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Ref: FOI2019/13453

E-mail: ISS-SecretariatGpMbx@mod.gov.uk

[redacted]

18 December 2019

Dear [redacted],

Thank you for your email of 9 December 2019 requesting the following information:

"I am interested in a copy of the operators manual, maintenance manual, parts lists to include illustrations, and EMERs for the PRC-349 radio."

I am treating your correspondence as a request for information under the Freedom of Information Act 2000 (FOIA).

A search for the information has now been completed within the Ministry of Defence, and I can confirm that all the information in scope of your request is held. The information you have requested can be found attached with this letter; please note there are seven PDF files of documentation.

If you have any queries regarding the content of this letter, please contact this office in the first instance.

If you wish to complain about the handling of your request, or the content of this response, you can request an independent internal review by contacting the Information Rights Compliance team, Ground Floor, MOD Main Building, Whitehall, SW1A 2HB (e-mail CIO-FOI-IR@mod.gov.uk). Please note that any request for an internal review should be made within 40 working days of the date of this response.

If you remain dissatisfied following an internal review, you may raise your complaint directly to the Information Commissioner under the provisions of Section 50 of the Freedom of Information Act. Please note that the Information Commissioner will not normally investigate your case until the MOD internal review process has been completed. The Information Commissioner can be contacted at: Information Commissioner's Office, Wycliffe House, Water Lane, Wilmslow, Cheshire, SK9 5AF. Further details of the role and powers of the Information Commissioner can be found on the Commissioner's website at https://ico.org.uk/.

Yours sincerely,

Defence Digital Secretariat

UK/PRC-349

TECHNICAL HANDBOOK - UNIT REPAIRS

Errata

Note: This Page 0 is to be filed immediately in front of Page 1, Issue 1, dated Apr 77.

1. The following amendments must be made to the regulation.

2. Page 1, para 3, line 5:

   Delete: 'detailed faulty parts'

   Insert: 'discrete items detailed in EMER Tels F606'.

4651/Tels

CONDITIONS OF RELEASE

1. [redacted]

2.

3. [redacted]

4.

UK/PRC-349

TECHNICAL HANDBOOK - UNIT REPAIRS

INTRODUCTION

1. The main purpose of this regulation is to define the scope and extent of permitted Unit repairs and routine servicing necessary to maintain the equipment in a serviceable condition. Instructions are provided to enable appropriate Unit personnel (whether user-arm or attached REME) to perform such tasks.

ASSOCIATED PUBLICATIONS

2. Reference may have to be made to the following associated publications:

a. User handbook, UK/PRC-349	Army code 61646
b. User handbook, Test set audio, radio audio accessories.	Army code 61656
c. User handbook, Condition test set, Clansman radio.	Army code 61655
d. User handbook, Clansman audio accessories.	Army code NYA
e. EMER, Clansman audio accessories.	Tels C 740 to 749

SCOPE OF UNIT REPAIRS

3. The RT-349 is a sealed equipment which must not be opened unless drying and seal-testing facilities are available. Therefore, at Unit level no repairs will be carried out on this equipment other than the replacement of a damaged audio socket dust c[illegible] (5935/5395-99-626-4256). The headset will be repaired by replacement of [illegible]s. The repair policy for the remaining accessories will be by replacement of CES items under normal CES exchange procedures.

The repair

TOOLS AND TEST EQUIPMENT

4. The following tools and test equipment are required at Unit level.

Item	Designation	Part No	Purpose
1	Screwdriver cross point No 1 (pozidrive)	F1/5120-99-122-4571	)
2	Screwdriver instrument	F1/5120-99-910-5875	) Repair of headset
3	Screwdriver instrument	F1/5120-99-910-5871	)
4	Tweezers	F1/5120-99-136-2056	)
5	Condition test set, Clansman radio	Z4/6625-99-620-3592	See para 5
6	Test set audio, radio audio accessaries	Z4/6625-99-620-3593	See para 6

FAULT LOCATION PROCEDURES

Condition test set, Clansman radio

5. The Condition test set provides a means of assessing the task worthiness of the radio. It has facilities for checking:

a. Transmitter output.

b. Side tone

c. Modulation

d. De-modulation

e. Receiver sensitivity

A working radio of the same frequency and mode of modulation is required for checks c, d and e. All the necessary ancillaries and full operating instructions are contained in the test set lid.

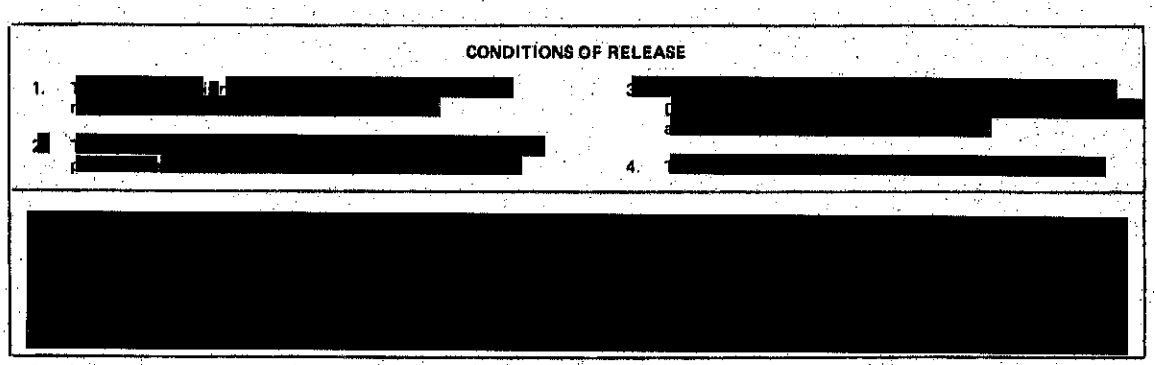
Test set audio, radio audio accessories

6. The audio accessories test set provides a means of assessing the serviceability of the headset by using audio tones for the transmit and receive paths, and meter indications of command currents, full operating instructions are contained within the test set.

Note: Details of the headset (issued as part of the UK/PRC-349 station) will be published shortly in the Clansman audio accessories EMER and User handbook.

END

4651/Tels



UK/PRC 349

TECHNICAL HANDBOOK - FIELD AND BASE REPAIRS

Errata

Sponsor: DGEME

Publications Authority: Electronics Branch REME

File ref: 4651

Notes...

(1) These Pages 0, Issue 2 and 01, Issue 1 supersede Page 0, Issue 1 dated Jun 81 and are to be filed immediately in front of Page 1, Issue 1 dated Jul 77.

(2) The amendments at Para 2 should have been made under previous errata issue but are included here as the information is still current.

1 The following amendments must be made to the regulation.

2 Page 49, Para 94:

2.1 Sub para b.(13), line 1:

Delete: 'Adjust 10aC1 (Rx)'
Insert: 'Adjust 10aC1 to its mid position and then adjust 10aL1 (Rx)'

2.2 Sub para b.(19), line 1:

Delete: 'Adjust 10aC13 (Tx)'
Insert: 'Adjust 10aC13 to its mid position and then adjust 10aL6 (Tx)'

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3 Page 8, Table 2, after item 13:

Insert:	'14	6625-99-622-5474	Probe Assembly	For access to test points on motherboard or synthesiser board 10A through the overlays, part of item 1 and item 8.

4 Page 42, Para 88, after line 13:

Insert: 'Assembly 4 must not be adjusted for optimum r.f. power output.'

UK/PRC-349

TECHNICAL HANDBOOK - FIELD AND BASE REPAIRS

This EMER must be read in conjunction with Tels F 602 which contains figures and tables to which references are made.

CONTENTS

Note: These Pages 3-9/10 supersede Pages 3-9/10 Issue 1 dated Jul 77.
Items marked thus ● have been amended.

FAULT FINDING

TABLES

FIGURES

WARNING

1. In assembly 4 of this equipment, the r.f. transistor heatsink contains beryllium oxide. In certain circumstances it can constitute a hazard to health. Before working on the equipment, consult Gen K 050 - Beryllium Toxic Hazard in Electronic Equipments - which gives general information, handling and disposal instructions.

INTRODUCTION

SCOPE OF REPAIRS

2. This regulation gives repair information for use by Field and Base workshops. Field repair is confined to the replacement of faulty assemblies except for the box assembly and the synthesizer where repair is by replacement of faulty sub-assemblies, mechanical parts and certain discrete components. Base repair is not envisaged, but when equipments are presented to a Base workshop, the level of repair will be to the standard of that at Field level; hence Part 2 (Base repairs) is not published.

SPECIFICATION TESTING, ALIGNMENT AND REPAIR PROCEDURES

3. The procedures contained in Part 1 of this regulation involve the use of the test rig electronic (t.r.e.) and the RT-349 field repair test kit (f.r.t.k). Specification testing of the RT-349 can be carried out with the equipment sealed (lid fitted) or unsealed (lid removed). With the exception of tests 9 and 11, all other specification tests can be carried out with the motherboard, fitted with all assemblies, mounted in the motherboard assembly test jig (item 1, Table 2). All RT-349 alignment procedures may be carried out with the equipment unsealed (lid removed) except the adjustments associated with assembly 10 as given in para 94; access to 3TP1 and 3TP2 is obtained by withdrawing assembly 8. All alignment procedures may also be carried out when the motherboard, fitted with all assemblies, is mounted in the motherboard assembly test jig. When the motherboard and all assemblies is refitted into the box assembly the SET SQU preset control may need to be rechecked.

USE OF AUTOMATIC TEST EQUIPMENT (A.T.E.)

4. Specification testing for inspection purposes will normally be carried out using the a.t.e. The test numbers on the a.t.e. are cross-referenced to the t.r.e. test numbers; details are included in Part 3 of this regulation.

FIELD REPAIR EQUIPMENT

5. The items of test equipment shown in Table 1 are required to carry out the procedures contained in Part 1 of this regulation.

Table 1 - Field repair equipment

Item	Cat No	Designation	Purpose and remarks
1a	Z4/6625-99-620-5350	Test rig electronic equipment test controller No 1	Specification and diagnostic testing of radios
or			
1b	Z4/6625-99-620-5078	Test rig electronic equipment test controller No 2	Either controller requires the peripheral test equipment listed in Tels M 382 para 6
2	Z4/6625-99-642-3437	Modulation meter 9008M	See para 10
3	Z4/6625-99-965-7922	RT-349 field repair test kit (f.r.t.k.)	Fault finding and alignment of RT-349 (open)
4	Z4/6625-99-105-7049	Multimeter set CT498A	Fault finding on RT-349 (open)
5	W3/4440-99-114-0440	Dehumidifier desiccant series 1, Mk 111	Drying
6	Z4/6625-99-200-2271	Leak locator CT509	Seal testing
7	F1/5180-99-120-3922	Tool kit telecom (technician)	General purpose
8	F1/5180-99-445-8208	Tool kit telecom (supplementary)	General purpose
9	F1/3439-99-136-7370	Desoldering set electrical	Removal of assembly 10 sub assembly interconnecting leads

GENERAL REPAIR INFORMATION

INTERNAL IDENTIFICATION BY COLOUR CODING

6. a. White circles are used to identify test-points on the motherboard.

b. Green circles or inscriptions are used to identify screws or controls, on assemblies, which may be removed or adjusted at field repair level.

c. Red circles and inscriptions are used to identify preset controls which should never need to be adjusted.

FIXING OF LABELS

7. The nameplate label and the modification label (recessed) are both self-adhesive by removing the protective backing paper. The serial number should be suitably marked on the nameplate label before fixing to the box of the radio.

REPAINTING

8. At field workshop level, re-touching of damaged surfaces may be carried out, but not repainting. Only the following paints are to be used:

a. H1a/8010-99-224-2079 paint, priming, 1.5 litre pack.

b. H1a/8010-99-224-8663 paint, finishing polyurethane, matt finish, deep bronze green, 1.5 litre pack.

These are two-part paints which must be mixed in the proportions as printed on the package. Do not mix more than is necessary as its 'mixed' life is 8 hours at 20°C or 4 hours at 33°C. Do not apply the paint in conditions of low temperature or high humidity.

TEST RIG, ELECTRONIC (T.R.E.)

9. The t.r.e. is fully described in Tels M 382, and no attempt is made in this regulation to describe t.r.e. functions. Two types of t.r.e. exist, one containing a Schlumberger r.f. signal generator, the other a Racal r.f. signal generator; the differences between the two types are explained in Tels M 382.

10. The modulation meter CT409 is NOT suitable for use with the RT-349. Modulation meter 9008M (Z4/6625-99-642-3437) is a suitable item, and is being provisioned. The information in this regulation assumes the use of the 9008M.

11. When referring to the t.r.e., the following abbreviations are used throughout this document:

Note: These Pages 7 to 10, Issue 3 supersede Pages 7 to 10, Issue 2 dated Sept.78. Item 4 NSN changed & Item 5 deleted in Table 2; ref. 5 deleted in Fig 1; para 20 amended and para 21 deleted on page 9.

Control supply	CS		
Control test conditions	CTC	Audio frequency generator	a.f. gen
Clansman interface	IF(C)	Cathode ray oscilloscope	c.r.o.
Digital voltmeter	d.v.m.	Lower limit	LL
Frequency counter	counter	Upper limit	UL
Equipment-under-test	e.u.t.		
Radio frequency generator	r.f. gen.		
Modulation meter	mod. meter		

12. Controls and terminations (Fig 7) on CS, CTC and IF(C) are referred to by the numbers shown in Tels M 382, Table 2002, e.g. the push on – push off switch marked EUT on Control Test Conditions is referred to as CTC6. Instructions are given as 'Depress (or Release) CT6'. Instructions for rotary switches are given as 'Set CTC1 to CW TX'. Connections to terminations are given as 'Connect CT20 to .....'.

13. This document details the t.r.e. switch settings required to carry out each specific function; for specification testing, each switch position is detailed at the commencement of each test to allow any particular specification test to be carried out in isolation.

14. Range settings of individual test equipment (counter, d.v.m. etc.) are not detailed unless specifically required. Instructions are given as 'd.v.m. shall indicate', and correct operation and range-selection is implied

FIELD REPAIR TEST KIT (F.R.T.K.)

15. When carrying out alignment, fault diagnosis or repairs, the RT349 motherboard, with all assemblies fitted, can be removed from the box assembly (para 36) and inserted into the test jig (item 1, Table 2); refer to para 33 for fitting instructions.

16. Table 2 gives a list of the items contained within the field repair test kit (Fig 1).

Table 2 – Items, f.r.t.k.

Item	Cat. No.	Designation	Purpose and remarks
1	6625-99-649-5580	Motherboard assembly test jig	To enable alignment, fault diagnosis and repair of radio
2	5120-99-649-5581	Assembly extractor tool	To facilitate removal of assemblies from RT349
3	6625-99-649-5582	Antenna adaptor (2off)	BNC antenna connection to RT349

Table 2 (cont'd)

Item	Cat. No.	Designation	Purpose and remarks
4	5935-99-215-7875	Power supply connector (2off)	For use with 8920C
5		Item deleted	
6	6625-99-649-5585	Power supply connector	For use with bench d.c. power supplies. Provides protection against transients, overvoltage (up to 32V) and reverse polarity
7	6625-99-649-5586	Dummy synthesizer cover	Screen cover providing access to preset adjusters
8	6625-99-649-5587	Synthesizer sub assy 10a Overlay	Provides safe access to test points
9		Trimming tools:–	
	5120-99-622-5472	Metal tipped	Adjustment of preset capacitors and resistors
	7520-99-620-6308	Pencil clutch	) Adjustment of preset) inductor cores
	5120-99-649-5588	Plastic tips for pencil clutch	)
10	6625-99-649-6593	Synthesizer-to-motherboard Mechanical alignment jig	Required when fitting an assembly 10 to a motherboard
11	5120-99-649-6594	Mandrel	For replacement of the insert, battery fixing
12	6625-99-649-8719	Motherboard test plug	For access to motherboard test sockets
13	6625-99-649-5605	Carrying case	

17. When the motherboard with all assemblies is fitted into the test jig (item 1, Table 2), the frequency setting switches (FSS) and the system switch (SSW) are controlled by knobs on the test jig, in the same manner as the knobs on the RT349 box assembly. The battery connections (1PL4/5), the audio socket (SK1) and the antenna socket (1SK2) directly replace those on the box assembly and as such are given the same designations.

18. The extractor tool (item 2, Table 2) is used to withdraw assemblies (4 to 9) when the motherboard assembly (3) is fitted into either the RT349 box or the test jig; refer to para 39 for fitting instructions.

19. The antenna adaptor (item 3, Table 2) screws into the antenna socket on either the RT349 radio or the motherboard test jig; it is used to provide the e.u.t. with a 50Ω BNC connection for test equipment.

20. The power lead (item 4 Table 2) is used to connect either an RT349 or motherboard test jig to the output of the 8920C.

21. Paragraph deleted

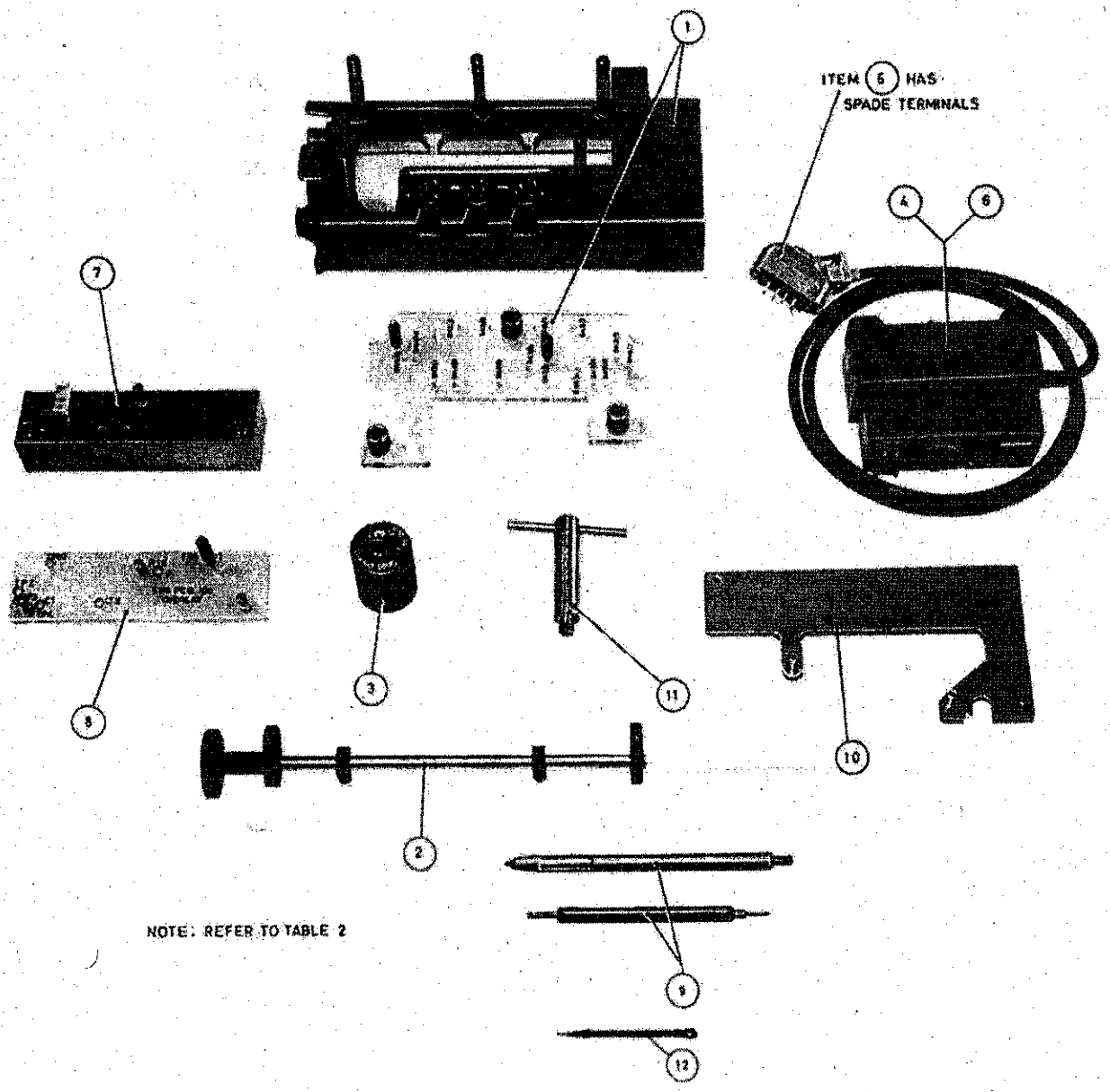


Fig 1 – RT349 field repair test kit

22. The power lead (item 6, Table 2) serves the same purpose as items 4 and 5 but connects to any permitted d.c. supply where protection is not provided against transients, overvoltage and reverse polarity.

23. The dummy synthesizer cover (item 7, Table 2) provides access to preset controls and a test point required for alignment purposes following repair. When alignment is completed, the dummy cover is removed and the normal cover is re-fitted.

24. The synthesizer sub assy 10a overlay (item 8, Table 2) is fitted over the track of board 10a, and provides access to test points in a manner such as to avoid the damaging effects of accidentally applying short-circuits between adjacent tracks etc.

25. The synthesizer/motherboard mechanical alignment jig (item 10, Table 2) is used when re-fitting a synthesizer (assembly 10) to the motherboard following repair.

26. The mandrel is used to replace the insert, battery fixing following removal of a damaged item.

27. The trimming tools consist of a metal-tipped double-ended screwdriver, and a clutch pencil with a 'stick' of plastic-tipped screwdriver inserts. The button at one end of the pencil is pressed in order to open the clutch jaws and fit an insert.

GENERAL REPAIR INSTRUCTIONS

PRELIMINARY TEST

28. A fault condition could exist in an RT-349 causing it to be in a permanent send condition; this may damage the t.r.e., or common purpose test equipment, and hence the preliminary test described in para 67 must be carried out prior to any specification tests or repairs. Also, for the same reason, a headset must not be connected to the radio when using the t.r.e.

DRYING AND SEALING

29. Upon receipt of an RT-349 for repair, proceed as follows:

a. Pressurise the equipment to 5 lbf/in^2 using dry air.

b. Using a leak locator (item 5, Table 1), carry out a dip test in a water tank and, if necessary, replace the appropriate seals or gaskets. The addition of a wetting agent will assist in the detection of leaks.

c. Open the equipment, in the driest possible conditions, and carry out all obvious repairs and replacements.

d. Place the opened equipment in the de-humidifier (T&M N 352); dry out for at least one hour at 50°C with dry air, from the pump, passing through the oven.

e. Following a cooling period, carry out as necessary electrical tests, repairs and re-alignment.

f. As soon as possible, following re-alignment, place the equipment in the oven for 15 minutes at 50°C.

g. Fit a new silica-gel sachet (Z1/4440-99-013-9203).

h. Fit, as required, new gaskets smeared with grease XG271; seal the equipment in its box.

j. Using dry air from the de-humidifier, pressurise the radio to 5 lbf/in^2; repeat the dip test, using the leak locator, and check that no air bubbles appear.

SOLDERING AND DESOLDERING

30. The physical size of the synthesizer (assembly 10) and the close proximity of the adjacent soldered connections requires that extreme care must be taken when desoldering or resoldering. Prolonged application of heat could cause damage to printed-circuit boards, particularly when desoldering.

31. The suction soldering tool must be used for dismantling and desoldering the synthesizer. Select the soldering head which is compatible with the size of joint required. In order to avoid the risk of shorting adjacent pins or track, the bit diameter should not be greater than the 'land' between the pins or track. The suction soldering tool must be carefully maintained. The hole in the bit must be kept clear, and the extracted-solder-sump emptied regularly.

32. In order to provide maximum protection for the l.s.i. module against electrostatic build-up, the soldering iron and suction soldering tool must be properly earthed.

FITTING THE MOTHERBOARD ASSEMBLY INTO THE TEST JIG (PART OF F.R.T.K.)

33. a. Carry out the instructions in para 35 and 36.

b. Set the SSW on the test jig to 0 (off) and FSS knobs on the test jig to 37.00MHz.

c. Gently ease the motherboard assembly into the test jig, observing the following precautions:

(1) Tilt the assembly, slightly, towards the antenna socket pin to ensure satisfactory contact with the spring-connector on assembly 4.

(2) Ensure that the switch shafts engage satisfactorily with the knobs.

(3) Ensure that all the motherboard assembly fixing screws are correctly located before tightening; if necessary, ease the motherboard assembly towards the antenna socket pin, thus compressing assembly 4 spring-connector, in order to allow the fixing bushes to line up with the screw holes in the test jig.

d. Screw-up and tighten the four long screws (A of Fig 2) and two short knurled pillar screws (B of Fig 2).

e. Fit the test jig overlay and tighten the three knurled rings (C of Fig 2).

Note: This Page 13/14 supersedes Page 13/14 Issue 1 dated Jul 77. Fig 2 has been updated.

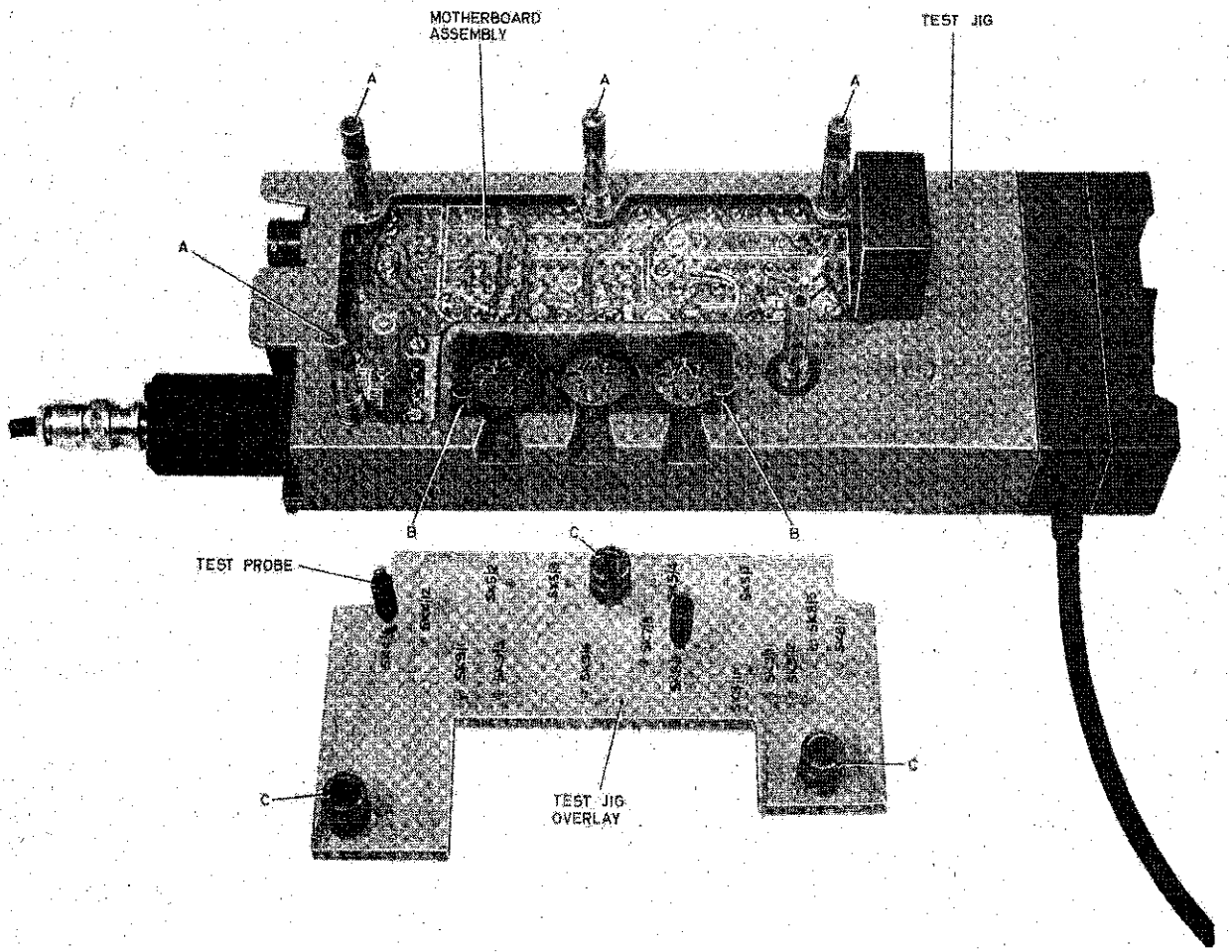


Fig 2 - Motherboard assembly fitted into test jig

DISMANTLING AND RE-ASSEMBLY

ORDER OF DISMANTLING

34. Following the preliminary test (para 67), before any fault-finding and repair work can be carried out on the RT-349, the motherboard with all assemblies should be removed and fitted into the motherboard test jig (item 1, Table 2) in accordance with the instructions in para 33. The order in which the remaining dismantling procedures are carried out will depend on where the fault exists; a guide to the order of dismantling is as follows:

a. Fault in one of the assemblies 4 to 9; withdraw the faulty assembly from the test jig using the extractor tool (item 2, Table 2).

b. Fault in synthesizer assembly 10; withdraw motherboard with all assemblies from the test jig and remove the assembly 10 from the motherboard.

c. Fault on motherboard; using the extractor tool withdraw the assemblies 4 to 9 from the test jig. Remove motherboard and assembly 10. Remove assembly 10 from the motherboard.

DISMANTLING

Lid

35. Unscrew and remove the ten 2.5 mm pan-head screws with their crinkle washers that secure the lid to the box, and remove the lid and sealing gasket.

Motherboard with all assemblies

36. a. It is essestial that the frequency setting switches are set to 37.000 before attempting to dismantle or re-assemble the radio.

b. Holding the motherboard with all assemblies in the RT-349 box assembly, unscrew and remove the four 3.0 mm pan-head screws (that are recessed into the exterior of the box) and the four 3.0 mm socket-head screws (located in the four corners of the recess that accomodates the frequency setting switch knobs) complete with their Dowty sealing washers.

c. Gently ease out the motherboard with all assemblies from the box; this will disengage the spring connector on assembly 4 from the antenna socket pin. The motherboard with all assemblies can now be completely withdrawn from the box, attached only by the cableform.

d. Carefully remove the cableform plug from the motherboard assembly.

Motherboard

37. a. Using the extractor tool, withdraw assemblies 4 to 9 (para 38).

b. Carry out the instructions in para 36.

c. Remove assembly 10 from the motherboard (para 40).

Assemblies 4 to 9

(Fig 3)

38. Assemblies 4 to 9 have extraction key-hole slots in the screening covers; spigots on the extractor tool (item 2, Table 2) engage with these slots in order to withdraw the assemblies. The adjustable cam on the extractor tool is set to one of two positions as follows:

a. For assemblies 5 to 9: to the extreme end-stop.

b. For assembly 4: to the centre stop.

39. a. Turn the two cams on the extractor tool so that the white dot is uppermost.

b. Place the extractor tool above the assembly to be withdrawn and such that each cam is in contact (Fig 1) with the machined face on the box or the motherboard assembly test jig (item 1, Table 2).

c. Locate and lock the two spigots into the two key-hole slots.

d. Turn the knurled knob until the pins are withdrawn from the motherboard.

CAUTION: Attempted removal of assemblies without using the extractor tool can cause bending or damage to the assembly connecting pins.

Assembly 10 (synthesizer)

40. a. Carry out the instructions in para 36.

b. Prise off all the clips, terminating the flying leads, from the motherboard sockets (F 602, Fig 2005).

c. Unscrew and remove the five 2.5 mm pan-head screws and washers fixing assembly 10 to the motherboard.

Synthesizer sub assemblies 10a, 10b and 10c

41. Prior to dismantling assembly 10 (in order to provide maximum protection, for the l.s.i. module, against electrostatic build-up) the three frequency setting switches must be turned - using a suitable screwdriver - to the positions representing 45.975MHz; this must also be carried out prior to re-assembly if new switches are to be fitted.

42. Refer to F 602, Fig 2006. Locate the three frequency setting switches and note that the index marks, on the fixed and movable parts of each switch, are aligned; this setting of the switches represents 37.00MHz; hence, turn each switch in a clockwise direction, as follows:

a. MHz switch: to the 8th position from the present setting.

b. 100kHz switch: to the 9th position from the present setting.

c. kHz switch: to the 3rd position from the present setting.

The soldering and desoldering tools must be properly earthed (see para 30).

Note: This Page 17/18 supersedes Page 17/18 Issue 1, dated Jul 77. Fig 3 has been updated.

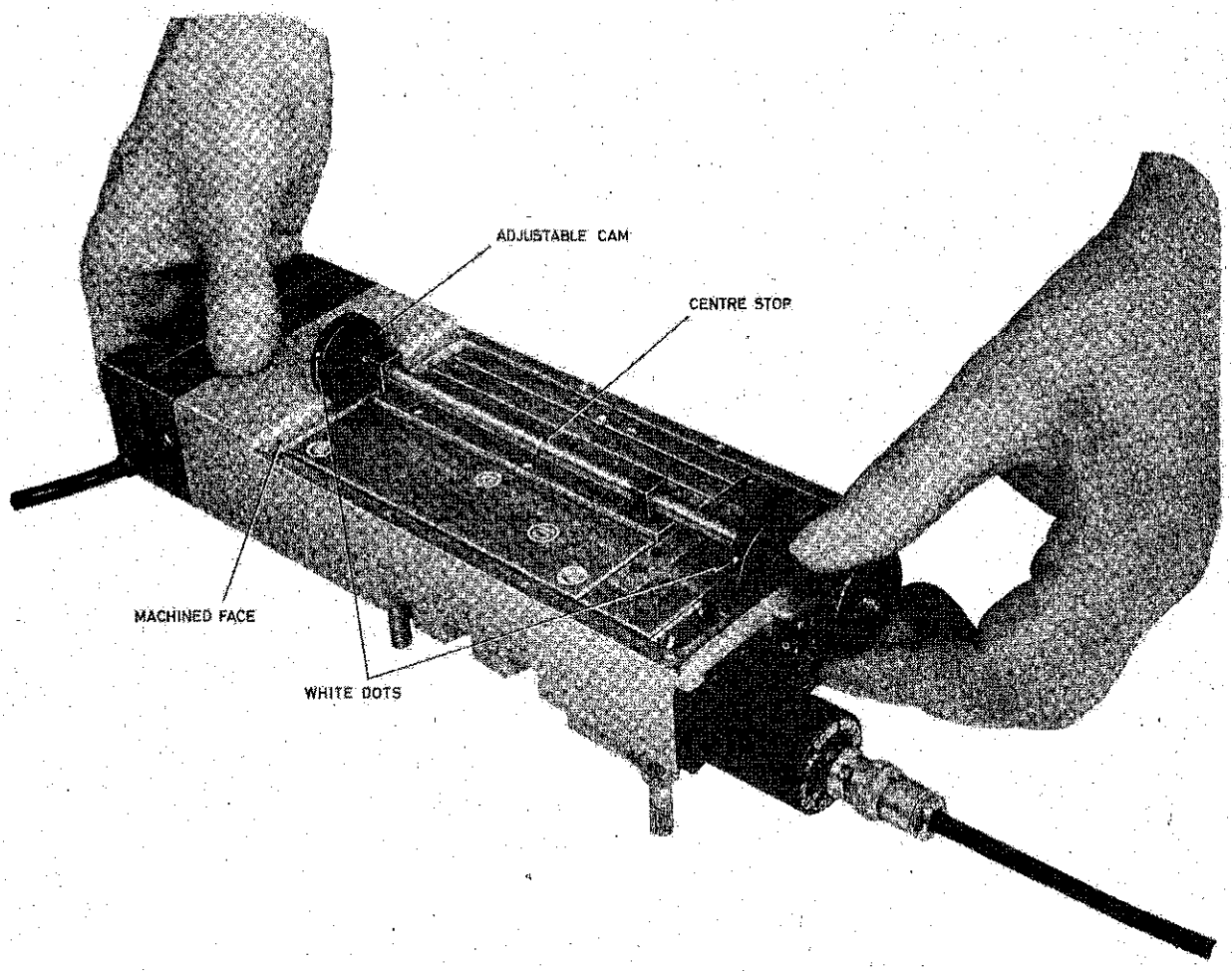


Fig 3 - Use of assembly extractor tool

Sub assembly 10a

43. a. Carry out the instructions in para 41 and 42.

b. Remove the cover (three screws).

c. Unsolder the flying leads numbered 3 and 13 from board 10a.

d. Unsolder (or cut) the eight interconnecting leads between boards 10a and 10b.

e. Remove the three screws and washers securing board 10a to board 10b, and remove board 10a.

Sub assembly 10b

44. a. Carry out the instructions in para 43.

b. Unsolder the remaining six flying leads (numbered 1,6,9,8,10 and 11) from board 10b.

c. Unsolder (or cut) the twelve interconnecting leads between board 10b and the FSS (sub assembly 10c).

d. Unscrew and remove the six tapped spacers with their crinkle washers and remove board 10b.

Sub assembly 10c.

45. Carry out the instructions in para 43 and 44.

Antenna socket

46. Remove the four 3.0 mm pan-head screws and washers in order to release the antenna socket.

Escutcheon plate

47. Remove the two 2.0 mm pan-head screws and washers in order to release the escutcheon plate.

Audio socket, system switch and wiring harness

48. a. Set the system switch to '0', ie index marks on switch are aligned.

b. Remove the motherboard with all assemblies in accordance with the instructions in para 36.

c. Unsolder the red lead from that system switch pin which is connected to the positive battery terminal.

d. Remove the escutcheon plate (para 47).

e. Unscrew the two 3.0 mm socket-head screws and Dowty sealing washers securing the system switch.

f. Unscrew the nut retaining the audio socket; withdraw the complete assembly from the inside of the box.

Knobs

49. a. Remove the motherboard with all assemblies in accordance with the instructions in para 36,

b. Each knob is held by an internal circlip which can be removed using suitable circlip pliers.

Insert, battery fixing

50. Using suitable pliers, unscrew the damaged insert.

RE-ASSEMBLY

51. In the main, re-assembly procedures are the reverse to dismantling, and are only given where considered necessary.

Insert, battery fixing

52. a. Ensure that the new insert and the casting boss are free of grease.

b. Apply adhesive Locktite Studlock grade 270 to the casting boss.

c. Fit the new insert to the mandrel (item 11, Table 2) and screw it into the casting boss.

d. Allow approximately three hours for the adhesive to set before removing the mandrel.

Knobs

53. Ensure that the knob shafts and holes in the casting are clean. Lubricate with grease MX 33.

Synthesizer sub assemblies 10a, 10b and 10c

Sub assemblies 10b and 10c

54. If the switch assembly 10c is being replaced, set the three frequency setting switches in accordance with paras 41 and 42. Re-assembly instructions are the reverse to those in para 44; however, the earth link which connects all three sub assemblies should be replaced as shown in F 602, Fig 2010, Note 2. If a new sub assembly 10b is being fitted, a protection clip will be fitted to the l.s.i. (ML1); remove this clip after fitting and soldering sub assembly 10b to sub assembly 10c, then cut the l.s.i. pins to within 0.8 mm.

Sub assembly 10a

55. Re-assembly instructions are the reverse to those of para 42. Finally, reset the three frequency setting switches to 37.000 ie the positions where the index marks on the fixed and movable parts of each switch are aligned (F 602, Fig 2010); use a suitable screwdriver to do this.

Note: ThesesPages 21-32 supersede Pages 21-32 Issue 1 dated Jul 77. They have been amended throughout.

Assembly 10 (synthesizer)

56. Re-assembly instructions are the reverse to those in para.40. However, the synthesizer should be positioned with respect to the motherboard by using the mechanical alignment jig (item 10, Table 2). Fit the synthesizer initially with the five 2.5 mm screws and washers not tightened. Fit the jig (Fig 5) ensuring that all four dowels are properly located in the relevant holes, then tighten the five screws. Ensure that the flying leads are clipped to the correct terminals on the motherboard (F 602, Fig 2005).

Audio socket, system switch and wiring harness

57. Re-assembly instructions are the reverse to those in para 48; when fitting the two securing screws, use new Dowty sealing washers if required (Tels F 602, item 9, Table 2002), lightly smeared with grease XG271. To ensure correct alignment of the system switch knob with the switch, proceed as follows:

a. Set the system switch knob to the 0 (off) position.

b. Using a suitable screwdriver, set the switch to the position where the fixed and movable index marks are aligned (F 602, Fig 2005).

Fitting assemblies to motherboard

58. a. Carry out the instructions in para.56.

b. Carefully fit the remaining assemblies to the motherboard. The arrows on the top of the assembly screening covers point towards the front panel (antenna socket, audio socket and system switch).

c. If difficulty is experienced fitting assembly 4, first remove assembly 6.

Note: Contact finger on assembly 6 and mating area on side of assembly 4 must be kept clean using suitable degreasing agent eg. acetone to ensure good contact.

Motherboard with all assemblies

59. The motherboard with all assemblies is fitted into the box as follows:

a. Fit the polarized cableform plug to the motherboard socket.

b. Gently ease the motherboard assembly into the box, observing the following precautions:

(1) Tilt the assembly, slightly, towards the antenna socket pin to ensure satisfactory contact with the spring-connector on assembly 4.

(2) Ensure that all switches engage satisfactorily with the knobs; refer to para 55.

(3) Fit a new Dowty sealing washer if required (Tels F 602, Table 2002, item 38), lightly smeared with grease XG271, to each of the eight motherboard securing screws.

(4) Ensure that all the motherboard assembly fixing screws are correctly located before tightening to 0.35-0.39 Nm (50-55 oz in); if necessary, ease the motherboard assembly towards the antenna socket pin, thus compressing assembly 4 spring-connector, in order to allow the fixing bushes to line up with the screw holes in the box.

(5) Ensure that the cableform is located along the side of the box and not pinched between the underside of the motherboard assembly and the casting bosses within the box.

Lid

60. Before re-fitting the lid, lightly smear the gasket with grease XG271. Tighten the ten securing screws to 0.35-0.39 Nm (50-55 oz in) in the sequence shown in Fig.4.

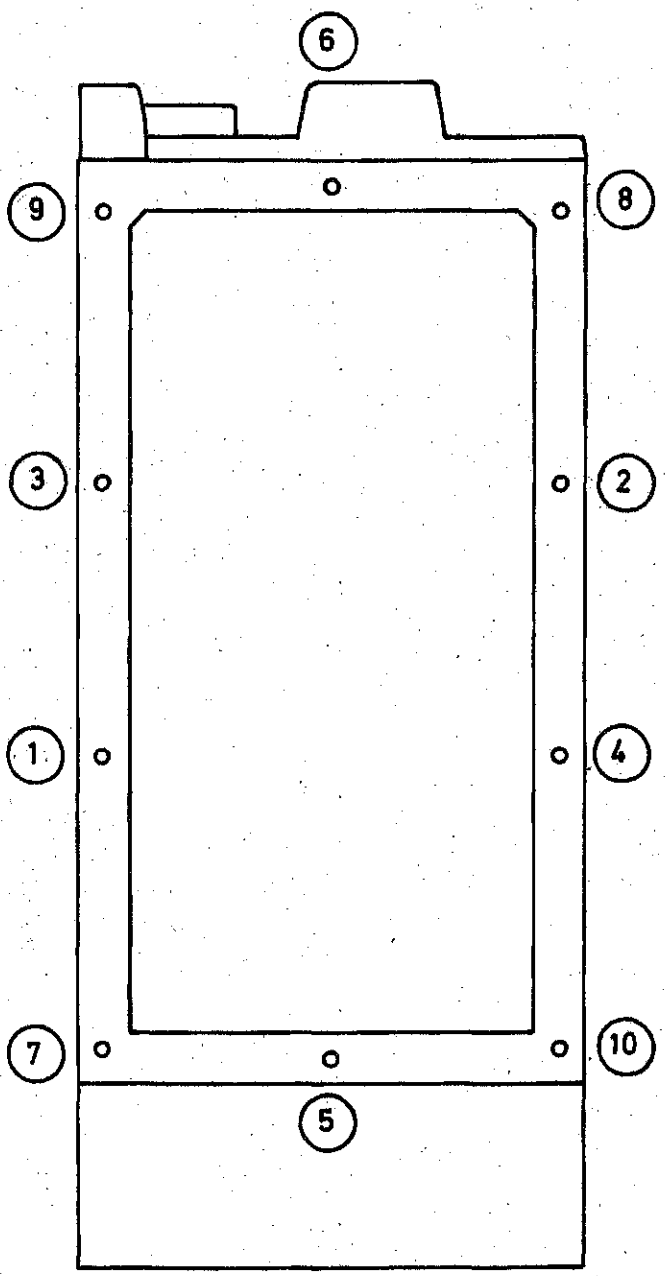
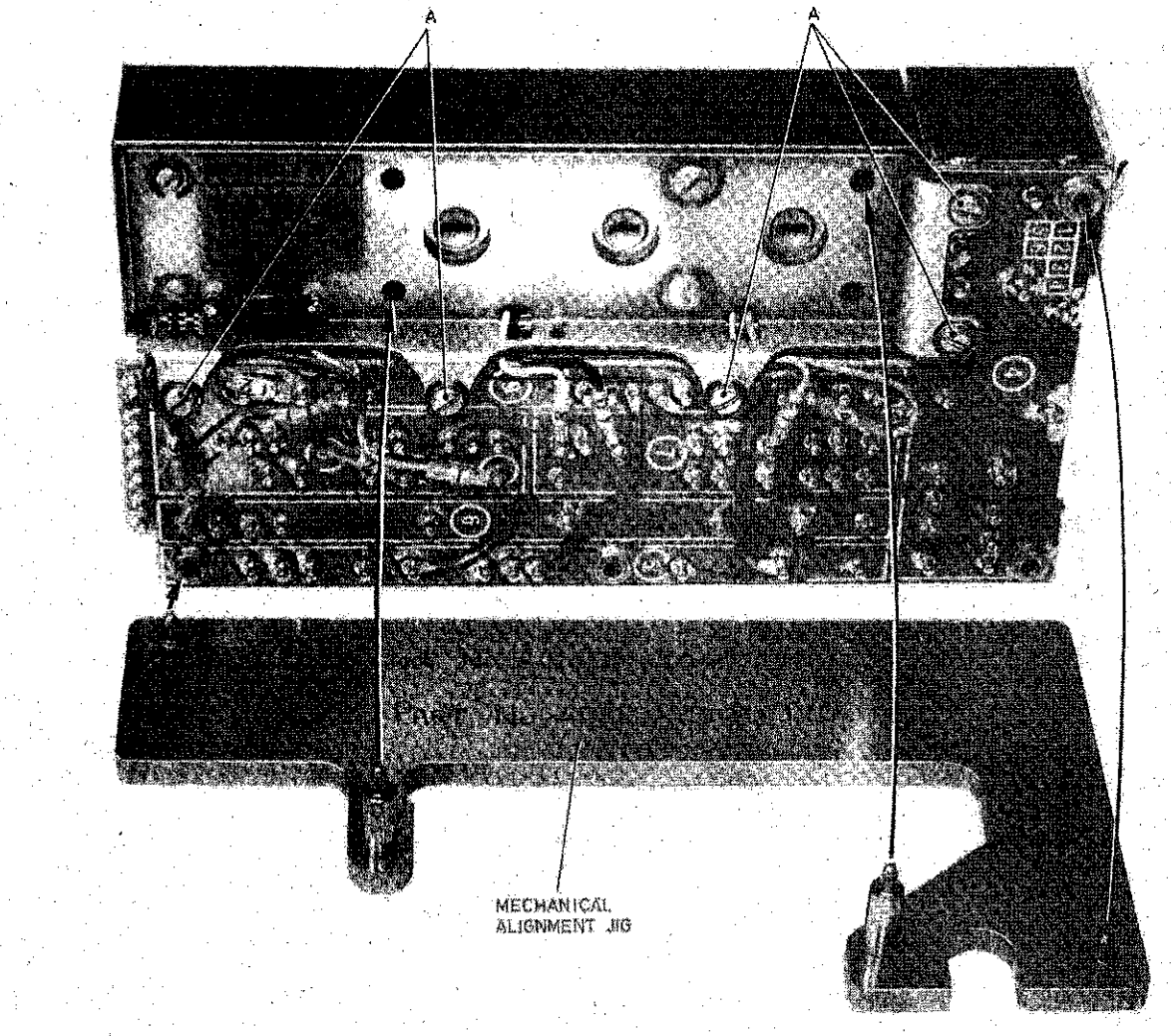


Fig.4 - Screw tightening sequence



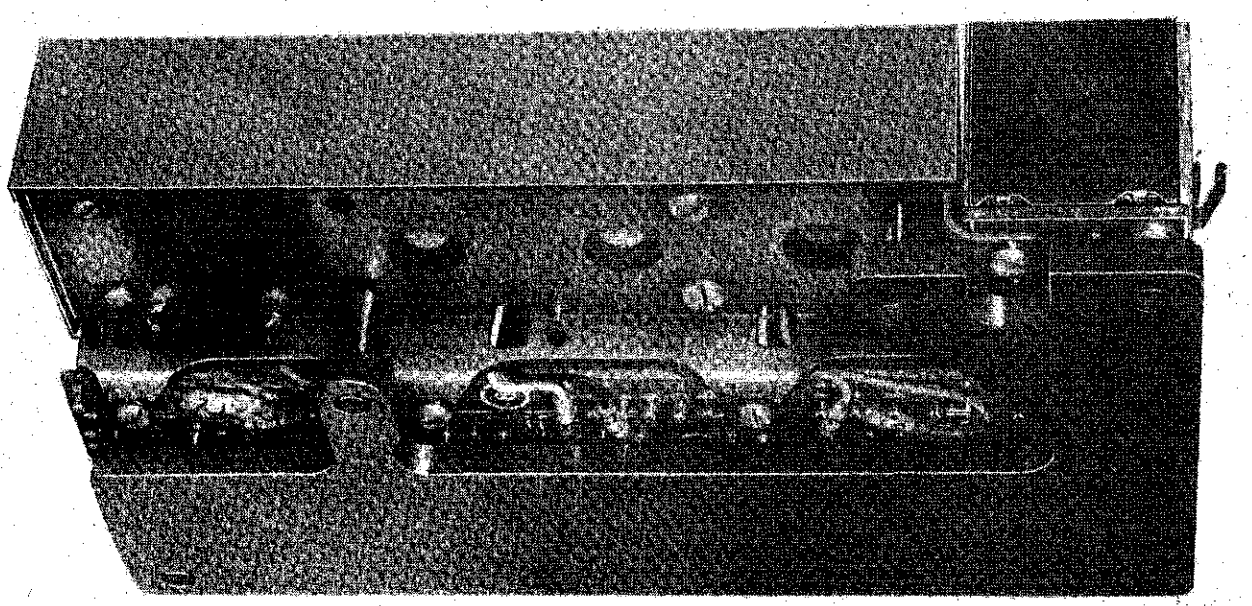


Fig 5 - Fitting synthesizer-to-motherboard mechanical alignment jig

SCREWS AND WASHERS

61. Refer to Table 3 for the details of all screws, washers, circlips and seals.

Table 3 - Screws, washers, circlips and seals

Type	Qty	Positions used
Screw, slotted, pan-head M2 x 4 mm long	3	Sub assy 10a to 10b fixing.
Screw, slotted head, countersunk M2 x 5 mm long	3	Synthesizer screening cover fixing.
Screw, slotted pan-head M2 x 5 mm long	2	Escutcheon plate fixing.
Screw, slotted pan-head M2.5 x 4 mm long	5	Synthesizer assy to motherboard fixing.
Screw, slotted pan-head M2.5 x 6 mm long.	10	Lid to box fixing.
Screw, slotted pan-head M3 x 6 mm long	8	Motherboard assy to box fixing. Antenna socket to box fixing.
Screw, socket head cap M3 x 8 mm long	6	Frequency setting switch to box fixing. System switch to box fixing.
Spacer, (screw special)	6	Synthesizer spacers.
Washer, crinkle M2 (black)	2	Escutcheon plate screws.
Washer, crinkle M2 (stainless steel)	9	Synthesizer 10a and 10b screws.
Washer, crinkle M2.5 (black)	10	Lid to box screws.
Washer, crinkle M2.5 (stainless steel)	5	Synthesizer assy to motherboard screws.
Washer, crinkle M3	4	Antenna, socket screws.
Washer, flat (5310-99-662-4912)	4	Frequency setting switches and system switch knobs.
Circlip	4	Frequency setting switches and system switch knobs.
Seal bonded, 6 BA	10	Motherboard assy frequency setting switch and system switch to box screws.

Note: These Pages 25-28 supersede Pages 25-28 Issue 2 dated Sept. 78.
Items marked thus • have been amended.

SPECIFICATION TESTING

INTRODUCTION

62. Specification testing can be carried out, with the equipment sealed (lid fitted) or unsealed (lid removed), using either the test rig, electronic (t.r.e.) or the automatic test equipment (a.t.e., refer to Part 3 of this regulation). Specification testing, less tests 9 and 11, can also be carried out with the motherboard (with all assemblies) fitted into the motherboard assembly test jig (item 1, Table 2). The specification tests using the t.r.e. follow a logical sequence, but the testing is not sequential, and the t.r.e. and e.u.t. settings are repeated at the commencement of each test. This allows a particular test to be carried out in isolation. The preliminary test in para 67 must be carried out before any other tests. When using the t.r.e., a headset must not be connected to the e.u.t. since this could cause damage to the t.r.e.

CONDITIONS OF TEST

63. The specification figures given in the 'Limits' definition are true values and constitute fundamental terms of reference.

64. All tests shall be carried out at room temperature (+15 °C to +35 °C).

CONNECTION OF THE EQUIPMENT-UNDER-TEST (E.U.T.) TO THE T.R.E.

65. a. Set the SSW on the e.u.t. to 0 (off).

b. Connect CS7 (t.r.e.) to 1PL4/5 (battery connections of the e.u.t., using the power lead (item 4, Table 2).

c. Fit the antenna adaptor (item 3, Table 2) to 1SK2 (antenna socket) of the e.u.t.

d. Connect the antenna adaptor to CTC20 (t.r.e.) using a 50 Ω BNC coaxial connector (item 7, Table 2001 of Tels M 382).

e. Connect IF(C)5 (t.r.e.) to 1SK1 (audio socket) of the e.u.t. using a 7 point audio connector (item 10, Table 2001 of Tels M 382).

f. Set all the power switches on the t.r.e. to 'on' and allow a 20 minute (approx) warm-up (stabilization) time.

66. The above connections, together with any others required, are repeated in abbreviated form in each of the following specification test procedures.

TEST 1 - PRELIMINARY TEST

67. a. Limits. With the d.c. supply set to 12 ±0.2V, and

(1) With the SSW on the e.u.t. set to 0 (off), there shall be no current drawn.

(2) With the SSW on the e.u.t. set to W and the pressel line open-circuited (ie receive mode), the power output shall not exceed 0.02μW.

b. E.U.T. connections.

CS7 to 1PL4/5
CTC20 to 1SK2 via the antenna adaptor
IF(C)5 to 1SK1

c. Method (1) Set the t.r.e. and e.u.t. switches as follows:

CS		CTC		IF(C)		E.U.T.
1	MP 9-21	1	CW	1	OC	FSS: 42.050
2	MP V	2	AF LOAD 300	3	Released	SSW: 0
6	Released	3	Released	4	Released	
		4	Released	7	NORMAL	
		5	Depressed			
		6	Released			
		7	Released			
		8	Released			
		9	Released			
		10	Depressed			
		11	Released			
		12	RF			
		13	AF			
		14	SIGNAL			
		26	INT			

(2) Adjust CS3 for supply voltage of LL 11.8V, UL 12.2V.

(3) Set CS2 to MP A and check, using the d.v.m.,that no current is drawn.

(4) Set the SSW to W.

(5) Depress CTC7 and check, using the d.v.m. that no significant power is transmitted.

TEST 2 - CURRENT CONSUMPTION

68. a. Limits. With the d.c. supply set to 12 ±0.2V, the current consumption of the e.u.t. shall be:

(1) Between 57 and 78mA in the receive mode.

(2) Between 4 and 9mA in the low state of the battery standby mode.

(3) Between 130 and 166mA in the transmit mode.

b. E.U.T. connections.

CS7 to 1PL4/5
CTC20 to 1SK2 via the antenna adaptor
IF(C) to 1SK1

c. Method. (1) Set the t.r.e. and e.u.t. switches as follows:

CS	CTC	IF(C)	E.U.T.
1 MP 9-21	1 RX FM	1 OC	FSS: 42.050
2 MP V	2 AF LOAD 300	3 Released	SSW: *
6 Released	3 Released	4 Released	
	4 Released	7 NORMAL	
	5 Depressed		
	6 Released		
	7 Released		
	8 Released		
	9 Released		
	10 Depressed		
	11 Released		
	12 RF		
	13 AF		
	14 CARRIER OFF		
	26 INT		

(2) Adjust CS3 for a supply voltage of LL 11.8V, UL 12.2V.
(3) Set CS2 to MP A and note d.v.m. indication which shall be LL 5.7mV (57mA) UL 7.8mV (78mA).

(4) Set SSW to L. The d.v.m. indication should vary, approximately every one second, between a high and low state. Check that the d.v.m. indication on the low state is UL 1mV. (10mA).

(5) Set CTC1 to CW TX and note the d.v.m. indication which shall be LL 13.0mV (130mA) UL 16.6mV (166mA).

(6) Re-set CTC1 to RX FM.

TEST 3 - POWER OUTPUT INTO 50Ω LOAD

69. a. Limits. (1) With a d.c. supply of 9.5 ±0.2V, the transmitted power output shall not be less than 100mW at all frequencies.

(2) With a d.c. supply of 16 ±0.2V, the transmitted power output shall not be greater than 475mW at all frequencies.

b. E.U.T. connections.

CS7 to 1PL4/5
CTC20 to 1SK2 via the antenna adaptor
IF(C)5 to 1SK1

c. Method. (1) Set the t.r.e. and e.u.t. switches as follows:

CS	CTC	IF(C)	E.U.T.
1 MP 9-21	1 CW	1 OC	FSS: 37.050
2 MP V	2 AF LOAD300	3 Released	SSW: *
6 Released	3 Released	4 Released	
	4 Released	7 NORMAL	
	5 Depressed		
	6 Released		
	7 Released		
	8 Released		
	9 Released		
	10 Depressed		
	11 Released		
	12 RF		
	13 RF		
	14 SIGNAL		
	26 INT		

(2) Adjust CS3 for a supply voltage of LL 9.3V, UL 9.7V.

(3) Depress CTC7; depress and hold CTC11 and note the following:

(a) The counter display which shall be the nominal frequency setting on the e.u.t.

(b) d.v.m. indication which shall be LL 316mV (100mW)

(c) The c.r.o. display which shall be approximately sinusoidal.

(4) Repeat operation (3) but with the FSS on the e.u.t. set, in turn, to the following frequencies:

39.050, 42.050, 45.050, 46.950

(5) Depress CTC5.

(6) Adjust CS3 until the d.v.m. indicates LL 15.8V, UL 16.2V.

(7) Depress CTC7; depress and hold CTC11 and note the d.v.m. indication which shall be UL 689mV (475mW)

(8) Repeat operation (7) but with the FSS on the e.u.t. set, in turn, to the following frequencies:

45.050, 42.050, 39.050, 37.050

TEST 4 - ACCURACY OF RADIATED CARRIER

70. a. Limits. The radiated frequency shall be within ±500Hz of the selected frequency.

b. E.U.T. connections.

CS7 to 1PL4/5
CTC20 to 1SK2 via the antenna adaptor
IF(C)5 to 1SK1

c. Method. (1) Set the t.r.e. and e.u.t. switches as follows:

CS	CTC	IF(C)	E.U.T.
1 MP 9-21	1 CW	1 OC	FSS: 37.000
2 MP V	2 AF LOAD 300	3 Released	SSW: L
6 Released	3 Released	4 Released	
	4 Released	7 NORMAL	
	5 Depressed		
	6 Released		
	7 Released		
	8 Released		
	9 Released		
	10 Depressed		
	11 Released		
	12 RF		
	13 AF		
	14 SIGNAL		
	26 INT		

(2) Adjust CS3 for a supply voltage of LL 11.8V, UL 12.2V.

(3) Depress CTC7 and set CTC1 to CW TX; note the counter display which shall be LL 36.999500MHz UL 37.000500MHz

(4) Repeat operation (3) but with the FSS on the e.u.t. set, in turn, to the following frequencies; the counter display shall be within the limits shown.

FSS setting	Counter display LL	Counter display UL
38.125	38.124500	38.125500
39.250	39.249500	39.250500
40.375	40.374500	40.375500
41.400	41.399500	41.400500
42.500	42.499500	42.500500
43.600	43.599500	43.600500
44.700	44.699500	44.700500
45.800	45.799500	45.800500
46.900	46.899500	46.900500

TEST 5 - 150Hz MODULATION

71. a. Limits. (1) The deviation of the transmitter output due to the internal 150Hz tone shall be between ±1.55kHz and ±2.5kHz.

5 (2) The frequency of the internal tone shall be between 148Hz and 152Hz.

b. E.U.T. connections.

CS7 to 1PL4/5
CTC20 to 1SK2 via the antenna adaptor
IF(C)5 to 1SK1

c. Method. (1) Set the t.r.e. and e.u.t. switches as follows:

CS	CTC	IF(C)	E.U.T.
1 MP 9-21	1 PILOT TONE	1 OC	FSS: 46.900
2 MP V	2 AF LOAD 300	3 Released	SSW: L
6 Released	3 Released	4 Released	
	4 Released	7 NORMAL	
	5 Depressed		
	6 Released		
	7 Released		
	8 Released		
	9 Released		
	10 Depressed		
	11 Released		
	12 AF		
	13 AF		
	14 SIGNAL		
	26 INT		

(2) Adjust CS3 for a supply voltage of LL 11.8V, UL 12.2V.

(3) Ensure that the 150Hz bandstop filter on the mod. meter is IN, and the 3kHz bandpass filter is OUT.

(4) Depress and hold CTC11, note the mod. meter indication due to the noise.

(5) Switch the 150Hz bandstop filter to OUT, and note the mod. meter indication due to the 150Hz squelch-tone and noise.

(6) Calculate the deviation, due to the 150Hz squelch-tone only, by subtracting the reading obtained in (5) from that obtained in (4). The result should be LL 1.55kHz, UL 2.5kHz.

(7) Repeat (3) to (6) with the FSS set to 42.000 and 37.000.

(8) Depress CTC11 and note the counter display which shall be LL 148.0, UL 152.0. Release CTC11.

TEST 6 - MODULATION SENSITIVITY

72. a. Limits. (1) The amplitude of a 1kHz tone applied to the microphone socket to produce a deviation of the transmitter output of ±3.5kHz ±0.3kHz shall be between 0.08 and 0.3mV p.d. with the SSW set to W.

(2) With the input maintained as above and the SSW set to L, the deviation shall be between ±0.68 and ±1.48kHz.

b. E.U.T. connections

CS7 to 1PL4/5
CTC20 to 1SK2 via the antenna adaptor
IF(C)5 to 1SK1

c. Method (1) Set the t.r.e. and e.u.t. switches as follows:

CS	CTC	IF(C)	E.U.T
1 MP 9-21	1 MOD S.T.	1 OC	FSS: 42.050
2 MP V	2 AF LOAD 300	3 Released	SSW: W
6 Released	3 Released	4 Released	
	4 Released	7 NORMAL	
	5 Depressed		
	6 Released		
	7 Released		
	8 Released		
	9 Released		
	10 Depressed		
	11 Released		
	12 AF		
	13 AF		
	14 SIGNAL		
	26 INT		

(2) Adjust CS3 for a supply voltage of LL 11.8V, UL 12.2V.

(3) Ensure that the 150Hz bandstop and 3kHz bandpass filters of the mod. meter are IN.

(4) Set the a.f. gen. to produce a single tone of 1kHz.

(5) Depress and hold CTC11, and adjust the a.f. gen. output attenuator until the mod. meter indicates 3.5kHz; release CTC11.

(6) Note the a.f. gen. setting which shall be LL 1.6mV e.m.f. (0.08mV p.d.), UL 6mV e.m.f. (0.3mV p.d.).

(7) Set the SSW to L.

(8) Maintain the above input and note the mod. meter indication which shall be LL 0.68kHz, UL 1.48kHz.

TEST 7 - MODULATION CONTROL

73. a. Limits. With 1kHz ±10% tone applied to the microphone socket at a level of 20 ±2mV p.d., the deviation of the transmitter output due to this modulating tone only shall not be greater than ±6.5kHz.

b. E.U.T. connections.

CS7 to 1PL4/5
CTC20 to 1SK2 via the antenna adaptor
IF(C)5 to 1SK1

c. Method. (1) Set the t.r.e. and e.u.t. switches as follows:

CS	CTC	IF(C)	E.U.T.
1 MP 9-21	1 MOD S.T.	1 OC	FSS: 42.050
2 MP V	2 AF LOAD 300	3 Released	SSW: L
6 Released	3 Released	4 Released	
	4 Released	7 NORMAL	
	5 Depressed		
	6 Released		
	7 Released		
	8 Released		
	9 Released		
	10 Depressed		
	11 Released		
	12 AF		
	13 AF		
	14 SIGNAL		
	26 INT		

(2) Adjust CS3 for a supply voltage of LL 11.8V, UL 12.2V.

(3) Ensure that the 150Hz bandstop and 3kHz bandpass filters of the mod. meter are IN.

(4) Set the a.f. gen. to produce a single tone of 1kHz at 400mV e.m.f. (20mV p.d.)

(5) Depress and hold CTC11; note the mod. meter indication which shall be UL 6.5kHz.

TEST 8 - SIDETONE

74. a. Limits. With an a.f. input of 1kHz ±10% at a level of 10mV r.m.s., the a.f. output into 300Ω with the e.u.t. set to any frequency shall be between 240 and 360mV.

b. E.U.T. connections.

CS7 to 1PL4/5
CTC20 to 1SK2 via the antenna adaptor
IF(C) to 1SK1

c. Method. (1) Set the t.r.e. and e.u.t. switches as follows:

CS	CTC	IF(C)	E.U.T.
1 MP 9-21	1 MOD S.T.	1 OC	FSS: 42.050
2 MP V	2 AF LOAD 300	3 Released	SSW: L
6 Released	3 Released	4 Released	
	4 Released	7 NORMAL	
	5 Depressed		
	6 Released		
	7 Released		
	8 Released		
	9 Released		
	10 Depressed		
	11 Released		
	12 AF		
	13 AF		
	14 SIGNAL		
	26 INT		

(2) Adjust CS3 for a supply voltage of LL 11.8V, UL 12.2V.

(3) Set the a.f. gen. to produce a single tone of 1kHz at 200mV e.m.f. (10mV p.d.).

(4) Depress CTC7.

(5) Depress and hold CTC11; note the d.v.m indication which shall be LL 240mV, UL 360mV.

TEST 9 - RECEIVER SENSITIVITY

75. a. Limits. The signal-plus-noise to noise ratio caused by a r.f. signal of 2μV e.m.f., with standard modulation, shall not be less than 14dB.

b. E.U.T. connections.

CS7 to 1PL4/5
CTC20 to 1SK2 via the antenna adaptor
IF(C)5 to 1SK1

c. Method. (1) Set the t.r.e. and e.u.t. switches as follows:

CS	CTC	IF(C)	E.U.T.
1 MP 9-21	1 RX FM	1 OC	FSS: 37.025
2 MP V	2 S+N:N	3 Released	SSW: *
6 Released	3 Released	4 Released	
	4 Released	7 NORMAL	
	5 Depressed		
	6 Released		
	7 Released		
	8 Released		

CS	CTC	IF(C)	E.U.T.
	9 Released		
	10 Depressed		
	11 Released		
	12 AF		
	13 AF		
	14 SIGNAL		
	26 INT		

CAUTION: DO NOT depress CTC11 during this test.

(2) Adjust CS3 for a supply voltage of LL 11.8V, UL 12.2V.

(3) Set the r.f. gen. to 37.025MHz, internally modulated by 1kHz ±10% at ±5kHz deviation.

(4) Set the r.f. gen. output attenuator to 114dB (2μV e.m.f.).

(5) Depress CTC7; check that there is a modulated tone in the loudspeaker and an output waveform on the c.r.o.

Method 1 - GO/NO GO

(6) Set CTC15 to 18.

(7) Set CTC14 to SIGNAL; note the d.v.m. indication as 'reading A'.

(8) Set CTC14 to MOD OFF; the d.v.m. indication shall be less than 'reading A'.

(9) Repeat operations (3) to (8) with the FSS and the r.f. gen. set, in turn, to the following frequencies:

39.025, 42.025, 45.525, 46.925MHz.

Method 2 - Obtaining results

(6) Set CTC14 to MOD OFF; record the d.v.m. indication as 'reading A'.

(7) Set CTC14 to SIGNAL, and adjust CTC15 until the d.v.m. indication is the same as 'reading A'.

(8) Note the setting of CTC15 and read the dB equivalent (from dB chart on CTC front panel) which shall be LL 14dB.

(9) Repeat operations (3) to (8) with the FSS and r.f. r.f. gen. set, in turn, to the following frequencies:

39.025, 42.025, 45.525, 46.925MHz.

TEST 10 - LIMITING

76. a. Limits. With a modulated r.f. signal applied to the antenna socket, the audio output in the receive mode shall not change by more than 1.5dB when the r.f. signal level is increased from 2μV e.m.f. to 100mV e.m.f.

b. E.U.T. connections.

CS7 to 1PL4/5
CTC20 to 1SK2 via the antenna adaptor
IF(C)5 to 1SK1

c. Method. (1) Set the t.r.e. and e.u.t. switches as follows:

CS	CTC	IF(C)	E.U.T.
1 MP 9-21	1 RX FM	1 OC	FSS: 42.050
2 MP V	2 AF LOAD 300	3 Released	SSW: *
6 Released	3 Released	4 Released	
	4 Released	7 NORMAL	
	5 Depressed		
	6 Released		
	7 Released		
	8 Released		
	9 Released		
	10 Depressed		
	11 Released		
	12 AF		
	13 AF		
	14 SIGNAL		
	26 INT		

CAUTION: DO NOT depress CTC11 during this test.

(2) Adjust CS3 for a supply voltage of LL 11.8V, UL 12.2V.

(3) Set the r.f. gen. to 42.050MHz modulated by 1kHz ±10%, and a deviation of ±5kHz.

(4) Set the r.f. gen. attenuator to 114dB (2μV e.m.f.)

(5) Depress CTC7; note the d.v.m. indication as 'reading A'.

(6) Re-set the r.f. gen. attenuator to 20dB (100mV).

(7) Note the d.v.m. indication as 'reading B'; 'reading B' shall not be greater than 1.5dB (18%) above 'reading A'.

TEST 11 - SQUELCH SENSITIVITY

77. a. Limits. The sensitivity of the squelch circuit to an external 150 ±2Hz tone is such that at the 2dB quieting level the squelch will be closed and at the 9dB quieting level the squelch will be open.

b. E.U.T. connections.

CS7 to 1PL4/5
CTC20 to 1SK2 via the antenna adaptor
IF(C)5 to 1SK1

c. Method. (1) Set the t.r.e. and e.u.t. switches as follows:

CS	CTC	IF(C)	E.U.T.
1 MP 9-21	1 RX FM	1 OC	FSS: 42.050
2 MP V	2 QUIETING	3 Released	SSW: *
6 Released	3 Released	4 Released	
	4 Released	7 NORMAL	
	5 Depressed		
	6 Released		
	7 Released		
	8 Released		
	9 Released		
	10 Depressed		
	11 Released		
	12 AF		
	13 AF		
	14 CARRIER OFF		
	26 INT		

CAUTION: DO NOT depress CTC11 during this test.

(2) Adjust CS3 for a supply voltage of LL 11.8V, UL 12.2V.

(3) Set the r.f. gen. to 42.050MHz modulated by 150 ±2Hz and with a deviation of ±1.3kHz.

(4) Depress CTC7.

(5) Set CTC15 to 79 (2dB); note the d.v.m. indication as 'reading A'.

(6) Set CTC14 to SIGNAL.

(7) Adjust the r.f. gen. attenuator until the d.v.m. indication is the same as 'reading A'.

(8) Set the SSW on the e.u.t. to L and note that the squelch is closed (no noise in the loudspeaker).

(9) Re-set SSW on e.u.t. to *.

(10) Set CTC14 to CARRIER OFF.

(11) Set CTC15 to 36 (9dB); note d.v.m. indication as 'reading B'.

(12) Re-set CTC14 to SIGNAL.

(13) Adjust the r.f. gen. attenuator until the d.v.m. indication is the same as 'reading B'.

(14) Set the SSW on the e.u.t. to L and note that the squelch is open (noise in the loudspeaker).

TEST 12 - A.F. POWER OUTPUT

78. a. Limits. With a r.f. signal modulated by 1kHz ±10% at ±5kHz deviation and 150 ±2Hz at ±1.5kHz deviation, and at a level of 1mV e.m.f., the audio output shall be:

(1) Between 460 and 640mV into 300Ω in L mode, or

(2) Between 17.5 and 22.5dB below the L level when in W mode.

b. E.U.T. connections.

CS7 to 1PL4/5
CTC20 to 1SK2 via the antenna adaptor
IF(C)5 to 1SK1

c. Method. (1) Set the t.r.e. and e.u.t. switches as follows:

CS	CTC	IF(C)	E.U.T.
1 MP 9-21	1 RX FM	1 OC	FSS: 42.050
2 MP V	2 AF LOAD 300	3 Released	SSW: L
6 Released	3 Released	4 Released	
	4 Released	7 NORMAL	
	5 Depressed		
	6 Released		
	7 Released		
	8 Released		
	9 Released		
	10 Depressed		
	11 Released		
	12 AF		
	13 AF		
	14 SIGNAL		
	26 INT		

CAUTION: DO NOT depress CTC11 during this test.

(2) Adjust CS3 for a supply voltage of LL 11.8V, UL 12.2V.

(3) Depress CTC7.

(4) Set the r.f. gen. to 42.050MHz modulated by 1kHz ±10% at ±5kHz deviation and 150 ±2Hz at ±1.5kHz deviation.

(5) Set the r.f. gen. attenuator to 60dB (1mV) and note the d.v.m. indication which shall be LL 460mV, UL 640mV.

(6) Set the SSW on the e.u.t. to W and note the d.v.m. indication which shall be LL 17.5dB UL 22.5dB below that noted in operation (5). (This is equivalent to between 8% and 12% of that noted in operation (5)).

TEST 13 - LOW BATTERY WARNING

79. a. Limits. The low battery warning shall operate with a supply voltage of between 9.4 and 9.8V d.c.

b. E.U.T. connections.

CS7 to 1PL4/5
IF(C)5 to 1SK1

Note: Disconnect the r.f. input lead.

c. Method. (1) Set the t.r.e. and e.u.t. switches as follows:

CS	CTC	IF(C)	E.U.T.
1 MP 9-21	1 CW	1 OC	FSS: 42.050
2 MP V	2 AF LOAD 300	3 Released	SSW: L
6 Released	3 Released	4 Released	
	4 Released	7 NORMAL	
	5 Depressed		
	6 Released		
	7 Released		
	8 Released		
	9 Released		
	10 Depressed		
	11 Released		
	12 AF		
	13 AF		
	14 CARRIER OFF		
	26 INT		

CAUTION: DO NOT depress CTC11 during this test.

(2) Adjust CS3 for a supply voltage of LL 11.8V, UL 12.2V.

(3) Slowly reduce the setting of CS3 until bursts of noise are heard in the loudspeaker. Note the d.v.m. indication which shall be LL 9.4V, UL 9.8V.

TEST 14 - BATTERY-SAVING PERIOD AND DELAY

80. a. Limits. (1) The time-interval after transmitting and before battery-saving occurs shall be between 9 and 17 seconds.

(2) The period of the supply switching shall be between 1.25 and 1.95 seconds.

b. E.U.T. connections.

CS7 to 1PL4/5
CTC20 to 1SK2 via the antenna adaptor
IF(C)5 to 1SK1

c. Method. (1) Set the t.r.e. and e.u.t. switches as follows:

CS	CTC	IF(C)	E.U.T.
1 MP 9-21	1 CW	1 OC	FSS: 42.050
2 MP V	2 AF LOAD 300	3 Released	SSW: L
6 Released	3 Released	4 Released	
	4 Released	7 NORMAL	
	5 Depressed		
	6 Released		
	7 Released		
	8 Released		
	9 Released		
	10 Depressed		
	11 Released		
	12 RF		
	13 AF		
	14 SIGNAL		
	26 INT		

(2) Adjust CS3 for a supply voltage of LL 11.8V, UL 12.2V. Set CS2 to MP A.

(3) Depress CTC11; note that the d.v.m. indicates the transmit supply current (LL 12mV, UL 15mV).

(4) Release CTC11 noting the time. The d.v.m. will indicate the receive supply current (LL 5.3mV, UL 7.6mV).

(5) After a time interval of LL 9 seconds, UL 17 seconds, the d.v.m. reading will start to fluctuate between a high (LL 5.3mV, UL 7.6mV) and a low (UL 1mV) state.

(6) The time interval for 10 such fluctuations should be LL 12 seconds, UL 20 seconds.

ADDITIONAL TESTS

81. Tests 15 and 16 are additional tests to be carried out when the equipment is suspected of having a fault in that specific area covered by these tests.

Test 15 - Variation of deviation with channel frequency

82. a. Limits. With a standard a.f. tone applied to the microphone socket, the deviation of the transmitter output, due to this tone, shall not vary from its nominal value by more than ±15% for any transmitter frequency.

b. E.U.T. connections.

CS7 to 1PL4/5
CTC20 to 1SK2 via the antenna adaptor
IF(C)5 to 1SK1

c. Method. (1) Set the t.r.e. and e.u.t. switches as follows:

CS	CTC	IF(C)	E.U.T.
1 MP 9-21	1 MOD S.T.	1 OC	FSS: 37.050
2 MP V	2 AF LOAD 300	3 Released	SSW: *
6 Released	3 Released	4 Released	
	4 Released	7 NORMAL	
	5 Depressed		
	6 Released		
	7 Released		
	8 Released		
	9 Released		
	10 Depressed		
	11 Released		
	12 AF		
	13 AF		
	14 SIGNAL		
	26 INT		

(2) Adjust CS3 for a supply voltage of LL 11.8V, UL 12.2V.

(3) Set the a.f. gen. to produce a single tone of 1kHz.

(4) Ensure that the 150Hz bandstop and 3kHz bandpass filters of the mod. meter are IN.

(5) Depress and hold CTC11; adjust the a.f. gen. attenuator setting to give an indication of 5kHz on the mod. meter and maintain this setting for the remainder of the test.

(6) Set the FSS on the e.u.t. to each of the following frequencies in turn: 39.050, 41.050, 43.050, 45.050 and 46.950MHz.

Note the maximum and the minimum deviation readings. Add the max. and min. readings together and divide the answer by 2. Call this answer 'A'.

Subtract 'A' from the maximum deviation noted. Call this answer 'B'.

Calculate the percentage variation of deviation as $\pm \frac{B}{A} \times \frac{100}{1}\%$ which shall be UL ±15%.

Test 16 - spurious responses

83. a. Limits. The second channel rejection shall be greater than 100dB at any frequency.

b. E.U.T. connections.

CS7 to 1PL4/5
CTC20 to 1SK2 via the antenna adaptor
IF(C)5 to 1SK1

c. Method. (1) Set the t.r.e. and e.u.t. switches as follows:

CS	CTC	IF(C)	E.U.T.
1 MP 9-21	1 RX FM	1 OC	FSS: 37.025
2 MP V	2 QUIETING	3 Released	SSW: *
6 Released	3 Released	4 Released	
	4 Released	7 NORMAL	
	5 Depressed		
	6 Released		
	7 Released		
	8 Released		
	9 Released		
	10 Depressed		
	11 Released		
	12 AF		
	13 AF		
	14 SIGNAL		
	26 INT		

CAUTION: DO NOT depress CTC11 during this test.

(2) Adjust CS3 for a supply voltage of LL 11.8V UL 12.2V.

(3) Depress CTC7.

(4) Set the r.f. gen. frequency to 37.025MHz.

(5) Set the r.f. gen. attenuator to 120dB; note the d.v.m. indication as 'reading A'.

(6) Set the r.f. gen. frequency to 79.825MHz ($f_s + 2f_{if}$).

(7) Adjust the r.f. gen. attenuator until the d.v.m. indication is the same as 'reading A'; note the r.f. attenuator setting which shall be UL 20dB.

SPECIAL TESTS

84. These tests are to be carried out only when an equipment is suspected of causing interference to other equipments; they are to be carried out at a nominated workshop. The tests are to be carried out with the antenna adaptor (item 3, Table 2) fitted to the antenna socket on the radio.

Transmitter spurious radiation (non-harmonic)

85. a. Limits. The output power of non-harmonically-related spurious emission, other than frequencies within 10% of the transmitted carrier, shall be attenuated to a level of not less than 60dB below the carrier level.

Transmitter spurious radiation (harmonic)

86. a. Limits. The output power of each harmonic of the nominal carrier frequency shall be attenuated to a level of not less than 40dB below the carrier level.

Receiver spurious emission

87. a. Limits. The level of any internally-generated unwanted signal, within the frequency range 1 to 500MHz, shall not exceed 100μV e.m.f. when measured at the antenna adaptor output terminated in a 50Ω load.

ALIGNMENT

INTRODUCTION

88. All RT-349 alignment procedures may be carried out with the equipment unsealed (lid removed) except the adjustments associated with assembly 10 as given in para 94; access to 3TP1 and 3TP2 is obtained by withdrawing assembly 8. All alignment procedures may also be carried out when the motherboard, fitted with all assemblies, is mounted in the motherboard assembly test jig. When the motherboard and all assemblies is refitted into the box assembly, the SET SQU preset control may need to be rechecked. Some adjustment or re-alignment may be required after fitting replacement assemblies into the RT-349; these should be carried out before any specification tests are attempted. A summary of the adjustments required, for a particular replacement assembly, is given in Table 4. If required, special test probes are provided in the f.r.t.k. for monitoring on the motherboard when using the motherboard test jig.

Assembly 4 must not be adjusted for optimum r.f. power output

Table 4 - Adjustment and alignment summary

Replacement assembly fitted	Adjustment/alignment check if required		Paragraph
4	4T3	(assembly 4)	90
	SET SQU	(assembly 5)	91
5	SET SQU	(assembly 5)	91
6	4T3	(assembly 4)	90
	SET SQU	(assembly 5)	91
7	7L1 and 7C3	(assembly 7)	92
	7L2 and 7C4	(assembly 7)	92
	SET 150Hz	(assembly 8)	93
	SET MOD	(assembly 8)	93
8	SET 150Hz	(assembly 8)	93
	SET MOD	(assembly 8)	93
9			-
10	7L1 and 7C3	(assembly 7)	92
	7L2 and 7C4	(assembly 7)	92

89. Adjustment holes in the assembly screening cans, which give access to preset controls used during manufacture, are either blanked off or circled and inscribed in red. No adjustments should need to be made to these controls at field level.

ASSEMBLY 4 (SETTING OF 4T3)

90. When a new assembly 4 or 6 is fitted, transformer 4T3 may need to be adjusted to minimise i.f. ripple.

a. E.U.T. connections.

CS7 to 1PL4/5
CTC20 to 1SK2 via the antenna adaptor
IF(C)5 to 1SK1

b. Method. (1) Set the t.r.e. and e.u.t. switches as follows:

CS	CTC	IF(C)	E.U.T.
1 MP 9-21	1 RX FM	1 OC	FSS: 42.050
2 MP V	2 AF LOAD 300	3 Released	SSW: *
6 Released	3 Released	4 Released	
	4 Released	7 NORMAL	
	5 Depressed		
	6 Released		
	7 Released		
	8 Released		
	9 Released		
	10 Depressed		
	11 Released		
	12 AF		
	13 AF		
	14 SIGNAL		
	26 INT		

CAUTION: DO NOT depress CTC11 during this alignment.

(2) Adjust CS3 for a supply voltage of LL 11.8V, UL 12.2V.

(3) Set the r.f. gen. frequency to 42.050MHz modulated by 1kHz at ±5kHz deviation.

(4) Set the r.f. gen. attenuator to 114dB (2μV e.m.f.).

(5) Observe the c.r.o. display and adjust 4T3 for minimum distortion.

ASSEMBLY 5 (SETTING OF SET SQU)

91. The SET SQU control (assembly 5) may need to be re-set when a new assembly 4, 5 or 6 is fitted.

a. E.U.T. connections.

CS7 to 1PL4/5
CTC20 to 1SK2 via the antenna adaptor
IF(C)5 to 1SK1

b. Method. (1) Set the t.r.e. and e.u.t. switches as follows:

CS	CTC	IF(C)	E.U.T.
1 MP 9-21	1 RX FM	1 OC	FSS: 42.050
2 MP V	2 QUIETING	3 Released	SSW: *
6 Released	3 Released	4 Released	
	4 Released	7 NORMAL	
	5 Depressed		
	6 Released		
	7 Released		
	8 Released		
	9 Released		
	10 Depressed		
	11 Released		
	12 AF		
	13 AF		
	14 CARRIER OFF		
	26 INT		

CAUTION: DO NOT depress CTC11 during this adjustment.

(2) Adjust CS3 for a supply voltage of LL 11.8V, UL 12.2V.

(3) Set the r.f. gen. to 42.050MHz modulated by 150 ±2Hz at 1.2kHz deviation.

(4) Depress CTC7.

(5) Set CTC15 to 50 (6dB); note the d.v.m. indication as 'reading A'.

(6) Set CTC14 to SIGNAL.

(7) Rotate the SET SQU control fully clockwise.

(8) Adjust the r.f. gen. attenuator for a d.v.m. indication the same as 'reading A'.

(9) Set the SSW on the e.u.t. to L.

(10) Slowly rotate the SET SQU control counter-clockwise until audio noise is produced (squelch opens).

(11) Set CTC15 to CARRIER OFF and confirm that the squelch closes.

ASSEMBLY 7 (SETTING OF TX AND RX OSCILLATORS)

92. If a new assembly 7 is fitted or assembly 10 is repaired, the Rx and Tx oscillators should be re-aligned.

a. E.U.T. connections.

CS7 to 1PL4/5
CTC20 to 1SK2 via the antenna adaptor
IF(C)5 to 1SK1

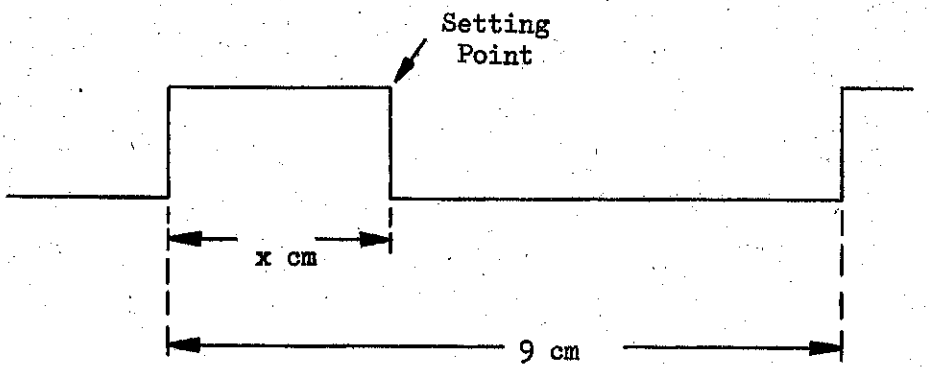
b. Method. (1) Set the t.r.e. and e.u.t. switches as follows:

CS	CTC	IF(C)	E.U.T.
1 MP 9-21	1 CW	1 OC	FSS: 37.500
2 MP V	2 AF LOAD 300	3 Released	SSW: *
6 Released	3 Released	4 Released	
	4 Released	7 NORMAL	
	5 Depressed		
	6 Released		
	7 Released		
	8 Released		
	9 Released		
	10 Depressed		
	11 Released		
	12 AF		
	13 AF		
	14 CARRIER OFF		
	26 INT		

(2) Adjust CS3 for a supply voltage of LL 11.8V, UL 12.2V.

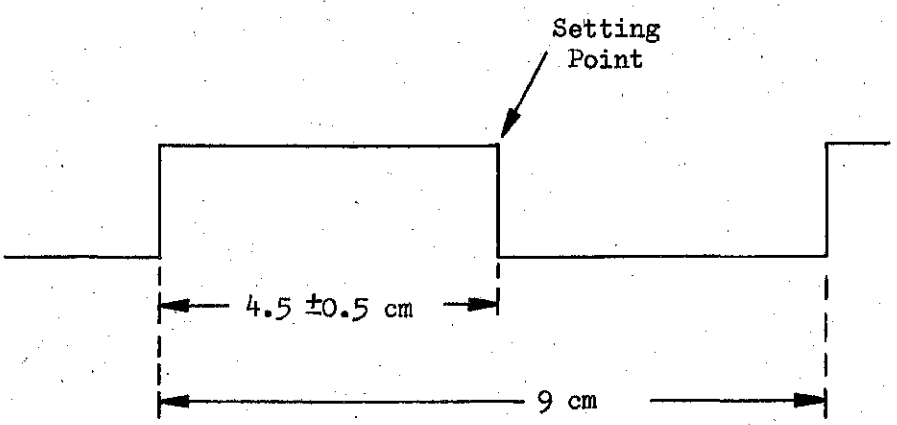
(3) Connect the c.r.o. CH1 input to either 3SK8/1 or 3TP1 via a high-impedance (X10-11pF) probe (when the motherboard with all its assemblies is in the box, remove assembly 8 for access to 3TP1).

(4) Set the c.r.o. to 'positive trigger', and check that positive polarity is displayed upwards. Adjust the timebase to 1 cycle equals 9 cm, and note that the display is of the form illustrated below.



The purpose of the following alignment procedure is to ensure that 'x' lies between 2 and 7 cm at all frequencies in both the 'receive' and 'transmit' modes.

(5) Adjust 7L1 at 37.50MHz and 7C3 at 46.50MHz to obtain the setting-point illustrated below; repeat as necessary.



(6) With the FSS on the e.u.t. set to each of the following frequencies, in turn, check that x lies between 2 and 7 cm; 37.000, 37.900, 42.000, 42.900, 46.000 and 46.900MHz.

(7) If operation (6) cannot be achieved, eg x is less than 2 cm, repeat operation (5) in order to obtain a slightly higher setting-point of say 4.8 ±0.5 cm. Repeat operation (6).

(8) Set CTC1 to CW TX; repeat operations (5) to (7) but making adjustments to 7L2 at 37.500MHz and 7C4 at 46.500MHz.

ASSEMBLY 8 (SETTING OF SET 150HZ AND SET MOD)

93. If a new assembly 8 or 7 is fitted, the SET 150HZ and SET MOD preset controls should be adjusted.

a. E.U.T. connections

CS7 to 1PL4/5
CTC20 to 1SK2 via the antenna adaptor
IF(C)5 to 1SK1

b. Method (1) Set the t.r.e. and e.u.t. switches as follows:

Note: These Pages 47-48 supersede Pages 47-48 Issue 1 dated Jul 77.
Items marked thus • have been amended.

CS	CTC	IF(C)	E.U.T.
1 MP 9-21	1 MOD S.T.	1 OC	FSS: 37.000
2 MP V	2 AF LOAD 300	3 Released	SSW: L
6 Released	3 Released	4 Released	
	4 Released	7 NORMAL	
	5 Depressed		
	6 Released		
	7 Released		
	8 Released		
	9 Released		
	10 Depressed		
	11 Released		
	12 AF		
	13 AF		
	14 SIGNAL		
	26 INT		

(2) Adjust CS3 for a supply voltage of LL 11.8V, UL 12.2V.

(3) Ensure that the 150Hz bandstop and 3kHz bandpass filters on the mod. meter are IN.

(4) Rotate the SET 150Hz control fully counter-clockwise in order to remove deviation caused by the 150Hz tone.

(5) Set the a.f. gen. to 1kHz ± 10% at 200mV e.m.f. (10mV p.d.).

(6) Depress and hold CTC11; set the FSS on the e.u.t. to 37.050, 39.050, 41.050, 43.050, 45.050 and 46.975 in turn. At the frequency which gives the highest deviation, adjust the SET MOD control to produce a deviation of ±5.7kHz.

(7) Set CTC1 to PILOT TONE.

(8) Set the 3kHz bandpass filter on the mod. meter to OUT.

(9) Note the deviation due to the noise, as indicated on the mod. meter.

(10) Set the 150Hz band-stop filter on the mod. meter to OUT.

(11) At the frequency which produced the highest deviation, adjust the SET 150Hz control to produce a deviation of ±2.3kHz plus the deviation due to the noise as determined in (9) above.

ASSEMBLY 10

94. After replacing a sub assembly within the synthesizer, the following alignment procedure should be carried out with the motherboard, with all assemblies, in the motherboard assembly test jig.

a. E.U.T. connections.

CS7 to 1PL4/5
CTC20 to 1SK2 via the antenna adaptor
IF(C)5 to 1SK1

b. Method (1) Set the t.r.e. and e.u.t. switches as follows:

CS	CTC	IF(C)	E.U.T.
1 MP 9-21	1 CW	1 OC	FSS: 46.000
2 MP V	2 AF LOAD 300	3 Released	SSW *
3 Released	3 Released	4 Released	
	4 Released	7 NORMAL	
	5 Depressed		
	6 Released		
	7 Released		
	8 Released		
	9 Released		
	10 Depressed		
	11 Released		
	12 ACCESS		
	13 AF		
	14 CARRIER OFF		
	26 INT		

(2) Adjust CS3 for a supply voltage of LL 11.8V, UL 12.2V.

(3) Replace the normal assembly screening cover with the dummy synthesizer cover (item 7, Table 7) screwed on.

Set 6 volts

(4) Connect the d.v.m. (CTC16/17) to 3SK7/8 (VT COARSE).

(5) Depress CTC3.

(6) Adjust 10aR18 (SET 6V) for a d.v.m. indication of LL 5.98V, UL 6.00V.

Set reference oscillator frequency

(7) Connect the counter (CTC21) to 10TP5 (REF) on the dummy cover.

(8) Adjust 10bC17 (SET REF) for a counter display of LL 3.200 000MHz, UL 3.200 100MHz.

Rx and Tx oscillators (assembly 7)

(9) The Rx and Tx oscillators in assembly 7 should now be aligned as in para 92.

Set Rx oscillator frequency

(10) Replace the synthesizer dummy cover with the normal screening cover.

(11) Set the FSS on the e.u.t. to 37.000MHz.

(12) Connect the counter (CTC21) to 3SK4/12 (RXO).

(13) Adjust 10aC1 ~~(RX)~~ to its mid-position and then adjust 10aL1 (RX) for a counter display of LL 58.399 800MHz, UL 58.400 100MHz.

(14) Set the FSS on the e.u.t. to 46.975MHz.

(15) Check that the counter display is LL 68.374 800MHz, UL 68.375 100MHz. If not, re-adjust 10aC1 and verify that the frequency is within the limits required with the FSS set to 37.000MHz.

Set Tx oscillator frequency

(16) Set the FSS on the e.u.t. to 46.975MHz.

(17) Set CTC1 to CW TX.

(18) Connect the counter (CTC21) to 3SK4/6 (TXO).

(19) Adjust 10aC13 ~~(TX)~~ to its mid position and then adjust 10aL6(TX) for a counter display of LL 46.974 800MHz, UL 46.975 100MHz.

(20) Set the FSS to 37.000MHz.

(21) Check that the counter display is LL 36.999 800MHz, UL 37.000 100MHz. If not, re-adjust 10aC13 and check at FSS of 46.975 that the frequency is within the required limits.

(22) Finally, check for the correct operation of the complete synthesizer by connecting the c.r.o. CH1 input to 3SK8/1 via a high-impedance (X10 - 11pF) probe; look for stable pulses of 3.125kHz on the c.r.o., for various combinations of the three FSS, on Tx and Rx (CTC11 depressed and released).

CRYSTAL AGEING ADJUSTMENT

95. The following adjustments may be made to compensate for crystal ageing when the transmit frequency exceeds ±500Hz of its nominal setting.

a. Resetting of Rx oscillator frequency as per para 94b (11) to (15).

b. Resetting of Tx oscillator frequency as per para 94b (16) to (21).

ADJUSTMENTS NOT NORMALLY CARRIED OUT

96. The pre-set controls for the following adjustments are inscribed and ringed in red on the RT-349, and SHOULD NOT be touched during normal repair and alignment procedures. However, if they are accidentally adjusted, they should be re-set as follows.

Set 9 volts (assembly 9)

97. a. E.U.T. connections.

CS7 to 1PL4/5
CTC20 to 1SK2 via the antenna adaptor
IF(C)5 to 1SK1

b. Method (1) Set the t.r.e. and e.u.t. switches as follows:

CS	CTC	IF(C)	E.U.T.
1 MP 9-21	1 CW	1 OC	FSS: 42.050
2 MP V	2 AF LOAD 300	3 Released	SSW: *
6 Released	3 Released	4 Released	
	4 Released	7 NORMAL	
	5 Depressed		
	6 Released		
	7 Released		
	8 Released		
	9 Released		
	10 Depressed		
	11 Released		
	12 AF		
	13 AF		
	14 SIGNAL		
	26 INT		

(2) Adjust CS3 for a supply voltage of LL 11.8V, UL 12.2V.

(3) Connect the d.v.m. (CTC 16/17) to 3SK5/2 (9V CONST); when the motherboard, with all its assemblies, is in the box assembly, remove assembly 5 for access to 3SK5/2.

(4) Depress CTC3.

(5) Adjust the SET 9V control for a meter indication of LL 9.00V, UL 9.10V.

Set low-battery-warning voltage (assembly 9)

98. a. E.U.T. connections

CS7 to 1PL4/5
IF(C)5 to 1SK1
Disconnect r.f. input

b. Method. (1) Set the t.r.e. and e.u.t. switches as follows:

CS	CTC	IF(C)	E.U.T.
1 MP 9-21	1 CW	1 OC	FSS: 42.050
2 MP V	2 AF LOAD 300	3 Released	SSW: L
6 Released	3 Released	4 Released	
	4 Released	7 NORMAL	
	5 Depressed		
	6 Released		
	7 Released		
	8 Released		
	9 Released		
	10 Depressed		
	11 Released		
	12 AF		
	13 AF		
	14 CARRIER OFF		
	26 INT		

(2) Adjust CS3 for a supply voltage of 9.6V.

(3) Rotate SET LB to the fully counter-clockwise position.

(4) Slowly rotate SET LB clockwise to the position where bursts of noise are heard in the loudspeaker.

Set audio output (assembly 5)

99. a. E.U.T. connections

CS7 to 1PL4/5
CTC20 to 1SK2 via the antenna adaptor
IF(C)5 to 1SK1

b. Method. (1) Set the t.r.e. and e.u.t. switches as follows:

CS	CTC	IF(C)	E.U.T.
1 MP 9-21	1 RX FM	1 OC	FSS: 42.050
2 MP V	2 AF LOAD 300	3 Released	SSW: *
6 Released	3 Released	4 Released	
	4 Released	7 NORMAL	
	5 Depressed		
	6 Released		
	7 Released		
	8 Released		
	9 Released		
	10 Depressed		
	11 Released		
	12 AF		
	13 AF		
	14 SIGNAL		
	26 INT		

CAUTION: DO NOT depress CTC11 during this test.

(2) Adjust CS3 for a supply voltage of LL 11.8V, UL 12.2V.

(3) Depress CTC7.

(4) Set the r.f. gen. to 42.050MHz modulated by 1kHz at ±5kHz deviation.

(5) Set the r.f. gen. attenuator to 60dB (1mV).

(6) Adjust the SET AF control for a d.v.m. indication of LL 520mV, UL 580mV.

Set 150Hz rejection (assembly 5)

100. Before attempting to adjust the SET REJ control, the SET AF procedure (para 99) must be carried out.

a. E.U.T. connections.

CS7 to 1PL4/5
CTC20 to 1SK2 via the antenna adaptor
IF(C)5 to 1SK1

b. Method. (1) Set the t.r.e. and e.u.t. switches as follows:

CS	CTC	IF(C)	E.U.T.
1 MP 9-21	1 RX FM	1 OC	FSS: 42.050
2 MP V	2 AF LOAD 300	3 Released	SSW: *
6 Released	3 Released	4 Released	
	4 Released	7 NORMAL	
	5 Depressed		
	6 Released		
	7 Released		
	8 Released		
	9 Released		
	10 Depressed		
	11 Released		
	12 AF		
	13 AF		
	14 SIGNAL		
	26 INT		

(2) Adjust CS3 for a supply voltage of LL 11.8V, UL 12.2V.

(3) Set the r.f. gen. to 42.050MHz modulated by 150 ±2Hz at ±1.5kHz deviation.

(4) Set the r.f. gen. attenuator to 60dB (1mV).

(5) Depress CTC7

(6) Adjust the SET REJ control for a minimum indication on the d.v.m.

Note: These Pages 53-56 supersede Pages 53-56 Issue 1 dated Jul 77.
Items marked thus ● have been amended.

FAULT FINDING

INTRODUCTION

101. Information is given for the location and correction of faults in accordance with the Field repair policy viz:

a. To assembly level within the RT-349.

b. To sub assembly level for assembly 10 (synthesizer).

c. To sub assembly level or mechanical parts for the box assembly.

Note: An enlarged version of Tels F 602, Fig 2001, RT-349 functional diagram, suitable for bench working, can be obtained on application to:

Commanding Officer,
Telecommunications and Radar Branch REME,
Leigh Sinton Road,
Malvern,
Worcs.

102. Initially, the following functional tests should be carried out in order to ascertain the nature of the fault; reference is then made to Table 5 for interpretation of the test results. The results of the actions specified in Table 5 lead to Table 6 which locates the faulty assembly. If assembly 10 is identified as faulty, paras 111 to 121 give the information required for fault-location to synthesizer sub assembly level.

FUNCTIONAL CHECK 1 (POWER OUTPUT)

103. a. Limits. With a d.c. supply of 12V ±0.2V, the transmitter power output shall lie between 130 and 350mW at any permitted frequency.

b. E.U.T. connections.

CS7 to 1PL4/5
CTC20 to 1SK2 via the antenna adaptor
IF(C)5 to 1SK1

c. Method (1) Set the t.r.e. and e.u.t. switches as follows:

CS	CTC	IF(C)	E.U.T.
1 MP 9-21	1 CW	1 OC	FSS: 42.050
2 MP V	2 AF LOAD 300	3 Released	SSW: *
6 Released	3 Released	4 Released	
	4 Released	7 NORMAL	
	5 Depressed		
	6 Released		
	7 Released		
	8 Released		
	9 Released		
	10 Depressed		

CS	CTC	IF(C)	E.U.T.
	11 Released		
	12 RF		
	13 AF		
	14 SIGNAL		
	26 INT		

(2) Adjust CS3 for a supply voltage of LL 11.8V, UL 12.2V.

(3) Depress CTC7.

(4) Depress and hold CTC11; note the following:

(a) the counter display shall be the nominal frequency setting on the e.u.t.

(b) the d.v.m. indication shall be LL 360mV (130mW) UL 592mV (350mW).

(5) Repeat the above procedure at frequency settings of 37.000 and 46.975MHz.

FUNCTIONAL CHECK 2 (150HZ MODULATION)

104. a. Limits. (1) The deviation of the transmitter output caused by the internal 150Hz tone shall be between ±1.55 and ±2.5kHz.

(2) The frequency of the internal tone shall be between 148 and 152Hz.

b. E.U.T. connections.

CS7 to 1PL4/5
CTC20 to 1SK2 via the antenna adaptor
IF(C)5 to 1SK1

c. Method. (1) Set the t.r.e. and e.u.t. switches as follows:

CS	CTC	IF(C)	E.U.T.
1 MP 9-21	1 PILOT TONE	1 OC	FSS: 42.050
2 MP V	2 AF LOAD 300	3 Released	SSW: L
6 Released	3 Released	4 Released	
	4 Released	7 NORMAL	
	5 Depressed		
	6 Released		
	7 Released		
	8 Released		
	9 Released		
	10 Depressed		
	11 Released		
	12 AF		
	13 AF		
	14 SIGNAL		
	26 INT		

(2) Adjust CS3 for a supply voltage of LL 11.8V, UL 12.2V.

(3) Ensure that the 150Hz bandstop filter on the mod. meter is IN and the 3kHz bandpass filter is OUT.

(4) Depress and hold CTC11 and note the mod. meter indication due to the noise.

(5) Switch the 150Hz bandstop filter to OUT and note the mod. meter indication due to the 150Hz squelch tone and noise.

(6) Calculate the deviation due to the 150Hz squelch tone only by subtracting the reading obtained in (5) from that obtained in (4) which shall be LL 1.55kHz UL 2.5kHz.

(7) Depress CTC11 and note the counter display which shall be LL 148Hz, UL 152Hz. Release CTC11.

FUNCTIONAL CHECK 3 (AUDIO MODULATION)

105. a. Limits. With an a.f. input of 3mV r.m.s. p.d., the transmitter deviation shall lie between 4.1 and 6.4kHz.

b. Connections.

CS7 to 1PL4/5
CTC20 to 1SK2 via the antenna adaptor
IF(C)5 to 1SK1

c. Method (1) Set the t.r.e. and e.u.t. switches as follows:

CS	CTC	IF(C)	E.U.T.
1 MP 9-21	1 MOD S.T.	1 OC	FSS: 42.050
2 MP V	2 AF LOAD 300	3 Released	SSW: L
6 Released	3 Released	4 Released	
	4 Released	7 NORMAL	
	5 Depressed		
	6 Released		
	7 Released		
	8 Released		
	9 Released		
	10 Depressed		
	11 Released		
	12 AF		
	13 AF		
	14 SIGNAL		
	26 INT		

(2) Adjust CS3 for a supply voltage of LL 11.8V, UL 12.2V.

(3) Ensure that the 150Hz bandstop filter on the mod. meter is IN.

(4) Set the a.f. gen. to produce a single tone of 1kHz at 60mV e.m.f. (3mV p.d.)

(5) Depress and hold CTC11; note the mod. meter indication which shall be LL ±4.1kHz UL ±6.4kHz.

FUNCTIONAL CHECK 4 (SIDETONE)

106. a. Limits. With an a.f. input of 1kHz ±10% at a level of 10mV r.m.s., the a.f. output into 300 ohms, with the e.u.t. set to any frequency, shall be between 240 and 360mV.

b. E.U.T. connections.

CS7 to 1PL4/5
CTC20 to 1SK2 via the antenna adaptor
IF(C)5 to 1SK1

c. Method Set the t.r.e. and e.u.t. switches as follows:

CS	CTC	IF(C)	E.U.T.
1 MP 9-21	1 MOD S.T.	1 OC	FSS: 42.050
2 MP V	2 AF LOAD 300	3 Released	SSW: L
6 Released	3 Released	4 Released	
	4 Released	7 NORMAL	
	5 Depressed		
	6 Released		
	7 Released		
	8 Released		
	9 Released		
	10 Depressed		
	11 Released		
	12 AF		
	13 AF		
	14 SIGNAL		
	26 INT		

(2) Adjust CS3 for a supply voltage of LL 11.8V, UL 12.2V.

(3) Set the a.f. gen. to produce a single tone of 1kHz at 200mV e.m.f. (10mV p.d.).

(4) Depress CTC7.

(5) Depress and hold CTC11; note the d.v.m. indication which shall be LL 240mV, UL 360mV.

FUNCTIONAL CHECK 5 (A.F. OUTPUT IN NOISE-ON (*) AND/OR L MODES)

107. a. Limits. With an r.f. signal of 1mV, modulated by both a 1kHz ±10% at ±5kHz and a 150Hz ±2Hz at ±1.5kHz deviation, the audio output in 'L' or '*' mode shall be between LL 460mV and UL 640mV into 300 ohms.

b. E.U.T. connections.

CS7 to 1PL4/5
CTC20 to 1SK2 via the antenna adaptor
IF(C)5 to 1SK1

c. Method. (1) Set the t.r.e. and e.u.t. switches as follows:

CS	CTC	IF(C)	E.U.T.
1 MP 9-21	1 RX FM	1 OC	FSS: 42.050
2 MP V	2 AF LOAD 300	3 Released	SSW: *
6 Released	3 Released	4 Released	
	4 Released	7 NORMAL	
	5 Depressed		
	6 Released		
	7 Released		
	8 Released		
	9 Released		
	10 Depressed		
	11 Released		
	12 AF		
	13 AF		
	14 SIGNAL		
	26 INT		

CAUTION: DO NOT depress CTC11 during this test.

(2) Adjust CS3 for a supply voltage of LL 11.8V, UL 12.2V.

(3) Depress CTC7.

(4) Set the r.f. gen. to 42.050MHz modulated by 1kHz ±10% at ±5kHz deviation and 150 ±2Hz at ±1.5kHz deviation.

(5) Set the r.f. gen. attenuator to 60dB (1mV).

(6) Note the d.v.m. indication which shall be LL 460mV, UL 640mV; check for the presence of a 1kHz tone in the loudspeaker.

(7) Set the SSW on the e.u.t. to L.

(8) Check that the d.v.m. indication is as in (6) above; also check for the presence of the 1kHz tone.

FAULT FINDING TO ASSEMBLY LEVEL

108. From the results of the previous functional tests, the nature of the fault is identified using Table 5; the last column of Table 5 indicates the action(s) to proceed to in Table 6 in order to rectify the fault. The motherboard with all assemblies must be fitted into the motherboard test jig (item 1, Table 2) when carrying out the actions in Table 6.

a. E.U.T. connections

CS7 to 1PL4/5
CTC20 to 1SK2 via the antenna adaptor
IF(C)5 to 1SK1

b. Method (1) Set the t.r.e. and e.u.t. switches as follows:

CS	CTC	IF(C)	E.U.T.
1 MP 9-21	1 CW	1 OC	FSS:) That position
2 MP V	2 AF LOAD 300	2 Released	) at which the
6 Released	3 Released	4 Released	) fault
	4 Released	7 NORMAL	SSW:) occurs.
	5 Depressed		
	6 Released		
	7 Released		
	8 Released		
	9 Released		
	10 Depressed		
	11 Released		
	12 ACCESS		
	13 ACCESS		
	14 CARRIER OFF		
	26 INT		

(2) Adjust CS3 for a supply voltage of LL 11.8V, UL 12.2V.

(3) Depress CTC3.

Table 5 - Fault identification

Fault ref.	R.F. power output?	Audio/squelch (150Hz) modulation on transmitted signal?	Sidetone?	Audio output in * Mode?	Proceed to Table 6, action No:-
A	No	-	No	No	1
B	No	-	No	Yes	22
C	No	-	Yes	Yes	27
D	No	No	Yes	No	43
E	Yes	No	Yes	Yes	31
F	Yes	Yes	No	Yes	37
G	Yes	Yes	Yes	No	38
H	Yes	Yes	No	No	35
J	Yes	No	No	No	42
K	Yes	No	Yes	No	44
L	Yes	No	No	Yes	30
	Fault description				
	Receiver faults				
M	No audio in L and W, but present in *.				46
N	Noise present in L and W modes.				46
O	Audio output at some frequencies only.				45
P	Low sensitivity.				41
Q	Audio distorted.				41
R	No difference between L and W positions of SSW.				49
	Transmitter faults				
S	R.F. power output at some frequencies only.				45
T	Low r.f. power output.				29
U	Audio distorted.				47
V	No difference between L and W positions of SSW.				48

FAULT RECTIFICATION

109. If, after replacing an assembly, no change results, ALWAYS REFIT THE ORIGINAL ASSEMBLY TO THE RADIO. Continuity and short-circuit (S/C) checks should be made with the multimeter set to the 'Ω' range, and the battery supply disconnected. In Table 6, the 'result' column gives the further action procedures for the 'Yes' and 'No' conditions. Where a possible double fault is indicated, (actions 26, 42, 43, 44), follow the first indicated action through to its conclusion in the Table before attempting the second action given.

Table 6 - Fault rectification

Action No	Action	Result and next action	
1	Disconnect 1PL3: check 1PL3 pin 1 for presence of +V BATT.	Yes 12	No 2
2	Check 1LK1 for continuity.	Yes 21	No 3
3	Renew 1LK1; connect 1PL3: fault cleared?	Yes 50	No 4
4	Check 1LK1 for continuity.	Yes 1	No 5
5	Set SSW to '0'. Check 3SK9/6 (9VRx) for S/C to earth.	Yes 16	No 6
6	Check 3SK8/7 (9VTx) for S/C to earth) SSW	Yes 17	No 7
7	Check 3SK9/11 (9V) for S/C to earth) to	Yes 18	No 8
8	Check 3SK9/12 (BATT) for S/C to earth) '0'	Yes 19	No 9
9	Check 3SK5/2 (9V CONST) for S/C to earth)	Yes 20	No 10
10	Insert new assembly 9: fault cleared?	Yes 50	No 11
11	Remove test point location overlay and check appropriate connections.	- -	- -
12	Connect the d.v.m. (CTC16/17) to 3SK9/6 (9VRx). Check for 9V.	Yes 13	No 10
13	Connect the d.v.m. (CTC16/17) to 3SK9/11 (9V). Check for 9V.	Yes 14	No 10
14	Connect the d.v.m. (CTC16/17) to 3SK9/3 (L_k). Check for OV (L_k information).	Yes 10	No 15

Table 6 (continued)

Action No	Action	Result and next action	
15	Remove test cover and check wiring of flying leads 10SK8 (VT COARSE), 10SK10 (VT FINE), 10SK13 (VCO); attempt alignment of oscillators (para 92); if unsuccesful, fit new assembly 7. Fault cleared?	Yes 50	No Syn†
16	Remove, in turn, assemblies 4, 6 and 7 and disconnect flying lead 10SK9 (9VRx) until S/C disappears; insert new assembly, as appropriate, or fault-find within assembly 10 (para 111 to 121). Fault cleared?	Yes 50	No 10
17	Remove, in turn, assemblies 7 and 8 and disconnect flying lead 10SK6(9VTx) until S/C disappears; insert new assembly, as appropriate, or fault-find within assembly 10. Fault cleared?	Yes 50	No 10
18	Remove test cover and disconnect flying lead 10SK11(9V). If S/C disappears, fault-find within assembly 10.	Yes Syn†	No 10
19	Remove, in turn, assemblies 4 and 8 and disconnect flying leads 10SK12 (+V BATT) and 10SK2 (+V BATT O/P) until S/C disappears; insert new assembly as appropriate or fault-find within assembly 10. Fault cleared?	Yes 50	No 10
20	Remove assembly 5; if S/C disappears, fit new assembly 5; fault cleared?	Yes 50	No 10
21	Check battery connections and wiring continuity of the audio socket, SSW and wiring harness assembly: fault cleared?	Yes 50	- -
22	Connect the d.v.m. (CTC16/17) to 3SK9/3 (L_k); depress CTC11 and check for 0V (L_k information correct).	Yes 26	No 23
23	Connect the d.v.m. (CTC16/17) to 3SK8/7 (9VTx); depress CTC11 and check for 9V.	Yes 15	No 24
24	Check 3SK8/7 (9VTx) for S/C to earth.	Yes 17	No 25
25	Insert new assembly 9: fault cleared?	Yes 50	- -

† para 111 to 121

Table 6 (continued)

Action No	Action	Result and next action	
26	Possible double fault: carry out 27 and then 37.	- -	- -
27	Connect the d.v.m. (CTC16/17) to 3SK9/12 (+V BATT) and check for battery volts.	Yes 28	No 29
28	Connect the d.v.m. (CTC16/17) to 3SK9/1 (T_w); depress CTC11 and check for 9V.	Yes 29	No 10
29	Insert new assembly 4, followed by 7 if necessary; fault cleared?	Yes 50	- -
30	Insert new assembly 8: fault cleared?	Yes 50	No 33
31	Insert new assembly 8: fault cleared?	Yes 50	No 32
32	Insert new assembly 7: fault cleared?	Yes 50	- -
33	Check continuity between 3SK8/11 (mic) and 1SK1, pin A.	Yes 50	No 34
34	Insert new audio socket, SSW and wiring harness assembly: fault cleared?	Yes 50	- -
35	Insert new assembly 5: fault cleared?	Yes 50	No 36
36	Check continuity between 3SK5/4 (AF) and 1SK1, pin D.	Yes 25	No 34
37	Insert new assembly 8, followed by assembly 5 if necessary; fault cleared?	Yes 50	No 11
38	Connect the d.v.m. (CTC16/17) to 3SK9/6 (9VRx) and check for 9V.	Yes 39	No 40
39	Connect the d.v.m. (CTC16/17) to 3SK9/3 (L_k) and check for OV (L_k information correct).	Yes 41	No 15
40	Check 3SK6/9 (9VRx) for S/C to earth.	Yes 16	No 10
41	Insert new assemblies 4, 6 and 5, in turn, and check that radio is satisfactory.	Yes 50	No 11
42	Possible double fault: carry out 38 then 30.	- -	- -
43	Possible double fault: carry out 27 then 38.	- -	- -
44	Possible double fault: carry out 38 then 31.	- -	- -

Note: These Pages 63-64 supersede Pages 63-64 Issue 1 dated Jul 77. Items marked thus ● have been amended.

Table 6 (continued)

Action No	Action	Result and next action	
45	Try re-alignment of oscillators, or fitting new assembly 7 and/or fault-find within assembly 10; fault cleared?	Yes 50	- -
46	Try re-setting squelch level (SET SQU) or fitting new assembly 5, followed by assembly 9; fault cleared?	Yes 50	- -
47	Insert new assembly 8, followed by assembly 7: fault cleared?	Yes 50	- -
48	Insert new assembly 8: fault cleared?	Yes 50	No 11
49	Insert new assembly 5: fault cleared?	Yes 50	No 11
50	Carry out specification tests after any necessary re-alignment.		

110. Having located and replaced faulty assemblies, check alignment and re-align as necessary.

● FAULT FINDING WITHIN ASSEMBLY 10 (SYNTHESIZER) (Fig 6, 2003 and 2005)

111. Fault finding is carried out with the motherboard, with all assemblies, fitted into the motherboard test jig (item 1, Table 2); refer to para 33 and ● Fig 6.

112. a. E.U.T. connections

CS7 to 1PL4/5
CTC20 to 1SK2 via the antenna adaptor
IF(C)5 to 1SK1

b. Method (1) Set the t.r.e. and e.u.t. switches as follows:

CS	CTC	IF(C)	E.U.T.
1 MP 9-21	1 CW	1 OC	FSS: See text
2 MP V	2 AF LOAD 300	2 Released	SSW: *
6 Released	3 Released	4 Released	
	4 Released	7 NORMAL	
	5 Depressed		
	6 Released		
	7 Released		
	8 Released		
	9 Released		
	10 Depressed		
	11 Released		
	12 ACCESS		

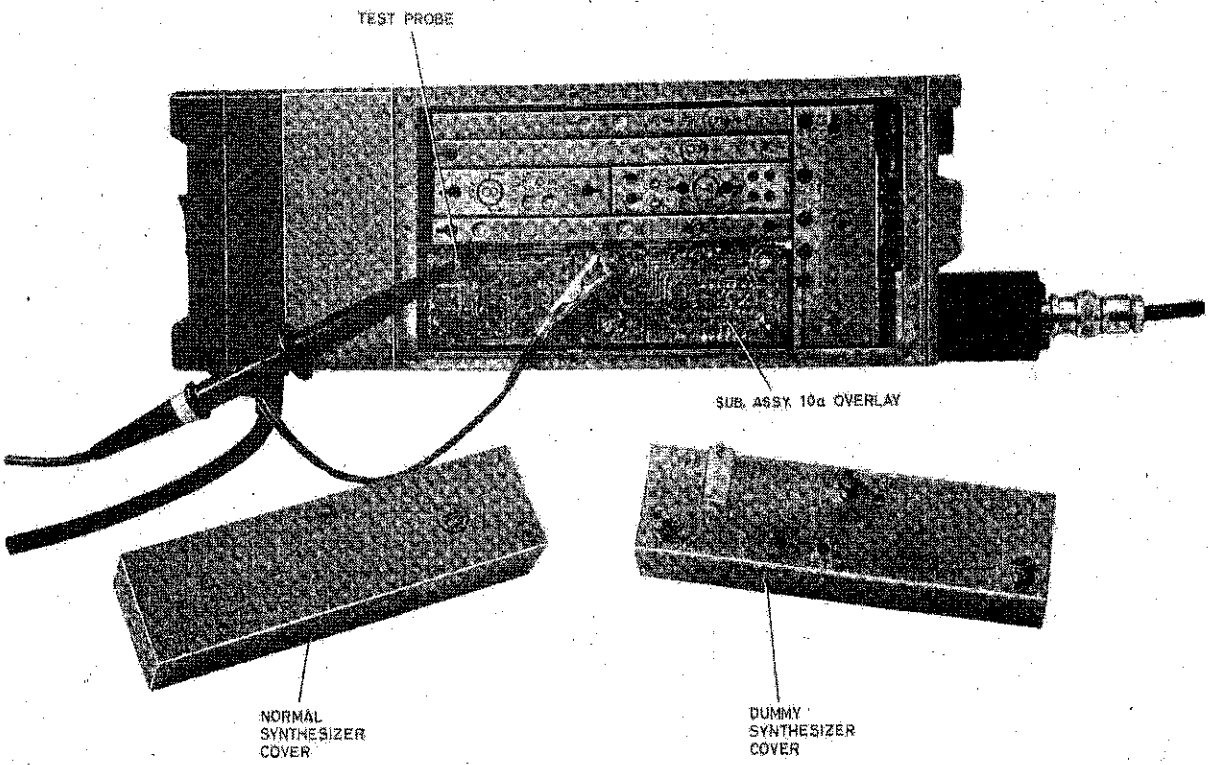


Fig 6 - Fault location : synthesizer (assembly 10)

CS CTC IF(C) E.U.T.

13 ACCESS
14 CARRIER OFF
26 INT

(2) Adjust CS3 for a supply voltage of LL 11.8V, UL 12.2V.

(3) Depress CTC3.

113. Remove the synthesizer cover and fit the sub assy 10a overlay (item 8, Table 2). Carry out a physical check of all flying leads to the synthesizer.

114. Connect the c.r.o. CH1 input to 3SK8/1 (3TP1) (comparison frequency output) on the motherboard via a high-impedance (X10 - 11pF) probe; check for stable 3.125kHz pulses, with CTC11 depressed and released. Repeat these checks for a number of settings of the FSS.

115. If in para 114, the pulses are present in only the transmit or receive mode, connect the d.v.m. (CTC16/17) to 10aTP2 and check for 9VRx and to 10aTP3 and check for 9VTx with CTC11 depressed. If the correct voltage is present, board 10a is faulty (Tx or Rx oscillator). Fit the dummy synthesizer cover (item 7, Table 2) and attempt to align the faulty oscillator (para 94(11) to (15) and/or (16) to (21)); if the oscillator cannot be aligned, change board 10a.

116. If, in para 114, the pulses are not present at certain MHz settings of the FSS, connect the d.v.m. (CTC16/17) to 3SK7/8 (V_T COARSE STEP VOLTS) and, for these FSS settings, refer to F 602, Table 2004 and check for a correct d.v.m. indication; if incorrect, change board 10b.

117. If, in para 116, the step voltages measured are present and correct, observe the effect of various settings of the 100kHz and kHz switches; if the synthesizer fails at certain settings, proceed as follows:

a. Set the MHz switch to one of the settings (para 114) which gave the expected step voltages.

b. Set the 100kHz and kHz switches to one of the positions which indicated a fault condition.

If, on each of the MHz steps, the 100kHz and kHz do not function correctly, the data information is incorrect. Remove and dismantle the synthesizer, desolder the appropriate data line. Check the switch data (Table 2003, F 602); if this data is correct, board 10b is faulty.

118. If, in para 114, the pulses are not present at any frequency setting in both the transmit and receive modes, connect the d.v.m. (CTC16/17) to 10aTP4 and check for 9 volts and to 10aTP10 and check for 6 volts. If 9 volts is present but 6 volts is incorrect, attempt to re-set 6 volts (para 94); if unsuccessful, change board 10a.

119. If 6 volts is present, check the divide-by-four pre-scaler as follows:

a. Disconnect the flying lead at 10SK13 (VCO IN).

b. To this flying lead, or to 10aTP1, connect the r.f. gen. set to 38.475MHz c.w. at 100mV e.m.f.; the r.f. gen. connection is made as follows:

(1) Disconnect the coaxial lead from the r.f. gen. r.f. fuse to the CTC; take the r.f. gen. output direct from the r.f. fuse.

(2) Set the LOCAL/REMOTE/MODE switch, on the Signal Processor Unit (9062), to LOCAL.

(3) Set the MODE switch, on the 9062, to CW.

(4) Set the ATTENUATOR, on the 9062, to 20dB (100mV).

(5) When the following check has been carried out, remake the original connection and switch settings on the r.f. gen.

c. Connect the counter (CTC21) to 10aTP6.

d. Depress CTC11.

e. Check for a 1MHz output (see Note) at 10aTP6; if correct, change board 10b, or if not, change board 10a.

Note: This particular frequency of 1MHz is a result of the r.f. gen. setting of 38.475MHz; it can be derived from the following expression:-

$$\frac{f_1 - f_2}{4}$$

where f_1 = r.f. gen. frequency.
and f_2 = the Transmit Crystal Oscillator frequency, ie 34.475MHz.

Hence, signal frequency at 10aTP6

$$= \frac{38.475-34.475}{4} = 1\text{MHz}$$

120. If the radio does not function, and a synthesizer fault is suspected, but the check in para 114 proves that the synthesizer is operational, proceed as follows:

a. Disconnect flying lead 10SK3.

b. To this flying lead, connect the d.v.m. (CTC16/17).

c. Measure the lock output which should be zero; if 6.0 volt, the lock pulse monostable is faulty and board 10a should be changed.

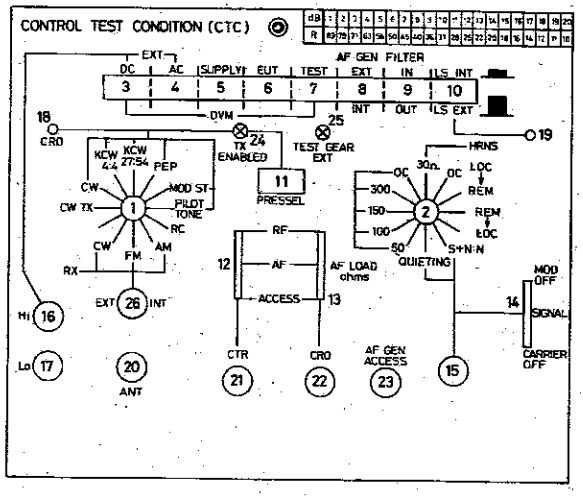
121. If when switching from 'receive' to 'transmit', or vice-versa, the audio does not momentarily mute, proceed as follows:

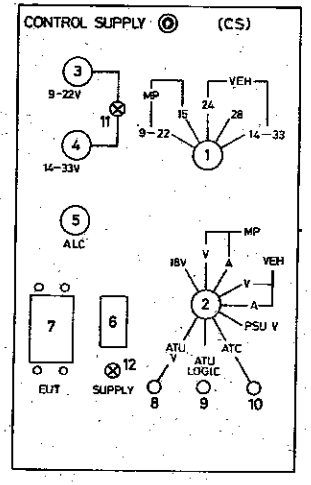
a. Disconnect flying lead at 10SK3.

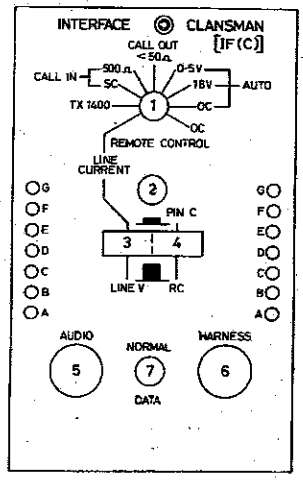
b. To this flying lead connect the d.v.m. (CTC16/17).

c. Measure the lock output which should be zero.

d. Disconnect 10SK8 (VT COARSE) which artificially unlocks the synthesizer; note the d.v.m. reading which would be 6 volts. If not, the lock pulse monostable is faulty and hence board 10a should be changed.







TEST RIG ELECTRONIC TEST CONTROLLER AS USED IN CLANSMAN.

2581/79

Fig 7 - Test rig electronic controller

4651/Tels

END

CONDITIONS OF RELEASE

1. [redacted]

[redacted]

UK/PRC 349

TECHNICAL HANDBOOK - FIELD REPAIR

ERRATA

Note...

This Page 0 is to be filed immediately in front of Page 1, Issue 1, dated Feb 95.

1. The following amendments must be made to the regulation:

Delete:	Page 1, Issue 1 dated Feb 95.
Insert:	Page 1, Issue 2 dated May 02.
Delete:	Page 5, Issue 1 dated Feb 95.
Insert:	Page 5, Issue 2 dated May 02.
Delete:	Page 9, Issue 1 dated Feb 95.
Insert:	Page 9, Issue 2 dated May 02.
Delete:	Page 10, Issue 1 dated Feb 95.
Insert:	Page 10, Issue 2 dated May 02.
Delete:	Pages 28-30, Issue 1 dated Feb 95.
Insert:	Pages 28-30, Issue 2 dated May 02.
Delete:	Pages 33-35, Issue 1 dated Feb 95.
Insert:	Pages 33-35, Issue 2 dated May 02.
Insert:	Pages 75 to 84, Issue 2 dated May 02.

END

CONDITIONS OF RELEASE

1. [redacted]

[redacted]

UK/PRC-349

TECHNICAL HANDBOOK - FIELD REPAIRS

CONTENTS

CONTENTS (continued)

CONTENTS (continued)

CONTENTS (continued)

CONTENTS (continued)

INTRODUCTION

HAZARDOUS SUBSTANCES

1 Before using any hazardous substance or material, the user must be conversant with the safety precautions and first aid instructions:

1.1 On the label of the container it was supplied in.

1.2 On the material Safety Data Sheet.

1.3 In local Safety Orders and Regulations.

WARNING

TOXIC SUBSTANCE. IN ASSEMBLY 4 OF THIS EQUIPMENT, THE RF TRANSISTOR HEATSINK CONTAINS BERYLLIUM OXIDE. IN CERTAIN CIRCUMSTANCES, IT CAN CONSTITUTE A HEALTH HAZARD. BEFORE WORKING ON THE EQUIPMENT, CONSULT HEALTH AND SAFETY MANAGEMENT IN THE EQUIPMENT SUPPORT ORGANISATION AND ES/REME UNITS - ARMY CODE No 63723, CHAPTER 15 - BERYLLIUM HAZARDS AND PRECAUTIONS.

SCOPE OF REPAIRS

2 This regulation gives repair information for use by Field and Base workshops. Field repair is confined to the replacement of faulty assemblies except for the box assembly and the synthesizer where repair is by replacement of faulty sub-assemblies, mechanical parts and certain discrete components. Base repair is not envisaged, but when equipments are presented to a Base workshop, the level of repair will be to the standard of that at Field level.

SPECIFICATION TESTING, ALIGNMENT AND REPAIR PROCEDURES

3 The procedure contained in this Part 2 of this regulation involves the use of the 8920C in the manual mode of operation and the RT-349 Field Repair Test Kit (FRTK). Specification testing of the RT-349 can be carried out with the equipment sealed (lid fitted) or unsealed (lid removed). With the exception of tests 9 and 11, all other specification tests can be carried out with the motherboard (with all assemblies) mounted in the motherboard assembly test jig (Table 2, Serial 1). All RT-349 alignment procedures may be carried out with the equipment unsealed (lid removed) except the adjustments associated with assembly 10 which are detailed in Para 167 to 172 (to gain access to test points 3TP1 and 3TP2, assembly 8 has to be withdrawn). All alignment procedures may also be carried out when the motherboard (fitted with all assemblies) is mounted in the motherboard assembly test jig. When the motherboard and all assemblies is refitted into the box assembly the SET SQU preset control setting may need to be rechecked.

RADIO TEST SYSTEM 8920C

4 The Radio Test System 8920C is fully described in the 8920C Operating Manual, and no attempt is made in this regulation to describe 8920C functions.

5 When referring to the 8920C, the following abbreviations are used throughout this document:

5.1	DMM	Digital multimeter
5.2	CRO	Cathode ray oscilloscope
5.3	EUT	Equipment under test
5.4	CIP	Connector interface panel
5.5	RIU	Radio interface unit
5.6	PSU	Farnell power supply unit
5.7	LL	Lower limit
5.8	UL	Upper limit

6 Controls and connectors on the 8920C equipment are referred to by their panel designations (e.g. AF GEN output on the 2955B unit).

7 This document details the 8920C control settings and connections required to carry out each specific function. For specification testing, the 8920C control settings and connections are repeated at the start of each test to allow any particular test to be carried out in isolation.

8 Range settings of individual test equipments (e.g. DMM, CRO) are not detailed unless specifically required. Instructions are given as '... DMM shall indicate ... ', and correct operation and range selection is implied.

USE OF THE 8920C IN THE AUTOMATIC MODE

9 Specification testing for inspection purposes will normally by carried out using the 8920C in the automatic mode. In Part 4 of this regulation, the test numbers associated with the automatic tests are cross-referenced to the paragraph numbers in Part 2 of this regulation.

GENERAL REPAIR INFORMATION

RT-349 INTERNAL IDENTIFICATION

10 The following colour coding, symbols and inscriptions are used to provide internal identification within the RT-349:

10.1 White circles : to identify test-points on the motherboard.

10.2 Green circles or inscriptions : to identify screws or controls on assemblies which may be removed or adjusted at field repair level.

10.3 Red circles and inscriptions : to identify preset controls which should never need to be adjusted.

FIXING OF LABELS

11 The nameplate label and the modification label (recessed) are both self adhesive, after removing the protective backing paper. The serial number should be suitably marked on the nameplate label **before** fixing to the box of the radio.

REPAINTING

12 At field workshop level, re-touching of damaged surfaces may be carried out, but not repainting. Only the following paints are to be used:

12.1 H1a/8010-99-224-2079 paint, priming, 1.5 litre pack.

12.2 H1a/8010-99-224-8663 paint, finishing polyurethane, matt finish, deep bronze green, 1.5 litre pack.

13 The paints specified in Para 12.1 and 12.2 are two-part paints which must be mixed in the proportions as printed on the package. Do not mix more than is necessary as the 'mixed' life is 8 hours at 20°C or 4 hours at 33°C. Do not apply the paint in conditions of low temperature or high humidity.

FIELD REPAIR EQUIPMENT

14 The items of test equipment shown in Table 1 are required to carry out the procedures contained in this Part 2 of this regulation.

TABLE 1 FIELD REPAIR EQUIPMENT

Serial (1)	Cat No (2)	Designation (3)
1	Z4/6625-99-152-4750	8920C Radio test system
2	Z4/6625-99-744-2009	Digital Voltmeter (HP34401A)
3	Z4/6625-99-883-8750	Oscilloscope GP 100 MHz
4	W3/4440-99-114-0440	Dehumidifier Desiccant series 1, Mk 3
5	Z4/6625-99-200-2271	Leak locator CT509
6	Z4/6625-99-965-7922	RT-349 Field Repair Test Kit (FRTK)
7	F1/5180-99-120-3922	Tool kit telecom (technician)
8	F1/5180-99-445-8208	Tool kit telecom (supplementary)
9	F1/3439-99-136-7370	Desoldering set electrical
10	TBA	Power lead (Part of Serial 1)
11	Z4/6625-99-940-4784	Audio lead (Part of Serial 1)
12	Z4/6625-99-125-8252	BNC-to-BNC coaxial lead, 1m (Part of Serial 1)

FIELD REPAIR TEST KIT (FRTK)

15 When carrying out alignment, fault diagnosis or repairs, the RT-349 motherboard (with all assemblies) can be removed from the RT-349 box assembly and inserted into the motherboard assembly test jig (Table 2, Serial 1). Table 2 lists of the items contained in the FRTK (Fig 1).

TABLE 2 FRTK ITEMS LIST

Serial (1)	NSN (2)	Designation (3)
1	6625-99-649-5580	Motherboard assembly test jig
2	5120-99-649-5581	Assembly extractor tool
3	6625-99-649-5582	Antenna adaptor (2 off)
4	6625-99-649-5584	Power supply lead
5	6625-99-649-5585	Power supply lead
6	6625-99-649-5586	Dummy synthesizer cover
7	6625-99-649-5587	Synthesizer sub-assembly 10a overlay
8		Trimming tools:
	5120-99-622-5472	Metal tipped
	7520-99-620-6308	Pencil clutch
	5120-99-649-5588	Plastic tips for pencil clutch
9	6625-99-649-6593	Synthesizer-to-motherboard mechanical alignment jig
10	5120-99-649-6594	Mandrel
11	6625-99-649-8719	Motherboard test plug
12	6625-99-649-5605	Carrying case
13	6625-01-131-3383	Probe assembly

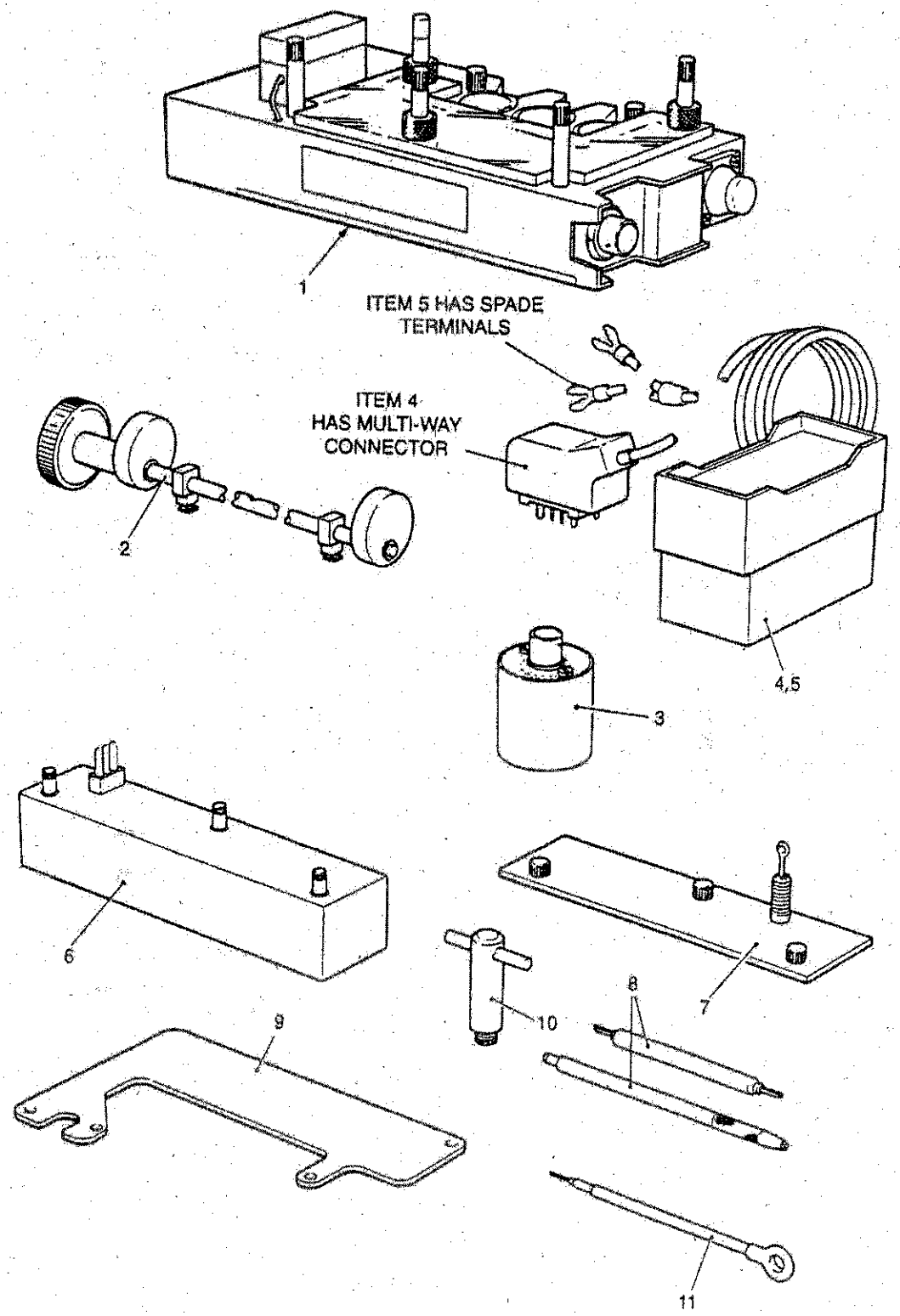


Fig 1 RT-349 Field repair test kit (FRTK)

16 When the motherboard (with all assemblies) is fitted into the motherboard assembly test jig (Table 2, Serial 1), the frequency setting switches (FSS) and the system switch (SSW) are controlled by knobs on the test jig in the same manner as the knobs on the RT-349 box assembly. The battery connections (1PL4/5), the audio socket (1SK1) and the antenna socket (1SK2) directly replace those on the RT-349 box assembly and are given the same designations.

17 The extractor tool (Table 2, Serial 2) is used to withdraw motherboard sub-assemblies 4 to 9 when the motherboard assembly (assembly 3) is fitted into either the RT-349 box or the test jig.

18 The antenna adaptor (Table 2, Serial 3) screws into the antenna socket on either the RT-349 radio or the motherboard assembly test jig; it is used to provide the Equipment Under Test (EUT) with a 50 ohm BNC connection for test equipment.

19 The power lead (Table 2, Serial 4) is used to connect either an RT-349 or a motherboard assemble test jig to the d.c. output on the 8920C Connector Interface Panel (CIP).

20 The power lead (Table 2, Serial 5) serves the same purpose as item 4, but connects any permitted d.c. supply where protection is not provided against transients, overvoltage and reverse polarity.

21 The dummy synthesizer cover (Table 2, Serial 6) provides access to preset controls and a test point which are required for alignment purposes following repair. When alignment is completed, the dummy cover is removed and the normal cover is re-fitted.

22 The synthesizer sub-assembly 10a overlay (Table 2, Serial 7) is fitted over the tracks of sub-assembly 10a to provide access to test points and help prevent accidental short-circuits.

23 The synthesizer/motherboard mechanical alignment jig (Table 2, Serial 9) is used when re-fitting a synthesizer (assembly 10) to the motherboard following repair.

24 The Mandrel (Table 2, Serial 10) is used to replace the battery fixing insert following removal of a damaged item.

25 The trimming tools (Table 2, Serial 8) consist of a metal-tipped, double-ended type, and a clutch pencil with a 'stick' of plastic-tipped screwdriver inserts. The button at one end of the pencil is pressed in order to open the clutch jaws for fitting an insert.

DRYING AND SEALING

26 Upon receipt of an RT-349 for repair, proceed as follows:

26.1 Pressurise the equipment to 5 lbf/in^2 using dry air.

26.2 Using a leak locator (Table 1, Serial 5), carry out a dip test in a water tank and, if necessary, replace the appropriate seals or gaskets. The addition of a wetting agent will assist in the detection of leaks.

26.3 In the driest possible conditions, open the equipment and carry out all obvious repairs and replacements.

26.4 Place the opened equipment in the dehumidifier (AESP 4440-A{100 or 106}) to dry out for at least one hour at 50°C.

26.5 Following a cooling period, carry out electrical tests, repairs and re-alignment, as necessary.

26.6 As soon as possible, following re-alignment, place the equipment in the oven for 15 minutes at 50°C.

26.7 Fit a new silica-gel sachet (Z1/4440-99-013-9203).

26.8 If necessary, fit new gaskets smeared with grease (XG271).

26.9 Seal the RT-349 in its box.

26.10 Using dry air from the dehumidifier, pressurise the radio to 5 lbf/in^2.

26.11 Repeat the dip test, using the leak locator, and check that no air bubbles appear.

SOLDERING AND DESOLDERING

27 The following caution should be observed to prevent equipment damage when soldering or desoldering.

CAUTION

EQUIPMENT DAMAGE. To prevent damage to the printed circuit boards when soldering or desoldering by prolonged application of heat, short circuits or electrostatic build-up, the following precautions must be observed:

a. Use the suction soldering tool for desoldering when dismantling the synthesizer.

b. Ensure that the soldering iron and suction soldering tool are properly earthed.

c. Select a soldering bit which is compatible with the size of joint and not greater in diameter than the land between the pins and the track.

d. The suction soldering tool must be carefully maintained. The hole in the bit must be kept clear and the extracted solder sump must be emptied regularly.

e. The physical size of the synthesizer (assembly 10) and the close proximity of the adjacent soldered connections require that extreme care must be taken when soldering or desoldering.

REMOVAL AND REPLACEMENT PROCEDURES

REMOVAL

RT-349 box lid

28 To remove the RT-349 box lid, proceed as follows:

28.1 Remove the ten 2.5 mm pan-head screws and crinkle washers that secure the lid to the box, and remove the lid and sealing gasket.

Assemblies 4 to 9

CAUTION

EQUIPMENT DAMAGE. Attempted removal of assemblies without using the extractor tool can cause bending or damage to the assembly connecting pins.

29 Assemblies 4 to 9 have extraction keyhole slots in the screening covers. Spigots on the assembly extractor tool (Table 2, Serial 2) engage with the key-hole slots to withdraw the assemblies. The adjustable cam on the assembly extractor tool is set to one of the two following positions:

29.1 To the extreme end stop for assemblies 5 to 9.

29.2 To the centre stop for assembly 4.

30 To remove assemblies 4 to 9, proceed as follows:

30.1 Turn the two cams on the assembly extractor tool so that the white dot is uppermost.

30.2 With reference to Fig 2, place the assembly extractor tool above the assembly to be withdrawn with each cam in contact with the machined face on the box or the motherboard assembly test jig (Table 2, Serial 1).

30.3 Locate and lock the two spigots into the two keyhole slots.

30.4 Turn the knurled knob until the pins are withdrawn from the motherboard.

Motherboard (with all assemblies)

31 To remove the motherboard (with all assemblies) from the RT-349 box, proceed as follows:

31.1 Set the FSS to 37.000 MHz.

31.2 Holding the motherboard (with all assemblies) in the RT-349 box assembly, remove the four 3.0 mm pan-head screws which are recessed into the exterior of the box.

31.3 Remove the four 3.0 mm socket-head screws and Dowty sealing washers which are located in the four corners of the recess that accommodate the three Frequency Setting Switch knobs.

31.4 Gently ease out the motherboard (with all assemblies) from the box. This will disengage the spring connector on assembly 4 from the antenna socket pin. The motherboard (with all assemblies) can now be completely withdrawn from the box, but remains attached to the box by the cable form.

31.5 Carefully remove the cableform plug from the motherboard assembly.

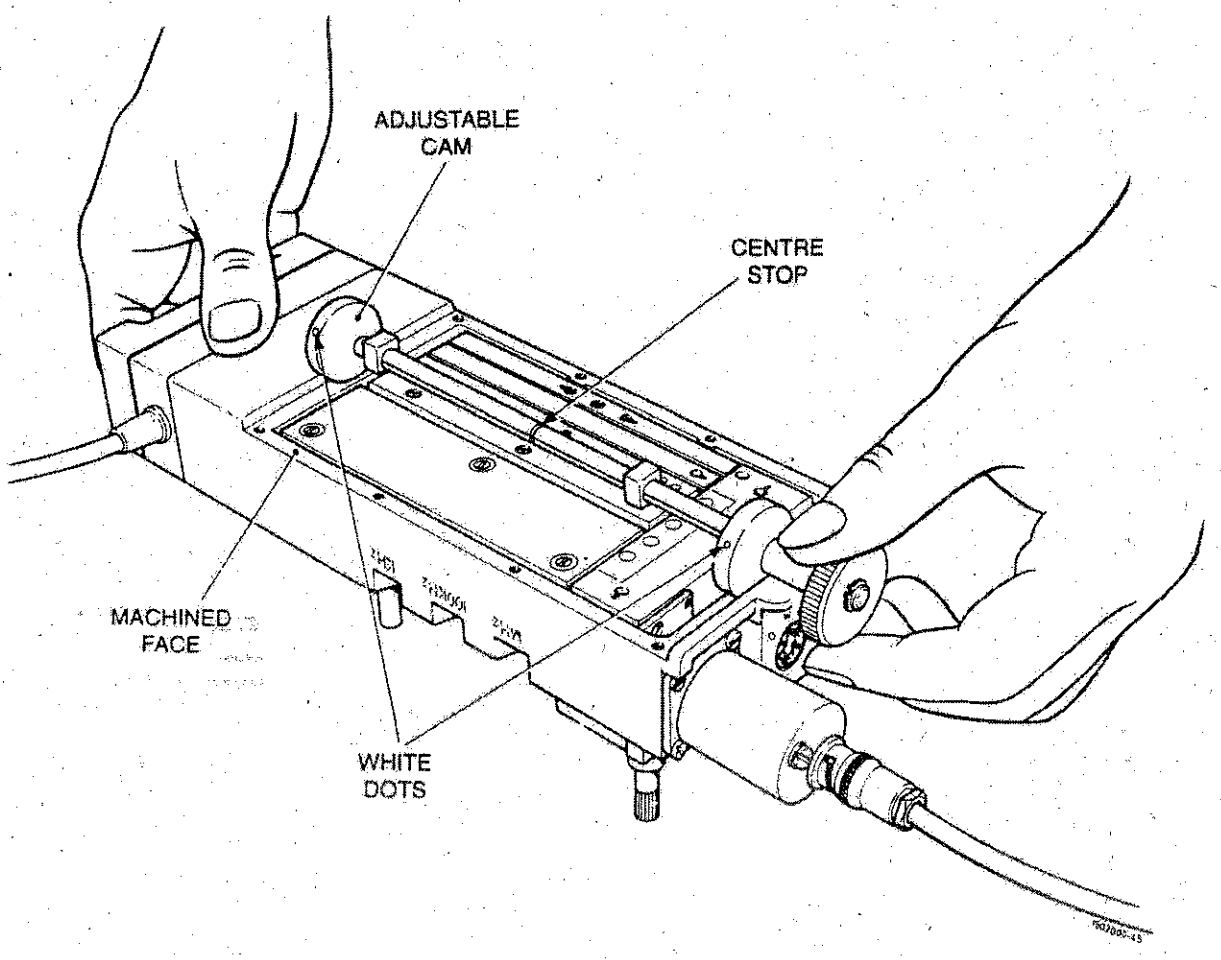


Fig 2 Use of assembly extractor tool

Synthesizer (assembly 10)

32 To remove the synthesizer (assembly 10), proceed as follows:

32.1 Remove the motherboard (with all assemblies) (Para 31).

32.2 Prise off all clips from the motherboard socket that terminate the flying leads (EMER Tels F 602, Fig 2005).

32.3 Remove the five 2.5 mm pan-head screws and washers securing the synthesizer to the motherboard and remove the synthesizer.

Synthesizer sub-assemblies 10a, 10b and 10c

CAUTION

EQUIPMENT DAMAGE. To provide maximum protection against electrostatic build-up prior to dismantling the synthesizer (assembly 10) or prior to re-assembly when new frequency setting switches (FSS) are to be fitted to sub-assembly 10c, the three switches must be set to the positions representing 45.975 MHz.

33 To remove synthesizer sub-assemblies 10a, 10b and 10c, proceed as follows:

33.1 Set the FSS to represent 45.975 MHz.

33.2 Refer to EMER Tels F 602, Fig 2010, locate the FSS and note that the index marks on the fixed and moveable parts of each switch are aligned, this is 37.000 MHz position.

33.3 Turn each switch in a clockwise direction, as follows:

33.3.1 MHz switch : to the 8th position from the present setting.

33.3.2 100 kHz switch : to the 9th position from the present setting.

33.3.3 kHz switch : to the 3rd position from the present setting.

Synthesizer sub-assembly 10a

34 To remove synthesizer sub-assembly 10a, proceed as follows:

34.1 Remove the synthesizer sub-assemblies 10a, 10b and 10c (Para 33).

34.2 Remove the cover (three screws).

34.3 Unsolder the flying leads (numbered 3 and 13) from sub-assembly 10a.

34.4 Unsolder (or cut) the eight interconnecting leads between sub-assemblies 10a and 10b.

34.5 Remove the three screws and washers securing sub-assembly 10a to sub-assembly 10b, and remove sub-assembly 10a.

Synthesizer sub-assemblies 10b and 10c

35 To remove synthesizer sub-assemblies 10b and 10c, proceed as follows:

35.1 Remove sub-assembly 10a (Para 34).

35.2 Unsolder the remaining six flying leads (numbered 1, 6, 8, 9, 10 and 11) from sub-assembly 10b.

35.3 Unsolder (or cut) the twelve interconnecting leads between sub-assembly 10b and sub-assembly 10c.

35.4 Remove the six tapped spacers and crinkle washers and remove sub-assembly 10b.

Motherboard

36 To remove the motherboard proceed as follows:

36.1 Using the assembly extractor tool (Table 2, Serial 2), withdraw assemblies 4 to 9 (Paras 29 and 30).

36.2 Remove the motherboard (with all assemblies) (Para 31).

36.3 Remove assembly 10 from the motherboard (Para 32).

Audio socket, system switch (SSW) and wiring harness

37 To remove the audio socket, SSW and wiring harness, proceed as follows:

37.1 Set the SSW to position O, to align the index marks on the switch.

37.2 Remove the motherboard (with all assemblies) (Para 31).

37.3 Unsolder the red lead from the SSW pin which is connected to the positive battery terminal.

37.4 Remove the escutcheon plate.

37.5 Remove the two 3.0 mm socket-head screws and Dowty sealing washers securing the SSW.

37.6 Remove the nut retaining the audio socket, and withdraw the complete assembly from the inside of the RT-349 box.

Knobs

38 To remove the knobs, proceed as follows:

38.1 Remove the motherboard (with all assemblies) (Para 31).

38.2 Remove the circlip retaining the knob and remove the knob.

REPLACEMENT

39 In general, replacement procedures are the reverse of the removal procedures, and are only included where considered necessary.

Battery fixing insert

40 To replace the battery fixing insert, proceed as follows:

40.1 Ensure that the new insert and the casting boss are free of grease.

40.2 Apply adhesive Locktite Studlock (grade 270) to the casting boss.

40.3 Fit the new insert to the mandrel (Table 2, Serial 10) and screw it into the casting boss.

40.4 Allow approximately three hours for the adhesive to set before removing the mandrel.

Knobs

41 Ensure that the knob shafts and holes in the casting are clean and then lubricate with grease (MX33).

Synthesizer sub-assemblies 10b and 10c

42 To replace synthesizer sub-assemblies 10b and 10c, proceed as follows:

42.1 If a new sub-assembly 10b is being fitted, fit a protection clip to ML1.

42.2 Set the three Frequency Setting Switches (FSS) to the setting specified in Para 33.

42.3 Replace the earth link which connects sub-assemblies 10a, 10b and 10c, as detailed in EMER Tels F 602, Fig 2010, Note 2.

42.4 Carry out the removal procedure detailed in Para 35 in reverse order.

42.5 Remove the protection clip from ML1 and cut the pins of ML1 to within 0.8 mm.

Synthesizer sub-assembly 10a

43 To replace the synthesizer sub-assembly 10a, proceed as follows:

43.1 Carry out the removal procedure detailed in Para 34 in reverse order.

43.2 Set the FSS to 37.000 MHz (EMER Tels F 602, Fig 2010).

Synthesizer (assembly 10)

44 To replace the synthesizer (assembly 10), proceed as follows:

44.1 Using the mechanical alignment jig (Table 2, Serial 9), position the synthesizer with respect to the motherboard.

44.2 Secure the synthesizer with five untightened 2.5 mm screws and washers.

44.3 Fit the jig (Fig 3) ensuring that all four dowels are properly located in the relevant holes and tighten the five 2.5 mm screws.

44.4 Ensure that the flying leads are clipped to the correct terminals on the motherboard (EMER Tels F 602, Fig 2005).

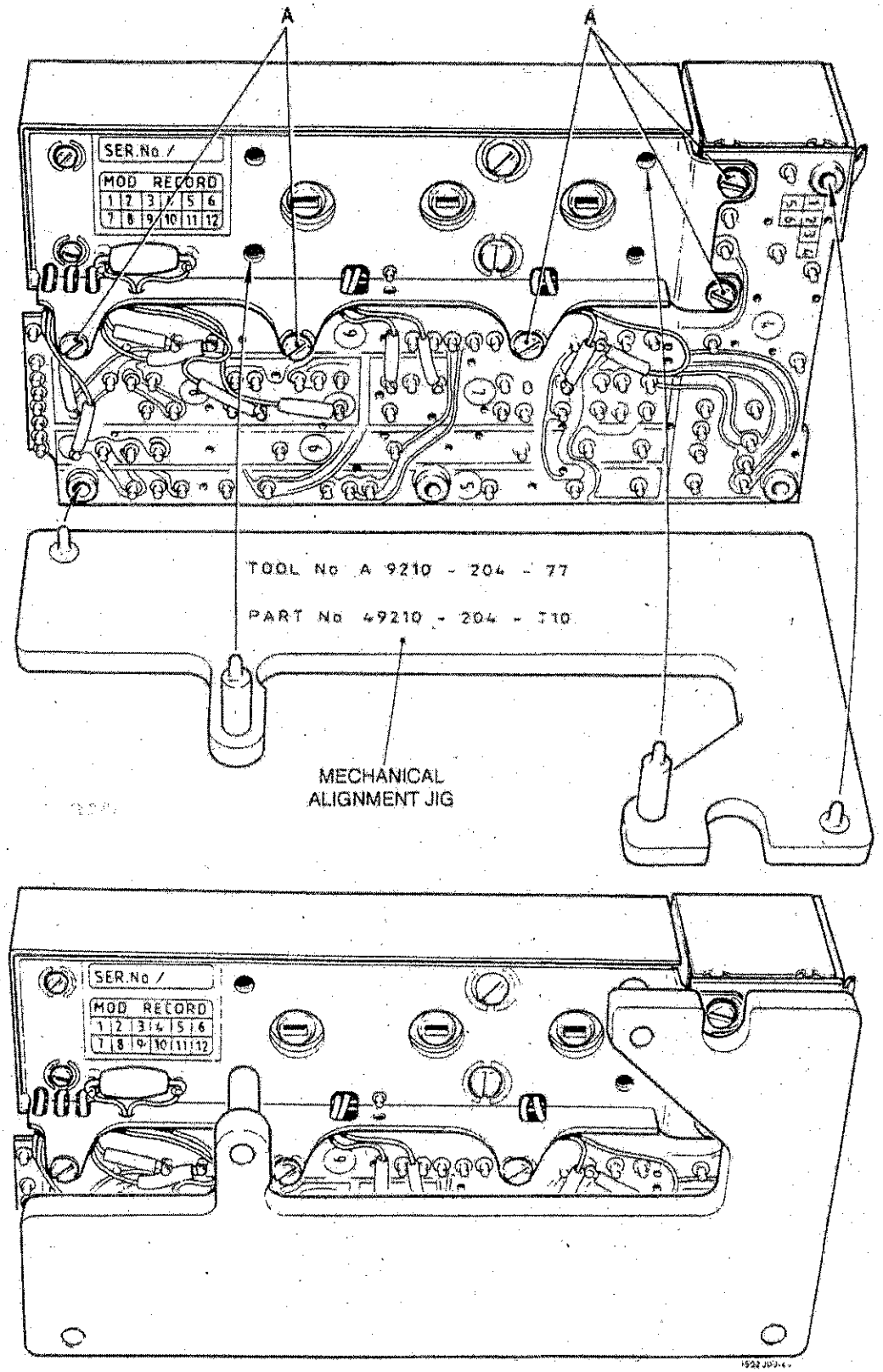


Fig 3 Fitting synthesizer-to-motherboard mechanical alignment jig

Audio socket, system switch (SSW) and wiring harness

45 To replace the audio socket, SSW and wiring harness, proceed as follows:

45.1 Fit the assembly to the inside of the RT-349 box and secure the audio socket with the retaining nut.

45.2 Secure the SSW using the two 3.0 mm screws and Dowty sealing washers removed in Para 37. If necessary, use new Dowty sealing washers (EMER Tels F 602, Table 2002, item 9) lightly smeared with grease (XG271).

45.3 Set the SSW to the O (off) position.

45.4 Refer to EMER Tels F 602, Fig 2005, and set the SSW to the position where the fixed and moveable index marks are aligned.

Fitting assemblies to the motherboard

46 To fit the assemblies to the motherboard, proceed as follows:

46.1 Replace the Synthesizer (assembly 10) (Para 44).

46.2 Carefully fit sub-assembly 10a to the motherboard (Para 43).

46.3 Carefully fit sub-assemblies 10b and 10c to the motherboard (Para 42).

NOTES

(1) The arrows on the top of the assembly screening covers point towards the front panel (antenna socket, audio socket and SSW).

(2) If difficulty is experienced fitting assembly 4, remove assembly 6 first.

(3) To ensure good contact, the contact finger on assembly 6 and the mating area on the side of assembly 4 must by kept clean using suitable degreasing agent (e.g. acetone).

Motherboard (with all assemblies)

47 To replace the motherboard (with all assemblies), proceed as follows:

47.1 Fit the polarised cableform plug to the motherboard socket.

47.2 Observing the following precautions, gently ease the motherboard assembly into the RT-349 box:

47.2.1 To ensure satisfactory contact with the spring connector on assembly 4, slightly tilt the assembly towards the antenna socket pin.

47.2.2 With reference to Para 44, replace the synthesizer sub-assembly ensuring that all switches engage correctly with the knobs.

47.2.3 If required, fit new Dowty sealing washers (EMER Tels F 602, Table 2002, item 38) to each of the eight motherboard securing screws. Lightly smear the sealing washers with grease (XG271).

47.2.4 Ensure that all the motherboard assembly fixing screws are correctly located before tightening to 0.35 Nm to 0.39 Nm. If necessary, ease the motherboard assembly towards the antenna socket pin. This compresses the spring connector on assembly 4, allowing the fixing bushes to line up with the screw holes in the RT-349 box.

47.2.5 Ensure that the cableform is located along the side of the RT-349 box and not pinched between the underside of the motherboard assembly and the casting bosses within the RT-349 box.

Lid

48 To replace the lid, proceed as follows:

48.1 Before replacing the lid, lightly smear the gasket with grease (XG271).

48.2 Tighten the ten securing screws to 0.35 Nm to 0.39 Nm in the sequence shown in Fig 4.

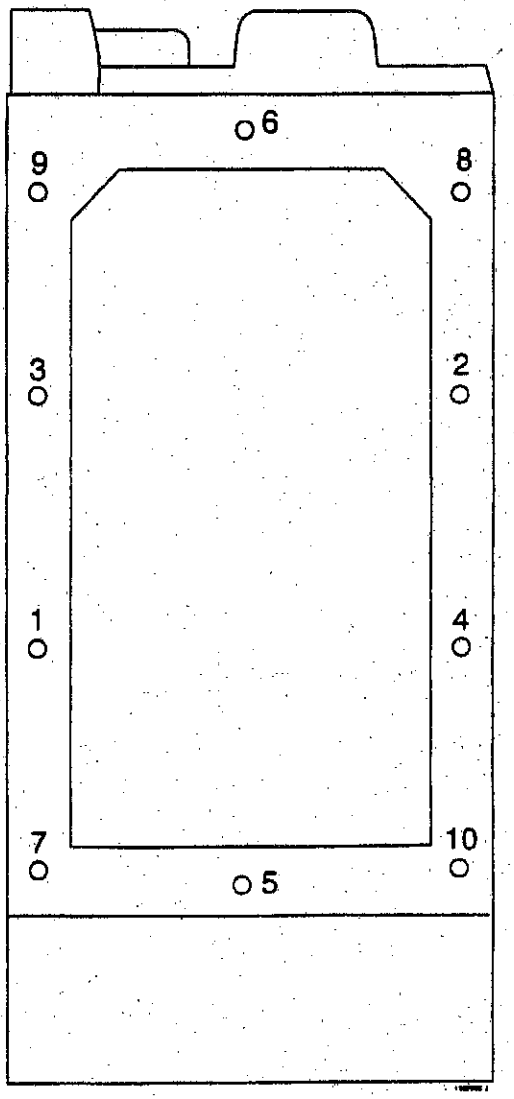


Fig 4 Screw tightening sequence

SCREWS AND WASHERS

49 Table 3 lists the RT-349 screws, washers, circlips and seals.

TABLE 3 RT-349 SCREWS, WASHERS, CIRCLIPS AND SEALS

Serial (1)	Designation (2)	Position used (3)	Qty (4)
1	Screw, slotted, pan-head M2 x 4 mm lg	Sub-assemblies 10a to 10b fixing.	3
2	Screw, slotted, countersunk M2 x 5 mm lg	Synthesizer screening cover fixing.	3
3	Screw, slotted, pan-head M2 x 5 mm lg	Escutcheon plate fixing.	2
4	Screw, slotted, pan-head M2.5 x 4 mm lg	Synthesizer assembly to motherboard fixing.	5
5	Screw, slotted, pan-head M2.5 x 6 mm lg	Lid to box fixing.	10
6	Screw, slotted, pan-head M3 x 6 mm lg	Motherboard assembly to RT-349 box fixing and Antenna Socket to RT-349 box fixing.	8
7	Screw, slotted, pan-head M3 x 8 mm lg	FSS to RT-349 box fixing and SSW to RT-349 box fixing.	6
8	Spacer, screw special	Synthesizer spacers.	6
9	Washer, crinkle M2, black	Escutcheon plate screws.	2
10	Washer, crinkle M2, stainless steel	Synthesizer sub-assembly 10a and 10b screws.	9
11	Washer, crinkle M2.5, black	Lid to RT-349 box screws.	10
12	Washer, crinkle M2.5, stainless steel	Synthesizer assembly to motherboard screws.	5
13	Washer, crinkle M3	Antenna socket screws.	4
14	Washer, flat (5310-99-662-4912)	FSS and SSW knobs.	4
15	Circlip	Motherboard assembly FSS and SSW to RT-349 box screws.	4
16	Seal bonded, 6 BA		10

FITTING THE MOTHERBOARD (WITH ALL ASSEMBLIES) INTO THE MOTHERBOARD ASSEMBLY TEST JIG

GENERAL

50 The motherboard (with all assemblies) should not be fitted into the motherboard assembly test jig (Table 2, Serial 1) before the preliminary test (Para 65 to 70) has been carried out.

51 To fit the motherboard (with all assemblies) into the motherboard assembly test jig, proceed as follows:

51.1 Remove the RT-349 box lid (Para 28).

51.2 Remove the motherboard (with all assemblies) (Para 31).

51.3 On the motherboard assembly test jig, set the System Switch (SSW) to O (off) and the three Frequency Setting Switches (FSS) for 37.000 MHz.

51.4 Observing the following precautions, gently ease the motherboard (with all assemblies) into the motherboard assembly test jig:

51.4.1 To ensure satisfactory contact with the spring connector on assembly 4, slightly tilt the assembly towards the antenna socket pin.

51.4.2 Ensure that the switch shafts engage correctly with the knobs.

51.4.3 Ensure that all the motherboard assembly fixing screws are correctly located before tightening. If necessary, ease the motherboard assembly towards the antenna socket pins. This action compresses the spring connector on assembly 4 and allows the fixing bushes to line up with the screw holes in the assembly test jig.

51.5 Screw-up and tighten the four long screws (Fig 5, items 'A') and two short knurled pillar screws (Fig 5, items 'B').

51.6 Fit the test jig overlay and tighten the three knurled rings (Fig 5, items 'C').

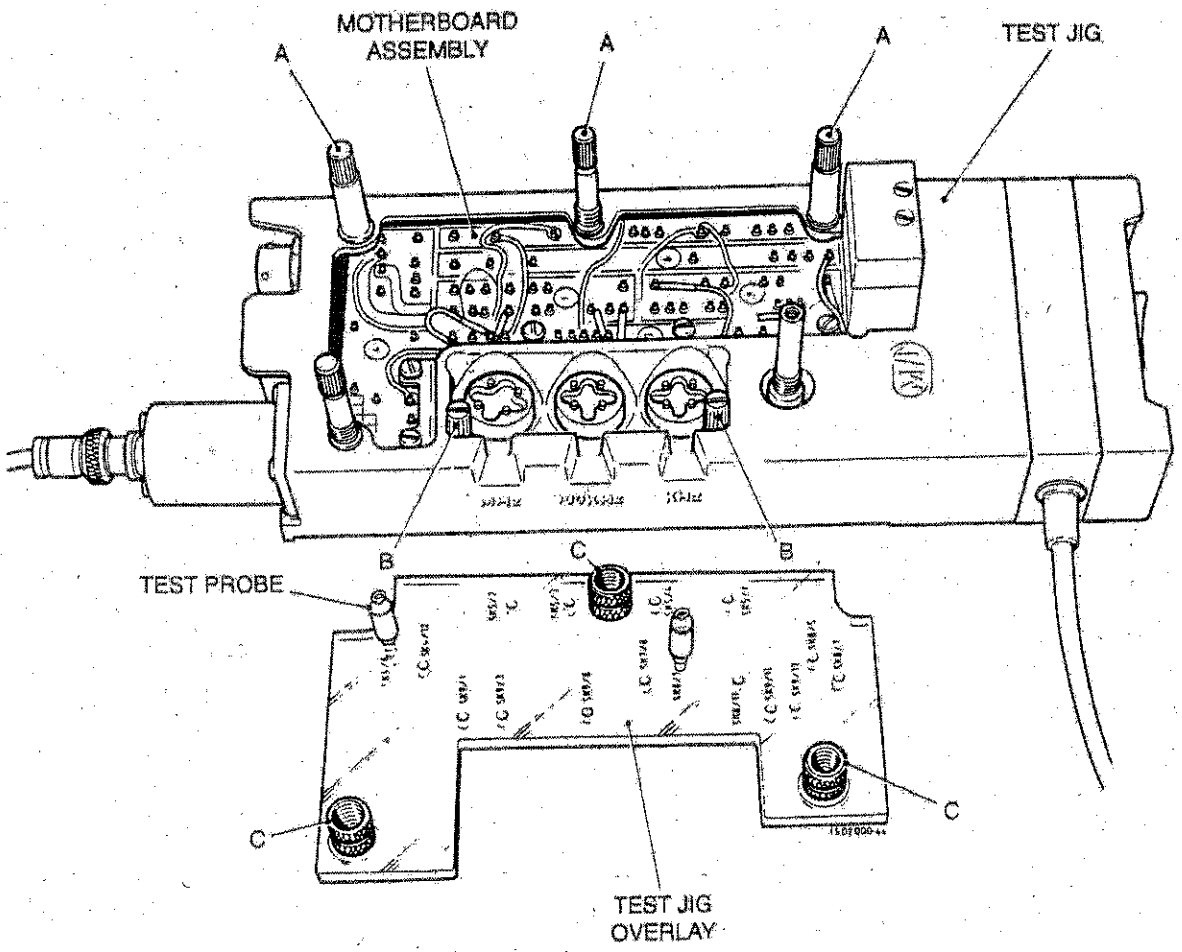


Fig 5 Motherboard assembly fitted into test jig

SPECIFICATION TESTING - 8920C MANUAL MODE

INTRODUCTION

CAUTION

EQUIPMENT DAMAGE. A headset fault can cause the RT-349 to go to a permanent send condition. When using the 8920C, a headset must not be connected to the EUT.

52 Specification testing, using the 8920C, can be carried out in either the manual (this Part 2) or automatic mode (Part 4 of this EMER) and with the EUT sealed (lid fitted) or unsealed (lid removed). Specification tests, less tests 9 and 11, can be carried out with the motherboard (with all assemblies) fitted into the motherboard assembly test jig (Table 2, Serial 1). The specification tests are given in a logical sequence, however, the tests do not have to be performed sequentially. The 8920C and EUT settings are repeated at the beginning of each test procedure to allow any individual test to be carried out in isolation.

53 The preliminary test, Test 1 (Paras 65 to 70), **must** always be carried out at the start of the test sequence and before any test carried out in isolation.

CONDITION OF TEST

54 The specification figures given in the 'test limits' definition are true values and constitute fundamental terms of reference.

55 All tests shall be carried out in an ambient temperature not exceeding the range +15°C to +35°C.

SPECIFICATION TEST INITIAL SETTING UP

56 Switch on the 2955B, RIU, digital multimeter (DMM) and the Farnell AP60-50 Power Supply (PSU), and allow 15 minutes for the equipment to warm up and stabilise. The initial setting up activities can be carried out during the warm up period.

57 The 8920C and EUT initial settings are given at the beginning of each test procedure to allow any individual test to be carried out in isolation.

58 The PSU, 2955B and RIU initial settings for each test are performed using the methods detailed in Paras 60 to 63. These methods will also be used when changes to initial settings are required during testing.

NOTE

RIU settings are made via the 2955B screen and keypad.

59 The standard connections between the 8920C and EUT are given in Para 64. Any differences are highlighted in the particular test procedure.

63.2 To make subsequent selections during the same test, proceed as follows:

63.2.1 Press HELP to select RIU Manual Control.

63.2.2 Press the appropriate 2955B key(s) to select the required test facility.

63.2.3 Press HELP to return to the 2955B Manual Screen.

EUT-to-8920C Interconnections

64 Make the EUT-to-8920C interconnections as follows:

64.1 Connect the power supply lead between the CIP DC SUPPLY connector and the EUT battery connector.

64.2 Connect the audio lead between the CIP AUDIO connector and the EUT audio connector.

64.3 Fit the antenna adaptor (Table 2, Serial 3) to the antenna socket on the EUT.

64.4 Connect the coaxial lead between the RIU ANT IN connector and the EUT antenna adaptor fitted to the EUT RF connector.

TEST 1 - PRELIMINARY TEST

Test limits

65 With the d.c. supply set to 12 V ±0.2 V and the SSW on the EUT set to O (Off), there shall be no current drawn.

66 With the SSW on the EUT set to W (Whisper) and the pressel line open-circuit (receive mode), the power output shall not exceed 0.02 µW.

Initial settings

67 Connect the EUT to the 8920C as per Para 64.

68 Prior to carrying out Test 1, set up the 8920C and EUT controls and conditions as follows:

68.1 PSU.

(1)	Voltage	:	12 V
(2)	Current Limit	:	1 A

68.2 2955B.

(1)	SET AF LOAD	:	300R
(2)	Skeleton Test Set-up	:	Current Consumption

68.3 CIP.

(1)	AUDIO/HARNESS	:	RADIO
(2)	POWER	:	OFF
(3)	LINE RESISTANCE	:	OC

68.4 EUT.

(1) FSS : 42.075 MHz
(2) SSW : O (Off)

Test methods

69 To carry out the first check of Test 1 (Para 65), proceed as follows:

69.1 Connect the DMM to CIP MONITOR +VE with respect to -VE.

69.2 Note the DMM indication which shall be zero (no current drawn by the EUT).

70 To carry out the second check of Test 1 (Para 66), proceed as follows:

70.1 Set the SSW on the EUT to W (Whisper).

70.2 Press Tx TEST on the 2955B and observe that the transmit page is displayed with the AF generator off.

70.3 Check the transmit frequency and power readings displayed on the 2955B display which shall be zero.

70.4 Reconnect the DMM to the RIU DMM connectors.

70.5 Press HELP to return to the Skeleton Test Menu.

TEST 2 - CURRENT CONSUMPTION

Test limits

71 With the d.c. supply set to 12 V ±0.2 V, the EUT current consumption limits shall be as follows:

71.1 Between 57 mA and 82 mA : receive mode.

71.2 Between 4 mA and 9 mA : low battery state of the battery standby mode.

71.3 Between 130 mA and 166 mA : transmit mode.

Initial settings

72 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for Test 2.

73 Prior to carrying out Test 2, set up the 8920C and EUT controls and conditions as follows:

73.1 PSU.

(1) Voltage : 12 V
(2) Current Limit : 1 A

73.2 2955B.

(1) SET AF LOAD : 300R
(2) Skeleton Test Set-up : Current Consumption

73.3 CIP.

(1)	AUDIO/HARNESS	:	RADIO
(2)	POWER	:	OFF
(3)	LINE RESISTANCE	:	OC

73.4 EUT.

(1)	FSS	:	42.075 MHz
(2)	SSW	:	* (Noise on)

Test methods

74 To carry out the first check of Test 2 (Para 71.1), proceed as follows:

74.1 Connect the DMM to CIP MONITOR +VE with respect to -VE.

74.2 Note the DMM indication which shall be LL 57 mV (57 mA), UL 82 mV (82 mA).

75 To carry out the second check of Test 2 (Para 71.2), proceed as follows:

75.1 Set the SSW on the EUT to L (Loud).

75.2 Wait approximately 10 seconds and observe the DMM voltage indication which shall vary, approximately every second, between a high state (receive current, Para 71.1) and a low state which shall be LL 4 mV (4 mA), UL 9 mV (9 mA).

76 To carry out the third check of Test 2 (Para 71.3), proceed as follows:

76.1 Press and hold in the PRESSEL switch.

76.2 Note the DMM voltage indication which shall be LL 130 mV (130 mA), UL 166 mV (166 mA).

76.3 Release the PRESSEL switch.

76.4 Reconnect the DMM to the RIU DMM connectors.

76.5 Press HELP to return to the Skeleton Test Menu.

TEST 3 - POWER OUTPUT INTO A 50 OHM LOAD

Test limits

77 With the d.c. supply set to 9.5 V ±0.2 V, the EUT transmitted power output shall not be less than 100 mW at all frequencies.

78 With the d.c. supply set to 16 V ±0.2 V, the EUT transmitted power output shall not be greater than 475 mW at all frequencies.

Initial settings

79 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for Test 3.

80 Prior to carrying out Test 3, set up the 8920C and EUT controls and conditions as follows:

80.1 PSU.

(1)	Voltage	:	9.5 V
(2)	Current Limit	:	1 A

80.2 2955B.

(1)	SET AF LOAD	:	300R
(2)	Skeleton Test Set-up	:	Transmitter - Output and Modulation

80.3 CIP.

(1)	AUDIO/HARNESS	:	RADIO
(2)	POWER	:	OFF
(3)	LINE RESISTANCE	:	OC

80.4 EUT.

(1)	FSS	:	37.050 MHz
(2)	SSW	:	* (Noise on)

Test methods

NOTE

Due to the automatic characterisation feature of the 8920C in automatic mode, the RF output power measurements for automatic mode and manual mode will differ for the same test. For cross-reference purposes, the automatic mode equivalent power measurement values are given in brackets after the manual mode measurement values.

81 To carry out the first check of Test 3 (Para 77), proceed as follows:

81.1 Press and hold in the PRESSEL switch.

81.2 Observe the Tx power reading on the 2955B display which shall be greater than 96 mW (100 mW).

81.3 Release the PRESSEL switch.

81.4 Carry out the procedure detailed in Paras 81.1 to 81.3 for FSS settings of 39.050 MHz, 42.075 MHz, 45.050 MHz and 46.950 MHz.

82 To carry out the second check of Test 3 (Para 78), proceed as follows:

82.1 Set the SSW on the EUT to O (Off).

82.2 Set the PSU d.c. output voltage to 16 V.

82.3 Set the SSW on the EUT to * (Noise on).

82.4 Press and hold in the PRESSEL switch.

82.5 Note the Tx power reading on the 2955B display which shall be not greater than 456 mW (475 mW).

82.6 Release the PRESSEL switch.

82.7 Carry out the procedure detailed in Para 82.4 to 82.6 for FSS settings of 45.050 MHz, 42.0575 MHz, 42.075MHz, 39.050 MHz and 37.050 MHz.

80 Prior to carrying out Test 3, set up the 8920C and EUT controls and conditions as follows:

80.1 PSU.

(1)	Voltage	: 9.5 V
(2)	Current Limit	: 1 A

80.2 2955B.

(1)	SET AF LOAD	: 300R
(2)	Skeleton Test Set-up	: Transmitter - Output and Modulation

80.3 CIP.

(1)	AUDIO/HARNESS	: RADIO
(2)	POWER	: OFF
(3)	LINE RESISTANCE	: OC

80.4 EUT.

(1)	FSS	: 37.050 MHz
(2)	SSW	: * (Noise on)

Test methods

NOTE

Due to the automatic characterisation feature of the 8920C in automatic mode, the RF output power measurements for automatic mode and manual mode will differ for the same test. For cross-reference purposes, the automatic mode equivalent power measurement values are given in brackets after the manual mode measurement values.

81 To carry out the first check of Test 3 (Para 77), proceed as follows:

81.1 Press and hold in the PRESSEL switch.

81.2 Observe the Tx power reading on the 2955B display which shall be greater than 96 mW (100 mW).

81.3 Release the PRESSEL switch.

81.4 Carry out the procedure detailed in Paras 81.1 to 81.3 for FSS settings of 39.050 MHz, 42.050 MHz, 45.050 MHz and 46.950 MHz.

82 To carry out the second check of Test 3 (Para 78), proceed as follows:

82.1 Set the SSW on the EUT to O (Off).

82.2 Set the PSU d.c. output voltage to 16 V.

82.3 Set the SSW on the EUT to * (Noise on).

82.4 Press and hold in the PRESSEL switch.

82.5 Note the Tx power reading on the 2955B display which shall be not greater than 456 mW (475 mW).

82.6 Release the PRESSEL switch.

82.7 Carry out the procedure detailed in Para 82.4 to 82.6 for FSS settings of 45.050 MHz, 42.050 MHz, 39.050 MHz and 37.050 MHz.

82.8 Press HELP to return to the Skeleton Test Menu.

82.9 Set the PSU output voltage back to 12 V.

TEST 4 - ACCURACY OF RADIATED CARRIER

Test limits

83 The radiated frequency shall be within ±500 Hz of the selected frequency.

Initial settings

84 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for Test 4.

85 Prior to carrying out Test 4, set up the 8920C and EUT controls and conditions as follows:

85.1 PSU.

(1)	Voltage	: 12 V
(2)	Current Limit	: 1 A

85.2 2955B.

(1)	SET AF LOAD	: 300R
(2)	Skeleton Test Set-up	: Transmitter - Output and Modulation

85.3 CIP.

(1)	AUDIO/HARNESS	: RADIO
(2)	POWER	: OFF
(3)	LINE RESISTANCE	: OC

85.4 EUT.

(1)	FSS	: 37.000 MHz
(2)	SSW	: L (Loud)

Test method

86 To carry out this specification check (Para 83), proceed as follows:

86.1 Press and hold in the PRESSEL switch.

86.2 Check the Tx frequency reading on the 2955B display which shall be LL 36.999500 MHz, UL 37.000500 MHz.

86.3 Release the PRESSEL switch.

90.3 CIP.

(1)	AUDIO/HARNESS	:	RADIO
(2)	POWER	:	OFF
(3)	LINE RESISTANCE	:	OC

90.4 EUT.

(1)	FSS	:	46.900 MHz
(2)	SSW	:	L (Loud)

Test methods

91 To carry out both checks of Test 5 (Paras 87 and 88), proceed as follows:

91.1 Select the 2955B 300 Hz low pass filter.

91.2 Press and hold in the PRESSEL switch.

91.3 Check the modulation level reading on the 2955B display which shall be LL 1.55 kHz, UL 2.5 kHz.

91.4 Check the modulation frequency reading (due to the internal tone) on the 2955B display which shall be LL 148 Hz, UL 152 Hz.

91.5 Release the PRESSEL switch.

91.6 Repeat operations 91.2 to 91.5, but with the FSS on the EUT set, in turn, to 42.000 MHz, 42.075MHz and 37.000 MHz.

91.7 Press HELP to return to the Skeleton Test Menu.

TEST 6 - MODULATION SENSITIVITY

Test limits

92 The amplitude of a 1 kHz tone applied to the microphone socket to produce a deviation of the transmitter output of 3.5 kHz ±0.3 kHz shall be between 0.08 mV and 0.3 mV pd with the SSW set to W (Whisper).

93 With the input maintained as above and the SSW set to L (Loud), the deviation shall be between 0.68 kHz and 1.48 kHz.

Initial settings

94 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for Test 6.

95 Prior to carrying out Test 6, set up the 8920C and EUT controls and conditions as follows:

95.1 PSU.

(1)	Voltage	:	12 V
(2)	Current Limit	:	1 A

95.2 2955B.

(1)	SET AF LOAD	:	300R
(2)	Skeleton Test Set-up	:	Transmitter - Output and Modulation
(3)	AF ATTENUATION	:	40 dB

95.3 CIP.

(1)	AUDIO/HARNESS	:	RADIO
(2)	POWER	:	OFF
(3)	LINE RESISTANCE	:	OC

95.4 EUT.

(1)	FSS	:	42.075 MHz
(2)	SSW	:	W (Whisper)

Test methods

96 To carry out the first check of Test 6 (Para 92), proceed as follows:

96.1 Set an AF generator frequency of 1 kHz and a level of approximately 170 mV, and set the AF generator on.

96.2 Press BAND PASS to select 0.3 - 3.4 kHz filter.

96.3 Press the PRESSEL switch, and adjust the VARIABLE rotary control on the 2955B until the display shows a modulation level of LL 3.2 kHz, LL 3.8 kHz.

96.4 Check the AF generator level which shall be LL 80 mV (0.08 mV pd), UL 300 mV (0.30 mV pd).

97 To carry out the second check of Test 6 (Para 93), proceed as follows:

97.1 Set the SSW on the EUT to L (Loud).

97.2 With the test conditions set as above, press the PRESSEL switch and observe the modulation level reading on the 2955B which shall be LL 0.68 kHz, UL 1.48 kHz.

97.3 Press HELP to return to Manual Control and press SELECT to return to Skeleton Test Menu.

TEST 7 - MODULATION CONTROL

Test limits

98 With a 1 kHz ±10% tone applied to the microphone socket at level of 20 mV ±2 mV pd, the transmitter output deviation, due to this modulating tone only, shall not be greater than 6.5 kHz.

Initial settings

99 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for Test 7.

100 Prior to carrying out Test 7, set up the 8920C and EUT controls and conditions as follows:

100.1 PSU.

(1)	Voltage	:	12 V
(2)	Current Limit	:	1 A

100.2 2955B.

(1)	SET AF LOAD	:	300R
(2)	Skeleton Test Set-up	:	Transmitter - Output and Modulation

100.3 CIP.

(1)	AUDIO/HARNESS	:	RADIO
(2)	POWER	:	OFF
(3)	LINE RESISTANCE	:	OC

100.4 EUT.

(1)	FSS	:	42.075 MHz
(2)	SSW	:	L (Loud)

Test method

101 To carry out this specification check (Para 98), proceed as follows:

101.1 Set an AF generator frequency of 1 kHz at a level of 200 mV and set the AF generator on.

101.2 Select the BAND PASS filter.

101.3 Press the PRESSEL switch, and observe the modulation level on the 2955B display which shall not be greater than 6.5 kHz.

101.4 Press HELP to return to the Skeleton Test Menu.

Test limits

102 With an AF input of 1 kHz ±10% at level of 10 mV rms, the AF output into 300 ohms with the EUT set to any frequency shall be between 240 mV and 360 mV.

Initial settings

103 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for Test 8.

104 Prior to carrying out Test 8, set up the 8920C and EUT controls and conditions as follows:

104.1 PSU.

(1)	Voltage	: 12 V
(2)	Current Limit	: 1 A

104.2 2955B.

(1)	SET AF LOAD	: 300R
(2)	Skeleton Test Set-up	: Transmitter - Sidetone

104.3 CIP.

(1)	AUDIO/HARNESS	: RADIO
(2)	POWER	: OFF
(3)	LINE RESISTANCE	: OC

104.4 EUT.

(1)	FSS	: 42.050 MHz
(2)	SSW	: L (Loud)

Test method

105 To carry out this specification check (Para 102), proceed as follows:

105.1 Set an AF generator frequency of 1 kHz at a level of 100 mV and set the AF generator on.

105.2 Press the PRESSEL switch, and observe the AF Volts reading on the 2955B display which shall be LL 240 mV, UL 360 mV.

105.3 Press HELP to return to the Skeleton Test Menu.

TEST 8 - SIDETONE

Test limits

102 With an AF input of 1 kHz ±10% at level of 10 mV rms, the AF output into 300 ohms with the EUT set to any frequency shall be between 240 mV and 360 mV.

Initial settings

103 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for Test 8.

104 Prior to carrying out Test 8, set up the 8920C and EUT controls and conditions as follows:

104.1 PSU.

(1)	Voltage	: 12 V
(2)	Current Limit	: 1 A

104.2 2955B.

(1)	SET AF LOAD	: 300R
(2)	Skeleton Test Set-up	: Transmitter - Sidetone

104.3 CIP.

(1)	AUDIO/HARNESS	: RADIO
(2)	POWER	: OFF
(3)	LINE RESISTANCE	: OC

104.4 EUT.

(1)	FSS	: 42.050 MHz
(2)	SSW	: L (Loud)

Test method

105 To carry out this specification check (Para 102), proceed as follows:

105.1 Set an AF generator frequency of 1 kHz at a level of 100 mV and set the AF generator on.

105.2 Press the PRESSEL switch, and observe the AF Volts reading on the 2955B display which shall be LL 240 mV, UL 360 mV.

105.3 Press HELP to return to the Skeleton Test Menu.

TEST 9 - RECEIVER SENSITIVITY

Test limits

106 The signal+noise-to-noise ratio caused by an RF signal of 2 μV emf, with standard modulation, shall not be less than 14 dB.

Initial settings

107 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for Test 9.

108 Prior to carrying out Test 9, set up the 8920C and EUT controls and conditions as follows:

108.1 PSU.

(1)	Voltage	: 12 V
(2)	Current Limit	: 1 A

108.2 2955B.

(1)	SET AF LOAD	: 300R
(2)	Skeleton Test Set-up	: Receiver - Audio Output

108.3 CIP.

(1)	AUDIO/HARNESS	: RADIO
(2)	POWER	: OFF
(3)	LINE RESISTANCE	: OC

108.4 EUT.

(1)	FSS	: 37.025 MHz
(2)	SSW	: * (Noise on)

Test method

109 To carry out this specification check (Para 106), proceed as follows:

109.1 Set an RF generator frequency of 37.025 MHz and a level of -106 dBm, and set the RF generator on.

109.2 Set a modulation frequency of 1 kHz at a level of 5 kHz and set the modulation on.

109.3 Adjust the VOLUME control on the 2955B until the tone can be heard.

109.4 Press dB on the 2955B to set dBR to zero.

109.5 Set the modulation off and note the dBR reading on the 2955B display which shall be less than -14 dB.

109.6 Repeat operations 109.1 to 109.5 for FSS and RF GEN settings, in turn, of 39.025 MHz, 42.025 MHz, 45.525 MHz and 46.925 MHz.

109.7 Press HELP to return to the Skeleton Test Menu.

TEST 10 - LIMITING

Test limits

110 With a modulated RF signal applied to the antenna socket on the EUT, the audio output in the receive mode shall not change by more than 1.5 dB when the RF signal level is increased from 2 μV emf to 100 mV emf.

Initial settings

111 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for Test 10.

112 Prior to carrying out Test 10, set up the 8920C and EUT controls and conditions as follows:

112.1 PSU.

(1)	Voltage	: 12 V
(2)	Current Limit	: 1 A

112.2 2955B.

(1)	SET AF LOAD	: 300R
(2)	Skeleton Test Set-up	: Receiver - Audio Output
(3)	RF SELECT	: HI SENS

112.3 CIP.

(1)	AUDIO/HARNESS	: RADIO
(2)	POWER	: OFF
(3)	LINE RESISTANCE	: OC

112.4 EUT.

(1)	FSS	: 42.050 MHz
(2)	SSW	: "(Noise on

Test method

113 To carry out this specification check (Para 110), proceed as follows:

113.1 Press SELECT on the 2955B to select the BNC RF connection path.

113.2 Set an RF generator frequency of 42.050 MHz at a level of -106.5 dBm and set the RF generator on.

113.3 Set a modulation frequency of 1 kHz at level of 5 kHz and set the modulation on.

113.4 Press dB on the 2955B to set dBR to zero.

113.5 Set RF generator level to -12.5 dBm and observe the dBR reading which shall not be greater than 1.5 dB.

113.6 Press SELECT on the 2955B to select the N-type RF IN/OUT connector.

113.7 Press HELP to return to Manual Control and press SELECT to return to Skeleton Test Menu.

TEST 11 - SQUELCH SENSITIVITY

Test limits

114 The sensitivity of the squelch circuit to an external 150 Hz ±2 Hz tone is such that at the 2 dB quieting level, the squelch will be closed, and at the 9 dB quieting level, the squelch will be open.

Initial settings

115 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for Test 11.

116 Prior to carrying out Test 11, set up the 8920C and EUT controls and conditions as follows:

116.1 PSU.

(1)	Voltage	: 12 V
(2)	Current Limit	: 1 A

116.2 2955B.

(1)	SET AF LOAD	: 300R
(2)	Skeleton Test Set-up	: Receiver - Audio Output

116.3 CIP.

(1)	AUDIO/HARNESS	: RADIO
(2)	POWER	: OFF
(3)	LINE RESISTANCE	: OC

116.4 EUT.

(1)	FSS	: 42.050 MHz
(2)	SSW	: * (Noise on)

Test method

117 To carry out this specification check (Para 114), proceed as follows:

117.1 Set an RF generator frequency of 42.050 MHz, set the RF level to -135 dBm and set the RF generator on.

117.2 Set a modulation frequency of 150 Hz at a level of 1.3 kHz and set the modulation on.

117.3 Press dB to set dBR to zero (the indication may be varying around zero).

117.4 Using the VARIABLE rotary control on the 2955B, increase the RF generator level to set the displayed dBR reading to -2 dB.

117.5 Set the SSW on the EUT to L (Loud).

117.6 Note the squelch condition which shall be closed (no noise from the loudspeaker).

117.7 Set the SSW on the EUT to * (Noise on).

117.8 Adjust the VARIABLE rotary control on the 2955B to set the dBR reading to -9 dB.

117.9 Set the SSW on the EUT to L (Loud).

117.10 Note the squelch condition which shall be open (noise present from loudspeaker).

117.11 Press HELP to return to the Skeleton Test Menu.

TEST 12 - AF POWER OUTPUT

Test limits

118 With a RF signal modulated by 1 kHz ±10% at 5 kHz deviation and 150 Hz ±2 Hz at 1.5 kHz deviation, and at a level of 1 mV emf, the audio output shall be:

118.1 Between 460 mV and 640 mV into 300 ohms in L (Loud) mode.

118.2 Between 17.5 dB and 22.5 dB below the L mode level (Para 118.1) when in W (Whisper) mode.

Initial settings

119 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for Test 12.

120 Prior to carrying out Test 12, set up the 8920C and EUT controls and conditions as follows:

120.1 PSU.

(1)	Voltage	: 12 V
(2)	Current Limit	: 1 A

120.2 2955B.

(1)	SET AF LOAD	: 300R
(2)	Skeleton Test Set-up	: Receiver - Audio Output

120.3 CIP.

(1)	AUDIO/HARNESS	: RADIO
(2)	POWER	: OFF
(3)	LINE RESISTANCE	: OC

120.4 EUT.

(1)	FSS	: 42.050 MHz
(2)	SSW	: L (Loud)

Test methods

121 To carry out the first check of Test 12 (Para 118.1), proceed as follows:

121.1 Set a RF generator frequency of 42.050 MHz at a level of -52.8 dBm and set the RF generator on.

121.2 Set a modulation frequency of 1 kHz at a level of 5 kHz and set the modulation on.

121.3 Set a second (MOD 2) modulation frequency of 150 Hz at a level of 1.5 kHz and set the second modulation generator on.

121.4 Observe the AF Volts reading on the 2955B display which shall be LL 460 mV, UL 640 mV.

122 To carry out the second check of Test 12 (Para 118.2), proceed as follows:

122.1 With the test conditions set as above for the first check, press dB on the 2955B to set dBR to zero.

122.2 Set the SSW on the EUT to W (Whisper).

122.3 Observe the dBR level on the 2955B display which shall be LL -22.5 dB, UL -17.5 dB.

122.4 Press HELP to return to the Skeleton Test Menu.

TEST 13 - LOW BATTERY WARNING

Test limits

123 The low battery warning shall operate for a supply voltage of between 9.4 V d.c. and 9.8 V d.c.

Initial settings

124 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for Test 13.

125 Prior to carrying out Test 13, set up the 8920C and EUT controls and conditions as follows:

125.1 PSU.

(1)	Voltage	: 12 V
(2)	Current Limit	: 1 A

125.2 2955B.

(1)	SET AF LOAD	: 300R
(2)	Skeleton Test Set-up	: Receiver - Audio Output

125.3 CIP.

(1)	AUDIO/HARNESS	: RADIO
(2)	POWER	: OFF
(3)	LINE RESISTANCE	: OC

125.4 EUT.

(1)	FSS	: 42.050 MHz
(2)	SSW	: L (Loud)

Test method

126 To carry out this specification check (Para 123), proceed as follows:

126.1 Adjust the VOLTAGE ADJUST control on the Farnell power supply to slowly reduce the EUT d.c. input supply until regular bursts of noise are heard from the loudspeaker. Observe the PSU voltage indication which shall be LL 9.4 V, UL 9.8 V.

126.2 Press HELP to return to the Skeleton Test Menu.

126.3 Set the PSU output voltage back to 12 V.

TEST 14 - BATTERY-SAVING PERIOD AND DELAY

Test limits

127 The time interval after transmitting and before battery saving occurs shall be between 9 and 17 seconds.

128 The supply switching period shall be between 1.25 seconds and 1.95 seconds.

Initial settings

129 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for Test 14.

130 Prior to carrying out Test 14, set up the 8920C and EUT controls and conditions as follows:

130.1 PSU.

(1)	Voltage	: 12 V
(2)	Current Limit	: 1 A

130.2 2955B.

(1)	SET AF LOAD	: 300R
(2)	Skeleton Test Set-up	: Current Consumption

130.3 CIP.

(1)	AUDIO/HARNESS	: RADIO
(2)	POWER	: OFF
(3)	LINE RESISTANCE	: OC

130.4 EUT.

(1)	FSS	: 42.050 MHz
(2)	SSW	: W (Whisper)

Test methods

131 To carry out the first check of Test 14 (Para 127), proceed as follows:

131.1 Connect the DMM to CIP MONITOR +VE with respect to -VE.

131.2 Press and hold in the PRESSEL switch .

131.3 On releasing the PRESSEL switch, note the time it takes for the DMM voltage to start pulsing which shall be LL 9 seconds, UL 17 seconds.

132 To carry out the second check of Test 14 (Para 128), proceed as follows:

132.1 For the test conditions as described above (Para 131), note the time duration for 10 such pulses to occur which shall be LL 12 seconds, UL 20 seconds.

132.2 Reconnect the DMM to the RIU DMM connectors.

132.3 Press HELP to return to the Skeleton Test Menu.

ADDITIONAL TESTS

133 Tests 15 and 16 are additional tests to be carried out when the equipment is suspected of having a fault in that specific area covered by these tests.

Test 15 - variation of deviation with channel frequency

Test limits

134 With a standard AF tone applied to the microphone socket, the deviation of the transmitter output, due to this tone, shall not vary from its nominal value by more than ±15% for any transmitter frequency.

Initial settings

135 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for Test 15.

136 Prior to carrying out Test 15, set up the 8920C and EUT controls and conditions as follows:

136.1 PSU.

(1)	Voltage	: 12 V
(2)	Current Limit	: 1 A

136.2 2955B.

(1)	SET AF LOAD	: 300R
(2)	Skeleton Test Set-up	: Transmitter - Output and Modulation

136.3 CIP.

(1)	AUDIO/HARNESS	: RADIO
(2)	POWER	: OFF
(3)	LINE RESISTANCE	: OC

136.4 EUT.

(1)	FSS	: 37.050 MHz
(2)	SSW	: * (Noise on)

Test method

137 To carry out this specification test, proceed as follows:

137.1 Set an AF generator frequency of 1 kHz at a level of approximately 8 mV and set the AF generator on.

137.2 Select the BAND PASS filter.

137.3 Press the PRESSEL switch, and adjust the 2955B VARIABLE rotary control to set the modulation level to 5 kHz ±0.05 kHz. Note the modulation level.

137.4 Press the PRESSEL switch and note the modulation level for EUT frequency settings of 39.050 MHz, 41.050 MHz, 43.050 MHz, 45.050 MHz and 46.950 MHz.

137.5 Add the maximum and minimum deviation readings together and divide the result by 2. Call this result 'A'.

137.6 Subtract result 'A' from the maximum deviation reading. Call this result 'B'.

137.7 Calculate the percentage deviation variation using the following formula, and the result shall be UL ±15%:

$$\frac{B}{A} \times \frac{100}{1} = \pm\%$$

137.8 Press HELP to return to the Skeleton Test Menu.

Test 16 - spurious responses

Test limits

138 The second channel rejection shall be greater than 100 dB at any frequency.

Initial settings

139 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for Test 16.

140 Prior to carrying out Test 16, set up the 8920C and EUT controls and conditions as follows:

140.1 PSU.

(1)	Voltage	: 12 V
(2)	Current Limit	: 1 A

140.2 2955B.

(1)	SET AF LOAD	: 300R
(2)	Skeleton Test Set-up	: Receiver - Audio Output
(3)	RF SELECT	: HI SENS

140.3 CIP.

(1)	AUDIO/HARNESS	: RADIO
(2)	POWER	: OFF
(3)	LINE RESISTANCE	: OC

140.4 EUT.

(1)	FSS	: 37.025 MHz
(2)	SSW	: * (Noise on)

Test method

141 To carry out this specification test, proceed as follows:

141.1 Select 2955B RF IN/OUT BNC connector.

141.2 Set an RF generator frequency of 37.025 MHz at a level of -112.5 dBm and set the RF generator on.

141.3 Ensure the modulation is off and set dBR to zero.

141.4 Set the RF generator frequency to 79.825 MHz.

141.5 Increase the RF generator level until the dBR reading returns to zero.

141.6 Observe the RF generator level which shall be greater than -12.5 dBm.

141.7 Press SELECT to select the 2955B RF IN/OUT N connector.

141.8 Press HELP to enter RIU Manual Control, select RF SELECT - NORMAL and press SELECT to return to the Skeleton Test Menu.

SPECIAL TESTS

142 These tests are to be carried out only when an equipment is suspected of causing interference to other equipments and are to be carried out at a nominated workshop. The tests are to be carried out with the antenna adaptor (Table 2, Serial 3) fitted to the antenna socket on the EUT.

143 Connect a Spectrum Analyser to RIU INST A connector.

NOTE

The INST A output is approximately 30 dB down on the signal at the RIU ANT IN connector.

Transmitter spurious radiation (non-harmonic) test

Test limits

144 The output power of non-harmonically related spurious emission, other than frequencies within 10% of the transmitted carrier, shall be attenuated to a level of not less than 60 dB below the carrier level.

Transmitter spurious radiation (harmonic) test

Test limits

145 The output power of each harmonic of the nominal carrier frequency shall be attenuated to a level of not less than 40 dB below the carrier level.

Receiver spurious emission test

Test limits

146 The level of any internally generated unwanted signal, within the frequency range 1 MHz to 500 MHz, shall not exceed 100 μV emf when measured at the antenna adaptor output terminated into a 50 ohm load.

ALIGNMENT

INTRODUCTION

147 All RT-349 radio alignment procedures may be carried out with the EUT unsealed (lid removed) except the adjustments associated with assembly 10 (Paras 167 to 174), which require the motherboard (with all assemblies) to be fitted into the motherboard assembly test jig (Paras 50 and 51). All alignment procedures may also be carried out when the motherboard (with all assemblies) is fitted into the motherboard assembly test jig.

148 When the motherboard assembly is refitted into the RT-349 box assembly, the SET SQU preset control setting may need to be rechecked. Some adjustment or re-alignment may be required after fitting replacement assemblies into the RT-349 and these should be carried out before any specification tests are attempted. A summary of the adjustments required for a particular assembly is given in Table 4. Special test probes are provided in the FRTK for use when monitoring motherboard parameters.

TABLE 4 ADJUSTMENT AND ALIGNMENT SUMMARY

Replacement assembly fitted	Adjustment/alignment check if required		Paragraph
4	4T3 SET SQU	(assembly 4) (assembly 5)	150 to 153
5	SET SQU	(assembly 5)	154 to 157
6	4T3 SET SQU	(assembly 4) (assembly 5)	150 to 153
7	7L1 and 7C3 7L2 and 7C4 SET 150 Hz SET MOD	(assembly 7) (assembly 7) (assembly 8) (assembly 8)	158 to 162
8	SET 150 Hz SET MOD	(assembly 8) (assembly 8)	163 to 166
9	-	-	-
10	7L1 and 7C3 7L2 and 7C4	(assembly 7) (assembly 7)	167 to 174

149 Adjustment holes in the assembly screening cans give access to preset controls used during manufacture. Some are blanked off and others are circled and inscribed in red. No adjustments to these controls should be necessary at Field level.

ASSEMBLY 4 (4T3 SETTING)

150 When a new assembly 4 or 6 is fitted, transformer 4T3 may need to be adjusted to minimise IF ripple.

Initial settings

151 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for this alignment activity.

152 Prior to carrying out this alignment activity, set up the 8920C and EUT controls and conditions as follows:

152.1 PSU.

(1)	Voltage	: 12 V
(2)	Current Limit	: 1 A

152.2 2955B.

(1)	SET AF LOAD	: 300R
(2)	Skeleton Test Set-up	: Receiver - Audio Output

152.3 CIP.

(1)	AUDIO/HARNESS	: RADIO
(2)	POWER	: OFF
(3)	LINE RESISTANCE	: OC

152.4 EUT.

(1)	FSS	: 42.050 MHz
(2)	SSW	: * (Noise on)

Method

153 To carry out this alignment activity, proceed as follows:

153.1 Set the RF generator frequency to 42.050 MHz at a level of -106.8 dBm and set the RF generator on.

153.2 Set up a modulation frequency of 1 kHz at a deviation level of 5 kHz and set the modulation on.

153.3 Set the 2955B distortion meter on.

153.4 Using the plastic adjustment tool, adjust transformer 4T3 to achieve minimum distortion.

153.5 Set distortion meter off.

ASSEMBLY 5 (SET SQU SETTING)

154 The SET SQU control (assembly 5) may need to be reset when a new assembly 4, 5 or 6 is fitted.

Initial settings

155 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for this alignment activity.

156 Prior to carrying out this alignment activity, set up the 8920C and EUT controls and conditions as follows:

156.1 PSU.

(1)	Voltage	: 12 V
(2)	Current Limit	: 1 A

156.2 2955B.

(1)	SET AF LOAD	: 300R
(2)	Skeleton Test Set-up	: Receiver - Audio Output

156.3 CIP.

(1)	AUDIO/HARNESS	: RADIO
(2)	POWER	: OFF
(3)	LINE RESISTANCE	: OC

156.4 EUT.

(1)	FSS	: 42.050 MHz
(2)	SSW	: * (Noise on)

Method

157 To carry out this alignment activity, proceed as follows:

157.1 Set the RF generator frequency to 42.050 MHz at a level of -135 dBm and set RF generator on.

157.2 Set up a modulation frequency of 150 Hz at a level of 1.2 kHz and set modulation on.

157.3 Using the adjustment tool, set SET SQU fully clockwise.

157.4 Press dB on the 2955B to set dBR to zero.

157.5 Using the VARIABLE rotary control, increase the RF generator level until the reading is -6 dB.

157.6 Set SSW on the EUT to L (Loud).

157.7 Adjust SET SQU counter-clockwise until the noise returns (squelch opens).

157.8 Set the RF generator off and confirm that the squelch closes (noise stops).

ASSEMBLY 7 (Rx and Tx OSCILLATOR SETTINGS)

158 If a new assembly 7 is fitted or assembly 10 repaired, the Rx and Tx oscillators should be re-aligned.

Initial settings

159 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for this alignment activity.

160 Prior to carrying out this alignment activity, set up the 8920C and EUT controls and conditions as follows:

160.1 PSU.

(1)	Voltage	: 12 V
(2)	Current Limit	: 1 A

160.2 2955B.

(1)	SET AF LOAD	: 300R
(2)	Skeleton Test Set-up	: Transmitter - Output and Modulation

160.3 CIP.

(1)	AUDIO/HARNESS	: RADIO
(2)	POWER	: OFF
(3)	LINE RESISTANCE	: OC

160.4 EUT.

(1)	FSS	: 37.500 MHz
(2)	SSW	: * (Noise on)

Methods

161 To carry out the Rx oscillator alignment activity, proceed as follows:

161.1 Connect the CRO input to either 3SK8/1 or 3TP1 (assembly 8 has to be removed from the motherboard to gain access to 3TP1) via a high impedance (x10, 11 pF) probe.

161.2 Set the CRO to 'positive trigger', and check that positive polarity is displayed upwards. Adjust the CRO timebase so that one cycle equals 9 cm and note that the waveform is as shown in Fig 6.

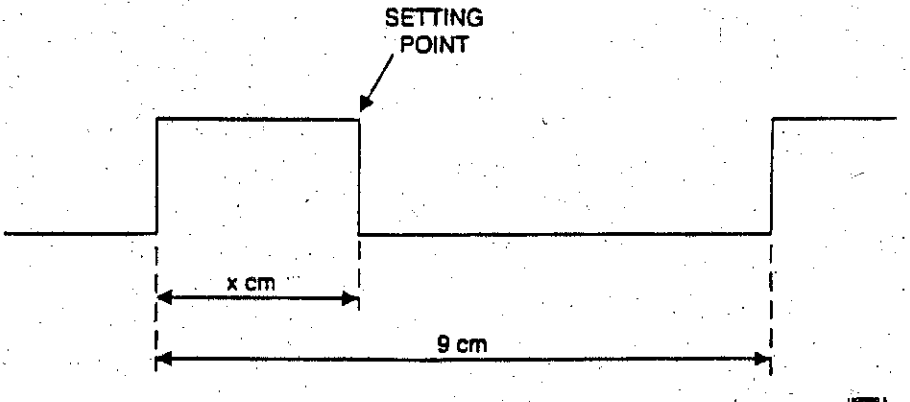


Fig 6 Tx and Rx oscillator alignment waveform

NOTE

The purpose of this alignment procedure is to ensure that 'x' is between 2 cm and 7 cm for all test frequencies in both the receive and transmit modes.

161.3 Using the plastic adjustment tool, adjust 7L1 so that 'x' equals 4.5 cm ±0.5 cm.

161.4 Set FSS on the EUT to 46.500 MHz and, using the metal adjustment tool (Table 2, Serial 8), adjust 7C3 so that 'x' equals 4.5 cm ±0.5 cm.

161.5 If necessary, repeat operations 161.3 and 161.4 until the correct result is obtained.

161.6 Check that 'x' is between 2 cm and 7 cm for EUT FSS frequency settings of 37.000 MHz, 37.900 MHz, 42.000 MHz, 42.900 MHz, 46.000 Mhz and 46.900 MHz.

161.7 If the correct result cannot be achieved for the frequencies covered in operation 161.6, (eg 'x' is less than 2 cm), repeat operations 161.3 to 161.5 to obtain a higher setting point of say 4.8 cm ±0.5 cm. Then repeat operation 161.6.

162 To carry out the Tx oscillator alignment activity, proceed as follows:

162.1 Set up and connect the 8920C, CRO and EUT as for the Rx oscillator alignment activity (Paras 161.1 to 161.6).

162.2 Press HELP, enter RIU Manual Control and select TRANSMIT - ON.

162.3 Press HELP to return to 2955B manual operation.

162.4 Carry out alignment operations as for Rx oscillator alignment (Paras 161.3 to 161.7), but adjusting coil 7L2 at 37.500 MHz and capacitor 7C4 at 46.500 MHz.

162.5 Press HELP to return to RIU Manual Control and select TRANSMIT - OFF.

162.6 Press SELECT on the 2955B to return to the Skeleton Test Menu.

ASSEMBLY 8 (SET 150 Hz AND SET MOD SETTINGS)

163 If a new assembly 8 or 7 is fitted, the SET 150 Hz and SET MOD preset controls should be adjusted.

Initial settings

164 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for this alignment activity.

165 Prior to carrying out this alignment activity, set up the 8920C and EUT controls and conditions as follows:

165.1 PSU.

(1)	Voltage	: 12 V
(2)	Current Limit	: 1 A

165.2 2955B.

(1)	SET AF LOAD	: 300R
(2)	Skeleton Test Set-up	: Transmitter - Output and Modulation

165.3 CIP.

(1)	AUDIO/HARNESS	: RADIO
(2)	POWER	: OFF
(3)	LINE RESISTANCE	: OC

165.4 EUT.

(1)	FSS	: 37.000 MHz
(2)	SSW	: L (Loud)

Method

166 To carry out the SET 150 Hz and SET MOD alignment activities, proceed as follows:

166.1 Press BAND PASS to select 0.3 kHz to 3.4 kHz filter.

166.2 Set the SET 150 Hz control fully counter-clockwise in order to remove deviation caused by the 150 Hz tone.

166.3 Set an AF level of 100 mV and set the AF generator on.

166.4 Press and hold the PRESSEL switch and note the deviation reading on the 2955B display.

166.5 Note the deviation readings for EUT FSS settings, in turn, of 37.050 MHz, 39.050 MHz, 41.050 MHz, 43.050 MHz, 45.050 MHz and 46.975 MHz.

166.6 At the frequency which produces the highest deviation, adjust the SET MOD control to produce a deviation of ±5.7 kHz.

166.7 Set the AF generator off.

166.8 Select the 300 Hz low pass filter.

166.9 Press the PRESSEL switch and note the deviation due to noise only.

166.10 Press the PRESSEL switch while adjusting the SET 150 Hz control for a modulation level of 2.45 kHz plus the deviation due to noise (Para 166.9).

ASSEMBLY 10

167 After replacing a sub-assembly within the synthesizer, the following alignment procedures should be carried out with the motherboard (with all assemblies) fitted in the motherboard assembly test jig (Paras 50 and 51).

Initial settings

168 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for this alignment activity.

169 Prior to carrying out this alignment activity, set up the 8920C and EUT controls and conditions as follows:

169.1 PSU.

(1)	Voltage	: 12 V
(2)	Current Limit	: 1 A

169.2 2955B.

(1)	SET AF LOAD	: 300R
(2)	Skeleton Test Set-up	: Transmitter - Output and Modulation

169.3 CIP.

(1)	AUDIO/HARNESS	: RADIO
(2)	POWER	: OFF
(3)	LINE RESISTANCE	: OC

169.4 EUT.

(1)	FSS	: 46.000 MHz
(2)	SSW	: O (Off)

169.5 Ensure that the EUT is switched off and replace the normal assembly screening cover with the dummy synthesizer cover (Table 2, Serial 6) and hand-tighten the captive retainers.

169.6 Switch the EUT to * (Noise on).

Set 6 volts

Method

170 To set the EUT internal 6 V d.c. level, proceed as follows:

170.1 Set the DMM to d.c. volts.

170.2 Connect the DMM positive lead to 3SK7/8 (VT COARSE).

170.3 Adjust 10aR18 (SET 6 V) for a DMM indication of LL 5.98 V, UL 6.00 V.

170.4 Remove the DMM leads and reconnect them to the RIU unit.

Set reference oscillator frequency

Method

171 To set the reference oscillator frequency, proceed as follows:

171.1 Press SELECT on the 2955B to select the BNC RF connector and disconnect the cable from the BNC RF connector.

171.2 Connect a x1 probe to the 2955B BNC RF connector and connect the probe to 10TP5 (REF) on the dummy cover.

171.3 Adjust 10bC17 (SET REF) for 2955B frequency reading of LL 3.200000 MHz, UL 3.200100 MHz.

171.4 Remove the probe from 10TP5.

171.5 Remove the probe lead from the 2955B BNC RF connector and press SELECT on the 2955B to reselect the N-type RF connector.

171.6 Connect the RF cable (previously removed) to the 2955B BNC RF connector.

Rx and Tx oscillators (assembly 7)

NOTES

(1) Assembly 7 components 7L1 and 7C3 interact with assembly 10 components 10aL1 and 10aC1 in the receive path, and assembly 7 components 7L2 and 7C4 interact with assembly 10 components 10aL6 and 10aC13 in the transmit path.

(2) Following Rx (Tx) oscillator (assembly 7) alignment, it may not be possible to set the RX (Tx) oscillator frequency without further adjustment of the Rx (Tx) oscillator (assembly 7), as the pulses on the oscilloscope set during assembly 7 alignment may not remain stable during assembly 10 adjustment.

172 Align the Rx and Tx oscillators (Paras 158 to 162).

Set Rx oscillator frequency

173 To set the Rx oscillator frequency, proceed as follows:

173.1 Enter RIU Manual Control and select FREQUENCY B - RF AMP.

173.2 Follow the connection details displayed on screen and as shown in Fig 7. Connect a x1 probe from the 2955B RF IN/OUT BNC connector to 3SK4/12 (RXO) on the EUT.

173.3 Connect the CRO input to either 3SK8/1 or 3TP1 via a high impedance (x10, 11 pF) probe.

NOTE

Assembly 8 has to be removed from the motherboard to gain access to 3TP1.

173.4 Set the FSS on the EUT to 37.000 MHz and SSW to * (Noise on).

173.5 Adjust SET FREQ RX (10aC1) to its mid position and adjust RX L1 (10aL1) for a 2955B frequency reading of LL 58.399800 MHz, UL 58.400100 MHz. Ensure that the oscilloscope displays stable pulses throughout the adjustment.

173.6 Set the FSS on the EUT to 46.975 MHz.

173.7 If necessary, adjust SET FREQ RX (10aC1) for a 2955B Tx frequency reading of LL 68.374800 MHz, UL 68.375100 MHz. Ensure that the oscilloscope displays stable pulses throughout the adjustment.

173.8 Repeat operations 173.4 to 173.7 until no further adjustment is necessary. If a satisfactory adjustment is not possible, it may be necessary to realign the Rx oscillator (Paras 161.3 to 161.7) before repeating operations 173.4 to 173.7.

NOTE

Adjustments 161.3 to 161.7 and 173.4 to 173.7 can be performed with the test system in its current configuration.

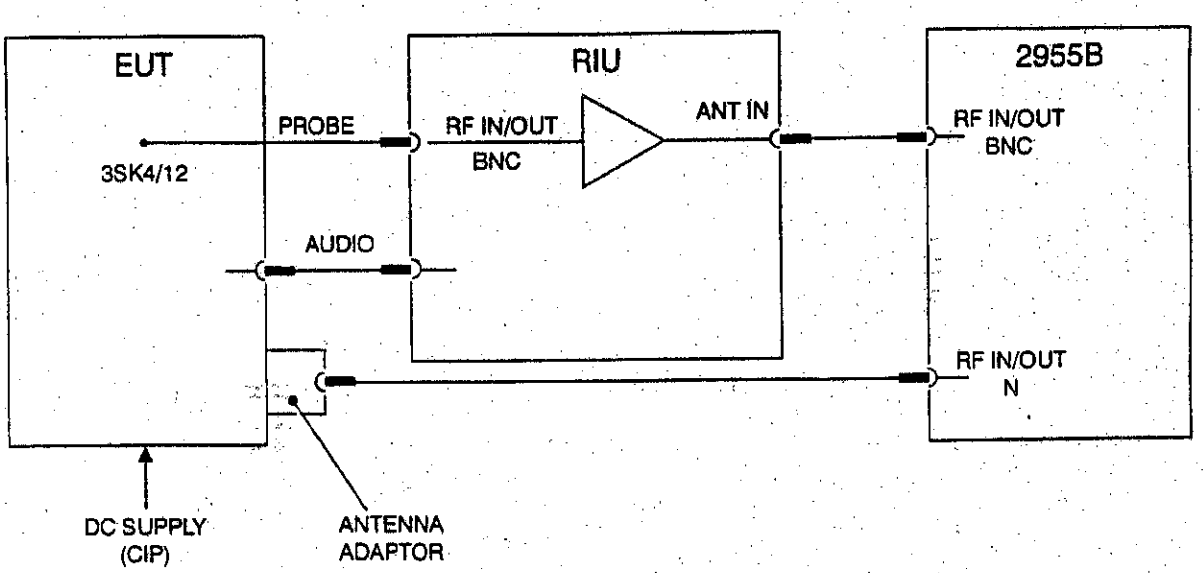


Fig 7 Frequency measurement B interconnection diagram

Set Tx oscillator frequency

174 To set the Tx oscillator frequency, proceed as follows:

174.1 Connect the x1 probe to 3SK4/6 (TXO).

174.2 Set the FSS on the EUT to 46.975 MHz.

174.3 Adjust SET FREQ Tx (10aC13) to its mid position.

174.4 Set Tx ON and adjust TX L6 (10aL6) for a frequency reading of LL 46.974800 MHz, UL 46.975100 MHz. Ensure that the oscilloscope displays stable pulses throughout the adjustment.

174.5 Set the FSS on the EUT to 37.000 MHz.

174.6 If necessary, adjust SET FREQ RX (10aC13) for a 2955B Tx frequency reading of LL 36.999800 MHz, UL 37.000100 MHz. Ensure that the oscilloscope displays stable pulses throughout the adjustment.

174.7 Repeat operations 174.2 to 174.6 until no further adjustment is necessary. If a satisfactory adjustment is not possible, it may be necessary to realign the Tx oscillator (Para 162.4) before repeating operations 174.2 to 174.6.

NOTE

Adjustments 162.4 and 174.2 to 174.6 can be performed with the test system in its current configuration using the TX ON/OFF softkeys.

174.8 Set Tx OFF when adjustments are complete.

174.9 Exit Frequency Measurement B to RIU Manual Control. Disconnect the probe from the EUT and return the RF cables to the normal connection configuration for the RT-349. Disconnect the oscilloscope from the EUT.

174.10 Finally, check for correct operation of the complete synthesizer, as follows:

174.10.1 Press SELECT to return to the Skeleton Test Menu.

174.10.2 Ensure that the SET AF LOAD selection is 300R, and select the Receiver -Audio Output skeleton test set up.

174.10.3 Disconnect the cable from the 2955B AF INPUT BNC socket.

174.10.4 Connect the lead of a x10 probe to the 2955B AF INPUT connector and connect the probe to 3SK8/1.

174.10.5 Select the 2955B SCOPE function and check for stable pulses at a frequency of 3.125 kHz for various FSS settings in Rx and Tx mode (for PRESSEL switch depressed and released).

174.10.6 Disconnect the probe lead and probe and reconnect the 2955B AF IN cable.

174.11 Switch the EUT off and replace the synthesizer dummy cover with the normal screening cover.

CRYSTAL AGEING ADJUSTMENT

175 The following adjustments may be made to compensate for crystal ageing when the transmit frequency exceeds ±500 Hz of its nominal setting.

175.1 Resetting of Rx oscillator frequency as per Para 173.

175.2 Resetting of Tx oscillator frequency as per Para 174.

ADJUSTMENTS NOT NORMALLY CARRIED OUT

176 The preset controls for the following adjustments are inscribed and ringed in red on the RT-349, and SHOULD NOT be touched during normal repair and alignment procedures. However, if they are accidentally adjusted, they should be reset as follows:

Set 9 volts (assembly 9)

Initial settings

177 **Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for this adjustment.**

178 Prior to carrying out this adjustment activity, set up the 8920C and EUT controls and conditions as follows:

178.1 PSU.

(1)	Voltage	: 12 V
(2)	Current Limit	: 1 A

178.2 2955B.

(1)	SET AF LOAD	: 300R
(2)	Skeleton Test Set-up	: Transmitter - Output and Modulation

178.3 CIP.

(1)	AUDIO/HARNESS	: RADIO
(2)	POWER	: OFF
(3)	LINE RESISTANCE	: OC

178.4 EUT.

(1)	FSS	: 42.050 MHz
(2)	SSW	: * (Noise on)

Method

179 To carry out the adjustment, proceed as follows:

179.1 Connect the DMM positive lead to 3SK5/2 (9V CONST). If this adjustment is to be carried out with the motherboard assembly in the radio box assembly, assembly 5 will have to be removed to enable access to 3SK5/2.

179.2 Adjust the SET 9 V control for a meter indication of LL 9.00 V, UL 9.10 V.

179.3 Reconnect the DMM leads to the DMM connectors on the RIU unit.

Set low battery warning voltage (assembly 9)

Initial settings

180 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for this adjustment.

181 Prior to carrying out this adjustment activity, set up the 8920C and EUT controls and conditions as follows:

181.1 PSU.

(1)	Voltage	: 9.6 V
(2)	Current Limit	: 1 A

181.2 2955B.

(1)	SET AF LOAD	: 300R
(2)	Skeleton Test Set-up	: Receiver - Audio Output

181.3 CIP.

(1)	AUDIO/HARNESS	: RADIO
(2)	POWER	: OFF
(3)	LINE RESISTANCE	: OC

181.4 EUT.

(1)	FSS	: 42.050 MHz
(2)	SSW	: L (Loud)
(3)	ANT	: Remove RF cable

Method

182 To carry out the adjustment, proceed as follows:

182.1 Set SET LB fully counter-clockwise.

182.2 Slowly rotate SET LB clockwise and stop at the position where regular bursts of noise are heard from the loudspeaker.

182.3 Reconnect the RF cable to EUT.

182.4 Reset the PSU output voltage to 12 V.

Set audio output (assembly 5)

Initial settings

183 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for this adjustment.

184 Prior to carrying out this adjustment activity, set up the 8920C and EUT controls and conditions as follows:

184.1 PSU.

(1)	Voltage	: 12 V
(2)	Current Limit	: 1 A

184.2 2955B.

(1)	SET AF LOAD	: 300R
(2)	Skeleton Test Set-up	: Receiver - Audio Output

184.3 CIP.

(1)	AUDIO/HARNESS	: RADIO
(2)	POWER	: OFF
(3)	LINE RESISTANCE	: OC

184.4 EUT.

(1)	FSS	: 42.050 MHz
(2)	SSW	: * (Noise on)

Method

185 To carry out the adjustment, proceed as follows:

185.1 Set a modulation level of 1 kHz and deviation of 5 kHz, and set modulation to on.

185.2 Set a RF generator frequency of 42.050 MHz at a level of -52.8 dBm (1 mV emf) and set the RF generator on.

185.3 Adjust the SET AF control for an AF level indication of LL 520 mV, UL 580 mV.

Set 150 Hz rejection (assembly 5)

Initial settings

186 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for this adjustment.

187 Prior to carrying out this adjustment activity, set up the 8920C and EUT controls and conditions as follows:

187.1 PSU.

(1)	Voltage	: 12 V
(2)	Current Limit	: 1 A

187.2 2955B.

(1)	SET AF LOAD	: 300R
(2)	Skeleton Test Set-up	: Receiver - Audio Output

187.3 CIP.

(1)	AUDIO/HARNESS	: RADIO
(2)	POWER	: OFF
(3)	LINE RESISTANCE	: OC

187.4 EUT.

(1)	FSS	: 42.050 MHz
(2)	SSW	: • (Noise on)

Method

188 To carry out the adjustment, proceed as follows:

188.1 Set a modulation level of 150 Hz at a deviation level of 1.5 kHz, and set modulation to on.

188.2 Set a RF generator frequency of 42.050 MHz at a level of -52.8 dBm (1 mV emf) and set the RF generator on.

188.3 Adjust the SET REJ control for a minimum AF Volts indication on the 2955B.

FUNCTIONAL TESTS

GENERAL

189 The following functional tests should be carried out for periodically checking the serviceability of RT-349 radios and as the first level of RT-349 failure diagnosis. Before carrying out the functional tests, ensure that the manual mode setup and preliminary specification test Test 1 (Paras 65 to 70) have been carried out.

FUNCTIONAL TEST 1 (POWER OUTPUT)

Test limits

190 With a d.c. supply of 12 V ±0.2 V, the transmitter power output shall be between 130 mW and 350 mW at any permitted frequency.

Initial settings

191 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for Functional Test 1.

192 Prior to carrying out this functional test, set up the 8920C and EUT controls and conditions as follows:

192.1 PSU.

(1)	Voltage	: 12 V
(2)	Current Limit	: 1 A

192.2 2955B.

(1)	SET AF LOAD	: 300R
(2)	Skeleton Test Set-up	: Transmitter - Output and Modulation

192.3 CIP.

(1)	AUDIO/HARNESS	: RADIO
(2)	POWER	: OFF
(3)	LINE RESISTANCE	: OC

192.4 EUT.

(1)	FSS	: 42.050 MHz
(2)	SSW	: * (Noise on)

Test method

NOTE

Due to the automatic characterisation feature of the 8920C in automatic mode, the RF output power measurements for automatic mode and manual mode will differ for the same test. For cross-reference purposes, the automatic mode equivalent power measurement values are given in brackets after the manual mode measurement values.

193 To carry out this functional test, proceed as follows:

193.1 Press the PRESSEL switch and check the following:

193.1.1 Transmitter frequency indication which shall be the nominal setting on the EUT.

193.1.2 Transmitter power indication which shall be LL 122 mW (130 mW), UL 336 mW (350 mW).

193.2 Repeat Para 193.1 operations, but for EUT frequency settings of 37.000 MHz and 46.975 MHz

193.3 Press HELP to return to the Skeleton Test Menu.

FUNCTIONAL TEST 2 (150 Hz MODULATION)

Test limits

194 The frequency of the internal tone shall be between 148 Hz and 152 Hz.

195 The deviation of the transmitter output caused by the internal 150 Hz tone shall be between 1.55 kHz and 2.5 kHz.

Initial settings

196 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for Functional Test 2.

197 Prior to carrying out this functional test, set up the 8920C and EUT controls and conditions as follows:

197.1 PSU.

(1)	Voltage	: 12 V
(2)	Current Limit	: 1 A

197.2 2955B.

(1)	SET AF LOAD	: 300R
(2)	Skeleton Test Set-up	: Transmitter - Output and Modulation

197.3 CIP.

(1)	AUDIO/HARNESS	: RADIO
(2)	POWER	: OFF
(3)	LINE RESISTANCE	: OC

197.4 EUT.

(1)	FSS	: 42.050 MHz
(2)	SSW	: L (Loud)

Test method

198 To carry out the first and second checks of Functional Test 2 (Paras 194 and 195), proceed as follows:

198.1 Press LOW PASS to select a 300 Hz low pass filter.

198.2 Press the PRESSEL switch and note the modulation frequency indication which shall be LL 148 Hz, UL 152 Hz and the modulation level which shall be LL 1.55 kHz, UL 2.5 kHz.

198.3 Press HELP to return to the Skeleton Test Menu.

FUNCTIONAL CHECK 3 (AUDIO MODULATION)

Test limits

199 With an AF input of 3 mV rms pd, the transmitter frequency deviation shall be between 4.1 kHz and 6.4 kHz.

Initial settings

200 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for Functional Test 3.

201 Prior to carrying out this functional test, set up the 8920C and EUT controls and conditions as follows:

201.1 PSU.

(1)	Voltage	:	12 V
(2)	Current Limit	:	1 A

201.2 2955B.

(1)	SET AF LOAD	:	300R
(2)	Skeleton Test Set-up	:	Transmitter - Output and Modulation

201.3 CIP.

(1)	AUDIO/HARNESS	:	RADIO
(2)	POWER	:	OFF
(3)	LINE RESISTANCE	:	OC

201.4 EUT.

(1)	FSS	:	42.050 MHz
(2)	SSW	:	L (Loud)

Test method

202 To carry out this functional test, proceed as follows:

202.1 Press BAND PASS twice to select the 0.3 kHz to 3.4 kHz filter.

202.2 Set an AF frequency of 1 kHz at a level of 30 mV and set the AF generator on.

202.3 Press the PRESSEL switch and observe the modulation level indication which shall be LL ±4.1 kHz, UL ±6.4 kHz.

202.4 Press HELP to return to the Skeleton Test Menu

FUNCTIONAL TEST 4 (SIDETONE)

Test limits

203 With an AF input of 1 kHz ±10% at a level of 10 mV rms, the AF output into 300 ohms, with the EUT set to any frequency, shall be between 240 mV and 360 mV.

Initial settings

204 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for Functional Test 4.

205 Prior to carrying out this functional test, set up the 8920C and EUT controls and conditions as follows:

205.1 PSU.

(1)	Voltage	: 12 V
(2)	Current Limit	: 1 A

205.2 2955B.

(1)	SET AF LOAD	: 300R
(2)	Skeleton Test Set-up	: Transmitter - Sidetone

205.3 CIP.

(1)	AUDIO/HARNESS	: RADIO
(2)	POWER	: OFF
(3)	LINE RESISTANCE	: OC

205.4 EUT.

(1)	FSS	: 42.050 MHz
(2)	SSW	: L (Loud)

Test method

206 To carry out this functional test, proceed as follows:

206.1 Set an AF frequency of 1 kHz at a level of 100 mV and set the AF generator on.

206.2 Press and hold the PRESSEL switch and observe the AF output indication which shall be LL 240 mV, UL 360 mV.

206.3 Press HELP to return to the Skeleton Test Menu.

FUNCTIONAL TEST 5 (AF OUTPUT IN NOISE-ON (*) AND/OR L MODES

Test limits

207 With an RF signal of 1 mV, modulated by both a 1 kHz ±10% at 5 kHz deviation and a 150 Hz ±2 Hz at 1.5 kHz deviation, the audio output in 'L' or '*' mode shall be between 460 mV and 640 mV into 300 ohms.

Initial settings

208 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for Functional Test 5.

209 Prior to carrying out this functional test, set up the 8920C and EUT controls and conditions as follows:

209.1 PSU.

(1)	Voltage	: 12 V
(2)	Current Limit	: 1 A

209.2 2955B.

(1)	SET AF LOAD	: 300R
(2)	Skeleton Test Set-up	: Receiver - Audio Output

209.3 CIP.

(1)	AUDIO/HARNESS	: RADIO
(2)	POWER	: OFF
(3)	LINE RESISTANCE	: OC

209.4 EUT.

(1)	FSS	: 42.050 MHz
(2)	SSW	: * (Noise on)

Test method

210 To carry out this functional test, proceed as follows:

210.1 Set an RF generator frequency of 42.050 MHz at a level of -52.8 dBm and set the RF generator to on.

210.2 Set a modulation frequency of 1 kHz at a level of 5 kHz and set the modulation on.

210.3 Set a second modulation frequency of 150 Hz at a level of 1.5 kHz and set the modulation on.

210.4 Observe the 2955B AF level indication which shall be LL 460 mV and UL 640 mV.

210.5 Set the SSW on the EUT to L (Loud), observe the 2955B AF level indication which shall be as Para 210.4 and check for the presence of the 1 kHz tone.

210.6 Press HELP to return to the Skeleton Test Menu.

FAULT FINDING

INTRODUCTION

211 The location and correction of faults in accordance with the Field repair policy is:

211.1 To assembly level within the RT-349.

211.2 To sub-assembly level for assembly 10 (synthesizer).

211.3 To sub-assembly level or mechanical parts for the box assembly.

NOTE

An enlarged version of EMER Tels F 602, Fig 2001, RT-349 functional diagram, suitable for bench working, can be obtained on application to:

Commanding Officer
Electronics Branch REME
Leigh Sinton Road
Malvern
Worcs
WR14 1LL

FAULT IDENTIFICATION

212 From the results obtained from the functional tests (Paras 189 to 210), the nature of the fault is identified using Table 5. The right-hand column of Table 5 indicates the Table 4 action(s) to be taken to locate and rectify the fault. The complete motherboard assembly must be fitted into the motherboard assembly test jig (Table 2, Serial 1) when carrying out the actions in Table 6.

213 If assembly 10 is identified as faulty, Paras 217 to 228 provide the information necessary for fault location to synthesizer sub-assembly level.

Initial settings

214 Set up the 8920C and EUT controls and conditions as follows:

214.1 PSU.

(1)	Voltage	:	12 V
(2)	Current Limit	:	1 A

214.2 2955B.

(1)	SET AF LOAD	:	300R
(2)	Skeleton Test Set-up	:	As required

214.3 CIP.

(1)	AUDIO/HARNESS	:	RADIO
(2)	POWER	:	OFF
(3)	LINE RESISTANCE	:	OC

214.4 EUT.

(1)	FSS	:	Position at which fault occurs
(2)	SSW	:	Position at which fault occurs

TABLE 5 FAULT IDENTIFICATION

Fault ref	RF power output	Audio/squelch (150 Hz) modulation on transmitted signal?	Sidetone	Audio output in * mode	Table 4 action No.
A	No	-	No	No	1
B	No	-	No	Yes	22
C	No	-	Yes	Yes	27
D	No	No	Yes	No	43
E	Yes	No	Yes	Yes	31
F	Yes	Yes	No	Yes	37
G	Yes	Yes	Yes	No	38
H	Yes	Yes	No	No	35
J	Yes	No	No	No	42
K	Yes	No	Yes	No	44
L	Yes	No	No	Yes	30
	Fault description				
	Receiver faults				
M	No audio in L and W, but present in * mode.				46
N	Noise present in L and W modes.				46
O	Audio output at some frequencies only.				45
P	Low sensitivity.				41
Q	Audio distorted.				41
R	No difference between L and W positions of SSW.				49
	Transmitter faults				
S	RF power output at some frequencies only.				45
T	Low RF power output.				29
U	Audio distorted.				47
V	No difference between L and W positions of SSW.				48

FAULT FINDING TO ASSEMBLY LEVEL

215 If, after replacing an assembly, the fault still exists, **always refit the original assembly to the radio.** Continuity and short-circuit (S/C) checks should be made using the DMM set to the ohms range, and the battery supply disconnected.

216 In Table 6, the 'Result and next action' column gives the next action to go to for the 'Yes' and 'No' conditions. Where a particular action points to more than one further action (actions 26, 42, 43 and 44), attempt the actions in the order given and follow each action to its conclusion in the table.

TABLE 6 FAULT RECTIFICATION

Action No	Action	Result and next action			
1	Disconnect 1PL3: check 1PL3 pin 1 for presence of +VE BATT.	Yes	12	No	2
2	Check 1LK1 for continuity.	Yes	21	No	3
3	Renew 1LK1; connect 1PL3: fault cleared?	Yes	50	No	4
4	Check 1LK1 for continuity.	Yes	1	No	5
5	Set SSW to O. Check 3SK9/6 ((9VRx) for S/C to earth.	Yes	16	No	6
6	Set SSW to O. Check 3SK8/7 (9VTx) for S/C to earth.	Yes	17	No	7
7	Set SSW to O. Check 3SK9/11 (9V) for S/C to earth.	Yes	18	No	8
8	Set SSW to O. Check 3SK9/12 (BATT) for S/C to earth.	Yes	19	No	9
9	Set SSW to O. Check 3SK5/2 (9V CONST) for S/C to earth.	Yes	20	No	10
10	Insert new assembly 9: fault cleared?	Yes	50	No	11
11	Remove test point location overlay and check appropriate connections.	-	-	-	-
12	Connect the DMM to 3SK9/6 (9VRx). Check for 9 V.	Yes	13	No	10
13	Connect the DMM to 3SK9/11 (9V). Check for 9 V.	Yes	14	No	10
14	Connect the DMM to 3SK9/3 (L_k). Check for 0 V (L_k information).	Yes	.10	No	15
15	Remove test cover and check wiring of flying leads 10SK8 (VT COARSE), 10SK10 (VT FINE), 10SK13 (VCO); attempt alignment of oscillators (Paras 158 to 162); if unsuccessful, fit a new assembly 7. Fault cleared?	Yes	50	No	Syn†

(continued)

† Para 217 to 228

TABLE 6 FAULT RECTIFICATION (continued)

Action No	Action	Result and next action	
16	Remove, in turn, assemblies 4, 6 and 7 and disconnect flying lead 10SK9 (9VRx) until S/C disappears; insert new assembly, as appropriate, or fault-find within assembly 10 (Para 217 to 228). Fault cleared?	Yes 50	No 10
17	Remove, in turn, assemblies 7 and 8 and disconnect flying lead 10SK6 (9VTx) until S/C disappears; insert new assembly, as appropriate, or fault-find within assembly 10 (Para 217 to 228). Fault cleared?	Yes 50	No 10
18	Remove test cover and disconnect flying lead 10SK11 (9V). If S/C disappears, fault-find within assembly 10 (Para 217 to 228). Fault cleared?	Yes Syn†	No 10
19	Remove, in turn, assemblies 4 and 8 and disconnect flying lead 10SK12 (+V BATT)) and 10SK2 (+V BATT O/P) until S/C disappears; insert new assembly, as appropriate, or fault-find within assembly 10 (Para 217 to 228). Fault cleared?	Yes 50	No 10
20	Remove assembly 5; if S/C disappears, fit new assembly 5. Fault cleared?	Yes 50	No 10
21	Check battery connections and wiring continuity of the audio socket, SSW and wiring harness assembly. Fault cleared?	Yes 50	- -
22	Connect the DMM to 3SK9/3 (L_k); depress PRESSEL and check for 0 V (L_k information correct).	Yes 26	No 23
23	Connect the DMM to 3SK8/7 (9VTx); depress PRESSEL and check for 9 V.	Yes 15	No 24
24	Check 3SK8/7 (9VTx) for S/C to earth.	Yes 17	No 25
25	Insert new assembly 9. Fault cleared?	Yes 50	- -
26	Carry out 27 and then 37.	- -	- -
27	Connect the DMM to 3SK9/12 (+V BATT) and check for battery volts.	Yes 28	No 29
28	Connect the DMM to 3SK9/1 (T_w); depress PRESSEL and check for 9 V.	Yes 29	No 10
29	Insert new assembly 4, followed by 7, if necessary. Fault cleared?	Yes 50	- -
30	Insert new assembly 8. Fault cleared?	Yes 50	No 33
31	Insert new assembly 8. Fault cleared?	Yes 50	No 32
32	Insert new assembly 7. Fault cleared?	Yes 50	- -

(continued)

† Para 217 to 228

TABLE 6 FAULT RECTIFICATION (continued)

Action No	Action	Result and next action			
33	Check continuity between 3SK8/11 (mic) and 1SK1, pin A.	Yes	50	No	34
34	Insert new audio socket, SSW and wiring harness assembly. Fault cleared?	Yes	50	-	-
35	Insert new assembly 5. Fault cleared?	Yes	50	No	36
36	Check continuity between 3SK5/4 (AF) and 1SK1, pin D.	Yes	25	No	34
37	Insert new assembly 8, followed by assembly 5, if necessary. Fault cleared?	Yes	50	No	11
38	Connect the DMM to 3SK9/6 (9VRx) and check for 9 V.	Yes	39	No	40
39	Connect the DMM to 3SK9/3 (L_k) and check for 0 V (L_k information correct).	Yes	41	No	15
40	Check 3SK6/9 (9VRx) for S/C to earth.	Yes	16	No	10
41	Insert new assemblies 4, 6 and 5, in turn, and check that radio is satisfactory.	Yes	50	No	11
42	Carry out 38 then 30.	-	-	-	-
43	Carry out 27 then 38.	-	-	-	-
44	Carry out 38 then 31	-	-	-	-
45	Try re-alignment of oscillators, or fitting a new assembly 7 and/or fault-find within assembly 10 (Para 217 to 228). Fault cleared?	Yes	50	-	-
46	Try re-setting squelch level (SET SQU) or fitting a new assembly 5, followed by assembly 9. Fault cleared?	Yes	50	-	-
47	Insert new assembly 8, followed by assembly 7. Fault cleared?	Yes	50	-	-
48	Insert new assembly 8. Fault cleared?	Yes	50	No	11
49	Insert new assembly 5. Fault cleared?	Yes	50	No	11
50	Having located and replaced faulty assemblies, check alignment and re-align as necessary. Carry out specification tests after any re-alignment.				

FAULT FINDING WITHIN ASSEMBLY 10 (SYNTHESIZER)

217 Fault finding is carried out with the motherboard (with all assemblies) fitted into the motherboard assembly test jig (Para 50 and 51). When carrying out the following fault finding procedures, it may be necessary to refer to Fig 8 and EMER Tels F 602, Figs 2003 and 2005.

Initial settings

218 Set up the 8920C and EUT controls and conditions as follows:

218.1 PSU.

(1)	Voltage	: 12 V
(2)	Current Limit	: 1 A

218.2 2955B.

(1)	SET AF LOAD	: 300R
(2)	Skeleton Test Set-up	: Transmitter - Output and Modulation

218.3 CIP.

(1)	AUDIO/HARNESS	: RADIO
(2)	POWER	: OFF
(3)	LINE RESISTANCE	: OC

218.4 EUT.

(1)	FSS	: See text
(2)	SSW	: • (Noise on)

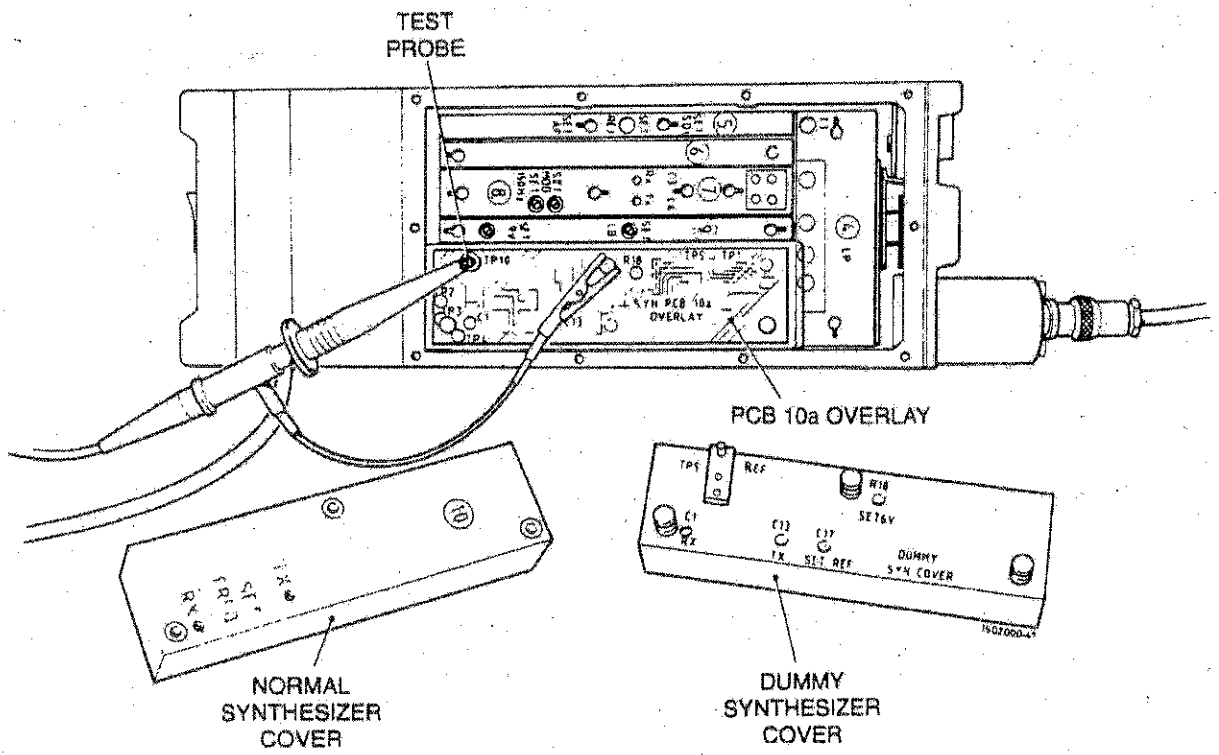


Fig 8 Fault location - Synthesizer (assembly 10)

Fault finding procedure

219 Carry out a physical check of all flying leads to the synthesizer.

220 Connect the CRO CH1 input to 3SK8/1 (3TP1) (comparison frequency output) on the motherboard via a high impedance (x10 - 11 pF) probe. Check for stable 3.125 kHz pulses, with PRESSEL switch pressed and released. Repeat these checks for a number of settings of the FSS.

221 If, in Para 220, the pulses are present in only the transmit or receive mode, remove the synthesizer cover and fit the synthesizer PCB 10a overlay (Table 2, Serial 7). Connect the DMM to 10aTP2 and check for 9 V (Rx), and to 10aTP3 and check for 9 V (Tx) with the PRESSEL switch depressed. If the correct voltage is present, board 10a has a possible Tx or Rx oscillator fault. Fit the dummy synthesizer cover (Table 2, Serial 6) and attempt to align the faulty oscillator (Paras 158 to 162). If the oscillator cannot be aligned, change board 10a.

222 If, in Para 220, the pulses are not present at certain MHz settings of the FSS, connect the DMM to 3SK7/8 (V_t COARSE STEP VOLTS) and, for these FSS settings, refer to EMER Tels F 602, Table 2004 and check for a correct DMM indication. If incorrect, change board 10b.

223 If, in Para 222, the step voltages measured are present and correct, observe the effect of various settings of the 100 kHz and kHz switches. If the synthesizer fails at certain settings, proceed as follows:

223.1 Set the MHz switch to one of the settings (Para 220) which gave the expected step voltages.

223.2 Set the 100 kHz and kHz switches to one of the positions which indicated a fault condition.

224 If, on each of the MHz steps, the 100 kHz and kHz do not function correctly, the data information is incorrect. Remove and dismantle the synthesizer, and disconnect the appropriate data line. Refer to EMER Tels F 602, Table 2003 and check the switch data. If this data is correct, board 10b is faulty.

225 If, in Para 220, the pulses are not present at any frequency setting in both the transmit and receive modes. Remove the synthesizer cover and fit the synthesizer PCB 10a overlay (Table 2, Serial 7). Connect the DMM to 10aTP4 and check for 9 V and then connect to 10aTP10 and check for 6 V. If 9 V is present, but 6 V is incorrect, attempt to reset 6 V (Para 170). If unsuccessful, change board 10a.

226 If 6 V is present, check the divide-by-four prescaler, as follows:

226.1 Switch the EUT off.

226.2 Press Rx to select the 2955B Receiver Test Page.

226.3 Select the 2955B RF BNC connector and remove the RIU cable from the 2955B RF BNC connector

226.4 Set up a RF generator frequency of 38.475 MHz, set the level to -12.5 dBm and set the RF generator on. Ensure the modulation is off.

226.5 Disconnect the flying lead at 10SK13 (VCO IN).

226.6 Connect the lead of a x1 probe to the 2955B RF BNC connector and the probe to the disconnected flying lead, or to 10aTP1.

226.7 Connect the lead of a x10 probe to the CRO and the probe to 10aTP6.

226.8 Set SSW on the EUT to * (Noise on).

226.9 Press and hold in the PRESSEL switch and check for the presence of a 1 MHz signal (see Note) on the CRO display. If the 1 MHz signal is correct, change board 10b. If not, change board 10a.

NOTE

This 1 MHz signal is a result of the RF generator setting of 38.475 MHz, which can be derived from the following expression:

$\frac{f_1 - f_2}{4}$ where f_1 = RF generator frequency
and f_2 = the Transmit Crystal Oscillator frequency (34.475 MHz)

Hence, signal frequency at 10aTP6 = $\frac{38.475 - 34.475}{4}$ = 1 MHz

226.10 Select the 2955B RF N connector, disconnect the probes from the CRO, 2955B and EUT and reconnect the RIU cable to the 2955B RF BNC connector.

227 If the radio does not function, and a synthesizer fault is suspected, but the check in Para 220 proves that the synthesizer is operational, proceed as follows:

227.1 Ensure that the synthesizer cover is fitted and disconnect flying lead at 10SK3.

227.2 To this flying lead, connect the DMM.

227.3 Measure the lock output, which should be zero. If 6 V, the lock pulse monostable is faulty and board 10a should be changed.

228 If, when switching from 'receive' to 'transmit', or vice-versa, the audio does not momentarily mute, proceed as follows:

228.1 Disconnect flying lead at 10SK3.

228.2 To this flying lead, connect the DMM.

228.3 Measure the lock output which should be zero.

228.4 Disconnect 10SK8 (VT COARSE), which artificially unlocks the synthesizer. Note the DMM reading, which should be 6 V. If not, the lock pulse monostable is faulty and hence board 10a should be changed.

MANUAL TESTING/AUTOMATIC TESTING

500.1 INTRODUCTION

The information contained in this regulation applies to the testing of the RT349 using the 8920C Radio Test System. For details of the operation of the 8920C Radio Test Station, reference should be made to AESP 6625-K-112-201 Test System Radio Communications (Marconi 8920C).

500.2 CONTROLS AND CONNECTORS

Before operating the 8920C Radio Test System it is first necessary to refer to the Operating Manual AESP 6625-K-112-201 and become familiar with the location and function of all external system controls and connectors.

500.3 SYSTEM START UP

To start up the 8920C system, proceed as follows:
Check that the mains input leads to the system equipment are connected to the mains supply.
Switch on the 2955B, RIU, DMM and PSU.
After a few seconds the Power On Self Test screen appears stating that the self test has been successfully completed. This is followed by the Receiver Test screen appearing momentarily on the 2955B display. The RIU then initiates an automatic "exercising relays" routine prior to the Clansman Main Menu appearing.

NOTES
If a printer is not connected, the Instrument Check screen appears before the Power On Self Test screen asking the operator to either continue without one or to exit. If 'continue' is selected, the Power On Self Test screen is displayed.
If the system does not complete the power on self test, the errors are indicated. For full details on the error indications and the remedial actions, refer to the 8920C Operating Manual (AESP 6625-K-112-201).

If the operator 'audio prompt' and/or the 'remote switch' facility(s) is required, select option 7 (Audio Prompt/Remote Switch) before selecting option 2 (Radio Selection) to enter automatic test mode.

For descriptions of the remaining Clansman Main Menu options, refer to the 8920C Operating Manual (AESP 6625-K-112-201).

500.4 SYSTEM OPERATION (AUTOMATIC MODE)

500.5 2955B Screen Prompt Options Selection

System operation is set up by selecting the appropriate menu options in response to prompts displayed on the 2955B. Selections are made using the appropriate keys on the 2955B. Some options are selected using the numeric keys and others by using the MODE keys, which are re-assigned by the software. The eight MODE keys make up the first column to the right of the screen. An option selected by a MODE key is displayed alongside the key used to select it.

500.6 Using the RADIO SELECTION Option

Option 2, RADIO SELECTION, on the Clansman Main Menu enables selection of the application test program (ATP) for the radio under test and the required print mode.
Option 4, RT349 on the Select Radio Type menu, invokes the RT349 application test program (ATP) which issues a series of prompts, as given in Table 19.
Option 8, PRINT OPTION on the Radio Selection menu, enables selection of the available print modes, but is only applicable for field testing.
Option 9, MAIN MENU, returns to the Main Menu screen.

TABLE 19 RADIO TEST PROGRAM PROMPTS

Screen Prompt (1)	Option (2)	Function (3)
RT349 EQUIPMENT LIST	SKIP	No equipment information is given.
INCORRECT KEYPRESS DEFAULTS TO SKIP DISPLAY	DISPLAY	An equipment list is displayed.
RT349 CONNECTION DETAILS	SKIP	No connection details are given
INCORRECT KEYPRESS DEFAULTS TO SKIP DISPLAY	DISPLAY	Connection details are given (Para 11).
LOG RADIO OPTION	SKIP LOG	No information requested for logging.
INCORRECT KEYPRESS DEFAULTS TO SKIP LOG	LOG RADIO	Equip No. Build Standard, Operator No. and Station No. are requested to be printed with the test results.
CLANSMAN RT349 TESTS Note Safety tests must be completed before Run All or Select Test options are run	NEXT RADIO	Enables selection of a different radio.

500.7 SYSTEM SHUTDOWN

The 8920C system software does not require a sequenced shutdown operation. To shut the system down, switch the 2955B, RIU, PSU and DMM equipment off and disconnect the a.c. supply cables from the source.

On completing test activities, it is good practice to disconnect test cables from the system equipment and stow them in a suitable storage place.

500.8 RT349 TEST CONNECTION DETAILS OPTION

When the operator selects the RT349 and then the DISPLAY option of the CONNECTION DETAILS screen prompt (Table 1), the following information is displayed on the 2955B:

SET SYSTEM AS FOLLOWS :-

SWITCH FARNELL OUTPUT ENABLE OUT.

ENSURE FARNELL 6050 PSU OVER VOLTAGE IS SET TO 35.0 VOLTS.

SET FARNELL PSU VOLTAGE ADJUST FULLY COUNTER CLOCKWISE.

SET RIU LINE CURRENT FULLY COUNTER CLOCKWISE.

-1- **PAGE 2**

SET SYSTEM AS FOLLOWS :-

SET CIP LINE RESISTANCE SWITCH TO OC.

SET CIP AUDIO/HARNESS SWITCH TO RADIO.

SET CIP POWER SWITCH TO OFF.

-2- **PAGE 3**

CONNECT AS FOLLOWS :-

N-BNC ADAPTOR TO RIU ANTENNA IN CONNECTOR.

BNC-BNC CABLE BETWEEN RIU AF IN AND 2955B AF INPUT.

BNC-BNC CABLE BETWEEN RIU AF GEN AND 2955B AF GEN OUTPUT.

N-N CABLE BETWEEN RIU RF IN/OUT AND 2955B RF IN/OUT CONNECTOR.

-3- **PAGE 4**

CONNECT AS FOLLOWS:

BNC-BNC CABLE BETWEEN RIU EXT MOD AND 2955B EXT MOD INPUT.

BNC-BNC CABLE BETWEEN RIU RF IN/OUT AND 2955B RF IN/OUT.

CIP CABLE BETWEEN CIP-RIU INTERFACE AND RIU AUDIO, HARNESS, CONTROL AND REMOTE.

REMOTE SWITCH CABLE TO CIP REMOTE SWITCH.

-4- **PAGE 5**

DISCONNECT HP34401A DMM VOLTS HIGH AND DMM VOLTS LOW INPUTS.

CONNECT AS FOLLOWS:

DMM LEAD RED BETWEEN CIP MONITOR +VE AND HP34401A DMM VOLTS HIGH.

DMM LEAD BLACK BETWEEN CIP MONITOR -VE AND HP34401A DMM VOLTS LOW.

-5- **PAGE 6**

CONNECT AS FOLLOWS :-

REMOVE LINK BETWEEN E.U.T. T/R SOCKET AND E.U.T. INT. TUNER SOCKET.

CONNECT BNC-BNC CABLE BETWEEN RIU N-BNC ADAPTOR AND E.U.T. T/R SOCKET.

CONNECT AUDIO LEAD BETWEEN CIP AUDIO SOCKET AND E.U.T AUDIO SOCKET 1.

-6- **PAGE 7**

CONNECT AS FOLLOWS :-

CONNECT RADIO POWER SUPPLY LEAD
BETWEEN RADIO SUPPLY SOCKET AND
CIP DC SUPPLY SOCKET.

-7- **PAGE 1**

CONTINUE

Note :- To improve Electro-Magnetic Compatibility (EMC), the E.U.T./8920C interconnection cables are fitted with round ferrite blocks which appear as a bulge in the cable. However, the connector closest to the ferrite block must be connected to the CIP.

500.9 LOG RADIO OPTION

When the operator selects CONTINUE on the Page 7 display of the CONNECTION DETAILS option, the program continues to the LOG RADIO screen.
The RADIO TYPE, NSN, TEST DATE and TIME responses are automatically completed by the 8920C and the operator is invited to complete the SERIAL NO, MOD STRIKE, OPERATOR I.D. and STATION NO. responses. The following information is displayed on the 2955B for the LOG RADIO option:

ENTER THE FOLLOWING :-

RADIO TYPE : RT349

NSN : 5820-99-643-4564

TEST DATE : xx/xx/xx

TIME : xx:xx:xx

SERIAL NO. :

MOD STRIKE :

OPERATOR I.D. :

PLEASE USE 2955B KEYPAD :-

PRESS DELETE FOR CORRECTIONS.
PRESS SELECT FOR NEXT LINE.

Note :- When the operator presses SELECT after completing the OPERATOR I.D. response, the program continues to Safety test 1 (Table 20).

500.10 MANUAL TESTING/AUTOMATIC TESTING CROSS REFERENCES

The Field Test No. column of Table 20 identifies the test numbers of specification tests which are carried out with the 8920C in the automatic mode. These specification tests can also be carried out with the 8920C in the manual mode.

To assist the operator, a cross reference of the field test numbers (for the automatic tests) and manual paragraph numbers (for the equivalent part 2 tests) are given in Table 20.

TABLE 20 FIELD TEST NUMBER / MANUAL CROSS REFERENCES

Test Frequency (MHz)	Field Test Number	Manual Para. Number	Test Frequency (MHz)
42.075	Safety 1	65	42.050
42.075	Safety 2	71	42.050
42.075	Safety 3	71	42.050
42.075	Safety 4	66	42.050
42.075	1	71	42.050
42.050	2	123	42.050
42.050	3	114	42.050
42.050	4	114	42.050
42.075	5	92	42.050
42.075	6	98	42.050
42.075	7	88	42.000
42.050	8	110	42.050
42.050	9	102	42.050
42.050	10	118	42.050
42.050	11	118	42.050
37.000	12	83	37.000
37.000	13	87	37.000
37.025	14	106	37.025
37.050	15	77	37.050
37.050	16	78	37.050
38.150	17	83	38.125
39.025	18	106	39.025
39.050	19	77	39.050
39.050	20	78	39.050
39.250	21	83	39.250
40.375	22	83	40.375
41.450	23	83	41.400
42.000	24	87	42.000
42.025	25	106	42.025
42.075	26	77	42.050
42.075	27	78	42.050
42.500	28	83	42.500
43.600	29	83	43.600
44.700	30	83	44.700
45.050	31	77	45.050
45.050	32	78	45.050
45.525	33	106	45.525
45.800	34	83	45.800
46.900	35	83	46.900
46.900	36	83	46.900
46.900	37	87	46.900
46.925	38	106	46.925
46.950	39	77	46.950
46.950	40	78	46.950

AMENDMENT SHEETS

SHEETS	ISSUE	DATE	COMMENT
ALL	1	Jan 1995	PART 2
1, 5, 9, 10, 28 to 30, 33 to 35, 75 to 84.	2	May 2002	MINOR CHANGES AND PART 4 ADDED TO DOCUMENT

UK/PRC 349

TECHNICAL HANDBOOK – AUTOMATIC TESTING FIELD

Sponsor: DGEME

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File ref: 3625

Note...
These Pages 1-23/24 , Issue 2 supersede Pages 1-26, Issue 1 dated Jan 79. The regulation has been completely revised and relates to Issue 2 of the test tape.

CONTENTS

Para

Table Page

INTRODUCTION

1 The information contained in this regulation applies to the testing of the RT 349 using the Clansman/Larkspur Automatic Test Equipment (ATE).

2 For details of the operation of the ATE reference should be made to Tels M 391.

GENERAL INSTRUCTIONS

3 The RT 349 test tape, identified by the plain language leader, will be used for:

3.1 The examination of equipment in the hands of the user.

3.2 In and out inspections of equipment undergoing repair in REME workshops.

3.3 The examination of depot stocks.

4 The printout of the high limit of the first test in the programme will identify the type and issue of tape. The high limit printout and its interpretation is:

5 The test sequence has been arranged so that a minimum of operator intervention is required to set the ATE controls.

6 Table 1 of this regulation contains a description of each test in the programme together with the operator action required.

7 Table 2 contains a printout of the test programme machine code.

8 Test procedures and frequencies contained in the tape, whilst substantially those in the test procedure detailed in Tels F 604 Part 1, have been considerably rationalized and adopted for ATE testing. Corresponding tests have been related by the insertion, under the main test number, of the relevant Tels F 604 Part 1 paragraph number.

9 Blocks of blank test numbers have been left throughout the test programme. These are to facilitate programme modification should this prove necessary.

Searching into tests

10 The annotation ■ against a test number in Table 1 indicates that the test is one of a composite series of tests and that the test is not to be searched into as the programmed information (normally inserted at the start of a series of tests) will not be present. All other tests are complete in themselves.

Operator action warning

11 The operator will receive warning that he is required to intervene in the test in two ways:

11.1 The audible warning will bleep for approximately two seconds and the OPERATOR ACTION lamp on the Programmer, Electronic Control (programmer) front panel will illuminate.

11.2 The tape will stop and the CONT ENCODE lamp on the programmer will illuminate.

12 Condition 11.1 in indicated in the operating instructions by the annotation @ and condition 11.2 by the annotation *.

Bar tests

13 A number of bar tests are inserted at the start of the test programme. These tests can either indicate catastrophic equipment failures or faults which could cause damage to the ATE. Should any of these tests fail, then testing, using the ATE, should be discontinued. Bar tests are indicated by the words 'bar test' in the test description heading. Should a bar test fail, the test sequence will automatically stop.

TEST CONDITIONS

Power supplies

14 Under normal conditions the d.c. supply to the equipment under test (e.u.t.) is 12 V unless otherwise stated in the test description.

R.F. input voltages

15 All r.f. input voltages are quoted in terms of the open circuit voltage at the synthesiser attenuator output.

A.F. output termination

16 The e.u.t. receiver a.f. output is terminated in the ATE by 300 Ω unless otherwise stated.

Variations in test peripherals

17 The frequency analyser (FAXD 120S) has been found unsuitable for testing the RT 349. As a result, the RT 349 test tape (Issue 2) has been designed for use with ATEs fitted with the Modulation Meter 9008M only.

18 The r.f. output level of the Racal synthesiser is twice that of the Schlumberger synthesiser and, to ensure compatibility, a 6 dB attenuator must be inserted in its output line.

ATE TEST METHODS

General

19 ATE test methods are described fully in Tels M 391. However, in the subsequent paragraphs of this text, a number of tests in the RT 349 test programme are described in some detail to facilitate the interpretation of results.

Signal + noise/noise ratio

20 The signal + noise/noise ratio measurements, at any frequency, require two tests. In the first test, a signal carrying standard modulation is applied to the e.u.t. antenna and the resultant a.f. output measured via 13 dB of attenuation. This result is recorded as the comparator high limit. In the second test, the modulation and a.f. attenuation are removed. The resultant a.f. output shall be less than that recorded as the comparator high limit.

Current consumption

21 The e.u.t. current consumption, for the receive or transmit condition, is measured indirectly by measuring the voltage drop produced by passing the current through a 0.1 Ω resistor. Thus a current of 1 A will produce a voltage drop of 100 mV.

Transmitter power measurement

22 Transmitter power is measured by applying the e.u.t. power output to a power monitor in the ATE and measuring the resultant d.c. voltage output. The RT 349 transmitter output is routed to the power monitor via the 20 dB attenuation route in the Switching Unit, Monitor (SUM). The conversion law is

$$1\ W \equiv 0.1\ V$$

150 Hz pilot tone deviation

23 There is no 150 Hz bandpass filter in the 9008M mod meter. To ensure accurate measurement of the 150 Hz tone, tests 0028 to 0031 have been programmed to fail. At the end of testing, the operator is required to carry out the following:

23.1 Ensure that the noise deviation in test 0028 is within the numerical high limit on the printout.

23.2 Subtract the measurement obtained in test 0028 for noise deviation, from each of the measurements obtained in tests 0029 to 0031 ensuring that the result of each calculation is within the numerical limits indicated on the printout.

23.3 Write PASS or FAIL against tests 0028 to 0031 on the printout.

24 In the second test, the e.u.t. is switched to LOUD. The deviation is measured with the input level set as far as the PASS condition recorded in the first test. The deviation shall be:

± (0.6 - 1.6 kHz)

Squelch sensitivity

25 The squelch sensitivity is measured by the ATE in tests 0012 to 0017. The requirement is that a signal strength, at the e.u.t. antenna, which produces a quieting level of 2 dB shall not open the squelch and that a signal level which produces a quieting level of 9 dB will open the squelch.

26 To test each of these conditions, these tests are required on the ATE. In test 0012 (0015), the e.u.t. is switched to NOISE and the a.f. output measured via 2 dB (9 dB) of a.f. attenuation. The result is recorded as a reference level for the second test. In test 0013 (0016), the a.f. attenuation is reduced to 0 dB and an r.f. signal (1.3 kHz deviation at 150 Hz) is applied to the e.u.t. antenna. This signal is automatically increased (ramped) in 1 dB steps until the level of the a.f. output equals that of the reference level in the first test. In test 0014 (0017), the e.u.t. is switched to LOUD and the a.f. shall be muted (unmuted in the 9 dB case).

Low battery warning

27 The low battery warning requirement is tested in tests 0010 to 0011. In test 0010, the e.u.t. supply voltage is set to 10 V and the a.f. output routed to the loud speaker in the Switching Unit, Manual Control (SUMC). The operator is required to listen to the loudspeaker output to ensure that there is no low battery indication. In test 0011, the e.u.t. supply voltage is reduced to 9.5 V. The operator shall hear an intermittent a.f. output, ie low battery warning.

Battery saving delay

28 The battery saving delay is the time interval from the end of a transmission until the battery saving condition occurs. Equipments tested by the ATE may have a delay of between 9 s and 17 s. This requirement is checked in test 0009.

INITIAL SETTING UP INSTRUCTIONS

Switching Unit, Manual Control (SUMC)

29 Press MAINS ON switch.

Tape Reader (reader)

30

30.1 Fit RT 349 test tape.

30.2 Depress POWER switch.

30.3 Press RUN.

Programmer, Electronic Control (programmer)

31 Ensure all switches are deselected.

Switching Unit, Monitor (SUM)

32

32.1 Select MANUAL.

32.2 Press RESET.

32.3 Select AUTO.

Line Printer (printer)

33 Depress the ON switch.

Thorn Power Supply (p.s.u.)

34

34.1 Switch to REMOTE.

34.2 Ensure that SET CURRENT, SET VOLTAGE and SET O/V controls are set to zero.

34.3 Set power switch to ON.

Counter, Electronic CT 574/3 (CT 574/3 counter)

35

35.1 Set to REMOTE.

35.2 Set sensitivity to 0.01.

35.3 Set power switch to OFF.

Modulation Meter 9008M (9008M mod meter)

36

36.1 Set power switch to 'power on'.

36.2 Select 'remote'.

36.3 Set function switch to LEVEL.

36.4 Set a.f. filters to OUT.

Voltmeter, Digital CT 577/3 (DVM)

37

37.1 Switch the power ON.

37.2 Select MANUAL.

37.3 Select REMOTE.

37.4 Switch AC RESPONSE TIME to 1 s.

37.5 Switch DC FILTER to OUT.

Converter, Signal Data (CSD)

38 Press 5 V switch.

Signal Processor 9062 (9062 processor)

39

39.1 Switch to 'operate'.

39.2 Switch attenuator to 'remote'.

39.3 Switch mode to 'remote'.

39.4 Fit 6 dB attenuator to 'output 50 Ω'.

Synthesiser, Frequency 9061 (9061 synthesiser)

40 Select 'remote'.

Signal Generator Set 2-tone 9063 (9063 sig gen)

41

41.1 Set power switch to on.

41.2 Select 'remote'.

41.3 Set tone A: frequency 150 Hz, output level 15 mV, tone selector switch to off.

TABLE 1 TEST DESCRIPTION

Test No. (1)	Test description (2)	Operator action (3)
	START	Press START on programmer
0001	Tape identification as per Para 4	
0002	Overvolts safety test The e.u.t. power supply is programmed to 25 V. The voltage applied to the e.u.t. shall not exceed 17 V.	@1 Connect AUDIO HARNESS lead to Interconnecting Box 20. 2 Connect RT 349 power lead to SUMC only. 3 Press STEP.
0003	Connect e.u.t. and Control Converter	@1 Connect RT 350 Control Converter to ATE. 2 Fit RT 349 Control Converter to RT 350 Control Converter. 3 Press 30 V button on CSD to ON. 4 Press RESET on CSD. 5 Press JOG and observe that all Control Converter switches rotate clockwise. 6 Press FIT and hold. Observe that all Control Converter switches rotate to their fully counter clockwise position and stop. 7 Rotate all e.u.t. switches fully counter clockwise. 8 Fit e.u.t. to Control Converter. 9 Press AUTO. 10 Connect power lead to e.u.t. 11 Connect antenna coax from e.u.t. to SUMC EUT ANTENNA port. 12 Connect audio lead from e.u.t. to Interconnecting Box 20 AUDIO Skt 1. 13 Press STEP.

(continued)

TABLE 1 TEST DESCRIPTION (continued)

Test No. (1)	Test description (2)	Operator action (3)
0004	Power monitor zero With no r.f. input, the power monitor is adjusted until the d.c. output is 0 ± 1 mV.	*1 Adjust power monitor zero controls on the SUM for zero DVM indication. When the DVM indication is 0 ± 1 mV, the PASS lamp will illuminate. Press PASS.
0005 (Para 67)	Current consumption-Off, 42.050 MHz (bar test) Current consumption with the e.u.t. mode switch set to '0' (off) shall be zero.	CAUTION... If any test (0005 to 0008) fails, do not continue testing (see Para 13)
0006 (Para 67)	Safety test - 42.050 MHz (bar test) With the e.u.t. in the receive mode, the e.u.t. antenna is routed to the frequency counter which shall indicate zero frequency.	
0007 (Para 68)	Current consumption-receive, 42.050 MHz (bar test) Current consumption in the receive condition shall be 57 mA to 82 mA. (DVM indication 5.7 mV to 8.2 mV).	
0008 (Para 68)	Current consumption - transmit, 42.050 MHz (bar test) Current consumption in the transmit condition shall be 130 mA to 166 mA. (DVM indication 13.0 mV to 16.6 mV).	
0009 (Paras 68 and 80)	Battery saving delay - 42.050 MHz The time interval between transmission and battery saving occurs shall be between 9 s and 17 s and the period of supply switching shall be between 1 s and 2 s approx.	*Observe that: 1 The battery saving condition does not occur before 9 s approx. 2 The battery saving condition does occur between 9 s and 17 s. 3 The DVM indication fluctuates from between 5.7 mV and 8.2 mV to 1.0 µV approx. 4 The route of DVM fluctuations is between 1 s and 2 s. 5 Press STEP.

(continued)

TABLE 1 TEST DESCRIPTION (continued)

Test No. (1)	Test description (2)	Operator action (3)
0010 (Para 79)	Low battery indication - 42.050 MHz (10 V) With the supply voltage set to 10 V, the low battery indication shall not operate.	@1 Press loudspeaker button on SUMC (ON). There shall be no audible output. 2 Press STEP.
0011 (Para 79)■	Low battery indication - 42.050 MHz (9.5 V) With the supply voltage set to 9.5 V, the low battery indication shall operate.	@1 An intermittent a.f. output shall be heard, ie low battery warning signal. Note... Allow up to 10 s for the output to become intermittent 2 Press loudspeaker button on SUMC (OFF). 3 Press STEP.
0012 (Para 77)	Squelch sensitivity - 42.050 MHz (1) With the e.u.t. switched to NOISE and no signal at the antenna, the receiver a.f. output is measured via 2 dB of attenuation and stored in the comparator high limit.	
0013 (Para 77)■	Squelch sensitivity - 42.050 MHz (2) With the e.u.t. switched to NOISE and the a.f. attenuation at zero, an r.f. signal (1.3 kHz deviation at 150 Hz) is applied to the antenna and automatically increased in 1 dB steps until the a.f. output is the same as that recorded in test 0012.	@1 Select PRINTER OFF. 2 Press STEP. Note... Should this test fail, testing will stop. To continue testing, press STEP.
0014 (Para 77)■	Squelch sensitivity - 42.050 MHz (3) With the r.f. signal set as in test 0013, the e.u.t. is switched to LOUD. The e.u.t. a.f. output shall be muted. (DVM indication less than 10 mV).	@1 Deselect PRINTER OFF. 2 Press STEP.

(continued)

TABLE 1 TEST DESCRIPTION (continued)

Test No. (1)	Test description (2)	Operator action (3)
0015 (Para 77)	Squelch sensitivity - 42.050 MHz (4) With the e.u.t. switched to NOISE and no signal at the antenna, the receiver a.f. output is measured via 9 dB of attenuation and stored in the comparator high limit.	
0016 (Para 77) ■	Squelch sensitivity - 42.050 MHz (5) With the e.u.t. switched to NOISE and the a.f. attenuation at zero, an r.f. signal (1.3 kHz deviation at 150 Hz) is applied to the antenna and automatically increased in 1 dB steps until the a.f. output is the same as that recorded in test 0015.	@1 Select PRINTER OFF 2 Press STEP. Note... Should this test fail, testing will stop. To continue testing, press STEP.
0017 (Para 77) ■	Squelch sensitivity - 42.050 MHz (6) With the r.f. signal set as in test 0016, the e.u.t. is switched to LOUD. The e.u.t. a.f. output shall be unmuted. (DVM indication greater than 20 mV).	@1 Deselect PRINTER OFF. 2 Press STEP.
0018 (Para 72)	Modulation sensitivity - 42.050 MHz, WHISPER With the e.u.t. in the transmit condition, a 1 kHz signal is applied to the microphone and automatically increased (ramped) from 0.08 mV to 0.3 mV in 0.02 mV steps to produce a deviation of 3.2 kHz to 3.8 kHz. (DVM indication 320 mV to 380 mV).	@1 Select PRINTER OFF. 2 Press STEP. Note... Should this test fail, testing will stop. To continue testing, press STEP.
0019 (Para 72) ■	Modulation sensitivity - 42.050 MHz, LOUD With the microphone input as for test 0018, the e.u.t. is switched to LOUD. The deviation shall be 0.68 kHz to 1.48 kHz. (DVM indication 218 mV to 474 mV).	@1 Deselect PRINTER OFF. 2 Press STEP.

(continued)

TABLE 1 TEST DESCRIPTION (continued)

Test No. (1)	Test description (2)	Operator action (3)
0026 (Para 73)	Modulation control - 42.050 MHz With a microphone input of 20 mV at 1 kHz and the e.u.t. in the transmit condition, the deviation shall not exceed 6.5 kHz. (DVM indication not greater than 65 mV).	@1 Switch 3 kHz a.f. filter on 9008M mod meter to IN. 2 Press STEP.
0027 (Para 72)	Pilot tone frequency - 42.050 MHz With the e.u.t. in the transmit condition, the frequency of the demodulated pilot tone shall be 148 Hz to 152 Hz.	@1 Switch 3 kHz a.f. filter on 9008M mod meter to OUT. 2 Press STEP.
0028 (Para 71)	Noise deviation - 46.900 MHz With the e.u.t. in the transmit condition, the deviation due to noise shall not be greater than 550 Hz. (DVM indication not greater than 176 mV).	Note... Tests 0028 to 0031 have been programmed to give a fail result (see Para 23).
0029 (Para 71) ■	Pilot tone deviation - 46.900 MHz With the e.u.t. in the transmit condition, the deviation due to the 150 Hz tone above shall be 1.55 kHz to 2.5 kHz. (DVM indication 496 mV to 800 mV).	
0030 (Para 71) ■	Pilot tone deviation - 42.000 MHz Test 0029 is repeated at a frequency of 42.000 MHz. (DVM indication 496 mV to 800 mV).	
0031 (Para 71) ■	Pilot tone deviation - 37.000 MHz Test 0029 is repeated at a frequency of 37.000 MHz. (DVM indication 496 mV to 800 mV).	

(continued)

TABLE 1 TEST DESCRIPTION (continued)

Test No. (1)	Test description (2)	Operator action (3)
0034 (Para 70)	Transmitter frequency accuracy - 37.000 MHz The transmitter frequency shall be 37.000 MHz ± 500 Hz.	
0035 (Para 75)	Signal + noise/noise ratio - 37.025 MHz (1) A 2 µV signal (5 kHz deviation at 1 kHz) is applied to the e.u.t. antenna. The e.u.t. a.f. output is measured via 14 dB of attenuation and recorded as the comparator high limit.	
0036 (Para 75) ■	Signal + noise/noise ratio - 37.025 MHz (2) The modulation is removed and the a.f. attenuation reduced to zero. The resultant a.f. output shall be less than that recorded in test 0035.	
0037 (Para 69)	Transmitter power - 37.050 MHz (9.5 V) With the supply voltage set to 9.5 V, the transmitter power output shall be not less than 100 mW. (DVM indication not less than 10 mV).	
0038 (Para 69) ■	Transmitter power - 37.050 MHz (16 V) With the supply voltage set to 16 V, the transmitter power output shall be not greater than 475 mW. (DVM indication not greater than 47.5 mV).	
0039 (Para 70)	Transmitter frequency accuracy - 38.150 MHz The transmitter frequency shall be 38.150 MHz ± 500 Hz.	

(continued)

TABLE 1 TEST DESCRIPTION (continued)

Test No. (1)	Test description (2)	Operator action (3)
0040 (Para 69)	Transmitter power - 39.050 MHz (9,5 V) With the supply voltage set to 9.5 V, the transmitter power output shall be not less than 100 mW. (DVM indication not less than 10 mV).	
0041 (Para 69)	Transmitter power - 39.050 MHz (16 V) With the supply voltage set to 16 V, the transmitter power output shall not be greater than 475 mW. (DVM indication not greater than 47.5 mV).	
0042 (Para 75)	Signal + noise/noise ratio - 39.025 MHz (1) A 2 µV signal (5 kHz deviation at 1 kHz) is applied to the e.u.t. antenna. The e.u.t. a.f. output is measured via 14 dB of attenuation and recorded as the comparator high limit.	
0043 (Para 75)	Signal + noise/noise ratio - 39.025 MHz (2) The modulation is removed and the a.f. attenuation reduced to zero. The resultant a.f. output shall be less than that recorded in test 0042.	
0044 (Para 70)	Transmitter frequency accuracy - 39.250 MHz The transmitted frequency shall be 39.250 MHz ± 500 Hz.	
0045 (Para 70)	Transmitter frequency accuracy - 40.375 MHz The transmitted frequency shall be 40.375 MHz ± 500 Hz.	

(continued)

TABLE 1 TEST DESCRIPTION (continued)

Test No. (1)	Test description (2)	Operator action (3)
0046 (Para 70)	Transmitter frequency accuracy - 41.450 MHz The transmitted frequency shall be 41.450 MHz ± 500 Hz.	
0047 (Para 75)	Signal + noise/noise ratio - 42.025 MHz (1) A 2 µV signal (5 kHz deviation at 1 kHz) is applied to the e.u.t. antenna. The e.u.t. a.f. output is measured via 14 dB of attenuation and recorded as the comparator high limit.	
0048 (Para 75) ■	Signal + noise/noise ratio - 42.025 MHz (2) The modulation is removed and the a.f. attenuation reduced to zero. The resultant a.f. output shall be less than that recorded in the previous test.	
0049 (Para 69)	Transmitter power - 42.025 MHz (9.5 V). With the supply voltage set to 9.5 V, the transmitter power output shall be not less than 100 mW. (DVM indication greater than 10 mV).	
0055 (Para 69) ■	Transmitter power - 42.025 MHz (16 V) With the supply voltage set to 16 V, the transmitter power output shall be not greater than 475 mW. (DVM indication not greater than 47.5 mV).	
0056 (Para 76)	Limiting - 42.050 MHz (1) With an antenna input of 2 µV (5 kHz deviation at 1 kHz) the e.u.t. a.f. output is measured and recorded as the comparator high limit.	

(continued)

TABLE 1 TEST DESCRIPTION (continued)

Test No. (1)	Test description (2)	Operator action (3)
0057 (Para 76) ■	Limiting - 42.050 MHz (2) The antenna input is increased to 100 mV and the e.u.t. a.f. output measured via 3 dB of attenuation. The resultant a.f. output shall be less than that recorded in test 0056.	
0058 (Para 74)	Sidetone - 42.050 MHz With a microphone input of 10 mV at 1 kHz, the sidetone a.f. output into 300 Ω shall be 240 mV to 360 mV. (DVM indication 240 mV to 360 mV).	
0059 (Para 78)	Receiver a.f. output - 42.050 MHz, LOUD With an antenna input of 1 mV (5 kHz deviation at 1 kHz and 1.5 kHz deviation at 150 Hz) the e.u.t. a.f. output, into 300 Ω, shall be 460 mV to 640 mV. (DVM indication 460 mV to 640 mV).	
0060 (Para 78) ■	Receiver a.f. output - 42.050 MHz, LOUD With antenna input as in test 0059, the e.u.t. a.f. output is measured via 17 dB of attenuation and recorded as the comparator high limit.	
0061 (Para 78) ■	Receiver a.f. output - 42.050 MHz, LOUD With antenna input as in test 0059, the e.u.t. a.f. output is measured via 23 dB of attenuation and recorded as the comparator low limit.	
0062 (Para 78) ■	Receiver a.f. output - 42.050, WHISPER With antenna input as in test 0059, the a.f. attenuation is reduced to zero and the e.u.t. switched to WHISPER. The resultant a.f. output shall be within the limits set in tests 0060 and 0061.	

(continued)

TABLE 1 TEST DESCRIPTION (continued)

Test No. (1)	Test description (2)	Operator action (3)
0063 (Para 69)	Transmitter power - 45.050 MHz (9.5 V) With the supply voltage set to 9.5 V, the transmitter power output shall be not less than 100 mW. (DVM indication not less than 10 mV).	
0064 (Para 69) ■	Transmitter power - 45.050 MHz (16 V) With the supply voltage set to 16 V, the transmitter power output shall be not greater than 475 mW. (DVM indication not greater than 47.5 mV).	
0065 (Para 75)	Signal + noise/noise ratio - 45.525 MHz (1) A 2 µV signal (5 kHz deviation at 1 kHz) is applied to the e.u.t. antenna. The e.u.t. a.f. output is measured via 14 dB of attenuation and recorded as the comparator high limit.	
0066 (Para 75) ■	Signal + noise/noise ratio - 45.525 MHz (2) The modulation is removed and the a.f. attenuation reduced to zero. The resultant a.f. output shall be less than that recorded in test 0065.	
0067 (Para 70)	Transmitter frequency accuracy - 42.500 MHz The transmitted frequency shall be 42.500 MHz ± 500 Hz.	
0068 (Para 70)	Transmitter frequency accuracy - 43.600 MHz The transmitted frequency shall be 43.600 MHz ± 500 Hz.	
0069 (Para 70)	Transmitter frequency accuracy - 44.700 MHz The transmitted frequency shall be 44.700 MHz ± 500 Hz.	

(continued)

TABLE 1 TEST DESCRIPTION (continued)

Test No. (1)	Test description (2)	Operator action (3)
0070 (Para 70)	Transmitter frequency accuracy - 45.800 MHz The transmitted frequency shall be 45.800 MHz ± 500 Hz.	
0071 (Para 70)	Transmitter frequency accuracy - 46.900 MHz The transmitted frequency shall be 46.900 MHz ± 500 Hz.	
0072 (Para 75)	Signal + noise/noise ratio - 46.925 MHz (1) A 2 µV signal (5 kHz deviation at 1 kHz) is applied to the e.u.t. antenna. The e.u.t. a.f. output is measured via 14 dB of attenuation and recorded as the comparator high limit.	
0073 (Para 75) ■	Signal + noise/noise ratio - 46.925 MHz (2) The modulation is removed and the a.f. attenuation reduced to zero. The resultant a.f. output shall be less than that recorded in test 0072.	
0074 (Para 69)	Transmitter power - 46.950 MHz (9.5 V) With the supply voltage set to 9.5 V, the transmitter power output shall be not less than 100 mW. (DVM indication not less than 10 mV).	
0075 (Para 69) ■	Transmitter power - 46.950 MHz (16 V) With the supply voltage set to 16 V, the transmitter power output shall be not greater than 475 mW. (DVM indication not greater than 47.5 mV).	
0076	Rewind and clear stores ATE stores are cleared and tape automatically rewinds to start of test programme.	

TABLE 2 MACHINE CODE

```
RESTRICTED RT 349 ISSUE 2 APR 84 TELS F 604 PT 3 START.

MT0001 CS0000 IS0000 VS0000 HM0349 HL0202 LM0000 LL0000 *
CF6850 *

MT0002 CS0000 IS0001 VS0250 SP0000 *
DV0004 AS6000 HM0170 HL0000 LM0030 LL0000 TD1010 CF0070 *

MT0003 VS0000 SP0000 *

MT0004 CS0000 DV0000 RS2000 HM0010 HL0000 LM0010 LL0000 *
CF1160 *

MT0005 CS0000 IS0001 VS0120 TD0050 MU0050 TD0050 ML5000 *
DV0000 AS3000 HM0010 HL0000 LM0010 LL0000 TD1010 CF5060 *

MT0006 CS0000 IS0001 VS0120 TD0050 MU0050 TD0050 ML5001 *
RS4000 HM0000 HL0000 LM0000 LL0000 TD1010 FC0005 TD1010 *
FC0005 TD1010 CF6070 *

MT0007 CS0000 IS0001 VS0120 TD0050 MU0050 TD0050 ML5003 *
DV0000 SU0420 SL5000 SA2060 RS0002 MM0100 AS3000 HM0082 *
HL0000 LM0057 LL0000 TD1010 CF5070 *

MT0008 CS0000 IS0001 VS0120 TD0050 MU0050 TD0050 ML5002 *
DV0000 RS1000 AS3000 HM0166 HL0000 LM0130 LL0000 TD1010 *
CF5070 *

MT0009 CS0000 IS0001 VS0120 TD0050 MU0050 TD0050 ML5002 *
DV0000 AS3000 HM9999 HL9999 LM9999 LL9999 RS1000 TD1020 *
RS0000 CF1160 *

MT0010 CS0000 IS0001 VS0100 TD0050 MU0050 TD0050 ML5002 *
DV0012 AS4010 SP0000 *

MT0011 VS0095 SP0000 *

MT0012 CS0000 IS0001 VS0120 TD0050 MU0050 TD0050 ML5003 *
DV0012 AA0002 AS4010 HM9999 HL9999 LM9999 LL9999 TD1020 *
CF1062 *

MT0013 SP0000 *
SG0014 SU0420 SL5000 MM0500 MF4215 MA2013 RS0002 AA0000 *
SA0139 LM0000 LL0000 TD1010 CF1070 SA0138 TD1005 CF1070 *
SA0137 TD1005 CF1070 SA0136 TD1005 CF1070 SA0135 TD1005 *
CF1070 SA0134 TD1005 CF1070 SA0133 TD1005 CF1070 SA0132 *
TD1005 CF1070 SA0131 TD1005 CF1070 SA0130 TD1005 CF1070 *
SA0129 TD1005 CF1070 SA0128 TD1005 CF1070 SA0127 TD1005 *
CF1070 SA0126 TD1005 CF1070 SA0125 TD1005 CF1070 SP0000 *

MT0014 TD0050 ML5002 SP0000 *
DV0001 HM0100 HL0000 LM0100 LL0000 TD1020 CF1060 *
```

(continued)

TABLE 2 - MACHINE CODE (continued)

```
MT0015  CS0000  IS0001  VS0120  TD0050  MU0050  TD0050  ML5003  *
DV0012  AA0009  AS4010  HM9999  HL9999  LM9999  LL9999  TD1020  *
CF1062  *

MT0016  SP0000  *
SG0017  SU0420  SL5000  MM0500  MF4215  MA2013  RS0002  AA0000  *
SA0136  LM0000  LL0000  TD1010  CF1070  SA0135  TD1005  CF1070  *
SA0134  TD1005  CF1070  SA0133  TD1005  CF1070  SA0132  TD1005  *
CF1070  SA0131  TD1005  CF1070  SA0130  TD1005  CF1070  SA0129  *
TD1005  CF1070  SA0128  TD1005  CF1070  SA0127  TD1005  CF1070  *
SA0126  TD1005  CF1070  SA0125  TD1005  CF1070  SA0124  TD1005  *
CF1070  SA0123  TD1005  CF1070  SA0122  TD1005  CF1070  SP0000  *

MT0017  TD0050  ML5002  SP0000  *
HM9999  HL9999  LM0200  LL0000  TD1020  CF1070  *

MT0018  CS0000  IS0001  VS0120  TD0050  MU0050  TD0050  ML5001  *
SP0000  *
SG0019  DV0002  MF4410  AS5110  HC0008  FA0005  MA1016  RS1000  *
HM3800  HL0000  LM3200  LL0000  TD1050  CF1070  MA1020  TD1005  *
CF1070  MA1024  TD1005  CF1070  MA1028  TD1005  CF1070  MA1032  *
TD1005  CF1070  MA1036  TD1005  CF1070  MA1040  TD1005  CF1070  *
MA1040  TD1005  CF1070  MA1044  TD1005  CF1070  MA1048  TD1005  *
CF1070  MA1052  TD1005  CF1070  MA1056  TD1005  CF1070  MA1060  *
TD1005  CF1070  SP0000  *

MT0019  TD0050  ML5002  SP0000  *
FA0004  HM4740  LM2180  TD1060  CF1070  *

MT0026  CS0000  IS0001  VS0120  TD0050  MU0050  TD0050  ML5002  *
SP0000  *
DV0002  MA2040  MF4410  AS5110  HC0008  FA0005  RS1000  HM6500  *
HL0000  LM0500  LL0000  TD1060  CF1070  *

MT0027  CS0000  IS0001  VS0120  TD0050  MU0050  TD0050  ML5002  *
SP0000  *
FA0000  HC2000  RS1040  HM0000  HL0152  LM0000  LL0148  TD1020  *
FC0005  TD1020  FC0005  TD1010  CF6070  *

MT0028  CS0000  IS0001  VS0120  TD0050  MU0099  TD0050  ML0002  *
DV0002  FA0004  AS5010  HC0008  RS1000  HM1760  HL0000  LM0000  *
LL0000  TD1050  CF1050  *

MT0029  FA0000  HM8000  HL0000  LM4960  LL0000  TD1050  CF1050  *

MT0030  TD0050  MU0050  TD1050  CF1050  *

MT0031  TD0050  MU0000  TD1050  CF1050  *

MT0034  CS0000  IS0001  VS0120  TD0050  MU0000  TD0050  ML0003  *
RS5000  HM3700  HL0500  LM3699  LL9500  TD1020  FC0005  TD1020  *
FC0005  TD1010  CF6070  *
```

(continued)

TABLE 2 MACHINE CODE (continued)

```
MT0035  CS0000  IS0001  VS0120  TD0050  MU0000  TD0050  ML2503  *
SU0370  SL2500  SA0114  MA2050  MF4410  MM0500  DV0012  AA0014  *
RS0002  AS4010  HM9999  HL9999  LM9999  LL9999  TD1020  CF1062  *

MT0036  MM0100  AA0000  LM0000  LL0000  TD1010  TD1010  CF1070  *

MT0037  CS0000  IS0001  VS0095  TD0050  MU0000  TD0050  ML5003  *
DV0001  SC2000  RS3000  HM9999  HL9999  LM0100  LL0000  TD1020  *
CF1070  *

MT0038  VS0160  HM0475  HL0000  LM0050  TD1020  CF1070  *

MT0039  CS0000  IS0001  VS0120  TD0050  MU0011  TD0050  ML5003  *
RS5000  HM3815  HL0500  LM3814  LL9500  TD1020  FC0005  TD1020  *
FC0005  TD1010  CF6070  *

MT0040  CS0000  IS0001  VS0095  TD0050  MU0020  TD0050  ML5003  *
DV0001  SC2000  RS3000  HM9999  HL9999  LM0100  LL0000  TD1020  *
CF1070  *

MT0041  VS0160  HM0475  HL0000  LM0050  TD1020  CF1070  *

MT0042  CS0000  IS0001  VS0120  TD0050  MU0020  TD0050  ML2503  *
SU0390  SL2500  SA0114  MA2050  MF4410  MM0500  DV0012  AA0014  *
RS0002  AS4010  HM9999  HL9999  LM9999  LL9999  TD1020  CF1062  *

MT0043  MM0100  AA0000  LM0000  LL0000  TD1010  CF1070  *

MT0044  CS0000  IS0001  VS0120  TD0050  MU0022  TD0050  ML5003  *
RS5000  HM3925  HL0500  LM3924  LL9500  TD1020  FC0005  TD1020  *
FC0005  TD1010  CF6070  *

MT0045  CS0000  IS0001  VS0120  TD0050  MU0033  TD0050  ML7503  *
RS5000  HM4037  HL5500  LM4037  LL4500  TD1020  FC0005  TD1020  *
FC0005  TD1010  CF6070  *

MT0046  CS0000  IS0001  VS0120  TD0050  MU0044  TD0050  ML5003  *
RS5000  HM4145  HL0500  LM4144  LL9500  TD1020  FC0005  TD1020  *
FC0005  TD1010  CF6070  *

MT0047  CS0000  IS0001  VS0120  TD0050  MU0050  TD0050  ML2503  *
SU0420  SL2500  SA0114  MA2050  MF4410  MM0500  DV0012  AA0014  *
RS0002  AS4010  HM9999  HL9999  LM9999  LL9999  TD1020  CF1062  *

MT0048  MM0100  AA0000  LM0000  LL0000  TD1010  CF1070  *

MT0049  CS0000  IS0001  VS0095  TD0050  MU0050  TD0050  ML5003  *
DV0001  SC2000  RS3000  HM9999  HL9999  LM0100  LL0000  TD1020  *
CF1070  *
```

(continued)

TABLE 2 MACHINE CODE (continued)

```
MT0055  VS0160  HM0475  HL0000  LM0050  TD1020  CF1070  *

MT0056  CS0000  IS0001  VS0120  TD0050  MU0050  TD0050  ML5003  *
SU0420  SL5000  SA0114  RS0002  DV0012  MA2050  MF4410  MM0500  *
AS4010  HM9999  HL9999  LM9999  LL9999  TD1020  CF1062  *

MT0057  SA2020  AA0002  LM0000  LL0000  TD1010  CF1070  *

MT0058  CS0000  IS0001  VS0120  TD0050  MU0050  TD0050  ML5002  *
DV0012  RS1000  FA0001  MA2200  MF4410  AS4110  HM3600  HL0000  *
LM2400  LL0000  TD1030  CF1070  *

MT0059  CS0000  IS0001  VS0120  TD0050  MU0050  TD0050  ML5003  *
SU0420  SL5000  SA2060  MA2050  MF5410  MM0500  RS0002  DV0012  *
AS4010  HM6400  HL0000  LM4600  LL0000  TD1010  CF1070  *

MT0060  AA0017  HM9999  HL9999  LM9999  LL9999  TD1020  CF1062  *

MT0061  AA0023  TD1015  CF1061  *

MT0062  TD0050  ML5001  AA0000  TD1010  CF1070  *

MT0063  CS0000  IS0001  VS0095  TD0050  MU0080  TD0050  ML5003  *
DV0001  SC2000  RS3000  HM9999  HL9999  LM0100  LL0000  TD1020  *
CF1070  *

MT0064  VS0160  HM0475  HL0000  LM0050  LL0000  TD1020  CF1070  *

MT0065  CS0000  IS0001  VS0120  TD0050  MU0085  TD0050  ML2503  *
SU0455  SL2500  SA0114  MA2050  MF4410  MM0500  DV0012  AA0014  *
RS0002  AS4010  HM9999  HL9999  LM9999  LL9999  TD1020  CF1062  *

MT0066  MM0100  AA0000  LM0000  LL0000  TD1010  CF1070  *

MT0067  CS0000  IS0001  VS0120  TD0050  MU0055  TD0050  ML0003  *
RS5000  HM4250  HL0500  LM4249  LL9500  TD1020  FC0005  TD1020  *
FC0005  TD1010  CF6070  *

MT0068  CS0000  IS0001  VS0120  TD0050  MU0066  TD0050  ML0003  *
RS5000  HM4360  HL0500  LM4359  LL9500  TD1020  FC0005  TD1020  *
FC0005  TD1010  CF6070  *

MT0069  CS0000  IS0001  VS0120  TD0050  MU0077  TD0050  ML0003  *
RS5000  HM4470  HL0500  LM4469  LL9500  TD1020  FC0005  TD1020  *
FC0005  TD1010  CF6070  *

MT0070  CS0000  IS0001  VS0120  TD0050  MU0088  TD0050  ML0003  *
RS5000  HM4580  HL0500  LM4579  LL9500  TD1020  FC0005  TD1020  *
FC0005  TD1010  CF6070  *
```

(continued)

TABLE 2 MACHINE CODE (continued)

```
MT0071  CS0000  IS0001  VS0120  TD0050  MU0099  TD0050  ML0003  *
RS5000  HM4690  HL0500  LM4689  LL9500  TD1020  FC0005  TD1020  *
FC0005  TD1010  CF6070  *

MT0072  CS0000  IS0001  VS0120  TD0050  MU0099  TD0050  ML2503  *
SU0469  SL2500  SA0114  MA2050  MF4410  MM0500  DV0012  AA0014  *
RS0002  AS4010  HM9999  HL9999  LM9999  LL9999  TD1020  CF1062  *

MT0073  MM0100  AA0000  LM0000  LL0000  TD1010  CF1070  *

MT0074  CS0000  IS0001  VS0095  TD0050  MU0099  TD0050  ML5003  *
DV0001  SC2000  RS3000  HM9999  HL9999  LM0100  LL0000  TD1020  *
CF1070  *

MT0075  VS0160  HM0475  HL0000  LM0050  TD1020  CF1070  *

MT0076  CS0000  IS0000  VS0000  ††0000  ††0000  *


END  RT  349  ISSUE  2  APR  84  TELS  F  604  PT  3  RESTRICTED.
```

END

CONDITIONS OF RELEASE

1. [redacted]

4. [redacted]

[redacted]

STATION, RADIO, UK/PRC 349

TECHNICAL HANDBOOK - AUTOMATIC TESTING (8920C RADIO TEST SYSTEM)

CONTENTS

Table

INTRODUCTION

1 The information contained in this regulation applies to the testing of the RT349 using the 8920C Radio Test System. For details of the operation of the 8920C Radio Test Station, reference should be made to AESP 6625-K-112 Test System Radio Communications (Marconi 8920C).

CONTROLS AND CONNECTORS

2 Before operating the 8920C Radio Test System it is first necessary to refer to the Operating Manual AESP 6625-K-112 and become familiar with the location and function of all external system controls and connectors.

SYSTEM START UP

3 To start up the 8920C system, proceed as follows:

3.1 Check that the mains input leads to the system equipment are connected to the mains supply.

3.2 Switch on the 2955B, RIU, DMM and PSU.

3.3 The Receiver Test screen appears momentarily on the 2955B display, followed by the Power On Self Test screen stating that the self test was completed successfully.

NOTES

(1) If a printer is not connected, the Instrument Check screen appears before the Power On Self Test screen asking the operator to either continue without one or to exit. If 'continue' is selected, the Power On Self Test screen is displayed.

(2) If the system does not complete the power on self test, the errors are indicated. For full details on the error indications and the remedial actions, refer to the 8920C Operating Manual (AESP 6625-K-112).

3.4 A few seconds after the Power On Self Test screen is presented, the Receiver Test screen is momentarily displayed followed by the Clansman Main Menu.

3.5 If the operator 'audio prompt' and/or the 'remote switch' facility(s) is required, select option 7 (Audio Prompt/Remote Switch) before selecting option 2 (Radio Selection) to enter automatic test mode.

3.6 For descriptions of the remaining Clansman Main Menu options, refer to the 8920C Operating Manual (AESP 6625-K-112).

SYSTEM OPERATION (AUTOMATIC MODE)

2955B Screen Prompt Options Selection

4 System operation is set up by selecting the appropriate menu options in response to prompts displayed on the 2955B. Selections are made using the appropriate keys on the 2955B. Some options are selected using the numeric keys and others by using the MODE keys, which are re-assigned by the software. The eight MODE keys make up the first column to the right of the screen. An option selected by a MODE key is displayed alongside the key used to select it.

RADIO SELECTION Option

5 Option 2, RADIO SELECTION, on the Clansman Main Menu enables selection of the application test program (ATP) for the radio under test and the required print mode.

Using the RADIO SELECTION Option

6 Option 2, RADIO SELECTION on the Main Menu, displays the Radio Selection menu.

7 Option 4, RT349 on the Radio Selection menu, invokes the RT349 application test program (ATP) which issues a series of prompts, as given in Table 1.

8 Option 8, PRINT OPTION on the Radio Selection menu, enables selection of the available print modes, as follows:

8.1 Select either Print at End of a run or Print During (default setting) a run.

8.2 Then select one of the following options:

8.2.1 Print None - nothing will be printed.

8.2.2 Print All - print all test results.

8.2.3 Print on Fail - print test failures only (default setting).

8.3 Then select Return.

9 Option 9, MAIN MENU, returns to the Main Menu screen.

TABLE 1 RADIO TEST PROGRAM PROMPTS

Screen Prompt (1)	Option (2)	Function (3)
EQUIPMENT LIST	SKIP	No equipment information is given.
	DISPLAY	An equipment list is displayed.
CONNECTION DETAILS	SKIP	No connection details are given.
	DISPLAY	Connection details are given (Para 12).
LOG RADIO OPTION	SKIP LOG	No information requested for logging.
	LOG RADIO	Date, Equip No. and Operator No. are requested to be printed with the test results
CLANSMAN RTXXX TESTS Note ... Safety tests must be completed before Run All or Select Test options are run	RUN ALL TESTS	All tests in the selected module are run.
	SELECT TEST	Gives a further screen prompt to enable individual tests to be run.
	CHANGE PRINT OPTION	Enables all test results to be printed or test failures only or no results printed - printing can be at the end of a run or during a run.
	NEXT RADIO	Enables selection of a different radio.

SYSTEM SHUT-DOWN

10 The 8920C system software does not require a sequenced shut-down operation. To shut the system down, switch the 2955B, RIU, PSU and DMM equipment off and disconnect the a.c. supply cables from the source.

11 On completing test activities, it is good practice to disconnect test cables from the system equipment and stow them in a suitable storage place.

RT349 TEST CONNECTION DETAILS OPTION

12 When the operator selects the RT349 and then the DISPLAY option of the CONNECTION DETAILS screen prompt (Table 1), the following information is displayed on the 2955B:

SET SYSTEM AS FOLLOWS :-

SWITCH FARNELL OUTPUT ENABLE OUT.

ENSURE FARNELL 6050 PSU OVER VOLTAGE IS SET TO 17.0 VOLTS.

SET FARNELL PSU VOLTAGE ADJUST FULY COUNTER CLOCKWISE.

SET RIU LINE CURRENT FULLY COUNTER CLOCKWISE.

-1- **PAGE 2**

SET SYSTEM AS FOLLOWS :-

SET CIP LINE RESISTANCE SWITCH TO OC.

SET CIP AUDIO/HARNESS SWITCH TO RADIO.

SET CIP POWER SWITCH TO OFF.

-2- **PAGE 3**

CONNECT AS FOLLOWS :-

N-BNC ADAPTOR TO RIU ANTENNA IN CONNECTOR.

BNC-BNC CABLE BETWEEN RIU AF IN AND 2955B AF INPUT.

BNC-BNC CABLE BETWEEN RIU AF GEN AND 2955B AF GEN OUTPUT.

N-N CABLE BETWEEN RIU RF IN/OUT AND 2955B RF IN/OUT CONNECTOR.

-3- **PAGE 4**

CONNECT AS FOLLOWS:

BNC-BNC CABLE BETWEEN RIU EXT MOD AND 2955B EXT MOD INPUT.

BNC-BNC CABLE BETWEEN RIU RF IN/OUT AND 2955B RF IN/OUT.

CIP CABLE BETWEEN CIP-RIU INTERFACE AND RIU AUDIO, HARNESS, CONTROL AND REMOTE.

REMOTE SWITCH CABLE TO CIP REMOTE SWITCH.

-4- **PAGE 5**

DISCONNECT SYSTEM 7150 DMM VOLTS HIGH AND DMM VOLTS LOW INPUTS.

CONNECT AS FOLLOWS:

7150 DMM LEAD RED BETWEEN CIP MONITOR +VE AND 7150 DMM VOLTS HIGH.

7150 DMM LEAD BLACK BETWEEN CIP MONITOR -VE AND 7150 DMM VOLTS LOW.

-5- **PAGE 6**

CONNECT AS FOLLOWS :-

E.U.T. ANTENNA ADAPTOR TO E.U.T. ANTENNA SOCKET.

BNC-BNC CABLE BETWEEN RIU N-BNC ADAPTOR AND E.U.T. ANTENNA ADAPTOR.

AUDIO LEAD BETWEEN CIP AUDIO SOCKET AND E.U.T AUDIO SOCKET.

CONNECT RADIO POWER SUPPLY LEAD BETWEEN RADIO SUPPLY SOCKET AND CIP DC SUPPLY SOCKET.

-6- **PAGE 1**

CONTINUE

Note :- To improve Electro-Magnetic Compatibility (EMC), the E.U.T./8920C interconnection cables are fitted with round ferrite blocks which appear as a bulge in the cable. However, **the connector closest to the ferrite block must be connected to the CIP.**

LOG RADIO OPTION

13 When the operator selects CONTINUE on the Page 4 display of the CONNECTION DETAILS option, the program continues to the LOG RADIO option and the first LOG RADIO option display appears on the 2955B. If the operator then selects SKIP, the program continues to Safety test 1 (Table 3) and starts E.U.T. testing.

14 If LOG RADIO is selected the second LOG RADIO display appears on the 2955B. The RADIO TYPE, NSN, TEST DATE and TIME responses are automatically completed by the 8920C and the operator is invited to complete the SERIAL NO, MOD STRIKE and OPERATOR I.D. responses. The following information is displayed on the 2955B for the LOG RADIO option:

LOG RADIO OPTION

SKIP

LOG RADIO

ENTER THE FOLLOWING :-

RADIO TYPE : RT349

NSN : 5820-99-643-4564

TEST DATE : 20/09/94

TIME : 11:40:02

SERIAL NO. :

MOD STRIKE :

OPERATOR I.D. :

PLEASE USE 2955 KEYPAD :-

PRESS DELETE FOR CORRECTIONS
PRESS SELECT FOR NEXT LINE

Note :- When the operator presses SELECT after completing the OPERATOR I.D. response the program continues to Safety test 1 (Table 3).

MANUAL TESTING/AUTOMATIC TESTING CROSS REFERENCES

15 The Test No. column of Table 3 (in this Part 4) identifies the test numbers of specification tests which are carried out with the 8920C in the automatic mode. These specification tests can also be carried out with the 8920C in the manual mode. Details of the manual tests are included in Part 2 of this EMER.

16 To assist the operator, a cross reference of the Part 4 test numbers (for the automatic tests) and Part 2 paragraph numbers (for the equivalent manual tests) are given in Table 2.

TABLE 2 PART 4 TEST NUMBER/PART 2 PARAGRAPH NUMBER CROSS REFERENCES

PART 4 TEST NUMBER	PART 2 PARAGRAPH NUMBER
Safety 1	65
Safety 2	71
Safety 3	71
Safety 4	66
1	71
2	123
3	114
4	114
5	92
6	98
7	88
8	110
9	102
10	118
11	118
12	83
13	87
14	106
15	77
16	78
17	83
18	106
19	77
20	78
21	83
22	83
23	83
24	87
25	106
26	77
27	78
28	83
29	83
30	83
31	77
32	78
33	106
34	83
35	83
36	--
37	87
38	106
39	77
40	78

TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION

17 Table 3 lists all the tests in the test program. To simplify the information shown in the Displayed Operator Information column of Table 3, only the information associated with the RUN ALL TESTS option and test PASS condition is included.

NOTE:- (1) Bold text in the Information Column indicates that the operator is required to press a key for the program to continue.

(2) The rectangular box following TEST: which is displayed with **YES/NO** is replaced by either PASS or FAIL, after the operator has pressed the key for either **YES** or **NO**.

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION

Test No.	Test Description	Displayed Operator Information
	SYSTEM START-UP (refer to Para 3).	
Safety 1 (Para 65)	Current consumption-off, 42.050 MHz (bar test) Current consumption with the E.U.T. mode switch set to OFF (0) shall be zero.	SET RADIO AS FOLLOWS :- FSS ..... 42.050MHZ. SSW ..... 0. **CONTINUE** CHANNEL - 42.050MHZ. DC CURRENT ZERO TEST IN PROGRESS EMER TEST SAFETY 1 TEST : PASS
Safety 2 (Para 71)	Current consumption - receive, 42.050 MHz (bar test) Current consumption with the E.U.T. in the receive condition shall be 57 mA to 82 mA.	SET RADIO AS FOLLOWS:- SW ..... *. **CONTINUE** CHANNEL - 42.050MHZ. CURRENT CONSUMPTION - RECEIVE TEST IN PROGRESS EMER TEST SAFETY 2 TEST : PASS

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
Safety 3 (Para 71)	Current consumption - transmit, 42.050 MHz (bar test) Current consumption with the E.U.T. in the transmit condition shall be 130 mA to 166 mA.	CHANNEL - 42.050MHZ. CURRENT CONSUMPTION - TRANSMIT TEST IN PROGRESS EMER TEST SAFETY 3 TEST : PASS
Safety 4 (Para 66)	Safety test- 42.050 MHz (bar test) With the E.U.T. in the receive mode, the E.U.T. transmit frequency is measured, this shall be 0 Hz.	CHANNEL - 42.050MHZ. SAFETY TEST - NO TRANSMIT TEST IN PROGRESS EMER TEST SAFETY 4 TEST : PASS DISCONNECT AS FOLLOWS:- 7150 DMM LEAD RED FROM CIP MONITOR +VE AND 7150 DMM VOLTS HIGH 7150 DMM LEAD BLACK FROM CIP MONITOR -VE AND 7150 DMM VOLTS LOW RECONNECT 7150 SYSTEM DMM VOLTS HIGH AND DMM VOLTS LOW INPUTS CONTINUE CLANSMAN RT349 TESTS RUN ALL TESTS SELECT TEST PRINT OPTION NEXT RADIO
	RUN ALL TESTS	

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
1 (Para 71)	Battery saving delay - 42.050 MHz The time interval between transmission and when battery saving occurs shall be between 9 seconds and 17 seconds and the period of supply switching shall be between 1.2 seconds and 1.95 seconds approx.	SET RADIO AS FOLLOWS :- SSW ..... L. **CONTINUE** CONNECT AS FOLLOWS: 7150 DMM LEAD RED BETWEEN CIP MONITOR -VE AND RIU DMM RED. 7150 DMM LEAD BLACK BETWEEN CIP MONITOR +VE AND RIU DMM BLACK. CHANNEL - 42.050MHZ. BATTERY SAVING DELAY TEST IN PROGRESS EMER TEST 1 TEST : PASS IS PERIOD OF DISPLAYED WAVEFORM BETWEEN 1.0 AND 2.0 SECS? PLEASE USE 2955 SCOPE POSITION KNOBS TO CENTRALISE TRACE. **YES** **NO** DISCONNECT AS FOLLOWS: 7150 DMM LEAD RED FROM CIP MONITOR -VE AND RIU DMM RED. 7150 DMM LEAD BLACK FROM CIP MONITOR +VE AND RIU DMM BLACK. **CONTINUE**

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
2 (Para 123)	Low battery indication - 42.050 MHz (10 V) With the supply voltage set to 10 V, the low battery indication shall not operate. With the supply voltage set to 9.5 V, the low battery indication shall operate.	LOW BATTERY WARNING PLEASE PRESS STEP VOLTAGE TO REDUCE POWER SUPPLY VOLTAGE. PRESS CONTINUE WHEN BURSTS OF NOISE ARE HEARD IN LOUDSPEAKER. ADJUST 2955 VOLUME FOR OPTIMUM POSITION. **STEP VOLTAGE** **CONTINUE** CHANNEL - 42.050MHZ. LOW BATTERY INDICATION TEST IN PROGRESS EMER TEST 2 TEST : PASS
3 (Para 114)	Squelch sensitivity - 42.050 MHz With the E.U.T. switched to NOISE (*) and no signal at the antenna, the receiver a.f. output is measured and recorded as the 0 dB reference level. A -135 dBm r.f. signal (1.3 kHz deviation at 150 Hz) is applied to the E.U.T. antenna and is automatically increased in 1 dB steps until the a.f. output is -2 dB. The E.U.T. is switched to LOUD (L) and the a.f. output shall be muted.	SET RADIO AS FOLLOWS :- SSW ..... *. **CONTINUE** CHANNEL - 42.050MHZ. SQUELCH SENSITIVITY - CLOSED TEST REFERENCE SETUP EMER TEST 3 SET RADIO AS FOLLOWS :- SSW ..... L. **CONTINUE** CHANNEL - 42.050MHZ. SQUELCH SENSITIVITY - CLOSED TEST IN PROGRESS EMER TEST 3 TEST : PASS

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
4 (Para 114)	Squelch sensitivity - 42.050 MHz With the E.U.T. switched to NOISE (*) and no signal at the antenna, the receiver a.f. output is measured and recorded as the 0 dB reference level. A -135 dBm r.f. signal (1.3 kHz deviation at 150 Hz) is applied to the E.U.T. antenna and is automatically increased in 1 dB steps until the a.f. output is - 9 dB. The E.U.T. is switched to LOUD (L) and the a.f. output shall be un-muted.	SET RADIO AS FOLLOWS :- SSW ..... *. **CONTINUE** CHANNEL - 42.050MHZ. SQUELCH SENSITIVITY - OPEN TEST REFERENCE SETUP EMER TEST 4 SET RADIO AS FOLLOWS :- SSW ..... L. **CONTINUE** CHANNEL - 42.050MHZ. SQUELCH SENSITIVITY - OPEN TEST IN PROGRESS EMER TEST 4 TEST : PASS
5 (Para 92)	Modulation sensitivity - 42.050 MHz, WHISPER/LOUD With the E.U.T. in the transmit condition, a 1 kHz signal is applied to the microphone and automatically increased (ramped) from 300 mV to 80 mV in 5 mV steps to produce a deviation of 3.2 kHz to 3.8 kHz. With the microphone input as above, the E.U.T. is switched to LOUD and the deviation shall be 0.68 kHz to 1.48 kHz.	SET RADIO AS FOLLOWS :- SSW ..... W. **CONTINUE** CHANNEL - 42.050MHZ. MODULATION SENSITIVITY - WHISPER TEST IN PROGRESS EMER TEST 5 TEST : PASS

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
5 (Para 92)	(Test continued)	SET RADIO AS FOLLOWS :- SSW ..... L. **CONTINUE** CHANNEL - 42.050MHZ. MODULATION SENSITIVITY - LOUD TEST IN PROGRESS EMER TEST 5 TEST : PASS
6 (Para 98)	<u>Modulation control - 42.050 MHz</u> With a microphone input of 200 mV at 1 kHz and the E.U.T. in the transmit condition, the deviation shall not exceed 6.5 kHz.	CHANNEL - 42.050MHZ. MODULATION CONTROL TEST IN PROGRESS EMER TEST 6 TEST : PASS
7 (Para 88)	<u>Pilot tone frequency - 42.050 MHz</u> With the E.U.T. in the transmit condition, the frequency of the demodulated pilot tone shall be 148 Hz to 152 Hz.	CHANNEL - 42.050MHZ. PILOT TONE FREQUENCY TEST IN PROGRESS EMER TEST 7 TEST : PASS
8 (Para 110)	<u>Limiting - 42.050 MHz</u> A -107 dBm r.f. signal (5 kHz deviation at 1 kHz) is applied to the E.U.T antenna, the E.U.T. a.f. output is measured and recorded as the 0 dB reference level. The r.f. signal level is increased to -13 dBm, the E.U.T. a.f. output is measured and must not be greater than 3 dB.	SET RADIO AS FOLLOWS :- SSW ..... *. **CONTINUE** CHANNEL - 42.050MHZ. LIMITING - AUDIO FREQUENCY TEST REFERENCE SETUP EMER TEST 8

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
8 (Para 110)	(Test continued)	CHANNEL - 42.050MHZ. LIMITING - AUDIO LEVEL TEST IN PROGRESS EMER TEST 8 TEST : PASS
9 (Para 102)	Sidetone - 42.050 MHz With a microphone input of 100 mV at 1kHz, the sidetone a.f. output into 300 Ω shall be 240 mV to 360 mV.	SET RADIO AS FOLLOWS :- SSW ..... L. **CONTINUE** CHANNEL - 42.050MHZ. SIDETONE TEST IN PROGRESS EMER TEST 9 TEST : PASS
10 (Para 118)	Receiver a.f. output - 42.050 MHz, LOUD A - 53 dBm r.f. input signal (5 kHz deviation at 1 kHz and 1.5 kHz deviation at 150 Hz) is applied to the E.U.T. antenna, the a.f. output into 300 Ω shall be 460 mV to 640 mV	CHANNEL - 42.050MHZ. AF VOLTAGE OUTPUT TEST IN PROGRESS EMER TEST 10 TEST : PASS
11 (Para 118)	Receiver a.f. output - 42.050 MHz, LOUD/WHISPER With the antenna input as in Test 10, the E.U.T. a.f. output is measured and recorded as the 0 dB reference level. The E.U.T. is switched to WHISPER (W), the E.U.T. a.f. output is measured and shall be -17 dB to -23 dB.	CHANNEL - 42.050MHZ. AF VOLTAGE OUTPUT - DB TEST REFERENCE SETUP EMER TEST 11 SET RADIO AS FOLLOWS :- SSW ..... W. **CONTINUE**

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
11 (Para 118)	(Test continued)	CHANNEL - 42.050MHZ. AF VOLTAGE OUTPUT - DB TEST IN PROGRESS EMER TEST 11 TEST : PASS
12 (Para 83)	Transmitter frequency accuracy 37.00 MHz The transmitter frequency shall be 37.000 MHz ± 500 Hz.	SET RADIO AS FOLLOWS :- FSS ..... 37.000MHZ. SSW ..... L. **CONTINUE** CHANNEL - 37.000MHZ. FREQUENCY ACCURACY TEST IN PROGRESS EMER TEST 12 TEST : PASS
13 (Para 87)	Pilot tone deviation - 37.000 MHz With the E.U.T. in the transmit mode, the deviation due to the 150 Hz tone shall be 1.55 kHz to 2.5 kHz.	CHANNEL - 37.000MHZ. PILOT TONE DEVIATION TEST IN PROGRESS EMER TEST 13 TEST : PASS
14 (Para 106)	Signal + noise/noise ratio 37.025 MHz A -107 dBm r.f. signal (5 kHz deviation at 1 kHz) is applied to the E.U.T. antenna, the E.U.T. a.f. output is measured and recorded as the 0 dB reference level. The modulation is removed, the E.U.T. a.f. output is measured and shall be less than -14 dB.	SET RADIO AS FOLLOWS :- FSS ..... 37.025MHZ. SSW ..... *. **CONTINUE** CHANNEL - 37.025MHZ. S+N/N RATIO TEST IN PROGRESS EMER TEST 14 TEST : PASS

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
15 (Para 77)	Transmitter power - 37.050 MHz (9.5 V) With the supply voltage set to 9.5 V, the transmitter power output shall be not less than 100 mW.	SET RADIO AS FOLLOWS :- FSS ..... 37.050MHZ. **CONTINUE** CHANNEL - 37.050MHZ. TX POWER OUTPUT - 9.5V TEST IN PROGRESS EMER TEST 15 TEST : PASS
16 (Para 78)	Transmitter power - 37.050 MHz (16 V) With the supply voltage set to 16 V, the transmitter power output shall be between 100 mW and 475 mW.	CHANNEL - 37.050MHZ. TX POWER OUTPUT - 16V TEST IN PROGRESS EMER TEST 16 TEST : PASS
17 (Para 83)	Transmitter frequency accuracy 38.150 MHz The transmitter frequency shall be 38.150 MHz ± 500 Hz.	SET RADIO AS FOLLOWS :- FSS ..... 38.150MHZ SSW ..... L. **CONTINUE** CHANNEL - 38.150MHZ. FREQUENCY ACCURACY TEST IN PROGRESS EMER TEST 17 TEST : PASS

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
18 (Para 106)	Signal + noise/noise ratio - 39.025 MHz A -107 dBm r.f. signal (5 kHz deviation at 1 kHz) is applied to the E.U.T. antenna, the E.U.T. a.f. output is measured and recorded as the 0 dB reference level. The modulation is removed, the E.U.T. a.f. output is measured and shall be less than -14 dB.	SET RADIO AS FOLLOWS :- FSS ..... 39.025MHZ. SSW ..... *. **CONTINUE** CHANNEL - 39.025MHZ. S+N/N RATIO TEST IN PROGRESS EMER TEST 18 TEST : PASS
19 (Para 77)	Transmitter power - 39.050 MHz (9.5 V) With the supply voltage set to 9.5 V, the transmitter power output shall be not less than 100 mW.	SET RADIO AS FOLLOWS :- FSS ..... 39.050MHZ. **CONTINUE** CHANNEL - 39.050MHZ. TX POWER OUTPUT - 9.5V TEST IN PROGRESS EMER TEST 19 TEST : PASS
20 (Para 78)	Transmitter power - 39.050 MHz (16 V) With the supply voltage set to 16 V, the transmitter power output shall be between 100 mW and 475 mW.	CHANNEL - 39.050MHZ TX POWER OUTPUT - 16V TEST IN PROGRESS EMER TEST 20 TEST : PASS
21 (Para 83)	Transmitter frequency accuracy 39.250 MHz The transmitted frequency shall be 39.250 MHz ± 500 Hz.	SET RADIO AS FOLLOWS :- FSS ..... 39.250MHZ. SSW ..... L.

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
21 (Para 83)	(Test continued)	CHANNEL - 39.250MHZ. FREQUENCY ACCURACY TEST IN PROGRESS EMER TEST 21 TEST : PASS
22 (Para 83)	Transmitter frequency accuracy 40.375 MHz The transmitted frequency shall be 40.375 MHz ± 500 Hz.	SET RADIO AS FOLLOWS :- FSS ..... 40.375MHZ. **CONTINUE** CHANNEL - 40.375MHZ. FREQUENCY ACCURACY TEST IN PROGRESS EMER TEST 22 TEST : PASS
23 (Para 83)	Transmitter frequency accuracy 41.450 MHz The transmitted frequency shall be 41.450 MHz ± 500 Hz.	SET RADIO AS FOLLOWS :- FSS ..... 41.450MHZ. **CONTINUE** CHANNEL - 41.450MHZ. FREQUENCY ACCURACY TEST IN PROGRESS EMER TEST 23 TEST : PASS
24 (Para 87)	Pilot tone deviation - 42.000 MHz With the E.U.T. in the transmit mode, the deviation due to the 150 Hz tone shall be 1.55 kHz to 2.5 kHz.	SET RADIO AS FOLLOWS :- FSS ..... 42.000MHZ. **CONTINUE**

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
24 (Para 87)	(Test continued)	CHANNEL - 42.000MHZ. PILOT TONE DEVIATION TEST IN PROGRESS EMER TEST 24 TEST : PASS
25 (Para 106)	Signal + noise/noise ratio - 42.025 MHz A -107 dBm r.f. signal (5 kHz deviation at 1 kHz) is applied to the E.U.T. antenna, the E.U.T. a.f. output is measured and recorded as the 0 dB reference level. The modulation is removed, the E.U.T. a.f. output is measured and shall be less than -14 dB.	SET RADIO AS FOLLOWS :- FSS ..... 42.025MHZ. SSW ..... *. **CONTINUE** CHANNEL - 42.050MHZ. S+N/N RATIO TEST IN PROGRESS EMER TEST 25 TEST : PASS
26 (Para 77)	Transmitter power - 42.025 MHz (9.5 V) With the supply voltage set to 9.5 V, the transmitter power output shall be not less than 100 mW.	CHANNEL - 42.025MHZ. TX POWER OUTPUT - 9.5V TEST IN PROGRESS EMER TEST 26 TEST : PASS
27 (Para 78)	Transmitter power - 42.025 MHz (16 V) With the supply voltage set to 16 V, the transmitter power output shall be between 100 mW and 475 mW.	CHANNEL - 42.025MHZ. TX POWER OUTPUT - 16V TEST IN PROGRESS EMER TEST 27 TEST : PASS
28 (Para 83)	Transmitter frequency accuracy 42.500 MHz The transmitted frequency shall be 42.500 MHz ± 500 Hz.	SET RADIO AS FOLLOWS :- FSS ..... 42.500MHZ. SSW ..... L. **CONTINUE**

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
28 (Para 83)	(Test continued)	CHANNEL - 42.500MHZ. FREQUENCY ACCURACY . TEST IN PROGRESS EMER TEST 28 TEST : PASS
29 (Para 83)	Transmitter frequency accuracy 43.600 MHz The transmitted frequency shall be 43.600 MHz ± 500 Hz.	SET RADIO AS FOLLOWS :- FSS ..... 43.600MHZ. **CONTINUE** CHANNEL - 43.600MHZ. FREQUENCY ACCURACY TEST IN PROGRESS EMER TEST 29 TEST : PASS
30 (Para 83)	Transmitter frequency accuracy 44.700 MHz The transmitted frequency shall be 44.700 MHz ± 500 Hz.	SET RADIO AS FOLLOWS :- FSS ..... 44.700MHZ. **CONTINUE** CHANNEL - 44.700MHZ. FREQUENCY ACCURACY TEST IN PROGRESS EMER TEST 30 TEST : PASS
31 (Para 77)	Transmitter power - 45.050 MHz (9.5 V) With the supply voltage set to 9.5 V, the transmitter power output shall be not less than 100 mW.	SET RADIO AS FOLLOWS :- FSS ..... 45.050MHZ. SSW ..... *. **CONTINUE**

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
31 (Para 77)	(Test continued)	CHANNEL - 45.050MHZ. TX POWER OUTPUT - 9.5V TEST IN PROGRESS EMER TEST 31 TEST : PASS
32 (Para 78)	Transmitter power - 45.050 MHz (16 V) With the supply voltage set to 16 V, the transmitter power output shall be between 100 mW and 475 mW.	CHANNEL - 45.050MHZ. TX POWER OUTPUT - 16V TEST IN PROGRESS EMER TEST 32 TEST : PASS
33 (Para 106)	Signal + noise/noise ratio - 45.525 MHz A -107 dBm r.f. signal (5 kHz deviation at 1 kHz) is applied to the E.U.T. antenna, the E.U.T. a.f. output is measured and recorded as the 0 dB reference level. The modulation is removed, the E.U.T. a.f. output is measured and shall less than -14 dB.	SET RADIO AS FOLLOWS :- FSS ..... 45.525MHZ. **CONTINUE** CHANNEL - 45.525MHZ. S+N/N RATIO TEST IN PROGRESS EMER TEST 33 TEST : PASS
34 (Para 83)	Transmitter frequency accuracy 45.800 MHz The transmitted frequency shall be 45.800 MHz ± 500 Hz.	SET RADIO AS FOLLOWS :- FSS ..... 45.800MHZ. SSW ..... L. **CONTINUE** CHANNEL - 45.800MHZ. FREQUENCY ACCURACY TEST IN PROGRESS EMER TEST 34 TEST : PASS

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
35 (Para 83)	Transmitter frequency accuracy 46.900 MHz The transmitted frequency shall be 46.900 MHz ± 500 Hz.	SET RADIO AS FOLLOWS :- FSS ..... 46.900MHZ. **CONTINUE** CHANNEL - 46.900MHZ. FREQUENCY ACCURACY TEST IN PROGRESS EMER TEST 35 TEST : PASS
36	Noise deviation - 46.900 MHz With the E.U.T. in the transmit condition, the deviation due to noise shall not be greater than 0.55 kHz.	CHANNEL - 46.900MHZ. NOISE DEVIATION TEST IN PROGRESS EMER TEST 36 TEST : PASS
37 (Para 87)	Pilot tone deviation - 46.900 MHz With the E.U.T. in the transmit condition, the deviation due to the pilot tone shall be 1.55 kHz to 2.5 kHz.	CHANNEL - 46.900MHZ. PILOT TONE DEVIATION TEST IN PROGRESS EMER TEST 37 TEST : PASS
38 (Para 106)	Signal + noise/noise ratio - 46.925 MHz A -107 dBm r.f. signal (5 kHz deviation at 1 kHz) is applied to the E.U.T. antenna, the E.U.T. a.f. output is measured and recorded as the 0 dB reference level. The modulation is removed, the E.U.T. a.f. output is measured and shall be less than -14 dB.	SET RADIO AS FOLLOWS :- FSS ..... 46.925MHZ. SSW ..... *. **CONTINUE** CHANNEL - 46.925MHZ. S+N/N RATIO TEST IN PROGRESS EMER TEST 38 TEST : PASS

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
39 (Para 77)	Transmitter power - 46.950 MHz (9.5 V) With the supply voltage set to 9.5 V, the transmitter power output shall be not less than 100 mW.	SET RADIO AS FOLLOWS:- FSS ..... 46.950MHZ **CONTINUE** CHANNEL - 46.950MHZ. TX POWER OUTPUT - 9.5V TEST IN PROGRESS EMER TEST 39 TEST : PASS
40 (Para 78)	Transmitter power - 46.950 MHz (16 V) With the supply voltage set to 16 V, the transmitter power output shall be not greater than 475 mW.	CHANNEL - 46.950MHZ. TX POWER OUTPUT - 16V TEST IN PROGRESS EMER TEST 40 TEST : PASS

CONDITIONS OF RELEASE

1. [redacted]

[redacted]

UK/PRC 349

TECHNICAL HANDBOOK - REPAIR CHARTS
(Revised throughout)

Note...
The charts in this publication may be amended to cover modifications and changes in repair policy. where they apply to a particular build standard (Field Batch) they are to be so annotated. The amendment state listed below applies to charts depicting the latest build standard

CONTENTS

INTRODUCTION

1 The repair charts in this regulation are based on the Agreed Repair Charts, but have been adapted for use in the Field by simplifying the symbolic information and including additional information which will be required in the course of repair. They reflect the approved policy for repair of the UK/PRC 349 equipment which may be briefly summarised as follows:

1.1 Unit repairs: No repairs or servicing will take place within the sealed RT 349. The headset will be repaired by replacement of discrete items (detailed in Repair Chart No. 1). The repair policy for the remaining accessories is by replacement of CES items under normal CES exchange procedures.

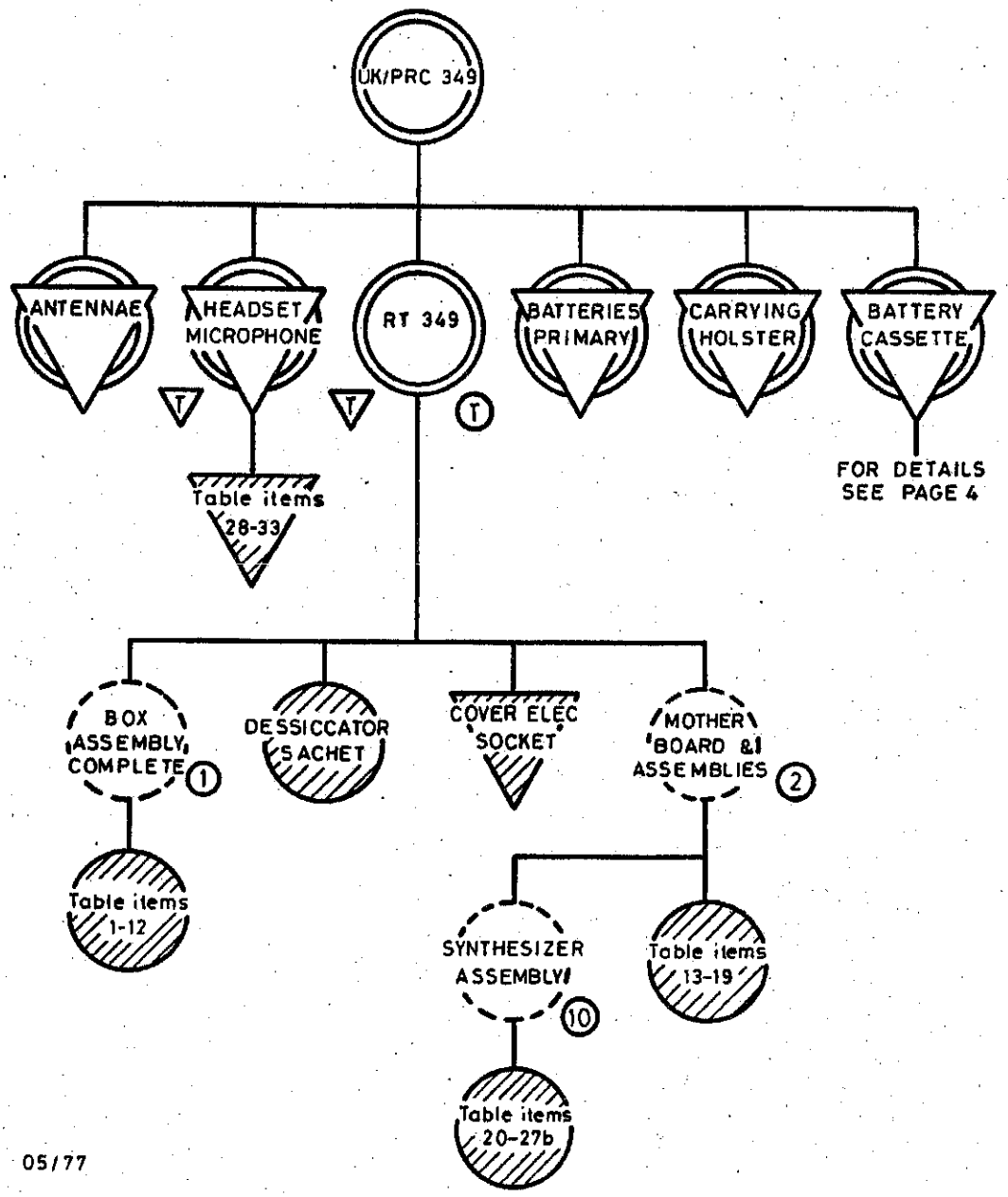
1.2 Field repairs: Repair of the RT 349 will be by replacement of faulty assemblies except for the box assembly and synthesizer where repair is by replacement of faulty sub assemblies and mechanical parts.

1.3 Base repairs: As at Field level (it is not envisaged that there will be any Base overhaul of this equipment.

INTERPRETATION OF REPAIR CHARTS

2 The repair charts depict the repair policy in diagrammatic form, using the series of symbols described in Fig 1. The symbols may contain a reference to a table where the items represented are listed. The table is located either on the page facing the diagram or on the same page as the diagram.

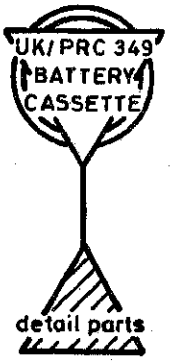
3 Information on each item is contained in or adjacent to the repair chart symbol as applicable.



Repair Chart No. 1 - UK/PRC 349 (Part 1)

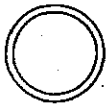
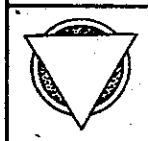
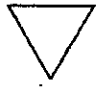
Item No	Designation	Qty	Assembly code/cct ref
1	Cover and rubber assembly	1	
2	Box assembly	1	
3	Seal test plug	1	
4	Identification plate	1	
5	Audio socket, system switch and wiring harness	1	
6	Knobs	4	
7	Gasket	1	
8	Antenna base	1	
9	Escutcheon plate	1	
10	Mod record plate	1	
11	Insert battery fixing	1	
12	Mechanical detail parts		
13	Motherboard	1	3
14	R.F. head, transmitter and antenna matching assembly	1	4
15	Discriminator, receiver amplifier and squelch assembly	1	5
16	I.F. amplifier assembly	1	6
17	Receiver and transmitter oscillators assembly	1	7
18	Divider and transmitter audio amplifier assembly	1	8
19	Regulator, d.c. switching and logic assembly	1	9
20	Cover	1	
21	Panel, electronic circuit	1	10a
22	Panel, electronic circuit	1	10b
23	Frequency setting switches and base assembly	1	10c
24	Spacers	6	
25	Connecting leads	10	
26	Resistor, 100 Ω	1	10cR1
27	Mechanical detail parts		
27a	Xtal (55.875 MHz)	1	XL1
27b	Xtal (34.475 MHz)	1	XL2
28	Headband - headset	1	
29	Earphone	1	
30	Throat microphone	1	
31	Wiring harness branched (3 branches)	1	
32	Clothing clip	1	
33	Push button	1	

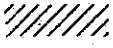
Repair Chart No.1 UK/PRC 349 (Part 2)



Item No.	Designation	Qty	Comments
1	Lid Assy	1	
2	PEC A	1	
3	Lock Assy	1	) PEC A
4	Screw	1	) Lock Assy
5	Fuse 500 mA	2	
6	Case Assy	1	
7	PEC B	1	
8	Battery Terminals	2	
9	Screw	2	Secure Bty Terminals
10	Sealing Ring	1	Case and Body
11	Sealing Ring	1	Cassette to PRC 349
12	Sealing Washer	1	
13	Clamp Screw	1	Secures Case & Lid
14	Sleeve Plastic	1	
15	Locking Screw	1	) Cassette to
16	'O' Ring		) RT 349

Repair Chart No. 2 Battery Cassette PRC 349

	INDICATES AN EQUIPMENT HELD ON USER CHARGE, WHICH WHEN DEFECTIVE MUST BE REPAIRED BY THE REPAIR ORGANISATION, OR IF A COMPLETE REPLACEMENT IS REQUIRED, IT MUST BE OBTAINED THROUGH THE NORMAL SUPPLY CHANNELS
	INDICATES AN ANCILLARY ITEM OF THE EQUIPMENT WHICH WHEN DEFECTIVE MUST BE REPAIRED BY THE REPAIR ORGANISATION. (NORMALLY A C.E.S. ITEM)
	INDICATES AN ANCILLARY ITEM OF THE EQUIPMENT WHICH IS NOT SUBJECT TO REPAIR. (NORMALLY A C.E.S. ITEM)
	INDICATES AN ITEM WHICH CAN BE REPLACED BY THE OPERATOR AT UNIT LEVEL. (NORMALLY RANGED AS A SPARE)
	INDICATES AN ITEM WHICH CAN BE REPLACED BY THE REPAIR ORGANISATION AT UNIT LEVEL. (NORMALLY RANGED AS A SPARE)
	INDICATES AN ITEM WHICH IS SUBJECT TO UNIT REPAIR BUT IS NOT RANGED AS A SPARE
	INDICATES AN ITEM WHICH CAN BE REPLACED BY THE REPAIR ORGANISATION AT FIELD LEVEL. (NORMALLY RANGED AS A SPARE)
	INDICATES AN ITEM WHICH IS SUBJECT TO FIELD REPAIR BUT IS NOT RANGED AS A SPARE

	INDICATES AN ITEM WHICH CAN BE REPLACED BY THE REPAIR ORGANISATION AT INTERMEDIATE LEVEL (NORMALLY RANGED AS A SPARE)
	INDICATES AN ITEM WHICH IS SUBJECT TO INTERMEDIATE REPAIR BUT IS NOT RANGED AS A SPARE
	INDICATES AN ITEM WHICH CAN BE REPLACED BY THE REPAIR ORGANISATION AT BASE LEVEL (NORMALLY RANGED AS A SPARE)
	INDICATES AN ITEM WHICH IS SUBJECT BASE REPAIR BUT IS NOT RANGED AS A SPARE
	CROSS HATCHING WITHIN ANY SYMBOL INDICATES THAT THE ITEM IS A CONSUMABLE ITEM
 AN INDICATION THUS	A DESIGNATION WITHOUT A SYMBOL SURROUND IS USED TO DENOTE/ INDICATE A LOGICAL BREAKDOWN AREA WHICH DOES NOT EXIST AS AN ASSEMBLY
	SYMBOLS REPRESENTING ITEMS WHICH ARE STOWED OR CARRIED REMOTE FROM THE EQUIPMENT ARE JOINED TO THE CHART BY BROKEN LINES
	THE SYMBOLS SO ANNOTATED REPRESENT CENTRALISED REPAIR ITEMS (CENTREMS). SEE LIST OF CENTREMS FOR REPAIR/RETURN AGENCY
	INDICATES THAT TEST AND DIAGNOSTIC FACILITIES ARE REQUIRED BY THE OPERATOR *
	INDICATES THAT TEST AND DIAGNOSTIC FACILITIES ARE REQUIRED AT UNIT LEVEL *

(T)	INDICATES THAT TEST AND DIAGNOSTIC FACILITIES ARE REQUIRED AT FIELD LEVEL *
[T]	INDICATES THAT TEST AND DIAGNOSTIC FACILITIES ARE REQUIRED AT INTERMEDIATE LEVEL *
T	INDICATES THAT TEST AND DIAGNOSTIC FACILITIES ARE REQUIRED AT BASE LEVEL *
P	INDICATES THAT A RE-USABLE PACKAGE IS TO BE PROVIDED FOR GENERAL USE
[P]	INDICATES THAT A RE-USABLE PACKAGE IS TO BE PROVIDED FOR USE BETWEEN BASE AND CONTRACTORS
(P)	INDICATES THAT A RE-USABLE PACKAGE IS TO BE PROVIDED FOR AN ASSEMBLY WHICH IS CARRIED AS AN OPERATORS SPARE WITH A MOBILE EQUIPMENT OR SYSTEM
F	INDICATES THAT THE ITEM IS SCHEDULED FOR REPAIR BY CONTRACTORS
(C)	INDICATES A NOMINATED WORKSHOP WITH ECHELON 2 CALIBRATION FACILITIES
[C]	INDICATES A NOMINATED WORKSHOP WITH ECHELON 3 CALIBRATION FACILITIES
(S)	INDICATES THAT SCREENING FACILITIES ARE REQUIRED AT FIELD LEVEL *
SL	SHELF LIFED ITEM. LIFE IN MONTHS TO BE INDICATED BY A FIGURE FOLLOWING THE SYMBOL
LU	LIFE USAGE ITEM. LIFE IN HOURS, ROUNDS FIRED, MILEAGE etc. TO BE INDICATED

TEST FACILITIES

* THESE SYMBOLS MAY BE ADDITIONALLY ANNOTATED TO INDICATE THE TYPE OF TEST FACILITY REQUIRED THUS:

1. GENERAL PURPOSE TEST EQUIPMENT.
2. BUILT-IN TEST EQUIPMENT.
3. SPECIAL-TO-TYPE TEST EQUIPMENT.
4. SPECIAL-TO-SYSTEM TEST EQUIPMENT.
5. AUTOMATIC TEST EQUIPMENT.

Fig 1

Key to repair chart symbols

Fig 1

CLANSMAN RADIO UK/PRC 349

TECHNICAL HANDBOOK - MODIFICATION INSTRUCTION

MODIFICATION INSTRUCTION INDEX

Priority: I = Immediate R = Routine (Mgmt N 097 refers)

Instr No. (1)	Priority (2)	Instruction detail (3)	Issue and Date (4)
1	R	Synthesiser - failure to lock at frequencies ending in 50 kHz.	1 Jun 81
2	-	RT 349 - Panel Electronic Circuit Assembly 8.	1 Apr 81
3	R	RT 349 - failure due to blowing of fuse link LK1	1 Sep 83
4	I	Battery Box - replacement of Screw, Cassette Clamp.	2 ~~Sep 86~~ Sep 87

END

[redacted]

CLANSMAN RADIO UK/PRC-349

TECHNICAL HANDBOOK - MODIFICATION INSTRUCTION

SUBJECT: Synthesiser - failure to lock at frequencies ending in 50 KHz

INTRODUCTION

1. The modification was introduced to overcome the synthesisers intermittent failure to lock at frequencies ending in 50 KHz.

APPLICABILITY

2. Synthesiser (NSN NA) prior to MOD STRIKE 3
part of
RT 349 Z1/5820-99-965-4485 prior to S No 5000

REASON FOR MODIFICATION

3. Code 3 - to improve reliability.

PRIORITY

4. Routine on repair only (Mgmt N 097 refers).

ESTIMATED TIME REQUIRED

5. 0.6 man hours.

MODIFICATION IMPLEMENTATION PLAN

6. a. This modification to be carried out by units authorised to carry out field or base repairs.

b. There are no associated modifications.

Action required

7. a. Units and establishments holding the equipment

NIL.

b. Units authorised to carry out field or base repairs

(1) On repair or overhaul, if necessary, demand stores and carry out this modification.

(2) On completion of the modification ensure that figure 3 is struck through on the modification record label on the base of the synthesiser assembly.

(3) Complete AF G 1084A when reporting completion of this modification to REME Data Centre. For the Equipment Code refer to Mgmt J 022.

ARMY MODIFICATION CODE Y00107

Stores, tools and equipment

Note: Refer to Army General and Administrative Instructions (AGAI) Chapter 90, Section 2, Issue 9/75.

8. a. Stores to be demanded

Stores are to be demanded through normal Ordnance channels quoting this EMER as the authority. The stores are to be demanded as individual items.

Item	COSA Sect	Part No	Designation	Qty per eqpt
1	Z99	5820-99-658-2745	Panel Electronic Circuit 10a	1
2	Z99	5820-99-643-8721	Panel Electronic Circuit 10b	1
3	Z99	5905-99-622-4886	Resistor Fixed 120Ω ± 5% 0.125 W	1

b. Stores to be obtained locally

NIL.

c. Stores to be removed

Items made redundant by the modifications are to be disposed of locally.

d. Special tools and test equipment

NIL.

Sequence of operations

9. a. Carry out dismantling procedure detailed in paras 40 to 45 and re-assembly procedure detailed in paras 54 to 56 of F 604, part 1, when replacing PECs 10a or 10b.

b. Failure of PEC 10a

On failure of PEC 10a both PECs 10a and 10b are to be replaced by items listed below:

(1) PEC 10a Z99/5820-99-658-2745

(2) PEC 10b Z99/5820-99-643-8721 mod strike 3

c. Failure of PEC 10b

On failure of PEC 10b replace with modified PEC 10b mod strike 3, and if PEC 10a is prior to S No G300D then replace the 22µH inductor in position R8 by a 120Ω ± 5% 0.125 W resistor.

Testing after embodiment

10. Carry out alignment procedure detailed in F 604 part 1, page 47, para 94, then carry out full specification test of the main equipment detailed in F 604 part 1.

EMER AMENDMENTS

11. F 602 circuit diagrams will be updated and issued later.

T/61173/3/Tels
ATMC Mod No 01766

END

CLANSMAN RADIO UK/PRC 349

TECHNICAL HANDBOOK - MODIFICATION INSTRUCTION

(ARMY MODIFICATION CODE Y 00108)

SUBJECT: RT-349 - Panel Electronic Circuit Assembly 8

INTRODUCTION

1. Panel electronic circuit (PEC) assembly 8b was modified to enable the use of Texas MC 1558 or equivalents by changing the value of 8b R14 from 470 KΩ to 390 KΩ. The change in value was required in order to meet Automatic Level Control sensitivity specifications.

APPLICABILITY

2. Transmitter Audio and Divider Assembly Z1/5820-99-643-8407

part of

Transmitter Receiver RT-349 Z1/5820-99-643-4564

REASON FOR MODIFICATION

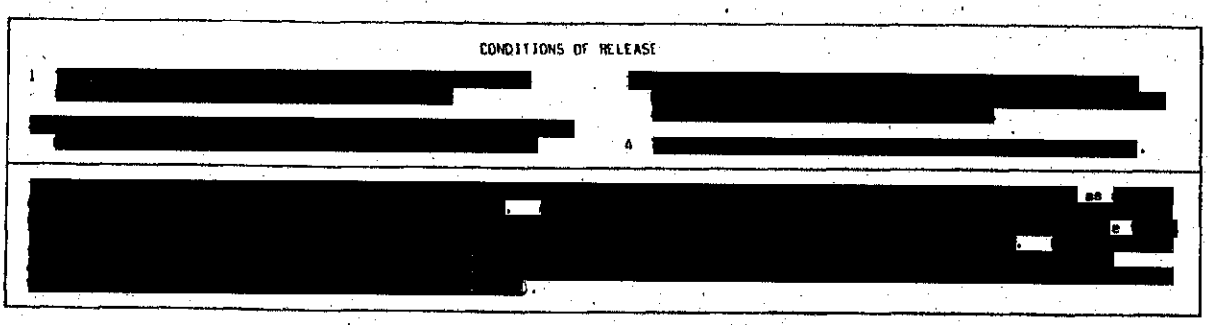
3. Code 5 - to conform to changes in pattern of commercial stores.

EMER AMENDMENTS

4. NIL.

T/61173/8/TELS
ATMC No 02617

END



CLANSMAN RADIO UK/PRC 349

TECHNICAL HANDBOOK - MODIFICATION INSTRUCTION

SUBJECT: RT 349 - failure due to blowing of fuse link LK1

INTRODUCTION

1 The fuse link in the RT 349 blows when an incorrectly assembled battery cassette (6135-99-657-5246) is fitted. Both radio and cassette contain 1 A fuses, but, due to physical differences, the fuse link in the radio blows first rendering the radio unserviceable. To overcome this problem, the fuse link in the cassette has been derated to 0.5 A. This instruction details the action required to carry out the modification to the battery cassette.

APPLICABILITY

2 Sub assembly Panel, Printed Circuit	5820-99-661-3770
part of:	
Battery Cassette (BCC 348C)	6135-99-657-5246
part of:	
Station Radio UK/PRC 349	Z1/5820-99-965-4485

REASON FOR MODIFICATION

3 Code 4 - to improve maintainability.

PRIORITY

4 Routine (Mgmt N 097 refers).

ESTIMATED TIME REQUIRED

5 0.2 man hours.

MODIFICATION IMPLEMENTATION PLAN

6

6.1 This modification may be carried out by units authorized to carry out field or base repairs.

6.2 There are no associated modifications.

6.3 On completion of the modification, the figure 1 is to be struck through on the modification record plate on the battery cassette

Action required

7

7.1 Units and establishments holding the equipment

7.1.1 Examine the equipment to determine whether the figure 1 has been struck through on the modification record plate.

7.1.2 If the figure 1 has not been struck through, liaise with REME support workshops on the number of equipments to be modified.

7.2 Units authorized to carry out unit, field or base repairs

7.2.1 When requested by holding units, carry out this modification.

7.2.2 On repair or overhaul, if necessary, demand stores and carry out this modification.

7.2.3 On completion of the modification ensure that the figure 1 is struck through on the modification record plate on the battery cassette.

7.2.4 Complete AF G 1084A when reporting completion of this modification to REME Data Centre. For the Equipment Code refer to Mgmt J 022.

ARMY MODIFICATION CODE Y 00655

7.3 All recipients of this regulation

Record the details of this instruction in the modification instruction index.

Stores, tools and equipment

Note...
Refer to Army General and Administrative Instructions (AGAI) Chapter 90 Section II Issue 9/75.

8

8.1 Stores to be demanded

Stores are to be demanded through normal Ordnance channels quoting this regulation as the authority:

Item	COSA Sect	NSN	Designation	Qty per eqpt
1	Z32	5920-99-059-0137	Fuse Link, Cartridge, Ceramic, 500 mA Size 00 to Def Stan 59-96 Pt 1	2

8.2 Stores to be obtained locally

1	-	-	White Paint	AR
2	-	-	Varnish, Clear	AR

8.2 Stores to be removed

Stores made redundant by the modification are to be disposed of locally.

Item	COSA Sect	NSN	Designation	Qty per eqpt
1	-	-	Fuse Link, Cartridge, 1A	2

8.4 Special tools and test equipment

Sequence of operations

9

9.1 Remove battery cassette cover (5820-99-661-3769).

9.2 Remove the p.e.c. (A) (5820-99-661-3770) from the cover. This is achieved by turning the Spacer, Board Lock (5820-99-661-3772).

9.3 Using white paint, cross out the figure 1 from the 1 AMP marking.

9.4 Inscribe the figures 0.5 in the free space above the + terminal adjacent to the figure 1.

9.5 After the white paint has had time to dry, cover the inscription with clear varnish.

CAUTION...

Care should be taken to keep the contact surface on the p.e.c. (A) free from paint or varnish.

9.6 Strike through, without obliterating, the figure 1 on the modification record label moulded into the bottom of the battery cassette.

9.7 Remove and discard the two existing 1 A fuses and replace with 0.5 A fuses.

Testing after embodiment

10 Nil.

EMER AMENDMENTS

11 Nil.

42171/EB
ATMC No. 02286

END

CONDITIONS OF RELEASE

1. [redacted]

[redacted]

CLANSMAN RADIO UK/PRC-349

TECHNICAL HANDBOOK - MODIFICATION INSTRUCTIONS

Note...
These Pages 1 to 4 Issue 2 supersede Pages 1 to 4 Issue 1 dated Sep 86.
Para 7 has been amended.

Sponsor: DGEME

Publications Authority: Electronics Branch REME

File ref: T61173/1
(Disk ref: EB/B/M/07 - PE190)

SUBJECT: Battery Box - replacement of Screw, Cassette Clamp

INTRODUCTION

1 A re-designed clamp screw is to be introduced to overcome the problem of damage to the battery cassette due to over tightening of the clamping screw. The new screw will replace the existing one.

APPLICABILITY

2 Battery Box 6150-99-657-5246
used on:
UK/PRC-349 5820-99-965-4485

REASON FOR MODIFICATION

3 Code 3 - to improve reliability.

PRIORITY

4 Immediate (Mgmt N 097 refers).

ESTIMATED TIME REQUIRED

5 0.1 man hour.

MODIFICATION IMPLEMENTATION PLAN

6

6.1 This modification may be carried out by units holding the equipments.

6.2 There are no associated modifications.

6.3 No strike action is required.

Action required by

7

7.1 Units and establishments holding the equipment

7.1.1 Examine the equipment to determine whether the modification has been carried out. Unmodified equipments will have a screw slot as shown in Fig 1 "a", modified equipments will have a "cut away" slot as shown in Fig 1 "b".

7.1.2 If required demand stores and carry out this modification.

7.2 Units authorised to carry out field and base repairs

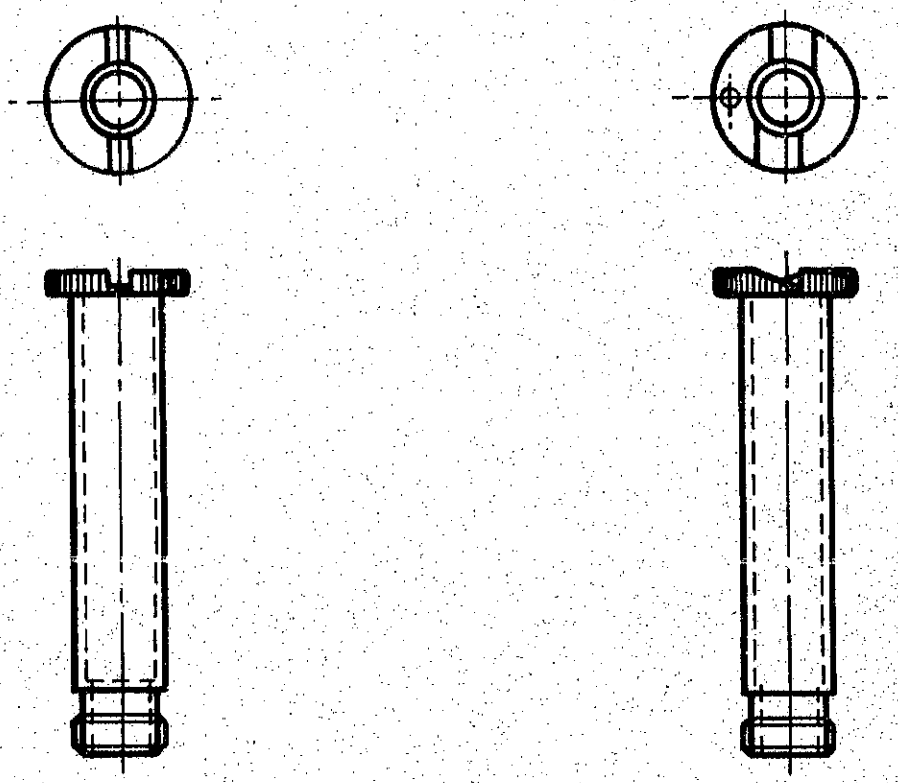
7.2.1 On repair or overhaul if necessary, demand stores and carry out this modification.

7.2.2 Complete AF G 1084A (Mgmt J 020 refers) when reporting completion of this modificiation to REME Data Centre. For the Equipment Code refer to Mgmt J 022.

ARMY MODIFICATION CODE Y 00917

7.3 All recipients of this instruction

Record the details of this instruction in the Modification Instruction Index.



"a" "b"

Fig 1

Stores, tools and test equipment

8

8.1 Stores to be demanded

Stores are to be demanded through normal Ordnance channels quoting this instruction as the authority. The stores are to be demanded as a complete kit and NOT as individual items.

Item No.	NSN	Designation	Qty per eqpt
	5820-99-743-1651	Kit, Modification comprising:	1
1	5820-99-661-3478	Screw, Cassette Clamp	1
2	-	Sleeve, Flame-Retarded yellow 12.7 mm bore 9 mm lg	1

8.2 Stores to be obtained locally

Grease X G271 TO DEF STAN 91-12 OR equivalent	As reqd

8.3 Special tools and test equipment

Nil.

Sequence of operations

9

9.1 Remove the Battery Cassette Screw by pulling it outward gently.

9.2 Dis-assemble the Battery Cassette housing by loosening the Cassette Clamp Screw (turn anti-clockwise).

9.3 Remove the existing clamp screw from the case housing by pushing it from its sleeve. If the sleeve is too tight, remove by cutting with a suitable knife. Discard the old sleeving and clamp screw and retain the plastic washer.

9.4 Fit the Plastic Washer Screw onto the new Clamp Screw Item (1).

9.5 Insert the new Clamp Screw into the Case housing.

9.6 Place the new heat shrinkable sleeve, Item (2), into position.

9.7 Apply heat directly and evenly to the new sleeve using a suitable hot air gun held at a distance of approximately 1 to 2 inches away from the sleeve. Maintain the heat until the required shrinkage is obtained, ie sleeve tightly fitted onto the clamp screw.

9.8 Lightly smear the threads and washer of the Clamp Screw, and all rubber sealing gaskets throughout the assembly with grease.

9.9 Re-assemble the Battery Cassette, finger tightening the Clamp Screw. DO NOT us any tools to tighten the clamp screw.

9.10 Fit Battery Cassette Screw back into the assembly.

Testing after embodiment

10 Carry out a Visual Inspection.

EMER AMENDMENTS

11 Nil.

ATMC No. 02075

END

CONDITIONS OF RELEASE

1. [redacted]

4. [redacted]

UK/PRC-349

TECHNICAL HANDBOOK - INSPECTION STANDARDS

Note: These Pages 1 - 7 Issue 2 supersede Pages 1 - 7 Issue 1 dated Sep 77. Items marked thus ● have been amended.

INTRODUCTION

1. a. This regulation details the standards to be applied during quality assessments at all levels.

b. Equipment is to be sentenced in accordance with T&M A 028, Chapter 006 and the latest relevant DCI.

c. The lower standard shown in the schedule at paragraph 4 will apply at the relevant higher standard when the higher standard column is left blank.

d. The preferred method of applying the Inspection Standard is as detailed in Item 2 of the schedule. Values shown elsewhere in the 'Inspection' column of the schedule are only to be applied when an a.t.e. is NOT available and the alternative method of testing with a t.r.e. is used.

e. The standards are to be applied in conjunction with the references in para 2, except that the acceptable quality levels have been re-defined as follows:

(1)	Inspection Standard.	T&M A 028 Chap 001 para 9.a (1).
(2)	Repair Standard.	T&M A 028 Chap 001 para 9.a (2).
(3)	Overhaul Standard.	T&M A 028 Chap 001 para 9.a (3).

REFERENCES

2. a. T&M A 028 Material Quality Assessment, Principles and Practices in REME, Chapters 001, 007, 620.

b. Tels M 382.

c. Tels F 604 parts 1 and 3.

TEST EQUIPMENT

3. Equipment required to carry out standard tests:

a. Inspection

(1) Preferred method. This method will always be used when an a.t.e. is available.

(a) Z4/6625-99-117-0421. Automatic test equipment, radio, field repair (a.t.e.).

(b) Z4/6625-99-642-3437. Modulation meter 9008M.

(c) Z4/6625-99-965-7922. RT-349 Field repair test kit (f.r.t.k.).

(2) Alternative method. This method will only be used when an a.t.e. is not available.

(a) Test equipment as listed in para 3.b. below.

b. Repair (and Overhaul)

(1) (a) Z4/6625-99-620-5350 Test rig electronic equipment test controller No 1.

OR (b) Z4/6625-99-620-5078 Test rig electronic equipment test controller No 2.

(2) The peripheral test equipment listed in Tels M 382 para 6.

(3) Z4/6625-99-642-3437 Modulation meter 9008M.

(4) Z4/6625-99-965-7922. RT-349 Field repair test kit (f.r.t.k.).

4. This schedule is to be reproduced and used as an Inspection Record

Acceptable Quality Levels (AQLs)						
Item (a)	Test/Operation (b)	Reference (c)	Inspection (d)	Repair (e)	Overhaul (f)	Result (g)
	GENERAL					
1	External Condition	) T&M A 028,)				
	Mechanical Condition	) Chapter 007 and 620)	As detailed in relevant references			
	Electrical Condition	)				
	Modification and Miscellaneous Instructions					
	SPECIFICATION/FUNCTIONAL TESTS					
2	Overall specification test (preferred method)	Tels F 604, Part 3	The equipment shall pass all tests on the a.t.e. tape.	N/A	N/A	
		Tels F 604, Part 1:-				
3	Preliminary test	para 67.				
	Battery drain, SSW at '0' position		UL OmV			
	Power out, Rx mode.		UL OmV			

4. Inspection Record (cont'd)

(a)	(b)	(c)	(d)	(e)	(f)	(g)
4	Current consumption	para 68.				
	Rx		LL 4.5mV UL 8.5mV	LL 5.3mV UL 7.6mV		
	Standby (low state)		UL 1.2mV	UL 1mV		
	Tx		LL 11.6mV UL 18.0mV	LL 12.6mV UL 16.0mV		
5	Power output, 9.5V	para 69.				
	FSS: 37.050		)			
	39.050		)			
	42.050		) LL 296mV	LL 316mV		
	45.050		)			
	46.950		)			
	Power output, 16V	para 69.				
	FSS: 46.950		)			
	45.050		)			
	42.050		) UL 737mV	UL 689mV		
	39.050		)			
	37.050		)			

4. Inspection Record (cont'd)

(a)	(b)	(c)	(d)	(e)	(f)	(g)
6	Accuracy of radiated carrier	para 70.				
	FSS: 37.000		)			
	38.125		)			
	39.250		)			
	40.375		)			
	41.400		) UL ±500Hz			
	42.500		) of FSS			
	43.600		) setting			
	44.700		)			
	45.800		)			
	46.900		)			
7	150Hz modulation	para 71.				
	FSS: 46.900		) LL ±1.55kHz	LL ±1.55kHz		
	42.000		) UL ±2.9kHz	UL ±2.5kHz		
	37.000		)			
	150Hz tone frequency		LL 147.0Hz UL 152.0Hz	LL 148.0Hz UL 152.0Hz		
8	Modulation sensitivity (W)	para 72.	LL 1.6mV UL 6.0mV			
	(L)		LL ±0.6kHz UL ±1.6kHz	LL ±0.68kHz UL ±1.48kHz		

4. Inspection Record (cont'd)

(a)	(b)	(c)	(d)	(e)	(f)	(g)
9	Modulation control	para 73	UL ±6.8kHz	UL ±6.5kHz		
10	Sidetone	para 74.	LL 215mV UL 400mV	LL 240mV UL 360mV		
11	Sensitivity	para 75.				
	FSS: 37.025		)			
	39.025		)			
	42.025		) LL 13dB	LL 14dB		
	45.525		)			
	46.925		)			
12	Limiting	para 76.	UL 2dB	UL 1.5dB		
13	Squelch sensitivity	para 77.				
	Squelch closed		LL 2dB			
	Squelch opened		UL 9dB			
14	A.F. power output	para 78.				
	(L)		LL 420mV UL 700mV	LL 460mV UL 640mV		
	(W)		LL 16dB)* UL 24dB)*	LL 17.5dB)* UL 22.5dB)*		
			*below L			

4. Inspection Record (cont'd)

(a)	(b)	(c)	(d)	(e)	(f)	(g)
15	Low battery warning	para 79.	LL 9.4V UL 9.8V			
16	Battery saving delay	para 80.	LL 8 s UL 20 s	LL 9 s UL 17 s		
	Supply switch period (10 fluctuations)		LL 12 s UL 20 s			
17	Variation of deviation	para 82.	N/A	UL ±15%		
18	Spurious responses	para 83.	N/A	UL 20dB		
19	Transmitter spurious radiation (non-harmonic)	para 85.	N/A	LL 60dB		
20	Transmitter spurious radiation (harmonic)	para 86.	N/A	LL 40dB		
21	Receiver spurious emission	para 87.	N/A	UL 100μV		

Notes: (1) Tests 17 and 18 are additional tests that are to be carried out when the equipment is suspected of having a fault in that specific area covered by the test.

(2) Tests 19, 20 and 21 are special tests to be carried out only when the equipment is suspected of causing interference to other equipments; they are to be carried out at a nominated workshop.

END

CLANSMAN RADIO UK/PRC 349

TECHNICAL HANDBOOK - MISCELLANEOUS INSTRUCTION

MISCELLANEOUS INSTRUCTION INDEX

Instr No. (1)	Instruction detail (2)	Issue and Date (3)
1	RT 349 synthesiser assembly - new replacement P.E.C. 10a.	1 Mar 81
2	Synthesiser (Unit 10) - failure to align Rx and Tx oscillators.	1 Jul 81
3	BCC 348 battery cassette - intermittent contact	1 Jun 83
4	UK/RT 349 - Synthesiser Assembly 10 - redesign of p.e.c. 10B.	1 Sep. 83
5	UK/RT 349 - Knob Turner	1 Jan 84
6	UK/RT 349 - damage to ferrite cores	1 Feb 84
7	Insulator Plate	1 Feb 84
8	Bcc Assembly - Insert, Battery fixing Tels (F 602 Fig 2)	1 June 84
9.	BCC 348C Battery Cassette - screw threads of nylon knob stripping with constant use.	1 Mar 87
10	Synthesiser (Assembly 10) -	1 Jun 89
11	Flexible whip antenna	1 Jun 89
12	Clansman UK/PRC 349	1 Jun 89
13	Headset Microphone - replacement of broken neckband assemblies	1 Aug 90

END

CLANSMAN RADIO UK/PRC 349

TECHNICAL HANDBOOK - MISCELLANEOUS INSTRUCTION

SUBJECT: RT 349 Synthesiser assembly new replacement PEC 10a.

INFORMATION

1. a. The integrated circuit SN 76514L(ML1) has become obsolete and in order to incorporate its replacement (integrated circuit LM 1596H) it was found necessary to redesign the circuit of PEC 10a.

b. During the redesign of the PEC integrated circuit NCY 264F06 (ML2) was replaced by discrete components and also changes to the transmit and receive crystal oscillators were introduced to improve the adjustment range.

c. The redesigned PEC 10a, Z99/5820-99-658-2745 is a direct replacement for the existing PEC 10a, Z9/5820-99-643-8722.

ACTION

2. No retrospective action is required. Diagrams in the XY2 will be amended.

ATMC Ser No 1981
T/61173/8/Tels

END

CLANSMAN RADIO UK/PRC 349

TECHNICAL HANDBOOK - MISCELLANEOUS INSTRUCTION

SUBJECT: Synthesiser (Unit 10) - failure to align Rx and Tx oscillators

INFORMATION

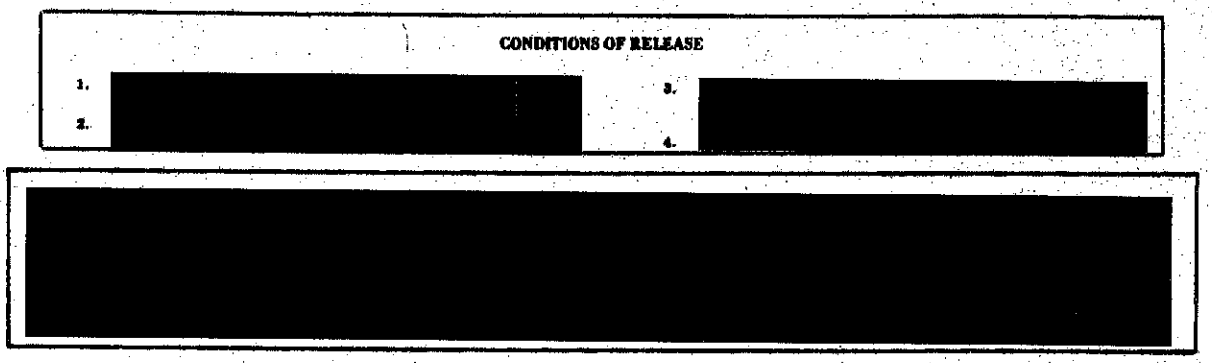
1. The new alignment procedure for the Rx and Tx oscillators details adjustments to 10aL1 and 10aL6 which eliminates the difficulty experienced in achieving the frequency setting of the oscillators.

ACTION

2. To gain access to 10aL1 and 10aL6 it will be necessary to carry out the procedures detailed in EMER TELS M 789 Misc Instr No 1.

T/61173/3

END



CLANSMAN RADIO UK/PRC 349

TECHNICAL HANDBOOK - MISCELLANEOUS INSTRUCTION

SUBJECT: BCC 348 battery cassette - intermittent contact

INFORMATION

1

1.1 When the battery cassette is carried loose as a spare, the contacts can be bent inwards and/or suffer ingress of dirt resulting in poor battery contact with the main equipment (RT 349).

1.2 Additionally, battery contact corrosion can result from adverse environmental exposure, ie immersion in salt water.

ACTION

2

2.1 Battery cassettes when carried loose, should be stowed with care.

2.2 Battery contacts should be kept clean and free from contamination.

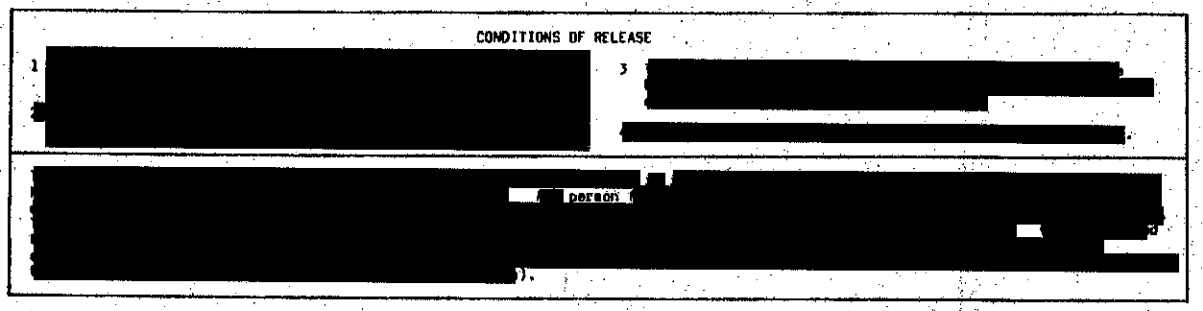
2.3 Battery contacts should be replaced as and when required.

INDEX ACTION

3 Record details of this instruction on the miscellaneous instruction index.

42171/EB

END



CLANSMAN RADIO UK/PRC 349

TECHNICAL HANDBOOK - MISCELLANEOUS INSTRUCTION

SUBJECT: UK/RT 349 - Synthesiser Assembly 10 - redesign of p.e.c. 10B

INTRODUCTION

1 Due to a high failure rate on production, the reference oscillator was redesigned and the synthesiser board (10B) circuitry was changed. As a result of redesign, there was an increase in current consumption of the 10B circuit and an amendment to the P.T.S. was introduced.

2 The new p.e.c. 10B (5820-99-751-4607) is a direct replacement for the existing p.e.c. 10B (5820-99-643-8721).

REASON FOR INSTRUCTION

3 Code 5 - to conform to changes in pattern of commercial stores.

ACTION REQUIRED

By units authorized to carry out field and base repairs

4 On failure of p.e.c. 10B, part of Synthesiser Assembly 10, demand stores in accordance with IPC Army Code No. 61755 Amdt No. 1 (Oct 82).

EMER AMENDMENTS

5 Tels F 604 Part 1, Issue 2, Test No. 2, Para 68 has been updated and amended separately.

INDEX ACTION

6 Record details of this instruction on the miscellaneous instruction index.

42171/EB

END

CLANSMAN RADIO UK/PRC 349

TECHNICAL HANDBOOK - MISCELLANEOUS INSTRUCTION

BY COMMAND OF THE DEFENCE COUNCIL

Ministry of Defence

Sponsor: DGEME

File ref: 42171

Publications Authority: Electronics Branch REME

SUBJECT: UK/RT 349 - knob turner

INTRODUCTION

1 Difficulties have been encountered with constant turning of the knobs during testing of radios.

REASON FOR INSTRUCTION

2 To assist in the inspection and testing of UK/RT 349.

ACTION REQUIRED BY UNITS

3 Locally manufacture a tool as detailed in Fig 1, using any suitable material (suggested material: aluminium alloy).

INDEX ACTION

4 Enter details of this instruction on the miscellaneous instruction index.

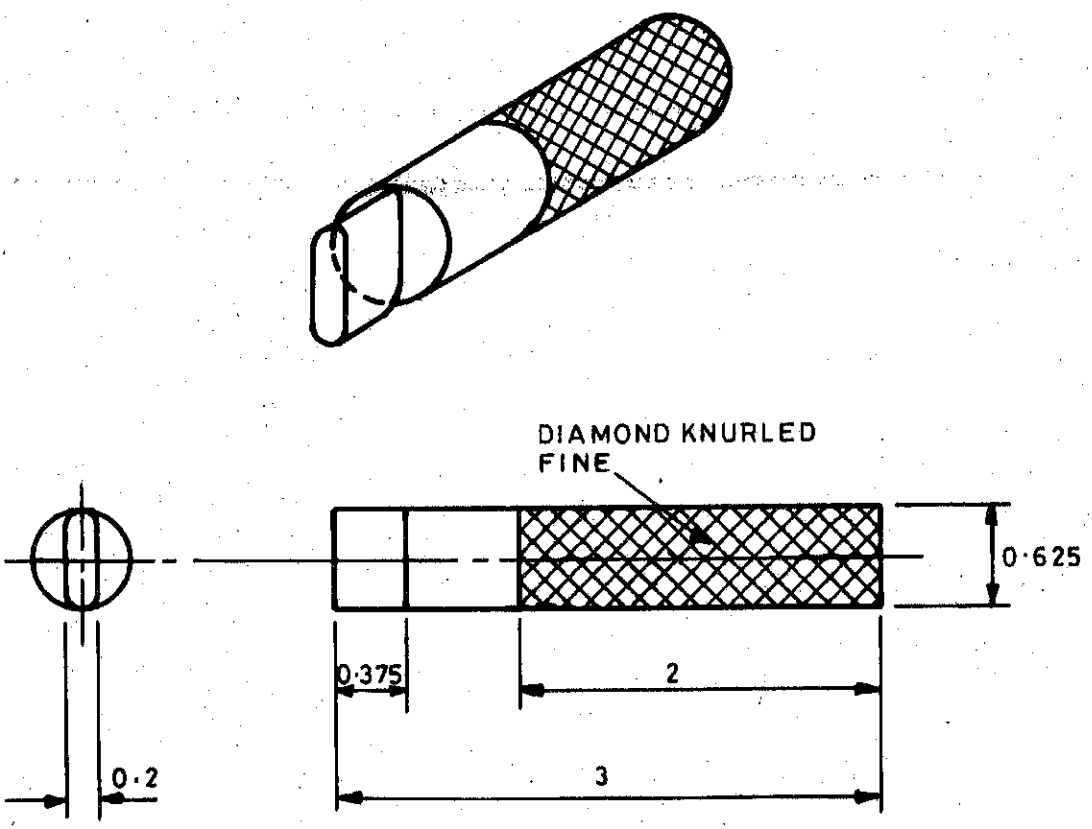
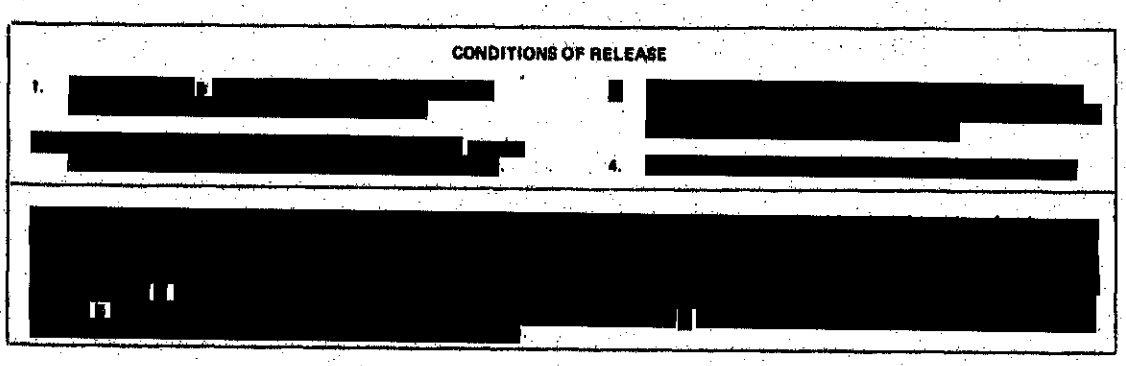


Fig 1 Tool details

END



CLANSMAN RADIO UK/PRC 349

TECHNICAL HANDBOOK - MISCELLANEOUS INSTRUCTION

BY COMMAND OF THE DEFENCE COUNCIL

Alice Whitmore.

Ministry of Defence

Sponsor: DGEME

File ref: 42100

Publications Authority: Electronics Branch REME

SUBJECT: UK/RT 349 - damage to ferrite cores

INFORMATION

1

1.1 Third line workshops are receiving an increasing number of Clansman radios that require the replacement of ferrite cores due to damage.

1.2 The damage may be due to units not using the correct trimming tools when making adjustments.

ACTION

2

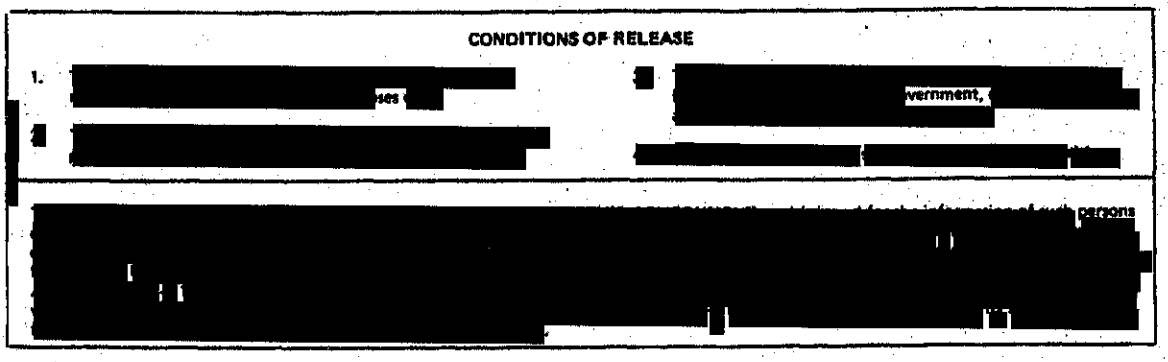
2.1 Units are to exercise care not to damage ferrite cores when carrying out alignment.

2.2 The correct trimming tool must always be used. Screwdrivers are not to be used.

INDEX ACTION

3 Record details of this instruction on the miscellaneous instruction index.

END



CLANSMAN RADIO UK/PRC 349

TECHNICAL HANDBOOK - MISCELLANEOUS INSTRUCTION

BY COMMAND OF THE DEFENCE COUNCIL

Sponsor: DGEME

File ref: 42171

Publications Authority: Electronics Branch REME

[redacted]

Ministry of Defence

SUBJECT: Insulator plates

INFORMATION

1 There have been many reported cases of CENTREMs being received by base workshops for repair, with the insulator plate, that fits between the CENTREM and the motherboard, missing.

2 These insulator plates are in short supply and the deficiency can cause delays in completion of CENTREM repairs.

3 The repair policy will be changed such that the insulator plates become field replaceable items.

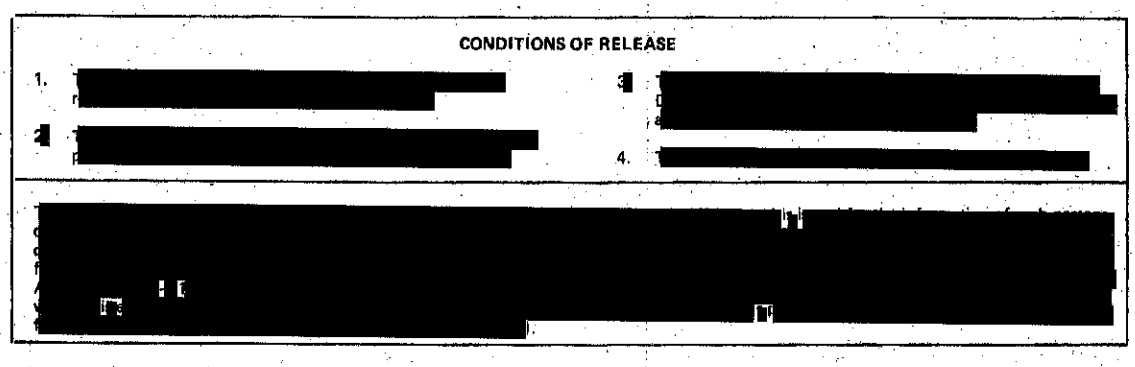
ACTION

4 As an interim measure, all insulator plates are to be retained by field workshops for reuse with the new CENTREM.

INDEX ACTION

5 Record details of this instruction on the miscellaneous instruction index.

END



CLANSMAN RADIO UK/PRC 349

TECHNICAL HANDBOOK - MISCELLANEOUS INSTRUCTION

Sponsor: DGEME

Publications Authority: Electronics Branch REME

File ref: 42170

SUBJECT: Box Assembly - Insert, Battery Fixing (Tels F 602 Fig 2)

INFORMATION

1 A high number of cases of battery cassette retaining screws with damage to threads have been reported. A contributory factor is the black finish on the stainless steel insert.

ACTION REQUIRED BY

Units and establishments holding the equipment

2 Request the unit REME personnel to clear any debris that may be fouling the threads of the Insert, Battery Fixing by using a M8 plug tap and running it down the insert. Take care that cross threading does not occur.

INDEX ACTION

3 Record details of this instruction on the miscellaneous instruction index.

END

CONDITIONS OF RELEASE

1. [redacted]

[redacted]

4. [redacted]

[redacted]

UK/PRC 349

TECHNICAL HANDBOOK - MISCELLANEOUS INSTRUCTION

Sponsor: DGEME

Publications Authority: Electronics Branch REME

File Ref: 4651
(Disk ref: EB/A/V/30 - E 1329)

SUBJECT: BCC 348C Battery Cassette - screw threads of nylon knob stripping with constant use

INTRODUCTION

1 The threads of the Nylon Locking Knob were found to wear out with constant use. A new improved fixing screw constructed from aluminium alloy black anodised, is now available as a replacement. The head of the screw has been redesigned with a circular shape and biased coin slot, which will allow the screw to be tightened using only finger pressure but will permit a coin or similar tool to be used for removal.

APPLICABILITY

2 Locking Knob — NSN Z99/5355-99-661-3762
part of:
Battery cassette — NSN Z99/6150-99-657-5246
part of:
Station, Radio, UK/PRC 349 — NSN Z1/5820-99-965-4485

ESTIMATED TIME REQUIRED

3 0.02 man hour.

ACTION REQUIRED BY

4

4.1 Units authorised to carry out field or base repairs

On failure of knob when stocks are exhausted, carry out this instruction.

4.2 All recipients of this instruction

Enter details of this instruction on the Misc Instr Index.

STORES REQUIRED

5 When failure occurs, and when the stocks of existing items are exhausted, then demand the following items from stores. The stores are to be demanded as a complete kit and NOT as individual items.

Item No.	COSA Sect	NSN	Designation	Qty per eqpt
	Z99	5820-99-661-6894	Modification Kit comprising the following:	1
1			Knob, Aluminium alloy to BS 1474 6082 Black Anodised	1
2	Z99	5310-99-661-3764	Washer, Flat	1
3	W3	5330-99-814-0019	Ring Sealing Toroidal	1

PROCEDURE

6 Remove the existing screw with ring sealing toroidal and washer flat, from the battery cassette and replace with items 1-3 of Para 5.

ATMC No. 02588

END

CONDITIONS OF RELEASE

1. [redacted]

[redacted]

STATION, RADIO, UK/PRC 349

TECHNICAL HANDBOOK - MISCELLANEOUS INSTRUCTION

Sponsor: DGEME

Publications Authority: Electronics Branch REME

File ref: 42170
(Disk ref: EB/B/X/26)

SUBJECT: Synthesiser (Assembly 10) - replacement of Crystals XL1 and XL2

INTRODUCTION

1 A number of defects were reported for failures due to the breakage of Crystals 10aXL1 and 10aXL2. Some improvement was achieved by fitting a foam rubber pad under each crystal in production. However it was not possible to overcome the problem completely and it was therefore decided to change the repair policy and introduce the crystals as a field replacement item.

APPLICABILITY

2 Panel Electronic Circuit (10a) Z1/5820-99-643-8722
part of:
Transmitter-Receiver, Radio, UK/RT 349 Z1/5820-99-643-4564

ACTION REQUIRED BY UNITS AUTHORISED TO CARRY OUT FIELD OR BASE REPAIRS

3 On failure of Crystals 10aXL1 or 10aXL2, remove the unserviceable crystal and replace with the relevant item listed at Para 4 below.

STORES TO BE DEMANDED

4

Item No	COSA Sect	NSN	Designation	Qty per eqpt
1	Z37	5955-99-744-7437	XL2	1
2	Z37	5955-99-744-7438	XL1	1

ATMC Serial No. 02660

END

CONDITIONS OF RELEASE

1. [redacted]

[redacted]

STATION, RADIO, UK/PRC 349

TECHNICAL HANDBOOK - MISCELLANEOUS INSTRUCTION

Sponsor: DGEME

Publications Authority: Electronics Branch REME

File ref: EB/61173/GEN
(Disk ref: EB/B/AQ/21)

SUBJECT: Flexible Whip Antenna - Repair of sheared mounting studs

INTRODUCTION

1

1.1 A problem has been identified with the mounting stud shearing on the base of the Flexible Whip Antenna. This is being overcome in manufacture by using different material for the stud.

1.2 This instruction details the procedure to be carried out as an interim method of repair.

APPLICABILITY

2 Flexible Whip Antenna Z99/5985-99-732-6041
part of:
Station, Radio, UK/PRC 349 Z1/5820-99-965-4485

ESTIMATED TIME REQUIRED

3 1/2 man hour.

ACTION REQUIRED BY UNITS AUTHORISED TO CARRY OUT UNIT, FIELD OR BASE REPAIRS

4 When the mounting stud shears, carry out the procedure at Paragraph 6 of this instruction.

STORES TO BE OBTAINED LOCALLY OR MANUFACTURED

5

Item	COSA Sect	NSN	Designation	Qty per eqpt
1	-	-	6 mm Stud	1

PROCEDURE

6

6.1 Prepare the end surface of the Antenna by cutting off and filing flat any remaining material from the sheared stud.

6.2 Drill and tap a 6 mm x 5 mm hole, as shown in Fig 1.

6.3 Prepare the 6 mm Stud (Para 5) as shown in Fig 2.

6.4 Locate the Stud into the tapped hole in the base of the Antenna, and secure in position using a drop of Locktite 270 "STUD LOCK" or equivalent on the last two threads of the stud prior to insertion.

Note...
Do not use too much Locktite.

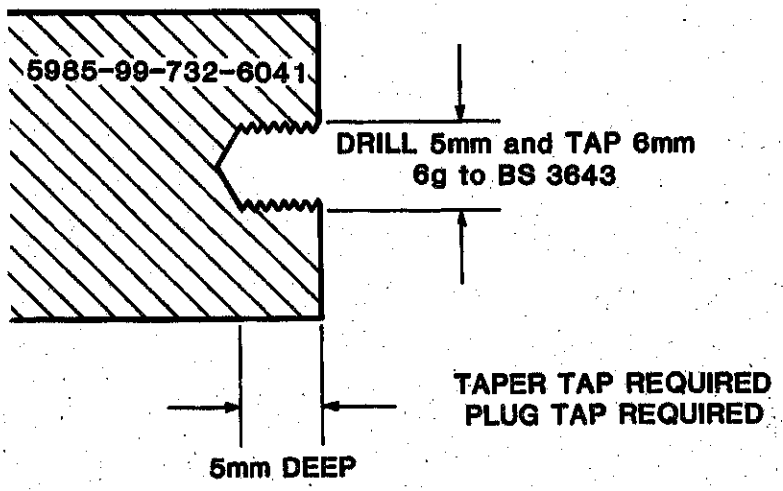


Fig 1

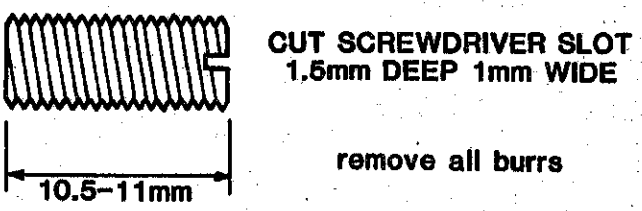


Fig 2

END

CONDITIONS OF RELEASE

1. [redacted]

[redacted]

STATION, RADIO, UK/PRC 349

TECHNICAL HANDBOOK - MISCELLANEOUS INSTRUCTION

Sponsor: DGEME

Publications Authority: Electronics Branch REME

File ref: 42170
(Disk ref: EB/B/R/24)

SUBJECT: Clansman UK/PRC 349 - Battery and Battery Cassette replacement gasket

INTRODUCTION

1 Due to problems encountered with sealing between batteries and the equipment, a redesigned Sealing Ring (Z99/5330-99-740-0248) has been introduced into service. This new Sealing Ring can be identified by a "lip" on one side.

ACTION REQUIRED BY UNITS AUTHORISED TO CARRY OUT UNIT, FIELD OR BASE REPAIRS

2 On replacement of the sealing ring, care is to be taken to ensure that the "lip" on the gasket is fitted into the groove on the Battery or Battery Cassette.

INDEX ACTION

3 Record details of this instruction on the miscellaneous instruction index.

END

CONDITIONS OF RELEASE

1. [redacted]

[redacted]

STATION, RADIO, UK/PRC 349

TECHNICAL HANDBOOK - MISCELLANEOUS INSTRUCTION

Sponsor: DGEME

Publications Authority: Electronics Branch REME

File ref: EB/60718/11

(Disk ref: EB/D/AC/36)

SUBJECT: Headset, Microphone - Replacement of broken neckband assemblies

INTRODUCTION

A problem has been identified with the plastic hook breaking on the microphone neckband assembly. This is being overcome in manufacture by using new neckband assemblies fitted with metal hooks and bars. The new neckband assemblies are interchangeable with existing assemblies and will be introduced into service when stocks of the existing neckband assemblies are depleted. The part numbers of the existing and new neckband assemblies are shown below for reference.

Existing neckband assembly	New neckband assembly	
NSN 5965-99-537-1403	NSN 5965-99-020-6023	With hook
NSN 5965-99-537-1402	NSN 5965-99-617-3171	With bar

ATMC Serial No. 03149

END

UK/PRC-349

TECHNICAL HANDBOOK - DATA SUMMARY

Note: These Pages 1-4 Issue 2 supersede Pages 1-4 Issue 1 dated Jun 77.
Items marked thus ● have been amended.

EQUIPMENT IDENTITY

Designation	Part Number
Station, radio UK/PRC-349 comprising:	Z1/5820-99-965-4485
Transmitter/receiver radio UK/RT-349	Z1/5820-99-643-4564
Battery, primary (12V)	Z1/6135-99-643-7932
● Whip antenna (0.5 m)	Z1/5820-99-649-2450
● * Whip antenna (sectional) (1.0 m)	Z1/5820-99-649-2451
Headset	Z42/5965-99-643-7935
Holster	Z1/5820-99-643-7933
User handbook	Army Code No 61646

● * May not be supplied with all stations

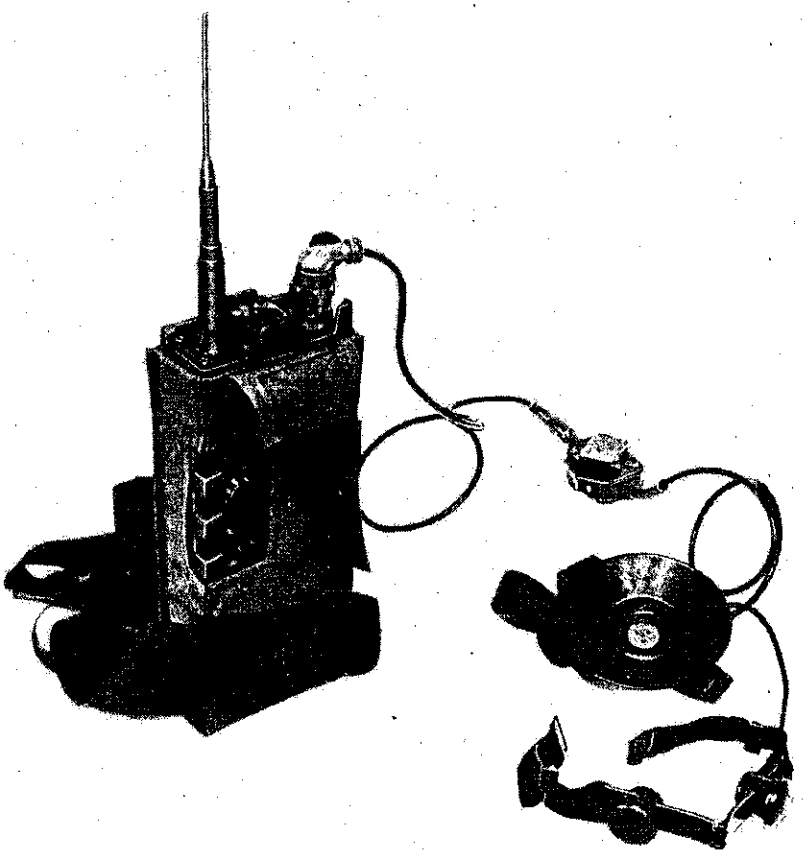


Fig 1 - General view

ROLE

Manpack infantry station for use at section and platoon level.

BRIEF DESCRIPTION

The RT-349 is a rugged, small light-weight v.h.f. manpack transmitter-receiver providing narrow-band frequency-modulated telephony; it is powered by a 12V primary battery, and embodies a battery-saving (standby) facility in the 'receive' state. Although it cannot be used as a rebroadcast station, it can initiate rebroadcast on the following radio stations: UK/PRC-351 and 352, and UK/VRC-353. The RT-349 employs transistors, integrated-circuits and discrete components. It uses frequency synthesis to give high channel-accuracy and stability; switched channel selection provides 25kHz increments in the frequency range 37 to 46.975MHz giving a total of 400 channels. It is hermetically sealed in a cast alluminium alloy case. Internal construction consists of a group of assemblies which, with one exception (synthesizer), plug into a motherboard. An antenna socket allows direct attachment of either whip antenna. A socket is also provisioned for connection of audio gear.

Station accessories

[redacted]utennae:	0.5 metre fixed whip. 1.0 metre four-section whip.
Battery:	Battery, dry (12V); manganese alkaline.
Audio Gear:	Headset, single-sided with throat microphone.
Carriage:	Holster.

PHYSICAL DATA

	Weight	Height	Width	Depth
RT-349 (including battery)	1.4 kg (3.08 lb)	246 mm (9.6 in)	91 mm (3.59 in)	41 mm (1.61 in)
Battery	0.35 kg (0.77 lb)	62 mm (2.55 in)	91 mm (3.57 in)	41 mm (1.61 in)

CLIMATIC RANGE

Temperature

Operational:	-20 to +55°C plus temperature rise due to solar radiation.
Storage:	-40 to +55°C plus temperature rise due to solar radiation.

Altitude

May be used and stored at altitudes up to 3048 m (10,000 ft).

Humidity

Operational:	95 - 100% with temperature normally not exceeding 30°C.
Storage:	Suitable for long storage under humid tropical conditions without any special packing other than trade pack.

TRANSPORTATION DATA

Air transportability:	may be carried unpressurized at altitudes up to 7,620 m (25,000 ft) and dropped by parachute using appropriate equipment.

PACKAGING DATA

SPIS: CPU 9654485

OPERATIONAL DATA

The RT-349 has four switched controls, three of which are used for channe. selection; the remaining switch (system) is a functional control having positions marked O (off), W (whisper), L (loud) and * (noise on).

PERFORMANCE

Using the battle antenna (0.5 m whip), typical range is 1 to 2 km dependent on siting and terrain. Using the sectional antenna (1.0 m whip), typical range is 1.5 to 3 km dependent on siting and terrain.

ELECTRICAL DATA

RT-349

Frequency range:	37 to 46.975MHz.
Channel spacing:	25kHz.
Number of channels:	400
Frequency accuracy:	Error does not exceed 1kHz variation from nominal.
Mode of operation:	Narrow-band f.m. (voice).

Receiver

Sensitivity:	A standard r.f. signal of 2μV e.m.f. produces a signal plus noise-to-noise ratio of not less than 10dB.

A.F. output

Loud:	1mW into 300Ω
Whisper:	Reduced by 20dB with respect to loud mode.

Transmitter

Power output:	Nominal 220mW with 12V supply (measured into 50Ω via a BNC antenna adaptor).
Deviation:	Nominal ±5kHz for normal voice level on loud and for reduced voice level on whisper.
Sidetone:	With normal voice level on loud, the sidetone output level is 0.3mW.

POWER REQUIREMENTS

A primary battery (12V) is provisioned with a life expectancy of 20 hr at 20°C and a transmit/receive/standby cycle of 1:1:9.

Input voltage range:	9.5 to 16V d.c.
Input power:	
Transmitter:	Nominal 140mA at 12V
Receiver	Nominal 70mA at 12V (signal being received) 35mA average at 12V (standby)

MAINTENANCE

Unit repairs:	No repairs or servicing will take place within the sealed RT-349. The headset will be repaired by replacement of detailed faulty parts. The repair policy for the remaining accessories is by replacement of CES items under normal CES exchange procedures.
Field repairs:	Repair of the RT-349 will be by replacement of faulty assemblies (complete) except for the box assembly and synthesizer where repair is by replacement of faulty sub-assemblies and mechanical parts.
Base repairs:	As at field level. (It is not envisaged that there will be any Base overhaul to this equipment).

ASSOCIATED PUBLICATIONS

Complete equipment schedule:	CES No. 43832
Illustrated parts catalogue:	Army Code No. 61755
User handbook:	Army Code No. 61646
Clansman audio accessories:	EMER Tels C 740

4651/Tels

END