

RESTRICTED

A.P. 116D-0105-5F(N)

Issue 2.

ARI 18124

UHF TRANSMITTER-RECEIVER

ARC 52

BAY SERVICING SCHEDULE

BY COMMAND OF THE DEFENCE COUNCIL

Michael Conway

Ministry of Defence.

Sponsored for use in the

ROYAL NAVY by HAD(N)

**Service users should send their comments through
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AP(N) 140 Chap.1 Annex A.**

Issued October 1974

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AMENDMENT RECORD SHEET

To record the incorporation of an Amendment List in this publication sign against the appropriate A.L. N° and insert the date of incorporation.

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INSTRUCTIONS

1. Bay Servicing Schedules which constitute Topic -5F(NAVAL) of the relevant Air Publication are designed to guide technical personnel engaged in servicing R.N. aircraft.
2. These schedules apply to equipment removed from aircraft in accordance with current servicing procedures or the pre-installation test of equipment undergoing repair.
3. Section I of this schedule details the minimum extent of maintenance which must be carried out to ensure that the equipment is in a serviceable condition.
4. All outstanding modifications are to be embodied, as applicable, during servicing of equipment and relevant STIs carried out.
5. Efforts should be made to locate defects and rectify unserviceable equipment within the repair facilities of the workshop before returning such "unserviceable" equipment to Naval Stores.
6. Details of further operations which may be necessary to improve the overall performance of the equipment are included in the Supplementary Servicing Section of this schedule.
7. The subject matter of this publication may be affected by DCIs (RN) NTIs, Topic -2 leaflets or other orders. When an instruction, order or leaflet contradicts any portion of this publication, the instruction, order or leaflet is to be taken as the over-riding authority.
8. Where information in this schedule differs from that contained in the Topic -1, this publication is to be taken as the over-riding authority.
9. In ships and establishments not provided with Second Line servicing facilities, authorisation is given in the Naval Aircraft Maintenance Manual for a First Line Functional Test to be carried out on equipment as an alternative to a Standard Serviceability Test requiring Second Line servicing facilities.

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LIST OF PRINCIPAL COMPONENTS

<u>REF. NO.</u>	<u>DESCRIPTION</u>
5821-99-942-8542	Transmitter Receiver TR5/ARC 52
5821-99-942-8541	Transmitter Receiver TR4/ARC 52
5821-99-942-8544	Tray, mounting, transmitter-receiver, radio. Type MT 1477/ARC 52.
5821-99-942-8543	Control Unit, transmitter-receiver radio Type C1607/ARC 52.
5821-99-945-5739	Control, radio set, Type C1607/4/ARC 52
5821-99-107-0030	Control, radio set, Type C1607/7/ARC 52
5821-99-943-3247	Control, receiver muting
5821-99-932-6361	Interconnecting box.
5985-99-932-6362	Antenna, (Derveaux, Type 248).
5985-99-911-8266	Aerial, (McMichael EDC/18136).
5945-99-932-1487	Relay, armature.
5985-99-222-2399	Antenna, Chelton Type 16-1

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TEST EQUIPMENT REQUIRED

COMMON RANGE

<u>Ref. No.</u>	<u>Description</u>	<u>Qty</u>
6625-99-580-6581	Signal Generator CT452A	1
Accessories for use with CT452A		
5995-99-940-0491	Cable assembly. Power.	1
5995-99-580-0513	Connector R.F. (BNC/BNC. 5 ft.)	1
6625-99-943-4059	Signal Generator CT433	1
6625-99-972-6346	Signal Generator CT394A	2
Accessories for use with CT394A		
5995-99-940-0491	Cable assembly. Power.	2
5995-99-972-8884	Connector R.F.	2
5995-99-972-8882	Connector R.F.	2
6625-99-943-3486	Lead Test D.C. Isolating	1
5995-99-972-8894	Adaptor 'T' Piece	2
5920-99-932-4381	Fuse Unit Co-axial	1
5920-99-999-3402	Fuse Link	A.R.
6625-99-580-6726	Oscilloscope CT484	1
Accessories for use with CT484		
6625-99-580-7466	Amplifier	1
6625-99-580-7467	Amplifier (Dual Trace)	1
6625-99-914-2604	Cable assembly R.F. (3 ft)	2
6625-99-914-2603	Cable assembly R.F. (13 inch)	1
5995-99-580-7463	Cable assembly R.F. (6 ft.)	2
5995-99-940-0491	Cable assembly power electrical (7 ft.)	1
6625-99-945-0506	Probe electronic test	1
6625-99-914-2815	Adaptor (BNC terminal)	1
5935-99-943-8203	Adaptor (BNC 83)	2
5935-99-932-2819	Adaptor (plug to plug)	1
6625-99-580-7462	Box stowage for accessories	1
6625-99-999-2642	Calibrator Frequency	1
6625-99-943-7328	Monitor RF/AF Assembly includes:	1
6625-99-999-2350	Monitor RF/AF	1
5995-99-932-2263	Connector	1
6625-99-972-2863	Leak Locator CT105	1
6625-99-946-8729	Leak Indicator Kit CT106	1

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TEST EQUIPMENT REQUIRED (CONTINUED)COMMON RANGE (CONTINUED)

<u>Ref. No.</u>	<u>Description</u>	<u>Qty</u>
6625-99-943-5568	Wattmeter, Absorption, CT419	1
6625-99-943-6879	Monitor R.F.	1
0557-5047	Wee Megger 250 volt	1
6625-99-972-0247	Multimeter, Electronic, CT471	1
6625-99-943-1524	Multimeter, Panclimatic (AVO 8)	1
6625-99-914-9811	Wattmeter, Absorption A.F.	1
6645-99-910-1001	Stop Watch 1/5 sec.	1
0274-9436	Gauge, Contact pressure, 0-25 grammes.	1
0274-9439	Gauge, 0-500 grammes.	1
4G/2595	Gauge, 0-20 lb/in ²	1

ALTERNATIVE COMMON TEST EQUIPMENT

6625-99-972-7357	Signal Generator CT452
10S/695	Signal Generator Type 57
10S/16823	Signal Generator Type 57A
6625-99-932-4976	Signal Generator Type 65B
10S/16344	Signal Generator Type 65
6625-99-943-1911	Signal Generator CT394
6625-99-943-1632	Oscilloscope CT414
6625-99-943-8384	Multimeter, Electronic, CT429
6625-99-943 2418	Voltmeter, Electronic, CT54
10S/16308	Multimeter, Electronic, CT38
6625-99-949-0510	Wattmeter, Absorption, CT44
6625-99-999-3591	Wattmeter, Absorption, CT443

TEST EQUIPMENT REQUIRED (CONTD)

<u>Ref. No.</u>	<u>SPECIAL TO TYPE</u> <u>Description</u>	<u>Qty.</u>
6625-99-943-4149	Test Set U.H.F. Equipment 15056 includes:	1
6625-99-943-3488	Test Set (U.H.F.) 15077	1
5340-99-943-4047	Strap Webbing	1
6625-99-943-4146	Connector Set 15057 comprising:	1
5995-99-943-4145	Cable assembly R.F.	1
5995-99-943-4144	Cable assembly R.F.	1
5995-99-943-4142	Cable assembly Power	1
5995-99-943-4033	Bag connector kit	1
6625-99-999-3075	Test Kit Trans-Receiver Radio includes:	1
5821-99-999-2643	Box interconnecting	1
6625-99-999-1865	Test Jig (Power Amp.)	1
6625-99-999-1046	Test Jig Oscillator (Spec. Gen.)	1
6625-99-999-4424	Test Set Amp. (20-30 MHz I.F.)	1
6625-99-999-2362	Test Set Amp. (Tx Rx Pre. Amp.)	1
6625-99-999-2363	Test Set Amp. (1.85 MHz I.F.)	1
6625-99-999-2365	Test Set Radio (Guard Rx.)	1
6625-99-999-2644	Test Set Tuning Unit	1
6625-99-999-2364	Test Set Amp. (Modulator)	1
6625-99-999-2384	Test Set Oscillator	1
6625-99-999-2366	Test Set Amp. (Audio)	1
5995-99-932-1910	Connector (15 way)	1
6150-99-999-8159	Connector (30 way)	1
5995-99-932-1903	Connector (25 way Cannon)	1
6150-99-999-8158	Connector (12 way to 10 way)	2
6150-99-999-8160	Connector (10 way)	2
5340-99-915-0268	Clip, Spring Tension	2
6625-99-999-0201	Test Set Electrical Power d.c. includes:	1
5985-99-999-1866	Dummy load, Electrical	1
5821-99-999-0819	Interconnecting Box.	1
6150-99-999-4743	Connector 25 way	2
5995-99-945-9895	Connector 4 way	2
6625-99-943-7031	Test Kit U.H.F. Equipment includes:	1
5821-99-932-1919	Box interconnecting	1
5995-99-932-3721	Connector 42 way 8 feet	1
5995-99-932-3722	Connector 30 way 4 feet	1
5995-99-932-1800	Connector 6 way 6 feet	1
5995-99-932-1802	Connector 6 way 15 feet	1
5995-99-932-1801	Connector 12 way 4 feet	1

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TEST EQUIPMENT REQUIRED (CONTINUED)
SPECIAL-TO-TYPE (CONTD)

<u>Ref. No.</u>	<u>Description</u>	<u>Qty</u>
6625-99-952-8806	Test Set, Control Unit	1
	includes:	
6625-99-952-8801	Cable assembly	1
6625-99-952-8802	Cable assembly	1
5821-99-932-2942	Power Unit No. 1	1
	includes:	
5995-99-932-4017	Connector 12 way 8 feet	1
5995-99-945-9896	Connector 5 feet (Type 3H29/1 Mains)	1
5821-99-942-8543	Control Unit Type C1607	1
5821-99-943-3247	Control Receiver Muting	1
6625-99-945-0061	Simulator Microphone	1
5821-99-942-8552	Spectrum Generator Unit	1
5821-99-942-8554	Main Rx. R.F. Amp. and Tx Pre-amp	1
6625-99-943-6880	Pedestal I.F. Test	1
6625-99-943-6881	Pedestal Oscillator Test	1
6625-99-943-6882	Pedestal Power Amplifier Test	1
6625-99-943-6883	Pedestal Receiver Test	1
6625-99-943-6884	Pedestal Spectrum Generator Test	1
5995-99-932-1905	Connector R.F. 5 feet UR67	1
5995-99-932-4021	Connector R.F. 5 feet	1
5995-99-999-2641	Connector R.F. 5 feet 3 in UR43	1
5995-99-932-1909	Connector R.F. 5 feet UR43	1
5995-99-932-2130	Connector 8 inches, microdot.	4
5995-99-932-1907	Connector R.F. 4 feet 10½ inches UR43	1
5995-99-932-2129	Connector R.F. 12 inches UR43	1
5995-99-932-1902	Connector 9 way Cannon 15 inches	1
5995-99-932-1903	Connector 25 way Cannon 15 inches	1

TEST EQUIPMENT REQUIRED (CONTINUED)SPECIAL-TO-TYPE (CONTD)

<u>Ref. No.</u>	<u>Description</u>	<u>Qty.</u>
5995-99-932-1908	Connector 15 way Cannon 15 inches	1
5995-99-932-1910	Connector 15 way Cannon 15 inches	4
5995-99-932-1803	Connector 15 way Cannon 15 inches	1
5995-99-932-1799	Connector 20 way Cannon 18 inches	1
6150-99-999-2783	Cable assembly. Power) For use in	1
6150-99-999-2782	Cable assembly. Power) servicing T.S.15077	1
5935-99-932-1911	Adaptor	1
5935-99-932-1912	Adaptor	1
5935-99-940-1652	Adaptor	1
5935-99-932-2381	Adaptor	1
5821-99-932-1806	Cover. R.F. Amp. Test Side.	1
5821-99-932-1804	Cover. Pre. amp. Test Side.	1
5821-99-932-1916	Cover. Spec. Gen. Test Side.	1
5821-99-932-2388	Cover. Guard Rx. Test Side.	1
5305-99-943-7755	Thumbscrew	18

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<u>Ref. No.</u>	<u>Description</u>	<u>Qty.</u>
<u>ACCESSORIES</u>		
4140-99-519-3570	Blower, Air, 8 inch 230V 50 Hz	1
5821-99-913-2641	Cooler, Air, Electronic Equipment Type VBM-2 115V 400Hz 3 phase (complete with adaptor) for use with P.A. Test Jig in Module Test Kit.	1 1
5820-99-945-9894	OR, Cooler, Air, Electronic Equipment Type VBM-3, 230V, 50 Hz single phase.	1
10S/16667	Trolley Radio Servicing	1
4320-99-972-4179	Pump, Pressurising "KISMET".	1
5940-99-972-9920	Clip Electrical (miniature)	6
5940-99-913-3677	Clip Electrical	6
5970-99-913-3676	Insulator Hood	6
5905-99-021-5635	Resistor 1 k.ohm ¼ watt) For use in 1
5910-99-011-5543	Capacitor 1,000 pf. ± 20%) supplementary 1
) servicing
5935-99-940-3381	Plug, Cannon, 30 way) Connector local 1
5935-99-940-3382	Socket " ") manufacture 1
5935-99-940-3395	Straight outlet Cannon) see Fig. 1. 2
6145-99-910-0174	Equipment Wire Type 2) AR
5930-99-051-0551	Switch Toggle) 1
<u>MATERIALS</u>		
10AF/545	Capsules ARCTON	1 Box
9150-99-942-3152	Grease X.G.295	4 ozs
9150-99-910-0512	Grease X.G.275	4 ozs
9150-99-943-8712	Oil Lubricating O.M.12	1 quart
9150-99-910-0589	Oil OX14	1 pint
9150-99-942-3150	Oil OX23	½ pint
Not referenced	Esso Oil. Teresso 52.	5 gall
8030-99-942-3548	Compound Silicone (MS2241)	2 ozs
8010-99-943-3454	Varnish, Electrical Insulating Air Drying	1 pint
8010-99-947-7826	Varnish Oil	1 pint
8010-99-947-7825	Remover, Paint	1 pint
0473/220-1465	Trichloroethane Technical	As required

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TEST BENCH

POWER SUPPLIES

TR4/ARC 52 27.5V \pm 0.5V 7.5 Amps d.c.
115/200V \pm 5% 3 phase 400 Hz 430 VA

TR5/ARC 52 27.5V \pm 0.5V 35 amps d.c.

ASSOCIATED PUBLICATIONS

AP.116D-0105-1 (2nd Edn.)	ARI 18124 ARC52
AP.116D-0133-1A	ARC52 module assemblies
AP.116D-0133-10	Servicing Diagrams Manual
AP.117M-0101-1	Test Set Type 15056
AP.116D-0133-1B	Special to type test equipment for Second Line Servicing of ARC52

SERVICING NOTES.

No.

1. Introduction
2. Module Removal
3. Module Replacement
4. Module Interchangeability
5. General Repair
6. Component Replacement
7. Test Equipment
8. Testing. Precautions and Notes
9. Autocat

SERVICING NOTES1. Introduction

Section 1 lays down the minimum inspection and overall performance tests which must be carried out before an equipment can be assessed as serviceable.

Section 2 contains a comprehensive check of the Transmitter-Receiver as a whole and also checks the correct functioning of individual modules. Reference is made to Section 3 where further tests or adjustment is necessary at module level.

Section 3 deals with the testing and adjustment of individual modules. The first chapter is for use when test pedestals and a known serviceable T.R. are used. Each driven module has a test pedestal to facilitate its servicing in the ARC 52, and non driven modules have Microdot extension leads to enable them to be serviced remote from the chassis. The second chapter describes the testing of modules using the Module Test Jig. Although a T.R. is not required in this case, some adjustment may be required when the module is refitted in a T.R.

2. Module Removal

- (1) The screws securing each module in the chassis are located on the underside of the chassis, and are coloured RED.
- (2) Before removing mechanically-driven modules, it is advisable to select a frequency which positions the Oldham couplers such that replacement is relatively easy. The most satisfactory frequencies for this purpose are:-
 - (a) With the set on its side - 310.0 MHz.
 - (b) With the set on its front panel - 220.0 MHz.
The Oldham coupler spigot appears opposite the circle etched on the module base plate when the module is positioned for 220.0 MHz.
- (3) Before removing the Mechanical Drive Unit, channel to 220.0 MHz if possible. If there is a fault which prevents this being done, make a note of the frequency setting before removing the module.

3. Module Replacement

(1) General

The modules and chassis should have their couplers positioned so that the key way and key are in a vertical position, and the spigot of the brass coupler is on the same side as the cut-away portion of its mating half. When the module-----

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3 (1) Continued

SERVICING NOTES (CONTD)

is in position, the special coupler adjusting tool (5120-99-943-8954) can be inserted through the hole on the centre of the gear plate coupler to the slotted end of the module coupler shaft. The module shaft can thereby be turned to produce correct coupler alignment.

When the module has been secured in position, an attempt should be made to turn the driving gear on the gear plate by grasping the gear between thumb and fore-finger. If a small amount of play or backlash is felt, the coupler is correctly engaged. If there is no play, the coupler is not engaged correctly, and any attempt to change frequency could cause serious damage, i.e. gear stripping or shaft distortion.

(2) Mechanical Drive Unit.

The Mechanical Drive Unit should always be replaced before any other driven module, as there are no holes through its gear plate shafts, and coupler positioning is effected by turning the gear trains. Certain modules have brass shafts, and great care should be taken when using the coupler adjusting tool.

If a serviced Mechanical Drive Unit has been set at a frequency other than 220.0 MHz, it can be set manually to the latter by closing the relays on top of the module with one hand, and operating the motor shaft with the other hand. Always rotate the shaft in such a direction that the numbers pass the pointer in ascending numerical order, and release the relay shortly before the required number appears opposite the pointer.

(3) 20-30- MHz I.F. Amplifier.

The correct setting for replacement of this module is 220.0 MHz as the shafts are spring-loaded and will always return to the datum position when free.

(4) Spectrum Generator.

A 1:2 gear from the coupler drives one of the shafts in this unit. There are thus two complete turns of the coupler for one turn of the shaft. When replacing this module, the chassis should be on the channel selection for 220.0 MHz, and the module coupler rotated until the variable capacitor plates of the amplifier are in the fully closed position.

4. Module Interchangeability

(1) Mechanically Driven Modules.

- (a) No adjustments should be necessary when fitting the Mechanical Tuning Unit, the Oscillator Unit or the 20-30 MHz I.F. Amplifier Unit into an ARC-52 main chassis. An overall check of the T.R. Unit should be all that is necessary.

SERVICING NOTES (CONTINUED)

4. (1) continued.

- (b) When the Power Amplifier, the Main Receiver and Transmitter Pre-Amplifier and Spectrum Generator modules are fitted into the ARC-52 main chassis, satisfactory operation should be obtained by adjustment of trimmer capacitors only, at 399.9 MHz (See Section 3, Chap. 1, Item No. SS12).

(2) Non-mechanically Driven Modules

- (a) When the 1.85 MHz I.F. Amplifier has been changed, Section 3, Chap. 1, Item No. SS10, Operation (3) (t) to (w) inclusive must be carried out.
- (b) When the Audio amplifier has been changed, Section 2, Items Nos. 9, 10, and 11 must be carried out.
- (c) When the Guard Receiver has been changed, Section 2, Item No. 9 must be carried out.
- (d) When the Modulator has been changed, Section 2, Item No's. 8 and 10 must be carried out.
- (e) When the d.c. Power Unit has been changed, Section 2, Chap. 2, Item No. 1 must be carried out.

5. General Repair

(1) Printed circuit components

Two possible methods of component replacement are as follows:

- (a) Crush the component being replaced and straighten the remaining wire ends. Place the new component in position on the board and wrap its lead-out wires around the old wires remaining in the board, using one turn only. Solder at the joint using a rapid application of heat, after allowing the soldering iron at least ten minutes to warm up.
- (b) Cut out the component, and remove its wire by unsoldering from the printed circuit and pushing the wire through the holes. Insert the new component leads through the holes and solder as in (a). Heat must not be applied for long periods as this may cause the printed circuit to lift from the board which involves the replacement of the board.

(2) Cableform

Should a single cable require replacement, it is recommended that a replacement be run along the outside of the cableform, rather than attempt to effect a cable change.

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SERVICING NOTES (CONTINUED)

5. (2) continued

A multiplicity of colours is used in wiring the equipment, but only one colour for each type of wire in extensive use is available for replacement at second line. Wire not extensively used in the equipment should be available in the normal way.

(3) Capacitors

Certain Temperature-compensating, fixed ceramic capacitors have the appearance of resistors. The colour coding is shown by either circular bands or spots, separated from each other by a space, and is as follows:-

Colour	Temperature Coefficient pF/pF/°C	First digit pF	Second digit pF	Multiplier	Tolerance	
					Over 10pF	10pF and under
Black	± 0 x 10 ⁻⁶	0	0	1	20%	2pF
Brown	- 30 x 10 ⁻⁶	1	1	10	1%	1.0pF
Red	- 80 x 10 ⁻⁶	2	2	100	2%	-
Orange	- 150 x 10 ⁻⁶	3	3	1000	2.5%	0.25pF
Yellow	-220 x 10 ⁻⁶	4	4	10000	-	-
Green	-330 x 10 ⁻⁶	5	5	-	5%	0.5%
Blue	-470 x 10 ⁻⁶	6	6	-	-	-
Violet	-750 x 10 ⁻⁶	7	7	-	-	-
Grey	+ 30 x 10 ⁻⁶	8	8	0.01	-	0.25%
White	+100 x 10 ⁻⁶	9	9	0.1	10%	1pF

Example:-

Capacitor colour coded yellow, violet, green, black, green:-

- (i) Temperature coefficient - yellow equals -220×10^{-6} pF/pF/°C, i.e. the value falls by 220×10^{-6} pF per pF for each degree Centigrade.
- (ii) Value of the capacitor - first digit is 7 (violet), second digit is 5 (green), multiplier is 1 (black), i.e. the value is $75 \times 1 = 75$ pF.

SERVICING NOTES (CONTINUED)

5.(3)(iii) Tolerance - green equals $\pm 5\%$.

NOTE:- Capacitors C814, C850 and C810 in the Guard Receiver may not comply strictly with the above code. If, in these cases the tolerance colour is Grey, this indicates a tolerance of $\pm 0.25\text{pF}$.

6. Component Replacement

(1) General

Neither the variable capacitors in the tank circuits of the driven modules, nor their associated driving mechanisms, are replaceable at 2nd line. This also applies to many small components whose replacement involves a long or difficult process.

Re-tracking of tank circuit capacitors should be only an occasional operation at 2nd line, subject to these modules being handled with great care. A Tracking Tool is provided for use in this operation.

The couplers (with the exception of the phosphor bronze centre section) and their shafts should not be removed at 2nd line, as their replacement entails the use of special jigs to ensure accurate alignment. The phosphor bronze centre sections may be removed after taking out the plastic securing ring.

(2) Gear Plate

Neither the gear plate nor its component gears are renewable at 2nd line. When a gear plate is removed for servicing the same items must be refitted.

(3) Main Chassis and Front Panel

When changing units housed inside the front panel, it is necessary to separate the main chassis and front panel. Precautions must be taken when re-mating the front panel and chassis. If the chassis is more than $1/16$ " out of true, to the chassis, the front panel will not fit flush with the case and gasket. The securing screws will not enter their holes squarely, and the joint will not be airtight. The case belonging to the chassis can be used as a checking gauge for mating the chassis to the front panel. Under these conditions, a chassis and front panel will not necessarily fit a case other than the one used as a checking gauge.

(4) Guard Receiver

(a) To remove the A.F. printed circuit board for component replacement, it is necessary to disconnect R843 and the secondary of T803, remove the I.F. Transformer lid shields, and gently ease the wired-in valves out of their clips.

SERVICING NOTES (CONTINUED)

6.(4) (a) continued.

After removal of the five Phillips screws, it is possible to raise the board sufficiently clear of the chassis to disconnect the leads from P801, thus facilitating removal of the board.

(b) To remove the R.F. printed circuit board, it is again necessary to disconnect R843, the secondary of T803, and ease out the wired-in valves. It is also necessary to unclamp and disconnect P802 from the board. After removal of six Phillips screws, the board can be removed in a similar manner to operation (a).

(c) It may be necessary to re-align this module after re-assembly.

(5) A.F. Amplifier

Removal of either printed circuit board in this module involves the disconnecting of all leads to the board, removal of the Phillips securing screws, easing out of the wired-in valves, and in the case of V404, removal of the aluminium screening block by taking out the four Phillips screws on the side of the module.

(6) 1.85 MHz I.F. Amplifier

(a) No servicing is possible on the block filter, as all cores are set in Araldite after manufacturer's alignment, and this section is replaceable as a complete item.

(b) Removal of the printed circuit board entails disconnecting nine wires and the removal of four Phillips screws.

(7) Spectrum Generator

(a) Amplifier Section. Component replacement is restricted to valves and valve screening cans.

(b) Frequency Generating Section. Access to the crystal oven and its printed circuit switch is obtained by first removing the cover, and then removing the hexagonal posts and disconnecting the leads at the feed-through capacitors at each end. When replacing the switch, care should be taken to ensure that the rotating contact is correctly aligned on each frequency and is not falling between two contacts. Access to other components, including valves, is obtained by removing the side panel and stripping down to the section required, commencing with the crystal oven.

(8) Transmitter and Receiver Pre-Amplifier

Component replacement in this module is restricted to valves and components mounted on the top deck.

6.(9) Power Amplifier

- (a) Component replacement in the penultimate amplifier has the same restrictions as in para. (8) above.
- (b) In the Power Amplifier section, the tank circuits should not be replaced at 2nd line, but there should be no difficulty in replacing other components. Valve extractor 5120-99-943-6541 is provided for use in the removal of Valve Type CV 3991.

(10) Mechanical Drive Unit

Component replacement in this module is confined to the components mounted on the top, i.e. relays and neons, and the cam springs, cannon plugs and tag board mounted above the cannon plugs. Removal of any other components, including the drive motor brushes, necessitates the unpinning of the couplers and should not be attempted at 2nd line.

(11) 20-30 MHz. I.F. Amplifier

- (a) The mechanical assembly (with the exception of springs and the block of permeability-tuned coils) should not be replaced at 2nd line.
- (b) Removal of the printed circuit board, on the side containing V201, V202, and V203, will necessitate the disconnection of L207 and C237 from the board, the disconnection of R205, R204, R224, R209, R225, R208, R202, C218, C209 and C227 from the feed-through capacitors, and the disconnection of the cannon plug leads at the board. After removing the four Phillips screws, V203 must be eased from its clip.
- (c) On the reverse side, R222, R227, C235, R218, R214 and R220 must be disconnected from the feed-through capacitors and test points, P203 and P204 must be disconnected from K201, the leads must be disconnected from the cannon plug, the three Phillips screws removed, and the valve V204 eased from its clip, before the printed circuit board is released.

(12) Oscillator Unit

- (a) To remove board TB1901, it is necessary to remove the two Phillips screws holding the board to its support, and to remove the two Phillips screws and nuts holding it to TB1902. Ten leads must be disconnected before the board is free.
- (b) To remove TB1902, first remove TB1901, as in (a) above, then ease the wired-in valves from their clips, remove the securing screws the securing screws from P1901, disconnect R1905 from J1901 (test point J) and disconnect any external leads to the printed circuit board, other than those from P1901.

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SERVICING NOTES (CONTINUED)

6. (12) (c) Printed circuit switches should not be replaced at 2nd line but minor adjustments may be carried out. The positioning of the switch rotors depends upon the accuracy of coupler and shaft pinning and is critical.

(13) Modulator

To remove the printed circuit board, first remove V703 and V704 and then the three Phillips screws securing V701 and V750. Unsolder V702 from the board and disconnect any leads attached to the board. The board will then be free after removing the securing screws. No undue difficulties should be encountered in replacing the remaining components.

(14) Front Panel Blower

Before removing the front panel blower unit, it is necessary to remove the handle, which is secured to the front panel by two Phillips screws. The blower motor is secured to the front panel by four Phillips screws, and care should be taken when removing to prevent damage to the motor supply leads.

7. Test Equipment

(1) Signal Generator CT.433 (Advance J1)

- (a) When a signal Generator CT433 is used the output must be monitored by a valve voltmeter. This is because the output control of the CT433 is only roughly calibrated. The frequency accuracy is adequate for ARC-52 testing and readings may be taken directly from the dial.
- (b) The CT433 output impedance is 600 ohms which is satisfactory for all tests of the ARC-52. When the MIC. Simulator is used the CT433 output is connected to the 600 ohms input terminals of the Simulator.

(2) Signal Generator Type 57

- (a) A special connector, Ref. No. 5995-99-932-4021 is provided for use with this Signal Generator, to match the output of the Signal Generator (10 ohms) to the module inputs (50 ohms). The signal Generator has a 50 ohm output on the "x 100 mV output" range, and the special connector should not be used in this case.
- (b) Adaptor 5935-99-932-4733 is used to adapt Lead, test, d.c. isolating, 6625-99-943-3486 to Signal Generator Type 57.

(3) Signal Generator CT.394

- (a) A concentric R.F. fuse is required to protect the Signal Generator should an ARC-52 be inadvertently switched to "Transmit" whilst connected to the Signal Generator. This

SERVICING NOTES (CONTINUED)

7. (3) (a) continued

fuse should be inserted between the Signal Generator output and the ARC 52 connector.

- (b) This Signal Generator must be retuned frequently during receiver testing. To ensure frequency accuracy, the Signal Generator is tuned about the nominal frequency to peak the ARC-52 A.V.C. voltage, monitored at the Interconnecting Box. The RF output level should be set low enough to just produce a peak in the ARC-52 A.V.C. voltage.

(4) AF Power Meter

Headphones should be disconnected and the Test Set, UHF Type 15077, switched to position 1 when taking measurements with an AF Power Meter. The impedance of the AF Power Meter should be set to 50 ohm.

(5) Use of Calibrator Frequency. 6625-99-999-2642.

- (a) Connect the signal source to be calibrated to the IN DIRECT socket of the calibrator, or, in the case of high voltage levels, to the In VIA ATTENUATOR socket. The coaxial link should be connected between the two remaining sockets.
- (b) Set the OSCILLATOR switch to the crystal position giving either the fundamental or the sub-harmonic of the frequency to be monitored. If an external crystal is used, set the OSCILLATOR switch to the CRYSTAL BANK position, and the CRYSTAL BANK switch to the number of the socket in which the crystal is inserted.
- (c) Set the METER selector to COUNT 10 kHz F.S.D.
- (d) Connect a pair of 150 ohm phones to the PHONE socket and adjust the GAIN control to give a suitable audio level.
- (e) Adjust the signal source for zero heterodyne frequency in either the phones or the frequency standard meter.

Note...The frequency standard meter will deflect hard over if the difference frequency is greater than 10kHz. To prevent damage to the meter in these circumstances adjust the signal source for a beat note in the headset before switching to Count 10kHz F.S.D.

(6) (a) TS 15077 when modified by Mods A3327 and A3328 provides simulated microphone outputs as follows:-

5mV 300 ohm	500mV 100 ohm
500mV 300 ohm	1V 82 ohm

- (b) Microphone Simulator when modified by Mod A3379 or A3380 provides the following outputs when the meter needle is at the SET mark:-

5mV 300 ohm	500mV 300 ohm
500mV 100 ohm	1V 82 ohm

SERVICING NOTES (CONTINUED)

8. Testing Precautions and Notes

(1) General

- (a) All R.F. voltages referred to in the text are open circuit voltages.
- (b) The phrases "not greater than" and "not less than" in the text are referred to the actual numerical value of the test figure quoted, irrespective of whether the value is positive or negative.

(2) Bench Fan

When running the ARC-52 with its case removed, it is necessary to provide cooling facilities, as the air from the front panel blower is no longer ducted around the unit. A bench fan is required, the air flow from which should be directed on to the rear of the chassis.

(3) Test Side Covers

Test Side Covers are required for alignment purposes, and alignment should not be attempted with side covers removed unless otherwise stated. Access to tank circuit capacitors in the mechanically-driven modules is difficult, and particularly so in the case of the Power Amplifier. If it is found necessary to remove any side covers prior to adjusting capacitor rotor vanes, these covers must be replaced before carrying out the subsequent test.

Special thumbscrews are provided with the test side covers to facilitate easy removal.

(4) Valve Heaters

Modules should not be run with valves removed (with the exception of V603 in the Power Amplifier) as the heater circuits are in series parallel. See the heater circuit diagram.

(5) 425v Fuse

If the drive to the Power Amplifier falls below -15 Volts, the 425 Volt fuse should be removed to avoid damaging the P.A. valve by running it with H.T. and low drive.

(6) Side tone

The "sidetone" link has two positions, "NORMAL" and "INTERCOM". In the NORMAL position, sidetone is derived from a rectified portion of the aerial output, and is only available on "Transmit". In the INTERCOM position sidetone is taken from the grid of V702 in the Modulator Unit, and is available on both "transmit" and "receive". The latter method should be in general use.

(7) Blower motor operating temperatures

S. 1501, the bimetal switch located in the chassis, with controls the operation of the blower motors has the following specifications:-

Closing Temperature + 40°C
Opening Temperature + 24°C

SERVICING NOTES (CONTD)

8.(7)cont. Thus the blowers of an equipment which has been subjected to an ambient temperature of + 40°C and has not cooled to below + 24°C will run immediately power is applied to the equipment.

(8) Modulator Test Point

The test point in some modulator units is smaller than those used throughout the remainder of ARC-52. In this case use should be made of Test Lead Attachment 6625-99-999-0840 instead of 6625-99-943-7028.

(9) Control Radio Set Type C1607/4. Pre-mod. 0764.

Under certain conditions, loss of communication may occur when using the Control Radio Set Type C1607/4 with Mod. No. 0764 not embodied. (No. 6 on the mod. label).

Until this modification is embodied the following precaution should be observed: When a UHF frequency is selected on a pre-set channel, the first digit of the manual frequency selector should not be set to '1'.

(10) Test Links

Tests are normally carried out with the linkages set as follows:-

	Modulator Input	- 200 ohms dynamic mic.
	Intercom	- from Modulator
◀	Squelch	- Carrier ▶
	Audio Output	- 75 ohms

If any alternative facility is required the linkages should be set accordingly, and the appropriate modified test carried out.

(11) Low Transmitter Power

If difficulty is experienced in meeting the transmitter power requirements, embodiment of the following modifications should be checked:-

8595(AL173), 8778(AL175), 8596(AL169), leaflet A9(AL244)

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SERVICING NOTES (CONTINUED)

9. A.F. Amplifier 5821-99-942-8555. Modification for use with UHF Radio Relay A.R.I. 23182 (AUTOCAT)

This Servicing Note details the action required to modify the standard ARC-52 for use in A.R.I. 23182. When the ARC-52 is no longer required in this role the modification must be removed.

- (1) Carry out the Physical Inspection and Standard Serviceability Test as detailed in Section 1.
- (2) Remove the A.F. module from the ARC-52 and remove its side covers.
- (3) Remove the circuit board securing screw, lock washer and plain washer adjacent to link LK.7.
- (4) Discard plain washer.
- (5) Fit lock washer and a 6BA terminal tag, Ref. No. 5940-99-999-3468 to securing screw and replace screw ensuring that tag is positioned so that LK 7 can be linked from existing connection pin 4 (cathode of V402A), to this earthing tag.
- (6) Lever tag up to prevent shorting surrounding components and solder LK 7 link as described in (5).
- (7) Check that the links are at the carrier squelch operation position.
- (8) Replace the side covers and refit the module in the Tx Rx.
- (9) Carry out the tests detailed in Section 1 Item No. 3, operation (8) and Section 2 Item No. 11 operation (5).
- (10) Using lacquer, opaque, yellow, 33B/942/9181, mark 'AUTOCAT' on the A.F. module and Tx. Rx. front panel.

10. R.F.P.A. Module.

Failures of the R.F.P.A. Module in some cases have been due to carbon dust from the Power Unit D.C. During Bay Servicing the following action should be taken:-

- (1) Remove the R.F.P.A. Module side covers.
- (2) Using a small brush and an air blower remove the bulk of the carbon dust.
- (3) Remove all traces of carbon dust by carefully cleaning with a small brush and an approved cleaning agent, particular attention being paid to the STAND OFF and FEED THROUGH INSULATORS.
- (4) Examine idler gears and lubricate as necessary with Oil OX-23.
- (5) Refit Module side covers.

SERVICING NOTES (CONTINUED)11. 20-30 MHz I.F. Module

If the Signal to Noise Ratio of the 20-30 MHz I.F. Module is unacceptable a possible cause could be a bad earth on the Coil Box cover. This can be overcome by carrying out the following check.

- (1) Remove the Module covers and Coil Box top.
- (2) Examine the Coil Box and cover for any signs of oil and grease cleaning as necessary using an approved cleaning agent.
- (3) The bonding spring fingers on the Coil Box top should be cleaned with a light abrasive such as a typewriter rubber or fine crocus paper.
- (4) Bend the spring fingers slightly outwards to increase the spring pressure. Care should be taken to avoid breaking these fingers.
- (5) Refit the Coil Box top and Module covers. Carry out Signal to Noise checks.

12. Control Units fitted to Sea King H.A.S. Mk 1 & 2 and Hunter T8M

Control Units Type 1607 or 1607/4 fitted in the cockpit of Sea King HAS MK 1 & 2 and Hunter T8M aircraft should have the Two red filters removed and replaced by FILTER INDICATOR, BLACK CAP, CLEAR FILTER Ref. No. 6210-99-914-3667, Part No. 80/10/0059.

All Control Units returned to stores should be fitted with red filters.

ITEM NO.OPERATION1. PHYSICAL INSPECTION

- (1) Release air pressure and loosen 12 screws in the front panel of the ARC-52 using Wrench 5120-99-942-9651. These screws should be released in cylinder head fashion, working outwards from the centre and loosening each by half a turn at a time until all are loose. Stand the Transmitter-Receiver upright on its front panel and lift off the cover.
- (2) Visually inspect the equipment, checking general cleanliness and for deterioration, loose or badly soldered connections, discoloured components, loose valve mountings and signs of mechanical damage. Check cableforms for signs of wear.
- (3) Examine the P.S. Unit (TR.5, ARC-52) for signs of carbon deposit; dust and blow clean with dry air.
- (4) Remove the D.C. Power Unit by loosening the five red-painted screws and inspect the dynamotor brushes and bearings. The bearings should be renewed or cleaned and re-greased with XG 275 as required. Brushes should be renewed as necessary. Refit the Power Unit.
- (5) Remove the external blower and check the position of the brush tops with respect to the top edges of the brush holders.
 - (a) If the brush tops are not more than 0.1 inches below the level of the top edges of the brush holders and assuming that there is no other unserviceability of the blower refit the blower in the transmitter-receiver.
 - (b) If the brush tops are more than 0.1 inches below the level of the brush holders, refer to Item No. SS15, Section 3 Chapter 1 before refitting the blower in the Transmitter-Receiver.
- (6) Inspect accessible gears. If cleaning and lubrication appears necessary refer to Item No. SS14, Section 3 Chapter 1.
- (7) ARC 52/TR5 only
Remove the carbon dust filter board assembly as follows:-
 - (a) Slacken the clip screws approximately two turns and pull upwards on the strip at each end.
 - (b) Inspect the filters for carbon dust contamination. If the contamination is excessive clean as follows, if not excessive proceed to operation (e).
 - (c) Wash the filter assembly in a weak solution of TEEPOL (Ref. 33D/2204958).
 - (d) Using a light air jet, blow off excess solution and allow to dry.
 - (e) Lightly squeeze the clips together to ensure full entry into the corrugations.
 - (f) Position the filter, clips downward, so that the filter pads occupy the first eight corrugations inside the base of the cover. The filter should be positioned in the width of the cover so that its left hand edge is in line with the centre panel fixing hole (viewed from the open end of the cover).
 - (g) Press the clips down into the corrugations so that the strip lies flat on the ribs and tighten the clip expanding screws.

/(h)

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ITEM NO.OPERATION

1. (7) Contd.
 (h) Check that the clips are functioning correctly by applying a light upward pull to the strip.
- (8) (a) Remove the following modules from the chassis assembly:-
 A.F. Amplifier module; I.F. amplifier Module; Guard Receiver Module.
- (b) Remove side covers from modules.
- (c) Locate and examine the following capacitors for leakage:-
 A.F. Amplifier Module, C408 and C415
 I.F. Amplifier Module, C335
 Guard Receiver Module, C841
- (d) If leakage has occurred proceed as follows:-
 (i) Remove and discard defective capacitors by cutting leads as close as possible to defective items.
 (ii) Wash affected part of PCB with Inhibisol.
 (iii) Return module for 3rd line repair.
- (e) Fit serviceable module to chassis assembly.

2. BENCH CONNECTIONS AND VOLTAGE CHECKS

- (1) Connect the ARC-52, Control Unit C1607 and Control Receiver Muting to the Interconnecting Box 5821-99-932-1919. Connect the Test Set Type 15077 RADIO socket to the ARC-52 aerial socket and to the Interconnecting Box. Ensure that power is switched off before fitting the 42 way Connector, 5995-99-932-3721, or damage to the filter chokes may result.
- (2) Control Units and Controls Receiver Muting for test, should be connected in place of the bench units and used in the Overall Transmitter-Receiver Checks (See Servicing Note No. 12).
- Particular attention should be paid to smooth operation of Control Unit switches and Volume control, and the functioning of panel lamps. If any unserviceability is apparent carry out the Supplementary inspection detailed in Section 3, Chapter 2, Item Nos. SS14, SS15 or SS16. If a Control Receiver Muting is suspect, refer to Section 3, Chapter 1, Item No. SS16.
- (3) Set the Interconnecting Box D.C. Supply to TR4 or TR5 as applicable and make the appropriate d.c. circuit breaker. For TR4 testing, switch 3 PHASE SUPPLY to ON.
- Switch on Test Set Type 15077.
- (4) Set Control Unit service switch to T/R.
- (5) Switch on the bench fan and direct air onto the rear of the ARC-52. Allow 15 minutes for equipment to stabilise.
- (6) Check h.t. and bias voltages with Multimeter (AVO 8) as follows:-
- | | |
|---------------------------------|--------------------------------|
| Power Unit/Rectifier Unit TP.E | 120 to 140V d.c. |
| Power Unit/Rectifier Unit TP.F | not less than -13.5 Volts d.c. |
| Modulator TP.X | -13.5 to -15.5V d.c. |
| Interconnecting Box 225 Volt TP | 210 to 260V d.c. |

ITEM NO.OPERATION3. OVERALL PERFORMANCE CHECKS

(1) Set the Control Unit CHAN. selector to 'M' and the manual frequency selectors to 225.0 MHz.

(2) Intercom.

Connect a headset to the Interconnecting Box and check intercom by verifying that speech into the mic. can be heard in the phones with the VOL control at mid-position. If incorrect carry out Item No SS11, Section 3 Chapter 1 or Chapter 2.

(3) Sidetone.

(a) On Test Set Type 15077, set METER SWITCH to position 5 and POWER switch to HIGH.

(b) Insert a co-axial link between TX and LOAD sockets.

(c) Press TALK switch to ON and check that intercom. is available on transmit by verifying that speech into the mic. can be heard on the phones. Listen for any abnormal background noise on transmit.

Release the TALK switch.

(4) Transmitter Power.

(a) Press Test Set Type 15077 TALK switch to ON. The Test Set meter reading should exceed 'B'.

(b) Repeat this check at the following frequencies and 'G'. If incorrect on any frequency carry out Item No. SS8, Section 3 Chapter 1 or Chapter 2.

225.0	230.0	240.0	250.0	260.0	270.0
280.0	290.0	300.0	311.1	322.2	333.3
344.4	355.5	366.6	377.7	388.8	399.9 MHz

(5) Modulation Depth.

(a) Set the Control Unit CHAN. selector to 'M' and the manual controls to 225.0 MHz.

(b) Set the Test Set Type 15077 SIG. GEN. FREQ MIC. SIM switch to 5mV 300 ohm position and METER switch to position 6. Press TALK switch to ON and adjust D.C. CAL. controls for full scale meter deflection 'D'.

(c) With the TALK switch ON, set the METER SWITCH to position 7. The meter reading should be between B and C. Release TALK switch.

(d) Repeat this check at a mid-frequency and the highest frequency in use. If incorrect on any channel, carry out Item No. SS3, Section 3, Chapter 1 or Chapter 2.

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ITEM NO.OPERATION

3. Contd.

- (6) Tone Modulation
- (a) Set the Control Unit frequency selectors to 225.0 MHz.
 - (b) Set the Test Set Type 15077 METER SWITCH to position 6. Press TONE switch to ON and adjust D.C. CAL. controls for full scale meter deflection 'D'.
 - (c) With the TONE switch ON, set the METER SWITCH to position 7. The meter reading should exceed 'B'. Release TONE switch.
 - (d) Repeat this check at a mid-frequency and the highest frequency in use.
 - (e) Disconnect the co-axial lead from the ARC-52 aerial socket and set METER switch to position 1.
- (7) Squelch level, Signal Plus Noise/Noise, Receiver Power, Muting.

NOTE: The tests detailed in this operation do not apply to equipments modified for use with Radio Relay, ARI 23182. When testing these units proceed direct to operation (8).

- (a) Turn the Control Unit VOL control fully clockwise and select a mid-frequency channel in use.
- (b) Make the following connections:

Multimeter CT471, set to the 12 Volt -ve d.c. range, to the Interconnecting Box AVC and EARTH test points.

Wattmeter Absorption A.F. to the Interconnecting Box PHONE and EARTH terminals. Disconnect the headset.

Signal Generator CT 394A to the ARC-52 aerial socket via an R.F. fuse.
- (c) Inject the selected frequency, modulated 30% at 1KHz and tune the Signal Generator for a peak reading on the Multimeter CT 471.

The Signal Generator must be retuned frequently during the following operations to compensate for frequency drift.
- (d) Increase the Signal Generator output until squelch just opens. This should occur between 2 and 3.5 μ V.
- (e) Set the Signal Generator output to 5 μ V.

The audio output level should be greater than 25 mW. Record the reading in dB.
- (f) Switch OFF the modulation and record the audio output level. The signal plus noise/noise ratio should be greater than 8dB.

ITEM NO.OPERATION

3. Contd.

(7) (f) Contd.

NOTE: Squelch operation will cut off the receiver output a few seconds after the Signal Generator modulation is switched off. To obtain a true reading therefore, the Wattmeter range and Signal Generator modulation should be switched simultaneously so that the reduced receiver output can be recorded before cut off occurs.

- (g) Increase the Signal Generator output to 1 mV. The audio output should be $125 \text{ mW} \pm 15 \text{ mW}$.
- (h) Set the Interconnecting Box muting switch to MUTE. The Wattmeter reading should fall by at least 37 db. Set the muting switch to NORMAL.
- (j) Repeat operation (c) to (g) at the frequencies listed in operation (4), and 'G'. If the readings on any frequency are incorrect carry out Item No. SS7 (1), Section 3 Chapter 1 or Item No. SS7 (2) Section 3 Chapter 2.

(8) Squelch Level, Receiver Power, Muting.

- (a) Turn the Control Unit VOL control fully clockwise and set the manual selectors to 315.5 MHz.
- (b) Make the following connections:

Multimeter CT 471, set to the 12 Volt -ve d.c. range, to the Interconnecting Box AVC and EARTH test points.

Wattmeter Absorption A.F. to the Interconnecting Box PHONE and EARTH Terminals. Disconnect the headset.

Signal Generator CT 394A to the ARC-52 aerial socket via an R.F. fuse.
- (c) Inject the selected frequency, modulated 30% at 1 KHz and tune the Signal Generator for a peak reading on the Multimeter CT 471.
- (d) Increase the Signal Generator output until squelch just opens. This should occur when the Signal Generator output is 3 uV. Adjust the main sensitivity control R1401 as necessary.
- (e) Set the Signal Generator output to 5 uV. The audio output level should be greater than 25 mW.

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OPERATION

3. (8) Contd.

- (f) Increase the Signal Generator to 1mV. Audio output should be 125 mW \pm 15 mW.
- (g) Set the Interconnecting Box muting switch to MUTE. The Wattmeter reading should fall by at least 37 dB. Set the muting switch to NORMAL.
- (h) Repeat operations (e) and (f) at the frequencies listed in operation (4), and 'G', setting the Signal Generator output to 15 μ V and frequency as appropriate. If readings on any channel are incorrect, carry out Item No. 11, Section 2.

(9) Guard Receiver

- (a) Set the Control Unit function switch to T/R. + G. and the CHAN. selector to any channel other than 'G' or 243 MHz.
- (b) Set the CT394A output to 15 μ V and tune for max. A.G.C. at T.P.Y. Decrease the Signal Generator output until the receiver is muted. Slowly increase the Signal Generator output until the receiver unmutes. The Signal Generator output at this point should be less than 10 μ V.
- (c) Set the Signal Generator output to 1mV. Audio output should be at least 125 mW. Set the Signal Generator output to 10 μ V and record the audio output in dB.
- (d) Switch off the modulation and record the audio output. The signal plus noise/noise ratio should be greater than 6dB.
- (e) If results obtained are incorrect, carry out Item No. SS 12, Section 3, Chapter 2.

(10) Auxiliary Audio

- (a) Set the Control Unit CHAN. Selector to 'M' and the manual frequency selectors to 315.5 MHz.
- (b) Retune the Signal Generator to peak the Multimeter AVG reading at 315.5 MHz.
- (c) Disconnect the Multimeter and reconnect it, set to 4 Volt a.c. range, to the Interconnecting Box AUX AUDIO and EARTH test points.
- (d) Set the Signal Generator output to 5 μ V, the multimeter reading should not fall below 1 Volt.
- (e) Increase the Signal Generator output to 100 mV - the Multimeter reading should not exceed 2.1 Volts.

Note ... The Signal Generator must not be retuned unless the Multimeter is reconnected to the AVC test point.

ITEM NO.OPERATION4. BLOWER MOTOR

Set the Control Unit function switch to OFF and apply a small clean soldering iron to the case of thermal switch S1501. After a brief delay, when the switch temperature reaches approximately 40°C, a click will be audible as the switch closes. Remove the soldering iron and set the Control Unit function switch to T/R. The external blower and internal stirrer motors should run until the switch cools.

5. PRESSURISING

- (1) Disconnect the equipment, ensuring that power is switched off before removing the 42 way connector, and replace the Transmitter-Receiver case.
- (2) Pressurise to 20 lb/in² using dry nitrogen when available, or dry air. Check for leaks using Leak Indicator CT.106. Release pressure to 5 lb/in².

SECTION 2

TRANSMITTER-RECEIVERS ARC-52

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	2	Channel Change Timing Check
	3	Transmitter Oscillator
	4	Operation of 20-30MHz I.F. Amplifier on Transmit
	5	Spectrum Generator
	6	Transmitter Pre-Amplifier
	7	Power Amplifier
	8	Modulator
	9	Guard Receiver
	10	Sidetone on Transmit
	11	Main Receiver
	12	Blower Motor
	13	Pressurising

OPERATIONITEM No

NOTE: The Servicing Instructions contained in this section are applicable to HM Ships, RN Air Stations and RN Air Yards only. They do NOT apply to Aircraft Contractors.

1. BENCH CONNECTIONS AND VOLTAGE CHECKS

- (1) Release the pressure and loosen 12 screws in the front panel of the ARC-52 using Wrench 5120-99-942-9651. These screws should be released in cylinder head fashion, working outwards from the centre and loosening each by half a turn at a time until all are loose.

Stand the Transmitter-Receiver upright on its front panel and lift off the cover.

- (2) Set the following pre-set controls fully clockwise:

R1402 (Guard Sensitivity) Main Chassis.

R415 (Main Audio Gain) Audio Amplifier.

R418 (Sidetone Audio Gain) Audio Amplifier.

R425 (Guard Audio Gain) Audio Amplifier.

R1505 (Aux Audio) Underside of Chassis.

R1507 (Guard Squelch) Underside of Chassis.

R1401 (Main Sensitivity) Main Chassis set fully anti-clockwise.

- (3) Make the following Test Bench connections:

ARC-52 to Interconnecting Box using the 42 way connector, 5995-99-932-3721. Ensure that power is switched off before fitting this connector or damage to filter chokes may result.

ARC-52 Aerial Output to Wattmeter CT419 using co-axial connector 5995-99-943-4145.

Wattmeter absorption A.F. to Interconnecting Box PHONE and EARTH terminals.

- (4) Set the Interconnecting Box D.C. Supply to TR 4 or TR 5 as applicable and make the appropriate d.c. circuit breaker. For TR 4 testing, switch 3 PHASE SUPPLY to ON.

Switch on Test Set Type 15077.

RESTRICTED

ITEM NO

OPERATION

1 continued

- (5) Set Control Unit service switch to T/R and VOL control fully clockwise.
- (6) Switch on the bench fan and direct air onto the rear of the ARC-52. Allow 15 minutes for equipment to stabilise.
- (7) Check h.t. and bias voltages with Multimeter (AVO 8) as follows:-

Power Unit/Rectifier Unit TP.E.	120 to 140V d.c.
Power Unit/Rectifier Unit TP.F.	not less than -13.5V d.c.
Modulator TP.X.	-13.5 to -15.5V d.c.
Interconnecting Box 225 Volt TP	210 to 260V d.c.

- (8) Measure TR4 ripple voltage at the following test points using an Oscilloscope CT484:

<u>Test Point</u>	<u>Ripple Voltage (peak to peak)</u>
E	not greater than 280 m Volts
F	" " " 2.1 Volts
S (PTT Mode)	" " " 5.6 Volts
225V (on Interconnecting Box)	" " " 11.2 Volts

2. CHANNEL CHANGE TIMING CHECKS

- (1) Set the Control Unit CHAN. Selector to 'M' and the manual selectors to 235.1 MHz.
- (2) Select 235.0 MHz on the manual frequency selectors. The time taken from the instant of switching until mechanical drive ceases should not exceed 6 seconds.

3. TRANSMITTER OSCILLATOR UNIT

- (1) Set the Control Unit service switch to OFF and remove the 425 Volt fuse, F1504, from fuseboard E1501 on underside of chassis. The fuse should remain out until the Power Amplifier checks of Item No. 7. Set the Control Unit Service switch to T/R.

OPERATIONITEM NO

SS.8 continued.

- (1) (f) Set the Control Unit function switch to T/R, the manual selectors to 399.9 MHz and the Interconnecting Box T/R. switch to TRANSMIT.
- (g) Adjust C609 to peak the Multimeter reading using Alignment Tool 5120-99-942-9597.
- (h) Set the Control Unit manual selectors to 395.7 MHz.
- (j) Check the tuning of Pre-Amplifier tank circuit, Z602, by inserting the iron and brass ends of the Tuning Wand through the access hole in the rear of the unit in turn, such that the tip of the wand is adjacent to that portion of the inductance arc in the tuned circuit.

Resonance is indicated by a fall in the Multimeter reading when either end of the wand is inserted.

If the Multimeter reading increases when the iron end of the wand is inserted, the appropriate sector of the capacitor rotor vane should be positioned nearer the stator.

If the Multimeter reading increases when the brass end of the wand is inserted, the appropriate sector of the capacitor rotor vane should be positioned further from the stator.

If the capacitor vanes require adjustment, set the Interconnecting Box T/R. switch to RECEIVE, set the Control Unit function switch to OFF, remove the side cover and adjust the appropriate vane sector. Replace the side cover, set the function switch to T/R and the T/R. switch to TRANSMIT and re-check for resonance.

Access for the tracking tool is by the hole marked Z602.

- (k) Repeat operation (j), adjusting the appropriate vane sector at each of the frequencies listed in TABLE 1 in turn. The lower vanes are those situated nearer to the Oldham coupler.

/TABLE 1

RESTRICTED

OPERATIONITEM NO

SS.8 continued.

TABLE 1

(1)

Channel	Vane in Use	Sector in Use	Colour
395.7 MHz	Lower	1st (shortest)	None
385.7	Upper	1st	Black
375.7	Lower	2nd	Black
365.7	Upper	2nd	Red
355.7	Lower	3rd	Red
345.7	Upper	3rd	Yellow
335.7	Lower	4th	Yellow
325.7	Upper	4th	Blue
315.7	Lower	5th	Blue
305.7	Upper	5th	None
295.7	Lower	6th	None
285.7	Upper	6th	Black
275.7	Lower	7th	Black
265.7	Upper	7th	Red
255.7	Lower	8th	Red
245.7	Upper	8th	Yellow
235.7	Lower	Last	Yellow
225.7	Upper	Last	None

(1) Set the Control Unit manual selectors to 399.9 MHz and adjust C609 to peak the Multimeter reading.

(m) Set the Interconnecting Box T/R. switch to RECEIVE and the Control Unit function switch to OFF. Disconnect the Multimeter.

(2) Power Amplifier Grid Circuit Tracking

(a) Connect the Multimeter CT471, set to the -120V d.c. range, to Test Point V and chassis.

(b) Set the Control Unit function switch to T/R, the manual selectors to 399.9 MHz and the Interconnecting Box T/R. switch to TRANSMIT.

(c) Adjust C611 to peak the Multimeter reading.

NOTE: C611 is an air spaced capacitor sited approximately $1\frac{3}{4}$ inches inside the unit. Access is by a hole in the cover labelled C611.

OPERATIONITEM NO

SS.8 continued.

- (2) (d) Set the Control Unit manual selectors to 395.7 MHz.

Check the tuning of the grid tank circuit by inserting the iron and brass ends of the tuning wand in turn, through the square hole in the cover, such that the tip of the wand is adjacent to that portion of the inductance arc in the tuned circuit.

Resonance is indicated by a fall in Multimeter reading when either end of the wand is inserted.

- (e) The grid circuit has two sectorised rotor vanes, each vane comprising nine sectors. One sector of each vane is in mesh with the stator vane on 395.7 MHz, and these rotor sectors must be adjusted to achieve the resonant condition.

If the Multimeter reading increases when the iron end of the wand is inserted, the appropriate sectors of the capacitor rotor vanes should be set nearer the stator.

If the Multimeter reading increases when the brass end of the wand is inserted, the appropriate sectors of the capacitor rotor vanes should be set further from the stator.

If adjustment of the tank circuit is necessary, proceed as follows:-

- (i) To bring these rotor sectors into the most accessible position, depress relay K1201 on the Mechanical Drive Unit, and observe rotation of the capacitor. When sectors appear adjacent to the access hole, set the Control Unit function switch to OFF. Release relay K1201.
- (ii) Adjust each rotor vane sector by a similar amount in the appropriate direction.
- (iii) Set the Control Unit function switch to T/R. The equipment will then channel back to 395.7 MHz. Recheck for resonance.

NOTE: Tracking Tool 5120-99-120-0367 should be used.

- (f) Set the Control Unit manual selectors to 385.7 MHz, and repeat operations (d) and (e), again adjusting the first sector of each vane.

RESTRICTED

OPERATION

ITEM NO

SS.8 continued.

- (2) (g) Repeat operations (d) to (f) at 395.7 MHz and 385.7 MHz, until resonance has been obtained on both frequencies by adjustment of the first capacitor sector.
- (h) Carry out operations (d) to (g) with each pair of frequencies which use the same rotor vane sector, i.e., from the 2nd to the 9th as in TABLE 2.

TABLE 2

Channel	Rotor Vane Sector in Use
375.7 MHz	2nd
365.7	2nd
355.7	3rd
345.7	3rd
335.7	4th
325.7	4th
315.7	5th
305.7	5th
295.7	6th
285.7	6th
275.7	7th
265.7	7th
255.7	8th
245.7	8th
235.7	9th
225.7	9th

- (j) Set the Interconnecting Box T/R. switch to RECEIVE
- (3) Power Amplifier Anode Circuit Tracking
 - WARNING: THE FOLLOWING ALIGNMENT REQUIRES APPLICATION OF E.H.T. (400V) TO THE POWER AMPLIFIER, CAUTION MUST BE EXERCISED.
 - (a) Set the Control Unit manual selectors to 225.7 MHz.
 - (b) Remove the top cover from the module and set C615 adjusting screw so that the gap between the capacitor plate and the anode clamp of V603, is between 0.010 and 0.013 inches. Replace the top cover.
 - (c) Replace fuse F1504.
 - (d) Connect J602 to its normal lead using connector 5995-99-932 2129.

OPERATIONITEM NO

SS.8 continued.

- (3) (e) Connect the Wattmeter CT419, set to the 25 Watt range, to P1402 on the front panel using connector 5995-99-932-1905. The Multimeter CT471 remains connected at Test Point V.
- (f) Set the Control Unit manual selectors to 399.9 MHz and the Interconnecting Box T/R. switch to TRANSMIT.

NOTE: The Multimeter reading should not fall below -15 Volts throughout the following checks. If it does, the preceding items should be re-checked before proceeding and the 425V fuse, F1504, should be removed until the Multimeter reading exceeds -15 Volts.

- (g) Adjust C627 to peak the Wattmeter reading using alignment tool 5120-99-942-9597.
- (h) Adjust C611 to peak the Multimeter reading.
- (j) Set the Control Unit manual selectors to 395.7 MHz. Check the tuning of the anode tank circuit by inserting the iron and brass ends of the tuning wand in turn, through the hole, normally covered, in the side of the module, such that the tip of the wand is adjacent to that portion of the inductance arc in the tuned circuit. Resonance is indicated by a fall in the Wattmeter reading when either end of the wand is inserted.
- (k) The anode tank capacitor has two sectorised rotor vanes, each comprising nine sectors. One sector of each vane is in mesh with the stator vane at 395.7 MHz, and these rotor sectors must be adjusted to achieve resonance.

If the Wattmeter reading increases when the iron end of the wand is inserted, the appropriate sectors of the capacitor rotor vanes should be set nearer the stator.

If the Wattmeter reading increases when the brass end of the wand is inserted, the appropriate sectors of the capacitor rotor vanes should be set further from the stator.

If adjustment of the tank circuit is necessary, proceed as follows:-

- (i) To bring these rotor sectors into the most accessible positions, depress relay K1201 on the Mechanical Drive Unit and observe rotation of the capacitor. When the sectors appear adjacent to the access hole, set the Control Unit function switch to OFF. Then release relay K1201.

RESTRICTED

OPERATION

ITEM NO

SS.8 continued.

- (3) (k) (ii) Adjust each rotor vane sector by a similar amount in the appropriate direction.
- (iii) Set the Control Unit function switch to T/R, the equipment will then channel back to 395.7 MHz Re-check for resonance.

NOTE: Tracking Tool 5120-99-120-0367 should be used.

- (l) Set the Control Unit manual selectors to 385.7 MHz and repeat operations (j) and (k), again adjusting the first sector of each vane
- (m) Repeat operations (j) and (l) at 395.7 MHz and 385.7 MHz, until resonance is achieved on both frequencies by adjustment of the first capacitor sector.
- (n) Carry out operations (j) to (m) with each pair of frequencies, which use the same rotor vane sector i e., from the 2nd to 9th as in TABLE 3.
- (o) Set the Control Unit manual selectors to 399.9 MHz and adjust C627 to peak the Wattmeter reading.
- (p) Set the Interconnecting Box T/R. switch to RECEIVE.

TABLE 3

Channel	Rotor Vane Sector in Use
375.7 MHz	2nd
365.7	2nd
355.7	3rd
345.7	3rd
335.7	4th
325.7	4th
315.7	5th
305.7	5th
295.7	6th
285.7	6th
275.7	7th
265.7	7th
255.7	8th
245.7	8th
235.7	9th
225.7	9th

OPERATIONITEM NO

SS.8 continued.

(4) Final Tracking

(a) With the Wattmeter connected to the T.R. aerial socket and the 425V fuse, F1504, in circuit, carry out operation (2), Grid Circuit Tracking, followed by adjustment of C611 at 399.9 MHz, detailed in operation (2) (a) to (2) (c). Repeat until no further improvement can be obtained in the Multi-meter reading.

(b) The Multimeter reading should not fall below -20 Volts for any Control Unit manual selector setting between 225.0 MHz and 399.9 MHz.

The Wattmeter reading should be not less than 12 Watts on any channel.

(c) Set the Interconnecting Box T/R. switch to RECEIVE, set the Control Unit function switch to OFF.

Disconnect the test equipment and Test Pedestal, refit the module in the chassis and carry out the Standard Serviceability Test detailed in Section 1.

SS.9 20-30 MHz AMPLIFIER. 5821-99-942-8557

NOTE: Inductors should be unlocked using Remover, Paint. 8010-99-947-7825.

- (1) Remove the module from the chassis and remove the module side covers. Secure the module to Test Pedestal 6625-99-943-6880, locate and secure the Test Pedestal in the chassis.
- (2) Reconnect microdot connections, with the exception of J1518, using connectors 5995-99-932-2130 and adaptors 5995-99-932-2381.
- (3) Connect the Signal Generator CT394 output to input connector J1518 using co-axial connector 5905-99-972-8884 and adaptor 5935-99-932-1911.
- (4) Set the Control Unit function switch to T/R, set the manual frequency, unit and decimal selectors to 0.7.
- (5) Set the Signal Generator CT452A to 1.85 MHz with the aid of the Calibrator Frequency. The Signal Generator should remain switched on during the following alignment.
- (6) Connect the Multimeter CT471, set to the 12V d.c. range, to Test Point L and chassis.

RESTRICTED

OPERATION

ITEM NO

SS.9 continued.

- (7) Using alignment tool 5120-99-943-7322, adjust L209, L210, L211 and L212 in turn to peak the Multimeter reading.
- (8) Connect the Avometer 8, set to the 10V d.c. range, to Test Point M on the chassis and earth, or to the Interconnecting Box A.V.C. Test Point and EARTH.
- (9) Set the Signal Generator CT394 output to maximum and adjust the frequency about 20.7 MHz to accurately peak the Avometer reading. Reduce the CT394 output as necessary to keep the Avometer reading below 1.5 Volts.
- (10) Using d.c. Isolator 6625-99-943-3486, inductively couple the Signal Generator CT452A to V203 by placing the Isolator crocodile clip near the valve.
- (11) Connect a headset to the Interconnecting Box and set the Control Unit VOL. control fully clockwise
- (12) Tune the Signal Generator CT394 for zero beat in the phones. Remove the inductive coupling at V203.

NOTE: Operations (10) to (12) should be repeated at frequent intervals during the following alignment.

- (13) Adjust the inductors L201 to L206 in turn to peak the Avometer reading. Reduce the Signal Generator C.T.394 output as necessary to keep the Avometer reading below 1.5 Volts.
- (14) Set the Control Unit manual frequency, unit and decimal selectors to 9.7.
- (15) Tune the Signal Generator C.T.394 about 29.7 MHz to peak the Avometer reading, reducing the Signal Generator output as necessary to keep the Avometer reading below 1.5 Volts.
- (16) Repeat operations (10) to (12).
- (17) Adjust C236, C241, and C245 and C250 to peak the Multimeter CT471 reading, using Alignment Tool 5120-99-942-9599.
- (18) Adjust C202, C207, C211, C217, C221 and C226 to peak the Avometer reading, reducing the Signal Generator CT394 output as necessary to keep the Avometer reading below 1.5 Volts.
- (19) Set the Control Unit manual frequency, unit and decimal selectors to 0.7.
- (20) Repeat operations (10) to (12).

OPERATIONITEM NO

SS.9 continued.

- (21) Adjust L209, L210, L211 and L212 to peak the Multimeter CT471 reading.
- (22) Adjust L210, L202, L203, L204, L205 and L206 to peak the Avometer reading, reducing the Signal Generator CT394 output as necessary to keep the Avometer reading below 1.5 Volts.
- (23) Remove the 425 Volt fuse, F1504, and reconnect the Multimeter CT471, set to the 12 V d.c range, to Test Point T and chassis.
- (24) Disconnect the Signal Generator CT394.
- (25) Set the Interconnecting Box T/R. switch to TRANSMIT, adjust L206 to peak the CT471 reading, switch to RECEIVE.
- (26) Repeat operations (14) to (25) until no further improvement can be obtained.
- (27) Re-lock inductors, using varnish, oil 8010-99-947-7826 and replace fuse F1504.
- (28) Reconnect J1518 using microdot adaptor 5935-99-932-2381.
- (29) Set the Control Unit manual selectors to 399.7 MHz.
- (30) Connect the Signal Generator, CT394, to the T.R. aerial socket P1402. Tune the CT394 about 399.7 MHz to accurately peak the Avometer reading.
- (31) Adjust C202 to peak the Avometer reading
- (32) Disconnect the test equipment and Test Pedestal, replace the module side covers and refit the module in the chassis. Carry out the Standard Serviceability Test detailed in Section 1.

SS.10 1.85 MHz AMPLIFIER. 5821-99-942-8556

(1) Preparation

- (a) Remove the module from the chassis and remove the A.F. side cover. Reconnect the module to J1503 using connector 5995-99-932-1910, leave P301 disconnected.
- (b) Connect the Wattmeter A.F. and Oscilloscope CT484 to the Interconnecting Box PHONE and EARTH terminals.

RESTRICTED

OPERATION

ITEM NO

SS.10 continued.

- (1) (c) Set the Control Unit function switch to T/R and turn the VOL. control fully clockwise.
- (d) Set the Signal Generator CT452A to 1.85 MHz, using the Calibrator Frequency.

The Signal Generator frequency must be re-checked at intervals throughout the following tests.

(2) No Signal Condition

- (a) Set the main sensitivity control, R1401, on the main chassis, fully clockwise.

Set C339 and C340 fully counter clockwise.

- (b) A.V.C. - Connect the Multimeter CT471, set to the 400 mV d.c. range, to Test Point M and chassis. The Multimeter reading should be approximately + 0.05 to -0.25 Volts.
- (c) Squelch. Connect the CT471, set to the 40V d.c. range, to pin 5 of J1503 and chassis. The Multimeter reading should be not less than 13 Volts.
- (d) Aux. Audio.-Connect the CT471, set to the 1.2V a.c. range, to pin 4 of J1503 and chassis. The Multimeter reading should be not more than 1 Volt.
- (e) Main Audio.-Connect the CT471, set to the 400 mV a.c. range, to pin 6 of J1503 and chassis. The Multimeter reading should be not more than 0.13 Volts.

(3) Signal Condition

- (a) Connect the Signal Generator, CT452A, output to P301 using connector 5995-99-932-4021 and adaptor 5935-99-932-1912.
- (b) Connect the Multimeter, CT471, set to the 4V d.c. range, to pin 5 of P302 and chassis. Connect the Avometer, set to the - 10V d.c. range, to Test Point M and chassis.
- (c) A.V.C. and Squelch.-Set the Signal Generator output, unmodulated, for a Multimeter reading of 0V. The Signal Generator output should be not greater than 15 μ V.
- (d) Turn C339 and C340 fully clockwise. Adjust the Signal Generator output for a Multimeter reading of 0V. The Signal Generator output should be not less than 23 μ V.

OPERATIONITEM NO

SS.10 continued.

- (3) (e) Turn C339 and C340 fully counter clockwise. Adjust the Signal Generator output for an Avometer reading of - 1 Volt. The Signal Generator output should be not more than 50 μ V, the Multimeter reading should be between - 1.5 and - 2.5 Volts.
- (f) Aux. Audio. - Modulate the Signal Generator 30% at 1 kHz and adjust the output for an Avometer reading of 1.0V. Reconnect the Multimeter, CT471, set to the 12V a.c. range, to pin 4 of P302 and chassis, the reading should be between 3 and 4 Volts.
- (g) Main Audio - Set the Signal Generator output to 50 μ V. Reconnect the Multimeter, set to the 4V a.c. range, to pin 6 of P302 and chassis, the reading should be not less than 1 Volt. Record this reading.
- (h) Switch off the Signal Generator modulation and set the Multimeter range to 1.2V a.c. The Multimeter reading should be not more than 1/10th of that noted in operation (g).
- (j) Set the Multimeter range switch to 4V a.c. and switch on the Signal Generator modulation.
- (k) Limiting.- Adjust the Signal Generator output for an Avometer reading of 1 Volt. Increase the Signal Generator modulation until the Oscilloscope Waveform just shows amplitude limiting. The depth of modulation should be between 40 and 65%.
- Reset the Signal Generator modulation to 30%.
- (l) Bandwidth. - Reconnect the Multimeter CT471, set to the 4V d.c. range, to pin 5 of P302 and chassis. Note the reading.
- (m) Increase the Signal Generator frequency until the Multimeter reading falls to that noted in operation (l). The Signal Generator Frequency, measured with the CT488 should be at least 40 kHz above 1.85 MHz. Record this Frequency.
- (n) Decrease the Signal Generator frequency below 1.85 MHz until the Multimeter reading again falls to that noted in operation (l). The Signal Generator frequency, measured with the CT488 should be at least 40 kHz below 1.85 MHz. Record this frequency. The difference between this and the frequency noted in operation (m) should be not less than 90 kHz.

RESTRICTED

OPERATION

ITEM NO

SS.10 continued.

- (3) (o) Squelch Characteristic. - Set the Multimeter range switch to 12V d.c. the Signal Generator to 1.85 MHz using the Calibrator Frequency and adjust the output level for a Multimeter reading of + 6.5 Volts. The Signal Generator output should be not greater than 15 μ V.
- (p) Set the main sensitivity control, R1401, fully counterclockwise and adjust the Signal Generator output level for a Multimeter reading of + 6.5 Volts. The Signal Generator output should be not less than 25 μ V.
- (q) A.V.C. Time Constant. - Set R1401 fully clockwise. Modulate the Signal Generator at 30%, 100 Hz and set the output level to 100 μ V.
- (r) Connect the Multimeter CT471, set to a suitable a.c. range, between the junction of C333, C324, and the chassis. Note the reading.
- (s) Connect pin 15 of P302 to chassis, the Multimeter reading should fall by at least 6 dB. Remove the short at P302.
- (t) Connect the Multimeter CT471, set to a suitable d.c. range, between Test Point N on the Audio Amplifier and chassis.

Disconnect the Signal Generator from the microdot lead and re-connect J1516.

Connect the output of Signal Generator CT394 to P1402.

- (u) Set the CT394 frequency below 200 MHz and the output level to not greater than 1 μ V.

Set the Control Unit manual frequency selectors to the frequencies listed in TABLE 1 in turn and note the Multimeter reading at each frequency.

TABLE 1

225.0 MHz	275.0 MHz	320.9 MHz	375.8 MHz
235.1	288.0	335.6	383.9
246.0	295.4	431.9	399.9
254.2	309.2	355.7	
267.3	315.5	362.9	

OPERATIONITEM NO

SS.10 continued.

- (3) (v) Set the Control Unit to that frequency giving the most negative voltage reading, or if all voltages are positive, to the channel giving the lowest reading.

Adjust C339 and C340 to produce the lowest level obtainable between 0 and + 1 Volt.

- (w) Disconnect the test equipment, replace the module side cover and refit the module in the chassis. Carry out the Standard Serviceability Test detailed in Section 1.

SS.11 AUDIO AMPLIFIER 5821-99-942-8555

(1) Preparation

NOTE: This operation does not apply to units modified for use with Radio Relay, ARI23182. For preparation of these units see operation (2).

- (a) Remove the module from the chassis and reconnect to the chassis using extension lead 5995-99-932-1908.
- (b) Remove the module side covers and disable the Squelch by connecting a jumper link between pins 2 and 4 of V402 (Signal/Noise Squelch) or between pins 7 and 4 of V402 (Carrier Squelch) as applicable.
- (c) Connect the Wattmeter A.F. to the Interconnecting Box PHONE and EARTH terminals.

(2) Preparation. Radio Relay ARI23182

- (a) Remove the module from the chassis and reconnect to the chassis using extension lead 5995-99-932-1908.
- (b) Remove the module side covers.
- (c) Connect the Wattmeter A.F. to the Interconnecting Box PHONE and EARTH terminals.
- (d) Using a battery and potentiometer, apply a negative bias in the range 0 to -6 Volts between pin 10 of the extension lead and chassis.
- (e) Connect the Multimeter CT471 set to the - 12V d.c. range between pin 10 of the extension lead and chassis.

RESTRICTED
OPERATION

ITEM NO

SS.11 continued.

- (2) (f) Increase the voltage at pin 10 and check that relay K401 operates at between - 1 and - 3 Volts.
- (g) Set the bias to a value greater than - 3 Volts to maintain relay K401 in the energised condition.
- (h) Disconnect the Multimeter.

(3) Main Audio

- (a) Connect the Signal Generator CT433 output to pin 8 of the extension lead and chassis.
- (b) Set the Signal Generator frequency to 1 kHz. Set the Control Unit function switch to T/R.
- (c) Adjust the Signal Generator output for a Wattmeter reading of 250 mW. The Signal Generator output, measured with the CT471 should not exceed 1 Volt.

(4) Sidetone Audio

- (a) Reconnect the Signal Generator CT433 output to pin 4 of the extension lead and chassis.
- (b) Set the Signal Generator output level to give a reading of 250 mW. The Signal Generator output, measured with the CT471 should not exceed 1.5 Volts.

(5) Guard Audio

- (a) Reconnect the Signal Generator CT433 output to pin 5 of the extension lead and chassis.
- (b) Set the Signal Generator output level to give a Wattmeter reading of 250 mW. The Signal Generator output, measured with the CT471 should not exceed 5 Volts.

(6) Aux. Audio

- (a) Reconnect the Signal Generator CT433 output to pin 13 of the extension lead and chassis.
- (b) Set the Signal Generator output to 3 Volts, using the CT471.
- (c) Connect the CT471, set to the 4V a.c. range, to the Interconnecting Box AUX. AUDIO and EARTH terminals. The Multimeter reading should be not less than 0.9 Volt.

OPERATIONITEM NO

SS.11 continued.

- (6) (d) Remove the jumper link at V402, disconnect the bias potentiometer and test equipment. Replace the module side covers and refit the module in the chassis. Carry out the Standard Serviceability Test detailed in Section 1.

SS.12 POWER AMPLIFIER, MAIN RECEIVER AND TRANSMITTER PRE-AMPLIFIER AND SPECTRUM GENERATOR

Checks to be carried out on insertion of one or more of these modules in the T.R.

- (1) Carry out the Standard Serviceability Test detailed in Section 1. If this proves unsatisfactory carry out the following instructions as appropriate.
- (2) Spectrum Generator, Transmitter section of the Main Tx Rx Pre-Amplifier.
 - (a) Connect the CT419 to the T.R. aerial socket. Connect the CT471, set to the - 40V d.c. range, to Test Point V and chassis.

Set the Control Unit function switch to T/R and the manual selectors to 399.9 MHz. Set the Interconnecting Box T/R. switch to TRANSMIT.
 - (b) Adjust C517, C522 and C526 in the Spectrum Generator, C115, C116 and C117 in the Transmitter Pre-Amplifier and C609, C611 in the pre-amplifier section of the Power Amplifier, to peak the Multimeter reading. This reading should be not less than - 20 Volts.
 - (c) Adjust C627 to peak the Wattmeter reading Re-adjust C611 to peak the Multimeter reading. The Wattmeter reading should be not less than 12 Watts. Set the T/R. switch to RECEIVE. Disconnect the Wattmeter and Multimeter.
- (3) Receiver section of the Main Tx Rx. Pre-Amplifier
 - (a) Connect the Multimeter CT471, set to the 4V d.c. range, to the Interconnecting Box A.V.C. and EARTH test points. Connect the Signal Generator CT394A to the T.R. aerial socket, P1402.
 - (b) Set the Control Unit function switch to T/R and the manual frequency selectors to 399.9 MHz.

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OPERATION

ITEM NO

SS.12 continued.

- (3) (c) Set the Signal Generator to 399.9 MHz with an unmodulated output of 1 mV. Tune the Signal Generator about 399.9 MHz to peak the Multimeter reading.
- (d) Reduce the Signal Generator output to zero and then gradually increase it to the point where the Multimeter reading just starts to rise.
- (e) Retune the Signal Generator to peak the Multimeter reading.
- (f) Adjust C19, C20 and C21 to peak the Multimeter reading.
- (4) Disconnect the test equipment, carry out the Standard Serviceability Test detailed in Section 1.

SS.13 TEST POINT VOLTAGES

TABLE 1 gives approximate figures, for guidance in fault finding. All voltage readings are taken between the appropriate Test Point and chassis with the module connected into the chassis and using a Multimeter CT471.

The T.R. should be allowed a warm up period of 15 minutes before readings are taken.

TABLE 1

T.P.	Location	Circuit	Voltage
Power Supply			
A	Right hand panel J1405	D.C. Supply	27.5V
B	TR4 only. Fuseboard J1501	Phase 1	115V 400Hz
C	TR4 only. Fuseboard J1502	Phase 2	115V 400Hz
D	TR4 only. Fuseboard J1503	Phase 3	115V 400Hz
E	TR4 Rectifier Unit J1001 TR5 Power Unit J1101	H.T. +	Not less than 120V.
F	TR4 Rectifier Unit J1002 TR5 Power Unit J1102	BIAS	Not less than -13.5V See NOTE 5.
Receiver			
G	Main R.F. Amplifier J2	R.F. drive from V1, V2 to mixer.	Not less than -1V d.c. See NOTE 1.

OPERATION

SS.13 continued.

TABLE 1 continued

T.P.	Location	Circuit	Voltage
Receiver			
H	Spectrum Generator J502	Drive to Tripler	Not less than -5.5V d.c.
J	Oscillator Unit J1901	Oscillator output 24.9-33.9 MHz	Not less than -1V d.c.
K	Oscillator Unit J1902	Oscillator output 3.05-2.15 MHz	Not less than -0.5V d.c.
L	20-30 MHz Amplifier J202	21.85-31.75 MHz injection and I.F. gain.	Not less than -2V d.c.
M	Right hand panel J1406	Main receiver A.V.C.	-0.3V See NOTE 8
N	A.F. Amplifier J401	Detector output	See NOTE 2
P	A.F. Amplifier J402	Audio gain	See NOTE 3
R	A.F. Amplifier J403	Signal to Noise sensing	See NOTE 4
Transmitter			
S	Fuseboard F1504	Transmitter H.V.	Not less than 400V d.c.
T	Transmitter Pre-Amp. J102	Spectrum and 20-30 MHz Amplifier injection	See NOTE 6
U	20-30 MHz Amplifier J201	1.85 MHz Oscillator output	Not less than -3V d.c.
V	Power Amplifier J603	Drive to V603	greater than -20V d.c.
X	Modulator J701	Bias	-15V d.c.
Guard Receiver			
Y	Guard Receiver P801-1	Guard receiver A.V.C.	Not less than -1V d.c. See NOTE 9.

RESTRICTED

OPERATIONITEM NO

SS.13 continued

TABLE 1 continued

<u>T.P.</u>	<u>Location</u>	<u>Circuit</u>	<u>Voltage</u>
Z	Guard Receiver P801-8	Detector output	See NOTE 7

- NOTES:
1. With the Spectrum Generator disconnected and with 0.1V input signal.
 2. Not less than 2V with an input signal of 1 mV, modulated 30% at 1 kHz.
 3. Not less than 3V a.c. with the Guard Receiver off, the guard potentiometer, R425, set to its midway position, the main audio potentiometer, R415, set to maximum and 1 mV input signal modulated 30% at 1 kHz. With the Guard Receiver on, R415 and R425 set to maximum and 1 mV input signal modulated 30% at 1 kHz applied to the Guard Receiver, the reading should be not less than 5V a.c.
 4. At least + 4V d.c. with the A.F. Amplifier connected for signal to noise squelch, the threshold potentiometer, R407, set to its midway position and 1 mV input signal modulated 30% at 400 Hz.
 With 1 mV input signal modulated 30% at 20 kHz the reading should be at least -4V d.c.
 When the A.F. Amplifier is connected for carrier operated squelch, with 1 mV unmodulated input signal, the reading should be at least -4.5V d.c.
 5. A bias supply of between -38V and -52V d.c. is available from the power unit, but it is reduced to -13.5V to -15V by the loading of the complete Transmitter-Receiver
 6. Minus 2.0V on Receive.
 With the Spectrum Generator disconnected, a change of -1V should be observed when switching to Transmit.
 7. Not greater than 15V max. with 1 mV input signal.
 8. About -0.3V d.c. with no signal and J1516 disconnected.
 9. With input of 1 mV modulated 30% at 1 kHz.

OPERATIONITEM NO

3.continued

- (2) Connect the Multimeter CT471, set to the -120 Volt d.c. range, to test point V and earth.
- (3) Set the Interconnecting Box T/R switch to TRANSMIT. The Multimeter reading should be not less than -20 Volts. Switch to RECEIVE.
- (4) Repeat operation (3) on the following frequency settings:
- | | | | | |
|-------|-----------|-------|-------|-------|
| 230.0 | 240.0 | 250.0 | 260.0 | 270.0 |
| 280.0 | 290.0 | 300.0 | 311.1 | 322.2 |
| 333.3 | 344.4 | 355.5 | 366.6 | 377.7 |
| 388.8 | 399.9 MHz | | | |

If the correct voltage is obtained on each frequency setting, proceed direct to Item No. 7 operation (4), if not, continue with operation (5).

- (5) Connect Multimeter CT471, set to the -4 Volt d.c. range, between test point J and earth, using test lead attachment 6625-99-943-7028.
- (6) With 'M' selected on the Control Unit CHAN selector, set the manual units selector to zero. The Multimeter reading should be greater than -1 Volt.
- (7) Repeat operation (6) for units selector settings of 1 to 9 inclusive.
- (8) Reconnect the Multimeter, set to the 12V -ve d.c. range, between test point K and earth.
- (9) With the Control Unit decimals selector set to zero, the Multimeter reading should be not less than -0.5 Volts.
- (10) Repeat operation (9) for decimal selector settings of 1 to 9 inclusive.
- (11) Disconnect the Multimeter.
- (12) If the readings obtained are not correct, carry out Item No. 885, Section 3, Chapter 1 or Chapter 2.

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OPERATION

ITEM NO

4. OPERATION OF 20-30 MHz I.F. AMPLIFIER ON TRANSMIT

- (1) Set the Control Unit decimal and unit selectors to 0.0. Connect the Multimeter CT471, set to the 12V -ve d.c. range, between test point U and earth.
- (2) Set the Interconnecting Box T/R switch to TRANSMIT. The Multimeter reading should be not less than -3 Volts. Switch to RECEIVE.
- (3) Connect the CT471 between test point L and earth. Set the Control Unit decimal and unit selectors to 0.0, 5.5 and 9.9 in turn, the Multimeter reading should be not less than -1 Volt.
- (4) Connect the CT471 between test point T on the Transmitter Pre-amplifier and earth.
- (5) Disconnect the Spectrum Generator input to the Pre-amplifier at J501.
- (6) Set the Control Unit decimal and unit selectors to 0.0 and note the Multimeter reading.
- (7) Set the Interconnecting Box T/R switch to TRANSMIT. The Multimeter negative voltage reading should increase by not less than 1 Volt. Switch to RECEIVE.
- (8) Repeat operation (6) and (7) with the unit and decimal selectors set to 5.5 and then to 9.9.
- (9) Disconnect the Multimeter.
- (10) If the readings obtained are incorrect carry out Item No SS9, Section 3 Chapter 1 or Chapter 2.

5. SPECTRUM GENERATOR

- (1) Connect the Monitor R.F. to J501 using connectors 5995-99-932-2130 and 5995-99-932-1909, and adaptor 5935-99-932-1912.
- (2) Connect the Multimeter CT.471, set to the -40 Volt d.c. range, to test point H and earth.
- (3) Set the Control Unit manual frequency selectors to 220 MHz and then in 10 MHz increments up to 390 MHz. Multimeter readings should be not less than -5.5 Volts on all channels.
- (4) Connect the CT471, set to the -12 Volt d.c. range, to the Monitor R.F. red and black terminals. Set the Control Unit manual frequency selectors to 220 MHz and then in 10 MHz increments to 390 MHz. Readings should be not less than -2.5 Volts on all channels.

OPERATIONITEM NO

5. continued

- (5) Disconnect the CT471 and Monitor R.F. and re-connect J501.
- (6) If the readings at test point H are less than -5.5 Volts on any channel, carry out Item No. SS6 (1) Section 3 Chapter 1 or Chapter 2.

6. TRANSMITTER PRE-AMPLIFIER

- (1) Disconnect the microdot lead from J101.
- (2) Connect the Monitor R.F. to J101 using connectors 5995-99-932 2130 and 5995-99-932-1909 and adaptor 5935-99-932-1912.
- (3) Connect the Multimeter CT471, set to the 12 Volt d.c. range, to the Monitor R.F. red and black terminals.
- (4) Set the Control Unit manual frequency selectors to 225.0 MHz.
- (5) Set the Interconnecting Box T/R switch to TRANSMIT. The Multimeter reading should be greater than 2.5 Volts. Switch to RECEIVE.
- (6) Repeat operation (5) on 315.5 MHz and 399.9 MHz.
- (7) Disconnect the Multimeter and Monitor R.F. and re-connect the microdot lead to J101.
- (8) If the figures obtained in operations (5) and (6) are incorrect carry out Item No. SS7(2), Section 3, Chapter 1, or Item No. SS7(1) Section 3 Chapter 2.

7. POWER AMPLIFIER

- (1) Connect the Multimeter CT471, set to the -120 Volt d.c. range, to test point V and earth.
- (2) Set the Interconnecting Box T/R switch to TRANSMIT. The Multimeter reading should be not less than -20 Volts. Switch to RECEIVE.
- (3) Repeat operation (2) for frequencies of 315.5 MHz and 225 MHz.
- (4) Set the Control Unit service switch to OFF and replace the 425 Volt fuse F1504 removed in Item No 3(1). Set the Control Unit service switch to T/R.

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ITEM NOOPERATION

7. continued

- (5) Connect Multimeter (AVO 8), set to the 1000 Volt d c. range, between test point S on the fuse panel and earth.
- (6) Set the Interconnecting Box T/R switch to TRANSMIT. The Multimeter (AVO 8) reading should be not less than 400 Volts and the Multimeter CT471 reading should be greater than -20 Volts.
- (7) Switch to RECEIVE. Disconnect the Multimeters.
- (8) With the Control Unit manual frequency selectors set to 225.0 MHz., switch to TRANSMIT. The wattmeter CT419 reading should be not less than 12 Watts. Switch to RECEIVE.
- (9) Repeat operation (8) on the following frequency settings:

230.0	240.0	250.0	260.0	270.0
280.0	290.0	300.0	311.1	322.2
333.3	344.4	355.5	366.6	377.7
388.8	399.9 MHz			

The average of these readings should be not less than 14 Watts.

- (10) If the results required in operation (8) are not obtained, carry out Item No SS8, Section 3, Chapter 1 or Chapter 2.

8. MODULATOR

- (1) Depth of modulation.
 - (a) Set the Control Unit manual frequency selectors to 315.5 MHz.
 - (b) Connect the Signal Generator CT433 600 Ω output, to the Microphone Simulator 0 and 600 Ω terminals. Link the Microphone Simulator 0 and EARTH terminals.
 - (c) Connect the Microphone Simulator output to the Interconnecting Box MIC terminals, using screened leads.
 - ◀ (d) Set the Microphone Simulator selector Switch to 5mV 300 ohm and interconnecting Box DYN/CARB switch to DYN. ▶
 - (e) Set the Signal Generator frequency to 1 kHz and adjust the attenuator for calibration mark indication on the Microphone Simulator meter.
 - (f) Disconnect the ARC-52 aerial output from the CT419 and reconnect it to the Monitor AF/RF TX socket.
 - (g) Connect the Monitor AF/RF 50 ohm LOAD socket to the CT419 using connector, 5995-99-932-1905.

OPERATIONITEM NO

8. continued

- (1) (h) Connect the Signal Generator CT394A output to the Monitor AF/RF INPUT A socket using either connector 5995-99-972-8884 supplied with the Signal Generator, or connector 5995-99-932-1905.
- (j) Connect the Monitor AF/RF OUTPUT to the Oscilloscope CT484, Y1 input.
- (k) Set the Interconnecting Box T/R switch to TRANSMIT. Set the CT394A output to maximum and tune the Signal Generator about 315.5 MHz, C.W. only, for maximum amplitude waveform on the Oscilloscope.
- (l) Adjust the Oscilloscope for a clearly defined, sinusoidal waveform. Adjust R702, on top of the Modulator Unit until clipping just commences, i.e. until the peaks of the displayed waveform just begin to flatten. This should occur at a modulation depth of between 65 and 95%.

NOTE: Percentage modulation depth is determined by inserting the peak to peak (A), and trough to trough (B) values in the following expression:-

$$\text{Modulation depth} = \frac{A - B}{A + B} \times 100\%$$

- (m) If the modulation depth is greater than 80%, R702 is now correctly set. If it is less than 80%, adjust R702 to give approximately 80% depth of modulation.
- (n) Switch to RECEIVE.
- (2) Tone Oscillator
- (a) Disconnect the Signal Generator CT433 from the Microphone Simulator and reconnect it to the Oscilloscope Y2 input.
- (b) Set the Interconnecting Box TONE switch to ON. Tune the Signal Generator CT394A about 315.5 MHz, C.W. only, for maximum amplitude waveform on the Oscilloscope.
- (c) Adjust the Oscilloscope for a clearly defined sinusoidal waveform and obtain from the peak to peak and trough to trough values, the modulation depth. This should be between 80 and 100%.
- (d) Check the tone oscillator frequency by comparison with the output of the Signal Generator CT433. This should be between 920 and 1120 Hz.
- (e) Set the TONE switch to OFF.

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OPERATION

ITEM NO

8. continued

- (2) (f) Disconnect the Signal Generator CT433, Signal Generator CT394A, Oscilloscope CT484, Monitor AF/RF and Microphone Simulator.

9. GUARD RECEIVER

- (1) Set the Control Unit service switch to T/R + G and select a frequency other than 243.0 MHz on the manual selectors.
- (2) Make the following connections:-
- (a) Phones to Interconnecting Box
- (b) Signal Generator CT394A to the ARC-52 aerial socket via an R.F. fuse.
- (c) Multimeter CT471, set to the 12 Volt d.c. range, to the AVC test point Y, and earth. Test point Y is on the underside of J1508, main chassis.
- (3) Set the CT394A frequency to 243.0 MHz, modulated 30% at 1 kHz and the output level to 20 μ V. Tune the Signal Generator about 243.0 MHz for a peak reading in the Multimeter.
- (4) Ensure that R1507 and R1402 are set fully clockwise.
- (5) Reduce the Signal Generator output until the receiver just mutes or to 1 μ V whichever is sooner. Increase the Signal Generator output until the receiver just unmutes as heard in the phones. The Signal Generator output should be not greater than 3.5 μ V.

NOTE: If reducing the Signal Generator output does not mute the receiver, set the Signal Generator output to 1 μ V and turn R1507 counter-clockwise until the receiver just mutes. If adjustment of R1507 does not mute the receiver, set it fully counter-clockwise and adjust R1402 until the receiver just mutes. Repeat operation (5).

- (6) Disconnect the phones from the Interconnecting Box. Check that the Signal Generator is correctly tuned.
- (7) Increase the Signal Generator output to 1mV. Adjust the guard audio control, R425, in the Audio Amplifier Unit, for a Wattmeter reading of 125 mW at the Interconnecting Box PHONE and EARTH terminals.
- (8) Set the Signal Generator output to 25 μ V. The Wattmeter reading should be within 3dB of 125 mW.

ITEM NOOPERATION

9. continued.

- (9) Set the Signal Generator output to 100 mV. The Wattmeter reading should be within 3dB of 125 mW.
- (10) Set the Signal Generator output to 10 μ V and note the reading in dB.
- (11) Switch OFF the Signal Generator modulation. The Wattmeter reading should be at least 6dB down on that obtained in operation (10).
- (12) If incorrect figures are obtained, carry out Item No SS4 Section 3, Chapter 1 or Chapter 2. Disconnect the Signal Generator CT394A.

10. INTERCOM. ON TRANSMIT

- (1) Connect the Signal Generator CT433 600 μ output, to the Microphone Simulator 0 and 600 μ terminals. Link the Microphone Simulator 0 and EARTH terminals
- (2) Connect the Microphone Simulator output to the Interconnecting Box MIC terminals, using screened leads. Connect the Wattmeter CT419 to the T.R. aerial socket
- (3) Set the Microphone Simulator selector switch to 5mV 300 ohm and Interconnecting Box DYN/CARB switch to DYN.
- (4) Set the Signal Generator frequency to 1 kHz and adjust the attenuator for calibration mark indication on the Microphone Simulator meter.
- (5) With T/R + G selected on the Control Unit, set the Interconnecting Box T/R switch to TRANSMIT and adjust the sidetone control, R418, for a Wattmeter reading of 250mW.
- (6) Switch to RECEIVE. Check that the audio power does not fall below 250mW.
- (7) Disconnect the Signal Generator CT433. Set the Control Unit service switch to T/R.
- (8) If incorrect readings are obtained carry out Item No SS11 Section 3, Chapter 1 or Chapter 2. Disconnect the CT419.

11. MAIN RECEIVER

(1) Preparation

- (a) Connect the Signal Generator CT394A output to the ARC-52 aerial socket via an R.F. fuse.
- (b) Connect the Multimeter CT471, set to the 12 Volt d.c. range to the Interconnecting Box A.V.C. and EARTH test points.

11. Continued.

- (1) (c) Set the Control Unit manual frequency selectors to 315.5 MHz.
- (d) Set the pre-set control R1401 (Main Sensitivity) main chassis fully clockwise.
- (e) Set the Signal Generator frequency to 315.5 MHz modulated 30% at 1 kHz. Set the output to 10 μ V. Tune the Signal Generator about 315.5 MHz for peak reading in the Multimeter.

(2) Audio Gain Setting and A.G.C. Test

- (a) Set R1510 fully clockwise when testing TR5, or fully counter clockwise when testing TR4 equipments. Check that the Control Unit VOL control is turned fully clockwise and that no phones are connected.
- (b) Increase the Signal Generator output to 1mV. Adjust the Main Audio Gain control, R415, in the Audio Amplifier Unit, for a Wattmeter reading of 250 mW at the Interconnecting Box PHONE and EARTH terminals.
- (c) Slowly increase the Signal Generator output to 500mV. The Wattmeter reading should not fall below 50mW. Adjust R1510 with minimum amount necessary to obtain this requirement.
- (d) Set the Control Unit manual frequency selectors to 246 MHz and tune the Signal Generator to 246 MHz, modulated 30% at 1 kHz. output level 1mV.
- (e) Reset R415 for a Wattmeter reading of 250mW.
- (f) Switch the Signal Generator output successively to 20 μ V, 100 μ V and 10mV. The Wattmeter reading should not deviate by more than 3dB from 250mW.

The Signal Generator output levels, when testing at frequencies other than 246 MHz are 10 μ V, 100 μ V and 10mV.

- (g) Set the Signal Generator output to 100mV. The Wattmeter reading should be 250mW +5dB -3dB. Adjust R1510 the minimum amount necessary to obtain this requirement.
- (h) Repeat operations (d) to (g) inclusive, at 315.5 MHz and 399.9 MHz.
- (j) Set the Control Unit manual frequency selectors to 246 MHz and tune the Signal Generator to 246 MHz, modulated 30% at 1 kHz. output level 5 μ V.
- (k) Adjust R415 for a Wattmeter reading of 50mW. Switch off the Signal Generator modulation, the Wattmeter reading should fall by at least 8dB.

OPERATIONITEM NO

11. (2) (k) continued.

NOTE: 1, Squelch operation will cut off the receiver output a few seconds after the Signal Generator modulation is switched off. To obtain a true reading therefore, the Wattmeter range and Signal Generator modulation should be switched simultaneously so that the reduced receiver output can be recorded before cut off occurs.

NOTE: 2, In TR4 equipments it may be necessary to turn R1510 slightly clockwise in order to obtain the required signal/noise ratio.

- (1) Repeat operation (k) at 315.5 MHz and 399.9 MHz setting the Signal Generator to the appropriate frequency, modulated 30% at 1 kHz, output 5 μ V.
- (m) Set the Control Unit manual frequency selectors to 315.5 MHz and tune the signal generator to 315.5 MHz, modulated 30% at 1 kHz, output 1mV.
- (n) Reset R415 for a Wattmeter reading of 125mW.

NOTE: The tests detailed in the following operations (3) and (4), do not apply to equipment modified for use with Radio Relay A.R.I. 23182. When testing these units proceed direct to operation (5).

(3) Signal/Noise

- (a) Set the Signal Generator output to 5 μ V. Note the Wattmeter reading in dB.
- (b) Switch off the Signal Generator modulation, the Wattmeter reading should fall by at least 8dB.

NOTE 1. See 'NOTE 1' following operation (2) (k).

NOTE 2. In TR4 equipments, R1510 is set fully counter-clockwise to reduce 400 Hz hum. (operation (2) (a)). It may be necessary to turn R1510 slightly clockwise in order to obtain the required signal/noise ratio.

- (c) Switch the Signal Generator modulation on.

(4) Signal/Noise Threshold

- (a) Recheck the Signal Generator tuning.
Reduce the Signal Generator output to 3 μ V.
- (b) Turn the signal/noise threshold control, R407, counter-clockwise until the receiver just mutes.

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ITEM NO

11. continued.

- (4) (c) Turn R407 slowly clockwise until the receiver just unmutes.
- (d) Mute the receiver by reducing the Signal Generator output. Slowly increase the Signal Generator output until muting is overcome. This should occur between 2 and 3.5 μ V.
- (e) Set the Signal Generator output to 5 μ V and reduce the modulation to zero. Slowly increase the modulation until muting is overcome. This should occur between 20 and 30%.

NOTE: If muting is overcome below 20%, the adjustment of R407 should be repeated with the Signal Generator modulation at 35%.

(5) Carrier Squelch Check

- (a) With the Signal Generator set to 315.5 MHz, modulated 30% at 1 KHz and the Control Unit manual frequency selectors set to 315.5 MHz, reduce the Signal Generator output to zero.
- (b) Slowly increase the Signal Generator output until the squelch relay, K401, operates.
- (c) The Signal Generator output at this point should be 3 μ V. Adjust the main sensitivity control, R1401, on the main chassis, as necessary to obtain this requirement.
- (d) Repeat operations (a) and (b) at the frequencies listed in Item No. 7(9) and 'G', setting the Signal Generator frequency and the Control Unit manual frequency selectors as appropriate. Ensure squelch relay, K401, operates at Signal Generator output levels not exceeding 15 μ V.

(6) Auxiliary Audio

- (a) Retune the Signal Generator to peak the Multimeter AVC reading at 315.5 MHz. Set the output to 1mV, modulated 30% at 1 kHz.
- (b) Disconnect the Multimeter and reconnect it, set to the 4 Volt a.c. range, to the Interconnecting Box AUX AUDIO and EARTH test points.
- (c) Adjust R1505, underside of main chassis, for a Multimeter reading of 1.5 Volts.
- (d) Reduce the Signal Generator output to 5 μ V, the Multimeter reading should not fall below 1 Volt.
- (e) Increase the Signal Generator output to 100mV, the Multimeter reading should not exceed 2.1 Volts.

OPERATIONITEM NO

11. continued.

- (6) NOTE: The Signal Generator must not be retuned unless the Multimeter is reconnected to the A.V.C. test point.

12. BLOWER MOTOR

Set the Control Unit function switch to OFF and apply a small clean soldering iron to the case of thermal switch S1501. After a brief delay, when the switch temperature reaches approximately 40°C, a click will be audible as the switch closes. Remove the soldering iron and set the Control Unit function switch to T/R. The external blower and internal stirrer motors should run until the switch cools.

13. PRESSURISING

- (1) Switch off equipment and test equipment, replace the transmitter receiver case.
- (2) Pressurise to 20 lb/in² using dry nitrogen when available, or dry air.
- (3) Check for leaks using Leak Indicator CT 106.
- (4) Release pressure to 5 lb/in².

CHAPTER 1SUPPLEMENTARY SERVICING USING TEST PEDESTALS
AND EXTENSION LEADS

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	SS.2	Relay Unit	
	SS.3	Modulator Unit	
	SS.4	Guard Receiver	
	SS.5	Oscillator Unit	
	SS.6	Spectrum Generator	
	SS.7	Rx and Tx Pre-Amplifier	
	SS.8	Power Amplifier	
	SS.9	20-30 MHz Amplifier	
	SS.10	1.85 MHz Amplifier	
	SS.11	Audio Amplifier	
	SS.12	Rx and Tx Pre-Amplifier)
		Power Amplifier)
		Spectrum Generator)
) Adjustments to be carried out on the insertion of one of these modules in the chassis.
	SS.13	Test Point Voltages	
	SS.14	Lubrication	
	SS.15	Blower Motor Brushes	
	SS.16	Control Receiver Muting	

OPERATIONITEM NOSS.1 D.C. POWER UNIT. 5821-99-942-8547

- (1) Remove the Power Unit from the ARC-52 chassis. Separate the dynamotor from the Power Unit chassis, ensuring that connections between the two items are not broken.
- (2) Connect the Power Unit chassis to the ARC-52 using connectors 5995-99-932-1910 and 5995-99-932-1799.
- (3) Connect the ARC-52 aerial output to the Wattmeter CT 419 using connector 5995-99-932-1905.
- (4) Set the Control Unit function switch to T/R, holding the dynamotor to absorb the starting torque, and check that relay K1101 operates satisfactorily and that the stabiliser V1102 glows.
- (5) Connect the Multimeter (AVO 8) set to the 1000V d.c. range to pin 13 of P1101, or to the dynamotor connection end of R1102 and earth.
- (6) Set the Interconnecting Box T/R switch to TRANSMIT. The Multimeter reading should be not less than 400 Volts. Switch to RECEIVE.
- (7) Connect the Multimeter, set to the 250V d.c. range, to test Point E and earth. The meter reading should be between 120 and 140 Volts.
- (8) Connect the Multimeter, set to the 1000V d.c. range, to pin 10 of P1102, or at the opposite end of R1102 to that used in operation (5) and earth. The meter reading should be between 210 and 260 Volts.
- (9) Connect the Multimeter, set to the 1000V d.c. range, to pin 11 of P1102 and earth. The meter reading should be between 210 and 260 Volts.
- (10) Set the Interconnecting Box T/R. switch to TRANSMIT. The meter reading should fall to zero. Switch to RECEIVE.
- (11) Connect the Multimeter, set to the -ve 25V d.c. range, to test Point F and earth. The meter reading should be not less than -13.5 Volts.

If the reading obtained differs widely from these figures, or there is reason to suspect this circuit carry out operations (12) to (15) inclusive. If satisfactory, proceed direct to operation (16).

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ITEM NO

SS.1. continued.

- (12) Set the Control Unit function switch to OFF. Disconnect pin 9 of P1102. Set the function switch to T/R.
- (13) Connect the Multimeter, set to the -ve 100V d.c. range, to test Point F and earth. The meter reading should be between -38 and -52 Volts.
- (14) Connect the Multimeter, set to the -ve 100V d.c. range, to pin 12 of P1102, or the junction of R1106, R1107 and earth. The meter reading should be between -20 and -30 Volts.
- (15) Set the Control Unit function switch to OFF. Reconnect pin 9 of P1102. Set the function switch to T/R.
- (16) Connect the Multimeter, set to the 25V d.c. range, to pin 8 or pin 12 of P1102 and earth. The meter reading should be 25.0 ± 1.0 Volts.
- (17) Set the Control Unit function switch to OFF and disconnect the Multimeter and Wattmeter CT419.
- (18) Disconnect, re-assemble and re-fit the Power Unit.
- (19) Carry out the Standard Serviceability Tests detailed in Section 1.

SS.2 RELAY UNIT. 5821-99-942-8545

- NOTES:
1. Relay pins are numbered in a clockwise direction from the red spot.
 2. The resistance of each relay coil should be $280 \text{ ohms} \pm 10\%$.
 3. Prior removal of the clamp securing C901 may simplify the checking of relays K903 and K904.

- (1) Remove the Relay Unit from the ARC-52 chassis. Carry out continuity checks to ensure that relay contacts are making in the de-energised condition in accordance with the circuit diagram.
- (2) Connect the Relay Unit to the ARC-52 chassis using connector 5995-99-932-1903. Connect the ARC-52 aerial output to the Wattmeter CT.419 using connector 5995-99-932-1905. Set the Control Unit function switch to T/R.
- (3) Connect the Multimeter (AV08), set to the 100V d.c. range, to pin 9 of P901 and earth. The meter reading should be between 25 and 29 Volts.
- (4) Relay K901
 - (a) Connect pin 10 of K901, or pin 11 of plug P901, to the chassis and check that relay K901 energises and the ARC-52 goes to the transmit condition.

OPERATIONITEM NO

SS.2 continued

- (4) (b) Remove the chassis connection and check that as K901 de-energises, Neon V901 flashes momentarily.
- (5) Relay K902
- (a) Set the Interconnecting Box T/R. switch to TRANSMIT.
- (b) Connect pin 8 of K902, or pin 14 of chassis socket J1509, to the chassis and check that relay K902 energises and the ARC-52 reverts to the receive condition.
- (c) Remove the chassis connection and set the T/R. switch to RECEIVE.
- (6) Relay K903
- (a) Connect the Multimeter (AV08), set to the 250V d.c. range, to pin 5 of K903 and the chassis.
- (b) Connect pin 8 of K903, or pin 12 of plug P901, to the chassis and check that relay K903 energises. The Multimeter reading should be 130V.
- (c) Disconnect the Multimeter and test connection.
- (7) Relay K904.
- (a) Connect pin 8 of K904, or pin 13 of J1509, to the chassis and check that relays K904 and K901 energise, putting the ARC-52 in the transmit condition.
- (b) Remove the test connection.
- (8) Set the supply voltage to 17.5 ± 0.5 Volts and repeat operations (5) to (7).
- (9) Set the Control Unit function switch to OFF. Disconnect and refit the Relay Unit. Disconnect the Wattmeter CT419.
- (10) Carry out the Standard Serviceability Tests detailed in Section 1.

SS.3 MODULATOR UNIT. 5821-99-942-8548

- (1) Remove the Modulator Unit from the chassis, remove the module side plate and reconnect the module to the ARC-52 chassis using connector 5995-99-932-1803.
- (2) Connect the Signal Generator CT433 600 μ output to the Microphone Simulator 600 μ and 0 terminals. Link the Simulator 0 and EARTH terminals.

RESTRICTED

OPERATION

ITEM NO

SS.3 continued.

- (3) Connect the Microphone Simulator OUTPUT terminals to the Interconnecting Box MIC terminals using screened leads. Connect the CT419 to the T.R. aerial socket
- (4) Set the Control Unit function switch to T/R and the manual frequency selectors to 399.9 MHz. Turn the Mic. Audio Gain control, R702, fully clockwise.
- (5) Set the Signal Generator frequency to 1 kHz. and adjust the output for calibration mark indication on the Microphone Simulator meter.
◀ Set the Microphone Simulator Selector switch to 5mV 300 ohm and Interconnecting Box microphone switch to BAL. MIC. DYNAMIC. ▶

NOTE: If the modulator is connected for carbon microphone input, 82 ohms, the relevant Simulator and Interconnecting Box switches should be set accordingly.

(6) Clipping Level and Modulation Depth

- (a) Connect the Oscilloscope CT484, Y2 input, to pin 3 of T702 and the chassis. Set the Y2 selector to D.C.
- (b) Set the Interconnecting Box T/R. switch to TRANSMIT and adjust the Oscilloscope for a suitable display.
- (c) Adjust R702 until clipping is just apparent on the Oscilloscope, i.e. until the tops of the displayed waveform just begin to flatten. The modulation depth at this point should be between 65 and 95%.

The modulation depth is given by the formula:-

$$\frac{\text{r.m.s. voltage at pin 3 of T702}}{\text{d.c. voltage at pin 3 of T702}} \times 141.4\%$$

- (d) Set R702 fully clockwise. The modulation depth should be at least 80%.
- (e) Set R702 to give a depth of modulation of 80%. Set the Interconnecting Box T/R. switch to RECEIVE.

(7) Sidetone

Connect the Multimeter CT471, set to the 40V a.c. range, to pin 6 of P701, or pin 1 (green lead), of V702 and chassis. The meter reading should be not less than 10 Volts.

(8) Tone

- (a) Disconnect the Multimeter CT471 and Signal Generator CT433. Reconnect the Signal Generator output to the Y1 input of the Oscilloscope.

OPERATIONITEM NO

SS3 continued.

- (8) (b) Adjust the Signal Generator output and Oscilloscope Y1 controls, to give a display suitable for comparison of frequency with a 1 kHz signal to be applied to the Y2 input.
- (c) Set the Interconnecting Box TONE switch to ON and check the depth of modulation as in operation (6). The modulation depth should be between 80 and 100%.
- (d) Check the tone oscillator frequency by comparison with the Signal Generator CT433. This should be between 920 and 1120 Hz. Set the TONE switch to OFF.
- (9) Set the Control Unit function switch to OFF. Disconnect the test equipment. Replace the module side plate and refit the Modulator Unit in the main chassis.
- (10) Carry out the Standard Serviceability Tests detailed in Section 1.

SS.4 GUARD RECEIVER. 5821-99-942-8558

- NOTES:
1. The following Guard Receiver check and alignment procedures are progressive and preceding items should be carried out as appropriate.
 2. Tuning slugs are varnish locked and this varnish must be removed before adjustment is attempted. On completion of tuning, the slugs must be re-locked.
 3. Before undertaking alignment procedures, it is advisable to first locate the components to be adjusted. This is particularly relevant to the r.f. side of the module.

(1) Preparation

- (a) Remove the Guard Receiver module from the chassis, remove the module side covers and disable the 34.45 MHz oscillator by placing a short circuit across crystal Y801.
- (b) Fit a Test Side Cover, 5821-99-932-2388, in place of the r.f. side cover. Connect the module to the ARC-52 chassis using connector 5995-99-932-1910.
- (c) Set the Control Unit function switch to T/R + G and turn the following controls fully clockwise:

Guard Sensitivity	R1402
Guard Audio	R425
Guard Squelch	R1507

RESTRICTED

OPERATION

ITEM NO

SS.4 continued.

- (1) (d) Make the following connections:

Multimeter CT471, set to the 12V d.c. range, to the Detector Test Point Z, i.e. pin 8 of J1508 and earth.
Wattmeter Absorption A.F. and Oscilloscope CT484, Y1 input, to the Interconnecting Box PHONE and EARTH terminals.

- (2) 1.85 MHz Alignment

- (a) Set the Signal Generator CT452A to 1.85 MHz, C.W., using the Calibrator Frequency, and connect the Signal Generator to pin 1 (green lead) of V807 and chassis via a D.C. Isolator 6625-99-943-3486.
- (b) Adjust the Signal Generator attenuator to give a Multimeter reading of between 5 and 10 Volts and maintain this level during the following alignment procedure.
- (c) Tune the primary and secondary windings of T805 to peak the Multimeter reading.
- (d) Disconnect the Signal Generator from V807 and re-connect it to the grid, pin 1 (green lead) of V806 and chassis.
- (e) Tune the primary and secondary windings of T804 to peak the Multimeter reading.
- (f) Disconnect the Signal Generator from V806 and re-connect it to the cathode, pin 2 (yellow lead) of V805 and chassis. Obtain access through the left-hand hole in the Test Side Cover
- (g) Tune the primary and secondary windings of T803 to peak the Multimeter reading.
- (h) Connect a 1000 ohm, $\pm 10\%$, $\frac{1}{4}$ watt resistor in series with a 1000pf $\pm 20\%$ capacitor across the primary of T805.
- (j) Accurately tune the secondary of T805 for a peak reading in the Multimeter.
- (k) Disconnect the resistor and capacitor from the primary of T805 and reconnect them across the secondary of T805.
- (l) Accurately tune the primary of T805 for a peak reading in the Multimeter.
- (m) Repeat operations (h) to (l) for transformers T804 and T803 in turn, adjusting the Signal Generator as necessary to keep the Multimeter reading between 5 and 10 Volts.

OPERATIONITEM NO

SS. 4 continued

(2) (n) Repeat operations (h) to (m) until no further improvement is obtained.

(o) Disconnect the test resistor and capacitor.

(3) 1.85 MHz. "Peak to Valley" Ratio

(a) Connect the Signal Generator CT452A, set to 1.85 MHz C.W., to the cathode, pin 2 (yellow lead), of V805 and chassis via the D.C. Isolator.

(b) Adjust the Signal Generator attenuator to give a Multimeter reading of 7 Volts . Note the attenuator setting in dB.

(c) Sweep the Signal Generator frequency from 1.78 to 1.92 MHz and note the frequencies at which the Multimeter reading peaks.

(d) (i) If there is only one peak response, at 1.85 MHz, the peak to valley ratio is 0 dB.

(ii) If there is only one peak response, at a frequency other than 1.85 MHz, tune the Signal Generator to peak the Multimeter reading and adjust the Signal Generator attenuator for a Multimeter reading of 7 Volts.

The difference between this attenuator setting and that noted in operation (b) should not exceed 1 dB. If this is not so, the 1.85 MHz section should be realigned.

(iii) If two response peaks are obtained, tune the Signal Generator to each in turn and note the Signal Generator attenuator settings, in dB, for a Multimeter reading of 7 Volts. Sweep the Signal Generator frequency from 1.78 to 1.92 MHz, note the frequency which gives minimum response and adjust the Signal Generator attenuator for a Multimeter reading of 7 Volts at this frequency. Note the attenuator setting in dB.

The difference between the attenuator settings at peak response should not exceed 1 dB.

The difference between the minimum response and either peak response settings should be not greater than 3 dB.

If these figures are exceeded the 1.85 MHz section should be re-aligned.

RESTRICTED

OPERATION

ITEM NO

SS.4 continued.

(4) 1.85 MHz Band width and Gain

- (a) Connect the Signal Generator CT452A, set to 1.85 MHz C.W., to the cathode, pin 2 (yellow lead), of V805 and chassis via the D.C. Isolator.
- (b) Adjust the Signal Generator attenuator to give a Multimeter reading of 7 Volts.
- (c) Increase the Signal Generator output by 6 dB and offset the frequency below 1.85 MHz until the Multimeter reading is 7 Volts. The amount detuned should be not less than 45 kHz.

NOTE: The amount detuned may be checked with a Frequency Counter if available, or the Signal Generator may be calibrated as follows:

Connect the Signal Generator to the Calibrator Frequency and select the 1.85 MHz crystal. Tune the Signal Generator about 1.85 MHz for zero beat, and note the reading in divisions on the tuning control.

Select the 2MHz crystal and tune the Signal Generator about 2 MHz for zero beat. Note the reading in divisions on the tuning control.

Dividing 150kHz by the difference between the two readings noted will give the number of kHz per division of the tuning control, i.e. approximately 3 kHz per division.

- (d) Offset the Signal Generator frequency above 1.85 MHz until the Multimeter reading falls to 7 Volts. The amount detuned above 1.85 MHz should be not less than 45 kHz.
- (e) Increase the Signal Generator output by a further 54 dB. Offset the frequency above and below 1.85 MHz until the Multimeter reading falls to 7 Volts. The difference between the upper and lower frequency should be not more than 400 kHz
- (f) Using the Calibrator Frequency, re-set the Signal Generator to 1.85 MHz. With the Signal Generator connected as in operation (a) adjust the attenuator for a Multimeter reading of 10 Volts. The Signal Generator output should be not more than 55 μ V.
- (g) Disconnect the Signal Generator CT452A and remove the short circuit from crystal Y801.

(5) 36.3 MHz Alignment

- (a) Using the Calibrator Frequency, set the Signal Generator CT394A to 36.3 MHz.

OPERATIONITEM NO

SS.4 continued.

- (5) (b) Connect the Signal Generator output to the cathode, pin 2 (yellow lead), of V805 and chassis, using connector 5995-99-972-8884 and D.C. Isolator 6625-99-943-3486.
- (c) Set the Signal Generator output to 50 μ V, C.W. and adjust L807 for a peak reading in the Multimeter, keeping the Multimeter reading between 5 and 10 Volts by adjustment of the Signal Generator attenuator.
- (d) Using the Calibrator Frequency, set the Signal Generator CT452A to 1.85 MHz. C.W. and loosely couple the output to T804. Sufficient coupling is obtained by inserting a short length of p.v.c. covered equipment wire through the primary tuning slug access hole.
- (e) A heterodyne frequency should now be displayed on the Oscilloscope CT484. Tune L807 to reduce the beat frequency to zero.
- (f) Remove the loose coupling at T804. Re-connect the Signal Generator CT394A via the D.C. Isolator to the grid, pin 2 (green lead) of V802A, obtaining access through the centre hole of the test side cover.
- (g) Set the CT394A output for a Multimeter reading of 7 Volts, and adjust the output as necessary to maintain this level during alignment.
- (h) Adjust the secondary L810B, and then the primary L810A, of T802 to peak the Multimeter reading.
- (j) Adjust the secondary L809B, and then the primary L809A, of T801 to peak the Multimeter reading.
- (k) Lock the cores with Silicone compound.
- (6) 36.3 MHz Bandwidth
- (a) Using the Calibrator Frequency, reset the Signal Generator CT394A to 36.3 MHz and reconnect the output to V802A grid as in operation (5) (f).
- (b) Adjust the Signal Generator output for a Multimeter reading of between 9 and 11 Volts. Note the Multimeter reading.
- (c) Increase the Signal Generator output by 6 dB and offset the frequency below 36.3 MHz until the Multimeter reading is that noted in operation (b). Note this frequency.

RESTRICTED

OPERATION

ITEM NO

SS.4 continued.

- (6) (d) Offset the Signal Generator frequency above 36.3 MHz until the Multimeter reading is again that noted in operation (b). Note this frequency.
- (e) The difference between the frequencies noted in operations (c) and (d) should be not less than 90 kHz.

NOTE: On the Signal Generator 24-48 MHz scale, 1 MHz = 117 divisions on the incremental dial.

- (f) The difference between the frequency noted in operation (c) and 36.3 MHz should be within ± 15 kHz of the difference between the frequency noted in operation (d) and 36.3 MHz.
- (g) Disconnect the Signal Generator CT394A.

(7) R.F. Alignment

- (a) Replace the normal module side covers.
- (b) Connect the Signal Generator CT394A output to P802 using Connector 5995-99-932-1907, and tune the Signal Generator about 243 MHz, C.W., for a peak reading in the Multimeter. Adjust the output level as necessary to maintain the Multimeter reading between 5 and 10 Volts during alignment.
- (c) Tune L806, L803 and L801 in this order, to peak the Multimeter reading.

(8) Sensitivity, A.G.C. and Noise Limiter

- (a) Using the Calibrator Frequency, set the Signal Generator CT452A to 1.85 MHz C.W. and loosely couple the output to T804 as in operation (5) (d).
- (b) With the Signal Generator CT394A connected as in operation (7), set the output level to 1 mV. A heterodyne frequency should now be displayed on the Oscilloscope CT484. Tune the CT394A to reduce the beat frequency to zero.
- (c) Remove the loose coupling at T804.

Set the CT394A output to 1 μ V, modulated 30% at 1 kHz and adjust the Guard Squelch control, R1507, until the receiver just mutes.

If the receiver does not mute, set R1507 fully counter clockwise and adjust R1402 until the receiver just mutes.

Reset R1507 so that the receiver just unmutes. Set the CT394A output to 1 mV.

OPERATIONITEM NO

SS.4 continued.

- (8) (d) Reconnect the Multimeter CT471, set to the 40V a.c. range, to pin 6 of J1508 and earth. The Multimeter reading should be not less than 12 Volts. Note this reading.
- (e) Reduce the Signal Generator CT394A output by 40dB. The Multimeter reading should not fall below 0.7 of the reading taken in operation (d).
- (f) Increase the Signal Generator output by 80dB, i.e. 40 dB above 1 mV. The Multimeter reading should not exceed 1.4 of the reading taken in operation (d).
- (g) Set the Signal Generator output to 500 mV. The meter reading should not fall below 12 Volts.
- (h) Repeat operations (a) to (d) inclusive to retune the CT394A and bring the receiver to the threshold of being not muted.
- (j) Set the Signal Generator output to 1 mV, modulated 30% at 300 Hz. The Multimeter reading should not rise above 1.1, or fall below 0.7 of the reading taken in operation (h).
- (k) Modulate the Signal Generator 30% at 3 kHz. The Multimeter reading should not rise above 1.1, or fall below 0.7 of the reading taken in operation (h).
- (l) Reconnect the Multimeter CT471, set to the 12 V d.c. range, to the Detector Test Point Z, i.e. pin 8 of J1508 and chassis.
- (m) Modulate the Signal Generator 30% at 1 kHz and tune for a peak reading in the Multimeter.
- (n) Adjust the Signal Generator modulation depth until peak limiting of the Oscilloscope Waveform just commences. The modulation depth of the point should be between 40 and 65%.
- (o) Repeat operations (a) to (d) inclusive to retune the CT394A and bring the receiver to the threshold of being not muted.
- (p) Set the Signal Generator output level to 5 μ V. The Multimeter reading should be not less than 2V. Switch off the Signal Generator modulation. The Multimeter reading should fall by not less than 6dB.
- (q) Set the Signal Generator modulation to 30% at 1 kHz and the output to 1 μ V.

Adjust the receiver to the threshold of being not muted as in operation (c).

RESTRICTED

OPERATION

ITEM NO

SS.4 continued.

(8) (q) Set the Guard Sensitivity control R1402 fully counter clockwise.
contd.

Increase the Signal Generator output from $1\mu\text{V}$ until the receiver is again at the threshold of being not muted. The Signal Generator output at this point should be not less than $10\mu\text{V}$.

(r) Set the Control Unit function switch to OFF. Disconnect the test equipment and refit the module in the main chassis.

(s) Carry out the Standard Serviceability Tests detailed in Section 1.

SS.5 OSCILLATOR UNIT 5821-99-942-8553

NOTE: Tuned inductors should be unlocked using Remover, Paint 8010-99-947-7825 and relocked on completion of alignment using Varnish, Oil, 8010-99-947-7826.

- (1) Set the Control Unit function switch to T/R and the manual frequency selectors to 220 MHz. Set the function switch to OFF.
- (2) Remove the module from the chassis. Remove the module cover and check that all crystals are in their correct positions. Replace the module cover.
- (3) Secure the module to Test Pedestal 6625-99-943-6881, ensuring that couplers are correctly engaged.
- (4) Locate the module and pedestal in position on the chassis ensuring that couplers are correctly engaged. Tighten the securing screws.
- (5) Connect the Oscillator module microdot output lead to J1515 on underside of chassis, using Connector 5995-99-932-2130 and Adaptor 5935-99-932-2381.
- (6) Connect the Multimeter CT471, set to the -4V d.c. range, to Test Point J and chassis.
- (7) Set the Control Unit function switch to T/R and the manual decimal and units selectors to 0.0.
- (8) After a ten minute warm up period, adjust L1901 to peak the Multimeter reading, using alignment tool 5120-99-942-9597. The Multimeter reading should be not less than -1 Volt.
- (9) Set the unit and decimal selectors to 1.0. Adjust L1902 to peak the Multimeter reading, which should be not less than -1 Volt.

OPERATIONITEM NO

SS.5 continued.

- (10) Repeat operation (9) in 1 MHz increments up to 9.0 MHz, adjusting the appropriate coil, L1903 to L1910, to peak the Multimeter reading. The Multimeter reading should be not less than -1 Volt at each step.
- (11) Reconnect the Multimeter, set to the -12V d.c. range, to Test Point K and chassis.
- (12) Set the unit and decimal selectors to 0.0. The Multimeter reading should be not less than -0.5 Volts.
- (13) Repeat operation (12) in 0.1 MHz increments up to 0.9 MHz.
- (14) Set the Control Unit function switch to OFF. Reconnect the Multimeter, set to the -4V d.c. range, to Test Point L on the 20-30 MHz I.F. Amplifier module, and chassis.
- (15) Set the Control Unit function switch to T/R and the manual frequency selectors to 300.0 MHz. The Multimeter reading should be not less than -1 Volt.
- (16) Repeat operation (15) in 0.1 MHz increments up to 309.9 MHz i.e. 99 steps.
- (17) Set the Control Unit manual frequency selectors to 220.0 MHz. Set the function switch to OFF.
- (18) Remove the Test Pedestal, disconnect test equipment. Remove the module cover and re-lock the oscillator coils, L1901-L1910. Replace the module cover.
- (19) Refit the module in the chassis and carry out the Standard Serviceability Test detailed in Section 1.

SS.6 SPECTRUM GENERATOR 5821-99-942-8552

- NOTES:
1. Tuned inductors and capacitors should be unlocked using Remover, Paint, 8010-99-947-7825 and relocked on completion of alignment using Varnish, oil, 8010-99-947-7826.
 2. Prior to servicing, switch contacts are to be lubricated with 2 or 3 drops of a composition of 50% Trichloroethane and 50% Esso Oil Teresso 52.
 3. Since inductors L503 to L518 may easily be tuned to an incorrect peak, it is advisable to check transmitter power after adjustment of each inductor.

RESTRICTED

OPERATION

ITEM NO

SS.6 continued.

(1) Oscillator Section Alignment

To be carried out when the voltage at Test Point H, measured with a Multimeter CT471, is less than -7 Volts.

- (a) Set the Control Unit function switch to T/R and manual frequency selectors to 220 MHz. Set the function switch to OFF.
- (b) Remove the module from the chassis and secure it to Test Pedestal 6625-99-943-6884. Locate and secure the Test Pedestal in the chassis leaving J.501 disconnected.
- (c) Connect the Multimeter CT471, set to the -40V d.c. range, to Test Point H and chassis.
- (d) Set the Control Unit function switch to T/R, and the manual selectors to 225.0 MHz, i.e. for a Spectrum Generator output of 200.0 MHz.
- (e) After a ten minute warm up period, adjust L501 to peak the Multimeter reading, using alignment tool 5120-99-942-9598.
- (f) Set the Control Unit manual selectors to 235.0 MHz, i.e. for a Spectrum Generator output of 210.0 MHz, and adjust L502 to peak the Multimeter reading.
- (g) Set the Control Unit manual selectors to the frequencies shown in the left-hand column of TABLE 1 in turn, and adjust the appropriate coil to peak the Multimeter reading.

NOTE: If instability is evident at 290 MHz it may be eliminated by changing Inductor L510. If the inductor fitted is 0.525 μ H, Ref. No. 5950-99-932-6233, identified by a red spot, replace by inductor 0.576 μ H, Ref. No. 5950-99-932-6260, identified by a yellow spot.

TABLE 1

OPERATIONITEM NO

SS.6 (1) continued.

TABLE 1

Channel Selected	Inductor	Spec. Gen. Frequency
245.0 MHz	L.503	220.0 MHz
255	L.504	230
265	L.505	240
275	L.506	250
285	L.507	260
295	L.508	270
305	L.509	280
315	L.510	290
325	L.511	300
335	L.512	310
345	L.513	320
355	L.514	330
365	L.515	340
375	L.516	350
385	L.517	360
395	L.518	370

NOTE: If coils L.531 and L.532 have been replaced or disturbed carry out operations (h) to (n), if not, proceed direct to operation (o).

- (h) With the Control Unit manual selectors set to 395.0 MHz, adjust L531 to peak the Multimeter reading using an insulated tool. Access to the coil should be by the hole in the rear face of the module cover. The coil is compressed to increase inductance.

WARNING: THIS COIL CARRIES H.T.

- (j) Set the Control Unit manual selectors to 305.0 MHz, and adjust C506 to peak the Multimeter reading.
- (k) Repeat operations (h) and (j) until no further improvement in voltage level is obtained.
- (l) Set the Control Unit manual selectors to 395.0 MHz. Adjust L532 to peak the Multimeter reading using an insulated tool. Access to L532 is obtained by removing V502 and V503 screening cans and inserting the tool between the valves and into the access hole in the oscillator section cover.

RESTRICTED

OPERATION

ITEM NO.

SS.6 continued.

- (1) (m) Set the Control Unit manual selectors to 305.0 MHz. Adjust C508 to peak the Multimeter reading.
 - (n) Repeat operations (l) and (m) until no further improvement in voltage level is obtained.
 - (o) Set the Control Unit manual selectors to 225.0 MHz. The Multimeter reading should be not less than -7 Volts. Note the Multimeter reading.
 - (p) Increase the frequency in 10 MHz increments from 225.0 MHz to 395.0 MHz. The Multimeter reading should be not less than -5.5V at each frequency. Note the Multimeter reading at each frequency.
 - (q) Disconnect the Multimeter.
- (2) Amplifier Section Alignment
- (a) Connect the Monitor R.F., 6625-99-943-6879 to J501, using Connectors 5995-99-932-1909 and 5995-99-932-2130, and Adaptor 5935-99-932-1912.
 - (b) Connect the Multimeter CT471, set to the -12V d.c. range, to the Monitor R.F. output terminals. With the Control Unit manual selectors set to 395.0 MHz the Multimeter reading should be not less than -2.5 Volts.
 - (c) Set the Control Unit manual selectors to each of the frequencies listed in TABLE 2 in turn. The Multimeter reading should be not less than -2.5 Volts at each frequency. If this requirements is not obtained carry out the following alignment procedure.
 - (d) Set the Control Unit manual selectors to 395.0 MHz and adjust C517, C522 and C526 in turn, using Alignment Tool 5120-99-942-9597, to peak the Multimeter reading.
 - (e) Remove the Amplifier section side cover and fit the Test Side Cover 5821-99-932-1916, using Thumbscrews 5305-99-943-7755.
 - (f) Set the Control Unit manual selectors to 385.0 MHz.
 - (g) Insert, in turn, the iron and brass ends of Tuning Wand 5120-99-943-1514, through the access hole in the Test Side Cover and into Z501 tuning assembly. Check for resonance, which will be indicated by a fall in the Multimeter reading when either end of the Tuning Wand is inserted.

OPERATIONITEM NO

SS.6 continued.

- (2) (h) If, when the iron end of the tuning wand is inserted, the Multimeter reading increases, the appropriate sector of the capacitor rotor vanes should be set nearer the stator vanes. If, when the brass end of the tuning wand is inserted, the Multimeter reading increases, the appropriate sector of the capacitor rotor vanes should be set further from the stator vanes.

If the capacitor vanes require adjustment, set the Control Unit function switch to OFF, remove the Test Side Cover and adjust the appropriate vane sector. Replace the Test Side Cover, set the function switch to T/R and re-check for resonance. Repeat as necessary until resonance is achieved.

- (j) Repeat operations (g) and (h) for tuning assemblies Z502 and Z503.
- (k) Repeat operations (g) to (j) inclusive at each of the frequencies listed in TABLE 2, commencing with 375.0 MHz.

TABLE 2

Channel Selected	Spectrum Generator frequency	Vane in use	Sector in use	Colour
385.0 MHz	360 MHz	Lower	2nd shortest	Black
375	350	Upper	2nd shortest	Black
365	340	Lower	3rd shortest	Red
355	330	Upper	3rd shortest	Red
345	320	Lower	4th shortest	Yellow
335	310	Upper	4th shortest	Yellow
325	300	Lower	5th shortest	Blue
315	290	Upper	5th shortest	Blue
305	280	Lower	6th shortest	None
295	270	Upper	6th shortest	None
285	260	Lower	7th shortest	Black
275	250	Upper	7th shortest	Black
265	240	Lower	8th shortest	Red
255	230	Upper	8th shortest	Red
245	220	Lower	9th shortest	Yellow
235	210	Upper	Longest	Yellow
225	200	Lower	Longest	None

NOTE: The shortest sector should not be adjusted in any alignment position.

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OPERATION

ITEM NO

SS.6 continued.

- (2) (1) Replace the normal side cover.
- (m) Set the Control Unit manual selectors to 395.0 MHz and adjust C517, C522 and C526 to peak the Multimeter reading.
- (n) Select each of the frequencies listed in TABLE 2 in turn and check that the Multimeter reading is not less than 2.5 Volts.
- (o) Disconnect the Multimeter and Monitor R.F. Connect the Spectrum Generator output, J501, to the Calibrator Frequency IN VIA ATTENUATOR socket. Connect the Multimeter CT471, set to the -40V d.c. range, to Test Point H and chassis.
- (p) Set the Control Unit manual selectors to 225.0 MHz.
- (q) Set the Calibrator Frequency OSCILLATOR switch to 10 MHz and the METER switch to COUNT 10 kHz F.S.D.
- (r) Adjust L501 for zero beat in the Calibrator Frequency meter or phones. The Multimeter reading should be not less than -5.5V or not more than 3dB down on the readings noted in operations (1) (o) and (1) (p) whichever is the greater.
- (s) Repeat operations (r) adjusting L502 with the Control Unit manual selectors set to 235 MHz.
- (t) Repeat operation (r) adjusting the appropriate inductor at the frequencies listed in TABLE 1.
- (u) Disconnect the test equipment and Test Pedestal, refit the module in the chassis and carry out the Standard Serviceability Test detailed in Section 1.

SS.7 RECEIVER AND TRANSMITTER PRE-AMPLIFIER, 5821-99-942-8554

(1) Receiver Alignment

- (a) Remove the module from the chassis and remove the main receiver side cover. Secure the module on Test Pedestal 6625-99-943-6883, locate and secure the Test Pedestal in the chassis.
- (b) Reconnect the microdot co-axial leads using microdot adaptors 5935-99-932-2381 and Connectors 5995-99-932-2130 as necessary.
- (c) Fit Test Side Cover 5821-99-932-1806.
- (d) Connect the Multimeter CT471, set to the 4V d.c. range, to the Interconnecting Box A.V.C. Test Point and EARTH, or to Test Point M and chassis.

OPERATIONITEM NO

SS.7 continued.

- (1) (e) Disconnect J.1. Set the Control Unit manual selectors to 399.9 MHz and the function switch to T/R.
- (f) Set the Signal Generator CT394A to 399.9 MHz (approx.) C.W., and the output level to 1 mV. Connect the Signal Generator output to J.1 using Connector 5995-99-932-1907 and tune the Signal Generator to peak the Multimeter reading.
- (g) Reduce the Signal Generator output to minimum and then increase the output until the Multimeter reading just starts to rise.
- (h) Adjust C19, C20 and C21 to peak the Multimeter reading using Alignment Tool 5120-99-942-9597.
- (j) Set the Control Unit manual selectors to 395.7 MHz and tune the Signal Generator about 395.7 MHz to peak the Multimeter reading.
- (k) Insert in turn the iron and brass ends of the tuning wand 5120-99-943-1514, through the holes in the Test Side Cover to check Z1, Z2 and Z3 for resonance. Resonance will be indicated by a fall in the Multimeter reading when either end of the tuning wand is inserted.

If, when the brass end of the tool is inserted, the Multimeter reading increases, the appropriate sector of the capacitor rotor vanes should be set further from the stator vanes.

If, when the iron end of the tool is inserted, the Multimeter reading increases, the rotor vanes should be set closer to the stator vanes.

If the capacitor vanes require adjustment, set the Control Unit function switch to OFF, remove the Test Side Cover and adjust the appropriate sector. Replace the Test Side Cover, set the Control Unit function switch to T/R and recheck for resonance.

- (1) Repeat operation (k), adjusting the appropriate vane sector at each of the frequencies listed in TABLE 1 in turn. The Signal Generator must be tuned at each frequency to accurately peak the Multimeter reading.

/TABLE 1

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OPERATION

ITEM NO

SS.7 (1) continued.

TABLE 1

Channel	Vane in Use	Sector in Use	Colour
395.7 MHz	Lower	1	None
385.7	Upper	1	Black
375.7	Lower	2	Black
365.7	Upper	2	Red
355.7	Lower	3	Red
345.7	Upper	3	Yellow
335.7	Lower	4	Yellow
325.7	Upper	4	Blue
315.7	Lower	5	Blue
305.7	Upper	5	None
295.7	Lower	6	None
285.7	Upper	6	Black
275.7	Lower	7	Black
265.7	Upper	7	Red
255.7	Lower	8	Red
245.7	Upper	8	Yellow
235.7	Lower	9	Yellow
225.7	Upper	9	None

NOTE: All preceding steps must be repeated after each 10 MHz step, and the sectors should be adjusted to produce a smooth curve.

- (m) Replace the normal side cover and repeat operations (e) to (h) inclusive. Disconnect the Signal Generator and Multimeter.
- (n) Reconnect the Multimeter CT471, set to the 1.2V d.c. range, to Test Point G and chassis. The Multimeter reading should be not less than 0.8 Volts.
- (o) Select each of the frequencies listed in TABLE 1, in turn, The Multimeter reading should be not less than 0.8 Volts at each frequency.
- (p) If the Transmitter Pre-amplifier is not to be checked, set the Control Unit function switch to OFF, disconnect the test equipment and Test Pedestal, refit the module in the chassis and carry out the Standard Serviceability Test detailed in Section 1.

(2) Transmitter Pre-Amplifier Alignment

NOTE: The duty cycle, 5 minutes transmit and 10 minutes receive should not be exceeded.

OPERATIONITEM NO

SS.7 continued.

- (2) (a) Remove the module from the chassis and remove the Pre-Amplifier side cover. Fit the module in Test Pedestal 6625-99-943-6883, locate and secure the Test Pedestal in the chassis.
- (b) Reconnect the microdot co-axial leads using microdot adaptors 5935-99-932-2381 and connectors 5995-99-932-2130 as necessary.
- (c) Fit Test Side Cover 5821-99-932-1804.
- (d) Remove the 425V fuse, F1504, from the fuse board on the underside of main chassis. Disconnect J101.
- (e) Connect the Monitor R.F. to J101 using connector 5995-99-932-2130, connector 5995-99-932-1909 and adaptor 5935-99-932-1912.
- (f) Connect the Multimeter VT.471, set to the 4V d.c. range, to the Monitor R.F. output terminals.
- (g) Set the Control Unit function switch to T/R and the manual selectors to 399.9 MHz. Allow a ten minute warm up period.
- (h) Set the Interconnecting Box T.R. switch to TRANSMIT. Adjust capacitor C115, C116 and C117 to peak the Multimeter reading.
- (j) Set the Control Unit manual selectors to 395.7 MHz.
- (k) Insert, in turn, the iron and brass ends of Tuning Wand 5120-99-943-1514, through the holes in the Test Side Cover to check Z101, Z102 and Z103 for resonance. Resonance will be indicated by a fall in the Multimeter reading when either end of the Tuning Wand is inserted.

If, when the iron end of the Tuning Wand is inserted, the Multimeter reading increases, the appropriate sector of the capacitor rotor vanes should be set nearer the stator vanes.

If, when the brass end of the Tuning Wand is inserted the Multimeter reading increases, the appropriate sector of the capacitor rotor vanes should be set further from the stator vanes.

If the capacitor vanes require adjustment, set the Interconnecting Box T/R. switch to RECEIVE, set the Control Unit function switch to OFF, remove the Test Side Cover and adjust the appropriate vane sector. Replace the Test Side Cover, set the Control Unit function switch to T/R and the Interconnecting Box T/R. switch to TRANSMIT. Re-check for resonance.

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OPERATION

ITEM NO

SS.7 continued.

- (2) (1) Repeat operation (k), adjusting the appropriate vane sector at each of the frequencies listed in TABLE 1 in turn. All preceding steps must be repeated after each 10 MHz step, and the sectors should be adjusted to produce a smooth curve.
- (m) Replace the normal side cover and set the Control Unit manual selectors to 399.9 MHz.
- (n) Adjust C115, C116 and C117 to peak the Multimeter reading. This reading should be not less than 2.5 Volts.
- (o) Set the Control Unit manual selectors to 395.7 MHz, and thence in 10 MHz steps down to 225.7 MHz. The Multimeter reading on all frequencies should be not less than 2.5 Volts.
- (p) Set the Interconnecting Box T.R. switch to RECEIVE and the Control Unit function switch to OFF. Replace the 425V fuse F1504.
- (q) Disconnect the Test Pedestal and test equipment, refit the module in the chassis and carry out the Standard Serviceability Test detailed in Section 1.

SS.8 POWER AMPLIFIER, 5821-99-942-8559

- NOTES: 1. When the Power Amplifier module is mounted on its Test Pedestal, some form of ducting must be used to direct air from the dynamotor impeller to the module air inlet.
2. The duty cycle, 5 minutes transmit and 10 minutes receive should not be exceeded.

(1) Pre-Amplifier Tracking

- (a) Remove the module from the chassis, remove the Pre-Amplifier side cover and refit using six thumbscrews 5305-99-943-7755.
- (b) Fit the module in Test Pedestal 6625-99-943-6882, locate and secure the Test Pedestal in the chassis.
- (c) Remove the 425 Volt fuse, F1504, from the fuse board of the underside of main chassis.
- (d) Reconnect J101 using microdot extension lead 5995-99-932-2130 and Adaptor 5995-99-932-2381.
- (e) Connect the Multimeter CT471, set to the 12V d.c. range, across resistor R603, i.e., to the feedthrough capacitor nearest to the Cannon plug and chassis. The use of miniature clips is recommended.

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OPERATION

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SS.14 LUBRICATION

- (1) Inspect accessible gears, if cleaning and lubrication appears necessary, remove the mechanically driven modules and the main chassis gear plate (see Servicing Notes).
- (2) Clean gears with Trichloroethane and lubricate sparingly as follows using a small brush or dropper.
 - (a) Lightly grease gears, except the Mechanical Tuning Unit differential coupler gears using Grease XG295.
 - (b) Oil each bearing except the Amplifier R.F. idler hubs and Mechanical Tuning Unit differential coupler bearings, using Oil OM12.
 - (c) Oil differential coupler gears and bearings using 2 to 3 drops of Oil OX 14.
 - (d) The Amplifier R.F. idler hubs should be greased using XG295 but, if the module is not being stripped further, 2 to 3 drops of Oil OX23 may be used in lieu.
 - (e) Switch contacts in the Spectrum Generator Unit should be lubricated using 2 to 3 drops of a composition of 50% Trichloroethane and 50% Esso Oil Teresso 52.
- (3) Refit modules and gear train plate in the T.R. Chassis ensuring that there is no surplus lubricant left on the gears.

SS.15 BLOWER MOTOR BRUSHES

- (1) Remove the Blower Motor from the T.R. unit, remove the brushes one at a time and measure the brush length. The permissible brush length varies according to the type of blower fitted, i.e. Plannair or Plessey.
- (2) If the brush lengths exceed 0.34 inches, for Plannair blowers, or 0.27 inches for Plessey blowers, replace the brushes and refit the blower in the T.R. unit.
- (3) If brush lengths are less than 0.34 inches, but greater than 0.2 inches for Plannair blowers, or less than 0.27 inches, but greater than 0.17 inches for Plessey blowers, replace the brushes as detailed in operations (5), (6) and (7).
- (4) If brush lengths are less than 0.2 inches for Plannair blowers or less than 0.17 inches for Plessey blowers, the blower motor should be returned to 4th line, with the brushes discarded and the cover strap secured around the body.

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OPERATION

ITEM NO

SS.15 continued

- (5) When fitting new Plannair brushes, note that the two chamfered corners on the brushes, 5977-99-947-8213, must be towards the centre of the blower.

Plessey brushes, 5977-99-947-8212, can only be fitted one way. When fitted, secure the brushes with brush springs.

- (6) Connect a 25 Volt d.c supply to the blower supply leads and run the blower until the brush is shaped to the commutator contour, (full 100% arc) over 80% of its width. This will require a running period of approximately 18 hours.
- (7) On completion of the running in, remove one brush and blow out the dust, refit the brush. Repeat this procedure with the second brush. Refit the Blower Motor in the T.R. Unit.

SS.16 CONTROL, RECEIVER MUTING. 5821-99-943-3247

(1) D.C. Operation

- (a) Ensure that the unit is wired for d.c. operation, i e.: links, C, D and E connected and links A and B broken.
- (b) Connect a 500 kohm \pm 10% $\frac{1}{2}$ watt resistor between PLA/A and PLA/E.
- (c) Connect the 27.5V d.c. positive supply to PLA/C and the supply negative to PLA/E.
- (d) Connect the Multimeter CT471, set to the -40V d.c. range, to PLA/A and earth.
- (e) With PLA/D shorted to earth, the Multimeter reading should vary with supply voltage as follows:

Supply Voltage d.c.	Negative Bias Voltage	
	Max.	Minm.
27.5V	32.5V	20.0V
22V	24.7V	15.2V
29V	35.1V	21.6V

(2) A.C. Operation

- (a) Ensure that the unit is wired for a.c. operation, i.e. with links A and B connected and links C, D and E broken.

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OPERATION

ITEM NO

SS.16 continued.

- (2) (b) Connect the 115V a.c. supply to PLA/B and PLA/E, and the 27.5V d.c. positive to PLA/C.
- (c) Connect the Multimeter CT471, set to the -40V d.c. range to PLA/A and earth.
- (d) With PLA/D connected to 27.5V d.c. negative, the Multimeter reading should vary with the a.c. supply voltage as follows:-

Supply Voltage a.c.	Negative Bias Voltage	
	Max.	Min.
102V	32.5V	20.0V
115V	37.7V	23.2V
124V	40.3V	24.8V

CHAPTER 2SUPPLEMENTARY SERVICING OF ARC-52
AND CONTROL UNITS USING THE MODULE TEST KIT

- Item No SS.1 Power Unit D.C.
SS.2 Relay Unit
SS.3 Modulator Unit
SS.4 Guard Receiver
SS.5 Oscillator Unit
SS.6 Spectrum Generator
SS.7 Rx and Tx Pre-Amplifier
SS.8 Power Amplifier
SS.9 20-30 MHz Amplifier
SS.10 1.85 MHz Amplifier
SS.11 Audio Amplifier
SS.12 Audio Amplifier (Radio Relay)
SS.13 Mechanical Drive Unit
SS.14 Control Unit C1607
SS.15 Control Unit C1607/4
SS.16 Control Unit C1607/7

OPERATIONITEM NOSS.1. D.C. POWER UNIT 5821-99-942-8547

- (1) Connect the Interconnecting Box, 5821-99-999-0819, to the 27.5V d c. supply, using connector 5995-99-945-9895.
- (2) Connect the Dummy Load, Electrical 5985-99-999-1866 to the Interconnecting Box using connector 6150-99-999-4743.
- (3) Secure the Power Unit D.C. under test to the Interconnecting Box and separate the dynamotor from its chassis by removing four screws.

Set the D.C. SUPPLY switch to ON.
- (4) Ensure that the CHECK CURRENT/NORMAL switch is set to NORMAL, that the E.H.T. is set to OFF, that the A.D.F. switch is set to OFF and that the BIAS switch is set to NORMAL.
- (5) Set the MODULE switch to ON and check that the dynamotor runs.
- (6) Connect the Multimeter CT471, set to the 40V d.c range, to each 27.5V Test Point in turn and earth. The Multimeter reading should be the supply voltage, +0V, -0.2V.
- (7) Connect the Multimeter CT471, between each 25.2V Test point in turn and earth. The Multimeter reading should be between +24.7 and +25.7V.
- (8) Set the E.H.T. switch to ON.
- (9) Connect the Multimeter CT471, set to the 1200V d.c. range, to the 425V Test Point and earth. The Multimeter reading should be between 405 and 450V.
- (10) Connect the Multimeter CT471, set to the 400V d.c. range, to the 130V Test Point and earth. The Multimeter reading should be between 125 and 140 Volts.
- (11) Set the E.H.T. switch to OFF and the A.D.F. switch to ON.
- (12) Connect the Multimeter CT471, to the 225V Test Point and earth. The Multimeter reading should be between 210 and 260V. The Neon Stabiliser, V1102, should glow.
- (13) Set the A.D.F. switch to OFF. The Multimeter reading should fall to zero and the stabiliser should no longer glow.
- (14) Connect the Multimeter, CT471, set to the -120V d.c. range to the -45V Test Point and earth. The Multimeter reading should be between -38 and -52 Volts.

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OPERATION

ITEM NO

SS.1 continued.

- (15) Set the BIAS switch to TEST. The Multimeter reading should be not less than -20V d.c.
Set the BIAS Switch to NORMAL.
- (16) Connect the Multimeter CT471 to the -22V Test Point and earth. The Multimeter reading should be between -20 and -30 Volts.
- (17) Current consumption may be checked by connecting an Avometer and external shunts, giving a range of 25 amps, to the POSITIVE and NEGATIVE Test Points. Set the CHECK CURRENT/NORMAL switch to CHECK CURRENT and the E.H.T. and A.D.F. switches to ON. The Avometer reading should be not more than 17 amps.
- (18) Switch off and disconnect all test equipment.

SS.2 RELAY UNIT 5821-99-942-8545

- (1) Connect the Interconnecting Box, 5821-99-999-2643, to the Power Unit, 5821-99-932-2942, and to the 28V d.c. supply using connectors, 5995-99-932-4017 and 5995-99-945-9895.
- (2) Set the Power Unit 425V, 130V and BIAS switches to OFF.
- (3) Connect the Relay Unit under test to the Interconnecting BOX RELAY UNIT socket using connector 5995-99-932-1903. Set the Power Unit 27.5V and 425V switches to ON. Set the 425V ADJ potentiometer for a Power Unit meter reading of 425V.
- (4) Set the Interconnecting BOX SELECTOR TO RELAY. Connect a Multimeter CT471, set to the 40V d.c. range, to the SQUELCH BIAS and EARTH Test Points. Note the Power Unit meter readings, 27.5V range, throughout the following checks, the relays should operate when the voltage is above 18 Volts.
- (5) Set the Interconnecting BOX RELAY TEST switch to each position in turn. Using TABLE 1 check for correct indication of the FAIL, DISABLE and PASS lamps and correct Multimeter readings.

OPERATION

ITEM NO

SS.2 continued.

TABLE 1

Relay Test Switch Position	1	2	3	4	5	6	7	8	9	
Correct Indication	Fail	On	Off	Off	Off	Off	Off	Off	Off	
	Disable	On	Off	On	On	On	On	On	On	
	Pass	Off	On	On	On	On	On	On	On	
Voltage at SQUELCH BIAS Test Point	0	Approx. +20V	Approx +20V	0	0	0	Same as P.S.U. Meter in 27.5V Position	0	0	
Relay Energised	None	None	K901	None	K901	K901	K902	K903	K901 K904	
Earth Applied to Relay via P.901 Pin No.	-	-	11	-	11	11	14	12	13	
Red Lamp, when lit earths through pin on P.901	-	15	2	18	20	22	24	4	21	
Amber. Supply pin on P.901	10	10	10	10	10	10	3	10	10	
Green. Lamp when lit earths through pin on P.901	22	2	15	21	18	4	22	24	20	
Relay or Associated Wiring Unserviceable if:	Red incorrect Check:-	Test Jig	K901	K901	K901	K904	K902	K903	K901	K901
	Amber incorrect Check:-	K902	K902	K902	K902	K902	K902	K902	K902	K902
	Green incorrect Check:-	-	K901	K901	K901	K901	K901	K902	K903	K901 K904

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OPERATION

ITEM NO

SS.3 MODULATOR UNIT. 5821-99-942-8548

- (1) Secure the Modulator under test to the Test Set Amplifier (Modulator), 6625-99-999-2364.
- (2) Connect the Test Set Amplifier to the Interconnecting Box, 5821-99-999-2643, TEST UNIT socket, using connector 5995-99-932-1903.
- (3) Set the Interconnecting BOX MODULE SELECTOR switch to MOD, and the AUDIO switch to MOD.
- (4) Set the Power Unit, 5821-99-932-2942, 425V, 130V and BIAS controls full counter clockwise.
Set the 425V and 130V switches to OFF.
- (5) Connect the Power Unit to the Interconnecting Box using connector 5995-99-932-4017.
- (6) Connect blower, VBM 2 or VBM 3, to the 230V a.c. supply and direct the air flow onto the two CV3990 valves, V703 and V704.
- (7) Set R702 in the Modulator Unit fully clockwise.
- (8) Set the Oscilloscope CT484, Y2 AC/DC selector to D.C. and connect Y2 input to any one of the Interconnecting Box Modulator load Test Points. Connect the CT484 EARTH terminal to earth.
- (9) Connect the Signal Generator CT433, 600 ohm output to the Microphone Simulator 0 - 600 terminals using screened lead. Link the Simulator 0 and EARTH terminals.

Connect the Microphone Simulator OUTPUT terminals to the Interconnecting Box A.F. INPUT terminals.

Set the Simulator MICROPHONE SELECTOR to the appropriate position.
- (10) Set the Signal Generator frequency to 1 kHz and adjust the output for calibration mark indication in the Microphone Simulator meter.
- (11) Set the Power Unit 27.5V switch to ON and the Test Set Amplifier SUPPLY switch to ON.
- (12) Connect the Multimeter CT471, set to the 400V d.c. range, to the Interconnecting BOX 130V and E Test Points. Set the Power Unit 130V d.c. switch to ON and set the 130V ADJ control to give a Multimeter reading of 130V. Disconnect the Multimeter.

OPERATIONITEM NO

SS.3 continued

- (13) Connect the Multimeter, set to the -40V d.c. range, to the Interconnecting BOX BIAS and E Test Points. Set the Power Unit BIAS switch to ON and set the BIAS ADJ control to give a Multimeter reading of -15V. Disconnect the Multimeter.
- (14) Connect the Multimeter, set to the 1200V d.c. range, to the Interconnecting BOX 425V and E Test Points. Set the Power Unit 425V switch to ON and set the 425V ADJ control for a Multimeter reading of 410 Volts. Disconnect the Multimeter.
- (15) Set the Test Set Amplifier E.H.T. switch to ON.

NOTE: The E.H.T. switch controls the 425V to the anodes and 130V to the screens of the modulator valves. Under no circumstances should the module be run with the E.H.T. switch to ON and the Power Unit 425V switch OFF or damage to the modulator Valves will result.

- (16) Set the Oscilloscope Y2 controls for a suitable display and adjust R702 until clipping of the waveform is just apparent. The modulation depth at this point should be between 65% and 95%.

Modulation depth is given by the formula:-

$$\frac{\text{RMS Voltage at any Modulator load Test Point}}{\text{D.C. Voltage at the same Test Point}} \times 141.4\%$$

Measurements may be made with the Multimeter CT471.

- (17) Set R702 fully clockwise. The modulation depth should be at least 80%.
- (18) Sidetone:- Connect the Multimeter, set to the 12V a.c. range, to the Test Set Amplifier INTERCOM and EARTH Test Points. Adjust R702 until clipping of the Oscilloscope waveform is just apparent. The Multimeter reading at this point should be not less than 10 Volts.
- (19) Set R702 fully clockwise. The Modulation depth should be at least 80%.
- (20) Tone:- Disconnect the Signal Generator from the Microphone Simulator and Interconnecting Box.
- Set the Interconnecting Box TONE switch to ON.
- (21) Set the Oscilloscope Y2 controls for a suitable display and calculate the modulation depth as detailed in operation (16). This should be not less than 80%.

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OPERATION

ITEM NO

SS.3 continued.

- (22) Connect the Signal Generator CT433, 600 ohm output, to the Oscilloscope Y1 input. Adjust for a suitable display.
- (23) Measure the TONE frequency by comparison with the Signal Generator. This should be between 900 and 1200 c/s.
- (24) Switch off and disconnect all test equipment.

SS.4 GUARD RECEIVER 5821-99-942-8558

- NOTES:
1. The following check and alignment procedures are progressive and preceding items should be carried out as appropriate.
 2. Tuning slugs are varnish locked and this varnish must be removed before adjustment is attempted. On completion of tuning, the slugs must be re-locked.
 3. Before undertaking alignment procedures, it is advisable to first locate the components to be adjusted. This is particularly relevant to the r.f. side of the module.

(1) 1.85 MHz Alignment

- (a) Connect the Interconnecting Box, 5821-99-999-2643, to the Power Unit 5821-99-932-2942 using connectors 5995-99-932-4017 and 5995-99-945-9895.
- (b) Connect the Guard Receiver under test to the Test Set Radio (Guard Receiver) 6625-99-999-2365 using connector 5995-99-932-1910.
- (c) Set the Power Unit 425V, 130V and BIAS switches to OFF and the 425V ADJ, 130V ADJ and BIAS ADJ controls fully counter-clockwise.
- (d) Connect the Test Set, Radio (Guard Receiver) to the Interconnecting Box TEST UNIT socket using connector 6150-99-999-8159.
- (e) Set the Interconnecting Box SENSITIVITY control fully clockwise and the MODULE SELECTOR to GUARD. Set the Test Set Radio SQUELCH control fully clockwise.
- (f) Remove the module side covers and disable the 34.45 MHz oscillator by shorting crystal Y801. Fit Test Side Cover 5821-99-932-2388 in place of the RF side cover.
- (g) Connect the Multimeter CT471, set to the 12V d.c. range, to the Test Set Radio DETECTOR and EARTH Test Points.

OPERATIONITEM NO

SS.4 continued.

- (i) (h) Set the Power Unit 425V, 130V and BIAS switches to ON and adjust the 425V ADJ, 130V ADJ and BIAS ADJ controls for 425V, +130V and -14V respectively.
- (j) Set the Signal Generator CT452 to 1.85 MHz using the Calibrator Frequency and connect the Signal Generator output to the grid, pin 1-green lead, of V807 and earth via the d.c. Isolator 6625-99-943-3486.
- (k) Set the Signal Generator output for a convenient Multimeter reading of between 5 and 10 Volts and Maintain this level during the following alignment procedure.
- Tune T805 primary and secondary windings to peak the Multimeter reading.
- (l) Disconnect the Signal Generator from V807 and reconnect it to the grid, pin 1-green lead, of V806 and earth.
- (m) Tune T804 primary and secondary windings to peak the Multimeter reading, adjusting the Signal Generator output as necessary to keep the Multimeter reading below 10V.
- (n) Disconnect the Signal Generator from V806 and reconnect it to the cathode, pin 2-yellow lead, of V805 and earth, obtaining access through the left hand hole in the Test Side cover.
- (o) Tune T803 primary and secondary windings to peak the Multimeter reading.
- (p) Connect a 1000 ohm, $\pm 10\%$, $\frac{1}{4}$ watt resistor in series with a 1000pf, $\pm 20\%$ capacitor across the primary of T805. Accurately tune the secondary of T805 to peak the Multimeter reading.
- (q) Remove the damping network from the primary and reconnect it across the secondary of T805. Accurately tune the primary to peak the Multimeter reading.
- (r) Repeat operations (p) and (q) to align transformers T804 and T803 in turn.
- (s) Repeat operations (p), (q) and (r) until no further improvement in response can be obtained.
- (t) Disconnect the damping network.

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OPERATION

ITEM NO

SS.4 continued.

(2) 1.85 MHz "Peak to Valley" Ratio

- (a) Connect the Signal Generator CT452A, set to 1.85 MHz CW, to the cathode, pin 2 (yellow lead), of V805 and chassis via the D.C. Isolator.
- (b) Adjust the Signal Generator attenuator to give a Multimeter reading of 7 Volts. Note the attenuator setting in dB.
- (c) Sweep the Signal Generator frequency from 1.78 to 1.92 MHz and note the frequencies at which the Multimeter reading peaks.
- (d) (i) If there is only one peak response, at 1.85 MHz, the peak to valley ratio is 0 dB.

(ii) If there is only one peak response, at a frequency other than 1.85 MHz, tune the Signal Generator to peak the Multimeter reading and adjust the Signal Generator attenuator for a Multimeter of 7 Volts.

The difference between this attenuator setting and that noted in operation (b) should not exceed 1 dB. If this is not so, the 1.85 MHz section should be realigned.

- (iii) If two response peaks are obtained, tune the Signal Generator to each in turn and note the Signal Generator attenuator settings, in dB, for a Multimeter reading of 7 Volts. Sweep the Signal Generator frequency from 1.78 to 1.92 MHz. Note the frequency which gives minimum response and adjust the Signal Generator attenuator for a Multimeter reading of 7 Volts at this frequency. Note the attenuator setting in dB.

The difference between the attenuator settings at peak response should not exceed 1 dB.

The difference between the minimum response and either peak response settings should be not greater than 3 dB.

If these figures are exceeded the 1.85 MHz section should be realigned.

(3) 1.85 MHz Bandwidth and Gain.

- (a) Connect the Signal Generator CT452A, set to 1.85 MHz CW, to the cathode, pin 2 (yellow lead), of V805 and chassis via the D.C. Isolator.
- (b) Adjust the Signal Generator attenuator to give a Multimeter reading of 7 Volts.

OPERATIONITEM NO

SS.4 continued.

- (3) (c) Increase the Signal Generator output by 5 dB and offset the frequency below 1.85 MHz until the Multimeter reading is 7 Volts. The amount detuned should be not less than 45 kHz.

NOTE: The amount detuned may be checked with a Frequency Counter if available, or the Signal Generator may be calibrated as follows:

Connect the Signal Generator to the Calibrator Frequency and select the 1.85 MHz crystal. Tune the Signal Generator about 1.85 MHz for zero beat, and note the reading in divisions on the tuning control.

Select the 2MHz crystal and tune the Signal Generator about 2MHz for zero beat. Note the reading in divisions on the tuning control.

Dividing 150 kHz by the difference between the two readings noted will give the number of kHz per division of the tuning control i.e. approximately 3 kHz per division.

- (d) Offset the Signal Generator frequency above 1.85 MHz until the Multimeter reading falls to 7 Volts. The amount detuned above 1.85 MHz should be not less than 45 kHz.
- (e) Increase the Signal Generator output by a further 54 dB. Offset the frequency above and below 1.85 MHz until the Multimeter reading falls to 7 Volts. The difference between the upper and lower frequency should be not more than 400 kHz.
- (f) Using the Calibrator Frequency, re-set the Signal Generator to 1.85 MHz. With the Signal Generator connected as in operation (a) adjust the attenuator for a Multimeter reading of 10 Volts. The Signal Generator output should be not more than 55 μ V.
- (g) Disconnect the Signal Generator CT452A and remove the short circuit from crystal Y801.

(4) 36.3 MHz Alignment.

- (a) Using the Calibrator Frequency, set the Signal Generator CT394A to 36.3 MHz.
- (b) Connect the Signal Generator output to the cathode, pin 2 (yellow lead), of V805 and chassis, using connector 5995-99-972-8884 and D.C. Isolator 6625-99-943-3486.

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OPERATION

ITEM NO

SS.4 continued.

- (4) (c) Set the Signal Generator output to 50 μ V, CW and adjust L807 for a peak reading in the Multimeter, keeping the Multimeter reading between 5 and 10 Volts by adjustment of the Signal Generator attenuator.
- (d) Using the Calibrator Frequency, set the signal Generator CT452A to 1.85 MHz. CW and loosely couple the output to T804. Sufficient coupling is obtained by inserting a short length of p.v.c. covered equipment wire through the primary tuning slug access hole.
- (e) A heterodyne frequency should now be displayed on the Oscilloscope CT484. Tune L807 to reduce the beat frequency to zero.
- (f) Remove the loose coupling at T804. Re-connect the Signal Generator CT394A via the D.C. Isolator to the grid, pin 2 (green lead) of V802A, obtaining access through the centre hole of the test side cover.
- (g) Set the CT394A output for a Multimeter reading of 7 Volts, and adjust the output as necessary to maintain this level during alignment.
- (h) Adjust the secondary L810B, and then the primary L810A of T802 to peak the Multimeter reading.
- (j) Adjust the secondary L809B, and then the primary L809A of T801 to peak the Multimeter reading.
- (k) Lock the cores with Silicone compound.
- (5) 36.3 MHz Bandwidth.
- (a) Using the Calibrator Frequency, reset the Signal Generator CT394 to 36.3 MHz and reconnect the output to V802A grid as in operation (4) (f).
- (b) Adjust the Signal Generator output for a Multimeter reading of between 9 and 11 Volts. Note the Multimeter reading.
- (c) Increase the Signal Generator output by 6 dB and offset the frequency below 36.3 MHz until the Multimeter reading is that noted in operation (b). Note this frequency.
- (d) Offset the Signal Generator frequency above 36.3 MHz until the Multimeter reading is again that noted in operation (b). Note this frequency.

OPERATIONITEM NO

SS.4 continued.

- (5) (e) The difference between the frequencies noted in operations (c) and (d) should be not less than 90 kHz.

NOTE: On the Signal Generator 24-28 MHz scale, 1 MHz = 117 division on the incremental dial.

- (f) The difference between the frequency noted in operation (c) and 36.3 MHz should be within \pm 15 kHz of the difference between the frequency noted in operation (d) and 36.3 MHz.

- (g) Disconnect the Signal Generator CT394A.

(6) R.F. Alignment

- (a) Replace the normal module side covers.

- (b) Connect the Signal Generator CT 394A output to P802 using Connector 5995-99-932-1907, and tune the Signal Generator about 243 MHz, CW, for a peak reading in the Multimeter. Adjust the output level as necessary to maintain the Multimeter reading between 5 and 10 Volts during alignment.

- (c) Tune L806, L805, L803, L802 and L801 in this order, to peak the Multimeter reading.

(7) Sensitivity, AGC and Noise Limiter

- (a) Connect the Oscilloscope CT484 to the Test Set Radio AF OUTPUT and EARTH Test Points.

- (b) Using the Calibrator Frequency, set the Signal Generator CT452A to 1.85 MHz CW and loosely couple the output to T804 as in operation (4) (d).

- (c) With the Signal Generator CT394A connected as in operation (6), set the output level to 1 mV. A heterodyne frequency should now be displayed on the Oscilloscope CT484. Tune the CT394A to reduce the beat frequency to zero.

- (d) Remove the loose coupling at T804.
Set the CT394A output to 1 μ V, modulated 30% at 1 kHz and adjust the Interconnecting Box CARRIER SQUELCH LEVEL control until the receiver just mutes. If the receiver does not mute, set the CARRIER SQUELCH LEVEL control fully counter clockwise and adjust the Interconnecting Box SENSITIVITY control until the receiver just mutes

Reset the CARRIER SQUELCH LEVEL control so that the receiver just unmutes. Set the CT394A output to 1 mV.

RESTRICTED

OPERATION

ITEM NO

SS.4 continued.

- (7) (e) Reconnect the Multimeter CT471, set to the 40V a.c. range, to pin 6 of J1508 and earth. The Multimeter reading should be not less than 12 Volts. Note this reading.
- (f) Reduce the Signal Generator CT394A output by 40 dB. The Multimeter reading should not fall below 0.7 of the reading taken in operation (e).
- (g) Increase the Signal Generator output by 80 dB, i.e. 40 dB above 1 mV. The Multimeter reading should not exceed 1.4 of the reading taken in operation (e).
- (h) Set the Signal Generator output to 500 mV. The meter reading should not fall below 12 Volts.
- (j) Repeat operations (b) to (e) inclusive to retune the CT394A and bring the receiver to the threshold of being not muted.
- (k) Set the Signal Generator output to 1 mV, modulated 30% at 300 Hz. The Multimeter reading should not rise above 1.1, or fall below 0.7 of the reading taken in operation (j).
- (l) Modulate the Signal Generator 30% at 3 kHz. The Multimeter reading should not rise above 1.1, or fall below 0.7 of the reading taken in operation (j).
- (m) Reconnect the Multimeter CT471, set to the 12V d.c. range, to the Test Set Radio Detector Test Point and chassis.
- (n) Modulate the Signal Generator 30% at 1 kHz and tune for a peak reading in the Multimeter.
- (o) Adjust the Signal Generator modulation depth until peak limiting of the Oscilloscope Waveform just commences. The modulation depth at this point should be between 40 and 65%.
- (p) Repeat operations (b) to (e) inclusive to retune the CT394A and bring the receiver to the threshold of being not muted.
- (q) Set the Signal Generator output level to 5 μ V. The Multimeter reading should be not less than 2V. Switch off the signal Generator modulation. The Multimeter reading should fall by not less than 6 dB.

OPERATIONITEM NO

SS.4 continued.

- (7) (r) Set the Signal Generator Modulation to 30% at 1 kHz and the output to $1\mu\text{V}$.

Adjust the receiver to the threshold of being not muted as in operation (d).

Set the Interconnecting Box SENSITIVITY control fully counter clockwise. Increase the Signal Generator output from $1\mu\text{V}$ until the receiver is again at the threshold of being not muted. The Signal Generator output at this point should be not less than $10\mu\text{V}$.

- (s) Switch off and disconnect all test equipment.

SS.5 OSCILLATOR UNIT 5821-99-942-8553

(1) Preparation.

- (a) Secure the Oscillator Unit under test to the Test Set Oscillator 6625-99-999-2384.
- (b) Connect P1902 (J1515) on the Oscillator Unit to SKTI (J1515) on the Test Set Oscillator using the microdot extension lead and adaptor if necessary.
- (c) Set the Power Unit 425V, 130V, MAINS and BIAS switches to OFF and turn the 27.5V ADJ, 425V ADJ, 130V ADJ and BIAS ADJ controls fully counter-clockwise.
- (d) Connect the Test Set Oscillator to the Power Unit using connector 6150-99-999-8158.
- (e) Set the Power Unit MAINS, 27.5V, 130V and BIAS switches to ON.

Set the 130V ADJ and BIAS ADJ controls for meter readings of 130V and -45V.

(2) Units Oscillator Alignment.

- (a) Connect the Multimeter CT471, set to the -4V d.c. range, to Test Point J and earth.
- (b) Set the Test Set Oscillator 1.0MHz indexing wheel to 0.0 MHz. Adjust L 1901 to peak the Multimeter reading. The Multimeter reading should be not less than -1 Volt.
- (c) Repeat operation (b), adjusting inductors L1902 to L1910 at the indexing Wheel settings given in TABLE 1.

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ITEM NOOPERATION

SS.5 (2) Contd.

TABLE 1

Indexing Position	Inductor
1.0	L1902
2.0	L1903
3.0	L1904
4.0	L1905
5.0	L1906
6.0	L1907
7.0	L1908
8.0	L1909
9.0	L1910

(3) Decimals Oscillator

- (a) Connect the Multimeter CT471, set to the -12V d.c. range, to Test Point K and earth.
- (b) Set the Test Set Oscillator 0.1 MHz indexing wheel to 0.0 MHz. The Multimeter reading should be not less than -0.5 Volts.
- (c) Repeat operation (b) at each setting of the 0.1 MHz indexing wheel.

(4) Output Checks.

- (a) Connect The Multimeter CT471, set to the 400 mV d.c. range, to the Test Set Oscillator D.C. OUTPUT and EARTH Test Points.
- (b) Connect the Test Set Oscillator fly leads to the module Test Points J and K.
- (c) Set the Test Set Oscillator 1.0 MHz indexing wheel to 0.0 MHz and the DISABLE OSC. switch to 0.1 MHz. Note the Multimeter reading; it should be not less than 90 mV.
- (d) Remove the fly lead from Test Point K. The Multimeter reading should be greater than that noted in operation (c). Reconnect the fly lead.
- (e) Repeat operations (c) and (d) for each 1.0 MHz increment of the 1 MHz indexing wheel.
- (f) Set the Multimeter range switch to -1.2V d.c. Set the Test Set Oscillator 0.1 MHz indexing wheel to 0.0 MHz and the DISABLE OSC. switch to 1.0 MHz. The Multimeter reading should be not less than 300 mV.

OPERATIONITEM NO

SS.5 continued.

(5) Test Set Oscillator

If the Test Set Oscillator becomes suspect during the foregoing tests carry out the following adjustment:-

- (a) Connect the Signal Generator CT394A to the Test Set Oscillator R.F. socket using connector 5995-99-932-1909 and adaptor 5935-99-932-4733.
- (b) Connect the Multimeter CT471, set to the 400 mV d.c. range, to the D.C. OUTPUT and EARTH Test Points.
- (c) Set the Signal Generator frequency to 25 MHz and the output to 500 mV. Adjust RV1 on the Test Set Oscillator for a Multimeter reading of 250 mV.

- (6) Switch off and disconnect all Test equipment.

SS.6 SPECTRUM GENERATOR 5821-99-942-8552

(1) Oscillator Section Alignment

To be carried out when the voltage at Test Point H, measured with a Multimeter CT 471, is less than -5.5 Volts.

- (a) Secure the module under test to the Test Jig Oscillator, 6625-99-999-1046 ensuring that the coupler and variable capacitors are set to 200 MHz, i e. the coupler is rotated until the variable capacitor plates are in the fully closed position.

NOTE: The 200 MHz position of the Spectrum Generator Unit is actually equivalent to a Control Unit setting of 220 MHz, since the oscillator frequency is less than that of the received signal by the amount of the variable I.F.

- (b) Set the Power Unit 130V, 425V and BIAS switches to OFF and the 130V ADJ, 425 ADJ and BIAS ADJ controls fully counter-clockwise.
- (c) Connect the Test Jig Oscillator to the Power Unit using connector 6150-99-999-8158.
- (d) Connect the Multimeter CT471, set to the -40V d.c range, to Test Point H and earth.
- (e) Set the Power Unit 130V switch to ON and the 130V ADJ control for a Power Unit meter reading of 130V.

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OPERATION

ITEM NO

SS.6 continued.

- (1) (f) Allow about ten minutes for the equipment to stabilise.
- (g) Adjust L501 to peak the Multimeter reading using alignment tool 5120-99-942-9598.
- (h) Set the Test Jig Oscillator indexing head to 210 MHz and adjust L502 to peak the Multimeter reading.

NOTE: The indexing head should always be rotated in the direction indicated by the arrow inscribed adjacent to the thumbwheel, when finally locating the indexing head.

- (j) Set the indexing head to the frequencies listed in TABLE 1 in turn, and adjust the appropriate coil to peak the Multimeter reading.

TABLE 1

Indexing head frequency MHz	Inductor
220	L503
230	L504
240	L505
250	L506
260	L507
270	L508
280	L509
290	L510
300	L511
310	L512
320	L513
330	L514
340	L515
350	L516
360	L517
370	L518

NOTE: If coils L531 and L532 have been replaced or disturbed carry out operations (k) to (p), if not, proceed direct to operation (q).

- (k) Set the indexing head to 370 MHz and adjust L531 to peak the Multimeter reading, by either compressing or expanding the coil using an insulated tool. Access to the coil is by the hole in the rear of the generator cover.
- (l) Set the indexing head to 280 MHz and adjust C506 to peak the Multimeter reading.

ITEM NO.OPERATION

SS.6 (1) contd.

- (m) Repeat operations (k) and (l) until no further improvement can be obtained.
- (n) Set the indexing head to 370 MHz and adjust L532 to peak the Multimeter reading, by either compressing or expanding the coil. Access to L532 is obtained by removing V502 and V503 screening cans and inserting an insulated tool between the valves and through the hole in the oscillator section cover.
- (o) Set the indexing head to 280 MHz. Adjust C508 to peak the Multimeter reading.
- (p) Repeat operations (n) and (o) until no further improvement can be obtained.
- (q) Set the indexing head to 200 MHz. Note the Multimeter reading; it should be not less than -5.5 Volts.
- (r) Increase the frequency in 10 MHz increments from 200 to 370 MHz. Note the Multimeter readings at all frequencies, it should be not less than -5.5 Volts.

(2) Amplifier Section Alignment

- (a) Set the indexing head to 370 MHz. Connect the Monitor R.F. 6625-99-943-6879, to the co-axial connector J501 using connectors 5995-99-932-1909 and 5995-99-932-2130, and Adaptor 5935-99-932-1912.
- (b) Reconnect the Multimeter CT471, set to the 12V d.c. range, to the Monitor R.F. output terminals. The Multimeter reading should be not less than 2 Volts.

Note the Multimeter reading for all the frequencies listed in TABLE 2. If the minimum of 2 Volts is not obtained on all channels carry out the following alignment procedure.
- (c) Remove the Amplifier Section side cover and fit the Test Side Cover 5821-99-932-1916.
- (d) Set the indexing head to 370 MHz and adjust C517, C522 and C526 in turn to peak the Multimeter reading using Alignment Tool 5120-99-942-9597.
- (e) Set the indexing head to 360 MHz.
- (f) Insert in turn, the iron and brass ends of Tuning Wand 5120-99-943-1514, through the access hole in the Test Side Cover and into Z501 tuning assembly. Check for resonance, which will be indicated by a fall in the Multimeter reading when either end of the Tuning Wand is inserted.

ITEM NO

SS.6 (2)(g) contd.

OPERATION

If, when the iron end of the tuning Wand is inserted, the Multimeter reading increases, the appropriate sector of the capacitor rotor vanes should be set nearer the stator vanes. If, when the brass end of the tuning wand is inserted, the Multimeter reading increases, the appropriate sector of the capacitor rotor vanes should be set further from the Stator vanes.

If the capacitor vanes require adjustment, rotate the indexing head until the appropriate vane appears opposite the hole in the rear of the unit. Adjust the vane, re-set the head to the correct frequency and re-check for resonance. If a non-insulated tool is used to bend the vanes, H.T. must be switched OFF whilst adjustment is made.

- (h) Repeat operations (f) to (g) for tuning assemblies Z502 and Z503.
- (j) Repeat operations (f) to (h) at each of the frequencies listed in TABLE 2 commencing with 350.0 MHz, and then in 10 MHz steps down to 200 MHz. The frequency should always be approached from the direction indicated by the arrow on the indexing head when finally locating the head. The sector of the rotor vane to be adjusted at each step is indicated in the table.

TABLE 2

	Vane	Sector	Colour
360	lower	2nd shortest	Black
350	upper	2nd shortest	Black
340	lower	3rd shortest	Red
330	upper	3rd shortest	Red
320	lower	4th shortest	Yellow
310	upper	4th shortest	Yellow
300	lower	5th shortest	Blue
290	upper	5th shortest	Blue
280	lower	6th shortest	None
270	upper	6th shortest	None
260	lower	7th shortest	Black
250	upper	7th shortest	Black
240	lower	8th shortest	Red
230	upper	8th shortest	Red
220	lower	9th shortest	Yellow
210	upper	longest	Yellow
200	lower	longest	None

NOTE:- The shortest sector should not be adjusted in any alignment position.

OPERATIONITEM NO

SS.6 continued.

- (2) (k) Replace the normal side cover.
- (l) Set the indexing head to 370 MHz and adjust C517, C522 and C526 to peak the Multimeter reading.
- (m) Select each of the frequencies listed in TABLE 2 in turn and check that the Multimeter reading is not less than 2.5 Volts.
- (n) Disconnect the Monitor R.F. and Multimeter. Connect the Spectrum Generator output, J501, to the Calibrator Frequency IN VIA ATTENUATOR socket. Link the two remaining Calibrator Frequency Sockets.
- (o) Connect the Multimeter CT471, set to the -40V d.c. range, to Test Point H and earth.
- (p) Set the Calibrator Frequency OSCILLATOR switch to 10 MHz and the METER switch to COUNT 10 kHz F.S.D.
- (q) Set the indexing head to 200 MHz and adjust L501 for a zero beat in the Calibrator Frequency meter or phones.

The Multimeter reading should be not less than -5.5V or more than 3 dB down on the reading noted in operation (l) (q) and (l) (r) whichever is the greater.

- (r) Repeat operation (q), adjusting L502 with the indexing head set to 210 MHz.
- (s) Repeat operation (q) adjusting the appropriate inductor at the frequencies listed in TABLE 1.
- (t) Switch off and disconnect all test equipment.

SS.7 RECEIVER AND TRANSMITTER PRE-AMPLIFIER 5821-99-942-8554

(1) Transmitter Pre-Amplifier

- (a) Remove the module side cover and fit the Test Side Cover 5821-99-932-1804, secure the module to the indexing head of Test Set Amplifier (Rx Tx Pre-Amp.) 6625-99-999-2362.
- (b) Secure a serviceable Spectrum Generator to Test Jig Oscillator (Spectrum Generator) 6625-99-999-1046.
- (c) Set the Power Unit 425V, 130V and BIAS switches to OFF and the 425V, ADJ, 130V ADJ and BIAS ADJ controls fully counter-clockwise.

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ITEM NO

SS.7 continued.

- (1) (d) Connect the Test Set Amplifier SKT 2 to the Test Jig Oscillator PL1 using cable assembly 6150-99-999-8160.
- (e) Connect the Test Set Amplifier PL1 to the Power Unit OUTPUT socket using connector 6150-99-999-8158.
- (f) Connect the Monitor R.F. to the module J101 using extension lead 5995-99-932-2130, adaptor 5935-99-932-1912 and connector 5995-99-932-1909.
- (g) Connect P2 (J501) of the Rx and Tx Pre-Amplifier unit, to J501 of the Spectrum Generator, using microdot adaptors 5935-99-932-2381 and extension leads 5995-99-932-2130 if necessary.
- (h) Set the Signal Generator CT394A frequency to 30 MHz using the Calibrator Frequency, set to the 10 MHz crystal position. Reduce the Signal Generator frequency by 0.1 MHz, approximately 9.5 divisions on the incremental dial.
- (j) Set the Power Unit 130V switch to ON, adjust the 130V ADJ control for a Power Unit meter reading of 130V. Allow ten minutes for the equipment to stabilise.
- (k) Set the Spectrum Generator indexing head to 370 MHz and the Rx Tx Pre-Amplifier indexing head to 399.9 MHz.

NOTE: The indexing heads should always be rotated in the direction of the arrow adjacent to the thumbwheel.

- (l) Connect the Multimeter CT471, set to the -12V d.c. range to Test Point T and earth. Adjust C526 in the Spectrum Generator to peak the Multimeter reading. Note this reading.
- (m) Connect the Signal Generator CT394A output to P4 (J1517) of the Rx and Tx Pre-Amplifier, using connector 5995-99-932-1905 and adaptor 5935-99-932-1911.
- (n) Adjust the Signal Generator output for a Multimeter reading which is greater by -1V than that obtained in operation (l).

NOTE: It may be necessary to set the Signal Generator OUTPUT switch to the HIGH position and to adjust the SET R.F. control for maximum reading in the R.F. meter to achieve this.

- (o) Re-connect the Multimeter CT471, set to the 4V d.c. range, to the output terminals of the Monitor R.F.
- (p) Adjust C115, C116, and C117 to peak the Multimeter reading.

OPERATIONITEM NO

SS.7 continued.

- (1) (q) Disconnect the Signal Generator from P4.
Re-set the Signal Generator to 25.0 MHz using the Calibrator Frequency set to the 12.5 MHz crystal position.
Set the Rx and Tx Pre-Amplifier indexing head to 395.0 MHz.
- (r) Disconnect P2 (J501) from J501 of the Spectrum Generator and repeat operations (l) to (o) inclusive.
- (s) Re-connect P2 to J501.
- (t) Insert in turn, the iron and brass ends of the tuning Wand 5120-99-934-1514, through the holes in the Test Side Cover to check Z101, Z102 and Z103 for resonance. Resonance will be indicated by a fall in the Multimeter reading when either end of the tuning Wand is inserted.

If, when the brass end of the tool is inserted, the Multimeter reading increases, the appropriate sector of the capacitor rotor vanes should be set further from the stator vanes.

If, when the iron end of the tool is inserted, the Multimeter reading increases, the rotor vanes should be set closer to the stator vanes.

If the capacitor vanes require adjustment, rotate the indexing head until the appropriate sector appears opposite the hole in the rear face of the module. Adjustment should be made using an insulated tool, i.e. Tool, tracking, 5120-99-120-0367. Reset the indexing head to 395.0 MHz.

Repeat this operation as necessary until resonance is achieved.

- (u) Repeat operation (t), reducing the frequency of the Test Set Amplifier and Test Jig Oscillator by 10 MHz at each step until 225.0 MHz on the Rx and Tx Pre-Amplifier and 200 MHz on the Spectrum Generator is reached. The sector of the rotor vane to be adjusted at each step is given in TABLE 1.

/TABLE 1

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OPERATIONITEM NO

SS. 7 (1) continued.

TABLE 1

Transmitter Pre-Amplifier	Spectrum Generator	Vane in Use	Sector In Use	Colour
395.0	370.0 MHz	Lower	1	None
385.0	360.0	Upper	1	Black
375.0	350.0	Lower	2	Black
365.0	340.0	Upper	2	Red
355.0	330.0	Lower	3	Red
345.0	320.0	Upper	3	Yellow
335.0	310.0	Lower	4	Yellow
325.0	300.0	Upper	4	Blue
315.0	290.0	Lower	5	Blue
305.0	280.0	Upper	5	None
295.0	270.0	Lower	6	None
285.0	260.0	Upper	6	Black
275.0	250.0	Lower	7	Black
265.0	240.0	Upper	7	Red
255.0	230.0	Lower	8	Red
245.0	220.0	Upper	8	Yellow
235.0	210.0	Lower	9	Yellow
225.0	200.0	Upper	9	None

NOTE: All preceding steps should be repeated after each 10 MHz step, and the sectors adjusted to produce a smooth curve.

- (v) Disconnect the Signal Generator and the Spectrum Generator. Replace the normal side covers and repeat operations (j) to (q).
- (w) Repeat operation (r), the Multimeter reading should be greater than 2 Volts.
- (x) Reduce the Rx and Tx Pre-Amplifier and Spectrum Generator indexing head settings to 225.0 and 200 MHz respectively, in 10 MHz increments. At each step the Multimeter reading should be greater than 2 Volts.

(2) Receiver Pre Amplifier.

- (a) Fit Test Side Cover 5821-99-932-1806, in place of the normal side cover. Ensure that the module is secured to the Test Set Amplifier and that the serviceable Spectrum Generator is secured to the Test Jig Oscillator.
- (b) Set the Power Unit 425V, 130V and BIAS switches to OFF and the 425V ADJ, 130V ADJ and BIAS ADJ controls fully counter-clockwise.

OPERATIONITEM NO

SS.7 continued.

- (2) (c) Connect the Test Jig Oscillator PL1 to the Test Set Amplifier SKT2.
Connect the Test Set Amplifier PL1 to the Power Unit OUTPUT socket.
Connect P2 (J1501) of the Receiver Pre-Amplifier to J501 of the Spectrum Generator, using microdot adaptors 5995-99-932-2130 and extension lead if necessary. Connect J1518 of the Receiver Pre-Amplifier to SKT3 (J1518) on the Test Set Amplifier.
- (d) Set the Power Unit 130V switch to ON and the 130V ADJ control for a Power Unit meter reading of 130V. Allow a ten minute warm up period for the equipment to stabilise
- (e) Set the Signal Generator CT394A to 400 MHz, unmodulated, using the Calibrator Frequency. Reduce the Signal Generator frequency by 0.1 MHz, approximately three quarters of a division on the incremental scale, to 399.9 MHz.
- (f) Connect the Multimeter CT471, set to the 4V d.c. range, to module Test Point G and earth. Connect the Signal Generator CT394A output to J1 on the module using connector 5995-99-932-1907.
- (g) Set the Receiver Pre-Amplifier indexing head to 399.9 MHz and the Spectrum Generator indexing head to 370.0 MHz, rotating the heads in the direction of the arrow adjacent to the thumb-wheel.
- (h) Increase the Signal Generator output until the Multimeter reading just starts to rise. Adjust C19, C20 and C21 to peak the Multimeter reading using alignment tool 5120-99-942-9597.
- (j) Connect the Multimeter CT471, set to the 120 μ A d.c. range to the METER terminals at the rear of the Test Set Amplifier. Set the Receiver Pre-Amplifier indexing head to 395.0 MHz and tune the Signal Generator about 395.0 MHz to peak the Multimeter reading. Keep the Multimeter level below 50 μ A by reducing the Signal Generator output as necessary.
- (k) Insert, in turn, the iron and brass ends of tuning wand 5120-99-943-1514, through the holes in the Test Side Cover to check Z1, Z2 and Z3 for resonance. Resonance will be indicated by a fall in the Multimeter reading when either end of the tuning Wand is inserted.

RESTRICTED

OPERATION

ITEM NO

SS.7 continued.

(2) (k) contd.

If, when the brass end of the tool is inserted, the Multimeter reading increases, the appropriate sector of the capacitor rotor vanes should be set further from the stator vanes.

If, when the iron end of the tool is inserted, the Multimeter reading increases, the rotor vanes should be set closer to the stator vanes.

If the capacitor vanes require adjustment access may be obtained by rotating the indexing head until the appropriate sector is opposite the hole in the rear cover of the unit. Adjustment must be made with an insulated tool, i.e. 5120-99-120-0367 Tool tracking. Re-set the indexing head to 395.0 MHz and re-check for resonance.

(l) Repeat operation (k) as necessary until resonance is achieved.

(m) Repeat operations (k) and (l) at 10 MHz intervals down to 225 MHz, tuning the Signal Generator to peak the Multimeter reading at each step. The rotor vane sector to be adjusted and the indexing head settings are given in TABLE 2.

TABLE 2

Spectrum Generator	Receiver Pre-Amplifier	Vane in use	Sector in use	Colour
370 MHz	395 MHz	Lower	1	None
360	385	Upper	1	Black
350	375	Lower	2	Black
340	365	Upper	2	Red
330	355	Lower	3	Red
320	345	Upper	3	Yellow
310	335	Lower	4	Yellow
300	325	Upper	4	Blue
290	315	Lower	5	Blue
280	305	Upper	5	None
270	295	Lower	6	None
260	285	Upper	6	Black
250	275	Lower	7	Black
240	265	Upper	7	Red
230	255	Lower	8	Red
220	245	Upper	8	Yellow
210	235	Lower	9	Yellow
200	225	Upper	9	None

NOTE:

All preceding steps should be repeated after each 10 MHz step and the sectors adjusted to produce a smooth curve.

OPERATIONITEM NO

SS.7 continued.

- (2) (n) Replace the normal side cover and repeat operations (g) and (h). Disconnect the Signal Generator CT394A.
- (o) Reconnect the Multimeter CT471, set to the 1.2V d.c. range, to Test Point G and earth. The Multimeter reading should be not less than 0.8 Volt.
- (p) Select each of the frequencies listed in TABLE 2 in turn, the Multimeter reading should be not less than 0.8 Volt on all channels.

SS.8 POWER AMPLIFIER 5821-99-942-8559

NOTE: The duty cycle, 5 minutes transmit and 10 minutes receive must not be exceeded.

(1) Pre-Amplifier Tracking.

- (a) Secure a serviceable Spectrum Generator to the Test Jig Oscillator, 6625-99-999-1046.
Secure a serviceable Main Receiver and Transmitter Pre-Amplifier to the Test Set Amplifier, 6625-99-999-2362. Secure the module under test to the Test Jig Power Amplifier 6625-99-999-1865 and connect blower VBM2 or VBM3 to the Test Jig P.A. air inlet. Switch on the blower.
- (b) Set the Power Unit 425V, 130V and BIAS switches to OFF and the 425V ADJ, 130V ADJ and BIAS ADJ controls fully counter-clockwise. Connect the Power Unit OUTPUT to PL1 on the Test Set Amplifier using connector 6150-99-999-8158.
- (c) Connect SKT2 of the Test Set Amplifier to PL1 of the Test Jig Oscillator using connector 6150-99-999-8160.
Connect SKT4 of the Test Set Amplifier to PL1 of the Test Jig P.A. using connector 6150-99-999-8160.
- (d) Connect the Wattmeter CT419, set to the 25 Watt range, to 6002 of the Power Amplifier, using connector 5995-99-932-1907.
Connect P602 (J101) lead on the Power Amplifier to J101 socket on the Receiver and Transmitter Pre-Amplifier using microdot extension lead 5995-99-932-2130 and adaptor 5935-99-932-2381 if necessary.
- (e) Set the Power Unit 130V switch to ON and adjust the 130V ADJ control for a Power Unit meter reading of 130V.

RESTRICTED

OPERATION

ITEM NO

SS.8 continued.

- (1) (f) Set the Signal Generator CT394A to 30 MHz using the Calibrator Frequency. Reduce the Signal Generator frequency by 0.1 MHz, approximately nine and a half divisions on the incremental dial.
- (g) Set the Receiver Transmitter Pre-Amplifier indexing head to 399.9 MHz, rotating the head in the direction of the arrow adjacent to the thumbwheel.
- (h) Connect the Multimeter CT471, set to the -4V d.c. range, to Test Point T and earth. Adjust C526 in the Spectrum Generator to peak the Multimeter reading. Note this reading.
- (j) Connect the Signal Generator CT394A output to P4 (J1517) of the Receiver Transmitter Pre-Amplifier using connector 5995-99-932-1905 and adaptor 5935-99-932-1911. Adjust the Signal Generator output to give a Multimeter reading greater by -1 Volt than that noted in operation (r).

NOTE: It may be necessary to set the Signal Generator OUTPUT switch to HIGH and to adjust the Set R.F. control for maximum R.F. meter reading to achieve this.

- (k) Connect P2 (J501) of the Receiver Transmitter Pre-Amplifier to J501 of the Spectrum Generator using microdot extension lead 5995-99-932-2130 and adaptor 5935-99-932-2381 if necessary.
- (l) Set the Power Amplifier and Spectrum Generator indexing heads to 399.9 MHz and 370 MHz respectively, rotating the heads in the direction of the arrow adjacent to the thumbwheel.
- (m) Connect the Multimeter CT471, set to the 4V d.c. range, across R603 in the Power Amplifier, i.e. to the feedthrough capacitor nearest to the cannon plug and earth. The use of miniature clips is recommended. Adjust C609 to peak the Multimeter reading using alignment tool 5120-99-942-9597.
- (n) Set the Receiver Transmitter Pre-Amplifier and Power Amplifier indexing heads to 395.0 MHz.
- (o) Disconnect the Signal Generator from P4(J1517). Disconnect P2 (J501) of the Receiver Transmitter Pre-Amplifier from J501 of the Spectrum Generator.
- (p) Connect the Multimeter CT471, set to the -4V d.c. range, to Test Point T and earth. Note the Multimeter reading.

OPERATIONITEM NO

SS.8 continued.

- (1) (q) Set the Signal Generator CT394A frequency to 25 MHz using the Calibrator Frequency and reconnect at the Signal Generator output to P4 (J1517) of the Receiver Transmitter Pre-Amplifier.
- (r) Adjust the Signal Generator output to give a Multimeter reading greater by -1 Volt than that noted in operation (p).
- (s) Reconnect P2(J501) of the Receiver Transmitter Pre-Amplifier to J501 of the Spectrum Generator and reconnect the Multimeter CT471, set to the 4V d.c. range, across R603 in the Power Amplifier.
- (t) Check the tuning of the pre-amplifier tank circuit, Z602, by inserting the iron and brass ends of the Tuning Wand through the access hole in the rear of the unit in turn, such that the tip of the Wand is adjacent to that portion of the inductance arc in the tuned circuit.

Resonance is indicated by a fall in Multimeter reading when either end of the Wand is inserted.

If the Multimeter reading increases when the iron end of the Wand is inserted, the appropriate sector of the capacitor rotor vane should be positioned nearer the stator.

If the Multimeter reading increases when the brass end of the Wand is inserted, the appropriate sector of the capacitor rotor vane should be positioned further from the stator.

If the capacitor rotor vanes require adjustment, set the indexing head to a position where the appropriate sector appears adjacent to the access hole in the rear of the unit.

Alignment tool 5120-99-120-0367 may be used for adjustment. Reset the indexing head to 395 MHz and recheck for resonance.

- (u) Repeat operation (t) at 10 MHz intervals down to 225 MHz, resetting all the indexing heads together. The sector of the capacitor rotor vanes to be adjusted at each frequency are given in TABLE 1. The lower vanes are those situated nearest the Oldham coupler.

/TABLE 1

RESTRICTED

OPERATIONITEM NO

SS.8 continued (1).

TABLE 1

Spectrum Generator	Rx Tx Pre-Amp and P.A.	Vane in Use	Sector in Use	Colour
370.0 MHZ	395.0 MHz	Lower	1st shortest	None
360.0	385.0	Upper	1st shortest	Black
350.0	375.0	Lower	2nd shortest	Black
340.0	365.0	Upper	2nd shortest	Red
330.0	355.0	Lower	3rd shortest	Red
320.0	345.0	Upper	3rd shortest	Yellow
310.0	335.0	Lower	4th shortest	Yellow
300.0	325.0	Upper	4th shortest	Blue
290.0	315.0	Lower	5th shortest	Blue
280.0	305.0	Upper	5th shortest	None
270.0	295.0	Lower	6th shortest	None
260.0	285.0	Upper	6th shortest	Black
250.0	275.0	Lower	7th shortest	Black
240.0	265.0	Upper	7th shortest	Red
230.0	255.0	Lower	8th shortest	Red
220.0	245.0	Upper	8th shortest	Yellow
210.0	235.0	Lower	last	Yellow
200.0	225.0	Upper	last	None

(v) Disconnect the Signal Generator from P4 (J1517).

(w) Disconnect P2 (J501) on the Receiver Transmitter Pre-Amplifier from J501 on the Spectrum Generator.

(x) Repeat operations (f) to (m) inclusive.

(2) Power Amplifier Grid Circuit Tracking.

NOTE: The grid and anode tank capacitors have one stator and two rotor vanes; both rotors have nine sectors. Unlike other variable capacitors in the equipment these sectors are not staggered and must therefore be adjusted in pairs as they come into mesh with the stator. It is important that adjustment is made at two frequencies for each sector, and the sector twisted if necessary to achieve resonance at both frequencies. Resonance must be checked and re-checked at the two frequencies until no further adjustment is necessary, attention can then be given to the next sector coming into mesh. A complete re-check over the whole frequency range will be necessary afterwards because the lower frequency sectors affect higher frequencies slightly.

OPERATIONITEM NO

SS.8 continued.

- (2) (a) Connect and adjust the equipment as detailed in operation (1) (a) to (1)(1) inclusive.
- (b) Connect the Multimeter CT471, set to the -120V d.c. range, to Test Point V and earth.
- (c) Adjust C611 to peak the Multimeter reading.

NOTE: This capacitor is air spaced and sited approximately $1\frac{3}{4}$ inches inside the module. Access is by a hole in the cover labelled C611.

- (d) Set the Receiver Transmitter Pre-Amplifier and Power Amplifier indexing heads to 395 MHz, rotating the heads in the direction of the arrow adjacent to the thumbwheel.
- (e) Carry out operations 1(1) to (s) inclusive.
- (f) Check the tuning of the grid tank circuit by inserting the iron and brass ends of the tuning Wand through the square hole in the cover, such that the tip of the Wand is adjacent to that portion of the inductance arc in the tuned circuit.

Resonance is indicated by a fall in the Multimeter reading when either end of the Wand is inserted.

If the Multimeter reading increases when the brass end of the Wand is inserted, the appropriate sector of the capacitor rotor vanes should be positioned further from the stator.

If the Multimeter reading increases when the iron end of the Wand is inserted, the appropriate sector of the rotor vane should be positioned nearer to the stator.

If adjustment is necessary proceed as follows:-

- (i) Set the Power Unit 130V switch to OFF.
- (ii) Rotate the Power Amplifier indexing head to bring the appropriate sectors adjacent to the access hole.
- (iii) Adjust each rotor vane sector by a similar amount in the appropriate direction using alignment Tool 5120-99-120-0367.
- (iv) Re-set the indexing head to 395 MHz and set the 130V switch to ON.

RESTRICTED

OPERATION

ITEM NO

SS.8 continued.

- (2) (f) (v) Re-check for resonance.
- (vi) Repeat this procedure until resonance is achieved.
- (g) Set the Receiver and Transmitter Pre-Amplifier and Power Amplifier indexing heads to 385 MHz and the Spectrum Generator to 360 MHz. Repeat operation (f) adjusting the first sector of each vane.
- (h) Repeat operation (f) at 395 MHz and 385 MHz (370 MHz and 360 MHz for the Spectrum Generator) until resonance is achieved on both frequencies by adjustment of the first capacitor sector.
- (j) Carry out operations (f) to (h) inclusive, at each pair of frequencies which use the same rotor vane sector, i.e., from second to ninth as shown in TABLE 2.

TABLE 2

Spectrum Generator	Rx and Tx Pre-Amp Power Amplifier	Rotor Vane Sector
350 MHz	375 MHz	2nd
340	365	2nd
330	355	3rd
320	345	3rd
310	335	4th
300	325	4th
290	315	5th
280	305	5th
270	295	6th
260	285	6th
250	275	7th
240	265	7th
230	255	8th
220	245	8th
210	235	9th
200	225	9th

OPERATIONITEM NO

SS.8 continued.

(3) Power Amplifier Anode Circuit Tracking.

NOTE: The anode tank capacitor is similar to the grid capacitor and must be adjusted in a similar way. See NOTE to operation (2).

WARNING: The following alignment requires the application of H.T. (425V) to the Power Amplifier and caution must be exercised.

- (a) Ensure that modules are secured to their respective test fixtures as detailed in operation (1) (a).
- (b) Set the Power Amplifier indexing head to 225 MHz, rotating the head in the direction of the arrow adjacent to the thumbwheel.
- (c) Remove the module top cover and set C615 adjusting screw for a gap between the capacitor plate and V603 anode clamp of between 0.010 inch and 0.013 inch. Replace the top cover.
- (d) Carry out operations (1)(b) to (1)(1) inclusive.
- (e) Connect the Multimeter CT471, set to the -120V d.c. range, to Test Point V and earth.
- (f) Set the Power Unit 425V Switch to ON and the 425V ADJ control for a Power Unit meter reading of 425 Volts.

NOTE: Throughout the following checks, the voltage at Test Point V should not fall below -15V d.c. If it does, the 425V must be switched off and the preceding items checked until the minimum voltage of -15V is obtained.

- (g) Adjust C627 to peak the Multimeter reading using alignment tool 5120-99-942-9597.
- (h) Adjust C611 to peak the Multimeter reading.
- (j) Set the Power Amplifier and Receiver Transmitter Pre-Amplifier indexing heads to 395 MHz.

Check the tuning of the Power Amplifier anode circuit by inserting the iron and brass ends of the tuning Wand through the hole, normally covered, on the side of the module, such that the tip of the Wand is adjacent to that portion of the inductance arc in the tuned circuit.

RESTRICTED

OPERATION

ITEM NO

SS.8 continued.

(3) (j) contd.

Resonance is indicated by a fall in Multimeter reading when either end of the tuning Wand is inserted.

If the Multimeter reading increases when the iron end of the Wand is inserted, the appropriate sector of the capacitor rotor vane should be set nearer to the stator.

If the Multimeter reading increases when the brass end of the Wand is inserted, the appropriate sector of the capacitor rotor vane should be set further from the stator.

(k) The anode tank capacitor has two sectorised vanes, each vane comprising nine sectors. One sector of each vane is in mesh with the stator vane on 395 MHz and these rotor sectors must be adjusted to achieve resonance. If adjustment of the tank circuit is necessary proceed as follows:-

(i) Set the Power Unit 425V switch to OFF and rotate the Power Amplifier indexing head until the appropriate sector is adjacent to the access hole.

(ii) Adjust each rotor vane by a similar amount in the appropriate direction using tool 5120-99-120-0367.

(iii) Reset the Indexing head to 395 MHz and set the 425V switch to ON.

Re-check for resonance.

(iv) Repeat this procedure until resonance is achieved.

(l) Set the Receiver and Transmitter Pre-Amplifier and Power Amplifier indexing heads to 385 MHz, and the Spectrum Generator indexing head to 360 MHz. Repeat operations (j) and (k) again adjusting the first sector of each vane.

(m) Repeat operations (j) and (k) on 395 MHz and 385 MHz, (370 MHz and 360 MHz for the Spectrum Generator) until resonance is achieved on both frequencies by adjustment of the first capacitor sector.

(n) Repeat operation (j) to (m) for each pair of frequencies using the appropriate rotor vane sector, i.e. from second to ninth as given in TABLE 3.

OPERATIONITEM NO

SS.8 continued.

(3)

TABLE 3

Spectrum Generator	Channel	Rotor Vane Sector in Use
350 MHz	375 MHz	2nd
340	365	2nd
330	355	3rd
320	345	3rd
310	335	4th
300	325	4th
290	315	5th
280	305	5th
270	295	6th
260	285	6th
250	275	7th
240	265	7th
230	255	8th
220	245	8th
210	235	9th
200	225	9th

(o) Set the 425V switch to OFF.

(p) Repeat operations (1)(d) to (1)(1) inclusive.

(q) Adjust C627 to peak the Wattmeter CT419 reading.

(4) Final Tracking.

(a) With the Wattmeter CT419, set to the 25 Watt range, connected to J602 and the 425V supply switched on and adjusted, carry out the checks detailed in the grid circuit tracking Op.(2), followed by adjustment of C611 at 399.9 MHz as detailed in (2) (a) to (2) (c) inclusive.

(b) Repeat operation (a) until no further improvement can be obtained in the Multimeter reading at Test Point V. This reading should not fall below -20V d.c. for any setting of the indexing heads given in TABLE 3. The power output on any channel should not fall below 12 Watts.

RESTRICTED

ITEM NO.

OPERATION

SS 9 20-30 MHz AMPLIFIER 5821-99-942-8557

(1) Functional Check

(a) Preliminary Tests

- (i) Secure the module to Test Set Amplifier 6625-99-999-4424. Connect the microdot leads to the appropriate microdot sockets using the shortest available extension leads and adaptors if necessary.
- (ii) Disconnect J1516 and J1518 from the Test Set. Connect Test Set J1516 and J1518 together. Connect Signal Generator, CT452A, to SIG. GEN. socket on rear of Test Set.
- (iii) Ensure that all Power Unit switches are in the OFF position and the voltage adjustment controls fully counter clockwise. Connect the Test Set Amplifier to one of the Power Unit OUTPUT sockets using connector 5995-99-932-4017.
- (iv) Set the Power Unit SUPPLY, 27.5V, 130V and BIAS switches to ON, and 130V ADJ, and BIAS ADJ. controls for Power Unit meter readings of 130V and 0V respectively. Allow a 5 minute warm up period.
- (v) Set the Test Set Amplifier indexing head to 20.7 MHz and the OSC. FREQUENCY switch to 22.55. Set the HT switch to ON and the TRANSMIT/RECEIVE switch to RECEIVE.
- (vi) Connect the Multimeter CT 471, set to the -12V d.c. range between the Test Set Amplifier XTAL CHECK test point and earth. Set the 1.85 MHz CRYSTAL switch to ON. The Multimeter reading should be not less than 2.5V.
- (vii) Disconnect the Multimeter and reconnect it, set to the -0.4V d.c. range, between the Test Set Amplifier METER test point and earth.
- (viii) Set the Signal Generator to approximately 1.85 MHz and the output level to 60 uV unmodulated.

ITEM NO.OPERATION

SS.9 (Contd)

(1) (a) (Contd)

- (ix) With the headset connected to the Test Set Amplifier PHONE socket, set the 1.85 MHz CRYSTAL switch to ON and tune the Signal Generator for zero beat in the phones. Release the CRYSTAL Switch and note the Multi-meter reading for use in Sub Item (e) (xi).
- (x) Disconnect the microdot lead connecting J1516 and J1518 on the Test Set. Connect module microdot leads J1516 and J1518 to their respective sockets on the Test Set Amplifier.

(b) Transmitter Oscillator

- (i) Connect the Multimeter CT 471, set to the -12V d.c. range, between test point U and earth. Set the TRANSMIT/RECEIVE Switch to TRANSMIT and check that the Multimeter reading is not less than 2.8V Switch to RECEIVE.

(c) Injection Oscillator Amplifier

- (i) Adjust the Power Unit BIAS ADJ. control for a Power Unit meter reading of 30V.
- (ii) Connect the Multimeter CT 471, set to -12V d.c. range, between Test Set Amplifier OSC CHECK test point and earth. Adjust the OSC DRIVE control for a Multimeter reading of 2.5V.
- (iii) Disconnect the Multimeter and reconnect it set to -1.2V d.c. range between test point L and earth. Note the Multimeter reading.
- (iv) Repeat Sub Items (c) (i) to (c) (iii) inclusive with the indexing head at 25.5 MHz, OSC FREQUENCY to 27.35 and indexing head at 29.7 MHz, OSC. FREQUENCY to 31.55. The Multimeter readings should not be less than 0.6V and within 0.4V of each other.

ITEM NO.OPERATION

SS.9 (Contd)

(1) (Contd)

(d) Transmitter Second 1F Performance

- (i) Set the indexing head to 20.7 MHz and OSC. FREQUENCY to 22.55.
- (ii). Connect the Multimeter, set to the -4V d.c. range, between the Test Set METER test point and earth.
- (iii) Set the TRANSMIT/RECEIVE Switch to TRANSMIT and note the Multimeter reading.
- (iv) Repeat operation (ii) with the indexing head at 25.5 MHz, OSC. FREQUENCY to 27.35 and indexing head at 29.7 MHz, OSC. FREQUENCY to 31.55.
- (v) The Multimeter readings should not be less than 1.5V and with 0.4V of each other.

(e) Signal Plus Noise/Noise Ratio and Gain

- (i) Set the indexing head to 20.7 MHz and OSC. FREQUENCY to 22.55.
- (ii) Connect the Multimeter, set to a suitable a.c. range, between the Test Set Amplifier AUDIO test point and earth.
- (iii) Set the Power Unit BIAS ADJ. control for a Power Unit meter reading of -10V.
- (iv) Set the Signal Generator output to 20.7 MHz at 20 uV.
- (v) Set the 1.85 MHz CRYSTAL switch to ON and tune the Signal Generator for zero beat in the phones. Release the 1.85 MHz CRYSTAL Switch and disconnect the headset.
- (vi) Set the Signal Generator to 1 kHz 30% modulation and adjust the OSC. DRIVE control to give a suitable Multimeter indication. Note this reading.
- (vii) Switch OFF the Signal Generator modulation and ensure that Multimeter reading drops by at least 12 dB, i.e. to one quarter of the reading obtained at Sub Item (e) (vi).

ITEM NO.OPERATION

SS.9 (Contd)

◀ (1) (e) (Contd).

- (viii) Connect the Multimeter, set to the -12V d.c. range between the Test Set Amplifier OSC CHECK test point and earth. Adjust the OSC. DRIVE control for a Multimeter reading of 3.5V.
- (ix) Connect the Multimeter, set to -1.2V d.c. range, between the Test Set Amplifier METER test point and earth.
- (x) With the headset connected to the Test Set Amplifier PHONE socket, set the 1.85 MHz CRYSTAL Switch to ON and tune the Signal Generator for zero beat in the phones. Release the 1.85 MHz CRYSTAL Switch.
- (xi) Adjust the Signal Generator output, unmodulated to give the same Multimeter reading as that obtained in Sub Item (1) (a) (ix). The Signal Generator output should not exceed 12 uV.
- (xii) Repeat Sub Items (1) (e) (ii) to (xi) inclusive with the indexing head set at 25.5 MHz, OSC. FREQUENCY switch at 27.35 and Signal Generator at 25.5 MHz.
- (xiii) Repeat Sub Items (1) (e) (ii) to (xi) inclusive with the indexing head at 29.7 MHz, OSC. FREQUENCY switch to 31.55 and Signal Generator at 29.7 MHz.
- (xiv) At the Power Unit set SUPPLY, 27.5V, 130V and BIAS switches to OFF.

(2) Alignment(a) Injection Oscillator Amplifier

- (i) Remove the module side covers and refit the module to the Test Set Amplifier. Connect the microdot leads to their respective sockets on the Test Set Amplifier.
- (ii) Ensure the 130V ADJ. and BIAS ADJ controls on the Power Unit are fully counter clockwise. Set SUPPLY, 27.5V, 130V and BIAS switches to ON and set the 130V ADJ. and BIAS ADJ. controls for Power Unit meter readings of 130V and 0V respectively. Allow a 5 minute warm up period. ▶

RESTRICTED

ITEM NO.OPERATION

SS.9 (Contd)

(2) (a) (Contd)

- (iii) Set the Test Set Amplifier indexing head to 20.7 MHz and the OSC. FREQUENCY Switch to 22.5. Set the HT Switch to ON and the TRANSMIT/RECEIVE switch to RECEIVE.
- (iv) Connect the Multimeter, set to the -4V d.c. range, between the Test Set Amplifier OSC. CHECK test point and earth. Adjust the OSC. DRIVE control for a Multimeter reading of 2.5V.
- (v) Connect the Multimeter, set to the -4V range, between test point L and earth. Adjust L209, L210, L211 and L212 to peak the Multimeter reading. Note the reading.
- (vi) Set the indexing head to 29.7 MHz and OSC FREQUENCY switch to 31.55.
- (vii) Connect the Multimeter, set to the -4V d.c. range, between the Test Set Amplifier OSC. CHECK test point and earth. Adjust the OSC DRIVE control for a Multimeter reading of 2.5V.
- (viii) Connect the Multimeter, set to the -12V d.c. range, between test point L and earth. Adjust, using alignment tool 5120-99-942-9599, C236, C241, C245 and C250 to peak the Multimeter (C236 is adjacent to C237 and C241 is adjacent to C243). Note the reading.
- (ix) Repeat Sub Items (2) (a) (iii) to (viii) inclusive, until no further improvement is achieved.
- (x) Set the indexing head to 25.5 MHz and OSC. FREQUENCY switch to 27.35.
- (xi) Connect the Multimeter, set to the -4V d.c. range, between the Test Set Amplifier OSC CHECK test point and earth. Adjust the OSC. DRIVE control for a Multimeter reading of 2.5V.
- (xii) Connect the Multimeter, set to the -12V d.c. range, between test point L and earth. Note the reading.
- (xiii) The Multimeter readings obtained at Sub Items (v), (viii) and (xii) should be not less than 0.6V and not differ by more than 0.4V. ▶

ITEM NO.OPERATION

SS.9 (Contd)

◀ (b) 1.F. Amplifier - Receiver

- (i) Set the Test Set Amplifier indexing head to 20.7 MHz and the OSC. FREQUENCY Switch to 22.5. Connect the Multimeter, set to the -4V d.c. range, between the Test Set Amplifier OSC. CHECK test point and earth. Adjust the OSC. DRIVE control for a Multimeter reading of 2.5V.
- (ii) Connect the Multimeter, set to the -1.2V d.c. range, between the METER test point and earth on the Test Set Amplifier.
- (iii) Connect a Signal Generator, CT 452A, output to the SIG. GEN. socket on the back of the Test Set Amplifier.
- (iv) Tune the Signal Generator about 20.7 MHz unmodulated, to peak the Multimeter reading, keeping this reading below 0.5V by adjustment of the Signal Generator output level.
- (v) Connect the headset to the PHONES socket of the Test Set Amplifier. Set the 1.85 MHz CRYSTAL Switch to ON and tune the Signal Generator for zero beat in the phones. Release the 1.85 MHz CRYSTAL switch.
- (vi) Adjust L201 to L206 inclusive, in turn, to peak the Multimeter reading, keeping the reading below 0.5V by adjustment of the Signal Generator output level.
- (vii) Set the indexing head to 29.7 MHz and the OSC FREQUENCY Switch to 31.55.
- (viii) Connect the Multimeter, set to -4V d.c. range, between the OSC. CHECK test point and earth on the Test Set Amplifier and adjust the OSC. DRIVE control for a reading of 2.5V.
- (ix) Tune the Signal Generator about 29.7 MHz, unmodulated, to peak the Multimeter reading, keeping this reading below 0.5V by adjusting the Signal Generator output level. ▶

RESTRICTED

ITEM NO.OPERATION

SS.9 (Contd)

(2) (b) (Contd)

- (x) Set the 1.85 MHz CRYSTAL switch to ON and tune the Signal Generator for zero beat in the phones. Release the 1.85 MHz CRYSTAL switch.
- (xi) Connect the Multimeter, set to the -1.2V d.c. range, between the METER test point and earth on the Test Set Amplifier.
- (xii) Adjust C202, C207, C211, C217, C221 and C226 to peak the Multimeter reading, keeping the reading below 0.5V by adjustment of the Signal Generator output level. (C202 is adjacent to C203 and C207 is adjacent to R202).
- (xiii) Repeat Sub Items (2) (b) (i) to (xii) inclusive, until no further improvement is achieved.
- (xiv) Set the indexing head to 20.7 MHz and the OSC FREQUENCY switch to 22.55.
- (xv) Repeat Sub Items (2) (b) (iv) and (v).
- (xvi) Adjust the Signal Generator output to obtain a Multimeter reading of 0.5V. Note the Signal Generator output level.
- (xvii) Repeat Sub Items (2) (b) (iv), (v) and (xvi) with the indexing head set to 25.5 MHz, OSC FREQUENCY switch to 27.35 and Signal Generator at 25.5 MHz. Also with the indexing head set to 29.7 MHz OSC. FREQUENCY switch to 31.55 and Signal Generator at 29.7 MHz.
- (xviii) The Signal Generator output levels noted at Sub Item (2) (b) (xvi) for the three frequencies, should not differ by more than 4dB.

(c) 1.F. Amplifier - Transmit

- (i) Repeat Sub Item (2) (b) (i)
- (ii) Connect the Multimeter, set to the -12V d.c. range, between the METER test point and earth on the Test Set Amplifier.
- (iii) Repeat Sub Item (2) (b) (v).
- (iv) Set the TRANSMIT/RECEIVE switch to TRANSMIT and note the Multimeter reading.

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SS.9 (Contd)

◀ (2) (c) (Contd)

- (v) Set the indexing head to 29.7 MHz and the OSC. FREQUENCY switch to 31.55.
- (vi) Connect the Multimeter, set to the -4V d.c. range, between the OSC. CHECK test point and earth on the Test Set Amplifier. Set the OSC. DRIVE Control for a Multimeter reading of 2.5V.
- (vii) Repeat Sub Items (2) (c) (iii) and (iv).
- (viii) The Multimeter readings obtained at Sub Items (2) (c) (iv) and (vii) should be greater than 1.5V and differ by not more than 0.4V.
- (ix) At the Power Supply Unit set SUPPLY, 27.5V, 130V and BIAS switches to OFF.
- (x) Remove the module from the Test Set Amplifier and lock inductors and capacitors with varnish oil, 8010-99-947-7836.
- (xi) Replace the module side covers and carry out SS.9 Item (1) Functional Check. ▶

RESTRICTED

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ITEM NO

SS.10 1.85 MHz AMPLIFIER 5821-99-942-8556

(1) Preparation

- (a) Connect the Interconnecting Box 5821-99-999-2643 to Power Unit 5821-99-932-2942 and the 27.5V supply using connectors 5995-99-932-4017 and 5995-99-945-9895.
- (b) Connect the Test Set Amplifier (1.85 MHz) 6625-99-999-2363 to the Interconnecting Box TEST UNIT socket.
- (c) Set the Power Unit 425V, 130V and BIAS switches to OFF and the 425V ADJ, 130V ADJ and BIAS ADJ controls fully counter-clockwise.
- (d) Secure the module under test to the Test Set Amplifier and set the Interconnecting Box MODULE SELECTOR switch to 1.85 MHz.
◀ I.F. Connect P301, sleeve markings J1516, on the module to ▶ SKT 3 on the Test Set Amplifier.
- (e) Set the Power Unit 130V and BIAS switches to ON.
- (f) Connect the Avometer 8, set to the 250V d.c. range, to the Interconnecting Box 130V Test Point and earth. Adjust the Power Unit 130V ADJ control for an Avometer reading of 130V.
- (g) Connect the Avometer 8, set to the -25V d.c. range, to the Interconnecting Box BIAS Test Point and earth.

Set the Power Unit BIAS ADJ control for an Avometer reading of -14V.
- (h) Set the Test Set Amplifier SUPPLY switch to ON and repeat operations (f) and (g).
- (j) Set the Interconnecting Box SENSITIVITY control fully clockwise. Set C339 and C340 in the module counter-clockwise to minimum capacity.

(2) No Signal Conditions.

- (a) A.G.C. - Connect the Multimeter CT471, set to the 1.2V d.c. range, to the Test Set Amplifier A.V.C. Test Point and earth. The Multimeter reading should be between +0.05V and -0.25V.

OPERATIONITEM NO

SS.10 continued.

- (2) (b) Squelch.- Connect the Multimeter, set to the 40V d.c. range to the Test Set Amplifier SQUELCH Test Point and earth. The Multimeter reading should be not less than 13V.
- (c) Aux. Audio.- Connect the Multimeter CT471, set to the 4V a.c. range, to the Test Set Amplifier AUX. AUDIO Test Point and earth. The Multimeter reading should be not more than 1 Volt.
- (d) Main Audio.- Connect the Multimeter, set to the 1.2V a.c. range, to the Test Set Amplifier MAIN AUDIO Test Point and earth. The Multimeter reading should be not more than 0.13 Volt.
- (3) Signal Conditions.
- (a) Set the Signal Generator CT452 to 1.85 MHz using the Calibrator Frequency. Connect the Signal Generator output to the Test Set Amplifier SIGN. GEN. socket, SKT1.
- (b) Squelch.- Connect the Multimeter CT471, set to the 1.2V d.c. range, to the Test Set Amplifier SQUELCH Test Point and earth.
- (c) Adjust the Signal Generator for zero Multimeter reading. Record the Signal Generator output, it should be not more than 32 μ V.
- (d) Set C339 and C340 fully clockwise. Reset the Signal Generator output for zero Multimeter reading, the Signal Generator output should be not less than 3 dB above the figure noted in operation (c). (i.e. 1.4 times).
- (e) A.G.C. Characteristic.-Set C339 and C340 fully counter-clockwise.
- (f) Connect the Multimeter, set to the -4V d.c. range, to the Test Set Amplifier $\frac{1}{2}$ A.V.C. Test Point and earth.
- (g) Adjust the Signal Generator output for a Multimeter reading of -1 Volt. The Signal Generator output should be not greater than 55 μ V.
- (h) Connect the Multimeter, set to the -4V d.c. range, to the Test Set Amplifier A.V.C. Test Point and earth. Adjust the Signal Generator output for a Multimeter reading of -2V. The Signal Generator output should be not greater than 55 μ V.

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ITEM NO

SS.10 continued.

- (3) (j) Connect the Multimeter, set to a suitable a.c. range, to the MAIN AUDIO Test Point and earth. Set the Signal Generator output to 1 mV, modulated 30% at 1 kHz. Note the Multimeter reading.
- (k) Set the Signal Generator output to 100 mV. The Multimeter reading should rise by not more than 10 dB over the reading taken in operation (j) (i.e. 3.2 times). Set the Signal Generator output to 50 μ V, the Multimeter reading should fall by not more than 1 dB below that obtained in operation (j) (i.e. 0.9 times).
- (l) Squelch Output.- Connect the Multimeter, set to the -4V d.c. range to the Test Set Amplifier $\frac{1}{2}$ A.V.C. Test Point and earth. Set the Signal Generator output, unmodulated, for a Multimeter reading of -1 Volt.
- (m) Connect the Multimeter, set to the -4V d.c. range, to the CARRIER SQUELCH Test Point and earth. The Multimeter reading should be between -1.5V and -2.5V.
- (n) Aux. Audio.- Connect the Multimeter, set to the -4V d.c. range to the Test Set Amplifier $\frac{1}{2}$ A.V.C. Test Point and earth. Set the Signal Generator output, modulated 30% at 1 kHz, to give a Multimeter reading of -1 Volt.
- ◀ (o) Connect the Multimeter, set to the 1.2V a.c. range, to the Test Set Amplifier AUX AUDIO Test Point and earth. The Multimeter reading should be between 3V and 4V. ▶
- (p) Main Audio.- Set the Signal Generator output to 50 μ V, modulated 30% at 1 kHz. Connect the Multimeter, set to the 4V a.c. range, to the Test Set Amplifier MAIN AUDIO Test Point and earth. Record the Multimeter reading, it should be not less than 1 Volt.
- (q) Switch off the Signal Generator modulation and set the Multimeter to the 1.2V a.c. Range. The Multimeter reading should be less than one tenth of that obtained in operation (p).
- (r) Limiting.- Connect the Multimeter, set to the -4V d.c. range, to the Test Set Amplifier $\frac{1}{2}$ A.V.C. Test Point and earth. Set the Signal Generator output, modulated 30% at 1 kHz for a Multimeter reading of -1 Volt.
- (s) Connect the Oscilloscope CT484 to the MAIN AUDIO Test Point and earth, adjust the Oscilloscope for a suitable display.

ITEM NOOPERATION

SS.10 continued.

- (3) (s) Increase the Signal Generator Modulation depth until amplitude Contd. limiting of the Oscilloscope waveform just commences. The Signal Generator modulation level should be between 40% and 65%.

Disconnect the Oscilloscope.

- (t) Bandwidth: Set the Signal Generator output, modulated 30% at 1kHz to give a Multimeter reading of -1 Volt.

Connect the Multimeter set to the 4V d.c. range to the CARRIER SQUELCH Test Point and earth. Record the Multimeter reading as the reference level for the bandwidth checks.

- (u) Increase the Signal Generator output by 6 dB and offset the frequency below 1.85 MHz until the Multimeter reading falls to the reference level. The Signal Generator frequency, measured with a CT488, should be at least 40 kHz below 1.85 MHz.
- (v) Offset the Signal Generator frequency above 1.85 MHz until the Multimeter reading again falls to the reference level. The Signal Generator frequency, measured with the CT488, should be at least 40 kHz above 1.85 MHz. The difference between this and the frequency measured in operation (t) should be at least 90 kHz.
- (w) Squelch Characteristic:- Set the Multimeter range switch to 12V d.c. Reset the Signal Generator to 1.85 MHz and reconnect the output to SKT1. Adjust the Signal Generator output for a Multimeter reading of +6.5 Volts. The Signal Generator output should be not greater than 15 μ V.
- (x) Set the Interconnecting Box SENSITIVITY control fully counter-clockwise and re-set the Signal Generator output for a Multimeter reading of +6.5V. The Signal Generator output should be not less than 25 μ V. Readings of the order of 30mV may be obtained.

RESTRICTED

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ITEM NO

SS.11 AUDIO AMPLIFIER 5821-99-942-8555

NOTE: This item does not apply to units modified for use with Radio Relay.

(1) Preparation.

- (a) Connect the Interconnecting Box 5821-99-999-2643 to the Power Unit 5821-99-932-2942 and to the 27.5V d.c. supply, using connectors 5995-99-932-4017 and 5995-99-945-9895.
- (b) Set the Power Unit 425V, 130V and BIAS switches to OFF and the 130V ADJ, 425V ADJ and BIAS ADJ controls fully counter-clockwise.
- (c) Secure the Audio Amplifier module to the Test Set Amplifier, 6625-99-999-2366, and connect the Test Set Amplifier to the Interconnecting Box TEST UNIT socket using connector 6150-99-999-8159.
- (d) Connect the Signal Generator CT433 output to the Interconnecting Box A.F. INPUT terminals.
- (e) Set the Module Selector switch to AUDIO.
- (f) Remove the module side covers and disable the squelch by connecting a jumper link between pins 2 and 4 of V402 (Sig./Noise Squelch) or between pins 7 and 4 of V402 (Carrier Squelch) as applicable.
- (g) Connect the Wattmeter A.F., set to 50 ohms impedance, to the Interconnecting Box A.F. OUTPUT terminals.
- (h) Set R407, R415, R418 and R425 on the module fully clockwise.
- (j) Set the Power Unit 130V and 27.5V switches to ON and the 130V ADJ control for a Power Unit meter reading of 130V.
- (k) Set the Test Set Amplifier SUPPLY switch to ON. Connect the Avometer, set to the 250V d.c. range, to the Interconnecting Box 130V and EARTH Test Points. Readjust the Power Unit 130V ADJ control for an Avometer reading of 130V.

- | <u>ITEM NO.</u> | <u>OPERATION</u> |
|-----------------|------------------|
|-----------------|------------------|
- SS.11 contd.
- (2) Main Audio.
- (a) Set the Interconnecting Box AUDIO selector to MAIN, if disabled as in operation (f), or to MAIN + AUX. if not disabled but connected for Signal/noise squelch. Set the S/N THRESHOLD and MAIN potentiometers fully clockwise and the SIDETONE and GUARD potentiometers approx. mid-position.
 - (b) Set the Signal Generator CT433 frequency to 1 kHz and the output to give a Wattmeter reading of 250 mW. The Signal Generator output, measured with a Multimeter CT471, set to the 1.2V a.c. range and connected at the Signal Generator output terminals should be not more than 1 Volt.
- (3) Sidetone Audio.
- (a) Set the Interconnecting Box AUDIO selector to SIDETONE. Set the S/N THRESHOLD and SIDETONE potentiometers fully clockwise and the MAIN and GUARD potentiometers approx. mid-position.
 - (b) Set the Signal Generator Output to give a Wattmeter reading of 250 mW.

The Signal Generator output, measured with the Multimeter CT471, set to the 4Va.c. range, should be not greater than 1.5 Volts.
- (4) Guard Audio.
- (a) Set the Interconnecting Box AUDIO selector to GUARD. Set the S/N THRESHOLD and GUARD potentiometers fully clockwise and the MAIN and SIDETONE potentiometers approx. mid-position.
 - (b) Set the Signal Generator output to give a Wattmeter reading of 250 mW.

The Signal Generator output, measured with the Multimeter CT471, set to the 12V d.c. range, should be not greater than 5 Volts.
- (5) AUX Audio and Signal/Noise Squelch.
- (a) Set the Interconnecting Box AUDIO selector to AUX. Set the S/N THRESHOLD, MAIN, GUARD and SIDETONE potentiometers fully clockwise.
 - (b) Using the Multimeter CT471 connected to the output terminals, set the Signal Generator output to 3 Volts.
 - (c) Reconnect the Multimeter, set to the 4V a.c. range, to the Test Set Amplifier AUX AUDIO Test Point and earth. The Multimeter reading should be not less than 0.9 Volts.

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ITEM NO

SS.11 continued.

- (5) (d) Disconnect the jumper connected in operation (1)(f) and ensure that the links are set for Signal/noise operation.
- (e) Using the Multimeter CT471 connected at the output terminals, set the Signal Generator frequency to 400 Hz and output level to 1 Volt.
- (f) Re-connect the Multimeter, set to the 12V d.c. range, to Test Point R and earth. The Multimeter reading should be not less than 4 Volts.
Readings in the order of 8 Volts may be obtained.
- (g) Set Signal/Noise threshold control, fully counter-clockwise.
- (h) Using the Multimeter CT471 connected at the output terminals, set the Signal Generator frequency to 20 kHz and output level to 1 Volt.
- (j) Reconnect the Multimeter set to the -12V d.c. range to Test Point R and earth. The Multimeter reading should be not less than -4 Volts.
Readings on the order of -8 Volts may be obtained.
- (k) Set R407 fully clockwise.
- (l) Set the Signal Generator frequency to 2 kHz and the output to the level at which the Squelch relay just operates.
Check that adjustment of R407 operates the Squelch relay.

(6) Carrier Squelch.

- (a) Ensure that links are set for carrier squelch operation and that the jumper connected in (1)(f) is disconnected.
- (b) Connect the Multimeter CT471, set to the 12V d.c. range, to the Interconnecting Box CARRIER SQUELCH TEST socket and EARTH.
- (c) Adjust the Interconnecting Box SQUELCH LEVEL control until the Multimeter reading falls below 4 Volts. Press the CARRIER SQUELCH, spring loaded lamp, which should illuminate. Adjust the SQUELCH LEVEL control until the lamp goes out. The Multimeter reading should be between +4 and +6.5 Volts. Note this reading.

OPERATIONITEM NO

SS.11 continued.

- (6) (d) Adjust the SQUELCH LEVEL control until the lamp re-lights. The Multimeter reading should be within 0.5 Volts of that obtained in operation (c) and not less than +4 Volts.

Release the lamp.

SS.12 AUDIO AMPLIFIER 5821-99-942-8555 (Modified for use with Radio Relay, ARI 23182)

(1) Preparation.

- (a) Connect the Interconnecting Box, 5821-99-999-2643, (having MOD. 0740 embodied) to the Power Unit 5821-99-932-2942 and to the 27.5V d.c. supply, using connectors 5995-99-932-4017 and 5995-99-945-9895.
- (b) Set the Power Unit 425V, 130V and BIAS switches to OFF and the 130V ADJ, 425V ADJ and BIAS ADJ controls fully counter-clockwise.
- (c) Secure the Audio Amplifier module to the Test Set Amplifier, 6625-99-999-2366, and connect the Test Set Amplifier to the Interconnecting Box TEST UNIT socket using connector 6150-99-999-8159.
- (d) Connect the Signal Generator CT433 output to the Interconnecting Box A.F. INPUT Terminals.
- (e) Set the Module Selector switch to AUDIO.
- (f) Connect the Wattmeter A.F., set to 50 ohms impedance, to the Interconnecting Box A.F. OUTPUT terminals.
- (g) Set R415, R418 and R425 on the module fully clockwise.
- (h) Set the Power Unit 130V and 27.5V switches to ON and the 130V ADJ control for a Power Unit meter reading of 130V.
- (j) Set the Test Set Amplifier SUPPLY switch to ON. Connect the Avometer, set to the 250V d.c. range, to the Interconnecting Box 130V and EARTH Test Points. Readjust the Power Unit 130V control for an Avometer reading of 130V.

RESTRICTED

OPERATION

ITEM NO

SS.12 continued.

(2) Main Audio.

- (a) Set the Interconnecting Box AUDIO selector to MAIN. Set the MAIN potentiometer fully clockwise and the SIDETONE and GUARD potentiometers approx. mid-position.
- (b) Set the Signal Generator CT433 frequency to 1 kHz and the output to give a Wattmeter reading of 250 mW. The Signal Generator output, measured with a Multimeter CT471, set to the 1.2V a.c. range and connected at the Signal Generator output terminals should be not more than 1 Volt.

(3) Sidetone Audio.

- (a) Set the Interconnecting Box AUDIO selector to SIDETONE. Set the SIDETONE potentiometer fully clockwise and the MAIN and GUARD potentiometers approx. mid-position.
- (b) Set the Signal Generator output to give a Wattmeter reading of 250 mW. The Signal Generator output, measured with the Multimeter CT471, set to the 4V a.c. range, should be not greater than 1.5 Volts.

(4) Guard Audio.

- (a) Set the Interconnecting Box AUDIO selector to GUARD. Set the GUARD potentiometer fully clockwise and the MAIN and SIDETONE potentiometers approx. mid-position.
- (b) Set the Signal Generator output to give a Wattmeter reading of 250 mW. The Signal Generator output, measured with the Multimeter CT471, set to the 12Va.c. range, should be not greater than 5 Volts.

(5) Aux. Audio.

- (a) Set the Interconnecting Box AUDIO selector to AUX. Set the MAIN, GUARD and SIDETONE potentiometers fully clockwise.
- (b) Using the Multimeter CT471 connected to the output terminals, set the Signal Generator output to 3 Volts.
- (c) Reconnect the Multimeter, set to the 4V a.c. range, to the Test Set Amplifier AUX. AUDIO Test Point and earth. The Multimeter reading should be not less than 0.9 Volts.

OPERATIONITEM NO

SS. 12 continued.

(6) Carrier Squelch.

- (a) Connect the Multimeter CT471, set to the -12V d.c. range, to the Interconnecting Box CARRIER SQUELCH TEST socket and EARTH.
- (b) Adjust the Interconnecting Box SQUELCH LEVEL control for a Multimeter reading of -3V.

Press the CARRIER SQUELCH spring loaded lamp, which should illuminate. Adjust the SQUELCH LEVEL control until the lamp goes out. The Multimeter reading should be not less than -1 Volt.

SS.13 MECHANICAL DRIVE UNIT

- (1) Connect the Interconnecting Box 5821-99-999-2643 to the Power Unit 5821-99-932-2942 and to the 27.5V d.c. supply using connectors 5995-99-932-4017 and 5995-99-945-9895.
- (2) Set the Power Unit 425V, 130V and BIAS switches to OFF and the 130V ADJ, 425V ADJ and BIAS ADJ controls fully counter-clockwise.
- (3) Secure the Mechanical Drive Unit to the Test Set Tuning Unit 6625-99-999-2644.
- (4) Connect the Test Set Tuning Unit to the Interconnecting Box MECHANICAL DRIVE plug.
- (5) Set the Interconnecting Box MODULE SELECTOR switch to MECH. DRIVE and the Test Set Tuning Unit SUPPLY switch to ON.
- (6) Set the Interconnecting Box MECH. DRIVE frequency selector switch to each position in turn. Note that the numbers on the mechanical drive friction drums correspond to the frequency selected at each position, and that after each relay has operated, the appropriate neon flashed momentarily.

NOTE: After testing as above the Mechanical Drive Unit should be reset to 220.0 MHz as follows:-

The Mechanical Drive Unit should be connected to an ARC-52 chassis using two 15 way patch cords. Set the Control Unit function switch to T/R and the manual frequency selectors to 220.0 MHz. Switch off the equipment and re-fit the unit in the chassis.

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SS.14 CONTROL UNIT C1607

- (1) Remove the Control Unit cover and set up the pre-set frequencies given in TABLE 1.

TABLE 1

Channel	Frequency	Channel	Frequency
1	225.0 MHz	10	314.5 MHz
2	235.1	11	320.9
3	246.0	12	335.6
4	254.2	13	341.9
5	267.3	14	355.7
6	275.0	15	362.9
7	288.0	16	375.8
8	295.4	17	383.9
9	309.2	18	399.9

- (2) Rotate the memory drum by means of the CHAN switch so that each set of top contacts in the switch bank is selected in turn. Check the spring pressure of the top contact of each set using Gauge 0274-9436. The pressure should be not less than 15 grammes.

If any contact pressure is less than 15 grammes, slacken the contact bank securing screws and set the contact with the lowest pressure to 15 grammes by applying light pressure to the contact bank. Tighten securing screws and recheck all top contact pressures.

- (3) Visually inspect to ensure that each pair of bottom contacts is not broken when the memory drum stud is in position immediately prior to that of selection.
- (4) Connect Interconnecting Box 5821-99-999-2643 to Power Unit 5821-99-932-2942 using connector 5995-99-932-4017.
- (5) Ensure that the Power Unit 425V, 130V and BIAS switches are OFF. Set the 27.5V d.c. switch to ON.
- (6) Connect the Control Unit to the Interconnecting Box using the 30 way connector.
- (7) Set the Interconnecting Box MODULE selector to CONTROL and the MEGACYCLE switch to 10.

OPERATION

ITEM NO

SS.14 continued.

- (8) Set the Control Unit CHAN switch to M and each manual selector to the blank position. Set the function switch to T/R, the Interconnecting Box SUPPLY lamp should light and remain on during the following checks.
- (9) Set the Control Unit function switch to T/R + G. The G lamp should light.
- (10) Set the Control Unit function switch to A.D.F. The A.D.F. lamp should light and the G lamp should go out. Re-set the function switch to T/R.
- (11) Set the Control Unit hundreds and tens selectors to the settings given in TABLE 2 in turn and check that the Interconnecting Box lamps light as given in the Table.

TABLE 2

Hun-dreds	Tens	Re-Entrant Earth Switch	200	0 or 5	1 or 6	2 or 7	3 or 8	4 or 9	0 to 4
Blank	Blank	Released Pressed	x						x
Blank	0	Released Pressed	x	x	x				x x
B 2	Blank	Released Pressed	x	*x (See note) *x					x
2	0	Released Pressed	x	x	x				x x
2	1	Released Pressed	x		x	x			x x
2	2	Released Pressed	x			x	x		x x
2	3	Released Pressed	x				x		x x

cont'd.....

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ITEM NO

SS. 14 continued.

TABLE 2 - (contd.)
Manual hundreds and tens switch tests

Hun- dreds.	Tens	Re-Entrant Earth Switch	200	0 or 5	1 or 6	2 or 7	3 or 8	4 or 9	0 to 4
2	4	Released	x					x	x
		Pressed	x					x	x
2	5	Released	x	x					
		Pressed	x	x	x				x
2	6	Released	x		x				
		Pressed	x		x	x			x
2	7	Released	x			x			
		Pressed	x			x	x		x
2	8	Released	x				x		
		Pressed	x				x	x	x
2	9	Released	x					x	
		Pressed	x				x	x	x
3	0	Released		x					x
		Pressed	x	x	x				x
3	1	Released			x				x
		Pressed	x		x	x			x
3	2	Released				x			x
		Pressed	x			x	x		x
3	3	Released					x		x
		Pressed	x				x	x	x
3	4	Released						x	x
		Pressed	x	x				x	x
3	5	Released		x					
		Pressed	x	x	x				x
3	6	Released			x				
		Pressed	x		x	x			x

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SS.14 continued.

TABLE 2 - (contd.)
Manual hundreds and tens switch tests

Hun-dreds	Tens	Re-Entrant Earth Switch	200	0 or 5	1 or 6	2 or 7	3 or 8	4 or 9	0 to 4
3	7	Released				x			
		Pressed	x			x	x		x
3	8	Released					x		
		Pressed	x				x	x	x
3	9	Released						x	
		Pressed	x				x	x	x

NOTE :- *Owing to a slight change in the shape of the rotor of switch S1804B, which was made after the first 1500 control units were produced, this indication will not appear on all units.

- (12) Set the Interconnecting Box MEGACYCLE switch to 1.0.
Set the C1607 units selector to the positions given in TABLE 3 and check that the Interconnecting Box lamps light as given in the Table.

TABLE 3
Manual units switch tests

Unit	Re-Entrant Earth Switch	200	0 or 5	1 or 6	2 or 7	3 or 8	4 or 9	0 to 4
Blank	Released							
	Pressed	x						x
0	Released		x					x
	Pressed	x	x					x
1	Released			x				x
	Pressed	x		x				x
2	Released				x			x
	Pressed	x			x			x
3	Released					x		x
	Pressed	x				x		x

contd.....

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ITEM NO

SS.14 continued.

TABLE 3 continued

Manual units switch tests

Unit	Re-Entrant Earth Switch	200	0 or 5	1 or 6	2 or 7	3 or 8	4 or 9	0 to 4
4	Released						x	x
	Pressed	x					x	x
5	Released		x					
	Pressed	x	x	x				x
6	Released			x				
	Pressed	x		x	x			x
7	Released				x			
	Pressed	x			x	x		x
8	Released					x		
	Pressed	x				x	x	x
9	Released						x	
	Pressed	x				x	x	x

- (13) Set the Interconnecting Box MEGACYCLE switch to 0.1.
 Set the C1607 decimal selector to the positions given in TABLE 4 and check that the Interconnecting Box lamps light as given in the Table.

TABLE 4

Manual decimals switch tests

Decimal	Re-Entrant Earth Switch	200	0 or 5	1 or 6	2 or 7	3 or 8	4 or 9	0 to 4
Blank	Released							
	Pressed	x						x
0	Released		x					x
	Pressed	x	x					x
1	Released			x				x
	Pressed	x		x				x

ITEM NO

SS. 14 continued.

TABLE 4 continued
Manual decimals switch tests

Decimal	Re-Entrant Earth Switch	200	0 or 5	1 or 6	2 or 7	3 or 8	4 or 9	0 to 4
2	Released				x			x
	Pressed	x			x			x
3	Released					x		x
	Pressed	x				x		x
4	Released						x	x
	Pressed	x					x	x
5	Released		x					
	Pressed	x	x	x				x
6	Released			x				
	Pressed	x		x	x			x
7	Released				x			
	Pressed	x			x	x		x
8	Released					x		
	Pressed	x				x	x	x
9	Released						x	
	Pressed	x				x	x	x

RESTRICTED
OPERATION

ITEM NO

SS. 14 continued.

(14) Set the Control Unit pre-set channel selector and the Inter-connecting Box MEGACYCLE switch, to the positions given in TABLE 5 in turn and check that the lamp light as shown.

TABLE 5
Present channels switch test
(With RE-ENTRANT EARTH switch released)

Channel	Megacycles Switch Position	200	0 or 5	1 or 6	2 or 7	3 or 8	4 or 9	0 to 4
1 225.0 MHz	10	x			x			x
	1.0	x	x					x
	0.1	x	x					x
2 235.1 MHz	10	x				x		x
	1.0	x	x					x
	0.1	x		x				x
3 246.0 MHz	10	x					x	x
	1.0	x		x				x
	0.1	x	x					x
4 254.2 MHz	10	x	x					
	1.0	x					x	x
	0.1	x			x			x
5 267.3 MHz	10	x		x				
	1.0	x			x			
	0.1	x				x		x
6 275.0 MHz	10	x			x			
	1.0	x	x					
	0.1	x	x					x
7 288.0 MHz	10	x				x		
	1.0	x				x		
	0.1	x	x					x
8 295.4 MHz	10	x					x	
	1.0	x	x					
	0.1	x					x	x
9 309.2 MHz	10		x					x
	1.0						x	
	0.1				x			x

cont'd.....

OPERATION

ITEM NO

SS.14 continued.

TABLE 5 continued

Channel	Megacycles Switch Position	200	0 or 5	1 or 6	2 or 7	3 or 8	4 or 9	0 to 4
10 314.5 MHz	10 1.0 0.1		x	x			x	x x
11 320.9 MHz	10 1.0 0.1		x		x		x	x x
12 335.6 MHz	10 1.0 0.1		x	x		x		x
13 341.9 MHz	10 1.0 0.1			x			x x	x x
14 355.7 MHz	10 1.0 0.1		x x		x			
15 362.9 MHz	10 1.0 0.1			x	x		x	x
16 375.8 MHz	10 1.0 0.1		x		x	x		
17 383.9 MHz	10 1.0 0.1					x x	x	x

Contd.....

RESTRICTED
OPERATION

ITEM NO

SS. 14 continued.

TABLE 5 continued

Channel	Megacycles Switch Position	200	0 or 5	1 or 6	2 or 7	3 or 8	4 or 9	0 to 4
18 399.9 MHz	10						x	
	1.0						x	
	0.1						x	
G 243.0 MHz	10	x					x	x
	1.0	x				x		x
	0.1	x	x					x

- (15) Set the Control Unit pre-set channel selector and the Inter-connecting Box MEGACYCLE switch, to the positions given in TABLE 6 in turn. As each position is selected, press the RE-ENTRANT EARTH switch and check that lamps light as indicated in the Table.
Release the RE-ENTRANT EARTH switch.

TABLE 6
Preset channels switch test
(with RE-ENTRANT EARTH switch pressed)

Channel	Megacycles Switch Position	200	0 or 5	1 or 6	2 or 7	3 or 8	4 or 9	0 to 4
1 225.0 MHz	10	x			x			x
	1.0	x	x	x				x
	0.1	x	x					x
2 235.1 MHz	10	x				x		x
	1.0	x	x	x				x
	0.1	x		x				x
3 246.0 MHz	10	x					x	x
	1.0	x	x	x				x
	0.1	x	x					x
4 254.2 MHz	10	x	x	x				x
	1.0	x					x	x
	0.1	x			x			x

Contd....

OPERATION

ITEM NO

SS.14 (15) continued.

TABLE 6 continued

Channel	Megacycles Switch Position	200	0 or 5	1 or 6	2 or 7	3 or 8	4 or 9	0 to 4
5 267.3 MHz	10	x	x	x				x
	1.0	x	x	x	x			x
	0.1	x				x		x
6 275.0 MHz	10	x	x	x	x			x
	1.0	x	x	x				x
	0.1	x	x					x
7 288.0 MHz	10	x	x	x		x		x
	1.0	x	x	x		x		x
	0.1	x	x					x
8 295.4 MHz	10	x	x	x			x	x
	1.0	x	x	x				x
	0.1	x					x	x
9 309.2 MHz	10	x	x	x				x
	1.0	x	x	x			x	x
	0.1	x			x			x
10 314.5 MHz	10	x	x	x				x
	1.0	x					x	x
	0.1	x	x	x				x
11 320.9 MHz	10	x	x	x	x			x
	1.0	x	x					x
	0.1	x	x	x			x	x
12 335.6 MHz	10	x	x	x		x		x
	1.0	x	x	x				x
	0.1	x	x	x				x
13 341.9 MHz	10	x	x	x			x	x
	1.0	x		x				x
	0.1	x	x	x			x	x

Contd.....

RESTRICTED
OPERATION

ITEM NO

SS.14 (15) continued.

TABLE 6 continued

Channel	Megacycles Switch Position	200	0 or 5	1 or 6	2 or 7	3 or 8	4 or 9	0 to 4
14 355.7 MHz	10	x	x	x				x
	1.0	x	x	x				x
	0.1	x	x	x	x			x
15 362.9 MHz	10	x	x	x				x
	1.0	x	x	x	x			x
	0.1	x	x	x			x	x
16 375.8 MHz	10	x	x	x	x			x
	1.0	x	x	x				x
	0.1	x	x	x		x		x
17 383.9 MHz	10	x	x	x		x		x
	1.0	x	x	x		x		x
	0.1	x	x	x			x	x
18 399.9 MHz	10	x	x	x			x	x
	1.0	x	x	x			x	x
	0.1	x	x	x			x	x
G 243.0 MHz	10	x					x	x
	1.0	x				x		x
	0.1	x	x					x

(16) Set the Interconnecting Box AUDIO selector to ATTR and the Control Unit VOL control fully clockwise.

NOTE: Severe overheating and resultant burn out of R1801 will occur if the Interconnecting Box AUDIO selector is left in the ATTR position with the Control Unit VOL control fully counter-clockwise.

(17) Connect the Signal Generator CT433 600 μ output to the Interconnecting Box A.F. INPUT terminals. Set the Signal Generator frequency to 50 Hz and using the Multimeter CT471, set to the 12V a.c. range, adjust the output to 5 Volts.

OPERATIONITEM NO

SS.14 continued.

- (18) Using the Multimeter CT471, check that the voltage at the Interconnecting Box ATTR and EARTH test points is not less than 4.7V r.m.s.

With the Control Unit VOL. control fully counter-clockwise the Multimeter reading should be less than 100 mV r.m.s.

- (19) Set the Interconnecting Box AUDIO selector to some position other than ATTR. Set the Control Unit function switch to OFF. Disconnect the Control Unit and replace the cover.

SS.15 CONTROL UNIT C1607/4

- (1) Remove the Control Unit cover and set up the pre-set frequencies given in TABLE 1.

TABLE 1

Channel	Frequency	Channel	Frequency
1	225.05 MHz	10	119.30 MHz
2	235.10	11	121.55
3	246.05	12	135.60
4	254.20	13	341.95
5	267.35	14	350.70
6	275.00	15	362.95
7	288.05	16	375.80
8	295.40	17	383.95
9	309.25	18	399.90

- (2) Rotate the memory drum by means of the CHAN. switch so that each set of micro-switch cans is depressed in turn. Visually inspect for wear.
- (3) Connect the Interconnecting Box 5821-99-999-2643, Mod. No. 9251/2 incorporated, to the Power Unit 5821-99-932-2942 using connector 5995-99-932-4017.
- (4) Ensure that the Power Unit 425V, 130V and BIAS switches are OFF. Set the 27.5V d.c. switch to ON.
- (5) Connect the Control Unit to the Interconnecting Box using connector 6150-99-999-8159 and to the Test Set Control Unit 6625-99-952-8806 using connector 6625-99-952-8801.

Connect the Test Set Control Unit to the Interconnecting Box using connector 6625-99-952-8802.

RESTRICTED

OPERATION

ITEM NO

SS.15 continued.

- (6) Set the Interconnecting Box MODULE selector to CONTROL and the MEGACYCLE switch to 10.
- (7) Set the Control Unit CHAN. switch to M. Set the Test Set Control Unit CHAN. switch to M and the manual selector to 110.00 MHz.
- (8) Set the Control Unit function switch to T/R, the Interconnecting Box SUPPLY lamp should light and remain on during the following checks.
- (9) Rotate the Control Unit function switch and note that the correct Interconnecting Box and Test Set Control Unit lamps light as given in TABLE 2.

TABLE 2

Function	G	ADF	M Units	VHF	Display	Test Signal	HSR Disable	Signal Converter	HSR
OFF									
T/R			x	x			x	x	x
T/R + G	x		x	x			x	x	x
ADF		x	x	x			x	x	x
DL			x	x	x			x	x
DL/T			x	x	x	x		x	x
T/R ON D/L OFF			x	x			x		x

- (10) Set the Control Unit function switch to T/R and the hundreds and tens selectors as indicated in TABLE 3. Check that the Interconnecting Box and Test Set Control Unit lamps light as given in the Table .

/TABLE 3

OPERATION

ITEM NO

SS.15 (10) continued.

TABLE 3

Hun- dreds	Tens	Re-Entrant Earth Switch	200	0 or 5	1 or 6	2 or 7	3 or 8	4 or 9	0 to 4	M Units	VHF
1	1	Released			x				x	x	x
		Made	x		x	x			x	x	x
1	2	Released				x			x	x	x
		Made	x			x	x		x	x	x
1	3	Released					x		x	x	x
		Made	x				x	x	x	x	x
1	4	Released						x	x	x	
		Made	x	x				x	x	x	
1	5	Released		x						x	
		Made	x	x	x				x	x	
1	6	Released			x					x	
		Made	x		x	x			x	x	
1	7	Released				x				x	
		Made	x			x	x		x	x	
1	8	Released					x			x	
		Made	x				x	x	x	x	
1	9	Released						x		x	
		Made	x	x				x	x	x	
2	0	Released	x						x	x	
		Made	x						x	x	
2	1	Released	x						x	x	
		Made	x						x	x	
2	2	Released	x			x			x	x	
		Made	x			x			x	x	

Contd...

RESTRICTED

OPERATION

ITEM NO

SS.15 (10) continued.

TABLE 3 continued

Hun- dreds	Tens	Re-Entrant Earth Switch	200	0 or 5	1 or 6	2 or 7	3 or 8	4 or 9	0 to 4	M Units	VHF
2	3	Released	x				x		x	x	
		Made	x				x		x	x	
2	4	Released	x					x	x	x	
		Made	x					x	x	x	
2	5	Released	x	x						x	
		Made	x	x	x				x	x	
2	6	Released	x		x					x	
		Made	x		x	x			x	x	
2	7	Released	x			x				x	
		Made	x			x	x		x	x	
2	8	Released	x				x			x	
		Made	x				x	x	x	x	
2	9	Released	x					x		x	
		Made	x	x				x	x	x	
3	0	Released		x					x	x	
		Made	x	x	x				x	x	
3	1	Released			x				x	x	
		Made	x		x	x			x	x	
3	2	Released				x			x	x	
		Made	x			x	x		x	x	
3	3	Released					x		x	x	
		Made	x				x	x	x	x	
3	4	Released						x	x	x	
		Made	x	x				x	x	x	

Contd.....

ITEM NO

OPERATION

SS.15 (10) continued.

TABLE 3 continued

Hun- dreds	Tens	Re-Entrant Earth Switch	200	0 or 5	1 or 6	2 or 7	3 or 8	4 or 9	0 to 4	M Units	VHF
3	5	Released		x						x	
		Made	x	x	x				x	x	
3	6	Released			x					x	
		Made	x		x	x			x	x	
3	7	Released				x				x	
		Made	x			x	x		x	x	
3	8	Released					x			x	
		Made	x				x	x	x	x	
3	9	Released						x		x	
		Made	x	x				x	x	x	

(11) Set the Interconnecting Box MEGACYCLE selector to 1.0 and the Control Unit manual selectors to 110.00 MHz.

Set the C1607/4 units selector to the positions given in TABLE 4 and check that the Interconnecting Box and Test Set Control Unit lamps light as indicated in the Table.

TABLE 4

Units	Re-Entrant Earth Switch	200	0 or 5	1 or 6	2 or 7	3 or 8	4 or 9	0 to 4	M Units	VHF
0	Released		x					x	x	x
	Made	x	x					x	x	x
1	Released			x				x	x	x
	Made	x		x				x	x	x
2	Released				x			x	x	x
	Made	x			x			x	x	x

Contd... . . .

RESTRICTED

OPERATION

ITEM NO

SS.15 continued.

TABLE 4 continued.

Units	Re-Entrant Earth Switch	200	0 or 5	1 or 6	2 or 7	3 or 8	4 or 9	0 to 4	M Units	VHF
3	Released					x		x	x	x
	Made	x				x		x	x	x
4	Released						x	x	x	x
	Made	x					x	x	x	x
5	Released		x						x	x
	Made	x	x	x				x	x	x
6	Released			x					x	x
	Made	x		x	x			x	x	x
7	Released				x				x	x
	Made	x			x	x		x	x	x
8	Released					x			x	x
	Made	x				x	x	x	x	x
9	Released						x		x	x
	Made	x				x	x	x	x	x

- (12) Set the Interconnecting Box MEGACYCLE selector to 0.1 and the Control Unit manual selectors to 110.00 MHz.

Set the C1607/4 decimals selector to the positions given in TABLE 5 and check that the Interconnecting Box and Test Set Control Unit lamps light as indicated in the Table.

/TABLE 5

OPERATION

ITEM NO

SS.15 (12) continued

TABLE 5

Decimals	Re-Entrant Earth Switch	200	0 or 5	1 or 6	2 or 7	3 or 8	4 or 9	0 to 4	M Units	Dec .00/.05	VHF
0.00	Released		x					x	x		x
	Made	x	x					x	x		x
0.05	Released		x					x	x	x	x
	Made	x	x					x	x	x	x
0.10	Released			x				x	x		x
	Made	x		x				x	x		x
0.15	Released			x				x	x	x	x
	Made	x		x				x	x	x	x
0.20	Released				x			x	x		x
	Made	x			x			x	x		x
0.25	Released				x			x	x	x	x
	Made	x			x			x	x	x	x
0.30	Released					x		x	x		x
	Made	x				x		x	x		x
0.35	Released					x		x	x	x	x
	Made	x				x		x	x	x	x
0.40	Released						x	x	x		x
	Made	x					x	x	x		x
0.45	Released						x	x	x	x	x
	Made	x					x	x	x	x	x
0.50	Released		x						x		x
	Made	x	x	x				x	x		x

Contd.....

ITEM NO
SS.15(12) continued.

RESTRICTED
OPERATION

TABLE 5 continued

Decimals	Re-Entrant Earth Switch	200	0 or 5	1 or 6	2 or 7	3 or 8	4 or 9	0 to 4	M Units	Dec .00/.05	VHF
0.55	Released		x						x	x	x
	Made	x	x	x				x	x	x	x
0.60	Released			x					x		x
	Made	x		x	x			x	x		x
0.65	Released			x					x	x	x
	Made	x		x	x			x	x	x	x
0.70	Released				x				x		x
	Made	x			x	x		x	x		x
0.75	Released				x				x	x	x
	Made	x			x	x		x	x	x	x
0.80	Released					x			x		x
	Made	x				x	x	x	x		x
0.85	Released					x			x	x	x
	Made	x				x	x	x	x	x	x
0.90	Released						x		x		x
	Made	x	x				x	x	x		x
0.95	Released						x		x	x	x
	Made	x	x				x	x	x	x	x

OPERATIONITEM NO

SS.15 continued.

- (13) Set the Control Unit pre-set channel selector, the Test Set Control Unit Type C 1607/4 pre-set channel selector and the Interconnecting Box Megacycle switch to the positions given in Table 6 in turn and check that the lamps light as shown.

/ TABLE 6

RESTRICTED
OPERATION

SS.15 (13) continued.

TABLE 6

Channel	MEG Switch Position	200	0 or 5	1 or 6	2 or 7	3 or 8	4 or 9	0 to 4	G Tens	M Units	Dec .00/.05	VHF
1	10	x			x			x		x	x	
225.05	1.0	x	x							x	x	
	0.1	x	x					x		x	x	
2	10	x				x		x		x		
235.10	1.0	x	x							x		
	0.1	x		x				x		x		
3	10	x					x	x		x	x	
246.05	1.0	x		x						x	x	
	0.1	x	x					x		x	x	
4	10	x	x							x		
254.20	1.0	x					x	x		x		
	0.1	x			x			x		x		
5	10	x		x						x	x	
267.35	1.0	x			x					x	x	
	0.1	x				x		x		x	x	
6	10	x				x				x		
275.0	1.0	x	x							x		
	0.1	x	x					x		x		
7	10	x				x				x	x	
288.05	1.0	x				x				x	x	
	0.1	x	x					x		x	x	
8	10	x					x			x		
295.40	1.0	x	x							x		
	0.1	x					x	x		x		
9	10		x					x		x	x	
309.25	1.0						x			x	x	
	0.1				x			x		x	x	
10	10			x				x	x	x		x
119.30	1.0						x		x	x		x
	0.1					x		x	x	x		x
11	10				x			x	x	x	x	x
121.55	1.0			x				x	x	x	x	x
	0.1		x					x	x	x	x	x

Contd.....

OPERATION

ITEM NO

SS.15 (13) continued.

TABLE 6 continued

Channel	MEG Switch Position	200	0 or 5	1 or 6	2 or 7	3 or 8	4 or 9	0 to 4	G Tens	M Units	Dec .00/.05	VHF
12	10					x		x	x	x		x
135.60	1.0		x						x	x		x
	0.1			x					x	x		x
13	10						x	x	x	x	x	
341.95	1.0			x				x	x	x	x	
	0.1								x	x	x	
14	10		x						x	x		
350.70	1.0		x					x	x	x		
	0.1				x				x	x		
15	10			x					x	x	x	
362.95	1.0				x			x	x	x	x	
	0.1						x		x	x	x	
16	10				x				x	x		
375.80	1.0		x						x	x		
	0.1					x			x	x		
17	10					x			x	x	x	
383.95	1.0					x		x	x	x	x	
	0.1						x		x	x	x	
18	10						x		x	x		
399.90	1.0								x	x		
	0.1								x	x		
G	10	x					x	x	x			
243	1.0	x						x	x			
	0.1	x	x					x	x			

(14) Set the Control Unit pre-set channel selector and the Inter-connecting Box MEGACYCLE switch, to the positions given in TABLE 7 in turn. As each position is selected, press the RE-ENTRANT EARTH switch and check that lamps light as indicated in the Table. Release the RE-ENTRANT EARTH switch.

/TABLE 7

RESTRICTED

OPERATION

ITEM NO

SS.15 (14) continued.

TABLE 7

Channel	MEG Switch Position	200	0 or 5	1 or 6	2 or 7	3 or 8	4 or 9	0 to 4	G Tens	M Units	Dec .00/.05	VHF
1	10	x			x			x		x	x	
225.05	1.0	x	x	x				x		x	x	
	0.1	x	x					x		x	x	
2	10	x				x		x		x		
235.10	1.0	x	x	x				x		x		
	0.1	x		x				x		x		
3	10	x					x	x		x	x	
246.05	1.0	x	x	x				x		x	x	
	0.1	x	x					x		x	x	
4	10	x	x	x				x		x		
254.20	1.0	x					x	x		x		
	0.1	x			x			x		x		
5	10	x	x	x				x		x	x	
267.35	1.0	x	x	x	x			x		x	x	
	0.1	x				x		x		x	x	
6	10	x	x	x	x			x		x		
275.0	1.0	x	x	x				x		x		
	0.1	x	x					x		x		
7	10	x	x	x		x		x		x	x	
288.05	1.0	x	x	x		x		x		x	x	
	0.1	x	x					x		x	x	
8	10	x	x	x			x	x		x		
295.40	1.0	x	x	x				x		x		
	0.1	x					x	x		x		
9	10	x	x	x				x		x	x	
309.25	1.0	x	x	x			x	x		x	x	
	0.1	x			x			x		x	x	
10	10	x	x	x				x	x	x		x
119.30	1.0	x	x	x			x	x	x	x		x
	0.1	x				x		x	x	x		x
11	10	x	x	x	x			x	x	x	x	x
121.55	1.0	x		x				x	x	x	x	x
	0.1	x	x	x				x	x	x	x	x

OPERATIONITEM NO

SS.15 (14) continued.

TABLE 7 continued

Channel	MEG Switch Position	200	0 or 5	1 or 6	2 or 7	3 or 8	4 or 9	0 to 4	G Tens	M Units	Dec .00/.05	VHF
12	10	x	x	x		x		x	x	x		x
	1.0	x	x	x				x	x	x		x
135.6	0.1	x	x	x				x	x	x		x
13	10	x	x	x			x	x	x	x	x	
	1.0	x		x				x	x	x	x	
341.95	0.1	x	x	x			x	x	x	x	x	
14	10	x	x	x				x	x	x		
	1.0	x	x					x	x	x		
350.70	0.1	x	x	x	x			x	x	x		
15	10	x	x	x				x	x	x	x	
	1.0	x			x			x	x	x	x	
362.95	0.1	x	x	x			x	x	x	x	x	
16	10	x	x	x	x			x	x	x		
	1.0	x	x	x				x	x	x		
375.80	0.1	x	x	x		x		x	x	x		
17	10	x	x	x		x		x	x	x	x	
	1.0	x				x		x	x	x	x	
383.95	0.1	x	x	x			x	x	x	x	x	
18	10	x	x	x			x	x	x	x		
	1.0	x	x	x			x	x	x	x		
399.90	0.1	x	x	x			x	x	x	x		
G	10	x					x	x	x			
	1.0	x				x		x	x			
243.0	0.1	x	x					x	x			

(15) Set the Interconnecting Box AUDIO selector to ATTR and the Control Unit VOL. control fully clockwise.

NOTE: Severe overheating and resultant burn out of R1801 will occur if the Interconnecting Box AUDIO selector is left in the ATTR position with the Control Unit VOL. control fully counterclockwise.

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ITEM NO

SS.15 continued.

- (16) Connect the Signal Generator CT433 600 μ output to the Interconnecting Box A.F. INPUT terminals. Set the Signal Generator frequency to 50 Hz and, using the Multimeter CT471 set to the 12 v a.c. range, adjust the output to 5 Volts.
- (17) Using the Multimeter CT471, check that the voltage at the Interconnecting Box ATTR and EARTH test points is not less than 4.7V r.m.s.
With the Control Unit VOL. control fully counter-clockwise the Multimeter reading should be less than 100 mV r.m.s.
- (18) Set the Interconnecting Box AUDIO selector to some position other than ATTR. Set the Control Unit function switch to OFF.
Disconnect the Control Unit and replace the cover.

SS.16 CONTROL UNIT C1607/7

- (1) Remove the Control Unit C1607/7 cover.
- (2) Connect the Interconnecting Box 5821-99-999-2643, Mod. No. 9251/2 incorporated, to the Power Unit 5821-99-932-2942 using connector 5995-99-932-4017.
- (3) Ensure that the Power Unit 425 v, 130 v and BIAS switches are OFF. Set the 27.5 V d.c. switch to ON.
- (4) Connect the C1607/7 PLA to the Interconnecting Box using connector 6150-99-999-8159.
- (5) Connect the locally manufactured connector to the bench 27.5 V d.c. supply (Fig. 1) with the TAKE COMMAND switch set to OFF.
- (6) Connect the C1607/7 to Control Unit C1607/4 using locally manufactured cable assembly (Fig.1).
- (7) Connect the C1607/4 PLC to Test Set Control Unit 6625-99-952-8806 using connector 6625-99-952-8801.
- (8) Connect the Test Set Control Unit to the Interconnecting Box using connector 6625-99-952-8802.
- (9) Set the Interconnecting Box MODULE selector to CONTROL and the MEGACYCLE switch to 10.
- (10) Set the C1607/7 CHAN. switch to M, the Test Set Control Unit CHAN. switch to M and the C1607/7 manual selector to 110.00 MHz.

OPERATIONITEM NO

SS. 16 continued.

- (11) Set the C1607/4 function switch to T/R, the Interconnecting Box supply lamp should light and remain on during the following checks.
- (12) Rotate the C1607/4 function switch and note that the correct Interconnecting Box and Test Set Control Unit lamps light as given in TABLE 1.

TABLE 1

Function	G	ADF	M Units	VHF	Display	Test Signal	HSR Disable	Signal Converter	HSR
OFF									
T/R			x	x			x	x	x
T/R + G	x		x	x			x	x	x
ADF		x	x	x			x	x	x
DL			x	x	x			x	x
DL/T			x	x	x	x		x	x
T/R ON D/L OFF			x	x			x		x

- (13) Set the C1607/4 function switch to T/R and the hundreds and tens selectors of the C1607/4 as indicated in TABLE 2. Check that the Interconnecting Box and Test Set Control Unit lamps light as given in the Table.

/TABLE 2

RESTRICTED
OPERATION

ITEM NO

SS.16 (13) continued.

TABLE 2

Hundreds	Tens	Re-Entrant Earth Switch	200	0 or 5	1 or 6	2 or 7	3 or 8	4 or 9	0 to 4	M Units	VHF
1	1	Released			x				x	x	x
		Made	x		x	x			x	x	x
1	2	Released				x			x	x	x
		Made	x			x	x		x	x	x
1	3	Released					x		x	x	x
		Made	x				x	x	x	x	x
1	4	Released						x	x	x	
		Made	x	x				x	x	x	
1	5	Released		x						x	
		Made	x	x	x				x	x	
1	6	Released			x					x	
		Made	x		x	x			x	x	
1	7	Released				x				x	
		Made	x			x	x		x	x	
1	8	Released					x			x	
		Made	x				x	x	x	x	
1	9	Released						x		x	
		Made	x	x				x	x	x	
2	0	Released	x						x	x	
		Made	x						x	x	
2	1	Released	x						x	x	
		Made	x						x	x	
2	2	Released	x			x			x	x	
		Made	x			x			x	x	

OPERATION

ITEM NO

SS.16 (13) continued.

TABLE 2 continued

Hundreds	Tens	Re-Entrant Earth Switch	200	0 or 5	1 or 6	2 or 7	3 or 8	4 or 9	0 to 4	M Units	VHF
2	3	Released	x				x		x	x	
		Made	x				x		x	x	
2	4	Released	x					x	x	x	
		Made	x					x	x	x	
2	5	Released	x	x						x	
		Made	x	x	x					x	x
2	6	Released	x		x					x	
		Made	x		x	x				x	x
2	7	Released	x			x				x	
		Made	x			x	x			x	x
2	8	Released	x				x			x	
		Made	x				x	x	x	x	
2	9	Released	x					x		x	
		Made	x	x				x	x	x	
3	0	Released		x					x	x	
		Made	x	x	x					x	x
3	1	Released			x				x	x	
		Made	x		x	x				x	x
3	2	Released				x			x	x	
		Made	x			x	x			x	x
3	3	Released					x		x	x	
		Made	x				x	x	x	x	

Contd.....

RESTRICTED

OPERATION

ITEM NO

SS.16 (13) continued)

TABLE 2 continued

Hundreds	Tens	Re-Entrant Earth Switch	200	0 or 5	1 or 6	2 or 7	3 or 8	4 or 9	0 to 4	M Units	VHF
3	4	Released Made	x x	x x				x x	x x	x x	
3	5	Released Made	x x	x x	x				x	x x	
3	6	Released Made	x x		x x	x			x	x x	
3	7	Released Made	x x			x x	x		x	x x	
3	8	Released Made	x x				x x	x x	x x	x x	
3	9	Released Made	x x	x x				x x	x x	x x	

OPERATIONITEM NO

SS.16 continued.

- (14) Set the Interconnecting Box MEGACYCLE selector to 1.0 and the C1607/4 manual selectors to 110.00 MHz.
Set the C1607/4 units selector to the position given in TABLE 3 and check that the Interconnecting Box and Test Set Control Unit lamps light as indicated in the Table.

TABLE 3

Units	Re-Entrant Earth Switch	200	0 or 5	1 or 6	2 or 7	3 or 8	4 or 9	0 to 4	M Units	VHF
0	Released		x					x	x	x
	Made	x	x					x	x	x
1	Released			x				x	x	x
	Made	x		x				x	x	x
2	Released				x			x	x	x
	Made	x			x			x	x	x
3	Released					x		x	x	x
	Made	x				x		x	x	x
4	Released						x	x	x	x
	Made	x					x	x	x	x
5	Released		x						x	x
	Made	x	x	x				x	x	x
6	Released			x					x	x
	Made	x		x	x			x	x	x
7	Released				x				x	x
	Made	x			x	x		x	x	x
8	Released					x			x	x
	Made	x				x	x	x	x	x
9	Released						x		x	x
	Made	x				x	x	x	x	x

RESTRICTED
OPERATION

ITEM NO

SS.16 continued.

- (15) Set the Interconnectin Box MEGACYCLE selector to 0.1 and the C1607/4 manual selectors to 110.00 MHz.
Set the C1607/4 decimals selector to the positions given in TABLE 4 and check that the Interconnecting Box and Test Set Control Unit lamps light as indicated in the Table.

TABLE 4

Decimals	Re-Entrant Earth Switch	200	0 or 5	1 or 6	2 or 7	3 or 8	4 or 9	0 to 4	M Units	Dec .00/.05	VHF
0.00	Released		x					x	x		x
	Made	x	x					x	x		x
0.05	Released		x					x	x	x	x
	Made	x	x					x	x	x	x
0.10	Released			x				x	x		x
	Made	x		x				x	x		x
0.15	Released			x				x	x	x	x
	Made	x		x				x	x	x	x
0.20	Released				x			x	x		x
	Made	x			x			x	x		x
0.25	Released				x			x	x	x	x
	Made	x			x			x	x	x	x
0.30	Released					x		x	x		x
	Made	x				x		x	x		x
0.35	Released					x		x	x	x	x
	Made	x				x		x	x	x	x
0.40	Released						x	x	x		x
	Made	x					x	x	x		x
0.45	Released						x	x	x	x	x
	Made	x					x	x	x	x	x

Contd.....

OPERATIONITEM NO

SS. 16 (15) continued.

TABLE 4 continued

Decimals	Re-Entrant Earth Switch	200	0 or 5	1 or 6	2 or 7	3 or 8	4 or 9	0 to 4	M Units	Dec .00/.05	VHF
0.50	Released		x						x		x
	Made	x	x	x				x	x		x
0.55	Released		x						x	x	x
	Made	x	x	x				x	x	x	x
0.60	Released			x					x		x
	Made	x		x	x			x	x		x
0.65	Released			x					x	x	x
	Made	x		x	x			x	x	x	x
0.70	Released				x				x		x
	Made	x			x	x		x	x		x
0.75	Released				x				x	x	x
	Made	x			x	x		x	x	x	x
0.80	Released					x			x		x
	Made	x				x	x	x	x		x
0.85	Released					x			x	x	x
	Made	x				x	x	x	x	x	x
0.90	Released						x		x		x
	Made	x	x				x	x	x		x
0.95	Released						x		x	x	x
	Made	x	x				x	x	x	x	x

(16) Set the TAKE COMMAND switch in the locally manufactured connector assembly to ON. Check that the C1607/7 green lamp lights.

(17) Set the Interconnecting Box MEGACYCLE switch to 10 and the C1607/7 hundreds and tens selectors to the positions given in TABLE 2 in turn. Check that the lamps light as indicated in the Table.

RESTRICTED

OPERATION

ITEM NO

SS.16 continued.

- (18) Set the Interconnecting Box MEGACYCLE switch to 1.0 and the C1607/7 manual selector switches to 110.00 MHz.

Set the C1607/7 units selector to the positions given in TABLE 3 and check that the lamps light as indicated in the Table.

- (19) Set the Interconnecting Box MEGACYCLE switch to 0.1 and the C1607/7 manual selectors to 110.00 MHz.

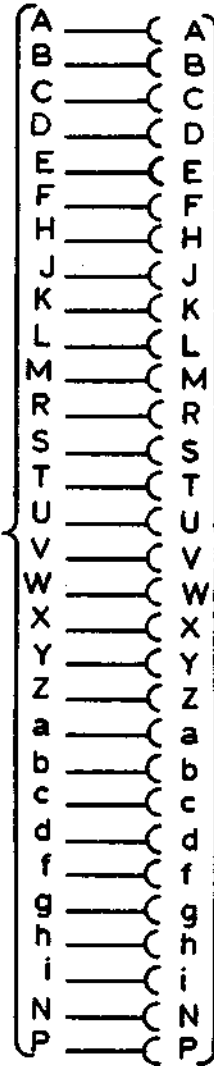
Set the C1607/7 decimals selector to the positions given in TABLE 4 and check that the lamps light as indicated in the Table.

- (20) Set the TAKE COMMAND switch and C1607/4 function switch to OFF. Disconnect the C1607/7 and replace the cover.

5935-99-940-3381
Plug 30 Way
(Cannon)
Plus

5935-99-940-3395
Straight Outlet

Mates with SKT.B
on Control Unit
C160717



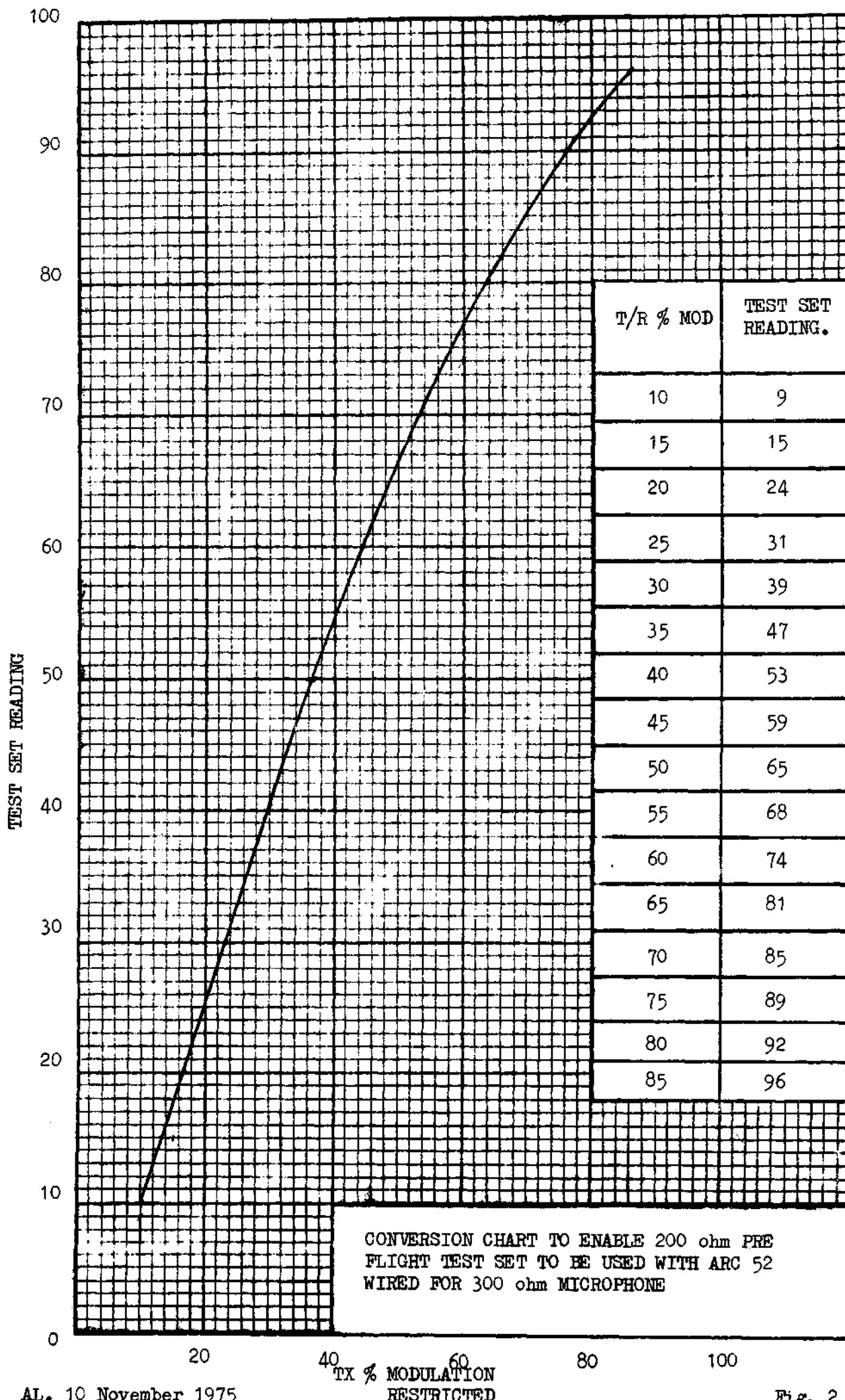
5935-99-940-3382
Socket 30 Way
(Cannon)
Plus

5935-99-940-3395
Straight Outlet

Mates with PL.A
on Control Unit
C160714

→ +28Volts panel light supply

→ 28 Volt neg. & earth



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