at this point. (Refer Section 3, Para. 64 below). The condenser C37 is a neutralising condenser to reduce the reaction of the B.A. on the oscillator and connects from oscillator grid to B.A. anode.

The anode of the tube is connected, through another section of the switch S5, to the anode tuning circuit comprising the tapped coil L205, tuning condenser C201 and the D.C. blocking condensers C211 and C212. The tuning unit has two bands to cover the range from 2 to 10 megacycles, namely 2 to 4.5 megacycles and 4.5 to 10 megacycles. The higher frequency band is obtained by short-circuiting portion of the coil L205 by means of the switch S202, the tuning condenser remaining unchanged. The resistor R202, in series with the 300V H.T. supply and condenser C212, form a decoupling filter. The coil L205, switch S202, condensers C210, C211, C212 and the resistor R202 are all mounted on the removable unit that mounts the M/F master oscillator tuning circuits, (refer to servicing instructions for method of removal, Section 6, Para. 71).

62. H/F POWER AMPLIFIER.

The high frequency power amplifier delivers power output in the range from 2 to 20 megacycles and employs the two Radiotron 807 valves, V4 and V5, in parallel. These valves operate with a nominal 550 volts on the anode, the screen being supplied from the 300 volt source.

The grid and cathode circuits of the P.A. remain exactly the same as for medium frequency operation, the anodes being switched to the H/F tuning circuit comprising the coil L1, switch S6, tuning condenser C32 and D.C. blocking condensers C30 and C31. The two bank switch S6 selects the appropriate tuning and loading taps for the frequency required. The tuning range of 2 to 20 megacycles is split up into five bands, S6 therefore having five positions. The unused portion of the coil is short-circuited to prevent resonance and the tuning ranges obtained are as follows :—

2 to 3.5 megacycles.
3.5 to 6.5 megacycles.
6.5 to 10 megacycles.
10 to 15 megacycles.
15 to 20 megacycles.

The whole of the range of the tuning condenser is not employed on each band and the dial on this condenser is engraved with concentric lines to indicate the usable portion of the range in each case.

From 2 to 10 megacycles, the power amplifier operates at Buffer Amplifier frequency, but from 10 to 20 megacycles the stage is used as a frequency multiplier, the anode circuit then being tuned to twice the buffer amplifier frequency of four times the oscillator frequency.

Output from the unit is obtained by means of a tap on the anode tuning coil L1 and the condenser C24 is provided in series with the output lead to prevent the application of D.C. to the 100 Ω line. The coil and two switch sections form a readily-removable assembly known as the " H/F P.A. Anode Tuning Unit, Coarse," (refer Section 6, para. 73).

63. MODULATOR AND EMISSION SWITCH.

The grid modulator unit employs the Radiotron 6V6G valve V1 which operates as a triode screen and anode being connected together, with 300 volts to the anode.

The power amplifier stage of the transmitter is grid modulated by this unit, the grid current from the former, in the Stand-by, M.C.W., or R/T positions of the " emission " switch S1, passing through the resistor R7, the secondary winding of the modulation transformer T2 and the metering resistor R8 to earth. The resistor R7 provides additional bias for the modulated stage and is by-passed for audio frequencies by the condenser C36. The effect of this resistor is to reduce materially the P.A. grid current. When the " emission " switch is on C.W. the P.A. grid is returned directly to earth through the metering resistor R8, the grid current in this case being the normal high value and the modulation winding of the transformer being disconnected.

On R/T transmission, the modulator valve operates as a microphone-amplifier-modulator, the transformer T1 being the microphone input transformer directly connected to the grid of the valve in the " Stand-by " and " R/T " positions of the " Emission " switch. The resistor, R1 is the grid leak and C1 an audio by-pass condenser. In the " Stand-by " position of S1 the input transformer is connected to the Remote Control Unit microphone circuit, so that the transmitter may be modulated from the remote control unit microphone, and the operator's microphone is connected to the intercommunication system.

When the " Emission " switch is placed in the C.W. or the M.C.W. position, the valve V1 operates as an audio oscillator, the output frequency being between 900 and 1,000 cycles per second. In this case, the condenser C3 is employed as the feedback condenser, R2 as the grid leak and condenser C4 as the circuit tuning condenser.

It will be noticed that the valve oscillates on C.W. as well as M.C.W., this arrangement being provided to furnish sidetone output to the operator on both C.W. and M.C.W. so that he can monitor his transmission. For this purpose, this valve is keyed together with the other valves in the transmitter. The side-tone is obtained from another secondary winding on the modulation transformer across which are connected resistors R33 and R34. In the " Stand-by " and " R/T " positions of the switch S1, the full output voltage from this winding is employed, but to reduce this output to a comfortable level on C.W. and M.C.W. the potentiometer consisting of R33 and R34 is employed. The sidetone output voltage is fed to the 'phone circuit in series with the receiver output.

Of the other components employed in the circuit, the resistor R5 and condenser C5 form a decoupling filter, C2 is an audio by-pass condenser, R3 the cathode bias resistor and R4 the metering resistor.

Besides performing the above functions the " Emission " switch has two extra poles which perform switching operations as follows. The first pole switches on the transmitter genemotor on the power unit by means of the starting relay. In the " Stand-by " position, the starting circuit is switched through to the remote control unit so that the machine may be started from there if required. The other contact of the switch closes the keying relay in the " R/T " position so that the carrier remains on all the time the switch is in this position. In the " Stand-by " position, this circuit is switched through to the remote control unit so that the same function may be performed at that point.

64. PULSE TRANSMISSION.

Pulse transmission facilities are provided in the transmitter on H/F only, the grid return lead from the buffer amplifier valve V3 being taken to the tag No. 7 on the junction box socket. If this connection is returned to earth, normal transmission will result. For pulse transmission, a high negative bias is applied to this lead, cutting off the B.A., and the P.A., without drive, produces no output. The pulse unit then momentarily reduces this bias to zero at small intervals of time. Each time the bias is reduced to zero, the B.A. becomes operative and drives the P.A. to peak output. Pulses of power are thereby produced, the shape, frequency and duration of the pulse depending on the pulse unit.

65. SPECIAL MECHANICAL FEATURES.

There are several special mechanical features included in the construction of the transmitter which warrant special description and these are mentioned separately in this section.

(a) Crystal Compartment.

The crystals are mounted in plug-in sockets in a compartment in the bottom left-hand corner of the transmitter and of which the crystal selector switch designation plate forms a hinged cover. This cover is hinged at the bottom and opens downwards from the top but can only be opened when the selector switch is in the " off " position with the tail of the knob pointing vertically downwards. In this position, a slot in the cover clears the tail of the knob and allows the cover to open. The cover is held closed by a spring clip at each side of the top. Also, on the front of this panel are two white spaces on which can be written the frequencies of the crystals in use. If crystals are changed, these markings can be rubbed out and the new frequencies substituted.

(b) Pilot Light.

The pilot light, which indicates when the transmitter filaments are on, is mounted in a screw-in socket behind a projecting red bezel. The bezel mounting is held on to the front panel by means of two non-losable screws in the bottom flanges. For instructions for replacement, refer to Section 6, Para. 66. It is very important that the transmitter is not operated without the pilot lamp as this upsets the voltage balance of the valve filaments.

(c) Knobs and Scales.

With the exception of the H/F master oscillator, all scales are directly attached to the control knob. The position of any scale must be fixed with respect to the angular position of the component to which it is attached. As all knobs have D-shaped holes to fit flats on the control shafts, it becomes necessary to provide some means of adjusting the scales to the required positions. All scales have a large hole in the centre and are clamped to the back of the knob by means of a stepped disc. These discs are fastened to the knob by means of three screws which pass from the front of the knob through clearance holes and are tapped into the disc at the back. The heads of these screws are revealed if the cover plate on the front of the knob is removed. If these screws are loosened, the scale becomes loose on the back of the knob and may be rotated and tightened up in the position required. The H/F master oscillator scale has the same feature on the mounting boss, the control knob operating on a vernier drive shaft. For instructions as to the correct positions for setting dials, refer to Section 6, Servicing and Maintenance.

(d) Stops.

All tuning controls, with the exception of the M/F power amplifier tuning variometer which has completely free rotation, are fitted with stops. The H/F power amplifier tuning control utilises the stops in the condenser itself, these being sufficiently robust, but the other three controls have additional stops which are adjusted so that they operate just before the condenser reaches the end of its travel in either direction. In the case of the H/F master oscillator, these are fitted to the vernier drive disc inside the unit but on the other two controls, namely H/F B.A. and M/F M.O., these are fitted directly to the scales and front panel. The stopping posts are drilled eccentrically and can, therefore, be adjusted to the desired position.

(e) Locks. (Refer Drawing No. 7752D1).

All tuning controls on the transmitter are fitted with locks of special construction which do not place any strain on the drive spindle. After removal of a knob and scale, the complete lock assembly may be removed as a unit (refer to Servicing and Maintenance instructions).

The locking mechanism consists of two brake shoes which, when locked, firmly grasp opposite edges of a brake disc on the back of the control knob and scale. The outer shoe consists of a metal plate which closely fits the brake disc on one side and projects from it on the other side. In a slot in this projection fits the other brake shoe, one end of which fits the opposite edge of the brake disc to the outer shoe. Both shoes are free to slide and are actuated by two bar springs and a cam at the ends away from the brake disc. The cam is operated by the locking knob and when in the unlocked position, the flats on the cam relieve the pressure on the springs and free the brake shoes from the brake disc. When the lock is operated, the rise on the cam forces the springs apart and, therefore, forces this end of the brake shoes apart. As one shoe slides inside the other, this will cause the braking ends to move towards one another and thus firmly grasp opposite edges of the brake disc. The springs, which consist of short, straight, square steel bars, are provided to take up the excess movement of the cam and to give constant pressure on the brake disc. The lock is assembled on a mounting plate, a hole in one end of which fits over the control shaft to be locked, the other end mounting the cam shaft. The assembly is screwed to the front panel by a single screw through a slot in the centre of the mounting plate.

(f) Handles.

These are fitted to the front of the unit, one on each side, for ease in withdrawing it from the shock base and also for carrying purposes. The handles can be turned to the side out of the way but it is intended that these be stiff in their movement so that they will not swing about in service. Adjustment of the stiffness of the handles is possible by means of the screws in the side of the mounting pillars.

(g) Side and Top Covers.

The side covers on the transmitter, and the receiver, are arranged in three pieces, namely the back and two sides. A top cover is also provided. The top is removed first by sliding it towards the back until the bollards in the frame disengage from the slots in the top cover. It may be very stiff to slide as springs under the rear bollards force the lid upwards all the time. The bollards themselves must not be unscrewed. In replacing, the front bollards engage in the slots before the rear ones and the lid must be pushed right forward until the rear fits neatly to the back cover. The front edge of the cover goes underneath the top bent edge of the front panel.

Of the other screens, the sides are removed first by pulling the rear edge outwards and to the rear. It is necessary to move the cover outwards to disengage the small protections in the cover from the rear angle of the framework. The rear cover has spring clips at the bottom to hold the lower edge to the frame and is removed by pulling upwards. These clips must be re-engaged in the bottom angle when replacing. The covers fit on with the louvres pointing downwards.

66. MODIFICATIONS.

During the early stages of production, several modifications have been incorporated in the transmitter and, therefore, transmitters with early serial numbers may not agree in all respects with the wiring and schematic diagrams. The modifications carried out are listed below. None of the modifications carried out on the transmitter will affect the equipment as a whole.

(a) H/F Oscillator Range and Crystal Selector Switch.

(Serial Nos. 1 to 10 inclusive are not modified.)

The shorting type rotor and contacts on Section 1 rear of this switch have been added to short-circuit the crystals when operating on master oscillator control. Also Sections 1 and 2 have been reversed to reduce the length of these shorting leads. To incorporate these changes in a unit which has not already been modified requires a major mechanical and wiring alteration to the oscillator unit or its replacement by a new spare.

(b) H/F Oscillator Anode Supply Switching.

(Serial Nos. 1 and 4 require new switch plate; Serial Nos. 1 to 10 inclusive have not the wiring modification.)

In the later transmitters, the supply to the H/F oscillator is switched off when on M/F as shown in the diagram by contacts on S5, Section 2, rear. Several transmitters have no switching facilities at all and others have the switching in series with the bleeder R13, R14 instead of the anode supply to the valve. In the first case, to complete the unit a new switch plate is required, but this can be easily replaced, if available, after removing the H/F oscillator unit from the framework. The switch wafer concerned is then revealed, being mounted above the unit removed in a shallow can on the horizontal shelf. In the second case, a simple wiring change is all that is necessary to bring the unit up-to-date.

(c) P.A. Heater By-Pass Condenser, C27.

(Serial Nos. 1 to 7 inclusive and No. 9 not modified.)

In several installations, this condenser is connected to the opposite side of the heater to that shown in the diagram. A simple wiring change will bring the unit up-to-date, but no effect will be noticeable.

(d) M/F Master Oscillator Fixed Tuning Condensers C206, C207.

These condensers, together with the temperature compensating condenser C213, are connected in parallel with the tuning gang for range adjustment and the values employed may vary from unit to unit. The values may be 208 or 190 $\mu\mu$F and in the latter case there may or may not be a 6 $\mu\mu$F condenser connected in parallel with C213. No change is to be made to the value included in any particular unit as the frequency range will be upset thereby.

(e) Stencilling Errors.

The condensers C205 and C210 on the M/F M.O. and H/F B.A. tuning unit have been stencilled in the reverse manner. All after Serial No. 42 inclusive, with the exception of No. 46 will be correct. In the others C210 should be C205 and vice versa.

(f) Meter By-Pass Condenser, C34.

This condenser was originally a 0·01 μF mica condenser, but in later transmitters this has had a 0.1 μF paper condenser connected in parallel with the above and numbered C38.

AERIAL COUPLING UNIT.

Circuit diagram No. 7732D12 (Wiring), 7732D13 (schematic).

81. GENERAL ARRANGEMENT AND CONSTRUCTION.

The Aerial Coupling Unit is separate from the transmitter and is arranged to couple the 100 Ω output of the latter to any aerial likely to be encountered in service aircraft. Electrically, it consists of two separate circuits, one for medium frequency tuning and the other for high frequency tuning. The 100 Ω line from the transmitter is changed over from one to the other by means of a relay which is operated by the M/F H/F switch in the transmitter. Metering is provided on both M/F and H/F, a common indicator also being changed over by the above relay. The keying relay is also mounted in the unit.

The Coupling Unit consists of a framework of welded angle iron construction with removable top, sides and back. The sides and back are made in one piece of folded aluminium for efficiency reasons and small handles on the back enable it to be easily withdrawn from the framework. The top is also of aluminium. All the components are mounted either from the bottom or the front with the exception of the relays which are mounted on an angle frame at the back. All controls are accessible from the front and the aerial current meter is mounted in the centre of the front panel. R.F. connections are made with special plugs and sockets mounted along the top of the front panel and other connections are made via a twelve-pin socket on the bottom left-hand corner to the junction box. A separate earth terminal is also provided.

82. KEYING.

The keying relay (REL2, Drawing No. 7732D13) is mounted in the back of the coupling unit and is contained in a sealed cover and plugs into a socket mounting. The adjustments of this relay are very critical to give the correct contact order for good keying conditions and if the relay gets out of adjustment in service, it should be removed from its socket and replaced by another. Unless under exceptional circumstances, adjustments must NOT be made to this relay in service. The relay is firmly held in its socket by means of two non-losable screws.

The relay has several contacts and besides changing over the aerial connections from transmitter to receiver, it keys the cathode circuits of the transmitter and the receiver preliminary stages in such a manner that the receiver is quenched during transmitting periods. A complete description of the operation is given in Section 2, paragraph 7 above.

83. M/F H/F CHANGEOVER.

A second relay (REL1) in the coupling unit is provided for changeover from M/F to H/F and vice versa. This relay is permanently mounted below the keying relay and is operated by the M/F H/F switch in the transmitter as previously explained (Section 2, para. 7 and Section 3, para. 53). This relay is of the two pole, two way type and one pole changes over the 100 Ω line from the M/F to the H/F tuning circuits, while the second pole changes over the aerial meter between the same circuits. The normal unoperated position of the relay is the H/F position.

84. M/F TUNING CIRCUITS.

Referring to Drawing No. 7732D13, the medium frequency tuning circuit consists of the input tuning variometer L3, which is connected from the 100 Ω line to earth and adjusts the coupling of the aerial to the transmitter, and the aerial tuning inductance and switch combination L4 and S4. The aerial tuning inductance consists of a large coil, bank wound with Litz wire and tapped in a number of positions. The switch, S4, short-circuits that portion of the coil not in use and a variometer rotor in the bottom of the coil provides a fine adjustment for covering between taps.

The input tuning variometer L3 is the " M/F Input Tuning " control, the switch, S4, the " M/F Aerial Tuning Coarse " and the variometer in L4, the " M/F Aerial tuning Fine." This medium frequency tuning circuit is connected to the " Trailing " aerial insulator in the top of the coupling unit.

The medium frequency aerial tuning circuit has been designed to couple the M/F Transmitter output at between 140 and 500 kc. to aerials of between 95 and 500 μμF capacity and of radiation resistances between 5 and 100 Ω.

RFT2, in series with the inductance L4, is the meter transformer. For metering system, refer to para. 86 below.

85. H/F TUNING CIRCUITS.

The H/F Aerial Coupling circuit has been designed to couple the 100 Ω output of the transmitter to any type of aerial likely to be encountered in service aircraft. With reference to the diagram, it will be seen that the circuit consists of capacity from the 100 Ω line to earth and inductance and capacity to tune the aerial.

The capacity for matching the aerial to the transmitter is divided into two sections, the "H/F Input Tuning Coarse" and the "H/F Input Tuning Fine." The former consists of the control switch, S1, and fixed condensers, C2 to C7 inclusive, each of which has a value of 350 μμF. The switch, S1, is so arranged that it can connect any number of the fixed condensers in parallel with the condenser, C1, by means of a shorting type rotor. The switch has seven positions giving steps of 0, 350, 700, 1,050, 1,400, 1,750, 2,100 μμF in parallel with the condenser, C1. C1 constitutes the "H/F Input Tuning Fine" control and covers the range between steps of the fixed condensers.

For tuning the aerial the inductance L1 and L2 and the condenser C8 are provided. The inductance, L1, is a fixed tapped inductance and the switch, S2, selects the tap required. The unused portion of the coil is short-circuited. This switch constitutes the "H/F Aerial Tuning Coarse" control. The inductance, L2, is a continuously variable coil of the roller type with 16 turns and covers the range between taps on L1. This is the "H/F Aerial Tuning Fine" control and the dial indicates the number of turns and fractions of a turn in circuit, zero being the minimum inductance.

The condenser, C8 and switch, S3, constitute the "Aerial Loading Capacity" control and the condenser may be connected in series with the aerial, short-circuited, or connected in parallel with the aerial as required and as indicated by the "Series," "Direct" and "Parallel" positions of the switch respectively.

It is to be noted that this control is operative on H/F only.

RFT1 is the current transformer for metering the H/F aerial current.

86. METERING.

The common meter on the front panel of the unit reads on both M/F and H/F, being changed over automatically as explained above. On M/F, the 1.5 amp. scale on the meter is read, whilst on H/F, the 3.0 amp. scale is to be used. The readings on this meter are to be taken as a tuning indication only and not as a true aerial current reading as wiring and socket capacity effects will, in most cases, cause the meter to read incorrectly, this depending on the aerial in use. Also, very low current readings are not to be taken as a fault in either the transmitter or the aerial meter, as this will again depend on the aerial in use, it being remembered that, with high impedance aerials, full power may be radiated with very low aerial current.

Metering is performed by means of the radio frequency current transformers RFT1 for H/F and RFT2 for M/F. Separate thermo couples TC1 and TC2 are also used, the secondaries of these being changed over to the one meter as already explained. In the H/F case, an R.F. filter circuit is included to prevent stray R.F. currents in the thermocouple. Chokes RFC1. RFC2 and condenser C9 form this filter.

87. CALIBRATION CHART.

An Aerial Coupling Unit Calibration Chart on a white enamelled aluminium plate is supplied with each equipment and on this can be written the frequencies in use and the tuning positions of all controls corresponding to those frequencies. It is intended that this be mounted on a wall close to the coupling unit and, when retuning the equipment to a preselected frequency, quick resetting of the coupling unit controls is obtained by reference to the chart. Pencilled marks on this chart can be rubbed out when required and new values substituted.

JUNCTION BOX.

Circuit diagram No. 7735Dr.

101. JUNCTION BOX AND INTERCONNECTING CABLES.

The junction box contains a terminal panel which is revealed when the cover plate is removed. All terminals are numbered and grouped to correspond with the various interconnecting cables which attach thereto.

In all instances, where multi-pin sockets are fitted to one end of any cable, the wiring has been arranged so that each numbered terminal in any group connects to the same contact number in the plug.

The outer face of the cover plate carries designations which indicate the unit to which that cable connects. The inside face of the cover carries essential instructions regarding the connection of various cables, and the alterations required if alternative facilities are used.

All interconnections between tags on the terminal panel are made on the underside. Ready access for servicing is obtained if the base plate is removed. The microphone filters are then revealed. The panel on which these are carried can be withdrawn once the four holding down screws are removed from the ends. All connecting wires to the filter panel are of sufficient length to allow it to be withdrawn and swung clear of the back of the junction box.

The pictorial view of the installation, Photo No. 1704 shows an alphabetical cable coding which identifies the PURPOSE only.

Whenever any of the various cables A, B, C, D, etc., have been assigned a definite length, Y10 identification numbers have been allotted. A small wrap on tag bearing the identification number is affixed to each cable. Since the type number of the junction box has no significance regarding the lengths of cables attached thereto, it is most important when ordering a Junction Box and set of cables for any particular installation to specify fully the complete list of identification numbers of all cables required. Standard lengths already existing are shown in the appended table.

102. STANDARD CABLE LENGTHS. (Reference Photo. No. 1704.)

Alpha	*Hudson Cables*		*Catalina Cables*	
Code	*Length*	*Ident. No.*	*Length*	*Ident. No.*
A	6′ 3″	Y10H–90076	3′ 6″	Y10H–90086
B	6′ 1″	Y10H–90077	11′ 0″	Y10H–90087
C	3′ 9″	Y10H–90078	5′ 0″	Y10H–90088
D	4′ 9″	Y10H–90079	4′ 9″	Y10H–90079
E	4′ 1″	Y10H–90080	4′ 3″	Y10H–90089
F	4′ 10″	Y10H–90081	4′ 10″	Y10H–90081
G	3′ 1″	Y10H–90082	9′ 0″	Y10H–90090
H	2′ 9″	Y10H–90083	2′ 9″	Y10H–90083
J	3′ 0″	Y10H–90084	4′ 0″	Y10H–90091
K	5′ 6″	Y10H–90085		
L				
M				
N		*Y10H–90124		

Various other lengths of cable are available and lengths may be added to meet special requirements. It is desirable however to keep the number of different lengths to a minimum to avoid unnecessary duplication and confusion.

POWER UNIT.

Drawing No. 7734D6 (24–28V), 7734D9 (12–14V).

111. GENERAL ARRANGEMENT AND CONSTRUCTION.

The power unit supplies H.T. power to both the receiver and transmitter and operates from the aircraft batteries at either 12-14 or 24-28 volts input. A change in input voltage requires a change in power unit, a particular power unit being designed for one voltage only. That is, a 26 volt power unit will not operate on 13 volts and vice versa..

No other alterations are required to the equipment when changing from 13 to 26 volts or vice versa, except in case of pulse generator. (Refer to separate instructions.) The unit supplies approximately 270 volts at 60mA for the operation of the receiver, 550 volts at 200mA for the main H.T. supply to the transmitter and 300 volts 100 mA for the minor H.T. to the transmitter. Circuits are also provided for distributing the L.T. supplies to the various units. In the following, the 26 volts unit is described with reference to Drawing No. 7734D6.

The Power Unit consists of a long, narrow, welded steel framework in which are mounted the audio and R.F. filter circuits and on top of which are mounted the two machines. Control switches, fuses and power outlet sockets are mounted along one side and the L.T. input terminals on the top between the two machines. The latter terminals are provided with a reversible cover to protect them from accidental contact. The complete unit slides lengthwise on to its mounting base which is not mounted on shock absorbers.

112. RECEIVER POWER SUPPLY.

The receiver power supply section employs a genemotor which is mounted on the left-hand of the unit looking at the control side. Referring to the diagram (Drawing No. 7734D6) which shows the 26V unit circuit, the switch S1 controls the L.T. to the complete equipment and when operated, lights the receiver filaments and starts the receiver machine. This switch is the left-hand switch on the control panel marked "Receiver". The fuses F8 and F9, mounted beside the above switch, protect the receiver L.T. supplies, the supply being connected from these to the power socket marked "REC." for the receiver filaments and to the L.T. side of the receiver genemotor. R.F. chokes and filter condensers in series with the supply to the machine prevent noise generated by the machine from getting into the L.T. supply circuits. The high tension output from the machine is provided with the fuse F7 and audio and R.F. filters prevent the machine noise from being carried to the receiver.

All the components in the receiver filter circuits are mounted in the compartments in the frame underneath the receiver machine. The fuse F7 is mounted in the "secondary fuse" panel at the opposite end of the control panel.

113. TRANSMITTER POWER SUPPLY.

The L.T. supply for the transmitter is controlled by the switch S2. When this is operated, the supply is connected to the transmitter filaments through the fuses F3 and F4. When the "Emission" switch on the transmitter is operated (Section 3 paragraph 63) the negative side of the battery is connected to Tag No. 8 on the transmitter outlet socket on the power unit. This causes the starting relay REL 1 to operate and connect the L.T. supply to the transmitter H.T. machine. Thus, when the transmitter "Emission" switch is in the "Stand-by" position, the machine will not be running but will start when this switch is placed in any of the operating positions. R.F. filter chokes and condensers in the L.T. Leads to this machine prevent the radiation of noise generated in the machine and the fuses F1 and F2 are connected in series with the same circuit.

The H.T. output rating of the machine is 550 volts at 350 mA and this 550 volt supply is connected to tag 9 of the outlet socket through the fuse F5. The 300 volt supply for the transmitter is obtained from the same source through the potentiometer R4, R5. The fuse F6 protects this supply and an audio filter circuit is included.

The switch S2 is mounted in the centre of the control panel with the fuses F1, F2 beside it (labelled "Transmitter Machine L.T."). The fuses F3, F4, F5 and F6 are mounted on the "Secondary Fuse" panel at the right-hand end of the control panel.

The resistor R1 is in series with the keying relay supply and the resistors R2 and R3 form a potentiometer for microphone supply with condenser C15 as microphone supply filter. The components in the transmitter supply filters are mounted directly underneath the transmitter machine.

114. CARTER MACHINE STARTER.

The normal power unit employs an Elcon or Emmco Genemotor but certain special units employ Carter Genemotors Type E5535 with the same output ratings. Units employing the latter have Serial Nos. from 1 to 24 inclusive. With the Carter machine, it is necessary to employ an auxiliary starting relay as a resistance starter. The relay REL2 and resistors R6 and R7 in the diagram form this starter and the operation is as follows:

When the main starting relay closes, the L.T. supply is connected directly to the field of the machine but is connected to the armature through the low resistance R7. As the coil o relay REL2 is connected across the armature of the machine, the voltage drop across the resistor R7 will prevent this pulling in. R7 limits the current drawn by the machine. As the machine gathers speed and the back E.M.F. is increased, the current will decrease and reduce the voltage drop across the R7. When the voltage across the armature rises to a predetermined value, the relay REL2 operates and short-circuits the starting resistor R7 and the machine has the full voltage applied to the armature. The resistor R6 is connected in series with the coil of the relay. When the L.T. is disconnected, the relay REL2 releases and is ready for the next starting cycle.

115. FUSE RATINGS.

The required ratings and types of the various fuses employed in the equipment are as follows:—

Fuse No.	*Type*	*Rating*		*Wire Size (when used)*	
		26V	*13V*	*26V*	*13V*
F1	Slydlok	.....	.....	22 S.W.G. T.C.	20 S.W.G. T.C.
F2	Slydlok	.....	.....	22 S.W.G. T.C.	20 S.W.G. T.C.
F3	Autoglas 4AG	5 amp.	5 amp.	.....	.....
F4	Autoglas 4AG	5 amp.	5 amp.	.....	.....
F5	Autoglas 4AG	½ amp.	½ amp.	.....	.....
F6	Autoglas 4AG	⅜ amp.	⅜ amp.	.....	.....
F7	Autoglas 4AG	⅜ amp.	⅜ amp.	.....	.....
F8	Slydlok	.....	.....	34 S.W.G. T.C.	28 S.W.G T.C.
	Autoglas 4AG	10 am .	20 amp.	.....	.....
F9	Slydlok	.....	.....	34 S.W.G. T.C.	28 S.W.G T.C.
	Autoglas 4AG	10 amp.	20 amp.	.....	.....

116. MODIFICATIONS FOR 12-14V OPERATION.

The differences in the 12–14V Power Unit to that described above are only slight, the main change being to the machines, which in this case are wound for 12.75 volts input. The functions of the unit are exactly the same as for the 26V case and reference to Dwg. No. 7734D9 will indicate the wiring changes necessary. It will be seen that the terminals 3, 4 on each outlet socket are joined together and to the L.T. negative supply, the L.T. positive connecting to tag 1 in each case. This arrangement allows 13V operation of all heaters as explained under the separate descriptions of transmitter and receiver.

The L.T. supply to the transmitter machine is connected directly to the fuses F1, F2, and thence through the relay and filters to the machine. This eliminates the switches S1 and S2 from this circuit, this being necessary because of the very heavy currents present. The machine may be isolated from the L.T. circuit by removing the fuses F1 and F2. The relay circuit is so arranged that it will not operate until both the switches S1 and S2 are closed so that the operation of the equipment remains exactly the same as for the 26V case.

The relay coil is arranged for operation on 13V instead of 26V. The resistor R1 is deleted and the value of R2 is changed to correct the microphone supply circuit voltage.

117. TYPES OF MACHINES AND INTERCHANGEABILITY.

Receiver Types, 26 and 12.75 Volts.

Ref. No.	Type No.	Description.
Y10A/55428	MDD3716	26-volt receiver type.
Y10A/55467	MDD3716–1	12·75-volt receiver type.

Transmitter Type, 26 Volts.

Ref. No.	Type No.	Description.
Y10A/55461	MDD	26-volt original Carter machine.
Y10A/55429	MDD6719	26-volt Elcon large type machine.
Y10A/55464	MDD4622	26-volt Emmco-Elcon machine, totally enclosed or ventilated by fan over H.T. windings on armature.
Y10A/55740	MDD4622–2	26-volt Emmco-Elcon machine. Ventilated with fan on extended shaft but with bakelite ring brush rockers.
Y10A/55743	MDD4622–4	26-volt Emmco-Elcon machine. Ventilated by fan on extended shaft. Brushes are fitted through the end housing, thus doing away with the bakelite brush-carrying mould.

Transmitter Type, 12.75 Volts.

Ref. No.	Type No.	Description.
Y10A/55468	MDD6719–1	12·75 Elcon large type machine.
Y10A/55474	MDD4622–1	12·75-volt Emmco-Elcon machine. Ventilated by fan on extended shaft, but with bakelite ring brush rockers.
Y10A/55742	MDD4622–3	12·75 Emmco-Elcon machine. Ventilated by fan on extended shaft. Brushes are fitted through the end housing, thus doing away with the bakelite brush-carrying mould.

INTERCHANGEABILITY OF PARTS.

Types MDD6719 and MDD6719-1.

Carcase, brush gear, brushes, bearings, and frames, are still interchangeable between the two machines, but windings are different, one being for 26 volts and the other for 12·75 volts. None of the parts on these machines are interchangeable with any other type.

Types MDD4622 and MDD4622-2.

Carcase, brush gear, grushes, bearings, end frames and windings, are all interchangeable. Armatures are not directly interchangeable as the second type has an extended shaft and fan. If the bearing cover plate and end bell from one machine are changed with the armature then this is possible. End bells for the latter type must be ventilated.

Type MDD4622-1.

This is the 12·75 equivalent of the above and carcase, end frames, end bells and H.T. brush gear are interchangeable with the above, but the field windings, L.T. brushes and armature windings are different.

Type MDD4622-4.

Windings, armature, bearings, and end covers will be interchangeable with the 26-volt, type MDD4622-2, but the carcase, end frames, brush holders and brush caps will not.

Type MDD4622-3.

Windings, armature, bearings and end covers will be interchangeable with the 12·75-volt, type MDD4622-1, but the carcase, end frames, brush holders and brush caps will not.

NOTE.—The above schedule is set out in the order in which Genemotors were designed and developed.

The last type listed in each section supersedes all previous types in that section and is electrically interchangeable with them.

INSTRUCTION BOOK No. 2-7730R.

AT5/AR8 EQUIPMENT.

SECTION 4—INSTALLATION INSTRUCTIONS.

1. GENERAL.

The mounting positions of each unit in the aircraft should be chosen with due regard to necessary clearances on the back, top and sides for movement of the unit on its shock suspension. The space requirements are shown on the attached Drawings :

Nos.		
	Transmitter	7731B1
	A.C.U.	7732B2
	Receiver	7733B1
	Power Unit	7734B1, B2, and B3
	Junction Box	7735D2
	Remote Control	7755D3

Two general methods of mounting of the equipment are possible :—

(a) Each shock base can be individually sprung on its own shock absorbers;

(b) The shock bases can be firmly bolted to an equipment rack or frame which itself is shock mounted.

2. SEPARATE MOUNTING OF UNITS.

The shock bases are individually mounted on their own shock absorbers. Since the shock bases are partially dismantled for easy packing purposes, it is essential that the shock absorbers, holding-down bolts, and limit washers, be correctly assembled. Refer to Drawing No. 7749D1 which depicts a sectional view of the correct assembly.

It is important that the limit washers be employed as shown if full protection to the equipment is to be obtained. The central holding-down bolt secures each absorber to the mounting bracket or platform. Omission of the limit washers will allow excessive movement of the absorber with consequent risk of damage to the bottom cover plate of each unit.

3. COMBINED MOUNTING OF UNITS.

In this method two or more units of the installation are mounted in a single equipment-rack or frame, which is itself shock mounted. The four shock absorbers are removed from each shock base which is then bolted firmly to the mounting frame. The holes normally used for securing the shock absorbers can be employed for the holding-down bolts, fastening the shock bases to the frame. Since these holes are located in the top of a light gauge channel section which will be damaged if the bolts are tightened excessively, it is recommended that spacers or packing pieces be used to carry the screwing-up stresses.

4. CORRECT METHOD OF INSTALLING CABLES.

All cables and the junction box are intended to be removable items and not portion of the fixed wiring of the aircraft. In the event of damage to any portion of the equipment, necessitating rapid and complete checking, it is intended that all units and connecting cables can be quickly removed or replaced. Therefore, the junction box should be located in an accessible position. All cables should be run as direct as possible. Wherever it is necessary to cleat the cable in position, spring clips or other type of quick-opening fastening should be employed.

Removal of plugs from cables to enable the lead to be passed through an existing small hole should be definitely avoided unless no alternative exists.

5. CONNECTING THE BASIC UNITS OF THE EQUIPMENT.

Having mounted the various sections of the equipment in the aircraft, the standard connecting cables supplied should be fitted. The correct order of connecting these cables will follow automatically if performed as given below :—

First, insert all cables attached to the junction box. The cover of this box carries titles over each outgoing cable, giving the name of the unit to which the far end is to be connected. Both the transmitter and receiver have two cable outlets marked respectively " junction box " and " power ".

Cables from the junction box, therefore, fit into the sockets marked " junction box ", on each of the main units; the remaining socket takes the cable which runs direct to the power unit. There are two cables to the power unit, one from the transmitter and one from the receiver. These cables are, in certain aspects, similar. The elbow fittings are arranged at different angles, and the lengths vary slightly. Refer to Section 2, paragraph 102 for correct cables. Photograph No. 1704 shows correct directions of all elbows for a Hudson Installation.

The " aerial " terminal on the receiver is to be connected to the " Rec." terminal on the Aerial Coupling Unit by means of cable " G ". The " 100 Ω line " terminal on the transmitter is also to be connected to the " Trans." terminal on the A.C.U. by cable " H." In both the above instances, the type of fitting on each cable will indicate the correct arrangement. Note that the fittings on the aerial leads will allow either aerial to be directly connected to the receiver, without making contact with the Aerial Coupling Unit.

Certain additional connections not provided for by the junction box cable assembly may be required.

When a connection has to be made from the equipment to the I/C circuits of the aircraft, refer to instructions on the inside of the junction box cover. The identification number of the standard cable (K) is given in table, Section 3, paragraph 102.

The Power Unit has to be connected to the battery supply in the aircraft. A length of twin heavy current lead is provided (cable J). It is advisable that the point of attachment of this cable be selected so that the total length of mains from the battery to the Power Unit is kept at a minimum.

The L/T terminals on the unit are covered with a removable cover, allowing side entry of the main L/T cable. The cover can be turned around to allow the cable to enter on either side of the power unit, as desired

6. CONNECTING THE REMOTE CONTROL UNIT.

Where possible cable connections in this equipment are so arranged that terminal numbers at each end of the cable correspond, but certain additional leads to the remote control units do not conform to this standard. Therefore, when connecting either type of unit, it is necessary to refer to the instructions inside the terminal covers.

Access to all terminals in the remote control unit is obtained by removing the lower half of the front panel. The cable clamp can be mounted on either side of the unit according to convenience. For mounting purposes, the back of the unit must be removed. Four holding-on screws are brought out through clearance holes in the front panel. Removal of these screws allows the unit to be pulled off its base. After the base has been fixed to the wall of the aircraft, the control unit should be screwed back on the base. It is possible to remove the front cover and the base separately.

7. D/F LOOP CABLE FOR HUDSON AIRCRAFT.

In Hudson aircraft, Cable No. Y10H–90124 must be used to connect the D.F. loop to the receiver.

Two modifications are required before the cable can be fitted—

(a) The cable fitting on the base of the loop must be changed.

(b) The existing hole in the girder near the base of the loop provided for the D.F. cable has to be increased. Refer to R.A.A.F. instructions.

Regarding item (a), all required parts are supplied with the D.F. cable. Remove the 4 screws in the corners of the plate on the loop base on which the cable fitting is attached. Withdraw the plate and associated contact brushes.

Transfer the insulated panel mounting the three brushes to the new plate-brush-fitting assembly, attaching it by means of the new screws and spacers supplied.

Reconnect the brushes to the new cable plug as shown on Drawing No. 8410D1.

Remount the assembly in the base of the loop using the 4 special screws provided. It is very important that the brush mounting plate is not accidentally inverted when remounting, otherwise the brushes will not line up with the slip rings.

Provided the hole in the girder has been enlarged, the cable may now be plugged into the loop and the receiver. The cable should be cleated down at the minimum number of points with quick-opening clips.

NSTRUCTION BOOK No. 2-7730R.

AT5/AR8 EQUIPMENT.

SECTION 5—ADJUSTMENT AND OPERATION.

CHECKING AND ADJUSTING A NEW INSTALLATION:

1. STARTING UP.

Place the emission switch on Transmitter to stand-by.

Place R.C.U. switch to I/C (if control unit is fitted).

Place both switches on Power Unit ON. Receiver Genemotor should start and all filaments should light.

Allow 30 seconds warming up time.

2. RECEIVER AND I/C.

Check the operation of receiver using free aerial connection, i.e., plug receiver line direct to aerial.

Test the following:

Speech signals into any microphone should be heard at good I/C level in all 'phones connected to the system.

Operation of the sending key will de-sensitise the receiver against incoming signals whilst the key is down, if the tone control is in any position except full anti-clockwise. (Equipments with Serial Numbers below 10 may not contain the modification allowing receiver keying.)

In the latter position, the intertuning switch is closed and the receiver remains operative independent of the action of the keying relay. The relay does not affect the I/C in any position of the intertuning switch.

3. D/F AND SENSE CHECK.

The D.F. and "Sense" functions require a careful check.

Sharp minimum should be obtained on aural bearings.

The sense test requires the fixed aerial to be plugged straight through to the receiver.

In taking sense bearings a correct bearing is indicated by minimum receiver output in the "Bearing" position of the loop reversing switch, and a reciprocal bearing by minimum receiver output in the "Reciprocal" position of this switch.

Should it be found that sense readings are reversed, the loop cable and loop socket connections should be checked for correct connections, Refer Drawing No. 8401D1.

If the cable is correct, then the scale of the drive unit should be reset 180 degrees with respect to the loop.

After correction, the D.F. error curve of the aircraft should be rechecked.

4. PRELIMINARY ADJUSTMENTS OF TRANSMITTER.

The aerials and R.F. lines may now be restored to the normal arrangement for common frequency, common aerial operation, refer Photo. No. 1704, and the tuning and adjusting of the transmitter proceeded with.

Place Transmitter line switch, S4, " off."

Select M/F or H/F band as required with the changeover switch S3–S5.

If the M/F Band is employed—

Set the " M/F M.O. range " switch, S201, to the range required.

Select the required frequency on the " M/F M.O. Tuner " dial.

Place the meter switch, S2, in the " P.A." position.

Place the Emission switch, S1, in the " C.W." position. The transmitter genemotor should start.

Select the appropriate band on the " M/F P.A. Range " switch, S301.

Press the key and tune the " M/F P.A. Tuner " control to give minimum current in the meter.

The transmitter is then completely tuned on M/F and the coupling unit should be adjusted as explained below.

If the H/F band is to be used—

Set the " H/F M.O. Range " switch, S101, to the required position on either crystal or M.O.

If the M.O. is being employed, set the scale to the required frequency. If crystal is being employed, it will not be necessary to adjust this dial.

Set the " H/F B.A. Range " switch, S202, to the appropriate range, taking care to consider whether harmonic multiplication is required or not.

Place the " H/F P.A. Range " switch, S6, in the position required.

Set the meter switch, S2, to the " B.A." position.

Place the Emission switch, S1, in the " C.W." position. The transmitter genemotor should start.

Press the key and tune the " H/F B.A. Tuner " control to give minimum reading in the meter. Lift the key.

Place the meter switch in the " P.A. " position.

Press the key and tune the " H/F P.A. Tuner " control to give minimum reading in the meter.

Place the meter switch in the " P.A. Grid " position and recheck the tuning of the B.A., tuning in this case to maximum reading in the meter.

5. GENERAL NOTES ON TUNING AND HARMONIC MULTIPLYING.

On M.F. the P.A. should not be operated on harmonics of the oscillator frequency, although this is possible with certain switch combinations.

On H.F., the following conditions of harmonic operation should be used :

Carrier Frequency	*B.A. Frequency*	*P.A. Frequency*
2–5 Mc.	Fundamental of Oscillator	Fundamental of Oscillator.
5–10 Mc.	2nd Harmonic of Oscillator.	2nd Harmonic of Oscillator.
10–20 Mc.	2nd Harmonic of Oscillator.	4th Harmonic of Oscillator.

In certain special instances when operating on crystal drive, it might be desirable to operate the B.A. on 3rd harmonic and the P.A. on 3rd or 6th harmonic of crystal frequency. The combination results in lower efficiencies and less output than the recommended method. Therefore, unless unavoidable, no one stage should be used for multiplying to higher orders than twice the grid frequency of that stage.

In general, during tuning up on H.F. it is easier to tune the B.A. to maximum P.A. grid current than to the dip in the B.A. cathode current, particularly on harmonic operation. On M.F. since the oscillator drives the P.A. direct, the meter switch should be set to P.A. and the latter tuned to the minimum reading.

6. TUNING OF COUPLING UNIT.

Having tuned the transmitter, the line switch may be placed " on " and the coupling unit tuned and adjusted.

In the following, it will be assumed that both aerials are connected or equivalent artificial aerials are used.

The necessary adjustments to the coupling unit on M.F. comprise—tuning the aerial by the coarse and fine controls and adjustment of the input tuning to give the maximum radiation (aerial current) consistent with the maximum allowable power input to the P.A.

7. ADJUSTMENT OF M.F. CIRCUIT.

Set " input " tuning to mid-position, set " coarse aerial tuning " to position 12. Rotate " fine aerial tuning " from 0 to 100, observing aerial meter for rise of aerial current.

Repeat procedure on each succeeding lower switch position, on " coarse aerial tuning " until point is found. Adjust " input " tuning variometer for maximum aerial current.

Note that this input adjustment does not tune the coupling unit in the normal sense of the word but only adjusts the coupling between the transmitter and A.C.U., thereby controlling the amount of power transferred from the transmitter. After any alteration to the " input tuning," the "fine aerial tuning " should be rechecked. It will be found that " input " adjustments only affect the aerial tuning when the coarse tuning switch is on a low numbered tap. Even in this case the effect is small.

8. ADJUSTMENT OF H.F. CIRCUIT.

The adjustment of the coupling circuit on H.F. is less straightforward than on M.F., owing to the fact that the circuit has to be capable of matching the very much greater range of electrical valves which H.F. aerials exhibit. This necessitates additional controls resulting in extra adjustment operations. If the following procedure is adopted the adjustments will be simplified.

Two points should be remembered before proceeding with the tuning.

(i) The higher the operating frequency the more critical become the adjustments, a given change in any control producing a much larger effect.

(ii) The higher the operating frequency the less the capacity and inductance that will be required in the tuning circuits.

NOTE.—When tuning the coupling unit the P.A. anode tuning on the transmitter must not be moved from the position found with the line switch off.

9. TUNING PROCEDURE FOR H.F. CIRCUIT.

Set the " H.F. input tuning fine " control to zero.

Set the " H.F. input tuning coarse " control to position 1.

Set the " H.F. aerial tuning coarse " control to position 1.

Set the " H.F. aerial loading capacity " switch to the " direct " position.

With the " Line " switch " on," press the key. The P.A. anode current should read from 150 to 200 mA. Rotate the " H.F. aerial tuning coarse " control until a position is found which makes the P.A. anode current decrease.

Adjust the " H.F. aerial tuning fine " and, if necessary, the " H.F. aerial tuning coarse " controls until minimum P.A. anode current is obtained.

If no indication of reduction in anode current is found when the coarse tuning control is first rotated, place the " H.F. aerial loading capacity " switch in the " series " position and repeat. If no tuning indication is found in this position, repeat with the capacity switch in the " Parallel " position.

If the coupling unit is being tuned to a high frequency, say over 8 to 10 megacycles, then the variations on the coarse tuning control may be too great and it will then be necessary to search with the " H.F. aerial tuning fine " control on each position of the coarse tapping switch, starting from position 1.

NOTE.—When tuning the coupling unit the P.A. anode tuning control on the transmitter must not be moved from the position found when the unit is tuned with the " line " switch " off."

When the " H.F. aerial tuning " coarse and fine controls have been adjusted to give minimum P.A. anode current proceed as follows :—

Increase the " H.F. input tuning fine " control until the P.A. anode current increases to a maximum. Note what this maximum is and then reduce this control until the current is 10 to 20 mA lower than this maximum. If insufficient range is available on the fine control, increase the coarse control.

Retune the aerial with the " H.F. aerial tuning " coarse and fine controls to give minimum current in the P.A. anode meter. The minimum obtained should be greater than that first obtained.

Again increase the " input tuning " controls to give the same maximum anode current as previously and retune with the " H.F. aerial tuning " controls to minimum current.

This process should be repeated and each time the tuning is adjusted the minimum value will increase. Continue the process until the minimum value obtained when the tuning controls are adjusted is 5 to 10 milliamperes below the absolute maximum obtainable when the circuit is out of tune or until the minimum value thus obtained is 200 milliamperes whichever is the lesser.

If, during the above process, the aerial meter indicates some aerial current, the tuning may be continued employing the aerial meter and tuning the " aerial tuning " controls to give maximum current. The " input tuning " controls are then increased in small steps and the " aerial tuning " controls readjusted until an absolute maximum of aerial current is obtained. If the " input tuning " controls are increased beyond this point a reduction in aerial current will be noticed.

Note that the " input tuning " controls are always increased in steps and never used as tuning controls. If it is attempted to use these as true tuning controls, spurious tuning points will be found and the circuit may be finally incorrectly adjusted resulting in loss of power.

10. CALIBRATION CHART.

The final stage of coupling unit adjustments should be to record on the calibration chart supplied the scale readings of all A.C.U. dials for each operating frequency.

Operating Instructions for a previously-checked equipment.

11. STARTING UP.

Check that transmitter emission switch is on " stand-by. "

Check that R.C.U. switch is on I/C.

Place both switches on power unit to "on." Note that the "Emission" switch is the main on-off control for the transmitter.

Allow ½ minute for valve cathodes to warm up

The Receiver and I/C are now operating.

The tuning of the receiver is straightforward if note is taken of the designations of the various switches and dials. It should be remembered, however, that normal sensitivity of the receiver is not realised with the standard aerial and line connections until the coupling unit has been tuned correctly. If common-wave working with listening-through is to be employed, the intertuning switch should be opened by placing the tone control anywhere except in the full anti-clockwise position.

12. TUNING TRANSMITTER TO ASSIGNED FREQUENCY.

Select required channel for operations M.F. or H.F.

Select crystal or M.O. range. Adjust to dial setting for correct frequency if M.O. is used

Select band required in each remaining stage, paying particular care when harmonic multiplication is used.

Place line switch off.

Place emission switch to C.W.

Press key and tune the various stages, taking note of the instructions on the various dials. The procedure to be followed is outlined in detail in Paragraph 3 above.

Lock all controls.

13. TUNING COUPLING UNIT TO ASSIGNED FREQUENCY.

Set all controls to the scale readings given on the A.C.U. calibration.

Place line switch "on," press key and, if necessary, slightly readjust the fine aerial tuning to compensate for any small variation in aerial constants due to weather or other random effects.

Finally, lock all controls.

14. ADDITIONAL ADJUSTMENTS FOR R/T TRANSMISSION.

On H.F. the P.A. grid current is subject to somewhat wide variations resulting from the use of fundamental and 2nd harmonic operation of the B.A.

Set meter switch to P.A. Grid, detune B.A. until a grid current of 2mA is obtained.

Best modulating conditions in the P.A. will now be realised.

15. TUNING TRANSMITTER TO RECEIVED SIGNAL.

Close the intertuning switch on the receiver by rotating tone control fully anti-clockwise. This ensures that the receiver will be operative when the transmitter key is down.

Tune the receiver to zero beat to the incoming signal to which the transmitter is to be adjusted. If the signal received is weak, the free aerial connection to the receiver should be employed. The receiver must not be subsequently touched.

Note the approximate frequency of the received signal from the receiver dial reading.

Tune the transmitter with the line off in the normal way to this approximate frequency.

Vary the transmitter oscillator dial setting until zero beat is heard between the incoming signal and the local transmitter signal.

Readjust the transmitter tuning and recheck the transmitter frequency against the incoming signal.

Open the intertuning switch on the receiver by rotating the tone control.

Place the transmitter line switch " on " and tune the aerial coupling unit in the normal way.

16. COMMUNICATION BETWEEN TWO AIRCRAFT OF A FLIGHT.

If any two aircraft of a flight have their equipments tuned to a common frequency, intercommunication over a short distance is possible if the line switch is left in the OFF position. The ensuing radiation from the transmitter is limited to the very small power transferred across the capacity of the line " on-off " switch.

17. GENERAL NOTES ON OPERATIONAL PROCEDURES AND PRECAUTIONS.

At the conclusion of any transmission schedule by the operator the emission switch must be returned to " stand-by " in order to allow instant starting by Remote Control without reference to the operator.

Both switches on the power unit should always be " on " when the equipment is in use even if the transmitter is not likely to be required.

The fixed aerial must be plugged straight through to the receiver for " sense " readings.

During tuning of the transmitter and the A.C.U., the sending key should not be closed for long periods whilst the P.A. is drawing high " off tune " anode currents.

Each separate operation should be performed as rapidly as possible and the key should be opened whilst any preparations for the next operation are completed.

INSTRUCTION BOOK No. 2-7730R.

AT5/AR8 EQUIPMENT.

SECTION 6—SERVICING AND MAINTENANCE.

RECEIVER.

1. REMOVING AND REPLACING.

The receiver is readily removed from the aircraft by disconnecting all interwiring therefrom, pressing together the two spring levers on the mounting, and pulling the receiver forward by the two handles.

It is replaced by sliding back on the runners of the mounting base, and pressing home firmly until the two catches slip into position, thus avoiding the possibility of the receiver coming adrift in flight.

On completion of servicing, see that the bottom plate and the inner lid (which holds the valve screens and i-f transformer tops in position) are replaced, before putting on the side covers and lid.

In the case of a fault in an M/F or H/F Unit, more accessibility may be had, when necessary, by removing the unit from the receiver. To do this, disconnect the leads from the tag strip on the I–F/A–F Unit, the lead joining the plates of V102 and V202, the lead from aerial socket to the terminal on the H/F Unit, and the lead between S102 and S203. Remove the appropriate panel mounting screws and knobs, and the screws supporting the rear of the unit, when it can be slid forward and out of the main assembly, (refer Photo. No. 1708).

Should it become necessary to remove a dial, care should be taken in replacing it, to ensure that it lines up correctly with the receiver adjustment. Whenever the scale is removed from the dial, it must be replaced in the same relative position with respect to the mounting holes.

The procedure for replacing a dial is as follows:

(a) Set gang condenser to fully enmeshed.
(b) Fix dial on spindle so that the thick line at the low frequency end of the scale coincides with the cursor line.
(c) Tighten screw on anchor block to grip tongue on dial.
(d) Remove front cover of dial, exposing vernier movement.
(e) Loosen two screws holding anchor block (to left of dial).
(f) Rotate dial slightly (about 1 or 2 degrees) towards high frequency end and tighten the screws.
(g) Replace dial cover.

The object of this operation is to ensure that the dial stops at each end become operative before the gang condenser stops, thus avoiding possible damage to the condenser.

When the adjustment has been correctly made, it should not be possible to align the cursor to the thick lines at either end of the scale, unless the anchor block is first loosened.

The correct adjustment for the ganged volume controls is as follows:

(a) Loosen the sprocket on a–f control.
(b) Loosen coupling between r–f control and front panel.
(c) Set knob on front panel to maximum volume position (clockwise)
(d) Rotate sprocket on r–f control so that the control is within 1 or 2 degrees of maximum position (clockwise from front).

(e) Tighten coupling.

(f) Rotate knob on front panel to minimum position (anti-clockwise).

(g) Rotate a–f control to within 1 or 2 degrees of minimum volume position (anti-clockwise from front).

(h) Tight sprocket on a–f control.

As, in the case of the tuning dials, the object of the adjustment is to utilise the front panel stops, in preference to the stops on the controls, avoiding the possibility of damage to the latter.

In adjusting the tone control, the only point to watch is that the intertuning switch is fully tripped before the anti-clockwise stop is reached.

The beat oscillator tuning control can only be adjusted during electrical tests (see Section 6, Para. 18). When the necessary facilities are not available, great care should be taken not to upset this adjustment, since the C.W. sensitivity can be seriously impaired by so doing.

2. INTERWIRING CONNECTIONS.

The connections to the junction box and power supply are made through the appropriate outlet sockets on the front of the receiver. They are as given in the tables below:

Junction Box

Pin No.	*Purpose*
1	Output to 'phones
2	Earth return
3	R-f volume control to keying relay
4	Output to 'phones
5	.....
6	.....
7	Power supply to Junction Box
8	Power supply to Junction Box
9	Microphone input
10	Power supply to Junction Box
11	.....
12	.....

Power Supply

Pin No.	*Purpose*
1	L.T. supply 13V positive
2	Earth return
3	L.T. supply 26V negative
4	L.T. supply 26V positive
7	Junction Box to Power Supply
8	Junction Box to Power Supply
9	H.T. positive
10	Junction Box to Power Supply

3. TAG STRIP CONNECTIONS.

The leads to the two tag strips, which interconnect the H/F M/F and I-F/A-F units, are as in the table below:

H/F Tag Strip.	*M/F Tag Strip.*	*I-F/A-F Unit.*	*H/F Unit.*	*M/F Unit.*
1	...	Heater supply	Heater supply	.....
...	1	Heater supply	.....	Heater supply
2	2	Heater supply	Heater supply	Heater supply
3	3	R-f Vol. Control	Cathode Returns	Cathode Returns
4	...	H.T. supply	S102 Tag 3	.....
...	4	H.T. supply	See note below	T201 Tag A1
5	5	.....	S102 Tag 4	H.T. supply
6	6	.....	S102 Tag 7	PL201 L.T. supply
7	7	A.V.C. supply	S102 Tag 9	T201 Tag A3
8	8	.....	S102 Tag 10	A.V.C. supply

Tag 4 on the M/F tag strip goes to plate of V102 by virtue of the common plate connection with V202.

4. SWITCH CONNECTIONS.

The switch connections are best checked by reference to Drawing No. 7733A1 in which all the switches in the receiver are illustrated, section by section.

5. COIL CONNECTIONS.

The tag positions on all coils in the receiver are numbered from 1 to 4 counter-clockwise, from the notch in the former, when looking at the tag end of the coil. The oscillator and beat-oscillator coils have 3 tags only, No. 4 being omitted. The tag positions on the bottom of all intermediate-frequency transformers are numbered A1 to A6 counter-clockwise when looking at the tags. No. 6 is identified by a coloured spot, the colour indicating the transformer type as below

T1: Red; T2: Blue; T3: Green; T201: Grey.

The tag positions on the top have the same numbers as those immediaetly under them, except that they are prefixed by B. They, therefore, run B1 to B6 clockwise.

6. CONTINUITY TESTS.

The table supplies the necessary information for continuity checking any coil or resistor in the receiver. The first column gives the component to be tested, and the second column the approximate resistance value, which should be obtained with a normal component (1 Ω indicates 1 Ω or less). Columns 3 and 4 give the two points to which the test prods should be applied, and column 5 gives any conditions necessary for correct readings.

It will be found, in some cases, that the test points are such that they include components (such as switches) other than the one under test. This is done for convenience in testing, and should be borne in mind when incorrect readings are had. Further point-to-point check will then be necessary to determine the exact location of the fault. Power must be removed from the receiver when making continuity checks, as otherwise incorrect readings will be given in many instances.

Component.	*Resistance Ω.*	*Test Points.*		*Remarks.*
L1	4	V2 Osc. Plate	C7	Side remote from R5
L1 (Tap)	2	V2 Osc. Plate	V2 screen grid	.....
L2	1	Power Socket 1	PL201	.....
L3	35	Power Socket 9	H.T. Tag Strip 4	.....
T1 Primary	7	Tag A4	Tag A6	.....
T1 Secondary	7	Tag B1	Tag B2	.....
T2 Primary	7	Tag A4	Tag A5	.....
T2 Secondary	7	Tag B1	Tag B3	.....
T3 Primary	7	Tag A4	Tag A6	.....
T3 Secondary	7	Tag B1	Tag B3	.....
T4 Primary	1,000	Plate V5	Power Socket 9	.....
T4 Secondary	120	Junction Box Socket 1	Junction Box Socket 4	.....
T5 Primary	5	Power Socket 3	Junction Box Socket 9	.....
T5 Secondary	1,200	S1B Tag 3	S1B Tag 10	.....
T201 Primary	7	Tag A4	Tag A6	.....
T201 Secondary	7	Tag B1	Tag B3	.....
L101 Primary	14	Aerial Socket	Earth	See 1D below
L101 Secondary	1	Grid V101	S101B Tag 7	Range Selector to D
L102 Primary	7	Aerial Socket	Earth	See 1E below
L102 Secondary	1	Grid V101	S101B Tag 7	Range Selector to E
L103 Primary	5	Aerial Socket	Earth	See 1F below

1D—M-F/H-F switch to H/F—Range Selector to D.
1E—M-F/H-F switch to H/F —Range Selector to E.
1F—M-F/H-F switch to H/F—Range Selector to F.

Component.	*Resistance Ω.*	*Test Points.*		*Remarks.*
L103 Secondary	1	Grid V101	S101B Tag 7	Range Selector to F
L104 Primary	25	Plate V101	S101C Tag 7	Range Selector to D
L104 Secondary	1	Grid V102	Earth	Range Selector to D
L105 Primary	10	Plate V101	S101C Tag 7	Range Selector to E
L105 Secondary	1	Grid V102	Earth	Range Selector to E
L106 Primary	4	Plate V101	S101C Tag 7	Range Selector to F
L106 Secondary	1	Grid V102	Earth	Range Selector to F
L107	1	C126	Earth	Range Selector to F
L107 Tap	1	Cathode V103	Earth	Range Selector to F
L108	1	C127	Earth	Range Selector to E
L108 Tap	1	Cathode V103	Earth	Range Selector to E
L109	1	C128	Earth	Range Selector to D
L109 Tap	1	Cathode V103	Earth	Range Selector to D
L201 Primary	100	Aerial Socket	Earth	See 2A below
L201 Secondary	16	Grid V201	S201C Tag 12	Range Selector to A-Traffic.
L202 Primary	40	Aerial Socket	Earth	See 2B below
L202 Secondary	8	Grid V201	S201C Tag 12	Range Selector to B-Traffic.
L203 Primary	16	Aerial Socket	Earth	See 2C below
L203 Secondary	4	Grid V201	S201C Tag 12	Range Selector to C-Traffic.
L204 Primary	2	Loop Socket (Red)	Loop Socket (Yellow)	Range Selector to A-D/F
L204 Pri. Tap	1	Loop Socket (Red)	Earth	See 2A below
L204 Secondary	12	Grid V201	Earth	Range Selector to A-D/F
L205 Primary	2	Loop Socket (Red)	Loop Socket (Yellow)	Range Selector to B-D/F
L205 Pri. Tap	1	Loop Socket (Red)	Earth	See 2B below
L205 Secondary	5	Grid V201	Earth	Range Selector to B-D/F
L206 Primary	2	Loop Socket (Red)	Loop Socket (Yellow)	Range Selector to C-D/F
L206 Pri. Tap	1	Loop Socket (Red)	Earth	See 2C below
L206 Secondary	4	Grid V201	Earth	Range Selector to C-D/F
L207 Primary	250	Plate V201	S201D Tag 12	Range Selector to A
L207 Secondary	16	Grid V202	S201E Tag 12	Range Selector to A
L208 Primary	115	Plate V201	S201D Tag 12	Range Selector to B
L208 Secondary	8	Grid V202	S201E Tag 12	Range Selector to B
L209 Primary	35	Plate V201	S201D Tag 12	Range Selector to C
L209 Secondary	4	Grid V202	S201E Tag 12	Range Selector to C
L210	7	L210 Tag 1	L210 Tag 3	Range Selector to A
L210 Tap	4	L210 Tag 1	Earth	Range Selector to A
L211	5	L211 Tag 1	L211 Tag 3	Range Selector to B
L211 Tap	3	L211 Tag 1	Earth	Range Selector to B
L212	3	L212 Tag 1	L212 Tag 3	Range Selector to C
L212 Tap	2	L212 Tag 1	Earth	Range Selector to C
R1	300	Cathode V1	Earth	Switch to R/T
R2	50,000	Cathode V1	Screen V1	.....
R3	50,000	Screen V1	Power Socket 9	.....
R4	2,000	T1 Tag A1	T1 Tag A6	.....
R5	50,000	Osc. Grid V2	Cathode V2	.....
R6	500	Cathode V2	Earth	.....
R7	50,000	Screen V2	Power Socket 9	Switch to C.W.
R8	100,000	Plate V2	Power Socket 9	.....
R9	.....	.....	.....	Removed from circuit
R10	300	Cathode V3	Earth	Switch to R/T

2A—M-F/H-F switch to M/F, Traffic-D/F-Sense switch to Traffic, Range Selector to A—traffic.

2B—As 2A, but Range Selector to B-Traffic.

2C—As 2A, but Range Selector to C-Traffic.

Component.	*Resistance Ω*	*Test Points.*		*Remarks.*
R11	100,000	Screen V3	Power Socket 9	.....
R12	2,000	T3 Tag A1	T3 Tag A6	.....
R13	100,000	T3 Tag A3	T3 Tag B3	.....
R14	20,000	S1B Tag 3	S1B Tag 10	.....
R15	.....	.....	.....	Removed from circuit
R16	0-75,000	R16	Earth	Rotate tone control
R17	0-1,500	R17	Earth	Switch to R/T, rotate volume control.
R18	250,000	3 Tag A3	Cathode V4	.....
R18 Tap	0-250,000	R18 Tap	Cathode V4	.....
R19	.....	.....	.....	Removed from circuit
R20	500,000	Grid V4	R20	.....
R21	500,000	R21	Earth	Switch to C.W.
R22	500,000	A.V.C. Diode V4	S1A Tag 6	Switch to C.W.
R23	500,000	S1A Tag 6	Earth	Switch to C.W.
R24	1MΩ	A.V.C. Diode V4	S1A Tag 2	Switch to R/T
R25	5,000	Cathode V4	Earth	.....
R26	250,000	Screen V4	Power Socket 9	.....
R27	50,000	Plate V4	S1B Tag 3	.....
R28	500,000	Grid V5	Earth	.....
R29	1,500	Cathode V5	Earth	.....
R30	200	Cathode V6	Earth	.....
R31	25,000	Cathode V6	Power Socket 9	.....
R32	21	Heater V6	Heater V6	Remove V5 and V6
R101	50,000	Screen V101	H/F Tag Strip 4	S102 to H/F
R102	100,000	Grid V101	H/F Tag Strip 7	S102 to H/F
R103	300	Cathode V101	H/F Tag Strip 3	S102 to H/F
R104	50,000	Cathode V101	Screen V101	.....
R105	2,000	Plate V101	H/F Tag Strip 4	S102 to H/F
R106	50,000	Screen V102	H/F Tag Strip 4	S102 to H/F
R107	50,000	Osc. Grid V102	Cathode V102	.....
R108	10,000	Plate V103	H/F Tag Strip 4	S102 to H/F
R109	.....	.....	.....	Removed from circuit
R110	500	Cathode V102	H/F Tag Strip 3	S102 to H/F
R111	42	Heater V103	Heater V103	Remove V103 & P:L101
R112	50,000	R112	Cathode V103	.....
R113	23	R113	R113	Switch to M/F, remove PL101 and PL102
R114	10,000	S101E Tag 11	Earth	.....
R115	10,000	S101E Tag 12	Earth	.....
R116	50	Grid V103	R116	.....
R201	120,000 to 240,000	R201	R201	Rotate sense resistor
R202	100,000	Grid V201	M/F Tag Strip 8	.....
R203	300	Cathode V201	M/F Tag Strip 3	.....
R204	50,000	Screen V201	Cathode V201	.....
R205	4,000	.....	.....	See 3 below
R206	3,000	.....	.....	See 3 below
R207	2,000	.....	.....	See 3 below
R208	100,000	Grid V202	M/F Tag Strip 8	.....
R209	800	Cathode V202	M/F Tag Strip 3	.....
R210	2,000	S201D Tag 12	M/F Tag Strip 5	.....
R211	50,000	Osc. Grid V202	Cathode V202	.....
R212	20,000	Osc. Plate V202	M/F Tag Strip 5	.....
R213	50,000	Screen V202	M/F Tag Strip 5	.....
R214	50,000	Screen V201	M/F Tag Strip 5	.....
R215	2,000	T201 Tag A1	T201 Tag A6	.....
R216	100,000	T201 Tag A3	R201 Tag B3	.....
R217	250,000	.....	.....	See 3 below.
R218	1,000	R218	R218	.....

3—Must be disconnected from circuit for test.

7. VALVE CONNECTIONS AND VOLTAGES.

All the valves in the receiver are of the octal-base (eight pin) type. The socket contacts are numbered from one to eight clockwise from the key position, when looking at the bottom of the socket.

The valve electrodes connect to the pins as in the table below:

Ckt. Ref.	*Type*		*Contact Number* 1	2	3	4	5	6	7	8	*Top Cap*
V1	6U7G	1st I-F Amp.	NC	H	P	SG	S	NC	H	C	G
V2	6A8G	Beat Osc.	NC	H	P	SG	OG	OP	H	C	G
V3	6U7G	2nd I-F Amp.	NC	H	P	SG	S	NC	H	C	G
V4	6G8G	Det. A-F Amp.	NC	H	P	D2	D1	SG	H	C	G
V5	6J7G	Output	NC	H	P	SG	S	NC	H	C	G
V6	6X5GT	Limiter Diode	NC	H	P2	NC	P1	NC	H	C	...
V101	6U7G	H/F R-F Amp.	NC	H	P	SG	S	NC	H	C	G
V102	6A8G	H/F converter	NC	H	P	SG	OG	OP	H	C	G
V103	6V6G	H/F Osc.	NC	H	P	SG	G	NC	H	C	...
V201	6U7G	M/F R-F Amp.	NC	H	P	SG	S	NC	H	C	G
V202	6A8G	M/F Converter	NC	H	P	SG	OG	OP	H	C	G

C signifies Cathode.
D signifies Diode Plate.
G signifies Grid.
H signifies Heater.
NC signifies No Connection.
OG signifies Oscillator Grid.
OP signifies Oscillator Plate.
P signifies Plate.
S signifies Suppressor Grid.
SG signifies Screen Grid.

It will be noticed that valve-socket contacts which have no connection to valve electrodes, are often used to support circuit components.

Electrode voltages will vary somewhat from valve to valve, with resistor tolerances, and with power supply voltages, and it is difficult to lay down rigid tolerances. The table below should, therefore, be regarded as a guide only.

Faulty valves will usually, though not necessarily, be indicated by incorrect electrode voltages.

The heater voltages are measured on pins 1 and 7 of each valve, and should be 6.3 volts. For the remaining voltages, the chassis is the negative point in all instances.

A 1,000 Ω per volt meter should be used. The C-W/R-T switch should be in the C-W position and the volume control fully advanced. There should be no signal impressed on the receiver. When testing V101, V102 and V103, the M-F/H-F switch should be in the H/F position, and for V201 and V202 it should be in the M/F position. For the remaining valves, the switch position is immaterial.

When measuring voltages (particularly heater voltages), it is desirable to apply the test prods to the valve pins, rather than the socket contacts. A faulty connection between contact and pin may otherwise pass unnoticed.

The nominal voltages are as follows:

Valve Circuit Ref.	*Cathode*	*Screen*	*Plate*	*Osc. Plate*
V1	3	80	230	...
V2	2	45	100	45
V3	3	80	230	...
V4	10·5	95	60	...
V5	7.5	...	245	...
V6	2	...	...	...
V101	3	80	230	...
V102	2	45	240	45
V103	0	115	115	...
V201	3	80	230	...
V202	6	85	245	150

CIRCUIT ALIGNMENT AND STAGE GAINS:

8. RECEIVER ADJUSTMENTS.

Except as otherwise stated, the following conditions shall apply for all tests:—

(1) The M-F/H-F switch and range selector (A, B, C or D, E, F) shall be set to select the appropriate range of frequencies. On M/F, the "traffic" position of the range switch shall be used.

(2) The appropriate tuning dial shall be set so that normal test output (six milliwatts in 2,000 Ω) is obtained with the least possible radio-frequency-input voltage at the required test frequency.

(3) On M/F, the aerial tuning control is set as for (2) above.

(4) The Traffic-D/F-Sense switch shall be in the traffic position.

(5) The C-W/R-T switch shall be in the C-W position.

(6) The beat oscillator shall be disabled by some means which does not otherwise affect the receiver performance, such as removing the high tension supply lead from contact S1A/8 on the C-W/R-T switch.

(7) The volume control shall be set for maximum output from the receiver.

(8) The tone control shall be set for minimum attenuation of the higher audio frequencies.

9. TEST APPARATUS.

Except for D/F tests, which are dealt with later, the testing of this receiver does not call for any apparatus other than that which will be available in a normally-equipped test room.

The testing of the I-F/A-F unit can be carried out independently of the others, provided that the 12.6 volt heater connection is used, and V6 is removed from its socket, but an M/F or H/F unit can only be tested as part of a complete receiver.

10. I-F/A-F UNIT.

If tested without M/F and H/F units, earth the grid of the first i-f amplifier before commencing tests.

11. OUTPUT STAGE.

Audio-frequency inputs to the grid should be via a suitable blocking condenser, the grid cap remaining in position. The cathode resistor should be temporarily shunted by a 25 μF condenser.

400 cycle input of 1.3V gives normal test output of 6 mW in 2,000 Ω. With constant input, the output is down 4 db. at 100 cycles and 0 db. at 7,500 cycles.

With the tone control set for maximum "high" attenuation, the 400 cycle output drops 2 db. and the output at 1,000 cycles should be 4.5 db. below that at 400 cycles.

Remove the 25μF condenser from the cathode of the output stage, and reset the tone control before proceeding.

12. INTERCOMMUNICATION AMPLIFIER.

Audio-frequency inputs are applied to the primary of the input transformer via pin 9 on the junction box socket and pin 3 on the power socket. A 50 Ω source can be obtained by shunting the 600 Ω output of a beat-frequency oscillator with a potentiometer of 550 Ω in series with 50 Ω, and taking the input voltage from the 50 Ω resistor. It is then convenient to measure the voltage output of the B.F.O. and assume that the pad introduces an attenuation of 22 db. Fidelity is then —10 db. at 100 cycles, +4 at 2,500 cycles and —2 at 7,000 cycles, reference frequency being 400 cycles.

13. DRIVER STAGE.

Audio-frequency inputs to the grid should be via a suitable blocking condenser, the grid cap remaining in position. The cathode resistor should be temporarily shunted with a 25 μF condenser.

400 cycle input for normal test output is 0.1 volt. To obtain this small output from a B.F.O., it is suggested that the pad used for testing the inter-communication amplifier be used.

Fidelity is than — 2 db. at 100 cycles, and — 2 db. at 7,000 cycles.

The audio amplifier should be approximately linear up to 125 mW output, i.e., up to 16 volts across the load.

Remove the 25 μF condenser from the cathode of the driver stage before proceeding.

14. DIODES.

Performance can be checked by connecting the signal generator to the signal diode—via 250 μμF—and earth. The circuit then resonates to approximately 530 kc., and the input necessary for normal test output is 45 mV approximately.

15. COIL ADJUSTMENTS.

The intermediate-frequency transformer and tuning coils are accurately aligned and sealed during factory tests. They have a high degree of frequency stability, and are unlikely to require re-tuning except after actual mechanical damage necessitating replacement. It is strongly urged that they be not interfered with, except in the latter eventuality.

Re-alignment is effected by rotating the slug-adjusting screws. In the i-f transformers, the primary adjustment is at the bottom and the secondary at the top.

16. INTERMEDIATE FREQUENCY.

The intermediate frequency is 755 kc., and as the receiver has to function at 740 and 765 kc., it is most important that the signal generator be checked sufficiently often to ensure that the i-f amplifier is accurately aligned to the correct frequency.

17. SECOND I-F AMPLIFIER.

Apply signal generator to grid of V3 and chassis by the shortest possible leads. Input for normal test output is 10 mV approximately.

18. BEAT OSCILLATOR.

Connect up H.T. lead, loosen coupling in drive shaft, and rotate tuning slug for zero beat with 755 kc. unmodulated input, then tighten coupling so that knob on front panel lines up with the white arrow.

Check change in beat note for one turn of knob. This should be $\pm$ 3.5 kc. approximately.

With beat note set for 400 cycles, the unmodulated input to the second i-f amplifier grid for normal test output is 4.5 mV approximately.

Disconnect H.T. from the beat oscillator before proceeding.

19. FIRST I-F AMPLIFIER.

Apply signal generator to grid of V1 and chassis. Input for normal test output is 500 uV approximately.

20. M/F AND H/F UNITS.

In each of these units the oscillator, r-f and aerial circuits are aligned by means of a capacity trimmer and an iron slug for the inductance.

The trimmers are accessible from the sides of the units, and the slugs on the chassis. Each is identifiable by reference to the chassis markings and schematic diagram.

There is no trimmer in the M/F aerial circuit, as its place is taken by the M/F aerial tuning condenser on the front panel.

Circuit adjustments are made in the normal manner, trimmer adjustments being done at a frequency near the highest of the range, and slug adjustments near the low-frequency end. The dial scales will then check with the signal-generator frequency.

At the high-frequency end of Range B, and the low-frequency end of Range C, some difficulty with alignment may be had, in the form of whistle modulation and converter oscillation at or near maximum sensitivity.

This is due to the proximity of the intermediate frequency. It is normal to the design, and does not indicate a fault.

Detailed procedure for the alignment of each frequency range is given below :

21. M/F UNIT, RANGE A.

Adjust trimmer and slug to cover the range 136-340 kc. The oscillator grid current should should vary from 240 μA at 136 kc. to 480 μA at 340 kc.

Set the gang condenser so that the grid current is 400 μA, when the i-f input should be 50μV.

In order to permit the measurement of r-f gains with a reasonable noise background, it is now convenient to reduce the i-f gain. This can be done by shunting the secondary of T2 (in the I-F/A-F Unit) with a 10,000 Ω carbon resistor.

I-f input to the converter grid will now be 350 μV, and the signal-frequency input will be 450μV at 136 kc. and 550 μV at 340 kc.

The r-f circuit trimmer and slug should be adjusted at the tracking points, 155 kc. and 320 kc. approximately. The r-f gain is 6 at 136 kc. to 9 at 340 kc.

The aerial-circuit trimmer is accessible from the front panel, therefore the slug should be set for minimum variation of the trimmer throughout the range. The gains from signal generator to r-f grid are 6 at 136 kc. to 20 at 340 kc.

The tracking may be checked by a listening test over the whole range.

The significant information for Range A is given in table form below :

End Points	136 kc. and 340 kc.
Osc.-Grid Current	240 μA to 480 μA
Converter-Grid Input +	450 μV to 550 μV
Tracking Points	155 kc. and 320 kc.
R-f Gain	6 to 9
Antenna Gain	6 to 20

+ With 10,000 Ω shunt on T2.

22. RANGE B.

The procedure is the same as for Range A. Test details are as below :

End Points	300 kc. and 740 kc.
Osc.-Grid Current	250 μA to 400 μA
Converter-grid Input +	500 μV to 500 μV
Tracking Points	340 kc. and 700 kc.
R-f Gain	5 to 4
Ant. Gain	12 to 7

+ With 10,000 Ω shunt on T2.

23. RANGE C.

Procedure as for Range A.

End Points	765 kc. and 2,050 kc.
Osc.-Grid Current	150 to 250 μA
Converter-Grid Input +	550 μV to 450 μV
Tracking Points	850 kc. and 1,900 kc.
R-f Gain	7 to 3
Ant. Gain	7 to 18

+ With 10,000 Ω shunt on T2.

24. H/F UNIT, RANGE D.

Procedure same as for Range A of M/F Unit except that the aerial trimmer is not accessible from the front panel, therefore the aerial circuit is tracked as for the r-f circuit.

The i-f input to converter grid is 20 μV with the oscillator-grid current 400 μA and the 10,000 Ω resistor removed from T2 in the I-F/A-F unit.

End Points	1.96 Mc. and 4.5 Mc.
Osc.-Grid currents	400 μA to 400 μA
Converter-Grid Input +	130 μV to 200 μV
Tracking Points	2.25 Mc. and 4.25 Mc.
R-f Gain	10 to 13
Ant. Gain	2.5 to 2.5

+ With 10,000 Ω shunt on T2.

Check image ratio at the highest frequency on this range. It should be 1,800/1.

25. RANGE E.

Same as Range D above.

End Points	4.2 Mc. and 9.7 Mc.
Osc.-Grid Current	240 μA to 280 μA
Converter-Grid Input +	140 μV to 140 μV
Tracking Points	4.7 Mc. and 9.15 Mc.
R-f Gain	9 to 9
Ant. Gain	1.7 to 1.7
Image Ratio	4,000/1 to 1,000/1

+ With 10,000 Ω resistor on T2.

26. RANGE F.

Same as Range D above.

End Points	9 Mc. and 20.7 Mc.
Osc.-Grid Current	240 μA to 360 μA
Converter-Grid Input +	350 μV to 180 μV
Tracking Points	10 Mc. and 19.5 Mc.
R-f Gain	6 to 4
Ant. Gain	1.5 to 2
Image Ratio	4,000/1 to 300/1

+ With 10,000 Ω resistor on T2.

When correctly aligned, the sensitivity should be better than 3 microvolts on all ranges except F, where it should be better than 10 microvolts.

27. LIMITER DIODE.

The rectification of the limiter diode can be checked with the aid of a four-volt battery.

With the range switch to M/F and the range selector to A-traffic connect a voltmeter from the cathode of V6 to chassis. The voltage should be 2 as given in the table of electrode voltages. Now connect the four-volt battery, positive to aerial socket and negative to chassis. This will cause sufficient rectification in V6 to raise the cathode voltage to 3 volts approximately.

D/F TESTS :

28. TEST APPARATUS AND CONDITIONS.

This may take the form of practical tests with service loops and open aerials, but where it is necessary or desirable to do them with a signal generator, a loop and cable, having the following constants, shall be connected to the loop-input socket of the receiver :

Inductance = 116 μH Self-Capacitance = 129 μμF.
H.F. resistance to be not more than 20 Ω at 1,000 kc.

The voltages shall be introduced into the loop from a suitable co-axial coil inductively coupled thereto, and the following receiver adjustments shall apply :

(1) M-F/H-F range switch shall be set to M/F, and the range selector to the appropriate range of frequencies. The D/F position of the switch shall be used.

(2) The M/F tuning dial shall be set so that normal test output is obtained with the least possible radio-frequency-input voltage at the required test frequency.

(3) The aerial-tuning control is set as for (2) above.

(4) The Traffic-D/F-Sense switch shall be in the D/F position.

(5) The C-W/R-T switch shall be in the C-W position.

(6) The beat oscillator shall be disabled by some means which does not otherwise affect the receiver performance, *such as removing the H.T. supply lead from contact* S1A/8 on the C-W/R-T switch.

(7) The volume control shall be set for maximum output from the receiver.

(8) The tone control shall be set for minimum attenuation of the higher audio frequencies.

The constants given for the receiving loop are those for service loops used with this installation. In the absence of such a loop, a suitable one can be constructed by close-winding eighteen turns of 24 A.W.G. enamelled wire on a six-inch-diameter former. The cable capacitance should be adjusted to resonate the loop and cable at 1,300 kc.

The natural frequency of the transmitting loop—with its leads—must be much greater than the highest test frequency required, and the distance between the loops must be at least twice the largest dimension of either loop, and much less than the lowest test wavelength. The distance from either loop to surrounding objects should be much greater than the distance between the loops.

The transmitting-loop cable should be equipped with a plug to fit a standard-signal generator. It is also desirable to put in series with the high-potential side of the transmitting loop, a resistor of sufficiently high value that the current through the loop is determined by the resistor and not by the loop reactance.

A suitable loop can be made by winding three turns of 24 A.W.G. enamelled wire—spaced approximately $\frac{1}{8}''$ between turns—on a 6″ diameter former. A carbon resistor of 400 Ω is suitable for the series resistance.

The earthed side of the transmitting loop should be directed towards the receiving loop.

Under these conditions, the field strength at the receiving loop can be determined from the following expression:

$$e = \frac{7.42 \times N \times r^2 \times E \times 10^3}{X^3 \times R} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (1)$$

Where e = Field strength at receiving loop in μV per metre.
N = Number of turns in transmitting loop.
r = Radius of transmitting loop in inches.
E = Signal-generator output in microvolts.
X = Distance between loops in inches.
R = Resistor in series with transmitting loop in Ω.

It is convenient to adjust the distance between loops—subject to the fulfilment of the conditions already stated—so that the field strength is equal to some suitable and easily-remembered fraction of the signal-generator output, say one-tenth.

Then, for the above transmitting loop and resistor, X is 17 inches, when E/e is 10, that is, when the loops are coaxial and 17 inches apart (between centres of windings), the field strength at the receiving loop in microvolts per metre is one-tenth of the signal-generator output in microvolts.

The voltage induced in the receiving loop is then given by the field strength multiplied by the effective height. The effective height of the receiving loop given above is 0.0069F, where F is the test frequency in Mc.

Therefore, the voltage induced in the loop is given by:—

$$V = 0.00069\ F.E. \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (2)$$

Where V = E.M.F. induced in the receiving loop in μV.
F = Test frequency in Mc.
E = Signal-generator output in μV.

29. LOOP INPUT CIRCUIT ADJUSTMENT.

In the case of the loop-input coils, the iron slugs are not used for inductance adjustment, but for the rejection of vertical pick-up in the loop, by means of equalising the couplings between the two halves of the primary and the secondary.

This adjustment is made by inserting a voltage from the standard-signal generator between both loop-input socket terminals (in parallel) and the earth terminal. The slug in the appropriate loop-input coil is then adjusted for minimum output.

The adjustment is made at the following frequencies :

Range	A	B	C
Frequency	250 kc.	550 k.c.	1,450 kc.

When correctly aligned, the D/F sensitivity should be better than 2F microvolts in the loop, where F is the test frequency in megacycles. Then E in expression (2) above, becomes 2.9 millivolts, and is independent of the test frequency. Therefore, for the loops and conditions given above, the signal-generator setting for the sensitivity test is 2.9 millivolts at any test frequency, which is equivalent to saying that the sensitivity is 290 microvolts per metre for the receiving loop specified above.

The loop input coil gains (uV to r-f grid/uV induced in the loop) should be checked for each range as below :

Range	*L.F. End*	*H.F. End*
A	100	100
B	45	30
C	14	10

As this is purely a coil gain test, it can be done at any input level.

30. SENSE TESTS.

With the above test loops, sense bearings are readily checked by connecting a lead from the high-potential side of the transmitting loop to the aerial socket as shown in Drawing No. 7730D1. The input so obtained will be in correct phase and amplitude for sense tests. With the connections as shown the minimum output should be obtained in the "bearing" position of the loop reversing switch. The sense resistor should be adjusted in the normal manner.

TRANSMITTER.

51. REMOVAL AND REPLACEMENT.

The transmitter may be readily removed from the installation by disconnecting the interwiring cables and withdrawing it from its shock base in the normal manner. When replacing, care must be taken that the unit is firmly pressed home until the two latch bars snap into position, thus avoiding the possibility of the unit coming adrift in flight.

The side and top screens may be easily removed from the unit once it is out of the shock base. The top is removed first by drawing it towards the rear of the unit by means of the small handle until the bollards disengage from the slots in the lid. It will be noticed that the rear bollards disengage first and the rear of the lid should then be lifted over these and drawn further back to disengage the front bollards. When replacing, the front should be engaged first. The side covers are next removed by drawing them outwards and to the rear. The back cover is removed last by pulling it upwards. When replacing the back, care should be taken to engage the clips on the bottom edge in the lower angle of the framework. The correct side covers are readily found by noting the louvres, which should have the openings downwards. These are to be engaged in the slots at the bottom and front and the projections at the rear should fall inside the rear frame angle. The lid then holds all covers firmly in place.

The bottom may be removed from the unit by undoing all the screws showing. This must be replaced before operation.

In the case of a fault in one of the removable units, it may be necessary to take this from the transmitter frame. The methods of removal of each of these units are separately described below.

52. INTERWIRING CONNECTIONS.

The connections to the junction box and power unit are made through the appropriate outlet sockets on the front of the transmitter and are as given in the tables below :

Junction Box :

Pin No.	*Purpose.*
1	Keying relay connection.
2	C.W. remote control.
3	L.T. supply 26V negative.
4	Sidetone output connection.
5	Intercommunication microphone input.
6	Remote control unit microphone.
7	Pulse sender connection.
8	Remote control unit Send/Receive switching.
9	Operator's microphone.
10	Cathode return.
11	Remote control unit generator switch.
12	M/F H/F relay.

Power Supply :

Pin No.	*Purpose.*
1	L.T. supply 13V positive.
2	Earth.
3	L.T. supply 26V negative } 12V negative.
4	L.T. supply 26V positive } 12V negative.
7	Earth.
8	Generator Starting Relay.
9	H.T. supply 550V positive.
10	H.T. supply 300V positive.

The frame earth is connected to the terminal at the bottom of the panel and the 100 Ω line connects to the socket at the top.

53. SWITCH CONNECTIONS.

The switch connections are best checked by reference to Drawing No. 7731A1 in which all the switches are illustrated, section by section. In this diagram, the switches are shown looking at the back of the switch, with the switch in the extreme counter-clockwise position when looking at the front of the unit. Switch sections are numbered from the knob end towards the rear and "front" signifies contacts on the front of a wafer, "rear" signifying contacts on the rear of a wafer, the view being drawn, in each case, looking at the back of the switch.

54. R.F. CHOKE CONNECTIONS.

In all cases of R.F. chokes in the transmitter, the finish of the winding is marked with coloured spot and this should connect to the high potential side of the circuit. When looking at the base of the choke with the notch on the left-hand side, the bottom tag will be the finish and the top tag the start.

55. CONTINUITY TESTS.

The following table supplies the necessary information for continuity checking any coil or resistor in the transmitter.

The first column gives the reference number of the component to be tested. The second column contains the nominal resistance to be expected between the test points given in columns three and four. Column five gives any special conditions required for test. A nominal resistance of 1 Ω means 1 Ω or less.

It will be found, in some cases, that the test points are such that they include components (such as switches) other than the one under test. This is done for convenience in testing, and should be borne in mind when incorrect readings are obtained. Further point-to-point checking will then be necessary to determine the exact location of the fault. The special conditions of test have been chosen to reduce, as far as possible, the influence of other components on the test.

All external connections must be removed from the transmitter when making continuity tests, otherwise incorrect readings will result. The instrument employed should be capable of measuring resistances from 1 Ω to 1,000,000 Ω.

Component Reference No.	*Nominal Resistance Ω*	*Test Points.*		*Special Conditions for Test and Remarks.*
		1	2	
R1	100,000	R1	R1	S1 in C.W.
R2	20,000	R2	R2	S1 in R/T
R3	400	R3	R3	
R4	35	R4	R4	S2 in P.A.
R5	1,000	R5	R5	
R6				
R7	50,000	R7	R7	S1 in C.W.
R8	35	R8	R8	See 1 below
R9	1,715	R9	R9	S2 in P.A. Grid
R10	60	R10	R10	S2 in P.A.
R11	35	R11	R11	S2 in P.A.
R12	250	R12	R12	
R13	25,000	R13	R13	See 2 below
R14	10,000	R14	R14	S5 in M/F
R15	75	R15	R15	S5 in H/F
R16	1,000	R16	R16	S5 in M/F
R17	250,000	Inner C10	Upper C11	S5 in M/F
R18	50	V3 Grid	Lead to R18	
R19	250	R19	R19	
R20	1,000,000	R20	R20	
R21	35	R21	R21	S2 in P.A.

Component Reference No.	*Nominal Resistance Ω*	*Test Points.* 1	2	*Special Conditions for Test and Remarks.*
R22	40,000	R22	2	
R23	40	R23	R23	See 3 below
R24	30	R24	R24	See 4 below
R25	10,000	R25	R25	
R26	50	Front RFC3	V4 Grid	
R27	1,000	.....	.....	See 5 below
R28	50	Upper C22	V4 Screen	.....
R29	50	Front RFC3	V5 Grid	.....
R30	35	R30	R30	S2 in B.A.
R31	50	Upper C28	V5 Screen	.....
R32	10,000	Lower R32	Upper C22	S4 in off
R33	800	.....	.....	See 6 below
R34	50	R34	R34	See 7 below
R101	1,000,000	Tag P, H/F M.O.	Tag E, H/F M.O.	S101 in XI
R102	200,000	.....	.....	See 8 below
R103	100,000	Tag E, H/F M.O.	Tag G, H/F M.O.	S101 in 4–5 Mc.
R201	50,000	Tag 1, M/F M.O.	Tag 2, M/F M.O.	S5 in H/F
R202	500	R202	R202	S5 in M/F
RFC1*	4·6	RFC1	RFC1	S5 in M/F
RFC2*	28	RFC2	RFC2	S5 in H/F
RFC3*	420	RFC3	RFC3	.....
RFC301*	30	RFC301	RFC301	.....
RFC302	1	Outer RFC301	M/F P.A. Tag 1	.....
L1	1	Outer C30	Outer C31	.....
L1	1	Outer C24	Outer C31	See 9 below
L101	1	Stator C105	Stator C105	S101 in 2–2·5 Mc.
L102	1	Stator C105	Stator C105	S101 in 2·5–3·2 Mc.
L103	1	Stator C105	Stator C105	S101 in 3·2–4 Mc.
L104	1	Stator C105	Stator C105	S101 in 4–5 Mc.
L201*	20	Stator C205	Stator C205	S201 in 140–185 kc.
L202*	11	Stator C205	Stator C205	S201 in 185–260 kc.
L203*	3	Stator C205	Stator C205	S201 in 260–370 kc.
L204*	1·7	Stator C205	Stator C205	C201 in 370–500 kc.
L205	1	Inner C211	Inner C212	S202 in 2–4·5 Mc.
L205	1	Inner C212	Tap on L205	S202 in 2–4·5 Mc.
L301*	2	Inner RFC301	Tag 2 M/F P.A.	.....
T1 (Sec.) *	1,200	V1 Grid	Rear R1	S1 in R/T
T1 (Pri.) *	5	Junct. Con. 6	Power Con. 3	S1 in Stand-by
T2 (Pri.) *	36	V1 Plate	Lower R5	.....
T2 (½ Sec. 1) *	10	Rear R8	Front C3	S1 in C.W.
T2 (½ Sec. 1) *	10	Rear R7	Front C3	S1 in C.W.
T2 (Sec. 2) *	11	Upper R33	Upper R34	See 10 below

* Components marked are liable to vary widely from time to time due to alternative materials being employed.

References to Table :

1. S1 in C.W. position and S2 in P.A. position.
2. R13 consists of two 50,000 Ω resistors in parallel. S5 in M/F position.
3. V5 removed from socket. R23 consists of two 80 Ω resistors in parallel.
4. Pilot light PL1 removed from holder, (see Section 6, para. 66).
5. R27 consists of a centre-tapped 1,000 Ω resistor. Each half should measure 500 Ω.
6. R33 cannot be tested without disconnecting either T2 or R34.
7. Measures R34 in parallel with R33 and T2 (Sec.) in series.
8. R102 is most conveniently tested by checking R103 and R102 in series, (300,000 Ω) between tag G H/F M.O. and Tag E H/F M.O., S101 being placed in position XI.
9. In all positions of S6.
10. This includes R33 of 800Ω and R34 of 50 Ω in series across the winding.

56. VALVE CONNECTIONS AND VOLTAGES.

Of the two types of valve in the transmitter, the 807 valves have a five-pin base and the 6V6G valves have an octal base (eight pin). When looking at the bottom of the five-pin socket, it is marked with a red spot between the heater pins and the socket contacts are numbered from one to five clockwise from this point. In the case of the octal sockets, the socket contacts are numbered from one to eight clockwise from the key position, when looking at the bottom of the socket.

The valve electrodes connect to the pins as in the table below:—

Ckt. Ref.	*Type*	*Function*	*Contact Number* 1	2	3	4	5	6	7	8	*Top Cap*
V1	6V6G	Modulator	NC	H	P	SG	G	NC	H	C	...
V2	6V6G	H/F Osc.	NC	H	P	SG	G	NC	H	C	...
V3	807	H/F B.A. Ω M/F M.O.	H	SG	G	C	H	...	...	...	P
V4	807	Power Amplifier	H	SG	G	C	H	...	...	...	P
V5	807	Power Amplifier	H	SG	G	C	H	...	...	...	P

C signifies Cathode. NC signifies no Connection.
G signifies Grid. P signifies Plate.
H signifies Heater. SG signifies Screen grid.

Electrode voltages will vary somewhat from valve to valve, with resistor tolerances and with power supply voltages, and it is difficult to lay down rigid tolerances. The table below should, therefore, be regarded as a guide only.

The heater voltages are measured between the appropriate pins of each valve and should be 6 volts. The remaining voltages are measured between the correct pin and the chassis in all cases, the chassis being negative.

A 1,000 Ω per volt meter should be used, and when measuring voltages it is desirable to apply the test prods to the valve pins, rather than the socket contacts. A faulty connection between socket and pin may otherwise pass unnoticed.

Voltages cannot be measured on valve pins while the transmitter is oscillating as the presence of radio frequency voltages will upset the meter readings and may damage the meter.

In the following table, the voltages are measured with the "M/F-H/F" switch in the "H/F" position, the H/F oscillator switch in an "off" position, the "emission" switch on "R/T," the line switch "off" and the key pressed.

The nominal voltages are as below:—

Valve Circuit Ref.	*Voltage to earth* *Plate*	*Screen*	*Cathode*
V1	260	260	16
V2	43	43	2
V3	270	205	14
V4	550	275	24
V5	550	275	24

With the line switch "on," the screen voltage on valves V4 and V5 will rise to 300V.

If the anode voltage on valves V4 and V5 differs greatly from the above, all other voltages should vary in proportion.

57. TYPICAL METER READINGS.

The meter provided in the transmitter measures the currents in all the critical circuits and provides a useful indication to the operation of the unit and the location of faults.

The following typical meter readings will give an indication of the conditions to be expected. These will vary somewhat from valve to valve and transmitter to transmitter and these should, therefore, be regarded as a guide only. Measurements are taken with H.T. supplies of 550 and 300 volts and with line switch " off."

(a) H/F Oscillator (Xtl. Osc.)

When not oscillating	6–7 mA
When oscillating on crystal	2–4 mA
When oscillating on master oscillator	4–5 mA

(b) H/F Buffer Amplifier (B.A.).

Without drive from the oscillator	45–50 mA
When in tune and driving the P.A.	25–35 mA

(c) H/F Power Amplifier Grid (P.A. Grid).

Being driven (Lowest at 10 Mc. and highest at 2 Mc.)	6–14 mA

(d) H/F Power Amplifier Anode (P.A.).

Without drive	90–110 mA
With drive and tuned to buffer frequency	40–50 mA
With drive and tuned to twice buffer frequency	60–70 mA

(e) M/F Oscillator (B.A.).

Not oscillating	45–50 mA
Oscillating	20–30 mA

(f) M/F Power Amplifier Grid (P.A. Grid).

Being driven (being lowest at 140kc. and highest at 500 kc.)	7–10 mA

(g) M/F Power Amplifier Anode (P.A.).

Without drive	90–110 mA
With drive and in tune	70–90 mA

(h) Modulator Anode (Mod.).

On C.W., M.C.W. or R/T	25–35 mA

The letters in the brackets in each case indicate the meter switch position concerned.

CIRCUIT ADJUSTMENTS :

58. TEST APPARATUS.

For adjustment of the transmitter oscillators, an accurate standard of frequency is necessary and, for this purpose, a crystal calibrator or multi-vibrator is the most suited. The unit should have outputs every 1,000, 100 and 10 kc. from 140 kc. to 5 megacycles. A service type crystal-controlled heterodyne wavemeter would be suitable for this purpose.

If neither of the above pieces of apparatus is available, the oscillators in one transmitter may be lined up against another similar transmitter of known accuracy. Because of transmitter frequency tolerances, this will not give as accurate results as using the crystal reference. Greater accuracy may be obtained on the H/F ranges if crystals are available of frequencies at or near the ends of each H/F oscillator range. These can be employed in the second transmitter as reference. An ordinary type heterodyne or absorption wavemeter could be employed with low accuracy of the result and this is not recommended.

If a multi-vibrator or second transmitter is employed as frequency standard, it is necessary to employ a receiver to pick up signals from both the standard and the transmitter being checked. For this purpose, the AR8 receiver is particularly suitable. The receiver is tuned to the standard frequency required and the oscillator being aligned is adjusted to give zero beat with this standard.

It is advisable also to have a cathode ray oscillograph and beat frequency oscillator so that the exact deviation from the standard can be measured. The accuracy of the reference standard will determine the advisability of this check, it being significant only if a crystal-controlled standard is available. For this check, the output of the receiver is connected to the vertical plates of the oscillograph and the beat frequency oscillator to the horizontal plates. When the audio frequency from the oscillator is the same as the beat frequency from the receiver, an ellipse will appear on the oscillograph screen.

For completely testing the transmitter, it is also necessary to have a 100 Ω non-inductive resistor and thermo-ammeter of 1 or 1.5 amps. full scale deflection.

Note.—Before testing the transmitter, terminal 7 on the "JUNC. BOX" outlet must be connected to earth. This connection is normally taken care of in the junction box or pulse unit.

59. H/F OSCILLATOR ALIGNMENT.

The H/F oscillator section has four ranges as previously described, each range being provided with its individual coil and trimmer condensers. The coil and condenser corresponding to each range are shown in the table below and are marked on the back of the oscillator unit assembly.

Range	*Coil*	*Trimmer*
2.0 to 2.5 Mc.	L101	C101
2.5 to 3.2 Mc.	L102	C102
3.2 to 4.0 Mc.	L103	C103
4.0 to 5.0 Mc.	L104	C104

Each coil is provided with an adjustable magnetite slug, and with this and the trimmer condenser each range is adjusted to line up with the calibrated scale.

All ranges have been accurately adjusted and sealed before leaving the factory and these adjustments should not be touched unless structural damage has necessitated the replacement of some part. Damage to the unit should not be repaired in the field unless absolutely essential, the unit normally being replaced by the spare complete unit supplied.

Although the spare units have been approximately adjusted before leaving the factory realignment will be necessary to allow for individual transmitter variations.

Readjustment of the trimmer condensers on all bands may be necessary if the oscillator valve, V2, is replaced. The coil slug adjustments should not need touching in this case.

Before starting the lining-up process, the neutralising condenser must be adjusted in the following manner. The oscillator is tuned to 5 Mc. and the Buffer Amplifier to 10 Mc. The oscillator frequency is then carefully tuned to zero beat against the frequency standard. The B.A. is now tuned to 5 Mc. and, without touching the master oscillator control, the neutralising condenser is adjusted until zero beat is again obtained against the frequency standard.

When making frequency adjustments, it is essential that the Buffer Amplifier and Power Amplifier be in tune in all cases. The "line" switch is to be in the "off" position and the "emission" switch on "C.W." The key should be pressed only long enough to make adjustments and measurements in each case and should not be held down continuously. Filaments should be allowed to heat for at least 15 minutes before commencing frequency adjustments.

Adjustments are made at each end of the range, varying the coil slug at the low frequency end and the trimmer condenser at the high frequency end. Adjustment of either will vary both ends of the range so that adjustment will have to be made to each end alternately until the desired result is obtained. Each time an adjustment is made to one end the other end must be checked.

The frequency ranges, when adjusted, shall be within 0.1% of the nominal frequency at the two ends and centre of each range. The checking points shall be as follows:

2.0	2.25	2.5 Mc.
2.5	2.9	3.2 Mc.
3.2	3.6	4.0 Mc.
4.0	4.5	5.0 Mc.

60. M/F OSCILLATOR ALIGNMENT.

The medium frequency oscillator also has four ranges and adjustments with coil slug and trimmer condenser are provided for each range similar to the H/F oscillator. The following table gives the ranges and corresponding coil and condenser.

Range	*Coil*	*Trimmer*
140 to 185 kc.	L201	C201
185 to 260 kc.	L202	C202
260 to 370 kc.	L203	C203
370 to 500 kc.	L204	C204

Alignment of the circuits is carried out with coil slug and trimmer condensers in a similar manner to the H/F case, the circuit being aligned at each end of the band and checked in the centre.

The neutralising condenser will have little or no effect on the M/F oscillator frequency. Before adjustment or measurement in each case, the Power Amplifier must be in tune and loaded into a 100 Ω pure resistance. This resistance should be connected from the "100 Ω line" terminal to earth and the "line" switch placed "on".

The oscillator should be adjusted to within 0.1% of the nominal frequency at each end and the centre of each range, the checking points being as follows:

140	165	185 kc.
185	230	260 kc.
260	320	370 kc.
370	450	500 kc.

Note.—Transmitters with early serial numbers will not line up to within 0.1% but in all cases adjustment to within 0.3% is possible.

61. H/F B.A. TUNING RANGES.

No adjustment of the tuning ranges of the buffer amplifier is provided, but the condenser should cover the tuning ranges shown on the dial when the switch is in the appropriate position. On the high frequency range, the 10 Mc. tuning point will, in some cases, be at the extreme minimum position of the condenser, but this is permissible provided the P.A. grid drive and output at 10 and 20 Mc. is not reduced.

62. P.A. TUNING RANGES.

No adjustment of the power amplifier tuning ranges is provided on H/F but the quality control check on all coils will ensure that the frequency ranges are covered within the limits marked on the dial when the switch is in the appropriate position.

On M/F, to allow for condenser tolerances, two taps are provided on the coil for each range. If, when a coil is replaced, the taps are connected to the same positions as the original coil, the result obtained will be generally correct. If adjustment is required, any one tap may be moved to the other point in the same horizontal line. When correctly connected, the variometer should cover the range stated on the selected position of the range switch.

63. POWER OUTPUT.

The power output of the transmitter can be measured into a 100 Ω pure resistance load and for correct operation shall be greater than the values stated below. Power must be measured with standard test voltages of 550 volts main H.T. and 300 volts minor H.T. When measuring output power, the power amplifier must be tuned to maximum output current. This tuning point will be slightly different, in most cases, from the tuning point for minimum anode current with the line off.

The powers obtained shall be greater than the following:

(a) On C.W. Operation.

At frequencies between 140 and 500 kc.	35 watts
At frequencies between 2 and 5 Mc. (B.A. and P.A. both operating at fundamental frequency)	45 watts
At frequencies between 5 and 10 Mc. (B.A. and P.A. both operating at twice oscillator frequency)	40 watts
At frequencies between 10 and 20 Mc. (doubling in both B.A. and P.A.) ...	25 watts

(b) On M.C.W. and R/T Operation.

The power output under either of these conditions should be greater than one-third of the output on C.W. for the same frequency.

64. MODULATOR.

The modulator valve, V1, operates as a tone oscillator on C.W. and M.C.W. as previously explained. To check the operation of the unit, the cathode ray oscillograph is most useful. The vertical plates of the oscillograph should be connected, one to earth and the other to the 100 Ω line terminal through a condenser of 20 to 30 μμF. Modulation depth and distortion on M.C.W. may then be estimated by visual inspection.

On the medium frequency ranges, the modulation depth will vary from approximately 40% at 140 kc. to 70% at 500 kc. and no adjustment is possible.

On the high frequency ranges, the modulation depth may be adjusted by slightly detuning the buffer amplifier. 100% modulation should be obtained with a power amplifier grid current of 1.5 to 2.0 mA. The waveform is, in most cases, flattened on the tops but excessive distortion should not be shown.

A further check on the operation may be obtained by measuring the side tone output voltage (tag 4 to earth, " JUNC. BOX " outlet). The voltage on both C.W. and M.C.W. should be between 1.0 and 1.4 volts.

On R/T operation, an audio tone injected into the microphone input circuit (tags 9 and 3 " JUNC. BOX " outlet) should modulate the carrier. The input impedance is approximately 50 Ω. On the H/F band with a 1,000 cycle per second injected tone and with the grid current adjusted as above, the voltage required for 100% modulation should be less than 0.7 volt. Under the same conditions, but with 50% modulation only, the side tone output should be over 12 volts.

In nearly all cases, the R.F. output current will decrease with modulation, but this is not a sign of faulty operation.

65. REPLACEMENT OF VALVES.

With the exception of the H/F Master Oscillator valve, V2, all valves are firmly held in their sockets by means of a circular clamp around the base. To remove the valves, it is first necessary to loosen the screw tightening the clamp, after which the valves may be withdrawn in the usual way. When replacing valves, make sure the clamp is tightened so that they cannot vibrate out of their sockets. To remove the H/F oscillator valve V2, it is only necessary to remove the valve can as shown and the valve may then be pulled from its socket in the normal way.

When all valves are removed for any reason, make sure that they are all marked so that they can be put back in the same sockets from which they were taken. If this is done, the oscillator calibrations will not be disturbed, whereas if the valve positions are changed, the oscillators may need realignment.

It is advisable to remove all valves before service work is carried out on the unit.

66. PILOT LAMP REPLACEMENT.

The pilot lamp can be readily replaced from the front of the unit by removing the bezel holder. To do this, undo the two non-losable screws in the flanges on the base of the bezel holder and the complete unit comes off. The pilot lamp is then projecting through the front panel and may easily be unscrewed. Replace with a 3.2 volt, 0.3 amp. pilot lamp and remount the bezel holder.

The transmitter must not be operated without a good pilot lamp in the socket as the absence of the lamp will upset the balance of the heater circuits.

67. REMOVAL OF THE H/F M.O. UNIT.

This unit may be withdrawn from the frame without removing the front panel, proceeding as follows :

Remove the bottom cover from the transmitter. Unsolder the three leads from the three tags on the back of the removable unit. These tags are accessible through the space under the globar panel at the back of the unit. Loosen the two screws on the bottom of the unit holding the back of the unit to the transverse angle across the frame. These screws need not be taken out as slots in the angle will allow them to slide forward when the unit is withdrawn from the frame.

Remove the dished metal cover from the side of the removable unit. This is fastened with four screws to the oscillator unit framework and must be entirely removed.

Undo the four non-losable screws holding the unit to the front of the frame. One screw is situated in each corner of the removable unit front panel. Being non-losable, these screws will not come right out, but will become loose in the panel. The unit can now be withdrawn straight out through the front panel, care being taken not to catch the condenser gang lugs on the front frame angle.

When replacing the unit, the above process is reversed, care being taken to see that the side screen is mounted correctly and the unit screwed down to the transverse angle at the back. Connections should then be carefully soldered to the three lugs on the back of the oscillator unit in the order they were removed.

68. METER REMOVAL.

The meter may be removed from the transmitter and replaced without interference with any of the other components or assemblies by unscrewing the three mounting screws in the flange of the meter and pulling it forward out of the front panel. The connections at the back may then be disconnected and the meter is free. When replacing, the connections have to be made first, care being taken to see that the correct polarity of leads is obtained.

69. REMOVAL OF LOCKS AND KNOBS.

Knobs are fastened to the control shafts with either one or two grub screws. If these screws are loosened, the knobs may be withdrawn from the shafts and, as the knobs are provided with D-shaped holes to fit the flats on the shafts, they can only be replaced in the same position as they were removed. All switch knobs are provided with a felt washer between the knob and front panel and this must be replaced before the knob. Before removing knobs and scales with which locks are associated, the locks must be in the " unlocked " position. The complete

knob, scale and brake disc are then withdrawn from between the brake shoes. It is not necessary to undo the cover plate on the front of these knobs, but only the grub screws in the sides. When replacing these knobs, care must be taken to see that the brake disc on the back of the knob is fitting between the two brake shoes, otherwise the lock will not operate.

The complete lock mechanism can be readily removed after the knob and scale by undoing the single screw in the slot in the centre of the lock mounting plate. When replacing, the hole in the mounting plate is fitted over the control shaft and the above screw tightened up in its original position. Care must be taken in handling these locks that the inner brake shoe and pressure springs do not accidentally fall out of the assembly. Without a brake disc to hold them in, this may happen if the assembly is upended or inverted. It is not necessary to remove the locking knob from the lock before removing the lock from the panel.

Insecure locking with the mechanism can be caused by weakening of the bar springs or bending of the same. Temporary efficiency may sometimes be restored by disassembling the lock and reversing the springs but, if possible, the springs should be replaced. Other causes may be wear in the cam or in the spring supports. In either case, a new part will be required.

Backlash in the drive, when locked, may be due to inefficient locking as above or may be due to wear or damage to the lock mounting screw or guide slot. New parts will have to be fitted in either case.

70. FRONT PANEL REMOVAL.

Before the front panel can be removed, it is necessary to remove all handles and control knobs. The locking knobs need not be removed. To remove the handles, the screws in the mounting posts must be completely removed, the handles will then drop down and can be taken off. Knobs are removed in the usual way and these should be arranged or marked so that they may be returned to the shaft from which they were taken. It is not necessary to remove any knobs from the H/F master oscillator front panel with the exception of the vernier drive knob which projects over the main panel.

The front panel is secured with 15 screws, 14 being around the outside and the last being in the centre below the meter. After all knobs have been removed and screws taken out, the front panel, complete with locks, may be lifted off the frame.

When replacing the panel, care must be taken to see that all screws are inserted and that the U-shaped stiffener around the left-hand lower handle mounting post is included.

71. REMOVAL OF H/F B.A. AND M/F M.O. UNIT.

(a) Transmitters with Serial Numbers below 915.

To remove this unit from the framework, it is first necessary to remove the front pane as described in paragraph 70 above.

The unit is supported at the rear by three slotted brackets which must be removed. One bracket is on the back of the two gang tuning condenser on the right-hand side, one at the top and the other at the bottom of the back.

Remove the four leads soldered to the tags numbered 1, 3, 4 and 5 on the component panel at the rear of the unit. The earth lead on 2 need not be removed as the other end is disconnected when the bracket is removed. The unit is then held by three screws in the front, two countersunk screws in the left-hand frame angle and one screw in the vertical partition at the right. The countersunk screws have small spacers at the back of the angle between it and the unit which are loose when the screws are removed. The unit may now be withdrawn through the left-hand side of the framework provided the valves are not in their sockets.

When handling this unit, great care must be taken not to damage the two-gang tuning condenser. This should be handled at all times with the plates fully in mesh and the plates themselves must not be touched. This condenser is accurately calibrated and interference with the plates will upset this calibration.

When replacing the unit, the small spacers behind the countersunk screws must not be forgotten. All brackets are to be screwed to their original mountings, particular care being taken with the one on the rear of the two gang condenser. This must be tightened up so that it places no strain on the condenser.

After the unit is screwed into place, the front panel may be replaced.

The tag strip connections are as follows:

Tag No.	*Connects to*
1	S5 Section 2 (M.O. Grid)
2	Earth
3	RFC2 (H.T. Supply)
4	S5 Section 1 (B.A. Anode)
5	S5 Section 1 (M.O. Anode)

(*b*) Transmitters with Serial Numbers over 914.

In these later transmitters this unit has been arranged so that it can be removed without first removing the front panel.

First remove the four knobs from the H/F B.A. and M/F M.O. controls. The unit is supported at the rear by the three slotted brackets as described in (a) above and also by three screws in the front, two projecting through the front panel on the left hand side and the third screwing into the side of the unit through the vertical partition close to the front of the H/F P.A. tuning condenser.

The four leads soldered to tags 1, 3, 4 and 5 must be removed and the unit can then be withdrawn through the left hand side of the framework, provided the valves are not in their sockets.

The same precautions should be taken in handling the unit as described in (a) above and the unit is replaced in the reverse manner to the removal. All brackets must be replaced.

72. REMOVAL OF M/F P.A. UNIT.

This unit may be removed from the frame without removing the front panel.

Remove the two knobs marked "M/F P.A. Tuner" and "Range" from the front of the transmitter and unsolder the lead to the choke RFC301 from the power socket and also the earth lead at the back of the unit.

The unit is held in the frame by means of four non-losable screws in the horizontal shelf. One is underneath the rear of the main H/F tuning condenser C32, the second just in front of the right-hand corner of the rear switch plate on the H/F tuning inductance L1, the third in front of the right-hand corner of the front switch section of the same inductance and the fourth just behind the right-hand edge of the meter in front of the M/F-H/F switch. The latter can be reached with a long screwdriver. When the screws are undone, the unit should be turned upside down so that these screws will fall into the recesses provided.

The M/F P.A. unit can now be moved towards the rear, at the same time lifting the rear edge. Move it a short distance and then unsolder the three leads on the tag panel on the front of the unit. It may now be withdrawn until the spindles are clear of the front panel and then lifted out of the right-hand side of the frame.

In transmitters with serial numbers below 10, no recesses have been provided for the non-losable screws to fall into when the unit is inverted, so that, to withdraw the unit, it is necessary to further unscrew these screws until they are standing out of the panel, leaving the undersurface flush. Do not take them right out as it will be very difficult to replace them. In this case, it may be easier to remove the front panel, when the screws become more accessible.

When replacing the unit, it is advisable to resolder the three connections to the tag strip on the front of the unit before finally screwing the unit in its correct position. If care is taken to note the method of removal, replacement will be simplified, the reverse process being used. The connections to the tag strip are as follows:

Tag	*Connects to*
1	Condenser C30 (M/F H.T. Supply)
2	Switch S3 (Anode connection)
3	Switch S3 (Output connection)

73. REMOVAL OF H/P P.A. ANODE TUNING COIL AND SWITCH ASSEMBLY.

To remove this coil, it is first necessary to remove the front panel as explained in Paragraph 70 above.

Unsolder the leads from the coil to the condensers C30 and C31. These should be undone from the condenser end, leaving the leads attached to the coil. The condensers are situated underneath the main tuning condenser, C32. Unsolder the lead from the coil-switch assembly to the condenser C24 at the front of the unit, leaving the lead attached to the coil.

The assembly is secured in the unit by means of four screws, two in the front and two in the back. On removal of these, the assembly may be withdrawn through the right-hand side of the unit.

When reassembling, care must be taken that the soldered joints are sound, with the connections in the correct place.

74. SETTING OF CALIBRATED SCALES.

All calibrated scales on the transmitter are set to bear a definite relation to the position of the tuning element to which they are attached. If a dial becomes displaced, the calibration will be incorrect and the dial should be reset as follows:

(a) M/F P.A. Tuning, Fine.

This control operates a variometer capable of continuous rotation. The scale is marked 0 to 100 over 180 degrees and has to be set so that at minimum inductance the zero mark is opposite the reference mark and at maximum inductance the 100 is opposite this mark. To determine the minimum inductance position, tune the transmitter to 500 kc. The tuning point of this control will be close to the minimum inductance position and the true minimum position can then be determined by inspection. This position is obtained when the plane of the rotor winding is parallel to the plane of the stator winding.

Dials may be rotated with respect to the control shaft by removing the cover plate from the front of the knob and loosening the three screws thus revealed. This makes the scale loose on the knob and it can then be rotated to the desired position, holding the knob and shaft steady. The dial locking screws are then tightened and the cover plate replaced.

(b) H/F P.A. Tuning, Fine.

This tuning condenser is not fitted with auxiliary stops and the scale is adjusted by setting the condenser to maximum capacity and turning the scale in respect to the control shaft and knob (it being loosened as before) until the reference line on the scale next to the 2.0 Mc. mark coincides with the cursor line.

(c) M/F Master Oscillator dial.

This scale is provided with auxiliary stops on the front panel to protect the tuning condenser and the dial is set as follows:

Remove the maximum capacity stop from the front panel by unscrewing the small screw through the stop and set the condenser to the maximum capacity position and lock. Remove the cover plate from the front of the knob and loosen the three dial locking screws and turn

the scale around until the diametral line on the scale next to the 370 kc. mark coincides with the line on the cursor. If necessary, adjust the cursor to suit. In the correct position, the scale calibration will appear on the right-hand side of the cursor line. Lock the scale in this position by tightening the three screws, and replace the cover. Replace the stop on the front panel and adjust so that the condenser stops approximately one degree before reaching the end of its travel. Adjust the minimum capacity stop similarly.

(d) H/F Buffer Amplifier Dial.

As for the last-mentioned, this dial is provided with front panel stops for protection of the condenser and it is set in the same manner so that the reference line next to the 2.0 Mc. mark on the scale coincides with the indicator line when the condenser is in the maximum capacity position. Adjust the two stops so that the condenser is stopped by these approximately one degree before reaching the end of its travel.

(e) H/F Oscillator Dial.

This drive is provided with auxiliary stops on the rear of the friction drive plate behind the front panel.

Remove the oscillator unit from the transmitter (Section 6, Paragraph 67) and remove the maximum capacity stop from the rear of the friction drive plate. Set the condenser to the maximum capacity position and lock the shaft with the front panel lock. Take the cover plate off the front of the condenser spindle. Loosen the three screws thus revealed and turn the dial plate, without turning the condenser, until the diametral line on the scale coincides, top and bottom, with the cursor line. If necessary, adjust the cursor in a horizontal and/or vertical direction until perfect alignment is obtained. If the scale is in the correct position, the figures 4 and 3.2 will appear right side up to the right of the top cursor line.

With the dial in this position tighten up the three lock screws and replace the cover plate. Now replace the stop previously removed and adjust its position so that the dial stops approximately one degree before the condenser reaches the maximum position. Adjust the stop on the minimum capacity end so that the condenser stops approximately one degree before the all out position is reached.

AERIAL COUPLING UNIT.

81. REMOVAL AND REPLACEMENT.

The Aerial Coupling Unit may be removed from the installation in the same manner as the receiver and transmitter. When replacing, care must be taken that the unit is firmly pressed home until the two latch bars snap into position, thus avoiding the possibility of the unit coming adrift during flight.

The top and side screens may readily be removed from the unit after it has been withdrawn from the shock base. The top is removed in the usual manner by drawing it towards the rear, but the sides and back in this case are formed of one piece. Two small handles on the back are provided for ease of withdrawal, which is accomplished by pulling towards the rear.

The bottom of the unit is employed for mounting several components and cannot be removed without first undoing these components.

82. INTERWIRING CONNECTIONS.

Apart from the R.F. connections, all circuits to the coupling unit are made to the multi-pin plug at the bottom of the frame as given in the table below:

Tag	*Purpose*
1	M/F H/F changeover relay
2	Earth
3	M/F H/F changeover relay
4	Transmitter cathode keying
7	Keying relay coil
8	Keying relay coil
9	Receiver cathode keying
10	Earth

Four sockets are provided at the top of the unit, two for connecting to the trailing and fixed aerials, one for connecting to the transmitter output and the last for connecting to the receiver aerial. An earth terminal completes the connections.

83. CONTINUITY TESTS.

The following table supplies the necessary information for checking any coil or relay contact in the coupling unit.

The first column gives the reference number of the component to be tested. The second column contains the nominal resistance to be expected between the test points given in columns three and four. Column five gives any special conditions required for test. In the table 1 Ω means 1 Ω or less.

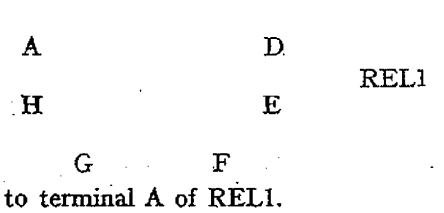
Particular care must be taken when testing meter circuits that the instructions given are followed or false results will be obtained and the meter thermocouples will be damaged.

Component Ref. No.	*Nominal Resistance Ω.*	*Test Points.* 1	2	*Special Conditions for Test Remarks.*
L1	1	Upper L2	Each S2 lug	S2 in 11
L2	1	L2	L2	In all positions of L2, see 12 below.
L3	1	L3	Earth	In all positions of L3
L4	9	L4	L4	S4 in 12
	9	L4	L4	S4 in 11
	8½	L4	L4	S4 in 10
	8	L4	L4	S4 in 9
	7	L4	L4	S4 in 8

Component Ref. No.	*Nominal Resistance Ω.*	*Test Points.* 1	2	*Special Conditions for Test Remarks.*
L4 *(contd.)*	6½	L4	L4	S4 in 7
	6	L4	L4	S4 in 6
	5½	L4	L4	S4 in 5
	5	L4	L4	S4 in 4
	4½	L4	L4	S4 in 3
	3½	L4	L4	S4 in 2
	3	L4	L4	S4 in 1
RFT1	1	Lead to Sec.	Lead to Sec.	See 1 below
RFC1	1	RFC1	RFC1	See 2 and 3 below
RFC2	1	RFC2	RFC2	See 2 and 3 below
RFT2	1	Inner lug	Inner lug	.....
RFT2	1	Outer lug	Outer lug	See 4 below
REL1	75	B	C	See 2 and 5 below
	1	A	H	See 2, 7, 6 below
	1	A	G	See 2, 6, 8 below
	1	D	E	See 2, 7, 6 below
	1	D	F	See 2, 6, 8 below
REL2	30	Terminal 4	Terminal 10	See 5 below
	1	Terminal 1	Terminal 3	See 6 and 9 below
	1	Terminal 1	Terminal 2	See 6 and 10 below
	1	Terminal 5	Terminal 8	See 6 and 9 below
	1	Terminal 5	Terminal 7	See 6 and 10 below
TC1	.....	.....	.....	See 11 below
TC2	.....	.....	.....	See 11 below
M1	.....	.....	.....	See 11 below

Reference to Table :

1. Unsolder the leads from the secondary of the transformer of RFT1 to the thermocouple TC1.
2. For purposes of these tests, label the terminals of REL1 in the following manner :



3. Unsolder the shielded lead to terminal A of REL1.
4. Unsolder leads to TC2.
5. Disconnect Junction Box connector.
6. Transmitter, Power Supply Unit and Aerial Coupling Unit should be connected and the L.T. should be on.
7. Switch S5 on the transmitter should be in the M/F position and the emission switch, S1, in stand-by.
8. Switch, S5, on the transmitter should be in the H/F position and the emission switch, S1, in stand-by.
9. The emission switch, S1, on the transmitter should be in the stand-by position.
10. The emission switch, S1, on the transmitter should be in the R/T position, the 100 Ω line switch off, and the 100 Ω line disconnected.
11. TC1, TC2, M1 are not conveniently tested by means of continuity tests, see Paragraph 84.
12. The test for L2 will not indicate faults in the short-circuiting roller, but includes the rear spring wiper.

84. METER TESTS.

The meter circuits in the Aerial Coupling Unit may be checked in the following manner:

(a) M/F Metering.

Tune the transmitter and aerial coupling unit to 500 kc. employing an artificial aerial of 300 to 500 $\mu\mu$F capacity and zero resistance. Connect an R.F. current meter, preferably with 1.5 amps. full scale deflection, in the earth side of the artificial aerial condenser and adjust the tuning to give 1.5 amps. aerial current as read in the external meter. The meter in the aerial coupling unit should read between 1.25 and 1.5 amps. It is to be remembered that this meter is intended as a tuning indicator only and the accuracy is not high.

(b) H/F Metering.

For this check, the same artificial aerial is used, but a meter of at least 3.0 amps. full scale deflection is required. Using this aerial, the transmitter and aerial coupling unit are tuned to 2.0 Mc. and the coupling unit adjusted to give a current of 3.0 amps. in the external meter. The meter in the unit should now read between 2.5 and 3.0 amps.

If the meter does not read in either of the above cases, the changeover relay contacts (REL1) should first be checked as shown in the continuity table above. If this check proves satisfactory, the thermocouple would be suspected. To check the thermocouple, it and the meter should be removed from the unit and the secondary of the couple connected to the correct terminals on the meter. If, now, a current of up to 100 mA (D.C. or A.C.) is passed through the primary of the thermocouple, a corresponding deflection should appear on the meter.

IMPORTANT.—The full scale deflection of this meter-thermocouple combination without the current transformers, is 100 mA only.

If the test shows faults, it is advisable to check the couple again employing another meter to ensure that it is the thermocouple at fault and not the meter itself. In either case, it will be necessary to replace with a new meter or thermocouple as required.

85. METER REMOVAL.

The meter in the coupling unit may be readily removed in the same manner as that in the transmitter by first undoing the three screws in the mounting flange when the meter may be withdrawn sufficiently to allow the leads to be removed from the terminals.

86. REMOVAL OF KNOBS AND LOCKS.

The knobs and locks on the coupling unit are similar to those employed on the transmitter and the instructions already given for their removal and replacement should be followed, (Section 6, Paragraph 69).

87. FRONT PANEL REMOVAL.

After removing the knobs and carrying handles, the front panel may be readily removed by undoing the five holding-on screws, three at the top and two at the bottom. Locks need not be removed from the panel and the meter should remain in position.

88. SWITCH LOCATORS AND CONTACTS.

The switch locators on the heavy duty type switches on the coupling unit are mounted on the false front panel separately to the switch. The switch drive shafts are fastened to the rear of the locator with a small split pin. All locators have been freely lubricated with anti-freeze grease Type DTD. 143C and should not require re-lubrication. If the locator is removed from the panel, care must be taken not to rotate it without a back plate as the spring rollers will probably fly out. If thin metal plates are provided between the locators and the panel, these must be replaced on reassembling.

If switch contacts become roughened through lack of lubrication, these should be re-lubricated, preferably with a dilute solution of Lanoline in Trichlorethylene. If this is not available, a slight smear of anti-freeze grease would be suitable.

When making correct contact, the switch contacts should lift appreciably on the entrance of the blade.

89. VARIOMETER CONTACT BRUSHES.

Three components in the coupling unit are fitted with wire spring wipers on the rotating shafts. The components concerned are:—

M/F Input Tuning Variometer.
M/F Aerial Tuning, Fine, Variometer.
H/F Aerial Tuning, Fine, Roller Coil.

The brushes should firmly grip the shafts in the grooves provided and should operate dry and clean. These springs must not be greased or poor contact will result. If the springs become bent and do not grip the spindle to make good contact, they may be adjusted by squeezing the wires together at the mounting end. Do not unhook the wires at the loose end but remove from the end of the shaft while in the hooked position.

90. ROLLER COIL ADJUSTMENTS.

The H/F Aerial Tuning, Fine, Control operates a roller coil which may require some attention. The roller is designed to grip each side of the wire on the former, thus giving a wiping contact and it is insulated from the shaft on which it rotates. Electrical contact is made to a metal plate which presses against the back of the roller, giving a wiping contact.

If the roller or contact plate wear greatly they will have to be replaced, but if the contact plate does not make good contact on the roller the tension may be increased by removing the plate and flattening it slightly at the bend. Contact plate and roller should be greased with a solution of Lanoline in Trichlorethylene only. The roller shaft may be lubricated with anti-freeze grease.

The stop mechanism is to be adjusted so that the stop operates just before the roller reaches the end of the wire at either end of the coil. With the roller at the end of the coil which short-circuits the whole coil, the indicator should then show the figure 0 opposite the indicator line on the front panel. When, at the other end, the figure 15 should be showing.

The roller coil is mounted by means of four screws to the false front panel and may be easily removed once the main front panel is removed.

91. RELAY TESTING BRIDGE.

General Remarks on the problem of relay adjustment.

The testing and adjustment of relays is an art demanding considerable skill and proper equipment, if the same repetitive accuracy, useful life and reliability, as has been realised with valves, coils, condensers, and other circuit components, is to be achieved.

Relays are in the same category as valves, generator brushes, etc., as they are consumable items whose life can be rated in terms of operating hours. Spare relays should always be kept available for instant replacement of faulty components. Faulty relays should be returned to the central repair depot for repair, complete re-test and adjustment.

A typical adjustment and testing bridge is described which is similar for adjusting all AT5/AR8 relays. In succeeding paragraphs, the adjustment and test code is given for each type of relay in the Coupling Unit. Refer to Section 6, Paragraphs 115 and 116 for test codes for the relays in the power unit.

The circuit of the test bridge is shown on Drawing No. 8641D1, it consists of three main parts :—

(a) A group of resistances arranged to allow smooth adjustment of the voltage applied to the relay coil from zero to maximum battery voltage.

(b) A motor-driven switch for keying the relay coil supply.

(c) A switch and meter combination which allows direct measurement of the time any contact pair is made.

The bridge, therefore, allows the relay to be operated statically or with repetitive keying at controllable speed under known coil voltage conditions.

The time duration of coil voltage can be determined, and also the duration of closure of any pair of contacts. The lag in the motion of the relay is thus made immediately apparent, also erratic performance arising from any cause is immediately revealed.

The simplified schematic circuit depicts a keying relay connected to the test bridge. The coil and all fixed and moving contacts are connected to the tester.

F1 is a motor whose speed is controlled by a field rheostat R1. This motor is started when required by S5. The motor drives a pair of contacts S2 via a train of gears, operating them at a speed of 5 to 15 cycles per second.

If S1 is closed, the battery voltage is applied via the keying switch, S2, to the resistor bank R2.....R12. Any required percentage of this voltage is tapped off by R2 and S6 and applied to the relay coil. If the ganged switches S3, S4 are closed, the keying switch is shorted and the steadily applied coil voltage measured on M1. After adjustment to the required test value, S3, S4 can be opened, allowing the relay to be driven at the speed of the keying switch. The voltmeter switch prevents unnecessary wear on the instrument.

M2 is a D.C. milliammeter provided with filtering C1, R14. R13 is used to adjust the meter to full scale reading when S7 is in position 5 and S3, S4 is closed. This meter is calibrated 0–100. When S3 is opened, M2 no longer reads full scale. If the motor-driven switch has been adjusted to " make " and " break " for exactly equal intervals of time, M1 will read 50, i.e., signifying that the switch S2 is " made " for exactly 50% of the time required for a complete cycle. The % time closure of S2 also gives the time of application of voltage to the relay coil.

By placing S7 to positions 2 and 4, the % time of contact of the " make " contacts of the relay can be measured. In general, this will be different from the % time of coil voltage owing to the various factors causing lag. Inertia effects cause a lag on the pull in and demagnitising time causes a lag on the release. By very careful adjustment of air gap and spring tension, it is possible to make both lags equal for a selected contact. This results in the duration of coil voltage being faithfully reproduced by duration of contact time. There will be no clipping introduced at high speed, but only a progressively increasing delay.

Simpler type relays, which are not required to perform keying functions, can only be thoroughly checked by a repetitive operational test. The % time of the contacts is checked in various positions of the relay, and particular note is taken whether continued operation during the position check causes any permanent or erratic change in operation. Poor bearings, insecure spring anchorages and improperly-locked screws are rapidly revealed.

The detail of the procedure varies, of course, with each type of relay and is described separately in paragraphs 92, 93 below.

92. KEYING RELAY REMOVAL AND ADJUSTMENT.

The keying relay is arranged to plug-in to the unit and may be easily removed by undoing the two non-losable screws, one at the top and the other at the bottom, and pulling out.

Unless absolutely necessary, this relay must not be adjusted in the field and should be replaced by a new adjusted relay. The following adjusting instructions will indicate the delicacy of the work involved.

If the repairs to a faulty relay necessitate dismantling and replacement of any part, the following details should be carefully observed during reassembly :—

(a) The armature supporting ribbons must be flat. They are easily distorted by the holding screws unless care is taken.

(b) The armature must float freely between the spacers holding the top panels, and the air gap must be parallel. The procedure recommended is to lower the bottom contacts until the armature comes to rest on the pole tips. Hold it firmly in position whilst the ribbon anchorages are tightened This ensures that the air gap when the relay is properly adjusted will be parallel.

(c) Adjust the height of both bottom contacts equally until an air gap between the pole tips and armature is 0.02″ ± 0.005″ in the closed position of the relay. Special narrow feeler gauges are required for this check.

(d) Adjust the top solid contact and back-rest-screw until the air gap between fixed and moving contacts in the open position of the relay is 0.025″ at each end. Make sure that the armature is resting on the back rest and not on the leaf contact.

(e) Adjust the leaf contact so that in the closed position the air gap between it and the moving contact is not less than 0.018″.

(f) Should it be necessary to reset or replace any of the parts of the leaf contact, care must be exercised on reassembly to ensure that the adjusting screw is accurately located in the centre of the clearance hole in each leaf.

(g) Adjust the spring tension so that the relay will just pull in at 4.7 volts, when the coil voltage is gradually increased from a low value.

Electrical Test.

These instructions assume that firstly the test bridge energises the coil for "50% time" and, secondly, that the relay is checked in its normal operating position, i.e., base panel vertical.

The operation is checked with 10, 12, 14 volts applied to the coil. 12 volts is the nominal working value whilst 10 and 14 are, respectively, the under and over voltage limits.

On the 12 volt operation, the following figures should be obtained :—

Circuit or Contact	% *time at* 5 C.P.S.
Coil	50%
Trans. Power Contact	48–52%
Trans. Aerial	2–4% longer than Trans. Power Contact
Rec. Aerial	4–10% less than Trans. Power Contact
Rec. Power Contact	0–15% less than Trans. Power Contact

The above % times should not alter more than ±5 on the 12V figures for 10 and 14V operation nor for speed change from 5 to 15 C.P.S. at normal volts. To obtain the required figures quickly, calls for experience and skill. In the general approach to the problem, the % time of the make contact is first checked and adjusted by altering the spring tension and/or the air gap. The latter adjustment is achieved by raising or lowering the bottom contacts.

The receiver contact is then slightly readjusted to just beyond the point where the % time readings are erratic or unstable, to ensure that the setting allows a reasonable margin for wear before readjustment would be necessary.

With experience, the performance of the relay on the initial test under varying speed conditions and varying coil voltages, allows an accurate diagnosis to be made of the predominating factor causing misadjustment.

If the air gap is too small, the demagnetising time of the magnet will be increased. The % time on the make contacts will be high and will increase with speed and voltage. Increasing the spring tension will correct the % time for one voltage and for varying speeds, but not necessarily for varying voltages. A slight readjustment of the fixed contacts to increase the air gap is indicated.

The final check consists of re-examining all contact gaps to see that they are within the limits quoted in (d) and (e) above.

Carefully lock and cement all bolts, nuts, screws. Allow the relay to operate for 10 minutes at 15 C.P.S. as a final check of locking and cementing.

93. M/F H/F CHANGEOVER RELAY.

This relay is provided with a fixed mounting in the unit but may be removed by undoing the nuts on the back and removing all the leads. If the relay becomes inoperative, it should be replaced with a spare adjusted relay. Unless absolutely necessary, adjustments should not be attempted in the field. The relay is adjusted as follows :—

(a) When the armature is closed, a small air gap of the order of 0.001″ to 0.010″ should exist between the armature and core of the coil. This check will only be necessary if the coil has been replaced.

(b) The stiff portion of the moving contact should be set so that when the armature is closed on to a feeler gauge of 0.015″ which is inserted in the gap between the armature and yoke, both arms make on the bottom fixed contacts.

(c) Adjust the contact ribbons so that if the relay is held horizontally with the return spring removed, the moving contacts will "float" approximately mid-way between the fixed contacts. A polished rod of approximately $\frac{1}{4}$″ dia. can be used to "work" the contact ribbons into a smooth curve which is adjusted so that no appreciable "pull" is exerted on the armature.

(d) Adjust the height of the fixed contacts by bending so that the total gap between fixed and moving contact is within the limit 0.025″ to 0.035″ in either open or closed positions.

Electrical Tests.

These tests are performed on a relay test bridge of the type described in Section 91. The panel of the relay must be vertical.

(e) Adjust the tension of the return spring by setting the anchor bracket so that the following pull-in and release voltages are obtained :

Pull-in :	Between 8 and 9 Volts
Release :	Not less than 2V

The readings are taken as the value which is read on the coil voltmeter at the instant of operation when the operating point is approached by gradually increasing or decreasing the applied voltage.

(f) The relay is now to be electrically operated at 5 C.P.S. in various positions with 12V applied to the coil. The object of this test is to discover whether any sudden change occurs in performance. The percent. time will, of course, change with various orientations, but it should be a smooth alteration. A half-minute test of this character will definitely reveal whether any of the free fitting parts are able to work into any positions or tight spots that can cause erratic operation. The pull-in and release figures should be rechecked after each running test. Grease, flux, dirt or burrs in the armature bearing will cause trouble. Badly formed springs can sometimes take up slightly different positions on their anchorages, thereby causing a major change to the pull-in and release figures.

(g) The repaired and readjusted relay should be given a final careful inspection. All terminals, screws, etc., should be locked and cemented, and have cover replaced.

94. SETTING OF SCALES.

Several scales on the coupling unit are provided with the setting device the same as that described for the transmitter, and these scales are moved in relation to the knob by removing the knob cover plate and loosening the three screws thus revealed. The scale may then be rotated to the correct position with respect to the knob as follows :—

(a) H/F Aerial Tuning, Fine.

Rotate the inductance until the minimum inductance stop is reached, i.e., until the whole coil is short-circuited by the roller. The figure 0 should now appear in the window opposite the panel indicator line and, with the inductance hard up against the stop, the zero on the circular scale should also be opposite the same indicator line. After rotating the plate with respect to the knob, the three screws should be tightened and the cover plate replaced.

(b) H/F Input Tuning, Fine.

With the condenser set to the maximum capacity position, the 100 mark on the scale should be opposite the reference line on the panel.

(c) M/F Input Tuning.

With the variometer set to the maximum inductance position, the 100 mark on the scale should be opposite the reference line on the panel. The maximum inductance position will be one of the two positions in which the plane of the rotor winding is parallel to the plane of the stator winding. The correct one of the two can be obtained by experiment, the correct adjustment for 500 kc. being generally towards the minimum inductance end.

(d) M/F Aerial Tuning, Fine.

With the variometer set to the maximum inductance position, the 100 mark on the scale should be opposite the reference line on the panel. The maximum inductance position will again be one of the two positions in which the plane of the rotor winding is parallel to the plane of the stator winding and the correct position out of the two can only be found by experiment. If the coupling unit is tuned to a dummy aerial of 500$\mu\mu$F capacity at 500 kc., the tuning point will be towards the minimum inductance end of the variometer with the " coarse " control in position 1.

JUNCTION BOX AND CABLES.

101. REMOVAL AND ACCESS.

The junction box is screwed down into the aircraft and to remove it, these screws must be undone. If cables are run with clips to hold them in position, it will be a simple matter to remove and replace these and, therefore, cables should not be lashed to the craft or passed through holes too small to take the end fittings.

All cables are connected to tags on the top of the junction box and these are revealed when the top is removed. Staggering of the holes in the top panel prevents the screwing down of these the wrong way round so that cable outlet positions will be correctly labelled. All connections between tags are made on the underside of the tag panel and access may be obtained to this by removing the bottom cover plate on the junction box. This is held on by six countersunk screws. The microphone filter chokes and condensers are now revealed and these may be withdrawn from the unit after undoing the four holding screws, two in each end. The leads to these components are long enough to allow the assembly to be swung clear of the junction box, so revealing the cross-connections.

102. CONTINUITY TABLE.

The following table indicates all the cross-connections required in the junction box. The numbers in each column indicate the tag number on the particular cable plug concerned and all numbers in the same horizontal line should be connected together but should not be connected to any of the other numbers. The resistance of the microphone filter chokes should be approximately 35 Ω.

Trans.	*Rec.*	*A.C.U.*	*Opr.*	*I/C*	*R.C.U.*	*Pulse.*
1	.....	7	7	.....	.....	.....
2	.....	.....	.....	.....	.....	10
	2	2, 10	4, 2	4, S	2	2, E
3	.....	3	3	.....	3	3
4	4	.....	.....	.....	.....	.....
5	9	.....	.....	3	4	.....
6	.....	.....	.....	.....	9	.....
7	.....	.....	.....	.....	.....	7
8	.....	.....	.....	.....	8	.....
9	.....	.....	9	.....	.....	.....
10	.....	4	.....	.....	.....	.....
11	.....	.....	.....	.....	7	.....
12	.....	1	.....	.....	.....	.....
	1	.....	1	1	1	.....
	3	9	.....	.....	.....	.....
	7	.....	.....	.....	.....	1
	8	8	.....	.....	.....	.....
	10		10			
	10			2	.....	.....
	10				10	.....
3			10	.....	.....	.....
3				2	.....	.....
3					10	.....

103. ELECTROLYTIC CONDENSERS.

The condensers employed in the microphone filter circuits are Ducon Electrolytics of 100 μF, 25V D.C. Working and cannot, therefore, be checked by ordinary means. The following procedure is recommended.

A D.C. voltage of approximately 35 volts is applied to the condenser in the correct polarity and after one minute the leakage current is measured. This should not exceed 0.1 mA per μF, i.e., in this case should not exceed 10 mA. Condensers which pass a current in excess of this after being on for one minute are faulty. The voltage is applied for one minute before test to allow condensers which have been out of use for some time to regain their characteristics. If the condenser shows no current at all, it can be considered to be open circuit and, therefore, faulty also.

104. STANDARD CABLE CONNECTION CODES.

In some of the 7 and 12 core cables, it will be noticed that each wire has a distinctive colouring and where this applies a standard connection code has been applied in the connection of these to the attached plugs. The following tables show the connection codes employed :—

(a) 12 Pin Connector.

Pin No.	*7 Core Cable*	*12 Core Cable*
1	White, thick core	Green, thick core
2	Screen	Red, thick core and screen
3	Black, thick core	White, thick core
4	Brown	Black, thick core
5	.....	Pink
6	.....	Salmon
7	Blue	Brown
8	Yellow	Yellow
9	Red, heavy insulation	Black, heavy insulation
10	Green	Blue
11	.....	Red
12	.....	Grey

(b) 8 Pin Connector.

Pin No.	*7 Core Cable*	*12 Core Cable*
1	White, thick core	Green, thick core
2	Screen	Red, thick core and screen
3	Black, thick core	White, thick core
4	Brown	Black, thick core
7	Blue	Brown
8	Yellow	Yellow
9	Red, heavy insulation	Black, heavy insulation
10	Green	Blue

To fit a cable to a plug, strip back the rubber sheath a sufficient distance. Cut metal braid back to within half inch of sheath.

Lightly bind braid with 28–30 S.W.G. T.C. wire, commencing from sheath. $\frac{1}{4}$ inch width of binding is required.

Special care must be taken not to make binding tight or insulation of cores will be damaged.

Fray screening and fold back over first binding.

Lightly bind with tinned copper wire as before, taking special care not to make binding tight. Solder in several spots only to fasten binding to braid. It is absolutely essential that no broken strands of braid project at the fold. Also that no solder must be allowed to run to the edge of the fold otherwise a sharp edge is formed which will cut through the rubber insulation. Solder a short length of $\frac{1}{8}$ inch copper braid to the binding.

Slip the fastening rings and adaptor over the cable before making the connections to the pins of the plug. To avoid the possibility of short-circuits between wires at the pins, a length of Empire Tube should be slipped over each wire before it is connected and be pushed down over the pin after the soldered joint is made.

The adaptor should be fastened to the plug frame in the required position with one-eighth inch long 5BA screws. Longer screws must not be used as they will short-circuit some of the pins to frame. When inserting the cord grips in the adaptor, pull back the braid pig-tail attached to the screening and insert one cord grip so that it presses firmly on the pigtail; the screening is then making good electrical contact with the frame of the plug.

(c) Termination of Screen in 7-core Cable.

After binding and finishing the screen as above, solder a short length of 23/36 V.I.R. wire to the screen and connect to pin 2 of the plug.

(d) Termination of Screen in 12-Core Cable.

After binding the screen as above, solder the " Red, thick core " lead to the screen. Solder a short length of 40/36 V.I.R. wire to the screen and connect to pin 2 on the plug.

POWER UNIT.

111. REMOVAL AND ACCESS.

The Power Unit may readily be removed from the installation by removing the interwiring connections and sliding the unit off the mounting base after releasing the latch bars in the usual manner. It is only necessary to slide the unit half the length of the base after which it may be lifted off.

Access may be obtained to the components mounted inside the unit by removing the base, the back and one end. The bottom is attached by means of 14 screws around the edges. The back and one end are made in one piece and are secured by 16 screws to the frame. In the case of the bottom and back, all visible screws in the plates concerned should be removed.

If access is required to components mounted on the rear of the front panel, this may be obtained by removing the screws around the edge of the panel concerned. The panel may then be lifted out of the groove at the bottom and tilted forward sufficiently to get at the rear of it without removing any leads. The panel is made in two sections which may be removed separately.

Access to the brush gear of the machines is obtained by removing the end bells which are held on by means of two screws in each. These are sealed with wire passed through holes in the heads of the screws in case they work loose under vibration.

112. INTERWIRING CONNECTIONS.

With the exception of the L.T. input and the earth, all connections to the power unit are made through two eight-pin sockets, one for the transmitter and one for the receiver. The L.T. input connects to two terminals on the top of the unit between the machines. The cover over these terminals may be reversed to bring the leads out in either direction, forwards or to the rear. This cover can be more easily removed if the end bell on the receiver machine is removed.

The following table indicates the connections to the connection sockets:

Receiver Outlet.

Pin No.	*Purpose*	
1	L.T. supply 13V positive	
2	Earth	
3	L.T. supply 26V negative	13V negative
4	L.T. supply 26V positive	
7	L.T. supply positive to Pulse Sender.	
8	L.T. supply to keying relay.	
9	H.T. supply 250V positive.	
10	Microphone supply, positive.	

Transmitter Outlet.

Pin No.	*Purpose*	
1	L.T. supply 13V positive.	
2	Earth.	
3	L.T. supply 26V negative	13V negative.
4	L.T. supply 26V positive	
7	Earth.	
8	Generator starting relay control.	
9	H.T. supply 550V positive.	
10	H.T. supply 300V positive.	

The earth connects to the terminal provided on the front panel of the unit.

113. CONTINUITY TESTS.

The following table supplies the necessary information for continuity checking any choke, relay, fuse or resistor in the power unit.

The first column gives the reference number of the component to be tested. The second column gives the nominal resistance to be expected between the test points given in columns three and four. Column five gives any special conditions required for test. In the table, a nominal resistance of one Ω means one Ω or less.

It will be found, in some cases, that the test points are such that they include components other than the one under test. This is done for convenience in testing and should be remembered when incorrect readings are obtained. The special conditions of test have been chosen to reduce, as far as possible, the influence of other components on the test.

All external connections must be removed from the unit before making these tests and both switches on the unit are to be placed in the "OFF" position.

The table applies to a unit for 26 volt operation only. It is necessary to remove the bottom before the tests can be performed.

For modifications to the unit for 12-14 volt operation, refer to Paragraph 119 below.

Component Reference No.	*Nominal Test Resistance* Ω	*Test Points.* 1	*Test Points.* 2	*Special Conditions for Test Remarks.*
R1	36	R1	R1	.....
R2	17	Rec. Con. 10	Rec. Con. 3 & 4	See 1 below
R3	17	Rec. Con. 10	Rec. Con. 3 & 4	See 1 below
R4	1,700	R4	R4	See 2 below
R5	6,000	R5	R5	See 2 below
R6	50	R6	R6	See 3 & 4 below
R7	1	R7	R7	See 3 & 5 below
RFC1	1	RFC1	RFC1	.....
RFC2	1	RFC2	RFC2	.....
RFC3*	30	RFC3	RFC3	.....
RFC4*	30	RFC4	RFC4	.....
RFC5	1	RFC5	RFC5	.....
RFC6	1	RFC6	RFC6	.....
RFC7*	30	RFC7	RFC7	.....
RFC8	1	Rear RFC8	REL1 near C21	.....
RFC9	1	RFC9	RFC9	.....
RFC10	1	RFC10	RFC10	.....
RFC11	1	RFC11	RFC11	.....
L1*	40	Lower F6	Upper C5	Secondary Fuses out
L2*	40	Lower F7	Outer C13	Secondary Fuses out
L3*	40	Outer RFC7	Outer C13	.....
REL1	30	Trans. Con. 8	Rec. Con. 4	.....
REL2	.....	.....	.....	See R6 above
F1	1	.....	.....	See 6 below
F2	1			
F3	1			
F4	1			
F5	15			
F6	15			
F7	15			
F8	1			
F9	1			

* Components marked may vary widely from time to time due to use of alternative materials.

References to Table :

1. Measures R2 and R3 in parallel. Short Receiver Connector pins 3 and 4.
2. Remove cover from the end of Gen. No. 1 nearer to Gen. No. 2. Remove one of the H.T. brushes. R4 consists of two 850 Ω resistors in series.
3. For Carter Machine only. See Section 3, paragraph 114. Remove cover from box attached to machine.
4. Measures R6 with REL2 coil in parallel, provided the resistance between L.T. brushes of Gen. No. 1 is small.
5. Unsolder the leads to a lug of R7. R7 has a value of 0.5 Ω.
6. Remove fuse from holder. A test resistance of 15 Ω is to be regarded as 15 Ω or less.

114. ELECTRICAL TESTS.

The following table indicates the voltage to be expected from a normal power unit operating without load when supplied with 26 volts input.

The voltages are measured on the outlet sockets between the points shown with both machines running. To start the transmitter machine, it is necessary to short pin 8 on the transmitter socket to pin 3. This operates the starting relay and the machine starts. H.T. voltage may vary somewhat from the figures shown and these should be taken as a guide only.

Receiver Outlet—

Measuring Points		
1 (*Positive*)	2 (*Negative*)	*Voltage*
Pin 4	Pin 3	26V
Pin 7	Pin 3	26V
Pin 8	Pin 3	26V
Pin 9	Pin 2 or Earth	260V
Pin 10	Pin 3	8V

If a resistance of 36 Ω is connected from pin 8 to pin 3, the voltage across this resistance should then be 12V approximately.

Transmitter Outlet—

Measuring Points		
1 (*Positive*)	2 (*Negative*)	*Voltage*
Pin 4	Pin 3	26V
Pin 9	Pin 2, 7 or earth	550V
Pin 10	Pin 2, 7 or earth	425V

115. MAIN STARTING RELAY ADJUSTMENT.

Main Starting Relay.

After any overhaul or repair necessitating dismantling, the following points should be watched during re-assembly.

(a) Plunger Assembly.

Guide bracket must be secure and insulated from frame. The contact arm must have a smooth finish.

Lock nuts must be well soldered.

When the spring is fully compressed, the contact arm must still remain within the guide bracket.

The spring which is fitted to this assembly might have to be subsequently removed and adjusted if the electrical test requirements are not met.

(b) L.T. Contact Assembly.

The surface of the contacts must be smooth and free of turning " pips ".

The contacts must be mounted square and insulated from the spinning.

The length of contact stud projecting through the spinning must be approximately $\frac{18}{}$".

(c) Electrical Test.

This can be performed on the electrical test bridge described in Section 6, paragraph 91.

The " percent-time " meter is used to check continuity through the power contacts in the closed position of the relay. The relay must be mounted in the horizontal position for electrical test.

When the pull-in voltage is varied gradually, the following results should be obtained :—

	24V *Relay*	12V *Relay*
Pull in :	Not more than 16V	Not more than 8V
Release :	Not less than 2V	Not less than 1V

If these figures cannot be obtained, the relay must be opened and the coil spring stretched or compressed according to whether increased or decreased spring pressure is required. The continuity between contacts should be checked in the closed position of the relay.

The relay should now be operated electrically a number of times whilst held in various positions, the pull-in and release voltages and continuity being rechecked after each test.

The object of this trial is to ascertain whether repeated operation can cause any realignment of loose fitting parts which could affect the performance of the relay.

116. AUXILIARY STARTING RELAY ADJUSTMENT.

Auxiliary Starting Relay Type 12R7190, Ref. Y10D/70261.

This relay is only used in power units fitted with Carter Genemotors, or any other type which might be used in future and which require two stage starting.

(a) Preliminary Adjustments.

Adjust height of " make " contact so that in closed position of relay the air gap between armature and yoke is 0.040" to 0.060".

Adjust back stop so that the gap between fixed and moving contacts is 0.015" $\pm$ 0.002".

Carefully inspect relay bearings, if necessary removing the armature.

The bearings must be clean, free of grease, soldering flux and punching burrs.

The spring anchorage must be tightly riveted. If the rivet has loosened, even slightly, the anchor bracket should be soldered to the magnet yoke.

Worn or pitted contacts can be reconditioned if necessary with a super finefile and burnishing tool. Glass or emery cloth should not be used under any circumstances. Although reconditioning of the contacts is possible, it is seldom necessary and should be undertaken only if indicated by the electrical test results.

(b) Electrical Tests.

These tests may be performed on the electrical test bridge described in Section 6, paragraph 91, or any similar circuit.

The " percent time " meter can be used to check contact " continuity ".

Connect the relay coil to the supply source using a 150 Ω resistance in series with the coils.

The test voltages referred to below are the values applied to the coil and series resistance combined.

Adjust the spring tension by bending the anchor bracket so that the pull-in and release voltages of the relay with the panel vertical, fall within the values specified.

Pull in: Not greater than 20V
Release: Not less than 15V.

The applied voltages must be varied gradually to obtain correct results.

The relay must now be electrically operated a number of times whilst held in various positions, the pull-in and release figures being rechecked after each test. The object of this test is to ascertain whether repeated operation of the relay in various positions can cause any change to its performance resulting from re-alignment of loose fitting parts.

Irregular behaviour is most likely to be due to bearings. Excessive difference between pull-in and release voltages can be due to too large movement of the armature, or to excessive air gap between armature and yoke.

Having obtained the ratio of voltage for pull-in to release voltage, adjustment of the spring tension should bring both figures right simultaneously.

(c) Final Inspection.

All screws, nuts, etc., disturbed during adjustment should be locked tight and cemented.

Pigtails should be free and neatly spiralled.

All soldered joints should be in good order.

The cover should be replaced immediately the adjustments are completed.

117. SERVICING OF MACHINES.

The H.T. machines on the power unit will require regular attention and servicing in the same manner as all machinery. The machines should be re-lubricated at least once every six months.

The spring pressure should hold the brushes firmly on the commutator when the machine is running but should not be too tight or excessive wear will result.

The carbon dust from the brushes will collect on the bakelite mounting rings as the brushes wear and should be wiped off regularly.

Dirty commutators can be cleaned by wiping them with a fine grade of glass paper while the machine is running. Emery paper must not be used or damage to the commutator will result.

Worn brushes in any position will have to be replaced with new ones. New brushes will have to be bedded in to fit the commutator to obtain good, noise-free running. To allow for low temperature operation, the brush holders have a relatively large amount of clearance and, because of this, the grinding-in must be done in the direction of rotation of the machine only and not with a to and fro motion. The best method is to wrap a ribbon of fine glass paper around the commutator and, with the pressure on the brushes, turn the rotor in the correct direction. The brushes must be lifted for the return stroke. Do not use emery paper or damage will result to the commutator.

The machines run in ball bearings at each end, one of these bearings being fixed longitudinally and the other being free to slide to allow for variations in length of the rotor with temperature. To re-lubricate these bearings, it is necessary to dismantle the machine in the manner described. Bearings must be lubricated with anti-freeze grease type DTD143C and must not be packed tight, only a small amount of grease being employed.

(a) Transmitter Machine.

To dismantle the transmitter machine, remove the two end bells. At the H.T. end of the machine remove the brushes and disconnect all wires from the brush holders. Remove the screws from the boss in the centre of the end frame, and the tie-rods or screws holding the end frame to the field structure. The end frame can now be removed. The ball race remains fixed to the end of the armature shaft.

To take the armature out, remove the L.T. brushes from their holders and unscrew the screws in the centre boss of the end frame on that end of the machine. The armature may now be drawn out of the frame from the H.T. end, bringing with it the other ball race which is fixed to the armature shaft in the same way as the H.T. end.

When re-assembling the machine, care must be taken to see that the end frame is correctly located and the bearings slide correctly into the recesses provided. Without brushes on the commutators, the armature should rotate freely. All screws must be tight and sealed. When replacing brushes, they must be inserted in the same holders the same way around as they were removed or else they will require regrinding.

(b) Receiver Machine.

Remove all brushes from the machine, taking care to see that they are marked so they can be replaced in the same positions and the same way up in the holders. Disconnect the leads from the brush holders and undo the three round head screws in the boss in the centre of the end casting on each end of the machine.

Undo the two nuts on the end frame on one end of the machine and withdraw the clamping rods. These rods run right through them achine, the same rods clamping both end frames.

The end frames may now be withdrawn from the machine. Care must be taken that the flats on each side of the bearing clamping plate inside the machine clear the brush holders when the end casting is withdrawn. These may have to be rotated on the shaft to the correct position.

118. REPLACEMENT OF MACHINES.

(a) Transmitter Machine.

To remove the transmitter machine, it is necessary to remove all covers from the unit and to undo the larger portion of the front panel. The four leads from the machine may now be unsoldered from the appropriate positions, the two L.T. leads being soldered to the chokes RFC8 and RFC9 and the two H.T. leads to the resistors R4 and R5 respectively. All these leads are run in screened wire and it is necessary to unsolder this braid from earth at several points.

The four screws through the mounting feet of the machine into the unit frame may now be removed and the machine lifted off, pulling the leads through the grommet.

When replacing the machine, see that the leads are fed through the grommet and that the rubber washers on the mounting feet are assembled correctly. Correct polarity of leads is essential and the machine should be watched when first started to see that the direction of rotation is correct according to the marking on the machine.

(b) Receiver Machine.

The L.T. leads from this machine are attached one to each side of C8 and the H.T. leads are soldered to tags in the rear compartment underneath the machine, the positive to the top of the ebonite spacer and the negative to earth. The machine is then held to the unit by four screws through the mounting feet, the rubber washers remaining attached to the framework of the unit.

When replacing, the polarity of the leads must be carefully observed and the direction of rotation of the machine checked when first switching on.

119. MODIFICATIONS FOR 12-14V OPERATION.

The differences between the 26V and the 13V power units are outlined in the general description (Sect. 3, para. 116). In general, the foregoing instructions for servicing and maintenance apply to both types but several components have different resistance values as follows:

Component Reference No.	*Nominal Test Resistance Ω.*	*Test Points.*		*Remarks.*
		1	2	
R1	.....	.....	.....	Not used in 13V unit
R2	12·5	Rec. Con. 10	Rec. Con. 8	See 1 below
R3	12·5	Rec. Con. 10	Rec. Con. 3	See 1 below
REL1	9	Trans. Con. 8	Rec. Con. 1	.....

Note 1.—Measures R2 and R3 in parallel. Short Receiver connector pins 1 and 3.

The H.T. test voltages shown in paragraph 114 will apply but the L.T. voltages will be reduced to 13 volts and the microphone voltage between pins 10 and 3 on the receiver socket will be reduced to approximately 6 volts.

REMOTE CONTROL UNIT.

121. REMOVAL AND ACCESS.

When removing the control unit from the aircraft, unless it is removed with the junction box and cables, it will be necessary to disconnect the interwiring cable from it. The terminals are exposed on removing the cover plate of the front of the unit, this being held by four screws. To remove the unit itself, the four screws which project through clearance holes in the front panels are removed and the unit may then be lifted off its base, this being screwed to the mounting frame (refer to drawing No. 7755D3).

With the unit removed from its base, access may be obtained to the rear and the removal of the front cover reveals all the terminals. The inside of this front cover is engraved with connecting instructions for the interwiring leads.

122. CONTINUITY TABLE.

For the continuity test a low reading ohmmeter is to be employed and zero resistance should be obtained between the two measuring points shown in any one line in the following table with the switch in the position shown in the third column.

Remote Control Unit, type P7755.

Test Points.		*Switch Position.*	*Test Points.*		*Switch Position.*
1	2		1	2	
Case	2	I/C	4	M—	Rec.
Case	T—	I/C	3	7	Send
4	M—	I/C	3	8	Send
10	M+	I/C	9	M—	Send
3	7	Rec.			

Before commencing continuity tests all external connections must be removed, otherwise incorrect readings will result.

Remote Control Unit, type P7755.

Test Points.		*Switch Position.*	*Test Points.*		*Switch Position.*
1	2		1	2	
Case	2	any position	3	7	C.W.
Case	T—	any position	Case	5	C.W.
1	T+	any position	4	M—	C.W.
Key	12	any position	3	7	R/T
Key	11	any position	3	8	R/T
10	M+	any position	9	M—	R/T
4	M—	I/C			

Before commencing continuity tests all external connections must be removed, otherwise incorrect readings will result.

SCHEDULE OF COMPONENTS

FOR

RECEIVER AR8

TYPE C7733

SCHEDULE OF COMPONENTS FOR RECEIVER AR8, TYPE C7733.

Item No.	Circ. Ref. No.	Description.	Dwg. Photo. Ref.	Circuit.	Function.	Test Ref.	Maker's Name.	Maker's Designation.	R.A.A.F. Ref. No.
1	C1	CONDENSER, 0.05 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1703	7733A1 and 7733C1	Cathode By-pass VI...	...	A.W.A. ...	S7080	Y10C/65133
2	C2	CONDENSER, 0.05 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1703	7733A1 and 7733C1	Screen By-pass VI ...	...	A.W.A. ...	S7080	Y10C/65133
3	C3	CONDENSER, 0.05 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1703	7733A1 and 7733C1	Plate By-pass VI ...	...	A.W.A. ...	S7080	Y10C/65133
4	C4	CONDENSER, 85 μμF, ±2½% Fixed, 300V Wkg., Silver Mica Dielectric, Tropical Finish.	(In T1) 1703	7733A1 and 7733C1	Tune Primary T1 ...	...	A.W.A. ...	S7946	Y10C/65134
5	C5	CONDENSER, 85 μμF, ±2½% Fixed, 300V, Wkg., Silver Mica Dielectric, Tropical Finish.	(In T1) 1703	7733A1 and 7733C1	Tune Secondary T1 ...	...	A.W.A. ...	S7946	Y10C/65134
6	C6	CONDENSER, 5,000 μμF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	(In T1) 1703	7733A1 and 7733C1	Couple T1 to T2 ...	...	A.W.A. ...	S6773	Y10C/65135
7	C7	CONDENSER, 200 μμF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1814	7733A1 and 7733C1	Grid Condenser V2 ...	...	A.W.A. ...	S6771	Y10C/65136
8	C8	CONDENSER, 0.05 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1814	7733A1 and 7733C1	Screen By-pass V2 ...	...	A.W.A. ...	S7080	Y10C/65133
9	C9	CONDENSER, 5,000 μμF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	(In T2) 1814	7733A1 and 7733C1	Couple T2 to T1 ...	...	A.W.A. ...	S6773	Y10C/65135
10	C10	CONDENSER, 85 μμF, ±2½% Fixed, 300V Wkg., Silver Mica Dielectric, Tropical Finish.	(In T2) 1814	7733A1 and 7733C1	Tune Primary T2 ...	...	A.W.A. ...	S7946	Y10C/65134
11	C11	CONDENSER, 85 μμF, ±2½% Fixed, 300V Wkg., Silver Mica Dielectric, Tropical Finish.	(In T2) 1814	7733A1 and 7733C1	Tune Secondary T2 ...	...	A.W.A. ...	S7946	Y10C/65134
12	C12	CONDENSER, 0.05 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1814	7733A1 and 7733C1	Cathode By-pass V3...	...	A.W.A. ...	S7080	Y10C/65133
13	C13	CONDENSER, 0.05 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1814	7733A1 and 7733C1	Plate By-pass V3 ...	...	A.W.A. ...	S7080	Y10C/65133
14	C14	CONDENSER, 0.05 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1814	7733A1 and 7733C1	Screen By-pass V3 ...	...	A.W.A. ...	S7080	Y10C/65133

Schedule of Components for Receiver AR8, Type C7733—*continued.*

15	C15	CONDENSER, 85 μμF, ±2½% Fixed, 300V Wkg., Silver Mica Dielectric, Tropical Finish.	(In T3) 1814	7733A1 and 7733C1	Tune Primary T3 ...	...	A.W.A. ...	S7946	Y10C/65134
16	C16	CONDENSER, 85 μμF, ±2½% Fixed, 300V Wkg., Silver Mica Dielectric, Tropical Finish.	(In T3) 1814	7733A1 and 7733C1	Tune Secondary T3 ...	...	A.W.A. ...	S7946	Y10C/65134
17	C17	CONDENSER, 250 μμF, ±5% Fixed, 300V Wkg., Silver Mica Dielectric, Tropical Finish.	(In T3) 1814	7733A1 and 7733C1	Diode By-pass V4 ...	...	A.W.A. ...	1S7946	Y10C/65137
18	C18	CONDENSER, 250 μμF, ±5% Fixed, 300V Wkg., Silver Mica Dielectric, Tropical Finish.	(In T3) 1814	7733A1 and 7733C1	Diode By-pass V4 ...	...	A.W.A. ...	1S7946	Y10C/65137
19	C19	CONDENSER, 200 μμF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1814	7733A1 and 7733C1	A.V.C. Feed	...	A.W.A. ...	S6771	Y10C/65136
20	C20	CONDENSER, 0.05 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1814	7733A1 and 7733C1	Cathode By-pass V4...	...	A.W.A. ...	S7080	Y10C/65133
21	C21	CONDENSER, 0.05 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1814	7733A1 and 7733C1	A.V.C. Filter	...	A.W.A. ...	S7080	Y10C/65133
22	C22	CONDENSER, 0.1 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish, 2 connected in parallel.	1814	7733A1 and 7733C1	Screen By-pass V4 ...	...	A.W.A. ...	S7080	Y10C/65131
23	C23	CONDENSER, 200 μμF, ±10% Fixed, 750V D.C. Wkg., Mica Dielectric, Tropical Finish.	1814	7733A1 and 7733C1	Plate R-F By-pass V4	...	A.W.A. ...	S6771	Y10C/65136
24	C24	CONDENSER, 0·05 μF, ±10% Fixed, 700V Wkg., Paper Dielectric, Tropical Finish.	1814	7733A1 and 7733C1	Coupling V4 to V5 ...	...	A.W.A. ...	S7080	Y10C/65138
25	C25	CONDENSER, 1,000 μμF, ±10% Fixed, 750V D.C. Wkg., Mica Dielectric, Tropical Finish.	1814	7733A1 and 7733C1	Plate R-F By-pass V5	...	A.W.A. ...	S6772	Y10C/65139
26	C26	CONDENSER, 1 μF, ±10% Fixed, 400V Wkg., Paper Dielectric.	1814	7733A1 and 7733C1	Plate A-F By-pass V4	...	Chanex ...	PS74	Y10C/65140
27	C27	CONDENSER, 0·05 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1814	7733A1 and 7733C1	A.V.C. Filter V4 ...	...	A.W.A. ...	S7080	Y10C/65133
28	C28	CONDENSER, 0·05 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1814	7733A1 and 7733C1	Signal Diode to Signal Grid V4.	...	A.W.A. ...	S7080	Y10C/65133
29	C29	CONDENSER, 0·05 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1814	7733A1 and 7733C1	Tone Control V5 ...	...	A.W.A. ...	S7080	Y10C/65133
30	C30	CONDENSER, 1,000 μμF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1814	7733A1 and 7733C1	R-F By-pass 'Phone Output.	...	A.W.A. ...	S6772	Y10C/65139

Schedule of Components for Receiver AR8, Type C7733—*continued.*

Item No.	Circ. Ref. No.	Description.	Dwg. Photo. Ref.	Circuit.	Function.	Test Ref.	Maker's Name.	Maker's Designation.	R.A.A.F. Ref. No.
31	C31	CONDENSER, 1,000 μμF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1814	7733A1 and 7733C1	R-F By-pass 'Phone Output.	...	A.W.A. ...	S6772	Y10C/65139
32	C32	CONDENSER, 0.1 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1814	7733A1 and 7733C1	R-F By-pass Heater Circuit.	...	A.W.A. ...	S7080	Y10C/65131
33	C33	CONDENSER, 0.1 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1814	7733A1 and 7733C1	R-F By-pass Heater Circuit.	...	A.W.A. ...	S7080	Y10C/65131
34	C34	CONDENSER, 0.1 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1814	7733A1 and 7733C1	R-F By-pass Heater Circuit.	...	A.W.A. ...	S7080	Y10C/65131
35	C35	CONDENSER, 0.05 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1814	7733A1 and 7733C1	Cathode By-pass V2...	...	A.W.A. ...	S7080	Y10C/65133
36	C36	CONDENSER, 0.1 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1814	7733A1 and 7733C1	R-F By-pass Cathode Returns.	...	A.W.A. ...	S7080	Y10C/65131
37	C37	CONDENSER, 750 μμF, ±2½% Fixed, 300V Wkg., Silver Mica Dielectric, Tropical Finish.	(In L1) 1814	7733A1 and 7733C1	Tune Beat Oscillator Circuit.	...	A.W.A. ...	S7946	Y10C/65141
38	C38	CONDENSER, 6 μμF, ±15% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1814	7733A1 and 7733C1	Couple V2 to V4 ...	...	A.W.A. ...	S6771	Y10C/65142
39	C39	CONDENSER, 1 μF, ±10% Fixed, 400V Wkg., Paper Dielectric.	1703	7733A1 and 7733C1	A-F By-pass H.T. Supply.	...	Chanex ...	PS74	Y10C/65140
40	C40	CONDENSER, 0.05 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1703	7733A1 and 7733C1	Cathode By-pass V6 ...	...	A.W.A. ...	S7080	Y10C/65133
41									
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Schedule of Components for Receiver AR8, Type C7733—*continued.*

48									
49									
50									
51	C101	CONDENSER, 1,000 μμF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1701	7733A1 and 7733C1	R-F By-pass H.T. Supply.	...	A.W.A. ...	S6772	Y10C/65139
52	C102	CONDENSER, 0.05 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1701	7733A1 and 7733C1	Cathode By-pass V101	...	A.W.A. ...	S7080	Y10C/65133
53	C103	CONDENSER, 0.05 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1701	7733A1 and 7733C1	Screen By-pass V101...	...	A.W.A. ...	S7080	Y10C/65133
54	C104	CONDENSER, 5.25 μμF, Variable, 400V Peak, Air Dielectric.	1701	7733A1 and 7733C1	Trim Aerial Circuit Range D.	...	A.W.A. ...	S7105 or 1S7105	Y10C/65143 Y10C/65480
55	C105	CONDENSER, 5–25 μμF, Variable, 400V Peak, Air Dielectric.	1701	7733A1 and 7733C1	Trim Aerial Circuit Range E.	...	A.W.A. ...	S7105 or 1S7105	Y10C/65143 Y10C/65480
56	C106	CONDENSER, 5–25 μμF, Variable, 400V Peak, Air Dielectric.	1701	7733A1 and 7733C1	Trim Aerial Circuit Range F.	...	A.W.A. ...	S7105 or 1S7105	Y10C/65143 Y10C/65480
57	C107	CONDENSER, 0.05 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1701	7733A1 and 7733C1	A.V.C. Filter V101 ...	...	A.W.A. ...	S7080	Y10C/65133
58	C108	CONDENSER, 290 μμF, Variable, 300V Peak Wkg., Air Dielectric. This condenser is 1 section of a 3 gang assembly, which includes C119, 120, 109, 124, 125, 135 and 136.	1700	7733A1 and 7733C1	Tune H/F Aerial Input	...	A.W.A. ...	7747W12	Y10C/65124
59	C109*	CONDENSER, 24 μμF, ±5% Fixed, 500V Wkg., Rutile Dielectric, Tropical Finish (subject to ±10μμF variation in production).	1700	7733A1 and 7733C1	Temperature compensation H/F Aerial Input.	...	A.W.A. ...	Erie	Y10C/65144
60	C110	CONDENSER, 1,000 μμF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1701	7733A1 and 7733C1	R-F By-pass heater circuit.	...	A.W.A. ...	S6772	Y10C/65139
61	C111	CONDENSER, 0·05 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1701	7733A1 and 7733C1	Screen By-pass V102	...	A.W.A. ...	S7080	Y10C/65133
62	C112	CONDENSER, 0·05 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1701	7733A1 and 7733C1	Cathode By-pass V102	...	A.W.A. ...	S7080	Y10C/65133
63	C113	CONDENSER, 200 μμF, ± Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1701	7733A1 and 7733C1	Osc.-Grid Condenser V102.	...	A.W.A. ...	S6771	Y10C/65136
64	C114	CONDENSER, 5–25 μμF, Variable, 400V Peak, Air Dielectric.	1701	7733A1 and 7733C1	Trim R-F Circuit Range D.	...	A.W.A. ...	S7105 or 1S7105	Y10C/65143 Y10C/65480

Schedule of Components for Receiver AR8, Type C7733—*continued.*

Item No.	Circ. Ref. No.	Description.	Dwg. Photo. Ref.	Circuit.	Function.	Test Ref.	Maker's Name.	Maker's Designation.	R.A.A.F. Ref. No.
65	C115	CONDENSER, 5–25 μμF, Variable, 400V Peak, Air Dielectric.	1701	7733A1 and 7733C1	Trim R-F Circuit Range E.	...	A.W.A. ...	S7105 or 1S7105	Y10C/65143 Y10C/65480
66	C116	CONDENSER, 5–25 μμF, Variable, 400V Peak, Air Dielectric.	1701	7733A1 and 7733C1	Trim R-F Circuit Range F.	...	A.W.A. ...	S7105 or 1S7105	Y10C/65143 Y10C/65480
67	C117	CONDENSER, 0·05 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1701	7733A1 and 7733C1	Plate By-pass V101 ...	...	A.W.A. ...	S7080	Y10C/65133
68	C118	Not used	.....	.....	.....	...	.....	.....	.....
69	C119	CONDENSER, 290 μμF, Variable, 300V Peak Wkg., Air Dielectric. This condenser is 1 section of a 3-gang assembly.	1700	7733A1 and 7733C1	Tune R-F Circuit H/F Unit.	...	A.W.A. ...	Refer C108	Refer C108
70	C120*	CONDENSER, 12μμF, ±5% Fixed, 500V Wkg., Rutile Dielectric, Tropical Finish (subject to ±10 μμF variation in production).	1700	7733A1 and 7733C1	Temperature compensation R-F Circuit H/F Unit.	...	A.W.A. ...	Erie	Y10C/65145
71	C121	CONDENSER, 0·05 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1701	7733A1 and 7733C1	Plate By-pass V103 ...	...	A.W.A. ...	S7080	Y10C/65133
72	C122	CONDENSER, 1,000 μμF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1701	7733A1 and 7733C1	R-F By-pass Heater Circuit.	...	A.W.A. ...	S6772	Y10C/65139
73	C123	CONDENSER, 115 μμF, ±2½% Fixed, 300V Wkg., Silver Mica Dielectric, Tropical Finish.	1701	7733A1 and 7733C1	Grid Condenser V103	...	A.W.A. ...	3S7946	Y10C/65312
74	C124*	CONDENSER, 12μμF, ±5% Fixed, 500V Wkg., Rutile Dielectric, Tropical Finish (subject to ±10 μμF variation in production).	1700	7733A1 and 7733C1	Temp. Compensation H/F Osc. Circuit.	...	A.W.A. ...	Erie	Y10C/65145
75	C125	CONDENSER, 290 μμF Variable, 300V Peak Wkg., Air Dielectric. This condenser is 1 section of a 3-gang assy.	1700	7733A1 and 7733C1	Tune Oscillator Circuit H/F Unit.	...	A.W.A. ...	Refer C108	Refer C108
76	C126	CONDENSER, 5–25 μμF, Variable, 400V Peak, Air Dielectric.	1701	7733A1 and 7733C1	Trim Osc. Circuit Range F.	...	A.W.A. ...	S7105 or 1S7105	Y10C/65143 Y10C/65480
77	C127	CONDENSER, 5–25 μμF, Variable, 400V Peak, Air Dielectric.	1701	7733A1 and 7733C1	Trim Osc. Circuit Range E.	...	A.W.A. ...	S7105 or 1S7105	Y10C/65143 Y10C/65480
78	C128	CONDENSER, 5–25 μμF, Variable, 400V Peak, Air Dielectric.	1701	7733A1 and 7733C1	Trim Osc. Circuit Range D.	...	A.W.A. ...	S7105 or 1S7105	Y10C/65143 Y10C/65480
79	C129	CONDENSER, 2,250 μμF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1701	7733A1 and 7733C1	Osc. Circuit Padder Range F.	...	A.W.A. ...	S6773	Y10C/65147

Schedule of Components for Receiver AR8, Type C7733—*continued.*

80	C130	CONDENSER, 750 μμF, ±2½% Fixed, 300V Wkg., Silver Mica Dielectric, Tropical Finish, two connected in parallel.	1701	7733A1 and 7733C1	Osc. Circuit Padder Range E.	...	A.W.A. ...	S7946	Y10C/65313 (2 in par.).
81	C131	CONDENSER, 700 μμF, ±2½% Fixed, 300V Wkg., Silver Mica Dielectric, Tropical Finish.	1701	7733A1 and 7733C1	Osc. Circuit Padder Range D.	...	A.W.A. ...	S7946	Y10C/65314
82	C132	CONDENSER, 6 μμF, ±15% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1701	7733A1 and 7733C1	R-F Coupling Range D	...	A.W.A. ...	S6771	Y10C/65142
83	C133	CONDENSER, 6 μμF, ±15% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1701	7733A1 and 7733C1	R-F Coupling Range E	...	A.W.A. ...	S6771	Y10C/65142
84	C134	CONDENSER, 12 μμF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish	1701	7733A1 and 7733C1	R-F Coupling Range F	...	A.W.A. ...	S6771	Y10C/65149
85	C135	CONDENSER, 6 μμF, ±10% Fixed, 500V Wkg., Rutile Dielectric, Tropical Finish.	1700	7733A1 and 7733C1	Temperature Compensation H/F Aerial Input.	...	A.W.A. ...	Erie	Y10C/65150
86	C136	CONDENSER, 6 μμF, ±10% Fixed, 500V Wkg., Rutile Dielectric, Tropical Finish.	1700	7733A1 and 7733C1	Temperature Compensation R-F Circuit H/F Unit.	...	A.W.A. ...	Erie	Y10C/65150
87									
88									
89									
90									
91	C201	CONDENSER, 100 μμF, Variable, 1,000V Peak, Air Dielectric.	1699	7733A1 and 7733C1	Trim. M/F Aerial Input.	...	A.W.A. ...	9U5363	Y10C/65117
92	C202	CONDENSER, 12μμF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1699	7733A1 and 7733C1	Vertical Input Limiter for Sense Bearings.	...	A.W.A. ...	S6771	Y10C/65149
93	C203	CONDENSER, 12 μμF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1699	7733A1 and 7733C1	Aerial Input Coupling M/F Unit.	...	A.W.A. ...	S6771	Y10C/65149
94	C204	CONDENSER, 0.05 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1699	7733A1 and 7733C1	Cathode By-pass V201	...	A.W.A.A.	S7080	Y10C/65133
95	C205	CONDENSER, 0.05 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1699	7733A1 and 7733C1	Screen By-pass V201	...	A.W.A. ...	S7080	Y10C/65133
96	C206	CONDENSER, 0.05 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1699	7733A1 and 7733C1	A.V.C. Filter V201 ...	...	A.W.A. ...	S7080	Y10C/65133

* The nominal value of this component may be varied from time to time to compensate for unavoidable changes in other associated components.
Always replace a faulty component by one, or a group, having the same nominal capacity.

Schedule of Components for Receiver AR8, Type C7733—*continued.*

Item No.	Circ. Ref. No.	Description.	Dwg. Photo. Ref.	Circuit.	Function.	Test Ref.	Maker's Name.	Maker's Designation.	R.A.A.F. Ref. No.
97	C207	CONDENSER, 428 μμF, Variable, 300V Peak Wkg., Air Dielectric. This condenser is 1 section of a 3 gang assy. which includes C217, C218, C234–236.	1702	7733A1 and 7733C1	Tune M/F Aerial Input	...	A.W.A. ...	7748W27	Y10C/65116
98	C208	Not used	.....	.....	.....	...	.....	.....	.....
99	C209	CONDENSER, 0.05 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1699	7733A1 and 7733C1	Cathode By-pass V202	...	A.W.A. ...	S7080	Y10C/65133
100	C210	CONDENSER, 0.05 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1699	7733A1 and 7733C1	Screen By-pass V202...	...	A.W.A. ...	S7080	Y10C/65133
101	C211	CONDENSER, 5–25 μμF, Variable, 400V Peak, Air Dielectric.	1699	7733A1 and 7733C1	Trim. R-F Circuit Range A.	...	A.W.A. ...	S7105 or 1S7105	Y10C/65143 Y10C/65480
102	C212*	CONDENSER, 12 μμF, ±5% Fixed, 500V Wkg., Rutile Dielectric, Tropical Finish. (Subject to ±10 μμF, variation in production.)	1699	7733A1 and 7733C1	Temperature Compensation R-F Circuit Range A.	...	A.W.A. ...	Erie	Y10C/65145
103	C213	CONDENSER, 5–25 μμF, Variable, 400V Peak, Air Dielectric.	1699	7733A1 and 7733C1	Trim. R-F Circuit Range B.	...	A.W.A. ...	S7105 or 1S7105	Y10C/65143 Y10C/65480
104	C214*	CONDENSER, 12 μμF, ±5% Fixed, 500V Wkg., Rutile Dielectric, Tropical Finish. (Subject to ±10 μμF variation in production.)	1699	7733A1 and 7733C1	Temperature Compensation R-F Circuit Range B.	...	A.W.A. ...	Erie	Y10C/65145
105	C215	CONDENSER, 5–25 μμF, Variable, 400V Peak, Air Dielectric.	1699	7733A1 and 7733C1	Trim. R-F Circuit Range C.	...	A.W.A. ...	S7105 or 1S7105	Y10C/65143 Y10C/65480
106	C216	CONDENSER, 0.05 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1699	7733A1 and 7733C1	A.V.C. Filter V202 ...	...	A.W.A. ...	S7080	Y10C/65133
107	C217	CONDENSER, 428 μμF, Variable, 300V Peak, Air Dielectric. This condenser is 1 section of a 3-gang assy.	1702	7733A1 and 7733C1	Tune R-F Circuit M/F Unit.	...	A.W.A. ...	Refer C207	Refer C207
108	C218*	CONDENSER, 12 μμF, ±5% Fixed, 500V Wkg., Rutile Dielectric, Tropical Finish. (Subject to ±10 μμF Variation in production.)	1702	7733A1 and 7733C1	Temperature compensation R-F circuit M/F Unit.	...	A.W.A. ...	Erie	Y10C/65145
109	C219	CONDENSER, 0.05 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1699	7733A1 and 7733C1	Plate By-pass V201 ...	...	A.W.A. ...	S7080	Y10C/65133

Schedule of Components for Receiver AR8, Type C7733—*continued.*

110	C220	CONDENSER, 0.05 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1699	7733A1 and 7733C1	A.V.C. Filter VI	...	A.W.A. ...	S7080	Y10C/65133
111	C221	CONDENSER, 0.05 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1699	7733A1 and 7733C1	Plate By-pass V102-V202.	...	A.W.A. ...	S7080	Y10C/65133
112	C222	CONDENSER, 85 μμF, ±2½% Fixed, 300V Wkg., Silver Mica Dielectric, Tropical Finish.	(In T201) 1702	7733A1 and 7733C1	Tune Primary T201	...	A.W.A. ...	S7946	Y10C/65134
113	C223	CONDENSER, 85 μμF, ±2½% Fixed, 300V Wkg., Silver Mica Dielectric, Tropical Finish.	(In T201) 1702	7733A1 and 7733C1	Tune Secondary T201	...	A.W.A. ...	S7946	Y10C/65134
114	C224	CONDENSER, 5–25 μμF, Variable, 400V Peak, Air Dielectric.	1699	7733A1 and 7733C1	Trim. Osc. Circuit Range A.	...	A.W.A. ...	S7105 or 1S7105	Y10C/65143 Y10C/65480
115	C225	CONDENSER, 5–25 μμF, Variable, 400V Peak, Air Dielectric.	1699	7733A1 and 7733C1	Trim. Osc. Circuit Range B.	...	A.W.A. ...	S7105 1S7105	Y10C/65143 Y10C/65480
116	C226	CONDENSER, 5–25 μμF, Variable, 400V Peak, Air Dielectric.	1699	7733A1 and 7733C1	Trim. Osc. Circuit Range C.	...	A.W.A. ...	S7105 or 1S7105	Y10C/65143 Y13C/65480
117	C227	CONDENSER, 455 μμF, ±2½% Fixed, 300V Wkg., Silver Mica Dielectric, Tropical Finish.	1699	7733A1 and 7733C1	Osc. Circuit Padder Range C.	...	A.W.A. ...	3S7946	Y10C/65308
118	C228	CONDENSER, 208 μμF, ±2½% Fixed, 300V Wkg., Silver Mica Dielectric, Tropical Finish.	1699	7733A1 and 7733C1	Osc. Circuit Padder Range B.	...	A.W.A. ...	3S7946	Y10C/65309
119	C229	CONDENSER, 103 μμF, ±2½% Fixed, 300V Wkg., Silver Mica Dielectric, Tropical Finish.	1699	7733A1 and 7733C1	Osc. Circuit Padder Range A.	...	A.W.A. ...	3S7946	Y10C/65310
120	C230*	CONDENSER, 35 μμF, ±10% Fixed, 300V Wkg., Silver Mica Dielectric, Tropical Finish. (Subject to ±10 μμF Variation in production.)	1699	7733A1 and 7733C1	Fixed Trimmer Osc. Circuit Range B.	...	A.W.A. ...	3S7946	Y10C/65306
121	C231*	CONDENSER, 40 μμF, ±5% Fixed, 300V Wkg., Silver Mica Dielectric, Tropical Finish. (Subject to 10 μμF Variation in production.)	1699	7733A1 and 7733C1	Fixed Trimmer Osc. Circuit Range A.	...	A.W.A. ...	3S7946	Y10C/65307
122	C232	CONDENSER, 1,000 μμF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1699	7733A1 and 7733C1	Osc. Plate Coupling M/F Unit.	...	A.W.A. ...	S6772	Y10C/65139
123	C233	CONDENSER, 250 μμF, ±5% Fixed, 300V Wkg., Silver Mica Dielectric, Tropical Finish.	1699	7733A1 and 7733C1	Osc. Grid Condenser M/F Unit.	...	A.W.A. ...	3S7946	Y10C/65311
124	C234	CONDENSER, 428 μμF, Variable, 300V Peak Wkg., Air Dielectric. This condenser is 1 section of a 3-gang . Assy.	1702	7733A1 and 7733C1	Tune Osc. Circuit M/F Unit.	...	A.W.A. ...	Refer C207	Refer C207

* The nominal value of this component may be varied from time to time to compensate for unavoidable changes in other associated components.
Always replace a faulty component by one, or a group, having the same nominal capacity.

Schedule of Components for Receiver AR8, Type C7733—*continued.*

Item No.	Circ. Ref. No.	Description.	Dwg. Photo. Ref.	Circuit.	Function.	Test Ref.	Maker's Name.	Maker's Designation.	R.A.A.F. Ref No.
125	C235*	CONDENSER, 12 μμF, ±5% Fixed, 500V Wkg., Rutile Dielectric, Tropical Finish. (Subject to ±10 μμF variation in production.)	1702	7733A1 and 7733C1	Temperature Compensation Osc. Circuit M/F Unit.	...	A.W.A. ...	Erie	Y10C/65145
126	C236*	CONDENSER, 6 μμF, ±10% Fixed, 500V Wkg., Rutile Dielectric, Tropical Finish. (Subject to ± μμF, variation in production.)	1702	7733A1 and 7733C1	Temperature Compensation Osc. Circuit M/F Unit.	...	A.W.A. ...	Erie	Y10C/65150
127	C237*	CONDENSER, 12 μμF, ±5% Fixed, 500V Wkg., Rutile Dielectric, Tropical Finish. (Subject to ±10 μμF variation in production.)	1699	7733A1 and 7733C1	Temperature Compensation Aerial Input Range A.	...	A.W.A. ...	Erie	Y10C/65145
128	C238*	CONDENSER, 12 μμF, ±5% Fixed, 500V Wkg., Rutile Dielectric, Tropical Finish. (Subject to ±10 μμF variation in production.)	1699	7733A1 and 7733C1	Temperature Compensation Aerial Input Range B.	...	A.W.A. ...	Erie	Y10C/65145
129									
130									
131	L1	B.O. Coil, 50 μH includes C37	1814	7733A1 and 7733C1	Beat Frequency Osc. Inductance.	Sect. 6, Para. 6.	A.WA.. ...	7733T100	Y10D/70248
132	L2	CHOKE, 10 μH	1814	7733A1 and 7733C1	L.T. H-F Filter Choke	Sect. 6, Para. 6.	A.W.A. ...	7920T159	Y10C/65187
133	L3	CHOKE, 720 μH	1703	7733A1 and 7733C1	H.T. H-F Filter Choke	Sect. 6, Para. 6.	A.W.A. ...	3036/0	Y10C/65188
134									
135	L101	AERIAL COIL, 17 μH	1701	7733A1 and 7733C1	Aerial Input Range D	Sect. 6, Para. 6.	A.W.A. ...	7747V100	Y10D/70230
136	L102	AERIAL COIL, 4μH	1701	7733A1 and 7733C1	Aerial Input Range E	Sect. 6, Para. 6.	A.W.A. ...	7747V100–1	Y10D/70231
137	L103	AERIAL COIL, 1 μH	1701	7733A1 and 7733C1	Aerial Input Range F	Sect. 6, Para. 6.	A.W.A. ...	7747V100–2	Y10D/70232
138	L104	R.F. COIL, 17 μH	1701	7733A1 and 7733C1	R-F Transformer Range D.	Sect. 6, Para. 6.	A.W.A. ...	7747V97	Y10D/70227
139	L105	R.F. COIL, 4 μH	1701	7733A1 and 7733C1	R-F Transformer Range E.	Sect. 6, Para. 6.	A.W.A. ...	7747V97–1	Y10D/70228
140	L106	R.F. COIL, 1 μH	1701	7733A1 and 7733C1	R-F Transformer Range F.	Sect. 6, Para. 6.	A.W.A. ...	7747V97–2	Y10D/70229

Schedule of Components for Receiver AR8, Type C7733—*continued.*

141	L107	OSCILLATOR COIL, 1μH	1701	7733A1 and 7733C1	Oscillator Coil Range F	Sect. 6, Para. 6.	A.W.A. ...	7747V152–2	Y10D/70235
142	L108	OSCILLATOR COIL, 3.5 μH	1701	7733A1 and 7733C1	Oscillator Coil Range E	Sect. 6, Para. 6.	A.W.A. ...	7747V152–1	Y10D/70234
143	L109	OSCILLATOR COIL, 11 μH	1701	7733A1 and 7733C1	Oscillator Coil Range D.	Sect. 6, Para. 6.	A.W.A. ...	[a] 7747V152	Y10D/70233
144									
145									
146	L201	AERIAL COIL, 2,650 μH	1699	7733A1 and 7733C1	Aerial Input Range A	Sect. 6, Para. 6.	A.W.A. ...	7748V24	Y10D/70242
147	L202	AERIAL COIL, 520 μH	1699	7733A1 and 7733C1	Aerial Input Range B	Sect. 6, Para. 6.	A.W.A. ...	7748V24–1	Y10D/70243
148	L203	AERIAL COIL, 80 μH	1699	7733A1 and 7733C1	Aerial Input Range C	Sect. 6, Para. 6.	A.W.A. ...	7748V24–2	Y10D/70244
149	L204	D.F. COIL, 1,900 μH	1699	7733A1 and 7733C1	Loop Input Range A	Sect. 6, Para. 6.	A.W.A. ...	7748V105	Y10D/70245
150	L205	D.F. COIL, 320 μH	1699	7733A1 and 7733C1	Loop Input Range B	Sect. 6, Para. 6.	A.W.A. ...	7748V105–1	Y10D/70246
151	L206	D.F. COIL, 35 μH	1699	7733A1 and 7733C1	Loop Input Range C	Sect. 6, Para. 6.	A.W.A. ...	7748V152	Y10D/70247
152	L207	R.F. COIL, 2,500 μH	1699	7733A1 and 7733C1	R-F Transformer Range A.	Sect. 6, Para. 6.	A.W.A. ...	7748V21	Y10D/70239
153	L208	R.F. COIL, 525 μH	1699	7733A1 and 7733C1	R-F Transformer Range B.	Sect. 6, Para. 6.	A.W.A. ...	7748V21–1	Y10D/70240
154	L209	R.F. COIL, 80 μH	1699	7733A1 and 7733C1	R-F Transformer Range C.	Sect. 6, Para. 6.	A.W.A. ...	7748V21–2	Y10D/70241
155	L210	OSCILLATOR COIL, 170 μH	1699	7733A1 and 7733C1	Oscillator Coil Range A	Sect. 6, Para. 6.	A.W.A. ...	7748V18	Y10D/70236
156	L211	OSCILLATOR COIL, 75 μH	1699	7733A1 and 7733C1	Oscillator Coil Range B	Sect. 6, Para. 6.	A.W.A. ...	7748V18–1	Y10D/70237
157	L212	OSCILLATOR COIL, 25 μH	1699	7733A1 and 7733C1	Oscillator Coil Range C	Sect. 6, Para. 6.	A.W.A. ...	7748V18–2	Y10D/70238
158									
159									
160									
161	PL101	PILOT LAMP, 3.2V, 300 mA	1700	7733A1 and 7733C1	Power Indicator ...	...	Mazda ...	.....	G5A/25253
162	PL102	PILOT LAMP, 3.2V, 300 mA	1700	7733A1 and 7733C1	H/F Dial Lamp ...	...	Mazda ...	.....	G5A/25253
163	PL201	PILOT LAMP, 3.2V, 300 mA	1702	7733A1 and 7733C1	M/F Dial Lamp ...	...	Mazda ...	.....	G5A/25253

[a] After Condenser Ref. Number indicates.—The nominal value of this component may be varied from time to time to compensate for unavoidable changes in other associated components. Always replace a faulty component by one, or a group, having the same nominal capacity.

Schedule of Components for Receiver AR8, Type C7733—*continued*.

Item No.	Circ. Ref. No.	Description.	Dwg. Photo. Ref.	Circuit.	Function.	Test Ref.	Maker's Name.	Maker's Designation.	R.A.A.F. Ref. No.
164	...	BEZEL, Red	1700	.....	For Item 161 ...	...	A.W.A. ...	1S9850	Y10A/55599
165									
166	R1	RESISTOR, 300 Ω Fixed, ½ watt, Wire Terminals.	1703	7733A1 and 7733C1	Minimum Bias V1 ...	Sect. 6, Para. 6.	Chanex ...	RR3011	Y10C/65157
167	R2	RESISTOR, 50,000 Ω Fixed, 1 watt, Wire Terminals.	1703	7733A1 and 7733C1	Screen Network V1 ...	Sect. 6, Para. 6.	Chanex ...	RV5031	Y10D/65158
168	R3	RESISTOR, 50,000 Ω Fixed, 1 watt, Wire Terminals.	1703	7733A1 and 7733C1	Screen Network V1 ...	Sect. 6, Para. 6.	Chanex ...	RV5031	Y10C/65158
169	R4	RESISTOR, 2,000 Ω Fixed, 1 watt, Wire Terminals.	(In T1) 1703	7733A1 and 7733C1	Plate Supply V1 ...	Sect. 6, Para. 6.	Chanex ...	RV2021	Y10C/65159
170	R5	RESISTOR, 50,000 Ω Fixed, ¼ watt, Wire Terminals.	1814	7733A1 and 7733C1	Oscillator Grid Leak V2.	Sect. 6, Para. 6.	Chanex ...	RM5031	Y10C/65160
171	R6	RESISTOR, 500 Ω Fixed, ½ watt, Wire Terminals.	1814	7733A1 and 7733C1	Bias V2	Sect. 6, Para. 6.	Chanex ...	RR5011	Y10C/65176
172	R7	RESISTOR, 50,000 Ω Fixed, 1 watt, Wire Terminals.	1814	7733A1 and 7733C1	Screen and Osc. Plate Supply V2.	Sect. 6, Para. 6.	Chanex ...	RV5031	Y10C/65158
173	R8	RESISTOR, 100,000 Ω Fixed, ½ watt, Wire Terminals.	1814	7733A1 and 7733C1	Plate Supply V2 ...	Sect. 6, Para. 6.	Chanex ...	RR1041	Y10C/65162
174	R9	Not used	.....	.....	.....	...	.....	.....	.....
175	R10	RESISTOR, 300 Ω Fixed, ½ watt, Wire Terminals.	1814	7733A1 and 7733C1	Minimum Bias V3 ...	Sect. 6, Para. 6.	Chanex ...	RR3011	Y10C/65157
176	R11	RESISTOR, 100,000 Ω Fixed, ½ watt, Wire Terminals.	1814	7733A1 and 7733C1	Screen Supply V3 ...	Sect. 6, Para. 6.	Chanex ...	RR1041	Y10C/65162
177	R12	RESISTOR, 2,000 Ω Fixed, 1 watt, Wire Terminals.	(In T3) 1703	7733A1 and 7733C1	Plate Supply V3 ...	Sect. 6, Para. 6.	Chanex ...	RV2021	Y10C/65159
178	R13	RESISTOR, 100,000 Ω Fixed, 1 watt, Wire Terminals.	(In T3) 1703	7733A1 and 7733C1	Decouple Diode Circuit V4.	Sect. 6, Para. 6.	Chanex ...	RV1041	Y10C/65189
179	R14	RESISTOR, 20,000 Ω Fixed, ¼ watt Wire Terminals.	1814	7733A1 and 7733C1	Decouple Plate Circuit V4.	Sect. 6, Para. 6.	Chanex ...	RM2031	Y10C/65163
180	R15	Not used	.....	.....	.....	...	.....	.....	.....
181	R16	RESISTOR, 100,000 Ω Variable, Carbon Elements, supplied with equipments Serial Nos. 1 to 10 only.	.....	7733A1 and 7733C1	Tone Control (Superseded by 181B).	Sect. 6, Para. 6.	.....	.....	.....
181A	R16	RESISTOR, 250,000 Ω Variable, Carbon Element with Switch, supplied with equipments Serial Nos. 11 to 60 only.	1814	7733A1 and 7733C1	Tone Control and Intertuning Switch (superseded by 181B).	Sect. 6, Para. 6.	.....	.....	.....
181B	R16	RESISTOR, 100,000 Ω Variable, Carbon Element with Switch, supplied with equipments Serial Nos. 61 onwards.	1814	7733A1 and 7733C1	Tone Control and Intertuning Switch.	Sect. 6, Para. 6.	A.W.A. ...	7920T405	Y10C/65247
182	R17	RESISTOR, 1,500 Ω Variable, Wire Wound Element (tapered).	1814	7733A1 and 7733C1	R-F Volume Control...	Sect. 6, Para. 6.	A.W.A. ...	7733V105	Y10C/65112

Schedule of Components for Receiver AR8, Type C7733—*continued.*

183	R18	RESISTOR, 250,000 Ω Variable, Carbon Element.	1814	7733A1 and 7733C1	A-F Volume Control...	Sect. 6, Para. 6.	A.W.A. ...	7748T48	Y10C/65115
184	R19	Not used	.....	.....	.....	...	.....	.....	.....
185	R20	RESISTOR, 500,000 Ω Fixed, ½ watt, Wire Terminals.	1814	7733A1 and 7733C1	Grid Return V4 ...	Sect. 6, Para. 6.	Chanex ...	RM5041	Y10C/65165
186	R21	RESISTOR, 500,000 Ω Fixed, ½ watt, Wire Terminals.	1814	7733A1 and 7733C1	A.V.C. Filter V4 ...	Sect. 6, Para. 6.	Chanex ...	RM5041	Y10C/65165
187	R22	RESISTOR, 500,000 Ω Fixed, ½ watt, Wire Terminals.	1814	7733A1 and 7733C1	A.V.C. Diode Load ...	Sect. 6, Para. 6.	Chanex ...	RM5041	Y10C/65165
188	R23	RESISTOR, 500,000 Ω Fixed, ½ watt, Wire Terminals.	1814	7733A1 and 7733C1	A.V.C. Diode Load ...	Sect. 6, Para. 6.	Chanex ...	RM5041	Y10C/65165
189	R24	RESISTOR, 1 Ω Fixed, ½ watt, Wire Terminals.	1814	7733A1 and 7733C1	A.V.C. Filter	Sect. 6, Para. 6.	Chanex ...	RM1051	Y10C/65166
190	R25	RESISTOR, 5,000 Ω Fixed, ½ watt, Wire Terminals.	1814	7733A1 and 7733C1	Bias V4	Sect. 6, Para. 6.	Chanex ...	RM5021	Y10C/65167
191	R26	RESISTOR, 250,000 Ω Fixed, ½ watt, Wire Terminals.	1814	7733A1 and 7733C1	Screen Supply V4 ...	Sect. 6, Para. 6.	Chanex ...	RR2541	Y10C/65168
192	R27	RESISTOR, 50,000 Ω Fixed, ½ watt, Wire Terminals.	1814	7733A1 and 7733C1	Plate Load V4 ...	Sect. 6, Para. 6.	Chanex ...	RR5031	Y10C/65169
193	R28	RESISTOR, 500,000 Ω Fixed, ½ watt, Wire Terminals.	1814	7733A1 and 7733C1	Grid Resistor V5 ...	Sect. 6, Para. 6.	Chanex ...	RM5041	Y10C/65165
194	R29	RESISTOR, 1,500 Ω Fixed, ½ watt, Wire Terminals.	1814	7733A1 and 7733C1	Bias V5	Sect. 6, Para. 6.	Chanex ...	RM1521	Y10C/65170
195	R30	RESISTOR, 200 Ω Fixed, Wire Wound, Coating "C," Wire Terminals Type 1.	1703	7733A1 and 7733C1	Bias V6	Sect. 6, Para. 6.	I.R.C. ...	AA	Y10C/65171
196	R31	RESISTOR, 25,000 Ω Fixed, Wire Wound, Coating "C" with mounting Brackets and Lug Terminals Type 2, overall size 4 inches long x ¾-inch dia.	1703	7733A1 and 7733C1	H.T. Supply V6 ...	Sect. 6, Para. 6.	I.R.C. ...	DH	Y10C/65172
197	R32	RESISTOR, 21Ω Fixed, Wire Wound, Coating "C," with Wire Terminals Type 1.	1703	7733A1 and 7733C1	Balance Heater Circuit	Sect. 6, Para. 6.	I.R.C. ...	AA	Y10C/65173
198									
199									
200									
201	R101	RESISTOR, 50,000 Ω Fixed, 1 watt, Wire Terminals.	1701	7733A1 and 7733C1	Screen Supply V101 ...	Sect. 6, Para. 6.	Chanex ...	RV5031	Y10C/65158
202	R102	RESISTOR, 100,000 Ω Fixed, ½ watt, Wire Terminals.	1701	7733A1 and 7733C1	A.C.V. Filter V101 ...	Sect. 6, Para. 6.	Chanex ...	RR1041	Y10C/65162
203	R103	RESISTOR, 300 Ω Fixed, ½ watt, Wire Terminals.	1701	7733A1 and 7733C1	Bias V101	Sect. 6, Para. 6.	Chanex ...	RR3011	Y10C/65157
204	R104	RESISTOR, 50,000 Ω Fixed, ½ watt, Wire Terminals.	1701	7733A1 and 7733C1	Screen Network V101	Sect. 6, Para. 6.	Chanex ...	RR5031	Y10C/65169

Schedule of Components for Receiver AR8, Type C7733—*continued.*

Item No.	Circ. Ref. No.	Description.	Dwg. Photo. Ref.	Circuit.	Function.	Test Ref.	Maker's Name.	Maker's Designation.	R.A.A.F. Ref. No.
205	R105	RESISTOR, 2,000 Ω Fixed, ½ watt, Wire Terminals.	1701	7733A1 and 7733C1	Plate Supply V101 ...	Sect. 6, Para. 6.	Chanex ...	RR2021	Y10C/65174
206	R106	RESISTOR, 50,000 Ω Fixed, 1 watt, Wire Terminals.	1701	7733A1 and 7733C1	Screen Supply V102 ...	Sect. 6, Para. 6.	Chanex ...	RV5031	Y10C/65158
207	R107	RESISTOR, 50,000 Ω Fixed, ¼ watt, Wire Terminals.	1701	7733A1 and 7733C1	Grid Leak V102 ...	Sect. 6, Para. 6.	Chanex ...	RM5031	Y10C/65160
208	R108	RESISTOR, 10,000 Ω Fixed, Wire Wound, Coating "C," Wire Terminals Type 1.	1701	7733A1 and 7733C1	Plate Supply V103 ...	Sect. 6, Para. 6.	I.R.C. ...	AB	Y10C/65175
209	R109	Not used	.....	.....	.....	...	.....	.....	.....
210	R110	RESISTOR, 500 Ω Fixed, ½ watt, Wire Terminal.	1701	7733A1 and 7733C1	Bias V102	Sect. 6, Para. 6.	Chanex ...	RR5011	Y10C/65176
211	R111	RESISTOR, 42 Ω Fixed, Wire Wound, Coating "C," Wire Terminals Type 1.	1701	7733A1 and 7733C1	Balance Heater Circuit	Sect. 6, Para. 6.	I.R.C. ...	AA	Y10C/65177
212	R112	RESISTOR, 50,000 Ω Fixed, ¼ watt, Wire Terminals.	1701	7733A1 and 7733C1	Grid Leak V103 ...	Sect. 6, Para. 6.	Chanex ...	RM5031	Y10C/65160
213	R113	RESISTOR, 11½ Ω Fixed, Wire Wound, Coating "C," Lug Terminals Type 2, 2 connected in series.	1700	7733A1 and 7733C1	Balance Heater Circuit	Sect. 6, Para. 6.	I.R.C. ...	AA	Y10C/65178 (2 in series).
214	R114	RESISTOR, 10,000 Ω Fixed, ¼ watt, Wire Terminals.	1701	7733A1 and 7733C1	Oscillator Limiter Range D.	Sect. 6, Para. 6.	Chanex ...	RM1031	Y10C/65179
215	R115	RESISTOR, 10,000 Ω Fixed, ¼ watt, Wire Terminals.	1701	7733A1 and 7733C1	Oscillator Limiter Range E.	Sect. 6, Para. 6.	Chanex ...	RM1031	Y10C/65179
216	R116	RESISTOR, 50 Ω Fixed, ¼ watt, Wire Terminals.	1701	7733A1 and 7733C1	Grid Suppressor V103	Sect. 6, Para. 6.	Chanex ...	RM5001	Y10C/65180
217									
218									
219									
220									
221	R201	RESISTOR, 250,000 Ω Variable, Carbon Element.	1699	7733A1 and 7733C1	Sense Resistance ...	Sect. 6, Para. 6.	A.W.A. ...	7748T48	Y10C/65115
222	R202	RESISTOR, 100,000 Ω Fixed, ½ watt, Wire Terminals.	1699	7733A1 and 7733C1	A.V.C. Filter V201 ...	Sect. 6, Para. 6.	Chanex ...	RR1041	Y10C/65162
223	R203	RESISTOR, 300 Ω Fixed, ½ watt, Wire Terminals.	1699	7733A1 and 7733C1	Minimum Bias V201	Sect. 6, Para. 6.	Chanex ...	RR3011	Y10C/65157
224	R204	RESISTOR, 50,000 Ω Fixed, ½ watt, Wire Terminals.	1699	7733A1 and 7733C1	Screen Network V201	Sect. 6, Para. 6.	Chanex ...	RR5031	Y10C/65169

Schedule of Components for Receiver AR8, Type C7733—*continued.*

225	R205	RESISTOR, 4,000 Ω Fixed, ½ watt, Wire Terminals.	1699	7733A1 and 7733C1	Load Resistor R-F Circuit Range C.	Sect. 6, Para. 6.	Chanex ...	RM4021	Y10C/65181
226	R206	RESISTOR, 3,000 Ω Fixed, ½ watt, Wire Terminals.	1699	7733A1 and 7733C1	Load Resistor R-F Circuit Range B.	Sect. 6, Para. 6.	Chanex ...	RM3021	Y10C/65182
227	R207	RESISTOR, 2,000 Ω Fixed, ½ watt, Wire Terminals.	1699	7733A1 and 7733C1	Load Resistor R-F Circuit Range A.	Sect. 6, Para. 6.	Chanex ...	RM2021	Y10C/65183
228	R208	RESISTOR, 100,000 Ω Fixed, ½ watt, Wire Terminals.	1699	7733A1 and 7733C1	A.V.C. Filter V202 ...	Sect. 6, Para. 6.	Chanex ...	RR1041	Y10C/65162
229	R209	RESISTOR, 800 Ω Fixed, ½ watt, Wire Terminals.	1699	7733A1 and 7733C1	Minimum Bias V202..,	Sect. 6, Para. 6.	Chanex ...	RR8011	Y10C/65184
230	R210	RESISTOR, 2,000 Ω Fixed, ½ watt, Wire Terminals.	1699	7733A1 and 7733C1	Plate Supply V201 ...	Sect. 6, Para. 6.	Chanex ...	RR2021	Y10C/65174
231	R211	RESISTOR, 50,000 Ω Fixed, ½ watt, Wire Terminals.	1699	7733A1 and 7733C1	Osc. Grid Leak V202...	Sect. 6, Para. 6.	Chanex ...	RM5031	Y10C/65160
232	R212	RESISTOR, 20,000 Ω Fixed, 1 watt, Wire Terminals.	1699	7733A1 and 7733C1	Osc. Plate Supply V202.	Sect. 6, Para. 6.	Chanex ...	RV2031	Y10C/65185
233	R213	RESISTOR, 50,000 Ω Fixed, 1 watt, Wire Terminals.	1699	7733A1 and 7733C1	Screen Supply V202 ...	Sect. 6, Para. 6.	Chanex ...	RV5031	Y10C/65158
234	R214	RESISTOR, 50,000 Ω Fixed, 1 watt, Wire Terminals.	1699	7733A1 and 7733C1	Screen Network V201	Sect. 6, Para. 6.	Chanex ...	RV5031	Y10C/65158
235	R215	RESISTOR, 2,000 Ω Fixed, 1 watt, Wire Terminals.	(In T201) 1702	7733A1 and 7733C1	Plate Supply V102 and V202.	Sect. 6, Para. 6.	Chanex ...	RV2021	Y10C/65159
236	R216	RESISTOR, 100,000 Ω Fixed, 1 watt, Wire Terminals.	1702	7733A1 and 7733C1	A.V.C. Filter VI ...	Sect. 6, Para. 6.	Chanex ...	RV1041	Y10C/65189
237	R217	RESISTOR, 250,000 Ω Fixed, 1 watt, Wire Terminals.	1699	7733A1 and 7733C1	Grid Load V202 Range B.	Sect. 6, Para. 6.	Chanex ...	RM2541	Y10C/65186
238	R218	RESISTOR, 1,000 Ω Fixed ½ watt, Wire Terminals.	1699	7733A1 and 7733C1	Sense Resistor	Sect. 6, Para. 6.	Chanex ...	RR1021	Y10C/65305
239									
240									
241	S1	SWITCH, Rotary Oak Type, 5 Poles, 2 Positions.	1814	7733A1 and 7733C1	C-W/R-T Switch ...	Sect. 6, Para. 4.	A.W.A. ...	7733D1	Y10F/80068
242	S101	SWITCH, Rotary Oak Type, 10 Poles, 3 Positions with 1 Shorting Section, H.F. Ceramic Wafers and Mountings.	1701	7733A1 and 7733C1	Wavechange H/F Unit	Sect. 6, Para. 4.	A.W.A. ...	Refer. Item, 244	.....
243	S102	SWITCH, Rotary Oak Type, 4 Poles, 2 Positions.	1701	7733A1 and 7733C1	M-F/H-F Switch ...	Sect. 6, Para. 4.	A.W.A. ...	7747D2	Y10F/80075
244	...	SWITCH ASSEMBLY, Comprising S101, S102 with Mountings.	1701	7733A1 and 7733C1	.....	Sect. 6, Para. 4.	A.W.A. ...	Pt. 7747W19	Y10F/80054
245	S201	SWITCH, Rotary Oak Type, 8 Poles, 6 Positions with 7 Shorting Sections and Mountings.	1699	7733A1 and 7733C1	Wavechange M/F Unit	Sect. 6, Para. 4.	A.W.A. ...	Refer. Item, 248	Y10F/80076
246	S202	SWITCH, Rotary Oak Type, 1 Pole, 2 Positions.	1699	7733A1 and 7733C1	Bearing Reciprocal Switch.	Sect. 6, Para. 4.	A.W.A. ...	7748D2	Y10F/80077

Schedule of Components for Receiver AR8, Type C7733—*continued.*

Item No.	Circ. Ref. No.	Description.	Dwg. Photo. Ref.	Circuit.	Function.	Test Ref.	Maker's Name.	Maker's Designation.	R.A.A.F. Ref. No.
247	S203	SWITCH, Rotary Oak Type, 1 Pole, 3 Positions.	1699	7733A1 and 7733C1	Traffic D/F Sense Switches.	Sect. 6, Para. 4.	A.W.A. ...	7748D3	Y10F/80078
248	...	SWITCH ASSEMBLY, Comprising S201, S202, S203 and Mountings.	1699	7733A1 and 7733C1	.....	...	A.W.A. ...	Part No. 7748X34	Y10F/80055
249									
250									
251	T1	I.F. TRANSFORMER, 470 μH, includes C4, C5, C6 and R4.	1703	7733A1 and 7733C1	Couple V1 to T2 ...	Sect. 6, Para. 6.	A.W.A. ...	7733V14	Y10A/55452
252	T2	I.F. TRANSFORMER, 470 μH, includes C9, C10 and C11.	1703 and 1814	7733A1 and 7733C1	Couple T1 to V3 ...	Sect. 6, Para. 6.	A.W.A. ...	7733V15	Y10A/55453
253	T3	I.F. TRANSFORMER, 470 μH, includes C15, C16, C17, C18, R12 and R13.	1703 and 1814	7733A1 and 7733C1	Couple V3 to V4 ...	Sect. 6, Para. 6.	A.W.A. ...	7733V16	Y10A/55454
254	T4	TRANSFORMER, Primary Current 6 mA D.C., Ratio 3.32 : 1, Impedance Ratio 22,000 Ω to 2,000 Ω.	1814	7733A1 and 7733C1	'Phone Output ...	Sect. 6, Para. 6.	A.W.A. ...	1XA7998	Y10A/55439
255	T5	TRANSFORMER, Primary Current 60 Ω D.C. Ratio 1 : 25, Impedance Ratio 6 Ω : 375,000 Ω.	1703	7733A1 and 7733C1	Microphone Input ...	Sect. 6, Para. 6.	A.W.A. ...	1XD7972	Y10A/55426
256									
257	T201	I.F. TRANSFORMER, 470 μH, includes C222, C223, R215 and R216.	1699 and 1702	7733A1 and 7733C1	Couple V102 or V202 to V1.	Sect. 6, Para. 6.	A.W.A. ...	7748V12	Y10A/55455
258	V1	VALVE	1703	7733A1 and 7733C1	1st I.F. Amplifier ...	Sect. 6, Para. 7.	Radiotron	6U7G	Y10E/55249
259	V2	VALVE	1703 and 1814	7733A1 and 7733C1	Beat Oscillator ...	Sect. 6, Para. 7.	Radiotron	6A8G	Y10E/75018
260	V3	VALVE	1703 and 1814	7733A1 and 7733C1	2nd I.F. Amplifier ...	Sect. 6, Para. 7.	Radiotron	6U7G	Y10E/55249
261	V4	VALVE	1703 and 1814	7733A1 and 7733C1	Detector A.F.-A.V.C....	Sect. 6, Para. 7.	Radiotron	6G8G	Y10E/75025
262	V5	VALVE	1703 and 1814	7733A1 and 7733C1	Output	Sect. 6, Para. 7.	Radiotron	6J7G	Y10E/75023
263	V6	VALVE	1703	7733A1 and 7733C1	Limiter Diode ...	Sect. 6, Para. 7.	Radiotron	6X5GT	Y10E/75026
264	V101	VALVE	1700	7733A1 and 7733C1	H/F R-F Amplifier ...	Sect. 6, Para. 7.	Radiotron	6U7G	Y10E/55249
265	V102	VALVE	1700	7733A1 and 7733C1	H/F Converter ...	Sect. 6, Para. 7.	Radiotron	6A8G	Y10E/75018

Schedule of Components for Receiver AR8, Type C7733—*continued.*

266	V103	VALVE	1700	7733A1 and 7733C1	H/F Oscillator ...	Sect. 6, Para. 7.	Radiotron	6V6G	Y10E/55248
267	V201	VALVE	1702	7733A1 and 7733C1	M/F R-F Amplifier ...	Sect. 6, Para. 7.	Radiotron	6U7G	Y10E/55249
268	V202	VALVE	1702	7733A1 and 7733C1	M/F Converter ...	Sect. 6, Para. 7.	Radiotron	6A8G	Y10E/75018
269	VS1	VALVE SOCKET, Octal, H.F., Ceramic	.....	.....	.....	...	Ducon ...	.....	Y10H/90070
270	VS2	VALVE SOCKET, Octal, H.F., Ceramic	.....	.....	.....	...	Ducon ...	.....	Y10H/90070
271	VS3	VALVE SOCKET, Octal, H.F., Ceramic	.....	.....	.....	...	Ducon ...	.....	Y10H/90070
272									
273	VS4	VALVE SOCKET, Octal, H.F., Ceramic	.....	.....	.....	...	Ducon ...	.....	Y10H/90070
274	VS5	VALVE SOCKET, Octal, H.F., Ceramic	.....	.....	.....	...	Ducon ...	.....	Y10H/90070
275	VS6	VALVE SOCKET, Octal, H.F., Ceramic	.....	.....	.....	...	Ducon ...	.....	Y10H/90070
276	VS101	VALVE SOCKET, Octal, H.F., Ceramic	.....	.....	.....	...	Ducon ...	.....	Y10H/90070
277	VS102	VALVE SOCKET, Octal, H.F., Ceramic	.....	.....	.....	...	Ducon ...	.....	Y10H/90070
278	VS103	VALVE SOCKET, Octal, H.F., Ceramic	.....	.....	.....	...	Ducon ...	.....	Y10H/90070
279	VS201	VALVE SOCKET, Octal, H.F., Ceramic	.....	.....	.....	...	Ducon ...	.....	Y10H/90070
280	VS202	VALVE SOCKET, Octal, H.F., Ceramic	.....	.....	.....	...	Ducon ...	.....	Y10H/90070
281	...	SOCKET, 12 Pin, Male	1703	.....	.....	...	A.W.A. ...	5R5585	Y10H/90092
282	...	SOCKET, 8 Pin, Male...	1703	.....	.....	...	A.W.A. ...	7R5585	Y10H/90093
283	...	SOCKET, Type 38	1703	7733A1 and 7733C1	.....	...	R.C.A. ...	.....	Y10H/8528
284	...	SOCKET, Type 57	.....	.....	.....	...	A.W.A. ...	7748T70	Y10H/10331
285	...	VERNIER DRIVE	.....	.....	.....	...	A.W.A. ...	R5375	Y10A/55456
286	...	VERNIER DRIVE	.....	.....	.....	...	A.W.A. ...	R5375	Y10A/55456
287	...	FLEXIBLE COUPLING	.....	.....	.....	...	A.W.A. ...	S8827	Y10A/55463
288	...	FLEXIBLE COUPLING	.....	.....	.....	...	A.W.A. ...	S6784	Y10A/55462
289	...	UNIVERSAL COUPLING	.....	.....	.....	...	A.W.A. ...	1R7745	Y10A/55437
290	...	UNIVERSAL COUPLING	.....	.....	.....	...	A.W.A. ...	1R7745	Y10A/55437
291									
292	...	MOUNTING BASE	.....	.....	.....		A.W.A. ...	2Z7749	Y10D/70285
293	...	AMPLIER UNIT, Comprises C1–40, L1–3, R1–32, S1, T1–5, V1–6, VS1–6 and Items 281, 282, 283, 287 and 288.	1703 and 1814	.....	.....	Sect. 6, Para. 8.	A.W.A. ...	C7920	Y10D/70287
294	...	H.F. TUNING UNIT, Comprises C101–106, L101–109, PL101–102, R101–116, S101, 102, V101–103, VS101–103 and Items 285 and 289.	1700 and 1701	.....	.....	Sect. 6, Para. 8.	A.W.A. ...	C7747	Y10D/70219
295	...	M.F. TUNING UNIT, Comprises C201–238, L201–212, PL201, R201–217, S201–203, T201, V201, 202, VS201, 202 and Items 286 and 290.	1699 and 1702	.....	.....	Sect. 6, Para. 8.	A.W.A. ...	C7748	Y10D/70220

SCHEDULE OF COMPONENTS

FOR

TRANSMITTER AT5

TYPE J7731

SCHEDULE OF COMPONENTS FOR TRANSMITTER AT5, TYPE J7731.

Item No.	Circ. Ref. No.	Description.	Dwg. Photo. Ref.	Circuit.	Function.	Test Ref.	Maker's Name.	Maker's Designation.	R.A.A.F. Ref. No.
1	C1	CONDENSER, 0.1 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1761, 1764	7733A1 and 7731C1	Anode Decoupling ...	...	A.W.A. ...	S7080	Y10C/65131
2	C2	CONDENSER, 0.1 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1763	7733A1 and 7731C1	Audio By-pass ...	...	A.W.A. ...	S7080	Y10C/65131
3	C3	CONDENSER, 0.015 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1751, 1764	7733A1 and 7731C1	Audio Oscillator Feedback.	...	A.W.A. ...	S7080	Y10C/65208
4	C4	CONDENSER, 0.075 μF, ±5% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1761, 1764	7733A1 and 7731C1	Audio Oscillator Tuning.	...	A.W.A. ...	S7080	Y10C/65209
5	C5	CONDENSER, 0.5 μF, ±10% Fixed, 400V Wkg., Paper Dielectric.	1761, 1763, 1762	7733A1 and 7731C1	Audio By-pass ...	...	Ducon ...	P.S.71	Y10C/65210
6	C6	CONDENSER, 5,000 μμF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1765, 1761	7733A1 and 7731C1	R.F. By-pass ...	...	A.W.A. ...	S6773	Y10C/65135
7	C7	CONDENSER, 745 μμF, ±10% Fixed, 350V Wkg., Silver Mica Dielectric, Tropical Finish, Precision Condenser with low temperature coefficient.	1765, 1761	7733A1 and 7731C1	Oscillator Anode Coupling.	...	A.W.A. ...	S7946	Y10C/65211
8	C8	CONDENSER, 5,000 μμF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish, 2 connected in parallel.	1765, 1761	7733A1 and 7731C1	R.F. By-pass ...	...	A.W.A. ...	S6773	Y10C/65135 (2 in parallel).
9	C9	CONDENSER, 5,000 μμF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1765, 1761	7733A1 and 7731C1	R.F. By-pass ...	...	A.W.A. ...	S6773	Y10W/65135
10	C10	CONDENSER, 100 μμF, ±10% Fixed, 300V Wkg., Silver Mica Dielectric, Tropical Finish, Precision condenser with low temperature coefficient.	1765, 1761	7733A1 and 7731C1	B.A. Grid Coupling ...	...	A.W.A. ...	S7946	Y10C/65212
11	C11	CONDENSER, 1,000 μμF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1765, 1761	7733A1 and 7731C1	R.F. By-pass ...	...	A.W.A. ...	S6772	Y10C/65139
12	C12	CONDENSER, 0.1 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1763	7733A1 and 7731C1	Audio By-pass ...	...	A.W.A. ...	S7080	Y10C/65131
13	C13	CONDENSER, 5,000 μμF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1763	7733A1 and 7731C1	R.F. By-pass ...	...	A.W.A. ...	S6773	Y10C/65135

Schedule of Components for Transmitter AT5, Type J7731—*continued.*

14	C14	CONDENSER, 5,000 μμF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1763	7733A1 and 7731C1	R.F. By-pass	...	...	A.W.A. ...	S6773	Y10C/65135
15	C15	CONDENSER, 100 μμF, ±5% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1765, 1761	7733A1 and 7731C1	P.A. Grid Coupling	...	...	A.W.A. ...	S6771	Y10C/65213
16	C16	CONDENSER, 0.1 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1763	7733A1 and 7731C1	Audio By-pass	...	...	A.W.A. ...	S7008	Y10C/65131
17	C17	CONDENSER, 2,500 μμF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1763	7733A1 and 7731C1	R.F. By-pass	...	...	A.W.A. ...	S6773	Y10C/65214
18	C18	CONDENSER, 1,000 μμF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1764	7733A1 and 7731C1	R.F. By-pass	...	...	A.W.A. ...	S6772	Y10C/65139
19	C19	CONDENSER, 5,000 μμF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1763	7733A1 and 7731C1	R.F. By-pass	...	...	A.W.A. ...	S6773	Y10C/65135
20	C20	CONDENSER, 5,000 μμF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1763	7733A1 and 7731C1	R.F. By-pass	...	...	A.W.A. ...	S6773	Y10C/65135
21	C21	CONDENSER, 0.1 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1763	7733A1 and 7731C1	Audio By-pass	...	...	A.W.A. ...	S7080	Y10C/65131
22	C22	CONDENSER, 1,000 μμF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1763	7733A1 and 7731C1	R.F. By-pass	...	...	A.W.A. ...	S6772	Y10C/65139
23	C23	CONDENSER, 0.1 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1763	7733A1 and 7731C1	Audio By-pass	...	...	A.W.A. ...	S7080	Y10C/65131
24	C24	CONDENSER, 0.02 μF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1763, 1762	7733A1 and 7731C1	D.C. Blocking	...	...	A.W.A. ...	24U7684	Y10C/65215
25	C25	CONDENSER, 5,000 μμF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1763	7733A1 and 7731C1	R.F. By-pass	...	...	A.W.A. ...	S6773	Y10C/65135
26	C26	CONDENSER, 0.1 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1763	7733A1 and 7731C1	Audio By-pass	...	...	A.W.A. ...	S7080	Y10C/65131
27	C27	CONDENSER, 5,000 μμF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1763	7733A1 and 7731C1	R.F. By-pass	...	...	A.W.A. ...	S6773	Y10C/65135
28	C28	CONDENSER, 1,000 μμF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1763	7733A1 and 7731C1	R.F. By-pass	...	...	A.W.A. ...	S6772	Y10C/65139
29	C29	CONDENSER, 0.1 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1763	7733A1 and 7731C1	Audio By-pass	...	...	A.W.A. ...	S7080	Y10C/65131

Schedule of Components for Transmitter AT5, Type J7731—*continued.*

Item No.	Circ. Ref. No.	Description.	Dwg. Photo. Ref.	Circuit.	Function.	Test Ref.	Maker's Name.	Maker's Designation.	R.A.A.F. Ref. No.
30	C30	CONDENSER, 0.02 μF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1763	7733A1 and 7731C1	D.C. Blocking ...	...	A.W.A. ...	19U2956	Y10C/65216
31	C31	CONDENSER, 0.005 μF, ±10% Fixed, 1,500V Wkg., Mica Dielectric, Tropical Finish.	1763	7733A1 and 7731C1	D.C. Blocking ...	...	A.W.A. ...	12U2956	Y10C/65217
32	C32	CONDENSER, 25–355 μμF, Variable, 1,500V Peak, Air Dielectric.	1763, 1762	7733A1 and 7731C1	H.F.P.A. Tuning ...	...	A.W.A. ...	15U3505	Y10C/65108
33	C33	Not used	.....	.....	.....	...	.....	.....	.....
34	C34	CONDENSER, 0.01 μF, ±10% Fixed, Mica Dielectric, Tropical Finish.	1761	7733A1 and 7731C1	R.F. By-pass ...	...	T.C.C. ...	M.A.	Y10C/65194
35	C35	CONDENSER, 1 μF Fixed, ±10%, 200V Working, Paper Dielectric.	1761, 1763, 1762	7733A1 and 7731C1	Audio Filter	...	Ducon ...	P.S.58	Y10C/65218
36	C36	CONDENSER, 0.1 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1761, 1764	7733A1 and 7731C1	Audio By-pass ...	...	A.W.A. ...	S7080	Y10C/65131
37	C37	CONDENSER, 2 μμF Variable, 900V Peak Wkg., Air Dielectric.	1761, 1763, 1762	7733A1 and 7731C1	B.A. Neutralising ...	...	A.W.A. ...	U7919	Y10C/65125
38	C38	CONDENSER, 0.1 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1761	7733A1 and 7731C1	R.F. By-pass ...	...	A.W.A. ...	S7080	Y10C/65131
39									
40									
41	C101	CONDENSER, 5–25 μμF Variable, 400V Peak, Air Dielectric.	1816	7733A1 and 7731C1	Oscillator Trimmer ...	...	A.W.A. ...	S7105 or 1S7105	Y10C/65143 Y10C/65480
42	C102	CONDENSER, 5–25 μμF Variable, 400V Peak, Air Dielectric.	1815, 1816	7733A1 and 7731C1	Oscillator Trimmer ...	...	A.W.A. ...	S7105 or 1S7105	Y10C/65143 Y10C/65480
43	C103	CONDENSER, 5–25 μμF Variable, 400V Peak, Air Dielectric.	1816	7733A1 and 7731C1	Oscillator Trimmer ...	...	A.W.A. ...	S7105 or 1S7105	Y10C/65143 Y10C/65480
44	C104	CONDENSER, 5–25 μμF Variable, 400V Peak, Air Dielectric.	1815, 1816, 1817	7733A1 and 7731C1	Oscillator Trimmer ...	...	A.W.A. ...	S7105 or 1S7105	Y10C/65143 Y10C/65480
45	C105	CONDENSER, 2-Gang, 11–77 μμF per Section, Variable, 400V Peak Wkg., Air Dielectric.	1815, 1816, 1817	7733A1 and 7731C1	Oscillating Tuning ...	...	A.W.A. ...	7750T23	Y10C/65118
46	C106	CONDENSER, 12 μμF, ±5% Fixed, 500V Peak Wkg., Rutile Dielectric, Tropical Finish, Precision Condenser with Special Negative Temperature Coefficient.	1815, 1816	7733A1 and 7731C1	Oscillator Temperature Compensation.	...	A.W.A. ...	Erie	Y10C/65145
47	C107	Not used	.....	.....	.....	...	.....	.....	.....

Schedule of Components for Transmitter AT5, Type J7731—*continued.*

48	C108	CONDENSER, 100 μμF, ±5% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1815, 1816	7733A1 and 7731C1	Crystal Feedback	...	...	A.W.A. ...	3S6771	Y10C/65315
49	C109	CONDENSER, 50 μμF, ±5% Fixed, 300V Wkg., Silver Mica Dielectric, Tropical Finish, Precision Condenser with Low Temperature Coefficient.	1815	7733A1 and 7731C1	Oscillator Grid Coupling.	...	...	A.W.A. ...	S7946	Y10C/65219
50										
51	C201	CONDENSER, 7–22 μμF Variable, 700V Peak Wkg., Air Dielectric.	1760	7733A1 and 7731C1	Oscillator Trimmer	...	...	A.W.A. ...	U8316	Y10C/65111
52	C202	CONDENSER, 7–22 μμF Variable, 700V Peak Wkg., Air Dielectric.	1760, 1759	7733A1 and 7731C1	Oscillator Trimmer	...	...	A.W.A. ...	U8316	Y10C/65111
53	C203	CONDENSER, 7–22 μμF Variable, 700V Peak Wkg., Air Dielectric.	1760, 1759	7733A1 and 7731C1	Oscillator Trimmer	...	...	A.W.A. ...	U8316	Y10C/65111
54	C204	CONDENSER, 7–22 μμF Variable, 700V Peak Wkg., Air Dielectric.	1760	7733A1 and 7731C1	Oscillator Trimmer	...	...	A.W.A. ...	U8316	Y10C/65111
55	C205	CONDENSER, 2-Gang, 10–420 μμF per Section, Variable, 300V Peak Wkg., Air Dielectric, Variation from Nominal Law Compensated by C206, C207.	1760	7733A1 and 7731C1	Oscillator Tuning	...	...	A.W.A. ...	7759T27	Y10C/65110
56	C206*	CONDENSER, 190 to 208 μμF (Value Determined on Test) Fixed, 300V Wkg., Silver Mica Dielectric, Tropical Finish. Precision Condenser with Low Temperature Coefficient.	1759	7733A1 and 7731C1	Oscillator Tuning	...	3.66	A.W.A. ...	S7946	.....
57	C207*	CONDENSER, 190 to 208 μμF (Value Determined on Test) Fixed, 300V Wkg., Silver Mica Dielectric, Tropical Finish. Precision Condenser with Low Temperature Coefficient.	1759	7733A1 and 7731C1	Oscillator Tuning	...	3.66	A.W.A. ...	S7946	.....
		NOTE.—An A.W.A. Midget Mica Condenser, Type S6771, 6 μμF, may be connected in parallel with C206, C207 in some Units to compensate for Law Variations in C205.	1759	7733A1 and 7731C1	Oscillator Tuning	...	3.66	A.W.A. ...	S6771	.....
58	C208	CONDENSER, 5,000 μμF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish, 2 Connected in Parallel.	1759, 1760	7733A1 and 7731C1	D.C. Blocking	...	...	A.W.A. ...	S6773	Y10C/65135 (2 in parallel).
59	C209	Condenser, 14μμF, ±2μμF Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1760, 1759	7733A1 and 7731C1	Grid Feedback	...	...	A.W.A. ...	S6771	Y10C/65220
60	C210	CONDENSER, 10–420 μμF Variable, 300V Peak, Air Dielectric.	1760, 1759	7733A1 and 7731C1	B.A. Tuning ...	...	...	A.W.A. ...	7759T26	Y10C/65109

* The nominal value of this component may be varied from time to time to compensate for unavoidable changes in the other associated components. Always replace a faulty component by one, or a group, having the same nominal capacity.

Schedule of Components for Transmitter AT5, Type J7731—*continued.*

Item No.	Circ. Ref. No.	Description.	Dwg. Photo. Ref.	Circuit.	Function.	Test Ref.	Maker's Name.	Maker's Designation.	R.A.A.F. Ref. No.
61	C211	CONDENSER, 0.01 μF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1760, 1759	7733A1 and 7731C1	D.C. Blocking ...	...	A.W.A. ...	3U2956	Y10C/65221
62	C212	CONDENSER, 0.01 μF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1760, 1759	7733A1 and 7731C1	D.C. Blocking ...	...	A.W.A. ...	3U2956	Y10C/65221
63	C213	CONDENSER, 40 μμF, ±5% Fixed, 500V Wkg., Rutile Dielectric, Tropical Finish, Precision Condenser with Special Negative Temperature Coefficient.	1759	7733A1 and 7731C1	Oscillator Temperature Compensation.	...	A.W.A. ...	ERIE	Y10C/65222
64									
65									
66	C301	CONDENSER, 2,500 μμF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1766	7733A1 and 7731C1	P.A. Tuning	...	A.W.A. ...	11U2956	Y10C/65223
67	C302	CONDENSER, 2,500 μμF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1766	7733A1 and 7731C1	P.A. Tuning	...	A.W.A. ...	11U2956	Y10C/65223
68	C303	CONDENSER, 7,000 μμF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1766	7733A1 and 7731C1	P.A. Tuning	...	A.W.A. ...	23U2956	Y10C/65224
69	C304	CONDENSER, 7,000 μμF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1766	7733A1 and 7731C1	P.A. Tuning	...	A.W.A. ...	23U2956	Y10C/65224
70	C305	CONDENSER, 0.02 μF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1766	7733A1 and 7731C1	D.C. Blocking ...	...	A.W.A. ...	19U2956	Y10C/65216
71									
72									
73									
74									
75									
76	L1	INDUCTANCE	1763, 1762	7733A1 and 7731C1	H.F. P.A. Anode Tuning, 2–20 Mc.	6.55, 6.62, 6.73	A.W.A. ...	V7914	Y10D/70296

Schedule of Components for Transmitter AT5, Type J7731—*continued.*

77	L101	INDUCTANCE	1815, 1816	7733A1 and 7731C1	Oscillator Tuning, 2–2.5 Mc.	6.55, 6.59, 6.67	A.W.A. ...	7750T17	Y10D/70253
78	L102	INDUCTANCE	1816, 1817	7733A1 and 7731C1	Oscillator Tuning, 2.5–3.2 Mc.		A.W.A. ...	7750T17–1	Y10D/70254
79	L103	INDUCTANCE	1816, 1817	7733A1 and 7731C1	Oscillator Tuning, 3.2–4.0 Mc.		A.W.A. ...	7750T17–2	Y10D/70255
80	L104	INDUCTANCE	1815, 1817	7733A1 and 7731C1	Oscillator Tuning, 4.0–5.0 Mc.		A.W.A. ...	7750T17–3	Y10D/70256
81	L201	INDUCTANCE	1760, 1759	7733A1 and 7731C1	Oscillator Tuning, 140–185 kc.		A.W.A. ...	7759T18	Y10D/70249
82	L202	INDUCTANCE	1760, 1759	7733A1 and 7731C1	Oscillator Tuning, 185–260 kc.	6.55, 6.60, 6.71	A.W.A. ...	7759T19	Y10D/70250
83	L203	INDUCTANCE	1760, 1759	7733A1 and 7731C1	Oscillator Tuning, 260–370		A.W.A. ...	7759T18–1	Y10D/70251
84	L204	INDUCTANCE	1760, 1759	7733A1 and 7731C1	Oscillator Tuning, 370–500 kc.		A.W.A. ...	7759T19–1	Y10D/70252
85	L205	INDUCTANCE	1760, 1759	7733A1 and 7731C1	B.A. Anode Tuning, 2–10 Mc.	6.55, 6.61, 6.71	A.W.A. ...	7759T12	Y10D/70225
86	L301	INDUCTANCE	1766	7733A1 and 7731C1	M.F. P.A. Anode Tuning, 140–500 kc.	6.55, 6.62, 6.72	A.W.A. ...	V7754	Y10D/70258
87	M1	METER, 5 mA, D.C., Full Scale Movement, Scale marked 0–250 mA and 0–15 mA.	1765, 1761	7733A1 and 7731C1	All Circuit Metering ...	6.57	A.W.A. ...	7731D5	Y10A/55431
88	PL1	PILOT LIGHT, 3.2V 0.3 Amp. ...	1761	7733A1 and 7731C1	Filament Supply Indication.	6.66	Mazda ...	.....	G5A/25253
89	...	BEZEL, Red	.....	7733A1 and 7731C1	For Item 88	....	A.W.A. ...	7731T34	Y10A/55530
90									
91	R1	RESISTOR, 0.1 MΩ Fixed, 1 watt, Wire Terminals.	1761, 1764	7733A1 and 7731C1	Audio Amplifier Grid Leak.	6.55	Chanex ...	RV104I	Y10C/65189
92	R2	RESISTOR, 20,000 Ω Fixed, 1 watt, Wire Terminals.	1761, 1764	7733A1 and 7731C1	Audio Oscillator Grid Leak.	6.55	Chanex ...	RV2031	Y10C/65185
93	R3	RESISTOR, 400 Ω Fixed, Wire Wound, Coating "C," with Wire Terminals, Type 1.	1763 1763	7733A1 and 7731C1	Modulator Cathode Bias.	6.55	I.R.C. ...	AA	Y10C/65225
94	R4	RESISTOR, 35 ±1% Ω Fixed, 250 mA, Coating CV, with Lug Terminals, Type 3.	1763	7733A1 and 7731C1	Modulator Metering Shunt.	6.55	I.R.C. ...	AB	Y10C/65226
95	R5	RESISTOR, 1,000 Ω Fixed, 2 Watt, Wire Terminals.	1763	7733A1 and 7731C1	Anode Decoupling ...	6.55	I.R.C. ...	BT2	Y10C/65227
96	R6								
97	R7	RESISTOR, 50,000 Ω Fixed, 2 Watt, Wire Terminals.	1761, 1764	7733A1 and 7731C1	P.A. Grid Leak ...	6.55	I.R.C. ...	BT2	Y10C/65228
98	R8	RESISTOR, 35 ±1% Ω, 250 mA, Coating CV, with Lug Terminals, Type 3.	1761, 1764	7733A1 and 7731C1	P.A. Grid Metering Shunt.	6.55	I.R.C. ...	AB	Y10C/65226

Schedule of Components for Transmitter AT5, Type J7731—*continued.*

Item No.	Circ. Ref. No.	Description.	Dwg. Photo. Ref.	Circuit.	Function.	Test Ref.	Maker's Name.	Maker's Designation.	R.A.A.F. Ref. No.
99	R9	RESISTOR, 1,715 ±1% Ω Fixed, 250 mA, Coating CV, with Lug Terminals, Type 3.	1764	7733A1 and 7731C1	Meter Series Resistor for 250 mA Ranges.	6.55	I.R.C. ...	AB	Y10C/65229
100	R10	RESISTOR, 60 Ω ±1% Fixed, 250 mA, Coating CV, with Lug Terminals, Type 3.	1764	7733A1 and 7731C1	Meter Series Resistor for 15 mA Ranges.	6.55	I.R.C.	AB	Y10C/65230
101	R11	RESISTOR, 35 Ω, ±1% Fixed, 250 mA, Coating CV, with Lug Terminals, Type 3.	1765, 1763	7733A1 and 7731C1	Oscillator Metering ...	6.55	I.R.C. ...	AB	Y10C/65226
102	R12	RESISTOR, 250 Ω Fixed, Wire Wound, Coating C, Wire Terminals, Type 1.	1765, 1761	7733A1 and 7731C1	Cathode Bias ...	6.55	I.R.C. ...	AA	Y10C/65231
103	R13	RESISTOR, 50,000 Ω Fixed, 2 Watt, Wire Terminals, 2 Connected in Parallel.	1765, 1761	7733A1 and 7731C1	H.T. Dropping ...	6.55	I.R.C. ...	BT2	Y10C/65228 (2 in parallel).
104	R14	RESISTOR, 10,000 Ω Fixed, 2 Watt, Wire Terminals.	1765, 1761	7733A1 and 7731C1	H.T. Bleeder	6.55	I.R.C. ...	BT2	Y10C/65233
105	R15	RESISTOR, 75 Ω Fixed, Wire Wound, Coating C, with Wire Terminals, Type 1.	1765, 1761	7733A1 and 7731C1	Relay Supply	6.55	I.R.C. ...	AA	Y10C/65234
106	R16	RESISTOR, 1,000 Ω Fixed, 2 Watt, Wire Terminals.	1765, 1761	7733A1 and 7731C1	Decoupling	6.55	I.R.C. ...	BT2	Y10C/65227
107	R17	RESISTOR, 0.25 MΩ Fixed, 1 Watt, Wire Terminals.	1765	7733A1 and 7731C1	H.F. B.A. Grid Leak...	6.55	Chanex ...	RV2541	Y10C/65235
108	R18	RESISTOR, 50 Ω Fixed, ½ Watt, Wire Terminals.	1765	7733A1 and 7731C1	Grid Damping ...	6.55	Bifrost ...	.....	Y10C/65236
109	R19	RESISTOR, 250 Ω Fixed, Wire Wound, Coating "C," with Wire Terminals, Type 1.	1763	7733A1 and 7731C1	Cathode Bias ...	6.55	I.R.C. ...	AA	Y10C/65237
110	R20	RESISTOR, 1 MΩ Fixed, 1 Watt, Wire Terminals.	1763	7733A1 and 7731C1	Keying Bias	6.55	I.R.C. ...	BT1	Y10C/65238
111	R21	RESISTOR, 35 Ω ±1% Fixed, 250 mA, Coating CV, with Lug Terminals, Type 3.	1763	7733A1 and 7731C1	B.A. Metering ...	6.55	I.R.C. ...	AB	Y10C/65226
112	R22	RESISTOR, 40,000 Ω Fixed, 2 Watt, Wire Terminals.	1763	7733A1 and 7731C1	Screen Dropping ...	6.55	I.R.C. ...	BT2	Y10C/65239
113	R23	RESISTOR, 80 Ω Fixed, Wire Wound, Coating "C," with Wire Terminals, Type 1, 2 Connected in Parallel.	1764, 1763	7733A1 and 7731C1	Pilot Supply	6.55	I.R.C. ...	AB	Y10C/65240
114	R24	RESISTOR, 30 Ω Fixed, Wire Wound, Coating "C", with Wire Terminals, Type 1.	1764	7733A1 and 7731C1	Pilot Supply	6.55	I.R.C. ...	AB	Y10C/65232

Schedule of Components for Transmitter AT5, Type J7731—*continued.*

115	R25	RESISTOR, 10,000 Ω Fixed, 2 Watt, Wire Terminals.	1763	7733A1 and 7731C1	P.A. Grid Leak ...	6.55	I.R.C. ...	BT2	Y10C/65233
116	R26	RESISTOR, 50 Ω Fixed, ½ Watt, Wire Terminals.	1763	7733A1 and 7731C1	Grid Damping ...	6.55	Bifrost ...	.....	Y10C/65236
117	R27A and R27B	RESISTOR, 1,000 Ω Centre Tapped, WireWound, Coating "C," with Mounting Brackets and Lug Terminals, Type 2, Overall Size 3½ in. long x ⅝ in. diameter.	1763	7733A1 and 7731C1	Cathode Bias... ...	6.55	I.R.C. ...	DG	Y10C/65241
118	R28	RESISTOR, 50 Ω Fixed, ½ Watt, Wire Terminals.	1763	7733A1 and 7731C1	Screen Damping ...	6.55	Bifrost ...	.....	Y10C/65236
119	R29	RESISTOR, 50 Ω Fixed, ½ Watt, Wire Terminals.	1763	7733A1 and 7731C1	Grid Damping ...	6.55	Bifrost ...	.....	Y10C/65236
120	R30	RESISTOR, 35 Ω ±1% Fixed, 250 mA, Coating CV, with Lug Terminals, Type 3.	1763	7733A1 and 7731C1	P.A. Cathode Metering	6.55	I.R.C. ...	AB	Y10C/65226
121	R31	RESISTOR, 50 Ω Fixed, ½ Watt, Wire Terminals.	1763	7733A1 and 7731C1	Screen Damping ...	6.55	Bifrost ...	.....	Y10C/65236
122	R32	RESISTOR, 10,000 Ω Fixed, 2 Watt, Wire Terminals.	1763	7733A1 and 7731C1	Screen Dropping ...	6.55	I.R.C. ...	BT2	Y10C/65233
123	R33	RESISTOR, 800 Ω Fixed, 1 Watt, Wire Terminals.	1765, 1761	7733A1 and 7731C1	Side Tone Divider ...	6.55	Chanex ...	RV8011	Y10C/65242
124	R34	RESISTOR, 50 Ω Fixed, 1 Watt, Wire Terminals.	1765, 1761	7733A1 and 7731C1	Side Tone Divider ...	6.55	Bifrost ...	.....	Y10C/65243
125									
126									
127									
128									
129									
130									
131	R101	RESISTOR, 1 MΩ Fixed, 1 Watt, Wire Terminals.	1817	7733A1 and 7731C1	Oscillator Anode Load	6.55	Chanex ...	RV1051	Y10C/65244
132	R102	RESISTOR, 0.2 MΩ Fixed, ½ Watt, Wire Terminals.	1815	7733A1 and 7731C1	Oscillator Grid Leak...	6.55	Chanex ...	RR2041	Y10C/65245
133	R103	RESISTOR, 0.1 MΩ Fixed, ½ Watt, Wire Terminals.	1817	7733A1 and 7731C1	Oscillator Grid Leak...	6.55	Chanex ...	RR1041	Y10C/65162
134									
135	R201	RESISTOR, 50,000 Ω Fixed, 2 Watt, Wire Terminals.	1760, 1759	7733A1 and 7731C1	M.F. Oscillator Grid Leak.	6.55	I.R.C. ...	BT2	Y10C/65228

Schedule of Components for Transmitter AT5, Type J7731—*continued.*

Item No.	Wirc. Ref. No.	Description.	Dwg. Photo. Ref.	Circuit.	Function.	Test Ref.	Maker's Name.	Maker's Designation.	R.A.A.F. Ref. No.
136	R202	RESISTOR, 500 Ω Fixed, Wire Wound, Coating "C," with Wire Terminals Type 1.	1760, 1759	7733A1 and 7731C1	B.A. Anode Decoupling	6.55	I.R.C. ...	AB	Y10C/65246
137									
138	RFC1	R.F. CHOKE	1765, 1763, 1762	7733A1 and 7731C1	H.F. Oscillator Anode Choke.	6.54, 6.55	A.W.A. ...	7731V105	Y10C/65105
139	RFC2	R.F. CHOKE	1765, 1763	7733A1 and 7731C1	M.F. Oscillator Aonde Choke.	6.54, 6.55	A.W.A. ...	7731V104	Y10C/65104
140	RFC3	R.F. CHOKE	1765, 1762	7733A1 and 7731C1	P.A. Grid Choke ...	6.54, 6.55	A.W.A. ...	7731V106	Y10C/65106
141	RFC301	R.F. CHOKE	1766	7733A1 and 7731C1	M.F. P.A. Anode Choke.	6.54, 6.55	A.W.A. ...	7753V29	Y10C/65119
142	RFC302	R.F. CHOKE	1766	7733A1 and 7731C1	H.F. P.A. Anode Choke.	6.54, 6.55	A.W.A. ...	S7746	Y10C/65107
143	S1	SWITCH, Rotary Oak Type, 8 Poles, 4 Positions.	1761, 1764	7733A1 and 7731C1	Emission Switch	6.53	A.W.A. ...	7731D2	Y10F/80068
144	S2	SWITCH, Rotary Oak Type, 3 Poles, 5 Positions.	1761, 1764	7733A1 and 7731C1	Metering	6.53	A.W.A. ...	7731D4	Y10F/80070
145	S3	SWITCH, Rotary Heavy Duty, 2 Poles, 2 Positions. This switch is linked with S5.	1761	7733A1 and 7731C1	M.F. H.F. Changeover	6.53	A.W.A. ...	4R7739	Y10F/80064
146	S4	SWITCH, Rotary Oak Type, 2 poles, 2 Positions.	1761, 1763, 1762	7733A1 and 7731C1	Line ON/OFF ...	6.53	A.W.A. ...	7731D3	Y10F/80069
147	S5	SWITCH, Rotary Oak Type, 5 Poles, 2 Positions. H.F. Ceramic Wafers, this switch is linked to S3.	1765, 1761, 1764, 1763, 1762	7733A1 and 7731C1	M.F. H.F. Changeover	6.53	A.W.A. ...	7731D1	Y10F/80067
148	S6A	SWITCH, Rotary Heavy Duty, 1 Pole, 5 Positions.	1761, 1762	7733A1 and 7731C1	H.F. P.A. Range Switch.	6.53	A.W.A. ...	5R7739	Y10F/80065
149	S6B	SWITCH, Rotary Heavy Duty, 1 Pole, 5 Positions.	1762, 1761	7733A1 and 7731C1	H.F. P.A. Range Switch.	6.53	A.W.A. ...	6R7739	Y10F/80066
150									
151	S101	SWITCH, Rotary Oak Type, 5 Poles, 12 Positions, with 2 shorting sections.	1815, 1816, 1817	7733A1 and 7731C1	H.F. Oscillator Range and Crystal Section.	6.53	A.W.A. ...	7750D1	Y10F/80059
152	S201	SWITCH, Rotary Oak Type, 2 Poles, 4 Positions with 1 shortening section.	1759	7733A1 and 7731C1	M.F. Oscillator Range Selection.	6.53	A.W.A. ...	7759D1	Y10F/80056
153	S202	SWITCH, Rotary Oak Type, 1 Pole, 2 Positions.	1759	7733A1 and 7731C1	H.F. B.A. Range Selection.	6.53	A.W.A. ...	7759D2	Y10F/80057
154	S301	SWITCH, Rotary Heavy Duty ...	1766	7733A1 and 7731C1	M.F. P.A. Range Selection.	6.53	A.W.A. ...	3R7739	Y10F/80063

Schedule of Components for Transmitter AT5, Type J7731—*continued.*

155	T1	TRANSFORMER, Primary Current 0.06A, Ratio 1 : 25, Impedance Ratio 60 Ω : 375,000 Ω.	1764	7733A1 and 7731C1	Microphone Input ...	6.55, 6.64	A.W.A. ...	1XD7972	Y10A/55426
156	T2	TRANSFORMER Primary Current 0.04A, Secondary Current 0.003A.	1761, 1763	7733A1 and 7731C1	Modulation and Audio Oscillator Transformer.	6.55, 6.64	A.W.A. ...	1XA7980	Y10A/55427
157	V1	VALVE	1765, 1761, 1763, 1762	7733A1 and 7731C1	Audio Oscillator ...	6.56	A.W.V. ...	Radiotron 6V6G	Y10E/55248
158	V2	VALVE	1765, 1761, 1763, 1762	7733A1 and 7731C1	H.F. Oscillator ...	6.56	A.W.V. ...	Radiotron 6V6G	
159	V3	VALVE	1763, 1762	7733A1 and 7731C1	H.F. B.A. and M.F. Oscillator.	6.56	A.W.V. ...	Radiotron 807	
160	V4	VALVE	1763, 1762	7733A1 and 7731C1	Power Amplifier ...	6.56	A.W.V. ...	Radiotron 807	Y10E/55202
161	V5	VALVE	1763, 1762	7733A1 and 7731C1	Power Amplifier ...	6.56	A.W.V. ...	Radiotron 807	
162	VS1	VALVE SOCKET, Octal H.F. Ceramic	.....	7733A1 and 7731C1	.....	...	Ducon ...	S7957	Y10H/90070
163	VS2	VALVE SOCKET, Octal H.F. Ceramic	.....	7733A1 and 7731C1	.....	...	Ducon ...	S7957	Y10H/90070
164	VS3	VALVE SOCKET, 5 Pin H.F. Ceramic	.....	7733A1 and 7731C1	.....	...	Nilchrom	1S7957	Y10H/90069
165	VS4	VALVE SOCKET, 5 Pin H.F. Ceramic	.....	7733A1 and 7731C1	.....	...	Nilchrom	1S7957	Y10H/90069
166	VS5	VALVE SOCKET, 5 Pin H.F. Ceramic	.....	7733A1 and 7731C1	.....	...	Nilchrom	1S7957	Y10H/90069
167	X1	CRYSTAL, Variable Air Gap	.....	.....	.....	...	A.W.A. ...	R7847	Y10X/95007
168	X2	CRYSTAL, Variable Air Gap	.....	.....	.....	...	A.W.A. ...	R7847	Y10X/95007
169	X3	CRYSTAL, Variable Air Gap	.....	.....	.....	...	A.W.A. ...	R7847	Y10X/95007
170	X4	CRYSTAL, Variable Air Gap	.....	.....	.....	...	A.W.A. ...	R7847	Y10X/95007
171	X5	CRYSTAL, Variable Air Gap	.....	.....	.....	...	A.W.A. ...	R7847	Y10X/95007
172	X6	CRYSTAL, Variable Air Gap	.....	.....	.....	...	A.W.A. ...	R7847	Y10X/95007
173	...	PLUG, Type 68	.....	.....	Output Connection ...	...	A.W.A. ...	7732T19	Y10H/8528
174	...	SOCKET, 8 Pin Male, Insulation Voltage 3,500V D.C.	.....	.....	Power Unit Connections.	6.52	A.W.A. ...	7R5585	Y10H/90093
175	...	SOCKET, 12 Pin Male, Insulation Voltage 2,500V D.C.	.....	.....	Junction Box Connections.	6.52	A.W.A. ...	5R5585	Y10H/90092
176	...	DIAL LOCK	.....	.....	.....	3.65, 6.69	A.W.A. ...	R7752	Y10A/55433
177	...	FLEXIBLE COUPLING	.....	.....	.....	...	A.W.A. ...	S8327	Y10A/55463
178	...	DIAL LOCK	.....	.....	.....	3.65, 6.69	A.W.A. ...	R7752	Y10A/55433
179	...	FLEXIBLE COUPLING	.....	.....	.....	...	A.W.A. ...	S8327	Y10A/55463
180	...	DIAL LOCK	.....	.....	.....	3.65, 6.69	A.W.A. ...	R7752	Y10A/55433
181	...	UNIVERSAL COUPLING	.....	.....	.....	...	A.W.A. ...	2R7745	Y10A/55438
182	...	DIAL LOCK	.....	.....	.....	3.65, 6.69	A.W.A. ...	R7752	Y10A/55433
183	...	UNIVERSAL COUPLING	.....	.....	.....	...	A.W.A. ...	R7745	Y10A/55436
184	...	DIAL LOCK	.....	.....	.....	3.65, 6.69	A.W.A. ...	R7752	Y10A/55433
185	...	PLATES, CLICKING, 12 Position ...	.....	.....	.....	...	A.W.A. ...	R7738	Y10A/55434

Schedule of Components for Transmitter AT5, Type J7731—*continued.*

Item No.	Circ. Ref. No.	Description.	Dwg. Photo. Ref.	Circuit.	Function.	Test Ref.	Maker's Name.	Maker's Designation.	R.A.A.F. Ref No.
186	...	PLATES, CLICKING, 12 Position ...	.....	.....	.....	...	A.W.A. ...	R7738	Y10A/55434
187	...	PLATES, CLICKING, 12 Position ...	.....	.....	.....	...	A.W.A. ...	R7738	Y10A/55434
188									
189	...	MOUNTING BASE	.....	.....	.....	...	A.W.A. ...	2Z7749	Y10D/70285
190	...	H.F. OSCILLATOR UNIT, Comprises C101–109, L101–104, R101–103, S101, X1–6 and Items 180 and 181.	.....	7733A1 and 7731C1	.....	6.59, 6.67	A.W.A. ...	J7750	Y10D/70221
191	...	M.F. M.O. and H.F. B.A. TUNING UNIT, Comprises C201–213, L201–205, R201, R202, S201, 202 and Items 176–179.	.....	7733A1 and 7731C1	.....	6.60, 6.61, 6.71	A.W.A. ...	J7759	Y10D/70226
192	...	M.F. P.A. TUNING UNIT, Comprises C301–305, L301, RFC301, 302, S301 and Items 182, 183 and 185.	.....	7733A1 and 7731C1	.....	6.62, 6.72	A.W.A. ...	J7753	Y10D/70257
193	...	H.F. P.A. COARSE TUNING UNIT, Comprises L1, S6A, S6B and Item 187.	....	7733A1 and 7731C1	.....	6.62, 6.72	A.W.A. ...	V7758	Y10D/70259

SCHEDULE OF COMPONENTS

FOR

AERIAL COUPLING UNIT

TYPE J7732

SCHEDULE OF COMPONENTS FOR AERIAL COUPLING UNIT, TYPE J7732.

Item No.	Circ. Ref. No.	Description.	Dwg. Photo. Ref.	Circuit.	Function.	Test Ref.	Maker's Name.	Maker's Designation.	R.A.A.F. Ref. No.
1	C1	CONDENSER, 12–440 μμF, Variable, 300V Peak Wkg., Air Dielectric.	1697	7732D12 and 7732D13	H.F. Input Tuning Fine.	...	A.W.A. ...	5U8298	Y10C/65121
2	C2 to C7 (Incl.).	CONDENSER, 350 μμF ±30 μμF Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1698	7732D12 and 7732D13	H.F. Input Tuning, Coarse.	...	A.W.A. ...	S6771	Y10C/65128
3	C8	CONDENSER, 80 μμF Fixed, 1,000V Peak Wkg., Air Dielectric.	1697, 1698	7732D12 and 7732D13	H.F. Aerial Loading...	...	A.W.A. ...	U7913	Y10C/65129
4	C10	CONDENSER, 0.1 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1698	7732D12 and 7732D13	Key Click Filter ...	...	A.W.A. ...	S7080	Y10C/65131
5	C9	CONDENSER, 2,000 μμF, ±10% Fixed, 750V Wkg., Mica Dielectric, Tropical Finish.	1698	7732D12 and 7732D13	H.F. Aerial Current Metering.	...	A.W.A. ...	S6773	Y10C/65316
6	L1	INDUCTANCE, Tapped	1697, 1698	7732D12 and 7732D13	H.F. Aerial Tuning, Coarse.	6.83	A.W.A. ...	V7915	Y10D/70289
7	L2	INDUCTANCE, Variable	1697, 1698	7732D12 and 7732D13	H.F. Aerial Tuning, Fine.	6.83, 6.90, 6.89	A.W.A. ...	V7737	Y10D/70223
8	L3	INDUCTANCE, Variometer Type ...	1698	7732D12 and 7732D13	M.F. Input Tuning ...	6.83, 6.89	A.W.A. ...	V7736	Y10D/70222
9	L4	INDUCTANCE, Tapped, with Variometer.	1697, 1698	7732D12 and 7732D13	M.F. Aerial Tuning ...	6.83, 6.89	A.W.A. ...	.....	Rotor: Y10D/70290, Stator: Y10D/70291.
10									
11	M1	METER, 0–100 mA Thermoammeter, with scale divided to read 0–3A and 0–1.5A.	1697	7732D12 and 7732D13	M.F. and H.F. Aerial Current Metering.	6.84, 6.85	A.W.A. ...	7732D8	Y10A/55430
12	REL1	RELAY, Coil 12V, 160 mA, 2 make contacts, contact rating 3A, 240V.	1697, 1698	7732D12 and 7732D13	M.F./H.F. Changeover	6.93	A.W.A. ...	22R7190	Y10F/80283
13	REL2	RELAY, Coil 6V, 1/3A, 2 connected in series, 2 make, 2 break contacts.	1697, 1698	7732D12 and 7732D13	Keying	6.92	A.W.A. ...	R7743	Y10F/70218
14	RFT1	R.F. TRANSFORMER, Primary Current 3A, Ratio 30 : 1, Range 2–20 Mc., Comprises C9, RFC1, RFC2, TC1.	1697, 1698	7732D12 and 7732D13	H.F. Aerial Current Metering.	6.84	A.W.A. ...	R7741	Y10A/55424

Schedule of Components for Aerial Coupling Unit, Type J7732—*continued.*

15	RFT2	R.F. TRANSFORMER, Ratio Adjustment 15 : 1 Prim. 1.5A, Sec. 100 mA, frequency range 100 to 500 kc.	1698	7732D12 and 7732D13	M.F. Aerial Current Metering.	6.84	A.W.A. ...	R7742	Y10A/55425
16	RFC1 and RFC2	R.F. Choke	1698	7732D12 and 7732D13	H.F. Aerial Current Metering.	6·84	A.W.A. ...	S7746	Y10C/65107
17	S1	SWITCH, Rotary Oak Type, 1 Pole, 7 Positions, shorting type rotor.	1776 (Ref. 8).	7732D12 and 7732D13	H.F. Input Tuning, Coarse.	6.88	A.W.A. ...	7757D2	Y10F/80073
18	S2	SWITCH, Rotary Heavy Duty Type...	1697	7732D12 and 7732D13	H.F. Aerial Tuning, Coarse.	6.88	A.W.A. ...	1R7739	Y10F/80061
19	S3	SWITCH, Rotary Heavy Duty Type, 2 Poles, 3 Positions.	1697, 1698	7732D12 and 7732D13	H.F. Aerial Loading Capacity Change-over.	6.88	A.W.A. ...	R7739	Y10F/80060
20	S4	SWITCH, Rotary Heavy Duty Type, 1 Pole, 12 Positions.	1698	7732D12 and 7732D13	M.F. Aerial Tuning, Coarse.	6.88	A.W.A. ...	2R7739	Y10F/80062
21	TC1	THERMO COUPLE, 0–100 mA, Resistance 4·5 Ω.	1698	7732D12 and 7732D13	H.F. Aerial Current Metering.	6.84	Vane ...	Type C5	Y10A/55432
22	TC2	THERMO COUPLE, 0–100 mA, Resistance 4.5 Ω.	1698	7732D12 and 7732D13	M.F. Aerial Current Metering.	6.84	Vane ...	Type C5	Y10A/55432
23	...	SOCKET, 12 Pin, Male...	.....	.....	Junction Box Connections.	6.82	A.W.A. ...	5R5585	Y10H/90092
24	...	PLUG, Single Pin, Male	.....	.....	Fixed Aerial	...	A.W.A. ...	7732U11	Y10H/90068
25	...	PLUG, Single Pin, Male	.....	.....	Trailing Aerial ...	...	A.W.A. ...	7732U11	Y10H/90068
26	...	PLUG, Type 68	.....	.....	Transmitter	...	A.W.A. ...	7732T19	Y10H/8528
27	...	SOCKET, Type 38	.....	.....	Receiver	...	R.C.A. ...	.....	.....
28	...	AERIAL LOADING CAPACITY (H.F.), Comprises C8 and S3.	.....	.....	H.F. Aerial Loading ...	...	A.W.A. ...	U7740	Y10C/65120
29	...	PLATE, CLICKING, 12 Position ...	.....	.....	.....	...	A.W.A. ...	R7738	Y10A/55434
30	...	AERIAL TUNING SECTION (H.F. COARSE), Comprises L1 and S2.	.....	.....	H.F. Aerial Tuning, Coarse.	...	A.W.A. ...	V7756	Y10D/70282
31	...	PLATES, CLICKING, 12 Position ...	.....	.....	.....	...	A.W.A. ...	R7738	Y10A/55434
32	...	AERIAL TUNING SECTION (M.F.), Comprises L4, S4, TC2.	.....	.....	M.F. Aerial Tuning ...	...	A.W.A. ...	V7744	Y10D/70224
33	...	PLATES, CLICKING, 24 Position ...	.....	.....	.....	...	A.W.A. ...	1R7738	Y10A/55435
34	...	UNIVERSAL COUPLING	.....	.....	.....	...	A.W.A. ...	R7745	Y10A/55436
35		INPUT TUNING SECTION (H.F. COARSE), Comprises S1, C2 to C7.	1698	.....	H.F. Input Tuning Coarse.	...	A.W.A. ...	U7757	Y10C/65122
36	...	DIAL LOCK	.....	.....	.....	6.86, 3.65	A.W.A. ...	R7752	Y10A/55433
37	...	DIAL LOCK	.....	.....	.....	6.86, 3.65	A.W.A. ...	R7752	Y10A/55433
38									
39	...	MOUNTING BASE	.....	.....	.....	...	A.W.A. ...	1Z7749	Y10D/70283

SCHEDULE OF COMPONENTS

FOR

JUNCTION BOX

TYPE R7735

SCHEDULE OF COMPONENTS FOR JUNCTION BOX, TYPE R7735.

Item No.	Circ. Ref. No.	Description.	Dwg. Photo. Ref.	Circuit.	Function.	Test Ref.	Maker's Name.	Maker's Designation.	R.A.A.F. Ref. No.
1	C1	CONDENSER, 100 μF, Fixed, 25V D.C. Wkg., Electrolytic.	1812	7735D1	Microphone Filter ...	6.103	Ducon ...	EEC904	Y10C/65132
2	C2	CONDENSER, 100 μF, Fixed, 25V D.C. Wkg., Electrolytic.	1812	7735D1	Microphone Filter ...	6.103	Ducon ...	EEC904	Y10C/65132
3	C3	CONDENSER, 100 μF, Fixed, 25V D.C. Wkg., Electrolytic.	1812	7735D1	Microphone Filter ...	6.103	Ducon ...	EEC904	Y10C/65132
4									
5									
6	L1	CHOKE, 1.4 H, Current 0.1A D.C., Flash Test Rating 1,500V, D.C.	1812	7735D1	Microphone Filter ...	6.102	A.W.A. ...	1XA7819	Y10C/65102
7	L2	CHOKE, 1.4H, Current 0.1A D.C., Insulation Voltage 1,500V D.C.	1812	7735D1	Microphone Filter ...	6.102	A.W.A. ...	1XA7819	Y10C/65102
8	L3	CHOKE, 1.4H, Current 0.1A D.C., Insulation Voltage 1,500V D.C.	1812	7735D1	Microphone Filter ...	6.102	A.W.A. ...	1XA7819	Y10C/65102

SCHEDULE OF COMPONENTS

FOR

26V POWER SUPPLY UNIT

TYPE H7734

SCHEDULE OF COMPONENTS FOR POWER SUPPLY UNIT, TYPE H7734.

Item No.	Circ. Ref. No.	Description.	Dwg. Photo. Ref.	Circuit.	Function.	Test Ref.	Maker's Name.	Maker's Designation.	R.A.A.F. Ref. No.
1	C1	CONDENSER, 2 μF, ±10% Fixed, 200V Wkg., Paper Dielectric.	1706, 1813	7734D6	Audio Filter	...	Ducon ...	P.S.60	Y10C/65190
2	C2	CONDENSER, 2 μF, ±10% Fixed, 200V Wkg., Paper Dielectric.	1706, 1813	7734D6	Audio Filter	...	Ducon ...	P.S.60	Y10C/65190
3	C3	CONDENSER, 2.5 μF, ±10% Fixed, 700V Wkg., Paper Dielectric. Less Mounting Feet.	1813	7734D6	Audio Filter	...	A.W.A. ...	2U3551 (Less Mtg. Feet.)	Y10C/65191
4	C4	CONDENSER, 2.0 μF, ±10% Fixed, 350V Wkg., Paper Dielectric.	1706	7734D6	Audio Filter	...	A.W.A. ...	1U3551	Y10C/65192
5	C5	CONDENSER, 4.0 μF, ±10% Fixed, 350V Wkg., Paper Dielectric. Less Mounting Feet.	1706, 1813	7734D6	Audio Filter	...	A.W.A. ...	6U3551 (Less Mtg. Feet.)	Y10C/65193
6	C6	CONDENSER, 0.01 μF, ±10% Fixed, 350V Wkg., Mica Dielectric, Sealed in a Bakelite Case.	In RTF 1706	7734D6	Noise Filter	...	T.C.C. ...	M.A.	Y10C/65194
7	C7	CONDENSER, 0.01 μF, ±10% Fixed, 350V Wkg., Mica Dielectric, Sealed in a Bakelite Case.	In RT1 1706	7734D6	Noise Filter	...	T.C.C. ...	M.A.	Y10C/65194
8	C8	CONDENSER, 0.25 μF, ±10% Fixed, 200V Wkg., Paper Dielectric.	1813	7734D6	Noise Filter	...	Ducon ...	P.S.53	Y10C/65195
9	C9	CONDENSER, 0.25 μF, ±10% Fixed, 200V Wkg., Paper Dielectric.	1813	7734D6	Noise Filter	...	Ducon ...	P.S.53	Y10C/65195
10	C10	CONDENSER, 0.5 μF, ±10% Fixed, 200V Wkg., Paper Dielectric.	1813	7734D6	Noise Filter	...	Ducon ...	P.S.56	Y10C/65196
11	C11	CONDENSER, 0.5 μF, ±10% Fixed, 200V Wkg., Paper Dielectric.	1813	7734D6	Noise Filter	...	Ducon ...	P.S.56	Y10C/65196
12	C12	CONDENSER, 2.0 μF, ±10% Fixed, 400V Wkg., Paper Dielectric.	1706, 1813	7734D6	Audio Filter	...	Ducon ...	P.S.76	Y10C/65197
13	C13	CONDENSER, 4.0 μF, ±10% Fixed, 400V Wkg., Paper Dielectric.	1706, 1813	7734D6	Audio Filter	...	Ducon ...	P.S.78	Y10C/65198
14	C14	CONDENSER, 4.0 μF, ±10% Fixed, 400V Wkg., Paper Dielectric.	1706	7734D6	Audio Filter	...	Ducon ...	P.S.78	Y10C/65198
15	C15	CONDENSER, 4.0 μF, ±10% Fixed, 200V Wkg., Paper Dielectric.	1813	7734D6	Audio Filter	...	Ducon ...	P.S.62	Y10C/65199
16	C16	CONDENSER, 0.01 μF, ±10% Fixed, 350V Wkg., Mica Dielectric, Sealed in a Bakelite Case.	In RT1 1706	7734D6	Noise Filter	...	T.C.C. ...	M.A.	Y10C/65194
17	C17	CONDENSER, 0.01 μF, ±20% Fixed, 2,000V Wkg., Mica Dielectric, Sealed in a Bakelite Case.	In RT2 1706	7734D6	Noise Filter	...	Simplex...	A.	Y10C/65470

Schedule of Components for Power Supply Unit, Type H7734—*continued.*

18	C18	CONDENSER, 0.01 μF, ±10% Fixed, 350V Wkg., Mica Dielectric, Sealed in a Bakelite Case.	In RT2 1706	7734D6	Noise Filter	...	T.C.C. ...	M.A.	Y10C/65194
19	C19	CONDENSER, 0.01 μF, ±10% Fixed, 350V Wkg., Mica Dielectric, Sealed in a Bakelite Case.	In RT2 1706	7734D6	Noise Filter	...	T.C.C. ...	M.A.	Y10C/65194
20	C20	CONDENSER, 0.01 μF, ±10% Fixed, 350V Wkg., Mica Dielectric, Sealed in a Bakelite Case.	1813	7734D6	Noise Filter	...	T.C.C. ...	M.A.	Y10C/65194
21	C21	CONDENSER, 0.01 μF, ±10% Fixed, 350V Wkg., Mica Dielectric, Sealed in a Bakelite Case.	1706, 1813	7734D6	Noise Filter	...	T.C.C. ...	M.A.	Y10C/65194
22	C22	CONDENSER, 0.5 μF, ±10% Fixed, 350V Wkg., Paper Dielectric, Tropical Finish.	1813	7734D6	Noise Filter	...	A.W.A. ...	S7080	Y10C/65200
23									
24									
25	F1	FUSE, 15 Amps.	1813	7734D6	Transmitter Machine Supply.	3.115	Slydlok ...	15334	Y10H/90071
26	F2	FUSE, 15 Amps.	1813	7734D6	Transmitter Machine Supply.	3.115	Slydlok ...	15334	Y10H/90071
27	F3	Fuse, 5 Amps., Glass Cartridge ...	1813	7734D6	Transmitter Filament Supply.	3.115	Australux	4AG	Y10H/90073
28	F4	FUSE, 5 Amps., Glass Cartridge ...	1813	7734D6	Transmitter Filament Supply.	3.115	Australux	4AG	Y10H/90073
29	F5	FUSE, 0.5 Amp., Glass Cartridge ...	1813	7734D6	Transmitter 550V H.T. Supply.	3.115	Australux	4AG	Y10H/90074
30	F6	FUSE, ⅛ Amp., Glass Cartridge ...	1813	7734D6	Transmitter 300V H.T. Supply.	3.115	Australux	4AG	Y10H/90075
31	F7	FUSE, ⅛ Amp., Glass Cartridge ...	1813	7734D6	Receiver 250V H.T. Supply.	3.115	Australux	4AG	Y10H/90075
32	F8	FUSE, 5 Amps.	1813	7734D6	Receiver Machine Supply.	3.115	Slydlok ...	5344	Y10H/90072
33	F9	FUSE, 5 Amps.	1813	7734D6	Receiver Machine Supply.	3.115	Slydlok ...	5344	Y10H/90072
34									
35	L1	CHOKE, 1.4H, 0.1A D.C., Flash Test Rating 1,500V.	1813	7734D6	Audio Noise Filter ...	6.113	A.W.A. ...	1XA7819	Y10C/65102
36	L2	CHOKE, 1.4H, 0.1A D.C. Flash Test Rating 1,500V.	1706	7734D6	Audio Noise Filter ...	6.113	A.W.A. ...	1XA7819	Y10C/65102
37	L3	CHOKE, 1.4H, 0.1A D.C. Flash Test Rating 1,500V.	1706, 1813	7734D6	Audio Noise Filter ...	6.113	A.W.A. ...	1XA7819	Y10C/65102
38									

Schedule of Components for Power Supply Unit, Type H7734—*continued.*

Item No.	Circ. Ref. No.	Description.	Dwg. Photo. Ref.	Circuit.	Function.	Test Ref.	Maker's Name.	Maker's Designation.	R.A.A.F. Ref No.
39	R1	RESISTOR, 36 Ω Fixed, Wire Bound, Coating B, with Mounting Brackets and Lug Terminals, Type 3, overall dimensions 3½ in. x ⅜ in. d. 600V insulation.	1813	7734D6	Keying Relay Supply Resister.	6.113	I.R.C. ...	D.G.	Y10C/65201
40	R2	RESISTOR, 50 Ω Fixed, Wire Wound, Coating "B," with Mounting Brackets and Lug Terminals, Type 3, overall dimensions 3½ in. L x ⅜ in. d. 600V Insulation.	1813	7734D6	Microphone Supply ...	6.113	I.R.C. ...	D.G.	Y10C/65202
41	R3	RESISTOR, 25 Ω Fixed, Wire Wound, Coating "B," with Mounting Brackets and Lug Terminals Type 3, overall dimensions 3½ in. L x ⅜ in. d. 600V Insulation.	1813	7734D6	Microphone Supply ...	6.113	I.R.C. ...	D.G.	Y10C/65203
42	R4	RESISTOR, 850 Ω Fixed, Wire Wound, Coating "B," with Lug Terminals Type 3, overall dimentions 3½ in. x L 1⅛ in. d., 2 connected in series.	1813	7734D6	Transmitter 300V H.T. Supply Potential Divider.	6.113	A.W.A. ...	7734T61	Y10C/65204
43	R5	RESISTOR, 6,000 Ω Fixed, Wire Wound, Coating "B," with Lug Terminals Type 3, overall dimensions 3½ in. L x 1⅛ in. d.	1813	7734D6	Transmitter 300V H.T. Supply Potential Divider.	6.113	A.W.A. ...	7734T61-1	Y10C/65205
44	R6	RESISTOR, 150 Ω Fixed, Wire Wound, Coating "B," with Lug Terminals Type 2, overall dimensions 2 in. L x ⅜ in. d., supplied with equipments Serial Nos. 1-24 only.	.....	7734D6	Carter Gentr. Starting Relay Series Resistor.	6.113	I.R.C. ...	D.G.	Y10C/65206
45	R7	Resistor, 0.5 Ω Fixed, Wire Wound, Coating "B," with Lug Terminals Type 2, overall dimensions 2 in. L x ⅜ in. d., supplied with equipments Serial Nos. 1-24 only.	.....	7734D6	Carter Generator Series Starting Resistor.	6.113	I.R.C. ...	D.G.	Y10C/65207
46									
47									
48	RFC1	CHOKE	1706, 1813	7734D6	Noise Filter	6.113	A.W.A. ...	Q7917	Y10C/65103
49	RFC2	CHOKE	1813	7734D6	Noise Filter	6.113	A.W.A. ...	Q7917	Y10C/65103
50	RFC3	CHOKE	1813	7734D6	Noise Filter	6.113	A.W.A. ...	7753V29	Y10C/65119
51	RFC4	CHOKE	1813	7734D6	Noise Filter	6.113	A.W.A. ...	7753V29	Y10C/65119
52	RFC5	CHOKE	1813	7734D6	Noise Filter	6.113	A.W.A. ...	3149/0	Y10C/65123

Schedule of Components for Power Supply Unit, Type H7734—*continued.*

53	RFC6	CHOKE	1813	7734D6	Noise Filter	6.113	A.W.A. ...	3149/0	Y10C/65123
54	RFC7	CHOKE	1813	7734D6	Noise Filter	6.113	A.W.A. ...	7753V29	Y10C/65119
55	RFC8	CHOKE	1706	7734D6	Noise Filter	6.113	A.W.A. ...	7734T124	Y10C/65126
56	RFC9	CHOKE	1813	7734D6	Noise Filter	6.113	A.W.A. ...	7734T124–1	Y10C/65127
57	RFC10	CHOKE	1706, 1813	7734D6	Noise Filter	6.113	A.W.A. ...	3149/0	Y10C/65123
58	RFC11	CHOKE	1706, 1813	7734D6	Noise Filter	6.113	A.W.A. ...	3149/0	Y10C/65123
59									
60									
61	REL1	RELAY, Coil, 24V, 0.8 Amp.	1813	7734D6	Transmitter Generator Starting Relay.	6.115	A.W.A. ...	2R2527	Y10F/70260
62	REL2	RELAY, Coil, 12V, 160mA, Supplied with Equipments Serial Nos. 1–24 only.	...	7734D6	Carter Generator Auxiliary Starting Relay.	6.116	A.W.A. ...	12R7190	Y10F/70261
63									
64	RT1	GENEMOTOR, 26V Input, 260V, 100 mA Output.	1706	7734D6	Receiver H.T. Supply	6.117, 6.118, 6.114	Elcon ...	MDD3716	Y10A/55428
65	RT2	GENEMOTOR, 26V Input, 550V, 350 mA Output, Supplied with Equipments Serial Nos. 25 and over.	1706	7734D6	Transmitter H.T. Supply.	6.117, 6.118, 6.114	Elcon ... Emmco ...	MDD6719 MDD4622-2 MDD4622 MDD4622-4	Y10A/55429 Y10A/55740 Y10A/55464 Y10A/55743
66	RT2	GENEMOTOR, 26V Input, 550V, 350 mA Output, Supplied with Equipments Serial Nos. 1–24 only.	.....	7734D6	Transmitter H.T. Supply.	...	Carter ...	E5535	Y10A/55461
67									
68	S1	SWITCH, Tumbler Type, 2-Pole, 2-Position, 240V, 10A.	1813	7734D6	Main L.T. Control Switch.	...	Scanlan	4308	Y10F/80071
69	S2	SWITCH, Tumbler Type, 2-Pole, 2-Position, 240V, 10A.	1813	7734D6	Transmitter L.T. Control Switch.	...	Scanlan	4308	Y10F/80071
70	...	STARTER, Two Stage, Supplied with Equipments Serial Nos. 1–24 only, Comprising Items 62, 45, 44, Case and Mounting Adaptor.	.....	7734D6	Carter Generator Starting.	3.114, 6.116	A.W.A. ...	7734W110	Y10D/70288
71	...	SOCKET, 8-Pin, Male	.....	7734D6	Power Connections to Receiver and Transmitter.	6.112	A.W.A. ...	7R5585	Y10H/90093
72									
73		MOUNTING BASE	.....	7734D6	.....	...	A.W.A. ...	3Z7749	Y10D/70286

SCHEDULE OF COMPONENTS FOR POWER SUPPLY UNIT, TYPE 1H7734.

All components and mechanical details for the Type 1H7734 Power Supply Unit are identical with Type H7734, except in certain minor respects as listed below—

Item No.	Circ. Ref. No.	Description.	Dwg. Photo. Ref.	Circuit.	Function.	Test Ref.	Maker's Name.	Maker's Designation.	R.A.A.F. Ref. No.
		Due to Circuit Modifications, Diagram Number has been changed to ...	.....	**7734D9**	.....	...	.....	.....	.....
39	**R1**	**Not required.**							
40	R2	Resistor, 25 Ω, Fixed, Wire Wound, Coating "B," with Mounting Brackets and Lug Terminal, Type 3, overall dimensions 3½ in. L x ¾ in. D., 600V insulation.	1813	7734D9	Microphone Supply ...	6.119	I.R.C. ...	D.G.	Y10C/65203
61	REL1	RELAY COIL 12V	1813	7734D9	Transmitter Generator Starting Relay.	6.115	A.W.A. ...	3R2527	Y10F/70297
62	REL2	Not required.							
64	RT1	GENEMOTOR 12.75V Input, 250V, 100 mA Output.	1706	7734D9	Receiver H.T. Supply	6.117 6.118 6.119	Elcon ...	MDD3716-1	Y10A/55467
65	RT2	GENEMOTOR 12.75V Input, 550V, 350 mA Output.	1706	7734D9	Transmitter H.T. Supply.	6.117 6.118 6.119	Elcon ...	MDD6719-1 MDD4622-1 MDD4622-3	Y10A/55468 Y10A/55474 Y10A/55742
66	RT2	Not required.							

SCHEDULE OF COMPONENTS

FOR

REMOTE CONTROL UNITS

TYPE P7755 and 1P7755

SCHEDULE OF COMPONENTS FOR REMOTE CONTROL UNIT, TYPE R7755.

Item No.	Circ. Ref. No.	Description.	Dwg. Photo. Ref.	Circuit.	Function.	Test Ref.	Maker's Name.	Maker's Designation.	R.A.A.F. Ref. No.
1	S1	SWITCH, Rotary Oak Type, 3 Poles, 3 Positions. (Control Unit P7755.)	.....	7755D2	Remote Control of Transmitter.	6.122	A.W.A. ...	7755D1	Y10F/80072
2	S1	SWITCH, Rotary Oak Type, 4 Poles, 3 Positions. (Control Unit 1P7755.)	.....	7755D5	Remote Control of Transmitter.	6.122	A.W.A. ...	7755D6	.....

INSTRUCTION BOOK, No. 9013R

DRIVE, REMOTE, CABLE OPERATED

TYPE R9013

INSTRUCTION BOOK No. 9013R.

AT5/AR8 EQUIPMENT.

SECTION 1.—DESCRIPTION.

1. GENERAL.

This flexible drive unit has been designed to operate the Receiver type AR8 from a remote position situated not more than 5½ feet from the Receiver.

It comprises the following units :—

One Control Panel...	R9012
One Tuning Gear Box	2R8812
One Volume Control Gearbox	3R8812
Two Flexible Drive Cables	R9011
One Tuning Gear Box	R8812
One Volume Control Gearbox	1R8812

2. DETAILED.

The control panel is adapted for mounting in any position within the limits of cable length, and at any angle, provision being made for adjusting the pointer and dial scale to suit.

The gear boxes at both the receiver and control panel ends can be fitted so that the cable enters from either the left or right, above or below the shaft to which the box is fitted, and the tuning control can be fitted to either the H.F. or M.F. tuning condenser. The gear boxes on the receiver are normally supplied for right-hand entry of the cable, whilst on the control panel the cables enter from the left, the handwheel being on the right-hand shaft. However, other combinations may be used to control the receiver from a left-hand position as required.

The gear boxes on the control panel contain stops to prevent the controls being rotated past a given point.

The " TUNING " control at the remote end is provided with a dial calibrated from 0 to 100, which rotates at the same speed as the receiver condenser gang.

The cables are coupled through the driving gear boxes to cast aluminium hand wheels which are provided with a swivel handle for rapid rotation. The cables are driven directly by the handwheels, the " TUNING " cable being geared down 120 to 1 to the tuning control and the " VOLUME " cable, 60 to 1 to its control.

The external finish of the gear boxes and control panel is grey wrinkle enamel.

4. MOUNTING "TUNING" DRIVE TO H.F. CONTROL, RIGHT-HAND FITTING.

(i) Set the tuning gang to full-in position.
(ii) Remove dial cursor from pillars.
(iii) Loosen clamping screw in dial anchor block.
(iv) Loosen set screw in dial, and remove dial.
(v) Loosen clamp on gear box, but do not remove.
(vi) Turn " TUNING " handwheel on the control panel to bring scale to " zero."
(vii) Fit gear box over shaft and engage tongue on clamp in the slot in the anchor block. Tighten the clamping screw in anchor block.
(viii) Set gear box to a suitable angle to give an easy sweep to the cable, making sure that the gang remains fully meshed.
(ix) Tighten gear box clamp.
(x) Tighten set screw in driving boss.
(xi) Check the drive for free movement. If it is uneven or jumpy, slacken the anchor block screw, then rock the box to remove side drag on the cable. Re-tighten the screw.

5. MOUNTING "TUNING" DRIVE TO M.F. CONTROL—RIGHT-HAND FITTING.

Follow exactly the same procedure as in 4., except that the " TUNING " handwheel is turned to " 100 " on the scale.

6. MOUNTING VOLUME CONTROL DRIVE—LEFT-HAND FITTING.

(i) Remove the cap at the left end of the gear box.
(ii) Remove the cable union nut.
(iii) Fit the cable in the left-hand entry and place the cap on the right-hand entry.
(iv) Interchange the cable and the volume control handwheel on the control panel.
(v) Follow the same procedure as in 3., except that the volume control handwheel is turned to a full clockwise rotation.

7. MOUNTING "TUNING" DRIVE TO H.F. CONTROL—LEFT-HAND FITTING.

(i) The direction of entry to the gear box can be reversed by either rotating the box around the shaft 180 degrees, other controls permitting, or by using the procedure outlined in 6(i), (ii), (iii).
(ii) Interchange the cable and " TUNING " handwheel on the control panel.
(iii) Follow exactly the same procedure as in 4, except that the " TUNING " handwheel is tuned to " 100 " on the scale.

8. MOUNTING "TUNING" DRIVE TO M.F. CONTROL—LEFT-HAND FITTING.

(i) The direction of entry to the gear box can be reversed by either rotating the box 180 degrees around the shaft or by using the procedure outlined in 6(i), (ii), (iii).
(ii) Interchange the cable and " TUNING " handwheel on the control panel.
(iii) Follow exactly the procedure laid down in 4.

INSTRUCTION BOOK, No. 8811R

UNIT POWER SUPPLY,

TYPE "S"

TYPE H 8811

INSTRUCTION BOOK No. 8811R.

AT5/AR8 EQUIPMENT.

SECTION 1.—BRIEF SPECIFICATION.

The Power Supply Unit type "S" has been designed to supply the low tension and high tension voltages necessary for the operation of the general purpose radio equipment type AT5/AR8 (J7730) from 240 volt 50 Ω A.C. mains.

The input power required is approximately 480 watts when the equipment is transmitting on C.W. telegraphy with the key down.

The overall dimensions of the unit are shown in Dwg. No. 8811B1.

The weight of the unit complete is approximately 108 pounds. The special mounting base weighs approximately 5 pounds.

INSTRUCTION BOOK No. 8811R.

AT5/AR8 EQUIPMENT.

SECTION 3.—INSTALLATING INSTRUCTIONS.

1. INSTALLATION.

The unit, as packed for shipment, is mounted on its own mounting base, and this must be removed from the packing case and installed in an appropriate position. If the A.C. power unit is being used to replace a D.C. unit, the new mounting base should be installed in place of the original one. The new base will then take either an A.C. or a D.C. power unit as required. The outline diagram No. 8811B1 indicates the overall dimensions of the unit and the mounting space necessary. This space is no larger than that required for the D.C. Power Unit employing MDD6719 series machines.

INSTRUCTION BOOK No. 8811R.

AT5/AR8 EQUIPMENT.

SECTION 5.—SERVICING AND MAINTENANCE.

1. REMOVAL AND ACCESS.

The power unit may be easily removed from the installation by detaching the interwiring connections and sliding the unit off the mounting base, after releasing the latch bars in the usual manner. It is only necessary to slide the unit half the length of the base, after which it may be lifted off.

Access is gained to the components mounted on the chassis and case assembly by removable front, top and bottom panels. The front panel can be removed by undoing two screws near its lower edge, and then lifting it off the bollards on the upper edge of the case. This exposes all components which might need adjustment or quick replacement, i.e., valves, relays, etc.

The top and bottom panels, which are fastened by eleven and twelve screws respectively, need only be removed when more serious faults occur.

The panel which mounts the relays and bleeder resistors can be removed by undoing four small screws in the lower brackets and two slightly larger screws in the upper panel, above and below TDR1. The leads to the components on this panel are "goose-necked" to provide easy access to those situated behind the panel.

2. INTERWIRING CONNECTIONS.

With the exception of the mains input, special L.T. output, and earth connections, all leads pass through two eight-pin sockets, one for the receiver supplies and one for the transmitter supplies.

Receiver Eight Pin Connector.

Pin No.	*Purpose.*
1	L.T. supply, 12V A.C.
2	Earth.
3	Earth and 12V A.C.
4	Earth.
7	L.T. supply positive to pulse sender.
8	L.T. supply positive to keying relay.
9	H.T. supply 250V positive.
10	Microphone supply, positive.

Transmitter Eight-Pin Connector.

Pin No.	*Purpose.*
1	L.T. supply 12V positive.
2	Earth.
3	L.T. supply 12V negative.
4	L.T. supply 12V negative.
7	Earth.
8	H.T. on switch.
9	H.T. supply 550V positive.
10	H.T. supply 300V positive.

References to Table.

1. Disconnect one end of the component by undoing the mounting screw. R4 and R5 are each two in series.

2. R6 and R7 are in series 1,800 Ω each. Remove secondary fuses and disconnect one end of R4.

3. Operate REL2 to the position it would occupy if its coil were energised.

4. Operate REL2 to the position it would occupy if its coil were energised; remove F1 and F2. The primary windings of T1 and T2 are now in parallel, being 9 Ω and 2 Ω respectively.

5. Operate REL1 to the position it would occupy if its coil were energised. Remove secondary fuses.

6. Remove secondary fuses. L4 and L5 are in series, being 31·5 Ω each.

7. Measure the resistance across the coil terminals of the relay.

8. Operate REL2 to the position it would occupy if its coil were energised, and measure the resistance on the element terminals of TDR1.

4. ELECTRICAL TESTS.

The following is a list of the voltages which should appear on the terminals of the unit when the mains input reads 240V and when the connecting cables A and B are disconnected.

The voltages are measured on the outlet sockets between the points shown. To make the transmitter H.T. voltages available it is necessary to short pins 8 and 3 of the transmitter socket together, thereby operating REL1 and switching the supplies through to the outlet socket.

The voltages may vary somewhat from the figures quoted, and these should be taken as a guide only.

Receiver Outlet.

Measuring Points.

1 *Positive for D.C.*	2 *Negative for D.C.*	*Voltage.*
Pin 1	Pin 2, 3, 4 or earth	12V A.C.
Pin 7	Pin 2 or earth	17·0V D.C.
Pin 8	Pin 2 or earth	17·0V D.C.
Pin 9	Pin 2 or earth	390V D.C.
Pin 10	Pin 2 or earth	8·4V D.C.

Transmitter Outlet.

Measuring Points.

1 *Positive.*	2 *Negative.*	*Voltage.*
Pin 1 with REL1 operated	Pin 2, 3, 4 or earth	15·5V D.C.
Pin 9	Pin 2 or earth	605V D.C.
Pin 10	Pin 2 or earth	480V D.C.

5. RELAY ADJUSTMENT.

(a) Time Delay Relay.

This relay CDR1 is located on the removable panel, directly behind the front panel, and is used to delay the application of H.T. to the anodes of the rectifier valves until the valve filaments have been heated sufficiently for safe operation.

It is not necessary to remove the cover from the relay to make the adjustment.

The following procedure is suggested on the assumption that the relay is badly out of timing. If the timing is only slightly in error, then it is only necessary to follow the instructions in step (v).

SCHEDULE OF COMPONENTS FOR UNIT, POWER SUPPLY, TYPE H8811.

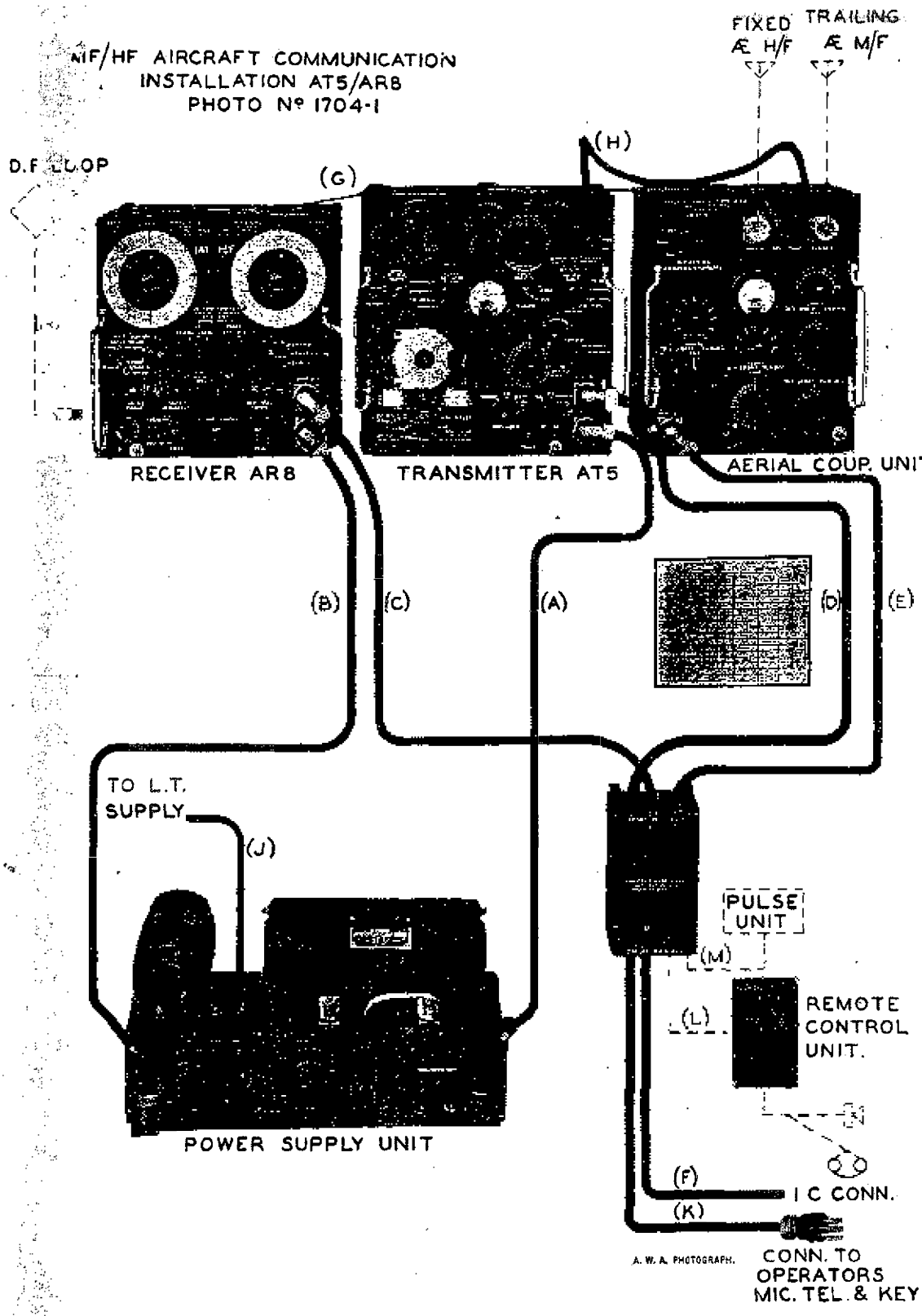
Drawing No. 811D3. Photo Nos. 8811-1, -2, -3.

Item No.	Circ. Ref. No.	Description.	Dwg. Photo. Ref.	Circuit.	Function.	Test Ref.	Maker's Name.	Maker's Designation.	R.A.A.F. Ref. No.
1	C1	CONDENSER, 16 μF, Fixed, 525V Peak Wkg., Semi-dry Elect. (2 connected in series).	.....	8811D3	Main H.T. Smoothing	...	Ducon ...	EE10783	Y10C/66009
2	C2	CONDENSER, 16 μF, Fixed, 525V Peak Wkg., Semi-dry Elec. (4 connected in series parallel).	.....	8811D3	Main H.T. Smoothing	...	Ducon ...	EE10783	Y10C/66009
3	C3	CONDENSER, 1,000 μF, Fixed, 12V Peak Wkg., Semi-dry Elec. (2 connected in parallel).	.....	8811D3	L.T. Smoothing ...	...	Ducon ...	E.H.P.	Y10C/66010
4	C4	CONDENSER, 4 μF, ±10% Fixed, 400V Wkg., Paper Dielectric (A.W.A. 7955).	.....	8811D3	Rec. H.T. Smoothing	...	Ducon ...	PS78	Y10C/65033
5	C5	CONDENSER, 4 μF, ±10% Fixed, 200V Wkg., Paper Dielectric (A.W.A. 7955).	.....	8811D3	Mic. Supply By-pass...	...	Ducon ...	PS62	Y10C/65199
6	C6	CONDENSER, 4 μF, ±10% Fixed, 350V Wkg., Paper Dielectric.	.....	8811D3	Minor H.T. Smoothing	...	A.W.A. ...	6U3551	Y10C/66011
7									
8									
9	F1	FUSE, Bakelite Carrier, Loaded 5 amp.	.....	8811D3	Mains Input	5.3, 5.6	Slydlok ...	5344	Y10H/90072
10	F2	FUSE, Bakelite Carrier, Loaded 5 amp.	.....	8811D3	Mains Input	5.3, 5.6	Slydlok ...	5344	Y10H/90072
11	F3	FUSE, 5 amp. Glass Cartridge ...	.....	8811D3	Transmitter L.T. Supply.	5.3, 5.6	Australux	4AG	Y10H/90073
12	F4	FUSE, 5 amp. Glass Cartridge ...	.....	8811D3	Transmitter L.T. Supply.	5.3, 5.6	Australux	4AG	Y10H/90073
13	F5	FUSE, 1 amp. Glass Cartridge ...	.....	8811D3	Main 550V H.T. Supply.	5.3, 5.6	Australux	4AG	.....
14	F6	FUSE, ⅜ amp. Glass Cartridge... ...	.....	8811D3	Transmitter 300V H.T. Supply.	5.3, 5.6	Australux	4AG	Y10H/90075
15	F7	FUSE, ⅜ amp. Glass Cartridge ...	.....	8811D3	Receiver 250V H.T. Supply.	5.3, 5.6	Australux	4AG	Y10H/90075
16	F8	FUSE, Bakelite Carrier, Loaded 5 amp.	.....	8811D3	L.T. Supply Positive...	5.3, 5.6	Slydlok ...	5344	Y10H/90072
		Or 5 amp. Glass Cartridge ...	.....	8811D3	L.T. Supply Positive...	...	Australux	4AG	Y10H/90073

Schedule of Components for Unit, Power Supply, Type H8811—*continued.*

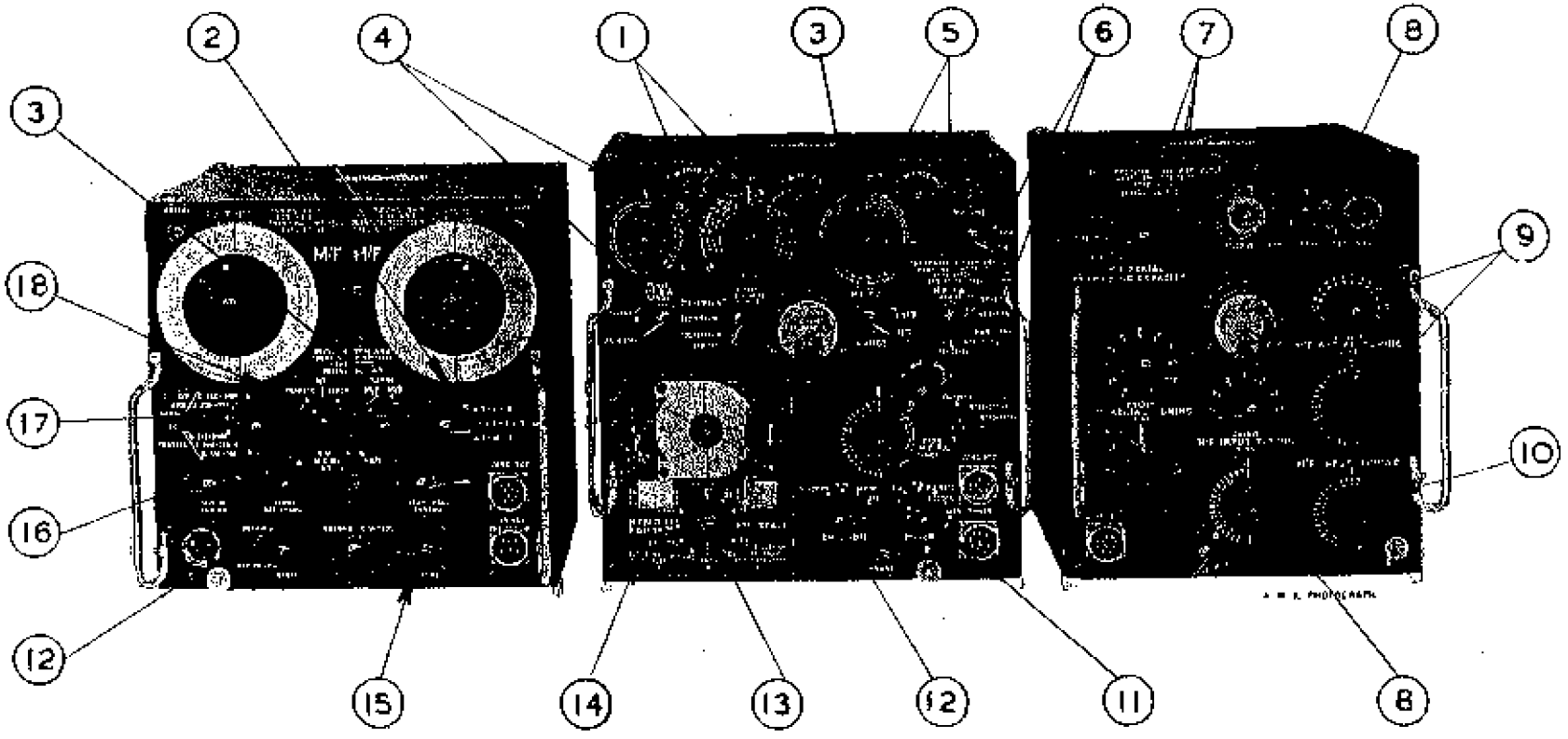
Item No.	Circ. Ref. No.	Description.	Dwg. Photo. Ref.	Circuit.	Function.	Test Ref.	Maker's Name.	Maker's Designation.	R.A.A.F. Ref. No.
31	R5	RESISTOR, 3,000 Ω Fixed, Wire Wound, Ctg. B, with Lug Terminals, Type 3, Overall Dimensions 3½ in. L x 15/16 in. dia. (2 connected in series).	.....	8811D3	Transmitter 300V H.T. Potential Divider.	5.3	I.R.C. ...	EN	Y10C/66005
32	R6	RESISTOR, 1,800 Ω Fixed, Wire Wound, Ctg. B, with Mounting Brackets and Lug Terminals, Type 2, Overall Dimensions 4 in. L x ¾ in. dia.	.....	8811D3	Receiver H.T. Potential Divider.	5.3	I.R.C. ...	DH	Y10C/66008
33	R7	RESISTOR, 1,800 Ω Fixed, Wire Wound, Ctg. B, with Mounting Brackets and Lug Terminals, Type 2, Overall Dimensions 4 in. L x ¾ in. dia.	.....	8811D3	Receiver H.T. Potential Divider.	5.3	I.R.C. ...	DH	Y10C/66008
34	R8	RESISTOR, 5,000 Ω Fixed, Wire Wound, Ctg. B, with Lug Terminal, Type 3, Overall Dimensions 3½ in. L x 15/16 in. dia.	.....	8811D3	Receiver H.T. Potential Divider.	5.3	I.R.C. ...	EN	Y10C/66007
35									
36									
37									
38	REL1	RELAY, Coil 12V, 2 " make " Contacts	.....	8811D3	Transmitter H.T. Supplies.	5.3, 5.5	A.W.A. ...	6R7190	Y10F/70488
39	REL2	RELAY, Coil 12V, 3 " make," 2 " break " Contacts.	.....	8811D3	Main H.T. Supply ...	5.3, 5.5	A.W.A. ...	1R7190	Y10F/70489
40									
41	S1	SWITCH, Tumbler Type, 2 Pole, 2 Position, 240V, 10A.	.....	8811D3	Mains Supply ...	5.4	Scanlan ...	4308	Y10F/80071
42	S2	SWITCH, Tumbler Type, 2 Pole, 2 Position, 240V, 10A.	.....	8811D3	Transmitter L.T. Supply.	5.4	Scanlan ...	4308	Y10F/80071
43									
44	T1	TRANSFORMER— 220V /12V 3A 240V, 40–60 ~ /19V 3A tap 18V 260V /2.5V 10A (1000V. P. Insulation).	.....	8811D3	L.T. and Filament Supply.	5.3	A.W.A. ...	2TK9068	Y10A/55692

MF/HF AIRCRAFT COMMUNICATION
INSTALLATION AT5/AR8
PHOTO Nº 1704-1



NOTE—CABLE IDENTIFICATION LETTERS ABC ETC. ARE ASSIGNED TO EACH CABLE FOR IDENTIFYING ITS POSITION IN THE INTERWIRING SCHEME, (REF. SECT. 3 PAR. 102)

① M.F. OSCILLATOR RANGE SWITCH AND TUNING
② H.F. RANGE SELECTOR
③ M.F. H.F. CHANNEL SELECTOR SWITCHES
④ H.F. BUFFER RANGE
⑤ H.F. P.A. RANGE SWITCH AND TUNING
⑥ H.F. P.A. RANGE SWITCH AND TUNING
⑦ H.F. AERIAL TUNING
⑧ H.F. AERIAL COUPLING
⑨ M.F. AERIAL TUNING
⑩ M.F. AERIAL COUPLING
⑪ METER SWITCH
⑫ OPERATORS FUNCTIONAL CONTROL SWITCH
⑬ H.F. OSC. RANGES AND CRYSTAL SELECTOR
⑭ PLUG IN CRYSTALS MOUNT BEHIND HINGED COVER
⑮ TONE CONTROL AND INTERWIRING SWITCH
⑯ M.F. AERIAL TUNING COND
⑰ M.F. RANGE SELECTOR SWITCH
⑱ D.F. TRAFFIC SELECTOR



RECEIVER AR8 TRANSMITTER AT5 AERIAL COUPLING UNIT

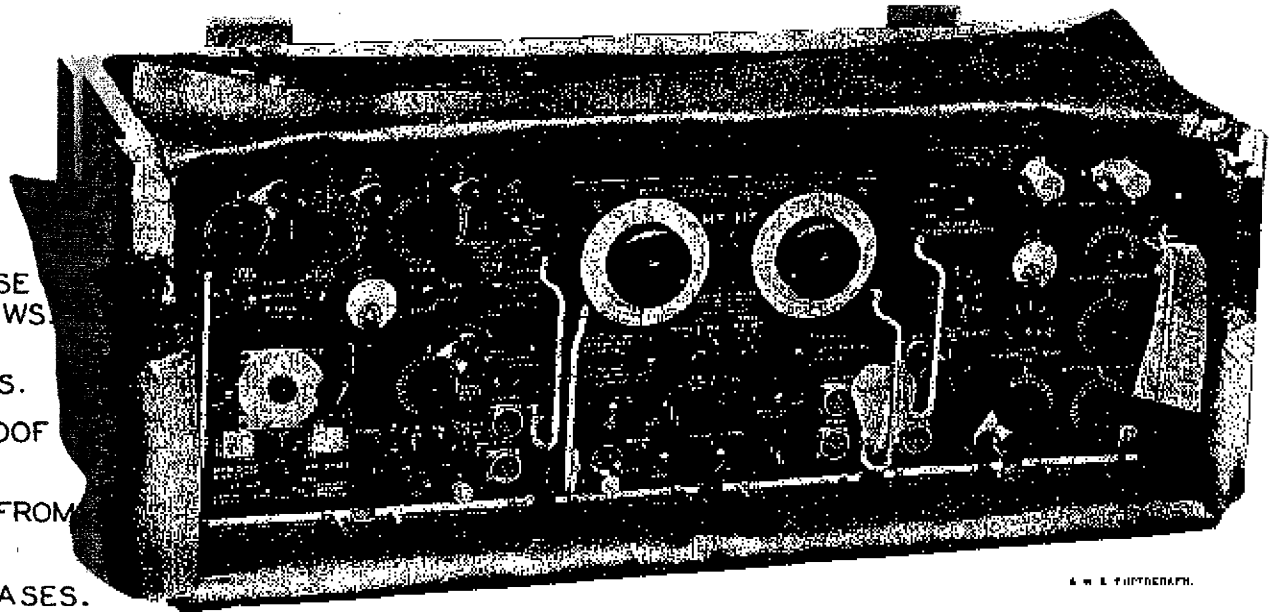
PHOTO Nº 1776-1

WARNING FOR STORAGE OR TRANSPORT

THE UNITS SHOULD NOT BE MOUNTED ON THEIR SHOCK BASES UNLESS THE LATTER ARE BOLTED DOWN. IF THIS CANNOT BE ARRANGED, STORE OR PACK SEPARATELY.

UNPACKING

1. REMOVE TOP OF OUTER CASE.
2. REMOVE INNER CASE.
3. REMOVE TOP AND SIDE OF INNER CASE FASTENED BY SCREWS.
4. REMOVE BATTENS SUPPORTING UNITS.
5. REMOVE WATERPROOF COVERING.
6. WITHDRAW UNITS FROM SHOCK BASES.
7. UNBOLT SHOCK BASES.



INNER CASE CONTAINING TRANSMITTER RECEIVER AND *AERIAL COUPLING UNIT FOR FURTHER PROTECTION THIS INNER CASE IS MOUNTED IN AN OUTER CASE 46x19x18"

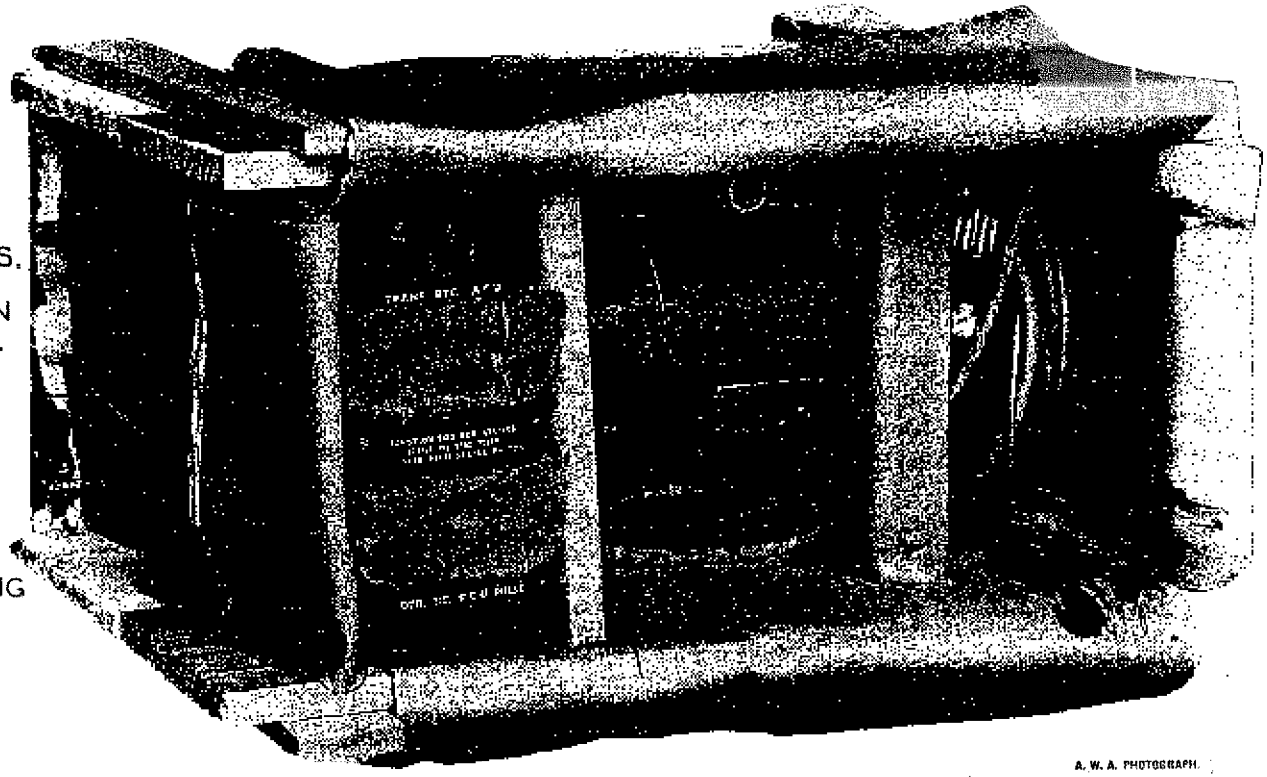
PHOTO Nº 1774-1

WARNING FOR STORAGE OR TRANSPORT

THE UNITS SHOULD NOT BE MOUNTED ON THEIR SHOCK BASES UNLESS THE LATTER ARE BOLTED DOWN. IF THIS CANNOT BE ARRANGED, STORE OR PACK SEPARATELY.

UNPACKING

1. REMOVE TOP AND PACKING BATTENS.
2. REMOVE JUNCTION BOX AND CABLES.
3. REMOVE END AS SHOWN.
4. WITHDRAW UNIT FROM MOUNTING BASE
5. UNBOLT MOUNTING BASE

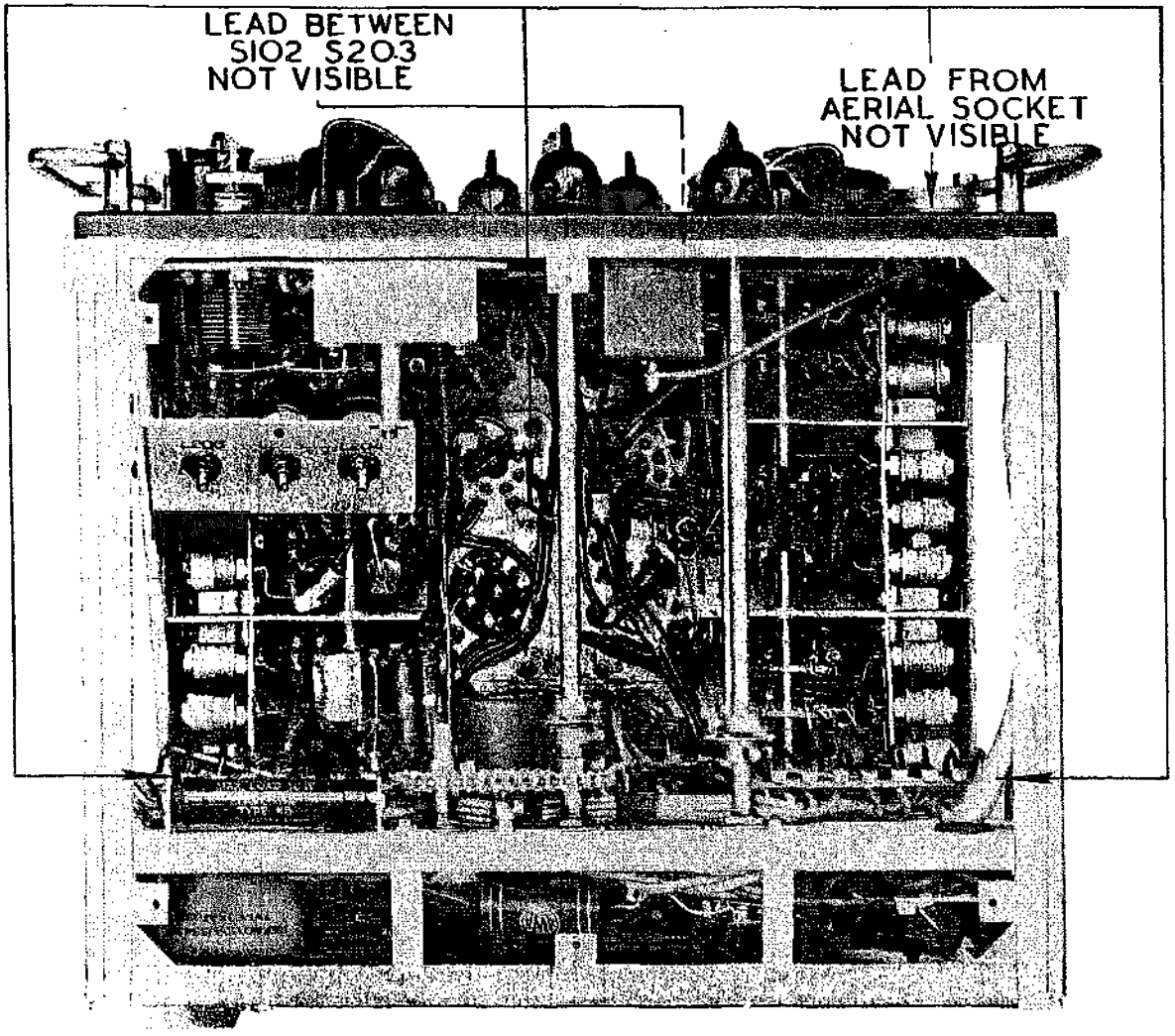


A. W. A. PHOTOGRAPH.

CASE CONTAINING JUNCTION BOX AND POWER SUPPLY

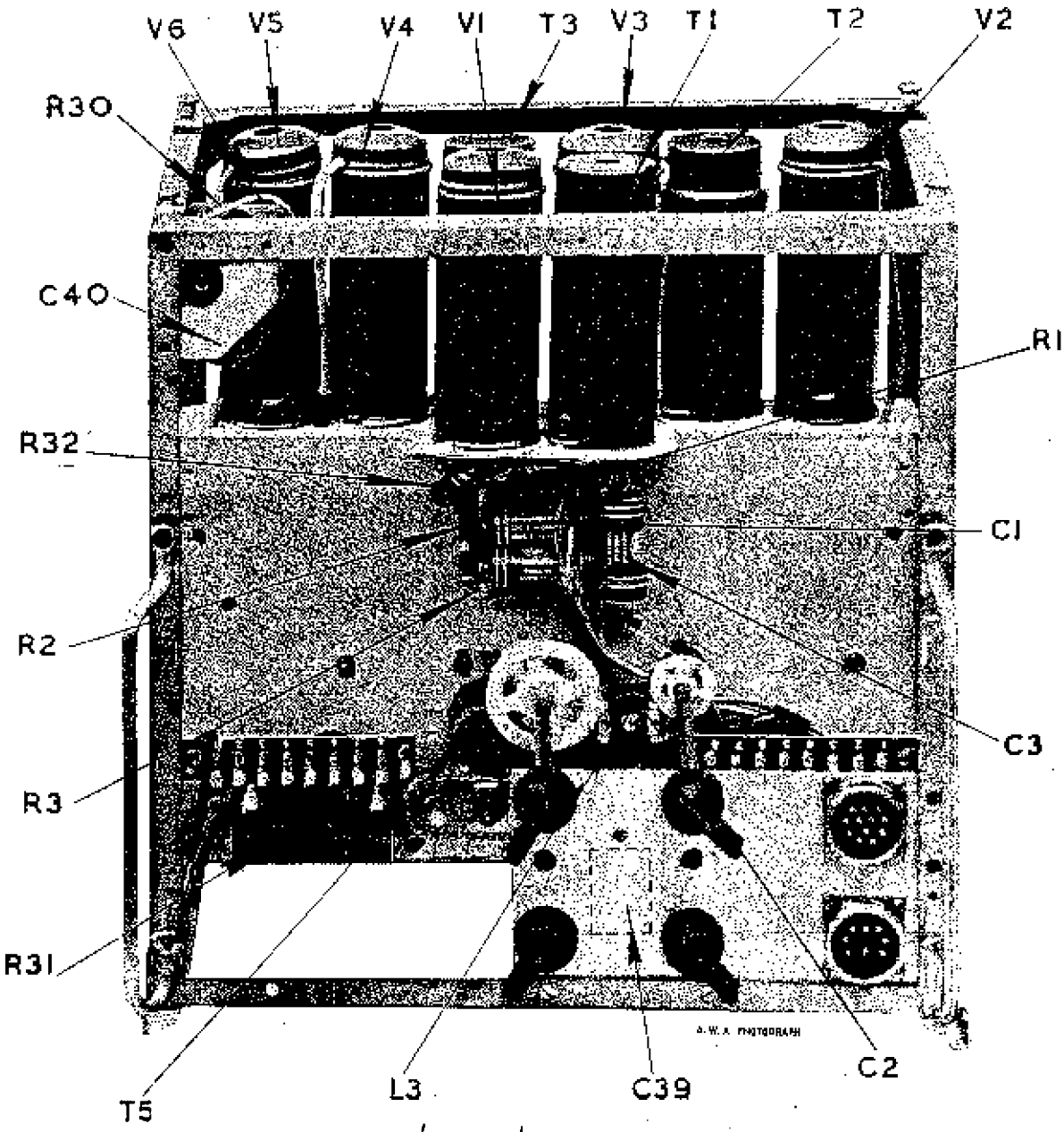
PHOTO Nº 1775-1

LEADS TO BE REMOVED IF M/F & H/F UNITS ARE TO BE TAKEN OUT OF FRAME.

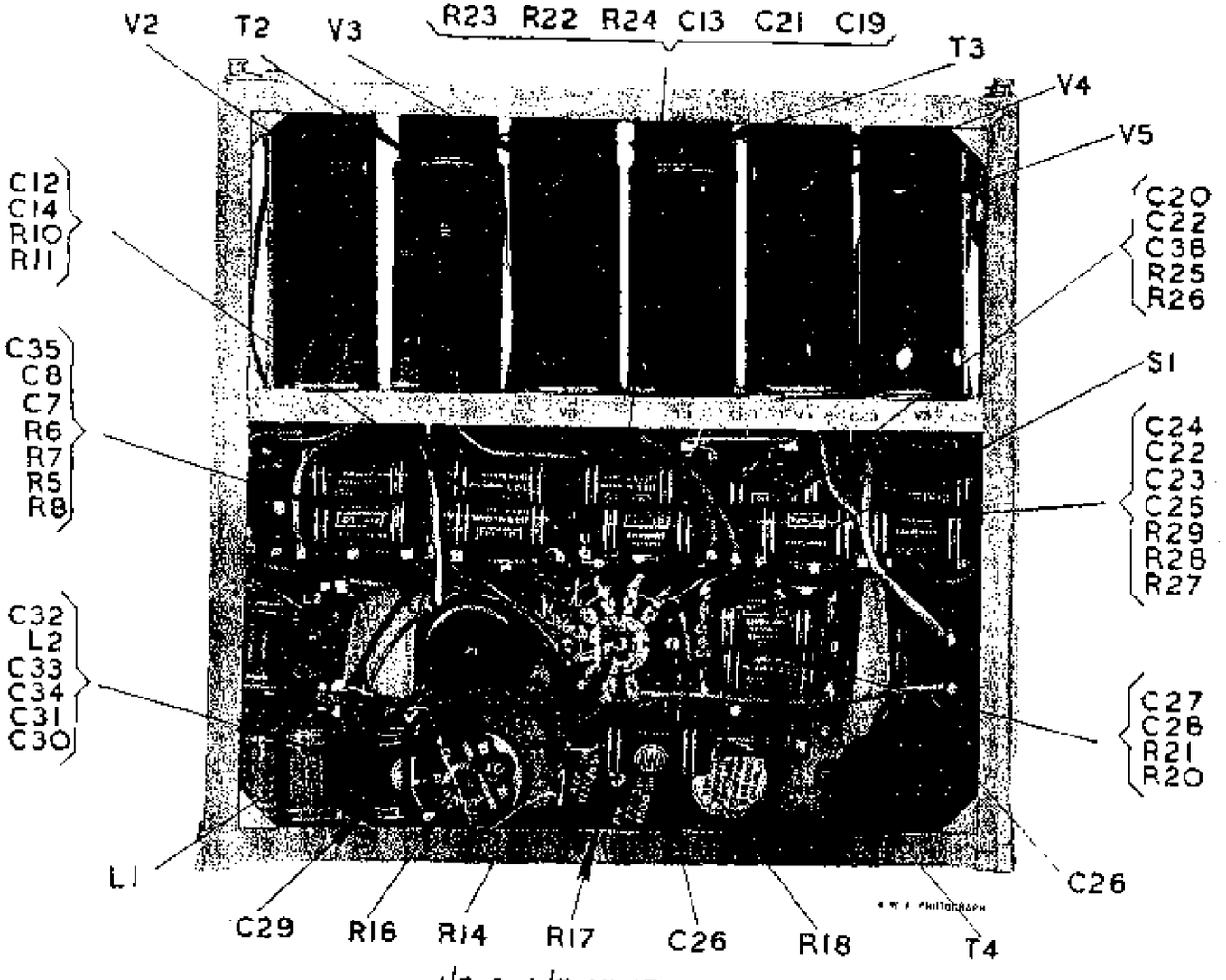


UNDERSIDE VIEW OF RECEIVER
PHOTO Nº 1708-1

A.W.A. PHOTOGRAPH.

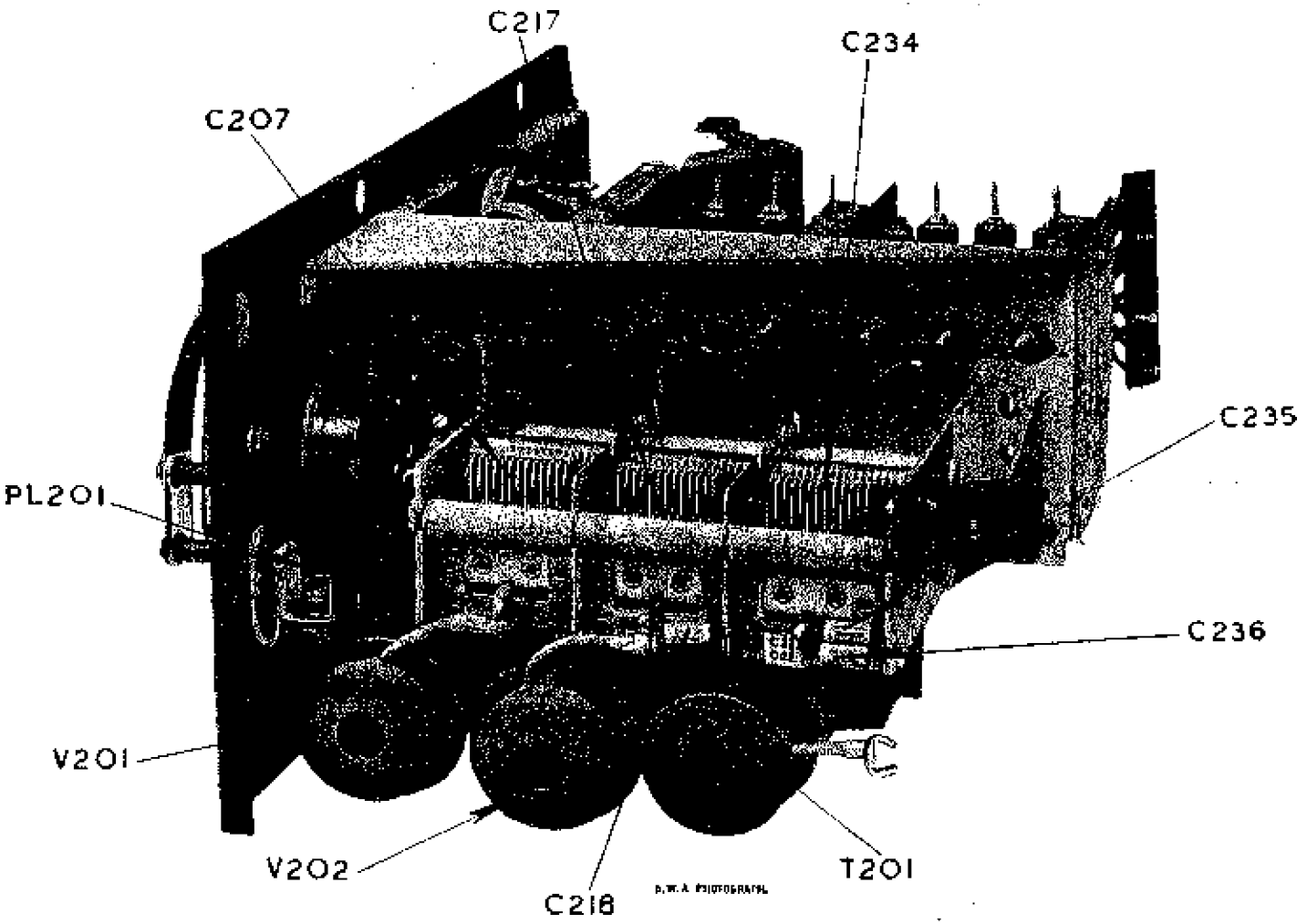


I/F & A/F UNIT
PHOTO Nº 1703-1
(REF. ALSO 1814-1)

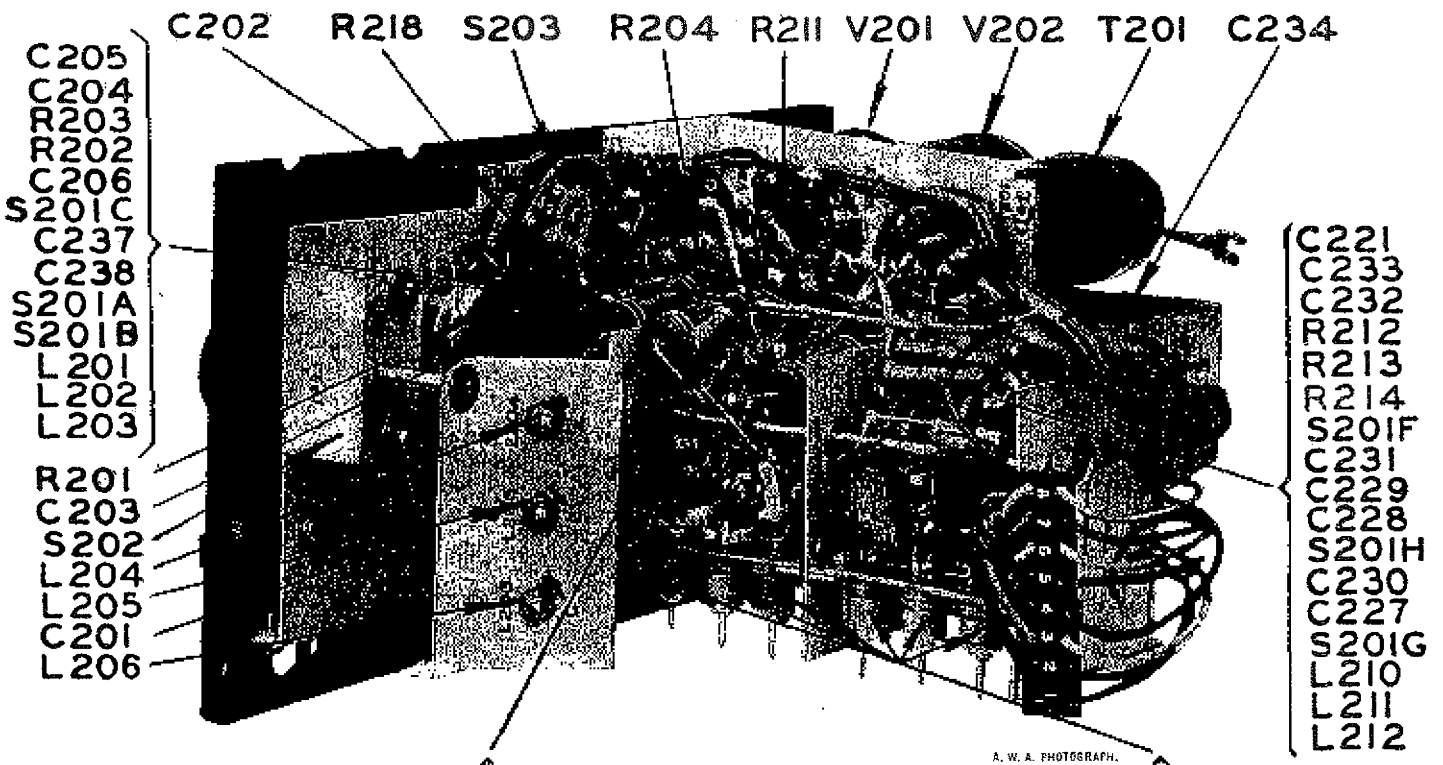


I/F & A/F UNIT

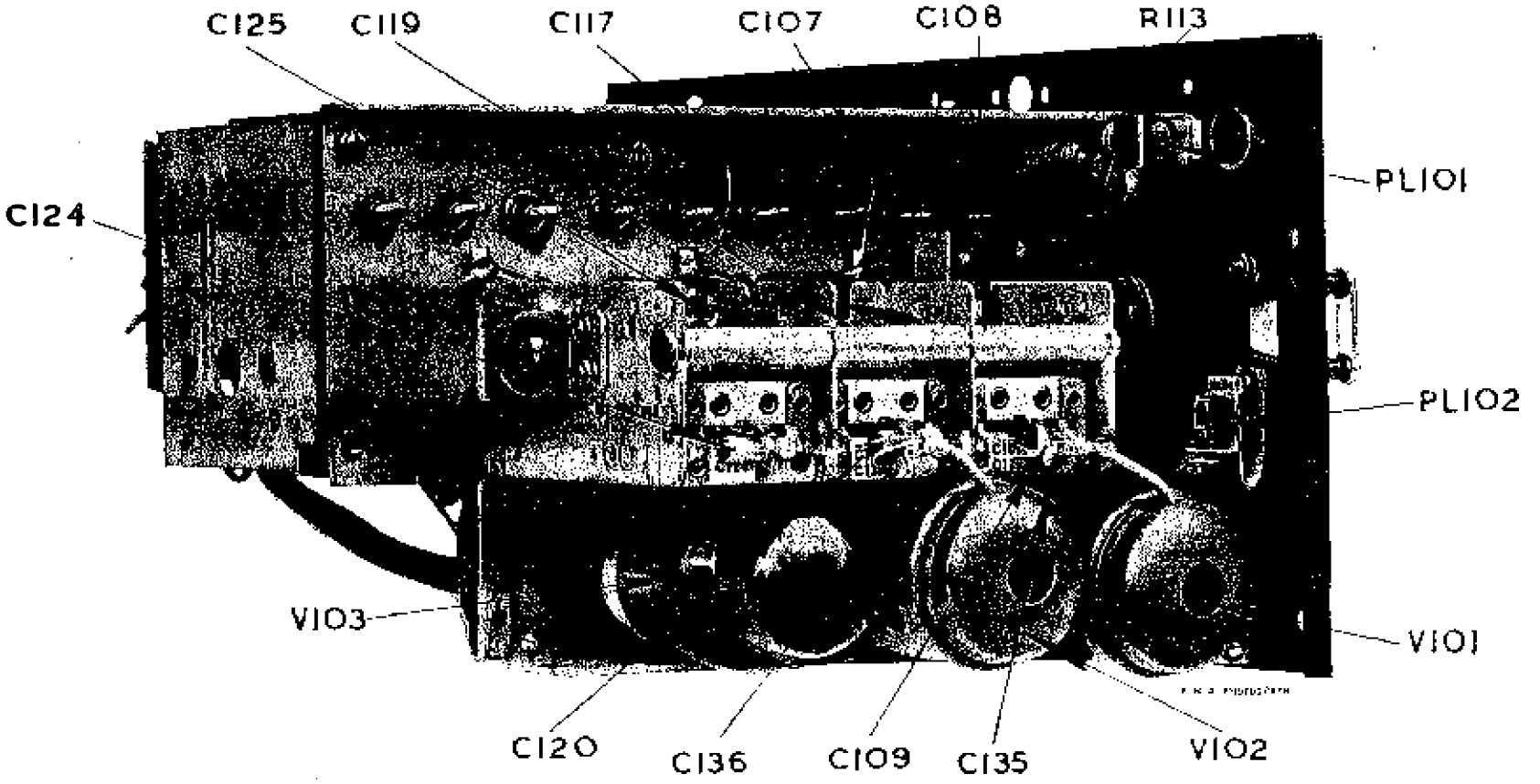
PHOTO Nº 1814-1 (REF. ALSO 1703-1)



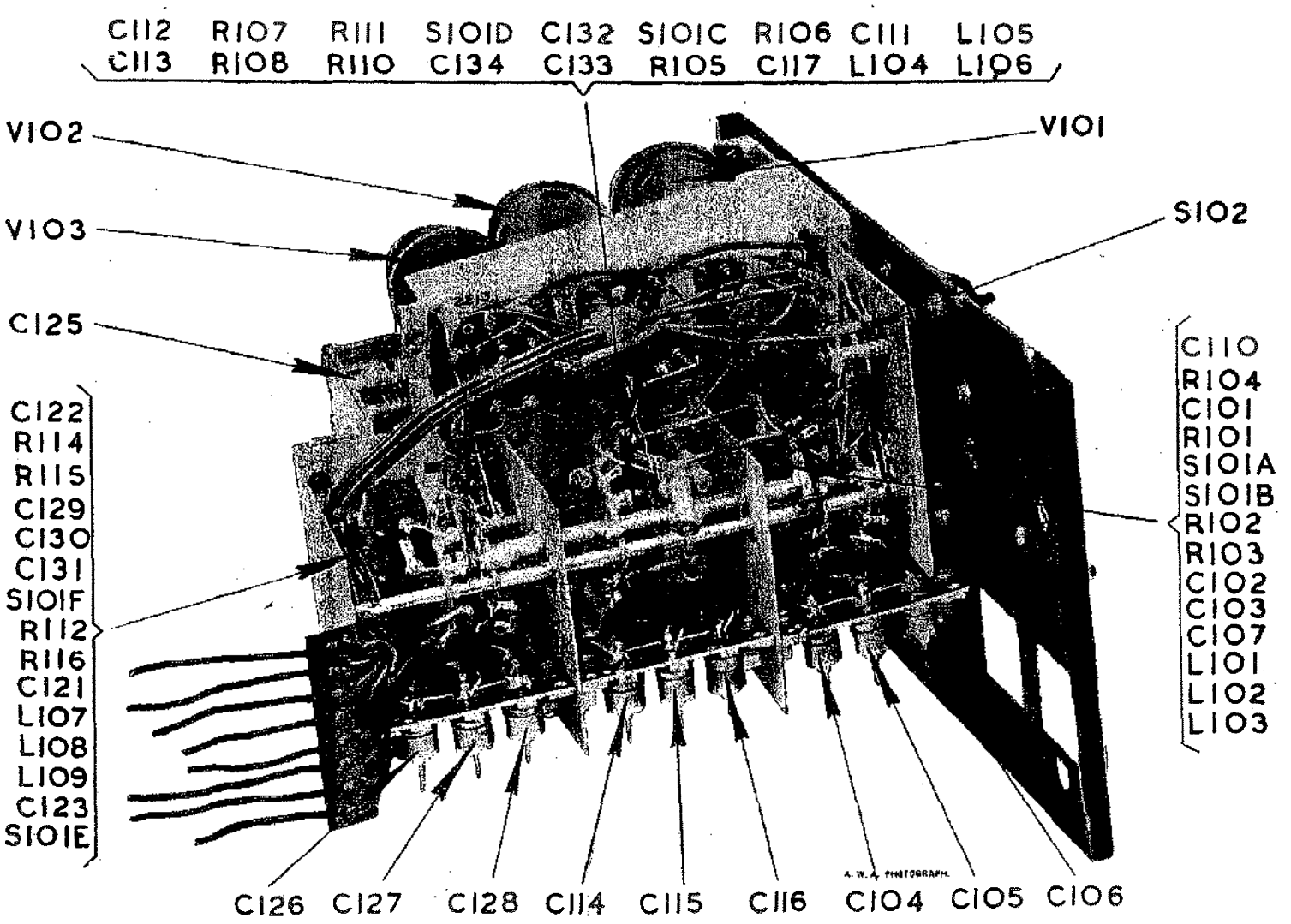
M/F TUNING UNIT
PHOTO Nº 1702-1
(REF. ALSO 1699-1)



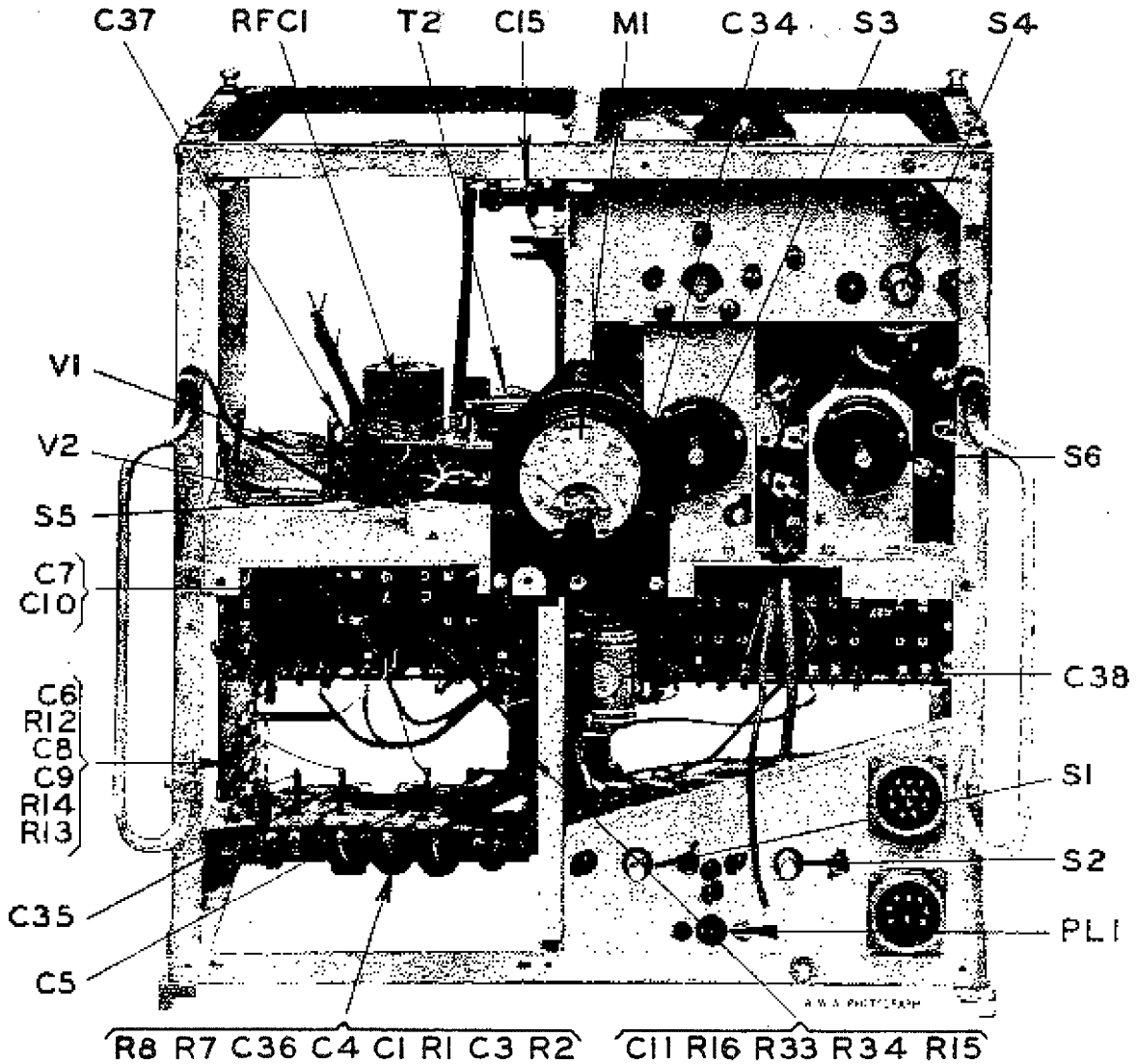
M/F TUNING UNIT
PHOTO Nº 1699-1
(REF ALSO 1702-1)



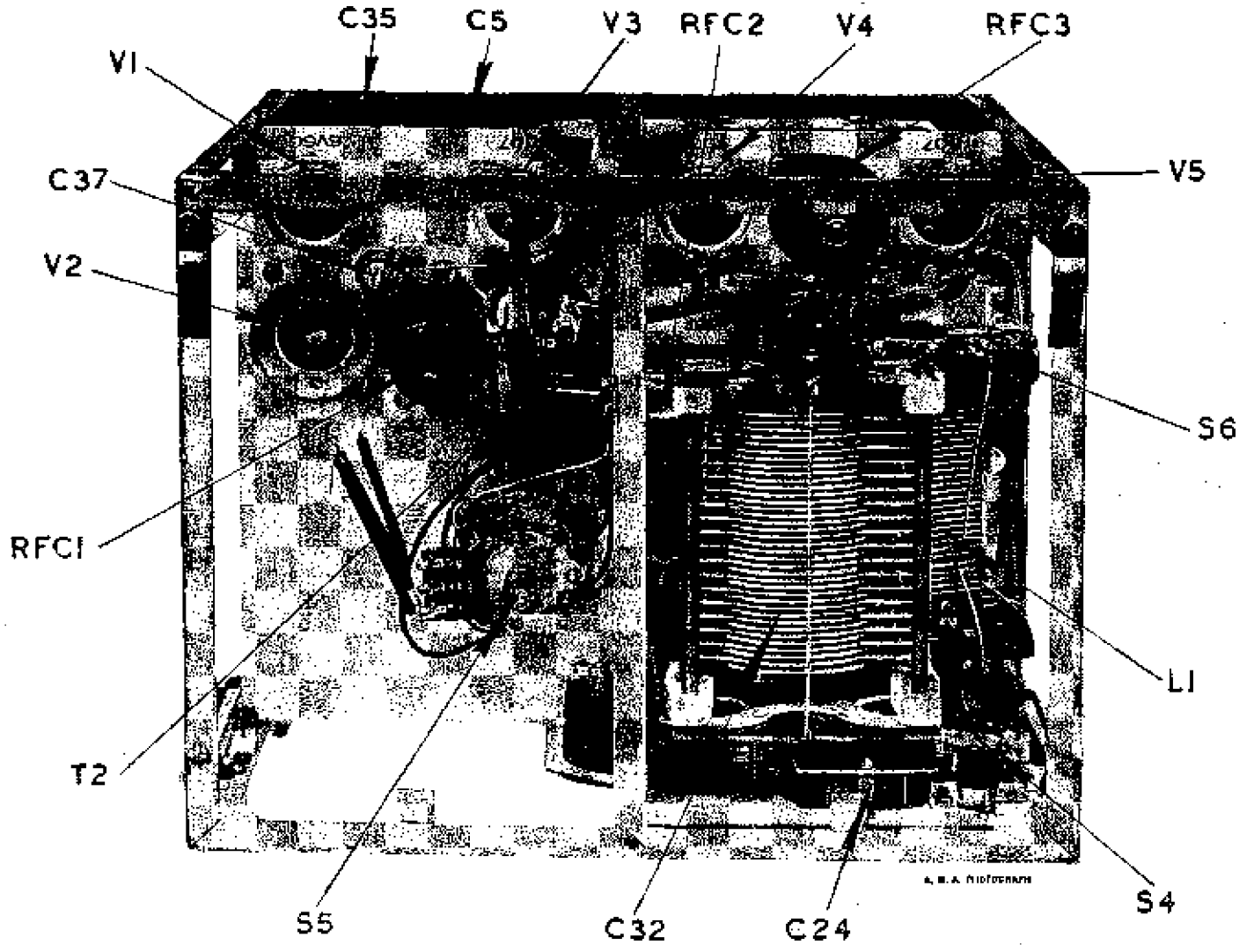
H/F TUNING UNIT
PHOTO Nº 1700-1
(REF. ALSO 1701-1)



H F TUNING UNIT
PHOTO Nº 1701-1
(REF. ALSO 1700-1)

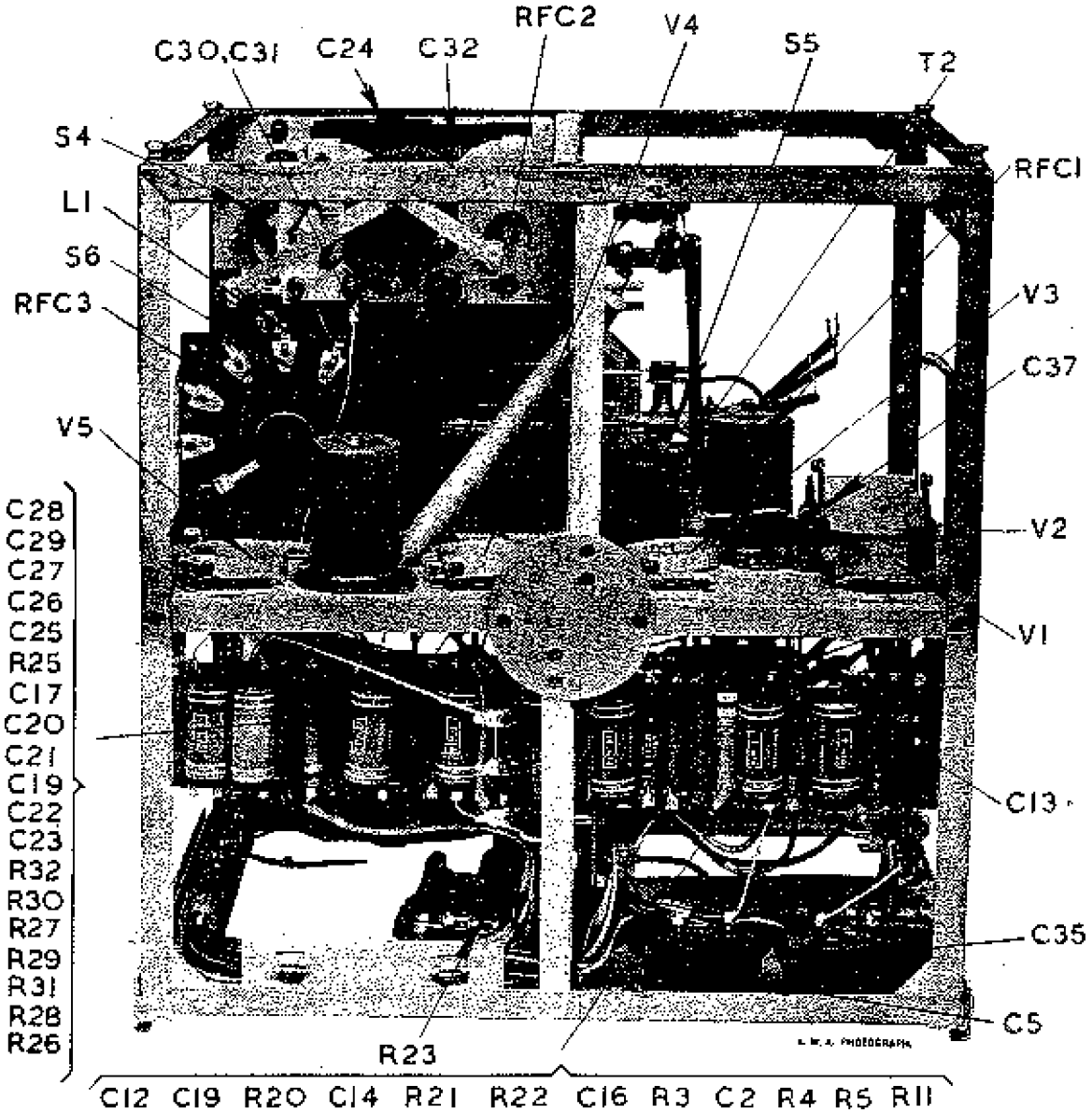


TRANSMITTER FRAMEWORK
PHOTO N° 1761-1
(REF. ALSO 1762-1, 1763-1, 1764-1, 1765-1)

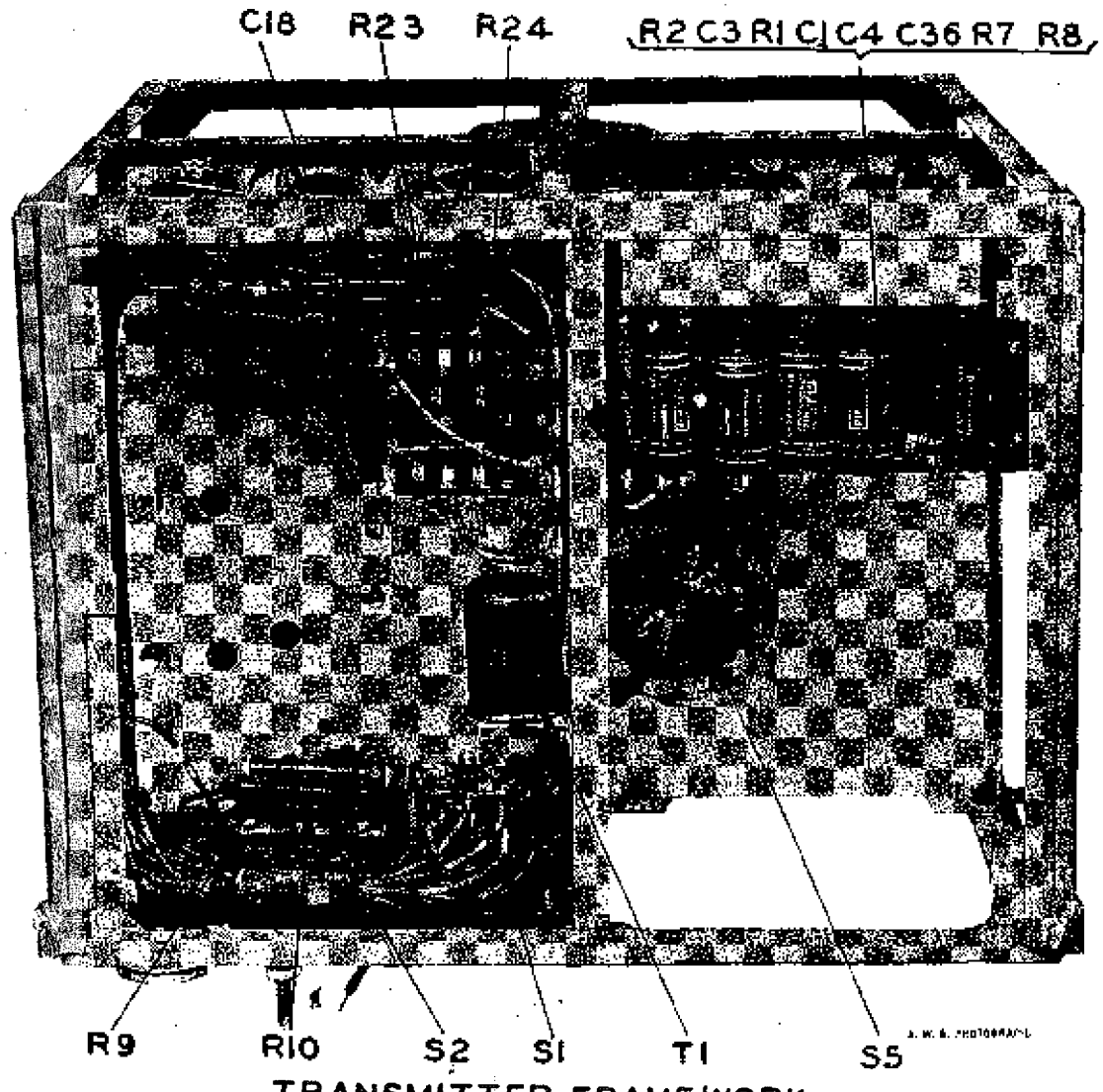


TRANSMITTER FRAMEWORK

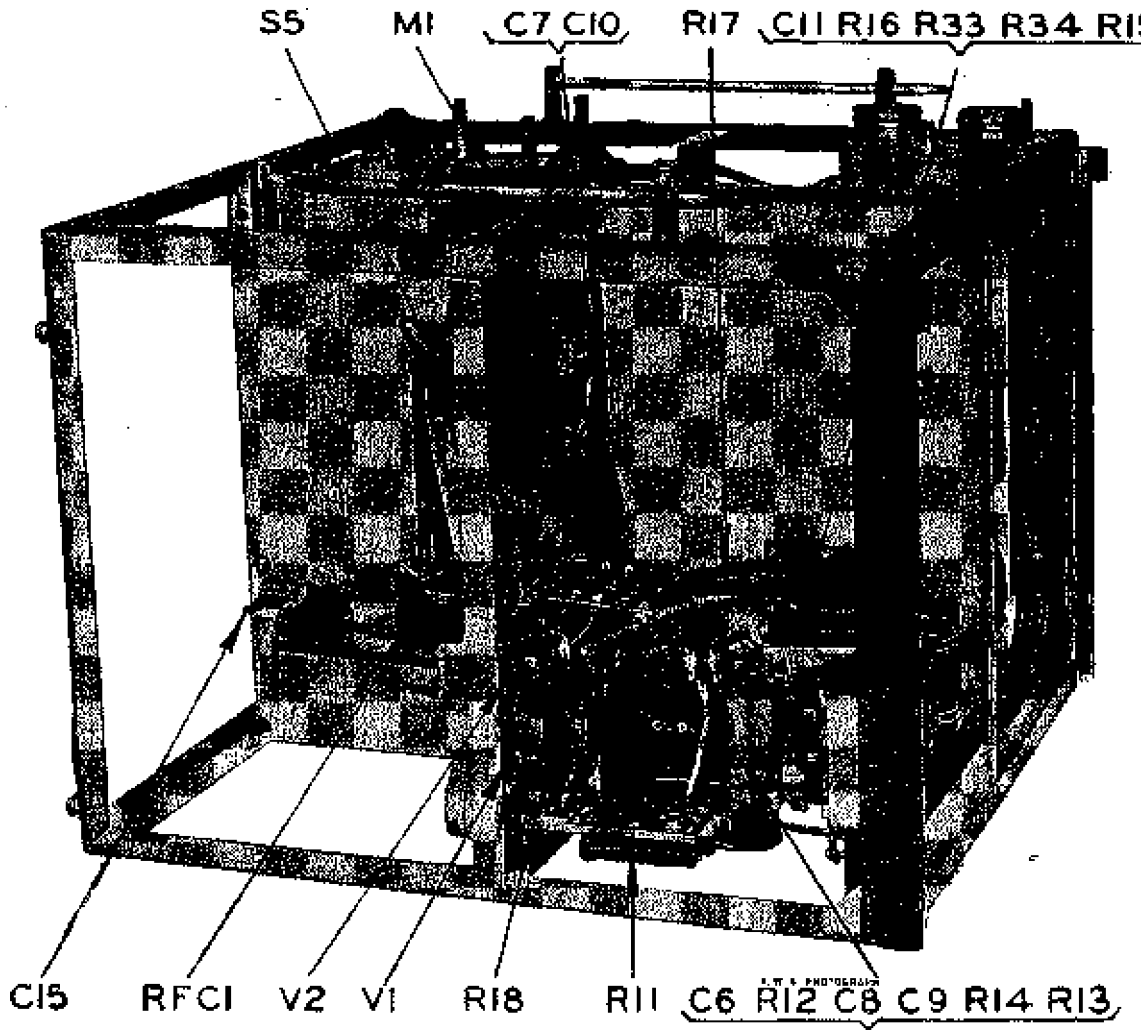
PHOTO Nº 1762-1 (REF. ALSO 1761-1, 1763-1, 1765-1, 1764-1)



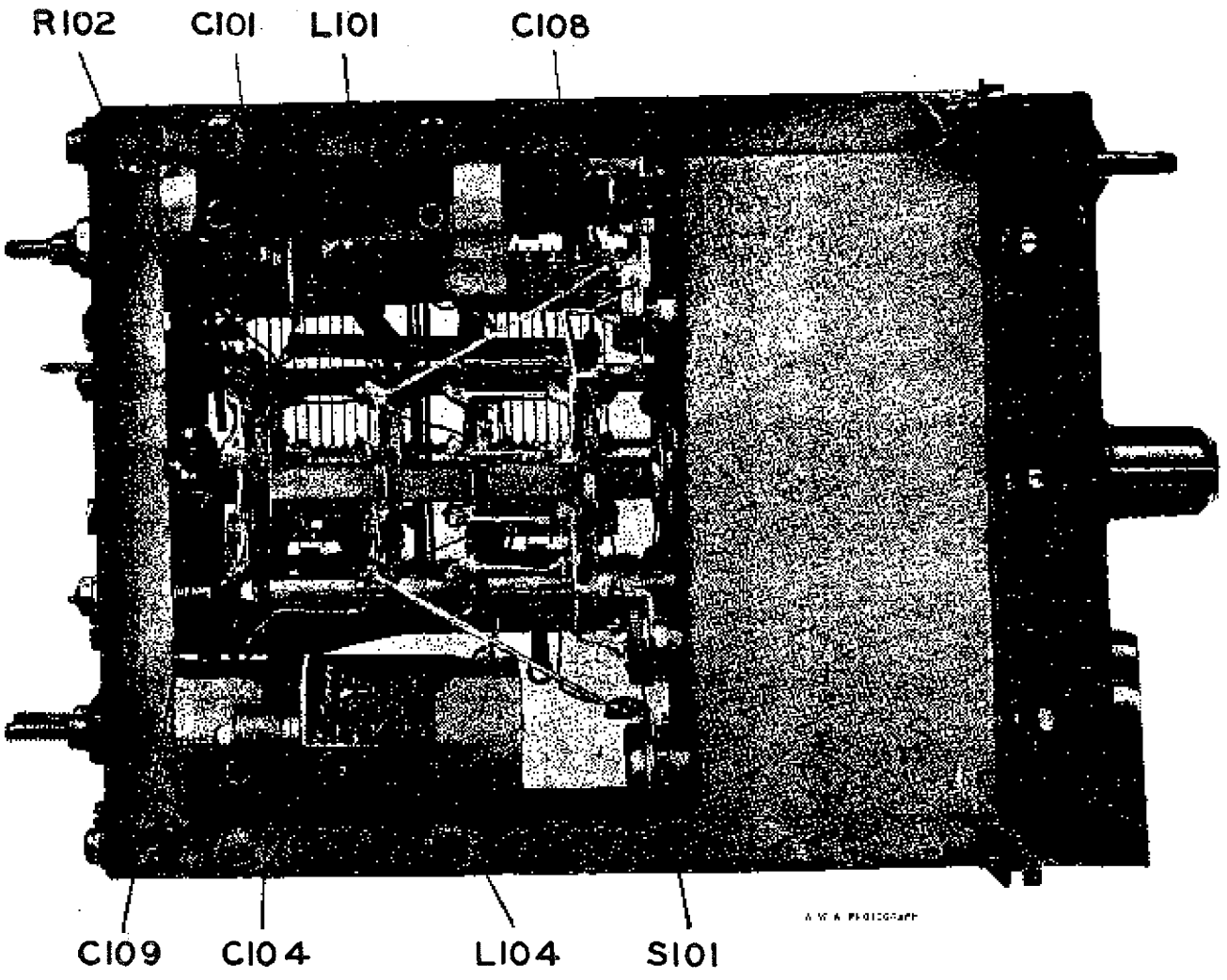
TRANSMITTER FRAMEWORK
PHOTO Nº 1763-1
(REF. ALSO 1764-1, 1762-1, 1765-1)



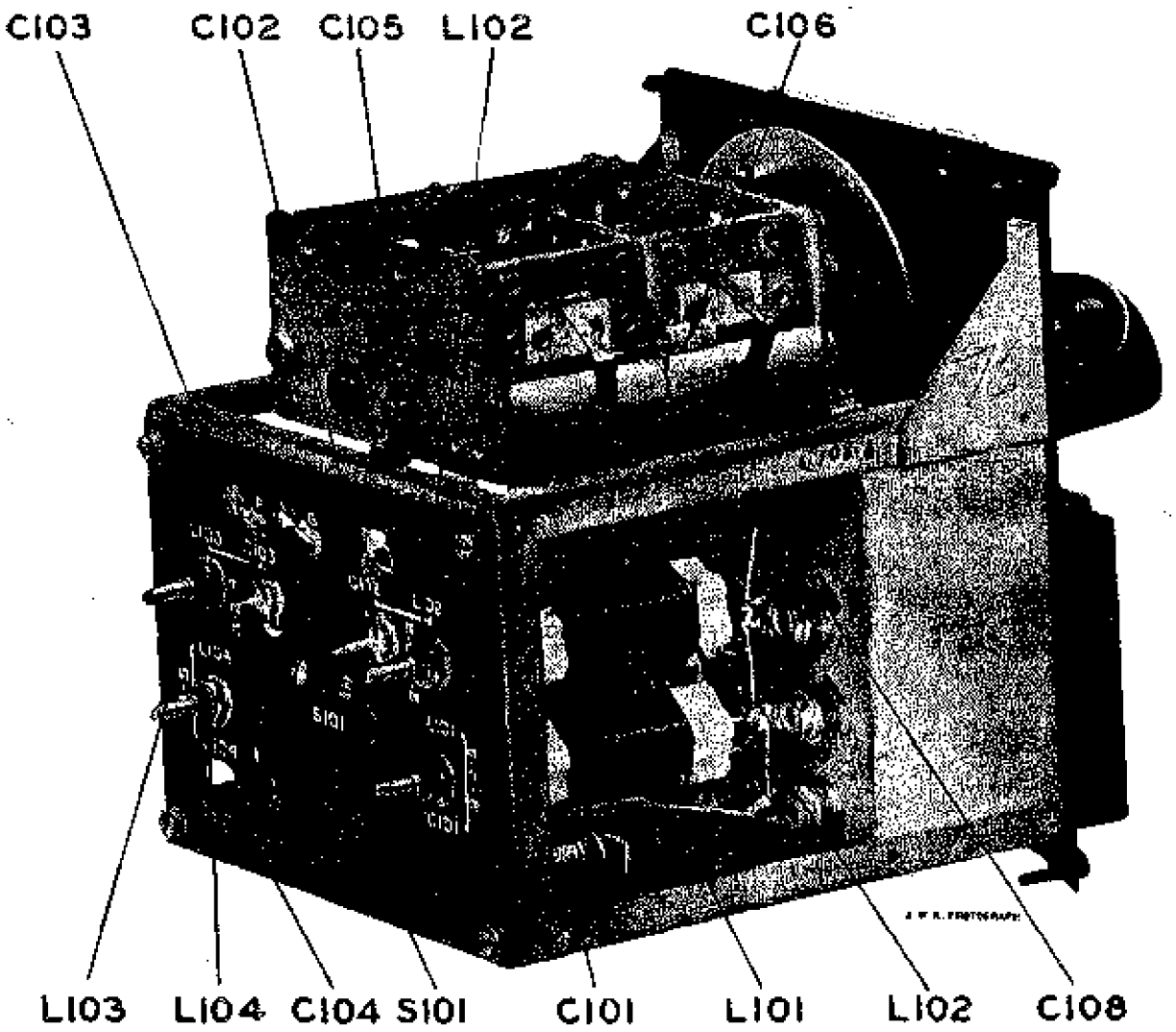
TRANSMITTER FRAMEWORK
PHOTO N° 1764-1
(REF. ALSO 1761-1, 1762-1, 1763-1, 1765-1)



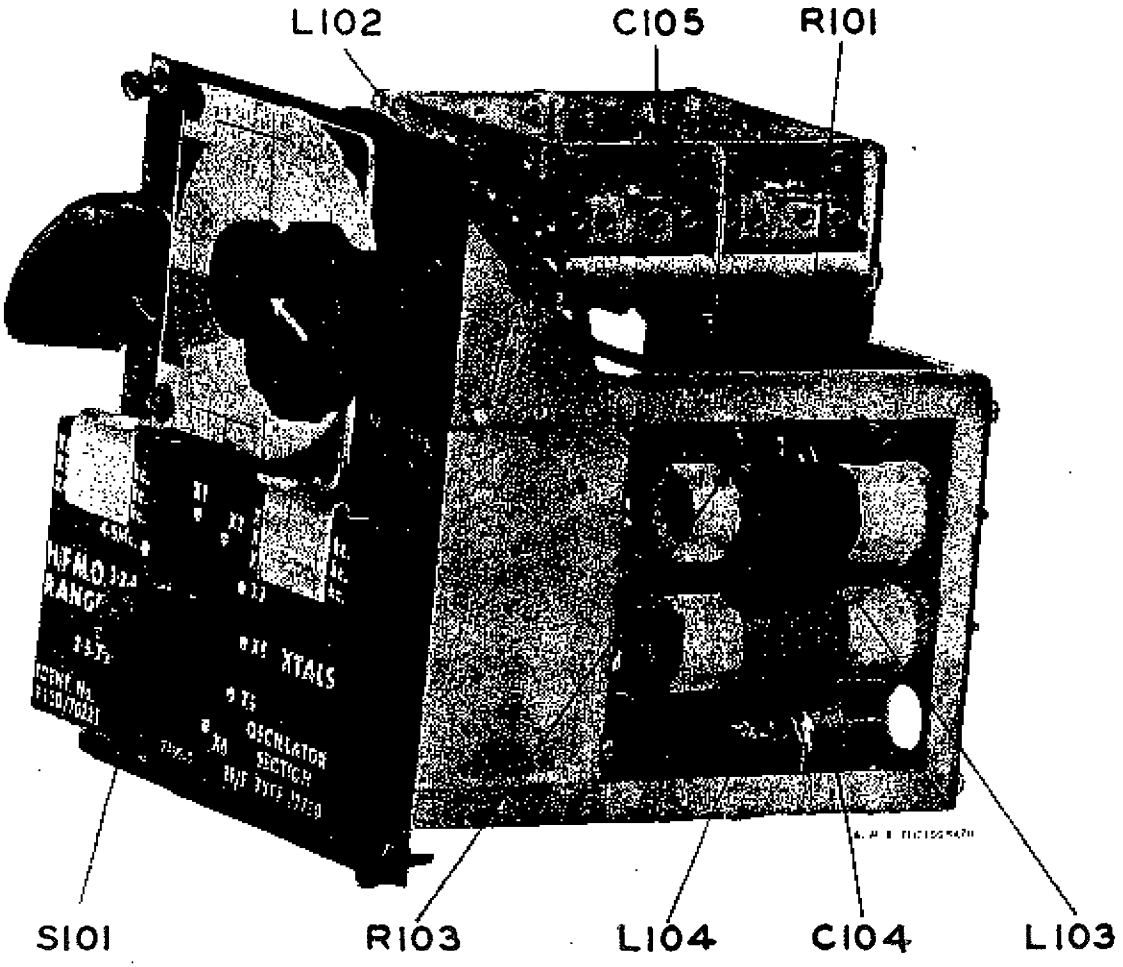
TRANSMITTER FRAME WORK
PHOTO N°1765-1
(REF. ALSO 1761-1, 1762-1, 1763-1, 1764-1)



H.F. OSCILLATOR UNIT
PHOTO N° 1815-1
(REF. ALSO 1816-1, 1817-1)



H.F. OSCILLATOR UNIT
PHOTO N°1816-1
(REF. ALSO 1815-1, 1817-1)



H.F. OSCILLATOR UNIT
PHOTO Nº 1817-1
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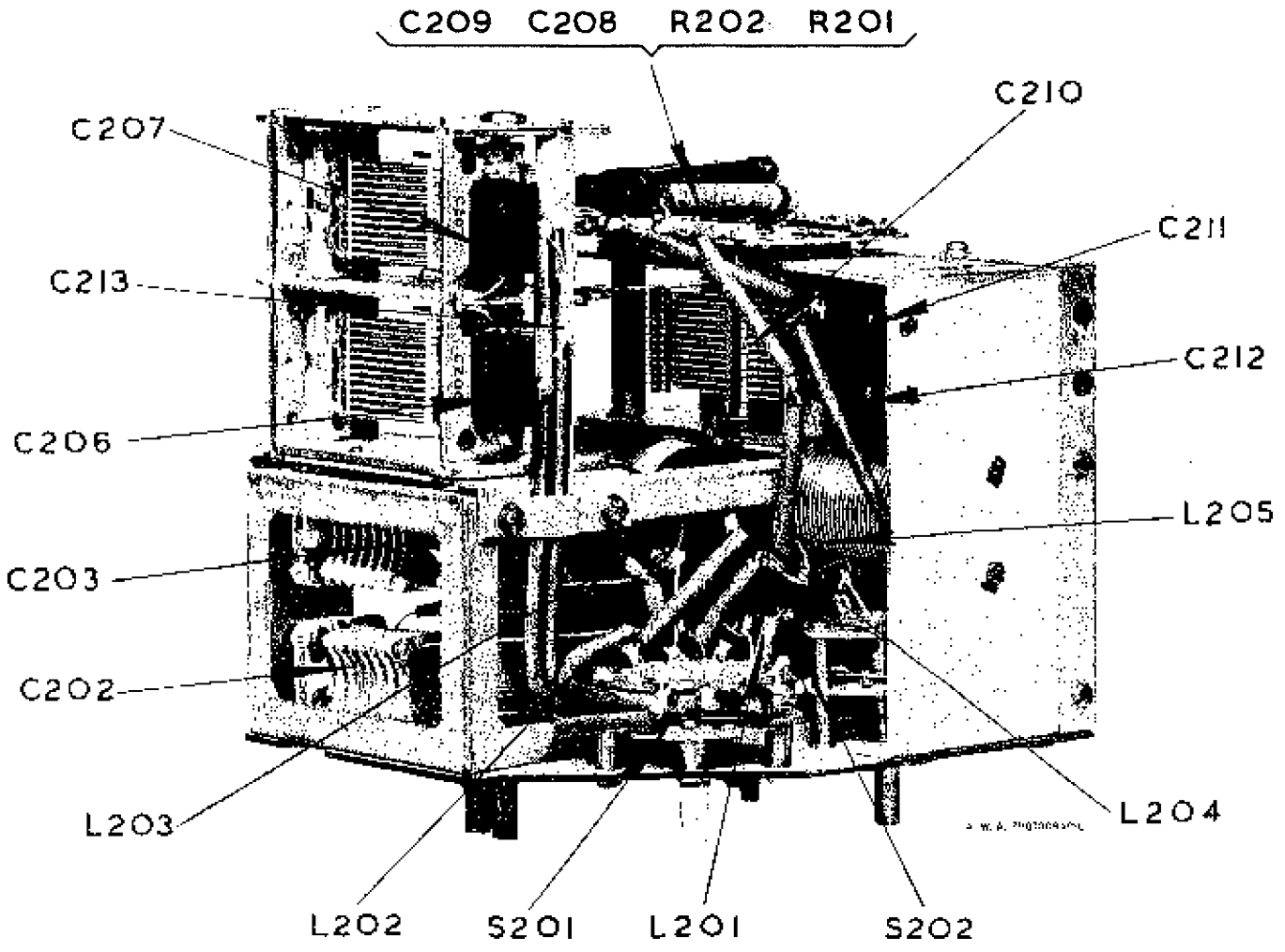
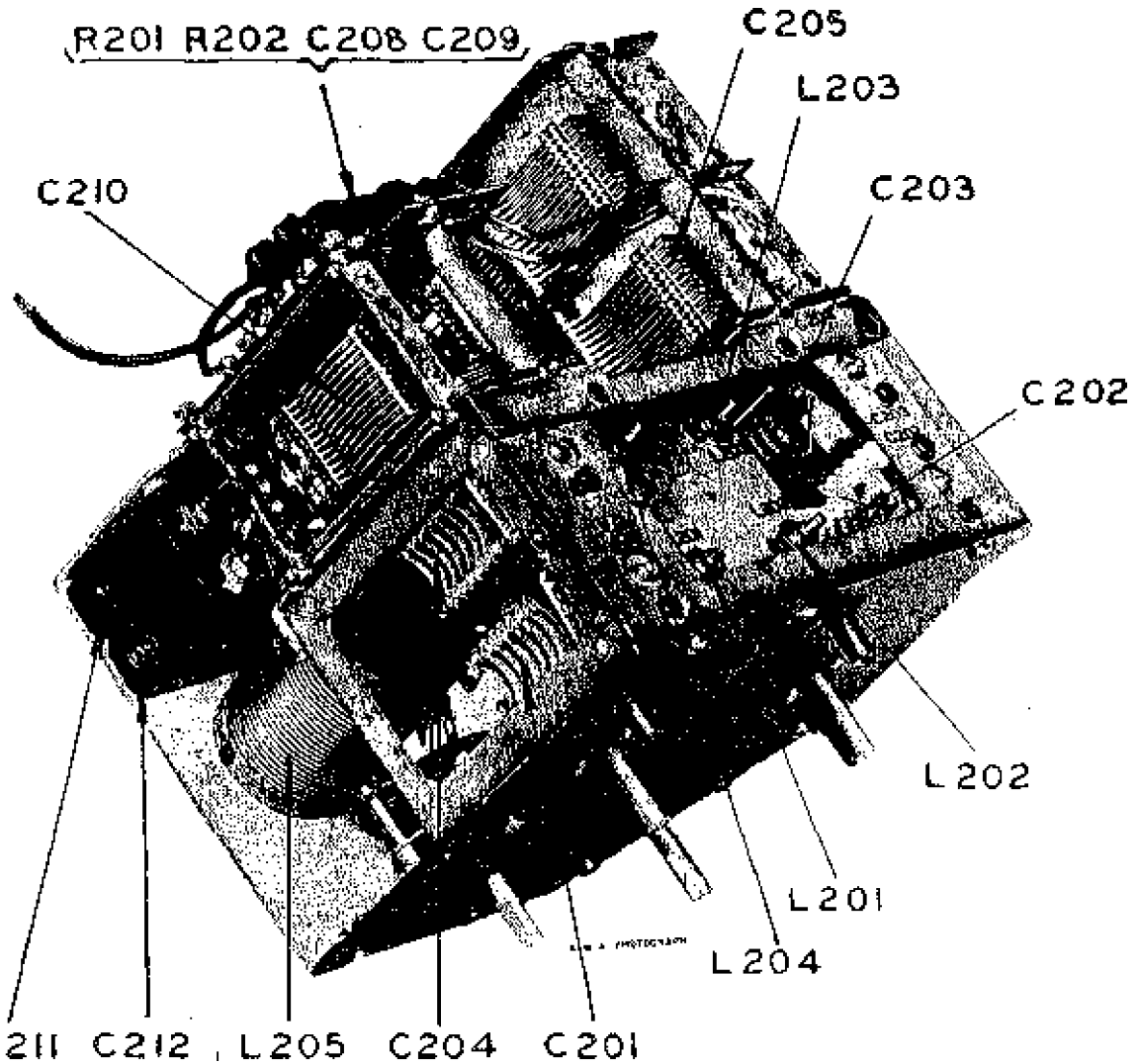


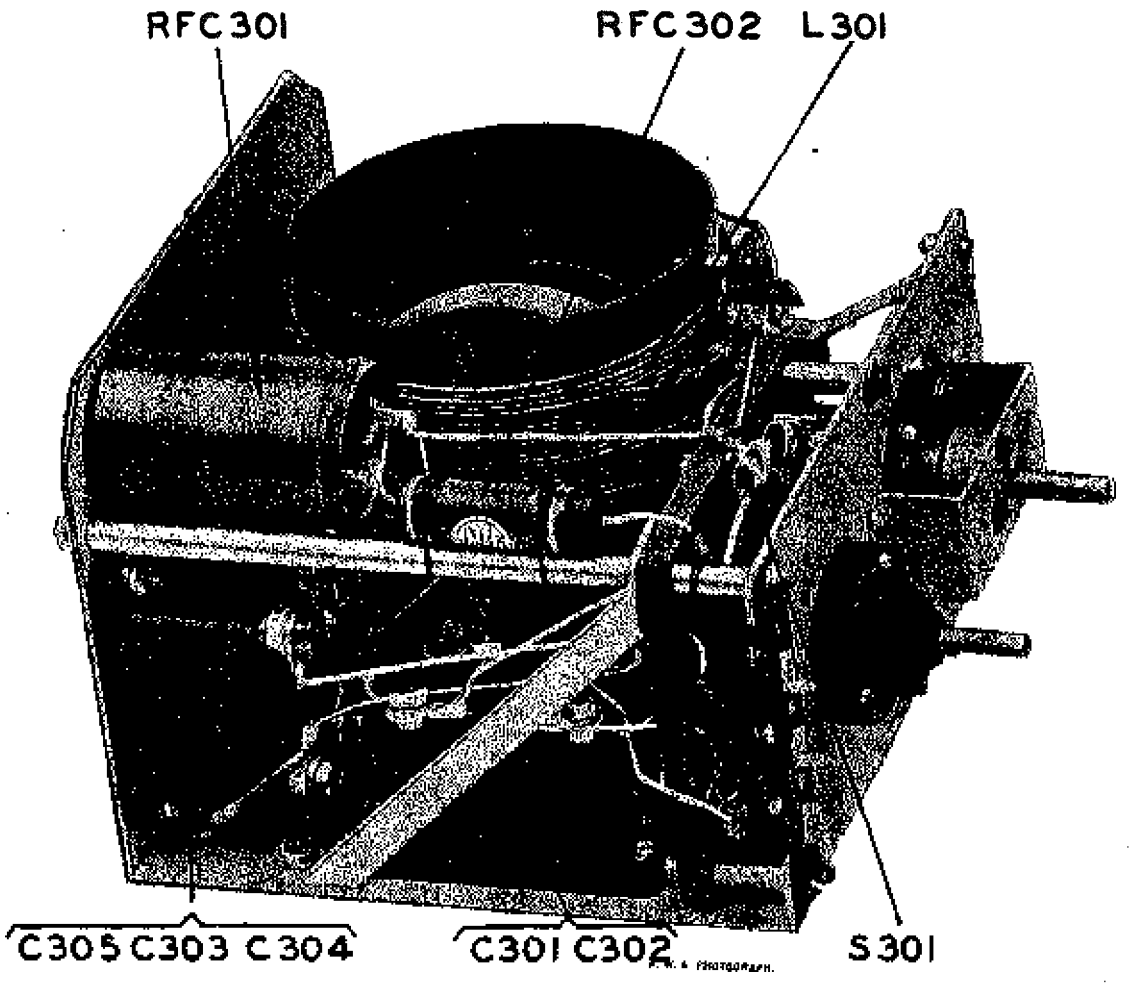
HF. BA. & MF. MO. TUNING SECTION
PHOTO Nº 1759-1
(REF. ALSO 1760)



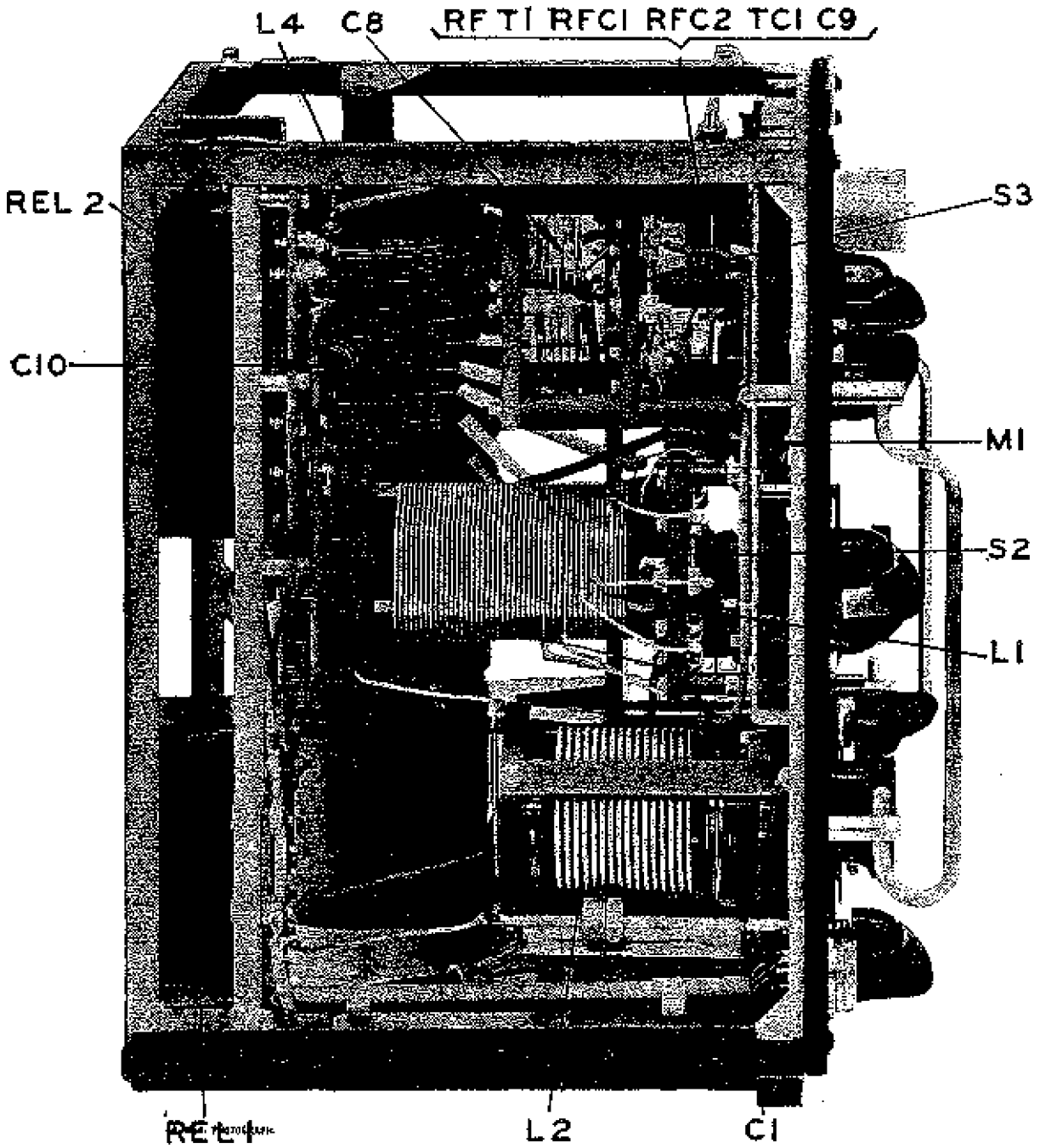
H.F. B.A. & M.F. M.O. TUNING UNIT

PHOTO Nº 1760-1

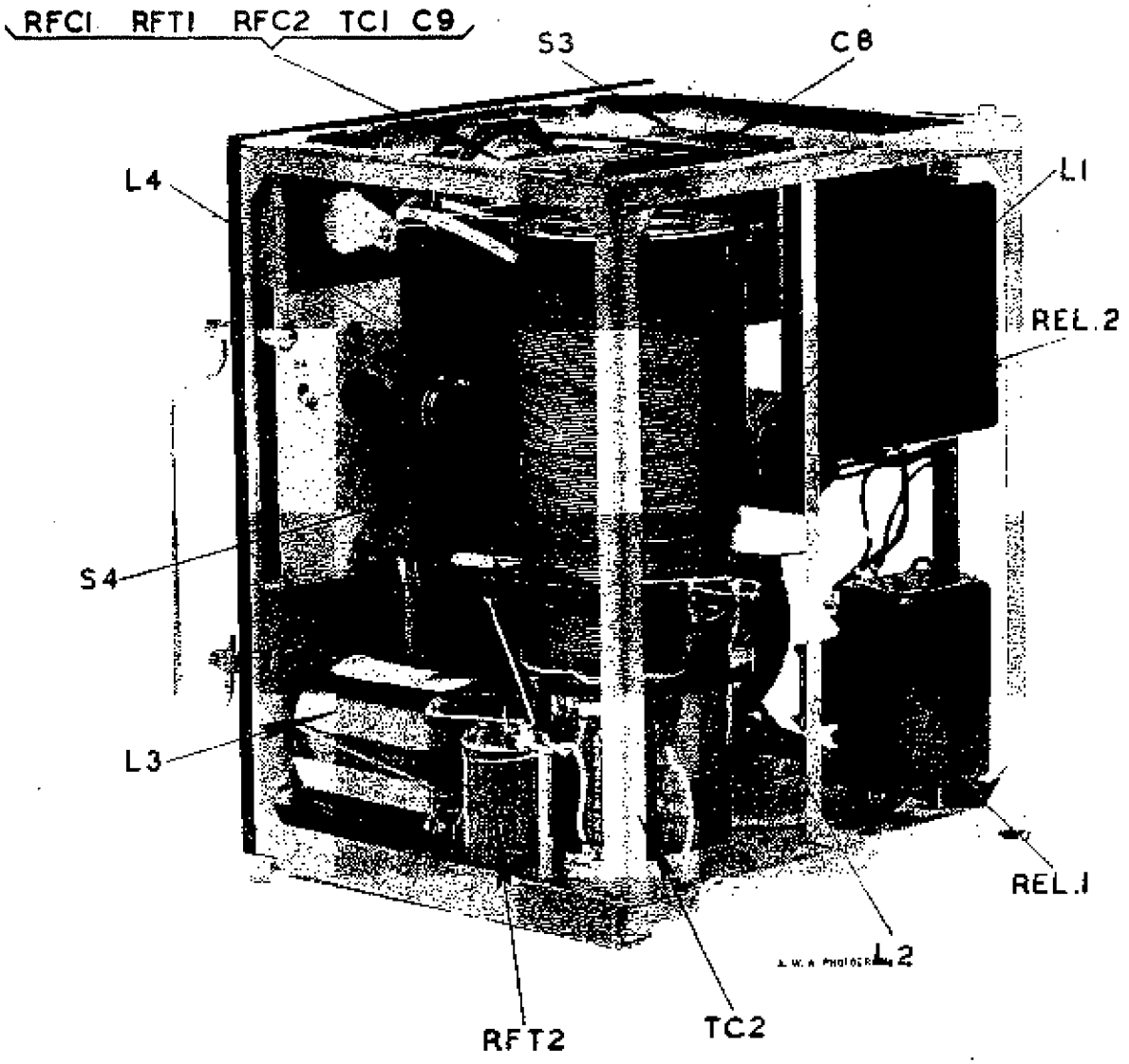
(REF. ALSO 1759-1)



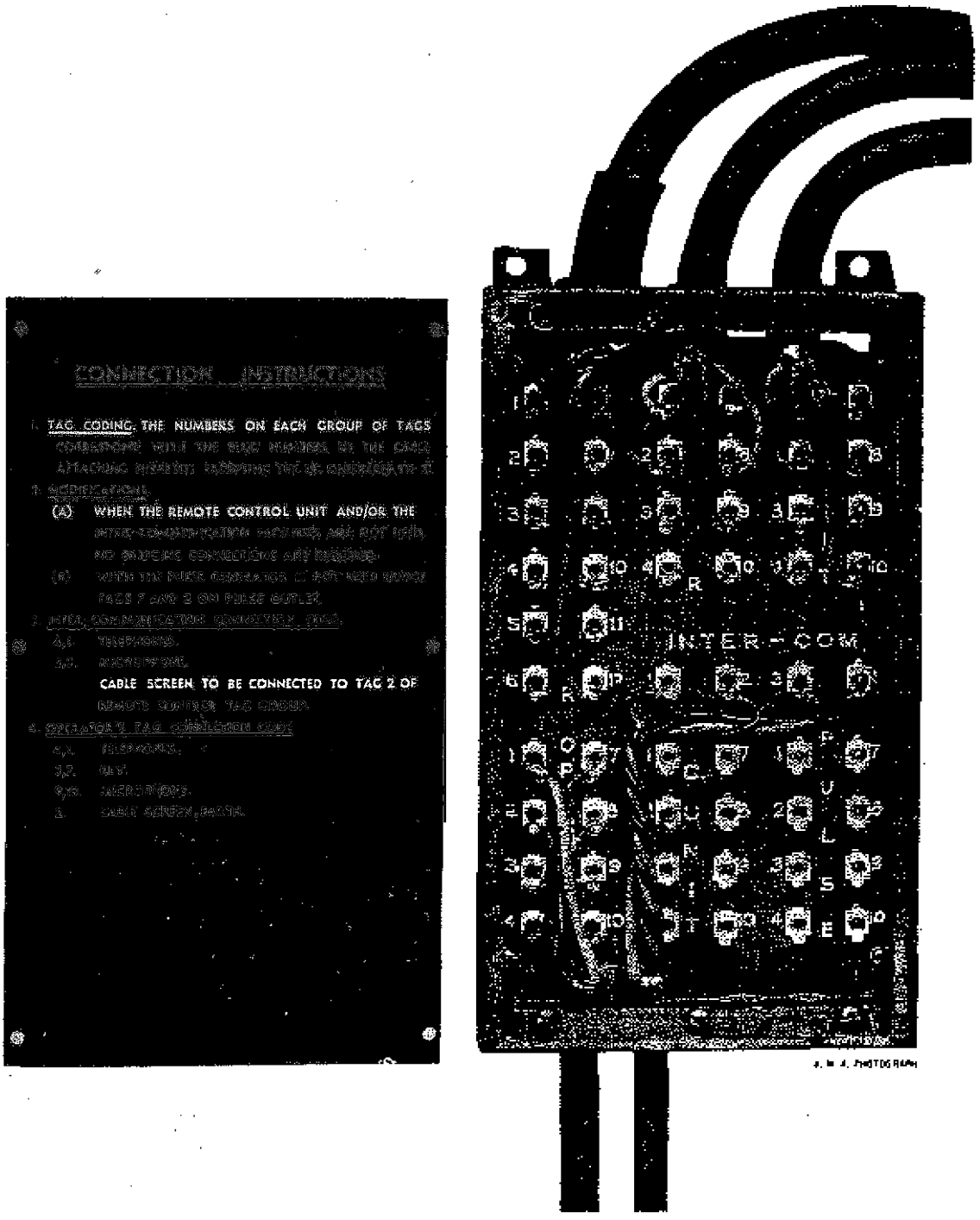
M.A. P.A. TUNING UNIT
PHOTO N°1766-1



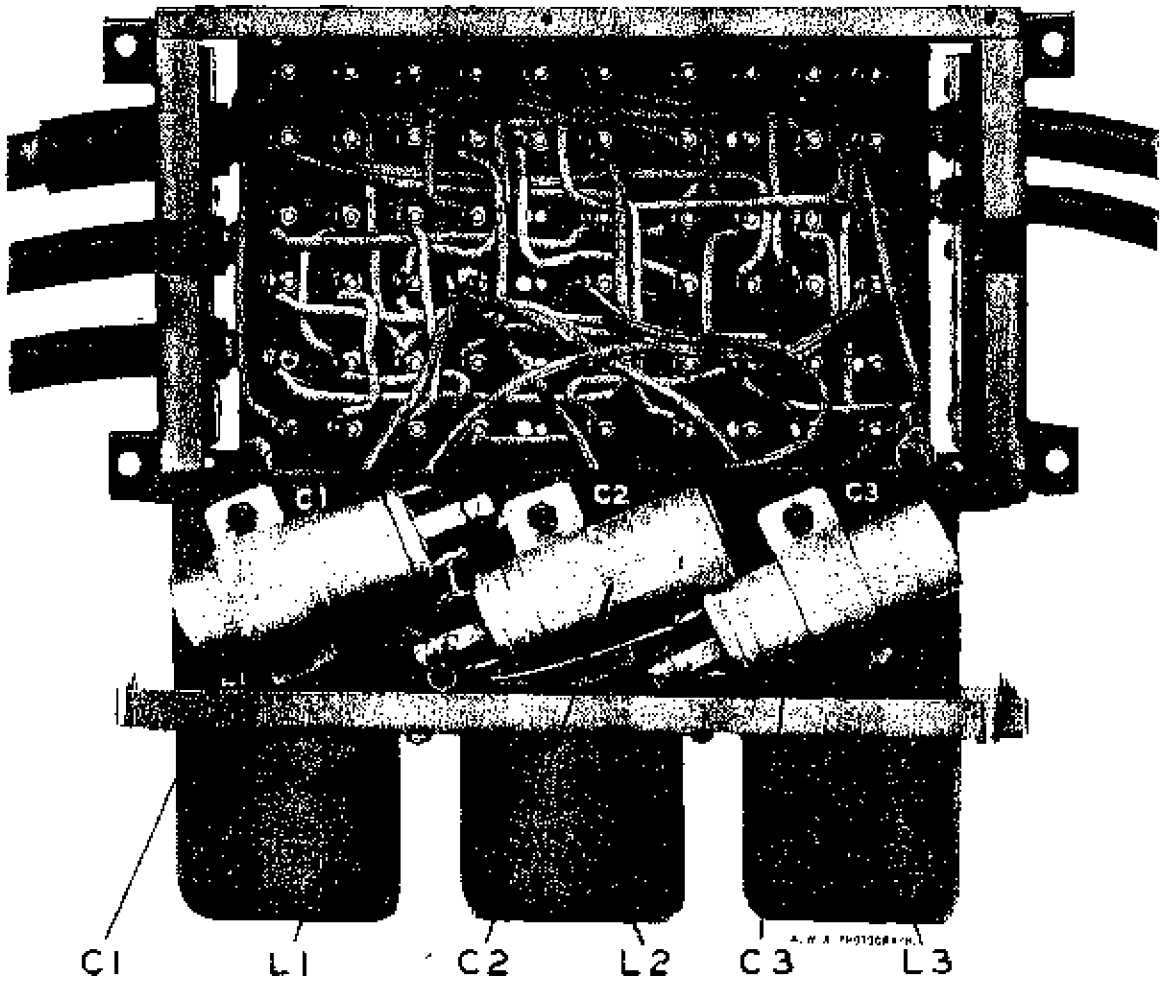
AERIAL COUPLING UNIT
PHOTO Nº 1697-1
(REF. ALSO 1698-1)



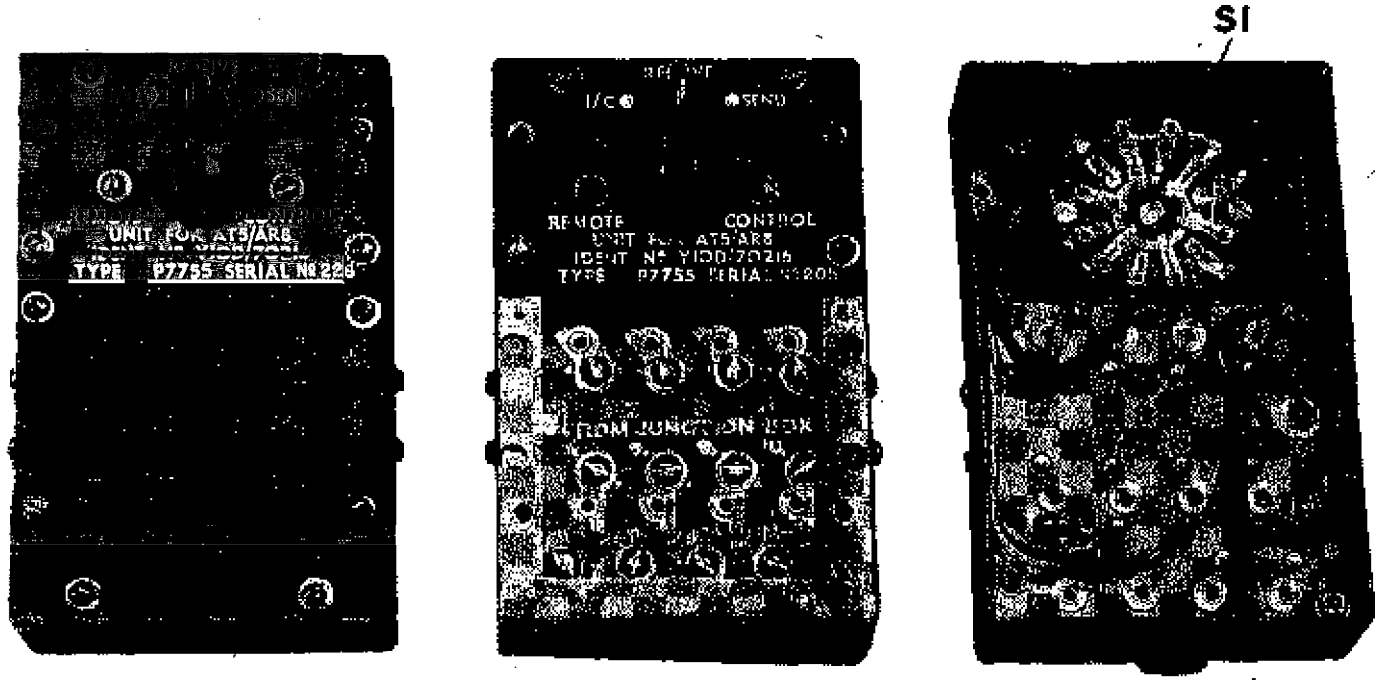
AERIAL COUPLING UNIT
PHOTO Nº 1698-1
(REF. ALSO 1697-1)



TOP VIEW SHOWING INSIDE OF COVER
JUNCTION BOX
PHOTO Nº 1709-1
(REF ALSO 1705-1)

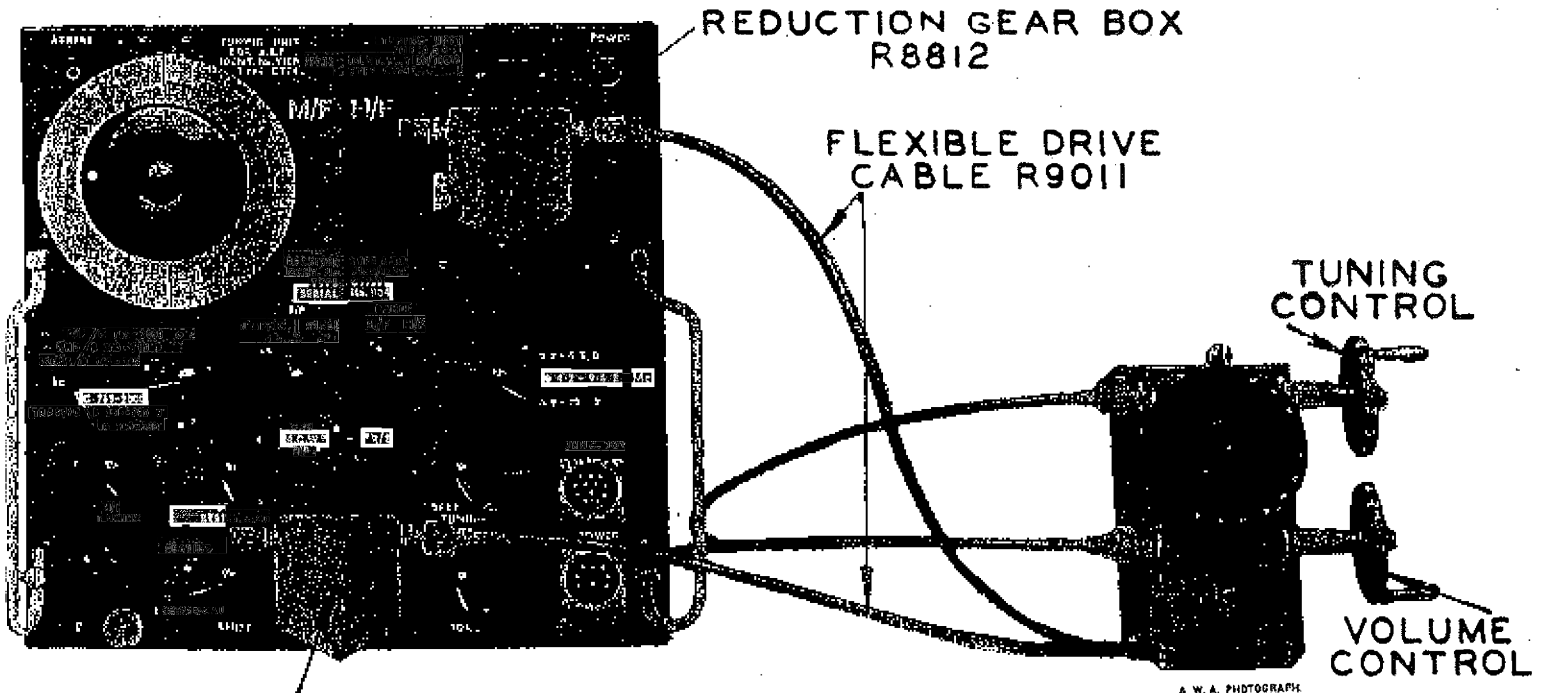


JUNCTION BOX
PHOTO Nº 1812-1
(REF. ALSO 1709-1)

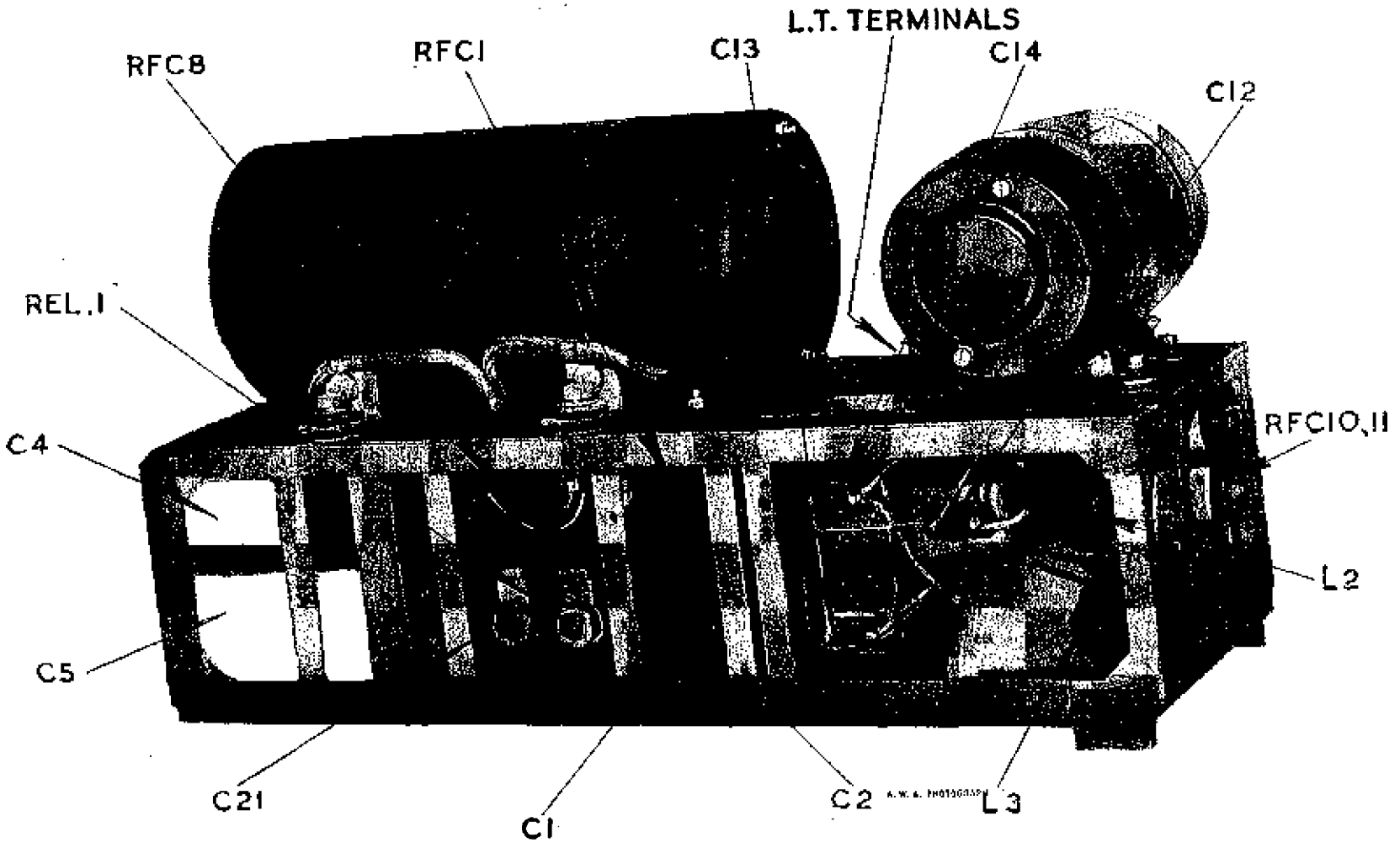


A.W.A. PHOTOGRAPH.

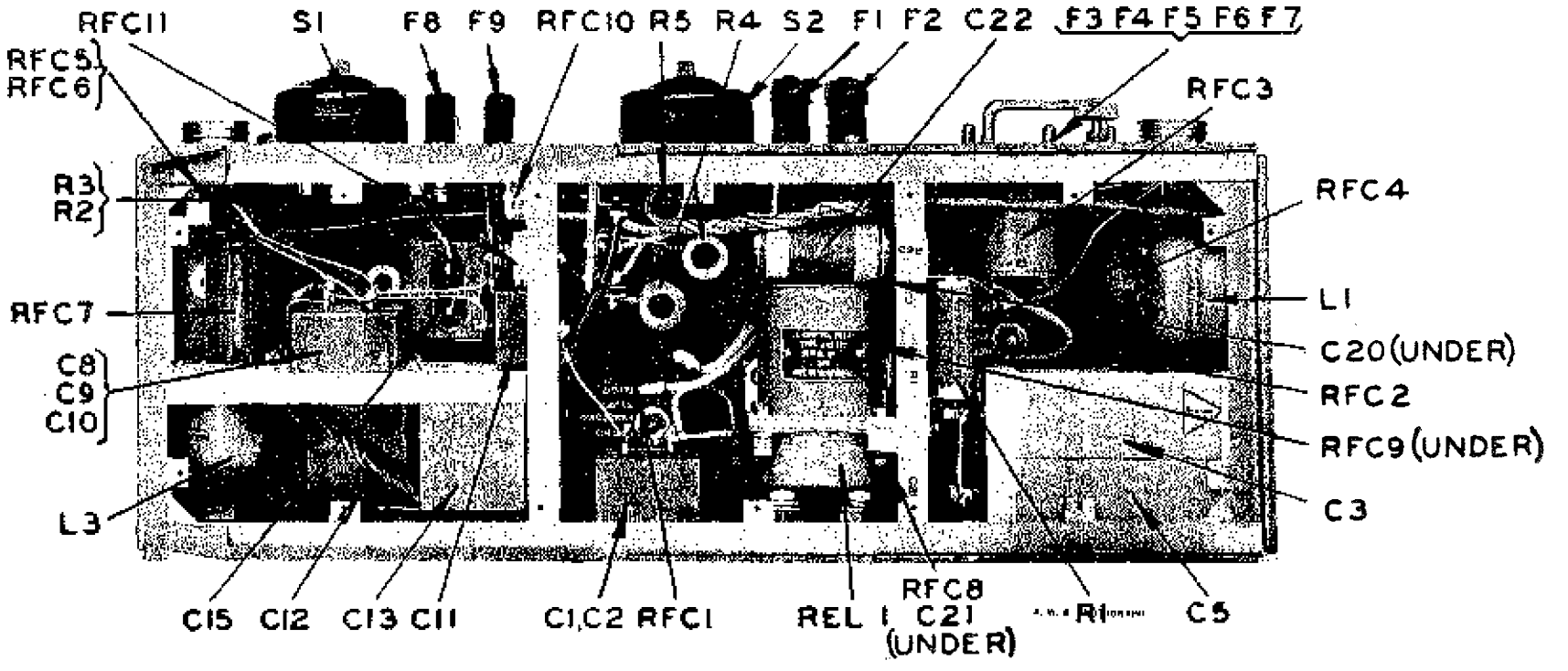
REMOTE CONTROL UNIT
PHOTO N° 7755-1



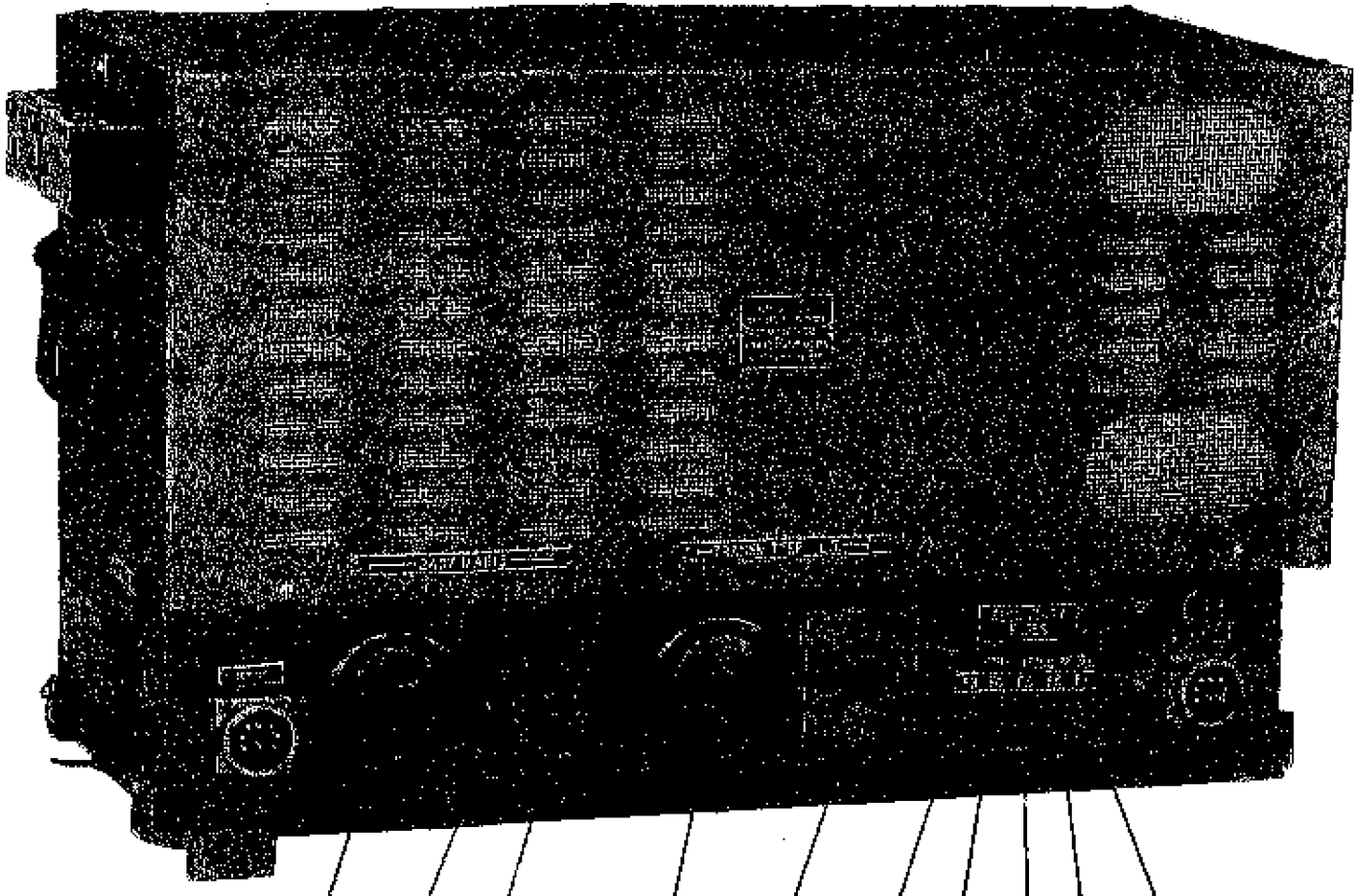
CABLE OPERATED REMOTE DRIVE
PHOTO N°9013-1



UNIT POWER SUPPLY
PHOTO Nº 1706-1
(REF. ALSO 1696-1)



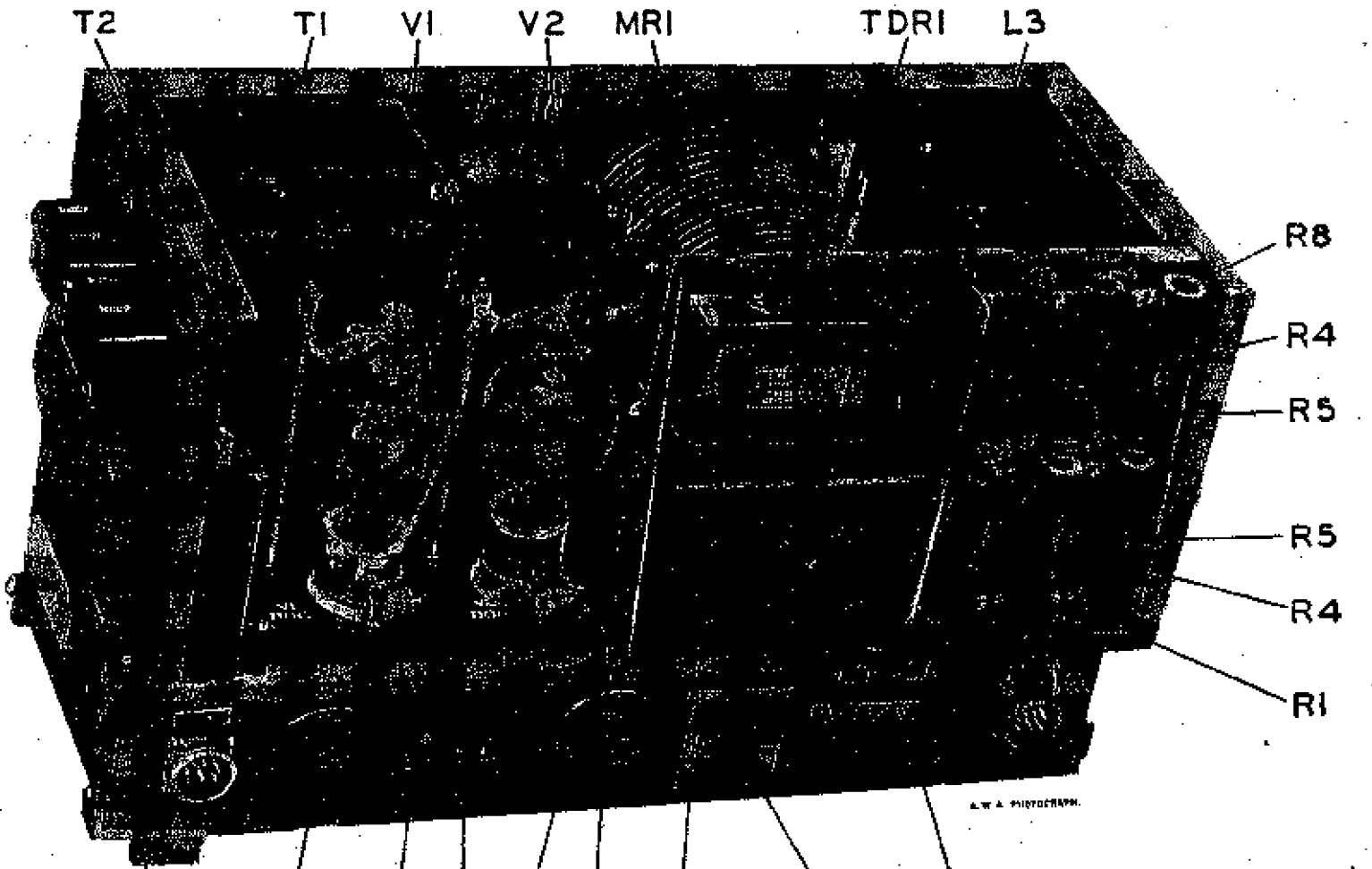
UNIT POWER SUPPLY
PHOTO Nº 1813-1
(REF. ALSO 1706-1)



POWER SUPPLY TYPE S

PHOTO N° 8811-1

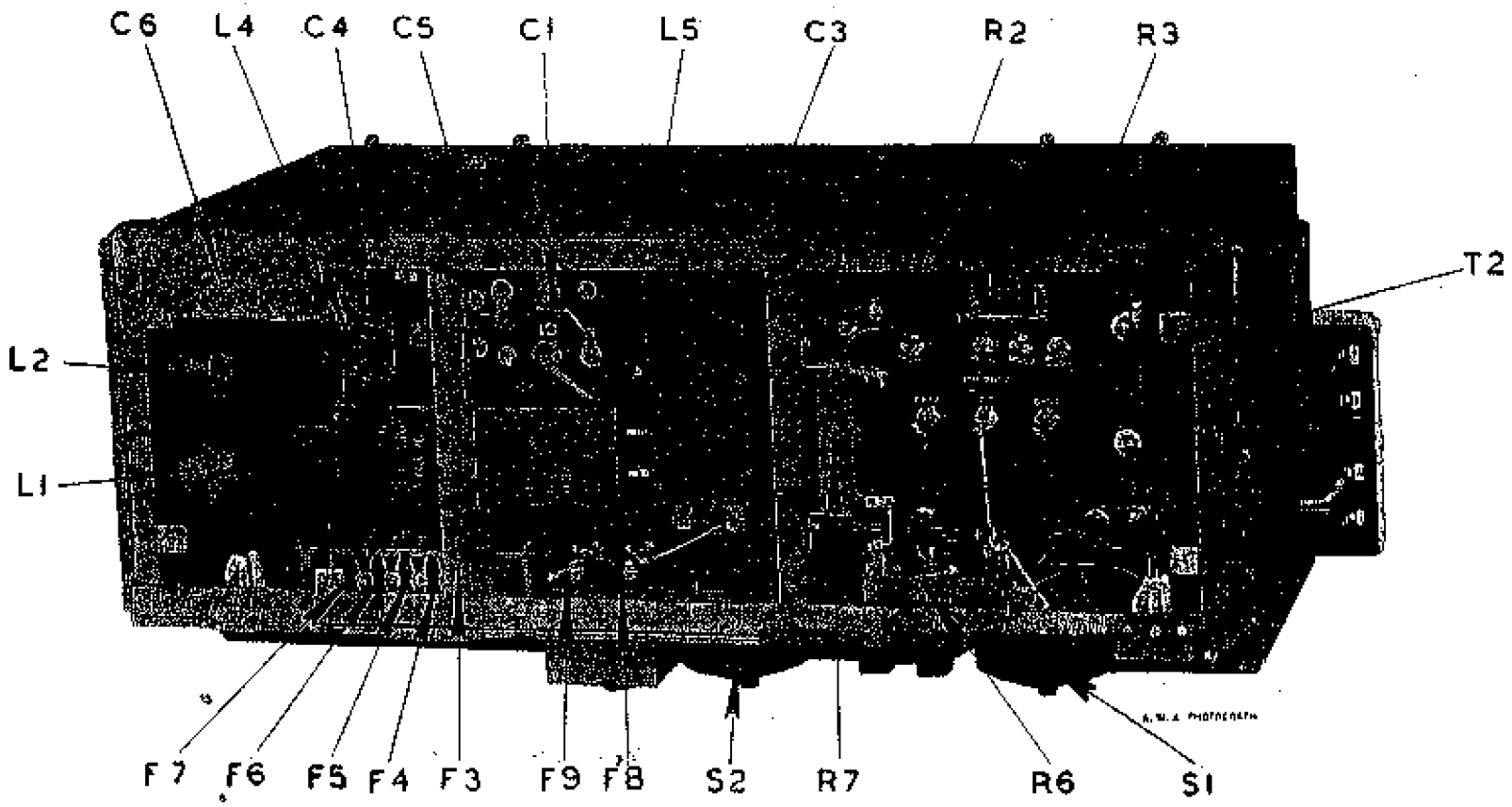
(REF. ALSO 8811-2, 8811-3)



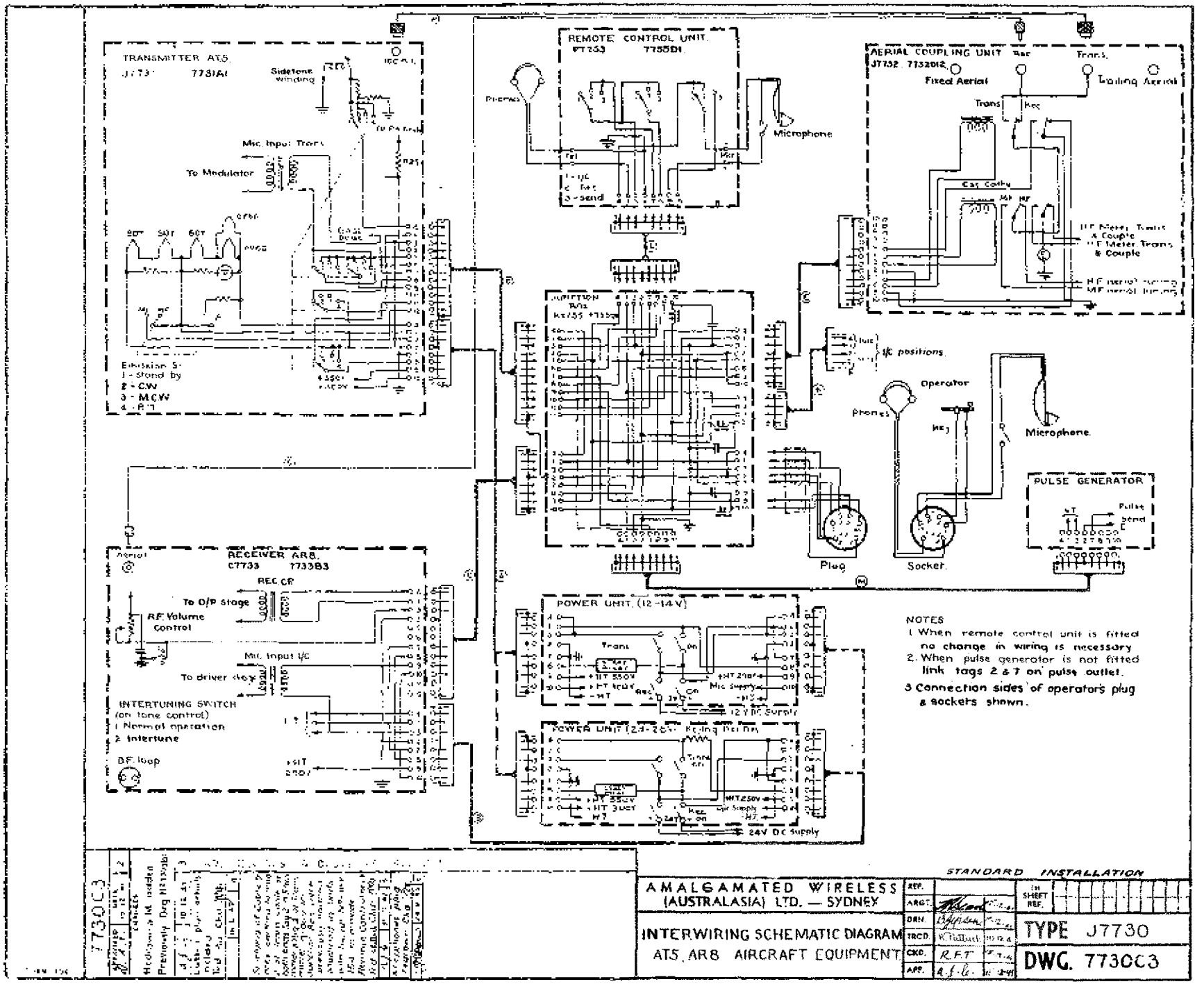
POWER SUPPLY TYPE S

PHOTO Nº 8811-2

(REF ALSO 8811-1 8811-3)



POWER SUPPLY TYPE S
PHOTO Nº 8811-3
(REF. ALSO 8811-1-2)



NOTES

1. When remote control unit is fitted no change in wiring is necessary.
2. When pulse generator is not fitted link tags 2 & 7 on pulse outlet.
3. Connection sides of operator's plug & sockets shown.

STANDARD INSTALLATION

AMALGAMATED WIRELESS (AUSTRALASIA) LTD. — SYDNEY

INTERWIRING SCHEMATIC DIAGRAM
AT5, AR8 AIRCRAFT EQUIPMENT

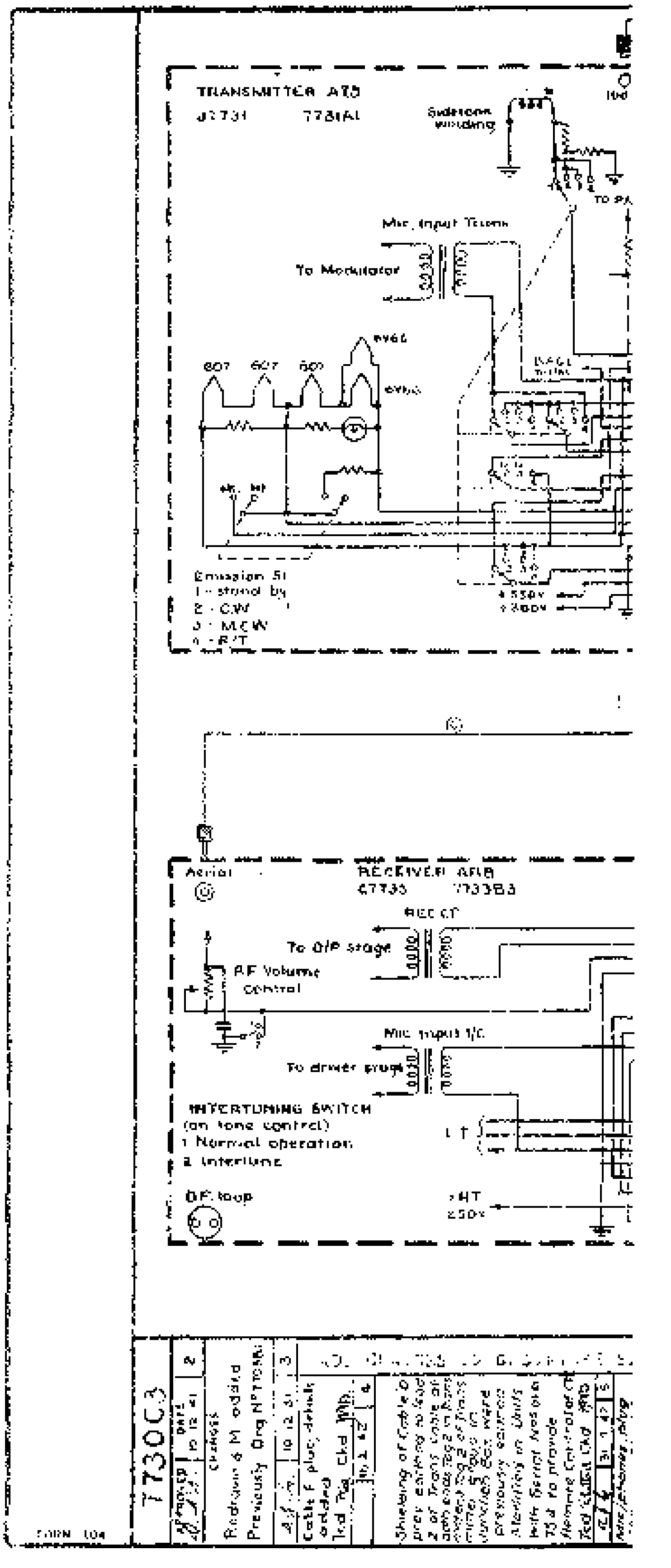
REF.		
AR&T.		
DRN.		
TRCD.	W. Ballard	
CKD.	R.F.T.	
APP.	A.F.L.	

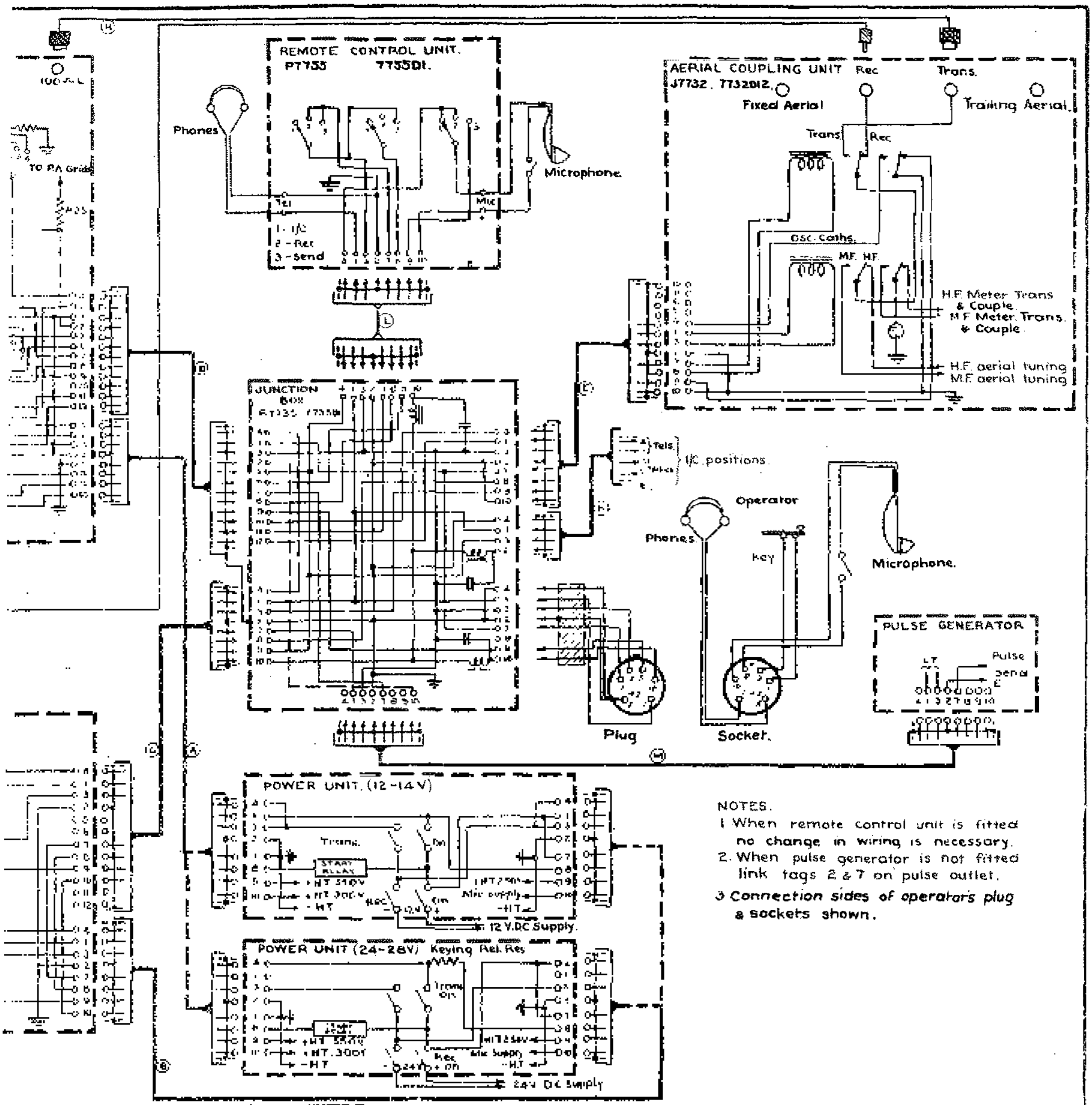
CH SHEET REF.

TYPE J7730

DWG. 7730C3

7730C3


TRANSMITTER AT5
Sidetone winding
Mic. input Trans
To Modulator
6V6
Emission Sl
1 - stand by
2 - C.W
3 - M.C.W
RECEIVER AR8
To O/P stage
R.F. Volume control
Mic. input T/C
INTERTUNING SWITCH
(on tone control)
1 Normal operation
2 Intertune
D.F. loop
7730C3
CHANGES
FORM 104



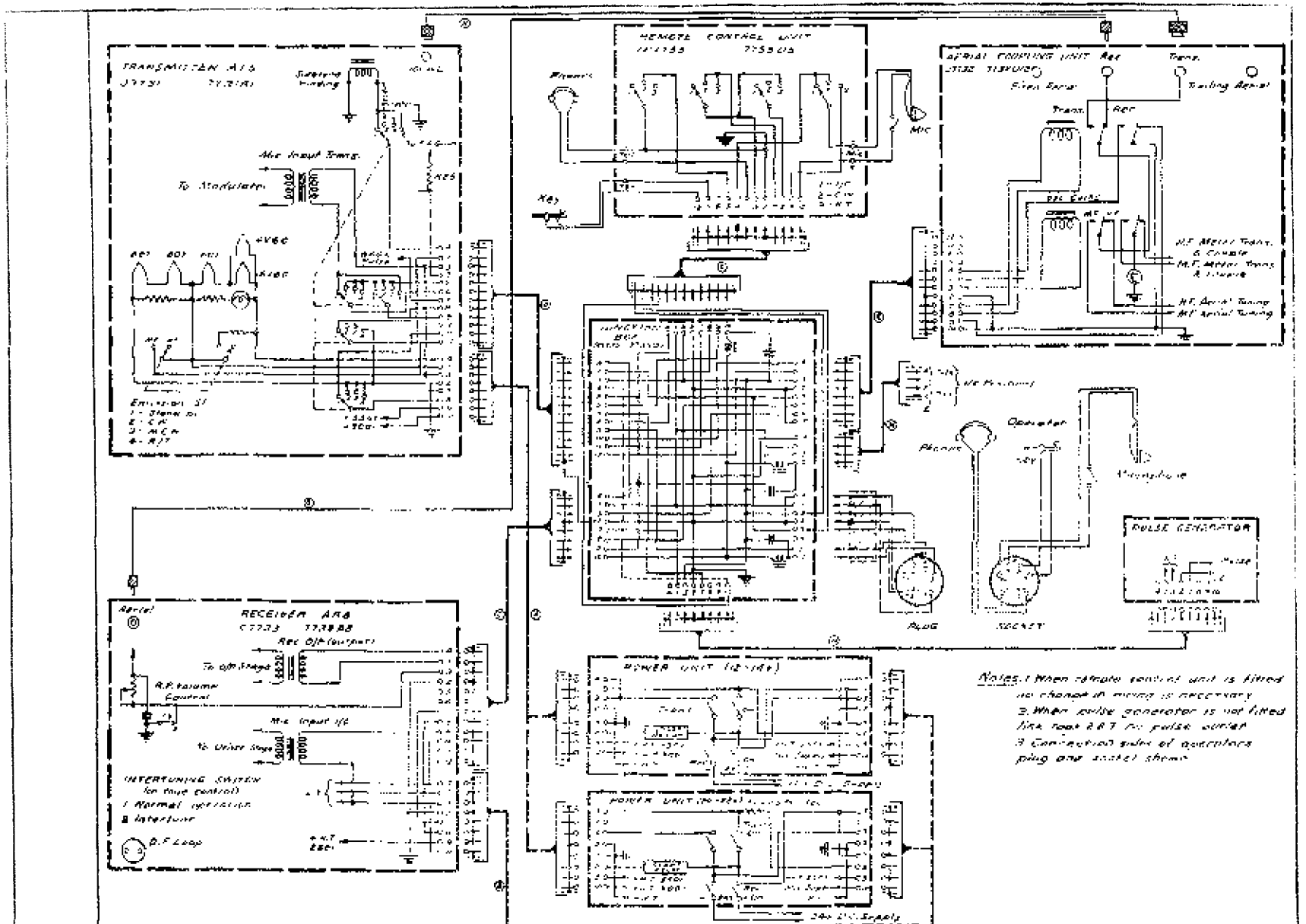
NOTES.

1. When remote control unit is fitted no change in wiring is necessary.
2. When pulse generator is not fitted link tags 2 & 7 on pulse outlet.
3. Connection sides of operator's plug & sockets shown.

STANDARD INSTALLATION

AMALGAMATED WIRELESS (AUSTRALASIA) LTD. — SYDNEY	REF.	SHEET REF.
	ARGT.	
	DRN.	
INTERWIRING SCHEMATIC DIAGRAM	TRCD. R. Pollock 10-12-41	TYPE J7730
AT5, AR8 AIRCRAFT EQUIPMENT	CKD. R.F.T.	DWG. 7730C3
	APP.	

Remote Control of ...
Microphones plug ...



ADD CHANGES TO JOBSHEETS STENCIL

7730C4

THIS DIAGRAM APPLIES TO INSTALLATIONS USING R.C. UNIT IP7755

AMALGAMATED WIRELESS (AUSTRALASIA) LTD. - SYDNEY

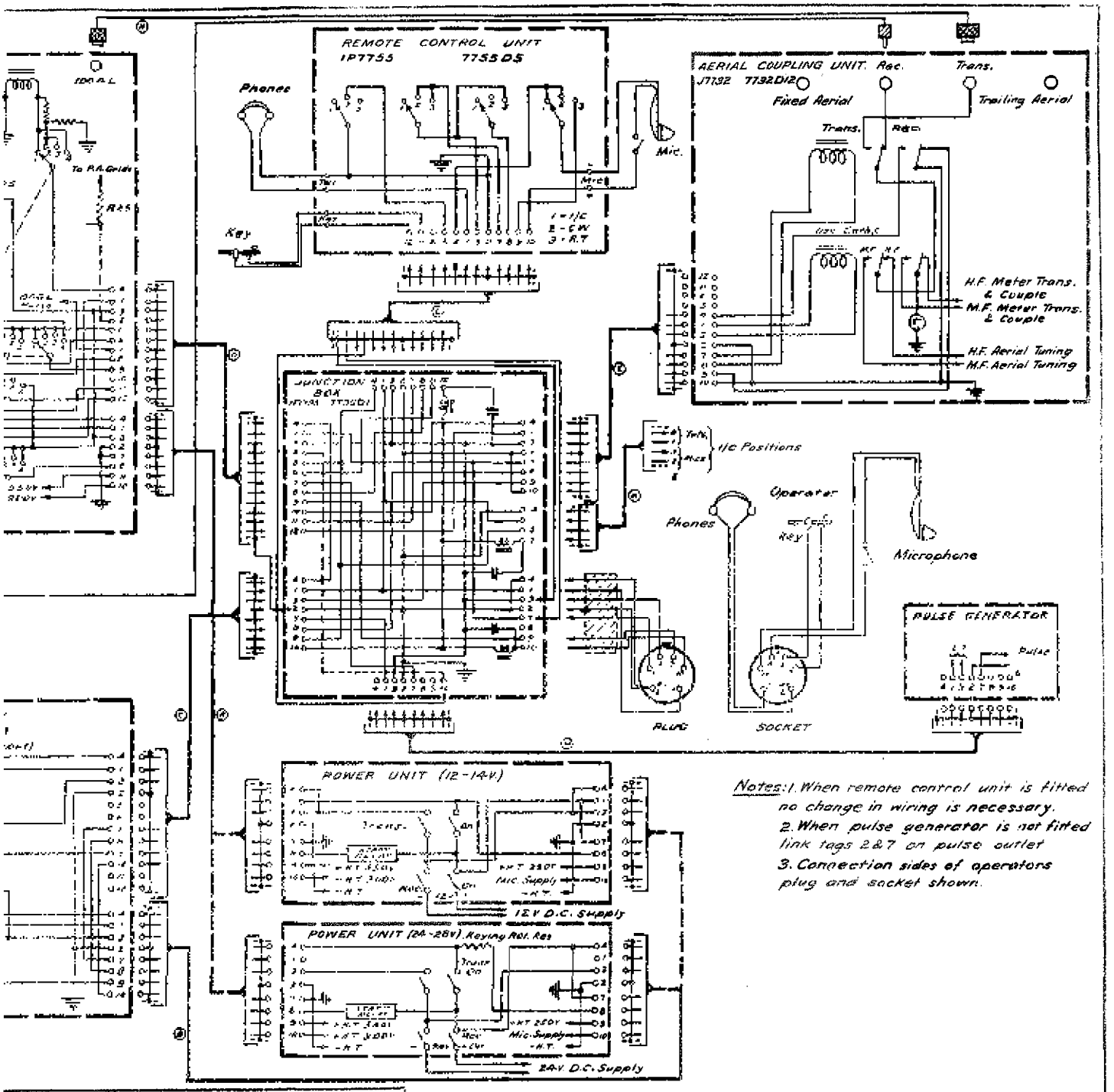
INTERWIRING SCHEMATIC DIAGRAM
AT5/AR8 AIRCRAFT EQUIPMENT

ARGT.		
DRN.		
TRCD.		
CKD.		
APP.		

TYPE J7730

DWG. 7730C4

773 0C4
APPROVED
DATE
18-8-42
CHANGES
ADD CHANGES TO GEETHER STU
TRANSMITTER ATS
To Modulator
RECEIVER ARC
To RF Exciter
To Driver Stage
INTERTWINING SWITCH



Notes: 1. When remote control unit is fitted no change in wiring is necessary.
2. When pulse generator is not fitted link tags 2 & 7 on pulse outlet
3. Connection sides of operators plug and socket shown.

ER STENCIL

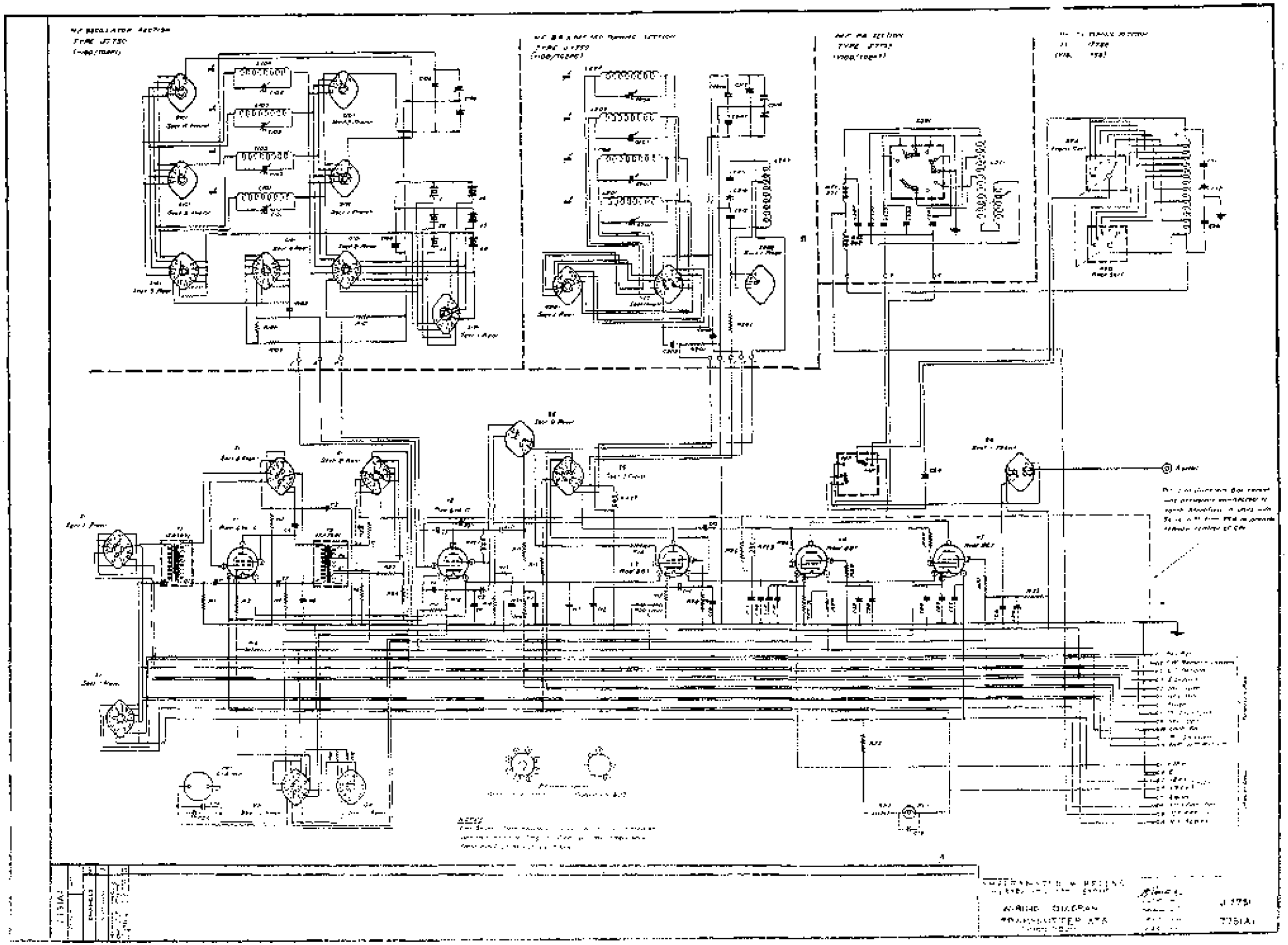
THIS DIAGRAM APPLIES TO INSTALLATIONS USING R.C. UNIT IP7755

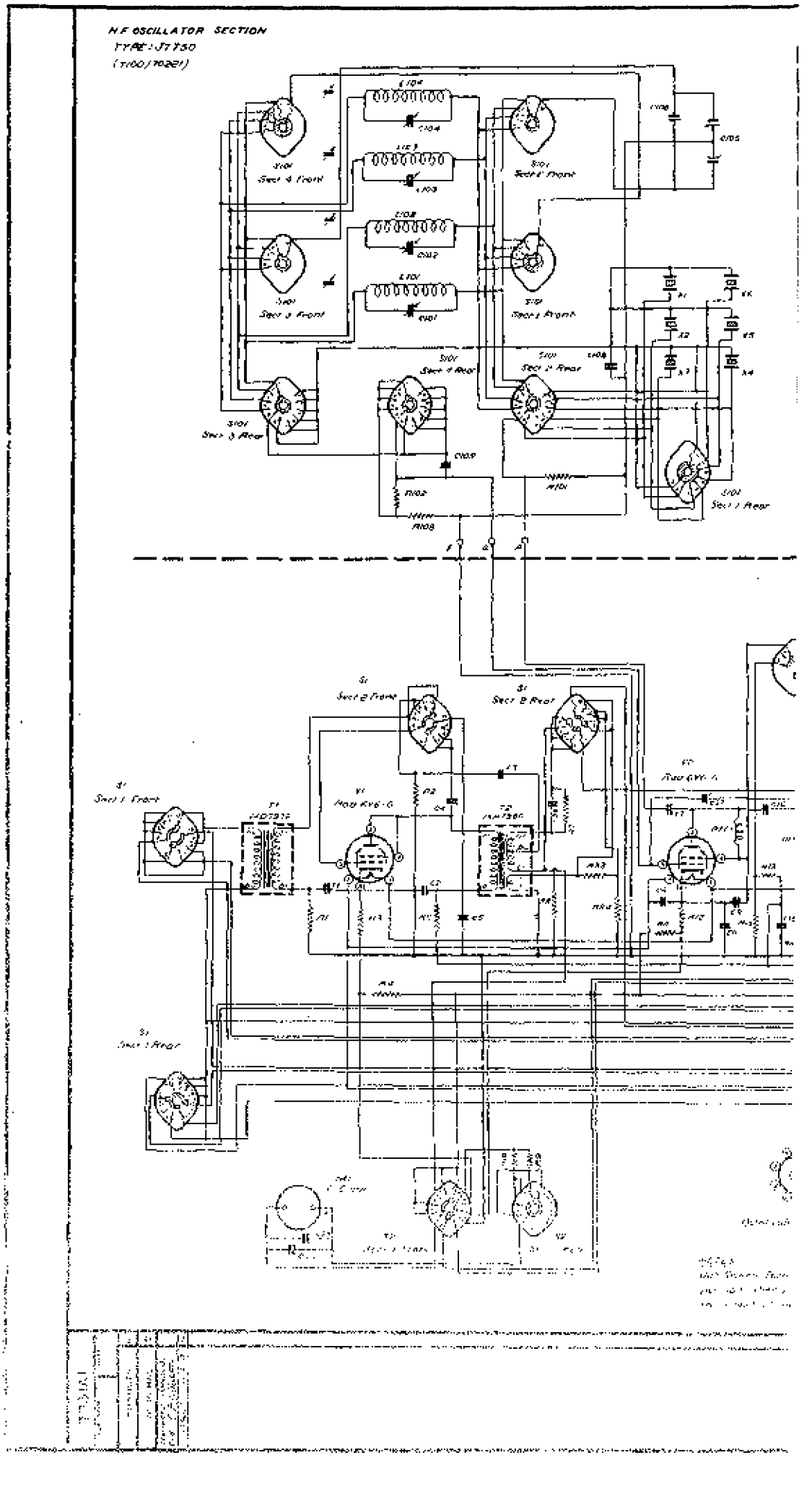
AMALGAMATED WIRELESS (AUSTRALASIA) LTD. - SYDNEY

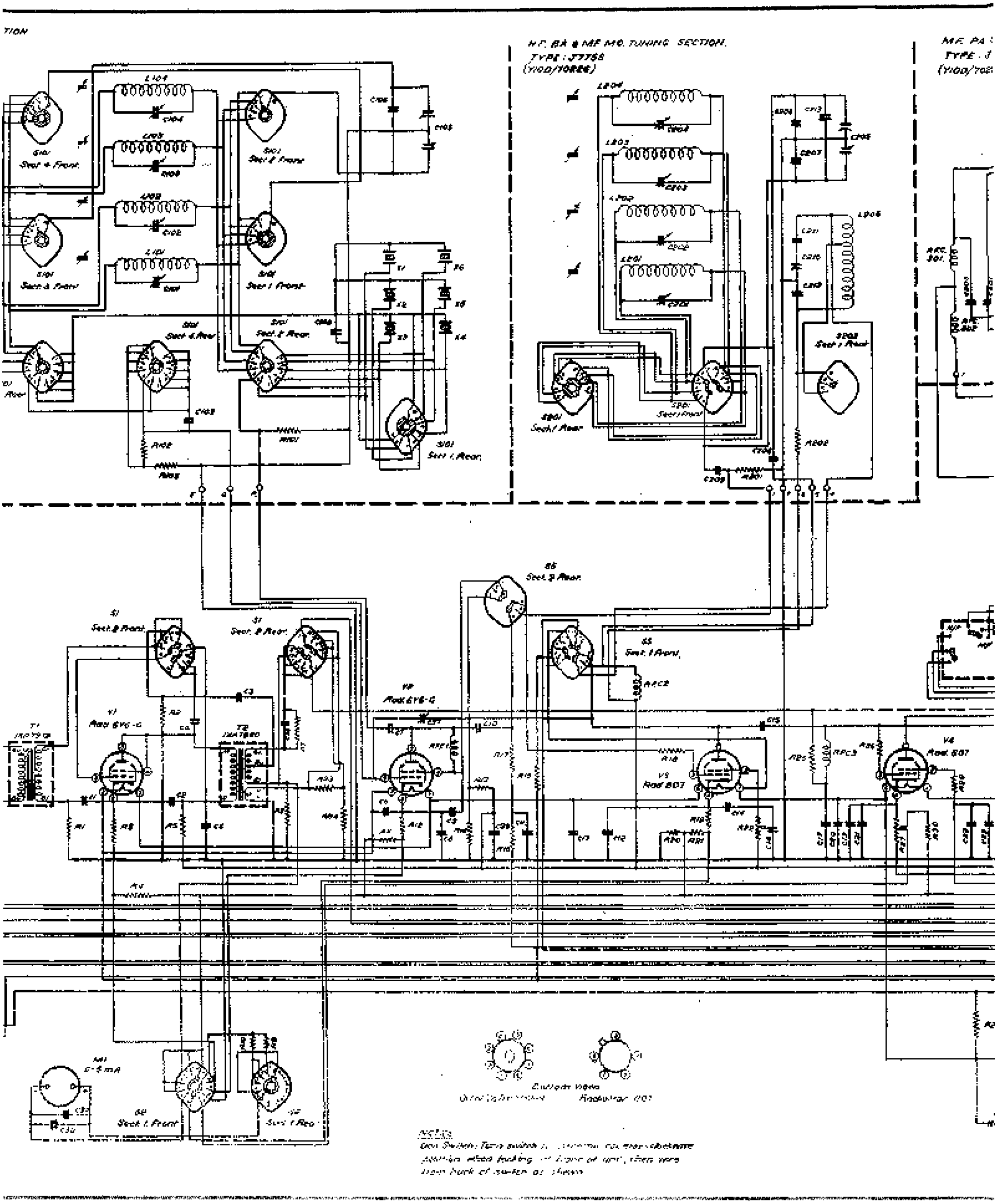
INTERWIRING SCHEMATIC DIAGRAM
AT5/AR8 AIRCRAFT EQUIPMENT

REF.		SHEET REF.
ARGT.		
DRN.		TYPE J7730
TRCD.		
CKD.		9/8/42
APP.		9/8/42

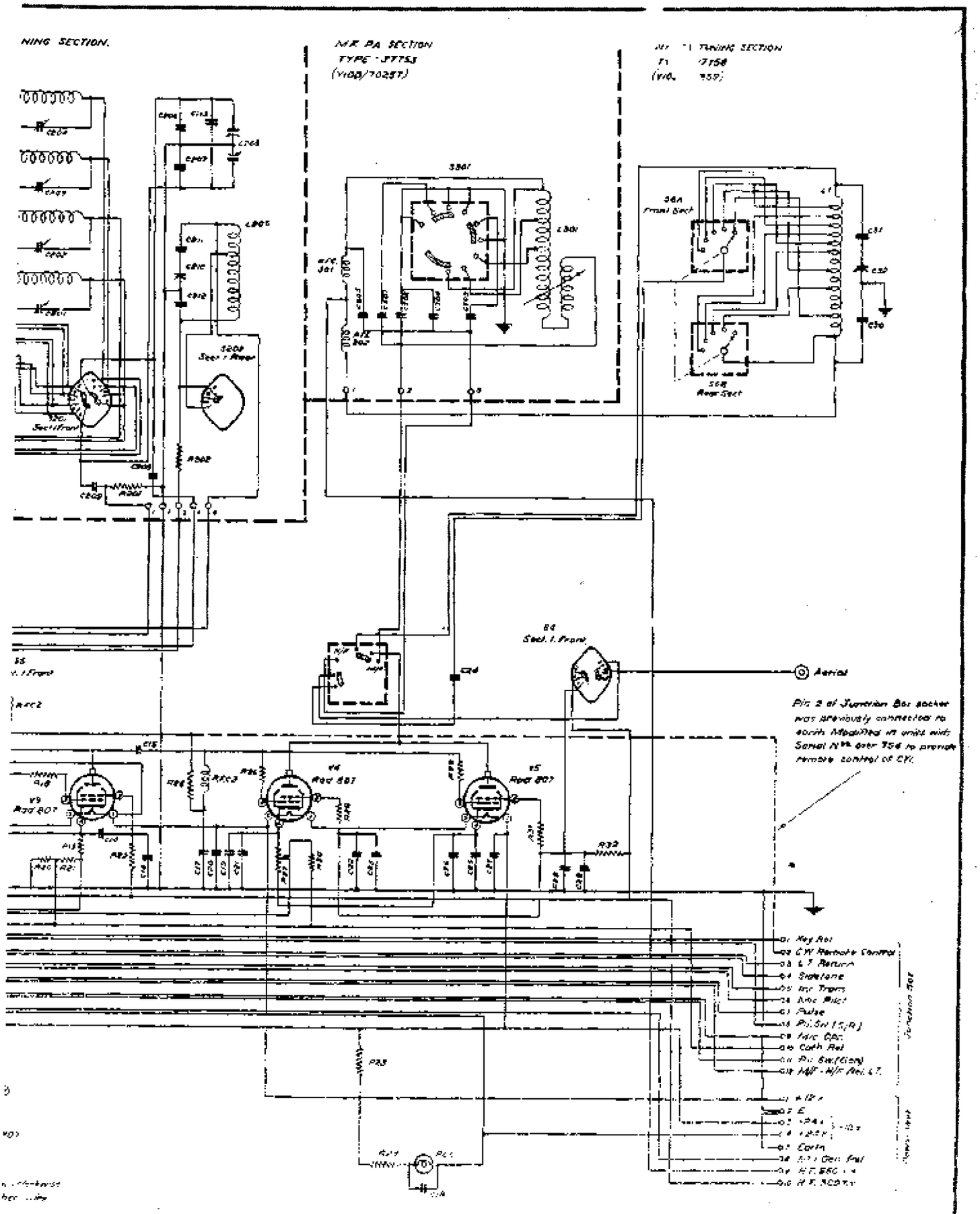
DWG. 7730C4




H.F. OSCILLATOR SECTION
TYPE: JT 150
(T160/T162)



TION
H.F. BA & MF MO. TUNING SECTION.
TYPE : J7758
(Y100/70826)
M.F. PA
TYPE
S1 Sect. 2 Front.
S1 Sect. 2 Rear.
V1 Rad. 6V6-G
V2 Rad. 6V6-G
V3 Rad. 807
V4 Rad. 807
S5 Sect. 1 Front.
S5 Sect. 2 Rear.
S101 Sect. 1 Rear.
S201 Sect. 1 Rear.
S202 Sect. 1 Rear.
M1 0-4 mA
S6 Sect. 1 Front.
NOTES



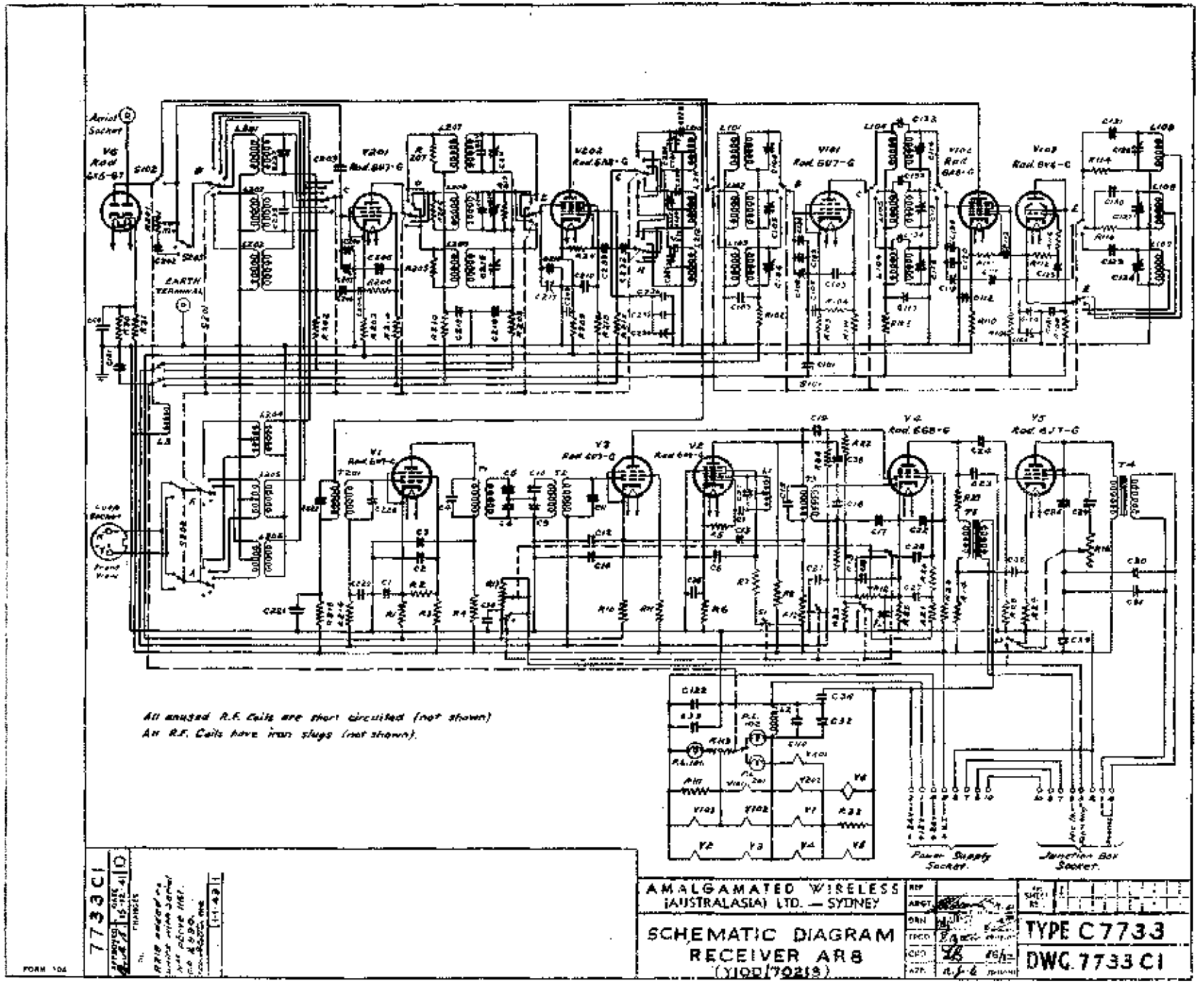
AMALGAMATED WIRELESS (AUSTRALASIA) LTD. - SYDNEY

WIRING DIAGRAM.

TRANSMITTER AT5 (Y100/7031)

3775I

7731A1



AMALGAMATED WIRELESS (AUSTRALASIA) LTD. — SYDNEY

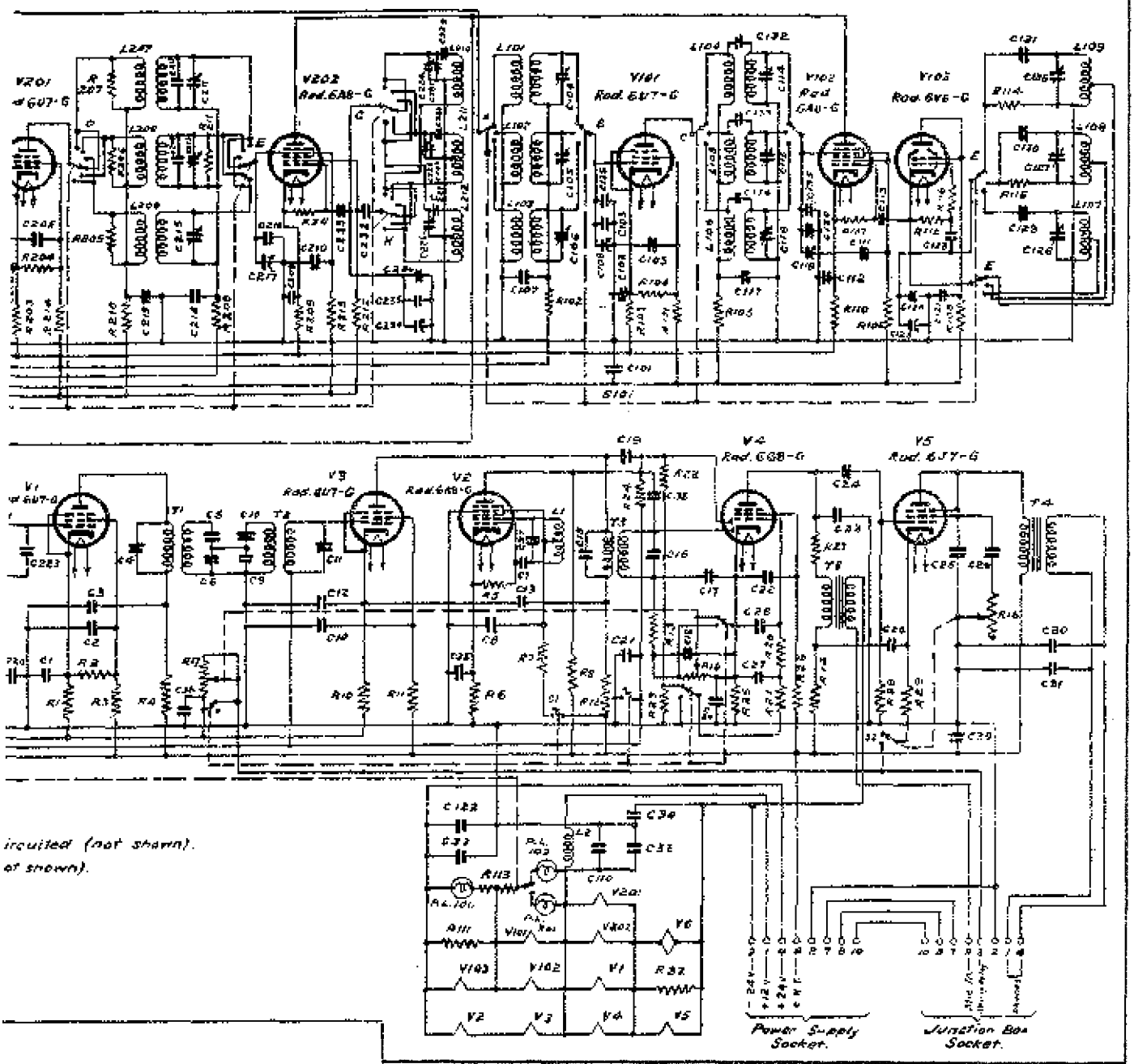
SCHEMATIC DIAGRAM
RECEIVER AR8
(VIOD/70219)

TYPE C7733
DWG. 7733 C1

7733 C1

FORM 104

Aerial Socket
V6 Rad 6A5-GT
V201 Rad. 6U7-G
V1 Rad 6B7-G
EARTH TERMINAL
Loop Socket
Front View
S201
All unused R.F. Coils are short circuited (not
All R.F. Coils have iron slugs (not shown).
7730CJ
CHASSIS
FORM 10A

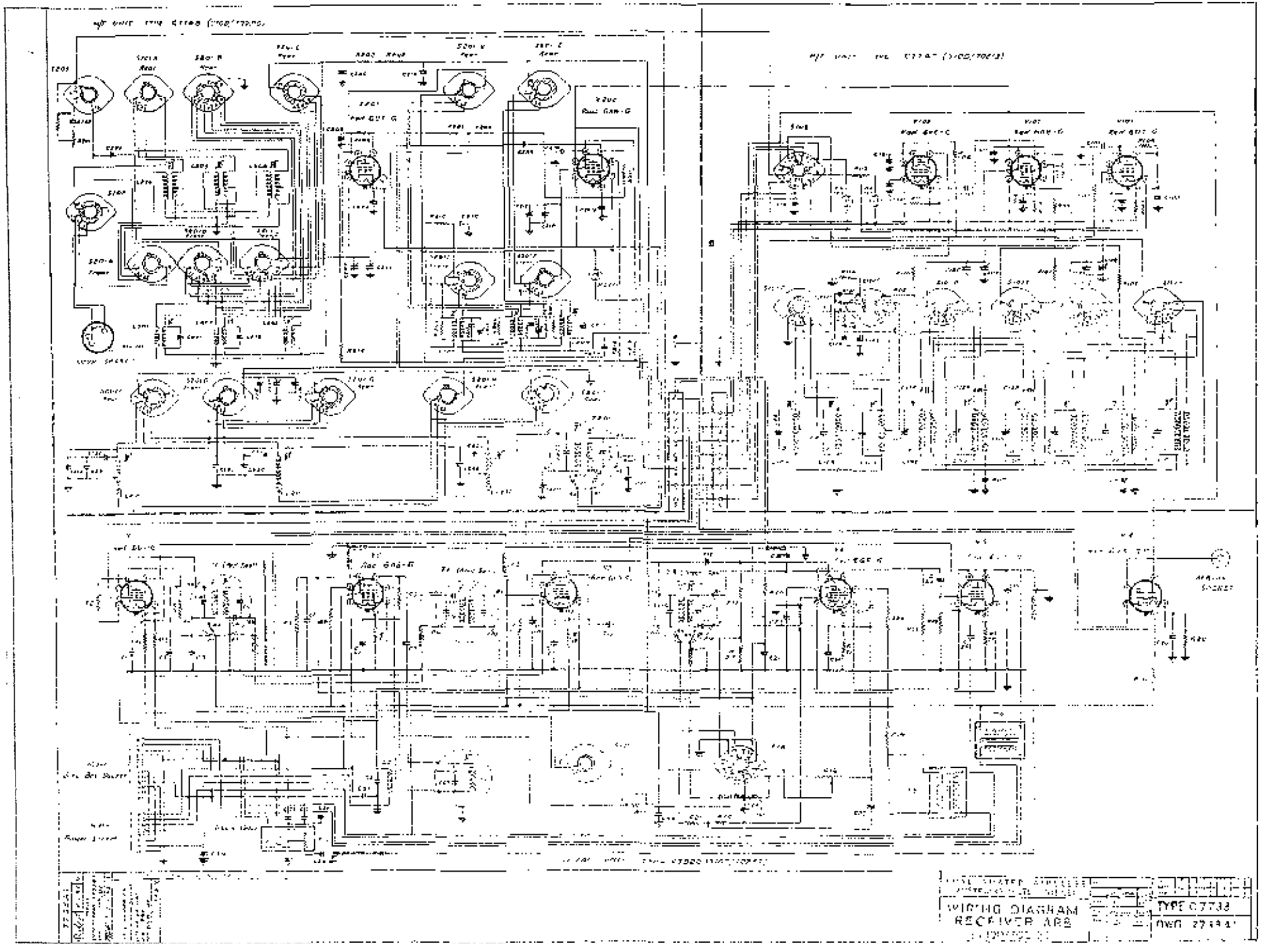


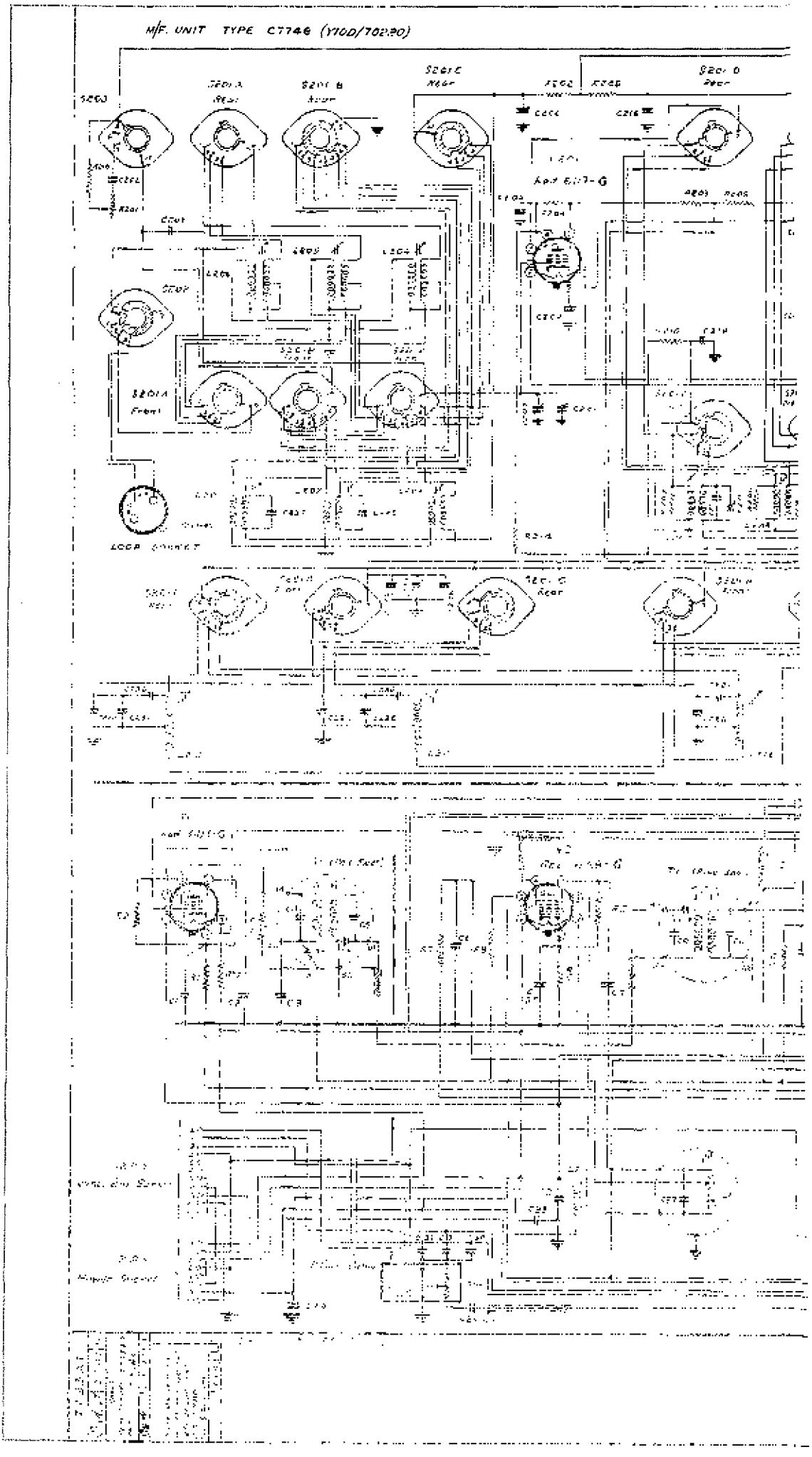
ircuited (not shown).
e shown).

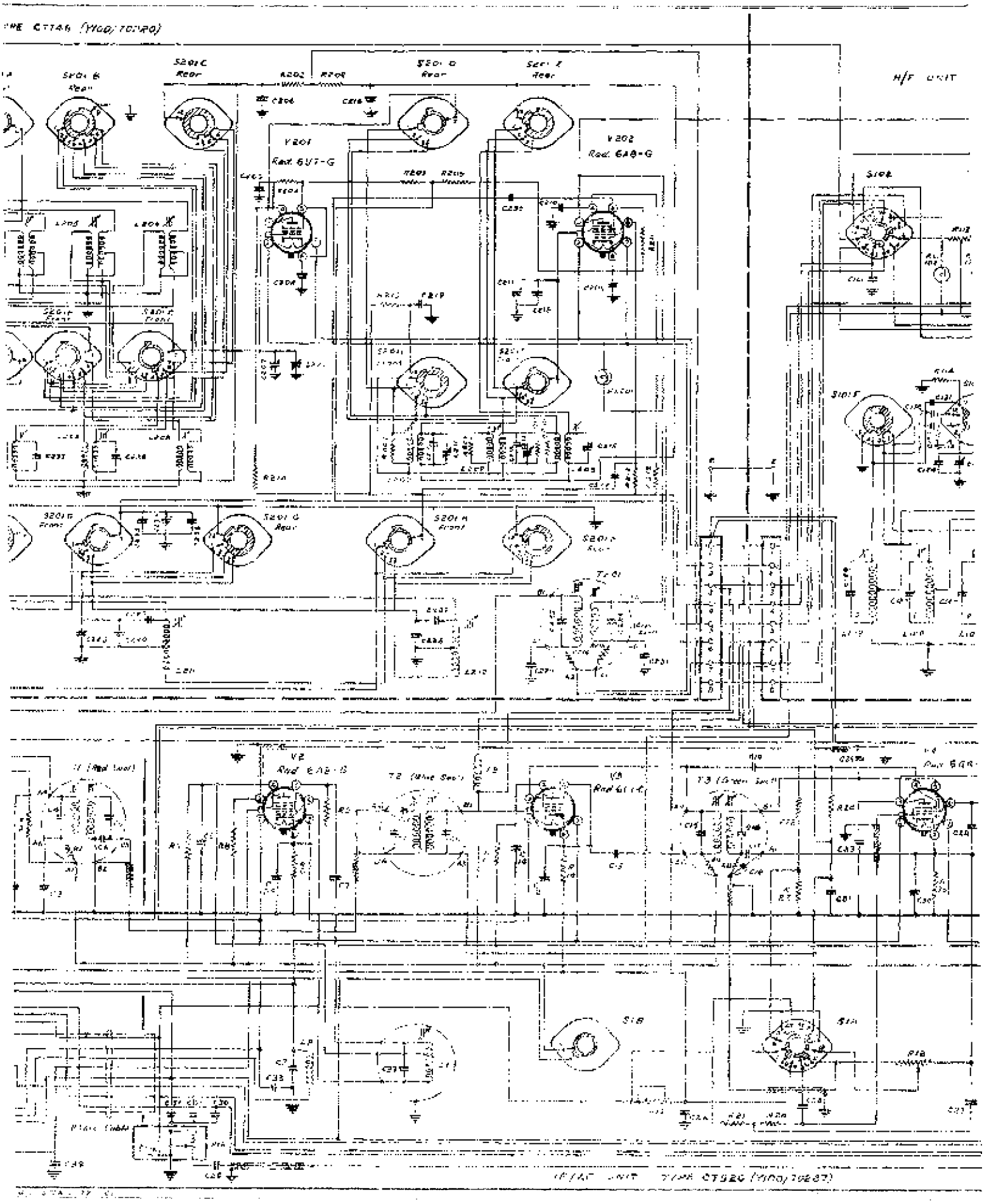
AMALGAMATED WIRELESS (AUSTRALASIA) LTD. — SYDNEY

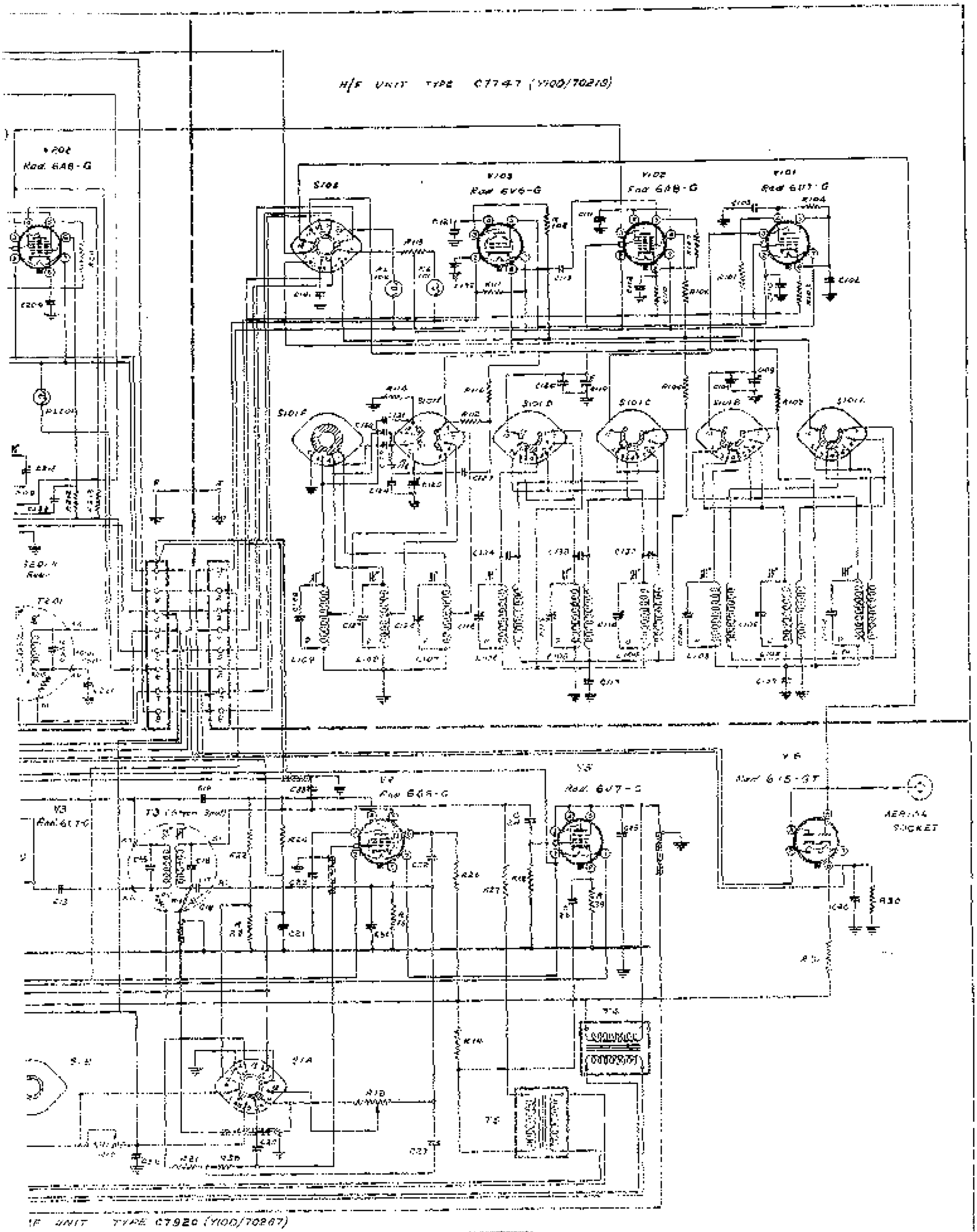
SCHEMATIC DIAGRAM
RECEIVER AR8
(Y100/70213)

REF.		SHEET REF.
ARGT.		
DRN.		TYPE C7733
TRCD.		
CKD.	16/12	DWG. 7733 C1
APP.		


WIRING DIAGRAM
RECEIVER AR8
TYPE C7738


M/F. UNIT TYPE C7746 (Y10D/702:20)


V201
Rad. 6U7-G
V202
Rad. 6A8-G
V2
Rad. 6A8-G
V3
Rad. 6U7-G
V4
Rad. 6A8-G
T2 (Mixer Unit)
T3 (Oscillator Unit)
H/F UNIT



AMALGAMATED WIRELESS (AUSTRALASIA) LTD. – SYDNEY

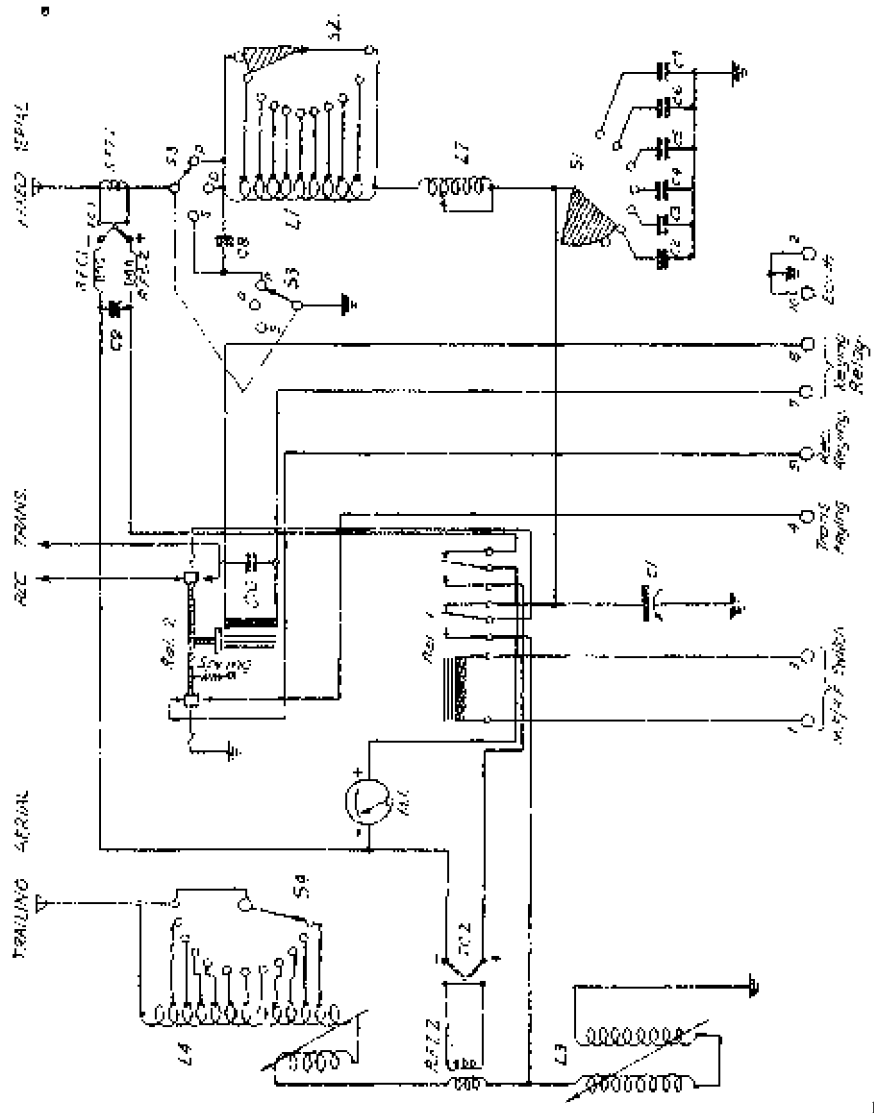
WIRING DIAGRAM RECEIVER AR8

(Y100/70218)

TYPE C7733

DWG. 7733 A1

7732D13



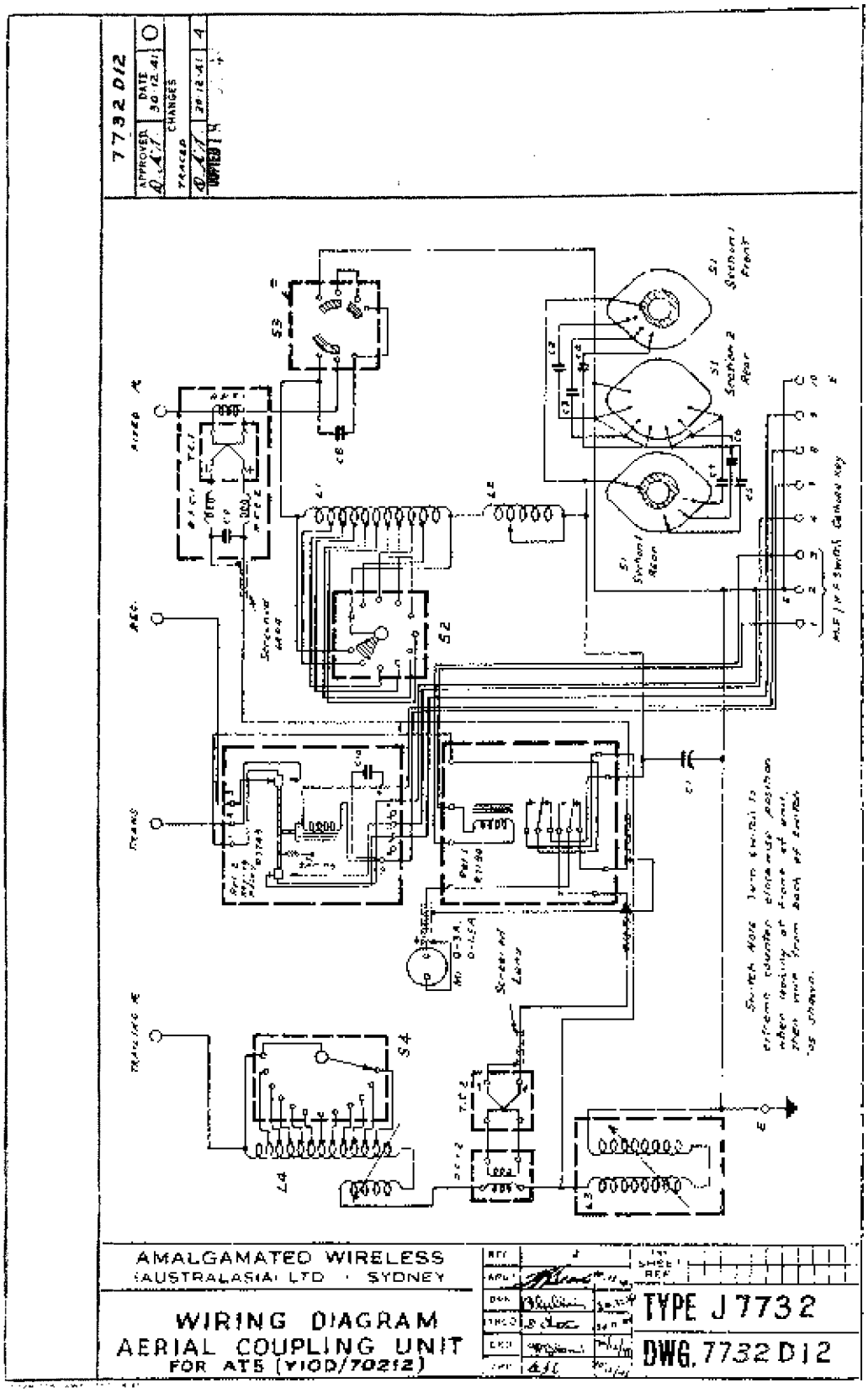
AMALGAMATED WIRELESS
(AUSTRALASIA) LTD. - SYDNEY

SCHEMATIC DIAGRAM
AERIAL COUPLING UNIT
FOR AT5 (Y10D/70212)

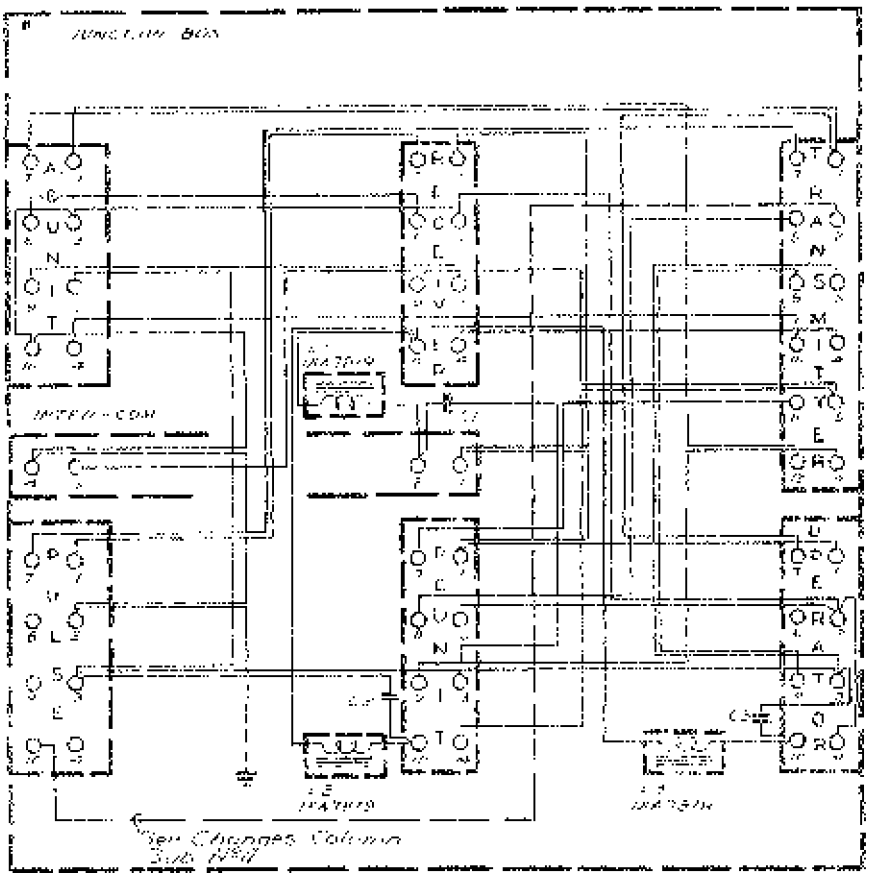
REF	
ARG'T	
DRN.	
TRCD	
CKD	
APP.	

TYPE J7732

DWG. 7732D13


7732 D12
APPROVED
DATE
30-12-41
CHANGES
TRACED
DRAWN
AMALGAMATED WIRELESS
(AUSTRALASIA) LTD · SYDNEY
WIRING DIAGRAM
AERIAL COUPLING UNIT
FOR AT5 (Y10D/70212)
TYPE J 7732
DWG. 7732 D12

7735D1



NOTE:-
Wiring side of terminal panel shown.

AMALGAMATED WIRELESS (AUSTRALASIA) LTD. : SYDNEY

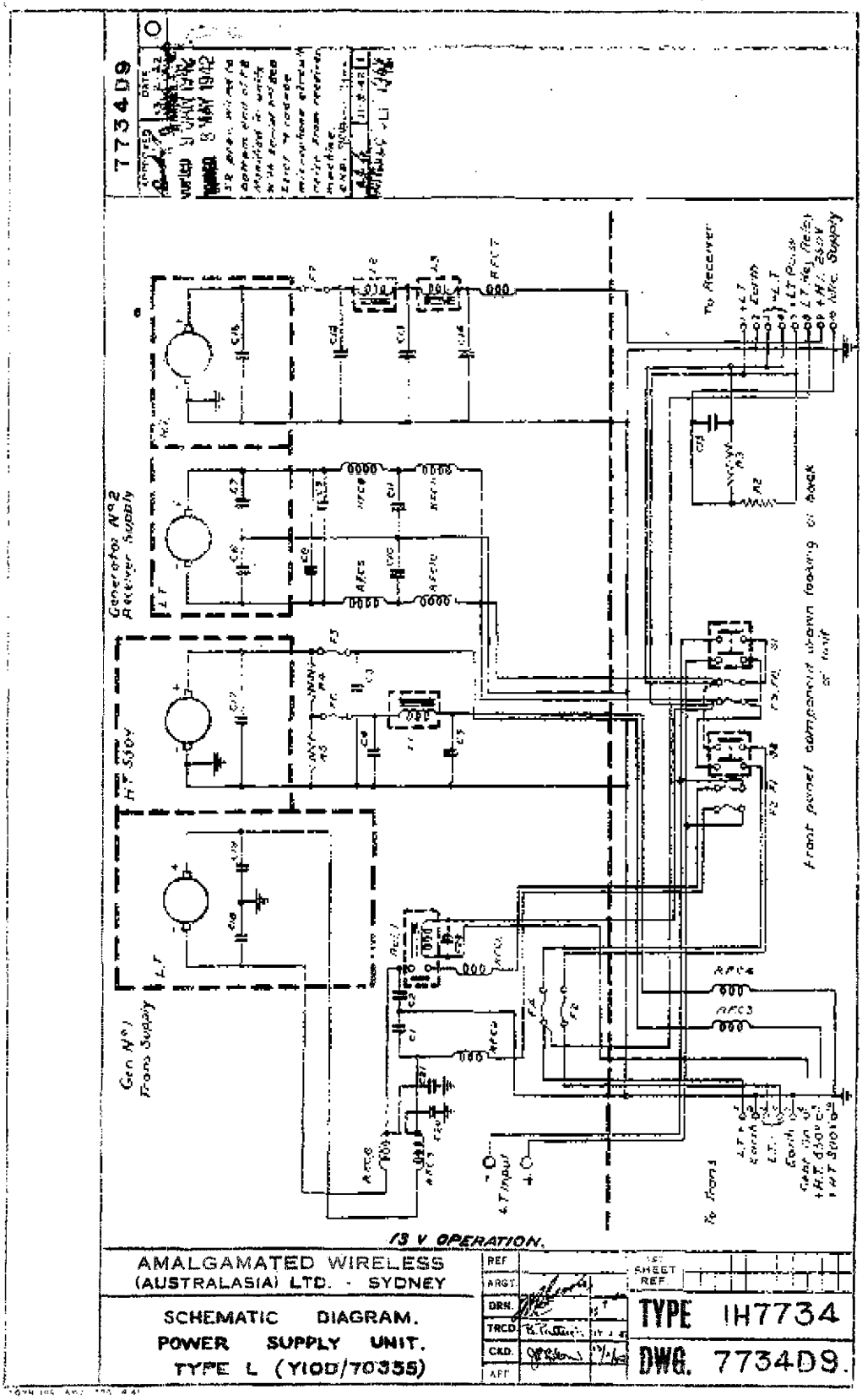
SCHEMATIC DIAGRAM

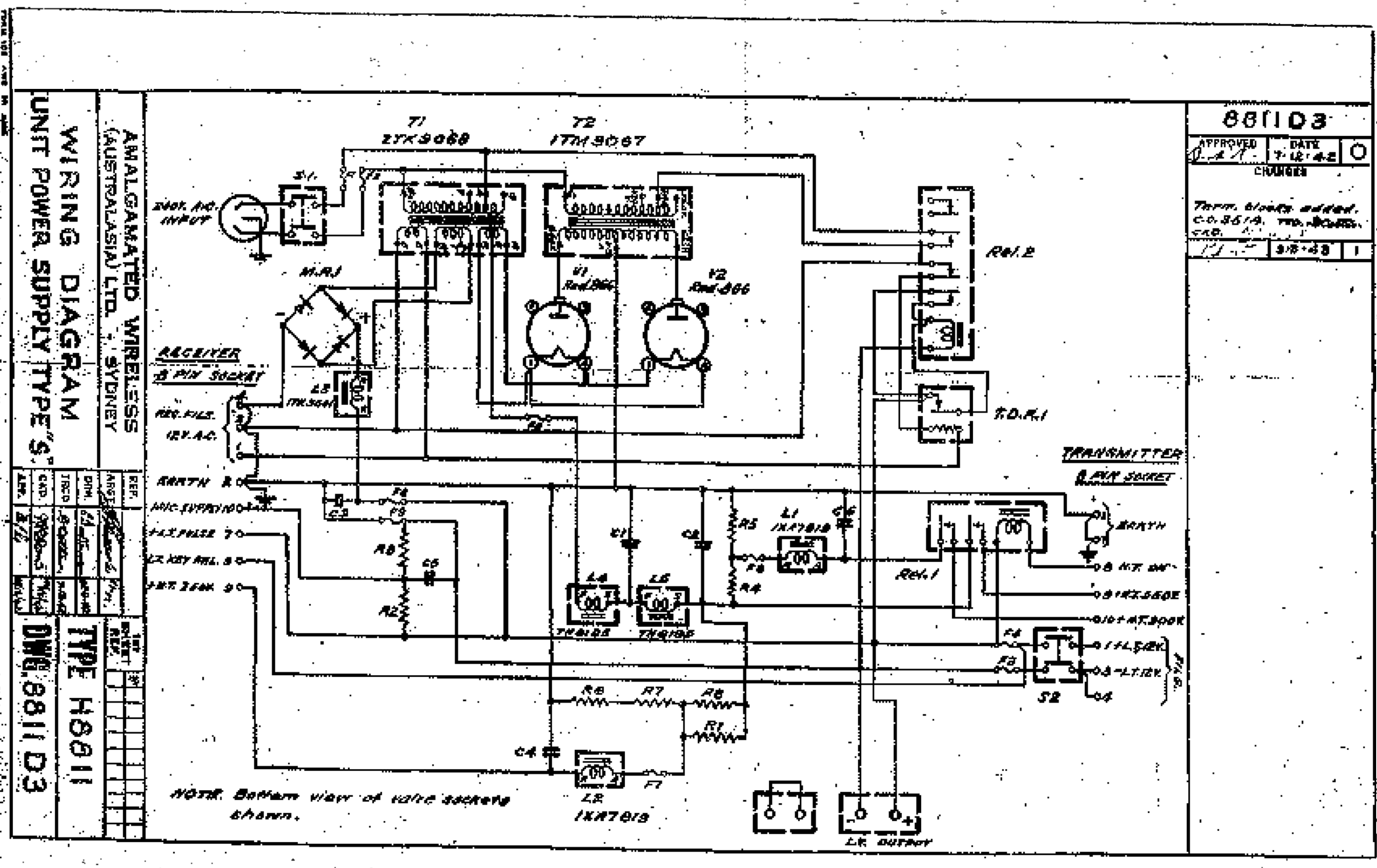
JUNCTION BOX
FOR AT5/AR8 (7100/7015)

TYPE R7735

DWG. 7735D1

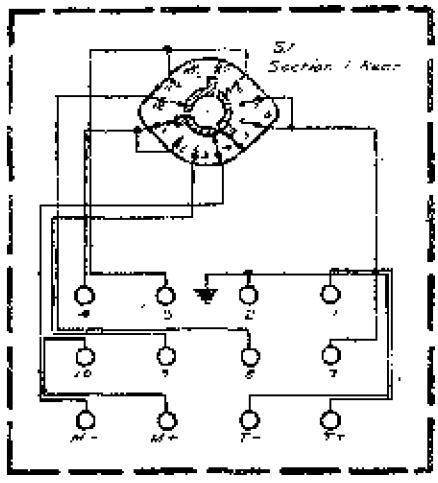
AMALGAMATED WIRELESS
(AUSTRALASIA) LTD. SYDNEY
SCHEMATIC DIAGRAM
POWER SUPPLY UNIT
TYPE G (A100/700214)
TYPE HT704
DWG. 773486


773409
To Receiver
Generator No 2
Receiver Supply
H.T. 560V
L.T.
Gen No 1
From Supply
To Panel
4.7 Input
13 V OPERATION.
AMALGAMATED WIRELESS
(AUSTRALASIA) LTD. - SYDNEY
SCHEMATIC DIAGRAM.
POWER SUPPLY UNIT.
TYPE L (Y10D/70355)
REF
ARGT
DRN.
TRCD
CKD.
APP.
SHEET REF
TYPE IH7734
DWG. 7734D9.



AMALGAMATED WIRELESS (AUSTRALASIA) LTD. SYDNEY
WIRING DIAGRAM
UNIT POWER SUPPLY TYPE "S"
TYPE H6811
DWG. 6811 D3
6811 D3
APPROVED
DATE
CHANGES
Term. blocks added.
T1
2TX9068
T2
1TM9067
S1
240V. A.C. INPUT
M.R.1
V1
Rad.866
V2
Rad.866
Rel.2
T.D.R.1
RECEIVER
8 PIN SOCKET
REC. FILS.
12V. A.C.
EARTH
L3
C3
F4
F5
R5
R6
R2
C5
C1
C2
C6
L1
1KA7818
L4
L5
TK8166
Rel.1
TRANSMITTER
8 PIN SOCKET
EARTH
S2
R8
R7
R1
C4
L2
1KA7818
F7
NOTE: Bottom view of valve sockets shown.
L.T. OUTPUT

0	ADD CHANGES TO GESTETNER STENCIL	



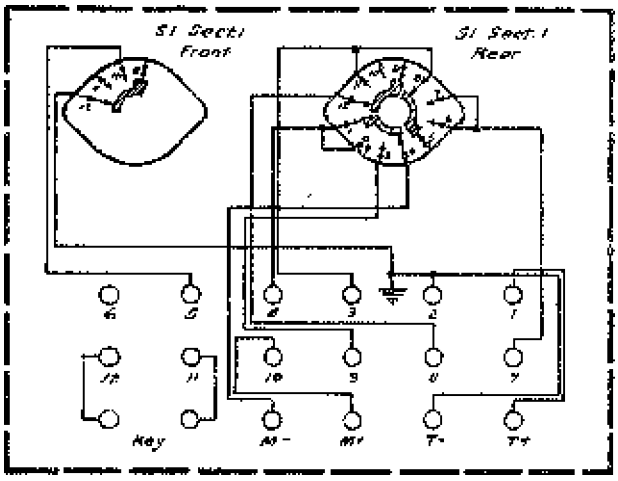
Oak Switch Note - Turn switch to extreme counter-clockwise position when looking at front of unit, then wire from back of switch as shown.

AMALGAMATED WIRELESS (AUSTRALASIA) LTD. - SYDNEY	REF.		TO: SHEET REF
	ARGT.		
SCHEMATIC DIAGRAM	DRN.		TYPE P7755
	TRCD.		
REMOTE CONTROL UNIT FOR AT5/AR8(Y10D/70216)	CKD.		DWG. 7755D2
	APP.		

FORM 108 AWA 350 4.61

7755D5		
APPROVED	DATE	CHANGES
C.A.	31-7-42	O

ADD CHANGES To GESTETNER STENCIL



Oak Switch Note: Turn switch to extreme counter-clockwise position when looking at front of unit, then wire from back of switch as shown.

AMALGAMATED WIRELESS
(AUSTRALASIA) LTD. - SYDNEY

SCHEMATIC DIAGRAM
REMOTE CONTROL UNIT

DES.	
ARCT.	
DRN.	
TRCD	
CHD.	
APP.	

1ST SHEET REF.

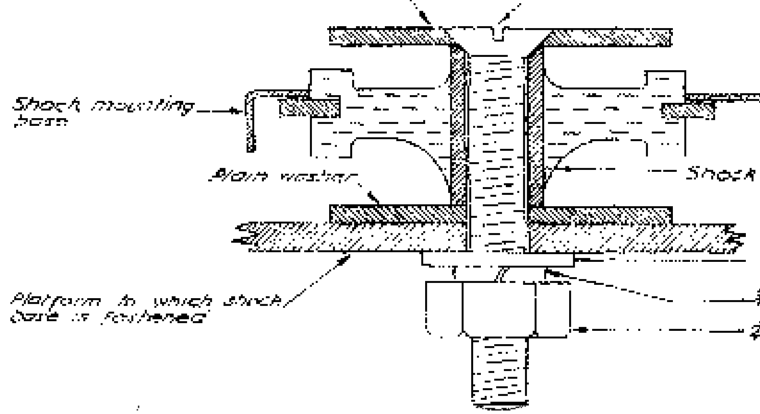
TYPE 1P7755

DWG. 7755D5

FORM 109 AWA 350 4/41

The sketch shows the correct assembly of shock absorber, washers, and bolt for the normal method of mounting of Type Z 7749 series shock bases.

SCALE:- Twice full size.



7749D1

Csk Screws was BSF C.O 19/5/42

Trd & ckd.

26-5-42

AMALGAMATED WIRELESS (AUSTRALASIA) LTD. - SYDNEY

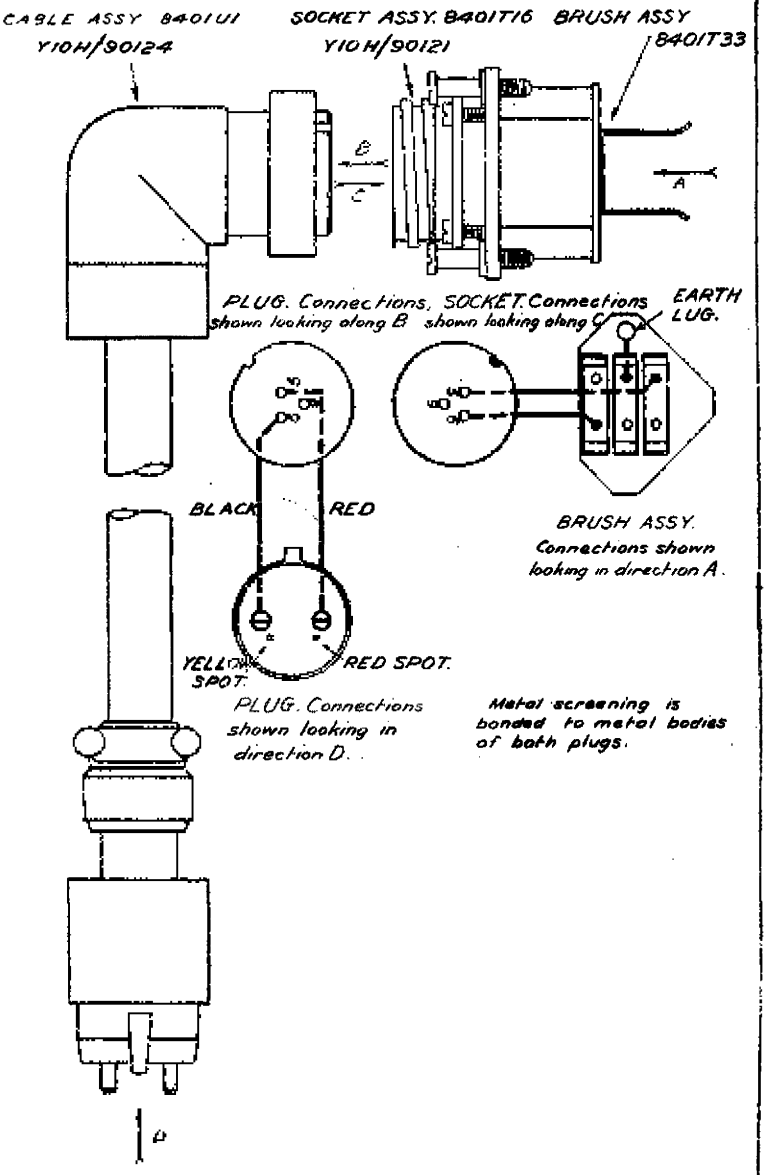
SHOCK ABSORBER ASSEMBLY AND MOUNTING DETAILS

TYPE

DWG. 7749D1

8401D1

APPROVED	DATE	
A.W.A.	22.12.41	0
	CHANGES	



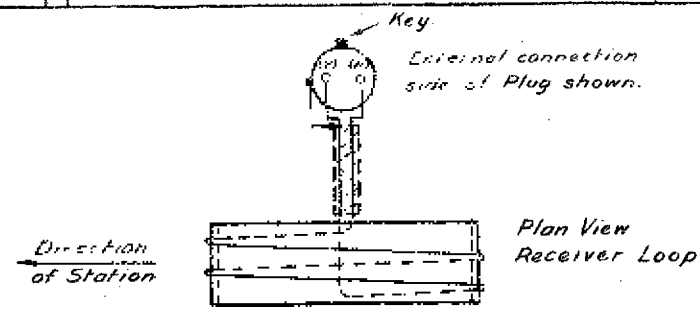
AMALGAMATED WIRELESS
(AUSTRALASIA) LTD. · SYDNEY

CABLE "N" FOR CONNECTING BENDIX LOOP TO A.R.8 RECEIVER IN HUDSON INSTALLATION.

REF.		1st SHEET REF. 1
ARGT.		TYPE B8401
DRN.		
TRCD.		
CKD.		22/12
APP.		DWG. 8401D1

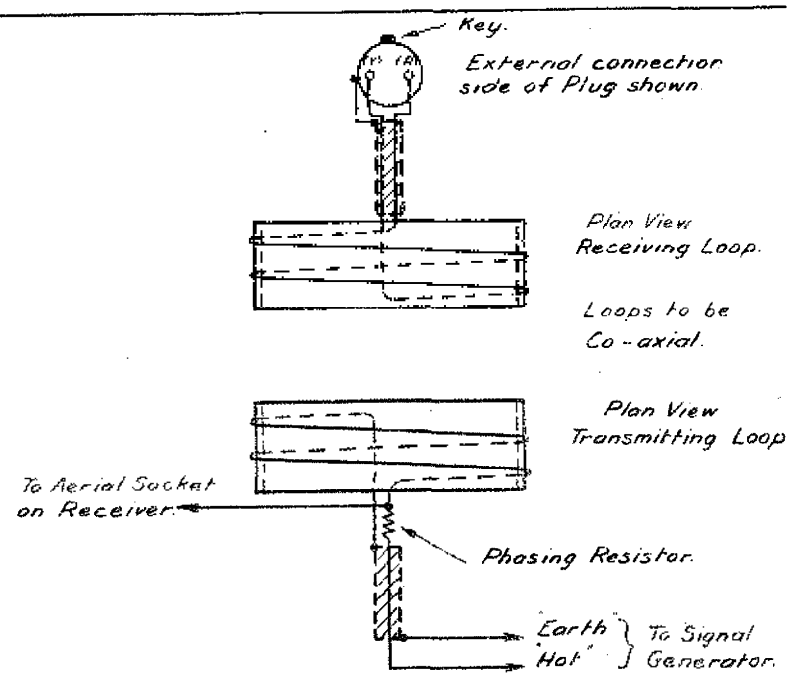
FORM 105 AWS 550 4/41

APPROVED	DATE	CHANGES
		Name added. 17-2-43



Open aerial to be effectively vertical and to be above the loop with connection to receiver at base of aerial.

AERIAL CONDITION.



SIGNAL GENERATOR CONDITION.

NOTE - With orientation and connections as shown correct sense should be obtained when connected to a receiver, i.e. minimum output should be obtained in the "Bearing" position of the loop reversing switch.

AMALGAMATED WIRELESS (AUSTRALASIA) LTD. - SYDNEY

CONDITIONS FOR SENSE CHECK ON AR8 RECEIVER

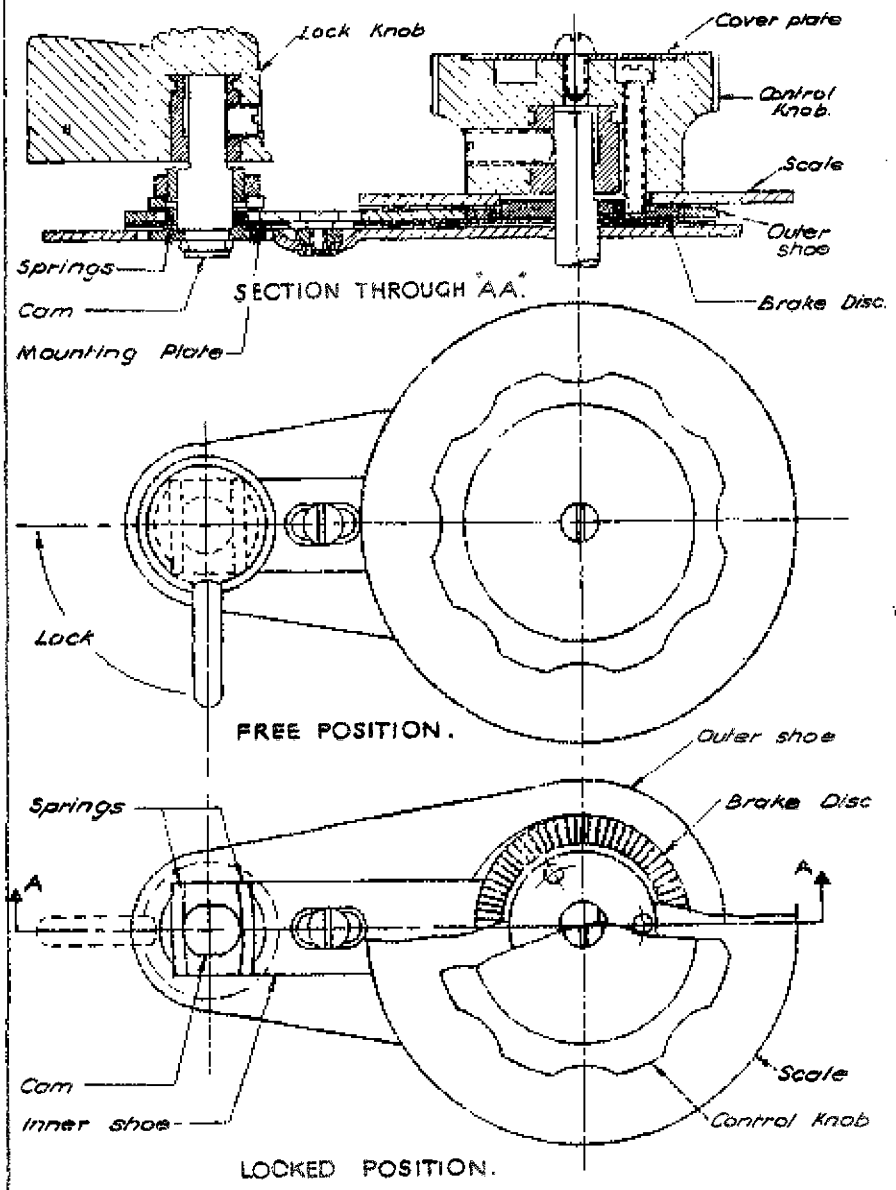
REF.		
ARGT.		
DRN.		
TRCD.		
CKD.	J.B.	18/12
APP.	A.J.L.	15-12-42

SHEET No. 1/2

TYPE

DWG. 7730D1

7752D1



AMALGAMATED WIRELESS (AUSTRALASIA) LTD. - SYDNEY

SCALE LOCKING DEVICE

TYPE R7752

DWG. 7752D1

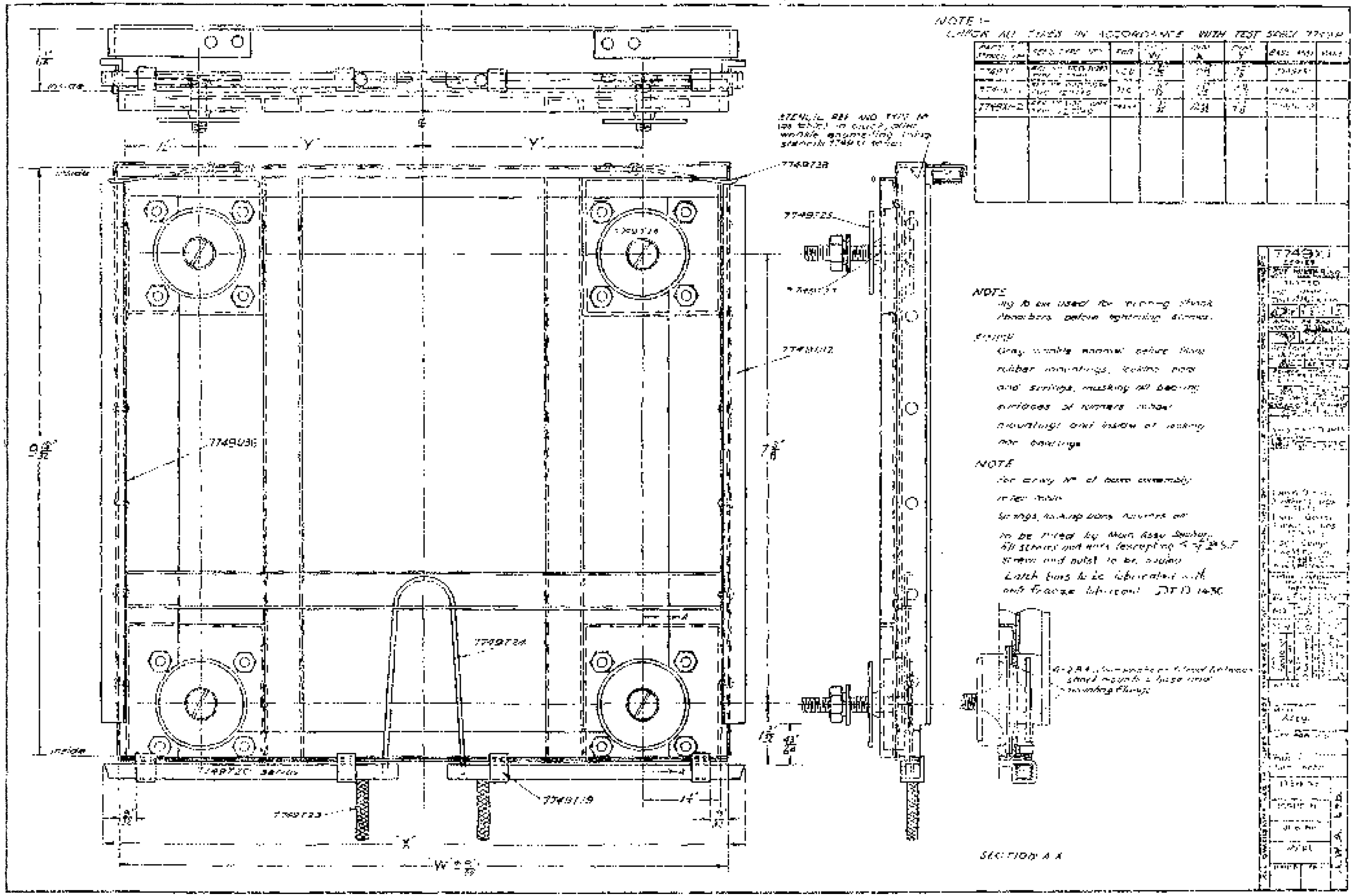
AMALGAMATED WIRELESS
(AUSTRALASIA) LTD. - SYDNEY

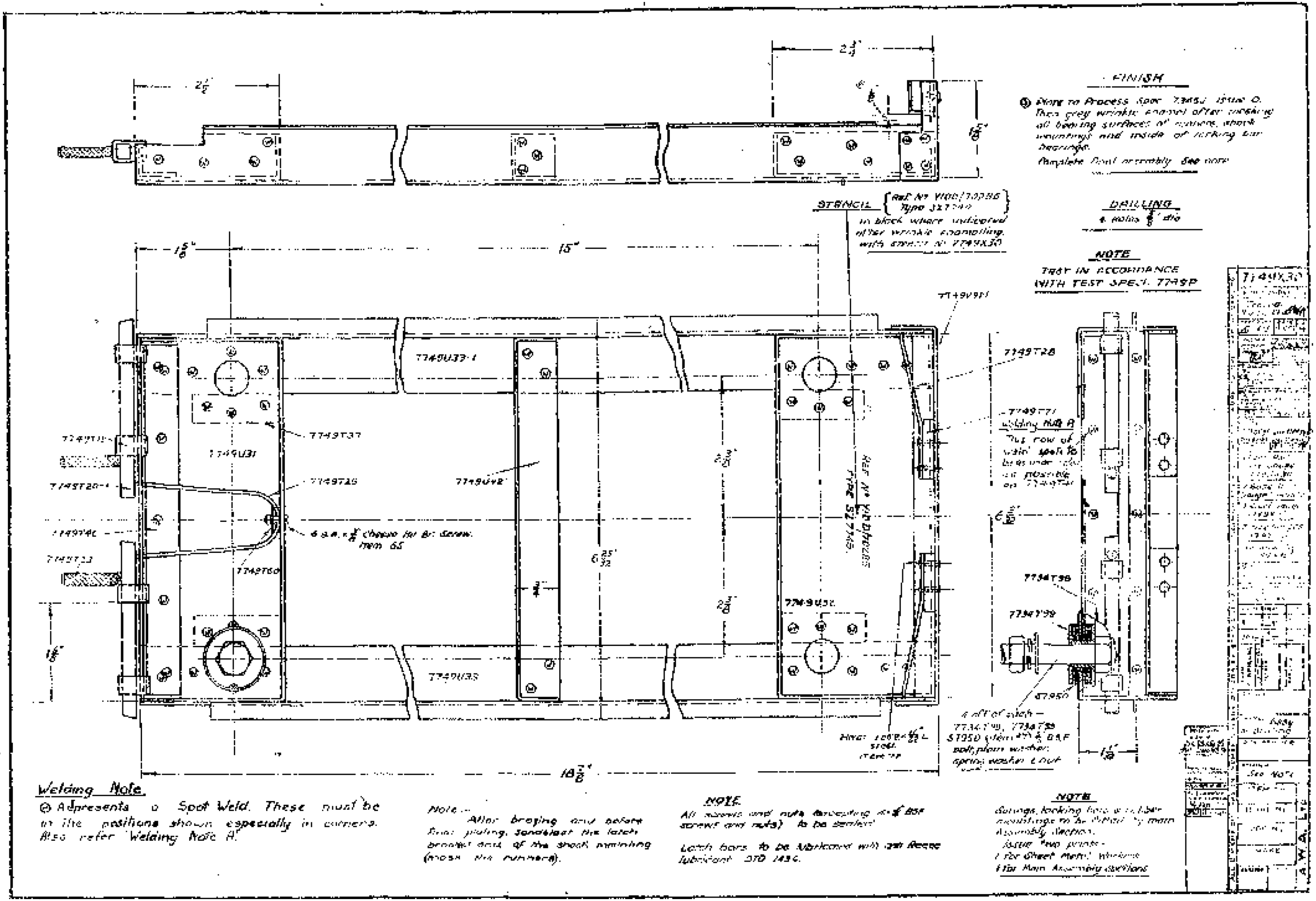
SIMPLIFIED SCHEMATIC
DIAGRAM
RELAY TEST UNIT

TYPE A9641

DWG. 9641DI

8641DI


NOTE:-
STENCIL REF AND TYPE No
7749738
7749725
7749712
7749036
7749734
7749720 series
7749723
7749119
NOTE
Jig to be used for trimming shock absorbers before tightening screws.
Grey stoving enamel before fixing rubber mountings,
and springs, masking all bearing
NOTE
Springs, locking bars, runners etc
to be fitted by Main Assy Section.
Latch bars to be lubricated with
anti-freeze lubricant DTD 1436
SECTION A.A

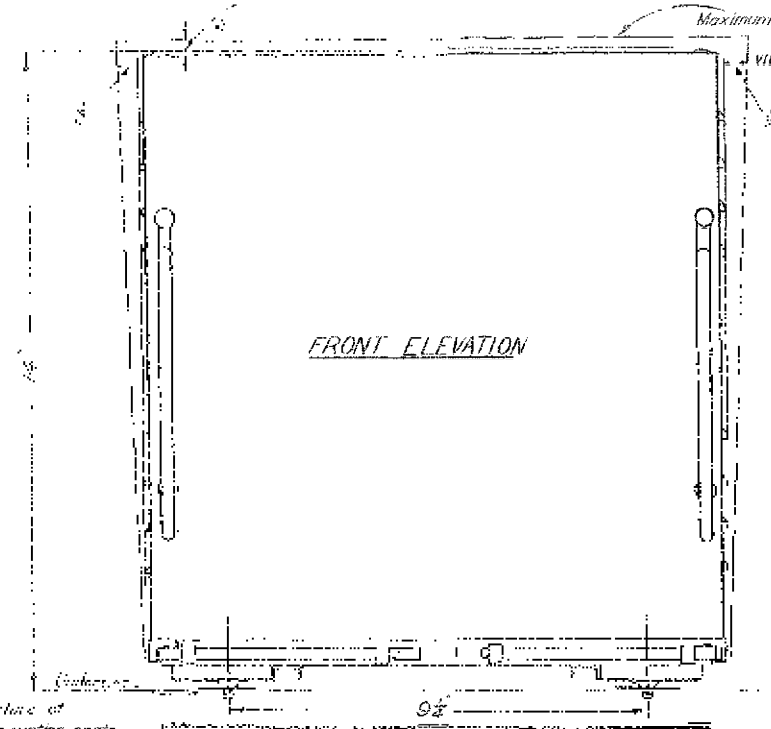

FINISH
Plate to Process Spec. 7345J Issue O.
Then grey wrinkle enamel after masking all bearing surfaces of runners, shock mountings and inside of locking bar bearings.
Complete Tray assembly. See note
DRILLING
4 holes 1/8" dia
NOTE
TEST IN ACCORDANCE WITH TEST SPEC. 7749P
STENCIL (Ref. No. Y100/70256 Type 327749) in black where indicated after wrinkle enamelling, with stencil No. 7749X30
Ref. No. Y100/70285 TYPE 327745
15"
1 5/8"
18 7/8"
6 25/32"
2 3/8"
7749U33-1
7749U33
7749U31
7749U42
7749T37
7749T25
7749T60
7749T28
7749V91
7749T40
7749T33
7749T20-1
7749U32
7734T98
7734T99
87950
6 B.A. x 1/8" cheese hd. Br. Screw. Item 65
4 off of each — 7734T99, 7734T98, 87950 (item 47) 4 B.A.F. bolt, plain washer, spring washer & nut
Welding Note
⊙ Represents a Spot Weld. These must be in the positions shown especially in corners. Also refer Welding Note A.
Note:— After brazing and before final plating, sandblast the latch bracket ends of the shock mounting (mask the runners).
NOTE
All screws and nuts (excepting 4 B.A.F. screws and nuts) to be sealed.
Latch bars to be lubricated with gun Grease lubricant DTD 143A.
NOTE
Springs, locking bars & rubber mountings to be fitted by main Assembly section.
Issue two prints— 1 for Sheet Metal Workers, 1 for Main Assembly sections
7749X30

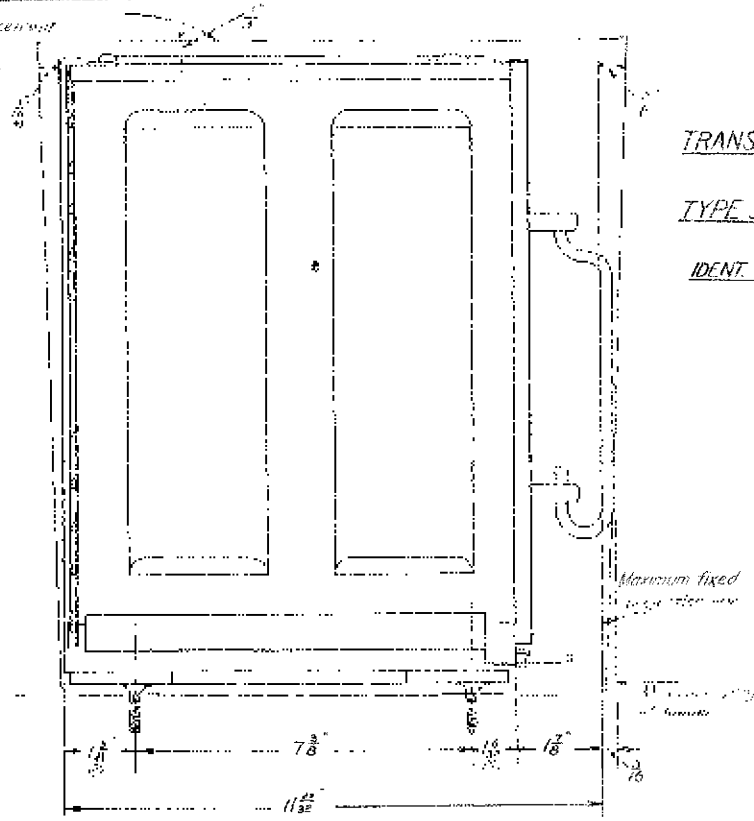
TRANSMITTER TYPE A.T.5

TYPE J773i

IDENT No. Y100/7021!

DRWG. No 773/81

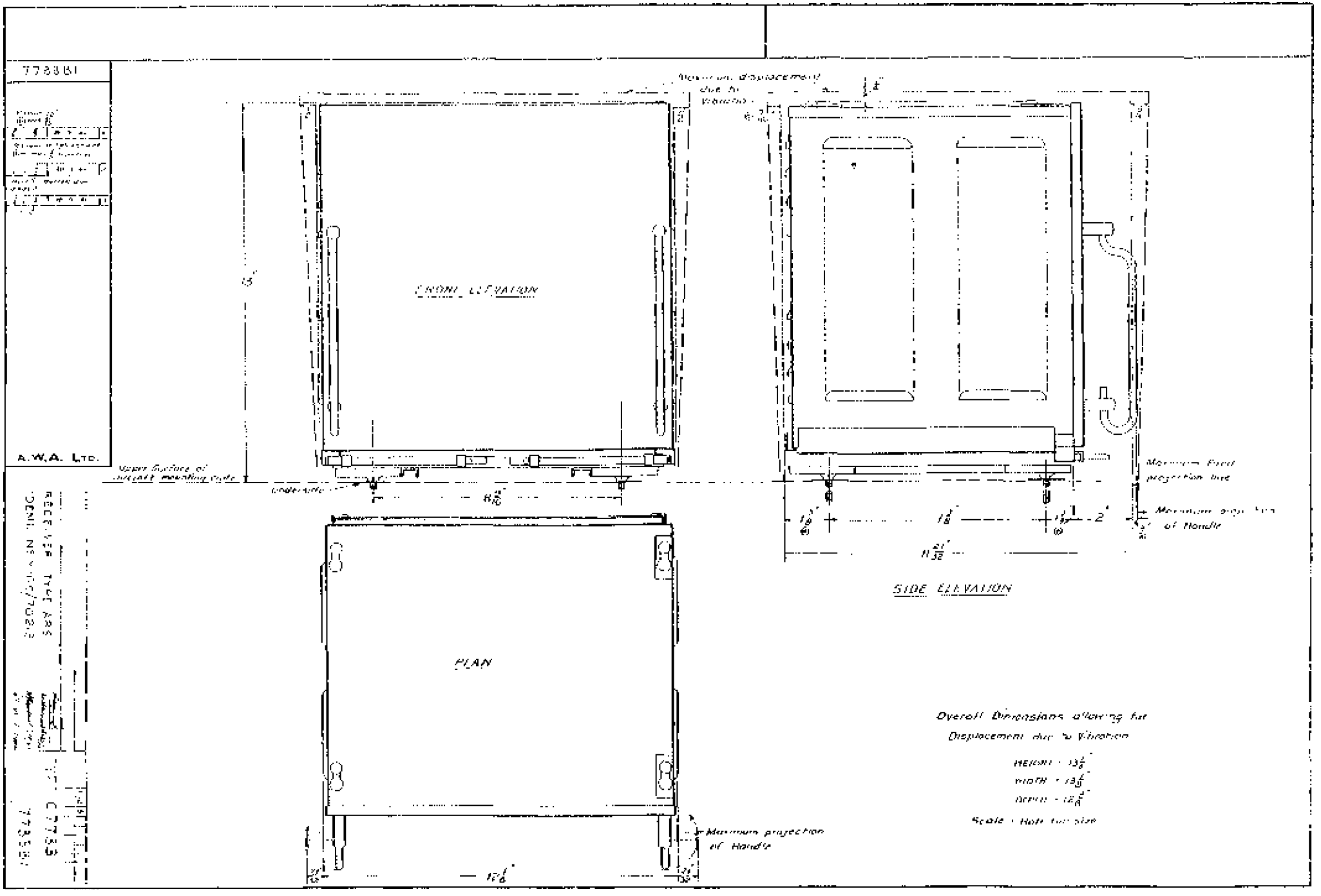


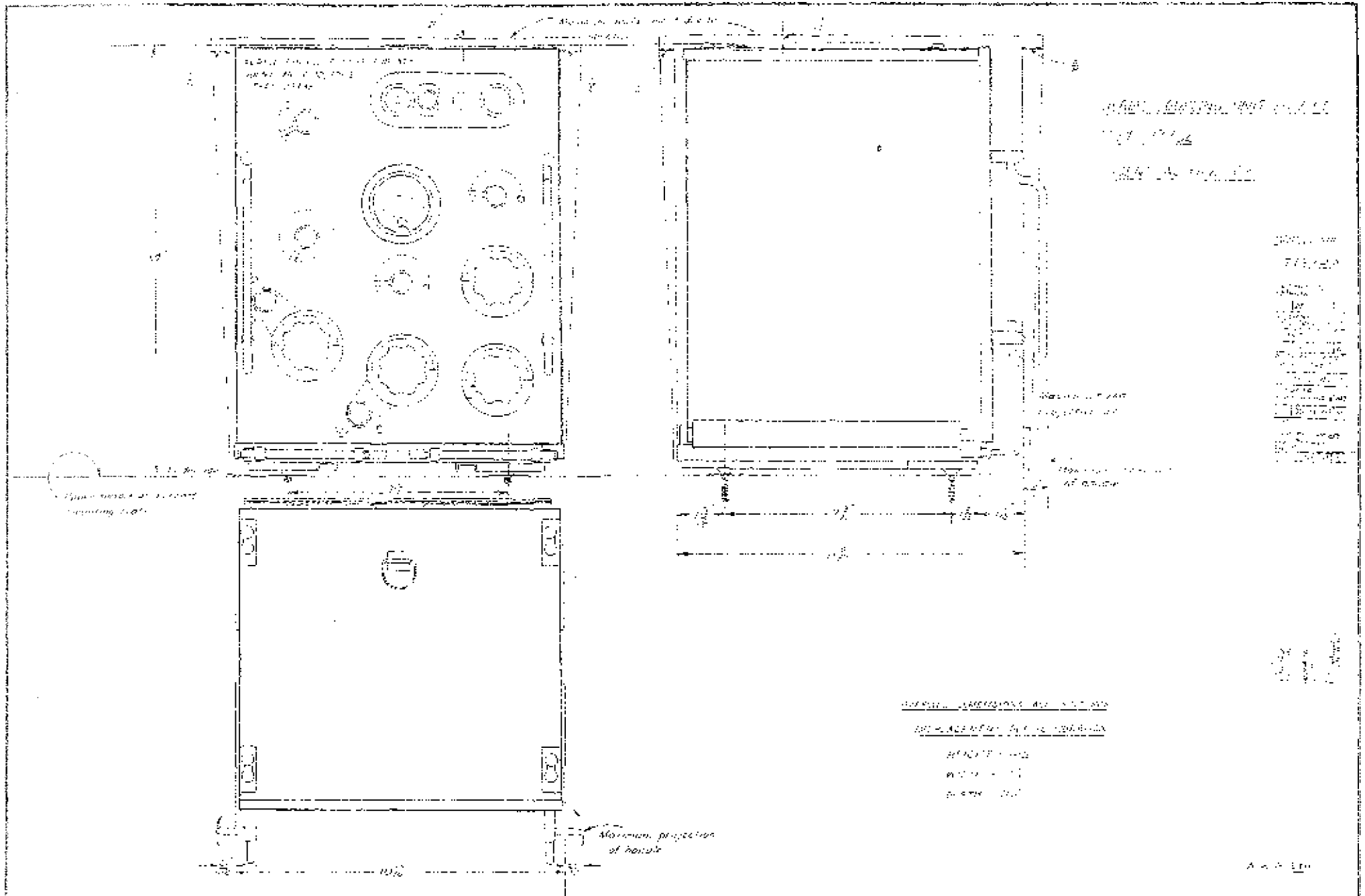


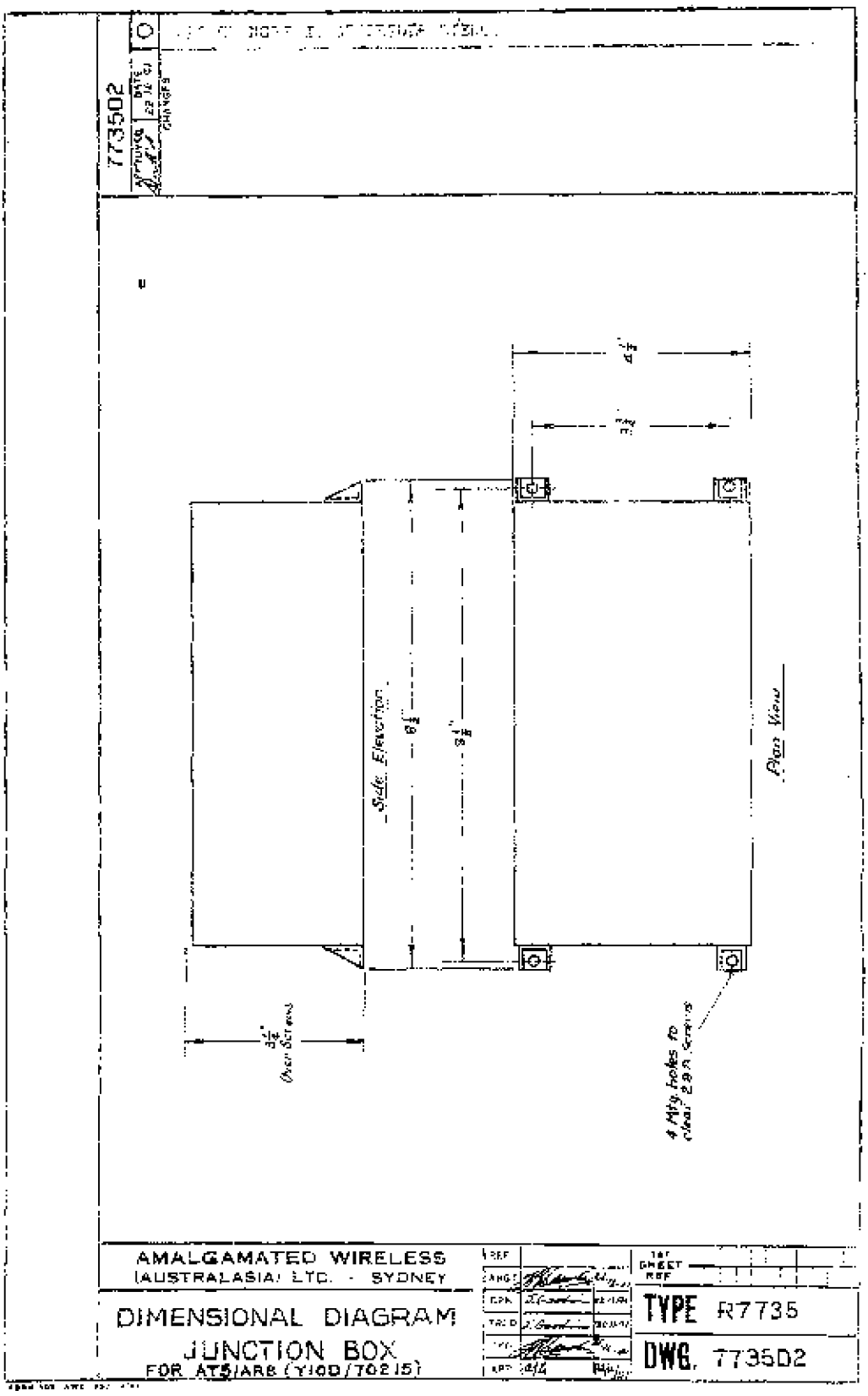
OVERALL DIMENSIONS ALLOWING FOR DISPLACEMENT DUE TO VIBRATION.

HEIGHT
WIDTH
DEPTH

ITEM No.
ISSUE No.
JOB No.
MAKE
A.W.A. LTD.


FRONT ELEVATION
SIDE ELEVATION
PLAN
Maximum projection of Handle
Maximum projection of Handle
A.W.A. LTD.



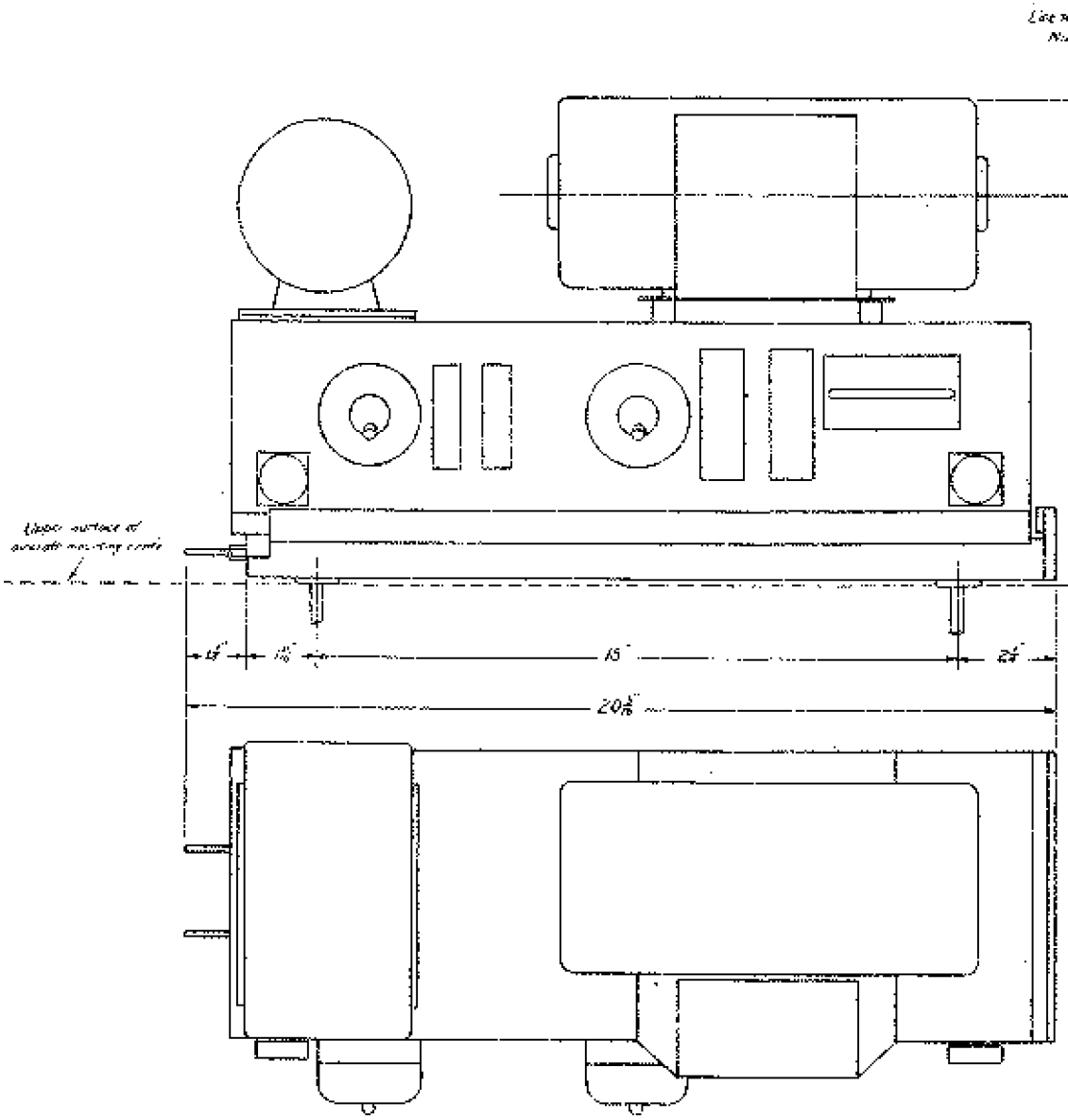


AMALGAMATED WIRELESS
(AUSTRALASIA) LTD. - SYDNEY

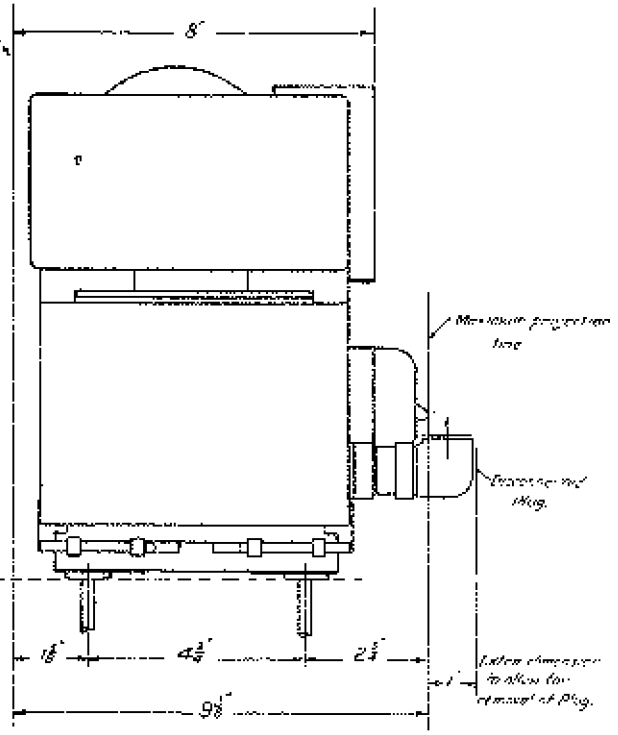
DIMENSIONAL DIAGRAM
JUNCTION BOX
FOR AT5/ARB (Y10D/702151)

TYPE R7735

DWG. 773502



FRONT ELEVATION & PLAN



END ELEVATION

UNIT POWER SUPPLY TYPE G (FOR AI SARS)
TYPE H7734 WITH CARTER TYPE GENEMOTOR
IDENT N° V102/7024 E5335.

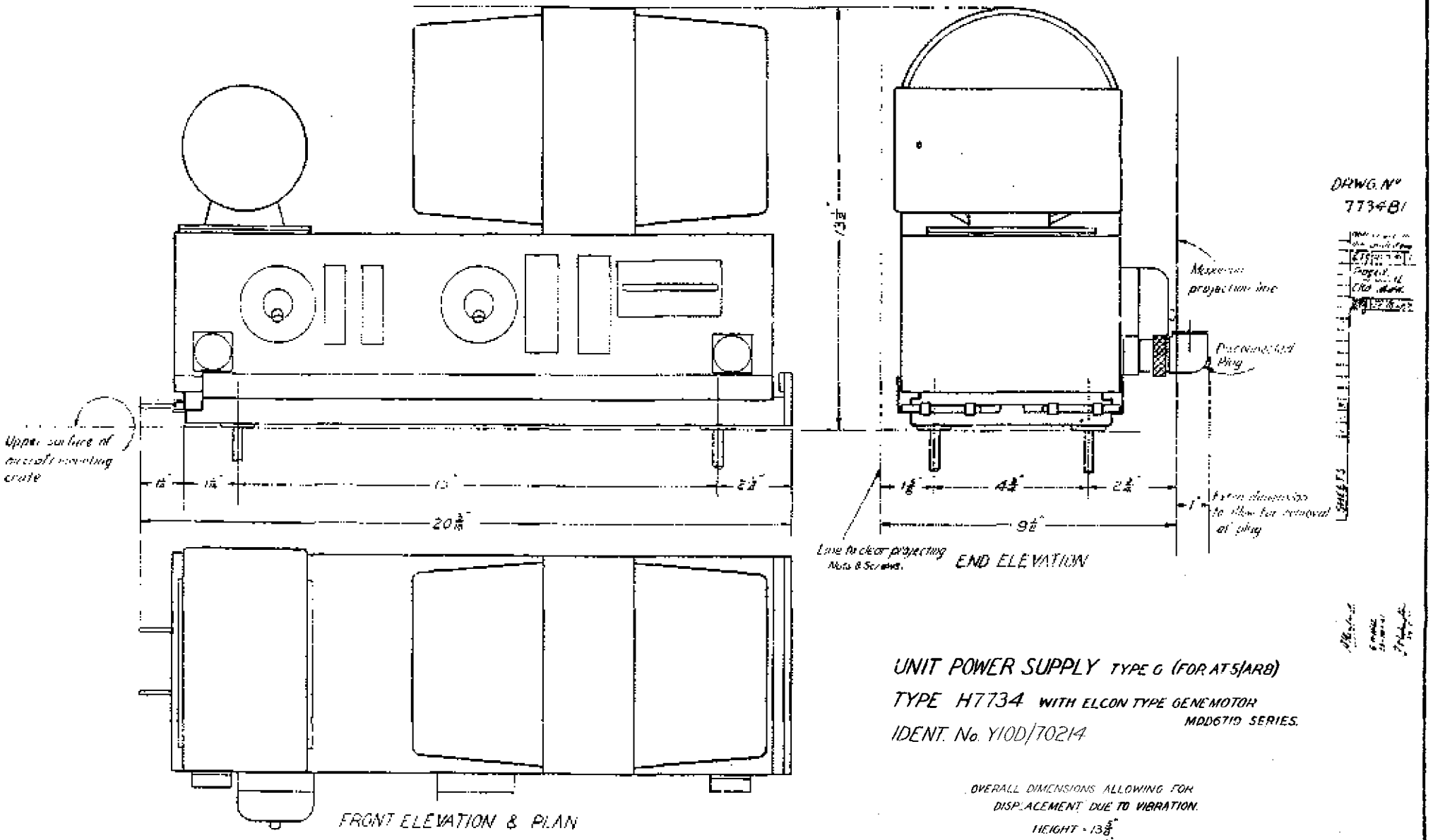
OVERALL DIMENSIONS, ALLOWING FOR DISPLACEMENT DUE TO VIBRATION

HEIGHT - 11⅝"
WIDTH - 20⅝"
DEPTH - 10½"

DRWG N° H7734 B2

ISSUE No.	
JOB No.	
MAKE	

A.W.A. LTD



UNIT POWER SUPPLY TYPE G (FOR AT5/ARB)

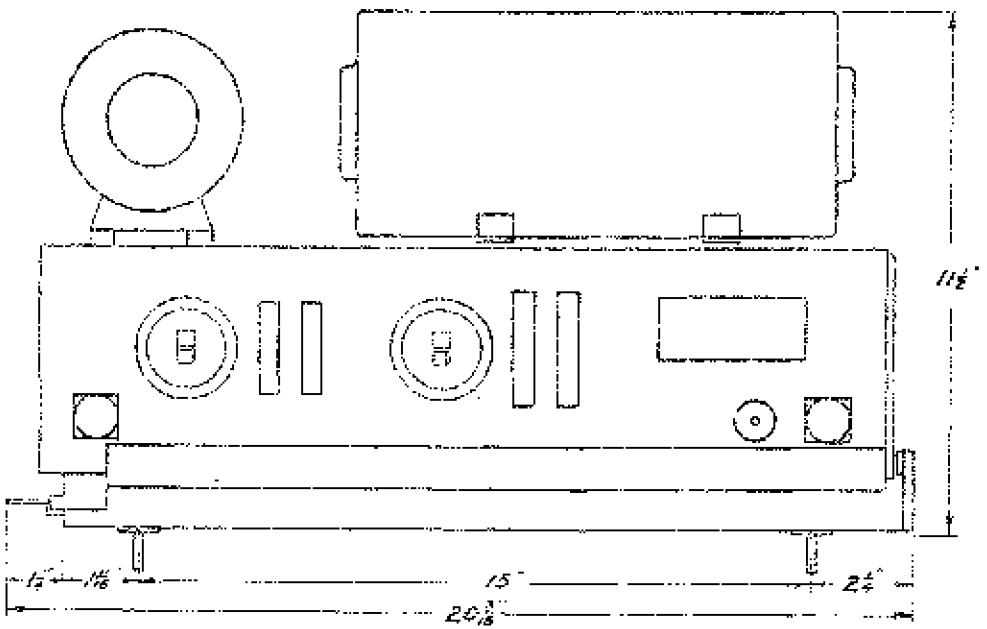
TYPE H7734 WITH ELCON TYPE GENEMOTOR MOD6719 SERIES.

IDENT. No. Y10D/70214

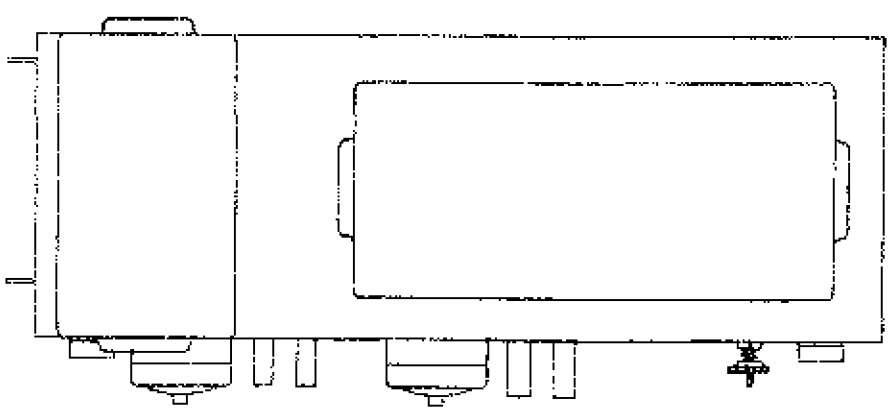
OVERALL DIMENSIONS ALLOWING FOR DISPLACEMENT DUE TO VIBRATION.

HEIGHT = 13⅝"
WIDTH = 20¼"
DEPTH = 10¼"

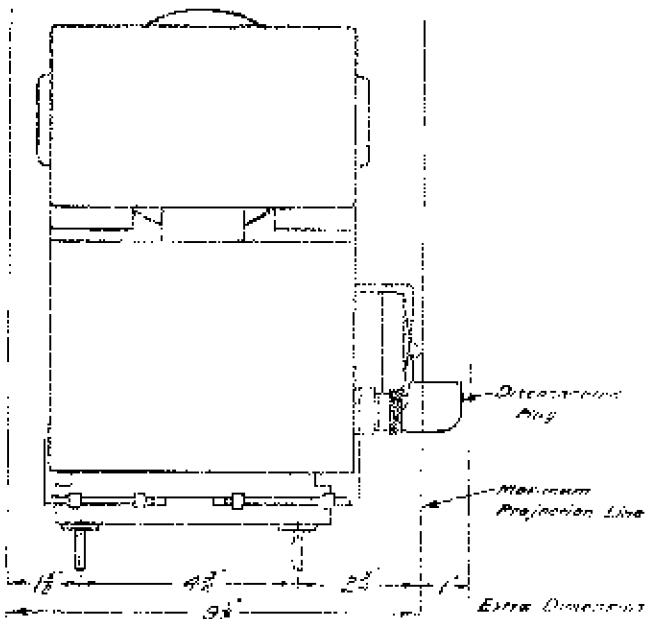
A.W.A. LTD.



FRONT ELEVATION



PLAN



END ELEVATION

TYPE 'B' 4773A 1100/70214
TYPE 'L' 11 4773A 1100/70355
Employing MOD AEEC Series Machines.

OVERALL DIMENSIONS ALLOWING FOR DISPLACEMENT DUE TO VIBRATION
HEIGHT - 11½"
WIDTH - 20⅝"
DEPTH - 10⅜"

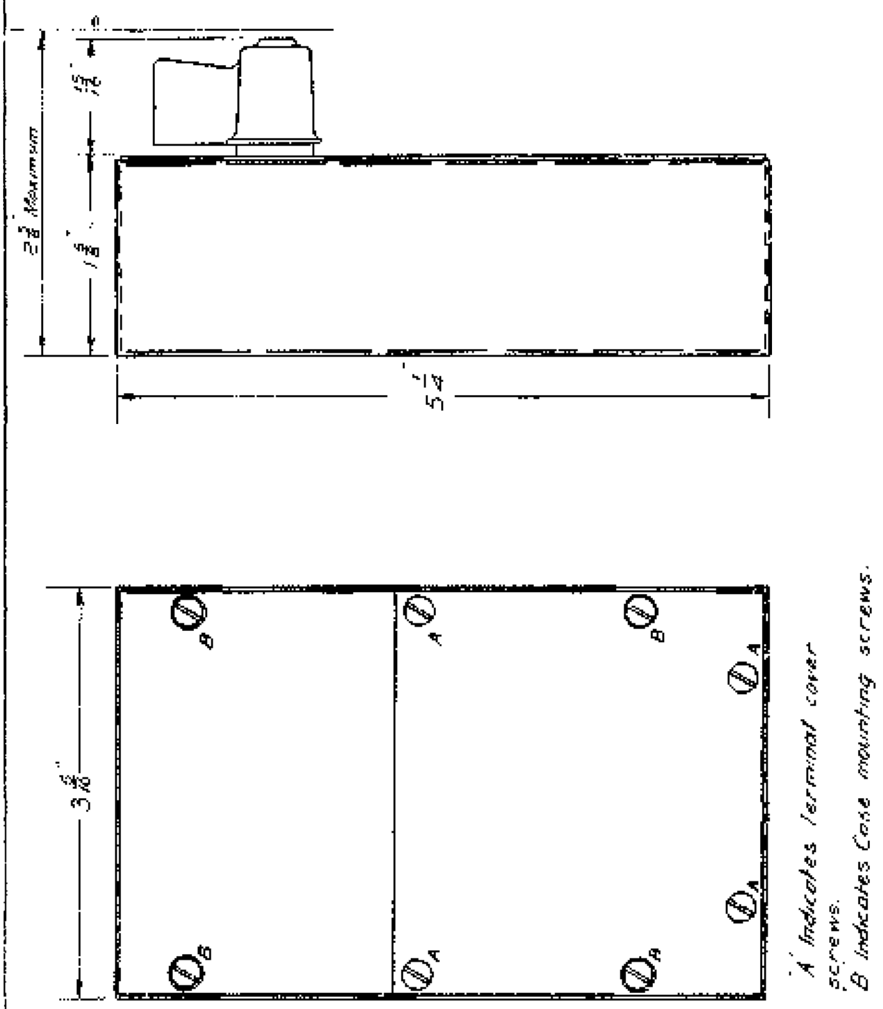
AMALGAMATED WIRELESS (AUSTRALASIA) LTD. - SYDNEY

UNIT POWER SUPPLY (FOR AT5/AR8)

TYPE 4773A SERIES

DRG. 773453

7755D3	APPROVED	DATE	0
		22.12.41	CHANGES

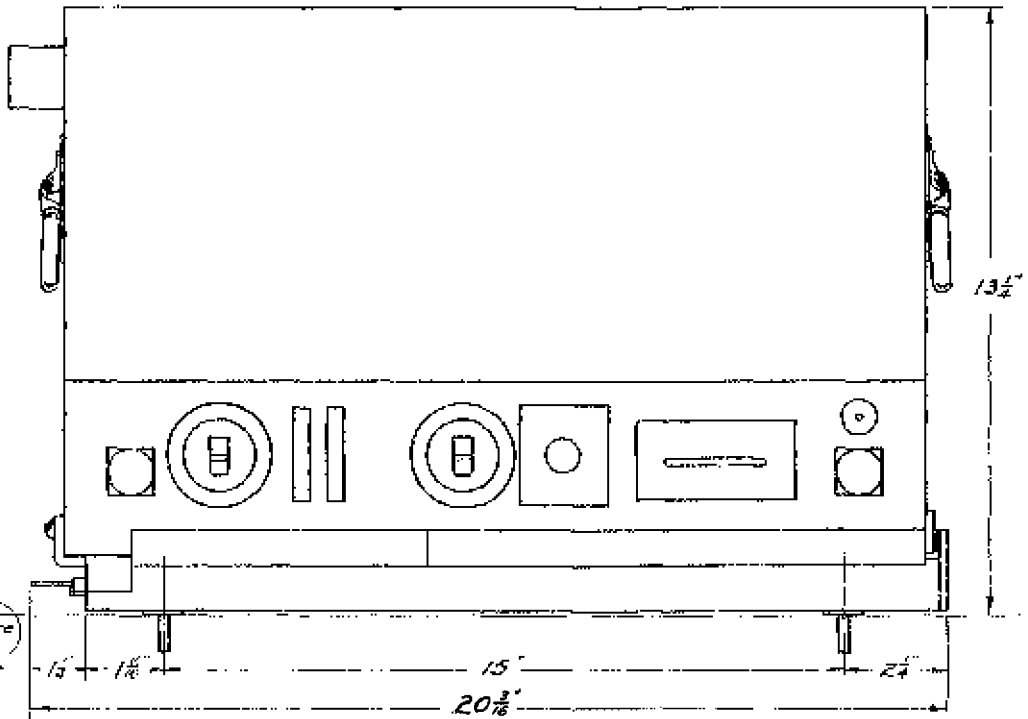


Scale: Full Size.

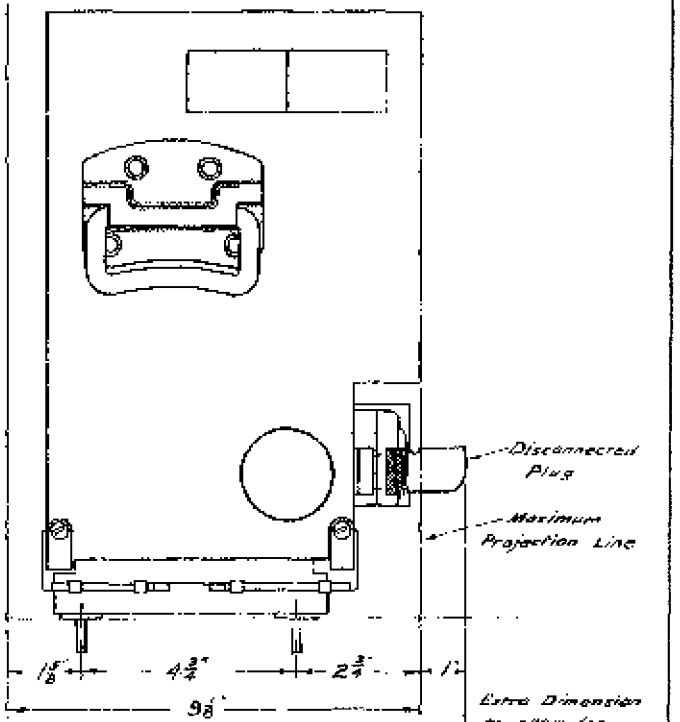
AMALGAMATED WIRELESS (AUSTRALASIA) LTD. - SYDNEY	REF / ARGT.		1ST SHEET REF
DIMENSIONAL DIAGRAM	DRN. / TRCD		TYPE P7755
REMOTE CONTROL UNIT FOR AT5/AR8 (Y10D/7021G)	CKD / APP.		DWG. 7755D3

8811B1

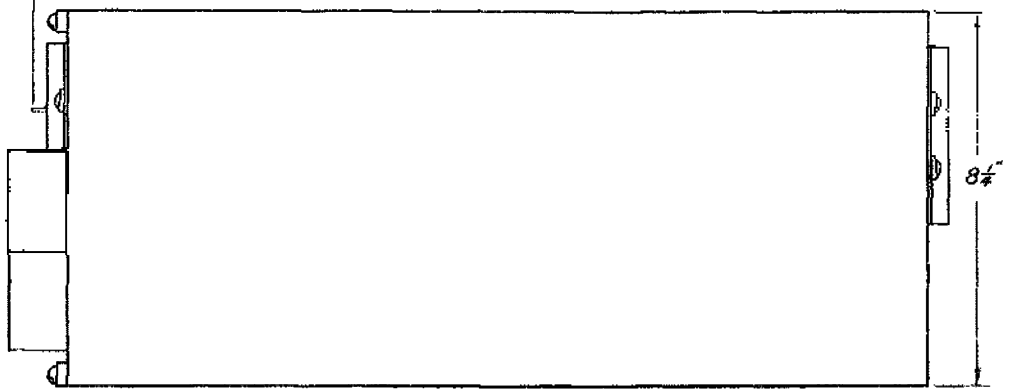
	DATE
	4.5.45
CHANGES	
ORIGINAL	



FRONT ELEVATION



END ELEVATION



PLAN.

OVERALL DIMENSIONS ALLOWING FOR DISPLACEMENT DUE TO VIBRATION.

HEIGHT - 13⅜"
WIDTH - 20½"
DEPTH - 10¼"

AMALGAMATED WIRELESS (AUSTRALASIA) LTD. - SYDNEY

UNIT POWER SUPPLY TYPE 5 (FOR AT5/AR8) IDENT. Nº Y100/70486

DRG. 8811B1

TYPE H8811