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United Kingdom

Ref: FOI2019/00098

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

[redacted]

14 January 2019

Dear [redacted],

Thank you for your email of 3 January 2019 requesting the following information:

"Please supply copies of all manuals for the Clansman VRC-353 radio system,

Such as...

4058Technical Handbook Data Summary
4059Technical Handbook Technical Description
4060Technical Handbook Unit Repairs
4061Technical Handbook Field Repairs.
4062Technical Handbook Field and Base Repairs Part.2
4063Technical Handbook Automatic Testing Field
4064Technical Handbook Automatic Testing 8290C Test System
4065Technical Handbook Repair Charts
3692 R.Signals training manual for RT353
3693User Handbook for Radio Station UK/VRC353"

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 in the attached files.

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,

ISS Secretariat

STATION, RADIO, UK/VRC 353

TECHNICAL HANDBOOK - FIELD REPAIRS

Errata

Note: This Page 0 is to be filed immediately in front of Page 1, Issue 1, dated Jun 78.

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

2. Page 29, para 77.a.(2), at end of sentence:

   Add: 'With fans switched on'.

3. Page 30, para 77.b.(2), after 'WIDE',

   Insert: 'set test switch to OVERRIDE',

4. Page 33:

   a. Para 80.a.(1), in table, against 'MIN':

      Delete: 'LL 40mW'
      Insert: 'LL 20mW'

   b. Para 80.b.(1)(b):

      Delete: 'LL 200mV'
      Insert: 'LL 140mV'

5. Page 37, para 83.a.(1), in table:

   a. Column 300Hz:

      Delete: '4dB down'
      Insert: '2dB down'

   b. Column 600Hz:

      Delete: '4dB down'
      Insert: '2dB down'

6. Page 38.b.(1)(h), in table:

   a. Final column (heading)

      Delete: '600Hz'
      Insert: '6000Hz'

6. Page 38.b.(1)(h), in table, contd:

b. Column 300Hz:

Delete: 'LL -3dB'
Insert: 'LL -2dB'

c. Column 600Hz:

Delete: 'LL -4dB'
Insert: 'LL -2dB'

7. Page 41:

a. Para 85.a., line 2:

Delete: '3kHz deviation'
Insert: '1.65kHz deviation'

b. Para 85.b., in table, under 'E.U.T.':

Delete: 'M WIDE TONE'
Insert: 'M NARROW'

8. Page 42:

a. Para 85.b.(1)(d), third line:

Delete: 'of 3kHz'
Insert: 'of 1.65kHz'

b. Para 85.b.(2)(d), fifth line:

Delete: '30mV (3kHz deviation)
Insert: '16.5mV (1.65kHz deviation)

9. Page 47, para 88.b.(1)(l), third line:

Delete: '15mV'
Insert: '20mV'

10. Page 52, para 91.a.:

Add new sub-sub-para as follows:

'(5) The voltage on the AUDIO sockets, pin C, will be LL 26V UL 30V with no load connected'.

11. Page 53, para 91.b.:

Add now sub-sub-para as follows:

'(5) Using AVO measure the voltage at the AUDIO socket (IF(C)5) fan out pin C (line), which shall be LL 26V UL 30V.

12. Page 59, para 95.b.:

Add new sub-sub-para as follows:

'(10) The power output when switched to TUNE will be LT 0.5V (250mW).

13. Page 61, para 97.a.(2); second line, after noise:

Insert: 'with or without fans running'

14. Page 62:

a. Para 97.b.(2)(c), add new sentence as follows:

'Set test switch to OVERRIDE, the deviation shall remain LT 0.2kHz'.

b. Para 97.b.(2), add new sub-sub-sub-para as follows:

'(g) Set test switch to OVERRIDE, the deviation shall remain LT 0.2kHz'.

2574/Tels

Errata

Note: These Pages 03—04 are to be filed immediately in front of Page 1, Issue 1, dated Sept. 76.

(The following amendments must be made to the regulation).

15. Page 8, para 15:

a. Connector item 1, third column:

Delete: 'TS5'
Insert: 'TS4'

b. Connector item 7, first column:

Delete: '7'
Insert: '9'

c. Connector item 8, first column:

Delete: '8'
Insert: '10'

d. First connector item 20, third column:

Delete: 'SK13'
Insert: 'SK17'

16. Page 11, para 28:

a. Line 2:

Delete: 'item 10'
Insert: 'item 8'

b. Line 4:

Delete: '1(a)SK using item 9'
Insert: '1(a)SK7 using item 7'

17. Page 30, para 78.a.(1), line 2:

Delete: '10mV'
Insert: '100mV'

18. Page 34, para.81.a.(3)

a. Lines 1 and 2:

Delete: 'power level within 1dB of its steady state level'
Insert: 'minimum power level of 40W'

b. Line 5:

Delete: '5 seconds'
Insert: '3 seconds'

19. Page 42, para 85.b.(2)(d), line 3:

    Delete: '1.99Hz'
    Insert: '150Hz'

20. Page 48, para 89.a.(1), line 4:

    Delete: 'LL 1mV'
    Insert: 'LL 2mV'

21. Page 60, para 96.b.(1)(c), line 1:

    Delete: '(94dB)'
    Insert: '(88dB)'

22. Page 95, para 157.g:

    Delete: 'LL 67.0175MHz UL'
    Insert: 'UL 67.0175MHz LL'

STATION, RADIO, UK/VRC 353

TECHNICAL HANDBOOK - FIELD REPAIRS

Errata

Note: This Page 05 is to be filed immediately in front of Page 1, Issue 1, dated Jun 78.

(The following amendments must be made to the regulation).

23. Page 26, Line 7, CAUTION, after 'handling information'.

    add: 'The devices are ML2-8 inclusive'.

24. Page 51, para 90.b., Method,

    a. Sub para (1)(c):

       delete: '800mV'

       insert: '47mV (for 80mV at terminals)'

    b. Sub para (1)(f):

       delete: '999mV'

       insert: '235mV'

       after X10, add: (for 4V at terminals)

2574/Tels

STATION, RADIO, UK/VRC 353

TECHNICAL HANDBOOK - FIELD REPAIRS

Errata

Note: This Page 06 is to be filed immediately in front of Page 1, Issue 1, dated Jun 78. (The following amendments must be made to the regulation).

25. Page 9, para 20, line 2:

    Delete: 'items 10 and 12 only'
    Insert: 'items 7 and 12 only'.

26. Page 22, para 70, add new sentence:

    'When renewing any of the motors on either the receiver or transmitter assemblies, first rotate the shaft of the motor by hand for a few revolutions to ensure good brush/commutator contact.'

27. Page 24, para 72.b., add new sentence:

    'When replacing the p.e.c., new heat sink compound must be used inside the two locating holes for the thyristors. Heat sink compound type DP 2623 is to be used.'

28. Page 25, para 72.m., Note, amend to read:

    'When replacing the p.a. valve, the heat sink compound around the valve seating recess must be renewed. The six bolts......'

29. Insert new pages 29-38.

30. Insert new pages 49-60.

2574/Tels

Errata

Note: This Page 07 is to be filed immediately in front of Page 1, Issue 1 dated Jun 78.

(The following amendments must be made to the regulation).

31. Page 59, Para 95.b:

a. Sub-para (1),(a), line 2:

After Item 33, add: '(modified)'.

b. Sub-para (1),(e):

After Sub-para add new Sub-para:

'(f) Remove link between pins M and P.'

c. Sub-para (2),(a) and (b):

(1) Delete all detail.

(2) Insert new Sub-para:

'(2) Set e.u.t. POWER switch to '0' and note that the l.e.d. on Item 33 (modified) is illuminated.'

d. Sub-para (3),(a), line 2:

Delete: 'pin D (live)'
Insert: 'pin S (live)'.

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TECHNICAL HANDBOOK - FIELD REPAIRS

Errata

Note...
These Pages 08-09 are to be filed immediately in front of Page 1, Issue 1 dated Jun 78.

(The following amendments must be made to the regulation).

32. Page 24, Para 72, Heading, after Transmitter (4):

Add: 'WARNING...
THE TRANSMITTER VALVE CONTAINS BERYLLIUM AND, WHEN REPLACED OR DAMAGED, SHOULD BE DISPOSED OF IN ACCORDANCE WITH Gen K 050.'

33. Page 51, Sub-para 90.b.(1):

a. Sub-sub-para (c), Line 1:

Delete: '1kHz at 47mV'
Insert: '1kHz at 85mV'

b. Sub-sub-para (f), Line 1:

Delete: 'generator for 235mV'
Insert: 'generator for 417mV'

34. Page 58, Sub-para 94.b.(4)(d), Line 2:

Delete: 'LL 1.56V, UL 3.1V'
Insert: 'LL 1.4V, UL 2.8V'

35. Page 61, Sub-para 97.a.(2), Line 3:

Delete: 'less than 0.2kHz'
Insert: 'less than 0.5kHz'

36. Page 62, Sub-para 97.b.(2)(c):

a. Line 3:

Delete: 'LT 0.2kHz (200Hz)'
Insert: 'LT 0.5kHz (500Hz)'

b. Line 4:

Delete: 'LT 0.2kHz.'
Insert: 'LT 0.5kHz.'

37. Remove and destroy Pages 63-64, Issue 2 dated Jan 80.

38. Insert new Pages 63-64a, Issue 3 dated Jun 82.

39. Page 75, end of Para 119:

Add: 'Before monitoring test points on board 2c refer to Tels H 619 Misc Instr No 11.'

40. Page 88, Para 146, Table, valve pins 2, 4, 6, 8, D.C. potential:

Delete: '3.1-3.4V'
Insert: '2.9-3.4V'.

41. Page 90, Para 148, Table, Pin No 5, Level, Line 3:

Delete: '3.1V'
Insert: '2.9V'.

42. Page 91, Para 148, Table, Pin No 9, Level, Line 3:

Delete: '3.1V'
Insert: '2.9V'.

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STATION, RADIO, UK/VRC 353

TECHNICAL HANDBOOK - FIELD REPAIRS

Errata

Notes...

(1) These Pages 010-011, Issue 4 supersede Page 010/011, Issue 3 dated Jun 84 and are to be filed immediately in front of Page 1, Issue 1 dated Jun 78.

(2) The amendments at Para 52 are new and must be made to the regulation.

(The following amendments must be made to the regulation)

43 Page 22, Para 69, after Sub para 3.:

Add new Sub para f.: 'f. On replacement of blower ensure that residual deviation is checked as highlighted in Tels H 614 Misc Instr No. 13'.

44 Page 6, Table 1, Items 9 and 10, Cat No. column:

Delete: 'N.I.V.'
Insert: 'Part of Test Kit Z4/6625-99-966-0009'.

45 Page 46, Sub para 88.a., Table, Other conditions column, line 12:

Delete: 'LL 0.77 Hz UL 1.4 Hz'
Insert: 'LL 0.77 Hz UL 1.9 Hz'

46 Page 29, after Sub para 77.b (1)(b), line 3:

Insert: '(150 Hz FILTER OUT, 3 kHz FILTER OUT)'.

47 Page 31, after Sub para 78.b (1)(c), line 1:

Insert: '(150 Hz FILTER IN, 3 kHz FILTER OUT)'.

48 Page 49, after Sub para 89.b. (1)(c), line 1:

Insert: '(150 Hz FILTER OUT, 3 kHz FILTER OUT).'

49 Page 51, after Sub para 90.b (1)(b), line 1:

Insert: '(150 Hz FILTER IN, 3 kHz FILTER OUT).'

50 Page 62, after Sub para 98.b. (4), line 2:

Insert: '(150 Hz FILTER OUT, 3 kHz FILTER OUT).'

51 Page 110, after Sub para 190.d, line 1:

Insert: '(150 Hz FILTER OUT, 3 kHz FILTER OUT).'

52 Page 108:

52.1 Sub para 185.n., line 1:

Delete: '(3n)L1 and (3n)L2'
Insert: '(3m)L1 and (3m)L2'

52.2 Sub para 185.q., line 1:

Delete: '(3n)C1 and (3n)C4'
Insert: '(3m)C1 and (3m)C4'

STATION, RADIO, UK/VRC 353

TECHNICAL HANDBOOK - FIELD REPAIRS

This regulation must be read in conjunction with Tels H 612. Base repair information will not be published as Part 2 of this regulation. A separate Base Repair Information Folder (BRIF) will be published and issued to nominated workshops.

CONTENTS

SPECIFICATION TESTS

Note...
These Pages 3 and 4 Issue 2, supersede Pages 3 and 4 Issue 1 dated Jun 78. Items marked thus ● have been amended.

FAULT FINDING (Continued)

ALIGNMENT

TABLES

FIGURES

INTRODUCTION

1. This regulation is divided into two parts, Part 1 is concerned with Field testing and repair of the equipment using the Test rig electronic (t.r.e. - see Tels M, 380), whilst Part 3 is concerned with Field testing and repair of the equipment using the Automatic test equipment (a.t.e. - see Tels M 390).

2. Base repair information will not be published as Part 2 of this regulation; a separate Base Repair Information Folder (BRIF) will be issued to nominated workshops.

Note...' These Pages 5 and 6 Issue 3 supersede Pages 5 and 6 Issue 2 dated Dec 78.

GENERAL

WARNINGS

Beryllium

3. a. This equipment uses components containing beryllium or beryllium oxide. In certain circumstances they can constitute a hazard to health. Before working on the equipment, consult EMER Gen K 050 - Beryllium Toxic Hazard in Electronic Equipments - which gives general information, handling and disposal instructions.

High voltage

3. b. The power amplifier valve located in the transmitter (4) is supplied with +800V by the p.s.u. (7), great care must be exercised to avoid contact with this line.

CAUTION

CMOS devices

4. This eqpt contains CMOS devices on board 7b of the power supply unit. These are 'Static Sensitive' devices. Before working on the power supply unit consult EMER Tels A414 Chap 545 - Handling Precautions, Static Sensitive Devices - which gives general handling information.

SCOPE OF REPAIRS

5. Repairs at Field workshop level will be confined to the replacement of faulty assemblies, sub-assemblies and certain discrete components as listed in Tels H616.

FIELD REPAIR TEST EQUIPMENT

6. The equipments detailed in Table 1 are required to carry out Field repairs, testing and aligning.

Table 1 - Field repair test equipment

Item	Cat No	Designation	Remarks
1a	Z4/6625-99-620-5350	Test rig electronic equipment, test controller No 1	Specification testing and diagnostic testing of radios. Either controller requires the peripheral test equipment listed in Tels M 382, para 6.
or			
1b	Z4/6625-99-620-5078	Test rig electronic equipment, test controller No 2	
2	Z4/6625-99-630-6172	Test set, radio, field repair, UK/RT 353 c/w accessories	Enables main assemblies of RT 353 to be operated in isolation from parent radio for fault finding or alignment.

Item	Cat No	Designation	Remarks
3	Z4/6625-99-637-0999	Test kit, data	Enables data tests to be carried out.
4		Deleted	
5	F1/5820-99-120-3922	Toolkit, telecomm (technician)	
6	F1/5820-99-445-8208	Toolkit, telecomm (supplementary)	
7	F1/3439-99-136-7370	Desoldering set electrical	
8		Deleted	
9		Deleted	
10		Deleted	
11	Z1/5905-99-013-5894	Resistor, fixed, 6.8kΩ ±2%, 1/8W	For use during i.f. alignment
12	-	Capacitor, fixed 6.6nF	For use during i.f. alignment
13	W3/4440-99-114-0440	Dehumidifier desiccant series 1 MK3	For drying
14	Z4/6625-99-200-2271	Leak Locator CT509	For seal testing
15	Z4/6625-99-052-3433	Analyser Spectrum (HP 8560A)	Enables receiver alignment to be carried out
16	-	Fluke 25 Multimeter	

GENERAL REPAIR INFORMATION

TEST SET RADIO, FIELD REPAIR (TEST KIT) (see Tels M710-719)

General

7. The following assemblies may be mounted on the test set (part of Test kit) for alignment or repair purposes:

Receiver (3)
Transmitter (4)
I.F. amplifier (5)
P.S.U. (7)

8. The assemblies may be operated in complete isolation from, or interconnected to, the parent radio. Table 2 specifies connectors and their use.

Table 2 - Test kit connectors

Item	Description	Qty	Terminations	Remarks
1	Lead electrical	1	Plug/Plug	) 800V connectors.
2	Lead electrical	1	Plug/Socket	)
3	Lead electrical	5	Plug/Plug	Banana and Oxley ends.
4	Lead electrical	10	Socket/Plug	Oxley socket/Banana plug.
5	Cable assembly r.f.	3	Plug/Socket	Coaxial pattern 16 and miniature r.f. terminations.
6	Lead test	1	Spade/Croc clip	Single wire.
7	Wiring harness	1	Plug/Socket	) 19-way.
8	Wiring harness	2	Socket/Socket	) Used with receiver (3).) Coloured orange.
9	Wiring harness	1	Plug/Socket	) 19-way.
10	Wiring harness	2	Socket/Socket	) Used with transmitter (4).) Coloured yellow.
11	Wiring harness	1	Socket/Socket	) 14-way.
12	Wiring harness	1	Plug/Socket	) Used with receiver (3).) Coloured orange.
13	Wiring harness	1	Socket/Socket	) 14-way.
14	Wiring harness	1	Plug/Socket	) Used with transmitter (4).) Coloured yellow.
15	Wiring harness	1	Plug/Socket	) 7-way.
16	Wiring harness	1	Socket/Socket	) Used with i.f. amp (5).) Coloured green.
17	Wiring harness	1	Plug/Socket	EMIHUS 44-way. Used with p.s.u. (7). Coloured violet.
18	Wiring harness	1	Socket/Socket	) 7-way
19	Wiring harness	1	Plug/Socket	) Used with p.s.u. (7).) Coloured violet.
20	Cable assy r.f.	5	Plug/Socket	Coaxial miniature r.f. connectors.
21	Wiring harness	1	Plug/Spades	) 2-way.
22	Wiring harness	1	Screw/Spades	) Used with p.s.u. (7).) Coloured violet.
23	Cable assy r.f.	1	Socket/Socket	Coaxial miniature r.f. connector. Used to connect Tx VCO to transmitter (4).
24	Wiring harness	1	Socket/Socket	) 7-way.
25	Wiring harness	1	Plug/Socket	) Used with i.f. amp (5).) Coloured green.
26	Adaptor	1	BNC plug to miniature coaxial plug	Used to connect item 5 to t.r.e. for board 2b alignment.

Fitting assemblies to test set

9. All connector item number references are as per Table 2.

Power supply unit (7) - providing power to parent radio

10. Locate p.s.u. on the dowel pins within the appropriately marked outline on the test set heat exchanger and secure with the bolts used to secure the assembly in the parent radio.

11. Make the following connections:

Connector item	From test set terminal	To
21	PSU SUPPLY (SK1)	PSU X1, X2
17	O/P OF PSU (SK50)	RT 353 - (1a)PL13
19	PSU BLOWERS (PL5)	PSU SK1

12. If it is required to monitor the blower lines, item 18 and the link box (para 26) may be connected in series with item 19.

Power supply unit (7) - Providing power to assembly mounted on test set

13. As for paras 10, 11 except that item 17 connects to I/P TO PSU DUMMY LOADS (PL4).

Transmitter (4)

14. Locate transmitter (4) within the appropriate outline on the test set heat exchanger and secure, using the bolts used to secure it in the parent radio.

15. Make the following connections for interconnection to the parent radio:

Connector item	From test set terminal	To
1	800V OUT (SK7)	Transmitter (4a) TS5-SK5
2	800V IN (SK51)	RT 353 (1a) PL7
7	Link box TX/RX	RT 353 (1a) SK8
8	Link box TX/RX	Transmitter (4a) PL1
13	Link box TX/RX (TURRET DRIVE)	RT 353 (1c) PL5
14	Link box TX/RX (TURRET DRIVE)	Transmitter (4f) SK1
	From transmitter	To parent radio
20	(4) PL2	(1a) SK13
20	(4) PL3	(1a) SK19
20	(4) PL4	(1a) SK18

Note: These Pages 9 and 10 supersede Pages 9 and 10, Issue 1, dated Jun 78. Items marked ● have been amended.

16. Make the following connections for interconnection to the test set:

Connector item	From test set terminal	To
● 1	800V OUT (SK7)	Transmitter (4a) TS4-SK5
8	TX (PL7)	Link box TX/RX
8	Link box TX/RX	Transmitter (4a) PL1
13	TX TURRET DRIVE (PL8)	Link box TX/RX (TURRET DRIVE)
14	Link box TX/RX (TURRET DRIVE)	Transmitter (4f) SK1
23	TX VCO CONTROL (SK52)	Transmitter (4a) PL3

17. R.F. power output at (4) PL4 must be connected to a 50Ω 50W dummy load before switching on the transmitter. Such a load is available at CTC20 on the t.r.e.

18. If the link box monitoring facilities are not required then direct connections may be made as follows:

● Test set TX (PL7) - item 10 - Tx(4a) PL1
Test set TX TURRET DRIVE (PL8) - item 14 - Tx(4f) SK1
● Test set 800V OUT (SK7) - item 1 - Tx(4a)TS4-SK5

Note: MRP INTERLOCK must be connected to IF(C) AUDIO socket 'fan out' pin F and CTC1 set to CW TX before transmit condition can be commanded.

Receiver (3)

19. Locate receiver (3) within the appropriate outline on the test set heat exchanger and secure using the bolts used to secure it in the parent radio. Make the following connections for interconnection to the parent radio:

Connector item	From test set terminal	To
● 7	Link box TX/RX	RT 353 (1a) SK7
● 8	Link box TX/RX	Receiver (3a) PL1
11	Link box TX/RX (TURRET DRIVE)	RT 353 (1a) PL6
12	Link box TX/RX (TURRET DRIVE)	Receiver (3g) SK1
	From receiver	To parent radio
20	PL2	(1a) SK12
20	PL3	(1a) SK13
20	PL4	(1a) SK14
20	PL5	(1a) SK15
20	PL6	(1a) SK16

20. If link box facilities are not required, then direct connections may be made using connector items 10 and 12 only.

21. Make the following connections for interconnection to the test set:

Connector item	From test set terminal	To
8	RX (PL9)	Link box TX/RX
8	Link Box TX/RX	RECEIVER (3a) PL1
11	Rx TURRET DRIVE (PL10)	Link box TX/RX (TURRET DRIVE)
12	Link box TX/RX (TURRET DRIVE)	RECEIVER (3g) SK1

22. If link box facilities are not required then direct connections may be made using connector items 8 and 12 only.

I.F. amplifier (5)

23. This unit may be placed in any convenient position on the heat exchanger

24. Make the following connections for interconnection to the parent radio:

Connector item	From test set terminal	To
15	Link box PSU/IF (BLOWER)	I.F. amplifier (5) PL1
16	Link box PSU/IF (BLOWER)	RT 353 (1a) SK9
20	I.F. Amplifier (5) PL2	RT 353 (1a) SK11

25. Make the following connections for interconnection to the test set:

Connector item	From test set terminal	To
16	Link box PSU/IF (BLOWER)	Test set i.f. (SK7)
15 and 24 combined	Link box PSU/IF (BLOWER)	I.F. amplifier (5) PL1

<u>Link box</u>

26. The link box may be used to enable the connectors to transmitter (4), receiver (3) and i.f. amplifier (5) to be monitored whilst these assemblies are fitted to the RT 353.

27. For transmitter (4) connect as follows:

(4) PL1 to link box TX/RX using item 10
(4f) SK1 to link box TX/RX (TURRET DRIVE) using item 14
Link box TX/RX to (1a) SK8 using item 9
Link box TX/RX (TURRET DRIVE) to 1(a) PL5 using item 13.

28. For receiver (3) connect as follows:

(3)PL1 to link box TX/RX using item ~~10~~ 8
(3g)SK1 to link box TX/RX (TURRET DRIVE) using item 12
Link box TX/RX to 1(a)SK7 using item ~~9~~ 7
Link box TX/RX (TURRET DRIVE) to (1a)PL6 using item 11

29. For i.f. amplifier connect as follows:

(5)PL1 to link box PSU/IF (BLOWERS) using item 16
Link box PSU/IF (BLOWERS) to (1a)SK5 using item 15
Coaxial connection to (5)PL2 may be monitored using a 'T' adaptor and pattern 17 to pattern 15 adaptor.

USE OF TEST RIG ELECTRONIC (T.R.E.)

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

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

Control Supply	CS	Loudspeaker	LS
Control Test Conditions	CTC	R.F. generator	R.F. sig gen
Clansman Interface	IF(C)		
Digital voltmeter	d.v.m.		
Frequency counter	Counter		
Modulation meter	mod meter		

32. Controls and terminations on CS, CTC and IF(C) are referred to by the numbers shown in Tels M 382 Table 2003, 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) CTC6'. Instructions for the rotary switches are given as 'set CTC1 to CW TX'. Connections to terminations are given as Connect ..... to CTC20.

33. 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 test to be carried out independent of specification test sequence.

34. Range settings of individual test equipments (counter, d.v.m. etc) are not detailed unless specifically required. Instructions are given as 'tune mod meter' or 'd.v.m. shall indicate' and correct operation and range selection is implied.

35. The following abbreviations are used for equipment under test (e.u.t.) switches:

F	=	Frequency	T	=	Test
M	=	Mode	G	=	Gain
P	=	Power	R	=	Remote

TEST KIT DATA (see Tels M 740-749)

36. The Test Kit Data includes a Test set data (D.T.S.), and is fully described in Tels M 742; no attempt is made in this document to describe D.T.S. functions. When referring to the D.T.S. the following abbreviations only are used:

TEST SELECTOR switch - TS
MODE switch - M

GENERAL REPAIR INSTRUCTIONS

GENERAL

37. All 'left-right', 'forward-rear', 'above-below' references are made as though facing the front panel with the equipment correctly mounted on Clansman mounting bars.

REPAINTING

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

Paint, priming H1a 8010-99-224-2079, 1.1/2 litre pack
Paint, finishing, polyurethane, matt finish deep bronze green H1a 8010-99-224-8663, 1.1/2 litre pack

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

OPENING THE EQUIPMENT

39. To remove the RT 353 from its case proceed as follows:

a. Lay the equipment on the working surface in the same plane as when it is mounted on the Clansman bars.

b. Unscrew and remove the four securing bolts at each corner of the front panel.

c. Unscrew the bolt located centrally in the rear wall between the blower outlets.

d. Place the equipment front panel downward on the working surface, remove the case and fit the rear supporting frame over the blowers (Part of Test kit).

Notes 1. The supporting frame MUST be fitted whenever the equipment is removed from its case.

2. When a case is replaced on a set other than that from which it was removed, the screws securing and locating the rear motor seals must be slackened and repositioned.

REMOVAL AND REPLACEMENT OF ASSEMBLIES

Transmitter (4)

40. To remove the transmitter proceed as follows:

a. Stand the equipment on the front panel to gain access to the bellows coupling on the tuning capacitor drive between transmitter (4) and receiver (3); the coupling is located forward of, and immediately between, the two blowers. Note that the securing block into which the rear case securing bolt fits is a sliding fit to facilitate access to the coupling securing screws.

b. Slacken the bellows coupling screws on the transmitter shaft.

c. Disconnect the +800V coaxial connector input located adjacent to the bellows securing screws.

d. Disconnect the three miniature coaxial sockets to (4)PL2, (4)PL3, and (4)PL4 at the front end of the transmitter main assembly. Note that the sockets have colour coded sleeves, the coding corresponding to the resistor colour code, ie socket to (4) PL2 (red sleeve), socket to (4)PL3 (orange sleeve) and socket to (4)PL4 (yellow sleeve).

e. Disconnect the multiconnector socket from (4)PL1, located just below the miniature coaxial connectors.

f. Disconnect the multiconnector socket from (1a)PL5, located immediately to the right of the transmitter turret drive motor.

g. To permit easier access to the lower transmitter securing bolts remove audio board (2d), located immediately below the transmitter, as follows:

(1) Release the two turnlock fasteners retaining the board pack securing cover and remove the cover.

(2) Pull the audio board (nearest to transmitter) out of the edge connector.

h. Remove the six bolts securing the upper and lower edges of transmitter (4) to the heat exchanger.

j. Ease the transmitter clear of the heat exchanger, taking care to avoid damage to the cableform and ensuring the tuning shaft is clear of the bellows coupling.

k. When replacing the transmitter take care to ensure that the tuning shaft engages with the bellows coupling, otherwise proceed by reverse order of removal.

Receiver (3)

41. To remove the receiver proceed as follows:

a. Stand the equipment on the front panel to permit access to the bellows coupling on the tuning capacitor drive between transmitter (4) and receiver (3); the coupling is located to the rear of, and immediately between, the two blowers. Note that the securing block into which the rear case securing bolt fits is a sliding fit to facilitate access to the coupling securing screws.

b. Slacken the bellows coupling screws on receiver shaft.

c. Remove the five miniature coaxial sockets from (3)PL2, (3)PL3, (3)PL4, (3)PL5 and (3)PL6 located at the front end of the receiver turret. Note that the sockets are colour coded in a similar manner to those of the transmitter sockets.

d. Remove the spade terminal connectors to X1, X2 on power supply unit (7) to provide easier access to the multiconnector socket on the front end of the receiver immediately below the miniature coaxial connectors. Disconnect the socket.

e. Disconnect the multiconnector socket to (1a)PL6 located immediately to the left of the receiver turret drive motor.

f. Remove the screw securing the receiver power supply unit bracing strut to the power supply unit. This strut is located between the right hand lower rear face of the receiver main assembly and the right hand rear casting of the power supply unit.

g. Remove the five bolts securing the receiver main assembly to the heat exchanger. There is one bolt to each corner of the assembly and one through a flange in the middle of the upper edge.

h. Ease the receiver clear of the equipment taking care to avoid damage to the cableform and ensuring the tuning shaft is clear of the bellows coupling.

j. Replacement is by reverse procedure, taking care to re-locate the receiver shaft with the bellows coupling.

Power supply unit (7)

42. To remove the power supply unit proceed as follows:

a. Remove the spade terminal connections to X1, X2 at the right hand upper front corner of the assembly.

b. Disconnect the multiconnector socket to (1a)PL4 at the left hand lower rear corner of the assembly.

c. Disconnect the power supply unit/receiver bracing strut by removing the two securing screws from the receiver. This strut is located between the right hand lower rear face of the receiver main assembly and the right hand upper rear casting of the power supply unit.

d. Unscrew the five bolts securing the assembly to the heat exchanger, three through the left hand lower side of the base plate, one through the left hand upper forward corner of the base plate and one accessible through a hole in the right hand face of the cover plate.

e. Ease the assembly clear of the equipment disengaging the output socket from (1a)PL3 mounted on the heat exchanger.

f. Replacement is by reverse procedure.

Board pack (2)

43. To remove one or more of the four boards proceed as follows:

a. Remove the pack retaining plate by releasing the two turnlock fasteners.

b. Remove the required boards by pulling them free of the edge connectors on the motherboard (2e).

I.F. amplifier (5)

44. To remove the i.f. amplifier proceed as follows:

a. Disconnect the multiconnector socket from (5)PL1 and ease the cables clear of the securing clamp.

b. Disconnect the miniature coaxial connector from (5)PL2.

c. Release the four bolts securing the assembly to the mounting pillars on the heat exchanger.

Note: Care must be taken to avoid damage to the cableform when gaining access to the upper right hand bolt.

d. Ease the assembly clear of the equipment, taking care to avoid damage to the adjacent cableforms.

e. When replacing the assembly great care must be taken to avoid damage to the adjacent cableforms. The cableform associated with the crystal oscillator sub-assembly (1h) is particularly susceptible to damage when securing the upper two bolts.

Synthesiser (6)

45. When removing or replacing this assembly particular care must be taken due to the restricted working space and the complexity of cableform in the area, especially when using a soldering tool.

46. Proceed as follows:

a. Remove the four screws securing the crystal reference oscillator (1h) located immediately above the synthesiser.

b. Cut the strapping securing the cableform (from (1a)S2 MODE switch to sub-assembly (1h)) to (1h) support pillar.

c. Gently ease the sub-assembly (1h) upwards to the limit of its cableform, taking care not to strain any of the connectors.

d. Release MODE switch (1a)S2 by removing three screws securing the switch knob to the back plate. Remove the knob and the metal key. Remove the metal collar retaining the switch to the front panel and ease the switch free to the limit of its cable form.

e. Use the soldering tool to disconnect the leads to the synthesiser pins along the upper left hand side (19, 20-25, 27, 28) to the rear (12-18) and those accessible along the lower left hand side (8-11).

f. Disconnect the miniature coaxial socket from (6)PL1.

g. Access to the remaining pins (1-7) requires partial withdrawal of the synthesiser.

h. The two support pillars for sub-assembly (1h), together with one screw through the left hand, upper, forward corner, secure the synthesiser (6) to its mounting blocks; they are identified by green marking.

j. Remove the pillars and screw defined in 'h' to release the synthesiser.

k. Carefully ease the assembly upwards until it is clear enough to permit the remaining connections to be unsoldered (pins 1-7).

l. Replacement is by reverse order but it must be emphasised that great care is needed to avoid damage to the cableform. When replacing the cable strapping (removed in b.) note that it also retains the three coaxial connectors for the transmitter.

REMOVAL AND REPLACEMENT OF SUB-ASSEMBLIES ON THE MAIN CHASSIS

General

47. To gain access to the sub-assemblies remove the main assemblies from the heat exchanger as required (para 40-46).

48. All items passing through the front panel are sealed, and when removed and replaced, grease XG271 must be used before final assembly.

49. Replacement is by reverse order of removal unless otherwise stated.

Crystal reference oscillator (1h)

50. When removing or replacing this sub-assembly great care must be exercised due to the restricted working space and the complexity of the cableform in the area. Proceed as follows:

a. Remove the four screws securing the sub-assembly and gently ease it clear to the limit of the cableform.

b. Use the soldering tool to disconnect all connectors.

Blower drive (1c)

51. Proceed as follows:

a. Use the soldering tool to disconnect the leads from the pins at the top edge of the board.

b. Remove the two securing screws in the upper corners of the board.

c. Slacken (do not remove) the three screws along the bottom edge of the board. Note that these screw into non-captive nuts to the front of the board and secure three power transistors to the mounting frame which acts as a heatsink.

d. Ease the board upwards to clear the mounting brackets and free the power transistors from their retaining slots.

<u>28V supply filter (1e)</u>

52. Proceed as follows:

a. Unsolder the output connectors from pins 3 and 4.

b. Remove the two screws securing the filter to the mounting pillar.

c. Unsolder the two input leads at pins A and B of the 28V input plug (1a)PL1.

d. Ease the filter clear of the equipment.

<u>Power relay (1a)RLA</u>

53. Proceed as follows:

a. Unsolder the cableform connectors at pin 2, pin 3, pin a and pin b. Do not unsolder the pink inter-pin connectors.

b. Remove the two screws securing the sub-assembly to the supporting pillars.

c. Remove the sub-assembly from the equipment.

<u>AUDIO sockets (1a)SK1, SK2, HARNESS plug (1a)PL2</u>

54. Proceed as follows:

a. Untie the cableform strapping from around the associated filter.

b. Unsolder all connectors to the associated filter.

c. Remove the front panel securing nut and ease the sockets/plug and filter free from the rear of the front panel.

<u>Frequency selection switch (1a)S1</u>

55. Proceed as follows:

a. Remove the four screws securing the crystal oscillator and connector board (1h) and gently ease the sub-assembly clear to give access to the soldered connectors on the right hand face.

b. Unsolder all connectors from switch (1a)S1.

c. Rotate the outer dial of switch (1a)S1 to align the access holes with two of the securing screws. Remove screws.

d. Rotate the outer dial to align with the remaining two securing screws. Remove screws.

e. Pull the knob assembly and driving gear free from the front panel. Take care to retain the toroidal seal.

f. Remove the securing screw at each corner of the frequency dial casting on the front panel.

g. Ease the frequency switch (1a)S1 sub-assembly free from the rear of the front panel taking care to avoid damage to the adjacent cableform.

h. When replacing the sub-assembly care must be exercised to avoid damage to the adjacent cableforms, particularly when re-soldering connectors to the sub-assembly (1h).

j. When replacing the knob and gear assembly ensure that the metal peg to the rear aligns with the slot in the actuating arm and that the toroidal seal is in place.

Motherboard (2e)

56. Proceed as follows:

a. Release the three screws securing the metal bracket just forward of the motherboard (2e) (the bracket mounts the black plastic runners for the board pack) and remove the bracket.

b. Release the four screws securing the motherboard to the supporting column on the heat exchanger and ease the assembly clear of the heat exchanger to give access to the cableform.

c. Release the cableform retaining strapping on those sections of the cableform which are routed under, but not connected to, the motherboard and ease clear.

d. Unsolder all the connectors from the motherboard pins and remove the assembly from the equipment.

e. When replacing the bracket removed in a. do not forget the earth connection from the motherboard which connects to the lower rear securing screw.

Gain control p.e.c. (1g), terminal strip (1a)TS1

57. Proceed as follows:

a. Unsolder all the connectors to the rear face of (1a)TS1.

b. Release the four securing screws which pass through the board, the metal spacers and board (1g) into the supporting pillars on the front panel. The screws are retained by the spacers.

c. Unsolder all the connectors to the front face of (1a)TS1 and remove the sub-assembly from the equipment.

d. Remove all the connectors to sub-assembly (1g) and remove the board from the equipment.

Elapsed time indicator (1a)RE1

58. Proceed as follows:

a. Unsolder the leads to the terminals.

b. Remove the cableform from the clamp adjacent to the sub-assembly.

c. Remove the three screws securing the sub-assembly to the supporting pillars on the front panel.

d. Remove the sub-assembly from the rear of the front panel.

Meter control board (1b), audio pre-amp (1d)

59. Proceed as follows:

a. Release the elapsed time indicator as in para 58.b-c. (do not unsolder the leads). Ease it clear of the front panel to the limit of the connectors.

b. Remove the two screws securing the sub-assemblies (1b) and (1d) to the front panel, these are accessible between the two boards.

Note: Great care must be exercised when releasing these screws to avoid damage to the cableform in the cramped conditions between the boards

c. Ease the two boards clear of the equipment to permit access to the four screws securing board (1b) and release these screws.

d. Unsolder all connectors from board (1b).

e. Unsolder all connectors from board (1d).

Switches (1a)S3-S6

60. Proceed as follows:

a. All switch connectors are soldered to pins on terminal board (1a)TS1 with the exception of those listed below:

S4 - TEST -	S4BB -	1 to (1b)13
	S4BB -	10 to (1b)1
	S4AB -	12 to (1a)S1-LPS A
S5 - GAIN -	S5AB -	1 to (1d)12
	S5AB -	4 to (1d)14
	S5AB -	9 to (1d)13
	S5BB -	All connections to (1g)

b. All connectors should be unsoldered at their destination (ie (1a) TS1, (1b) etc) except for that to (1a)S1-LPS A which is more easily disconnected at switch (1a)S4 AB-12.

c. Following the unsoldering of connections remove the three screws securing the switch knob to the back plate and remove the knob and metal key. The switch is retained in the front panel by the metal collar beneath the knob which screws on to the switch shaft. The switch is removed from the rear of the front panel.

Switch (1a)S2, MODE

61. Proceed as follows:

a. Remove the screws securing the crystal reference oscillator (1h) and ease this item clear of the rear of (1a)S2 to the extent permitted by its cableform.

b. Remove (1a)S2 from the front panel in a similar fashion to para 60 c.

c. With (1a)S2 clear of the main chassis to the extent permitted by its cableform, connections may be unsoldered either from the switch itself or from (1h).

Thermostat (1a)THT 1

62. THT 1 is secured to the heat exchanger wall by two screws, access to the securing screw nearest the front panel requires the removal of (1a)S5 GAIN switch from the front panel, though unsoldering of the connectors from the switch is not required.

Antenna changeover relay (1a)RLB

63. Proceed as follows:

a. Plessey Relay

(1) Disconnect the three miniature coaxial connectors.

(2) Unsolder the energising coil connectors and associated capacitors.

(3) Remove the two securing screws passing through the mounting bracket top-plate to release the relay.

b. H1-G Relay

(1) Remove p.s.u. (7) as detailed in para 42.

(2) Remove ANT/ARFAT (1a) SK4 from front panel.

(3) Remove the clamping plate on the top edge of the heat exchanger.

(4) Disconnect the coaxial connectors from the receiver (3)PL3 and transmitter (4)

(5) Unsolder the energising coil connectors.

(6) Remove the two securing screws passing through the mounting bracket and remove the relay.

Testmeter (1a)ME1

64. Proceed as follows:

a. Unsolder the four connectors from the rear of the meter.

b. Unscrew the knurled securing ring at the rear of the front panel and remove the meter.

c. The dial illuminating bulb is an integral part of the meter and when failure occurs the whole meter must be replaced as in a-b. above.

Remote terminal (1a)SK5, 6

65. Proceed as follows:

a. Unsolder the connectors from the terminal.

b. Remove the hexagonal securing nut at the rear of the front panel and remove the terminal and filter complete.

Tuner control board (1j)

66. Proceed as follows:

a. Unsolder all the connectors to the pins.

b. Remove the three screws securing the board to its support pillars and remove the sub-assembly.

ARFAT connector (1a)PL2 and filter (1f)

67. Proceed as follows:

a. To remove the plug release the four securing screws in the front panel and carefully pull the plug free to the limit of the ribbon wiring interconnecting it to filter (1f).

b. Unsolder the connectors from the pins to release the plug.

c. To remove the filter, unsolder the input connectors from the pins at the rear of the front panel.

d. Release the three securing screws and remove the filter from the rear of the front panel to the limit of the ribbon wire connectors.

e. Unsolder the ribbon wire connectors and remove the filter.

f. When replacing the filter remember the earth connector to the upper right hand securing screw.

ANT/ARFAT socket (1a)SK4

68. Proceed as follows:

a. Use a spanner to release the cover on the rear of the socket.

b. Unsolder and remove the coaxial lead.

c. Remove the hexagonal securing nut on the front panel and remove the socket.

d. When replacing the socket remember to replace the rubber sealing washer under the cover.

Blowers (1a)BL1,2

69. Proceed as follows:

a. Unsolder the appropriate leads from the blower control board (1c).

b. Release the four securing screws from the blower to be removed.

c. Remove the cross plate between the blowers (used for rear case securing bolt).

d. Pull the blower free from the heat exchanger inlet housing.

e. When replacing the blower remember the rubber/metal/rubber sealing washer between blower and blower housing, also the toroidal rubber seal recessed in the blower motor body shell.

† See page 21C

REMOVAL AND REPLACEMENT OF SUB-ASSEMBLIES OF MAIN ASSEMBLIES

70. Replacement of sub-assemblies is by reverse order of removal unless otherwise stated.

When renewing any of the motors on either the receiver or transmitter assemblies first rotate the shaft of the motor by hand for a few revolutions to ensure good brush/commutator contact.

Receiver (3)

71. Proceed as follows:

a. To separate the turret assembly (3g) from the main chassis (3a) first pull the miniature coaxial plug assembly off the mounting supports at the front end of the turret.

b. Remove the two securing bolts through the turret flange immediately to the right of the coaxial socket mounting.

c. Remove the two similar securing bolts at the other end of the turret, one below and to the right of the turret drive motor, the other immediately behind the relay on (3g)TS1.

d. Remove the two securing bolts fitted through the side flanges to the left of the receiver assembly.

e. Ease the turret clear of the main assembly.

Cautions: (1) With the turret removed great care must be exercised to avoid damage to the spring contacts (on the main assembly) which are extremely fragile. When replacing the turret ensure that the contacts are correctly located on the blocks and are not caught up on the lower lip of the block.

(2) The turret assembly and the main assembly are a MATCHED PAIR; a turret MUST always be refitted to the SAME main assembly from which it was removed.

f. Removing the turret permits access to the sub-assemblies (3b) front end protection, (3c) control i.f., (3d) signal i.f., (3e) signal mixer, (3f) buffer amplifier and partial access to (3h) local oscillator.

g. To facilitate the removal of sub-assemblies (3b) - (3f) remove the metal cover over the valve bases and discrete components associated with (3)V1 and (3)V2 by removing the five securing screws.

Note: The cross member on the underside of this cover is bent to clear the supporting pillar and no attempt should be made to re-align it.

h. With the cover removed as in g. the valves V1, V2 and associated components are accessible for replacement.

j. Sub-assemblies (3b) - (3f) may now be removed. (3b) front-end protection is a p.e.c. secured by four screws to support pillars on the main chassis (3a), whilst (3f) is a metal plate with mounted components and is similarly fixed. (3c), (3d) and (3e) are metal cans each secured by two diagonally opposed screws into support pillars on the main chassis (3a). All items are removed by unsoldering the connectors and releasing the securing screws.

k. Sub-assembly (3h) local oscillator is a metal plate with mounted components; two of the fixing screws are accessible beneath the turret but the third is located beneath the right hand side cover, removal of which (six screws) also gives access to V1, V2 sub-assembly (3k) varactor amplifier and the ganged tuning capacitor.

l. (3h) is removed by removing the fixing screws defined in k. then unsoldering all the connectors. (3k) is removed by removing four securing screws fitted through the main chassis (3a) base into the pillars supporting the sub-assembly, the complete sub-assembly and pillars are then eased clear of the main chassis. When clear all the connectors are unsoldered to release the sub-assembly.

m. Input filter (3j) and plug PL1 are removed complete, by removing the four securing screws and withdrawing the sub-assembly clear of the main chassis before unsoldering all the connectors.

n. The tuning motor and gear assembly is secured to a bracket fixed to the main chassis by three bolts, the motor supply connectors are unsoldered at (3a)C16 and (3a)C17. The motor may also be removed without the bracket by releasing the four retaining clamps.

o. The turret cover is removed by releasing the two spring clips to give additional access to the turret lids. Each turret lid bandpass is secured to the frame by seven screws and the longer turret lid r.f. by nine screws.

Note: The turret must NOT be rotated by hand or damage will result to the mechanical stop mechanism. Rotate the turret by turning the drive motor shaft in its normal direction of rotation.

p. Turret control p.e.c. (3g) is secured by two screws to pillars on the end of the turret frame adjacent to the drive motor, the input socket (3g)SK1 is connected directly to the p.e.c.

q. The relay associated with the turret system is located beneath (3g) and is secured in position by the pillars supporting the p.e.c.

r. The drive motor is secured to a casting by two screws; the supply connectors are unsoldered at the motor terminals.

Note: The axial shaft of the motor is deliberately offset to the nylon gear wheel to reduce the effect of backlash.

s. The micro-switch associated with the turret system is secured to the side of the motor casting just to the rear of the nylon turret drive gear.

t. The rotary switch driven by the turret shaft is secured to the turret frame end casting by two screws and a special push fit nut and is interconnected electrically with turret control p.e.c. (3g). To remove the nut it must

Transmitter (4) 'THE TRANSMITTER VALVE CONTAINS BERYLLIUM AND, WHEN REPLACED OR DAMAGED, SHOULD BE DISPOSED OF IN ACCORDANCE WITH Gen K 050.'

72. Proceed as follows:

a. To separate the turret sub-assembly (4f) from the main chassis (4a) release the four bolts at the corners and ease the turret free. Removal of the turret permits access to (4k) temperature sensor and the turret contact blocks.

b. Sub-assembly (4k) is a small p.e.c. secured to the heat transfer wall of the main assembly. The temperature sensing thyristors are located on the reverse side of the board and project into holes in the wall, these holes are filled with a heat conducting compound. A heat resistant gasket is inserted between the p.e.c. and the wall of the main assembly. To remove, release the two securing screws and unsolder the connectors. When replacing the PEC new heat sink compound must be used inside the two locating holes for the thyristors. Heat sink compound type DP 2623 is to be used

c. Two discrete components associated with the p.a. valve are also located beneath the turret sub-assembly, these are (4a)R4 and associated capacitor (4a)C49, the resistor is mounted within a heatsink attached to the heat transfer wall.

d. Ten screws secure the transmitter side cover, removal of which permits access to sub-assemblies (4c1) control board 1, (4c2) control board 2 and (4b) varacter plate. The ganged tuning capacitor, p.a. valve and associated discrete components are also located beneath the side plate.

__Note__: These Pages 25 and 26 supersede Pages 25 and 26, Issue 2 dated Dec 78. Sub para 72.g. to 72.m. including Note following sub para 72.m. have been deleted.

e. Sub-assemblies (4c1) and (4c2) are p.e.c's secured to a metal frame. External interconnection is by plug and socket. Disconnect both input sockets, release the centrally located screw securing the mounting bracket to the main chassis and remove both boards and bracket complete.

f. Discrete components associated with the p.a. valve are located in the immediate vicinity of the valve and are removed and replaced by conventional methods. It must be emphasised that access is limited in this area and great care must be exercised to avoid damage to cableform when soldering or desoldering.

g. to m. (inclusive) Deleted.

n. Varactor plate (4b) is a small metal plate providing a mounting for the varactor diodes and associated components; it is located just forward of the p.a. valve base.

o. Access to (4b) is limited and component replacement requires great care.

p. Some components of end filter (4a)TS1 are accessible beneath the black plastic cover marked DANGER HIGH VOLTAGE and others on the reverse side are accessible when sub-assemblies (4c1) and (4c2) are removed (d-e).

q. Harmonic filters (4e)TS1, (4e)TS2 and (4e)TS3 are located behind a metal cover to the right of the input filter (4a)TS1. They comprise components mounted on small p.e.c's secured to mounting pillars on a metal plate (4e).

r. With the cover removed (eight screws) each filter is removed by releasing the two securing screws and withdrawing the p.e.c. as the input and output connectors are unsoldered. The mounting plate (4e) may be removed by releasing the four screws securing it to the transmitter end plate; this permits access to the filter connectors.

s. The transmitter turret (4f) is similarly constructed to that on the receiver (3g) except that (4f) has only one turret lid per band and the p.e.c. associated with the control system is smaller.

t. Removal of the turret components is similar for both assemblies (see para 71. p-t).

__Power supply unit (7)__

__CAUTION__ __This power supply unit contains CMOS devices on board 7b. Before working on the supply unit consult Tels A 414 Chap 545 - Handling Precautions, Static Sensitive Devices - which gives general handling information. The devices are ML2-8 inclusive.__

73. Proceed as follows:

a. Blower drive supply (7n) comprises a series regulator transistor, with thermistor attached, mounted on chassis (7n2), and an associated p.e.c. (7n1) secured to pillars on (7n2). Chassis (7n2) forms the end plate of the power supply.

b. Unsolder all connections to p.e.c. (7n1) and remove the four securing screws.

c. Unsolder the connections to (7n2)TR1 and associated thermistor and remove. These items are not changed individually; failure of either one will require replacement of both. The thermister is secured to the transistor body with 'araldite' adhesive.

Note: The transistor mounting hardware includes a mica insulating washer for the body and a black plastic insulating bush for each securing screw.

d. Removing both side covers permits access to the remaining sub-assemblies and discrete components.

e. Transformer (7a)T2 and HV diode (7e) may be removed together by unsoldering all connectors to both items (accessible through the side panel) and removing the four securing screws through the base plate into (7a)T2, the two screws fitted through the side plate into (7e) mounting plate plus one screw in the end plate of the control board (7b) mounting tray.

f. Alternatively, the HV diode (7e) may be removed as a separate item by first removing the output section (7g) and choke section (7f) (sub-para 1), to permit access to (7e) side securing screw. Under these circumstances sufficient clearance may be obtained without unsoldering the connectors to (7f) and (7g).

g. The following discrete components are accesible immediately following sub para d.

(1) (7a)C1, C2 - Located directly below (7n1) and connected to (7a)L1, L2 respectively.

(2) (7a)C6, C5 - C6 is secured to the side plate by an hexagonal nut and C5 by two screws.

(3) (7a)C7, (7d) - C7 is secured to the side plate by three screws and (7d) by two screws. Removal of C7 necessitates carrying out the action of sub para j. without unsoldering.

Note...

These Pages 27, 28 and 28A supersede Pages 27 and 28 Issue 1 dated Jun 78. Note added after sub-para j, and sub-para 74d has been amended.

(4) (7a)L3, L4 - Secured to the baseplate by four screws and the terminal connectors through the side-plate.

(5) (7a)T1 - Secured to the baseplate by two screws.

(6) (7a)TR3, TR4 - Both secured to the side-plate, but TR4 cannot be removed unless (7a)T1 is first moved to one side to the limit of its connectors. Note mounting insulation washers.

(7) (7a)R2 - Located within a heatsink secured to the side-plate by two screws.

h. Following the removal of (7a)C5, C6 as in sub para g.(2) the following discete components are accesible:

(1) (7a)C3, C4 - Connected between (7a)L1, (7a)L2 and chassis respectively.

(2) (7a)L1, L2 - A combined unit secured by two screws to the base-plate below (7n).

(3) (7a)D1, D2 - Secured to the base-plate by hexagonal nuts.

(4) (7a)TR1 - Fitted in a recess in the base-plate in which it is secured by two screws. Note mounting hardware.

j. Control board (7b) plus its mounting tray is secured to the top of the power supply by five screws. When these are released and all connectors unsoldered the sub-assembly and tray may be removed. When replacing the board note that the long securing screw passes through the heatsink associated with (7b)TR1 and the short one secures the p.e.c. to the tray only (adjacent to (7b)ML6).

Note...

An updated design of Control board incorporates CMOS ICs which replace TTL ICs. This is identified as in the note to EMER H 612 para 201. The Control board CMOS differs from the above in that the short screw is adjacent to ML8.

k. Removal of (7b) permits access to regulator drive (7c) located directly below it, which comprises a p.e.c. within a metal mounting tray. Releasing the three securing screws from the mounting pillars within the tray enables the p.e.c. to be removed following the unsoldering of all connectors.

(Disk ref: EB/B/AZ/10)

l. Choke section (7f) and output section (7g) are removed together to faciliate unsoldering of interconnections.

(1) Remove the two screws securing the output socket and output section to the baseplate housing.

(2) Unsolder the connectors to the input terminals X1, X2 on the output section.

(3) Unsolder the connectors from both sub-assemblies to (7a)9.

(4) Remove the four screws securing the choke section to the baseplate, the countersunk screws in the cover support, and remove (7f) and (7g).

(5) When clear of the chassis the sub-assemblies may be separated by releasing the two upper screws from the cover plate of the output selection. Complete removal of this plate enables the output socket to be removed.

DRYING AND SEALING

74. a. On receipt for repair, pressurise the set to 5 lbf/in^2 using the leak locator, and carry out a dip test in a water tank to check the need for the replacement of any spindle seals or gaskets. The addition of a wetting agent to the water will assist the detection of leaks.

b. Open the set in the driest possible conditions and carry out all obvious repairs and replacements.

c. Place the open set in the dehumidifier and dry for at least one hour at 50 ^{o}C, with dry air from the pump unit passing through the oven. (T & M N 332 gives full details of the dehumidifier). After cooling, electrically test the set and carry out any necessary repairs or realignment.

d. As soon as possible after alignment place the open set in the oven for 15 minutes. Fit a new silica-gel desiccator. Smear the gaskets with Grease XG271 and reseal the set into its case, ensuring that the correct torque is applied as follows:

Item	Refer to	Torque to be applied
Cartridge Desiccator	H612, Fig 1b	3 $\pm$ 0.1 Nm
Seal Test Plug	H612, Fig 1b	2 $\pm$ 0.1 Nm
Case Retaining bolt	H612, Fig 1b	5 $\pm$ 0.2 Nm
Four Dowel Bolts	-	5 $\pm$ 0.2 Nm

e. Connect the leak locator to the set and pressurise the set up to 5 lbf/in^2 using dry air from the dehumidifier. Repeat the dip test. There shall be no air bubbles. Details for time constant testing are given under Base Repair Inspection Standards.

SPECIFICATION TESTS

GENERAL

75. The test figures specified have been derived from the information available. The values and methods of test may be adjusted when the Test Specifications are finalised.

ANALOGUE

Test 1 - Reverse polarity

76. a. Limit — The e.u.t. is protected from a reverse polarity supply connected at the 28V connector, no damage will result from such a connection.

b. Method — This test has no requirement for interconnection of e.u.t. and t.r.e.

(1) Set POWER switch on e.u.t. to MIN.

(2) Using a multimeter, set to read ohms, connect the black lead to e.u.t. 28V connector pin A (+) and the red lead to pin B (-).

Note: These Pages 29-30, Issue 3, supersede Pages 29-30, Issue 2, dated Mar 80.

(3) Note meter indication which shall be LL 1800Ω UL 2200Ω.

(4) Reverse the lead connections and note meter indication which shall be GT 1MΩ.

Test 2 - Tone modulation

77. a. Limits (1) The frequency of the tone modulation shall be LL 147Hz UL 151Hz, this shall produce a deviation of LL 1.5kHz UL 2.0kHz (NARROW) or LL 3.1kHz UL 3.8kHz (WIDE TONE) according to the setting of MODE switch.

(2) The deviation produced for WIDE selection of the MODE switch shall be LT 200Hz.

b. Method Switch fans on and set t.r.e. switches and e.u.t. switches as follows:

CS	CTC	IF(C)	E.U.T
1 VEH 24 2 VEH V 6 Released (ON)	1 PILOT TONE 2 AF LOAD 100 3 Released 4 Released 5 Released 6 Released 7 Depressed 8 Released 9 Released 10 Depressed 11 Released 12 AF 13 AF 14 SIGNAL 26 FM INT	1 O.C. 3 Released 4 Released 7 NORMAL	F 50.000MHz M NARROW P OFF T TX O/P G Mid-position R LOCAL

E.U.T. CONNECTIONS

24V to CS7 (item 5)
AUDIO (upper or lower) to IF(C)5 (item 10)
ANT/ARFAT to CTC20 (item 7)
HARNESS to IF(C)6 (item 11)

(1) (a) Set POWER switch on e.u.t. to 1W.

(b) Set CTC1 to PILOT TONE, depress CTC11 and tune mod meter for deviation at the selected e.u.t. frequency.

(c) Note counter indication which shall be LL 147Hz UL 151Hz. Note also mod meter indication which shall be LL 1.5kHz UL 2.0kHz.

(EB/E/AJ/05)

(d) Set e.u.t. MODE switch to WIDE TONE.

(e) Depress CTC11 and note mod meter indication which shall be LL 3.1kHz UL 3.8kHz.

(f) Set MODE switch to NARROW.

(g) Repeat b. to e. at following frequencies: 35, 40, 45, 55, 60, 65 and 70MHz.

(2) Set e.u.t. MODE sswitch to WIDE. Set Test switch to OVERDRIVE. Depress CTC11, and note mod meter indication which shall be LT 200Hz.

<u>Test 3 - Audio modulation and response</u>

78. a. Limit (1) With a d.c. supply at 24V at the 28V connector, and an a.f. input of 1kHz at 10mV r.m.s. e.m.f. at AUDIO socket pin A w.r.t. pin B the deviation shall be LL 4kHz UL 6kHz for NARROW selection of the MODE switch, and LL 8.0kHz UL 12.0kHz for WIDE selection, with the GAIN switch at mid-position in both cases. When the d.c. supply is reduced to 18V the deviation shall be LL 5kHz UL 15kHz for WIDE selection.

(2) With an a.f. input set at a level to produce a deviation of LL 4.9kHz UL 5.1kHz for a 1kHz modulation frequency, the deviation produced for given frequencies at the same level shall be as specified below:

150Hz	300Hz	600Hz	1500Hz	3000Hz	6000Hz
LT 1.6kHz	LL 3.1kHz UL 6.4kHz	LL 4kHz UL 6.4kHz	LL 4kHz UL 6.4kHz	LL 3.1kHz UL 6.4kHz	LT 1.6kHz

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

CS	CTC	IF(C)	E.U.T.
1 VEH 24 2 VEH V 6 Released (ON)	1 MOD S.T. 2 AF LOAD 100 3 Released 4 Released 5 Released 6 Released 7 Depressed 8 Released 9 Released 10 Depressed 11 Released 12 RF 13 RF 14 SIGNAL 26 FM INT	1 O.C. 3 Released 4 Released 7 NORMAL	F 50.000MHz M NARROW P OFF T RX SIG G MID-POSITION R LOCAL

<u>E.U.T. CONNECTIONS</u>

24V to CS7 (item 5)
AUDIO (upper or lower) to IC(C)5 (item 10)
ANT/ARFAT to CTC20 (item 7)
HARNESS to IF(C)6 (item 11)

(1) (a) Set POWER switch on e.u.t. to 50W.

(b) Set a.f. signal generator for 1kHz tone at 100mV.

(c) Set up mod meter to read deviation at 50.000MHz.

(d) Depress CTC11 and note mod meter indication which shall be LL 4kHz UL 6kHz.

(e) Set MODE switch to WIDE.

(f) Depress CTC11 and note mod meter indication which shall be LL 8.0kHz UL 12.0kHz.

(g) Set CS4 fully counter clockwise.

(h) Set CS1 to VEH 14-33.

(j) Depress CTC5 and set CS4 for 18V (nominal).

(k) Depress CTC11 and note mod meter indication which shall be LL 5kHz UL 15kHz.

(2) (a) Set CS1 to VEH 24.

(b) Depress CTC7.

(c) Depress CTC11 and adjust 1kHz tone level for mod meter indication of LL 4.9kHz UL 5.1kHz.

(d) Set modulating frequency in turn to the frequencies listed below and check that the deviation is within the limits specified.

Frequency	LL	UL
150Hz	-	1.6kHz
300Hz	4.0kHz	6.5kHz
600Hz	4.0kHz	6.5kHz
1500Hz	4.0kHz	6.5kHz
3000Hz	4.0kHz	6.5kHz
6000Hz	-	1.6kHz

<u>Test 4 - Frequency accuracy</u>

79. a. Limit The radiated r.f. frequency shall be within ±6 p.p.m. of that set by the front panel frequency selection switch for a d.c. supply voltage at 24V, and ±10 p.p.m. for a d.c. supply voltage of 18V. These limits shall apply throughout the operating range.

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

CS	CTC	IF(C)	E.U.T.
1 VEH 24 2 VEH V 6 Released (ON)	1 CW 2 AF LOAD 100 3 Released 4 Released 5 Released 6 Released 7 Depressed 8 Released 9 Released 10 Depressed 11 Released 12 RF 13 AF 14 SIGNAL 26 FM INT	1 O.C. 3 Released 4 Released 7 NORMAL	F 50.000MHz M WIDE P OFF T TX O/P G Mid-position R LOCAL

<u>E.U.T. CONNECTIONS</u>

24V to CS7 (item 5)
AUDIO (upper or lower) to IF(C)5 (item 10)
ANT/ARFAT to CTC20 (item 7)
HARNESS to IF(C)6 (item 11)

(1) (a) Set POWER switch on e.u.t. to 50W.

(b) Depress CTC11 and note counter indication. This shall be LL 49.999700MHz UL 50.000300MHz.

(c) Release CTC11.

(d) Set e.u.t. frequency selection switch to following frequencies in turn, depress CTC11 at each setting and note counter indication which shall be the set frequency ±6 p.p.m.

60.000,	70.000,	30.000,	31.000,	32.000
33.000,	34.000,	35.000,	36.000,	37.000
38.000,	39.000,	39.100,	39.200,	39.300
39.400,	39.500,	39.600,	39.700,	39.800
39.900,	39.925,	39.950,	39.975,	40.000MHz

<u>Note</u>: Above 60.000MHz if counter indication is wrong, depress CTC9 and de-sensitise counter. If wrong indication persists an e.u.t. fault is indicated.

(2) (a) Set CS1 to VEH 14-33 and depress CTC5.

(b) Adjust CS4 for 18V as indicated on d.v.m.

(c) Set e.u.t. frequency to 50.000MHz.

(d) Depress CTC11 and note counter indication which shall be LL 49.999500MHz UL 50.000500MHz.

Test 5 - R.F. power output

80\. a. Limits (1) With a 24V d.c. supply to the e.u.t. the r.f. power output into 50Ω shall be as specified below for given selections of the POWER switch at all frequencies within the operating frequency range:

POWER switch setting	R.F. power output	
MIN	LL 20mW	UL 250mW
1W	LL 0.5W	UL 2.5W
15W	LL 10W	UL 27W
50W	LL 40W	UL 75W

(2) With an 18V d.c. supply to the e.u.t. the r.f. power output into 50Ω for the 50W POWER switch setting shall be GT 30W.

b\. Method Set t.r.e. and e.u.t. switches as follows:

CS	CTC	IF(C)	E.U.T.
1 VEH 24	1 CW	1 O.C.	F 50.000MHz
2 VEH V	2 AF LOAD 100	3 Released	M WIDE
6 Released (ON)	3 Released	4 Released	P OFF
	4 Released	7 NORMAL	T TX O/P
	5 Released		G Mid-position
	6 Released		R LOCAL
	7 Depressed		
	8 Released		
	9 Released		
	10 Depressed		
	11 Released		
	12 RF		
	13 RF		
	14 SIGNAL		
	26 FM INT		

E.U.T. CONNECTIONS

24V to CS7 (item 5)
AUDIO (upper or lower) to IF(C)5 (item 10)
ANT/ARFAT to CTC20 (item 7)
HARNESS to IF(C)6 (item 11)

Note: Do not use d.v.m. ranges over 18V during r.f. power measurements.

(1) (a) Set POWER switch on e.u.t. to MIN.

(b) Depress CTC11 and note d.v.m. indication which shall be LL 140mV UL 500mV.

Note: $(\text{d.v.m. reading in volts})^2$ = Power in Watts.

(c) Release CTC11.

(d) Set POWER switch to 1W.

(e) Depress CTC11 and note d.v.m. indication which shall be LL 707mV UL 1.58V.

(f) Release CTC11.

(g) Set POWER switch to 15W.

(h) Depress CTC11 and note d.v.m. indication which shall be LL 3.16V UL 5.2V.

(j) Release CTC11.

(k) Set POWER switch to 50W.

(l) Depress CTC11 and note d.v.m. indication which shall be LL 6.325V UL 8.660V.

(m) Release CTC11.

(n) Repeat (1) at the following e.u.t. frequencies:

35.000, 40.000, 41.000, 48.000
55.000, 56.000, 65.000, 75.000
75.975MHz

Note: Above 56MHz UL 8.36V for 50W setting.

(2) (a) Set e.u.t. frequency to 50.000MHz.

(b) Set CS1 to VEH 14-33.

(c) Depress CTC5.

(d) Adjust CS4 for d.v.m. indication of 18V.

(e) Depress CTC7.

(f) Depress CTC11 and note d.v.m. indication which shall be GT 5.45V.

(g) Release CTC11.

Test 6 - R.F. power into mismatch, transmission inhibit whilst tuning, interruption of supply and normal delay

81. a. Limits (1) The transmitter will work into any impedance without damage.

(2) The transmitter will not transmit while the frequency synthesis loop is coarse tuning but is capable of transmitting within LT 10 seconds of making the last setting of the frequency selector switch.

(3) The transmitter will transmit at a minimum power level within LL 20 seconds UL 40 seconds when the d.c. supply has been switched off for GT 30 seconds, and within LT 10 seconds when the d.c. supply has been switched off for LT 3 seconds.

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

CS	CTC	IF(C)	E.U.T.
1 VEH 24 2 VEH V 6 Released (ON)	1 CW 2 AF LOAD 100 3 Released 4 Released 5 Released 6 Released 7 Depressed 8 Released 9 Released 10 Depressed 11 Released 12 RF 13 RF 14 SIGNAL 26 FM INT	1 O.C. 3 Released 4 Released 7 NORMAL	F 50.000MHz M WIDE P OFF T TX O/P G Mid-position R LOCAL

E.U.T. CONNECTIONS

24V to CS7 (item 5)
AUDIO (upper or lower) to IF(C)5 (item 10)
ANT/ARFAT to CTC20 (item 7)
HARNESS to IF(C)6 (item 11)

(1) (a) Set POWER switch on e.u.t. to 50W.

(b) Remove coaxial connector (item 7) from e.u.t. ANT/ARFAT socket.

(c) Set CTC1 to CW TX for GT 60 seconds, then set CTC1 to CW.

(d) Replace coaxial connector disconnected in b.

(e) Depress CTC11 and note d.v.m. indication which shall be LL 6.325V UL 8.660V.

(f) Set e.u.t. frequency selector switch to following frequencies in turn and repeat e. for each frequency.

35.000, 40.000, 41.000, 48.000, 55.000
56.000, 65.000, 75.000MHz

(g) Remove coaxial connector from e.u.t. ANT/ARFAT socket and short the inner connector on socket to e.u.t. chassis.

(h) Switch CTC1 to CW TX for GT 60 seconds, then set CTC1 to CW.

(j) Remove the short circuit from the ANT/ARFAT socket, and replace the coaxial connector removed in g.

(k) Repeat e.

(2) (a) Set e.u.t. frequency selector to 41.000MHz.

(b) Set CTC1 to CW TX.

(c) Observe d.v.m. indication whilst changing e.u.t. frequency selector to 40.000MHz and note that d.v.m. indication falls to zero during tuning and returns to LL 6.325V UL 8.660V within 10 seconds.

• (3) (a) Set POWER switch on e.u.t. to OFF for LL 2.5 UL 3.0 seconds and then to MIN.

(b) Note time taken for d.v.m. to indicate GT 140mV. This shall be LT 10 seconds.

(c) Set POWER switch on e.u.t. to OFF for GT 30 seconds and then to MIN.

(d) Note time taken for d.v.m. to indicate GT 140mV. This shall be LL 20, UL 40 seconds.

(e) Set CTC1 to CW.

Test 7 - Receiver sensitivity and frequency

82. a. Limit For an r.f. input of 0.5µV r.m.s. e.m.f. modulated by 1kHz for 5kHz deviation (NARROW) or 10kHz deviation (WIDE) the audio output signal + noise to noise ratio is GT 6dB at all frequencies within the frequency operating range.

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

CS	CTC	IF(C)	E.U.T.
1 VEH 24 2 VEH V 6 Released (ON)	1 RX FM 2 S+N:N 3 Released 4 Released 5 Released 6 Released 7 Depressed 8 Released 9 Released 10 Depressed 11 Released 12 RF 13 RF 14 SIGNAL 26 INT FM	1 O.C. 3 Released 4 Released 7 NORMAL	F 30.000MHz M WIDE P OFF T RX SIG G Fully clockwise R LOCAL

E.U.T. CONNECTIONS

24V to CS7 (item 5)
AUDIO (upper or lower) to IF(C)5 (item 10)
ANT/ARFAT to CTC20 (item 7)
HARNESS to IF(C)6 (item 11)

Caution: Do NOT depress CTC11 during this or any subsequent receiver test.

(1) (a) Set POWER switch on e.u.t. to MIN.

(b) Set r.f. signal generator to give 30MHz at 0.5µV (126dB) modulated by 1kHz at 100mV for 10kHz deviation.

(c) Set CTC14 to MOD OFF.

(d) Note and record d.v.m. indication.

(e) Set CTC14 to SIGNAL and adjust CTC15 to obtain same d.v.m. indication as that recorded in (d).

(f) Note indication on CTC15 and cross refer to the table at the top right hand edge of CTC to obtain corresponding dB reading. This shall be GT 6dB.

(g) Repeat a. to f. at following frequencies:

35.000, 40.000, 41.000, 48.000,
55.000, 56.000, 65.000, 75.000MHz

(h) Set e.u.t. MODE switch to NARROW.

(j) Set r.f. signal generator to 30MHz at 0.5µV (126dB) modulated by 1kHz at 50mV for 5kHz deviation.

(k) Repeat c. to f. at the frequencies shown in (g).

Test 8 - Demodulation response and limiting

83. a. Limits (1) With an r.f. input of 5µV r.m.s. e.m.f. modulated by an a.f. tone to 5kHz deviation (NARROW) the output level at AUDIO socket pin D w.r.t. pin E shall be as defined below w.r.t. the output at 1kHz.

150Hz	300Hz	600Hz	1.5kHz	3kHz	6kHz
GT 30dB down	UL 2dB up LL 3dB down	UL 2dB up LL 3dB down	LT 2dB up or down	LT 2dB up or down	LL 20dB down UL 12dB down

(2) The audio output level from an r.f. signal modulated by 1kHz does not vary by GT 2dB when the input level is varied from LL 1µV UL 1V r.m.s. e.m.f.

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

CS	CTC	IF(C)	E.U.T.
1 VEH 24 2 VEH V 6 Released (ON)	1 RX FM 2 AF LOAD 100 3 Released 4 Released 5 Released 6 Released 7 Depressed 8 Released 9 Released 10 Depressed 11 Released 12 RF 13 RF 14 SIGNAL 26 FM INT	1 O.C. 3 Released 4 Released 7 NORMAL	F 50.000MHz M NARROW P OFF T RX SIG G Fully clockwise R LOCAL

E.U.T. CONNECTIONS

24V to CS7 (item 5)
AUDIO (upper or lower) to IF(C) (item 10)
ANT/ARFAT to CTC20 (item 7)
HARNESS to IF(C)6 (item 11)

Caution: Do NOT depress CTC11 during this test.

(1) (a) Set POWER switch on e.u.t. to MIN.

(b) Set r.f. signal generator to 50.000MHz at 5µV level (106dB) modulated by 1kHz at 50mV level for 5kHz deviation.

(c) Note and record as V1 the d.v.m. indication.

(d) Set a.f. signal generator modulating frequency to 150Hz.

(e) Note and record as V2 the d.v.m. indication.

(f) Using $\text{dB} = 20 \log \frac{V1}{V2}$ calculate the ratio in dB. This shall be GT 30dB.

(g) Set a.f. signal generator modulating frequency to following frequencies in turn noting and recording d.v.m. indication as V2 at each frequency.

300, 600, 1500, 3000 and 6000Hz

(h) The dB ratios when calculated shall conform to the limits specified below w.r.t. the figure obtained in c.

300Hz	600Hz	1500Hz	3000Hz	6000Hz
LL -3dB UL +2dB	LL -3dB UL +2dB	LL -2dB UL +2dB	LL -2dB UL +2dB	LL -20dB UL -12dB

(2) (a) Set r.f. signal generator to 30MHz at 1µV (120dB) level modulated by 1kHz at 50mV for 5kHz deviation. Set e.u.t. to 30MHz.

(b) Note and record as V1 the d.v.m. indication.

(c) Increase the signal generator r.f. output level in 1dB steps to 60dB noting and recording as V2 the d.v.m. indication at each step.

(d) The ratios $20 \log \frac{V2}{V1}$ when calculated shall not differ by GT ±2dB.

Note: +2dB UL = $V1 \times 1.259$

-2dB LL = $\frac{V1}{1.259}$

Test 9 - A.M. rejection ratio and RX SIG meter indication

84. a. Limits

(1) With an r.f. input of LT 100mV r.m.s. e.m.f., first amplitude modulated by 1kHz to LL 28% UL 32%, and then frequency modulated by 1kHz to LL 1.45kHz UL 1.55kHz deviation (NARROW) or LL 2.9kHz UL 3.1kHz deviation (WIDE), the audio output due to the a.m. is GT 20dB down on the output due to f.m.

(2) With an on-tune r.f. signal at 100mV r.m.s. e.m.f. at the equipment ANT/ARFAT socket the test meter shall indicate GT 2/3 f.s.d.

b. Method

Set t.r.e. and e.u.t. switches as follows:

CS	CTC	IF(C)	E.U.T.
1 VEH 24 2 VEH V 6 Released (ON)	1 RX FM 2 AF LOAD 100 3 Released 4 Released 5 Released 6 Released 7 Depressed 8 Released 9 Released 10 Depressed 11 Released 12 RF 13 RF 14 SIGNAL 26 FM INT	1 O.C. 3 Released 4 Released 7 NORMAL	F 30.000MHz M WIDE P OFF T RX SIG G Fully clockwise R LOCAL

E.U.T. CONNECTIONS

24V to CS7 (item 5)
AUDIO (upper or lower) to IF(C)5 (item 10)
ANT/ARFAT to CTC20 (item 7)
HARNESS to IF(C)6 (item 11)

(1) Set POWER switch on e.u.t. to MIN.

(2) Racal

(a) Set controls as follows

Synthesiser frequency to 30,000MHz
Attenuation 106dB (5μV)
MODE to a.m.
Mode remote/local to 'local'
Modulation frequency to 1kHz
Modulation level to 30%

(b) Note and record, as V1, d.v.m. indication.

(c) Set mode remote/local switch to 'remote'

(d) Set two tone generator for 1kHz at 30mV

(e) Note and record, as V2, d.v.m. indication, V2 shall be GT 10 x V1.

(f) Set two tone generator level to 15mV.

(g) Set e.u.t. MODE switch to NARROW. Note and record, as V3, d.v.m. indication.

(h) Set following switches on Signal Processor:

Mode to a.m.
Mode remote/local to 'local'
Modulation frequency to 1kHz
Modulation level for indicated 30%

(j) Note and record, as V4, d.v.m. indication. V3 shall be GT 10 x V4.

(3) (a) Set mode remote/local switch to 'remote'.

(b) Set r.f. output level to 20dB (100mV).

(c) Set tone B on two tone generator for 1kHz at 15mV

(d) Note e.u.t. test meter indication which shall be GT 2/3 f.s.d.

(4) Schlumberger

(a) Set POWER switch to ON.

(b) Set synthesiser frequency to 30,000MHz and adjust output level for indicated 0dB.

(c) Set attenuator control to 106dB (5µV).

(d) Set following switches on Modulator and 3-tone generator:

CARRIER to ON
REMOTE/LOCAL to LOCAL
AM to AM INT
FM to OFF
MULTIPLIER to X1
GENERATOR A ON/OFF to ON at 1kHz
GENERATORS B and C to OFF
LEVEL A and B to 300mV (30%).

(e) Note and record, as V1, d.v.m. indication.

(f) Set following switches on Modulator and 3-tone generator:

AM to OFF
FM to INT
LEVEL A and B to 30mV

(g) Note and record, as V2, d.v.m. indication. V2 shall be GT 10 x V1.

(h) Set MODE switch on e.u.t. to NARROW.

(j) Note and record, as V3, d.v.m. indication.

(k) Set following switches on Modulator and 3-tone generator:

FM to OFF
AM to AM INT
A and B LEVEL to 300mV (30%)

(l) Note and record, as V4, d.v.m. indication. V3 shall be GT 10 x V4.

(5) (a) Set following switches on Modulator and 3-tone generator:

FM to INT
AM to OFF
A and B LEVEL to 15mV.

(b) Set attenuator for 20dB (100mV) on ATTENUATOR CONTROL UNIT.

(c) Note e.u.t. test meter indication which shall be GT 2/3 f.s.d.

Test 10 - Tone detection operation

85. a. Limit Reception of an r.f. signal at 0.7µV r.m.s. e.m.f. modulated by LL 147Hz UL 151Hz to 1.5kHz deviation will cause a current of LL 8mA UL 11mA to be drawn from a LL 17.5V UL 18.5V supply connected across the remote terminals for auto selection of the remote switch.

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

CS	CTS	IF(C)	E.U.T.
1 VEH 24 2 VEH V 6 Released (ON)	1 RC 2 LOC-REM 3 Released 4 Released 5 Released 6 Depressed 7 Released 8 Released 9 Released 10 Depressed 11 Released 12 RF 13 RF 14 SIGNAL 26 FM INT	1 AUTO 18V 3 Released 4 Released 7 NORMAL	F 30.000MHz M ~~WIDE TONE~~ NARROW P OFF T RX SIG G Mid-position R AUTO

E.U.T. CONNECTIONS

24V to CS7 (item 5)
AUDIO (upper or lower) to IF(C)5 (item 10)
ANT/ARFAT to CTC20 (item 7)
HARNESS to IF(C)6 (item 11)

(1) Racal

(a) Set POWER switch on e.u.t. to MIN.

(b) Set r.f. signal generator for 30MHz at 0.7μV (124dB).

(c) Set 'mode' 'remote/local' switch on Signal Processor to 'local' and MODE switch to 0-25kHz fm dev.

(d) Set 'modulation frequency' on Signal Processor for 149Hz at a level to produce an indicated deviation of ~~3kHz~~. 1.65kHz'

(e) Set 'mode' 'remote/local' switch on Signal Processor to 'remote' and note that d.v.m. indicates 18V (nominal).

(f) Set 'mode' 'remote/local' switch to 'local' and depress IF(C)3. Note d.v.m. indication which shall be LL 8mA UL 11mA.

(g) Use 'modulation frequency' control on Signal Processor to slowly decrease modulating tone frequency whilst observing d.v.m. Note frequency at which indication becomes LT 4mA. This shall be LT 144Hz.

(h) Set 'modulation frequency' to 149Hz and then slowly increase the frequency whilst observing d.v.m. Note frequency at which the indication becomes LT 4mA. This shall be GT 154Hz.

(2) Schlumberger

(a) Set POWER switch to ON.

(b) Set Frequency synthesiser to 30.00000MHz.

(c) Set Attenuator control unit to 124dB.

(d) Set the following switches on Modulator and 3-tone generator:

GENERATOR C to ON at 150 ~~1.99~~Hz
GENERATOR A and GENERATOR B to OFF
LEVEL C to 30mV (6kHz deviation)
CARRIER ON/OFF to OFF.

(e) Note d.v.m. indication which shall be +18V (nominal).

(f) Set CARRIER ON/OFF to ON.

(g) Depress IF(C)3.

(h) Note d.v.m. indication which shall be LL 8mA UL 11mA.

(j) Using GENERATOR C on 10 - 100Hz range with left hand control knob set for indicated '15' slowly decrease modulating frequency whilst observing d.v.m.

(k) Note frequency at which indication becomes LT 4mA. This shall be LT 144Hz.

(l) Set modulating frequency to 149Hz.

(m) Slowly increase modulating frequency whilst observing d.v.m.

(n) Note frequency at which indication becomes LT 4mA. This shall be GT 154Hz.

<u>Test 11 - Remote terminal control characteristics</u>

86. a. Limits

(1) When a short circuit is applied across e.u.t. remote terminals a current of LT 35mA will flow between the terminals for LOCAL, REM and AUTO selections of the REMOTE switch.

(2) Setting the REMOTE switch to CALL will place a short circuit condition across the remote terminals and will apply a LL 1.9kHz UL 2.1kHz tone at the terminals.

(3) For REM and AUTO selections of the REMOTE switch the equipment <u>MUST</u> be in the receive condition for remote terminal currents of LT 4mA, and in the transmit condition for currents of LL 8mA UL 14.5mA.

b. Method

Set t.r.e. and e.u.t. switches as follows:

CS	CTC	IF(C)	E.U.T.
1 VEH 24 2 VEH V 6 Released (ON)	1 RC 2 REM-LOC 3 Released 4 Released 5 Released 6 Depressed 7 Released 8 Released 9 Released 10 Depressed 11 Released 12 AF 13 RF 14 SIGNAL 26 FM INT	1 CALL IN S.C. 3 Depressed 4 Released 7 NORMAL	F 30.000MHz M WIDE TONE P OFF T RX SIG G Mid-position R LOCAL

<u>E.U.T. CONNECTIONS</u>

24V to CS7 (item 5)
AUDIO (upper or lower) to IF(C)5 (item 7)
ANT/ARFAT to CTC20 (item 10)
HARNESS to IF(C)6 (item 11)

(1) (a) Set POWER switch on e.u.t. to MIN. Note that call tone is heard in LS.

(b) Depress CTC9. Counter shall indicate LL 1.9kHz UL 2.1kHz. D.V.M. shall indicate LL 20mA UL 35mA. E.U.T. shall be in receive condition (Tx lamp extinguished).

(c) Set REMOTE switch to REM, AUTO, BK IN and IC in turn and note that the conditions remain as specified in a. and b.

Note: There may be a slight distortion of the audio from LS for BK IN and IC selections.

(2) (a) Set IF(C)1 to CALL OUT <50Ω.

(b) Set CTC2 to LOC-REM.

(c) Set e.u.t. REMOTE switch to CALL.

(d) Note d.v.m. indication which shall be LT IV. Note counter indication which shall be LL 1.9kHz UL 2.1kHz. The tone will be heard in LS.

(3) (a) Set IF(C)2 fully counter clockwise and IF(C)1 to LINE CURRENT.

(b) Set e.u.t. REMOTE switch to REM.

(c) Turn IF(C)2 slowly clockwise whilst observing Tx lamp on e.u.t., cease turning at the instant the lamp illuminates.

(d) Note d.v.m. indication which shall be LL 4mV UL 8mV (1mV = 1mA).

(e) Continue turning IF(C)2 slowly until Tx lamp extinguishes.

(f) Note d.v.m. indication which shall be LL 14.5mV UL 20mV.

Test 12 - Remote terminal resistance

87. a. Limits (1) With REMOTE switch set to CALL a resistance of LT 50Ω is measured across the remote terminals.

(2) When the equipment is in the receive mode and not responding to a 150Hz tone, a voltage of LT 22V connected across the remote terminals shall draw LT 4mA.

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

CS	CTC	IF(C)	E.U.T.
1 VEH 24 2 VEH V 6 Released (ON)	1 RC 2 REM-LOC 3 Released 4 Released 5 Released 6 Depressed 7 Released 8 Released 9 Released 10 Depressed 11 Released 12 RF 13 RF 14 SIGNAL 26 FM INT	1 LINE CURRENT 3 Depressed 4 Released 7 NORMAL	F 30.000MHz M WIDE TONE P OFF T RX SIG G Mid-position R LOCAL

E.U.T. CONNECTIONS

24V to CS7 (item 5)
AUDIO (upper or lower) to IF(C)5 (item 7)
ANT/ARFAT to CTC20 (item 10)
HARNESS to IF(C)6 (item 11)

(1) (a) Connect multimeter, set to read ohms, across remote terminals.

(b) Set REMOTE switch to CALL and note multimeter indication. This shall be LT 50Ω.

(c) Disconnect multimeter from remote terminals.

(d) Set POWER switch on e.u.t. to MIN.

(2) (a) Set IF(C)1 to 18V AUTO.

(b) Note d.v.m. indication which shall be LT 4mV.

Test 13 - Testmeter indication and TEST switch function

88 a. Limit (1) The testmeter shall indicate as specified for given positions of TEST switch as detailed below.

Test switch position	Other conditions	Meter indication
LPS OFF	No front panel illumination.	As for RX SIG position
FANS OFF	No front panel illumination. Blowers inhibited. Transmission inhibited.	As for RX SIG position
28V SPLY	28V at 28V connector. 20V at 28V connector.	LL 26V UL 30V LL 19V UL 21V
RX SIG	Reception of on-tune carrier varied between LL 0mV UL 100mV r.m.s. e.m.f.	LT 1/3 fsd to GT 2/3 fsd

Test switch position	Other conditions	Meter indication
TX O/P	Transmit condition commanded	Green sector ± 3 div of centre
AFC TX	Transmit condition commanded	
SYNTH *	Permitted frequency selected Prohibited frequency selected	Green sector Red sector
TEMP *	Equipment temperature within limits Equipment temperature outside limits	Green sector Red sector
ARFAT *	ARFAT connector Pin L open circuit Pin L connected to pin P (ARFAT overheat)	Green sector Red sector
	* Red sector indication due to SYNTH, TEMP or ARFAT produces an 'alarm' condition causing the frequency dial illumination to flash on and off at LL 0.77Hz UL 1.9Hz and all audio outputs to pulse on and off at the same rate. Transmissions are inhibited in the alarm condition.	
OVERRIDE	Alarm indication ceases Squelch lifted Transmission inhibit due to TEMP or ARFAT alarms is lifted. Both blowers run.	

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

CS	CTC	IF(C)	E.U.T.
1 VEH 24 2 VEH V 6 Released (ON)	1 CW 2 AF LOAD 100 3 Released 4 Released 5 Released 6 Released 7 Depressed 8 Released 9 Released 10 Depressed 11 Released 12 RF 13 RF 14 CARRIER OFF 26 FM INT	1 OC 3 Released 4 Released 7 NORMAL	F 30.000MHz M WIDE TONE P OFF T 28V SPLY G fully clockwise R LOCAL

E.U.T. CONNECTIONS

24V to CS7 (item 5)
AUDIO (upper or lower) to IF(C)5 (item 10)
ANT/ARFAT to CTC20 (item 7)
HARNESS to IF(C)6 (item 11)

(1) (a) Set POWER switch on e.u.t. to MIN.

(b) Set TEST switch to LPS OFF and note that frequency dial and test meter illumination is extinguished.

(c) Set TEST switch to FANS OFF and note that illumination defined in b. remains extinguished.

(d) Depress CTC11 and note that Tx lamp does not illuminate.

(e) Set TEST switch to 28V SPLY and note that test meter indicates LL 23V UL 26V.

(f) Set POWER switch on e.u.t. to OFF and CS1 to VEH 14-33.

(g) Depress CTC5 and adjust CS4 for d.v.m. indication of 20V (nominal).

(h) Set POWER switch on e.u.t. to MIN.

(j) Note that test meter indicates LL 19V UL 21V.

(k) Set CS1 to VEH 24, CTC1 to RX FM and depress CTC7.

(l) Set TEST switch to RX SIG and note that test meter indicates LT 1/3 f.s.d. and d.v.m. indication is LT 15mV.

(m) Set signal generator for 30.000MHz at 100mV (20dB) modulated by 1kHz at 100mV for 10kHz deviation.

(n) Set CTC14 to SIGNAL and note that test meter indicates GT 2/3 f.s.d. and tone is heard in LS.

(o) Set TEST switch to TX O/P and note that Tx lamp does not illuminate and test meter reads in the red sector.

(p) Set CTC1 to CW TX and note that Tx lamp illuminates and test meter reads in green sector.

(q) Set CTC1 to CW and TEST switch to AFC TX. Depress CTC11 and note that test meter reads LL 3 divisions left of centre UL 3 divisions right of centre.

(r) Set TEST switch to SYNTH, TEMP and ARFAT in turn and note that test meter reads in green sector at each position.

(s) Set TEST switch to SYNTH and frequency selector switch to 00.0000MHz. Note that test meter reads in red sector and frequency dial illumination flashes on and off while test meter illumination remains on and steady. Also note that noise in LS pulses in synchronism with frequency dial illumination.

(t) Set CTC2 to LOC-REM and note that noise in LS pulses in synchronism with frequency dial illumination.

(u) Disconnect plug from HARNESS socket on e.u.t. and connect leads between remote terminals + and - and IF(C) 6 fan out pins A and B respectively.

(v) Note that noise in LS pulses in synchronism with frequency dial illumination.

(w) Set CTC2 to AF LOAD 100. Disconnect the leads from e.u.t. remote terminals and reconnect plug to HARNESS socket. Set e.u.t. frequency to 30.000MHz.

(x) Set TEST switch to ARFAT and using a suitably adapted test plug (or item 33 of Table 2001, Tels M 382) short circuit ARFAT connector pin L to pin P. Note that test meter indicates in red sector, frequency dial illumination flashes and tone in LS pulses in synchronism.

(y) Set CTC1 to CW TX and note that Tx lamp does not illuminate.

(z) Set TEST switch to OVERRIDE and note that flashing ceases and d.v.m. indicates r.f. power output. Note also that both blowers start up. Set CTC1 to CW.

Test 14 - Audio inputs to AUDIO sockets and GAIN control function

89. a. Limits (1) With the GAIN control set to minimum, full deviation of LL 4kHz UL 6kHz (NARROW) and LL 8kHz UL 12kHz (WIDE) is produced by a 1kHz modulating tone applied at AUDIO socket pin A w.r.t. pin B at any level between LL 3mV UL 80mV r.m.s. e.m.f.

(2) The GAIN control reduces the sensitivity of the input defined in (1) by LL 6dB UL 8dB on switch positions 4 to 7 and by LL 17dB UL 19dB on positions 8 to 10 w.r.t. the sensitivity on positions 1 to 3, counting clockwise.

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

Note: These Pages 49-60, Issue 2 supersede Pages 49-60, Issue 1, dated Jun 78. Paras marked • have been amended.

CS	CTC	IF(C)	E.U.T.
1 VEH 24 2 VEH V 6 Released (ON)	1 MOD S.T. 2 AF LOAD 100 3 Released 4 Released 5 Released 6 Released 7 Depressed 8 Released 10 Depressed 11 Released 12 RF 13 RF 14 SIGNAL 26 FM INT	1 O.C. 3 Released 4 Released 7 NORMAL	F 50.000 MHz M WIDE P OFF T RX SIG G Fully counter clockwise R LOCAL

E.U.T. CONNECTIONS

24V to CS7 (item 5)
AUDIO (upper or lower) to IF(C) (item 10)
ANT/ARFAT to CTC20 (item 7)
HARNESS to IF(C)6 (item 11)

(1) (a) Set POWER switch on e.u.t. to 50W.

(b) Set a.f. generator for 1kHz tone at 100mV level.

(c) Set up mod meter to read deviation at 50.000MHz.

(d) Depress CTC11. Note and record mod meter indication which shall be LL 8.0kHz UL 12.0kHz.

(e) Increase a.f. generator level to 800mV.

(f) Depress CTC11. Note mod meter indication which shall be within the limits defined in d.

• (g) Decrease a.f. generator output level to 20mV.

(h) Depress CTC11. Note mod meter indication which shall be within the limits defined in d.

(j) Set e.u.t. MODE switch to NARROW. Repeat b. to h. Note mod meter indication which shall be LL 4kHz UL 6kHz.

(k) Set e.u.t. MODE switch to WIDE.

(2) Racal:

(a) Set 'level multiplier' to 0.1 depress CTC11 and adjust 'output level' to produce indicated deviation of LL 4.9kHz UL 5.1kHz. Record set level as L1.

(b) Depress CTC11 and set GAIN control three positions clockwise. Note that on the third switch movement deviation is reduced but remains within the limits LL 4.5kHz UL 5.5kHz for first two movements.

(c) With CTC11 depressed increase two tone generator output level to 2xL1 and then to 2.51xL1, check that the deviations produced are LT 4.9kHz and GT 5.1kHz respectively.

(d) Set two tone generator level for deviation limit specified in a. Record set level as L2.

(e) Set GAIN control a further four positions clockwise. Note that on the fourth movement the deviation is reduced but remains within the limits LL 4.5kHz UL 5.5kHz during the first three movements.

(f) Increase two tone generator output level to 2.81xL2 and then to 3.55xL2, check that the deviations produced are LT 4.9kHz and GT 5.1kHz respectively.

(g) Set two tone generator output level for deviation limits specified in a.

(h) Set GAIN control to the remaining clockwise positions in turn and check that the deviation is LL 4.5kHz. UL 5.5kHz.

(3) Schlumberger:

(a) Set Frequency synthesiser to 50.0000MHz.

(b) Set GENERATOR A to ON at 1kHz.

(c) Set following switches on Modulator and 3-tone generator:

AM to OFF
FM to OFF
OUTPUT VOLTAGE MULTIPLIER to X0.1
REMOTE/LOCAL CONTROL to LOCAL

(d) Depress CTC11 and set LEVEL A and B to produce mod meter indication of LL 4.9kHz UL 5.1kHz. Record set level as L1.

(e) Depress CTC11 and set GAIN control three positions clockwise. Note that on the third switch movement the deviation is reduced but remains within the limits LL 4.5kHz UL 5.5kHz for the first two movements.

(f) With CTC11 depressed increase LEVEL A and B to 2xL1 and then 2.51xL1, check that the deviations produced are LT 4.9kHz and GT 5.1kHz respectively.

(g) Set LEVEL A and B to produce the deviation specified in d. Record set level as L2.

Note...
These Pages 51 and 52 supersede Pages 51 and 52 Issue 3 dated Mar 87. Paragraph 91 has been amended.

(h) Set GAIN control a further four positions clockwise. Note that on the fourth movement the deviation is reduced but remains within the limits LL 4.5kHz UL 5.5kHz during the first three movements.

(j) Increase LEVEL A and B to 2.82xL2 and then to 3.55xL2, check that the deviations produced are LT 4.9kHz and GT 5.1kHz respectively.

(k) Set LEVEL A and B to produce the deviation specified in d.

(l) Set GAIN control to the remaining clockwise positions in turn and check that the deviation is LL 4.5kHz UL 5.5kHz.

Test 15 - Audio inputs to remote terminals

90. a. Limit (1) Full deviation of LL 4kHz UL 6kHz (NARROW) and LL 8.0kHz UL 12.0kHz (WIDE) is produced by a 1kHz modulating tone at LL 80mV UL 4V r.m.s. e.m.f. balanced at remote terminals.

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

<table>
<tr><th>CS</th><th>CTC</th><th>IF(C)</th><th>E.U.T.</th></tr>
<tr><td rowspan="2">1 VEH 24
2 VEH V
6 Released (ON)</td><td rowspan="2">1 RC
2 REM-LOC
3 Released
4 Released
5 Released
6 Depressed
7 Released
8 Released
9 Released
10 Depressed
11 Released
12 RF
13 RF
14 SIGNAL
26 FM INT</td><td>1 LINE CURRENT
2 Fully counter clockwise
3 Depressed
4 Released
7 NORMAL</td><td>F 50.000MHz
M WIDE
P OFF
T RX SIG
G Mid-position
R AUTO</td></tr>
<tr><td colspan="2">E.H.T. CONNECTIONS
~~24V to CS7 (item 5)~~
AUDIO (upper or lower) to IF(C)5 (item 10)
ANT/ARFAT to CTC20 (item 7)
REMOTE TERMINALS to IF(C)6 fan out pins A and B (incorrect connection results in a tone being heard in LS)</td></tr>
</table>

(1) (a) Set POWER switch on e.u.t. to 50W.

(b) Set mod meter to read deviatioin to 50.000MHz. (150Hz FILTER IN, 3kHz FILTER OUT)

(c) Set a.f. generator for 1kHz at 85mV (for 80mV at terminals.

(d) Set IF(C) to Tx 1400.

(e) Note and record mod meter indication which shall be LL 8.0kHz UL 12.0kHz.

(f) Set a.f. generator for 417mV with MULTIPLIER at X10 (for 4V terminals).

(g) Note and record mod meter indication which shall be LL 8.0kHz UL 12.0kHz.

(h) Set e.u.t. MODE switch to NARROW and repeat c. to g. for limits LL 4kHz UL 6kHz.

Test 16 - Audio output at AUDIO sockets

91. a. Limits (1) An r.f. input of 5µv r.m.s. e.m.f. modulated by 1kHz for 5kHz deviation (NARROW) or for 10kHz deviation (WIDE) produces an audio output of LL 2.15V UL 3.4V into 100Ω connected between AUDIO socket pin D and pin E, with GAIN control fully clockwise.

(2) With REMOTE switch set to IC the output defined in (1) is reduced by LL 8dB UL 12dB.

(3) The GAIN control reduced the output defined in (1) by nine steps of LL 3dB UL 5dB to a total of LL 34dB UL 42dB.

(4) The sidetone a.f. output at the AUDIO sockets is LL 2.19V UL 4.38V for an input at pin A w.r.t. pin B of 1kHz at GT 40mV.

(5) The voltage on the AUDIO sockets, pin C, will be LL 26V UL 30V with no load connected.

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

CS	CTC	IF(C)	E.U.T.
1 VEH 24 1 VEH V 6 Released (ON)	1 RX FM 2 AF LOAD 100 3 Released 4 Released 5 Released 6 Released 7 Depressed 8 Released 9 Released 10 Depressed 11 Released 12 AF 13 AF 14 SIGNAL 26 FM INT	1 OC 3 Released 4 Released 7 NORMAL	F 50.000MHz M WIDETONE P OFF T RX SIG G Fully clockwise R LOCAL

E.U.T. CONNECTIONS

24V to CS7 (item 5)
AUDIO (upper or lower) to (F(C)5) (item 10)
ANT/ARFAT to CTC20 (item 7)
HARNESS to IF(C)6 (item 11)

(1) (a) Set POWER switch on e.u.t. to MIN.

(b) Set signal generator for 50.000MHz at 5µV (106dB) modulated by 1kHz at 100mV for 10kHz deviation.

(c) Note and record as V1 the d.v.m. indication which shall be LL 2.15V UL 3.4V.

(2) (a) Set REMOTE switch to IC. Note and record d.v.m. indication which shall be LL 0.25xV1 UL 0.39xV1.

(b) Set REMOTE switch to LOCAL

(3) (a) Set GAIN control 1 step counter clockwise.

(b) Note and record as V2 the d.v.m. indication.

(c) Using dB = 20 log $\frac{V1}{V2}$, calculate the attenuation effected by the GAIN control. This shall be LL 3dB UL 5dB.

(d) Set GAIN control 1 further step counter clockwise.

(e) Note and record as V3 the d.v.m. indication.

(f) Using dB = 20 log $\frac{V2}{V3}$, calculate the attenuation effected by the GAIN control. This shall be LL 3dB UL 5dB.

(g) Repeat as in (3)(a-c) and (3)(d-f) for the remaining positions of the GAIN control.

(h) At final setting of the GAIN switch calculate the overall attenuation using dB = 20 log $\frac{V1}{V10}$, this shall be LL 34dB UL 42dB.

(j) Repeat (1)(b-c), (2)(a) and (3)(a-h) for alternative AUDIO socket.

(4) (a) Set a.f. generator for 1kHz at 500mV.

(b) Set CTC1 to MOD S.T.

(c) Depress CTC11.

(d) Set e.u.t. GAIN control fully clockwise.

(e) Note d.v.m. indication which shall be LL 2.19V UL 4.38V.

• (5) Using AVO measure the voltage at the AUDIO socket (IF(C)5) fan out pin C (line), which shall be LL 26V UL 30V.

Test 17 - Audio output at HARNESS connector

92. a. Limits (1) An r.f. input at 5μV r.m.s. e.m.f. modulated by 1kHz for 5kHz deviation (NARROW) or 10kHz (WIDE) produces an audio output of LL 1.14V UL 2.1V into 300Ω connected between pin D and pin E of the HARNESS connector.

(2) The output defined in (1) is independent of the GAIN control setting.

(3) With the REMOTE switch set to IC, the output defined in (1) is reduced by LL 8dB UL 12dB.

(4) The output impedance between the HARNESS connector pin D and pin E is LT 10Ω.

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

CS	CTC	IF(C)	E.U.T.
1 VEH 24	1 RX FM	1 OC	F 50.000MHz
2 VEH V	2 HRNS 30Ω	3 Released	M WIDE TONE
6 Released (ON)	3 Released	4 Released	P OFF
	4 Released	7 NORMAL	T RX SIG
	5 Released		G Fully clockwise
	6 Released		R LOCAL
	7 Depressed		
	8 Released		
	9 Released		
	10 Depressed		
	11 Released		
	12 AF		
	13 AF		
	14 SIGNAL		
	26 FM INT		

E.U.T. CONNECTIONS

28V to CS7 (item 5)
AUDIO (upper or lower) to IF(C)5 (item 10)
ANT/ARFAT to CTC20 (item 7)
HARNESS to IF(C)6 (item 11)

(1) (a) Set POWER switch on e.u.t. to MIN.

(b) Set signal generator for 50.000MHz at 5μV (106dB) modulated by 1kHz at 100mV for 10kHz deviation.

(c) Note and record as V1 the d.v.m. indication which shall be LL 1.14V UL 2.1V.

(2) (a) Set REMOTE switch to IC.

(b) Note and record as V2 the d.v.m. indication which shall be LL 0.25xV1 UL 0.39xV1.

(3) (a) Observe d.v.m. whilst switching GAIN control through its full range and note that the indication remains constant.

(4) (a) Remove the connector from HARNESS socket on t.r.e. and connect a multimeter, set to measure ohms ÷ 100, across pins D and E. Note that the indication is LT 10Ω.

Test 18 - Audio output at remote terminals

93. a. Limits (1) An r.f. input at 5 V r.m.s. e.m.f. modulated by 1kHz for 5kHz deviation (NARROW) or 10kHz (WIDE) produces an audio output of LL 0.54V UL 1.05V r.m.s. into a 300Ω load connected between the remote terminals.

(2) The output defined in (1) is independent of GAIN control.

(3) When the equipment is in the CALL mode the a.f. output at the remote terminals is GT 0.3V r.m.s. at LL 1.9kHz UL 2.1kHz when loaded with 300 ohms.

(4) The a.f. response is within the limits specified below w.r.t. the response at 1kHz when the modulating frequency is as detailed.

150Hz	300Hz	600Hz	1500Hz	3000Hz	6000Hz
GT 30dB down	UL 3dB up LL 4dB down	UL 3dB up LL 4dB down	UL 3dB up LL 3dB down	UL 3dB up LL 3dB down	UL 10dB down LL 20dB down

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

CS	CTC	IF(C)	E.U.T.
1 VEH 24 2 VEH V 6 Released (ON)	1 RX FM 2 LOC-REM 3 Released 4 Released 5 Released 6 Released 7 Depressed 8 Released 9 Released 10 Depressed 11 Released 12 AF 13 AF 14 SIGNAL 26 FM INT	1 OC 3 Released 4 Released 7 NORMAL	F 50.000MHz M WIDE TONE P OFF T RX SIG G fully clockwise R LOCAL

E.U.T. CONNECTIONS

24V to CS7 (item 5)
AUDIO (upper or lower) to IF(C)5 (item 10)
ANT/ARFAT to CTC20 (item 7)

(1) (a) Set POWER switch on e.u.t. to MIN.

(b) Set r.f. signal generator for 50.000MHz at 5µV (106dB) modulated by 1kHz at 100mV for 10kHz deviation.

(c) Ensure the harness connector is removed from IF(C)6.

(d) Connect remote terminals +ve and -ve to IF(C)6 fan out pin A and B respectively.

(e) Note and record as V1 the d.v.m. indication which shall be LL 245mV UL 477mV.

(2) (a) Observe d.v.m. while switching the GAIN control through its full range and note that the indication does not change.

(3) (a) Remove the co-axial connector from the ANT/ARFAT socket on e.u.t.

(b) Set REMOTE switch to CALL.

(c) Note d.v.m. indication which shall be GT 130mV.

(d) Note counter indication which shall be LL 1.9kHz UL 2.1kHz.

(4) (a) Re-connect the co-axial connector to the ANT/ARFAT socket on e.u.t.

(b) Set REMOTE switch to LOCAL.

(c) Set signal generator modulating frequency to 150Hz.

(d) Note and record as V2 the d.v.m. indication.

(e) Set modulating frequency as detailed below noting d.v.m. indication at each step.

Mod frequency	300Hz	600Hz	1500Hz	3000Hz	6000Hz
D.V.M. indication	V3	V4	V5	V6	V7

(f) The indications noted in (e) shall relate to V1 as detailed below:

V2 = UL 0.032
V3 = LL 0.630 UL 1.41
V4 = LL 0.630 UL 1.41
V5 = LL 0.708 UL 1.41
V6 = LL 0.708 UL 1.41
V7 = LL 0.1 UL 0.316

Test 19 - C.V.A. characteristics and a.f. output on IC

94. a. Limits (1) With an input of 1kHz at 2mV r.m.s. e.m.f. to the AUDIO socket pin A w.r.t. pin B, the REMOTE switch set to IC and the GAIN control set to a position providing an output nearest to 54mV, across a 75Ω load connected at pin D and E of the AUDIO socket, the input level may be slowly increased by 32dB and the output will rise by LT 0.5dB.

(2) With no r.f. input, the REMOTE switch set to BK IN or IC, and the GAIN control fully clockwise, a 1kHz tone at LL 18mV UL 80mV at the AUDIO socket pin A w.r.t. B, the output at pin D w.r.t. E into 75Ω will be LL 1.9V UL 3.8V r.m.s. and at the REMOTE terminals will be LL 0.54V UL 1.05V r.m.s. into 300Ω.

(3) With conditions as in (2) a 1kHz tone at LL 80mV UL 4V r.m.s. e.m.f. to the REMOTE terminals will produce an output at the AUDIO sockets pins D and E at the level defined in (2).

(4) When the squelch is lifted by an r.f. input the outputs defined in (2) become LL 1.35V UL 2.7V r.m.s. and LL 0.35V UL 0.75V r.m.s. respectively.

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

CS	CTC	IF(C)	E.U.T.
1 VEH 24 2 VEH V 6 Released (ON)	1 MOD S.T. 2 AF LOAD 100 3 Released 4 Released 5 Released 6 Released 7 Depressed 8 Released 9 Released 10 Depressed 11 Released 12 AF 13 AF 14 SIGNAL 26 FM INT	1 O.C. 3 Released 4 Released 7 NORMAL	F 50.000MHz M WIDE TONE P OFF T RX SIG G Fully counter clockwise R IC

E.U.T. CONNECTIONS

24V to CS7 (item 5)
AUDIO (upper or lower) to IF(C)5 (item 10)
ANT/ARFAT to CTC20 (item 7)

(1) (a) Set r.f. signal generator to 40.000MHz (this ensures that the squelch is not lifted).

(b) Set POWER switch on e.u.t. to MIN.

(c) Set a.f. generator for 1kHz tone at 20mV level.

(d) Depress CTC11 and adjust e.u.t. GAIN control for an output nearest to 62.3mV as indicated on d.v.m. Designate the set voltage V1 and record the level.

Note: This setting will usually be no more than two settings from fully counter clockwise. It is preferable to select a figure below rather than above 62.3mV.

● (e) Slowly increase a.f. generator output to 800mV. The d.v.m. indication shall not increase by GT 1.06 xV1.

(2) (a) Set GAIN control fully clockwise.

(b) Depress CTC11 and note d.v.m. indication which shall be LL 2.19V UL 4.38V.

(c) Set REMOTE switch to BK IN.

(d) Depress CTC11 and note d.v.m. indication which shall conform to the limit specified in (b).

(e) Connect remote terminals + and - to IF(C)6 fan out pins A and B respectively.

(f) Ensure that the harness connector is disconnected from IF(C)6.

(g) Set CTC2 to LOC-REM.

(h) Depress CTC11 and note d.v.m. indication which shall be LL 245mV UL 477mV.

(j) Set REMOTE switch to IC.

(k) Depress CTC11 and note d.v.m. indication which shall be within the limits specified in (h).

(3) (a) Set CTC1 to RC and CTC2 to REM-LOC.

(b) Note d.v.m. indication which shall be LL 2.19V UL 4.38V.

(c) Set REMOTE switch to BK IN.

(d) Note d.v.m. indication which shall conform to limits specified in (b).

<u>Caution</u>: R.F. interference may cause intermittent lifting of squelch to give low indications.

(4) (a) Set r.f. signal generator to 50.000MHz, unmodulated at 5μV, r.m.s. e.m.f. (106dB).

(b) Connect r.f. signal generator directly to e.u.t. ANT/ARFAT socket.

(c) Set CTC1 to MOD S.T. and CTC2 to AF LOAD 100.

(d) Set e.u.t. REMOTE switch to IC and repeat (2) (a-b, d-k), the limits being LL 1.~~56~~4V, UL ~~3.4V~~ 2.8V and LL 159mV UL 341mV respectively.

<u>Test 20 - T.U.A.A.M. control</u>

95. a. Limits (1) With the ARFAT socket pin M connected to pin P the e.u.t. shall be in the transmit mode and the power output shall be LL 40W UL 75W irrespective of the e.u.t. power range selected.

(2) With the POWER switch in the silent tune position ('O') the resistance between ARFAT socket pin O and pin P is LT 50Ω when the POWER switch is set to any other position the resistance shall be GT 10kΩ.

(3) With the e.u.t. POWER switch held in the TUNE posi- the 28V at pin S of the ARFAT socket is removed. The power output shall be LT 250mW.

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

CS	CTC	IF(C)	E.U.T.
1 VEH 24 2 VEH V 6 Released (ON)	1 CW TX 2 AF LOAD 100 3 Released 4 Released 5 Released 6 Released 7 Depressed 8 Released 9 Released 10 Depressed 11 Released 12 AF 13 AF 14 SIGNAL 26 FM INT	1 O.C. 3 Released 4 Released 7 NORMAL	F 50.000MHz M WIDE TONE P OFF T TX O/P G Fully clockwise R LOCAL

E.U.T. CONNECTIONS

24V to CS7 (item 5)
ANT/ARFAT to CTC20 (item 7)

(1) (a) With both AUDIO and HARNESS leads disconnected from e.u.t. connect Item 33, Table 2001, Tels M 382 to ARFAT socket on e.u.t. (MODIFIED)

(b) Set POWER switch on e.u.t. to 15W.

(c) Using Item 16, Table 2001, Tels M 382 connect pin M to P.

(d) Note d.v.m. indication which shall be LL 6.255 UL 8.66V.

(e) Set e.u.t. POWER switch to MIN, 1W, 15W and 50W in turn and note that the limits are as in (d) above

(f) REMOVE LINK BETWEEN PINS M AND P.

(2) (a) Using the multimeter, set to ohms, ~~check that the resistance between~~ pin O and pin P is GT 10kΩ, ~~ensuring~~ pin M is still connected to pin P.

(b) Set e.u.t. POWER switch to 'O' ~~and using multimeter, with red lead to pin P and range set to ÷ 100, check that the resistance between pin O and pin P is LT 50Ω.~~

(c) SET E.U.T. POWER SWITCH TO 'O' AND NOTE THAT THE LED (ITEM 33 (MODIFIED)) IS ILLUMINATED

(3) (a) With the multimeter set to read volts and connected between ~~pin D (live)~~ PIN S LIVE and pin P, note the reading which shall be LL 26V UL 30V.

(b) Set POWER switch on e.u.t. to TUNE and note the multimeter reading, which shall be LT 0.1V.

(c) The power output when switched to TUNE will be LT 0.5V (250mW).

DATA

Test 1 - Squelch operation and 150Hz tone detection

96. a. Limits (1) With the equipment operating in WIDE DATA mode, and with no signal input to the antenna, the output at HARNESS socket pin E shall be less than OV.

(2) With conditions as in (1) with an unmodulated r.f. signal of 40µV r.m.s. e.m.f. the output shall be LL 0.1V UL 1.5V.

(3) With an r.f. signal of 40µV, modulated by 1kHz to give 10kHz deviation, the output shall be LL 0.4V UL 1.5V.

(4) With an r.f. signal, of 40µV modulated by 149Hz to give 3.25kHz deviation, the output level shall be LL 3.0V UL 5.0V.

b. Method Set t.r.e. e.u.t. and D.T.S. switches as follows:

CS	CTC	IF(C)	E.U.T.	D.T.S.
1 VEH 24	1 RX FM	1 O.C.	F 70.000MHz	RX DELAY 1
2 VEH V	2 AF LOAD 50	3 Released	M WIDE DATA	TX DELAY 1
6 Depressed (Off)	3 Depressed	4 Released	P OFF	TS - SQUELCH
	4 Released	7 DATA	T RX SIG	M - ANALOGUE
	5 Released		G Fully clockwise	
	6 Released		R LOCAL	
	7 Released			
	8 Released			
	9 Released			
	10 Depressed			
	11 Released			
	12 RF			
	13 ACCESS			
	14 CARRIER OFF			
	26 FM INT			

E.U.T. CONNECTIONS

28V to D.T.S. 28V DC OUT
HARNESS to D.T.S. RADIO HARNESS
AUDIO (upper or lower) to IF(C)5
ANT/ARFAT to CTC20

D.T.S. CONNECTIONS

TEST RIG HARNESS to IF(C)6
DVM + and - to CTC16, 17
28V DC IN to CS7
CRO to CTC22

(1) (a) Released CS6 (on) and set POWER switch to e.u.t. to 50W.

(b) Set D.T.S. MODE switch to DATA.

(c) Set r.f. sig gen to 70.000MHz at 40µV (88dB), modulated by 1kHz at 100mV for 10kHz deviation.

(d) Set d.v.m. to 10V d.c. range, and note d.v.m. indication which shall be LL - 0.6V UL 0V.

(2) (a) Set CTC14 to MOD OFF.

(b) Note d.v.m. indication which shall be LL 0.1V UL 1.5V.

(3) (a) Set CTC14 to SIGNAL and D.T.S. TEST SELECTOR switch to TONE ON.

<u>Note</u>: These Pages 61 - 68, Issue 2 supersedes Pages 61 - 68, Issue 1 dated Jun 78. Paras marked ● have been amended.

(b) Check that tone is heard in LS, and note d.v.m. indication which shall be LL 0.4V UL 1.5V.

(4) (a) Modulate the r.f. sig gen by 149Hz at 32.5mV for 3.25kHz deviation.

(b) Note d.v.m. indication which shall be LL 3.0V UL 5.0V.

<u>Test 2 - Sidetone response, tone modulation</u>

97. a. Limits: (1) With the set in WIDE DATA mode transmitting an unmodulated carrier, the resultant true sidetone shall produce an output at HARNESS socket pin E of LL 0.1V UL 1.5V.

● (2) With the set transmitting an unmodulated carrier, the deviation due to noise with or without fans running shall be less than 0.2kHz in the WIDE DATA position of the MODE switch.

● (3) The deviation due to the 149Hz tone modulation shall be LL 3.1kHz, UL 3.8kHz in WIDE DATA.

b. Method: Set t.r.e., e.u.t. and d.t.s. switches as follows:

CS	CTC	IF(C)	E.U.T.	D.T.S.
1 VEH 24	1 CW	1 O.C.	F 70.000MHz	RX DELAY - 1
2 VEH V	2 AF LOAD 50	3 Released	M WIDE DATA	TX RELAY - 1
6 Depressed (off)	3 Depressed	4 Released	O OFF	TS - SQUELCH
	4 Released	7 DATA	T RX SIG	M - ANALOGUE
	5 Released		G Fully clockwise	
	6 Released		R LOCAL	
	7 Released			
	8 Released			
	9 Released			
	10 Depressed			
	11 Released			
	12 RF			
	13 ACCESS			
	14 CARRIER OFF			
	26 RM INT			

<u>E.U.T. CONNECTIONS</u>

28V to D.T.S. 28V DC OUT
HARNESS to D.T.S. RADIO HARNESS
AUDIO (upper or lower) to IF(C)5
ANT/ARFAT to CTC20

<u>D.T.S. CONNECTIONS</u>

TEST RIG HARNESS to IF(C)6
DVM + and - to CTC16, 17
28V DC IN to CS7
C.R.O. to CTC22

(1) (a) Release CS6 (on) and set POWER switch on e.u.t. to 50W.

(b) Set D.T.S. MODE switch to DATA.

(c) Depress CTC11 and note d.v.m. indication which shall be LL 0.1V UL 1.5V.

(2) (a) Set D.T.S. TEST SELECTOR switch to TONE OFF.

(b) Set CTC1 to MOD S.T.

(c) Depress CTC11, and tune mod meter to read deviation. Note mod meter indication which shall be LT 0.2kHz (200Hz). Set test switch to OVERDRIVE, the deviation shall remain LT 0.2kHz.

(d) Release CTC11.

(3) (a) Set D.T.S. TEST SELECTOR to TONE ON.

(b) Depress CTC11 and note mod meter indication which shall be LL 3.1kHz UL 3.8kHz.

(c) Repeat (2) (a) to (3) (d) with e.u.t. set to 50.000MHz, then 30.000MHz.

Test 3 - Data modulation

98. a. Limits: With the MOD switch set to WIDE DATA, and a 16 kilobit/sec pattern of 00001111, amplitude LL 1.58V UL 1.62V, applied to HARNESS plug pin A w.r.t. pin G, the carrier shall be deviated by LL 7.2kHz UL 8.8kHz.

b. Method: Set t.r.e., e.u.t. and D.T.S. switches as follows:

CS	CTC	IF(C)	E.U.T.	D.T.S.
1 VEH 24 2 VEH V 6 Depressed (off)	1 CW 2 AF LOAD 50 3 Depressed 4 Released 5 Released 6 Released 7 Released 8 Released 9 Released 10 Depressed 11 Released 12 RF 13 ACCESS 14 CARRIER OFF 26 FM EXT	1 O.C. 3 Released 4 Released 7 DATA	F 70.000MHz M WIDE DATA P OFF T RX SIG G Fully clockwise R LOCAL	RX DELAY - 1 TX DELAY - 1 TS - SQUELCH M - ANALOGUE

E.U.T. CONNECTIONS

28V to D.T.S. 28V DC OUT
HARNESS to D.T.S. RADIO HARNESS
ANT/ARFAT to CTC20

D.T.S. CONNECTIONS

TEST RIG HARNESS to IF(C)6
28V DC IN to CS7

(1) Release CS6 (on), and set POWER switch on e.u.t. to 50W.

(2) Set D.T.S. MODE switch to DATA.

(3) Set D.T.S. TEST SELECTOR switch to DATA TX.

(4) Depress CTC11, tune mod meter, and note deviation which shall be LL 7.2kHz UL 8.8kHz.

Note...
These Pages 63-64, Issue 4 supersede Pages 63-64, Issue 3 dated Jun 82. The information has been completely revised.

Test 4 - Data receiver sensitivity and error rates

99. a. Limits: (1) With the MODE switch set to WIDE DATA, and an r.f. signal of 50 μV r.m.s. e.m.f. modulated by a square wave of 2kHz to give 8kHz deviation applied to the antenna, the output at HARNESS plug pin D w.r.t. pin G shall be LL810mV UL 990mV peak to peak.

(2) With conditions as in (1) the output at HARNESS plug pin D w.r.t. pin G when loaded by a resistance of 300Ω shall be LL 380mV UL 515mV peak to peak.

(3) With an r.f. signal of 50μV r.m.s. e.m.f. modulated by 1kHz to give 10kHz deviation (WIDE DATA), the value of the nominal 1kHz component of the waveform measured at HARNESS plug pin D w.r.t. pin G shall be LL 1.0V UL 1.25V peak to peak.

(4) With an r.f. signal of 1μV r.m.s. e.m.f. modulated by 1kHz to give 10kHz deviation and the MODE switch set to WIDE DATA, the output at AUDIO connector pin D w.r.t. pin E with HARNESS plug pin F connected to pin G shall be less than 20 mV.

(5) With an r.f. signal at the e.u.t. frequency modulated by unfiltered data 16 kilobits/sec to give 8kHz deviation, the receiver sensitivity shall be such as to give the following error rates.

Signal source	Error rate
1.413μV r.m.s. e.m.f.	LT 0.3%
1.0μV r.m.s. e.m.f.	LT 4%
0.75μV r.m.s. e.m.f.	LT 14%
0.5μV r.m.s. e.m.f.	LT 26%

b. Method: Set t.r.e., e.u.t. and D.T.S. switches as follows:

CS	CTC	IF(C)	E.U.T.	D.T.S.
1 VEH 24	1 RX FM	1 O.C.	F 70.000MHz	RX DELAY - 1
2 VEH V	2 AF LOAD 50	3 Released	M WIDE DATA	TX DELAY - 1
6 Depressed (off)	3 Depressed	4 Released	P OFF	TS - SQUELCH
	4 Released	7 DATA	T RX SIG	M - ANALOGUE
	5 Released		G Fully Clockwise	
	6 Released		R LOCAL	
	7 Released			
	8 Released			
	9 Released			
	10 Depressed			
	11 Released			
	12 RF			
	13 ACCESS			
	14 SIGNAL			
	26 FM EXT			

E.U.T CONNECTIONS

28V to D.T.S. 28V DC OUT
HARNESS TO D.T.S. RADIO HARNESS
AUDIO (upper of lower) to IF(C)5
ANT/ARFT to CTC20

D.T.S. CONNECTIONS

TEST RIG HARNESS TO IF(C)6
DVM + and - to CTC16, 17
28V DC IN to CS7
SYNTH to sig gen ext mod input
CRO to CTC22

(1) (a) Release CS6 (on) and set e.u.t. POWER switch to 50W. Set D.T.S. MODE switch to DATA and TEST SELECTOR switch to DATA RX.

(b) Remove coaxial cables from the 50 Ω output socket on the processor and the input of the 9008M. Connect the output of the processor to the 100mV INPUT of the 9008M.

(c) Ensuring that the processor is set to ext, set the r.f. sig gen to 70.000MHz at 50μV (86dB). Switch the 2-tone generators A and B to OFF.

(d) By adjustment of the D.T.S. RX preset and the processor attenuator, set 8kHz deviation on the 9008M

(e) Reconnect co-axial cables disconnjected in Sub-para (b). Note display on c.r.o. and measure signal amplitude which shall be LL 810mV, UL 990mV p-p.

(2) (a) On D.T.S. depress LOAD switch, and measure signal amplitude on c.r.o. which shall be LL 380mV UL 515mW peak to peak.

(3) (a) Set CTC26 to FM INT. Disconnect SYNTH on D.T.S. to sig gen ext mod input.

(b) Set D.T.S. TEST SELECTOR switch to TONE ON.

(c) Set 2-tone generator A to ON. Set r.f. sig gen modulation to give 10kHz deviation at 1kHz.

(d) Observe c.r.o. display (Fig 1) and measure the level of the 1kHz content which shall be LL 1.0V UL 1.25 V peak to peak.

(e) Set e.u.t. and r.f. sig gen frequency to 30.000MHz and repeat (1), (2) and (3).

(4) (a) Set r.f. sig gen output to 1μV (120 dB), modulation to give 10kHz deviation at 1kHz.

(b) Set d.T.S. TEST SELECTOR switch to TONE OFF.

(c) Depress CTC7 and note d.v.m. indication which shall be less than 20mV.

(d) Set e.u.t. MODE switch to WIDE DATA and note d.v.m. indication which shall be less than 20mV. Reconnect SYNTH on D.T.S. to sig gen ext mod input.

(5) (a) Set r.f. sig gen output to 1.4µV (117dB). Ensure that 2-tone generators A and B are OFF.

(b) Set CTC26 to FM EXT, depress CTC3.

(c) Set D.T.S. TEST SELECTOR switch to TEST RX.

(d) Adjust D.T.S. RX DELAY for minimum indication on d.v.m. which shall be less than 0.24V.

(e) Set r.f. sig gen output to the following levels; at each setting note d.v.m. indication, which shall be as shown.

R.F. output (dB)	D.V.M.
120	LT 2.13V
123	LT 5.16V
126	LT 7 0V

(f) Note that D.T.S. RX DELAY switch lies between positions 1-8.

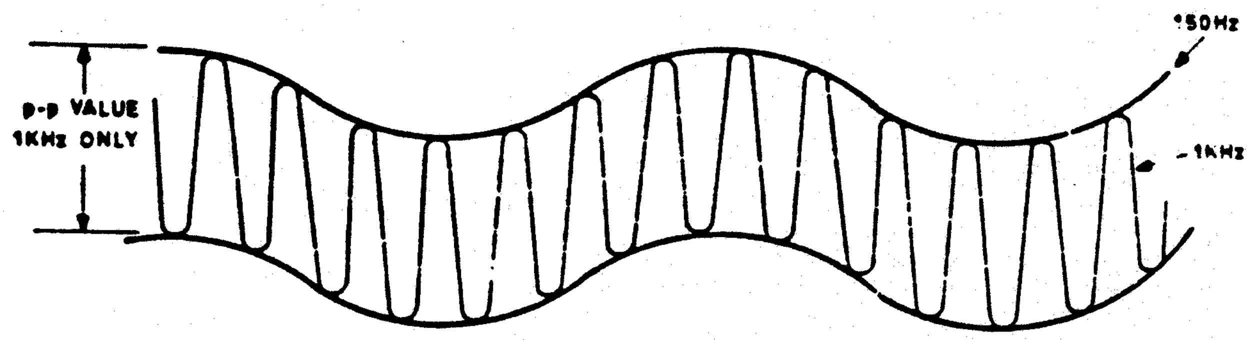

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Fig 1 - A.F. output, data

Test 5 - Data delay and frequency response

100. a. Limit: (1) The total delay through the e.u.t. when in the WIDE DATA mode shall be LL 70μS UL 130μS.

b. Method: Set t.r.e., e.u.t. and D.T.S. switches as follows:

CS	CTC	IF(C)	E.U.T.	D.T.S.
1 VEH 24 2 VEH V 6 Depressed (Off)	1 CW 2 AF LOAD 50 3 Depressed 4 Released 5 Released 6 Released 7 Released 8 Released 9 Released 10 Depressed 11 Released 12 RF 13 ACCESS 14 CARRIER OFF 26 FM EXT	1 O.C. 3 Released 4 Released 7 DATA	F 48.000MHz M WIDE DATA P OFF T RX SIG G Fully clockwise R LOCAL	RX DELAY - 1 TX DELAY - 1 TS - SQUELCH M - ANALOGUE

E.U.T. CONNECTIONS

28V to D.T.S. 28V DC OUT
HARNESS to D.T.S. RADIO HARNESS
AUDIO (upper or lower) to IF(C)5
ANT/ARFAT to CTC20

D.T.S. CONNECTIONS
TEST RIG HARNESS to IF(C)6
DVM + and - to CTC16, 17
28V DC IN to CS7
CRO to CTC22
CK to c.r.o. CHAN 2 and EXT TRIG I/P using suitable 'T' adaptor.

(1) (a) Release CTC6 (on) and set e.u.t. POWER switch to 50W.

(b) Set D.T.S. MODE switch to DATA and TEST SELECTOR switch to TEST TX.

(c) Set CTC1 to CW TX.

(d) Adjust D.T.S. TX DELAY switch clockwise for maximum indication on d.v.m. which shall be GT 2.83V.

(e) Check that D.T.S. TX DELAY switch lies between positions 1 and 8.

(f) Set c.r.o. controls to obtain 'Eye Pattern' (Fig 2) and check that the clock pulse lies within the 'Clear Area'.

(2) (a) With D.T.S. and c.r.o. controls set for 'eye pattern' (Fig 2), measure and record V mean, which shall be the average value of the maximum and minimum noise levels of the positive or negative going halfs of the eye pattern (Fig 2).

(b) Measure and record V max for the positive half of the 'eye pattern', which shall be LT 2 x V mean.

(c) Measure and record V min, for the positive half of the 'eye pattern' which shall be GT 0.6 x V mean.

(d) Repeat (b) and (c) for the negative half of the eye pattern.

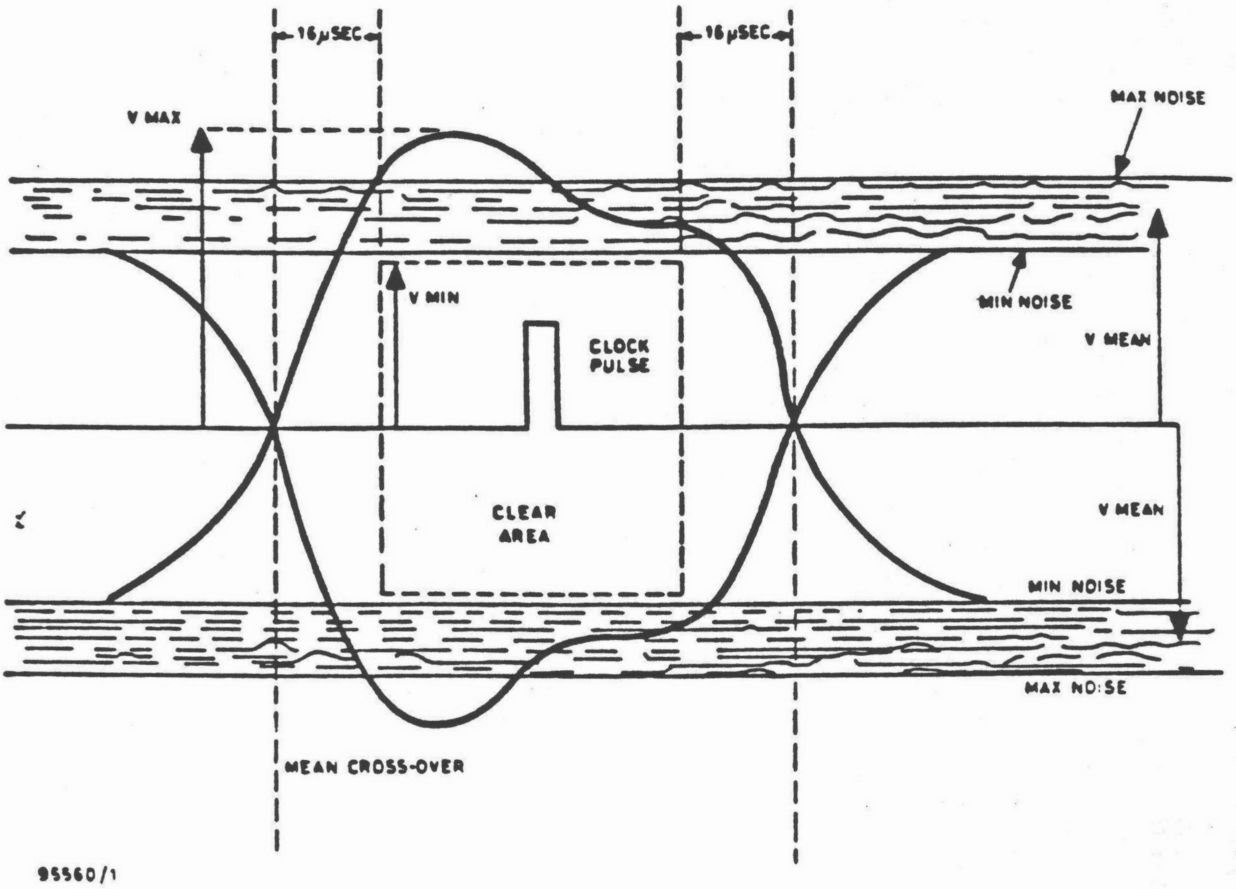

Fig 2 - Eye pattern

FAULT FINDING

GENERAL

101. Initial diagnosis will be by interpretation of front panel indications which will usually give a good guide to the general area in which the fault or faults are located. Further guidance will be given by consideration of failures of specification tests carried out on the a.t.e. or t.r.e.

102. The first decision should be to isolate the fault to one of five broad functional areas:

Transmit system
Receive system
Frequency synthesis system
Turret control system
Power supply system.

103. It should be noted that a fault in the power supply system may well produce apparent faults in one or more of the other systems, if such a fault is within the power supply unit, this may well be apparent by the diverse nature of the faults this can cause throughout the equipment.

104. Identification of a faulty assembly/sub-assembly within a system will be based on the following approach:

a. Check d.c. supplies.

b. Check inputs.

c. Check outputs.

FRONT PANEL INDICATIONS

105. Certain faults produce an alarm condition which results in the frequency dial illumination flashing on and off at approximately a 1Hz rate, with all audio outputs being pulsed at the same rate.

106. Identification of the particular fault causing an alarm is initially by interpretation of front panel test meter indications selected by the TEST switch.

107. Table 3 gives details of testmeter indications and suggests areas of fault locations.

Table 3 - Testmeter indications

Item No	TEST switch selection	Testmeter indication	Possible fault areas
1	28V SPLY	Outside LL 22V UL 26V for 24V input	Meter control board (1b)
2	RX SIG	No deflection or low deflection for average strength signals	Receive system, i.f. amplifier (5)
3	TX O/P	Red zone when pressel operated	Transmit system
4	AFC TX	Outside ±3 divisions of centre with pressel operated.	Transmit system fine frequency synthesis loop
5	SYNTH	Red Zone	Frequency synthesis loop system. Prohibited frequency set
6	TEMP	Red zone	Blowers system. Equipment overheat.
7	ARFAT	Red zone	ARFAT overheat

108. If the main frequency synthesis loop fails to lock (SYNTH) then the transmitter fine frequency synthesis loop will automatically fail (AFC TX) this prevents transmission of incorrect frequencies.

109. The reverse however is not true, ie the transmitter loop can fail even though the main loop locks, this enables the receiver to be used even though the transmitter is not useable.

110. It should be noted that setting a prohibited frequency will cause a SYNTH fault condition.

111. The Tx lamp will not illuminate when the pressel is depressed in the presence of fault conditions Items 4-7 of Table 3. Items 6 and 7 may be overridden by setting TEST switch to OVERRIDE and the transmitter may then be used.

112. True sidetone is employed and this enables a large part of the equipment to be functionally checked. If sidetone is present when the pressel is depressed the transmitter is radiating and is being modulated, the receiver and audio circuits are functioning except for a small section on audio board (2d) which is particular to the receiver audio function only.

113. The presence of sidetone does not prove the level of radiated power, depth of modulation, receiver sensitivity or a.f. output level.

SPECIFICATION TEST FAILURES

114. Table 4 itemises each specification test and suggests possible fault locations when failures occur.

Table 4 - Specification test failures

Test No	Reason for failure	Possible system failure	Possible assembly failure	Possible sub-assembly failure
1	Outside limits	-	-	Meter control board (1b)
2	(i) a. Frequency outside limits	Transmit	Tuning board (2a) Synthesiser (6)	
	b. Deviation outside limits	Transmit	Modulator board (2b) Transmitter (4)	Control board (4c2) Varactor plate (4b)
	(ii) Outside limits	Transmit	Modulator board (2b) Tuning board (2a)	
3	(i) Outside limits	Transmit	Modulator board (2b) Audio board (2d) Transmitter (4)	Control board (4c2) Varactor plate (4b) Audio pre-amp (1d)
	(ii) Outside limits	Transmit	Audio board (2d)	Audio pre-amp (1d)
4	(i) Outside limits a. No SYNTH lock	Turret control	Receiver turret (3g)	(3g)M1, (3g)TS1, (3g)RLA, (3g)S1, (3g)S2
		Frequency synthesis	Synthesiser (6) Tuning board (2a) Receiver (3)	Tuning motor Local oscillator (3h) Varactor amp (3k) Buffer amp (3f) Switch (1a)S1 Crystal oscillator (1h)
	b. SYNTH lock		Modulator board (2b) Transmitter (4)	Control board (4c2) Varactor plate (4b) Turret lid, 4g, 4h, 4j
			Receiver (3)	Control i.f. (3c)

Test No	Reason for failure	Possible system failure	Possible assembly failure	Possible sub-assembly failure
5	(i) a. No power output	Transmit	Control board (2c) Transmitter (4)	Control board (4c2) Turret lid 4g, 4h, 4j P.A. (1a)RLB
	b. Outside limits	Transmit	Transmitter (4)	Control board (4c1) P.A.
	(ii) Outside limits	Power supply Transmit	P.S.U. (7) Transmitter (4)	P.A.
6	(i) Test results in damage	Transmit	Transmitter (4)	P.A.
	(ii) a. Transmitter operates during time sequence	Transmit Frequency synthesis	Control board (2c) Synthesiser (6)	
	b. Outside time limit	Frequency synthesis	Synthesiser (6) Tuning board (2a) Receiver (3)	Varactor amp (3k) Local oscillator (3h) Buffer amp (3h) Tuning motor
	(iii) Outside time limit	Transmit	Modulator board (2b) Transmitter (4)	Control board (4c1)
7	(i) a. Sensitivity outside limit throughout frequency range	Receive	Receiver (3) I.F. amplifier (5) Audio board (2d)	V1, V2 Signal i.f. output (3)
	b. Sensitivity outside limit at extremes of frequency range	Receive	Receiver (3)	R.F. alignment
8	(i) Outside limits	Receive	I.F. amplifier (5) Audio board (2d)	
	(ii) Outside limits	Receive	Audio board (2d)	

Table 4 - (contd)

Test No	Reason for failure	Possible system failure	Possible assembly failure	Possible sub-assembly failure
9	(i) Outside limits	Receive	I.F. amplifier (5)	
	(ii) Outside limits	Receive	I.F. amplifier (5)	(1a)ME1 (1b) (1a)S4
10	(i) Outside limits	Remote control	Control board (2c)	
	Normal receiver function within limits			(1c)S6
	(ii) Outside limits	Receive	As for test 7	As for test 7
	Normal receiver function outside limits			
11	(i) a. No tone produced	Remote control	Synthesiser Tuning board (2a) Audio board (2d)	
	b. Tone outside frequency limits	Remote control	Synthesiser Tuning board (2a)	
	c. Equipment not in receive condition	Remote control	Control board (2c)	
	(ii) Outside limits	Remote control	Control board (2c)	
	(iii) a. No tone produced	Remote control	As for (1)a	
	b. Tone outside frequency limits	Remote control	As for (1)b	

Test No	Reason for failure	Possible system failure	Possible assembly failure	Possible sub-assembly failure
11 (cont)	c. No short circuit at Remote terminals	Remote control		(1a)S6
	(iv) Outside limits	Remote control	Control board (2c)	
12	(i) Outside limits	Remote control		(1a)S6
	(ii) Outside limits	Remote control	Control board (2c)	
13	Any out of limit result may be due to failure of the particular circuit being monitored failing to produce the correct voltage/logic level or to failure of (1a)S4 or associated wiring			
14	(i) Outside limits	Transmit	Audio board (2d) Modulator board (2b) Transmitter (4)	Control board (4c2) Varactor plate (4b) Audio pre-amp (1d)
	(ii) Outside limits	Transmit		Audio pre-amp (1d) (1a)S5
15	Outside limits	Transmit	Audio board (2d) Modulator board (2b) Transmitter (4)	Control board (4c2) Varactor plate (4b) Remote transformer (2)T2
16	(i) Outside limits	Receive/Audio	Receiver (3) I.F. amplifier (5) Audio board (2d)	
	(ii) Outside limits	Audio	Audio board (2d)	
	(iii) Outside limits	Audio		Gain control (1g)

Table 4 – (contd)

Test No	Reason for failure	Possible system failure	Possible assembly failure	Possible sub-assembly failure
16 (contd)	(iv) Outside limits	Receive/Audio	Audio board (2d) Receive (3) I.F. amplifier (5) Modulator board (2b)	
17	(i) a. No output 16(1) correct	Audio		Audio transformer (2)T1
	b. Outside limits	Audio	As for 16(1)	
	(iii) Outside limits	Audio	Audio board (2d)	
	(iv) Outside limit	Audio		Audio transformer (2)T1
18	(i) a. Outside limits 16(1) correct	Audio	Audio board (2d) Control board (2c)	
	b. Outside limits	Audio	As for 16(1)	
	(iii) a. Frequency outside limits	Audio	Synthesiser Tuning board (2a) Control board (2c)	
	b. Level outside limit	Audio	Audio board (2d)	
	(iv) Outside limits	Audio	Audio board (2d)	
19	(i) Outside limits	Audio	Audio board (2d)	
	(ii) Outside limits	Audio	Audio board (2d)	
	(iii) Outside limits	Audio	Audio board (2d)	
	(iv) Outside limits	Audio	Audio board (2d)	

FAULTY ASSEMBLY LOCATION

General

115. The Tables in this section give typical values of input and output signals that can be expected in a good equipment, they should be used in conjunction with Figs 2005 (Transmit system), 2004 (Receive system) and 2002 (Frequency synthesis system) to which they are complementary.

116. Details which appear on the figures may not always be repeated in the text and no details of d.c. supplies are given since these are fully illustrated on Fig 2014.

117. The source/destination of inputs/outputs are given since in some cases they may prove more readily accessible for monitoring purposes.

118. When it is required to monitor multi-connectors (eg (4)PL1) the facilities of the link box (part of Test kit) must be used (see paras 26-29).

119. It must be emphasised that values quoted are typical values and wide variations may be experienced from one equipment to another.

Transmit system (Fig 2005)

120. For all d.c. supplies see Fig 2014.

Transmitter (4)

121. To monitor pins of (4)PL1 and (4g)SK1 with transmitter (4) fitted in RT 353 the link box (part of Test kit) must be interconnected between assembly connector and chassis connector, (see paras 26-29).

Input at	Input from	Input frequency/level	Remarks	Measure using
PL3	(2b)S	-1.5V to +1.5V d.c.	OV (nominal for phase locked loop	Testmeter (1a)ME1 TX AFC
		+ Audio/Data modulation		NYA
		+ Tone modulation LL 146Hz UL 152Hz	Except WIDE Selection of MODE switch	
PL1-3	(2b)24	Logic 1 (pressel operated)	Transmit 3	D.V.M.
PL1-4	(2c)L	Logic 1 (No alarm, pressel operated)	P.A. on	D.V.M.
PL1-2	POWER switch	-ve LT 1mV d.c.	POWER switch to 1W	
-19		-ve LT 1mV d.c.	POWER switch to 15W	D.V.M.
-5		-ve LT 1mV d.c.	POWER switch to 50W	

Output at	Output to	Output frequency/level	Remarks	Measure using
PL4	RLB-SK21	R.F. output	R.F. to antenna	As per Spec.test No 5
PL1-1	RLB	LT 1.5V d.c. for logic 1 at PL1-4 28V (nominal) for logic 0 at PL1-4	Relay drive	D.V.M.
PL1-14	Tx LAMP	As PL1-1		D.V.M.
PL1-12	TEST switch	GT 100mV for logic 1 at PL1-4, LT 0.2V for logic 0 at PL1-4	TX O/P indication	
PL1-13	(2c)T	Logic 1	Temps.LT 85°C	D.V.M.
		Logic 0	Temps.GT 95°C	
PL1-9	TEST switch	GT 25V	Temps.LT 60°C	D.V.M.
		LT 15V	Temps.GT 70°C	

Modulator board (2b)

122. Fit board in appropriate extended (part of Test kit) to monitor the pins.

Input at pin	Input from	Input frequency/level	Remarks	Measure using
AA w.r.t. AB	(6)-30	LL 968.749kHz UL 968.751kHz mark : space LL 1.5:1 UL 1:1.5	Square-wave (nominal) at logic levels	Counter/ C.R.O.
6 w.r.t. 7	(3)PL2	LL 9.6695MHz UL 9.7055MHz GT 30mV r.m.s. (sine wave)	For transmitter loop locked (pressel depressed)	Counter/ C.R.O.
X	(2a)11	LL 147Hz UL 154Hz	Square-wave at logic levels (pressel depressed)	Counter/ C.R.O.
18	(2d)Z	1kHz at 0.5V r.m.s. (nominal)	CTC1 - MOD S.T. CTC2 - REM-LOC 1kHz tone at 200mV Depress CTC11	C.R.O.
U	(1h)7	Data	Data input	C.R.O.

Input at pin	Input from	Input frequency/level	Remarks	Measure using
24	(1j)7	Logic 1	'Transmit 3'	
17	(1n)42	Logic 0	NARROW MODE	
21	(1h)45	Logic 0	WIDE MODE	
Y	(1h)41	Logic 0	DATA MODE	D.V.M.
X	(1a)PL2-B	Logic 1	'Tx data 'at (1a)PL2-B	
23	(1a)PL2-F	Logic 1	'Transmit clear speech' at (1a)PL2-f	

Output at pin	Output to	Output frequency/level	Remarks	Measure using
12	(2c)N	Logic 1	For transmitter phase locked loop (Depress CTC'1)	
22	(2a)J	Logoc 0	For WIDE MODE or DATA MODE with no 'Clear speech command' but 'Tx Data' (=1) at pin Z	D.V.M.
8	(2c)W	Logic 0	For DATA MODE	

Control board (2c)

123. Fit board in appropriate extended (part of Test kit) to monitor the pins.

Input at pin	Input from	Input frequency/level	Remarks	Measure using
S	(1a)SK2-F	Logic 0	Depress CTC11 Connector item 10 to lower AUDIO socket	D.V.M.
U	(1a)SK1-F	Logic 0	Depress CTC11 Connector item 10 to upper AUDIO socket	

Input at pin	Input from	Input frequency/level	Remarks	Measure using
W	(2b)8	Logic 0	For 'data' except 'clear speech' working	
V	(1f)2	Logic 1	For no 'a.r.f.a.t. overheat'	
N	(2b)12	Logic 1	For transmitter phase locked loop (Depress CTC11)	
R	(6)28	Logic 1	For 'synth' lock	
T	(4)PL1-13	Logic 1	For no 'overheat'	D.V.M.
14			Pin at OV	
P Y 19	S6AF	OV	Dependent upon S6 setting	
18	S4CF	OV	For OVERRIDE selection of S4	
24	(2)T2	OV	For CALL selection of S6	
		19V	For other selections of S6	

Output at pin	Output to	Output frequency/level	Remarks	Measure using
L	(4)PL1-4	Logic 1	For no 'alarm' (Depress CTC11)	
AA	(2d)23	Alternate logic 1/logic 0 at 1Hz	'Alarm' (select prohibited frequency)	D.V.M.
		Logic 1	'No alarm'	
Z	(1h)25	Alternate OV/28V at 1Hz	'Alarm' (select prohibited frequency)	
		Logic 0	'No alarm'	

Output at pin	Output to	Output frequency/level	Remarks	Measure using
7	(3)PL1-5	LL 70Hz UL 97Hz 390mV	Squelch tone appears slightly distorted on c.r.o. Output lost when CTC11 depressed	Counter/ c.r.o./ d.v.m.
H	(2a)7	Logic 0	Pin 24 at 0V (S6 to CALL)	
		1.67V	Otherwise	D.V.M.
8		Logic 0	When squelch tone detected	

Audio board (2d)

124. Fit board in appropriate extender to monitor the pins.

Input at pin	Input from	Input frequency/level	Remarks	Measure using
M w.r.t. K	(1d)11	19mV r.m.s.	CTC1 - MOD S.T. CTC2 - REM-LOC 1kHz tone at 200mV (set) Depress CTC11 GAIN fully clockwise	
8 w.r.t. chassis		70mV r.m.s.	CTC1 - RC CTC2 - REM-LOC I.F. (C)1 - Tx 1400 1kHz tone at 200mV (set) GAIN fully clockwise	D.V.M.
Y		Logic 0		
		Logic 1	Depress CTC11	
H		Logic 1	LOCAL, REM, AUTO selection of S6	

Output at pin	Output to	Output frequency/level	Remarks	Measure using
Z	(2b)18	1kHz at 0.5V r.m.s. (nominal)	CTC1 - MOD S.T. CTC2 - REM-LOC 1kHz tone at 200mV (set) Depress CTC11	C.R.O.
		1kHz at 0.5V r.m.s. (nominal)	CTC1 - RC CTC2 - REM-LOC IF(C)1 - Tx 1400	

125. Audio pre-amp (1d)

Output at pin	Output to	Output frequency/level	Remarks
11 w.r.t. 10	(2d)M	1kHz	CTC1 - MOD S.T. CTC2 - REM-LOC Depress CTC11 1kHz tone at 200mV (set)
		at: 0.1V r.m.s. 0.2V r.m.s. 0.4V r.m.s.	GAIN fully counter clockwise 3-positions clockwise 7-positions clockwise

<u>Receive system</u> (Fig 2004)

126. For all d.c. supplies see Fig 2014.

Receiver (3)

127. To monitor the pins of (3)PL1 and (3g)SK1 with the receiver (3) fitted in the RT 353 the link box (part of Test kit) must be interconnected between the assembly connector and the chassis connector (see paras 26-29).

128. The received r.f. signal is injected at (3)PL3 and following amplification and mixing an i.f. output at 9.6875MHz is routed via (3)PL4.

Output at	Output to	Output frequency/level	Remarks	Measure using
(3)PL4	(5)PL2	9.6875MHz	R.F. input at (1a) SK4 at 30dB level from t.r.e.	Counter

I.F. amplifier (5)

129. For all d.c. supplies see Fig 2014.

Input at	Input from	Input frequency/level	Remarks	Measure using
(5)PL2	(3)PL4	9.6875MHz	R.F. input at (1a)SK4 at 30dB level from t.r.e.	Counter
PL1-6 (5a-6)	S2CF	29V	For WIDE selections of MODE switch	D.V.M.
		Logic 0	For NARROW selections	

Output at	Output to	Output frequency/level	Remarks	Measure using
PL1-2 (5a-2)	(1a)TS1-20	930mV	For r.f. input (1a) SK4 at 100dB modulated by 1kHz at 100mV WIDE TONE selected	D.V.M.
PL1-3 (5a-3) w.r.t. PL1-7		1kHz tone at 1V p-p	For input defined above	C.R.O.

Control board (2c)

130. Fit board in appropriate extender (part of Test kit) to monitor the pins.

Input at pin	Input from	Input frequency/level	Remarks	Measure using
F	(2b)24	Logic 1	Depress CTC11	D.V.M.
6	(5)PL1-3	1kHz tone at 1V p-p	For input defined for (5)PL1-2 output	C.R.O.

Output at pin	Output to	Output frequency/level	Remarks	Measure using
12	(2b)20	Logic 0	For received signal modulated by 150Hz tone	D.V.M.
10	(2b)W (2d)L	Logic 0	When squelch lifted by received signal	

Audio board (2d)

131. Fit board in appropriate extender (part of Test kit) to monitor the pins

Input at pin	Input from	Input frequency/level	Remarks	Measure using
6 w.r.t. 7	(5)PL1-3	Frequency: LL 300Hz UL 3kHz LL 146Hz UL 154Hz LL 83Hz UL 87Hz	Audio (1kHz at 100mV) + Tone (150Hz at 100mV) + Squelch (r.f. signal at 100dB)	C.R.O. Time/cm 1 ms Sensitivity 5V/cm Observe effect on waveform of switching off audio and tone modulations
L	(2c)10	Logic 0	For squelch lifted	D.V.M.
18	(2c)18	Logic 0	For OVERRIDE selection	
23	(2c)AA	Logic 0/logic 1	Select 00.000MHz	D.V.M. or C.R.O.
W	TS1-27	Logic 0	BK IN or IC	D.V.M.
Y	(1h)37	Logic 1	'Transmit 1' Depress CTC11	
P	(2a)6	LL 1.9kHz UL 2.1kHz	Square-wave/ select call	C.R.O./Counter

Output at pin	Output to	Output frequency/level	Remarks	Measure using
AA w.r.t. AB	(2)T1-2/3	1kHz at 2.7V r.m.s.	Tone on carrier input at (1a)SK4 (100dB) modulated by 1kHz at 100mV	C.R.O./D.V.M.
8	(2)T2-6	1kHz at 458mV	For input as above	

Modulator board (2b)

132. Fit board in appropriate extender (part of Test kit) to monitor the pins.

Input at pin	Input from	Input frequency/level	Remarks	Measure using
V	(5)PL1-2	930mV	For r.f. input at 100dB modulated by 1kHz at 100mV WIDE TONE selected	
20	(2c)12	Logic 0	For received signal modulated by 150Hz tone	D.V.M.
W	(2c)10	Logic 0	When squelch lifted by received signal	

Output at pin	Output to	Output frequency/level	Remarks	Measure using
		LL -0.6V UL +1.2V d.c.	Transmit or receive on WIDE DATA or NARROW DATA	
		LT OV (ie -ve)	No received signal for analogue selection	
19	(1a)PL2-E	NYA	NYA	D.V.M.
		LL 0.4V UL 1.2V d.c.	Received signal operating squelch but no 150Hz tone detected	
		LL 3V UL 5V	Received signal with 150Hz tone detected	

Frequency synthesis system (Fig 2002)

Receiver (3)

133. Use the facilities of the link box (part of Test kit) if required to monitor the pins.

Input at pin	Input from	Input frequency/level	Remarks	Measure using
PL1-12	(6)5	+3.9V d.c.		D.V.M.
PL1-11	(6)3	+3.68V d.c.		
PL1-7	(2a)N	OV		
PL1-9	(2a)U	OV		
PL6	(4)PL2	Selected frequency ±5 p.p.m. at 350mV	Depress CTC11	Counter/ D.V.M.

Output at pin	Output to	Output frequency/level	Remarks	Measure using
PL2	(2b)6	9.6875MHz at 300mV p-p	Depress CTC11	Counter/ D.V.M.
PL1-6	(2d)AB	10.9V d.c.		D.V.M.
PL5	(6)PL1	Set frequency + 9.6875MHz at 100mV		Counter/ D.V.M.

Tuning board (2a)

134. Fit board in appropriate extender (part of Test kit) to monitor the pins.

Input at pin	Input from	Input frequency/level	Remarks	Measure using
F	(6)25	6.25kHz at 1V p-p	Square wave	Counter/ c.r.o.
AA or Y	(7)13 (7)12	OV for no error OV for no error	For error square wave at pin dependant upon high (AA) or low (Y) error	Square wave visible on c.r.o.
Z	(3g)SK1-9	Logic 0	No inhibit	D.V.M.
		1.63V	inhibit	

Output at pin	Output to	Output frequency/level	Remarks	Measure using
N or U	(3)PL1 7 or 9	Both at 0V when not tuning. Potential of 20V between pins when tuning (polarity dependant upon error high/low	Difficult to measure due to speed of loop	D.V.M.

Modulator board (2b)

135. Fit board in appropriate extender (part of Test kit) to monitor the pins.

Input at pin	Input from	Input frequency/level	Remarks	Measure using
24	(1j)7	Logic 1	Depress CTC11	D.V.M.
AA w.r.t. AB	(6)30	968.75kHz nominally square wave but may be distorted by loading. Approximately 1V p-p		Counter C.R.O.
6 w.r.t. 7	(3)PL2	9.6875MHz at 300mV p-p	Depress CTC11	Counter/ C.R.O.

Output at pin	Output to	Output frequency/level	Remarks	Measure using
S w.r.t. R	(4)PL3	-1.5V d.c. to +1.5V d.c.	Depress CTC11 VCO Control	D.V.M.
1	(2c)N	Logic 1	Depress CTC11 Tx Lock	

Synthesiser (6)

136. Frequency switch (1a)S1 sets the variable divider (6d) by unique inputs of 0V and 3V according to Table 5 below.

137. Owing to the density of the wiring loom in the region of the synthesiser great care must be exercised when checking these functions.

Table 5 - Frequency setting inputs to synthesiser

Switch setting	X 10MHz			X 1MHz				X 100kHz					Switch
	Board A			Board C				Board D					Connectors
	13	2	15	4	9	8	6	2	10	4	8	12	
0	0V	0V	0V	3V	3V	3V	3V	0V	0V	3V	3V	0V	
1	0V	0V	0V	0V	0V	0V	0V	3V	0V	3V	3V	0V	
2	0V	0V	0V	3V	0V	0V	0V	0V	3V	3V	3V	0V	
3	3V	3V	0V	0V	0V	0V	3V	3V	3V	3V	3V	3V	
4	0V	0V	3V	3V	0V	0V	3V	0V	0V	0V	0V	3V	
5	3V	0V	3V	0V	3V	0V	3V	3V	0V	0V	0V	3V	
6	0V	3V	3V	3V	3V	0V	3V	0V	0V	0V	3V	3V	
7	3V	3V	3V	0V	0V	3V	3V	3V	0V	0V	3V	3V	
8	0V	0V	0V	3V	0V	3V	3V	0V	3V	0V	3V	3V	
9	0V	0V	0V	0V	3V	3V	3V	3V	3V	0V	3V	3V	

	X 25kHz		Switch
	Board E		Connectors
	2	6	
00	3V	3V	
25	0V	0V	
50	3V	0V	
75	0V	3V	

Note: It is more convenient to check these functions directly on the synthesiser terminals using the pin numbers indicated on Fig 2002.

Input at pin	Input from	Input frequency/level	Remarks	Measure using
PL1	(3)PL5	Set frequency plus 9.6875MHz at 100mV p-p		Counter/ c.r.o.
14 w.r.t. 15	(1h)2	4.8437MHz at 1.5V p-p	Measure at (1h)2	Counter/ c.r.o.

Note...
These Pages 87 and 88 supersede Pages 87 and 88 Issue dated Jun 78 Items marked thus have been amended

Table 5 - (contd)

Output at pin	Output to	Output frequency/level	Remarks	Measure using
30	(2b)AA	See Modulator board (2b) input at pin AA	Measure at (2b)AA	Counter/ C.R.O.
25	(2a)F	See Tuning board (2a) input at pin F	Measure at (2a)F	
13 12	(2a)AA (2a)Y	See Tuning board (2a) input at pins AA and Y	Measure at (2a)AA and Y	C.P.O.
3 w.r.t. 4	(3)PL1-11	+ 3.68V d.c.	Measure at (3)PL1-11	D.V.M.
5 w.r.t. 4	(3)PL1-12	+ 3.9V d.c.	Measure at (3)PL1-12	
28	(2c)R	Logic 1	'Synth lock'	D.V.M.

FAULTY SUB-ASSEMBLY LOCATION

General

138. The repair policy requires that faults be identified to sub-assembly level for the following assemblies:

Transmitter (4)

Receiver (3)

P.S.U. (7)

139. The tables in this section give typical values of input and output signals that can be expected in a good equipment, they should be used in conjunction with Figs 2006 (Transmitter), 2003 (Receiver) and 2007 (P.S.U.) to which they are complementary.

140. Details which appear on the figures may not always be repeated in the text and no details of d.c. supplies are given since these are fully illustrated in Fig 2014.

141. Fault finding to sub-assembly level involves use of the Test set (part of Test kit) with the t.r.e.; setting up details to achieve the necessary monitoring conditions are given as required.

<u>Transmitter sub-assemblies</u> (Fig 2006)

142. Remove the transmitter (4) and p.s.u. (7) from the RT 353 and install on the test set without using the link box (see paras 13, 14, 17, 18).

143. Ensure that the MRP INTERLOCK is connected to IF(C) AUIDO socket fan-out pin F, (using item 16-17 of Table 2001, Tels M 382) and that CTC1 is set to CW TX.

144. In the tables only those switch positions essential to the particular test are detailed.

Main chassis (4a) components

145. These items are discrete components associated with the power amplifier tetrode V1, they are either mounted on (4a)TS3, (4a)TS4 (H.V components) or interconnected between points in the immediate area of the valve base, eg C47 is interconnected between (4b)5 and turret contact 6.

146. Identification of a faulty item will largely be achieved by reference to valve pin potentials/signals.

Valve pin	D.C. potential	D.C. current	Test set switch positions	Remarks
Anode	 879V 880V 826V 797V	 10mA 20mA 75mA 150mA	28V - ON LOADINGS - LIGHT SELECT UNIT - Tx 800V BAND - 1 Tx POWER - MIN Tx POWER - 1W Tx POWER - 15W Tx POWER - 50W	Voltage measured on d.v.m. connected to d.v.m.sockets. Current measured on Test set meter <u>Note</u>: For current readings Start at POWER -50W setting and step down to MIN
2,4, 6,8	2.9-36V	-	For all settings of Tx POWER switch	Measure at (4a) TS3-2
Grid 2	288V 273V 256V 226V	-	Tx POWER - MIN Tx POWER - 1W Tx POWER - 15W Tx POWER - 50W	
Grid 1	-65V -52V -36V -23V	-	Tx POWER - MIN Tx POWER - 1W Tx POWER - 15W Tx POWER - 50W	

Varactor plate (4b)

147. To check frequency control proceed as follows:

a. Using two of item 5, Table 2, connect PL2 to CTC21 and PL4 to CTC20.

b. Using item 23, Table 2, connect Tx VCO control to PL3.

c. Set select unit to Tx VCO and vary SET VCO for 0V indication on d.v.m.

d. Set angle setting jig to 0. Slacken the two small thumbscrews and adjust the large thumbscrew for minimum frequency indication on counter.

e. Tighten the smaller thumbscrews and then set jig to 1.

f. Note and record frequency indication on counter.

g. Vary SET VCO for -1.5V indication on d.v.m.

h. Note and record frequency indication on counter.

j. Vary SET VCO for +1.5V indication on d.v.m.

k. Note and record frequency indication on counter.

l. Frequency recorded in k. shall be greater than that recorded in h. by GT 1% of that recorded in f.

m. Select BAND 3.

n. Set angle setting jig to 4.

o. Note and record frequency indication on counter.

p. Vary SET VCO for 0V indication on d.v.m.

q. Note and record frequency indication on counter.

r. Vary SET VCO for -1.5V indication on d.v.m.

s. Note and record frequency indication on counter.

t. The frequency recorded in o. shall be greater than that recorded in s. by GT 2% of that recorded in q.

Control board (4c1)

148. Check levels at pins as detailed.

Pin No	Level	Remarks	
1	Logic 1	For temperatures LT 85°C	
	Logic 0	For temperatures GT 95°C	
2	LT 950Ω w.r.t. chassis	For temperatures LT 85°C	
	GT 1150Ω w.r.t.chassis	For temperatures GT 95°C Note: Disconnect socket from (4c1) and measure at socket input pin.	
3	Logic 1	For MIN, 1W, 15W, 50W settings of Tx POWER switch	
5	0.0V	OFF, OSC ON	Tx POWER switch
	3.4V	MIN	
	3.1V	1W	
	1.93V	15W	
	Logic 0	50W	
6	+28V	OFF, OSC ON	Tx POWER Switch
	0.12V	MIN, 1W, 15W, 50W	
7	0.0V	OFF, TRANSMIT	
	3.4	MIN	
	Logic 0	1W	
	1.93	15W	
	0.0V	50W	
8	-204V	OFF, OSC ON	Tx POWER switch
	-115V	MIN.	
	-99V	1W	
	-76V	15W	
	-59V	50W	

Pin No	Level	Remarks	
9	0.0V	OFF, OSC ON	Tx POWER switch
	3.4V	MIN	
	3.1V	1W	
	Logic 0	15W	
	0.0V	50W	
10	0V	OFF, OSC ON	Tx POWER switch
	3.1 - 3.4V	MIN, 1W, 15W, 50W	

Control board (4c2)

149. Check levels at pins as detailed.

Pin No	Level	Remarks
1	-4.7V to +5.7V	According to setting of SET VCO
3	+39.4V	For -1.5V at pin 1
	+59.6V	For 0V at pin 1
	+115.6V	For +1.5V at pin 1
5	+29V	For all except OFF selection of Tx POWER switch
6	Logic 1	For all except OFF selection of Tx POWER switch

Oscillators (4g) - Band 1, (41) - Band 2, (4j) - Band 3

150. Check output level as follows:

a. Set alignment jig as in para 147 d-e.

b. Select BAND 1.

c. Set Tx POWER switch to OSC ON.

d. Monitor output at (4)PL2 on d.v.m. using probe electronic test h.f.

e. Record output levels at all settings of the jig from 1 to 4. This shall be GT 300mV r.m.s.

f. Repeat c-e for Band 2 and Band 3.

Temperature sensor (4k)

151. Check the levels at the pins as detailed.

Pin No	Level	Remarks
1	GT 25V	At LT 60°C
	LT 15V	At GT 70°C
		Note: Measure at (4)PL1-9 using link box
2	LT 950Ω w.r.t. chassis	At LT 85°C
	GT 1150Ω w.r.t. chassis	At GT 95°C
		Note: Measure at (4c1)2 with socket disconnected from (4c1)

Receiver sub-assemblies (Fig 2003)

Preliminary setting up

152. a. Remove receiver (3) and p.s.u. (7) from the RT 353 and install on the test set (part of Test kit) with the link box interconnected in the line to (3) PL1 (see para 20, 21 and 22).

b. Remove receiver back plate and turret cover for access.

c. Fit angle setting jig to test set, and set to '0'.

d. Connect (3)PL3 to CTC20 and (3)PL5 to CTC21.

e. Connect t.r.e. d.v.m. to test set d.v.m. sockets.

f. Slacken the clamp on the receiver main tuning capacitor shaft drive wheel and couple the bellows coupling between shaft end and angle setting jig.

g. Loosen the two smaller knurled thumbscrews on angle setting jig.

h. Set following switches on test set:

28V - ON
SELECT UNIT - RX ØEA
BAND - 1
SELECT UNIT - RX ØEA
LOADINGS - LIGHT

j. Adjust SET RX ØEA for 10.1V indication on d.v.m.

k. Adjust the large thumbscrew on angle setting jig for minimum frequency indication on counter (approx. 39.3MHz).

l. Tighten the smaller knurled thumbscrews on angle setting jig.

m. Set signal generator for 30.8MHz at 20dB output level.

Main chassis (3a) components

153. a. These comprise the discrete components associated with the valve amplification stages V1 and V2. Identification of a faulty item will largely be achieved by reference to valve potentials.

b. Test points referred to are identified on the main chassis in the region of the two valves.

c. Measurements are made using d.v.m. unless otherwise stated and the WANDER facility of the test box may be used.

Valve pin	Voltage/Signal level	Monitor at test point	Remarks
V1-1	0V	Turret contact 6	
V1-6	+8.8V Allow time for valve to stabilise	(3a)13	Test point located immediately behind V1. Difficult access makes it advisable to set 28V to OFF whilst locating test probe
V1-9	+222V	(3a)15	
TR1-b	+222V	(3a)17	
TR1-c	+242V	(3a)18	

Valve pin	Voltage/signal level	Monitor at test point	Remarks
V2-1	OV	Turret contact 16	
V2-6	+11V	(3a)42	Test point located adjacent V2 base below (3a)45
V2-9	+205V	(3a)46	

154. a. Use c.r.o. to monitor waveform at turret contact 2. This shall be approximately 0.2V p-p for the input defined in para 152.m.

b. Monitor waveform at turret contacts 11 and 16. These shall be approximately 0.65V p-p.

c. Monitor waveform at (3a)48. This shall be approximately 1.5V p-p.

Front end protection (3b)

155. Check levels at pins as detailed.

Pin No	Voltage/Signal level	Remarks
3	+8.8V	Measure at (3a)13 20dB r.f. attenuation
	+9V	10dB r.f. attenuation
	+10.6V	0dB r.f. attenuation
5	-23.3V	Measure at (3a)1 20dB r.f. attenuation
	-23.2V	10dB r.f. attenuation
	-21.8V	0dB r.f. attenuation

Varactor amplifier (3k)

156. a. On test box set SELECT UNIT switch to RX ØEA.

b. Connect d.v.m. to DVM sockets and WANDER socket to (3k)5.

c. Adjust SET RX ØEA for an indicated 2.0V on d.v.m.

d. Set SELECT UNIT switch to WANDER and note d.v.m. indication which shall be approximately 2.36V.

e. Set SELECT UNIT switch to RX ØEA and adjust SET RX ØEA for indication of 15.0V on the d.v.m.

f. Set SELECT UNIT switch to WANDER and note d.v.m. indication which shall be approximately 17.73V.

Local oscillator (3h)

157. a. Set SELECT UNIT to RX ØEA and adjust SET RX ØEA for 10.1V indication on d.v.m.

b. Connect counter to (3h)2.

Note: (3h)2 is a test point located immediately above the feed-through capacitor on rear face of (3h).

c. Set angle setting jig to 2, and note counter indication which shall be LL 40.3775MHz UL 40.4175MHz.

d. Set angle setting jig to 3 and note counter indication which shall be LL 49.8075MHz UL 49.847MHz.

e. Set BAND switch to 2 and note counter indication which shall be LL 64.4975MHz UL 64.5375MHz.

f. Set angle setting jig to 2 and note counter indication which shall be LL 51.5975MHz UL 51.6575MHz.

g. Set BAND to 3 and note counter indication which shall be LL 67.0175MHz UL 66.9775MHz.

h. Set angle setting jig to 3 and note counter indication which shall be LL 84.1275 UL 84.1675.

Note: Any serious deviation from the limits may indicate need for local oscillator alignment (para 184).

j. Set angle setting jig to 2.

k. Use d.v.m. probe to check output level of the sinusoidal waveforms at (3h)2 ensuring counter is disconnected:

BAND 1 - 300mV p-p
BAND 2 - 300mV p-p
BAND 3 - 300mV p-p

Buffer amplifier (3f) and control i.f. (3c)

158. a. Set angle setting jig to 2.

b. Use d.v.m. probe to measure waveform at (3h)2. (Test point immediately above the feed-through capacitor).

c. Note and record the r.m.s. level (approx. 300mV).

d. Use d.v.m. probe to measure the r.m.s. level of buffer amplifier output at (3a)PL5. This should be approximately twice the value recorded in c.

e. Set r.f. sig gen for 50.0000MHz at 30dB level and inject at (3)PL6.

f. Connect counter to (3)PL5.

g. Adjust angle setting jig until counter indicates 60.0000MHz (nominal).

h. Use d.v.m. to measure output level at (3)PL2. This shall be GT 15mV r.m.s.

Signal mixer (3e) and signal i.f. output (3d)

159. a. Select BAND 2.

b. Set r.f. signal generator for 50.0000MHz at 30dB level and inject at (3)PL3.

c. Connect counter at (3)PL5 and adjust angle setting jig for approximately 59.6875MHz.

d. Use SET RX ØEA as a fine control to set indicated frequency to 59.6875MHz..

e. Use d.v.m. probe to measure and record r.m.s. level of the signal at (3a)48 (input to (3e)5). This should be approximately 150mV.

f. Use d.v.m. probe to monitor either (3d)3 or (3d)4.

Note: (3d)3 and (3)4 are accessible through the gap between turret and turret frame immediately above the centre securing hole for the receiver assembly. The pins are identifiable by resistors R10, R11. Due to limited access a well insulated probe should be used and it is advisable to set 28V switch to OFF whilst making connection. The r.m.s. level of the waveform should be greater than that recorded in e.

g. Use c.r.o. to measure value of the waveform at (3)PL4. This should be approximately 1.0V p-p.

h. The frequency of the signal at (3)PL4 should be approximately 9.687MHz.

j. Select BAND 1.

Note...
These pages 97 and 98 Issue 2, supersede Pages 97 and 98, Issue 1 dated Jun 88. Warning added after Para 166.

k. Set t.f. sig gen for 30.71 MHz at 30dB level and using counter monitor frequency at (3)PL4. Adjust angle setting jig to give frequency of 9.68MHz.

l. Using c.r.o. connected to (3)PL4 in place of counter adjust (3d)C1 for maximum indicated amplitude.

Power supply unit sub-assemblies (Fig 2007)

160. Connect d.v.m. to DVM sockets on test set; connect c.r.o. in parallel with the d.v.m. to measure ripple. Table 6 defines voltage and ripple limits for all d.c. supplies from the p.s.u. (7) with test set switches as specified.

Table 6 - P.S.U. outputs

D.C. voltage	Test box switches	Voltage limits	Ripple limits (peak to peak)
All	28V to ON LOADING to HEAVY	-	-
+800	SELECT LINE - +800V SELECT UNIT - PSU1	LL 380V UL 420V	LT 4.0V
+250	SELECT LINE - +250V SELECT UNIT - PSU1 - PSU2	LL 237.5V UL 262.5V LL 237.5V UL 262.5V	LT 1.25V LT 1.25V
+28(RAW)	SELECT LINE - +28V RAW SELECT UNIT - PSU1	LL 26.6V UL 29.4V	-
+28	SELECT LINE - +28V SELECT UNIT - PSU1 - PSU2 - PSU3 - PSU4	LL 26.6V UL 29.4V LL 26.6V UL 29.4V LL 26.6V UL 29.4V LL 26.6V UL 29.4V LL 26.6V UL 29.4V	LT 140mV LT 140mV LT 140mV LT 140mV LT 140mV
+25	SELECT LINE - +25V SELECT UNIT - PSU1	-	-
+12	SELECT LINE - +12V - PSU1 - PSU2 - PSU3 - PSU4	LL 11.4V UL 12.6V LL 11.4V UL 12.6V LL 11.4V UL 12.6V LL 11.4V UL 12.6V LL 11.4V UL 12.6V	LT 60mV LT 60mV LT 60mV LT 60mV LT 60mV
+6	SELECT LINE - +6V SELECT UNIT - PSU1 - PSU2	LL 5.7V UL 6.3V LL 5.7V UL 6.3V	LT 30mV LT 30mV

Table 6 - (cont)

D.C. voltage	Test box switches	Voltage limits	Ripple limits (peak to peak)
+3	SELECT LINE - +3V SELECT UNIT - PSU 1	LL 3V UL 3.3V	LT 15mV
-6	SELECT LINE - 6V SELECT UNIT - PSU 1 - PSU 2 - PSU 3 - PSU 4	LL -5.7V UL -6.3V LL -5.7V UL -6.3V LL -5.7V UL -6.3V LL -5.7V UL -6.3V	LT 30mV LT 30mV LT 30mV LT 30mV
-300	SELECT LINE - -300V SELECT UNIT - PSU 1 - PSU 2	LL -247V UL -273V LL -247V UL -273V	LT 3.2V LT 3.2V

161. Any power supply unit which performs to the limits shown in Table 6 is considered to be funcitoning satisfactorily.

162. For fault finding purposes the p.s.u. may be considered in two sections. The first section from input up to and including (7d)3 is concerned with the production of a +18V stabilised supply. The second section from (7a)T2 secondary output is concerned with the production of the various d.c. supplies from the a.c. induced in T2. Linking the two defined sections is the inverter circuit driven by a square wave input from control board (7b) and providing the a.c. drive to transformer (7a)T2.

163. For fault location purposes the two sections may be isolated by disconnecing the lead from (7d)3, and connecting (7d)3 to the PSU REG O/P terminal of test set using item 6.

164. The presence of the +18V stabilised voltage at (7d)3 w.r.t. (7b)2 following removal of the lead establishes the correct functioning of the first section. The level with (7d)3 disconnected is of the order of +18.3V. Loss of, or degradation of, the +18V stabilised voltage is likely to affect all d.c. output voltages and may cause the p.s.u. to 'trip'.

165. The second section comprises conventional diode bridge rectification and capacitive smoothing circuits, failure of diode rectifiers will result in the loss of, or degradation of, the associated d.c. outputs. The p.s.u. may also 'trip' under certain conditions of diode failure. Failure of the smoothing circuits will result in out of tolerance ripple levels on the associated d.c. outputs.

166. The presence of the square wave drive to the inverter circuit is characterised by a distinctive 'hum' when the p.s.u. is running and may be confirmed by connecting a c.r.o. to the appropriate pins on (7b).

WARNING...

DAMAGE MAY BE CAUSED BY SHORT CIRCUITS BETWEEN PINS ON THE EDGE OF THE PEC, AND THE ADJACENT -18 VOLT TRACK.

Note...
These Pages 99, 99a and 100 Issue 3, supersede Pages 99, 99A and 100 Issue 2 dated Nov 87. Para 170 and 174 have been amended.

167. The output at (7a)T2 pin 6 is a square wave at 1:1 mark:space ratio, 28V peak to peak, and the output at pin 8 is the inverse of that at pin 6.

168. The following sub-assembly details are applicable only when the p.s.u. is fitted on the test set (part of Test kit) and the outputs are being delivered into the HEAVY dummy load.

P.S.U. overload trip test

169. a. With the p.s.u. connected to the test set, disconnect wire 788 from (7d)3.

b. Using item 6 of the Test kit, connect (7d)3 to PSU REG O/P terminal of test set.

c. On test set, set REG LOAD fully counter clockwise.

d. Connect CTC16, 17 to REG CURRENT MON sockets on test set.

e. Depress CTC3.

f. On test set, set 28V switch to ON.

g. Monitor d.v.m. and adjust REG LOAD clockwise until p.s.u. trips.

h. Note d.v.m. indication at which .s.u. tripped, which shall be LL 1.44V UL 1.67V (1V = 10A).

j. With p.s.u. tripped, note d.v.m. indication, which shall be less than 0.1V.

k. On test set, set 28V switch to OFF.

l. Re-connect wire 788 to (7d)3.

Control board (7b)

170. Caution: The logic levels within this board are 'floating', i.e Logic 0 (pin 7) is NOT 0V and must not be used as an earth return for test equipment. Such a connection may result in damage to D1, R1 and TR1. (An exception may be made in the case of the d.v.m. since it uses isolated terminals.)

PIN No	FREQUENCY LEVEL TTL 7b	FREQUENCY/LEVEL CMOS 7b	MEASURE USING
1	Square wave at logic levels logic 1(4v) -5 μs logic 0 -25 μs	as TTL 7b	CRO
2 W.R.T 7 (-ve) 2 W.R.T 3 (-ve) 2 W.R.T 5 (-ve)	+5.3 +23 +18v	+11.3 v as TTL 7b as TTL 7b	DVM DVM DVM
4	Square wave. 18v peak to peak. Mark : Space. 5:1	as TTL 7b	CRO
6	Series of -ve spikes at logic levels (5v pp). LT 8 pulses in 32 s for 'no fault' condition.	Series of -ve spikes at logic levels (12 v pp). LT 4 in 27.5 μs for 'no. fault' condition	CRO
9.10	Square wave. 30v peak to peak. Mark : Space. 1:1 at periodic time 200 μs	as TTL 7b	CRO
8.11	Not applicable	A series of spikes at cross over at periodic time of 100 s, app. The amplitudes between spikes being approximately equal	CRO

Note...
This Page 100 Issue 4, supersedes Page 100 Issue 3 dated Jun 89. Paras 171 and 174 Tables have been amended.

Regulator board (7c)

171.

Pin No	Frequency/level	Measure using
1 w.r.t. 6	+537mV	D.V.M.
2 w.r.t. 6	+23V	D.V.M.
3 w.r.t. 6	1.05V	D.V.M.
4	As (7b)1	C.R.O.
5 w.r.t. 6	+23V	D.V.M.

Tunnel diode (7d)

172.

Pin No	Frequency/level	Measure using
1	Logic 0	D.V.M.
2	As (7b)6	C.R.O.
3) w.r.t. (7b)2	+17.8V	D.V.M.
4) (+ve)	+17.9V	D.V.M.

+18V stabilised supply

173. With power supply unit (7) mounted on test set (part of Test kit) and its outputs feeding into HEAVY dummy loads, connect d.v.m. between control board (7b) pin 2 and pin 5 (-ve) and set (7b)R18 for an indicated 18.00V.

Clock pulse generator

174. With power supply unit (7) mounted on test set as para 173, use CRO to view the clock pulse generator output. The displayed waveform should be a nominal square wave with negative pulses and pulse width as below. Adjust for a periodic time as below.

MEASURE/SET	TTL (7b)	CMOS (7b)
View clock pulse generator at	(7b) R7	(7b) R12
Negative pulse amplitude (peak to peak)	4V approx	8V approx
Pulse width	1 to 2.5 μs	3 to 5 μs
Adjust resistor for periodic time	(7b) R3	(7b) R7
Periodic time	32 μs	27.5 μs

ALIGNMENT

General

175. All the following alignment procedures are carried out with the equipment removed from the outer case.

176. Alignment of the major assemblies (transmitter and p.s.u.) is carried out with these items mounted on the test set (part of Test kit).

Front panel meter setting

177. a. Set t.r.e. and e.u.t. switches as follows:

CS	CTC	IF(C)	E.U.T.
1 VEH 24 2 VEH V 6 Released (ON)	1 CW 2 AF LOAD 100 3 Released 4 Released 5 Released 6 Released 7 Depressed 8 Released 9 Released 10 Depressed 11 Released 12 RF 13 RF 14 SIGNAL 26 FM INT	1 O.C. 3 Released 4 Released 7 NORMAL	F 30.000MHz M WIDE TONE P OFF T 28V SPLY G Mid-position R LOCAL

E.U.T. CONNECTIONS

24V to CS7 (item 7)

b. Set POWER switch on e.u.t. to MIN.

c. Adjust R1 on meter control board (1b) (just below the elapsed time indicator) for a front panel meter indication of 24 (mid-scale).

Crystal oscillator

178. a. Set t.r.e. and e.u.t. switches as follows:

CS	CTC	IF(C)	E.U.T.
1 VEH 24 2 VEH V 6 Released (ON)	1 CW 2 AF LOAD 100 3 Released 4 Released 5 Released 6 Released 7 Depressed 8 Released 9 Released 10 Depressed 11 Released 12 RF 13 RF 14 SIGNAL 26 FM INT	1 O.C. 3 Released 4 Released 7 NORMAL	F 50.000MHz M WIDE TONE P OFF T 28V SPLY G Mid-position R LOCAL

E.U.T. CONNECTIONS

24V to CS7 (item 7)
AUDIO (upper or lower) to IF(C)6(item 10)
ANT/ARFAT to CTC20 (item 7)

b. Set POWER switch on e.u.t. to MIN.

c. Wait for GT 40 seconds and then depress CTC11.

d. Note and record counter indication which shall be LL 49.999900MHz UL 50.000100MHz.

e. If the frequency is not within the limits specified adjust the links on the base of board (1h) (to left of synthesiser) according to the table below:

Required change in frequency (Hz)	0V to pin(s)	Pin A to pin(s)
+75	B	-
-75	-	B
+150	C	-
-150	-	C
+225	B+C	-
-225	-	B+C
+300	D	-
-300	-	D
+375	B+D	-
-375	-	B+D
+450	C+D	-
-450	-	C+D
+525	B+C+D	-
-525	-	B+C+D

f. Record frequency obtained and connection used

Receiver - Transmitter tuning shaft coupling

179. a. Set t.r.e. and e.u.t. switches as follows:

CS	CTC	IF(C)	E.U.T.
1 VEH 24 2 VEH V 6 Depressed (off)	1 CW 2 AF LOAD 100 3 Released 4 Released 5 Released 6 Released 7 Depressed 8 Released 9 Released 10 Depressed 11 Released 12 ACCESS 13 RF 14 SIGNAL 26 FM INT	1 O.C. 3 Released 4 Released 7 NORMAL	F 50.000MHz M WIDE TONE P OFF T 28V SPLY G Mid-position R LOCAL

E.U.T. CONNECTIONS

24V to CS7 (item 7)
AUDIO (upper or lower) to IF(C)5 (item 10)

b. Remove tuning board (2a) and modulator board (2b) from their sockets on motherboard (2e).

c. Disconnect coaxial socket from PL1 on synthesiser (6).

d. Disconnect coaxial socket from PL5 on receiver (3) (See note).

Note: Due to the proximity of pins on boards (1b), (1d) and RE1 it is advisable to ensure the supply is switched off at CS6 whilst disconnecting this socket.

e. Using item 5 of Test kit connect (3)PL5 to CTC21.

f. Slacken off the securing bolts on the bellows coupling clamp on the transmitter/receiver tuning shaft.

g. Set CS6 to ON (released) and the POWER switch on e.u.t. to MIN.

h. Rotate receiver tuning shaft for minimum frequency indication on counter.

j. Remove coaxial connector from (3)PL5 and connect it to (4)PL2 (see Note sub-para d.).

k. Set CTC1 to CW TX.

l. Holding receiver tuning shaft firm, rotate transmitter shaft for minimum frequency indication on counter.

m. Set CTC1 to CW RX and e.u.t. POWER switch to OFF.

n. Without disturbing shaft setting tighten clamp securing screws on the bellows coupling.

Transmitter alignment

180. Carry out preliminary setting up as follows:

a. Mount transmitter (4) and p.s.u. (7) on test set without using the link box (paras 13, 14, 16-18).

b. Slacken collar on the tuning drive gearing.

c. Fit angle setting jig to test set and connect bellows coupling to the end of the transmitter tuning shaft.

d. Connect (4)PL2 to CTC21 using item 5 (Test kit)
(4)PL4 to CTC20 using item 5 (Test kit)

Short circuit (4)PL3 to chassis (sets Tx VCO at 0V).

e. Connect d.v.m. (CTC16, 17) to test set DVM sockets.

f. Set the switches on the test set as follows:

28V - ON
Tx POWER - 50W
SELECT UNIT - Tx VCO

Ensure MPP INTERLOCK connected and CS6 released (ON).

g. Set angle setting jig to 0 and slacken the two smaller knurled thumbscrews.

h. Adjust the large knurled thumbscrew on angle setting jig for minimum frequency indication on counter.

j. Tighten the smaller knurled thumbscrews.

181. Align oscillator frequency as follows:

a. Set BAND switch to 1.

b. Set angle setting jig to 2.

c. Adjust (4g)L1 to give a counter indication of 30.71MHz.

d. Set angle setting jig to 3.

e. Adjust (4g)C1 to give a counter indication of 40.14MHz.

f. Repeat b-e. until no further adjustment is required.

g. Repeat b-f. on bands 2 and 3 for the frequencies listed below.

Caution: Set Tx POWER to OFF whilst changing bands.

Band	Jig setting	Freq (MHz)	Adjust
1	2 3	30.71 40.14	(4g)L1 (4g)C1
2	2 3	41.97 54.83	(4h)L1 (4h)C1
3	2 3	57.31 74.46	(4j)L1 (4j)C1

182. Align power output as follows:

a. Set BAND switch to 1, Tx POWER to 4 and CTC1 to CW TX.

b. Set angle setting jig to 2.

c. Adjust (4g)C2 for maximum power indication on d.v.m.

d. Set angle setting jig to 3.

e. Re-adjust (4g)C2 for maximum power.

f. Repeat b-e. for optimum results.

g. Repeat b-f. for bands 2 and 3.

Caution: Set Tx POWER to OFF whilst changing bands.

Note... These Pages 105 to 110 Issue 3 supersede Pages 105, 109 and 110 Issue 2 dated Nov 87, Pages 106 to 108 were deleted by Issue 2 and are replaced by Issue 3.

h. If the power output does not reach specification limits, set e.u.t. Tx POWER and test set 28V switches to OFF and remove the appropriate turret lid to adjust L2 by physically moving the coil turns. Repeat b-h. until correct specification limits are obtained.

Receiver alignment

183. Carry out preliminary setting up as follows:

a. Mount receiver (3) and p.s.u. (7) on test set (para 13, 21).

b. Slacken collar on the tuning drive gearing.

c. Fit angle setting jig to test set and connect the bellows coupling to the end of the receiver tuning shaft.

d. Connect (3)PL5 to CTC21 and switch to ACCESS.

e. Connect Fluke 25 to the DVM sockets on the test set, and set Fluke to volts DC.

f. Ensure that CS6 is released (ON).

g. Set switches on test set as follows:

28V	-	ON
SELECT UNIT	-	RX ØEA
BAND	-	1

h. Adjust SET RX ØEA control on test set for an indication on the Fluke of 9.75V d.c.

j. Set angle setting jig to 0 and slacken the two smaller knurled thumbscrews.

k. Adjust the large knurled thumbscrew until the counter indicates minimum frequency (approx. 39.2MHz).

l. Tighten the smaller knurled thumbscrews.

184. Align local oscillator as follows:

a. Set angle setting jig to 2.

b. Adjust (3n)L4 to obtain a counter indication of 40.402MHz.

c. Set angle setting jig to 3.

d. Adjust (3n)C8 to obtain a counter indication of 49.832MHz.

e. Repeat a-d. until no further adjustment is required.

f. Repeat a-e. for bands 2 and 3 at the frequencies listed below:

Band	Jig Setting	Freq (MHz)	Limits (Freq)	Adjust
1	2 3	40.402 49.832	LL 40.38 UL 40.402 LL 49.81 UL 49.832	(3n)L4 (3n)C8
2	2 3	51.662 64.522	LL 51.64 UL 51.662 LL 64.50 UL 64.522	(3r)L4 (3r)C8
3	2 3	67.002 84.152	LL 66.98 UL 67.002 LL 84.13 UL 84.152	(3t)L4 (3t)C8

185. Align turret lids r.f. as follows:

CAUTION: DO NOT MANUALLY ROTATE THE RECEIVER TURRET HEAD TO CHANGE BANDS

a. Ensure the test set 28V is switched OFF.

b. Connect RF I/P of spectrum analyser to pin 23 of receiver (C8/R6 junction).

c. Connect RF OUT of spectrum analyser to (3)PL3.

d. Switch test set 28V ON and set to BAND 1 and angle jig setting to 2. Switch test set 28V to OFF.

e. Insulate contact No 11 from turret.

CAUTION: ALWAYS REMOVE INSULATOR BEFORE CHANGING BANDS

f. Switch test set 28V ON.

g. Switch on spectrum analyser (allow to self test and warm up - approx 3 mins).

h. Set controls on spectrum analyser as follows:

(1) Press FREQUENCY button
(2) Press CENTRE FREQUENCY button and set a frequency of 30.715MHz using front panel controls
(3) Press SPAN button and set a frequency of 10.0MHz
(4) Press AMPLITUDE button
(5) Press REF LVL button and set to +20dB
(6) Press AUX CONTROL button
(7) Press TRACKING GENERATOR button
(8) Press SRC PWR button and ensure ON is underlined
(9) Press FREQUENCY button

Alternative settings can be used to enable a more detailed display of the response curve.

NOTE: A RESPONSE SHOULD NOW BE SEEN IN THE DISPLAY

j. Adjust (3m)L1 and (3m)L2 for a symmetrical response about the REF FREQ.

k. Set angle setting jig to 3.

l. Set controls on spectrum analyser as follows:

(1) Press FREQUENCY button
(2) Press CENTRE FREQUENCY button and set a frequency of 40.145MHz using front panel controls
(3) Press SPAN button and set a frequency of 10.0MHz
(4) Press AMPLITUDE button
(5) Press REF LVL button and set to +20dB

m. Adjust (3m)C1 and (3m)C4 for a symmetrical response about the REF FREQ.

A TYPICAL RESPONSE CURVE IS SHOWN AT FIG 4

n. Repeat h-m. until no further adjustment is required.

p. Repeat h-n. for Bands 2 and 3 at the settings detailed below:

Band	Jig Setting	REF FREQ (MHz)	SPAN (MHz)	REF LVL	Adjust
1	2 3	30.715 40.145	10.0 10.0	+20dB +20dB	(3m)L1, L2 (3m)C1, C4
2	2 3	41.975 54.835	10.0 10.0	+20dB +20dB	(3p)L1, L2 (3p)C1, C4
3	2 3	57.315 74.465	10.0 10.0	+20dB +20dB	(3q)L1, L2 (3q)C1, C4

186. Align the turret lids bandpass circuits as follows:

Ensure the previous paragraph has been carried out to produce the best waveform possible.

a. Ensure the test set 28V is switched OFF.

b. Reconnect contact 11 to the turret (i.e. remove insulation).

c. Remove RF I/P of spectrum analyser from pin 23 of receiver (C8/R6 junction) and connect to pin 48 (C12/co-axial cable junction).

d. Switch test set 28V ON and set to BAND 1 and angle jig setting to 2.

e. Set controls on spectrum analyser as follows:

(1) Press FREQUENCY button
(2) Press CENTRE FREQUENCY button and set a frequency of 30.715MHz using front panel controls
(3) Press SPAN button and set a frequency of 10.0MHz
(4) Press AMPLITUDE button
(5) Press REF LVL button and set to +20dB

f. Adjust (3n)L1, (3n)L2 and (3n)L3 for a symmetrical response about the REF FREQ.

g. Press MKR -> button.

h. Ensure that the <> symbol is 20dB down at +/-5% either side of the centre frequency (this can be done by moving the calibration marker to the required frequency as shown in fig.4).

j. Set angle setting jig to 3.

k. Set controls on spectrum analyser as follows:

(1) Press FREQUENCY button
(2) Press CENTRE FREQUENCY button and set a frequency of 40.145MHz using front panel controls
(3) Press SPAN button and set a frequency of 10.0HMz
(4) Press AMPLITUDE button
(5) Press REF LVL button and set to +20dB

l. Adjust (3n)C2, (3n)C3 and (3n)C6 for a symmetrical response about the REF FREQ.

m. Press MKR -> button.

n. Ensure that the <> symbol is 20dB down at +/-5% either side of the centre frequency (this can be done by moving the calibration marker to the required frequency as shown in fig 4).

p. Repeat e-n until no further adjustment is required.

q. Repeat d-p for Bands 2 and 3 at the settings detailed below:

Band	Jig Setting	REF FREQ (MHz)	SPAN (MHz)	REF LVL	Adjust	+5% (MHz)	-5% (MHz)
1	2 3	30.715 40.145	10.0 10.0	+20dB +20dB	(3n) L1, L2, L3 (3n) C2, C3, C6	32.251 42.146	29.179 38.144
2	2 3	41.975 54.835	10.0 10.0	+20dB +20dB	(3r)L1, L2, L3 (3r)C2, C3, C6	44.074 57.577	39.876 52.093
3	2 3	57.315 74.465	10.0 10.0	+20dB +20dB	(3t)L1, L2, L3 (3t)C2, C3, C6	60.181 78.188	54.449 70.742

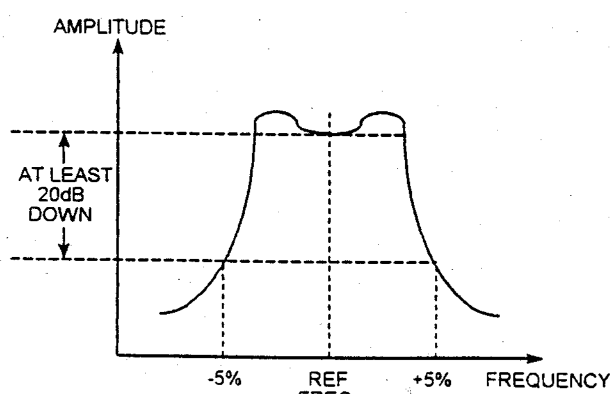

Fig.4 - R.F. Alignment Display

186A. Check Buffer Amp (3f) and Control IF (3c) settings as follows:

a. Set angle setting jig to 2.

b. Use CRO to measure the rms level of buffer amp output at (3)PL5, the reading shall be greater than 700mV on all bands.

c. Set signal generator to 50MHz at 200mV level, and inject at (3)PL6.

d. Connect counter to (3)PL5.

e. Adjust angle setting jig until counter reads 60MHz.

f. Use CRO to measure o/p level at (3)PL2, the reading shall be greater than 15mV rms.

187. Align signal i.f. output as follows:

a. With conditions as for bandpass alignment (para 186), remove detector source input from pin 48 (C12/co-axial cable junction).

b. Connect (3)PL4 to CH1 INPUT on the CRO.

c. Adjust (3d)C1 (access through hole midway between turret side securing screws) for maximum amplitude of output.

<u>150Hz tone level setting</u>

188. a. set t.r.e. and e.u.t switches as follows:

CS	CTC	IF(C)	E.U.T.
1 VEH 24V	1 RX FM	1 O.C.	F 50.000MHz
2 VEH V	2 AF LOAD 100	3 Released	M WIDE TONE
6 Released (ON)	3 Depressed	4 Released	P OFF
	4 Released	7 NORMAL	T RX SIG
	5 Released		G Mid-position
	6 Released		R LOCAL
	7 Released		
	8 Released		
	9 Released		
	10 Depressed		
	11 Released		
	12 AF		
	13 AF		
	14 SIGNAL		
	26 FM INT		

<u>E.U.T. CONNECTIONS</u>

24V to CS7 (item 5)
AUDIO (upper or lower) to IF(C)5 (item 10)
ANT/ARFAT to CTC20 (item 7)
HARNESS to IF(C)6 (item 11)
Monitor point 9 on (2c) to CTC16
(2c) chassis to CTC17

b. Fit control board (2c) in appropriate extender (part of Test kit).

c. Set POWER switch on e.u.t. to MIN.

d. Set signal generator for 50.000MHz at 10µV (100dB) modulated by 149Hz at 32.5mV level.

e. Adjust (2c)R43 (TN) for maximum indication on d.v.m.

<u>85Hz squelch level setting</u>

189. a. T.R.E. and e.u.t. switch settings are as para 188.

b. Fit control board (2c) in appropriate extender (part of Test kit).

c. Adjust (2c)R40 (SQ) to fully clockwise position (clutch slips) and then back-off four turns counter-clockwise.

d. Use d.v.m. to check that (2c)10 is at logic 0 w.r.t. (2c)D.

<u>Modulation level settings</u>

190. a. Set t.r.e. e.u.t and D.T.S. switches as follows:

<table>
<tr><th>CS</th><th>CTC</th><th>IF(C)</th><th>E.U.T.</th><th>D.T.S.</th></tr>
<tr><td rowspan="2">1 VEH 24V
2 VEH V
6 Released
(ON)</td><td rowspan="2">1 MOD S.T.
2 AF LOAD 100
3 Released
4 Released
5 Released
6 Released
7 Depressed
8 Released
9 Released
10 Depressed
11 Released
12 RF
13 RF
14 SIGNAL
26 FM INT</td><td>1 O.C.
3 Released
4 Released
7 NORMAL</td><td>F 40.000MHz
M WIDE
P OFF
T RX SIG
G Mid-position
R LOCAL</td><td>RX DELAY 1
TX DELAY 1
TS - SQUELCH
M - ANALOGUE</td></tr>
<tr><td colspan="3"><u>E.U.T. CONNECTIONS</u>

28V to D.T.S. 28V DC OUT
AUDIO (upper or lower) to IF(C)5 (item 10)
ANT/ARFAT to CTC20 (item 7)
HARNESS to D.T.S. RADIO HARNESS

<u>D.T.S. CONNECTIONS</u>

TEST RIG HARNESS to IF(C)6
28V DC IN to CS7</td></tr>
</table>

b. Set POWER switch on e.u.t. to 50W.

c. Set a.f. tone generator for 1kHz at 100mV level.

d. Set up mod meter to read 10kHz deviation at 40.000MHz.

e. Depress CTC11 and adjust R8 (A) on modulator board (2b) for LL 10.4kHz UL 10.6kHz deviation indication on mod meter.

f. Set MODE switch to WIDE TONE.

g. Set CTC1 to PILOT TONE.

h. Set a.f. tone generator to OFF.

j. Depress CTC11 and adjust R25 (T) on modulator board (2b) for LL 3.35kHz UL 3.45kHz.

k. Set e.u.t. MODE switch to WIDE DATA.

l. Set IF(C)7 to DATA.

m. Set D.T.S. MODE switch to DATA and TEST SELECTOR switch to DATA TX.

n. Set CTC1 to CW TX.

o. Adjust R14 (D) on modulator board (2b) for LL 7.9kHz UL 8.1kHz deviation indication on mod meter.

<u>Capacitor drive shaft alignment, transmitter and receiver</u>

191. a. Fig 5 shows the method of locating the transmitter (4) on the alignment jig (part of Test kit).

b. Slacken the drive assembly securing screws and locate the unit on the shaft setting gauge, ensuring that the shaft is located in the slot provided.

c. Locate the capacitor drive setting gauge on the end of the capacitor shaft (gauge marked TX).

d. Re-tighten the drive assembly securing screws.

e. Carry out b-d for the receiver (3) using the appropriately marked gauges.

<u>Modulator board (2b), discriminator alignment</u>

192. a. Set t.r.e. and e.u.t. switches as follows:

CS	CTC	IF(C)	E.U.T.
1 VEH 24	1 CW	1 O.C.	F 50.000MHz
2 VEH V	2 AF LOAD 100	3 Released	M WIDE
6 Depressed (off)	3 Depressed	4 Released	P OFF
	4 Released	7 NORMAL	T RX SIG
	5 Released		G Fully clockwise
	6 Released		R LOCAL
	7 Released		
	8 Released		
	9 Released		
	10 Depressed		
	11 Released		
	12 RF		
	13 RF		
	14 SIGNAL		
	26 FM INT		

<u>E.U.T. CONNECTIONS</u>

28V to CS7 (item 5)
AUDIO (upper or lower) to IF(C)5 (item 10)
ANT/ARFAT to CTC20 (item 7)

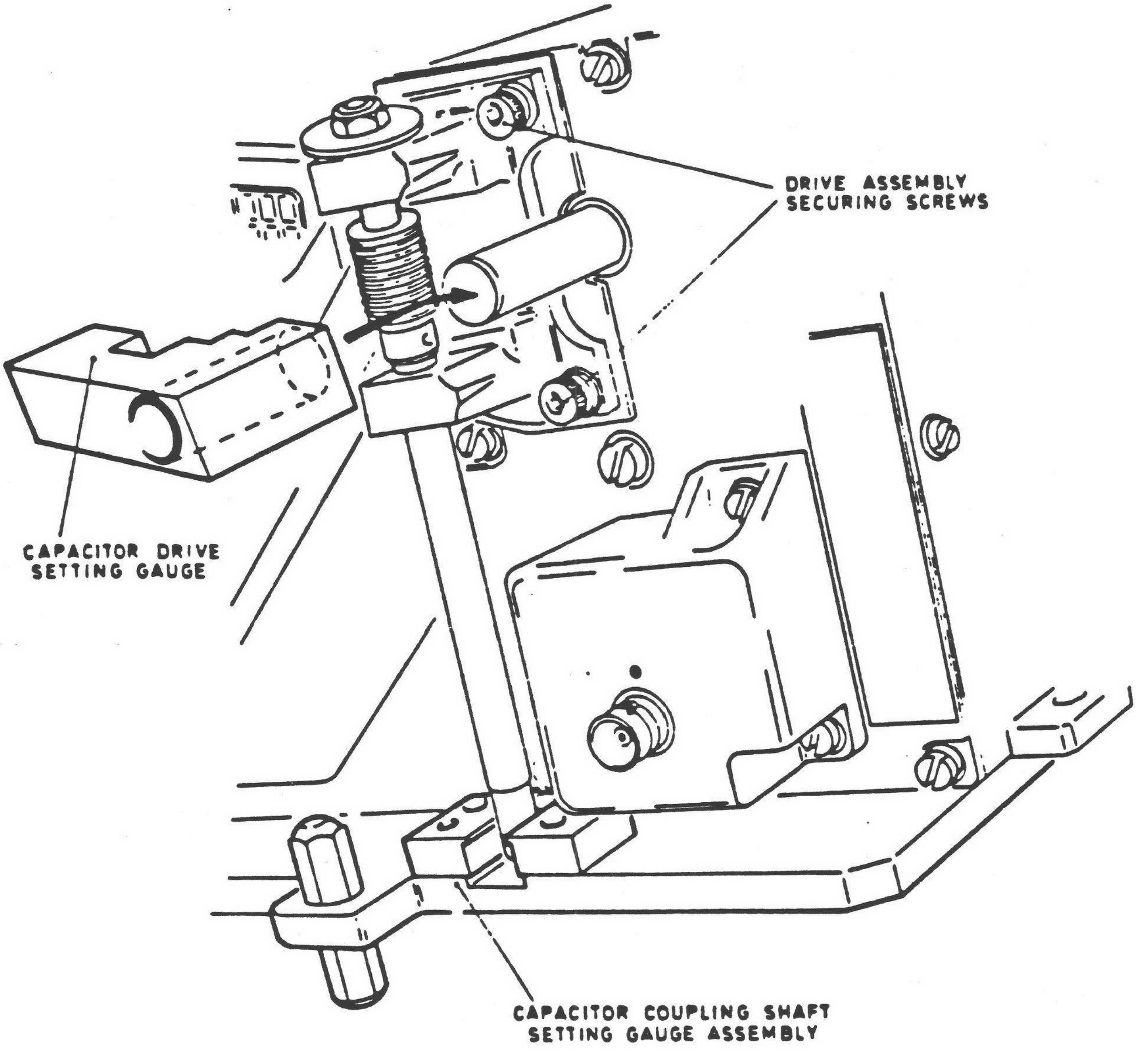

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Fig 5 – Capacitor drive shaft alignment (Tx)

b. With the e.u.t. removed from its case, extract modulator board and refit using the extender board (part of Test kit).

c. Disconnect SK2 from receiver (3), and using adaptor item 26, with item 5, connect SK2 to r.f. sig gen (part of t.r.e.).

d. Release CS6 (on) and set POWER switch on e.u.t. to MIN.

e. Using d.v.m. lead connect test point M3 on modulator board (2b) to d.v.m.

f. Short circuit test point M2 on modulator board to chassis via pin 7 of extender board.

Note: These Pages 113 to 116 supersede Pages 113 to 116, Issue 1 dated Jun 78. Paras marked ● have been amended.

g. Set r.f. sig gen to 8.2MHz at 30dB attenuation.

h. Set CTC1 to CW TX.

j. On modulator board adjust L3 for maximum indication on d.v.m. (approx 1.6V).

k. Disconnect d.v.m. lead from test point M3. Remove short circuit from test point M2, and connect to test point M3. Connect d.v.m. to test point M2.

l. Set r.f. sig gen to 11.0MHz at 30dB attenuation, and adjust L2 for maximum indication on d.v.m. (approx. 1.6V).

m. Set CTC1 to CW, and CS6 to OFF (depressed).

n. Remove d.v.m. lead from test point M2, and connect to test point M4. Remove short circuit from M3.

o. Disconnect r.f. sig gen from SK2, and reconnect SK2 to receiver.

p. Set CS6 to ON (released) and CTC1 to CW TX.

q. On modulator board, adjust L2 for d.v.m. indication of 0.0V ±20mV.

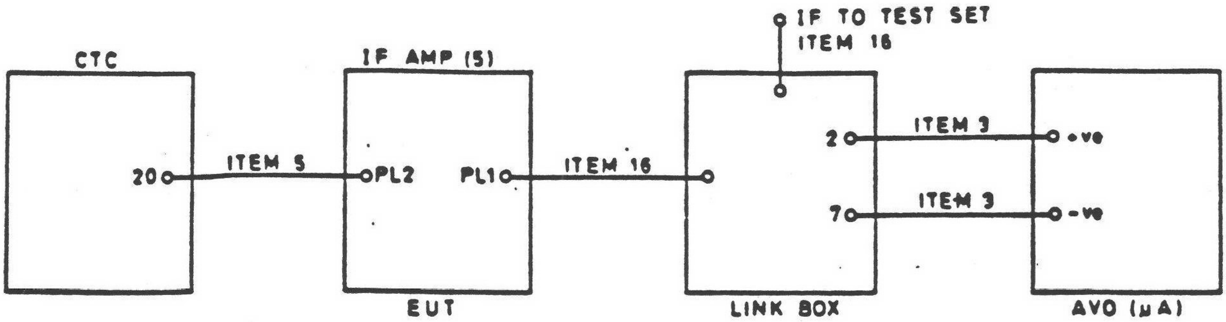
r. Disconnect d.v.m. depress CTC7, and set CTC1 to CW.

s. Carry out modulation level settings (para 190).

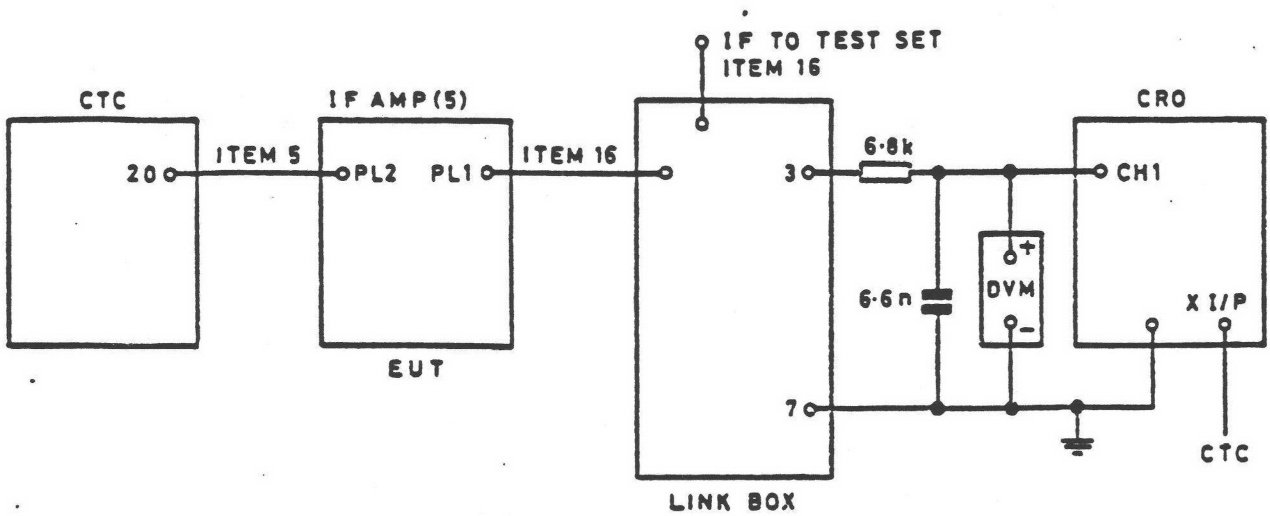
<u>I.F. amplifier (5) alignment</u>

● 193. a. Set t.r.e. and c.r.o. switches as follows:

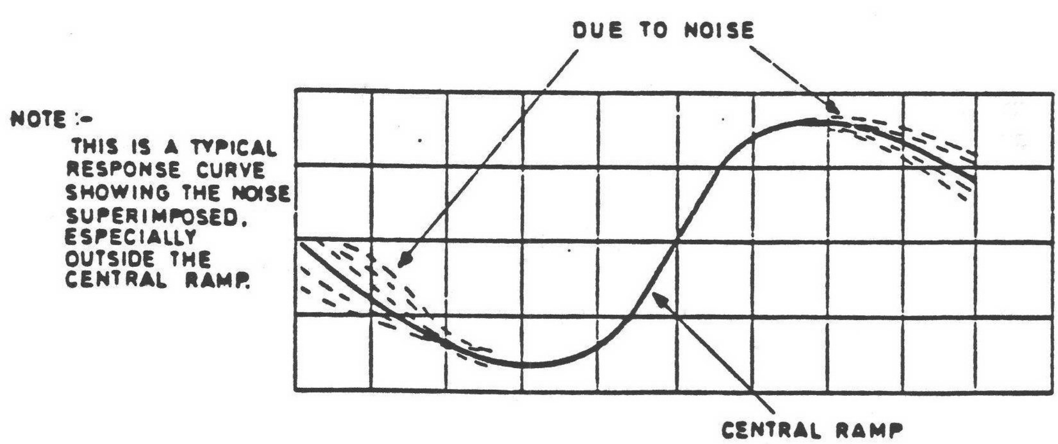
CS	CTC	C.R.O.
1 VEH 24 2 VEH V 6 Depressed (off)	1 RX FM 2 AF LOAD 100 3 Released 4 Released 5 Released 6 Released 7 Depressed 8 Depressed 9 Released 10 Released 11 Released 12 RF 13 ACCESS 14 MOD OFF 26 FM INT	CHANNEL MODE - CH1 AC CHAN 1 - 0.5V/CM TRIGGER MODE - X AMP X I/P - 0.5V/CM TRIGGER SOURCE - EXT TRIGGER COUPLING - AC TRIGGER SLOPE - + Connections CTC20 to 5PL2 (item 5) CTC22 to CTC23 C.R.O. lead to X I/P



(a) Test equipment connection



(b) Test equipment connections



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(c) Discriminator characteristic

Fig 6 - I.F. amplifier alignment, connections and display

b. Remove the i.f. amplifier cover nearest the solder terminals, and fit the alignment cover provided in the test kit.

c. Fit p.s.u. to test set (para 10, 11 and 13). Fit i.f. amplifier to test set using the link box (para 23 and 25).

d. Connect equipment as shown in Fig 6.a.

e. Set r.f. sig gen to 9.68750 MHz, output level to 10 µV (100 dB) unmodulated.

f. Set AVO to 300 µA range, release CS6 (on) and set test set to on.

g. Adjust r.f. sig gen output level until multimeter indicates: LL 30 µA, UL 60 µA.

h. Adjust L2 for maximum indication on the multimeter. As the meter reading increases to approx 1/2 f.s.d. increase the sig gen attenuation to maintain this level.

Note: The meter indication must always be due to the input r.f. signal, ie removal of input signal results in a fall of indication.

j. Repeat para h for L1.

k. Repeat paras h and j until maximum indication is achieved, then adjust L3 for maximum indication.

l. Set CTC14 to CARRIER OFF and record multimeter indication which shall be: LT 70 µA.

If the indication is GT 70 µA detune L2 to achieve a meter indication of 30 µA and then repeat para j and k ie alignment of L1 and L3.

Note: As a guide L2 will normally be slightly proud and L1 virtually flush with the tops of the respective cans after alignment.

m. After any re-alignment to L1 and L3 repeat CARRIER OFF part of para l.

n. Link pin 4 to pin 6 on Link box, ie WIDE mode, and carry out CARRIER OFF part of para l. and record this reading.

p. Set CTC 14 to MOD OFF and adjust sig gen output until the meter indication has increased by GT 20% of that in para n.

Note: r.f. sig gen output level which shall be GT 120 dB.

q. Switch test set off and remove the Link from pin 4 to pin 6 on link box.

Discriminator

194. a. Connect equipment as shown in Fig 6b using the 6.8 kΩ resistor and 6.6 nF capacitor, and DVM fan out terminals (CTC 16 and 17).

b. Set sig gen to 9.6875 MHz deviated by 5 Hz at 1 kHz with output level at 10 µV (100 dB).

c. Adjust L4 and L5 fully anti-clockwise.

d. Switch test set radio on and set DVM to 18 volt range, depress CTC3, set CTC14 to SIGNAL.

e. Adjust L5 to produce + 0.7 V d.c. on DVM.

f. Adjust L4 to produce - 0.05 V d.c. on DVM.

g. Switch DVM to ac range (depress CTC4), the output shall be: LL 368 mV a.c. UL 408 mV a.c. If necessary readjust L4 and L5 slightly to obtain correct a.c. reading.

h. Set DVM to d.c. (depress CTC3) and check reading is still as in para f. Repeat para's f. and g. until correct.

j. Connect pin 4 to pin 6 on link box. Set sig gen to 9.6875 MHz deviated 10 kHz at 1 kHz (WIDE mode).

k. Set DVM to d.c. mV (depress CTC3), the reading shall be a nominal +50 mV d.c. ± 100 mV d.c. Set DVM to a.c. range (depress CTC4), the reading shall be: LL 368 mV a.c., UL 408 mV a.c.

l. Set CTC14 to CARRIER OFF, set DVM to d.c. (depress CTC3), the reading shall be a nominal OV ± 50 mV d.c. If necessary adjust L3 by LT one turn for OV on DVM. If more than one turn is required repeat para 193.

m. Set sig gen to 9.6875 MHz deviated: LL 24 kHz, UL 28 kHz at 150 Hz, o.p.level 10 µV (100dB). Set CTC14 to SIGNAL.

n. Observe c.r.o. and adjust for waveform indication as per fig 6c. Ensure waveform is the same as fig 6c.

o. Switch off test set radio.

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END

UK/VRC 353

TECHNICAL HANDBOOK - FIELD REPAIR

CONTENTS

Para

CONTENTS (continued)

CONTENTS (continued)

Para

CONTENTS (continued)

CONTENTS (continued)

CONTENTS (continued)

CONTENTS (continued)

CONTENTS (continued)

INTRODUCTION

WARNINGS

(1) **TOXIC SUBSTANCE. IN THE TRANSMITTER (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.**

(2) **LETHAL VOLTAGES. THE POWER AMPLIFIER VALVE LOCATED IN THE TRANSMITTER (4) IS SUPPLIED WITH 800 V BY THE PSU, GREAT CARE MUST BE EXERCISED TO AVOID CONTACT WITH THIS SUPPLY LINE.**

CAUTION

EQUIPMENT DAMAGE. This equipment contains Static Sensitive devices on the PSU (7b). Before working on this assembly consult EMER Tels A 414 Chap 545 - Handling Precautions, Static Sensitive Devices which gives general handling information.

GENERAL

1 This regulation provides all the information required at Field level to carry out failure diagnosis, repairs, specification testing and alignment of the UK/VRC 353 (RT-353).

2 Base repair information is not detailed in this regulation, but is included in a Base Repair Information Folder (BRIF) which is issued to nominated workshops.

3 Throughout this regulation, the RT-353 assembly number is shown in brackets after the assembly name, eg transmitter (assembly 4) is shown as transmitter (4).

4 Sub-assemblies are identified by the main assembly name and assembly number, followed by a lower case letter in brackets, eg transmitter (sub-assembly 4a) is shown as transmitter (4a).

5 Connectors and components of an assembly or sub-assembly are identified by prefixing the connector or component identity with the assembly or sub-assembly number in brackets, eg transmitter (assembly 4) PL1 is shown as (4)PL1.

RADIO TEST SYSTEM 8920C

6 The Radio Test System 8920C (Table 1, Serial 1) is fully described in the 8920C Operating Manual, and no attempt is made in this regulation to describe 8920C functions.

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

7.1 DMM Digital multimeter

7.2 CRO Cathode ray oscilloscope

7.3 EUT Equipment under test

7.4 CIP Connector interface panel

7.5 RIU Radio interface unit

7.6 PSU Farnell power supply unit

7.7 LL Lower limit

7.8 UL Upper limit

7.9 GT Greater than

7.10 LT Less than

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

9 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.

10 Range settings of individual test equipments (eg 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

11 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

SCOPE OF REPAIRS

12 Repair at Field level is limited to the replacement of faulty boards and discrete components which are listed in EMER Tels H 616.

SEALS AND GASKETS

13 Seals and gaskets must, on re-assembly or renewal, be lightly smeared with grease (XG271).

REPAINTING

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

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

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

15 The paints specified in Paras 14.1 and 14.2 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.

DRYING AND SEALING

16 Upon receipt of an RT-353 for repair, proceed as follows:

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

16.2 Using a leak locator (Table 1, Serial 7), 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.

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

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

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

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

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

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

16.9 Seal the RT-353 in its case, ensure that the correct torque is applied as follows:

16.9.1 Cartridge desiccator : 3 Nm ±0.1 Nm.

16.9.2 Seal test plug : 2 Nm ±0.1 Nm.

16.9.3 Case retaining bolt : 5 Nm ±0.2 Nm.

16.9.4 Four dowel bolts : 5 Nm ±0.2 Nm.

16.10 Using dry air from the dehumidifier (Table 1, Serial 6), pressurise the RT-353 to 5 lbf/in^2.

16.11 Repeat the dip test, using the leak locator, and check that no air bubbles appear. Details for time constant testing are given in Base Repair Inspection Standards.

TOOLS, TEST EQUIPMENT AND CONNECTORS

17 The tools, test equipment and connectors shown in Table 1 are required to carry out the procedures contained in this Part 2 of this regulation.

TABLE 1 TOOLS, TEST EQUIPMENT AND CONNECTORS

Serial (1)	NSN (2)	Designation (3)
1	Z4/6625-99-152-4750	Test Set Radio Communications, GP (8920C)
2	Z4/6625-99-661-6891	Generator Set Signal GP (TF2019A)
3	Z4/6625-99-883-8750	Oscilloscope GP 100 MHz
4	Z4/6625-99-744-2009	Digital Voltmeter (HP34401A)
5	Z4/6625-99-052-3433	Analyser Set Spectrum GP Communications (HP8560A)
6	W3/4440-99-114-0440	Dehumidifier Desiccant series 1, Mk 3
7	Z4/6625-99-200-2271	Leak locator CT509
8	F1/5180-99-120-3922	Tool kit telecom (technician)
9	W3/3439-99-116-6545	Pace soldering tool
10	F1/5180-99-445-8208	Tool kit telecom (supplementary)
11	Z4/6625-99-630-6181	Test Kit, Radio Field Repair, UK/RT-353
12	Z4/6625-99-630-6233	Test Set, Radio
13	Z42/5995-99-501-7693	Power lead (Part of Serial 1)
14	Z4/6625-99-940-4784	Audio lead (Part of Serial 1)
15	Z4/6625-99-438-6923	Harness lead (Part of Serial 1)
16	Z4/6625-99-477-4448	Control lead (Part of Serial 1)
17	Z4/6625-99-918-3495	Remote leads (Part of Serial 1)
18	Z4/6625-99-125-7478	BNC-to-BNC coaxial lead, 1m (Part of Serial 1)
19	Z32/5995-99-729-4022	Earth lead (Part of Serial 1)
20	Z4/6625-99-756-1644	BNC shorting connector (Part of Serial 1)
21	-	6.8 kohm resistor
22	-	6.6 nF capacitor

TEST KIT, RADIO, FIELD REPAIR, UK/RT-353

18 For alignment purposes, the receiver (3), transmitter (4), IF amplifier (5) and PSU (7) can be mounted on the test set, radio, field repair. These assemblies can be operated in complete isolation from, or connection to the EUT.

19 Table 2 lists the items contained in the test kit, radio, field repair.

TABLE 2 TEST KIT, RADIO, FIELD REPAIR, UK/RT-353

Serial (1)	NSN (2)	Designation (3)	Remarks (4)	Qty (5)
1	Z4/5995-99-630-6210	Lead Electrical	800 V plug/plug	1
2	Z4/5995-99-630-6211	Lead Electrical	800 V plug/socket	1
3	Z4/5995-99-630-6216	Lead Electrical	Banana and Oxley ends plug/plug	5
4	Z4/5995-99-630-6213	Lead Electrical	Oxley socket/banana plug	10
5	Z4/5995-99-630-6214	Cable Assembly RF	Coaxial pattern 16 and miniature RF terminations plug/socket	3
6	Z4/6625-99-630-6215	Lead Test	Single wire spade croc clip	1
7	Z4/5995-99-630-6217	Wiring Harness	19-way, colour orange, plug/socket, used with receiver (3)	1
8	Z4/5995-99-630-6218	Wiring Harness	19-way, colour orange, socket/socket, used with receiver (3)	1
9	Z4/5995-99-630-6219	Wiring Harness	19-way, colour yellow, plug/socket, used with transmitter (4)	1
10	Z4/5995-99-630-6220	Wiring Harness	19-way, colour yellow, socket/socket, used with transmitter (4)	2
11	Z4/5995-99-630-6221	Wiring Harness	14-way, colour orange, socket/socket, used with receiver (3)	1
12	Z4/5995-99-630-6222	Wiring Harness	14-way, colour orange, plug/socket, used with receiver (3)	1
13	Z4/5995-99-630-6223	Wiring Harness	14-way, colour yellow, socket/socket, used with transmitter (4)	1
14	Z4/5995-99-630-6224	Wiring Harness	14-way, colour yellow, plug/socket, used with transmitter (4)	1
15	Z4/5995-99-630-6225	Wiring Harness	7-way, colour green, socket/socket, used with IF amplifier (5)	1

(continued)

TABLE 2 TEST KIT, RADIO, FIELD, UK/RT-353 (continued)

Serial (1)	NSN (2)	Designation (3)	Remarks (4)	Qty (5)
16	Z4/5995-99-630-6226	Wiring Harness	7-way, colour green, plug/socket, used with IF amplifier (5)	2
17	Z4/5995-99-630-6227	Wiring Harness	44-way EMTHUS, colour violet, plug/socket, used with PSU (7)	1
18	Z4/5995-99-630-6228	Wiring Harness	7-way, colour violet, socket/socket, used with PSU (7)	1
19	Z4/5995-99-630-6229	Wiring Harness	7-way, colour violet, plug/socket, used with PSU (7)	1
20	Z4/5995-99-630-6230	Cable Assembly RF	Coaxial miniature RF plug/socket	5
21	Z4/5995-99-630-6231	Wiring Harness	2-way, colour violet, plug/spades, used with PSU (7)	1
22	Z4/5995-99-630-6232	Wiring Harness	2-way, colour violet, screw/spades, used with PSU (7)	1
23	Z4/5995-99-637-9590	Cable Assembly RF	Coaxial miniature RF, socket/socket, used to connect TX VCO to transmitter (4)	1
24	Z4/5995-99-645-0010	Wiring harness	7-way, colour green, socket/socket, used with IF amplifier (5)	1
25	Z4/5995-99-645-0011	Wiring harness	7-way, colour green, plug/socket, used with IF amplifier (5)	1
26	Z4/5935-99-637-9959	Adaptor RF	Used to connect Item 5 to 2955B for alignment of assembly 2b	1
27	Z4/6625-99-630-6285	Frame Handling, RX/TX chassis	-	4
28	Z4/5820-99-630-6526	Cover	-	1
29	Z4/6625-99-630-6284	Interconnecting Box	-	1
30	Z4/6625-99-630-6288	Tracking Angle Setting Unit	-	1

(continued)

TABLE 2 TEST KIT, RADIO, FIELD, UK/RT-353 (continued)

Serial (1)	NSN (2)	Designation (3)	Remarks (4)	Qty (5)
31	Z4/5120-99-137-6836 or Z4/5120-99-137-6837	Crimping Tool	-	1
32	Z4/6625-99-630-6289	Panel Printed Circuit, Extender Tuning Board	-	1
33	Z4/6625-99-630-6290	Panel Printed Circuit, Extender Modulator Board	-	1
34	Z4/6625-99-630-6291	Panel Printed Circuit, Extender Control Board	-	1
35	Z4/6625-99-630-6292	Panel Printed Circuit, Extender Audio Board	-	1
36	Z4/4940-99-637-9793	Capacitor Coupling Shaft Setting Gauge	-	1
37	Z4/4940-99-637-9794	Capacitor Drive Setting Gauge RX		1
38	Z4/4940-99-637-9795	Capacitor Drive Setting Gauge TX		1

TEST SET RADIO

20 Table 3 provides details of the equipment contained in the test set, radio, field repair, RT-353.

TABLE 3 TEST SET RADIO

Serial (1)	NSN (2)	Designation (3)
1	Z4/6625-99-645-0367	Test Set, Radio Field Repair, UK/RT-353

FITTING ASSEMBLIES TO THE TEST SET, RADIO FIELD REPAIR

PSU (7) - Providing power to the EUT

21 To fit the PSU (7) to the test set (Table 3, Serial 1) and provide power for the EUT, proceed as follows:

21.1 Locate the PSU (7) on the dowel pins (within the appropriately marked outline) on the test set heat exchanger.

21.2 Secure the PSU (7) to the test set with the bolts used to secure the PSU (7) to the EUT.

21.3 Connect the wiring harness (Table 2, Item 21) between the test set P.S.U. SUPPLY connector and (7)X1,X2.

21.4 Connect the wiring harness (Table 2, Item 19) between the test set PSU BLOWERS connector and (7)SK1.

21.5 Connect the wiring harness (Table 2, Item 17) between the test set O/P. OF P.S.U. connector and (1a)PL13.

21.6 If required, the blower lines can be monitored by connecting wiring harness (Table 2, Serial 18) in series with the link box (Para 26) and the wiring harness (Table 2, Item 19).

PSU (7) - Providing power to an assembly mounted on the test set

22 To fit the PSU (7) to the test set (Table 3, Serial 1) and provide power for an assembly mounted on the test set, proceed as follows:

22.1 Carry out operations 21.1 to 21.4.

22.2 Connect the wiring harness (Table 2, Item 12) between the test set I/P. TO P.S.U. DUMMY LOADS connector and (1a)PL13.

Transmitter (4)

23 To fit the transmitter (4) to the test set (Table 3, Serial 1), proceed as follows:

23.1 Locate the transmitter (4) on the dowel pins (within the appropriately marked outline) on the test set heat exchanger.

23.2 Secure the transmitter (4) to the test set with the bolts used to secure the transmitter (4) to the EUT.

23.3 Make the following connections to the EUT:

23.3.1 Connect the lead (Table 2, Item 1) between the test set 800V OUT (SK7) connector and (4a)TS4-SK5.

23.3.2 Connect the lead (Table 2, Item 2) between the test set 800V IN (SK51) and (1a)PL7.

23.3.3 Connect the wiring harness (Table 2, Item 9) between the test set link box TX/RX connector and (1a)SK8.

23.3.4 Connect the wiring harness (Table 2, Item 10) between the test set link box TX/RX connector and (4a)PL1.

23.3.5 Connect the wiring harness (Table 2, Item 13) between the test set link box TX/RX (TURRET DRIVE) connector and (1c)PL5.

23.3.6 Connect the wiring harness (Table 2, Item 14) between the test set link box TX/RX (TURRET DRIVE) connector and (4f)SK1.

23.3.7 Connect a cable assembly RF (Table 2, Item 20) between (4)PL2 and (1a)SK17.

23.3.8 Connect a cable assembly RF (Table 2, Item 20) between (4)PL3 and (1a)SK19.

23.3.9 Connect a cable assembly RF (Table 2, Item 20) between (4)PL4 and (1a)SK18.

23.4 Make the following connections to the test set:

23.4.1 Connect the lead (Table 2, Item 1) between the test set 800V OUT (SK7) connector and (4a)TS4-SK5.

23.4.2 Connect the wiring harness (Table 2, Item 8) between the test set TX (PL7) connector and link box TX/RX.

23.4.3 Connect the wiring harness (Table 2, Item 8) between the test set link box TX/RX connector and (4a)PL1.

23.4.4 Connect the wiring harness (Table 2, Item 13) between the test set TX TURRET DRIVE (PL8) connector and the link box TX/RX (TURRET DRIVE).

23.4.5 Connect the wiring harness (Table 2, Item 14) between the test set link box TX/RX (TURRET DRIVE) connector and (4f)SK1.

23.4.6 Connect the cable assembly RF (Table 2, Item 23) between the test TX VCO CONTROL (PL2) connector and (4a)PL3.

CAUTION

EQUIPMENT DAMAGE. Before switching on the transmitter, the transmitter connector (4)PL4 must be connected to a 50 ohm dummy load. A 50 ohm load is available at the RIU ANT IN connector, with RF SELECT - NORMAL selected and the 2955B RF IN/OUT 'N' connector connected to the RIU RF IN/OUT 'N' connector.

23.5 If the link monitoring facilities are not required, connect the equipment as follows:

23.5.1 Connect the wiring harness (Table 2, Item 10) between the test set TX connector and (4a)PL1.

23.5.2 Connect the wiring harness (Table 2, Item 14) between the test set TX TURRET DRIVE connector and (4f)SK1.

23.5.3 Connect the lead (Table 2, Item 1) between the test set 800V OUT (SK7) connector and (4a)TS4-SK5.

NOTE

Before the transmit condition can be activated, the MRP INTERLOCK connector must be connected to the RIU AUDIO connector (fan out) pin F. Select the Transmitter - Output and Modulation skeleton test set-up from the Skeleton Test Menu, enter RIU Manual Control and select TRANSMIT-ON.

Receiver (3)

24 To fit the receiver (3) to the test set (Table 3, Serial 1), proceed as follows:

24.1 Locate the receiver (3) (within the appropriately marked outline) on the test set heat exchanger.

24.2 Secure the receiver (3) to the test set with the bolts used to secure the receiver (3) to the EUT.

24.3 Make the following connections to the EUT:

24.3.1 Connect the wiring harness (Table 2, Item 7) between the test set link box TX/RX connector and (1a)SK7.

24.3.2 Connect the wiring harness (Table 2, Item 8) between the test set link box TX/RX connector and (3a)PL1.

24.3.3 Connect the wiring harness (Table 2, Item 11) between the test set link box TX/RX (TURRET DRIVE) connector and (1a)PL6.

24.3.4 Connect the wiring harness (Table 2, Item 12) between the test set link box TX/RX (TURRET DRIVE) connector and (3g)SK1.

24.3.5 Connect a cable assembly RF (Table 2, Item 20) between the (3)PL2 and (1a)SK12.

24.3.6 Connect a cable assembly RF (Table 2, Item 20) between the (3)PL3 and (1a)SK13.

24.3.7 Connect a cable assembly RF (Table 2, Item 20) between the (3)PL4 and (1a)SK14.

24.3.8 Connect a cable assembly RF (Table 2, Item 20) between the (3)PL5 and (1a)SK15.

24.3.9 Connect a cable assembly RF (Table 2, Item 20) between the (3)PL6 and (1a)SK16.

24.4 If the link box facilities are not required, direct connections can be made using wiring harness (Table 2, Item 7) and wiring harness (Table 2, Item 12).

24.5 Make the following connections to the test set:

24.5.1 Connect the wiring harness (Table 2, Item 8) between the test set RX (PL9) connector and the link box TX/RX connector.

24.5.2 Connect the wiring harness (Table 2, Item 8) between the test set link box TX/RX connector and (3a)PL1.

24.5.3 Connect the wiring harness (Table 2, Item 11) between the test set Rx TURRET DRIVE (PL10) connector and the link box TX/RX (TURRET DRIVE) connector.

24.5.4 Connect the wiring harness (Table 2, Item 12) between the test set link box TX/RX TURRET DRIVE connector and (3g)SK1.

24.6 If the link box facilities are not required, direct connections can be made using wiring harness (Table 2, Item 8) and wiring harness (Table 2, Item 12).

IF amplifier (5)

25 To fit the IF amplifier (5) to the test set (Table 3, Serial 1), proceed as follows:

25.1 Place the IF amplifier in a convenient position on the test set heat exchanger.

25.2 Make the following connections to the EUT:

25.2.1 Connect the wiring harness (Table 2, Item 15) between the test set link box PSU/IF (BLOWER) connector and (5)PL1.

25.2.2 Connect the wiring harness (Table 2, Item 16) between the test set link box PSU/IF (BLOWER) connector and (1a)SK9.

25.2.3 Connect the cable assembly RF (Table 2, Item 20) between (5)PL2 and (1a)SK11.

25.3 Make the following connections to the test set:

25.3.1 Connect the wiring harness (Table 2, Item 16) between the test set link box PSU/IF (BLOWER) connector and the test set IF PL6.

25.3.2 Connect the wiring harness (Table 2, Item 15) and wiring harness (Table 2, Item 24) combined, between the test set link box PSU/IF (BLOWER) connector and (5)PL1.

Link box

26 The link box enables connectors to the transmitter (4), receiver (3) and the IF amplifier (5) to be monitored when these assemblies are fitted to the EUT.

Monitoring transmitter (4) connectors

27 To monitor transmitter (4) connectors when the transmitter is fitted to the EUT, connect the equipment as follows:

27.1 Connect the wiring harness (Table 2, Item 10) between the link box TX/RX connector and (4)PL1.

27.2 Connect the wiring harness (Table 2, Item 14) between the link box TX/RX (TURRET DRIVE) connector and (4f)SK1.

27.3 Connect the wiring harness (Table 2, Item 9) between the link box TX/RX connector and (1a)PL8.

27.4 Connect the wiring harness (Table 2, Item 13) between the link box TX/RX (TURRET DRIVE) connector and (1a)PL5.

Monitoring receiver (3) connectors

28 To monitor receiver (3) connectors when the receiver is fitted to the EUT, connect the equipment as follows:

28.1 Connect the wiring harness (Table 2, Item 8) between the link box TX/RX connector and (3)PL1.

28.2 Connect the wiring harness (Table 2, Item 12) between the link box TX/RX (TURRET DRIVE) connector and (3g)SK1.

28.3 Connect the wiring harness (Table 2, Item 7) between the link box TX/RX connector and (1a)PL7.

28.4 Connect the wiring harness (Table 2, Item 11) between the link box TX/RX (TURRET DRIVE) connector and (1a)PL6.

Monitoring IF amplifier (5) connectors

29 To monitor IF amplifier (5) connectors when the IF amplifier (5) is fitted to the EUT, connect the equipment as follows:

29.1 Connect the wiring harness (Table 2, Item 16) between the link box PSU/IF (BLOWERS) connector and (5)PL1.

29.2 Connect the wiring harness (Table 2, Item 15) between the link box PSU/IF (BLOWERS) connector and (1a)SK5.

NOTE

The coaxial connection to (5)PL2 can be monitored using a 'T' adaptor and pattern 17 to pattern 15 adaptor.

FAULT FINDING

INTRODUCTION

30 Initial failure diagnosis is to be by interpretation of front panel indications, which usually give a good guide to the general area in which the fault(s) is located. Further guidance may be given by consideration of specification test failures.

31 The first step is to isolate the fault to one of five main functional areas:

31.1 Transmit system.

31.2 Receive system.

31.3 Frequency synthesiser system.

31.4 Turret control system.

31.5 Power supply system.

NOTE

A power supply system fault may produce apparent faults in one or more of the other systems.

32 Identification of a faulty assembly/sub-assembly within a system is to be based on the following approach:

32.1 Check the d.c. supplies.

32.2 Check the inputs.

32.3 Check the outputs.

FRONT PANEL INDICATIONS

33 Certain faults produce an alarm condition which results in the frequency dial illumination flashing on and off at an approximate rate of 1 Hz, with all audio outputs being pulsed at the same rate.

34 Identification of an alarm indicated fault is initially by interpretation of front panel testmeter indications, selected by the TEST switch.

35 Table 4 gives details of testmeter indications and suggests fault location areas.

TABLE 4 TESTMETER INDICATIONS

Serial	TEST switch selection	Testmeter indication	Possible fault areas
1	28V SPLY	Outside LL 22 V, UL 26 V for 24 V input	Meter control board (1b)
2	RX SIG	No deflection or low deflection for average strength signals	Receive system, IF amplifier (5)
3	TX O/P	Red zone with PRESSEL switch operated	Transmit system
4	AFC TX	Outside ±3 divisions of centre with PRESSEL switch operated	Transmit system fine frequency synthesis loop
5	SYNTH	Red zone	Frequency synthesis loop system Prohibited frequency set
6	TEMP	Red zone	Blowers system Equipment overheat
7	ARFAT (or TURF)	Red zone	ARFAT overheat

36 If the main frequency synthesis loop fails to lock (SYNTH), the transmitter fine frequency synthesis loop automatically fails (AFC TX). This prevents transmission of incorrect frequencies.

37 The transmitter loop can fail even though the main loop locks. This enables the receiver to be used even though the transmitter is inoperable.

38 Setting a prohibited frequency causes a SYNTH fault condition.

39 The transmit lamp does not illuminate when the PRESSEL switch is depressed in the presence of fault conditions (Table 4, Serials 4 to 7). TEMP and ARFAT (or TURF) faults (Table 4, Serials 6 and 7) may be overridden by setting the TEST switch to OVERRIDE, allowing the transmitter to be used.

40 True sidetone is employed, enabling many of the equipment functions to be checked. If sidetone is present when the PRESSEL switch is depressed, the transmitter is radiating a modulated signal and the receiver and audio circuits are functioning except for a small section on audio board (2d), which is particular to the receiver audio function only.

41 The presence of sidetone does not prove the level of radiated power, depth of modulation, receiver sensitivity or AF output level.

SPECIFICATION TEST FAILURES

42 The specification tests are itemised in Table 5, which states the failure symptoms for each check within a test and suggests possible reasons for failure and fault locations.

TABLE 5 SPECIFICATION TEST FAILURES

Test No	Failure symptoms	Possible system failure	Possible assembly failure	Possible sub-assembly failure
1	Outside limits	-	-	Meter control board (1b)
2	(i) a. Frequency outside limits	Transmit	Tuning board (2a) Synthesiser (6)	
	b. Deviation outside limits	Transmit	Modulator board (2b) Transmitter (4)	Control board (4c2) Varactor plate (4b)
	(ii) Outside limits	Transmit	Modulator board (2b) Tuning board (2a)	
3	(i) Outside limits	Transmit	Modulator board (2b) Audio board (2d) Transmitter (4)	Control board (4c2) Varactor plate (4b) Audio pre-amp (1d)
	(ii) Outside limits	Transmit	Audio board (2d)	Audio pre-amp (1d)
4	(i) Outside limits a. No SYNTH lock	Turret control	Receiver turret (3g)	(3g)M1, (3g)TS1, (3g)RLA, (3g)S1m, (3g)S2
		Frequency synthesis	Synthesiser (6) Tuning board (2a) Receiver (3)	Tuning motor Local oscillator (3h) Varactor amp (3k) Buffer amp (3f) Switch (1a)S1 Crystal oscillator (1h)
	b. SYNTH lock		Modulator board (2b) Transmitter (4)	Control board (4c2) Varactor plate (4b) Turret lid, 4g, 4h, 4j
			Receiver (3)	Control IF (3c)
5	(i) a. No power output	Transmit	Control board (2c) Transmitter (4)	Control board (4c2) Turret lid 4g, 4h, 4j PA (1a)RLB
	b. Outside limits	Transmit	Transmitter (4)	Control board (4c1) PA
	(ii) Outside limits	Power supply	PSU (7)	
		Transmit	Transmitter (4)	PA

(continued)

TABLE 5 SPECIFICATION TEST FAILURES (continued)

Test No	Failure symptoms	Possible system failure	Possible assembly failure	Possible sub-assembly failure
6	(i) Test results in damage	Transmit	Transmitter (4)	PA
	(ii) a. Transmitter operates during time sequence	Transmit Frequency synthesis	Control board (2c) Synthesiser (6)	
	b. Outside time limit	Frequency synthesis	Synthesiser (6) Tuning board (2a) Receiver (3)	Varactor amp (3k) Local oscillator (3h) Buffer amp (3h) Tuning motor
	(iii) Outside time limit	Transmit	Modulator board (2b) Transmitter (4)	Control board (4c1)
7	(i) a. Sensitivity outside limit throughout frequency range	Receive	Receiver (3) IF amplifier (5) Audio board (2d)	V1, V2 Signal IF output (3)
	b. Sensitivity outside limit at extremes of frequency range	Receive	Receiver (3)	RF alignment
8	(i) Outside limits	Receive	IF amplifier (5) Audio board (2d)	
	(ii) Outside limits	Receive	Audio board (2d)	
9	(1) Outside limits	Receive	IF amplifier (5)	
	(ii) Outside limits	Receive	IF amplifier (5)	(1a)ME1 (1b) (1a)S4
10	(i) Outside limits	Remote control	Control board (2c)	
	Normal receiver function within limits			(1c)S6
	(ii) Outside limits	Receive	As for Test 7	As for Test 7
	Normal receiver function outside limits			
11	(i) a. No tone produced	Remote control	Synthesiser Tuning board (2a) Audio board (2d)	
	b. Tone outside frequency limits	Remote control	Synthesiser Tuning board (2a)	
	c. Equipment not in receive condition	Remote control	Control board (2c)	
	(ii) Outside limits	Remote control	Control board (2c)	

(continued)

TABLE 5 SPECIFICATION TEST FAILURES (continued)

Test No	Failure symptoms	Possible system failure	Possible assembly failure	Possible sub-assembly failure
11 (cont.)	(iii) a. No tone produced	Remote control	As for (1)a	
	b. Tone outside frequency limits	Remote control	As for (1)b	
	c. No short circuit at REMOTE terminals	Remote control		(1a)S6
	(iv) Outside limits	Remote control	Control board (2c)	
12	(i) Outside limits	Remote control		(1a)S6
	(ii) Outside limits	Remote control	Control board (2c)	
13	Any out of limit result may be due to failure of the particular circuit being monitored failing to produce the correct voltage/logic level or to failure of (1a)S4 or associated wiring			
14	(i) Outside limits	Transmit	Audio board (2d) Modulator board (2b) Transmitter (4)	Control board (4c2) Varactor plate (4b) Audio pre-amp (1d)
	(ii) Outside limits	Transmit		Audio pre-amp (1d) (1a)S5
15	Outside limits	Transmit	Audio board (2d) Modulator board (2b) Transmitter (4)	Control board (4c2) Varactor plate (4b) Remote transformer (2)T2
16	(i) Outside limits	Receive/Audio	Receiver (3) IF amplifier (5) Audio board (2d)	
	(ii) Outside limits	Audio	Audio board (2d)	
	(iii) Outside limits	Audio		Gain control (1g)
	(iv) Outside limits	Receive/Audio	Audio board (2d) Receiver (3) IF amplifier (5) Modulator board (2b)	
17	(i) a. No output 16(1) correct	Audio		Audio transformer (2)T1
	b. Outside limits	Audio	As for 16(1)	
	(ii) Outside limits	Audio	Audio board (2d)	
	(iv) Outside limits	Audio		Audio transformer (2)T1

(continued)

TABLE 5 SPECIFICATION TEST FAILURES (continued)

Test No	Failure symptoms	Possible system failure	Possible assembly failure	Possible sub-assembly failure
18	(i) a. Outside limits 16(1) correct	Audio	Audio board (2d) Control board (2c)	
	b. Outside limits	Audio	As for 16(1)	
	(iii) a. Frequency outside limits	Audio	Synthesiser Tuning board (2a) Control board (2c)	
	b. Level outside limit	Audio	Audio board (2d)	
	(iv) Outside limits	Audio	Audio board (2d)	
19	(i) Outside limits	Audio	Audio board (2d)	
	(ii) Outside limits	Audio	Audio board (2d)	
	(iii) Outside limits	Audio	Audio board (2d)	
	(iv) Outside limits	Audio	Audio board (2d)	

FAULT FINDING TO ASSEMBLY LEVEL

General

43 The test tables in this section give typical values of input and output signals that can be expected for a serviceable RT-353 radio. They should be used in conjunction with EMER Tels H 612, Fig 2005 (Transmit system), Fig 2004 (Receive system), Fig 2002 (Frequency synthesis system) and Fig 2014 (d.c. supplies). Details that appear on these figures may not always be repeated in the text and no details of d.c. supplies are given as these are illustrated in Fig 2014.

44 The source/destination of inputs/outputs are given, as in some cases they may prove more readily accessible for monitoring purposes.

45 When it is required to monitor multi-connectors (eg (4)PL1), the facilities of the link box (part of Test Kit) must be used (see Paras 26 to 29).

46 It must be emphasised that the specified test values are typical values and wide variations may be experienced between one EUT and another. Before monitoring test points on board (2c), refer to Tels H 619 Misc Instr No 11.

Transmit system

47 Refer to EMER Tels H 614, Fig 2005 for the Transmit system and Fig 2014 for all d.c. supplies.

Transmitter (4)

48 To monitor the pins of connectors (4)PL1 and (4g)SK1 with the transmitter (4) fitted to the RT-353, the link box (part of Test kit) must be interconnected between the assembly connector and chassis connector (see Paras 26 to 29).

TABLE 6 TRANSMITTER (4) INPUTS

Input at	Input from	Input frequency/level	Remarks	Test equipment
PL3	(2b)S	-1.5 V to +1.5 V d.c. Audio/Data modulation Tone modulation LL 146 Hz, UL 152 Hz	0 V (nominal for phase lock loop) Skeleton - Transmitter Output and Modulation Except WIDE selection of MODE switch	Testmeter (1a)ME1 TX AFC 8920C 2955B
PL1-3	(2b)24	Logic 1 (pressel operated)	Transmit 3	DMM
PL1-4	(2c)L	Logic 1 (no alarm, pressel operated)	PA on	DMM
PL1-2 PL1-19 PL1-5	POWER switch	-ve LT 1 mV d.c. -ve LT 1 mV d.c. -ve LT 1 mV d.c.	POWER switch to 1W. POWER switch to 15W POWER switch to 50W	DMM

TABLE 7 TRANSMITTER (4) OUTPUTS

Output at	Output to	Output frequency/level	Remarks	Test equipment
PL4	RLB-SK21	RF output	RF to antenna	As per spec. test No 5
PL1-1	RLB	LT 1.5 V d.c. for logic 1 at PL1-4 28 V (nominal) for logic 0 at PL1-4	Relay drive	DMM
PL1-14	Tx lamp	As PL1-1	-	DMM
PL1-12	TEST switch	GT 100 mV for logic 1 at PL1-4, LT 0.2 V for logic 0 at PL1-4	TX O/P indication	-
PL1-13	(2c)T	Logic 1 Logic 0	Temps. LT 85 deg. C Temps. GT 95 deg. C	DMM
PL1-9	TEST switch	GT 25 V LT 15 V	Temps. LT 60 deg. C Temps. GT 70 deg. C	DMM

Modulator board (2b)

49 Fit the board to the appropriate extender (part of Test kit) to monitor pins.

TABLE 8 MODULATOR BOARD (2b) INPUTS

Input at pin	Input from	Input frequency/level	Remarks	Test equipment
AA with respect to AB	(6)-30	LL 968.749 kHz, UL 968.751 kHz mark:space LL 1.5:1, UL 1:1.5	Square-wave (nominal) at logic levels	RIU Manual Control FREQUENCY A - CIP (Fig 1)/CRO
6 with respect to 7	(3)PL2	9.6875 MHz at GT 30 mV rms (sine wave)	For transmitter loop locked (PRESSEL depressed)	CRO
X	(2a)11	LL 147 Hz, UL 154 Hz	Square-wave at logic levels (PRESSEL depressed) Skeleton Tx Sidetone Connect probe to 2955B AF IN	2955B AF IN
18	(2d)Z	1 kHz at 0.5 V rms (nominal)	Skeleton Tx Sidetone 1 kHz tone at 120 mV Depress PRESSEL	CRO
U	(1h)7	Data	Data input Skeleton Data - Transmit Modulation	CRO
24	(1j)7	Logic 1	Transmit 3	DMM
17	(1n)42	Logic 0	NARROW mode	DMM
21	(1h)45	Logic 0	WIDE mode	DMM
Y	(1h)41	Logic 0	DATA mode	DMM
X	(1h)PL2-B	Logic 1	Tx data at (1a)PL2-B	DMM
23	(1a)PL2-F	Logic 1	Transmit clear speech at (1a)PL2-f	DMM

TABLE 9 MODULATOR BOARD (2b) OUTPUTS

Output to pin	Output to	Output frequency/level	Remarks	Test equipment
12	(2c)N	Logic 1	For transmitter phase locked loop (depress PRESSEL)	DMM
22	(2a)J	Logic 0	For WIDE mode or DATA mode with no 'clear speech command' but 'Tx Data' (=1) at pin Z	DMM
8	(2c)W	Logic 0	For DATA mode	DMM

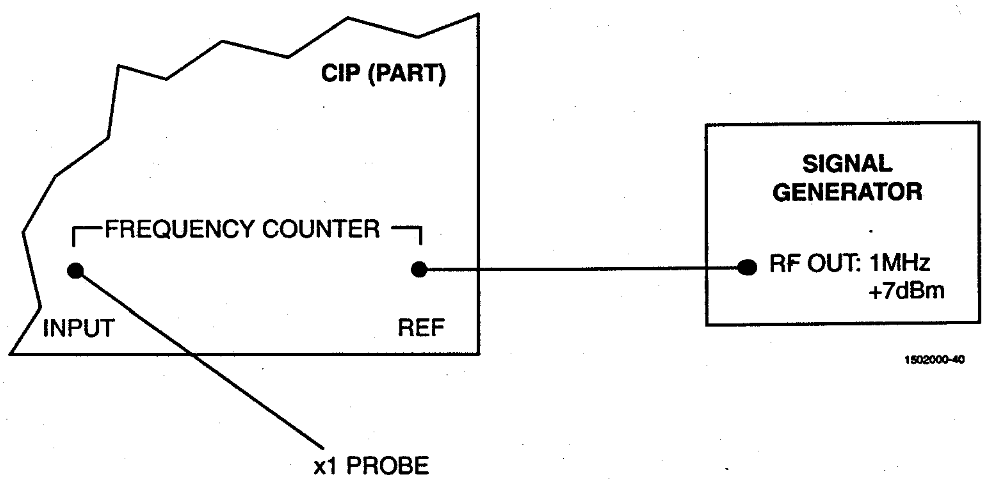


Fig 1 FREQUENCY A - CIP test connections

Control board (2c)

50 Fit the board to the appropriate extender (part of Test kit) to monitor pins.

TABLE 10 CONTROL BOARD (2c) INPUTS

Input at pin	Input from	Input frequency/level	Remarks	Test equipment
S	(1a)SK2-F	Logic 0	Depress PRESSEL Wiring harness (Table 2, Serial 15) to lower AUDIO socket	DMM
U	(1a)SK1-F	Logic 0	Depress PRESSEL Wiring harness (Table 2, Serial 15) to upper AUDIO socket	DMM
W	(2b)8	Logic 0	For 'data' except 'clear speech' working	DMM
V	(1f)2	Logic 1	For no 'ARFAT (or TURF) overheat'	DMM
N	(2b)12	Logic 1	For transmitter phase locked loop (depress PRESSEL)	DMM
R	(6)28	Logic 1	For 'synth' lock	DMM
T	(4)PL1-13	Logic 1	For no 'overheat'	DMM
14			Pin at 0 V	DMM
P Y 19	S6AF	0 V	Dependent upon S6 setting	DMM
18	S4CF	0 V	For OVERRIDE selection of S4	DMM
24	(2)T2	0 V 19 V	For CALL selection of S6 For other selections of S6	DMM

TABLE 11 CONTROL BOARD (2c) OUTPUTS

Output at pin	Output to	Output frequency/level	Remarks	Test equipment
L	(4)PL1-4	Logic 1	For no 'alarm' (depress PRESSEL)	DMM
AA	(2d)23	Alternate logic 1/logic 0 at 1 Hz Logic 1	'alarm' (select prohibited frequency) 'no alarm'	DMM
Z	(1h)25	Alternate 0 V/28 V at 1 Hz Logic 0	'alarm' (select prohibited frequency) 'no alarm'	DMM
7	(3)PL1-5	LL 70 Hz, UL 97 Hz 390 mV	Skeleton Receiver Audio Output with 2955B internal CRO Squelch tone appears slightly distorted on CRO Output lost when PRESSEL is depressed	2955B AF IN
H	(2a)7	Logic 0 1.67 V	Pin 24 at 0 V (S6 to CALL) Otherwise	DMM
8		Logic 0	When squelch tone is detected	DMM

Audio board (2d)

51 Fit the board to the appropriate extender (part of Test kit) to monitor the pins.

TABLE 12 AUDIO BOARD (2d) INPUTS

Input at pin	Input from	Input frequency/level	Remarks	Test equipment
M with respect to K	(1d)11	19 mV rms	Skeleton Tx Sidetone 1 kHz tone at 120 mV Depress PRESSEL GAIN fully clockwise	DMM
8 with respect to chassis		70 mV rms	Skeleton Remote - Rem-Loc AF Output 1 kHz tone at 70 mV CIP LINE RESISTANCE to Tx 1400 GAIN fully clockwise Connect probe to 2955B AF IN	DMM
Y		Logic 0 Logic 1	 Depress PRESSEL	DMM
H		Logic 1	LOCAL, REM, AUTO selection of S6	DMM

TABLE 13 AUDIO BOARD (2d) OUTPUTS

Output at pin	Output to	Output frequency/level	Remarks	Test equipment
Z	(2b)18	1 kHz at 0.5 V rms (nominal)	Skeleton Tx Sidetone 1 kHz tone at 120 mV Depress PRESSEL	CRO
		1 kHz at 0.5 V rms (nominal)	Skeleton Remote - Rem-Loc AF Output 1 kHz tone at 70 mV CIP LINE RESISTANCE to Tx 1400	CRO

Audio pre-amp (1d)

52 Audio pre-amp (1d) outputs are detailed in Table 14.

TABLE 14 AUDIO PRE-AMP (1d) OUTPUTS

Output at pin	Output to	Output frequency/level	Remarks	Test Equipment
11 with respect to 10	(2d)M	1 kHz	Skeleton Tx Sidetone 1 kHz tone at 120 mV Depress PRESSEL GAIN fully clockwise	DMM
		at: 0.4 V rms 0.2 V rms 0.1 V rms	GAIN fully counter-clockwise 3-positions clockwise 7-positions clockwise	

Receive system

53 Refer to EMER Tels H612, Fig 2004 for the receive system and Fig 2014 for all d.c. power supplies.

Receiver (3)

54 To monitor the pins of connectors (3)PL1 and (3g)SK1 with the receiver (3) fitted to the EUT, the link box (part of Test kit) must be connected between the assembly connector and the chassis connector (see Paras 26 and 29).

55 The received RF signal is injected at (3)PL3, and following amplification and mixing, an IF output at 9.6875 MHz is routed via (3)PL4.

TABLE 15 RECEIVER (3) OUTPUTS

Output at pin	Output to	Output frequency/level	Remarks	Test equipment
(3)PL4	(5)PL2	9.6875 MHz	RF input at (1a)SK4 at level -23 dBm (32 mV emf) from signal generator (Table 1, Serial 2) Skeleton Transmitter - Output and Modulation Measured at 2955B BNC input	2955B RF IN/OUT BNC

IF amplifier (5)

56 Refer to EMER Tels H612, Fig 2014 for all d.c. supplies.

TABLE 16 IF AMPLIFIER (5) INPUTS

Input at pin	Input from	Input frequency/level	Remarks	Test equipment
(5)PL2	(3)PL4	9.6875 MHz	RF input at (1a)SK4 at level -23 dBm (32 mV emf) from signal generator (Table 1, Serial 2) Skeleton Transmitter - Output and Modulation Measured at 2955B BNC input	2955B RF IN/OUT BNC
PL1-6 (5a-6)	S2CF	29 V Logic 0	For WIDE selections of MODE switch For NARROW selections	DMM

TABLE 17 IF AMPLIFIER (5) OUTPUTS

Output at pin	Output to	Output frequency/level	Remarks	Test equipment
PL1-2 (5a-2)	(1a)TS1-20	930 mV	Skeleton Receiver Audio Output For RF input from 2955B 'N' connector to (1a)SK4 at -93 dBm (10 μV emf) modulated by 1 kHz at 10 kHz WIDE TONE selected	DMM
PL1-3 (5a-3) with respect to PL1-7		1 kHz tone at 1 V p-p	For input as defined above	CRO

Control board (2c)

57 Fit the board to the appropriate extender (part of Test kit) to monitor the pins.

TABLE 18 CONTROL BOARD (2c) INPUTS

Input at pin	Input from	Input frequency/level	Remarks	Test equipment
F	(2b)24	Logic 1	Depress PRESSEL	DMM
6	(5)PL1-3	1 kHz tone at 1 V p-p	For input as defined for (5)PL1-2	CRO

TABLE 19 CONTROL BOARD (2c) OUTPUTS

Output at pin	Output to	Output frequency/level	Remarks	Test equipment
12	(2b)20	Logic 0	For received signal modulated by 150 Hz tone	DMM
10	(2b)W (2d)L	Logic 0	When squelch is lifted by received signal	DMM

Audio board (2d)

58 Fit the board to the appropriate extender (part of Test kit) to monitor the pins.

TABLE 20 AUDIO BOARD (2d) INPUTS

Input at pin	Input from	Input frequency/level	Remarks	Test equipment
6 with respect to 7	(5)PL1-3	LL 300 Hz, UL 3 kHz LL 146 Hz, UL 154 Hz LL 83 Hz, UL 87 Hz	Skeleton Receiver Audio Output Audio (1 kHz at 10 kHz) + Tone (150 Hz at 10 kHz) + Squelch [RF signal at -93 dBm (10 μV emf)]	CRO Time/cm 1 ms Sensitivity 5 V/cm Observe effect on waveform at switching off audio and tone modulations
L	(2c)10	Logic 0	For squelch lifted	DMM
18	(2c)18	Logic 0	For OVERRIDE selection	DMM
23	(2c)AA	Logic 0/Logic 1	Select 00.000 MHz	DMM or CRO
W	TS1-27	Logic 0	BK IN or IC	DMM
Y	(1h)37	Logic 1	'Transmit 1' Depress PRESSEL	DMM
P	(2a)6	LL 1.9 kHz, UL 2.1 kHz	Square-wave/select call	2955B AF IN

TABLE 21 AUDIO BOARD (2d) OUTPUTS

Output at pin	Output to	Output frequency/level	Remarks	Test equipment
AA with respect to AB	(2)T1-2/3	1 kHz at 2.7 V rms	Skeleton Receiver Audio Output Tone on carrier input at (1a)SK4 -93 dBm (10 μV emf) modulated by 1 kHz at 10 kHz	CRO/DMM
8	(2)T2-6	1 kHz at 458 mV	For inputs as defined above	CRO/DMM

Modulator board (2b)

59 Fit the board to the appropriate extender (part of Test kit) to monitor the pins.

TABLE 22 MODULATOR BOARD (2b) INPUTS

Input at pin	Input from	Input frequency/level	Remarks	Test equipment
V	(5)PL1-2	930 mV	Skeleton Receiver Audio Output For RF input at -93 dBm (10 μV emf) modulated by 1 kHz at 10 kHz with WIDE TONE selected	DMM
20	(2c)12	Logic 0	For received signal modulated by 150 Hz tone	DMM
W	(2c)10	Logic 0	When squelch is lifted by received signal	DMM

TABLE 23 MODULATOR BOARD (2b) OUTPUTS

Output at pin	Output to	Output frequency/level	Remarks	Test equipment
19	(1a)PL2-E	LL -0.6 V, UL +1.2 V d.c.	Skeleton Receiver Audio Output Transmit or receive on WIDE DATA or NARROW DATA	
		LT 0 V (ie -ve)	No received signal for analogue selection	
		NYK	NYK	DMM
		LL 0.4 V, UL 1.2 V d.c.	Received signal operating squelch but no 150 Hz tone detected	
		LL 3 V, UL 5 V	Received signal with 150 Hz tone detected	

Frequency synthesis system

<u>Receiver (3)</u>

60 Use the link box (part of Test kit) facilities, if required, to monitor the pins.

TABLE 24 RECEIVER (3) INPUTS

Input at pin	Input from	Input frequency/level	Remarks	Test equipment
PL1-12	(6)5	+3.9 V d.c.		DMM
PL1-11	(6)3	+3.68 V d.c.		DMM
PL1-7	(2a)N	0 V		DMM
PL1-9	(2a)U	0 V		DMM
PL6	(4)PL2	Selected frequency ±5 ppm at 350 mV	Depress PRESSEL Skeleton Transmitter Output and Modulation at 2955B BNC connector.	2955B RF IN/OUT BNC/DMM

TABLE 25 RECEIVER (3) OUTPUTS

Output at pin	Output to	Output frequency/level	Remarks	Test equipment
PL2	(2b)6	9.6875 MHz at 300 mV p-p	Depréss PRESSEL	CRO
PL1-16	(2d)AB	10.9 V d.c.		DMM
PL5	(6)PL1	Set frequency + 9.6875 MHz at 100 mV	Skeleton Transmitter Output and Modulation at 2955B BNC connector	2955B RF IN/OUT BNC/DMM

Tuning board (2a)

61 Fit the board to the appropriate extender (part of Test kit) to monitor the pins.

TABLE 26 TUNING BOARD (2a) INPUTS

Input at pin	Input from	Input frequency/level	Remarks	Test equipment
F	(6)25	6.25 kHz at 1 V p-p	Skeleton Receiver Audio Output Use 2955B internal CRO Square wave	2955B AF IN
AA or Y	(7)13 (7)12	0 V for no error 0 V for no error	For error square wave at pin dependant upon high (AA) or low (Y) error	Square wave visible on CRO
Z	(3g)SK1-9	Logic 0 1.63 V	No inhibit Inhibit	DMM

TABLE 27 TUNING BOARD (2a) OUTPUTS

Output at pin	Output to	Output frequency/level	Remarks	Test equipment
N or U	(3)PL1-7 or (3)PL1-9	Both at 0 V when not tuning. Potential of 20 V between pins when tuning (polarity dependant upon error high/low)	Difficult to measure due to speed of loop	DMM

Modulator board (2b)

62 Fit the board to the appropriate extender (part of Test kit) to monitor the pins.

TABLE 28 MODULATOR BOARD (2b) INPUTS

Input at pin	Input from	Input frequency/level	Remarks	Test equipment
24	(1j)7	Logic 1	Depress PRESSEL	DMM
AA with respect to AB	(6)30	968.75 kHz nominally square wave but may be distorted by loading. Approximately 1 V p-p		RIU Manual Control FREQUENCY A - CIP (Fig 1)/CRO
6 with respect to 7	(3)PL2	9.6875 MHz at 300 mV p-p	Depress PRESSEL	CRO

TABLE 29 MODULATOR BOARD (2b) OUTPUTS

Output at pin	Output to	Output frequency/level	Remarks	Test equipment
S with respect to R	(4)PL3	-1.5 V d.c. to +1.5 V d.c.	Depress PRESSEL VCO Control	DMM
1	(2c)N	Logic 1	Depress PRESSEL Tx Lock	DMM

Synthesiser (6)

63 Frequency switch (1a)S1 sets the variable divider (6d) by unique inputs of 0 V and 3 V in accordance with Table 30.

64 Owing to the density of the wiring loom in the region of the synthesiser, great care must be exercised when checking these functions.

TABLE 30 FREQUENCY SETTING INPUTS TO SYNTHESISER

Switch setting	X 10 MHz			X 1 MHz				X 100 kHz					Switch
	Board A			Board C				Board D					Connectors
	13	2	15	4	9	8	6	2	10	4	8	12	
0	0 V	0 V	0 V	3 V	3 V	3 V	3 V	0 V	0 V	3 V	3 V	0 V	
1	0 V	0 V	0 V	0 V	0 V	0 V	0 V	3 V	0 V	3 V	3 V	0 V	
2	0 V	0 V	0 V	3 V	0 V	0 V	0 V	0 V	3 V	3 V	3 V	0 V	
3	3 V	3 V	0 V	0 V	0 V	0 V	3 V	3 V	3 V	3 V	3 V	3 V	
4	0 V	0 V	3 V	3 V	0 V	0 V	3 V	0 V	0 V	0 V	0 V	3 V	
5	3 V	0 V	3 V	0 V	3 V	0 V	3 V	3 V	0 V	0 V	0 V	3 V	
6	0 V	3 V	3 V	3 V	3 V	0 V	3 V	0 V	0 V	0 V	3 V	3 V	
7	3 V	3 V	3 V	0 V	0 V	3 V	3 V	3 V	0 V	0 V	3 V	3 V	
8	0 V	0 V	0 V	3 V	0 V	3 V	3 V	0 V	3 V	0 V	3 V	3 V	
9	0 V	0 V	0 V	0 V	3 V	3 V	3 V	3 V	3 V	0 V	3 V	3 V	

	X 25 kHz		Switch
	Board E		Connectors
	2	6	
00	3 V	3 V	
25	0 V	0 V	
50	3 V	0 V	
75	0 V	3 V	

NOTE

It is more convenient to check these functions directly on the synthesiser terminals using the pin numbers indicated on Fig 2002

TABLE 31 SYNTHESISER (6) INPUTS

Input at pin	Input from	Input frequency/level	Remarks	Test equipment
PL1	(3)PL5	Set frequency plus 9.6875 MHz at 100 mV p-p		2955B RF IN/OUT BNC/DMM
14 with respect to 15	(1h)2	4.8437 MHz at 1.5 V p-p	Measure at (1h)2 using a x10 probe	RIU Manual Control FREQUENCY B - RF AMP (Fig 2)/CRO

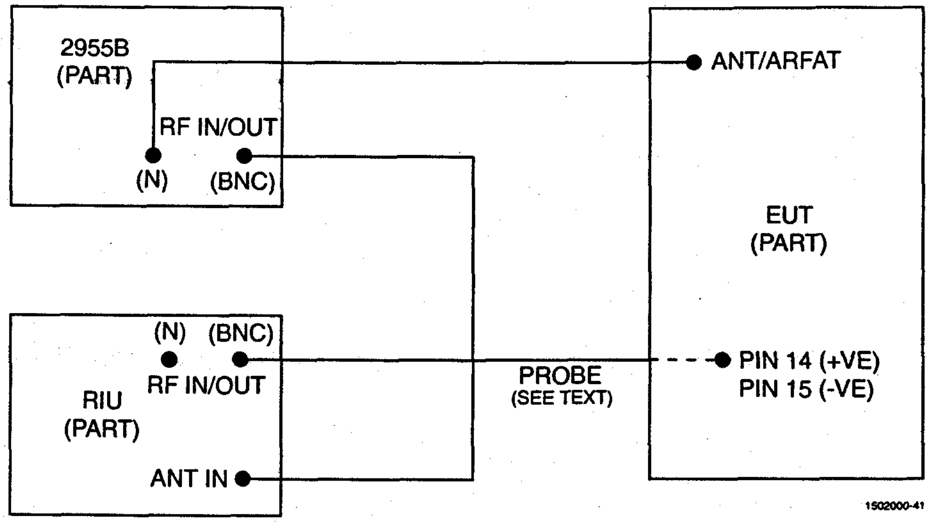


Fig 2 FREQUENCY B - RF AMP test connections

TABLE 32 SYNTHESISER (6) OUTPUTS

Output at pin	Output to	Output frequency/level	Remarks	Test equipment
30	(2b)AA	See Modulator board (2b) input at pin AA	Measure at (2b)AA	RIU Manual Control FREQUENCY A - CIP (Fig 1)/CRO
25	(2a)F	See Tuning board (2a) input at pin F	Measure at (2a)F	2955B AF IN
13 12	(2a)AA (2a)Y	See Tuning board (2a) input at pins AA and Y	Measure at (2a)AA and Y	CRO
3 with respect to 4	(3)PL1-11	+3.68 V d.c.	Measure at (3)PL1-11	DMM
5 with respect to 4	(3)PL1-12	+ 3.9 V d.c.	Measure at (3)PL1-12	DMM
48	(2c)R	Logic 1	'Synth lock'	DMM

FAULT FINDING TO SUB-ASSEMBLY LEVEL

General

65 The repair policy requires that faults be identified to sub-assembly level for the following assemblies:

65.1 Transmitter (4).

65.2 Receiver (3)

65.3 PSU (7)

66 The test tables in this section give typical values of input and output signals that can be expected for a serviceable RT-353 radio. They should be used in conjunction with EMER Tels H 612, Fig 2005 (Transmit system), Fig 2004 (Receive system), Fig 2002 (Frequency synthesis system) and Fig 2014 (d.c. supplies). Details that appear on these figures may not always be repeated in the text and no details of d.c. supplies are given as these are illustrated in Fig 2014.

67 Fault finding to sub-assembly level involves the use of the Test set (Table 3, Serial 1) with the 8920C Test Set.

67.1 Connect the power lead (Table 1, Serial 13) between the CIP POWER SUPPLY connector and the test set (Table 3, Serial 1) 28V connector.

67.2 Setting up details to achieve the necessary test conditions are given as required.

Transmitter (4) sub-assemblies

68 Remove the transmitter (4) and PSU (7) from the EUT and install them on the test set without using the link box (see Paras 22, 23.1 and 23.5).

69 Before the transmit condition can be activated, the MRP INTERLOCK connector must be connected to the RIU AUDIO connector (fan out) pin F. Select the Transmitter - Output and Modulation skeleton test set-up from the Skeleton Test Menu, enter RIU Manual Control and select TRANSMIT-ON.

70 Only those switch positions essential to the particular test are detailed in the tables.

Main chassis (4a) components

71 These items are discrete components associated with the power amplifier tetrode V1. They are either mounted on (4a)TS3, (4a)TS4 (HV components) or interconnected between points in the immediate area of the valve base, eg C47 is connected between (4b)5 and turret contact 6.

72 Identification of a faulty item will mostly be achieved by reference to valve pin potentials/signals.

TABLE 33 VALVE PIN POTENTIALS/SIGNALS

Valve pin	DC potential	DC current	Test set switch positions	Remarks
Anode	 879 V 880 V 826 V 797 V	 10 mA 20 mA 75 mA 150 mA	28 V - ON LOADINGS - LIGHT SELECT UNIT - Tx 800 V BAND - 1 Tx POWER - MIN Tx POWER - 1 W Tx POWER - 15 W Tx POWER - 50 W	Voltage measured on DMM connected to DMM sockets Current measured on Test set meter NOTE For current readings start at POWER - 50 W setting and step down to MIN
2, 4, 6, 8	2.9 V to 36 V	-	For all Tx POWER switch settings	Measure at (4a)TS3-2
Grid 2	288 V 273 V 256 V 226 V	-	Tx POWER - MIN Tx POWER - 1W Tx POWER - 15W Tx POWER - 50W	
Grid 1	-65 V -52 V -36 V -23 V	-	Tx POWER - MIN Tx POWER - 1W Tx POWER - 15W Tx POWER - 50W	

Varactor plate (4b)

73 To check frequency control, proceed as follows:

73.1 Disconnect the cable from the 2955B RF IN/OUT BNC connector.

73.2 Connect a cable assembly RF (Table 2, Serial 5) between PL2 and the 2955B RF IN/OUT BNC connector.

73.3 Connect a cable assembly RF (Table 2, Serial 5) between PL4 and the RIU ANT IN connector.

73.4 Select the 2955B Tx Test page and the 2955B RF IN/OUT BNC connector.

73.5 Connect the cable assembly RF (Table 2, Serial 23) between PL3 and the Tx VCO control connector.

73.6 Set the select unit to Tx VCO and adjust the SET VCO control for a DMM indication of 0 V.

73.7 Set the angle setting jig to 0, slacken the two small thumbscrews and adjust the large thumbscrew for a minimum Tx frequency indication.

73.8 Tighten the smaller thumbscrews and set the jig to 1.

73.9 Record the Tx frequency indication.

73.10 Adjust the SET VCO control for a DMM indication of -1.5 V.

73.11 Record the Tx frequency indication.

73.12 Adjust the SET VCO control for a DMM indication of +1.5 V.

73.13 Record the Tx frequency indication.

73.14 The frequency recorded in operation 73.13 shall be greater than that recorded for operation 73.11 by greater than 1% of that recorded in operation 73.9.

73.15 Select BAND 3.

73.16 Set the angle setting jig to 4.

73.17 Record the Tx frequency indication.

73.18 Adjust the SET VCO control for a DMM indication of 0 V.

73.19 Record the Tx frequency indication.

73.20 Adjust the SET VCO control for a DMM indication of -1.5 V.

73.21 Record the Tx frequency indication.

73.22 The frequency recorded in operation 73.17 shall be greater than that recorded for operation 73.21 by greater than 2% of that recorded in operation 73.19.

73.23 Disconnect the FRTK cables and reconnect the RIU RF IN/OUT BNC connector to the 2955B RF IN/OUT BNC connector. Select the 2955B RF IN/OUT N-type connector.

Control board (4c1)

74 Check the pin parameters as detailed in Table 34.

TABLE 34 CONTROL BOARD (4c1) PIN PARAMETERS

Pin No	Level	Remarks	
1	Logic 1	For temperatures LT 85 deg. C	
	Logic 0	For temperatures GT 95 deg. C	
2	LT 950 ohms with respect to chassis	For temperatures LT 85 deg. C	
	GT 1150 ohms with respect to chassis	For temperatures GT 95 deg. C NOTE Disconnect the socket from (4c1) and measure at the socket's input pin	
3	Logic 1	For MIN, 1W, 15W and 50W settings of the Tx POWER switch	
5	0.0 V	OFF, OSC ON	Tx POWER switch
	3.4 V	MIN	
	2.9 V	1W	
	1.93 V	15W	
	Logic 0	50 W	
6	+28 V	OFF, OSC ON	Tx POWER switch
	0.12 V	MIN, 1W, 15W 50W	
7	0.0 V	OFF, TRANSMIT	Tx POWER switch
	3.4 V	MIN	
	Logic 0	1W	
	1.93 V	15W	
	0.0 V	50 W	

(continued)

TABLE 34 CONTROL BOARD (4c1) PIN PARAMETERS (continued)

Pin No	Level	Remarks	
8	-204 V	OFF, OSC ON	Tx POWER switch
	-115 V	MIN	
	-99 V	1W	
	-76 V	15W	
	-59 V	50 W	
9	0.0 V	OFF, OSC ON	Tx POWER switch
	3.4 V	MIN	
	2.9 V	1W	
	Logic 0	15W	
	0.0 V	50 W	
10	0 V	OFF, OSC ON	Tx POWER switch
	3.1 - 3.4 V	MIN, 1W, 15W, 50W	

Control board (4c2)

75 Check the voltage levels at pins detailed in Table 35.

TABLE 35 CONTROL BOARD (4c2) PIN VOLTAGE LEVELS

Pin No	Level	Remarks
1	-4.7 V to +5.7 V	According to the setting of the SET VCO control
3	+39.4 V	For -1.5 V at pin 1
	+59.6 V	For 0 V at pin 1
	+115.6 V	For +1.5 V at pin 1
5	+29 V	For all except OFF selection of Tx POWER switch
6	Logic 1	For all except OFF selection of Tx POWER switch

Oscillators (4g) - Band 1, (4h) - Band 2, (4j) - Band 3

76 Check the output levels, as follows:

76.1 Set the angle setting jig to 0.

76.2 Slacken the two small thumbscrews and adjust the large thumbscrews for the minimum Tx frequency indication.

76.3 Tighten the smaller thumbscrews and set the jig to 1.

76.4 Select BAND 1.

76.5 Set the Tx POWER switch to OSC ON.

76.6 Monitor the output at (4)PL2, using the HF electronic test probe in conjunction with the DMM.

76.7 Record the output levels at all jig settings (1 to 4). The output level for each setting shall be greater than 300 mV.

76.8 Repeat operations 76.5 to 76.7 for Band 2 and Band 3.

Temperature sensor (4k)

77 Check the pin parameters as detailed in Table 36.

TABLE 36 TEMPERATURE SENSOR (4k) PIN PARAMETERS

Pin No	Level	Remarks
1	GT 25 V LT 15 V	At LT 60 deg. C At GT 70 deg. C NOTE Measure at (4)PL1-9 using the link box
2	LT 950 ohms with respect to chassis GT 1150 ohms with respect to chassis	AT LT 85 deg. C At GT 95 deg. C NOTE Measure at (4c1)2 with the socket disconnected from (4c1)

Receiver (3) sub-assemblies

Preliminary setting up

78 Carry out the preliminary setting up procedure, as follows:

78.1 Connect the power lead (Table 1, Serial 13) between the CIP DC SUPPLY connector and the test set INPUT VOLTAGE connector.

78.2 Remove the receiver (3) and PSU (7) from the EUT and install them on the test set (Table 3, Serial 1) with the link box interconnected in the line to (3)PL1 (Paras 24.4 to 24.6).

78.3 Remove the receiver back plate and turret cover.

78.4 Fit the angle setting jig to the test set and set the jig to 0.

78.5 Disconnect the cable from the 2955B RF IN/OUT BNC connector, and connect (3)PL3 to the RIU ANT IN connector and (3)PL5 to the 2955B RF IN/OUT BNC connector.

78.6 Connect the 8920C DMM to the test set DMM sockets.

78.7 Slacken the clamp on the receiver main tuning capacitor shaft drive wheel and couple the bellows between the shaft end and the angle setting jig.

78.8 Loosen the two smaller knurled thumbscrews on the angle setting jig.

78.9 Set the switches on the test set, as follows:

78.9.1 28 V - ON.

78.9.2 SELECT UNIT - RX ØEA.

78.9.3 BAND - 1.

78.9.4 LOADINGS - LIGHT.

78.10 Adjust SET RX ØEA for a DMM indication of 10.1 V.

78.11 Adjust the large thumbscrew on the angle setting jig for a minimum frequency indication (approx. 39.3 MHz).

78.12 Tighten the smaller knurled thumbscrews on the angle setting jig.

78.13 Set the RF generator frequency to 30.8 MHz at an output level of 100 mV emf (-13 dBm).

Main chassis (3a) components

79 These comprise the discrete components associated with the valve amplification stages V1 and V2. A faulty item will be identified mainly by reference to valve pin potentials.

80 The test points referred to are identified on the main chassis in the region of the two valves.

81 Measurements are made using the DMM, unless otherwise stated, and the WANDER facility of the test box may be used.

TABLE 37 MAIN CHASSIS (3a) VALVE PARAMETERS

Valve pin	Voltage/Signal level	Test point	Remarks
V1-1	0 V	Turret contact 6	
V1-6	+8.8 V Allow time for valve to stabilise	(3a)13	Test point is located immediately behind V1. Difficult access makes it advisable to set 28 V to OFF whilst locating test probe
V1-9	+222 V	(3a)15	
TR1-b	+222 V	(3a)17	
TR1-c	+242 V	(3a)18	
V2-1	0 V	Turret contact 16	
V2-6	+11 V	(3a)42	Test point is located adjacent to V2 base below (3a)45
V2-9	+205 V	(3a)46	

82 Measure the waveform amplitudes, as follows:

82.1 Use the CRO to monitor the waveform at turret contact 2. The waveform amplitude shall be approximately 0.2 V p-p for the input as defined in Para 78.13.

82.2 Monitor the waveform at turret contacts 11 and 16. The waveform amplitude for both contacts shall be approximately 0.65 V p-p.

82.3 Monitor the waveform at (3a)48. The waveform amplitude shall be approximately 1.5 V p-p.

Front end protection (3b)

83 Check voltage levels for pins as detailed in Table 38.

TABLE 38 FRONT END PROTECTION (3B) PIN VOLTAGE LEVELS

Pin No	Voltage level	Remarks
3	+8.8 V	Measure at (3a)13 with level -12.5 dBm (100 mV emf)
	+9 V	-2.5 dBm (320 mV emf)
	+10.6 V	+7 dBm (1 V emf)
5	-23.3 V	Measure at (3a)1 with level -12.5 dBm (100 mV emf)
	-23.2 V	-2.5 dBm (320 mV emf)
	-21.8 V	+7 dBm (1 V emf)

NOTE

To achieve RF levels of -20 dBm to +5 dBm use the 2955B BNC RF output. To achieve an RF level of +13 dBm, select Receiver Audio Output Skeleton, enter RIU Manual Control and set RF SELECT to 'RF AMP'. Set the RF generator to -2.7 dBm.

Varactor amplifier (3k)

84 To test the varactor amplifier (3k), proceed as follows:

84.1 Set the SELECT UNIT switch on the test box to RX ØEA.

84.2 Connect the DMM leads to the test box DMM sockets, and the WANDER socket to (3k)5.

84.3 Adjust SET RX ØEA for a DMM indication of 2.0 V.

84.4 Set the SELECT UNIT switch to WANDER and note the DMM indication which shall be approximately 2.36 V.

84.5 Set the SELECT UNIT switch to RX ØEA and adjust SET RX ØEA for a DMM indication of 15.0 V.

84.6 Set the SELECT UNIT switch to WANDER and note the DMM indication which shall be approximately 17.73 V.

Local oscillator (3h)

85 To test the local oscillator (3h), proceed as follows:

85.1 Set the SELECT UNIT switch to RX ØEA and adjust SET RX ØEA for a DMM indication of 10.1 V.

85.2 Connect 3h(2) to the 8920C as shown in Fig 2 (Page 28).

85.3 Press HELP, enter RIU Manual Control and select FREQUENCY B - RF AMP.

NOTE

Test point (3h)2 is located immediately above the feed-through capacitor on the rear face of (3h).

85.4 Set the angle setting jig to 2 and note the frequency indication which shall be LL 40.3775 MHz, UL 40.4175 MHz.

85.5 Set the angle setting jig to 3 and note the frequency indication which shall be LL 49.8075 MHz, UL 49.847 MHz.

85.6 Set the BAND switch to 2 and note the frequency indication which shall be LL 64.4975 MHz, UL 64.5375 MHz.

85.7 Set the angle setting jig to 2 and note the frequency indication which shall be LL 51.5975 MHz, UL 51.6575 MHz.

85.8 Set the BAND switch to 3 and note the frequency indication which shall be LL 66.9775 MHz, UL 67.0175 MHz.

85.9 Set the angle setting jig to 3 and note the frequency indication which shall be LL 84.1275 MHz, UL 84.1675 MHz.

NOTE

Any serious deviation from the specified limits may indicate a need for local oscillator alignment (Para 362).

85.10 Press HELP, press SELECT to return to the Skeleton Test Menu and select the Transmitter - Output and Modulation skeleton test set-up.

85.11 Set the angle setting jig to 2.

85.12 Check the output level indication of the sinusoidal waveform at (3h)2 for Bands 1, 2 and 3 using the HF electronic test probe to the DMM. The level for each Band setting shall be 300 mV p-p.

Buffer amplifier (3f) and control IF (3c)

86 To test the buffer amplifier (3f) and control IF (3c), proceed as follows:

86.1 Set the angle setting jig to 2.

86.2 Measure the waveform rms output level at (3h)2 using the HF electronic test probe to the DMM.

NOTE

Test point (3h)2 is located immediately above the feed-through capacitor on the rear face of (3h).

86.3 Record the rms level which shall be approximately 300 mV.

86.4 Measure the buffer amplifier rms output level at (3a)PL5. The level shall be approximately twice the value measured for operation 86.3.

86.5 Set the signal generator (Table 1, Serial 2) frequency to 50 MHz at a level of -23 dBm (32 mV emf) and apply the signal to (3)PL6.

86.6 Connect (3)PL5 to the 2955B RF IN/OUT BNC connector. Select the 2955B RF IN/OUT BNC connector.

86.7 Adjust the angle setting jig until the frequency indication is 60.0000 MHz (nominal).

86.8 Connect the HF electronic test probe to (3)PL2 and measure the output level which shall be greater than 15 mV.

Signal mixer (3e) and signal IF output (3d)

87 To test the signal mixer (3e) and signal IF output (3d), proceed as follows:

87.1 Select BAND 2.

87.2 Set the signal generator (Table 1, Serial 2) frequency to 50 MHz at a level of -23 dBm (32 mV emf) and apply the signal to (3)PL3.

87.3 Ensure (3)PL5 is connected to the 2955B RF IN/OUT BNC connector, and that the 2955B RF IN/OUT BNC connector is selected. Adjust the angle setting jig for approximately 59.6875 MHz.

87.4 Use the SET RX ØEA control for a fine adjustment of the 59.6875 MHz frequency.

87.5 Using the HF electronic test probe, record the rms output level of the signal at (3a)48 (input to (3e)5). The level indication shall be approximately 150 mV.

87.6 Use the HF electronic test probe to monitor either (3d)3 or (3d)4. The signal level shall be greater than that recorded in operation 87.5.

NOTE

> (3d)3 and (3d)4 are accessible through the gap between the turret and turret frame immediately above the centre securing hole for the receiver assembly. The pins are identified by resistors R10 and R11. Due to the limited access, a well insulated probe should be used and it is advisable to set the 28 V switch to OFF while making the connection.

87.7 Disconnect the 2955B RF IN/OUT connector from (3)PL5.

87.8 Using the CRO, measure the amplitude of the waveform at (3)PL4. The amplitude indication shall be approximately 1.0 V p-p.

87.9 Connect the 2955B RF IN/OUT BNC connector to (3)PL4.

87.10 The frequency indication for the signal at (3)PL4 shall be approximately 9.687 MHz.

87.11 Select BAND 1.

87.12 Set the signal generator (Table 1, Serial 2) frequency to 30.71 MHz at a level of -23 dBm (32 mV emf), and adjust the angle setting jig for a frequency indication of 9.68 MHz at (3)PL4.

87.13 Using the CRO facility, adjust (3d)C1 for maximum amplitude of the signal at (3)PL4.

PSU (7) sub-assemblies

88 Connect the DMM to the DMM sockets on the test set and connect the CRO in parallel with the DMM to measure ripple. Table 39 defines the voltage and ripple limits for all d.c. supplies provided by the PSU (7) with the test set switches set as specified.

TABLE 39 PSU (7) OUTPUTS

DC voltage	Test box switch settings	Output voltage limits	Ripple limits (peak-to-peak)
All	28V to ON LOADING to HEAVY	-	-
+800	SELECT LINE - +800 V SELECT UNIT - PSU1	 LL 380 V, UL 420 V	 LT 4.0 V
+250	SELECT LINE - +250 V SELECT UNIT - PSU1 - PSU2	 LL 237.5 V, UL 262.5 V LL 237.5 V, UL 262.5 V	 LT 1.25 V LT 1.25 V
+28 (RAW)	SELECT LINE - +28 V RAW SELECT UNIT - PSU1	 LL 26.6 V, UL 29.4 V	 -
+28	SELECT LINE - +28 V SELECT UNIT - PSU1 - PSU2 - PSU3 - PSU4	LL 26.6 V, UL 29.4 V LL 26.6 V, UL 29.4 V LL 26.6 V, UL 29.4 V LL 26.6 V, UL 29.4 V LL 26.6 V, UL 29.4 V	LT 140 mV LT 140 mV LT 140 mV LT 140 mV LT 140 mV
+25	SELECT LINE - +25 V SELECT UNIT - PSU1	-	-
+12	SELECT LINE - +12 V SELECT UNIT - PSU1 - PSU2 - PSU3 - PSU4	LL 11.4 V, UL 12.6 V LL 11.4 V, UL 12.6 V LL 11.4 V, UL 12.6 V LL 11.4 V, UL 12.6 V LL 11.4 V, UL 12.6 V	LT 60 mV LT 60 mV LT 60 mV LT 60 mV LT 60 mV
+6	SELECT LINE - +6 V SELECT UNIT - PSU1 - PSU2	 LL 5.7 V, UL 6.3 V LL 5.7 V, UL 6.3 V	 LT 30 mV LT 30 mV
+3	SELECT LINE - +3V SELECT UNIT - PSU1	 LL 3 V, UL 3.3 V	 LT 15 mV
-6	SELECT LINE - 6 V SELECT UNIT - PSU1 - PSU2 - PSU3 - PSU4	 LL -5.7 V, UL -6.3 V LL -5.7 V, UL -6.3 V LL -5.7 V, UL -6.3 V LL -5.7 V, UL -6.3 V	 LT 30 mV LT 30 mV LT 30 mV LT 30 mV
-300	SELECT LINE - -300 V - PSU1 - PSU2	 LL -247 V, UL -273 V LL -247 V, UL -273 V	 LT 3.2 V LT 3.2 V

89 Any PSU (7) which performs to the limits given in Table 39 is considered to be functioning satisfactorily.

90 For fault finding purposes, the PSU (7) may be considered in two sections. The first section, from the input up to and including (7d)3 is concerned with the production of a +18 V stabilised supply. The second section, from (7a)T2 secondary output is concerned with the production of the various d.c. supplies from the a.c. induced in T2. Linking the two sections is the inverter circuit driven by a square wave input from control board (7b) and providing the a.c. drive to transformer (7a)T2.

91 For fault location purposes the two sections may be isolated by disconnecting the leads from (7d)3, and connecting the test lead (Table 2, Serial 11) between (7d)3 and the test set PSU REG O/P terminal.

92 The presence of the +18 V stabilised voltage at (7d)3 with respect to (7b)2 (following removal of the lead) establishes the correct functioning of the first section. The level with (7d)3 disconnected is of the order of +18.3 V. Loss of, or degradation of, the +18 V stabilised voltage is likely to affect all d.c. output voltages and may cause the PSU (7) to 'trip'.

93 The second section comprises conventional diode bridge rectification and capacitive smoothing circuits. Failure of diode rectifiers results in the loss of, or degradation of, the associated d.c. outputs. The PSU (7) may also 'trip' under certain conditions of diode failure. Failure of the smoothing circuits causes out of tolerance ripple levels on the associated d.c. outputs.

94 The presence of the square wave drive to the inverter circuit is characterised by a distinctive 'hum' when the PSU (7) is running and may be confirmed by connecting a CRO to the appropriate pins on control board (7b).

CAUTION

> **EQUIPMENT DAMAGE. When connecting the CRO probe, care must be taken to avoid short circuits between pins on the edge of the board and the adjacent -18 V track.**

95 The output at (7a)T2 pin 6 is a square wave of 1:1 mark-to-space ratio and a voltage level of 28 V peak-to-peak. The output at pin 8 is the inverse of that at pin 6.

96 The following sub-assembly details are applicable only when the PSU (7) is fitted on the test set (Table 3, Serial 1) and the outputs are being delivered into the HEAVY dummy load.

<u>PSU (7) overload trip test</u>

97 To carry out the PSU (7) overload trip test, proceed as follows:

97.1 Increase PSU current limit setting from 12 A to 20 A.

97.2 With the PSU (7) connected to the test set, disconnect wire 788 from (7d)3.

97.3 Connect the test lead (Table 2, Serial 6) between (7d)3 and the test set PSU REG O/P terminal.

97.4 Set the test set REG LOAD control fully counter-clockwise.

97.5 Set the DMM to measure volts

97.6 Set the 28 V test set switch to ON.

97.7 Adjust the REG LOAD control clockwise until the PSU (7) 'trips' and note the DMM voltage indication at which this happened. The voltage indication shall be LL 1.44 V (14.4 A), UL 1.67 V (16.7 A)

97.8 With the PSU (7) 'tripped', note the DMM indication which shall be less than 0.1 V.

97.9 Set the test set 28 V switch to OFF.

97.10 Set the PSU current limit to 12 A. Reconnect wire 788 to (7d)3.

Control board (7b)

98 To test control board (7b), carry out the signal checks detailed in Table 40.

CAUTION

EQUIPMENT DAMAGE. The logic levels within this board are 'floating', ie Logic 0 (pin 7) is not at 0 V, and must not be used as an earth return for test equipment. Such a connection may result in damage to D1, R1 and TR1. (An exception may be made in the case of the DMM since it uses isolated terminals).

TABLE 40 CONTROL BOARD (7b) TEST PARAMETERS

Pin No	Frequency/Level (TTL 7b)	Frequency/Level (CMOS 7b)	Test equipment
1	Square wave at logic levels: Logic 1 (4 V) : 5 μs Logic 0 : 25 μs	As TTL 7b	CRO
Between 2 and: 7 (-ve) 3 (-ve) 5 (-ve)	 +5.3 V +23 V +18 V	 +11.3 V As TTL 7b As TTL 7b	DMM
4	Square wave: 18 V peak-to-peak 5:1 mark-to-space-ratio	As TTL 7b	CRO
6	Series of -ve spikes at logic levels (5 V p-p) LT 8 pulses in 32 μs for a 'no fault' condition	Series of -ve spikes at logic levels (12 V p-p) LT 4 pulses in 27.5 μs for 'no fault' condition	CRO
9-10	Square wave: 30 V peak-to-peak 1:1 mark-to-space ratio at periodic time of 200 μs	As TTL 7b	CRO
8-11	Not applicable	A series of spikes at cross over at periodic time of 100 μs (approx.) The amplitudes between spikes being approximately equal	CRO

Regulator board (7c)

99 To test regulator board (7c), carry out the signal checks detailed in Table 41.

TABLE 41 REGULATOR BOARD (7c) TEST PARAMETERS

Pin No	Frequency/Level	Test equipment
1 with respect to 6	+537 mV	DMM
2 with respect to 6	+23 V	DMM
3 with respect to 6	+105 V	DMM
4	As (7b)1	CRO
5 with respect to 6	+23 V	DMM

Tunnel diode (7d)

100 To test the tunnel diode (7d), carry out the signal checks detailed in Table 42.

TABLE 42 TUNNEL DIODE (7d) TEST PARAMETERS

Pin No	Frequency/Level	Test equipment
1	Logic 0	DMM
2	As (7b)6	CRO
3 with respect to (7b)2	+17.8 V	DMM
4 (+ve)	+17.9 V	DMM

+18 V stabilised supply

101 With the PSU (7) mounted on the test set (Table 3, Serial 1) and its outputs feeding into the HEAVY dummy loads, connect the DMM between control board (7b) pin 2 and pin 5 (-ve) and set (7b)R18 for a voltage indication of 18.00 V.

Clock pulse generator

102 With the PSU (7) mounted on the test set as per Para 101, use the CRO to view the clock pulse generator output. The displayed waveform shall be a nominal square wave with negative pulses and pulse width as defined in Table 43. Adjust the appropriate resistor to achieve the specified periodic time.

TABLE 43 CLOCK PULSE GENERATOR TEST PARAMETERS

Measure/Set	TTL (7b)	CMOS (7b)
Clock pulse generator output test point	(7b) R7	(7b) R12
Negative pulse amplitude (peak-to-peak)	4 V approx.	8 V approx.
Pulse width	1 μs to 2.5 μs	3 μs to 5 μs
Periodic time adjustment resistor	(7b) R3	(7b) R7
Periodic time	32 μs	27.5 μs

REMOVAL AND REPLACEMENT INSTRUCTIONS

GENERAL

103 References to front, rear, left and right are relative to facing the RT-353 front panel.

CASE

CAUTION

EQUIPMENT DAMAGE. The chassis supporting frame (Table 2, Serial 27) must be fitted whenever the RT-353 is removed from its case.

NOTE

When a case is replaced on an RT-353 other than that from which it was removed, the screws securing and locating the rear motor seals must be slackened and re-positioned.

104 To remove the RT-353 from its case, proceed as follows:

104.1 Lay the RT-353 on the working surface in the same plane as when it is mounted on the Clansman bars.

104.2 Remove the four securing bolts at each corner of the front panel.

104.3 Remove the bolt located centrally in the rear wall of the case between the blower outlets.

104.4 Place the RT-353, front panel downward, on the working surface and remove the case.

104.5 Fit the chassis handling frame (Table 2. Serial 27) over the blowers.

TRANSMITTER (4)

105 To remove the transmitter (4), proceed as follows:

105.1 Remove the case (Para 104).

105.2 Stand the RT-353 on the front panel to gain access to the bellows on the tuning capacitor drive between transmitter (4) and receiver (3); the coupling is located in front of, and between, the two blowers. Note that the securing block (into which the rear case securing bolt fits) is a sliding fit to facilitate access to the coupling securing screws.

105.3 Slacken the bellows coupling screws on the transmitter shaft.

105.4 Disconnect the +800V coaxial input connector (located adjacent to the bellows securing screws).

105.5 Disconnect the three miniature coaxial sockets from (4)PL2, (4)PL3 and (4)PL4 at the front end of the transmitter main assembly.

NOTE

The sockets have colour coded sleeves, the coding corresponding to the resistor colour code ie the socket to (4)PL2 has a red sleeve, the socket to (4)PL3 has an orange sleeve and the socket to (4)PL4 has a yellow sleeve.

105.6 Disconnect the multi-connector socket from (4)PL1 (located just below the miniature coaxial connectors).

105.7 Disconnect the multi-connector socket from (1a)PL5 (located immediately to the right of the transmitter turret drive motor).

105.8 To permit easier access to the lower transmitter securing bolts remove audio board (2d) (located immediately below the transmitter) as follows:

105.8.1 Release the two turnlock fasteners retaining the audio board (2b) securing cover and remove the cover.

105.8.2 Pull the audio board (2b) (nearest to transmitter) out of the edge connector.

105.9 Remove the six bolts securing the upper and lower edges of transmitter (4) to the heat exchanger.

105.10 Ease the transmitter (4) clear of the heat exchanger, taking care to avoid damage to the cableform and ensuring the tuning shaft is clear of the bellows coupling.

105.11 To replace the transmitter (4), take care to ensure that the tuning shaft engages with the bellows coupling, and carry out operations 105.1 to 105.10 in reverse order.

RECEIVER (3)

106 To remove the receiver (3), proceed as follows:

106.1 Remove the case (Para 104).

106.2 Stand the RT-353 on the front panel to gain access to the bellows on the tuning capacitor drive between transmitter (4) and receiver (3); the coupling is located to the rear of, and between, the two blowers. Note that the securing block (into which the rear case securing bolt fits) is a sliding fit to facilitate access to the coupling securing screws.

106.3 Slacken the bellows coupling screws on the receiver shaft.

106.4 Remove the five miniature coaxial sockets from (3)PL2, (3)PL3, (3)PL4, (3)PL5 and (3)PL6 (located at the front end of the receiver turret). Note that the sockets are colour coded in a similar manner to those of the transmitter sockets.

106.5 Remove the spade terminal connectors to XI, X2 on the PSU (7) (to provide easier access to the multi-connector socket on the front end of the receiver below the miniature coaxial connectors).

106.6 Disconnect the multi-connector socket from the front end of the receiver below the miniature coaxial connectors.

106.7 Disconnect the multi-connector socket from (1a)PL6 (located to the left of the receiver turret drive motor).

106.8 Remove the screw securing the receiver power supply unit bracing strut to the PSU (7). The bracing strut is located between the right-hand lower rear face of the receiver (3) and the right-hand rear casting of the PSU (7).

106.9 Remove the five bolts securing the receiver (3) to the heat exchanger. There is one bolt to each corner and one through a flange in the middle of the upper edge.

106.10 Ease the receiver (3) clear of the equipment, taking care to avoid damage to the cableform and ensuring the tuning shaft is clear of the bellows coupling.

106.11 To replace the receiver (3), taking care to re-locate the receiver shaft with the bellows coupling and carry out operations (106.1 to 106.10) in reverse order.

PSU (7)

107 To remove the PSU (7), proceed as follows:

107.1 Remove the case (Para 104).

107.2 Remove the spade terminal connections from XI, X2 at the right-hand upper front corner of the PSU (7).

107.3 Disconnect the multi-connector socket from (1a)PL4 at the left-hand lower rear corner of the PSU (7).

107.4 Disconnect the PSU (7)/receiver (3) bracing strut by removing the two securing screws from the receiver (3). This strut is located between the right-hand lower rear face of the receiver (3) and the right-hand upper rear casting of the PSU (7).

107.5 Remove the five bolts securing the PSU (7) to the heat exchanger, three through the left-hand lower side of the base plate, one through the left-hand upper forward corner of the base plate and one accessible through a hole in the right-hand face of the cover plate.

107.6 Ease the PSU (7) clear of the EUT, disengaging the output socket from (1a)PL3 which is mounted on the heat exchanger.

107.7 To replace the PSU (7), carry out operations (107.1 to 107.7) in reverse order.

BOARD PACK (2)

108 To remove one or more of the four board packs (2), proceed as follows:

108.1 Remove the case (Para 104).

108.2 Remove the board pack retaining plate by releasing the two turnlock fasteners.

108.3 Remove the board pack (2) by pulling it free of the edge connectors on the motherboard (2e).

108.4 To replace the board pack (2), carry out operations (108.1 to 108.3) in reverse order.

IF AMPLIFIER (5)

109 To remove the IF amplifier (5), proceed as follows:

109.1 Remove the case (Para 104).

109.2 Disconnect the multi-connector socket from (5)PLI and ease the cables clear of the securing clamp.

109.3 Disconnect the miniature coaxial connector from (5)PL2.

109.4 Release the four bolts securing the IF amplifier (5) to the mounting pillars on the heat exchanger.

CAUTION

EQUIPMENT DAMAGE. In operations 109.5 and 109.6, care must be taken to avoid damage to the cableform.

109.5 Ease the IF amplifier (5) clear of the EUT, taking care to avoid damage to the adjacent cableforms.

109.6 To replace the IF amplifier (5), take great care to avoid damage to the adjacent cableforms. The cableform associated with the crystal oscillator (1h) is particularly susceptible to damage when securing the upper two bolts.

SYNTHESISER (6)

CAUTION

> **EQUIPMENT DAMAGE. When removing or replacing the synthesiser (6), particular care must be taken due to the restricted working space and the complexity of cableforms in the area, especially when using a soldering tool (Table 1, Serial 9).**

110 To remove the synthesiser (6), proceed as follows:

110.1 Remove the case (Para 104).

110.2 Remove the four screws securing the crystal reference oscillator (1h) (located above the synthesiser (6)).

110.3 Cut the strapping securing the cableform between the [MODE switch (1a)S2 to crystal reference oscillator (1h)] and crystal reference oscillator (1h) pillar.

110.4 Gently ease the crystal reference oscillator (1h) upwards to the limit of its cableform, taking care not to strain any of the connectors.

110.5 Release MODE switch (1a)S2 by removing the three screws securing the switch knob to the back plate and remove the knob and the metal key.

110.6 Remove the metal collar retaining the MODE switch (1a)S2 to the front panel and ease the switch free to the limit of its cable form.

110.7 Using the soldering tool (Table 1, Serial 9), unsolder the leads from the synthesiser (6) pins along the upper left-hand side (19, 20-25, 27, 28) to the rear (12-18) and those accessible along the lower left-hand side (8-11).

110.8 Disconnect the miniature coaxial socket from (6)PL1.

110.9 Partially withdraw the synthesiser (6) to gain access to the remaining pins (1-7).

110.10 Remove the two support pillars for the crystal reference oscillator (1h) and the screw through the left-hand, upper, forward corner, secure the synthesiser (6) to its mounting blocks to release the synthesiser (6). The pillars and screw are identified by green marking.

110.11 Carefully ease the synthesiser (6) upwards until it is clear enough to permit the remaining connections to be unsoldered (pins 1-7).

110.12 To replace the synthesiser, **take great care** to avoid damage to the cableform and carry out operations 110.1 to 110.11 in reverse order. When replacing the cable strapping (removed in 110.3) note that it also retains the three coaxial connectors for the transmitter (4).

MAIN CHASSIS (1) SUB-ASSEMBLIES

General

111 To gain access to the main chassis (1) sub-assemblies, remove the case (Para 104) and the following main assemblies from the heat exchanger, as required:

111.1 Transmitter (4) (Para 105).

111.2 Receiver (3) (Para 106).

111.3 PSU (7) (Para 107).

111.4 Board pack (2) (Para 108).

111.5 IF amplifier (5) (Para 109).

111.6 Synthesiser (6) (Para 110).

112 All items passing through the front panel are sealed. These items must, on re-assembly or renewal, be lightly smeared with grease (XG271).

Crystal reference oscillator (1h)

CAUTION

EQUIPMENT DAMAGE. When removing or replacing the crystal reference oscillator (1h), care must be exercised to avoid damage to cableforms when soldering and unsoldering.

113 To remove the crystal reference oscillator (1h), proceed as follows:

113.1 Remove the four screws securing the crystal reference oscillator (1h) to the main chassis (1) and gently ease the crystal reference oscillator (1h) clear of the main chassis (1) to the limit of the cableform.

113.2 Unsolder all connectors to the crystal reference oscillator (1h).

113.3 To replace the crystal reference oscillator (1h), carry out operations 113.1 and 113.2 in reverse order.

Blower drive (1c)

114 To remove the blower drive sub-assembly (1c), proceed as follows:

114.1 Using the soldering tool (Table 1, Serial 9), unsolder the leads from the pins at the top edge of the board.

114.2 Remove the two securing screws in the upper corners of the board. Slacken (but do not remove) the three screws along the bottom edge of the board. Note that these screw into non-captive nuts at the front of the board and secure three power transistors to the mounting frame which acts as a heatsink.

114.3 Ease the board upwards to clear the mounting brackets and free the power transistors from their retaining slots.

114.4 To replace the blower drive (1c), carry out operations 114.1 to 114.3 in reverse order.

28 V supply filter (1e)

115 To remove the 28 V supply filter (1e), proceed as follows:

115.1 Unsolder the output connectors from pins 3 and 4.

115.2 Remove the two screws securing the filter to the mounting pillar.

115.3 Unsolder the two input leads at pins A and B of the 28 V input plug (1a)PL1.

115.4 Ease the 28 V supply filter (1e) clear of the equipment.

115.5 To replace the 28 V supply filter (1e), carry out operations 115.1 to 115.4 in reverse order.

Power relay (1a)RLA

116 To remove the power relay (1a)RLA, proceed as follows:

116.1 Unsolder the cableform connectors at pin 2, pin 3, pin a and pin b. **Do not unsolder the pink inter-pin connectors.**

116.2 Remove the two screws securing the power relay (1a)RLA to the supporting pillars and remove the power relay (1a)RLA.

116.3 To replace the power relay (1a)RLA, carry out operations 116.1 and 116.2 in reverse order.

AUDIO sockets (1a)SK1, (1a)SK2 and HARNESS plug (1a)PL2

117 To remove the AUDIO sockets (1a)SK1, (1a)SK2 and HARNESS plug (1a)PL2, proceed as follows:

117.1 Untie the cableform strapping from around the associated filter.

117.2 Unsolder all connectors to the associated filter.

117.3 Remove the front panel securing nut and ease the sockets/plug and filter free from the rear of the front panel.

117.4 To replace the AUDIO sockets (1a)SK1, (1a)SK2 and HARNESS plug (1a)PL2, carry out operations 117.1 to 117.3 in reverse order.

Frequency selection switch (1a)S1

CAUTION

> **EQUIPMENT DAMAGE. When removing or replacing the frequency selection switch (1a)S1, care must be exercised to avoid damage to cableforms when soldering and unsoldering.**

118 To remove the frequency selection switch (1a)S1, proceed as follows:

118.1 Remove the four screws securing the crystal oscillator board (1h) and gently ease the frequency selection switch (1a)S1 clear to give access to the soldered connectors on the right-hand face.

118.2 Unsolder all connectors from switch (1a)SI.

118.3 Rotate the outer dial of the frequency selection switch (1a)S1 to align the access holes with two of the securing screws and remove the screws.

118.4 Rotate the outer dial of the frequency selection switch (1a)S1 to align with the remaining two securing screws and remove the screws.

118.5 Pull the knob assembly and driving gear free from the front panel. Take care to retain the toroidal seal.

118.6 Remove the securing screw at each corner of the frequency dial casting on the front panel.

118.7 Ease the frequency selection switch (1a)S1 free from the rear of the front panel taking care to avoid damage to the adjacent cableform.

118.8 To replace the frequency selection switch (1a)S1, proceed as follows, taking care to avoid damage to the adjacent cableforms, particularly when re-soldering connectors to the sub-assembly (1h):

118.8.1 Replace the knob and gear assembly ensuring that the metal peg to the rear aligns with the slot in the actuating arm and that the toroidal seal is in place.

118.8.2 Carry out operations 118.1 to 118.8 in reverse order.

Motherboard (2e)

119 To remove the motherboard (2e), proceed as follows:

119.1 Release the three screws securing the metal bracket just forward of the motherboard (2e) and remove the bracket. The bracket mounts the black plastic runners for the board pack (2).

119.2 Release the four screws securing the motherboard (2e) to the supporting column on the heat exchanger and ease the motherboard (2e) clear of the heat exchanger to give access to the cableform.

119.3 Release the cableform retaining strapping on those sections of the cableform which are routed under, but not connected to, the motherboard (2e) and ease clear.

119.4 Unsolder all the connectors from the motherboard pins and remove the assembly from the RT-353.

119.5 To replace the motherboard (2e), carry out operations 119.1 to 119.4 in reverse order. When replacing the bracket removed in operation 119.1, do not forget the earth connection from the motherboard (2e) which connects to the lower rear securing screw.

Gain control board (1g) and terminal strip (1a)TS1

120 To remove the gain control board (1g) and terminal strip (1a)TS1, proceed as follows:

120.1 Unsolder all the connectors from rear face of (1a)TS1.

120.2 Release the four securing screws which pass through the board, the metal spacers and board (1g) into the supporting pillars on the front panel. The screws are retained by the spacers.

120.3 Unsolder all the connectors from the front face of (1a)TS1 and remove the terminal strip (1a)TS1 from the RT-353.

120.4 Remove all the connectors from board (1g) and remove the board from the RT-353.

120.5 To replace the gain control board (1g) and terminal strip (1a)TS1, carry out operations 120.1 to 120.4 in reverse order.

Elapsed time indicator (1a)RE1

121 To remove the elapsed time indicator (1a)RE1, proceed as follows:

121.1 Unsolder the leads from the terminals.

121.2 Remove the cableform from the clamp adjacent to the elapse time indicator (1a)RE1.

121.3 Remove the three screws securing the elapse time indicator (1a)RE1 to the supporting pillars on the front panel and remove the elapse time indicator (1a)RE1 from the front panel.

121.4 To replace the elapse time indicator, carry out operations 121.1 to 121.3 in reverse order.

Meter control board (1b) and audio pre-amp (1d)

122 To remove the meter control board (1b) and audio pre-amp (1d), proceed as follows:

122.1 Release the elapsed time indicator (1a)RE1 (Paras 121.2 and 121.3), do not unsolder the leads. Ease the elapse time indicator (1a)RE1 clear of the front panel to the limit of the connectors.

CAUTION

EQUIPMENT DAMAGE. With reference to operation 122.2, great care must be exercised when releasing the screws to avoid damage to the cableform in the cramped conditions between the boards.

122.2 Remove the two screws securing the meter control board (1b) and audio pre-amp (1d) to the front panel. The screws are accessible between the two boards.

122.3 Ease the two boards clear of the RT-353 to permit access to the four screws securing meter control board (1b) and release the exposed screws.

122.4 Unsolder all connectors from meter control board (1b).

122.5 Unsolder all connectors from audio pre-amp board (1d).

122.6 To replace the meter control board (1b) and audio pre-amp (1d), carry out operations 122.1 to 122.5 in reverse order.

Switches (1a)S3 to (1a)S6

123 To remove switches (1a)S3 to (1a)S6, proceed as follows:

NOTE

With the exception of the pins listed below, all switch connectors are soldered to pins on terminal board (1a)TS1:

S4 -	TEST -	S4BB -	1 to (1b)13
		S4BB -	10 to (1b)1
		S4AB -	12 to (1a)S1-LPS A
S5 -	GAIN -	S5AB -	1 to (1d)12
		S5AB -	4 to (1d)14
		S5AB -	9 to (1d)13
		S5BB -	All connections to (1g)

123.1 Unsolder the associated connector at the destination (ie (1a)TS1, (1b)TS1 etc), except for that to (1a)S1-LPS A which is more easily disconnected at switch (1a)S4 AB-12.

123.2 Remove the three screws securing the switch knob to the back plate and remove the knob and metal key. The switch is retained in the front panel by the metal collar beneath the knob which screws on to the switch shaft.

123.3 Remove the switch from the rear of the front panel.

123.4 To replace switches (1a)S3 to (1a)S6, carry out operations 123.1 to 123.3 in reverse order.

MODE switch (1a)S2

124 To remove the MODE switch (1a)S2, proceed as follows:

124.1 Remove the screws securing the crystal reference oscillator (1h) and ease the crystal reference oscillator clear of the rear of MODE switch (1a)S2 to the extent permitted by its cableform.

124.2 Remove the three screws securing the switch knob to the back plate and remove the knob and metal key. The switch is retained in the front panel by the metal collar beneath the knob which screws on to the switch shaft.

124.3 Remove the switch from the rear of the front panel.

124.4 With MODE switch (1a)S2 clear of the main chassis to the extent permitted by its cableform, unsolder the connections from the switch, either from the switch itself or from the crystal reference oscillator (1h).

124.5 To replace the MODE switches (1a)S2, carry out operations 124.1 to 124.4 in reverse order.

Thermostat (1a)THT 1

125 To remove the thermostat (1a)THT 1, proceed as follows:

125.1 Remove the GAIN switch (1a)S5 (Para 123).

125.2 Remove the two screws securing thermostat THT 1 to the heat exchanger wall. Unsoldering of the connectors from the switch is not required.

125.3 To replace thermostat (1a)THT, carry out operations 125.1 and 125.2 in reverse order.

Antenna changeover relay (1a)RLB

NOTE

There are two versions of relay (1a)RLB, the Plessey version and the H1-G Relay version.

126 To remove the antenna changeover relay (1a)RLB (Plessey version), proceed as follows:

126.1 Disconnect the three miniature coaxial connectors.

126.2 Unsolder the energising coil connectors and associated capacitors.

126.3 Remove the two securing screws passing through the mounting bracket top-plate to release the relay.

126.4 To replace the antenna changeover relay (1a)RLB (Plessey version), carry out operations 126.1 to 126.3 in reverse order.

127 To remove the antenna changeover relay (1a)RLB (H1-G Relay version), proceed as follows:

127.1 Remove the PSU (7) (Para 107).

127.2 Remove ANT/ARFAT connector (1a)SK4 from the front panel.

127.3 Remove the clamping plate on the top edge of the heat exchanger.

127.4 Disconnect the coaxial connectors from the receiver (3)PL3 and transmitter (4)

127.5 Unsolder the energising coil connectors.

127.6 Remove the two securing screws passing through the mounting bracket and remove the relay.

127.7 To replace the antenna changeover relay (1a)RLB (H1-G Relay version), carry out operations 127.1 to 127.6 in reverse order.

Testmeter (1a)ME1

128 To remove the testmeter (1a)ME1, proceed as follows:

128.1 Unsolder the four connectors from the rear of the testmeter (1aME1).

128.2 Unscrew the knurled securing ring at the rear of the front panel and remove the testmeter.

NOTE

The dial illuminating lamp is an integral part of the testmeter (1a)ME1 and when lamp failure occurs the testmeter must be replaced as detailed in operations 128.1 and 128.2.

Remote terminal (1a)SK5 and (1a)SK6

129 To remove the remote terminal (1a)SK5 and (1a)SK6, proceed as follows:

129.1 Unsolder the connectors from the remote terminal (1a)SK5 and (1a)SK6,

129.2 Remove the hexagonal securing nut at the rear of the front panel and remove the terminals and filter complete.

129.3 To replace the remote terminals, carry out operations 129.1 and 129.2 in reverse order.

Tuner control board (1j)

130 To remove the Tuner control board (1j), proceed as follows:

130.1 Unsolder all the connectors from the tuner control board (1j) pins.

130.2 Remove the three screws securing the tuner control board to its support pillars and remove the tuner control board.

130.3 To replace the tuner control board (1j), carry out operations 130.1 and 130.2 in reverse order.

ARFAT (or TURF) connector (1a)PL2 and filter (1f)

131 To remove the ARFAT (or TURF) connector (1a)PL2 and filter (1f), proceed as follows:

131.1 Remove the four screws securing the ARFAT (or TURF) connector to the front panel and carefully pull the plug free to the limit of the ribbon wiring interconnecting the ARFAT (or TURF) connector to filter (1f).

131.2 Unsolder the connectors from the pins and remove the ARFAT (or TURF) connector.

131.3 Unsolder the input connectors from the pins at the rear of the front panel.

131.4 Remove the three screws securing the filter and remove the filter from the rear of the front panel to the limit of the ribbon wire connectors. Unsolder the ribbon wire connectors and remove the filter.

131.5 To replace the ARFAT (or TURF) connector (1a)PL2 and filter (1f) carry out operations 131.1 to 131.4 in reverse order, remembering to connect the earth connector to the upper right-hand securing screw when replacing the filter.

ANT/ARFAT socket (1a)SK4

132 To remove the ANT/ARFAT socket (1a)SK4, proceed as follows:

132.1 Remove the cover on the rear of the ANT/ARFAT socket (1a)SK4.

132.2 Unsolder and remove the coaxial lead from the ANT/ARFAT socket.

132.3 Remove the hexagonal nut securing the ANT/ARFAT socket to the front panel and remove the socket.

132.4 To replace the ANT/ARFAT socket (1a)SK4, carry out operations 132.1 to 132.3 in reverse order, remembering to replace the rubber sealing washer under the cover.

Blowers (1a)BL1 and (1a)BL2

133 To replace the blowers (1a)BL1 and (1a)BL2, proceed as follows:

133.1 Unsolder the appropriate leads from the blower control board (1c).

133.2 Remove the four securing screws from the blower to be removed.

133.3 Remove the cross plate between the blowers (used for rear case securing bolt).

133.4 Pull the blower free from the heat exchanger inlet housing and remove the blower.

133.5 To replace blowers (1a)BL1 and (1a)BL2, carry out operations 133.1 to 133.4 in reverse order, remembering the rubber/metal/rubber sealing washer between blower and blower housing and the toroidal rubber seal recessed in the blower motor body shell. When the blower(s) have been replaced, check the residual deviation (refer to EMER Tels H 619 Misc. Instr. No. 13).

REMOVAL AND REPLACEMENT OF SUB-ASSEMBLIES

NOTE

When renewing any of the motors on either the receiver (3) or transmitter (4) sub-assemblies, first rotate the shaft of the motor by hand for a few revolutions to ensure good brush/commutator contact.

Receiver (3)

134 To remove receiver (3) sub-assemblies, proceed as follows:

134.1 Pull the miniature coaxial plug assembly off the mounting supports at the front end of the turret to separate the turret assembly (3g) from the main chassis (3a).

134.2 Remove the two securing bolts through the turret flange immediately to the right of the coaxial socket mounting.

134.3 Remove the two similar securing bolts at the other end of the turret, one below and to the right of the turret drive motor, the other immediately behind the relay on (3g)TS1.

134.4 Remove the two securing bolts fitted through the side flanges to the left of the receiver assembly.

134.5 Ease the turret clear of the main assembly.

CAUTIONS

(1) With the turret removed, great care must be exercised to avoid damage to the spring contacts (on the main assembly) which are extremely fragile. When replacing the turret ensure that the contacts are correctly located on the blocks and are not caught up on the lower lip of the block.

(2) The turret assembly and the main assembly are a MATCHED PAIR; a turret MUST always be refitted to the SAME main assembly from which it was removed.

NOTE

Removing the turret permits access to the sub-assemblies front end protection(3b), control IF (3c), signal IF (3d), signal mixer (3e), buffer amplifier (3f) and partial access to the local oscillator (3h).

134.6 Remove the five securing screws and remove the metal cover over the valve bases and discrete components associated with (3)VI and (3)V2 to facilitate the removal of sub-assemblies (3b) to (3f).

NOTE

The cross member on the underside of the metal cover is bent to clear the supporting pillar and no attempt should be made to re-align it.

135 With the cover removed as detailed in operation 134.6, the valves VI, V2 and associated components are accessible for replacement.

136 Sub-assemblies (3b) to (3f) may now be removed. The front-end protection (3b) is a PEC secured by four screws to support pillars on the main chassis (3a), whilst (3f) is a metal plate with mounted components and is similarly fixed. Sub-assemblies (3c), (3d) and (3e) are metal cans each secured by two diagonally opposed screws into support pillars on the main chassis (3a). All the items detailed in this paragraph are removed by unsoldering the connectors and releasing the securing screws.

137 The local oscillator sub-assembly (3h) is a metal plate with mounted components; two of the fixing screws are accessible beneath the turret but the third is located beneath the right-hand side cover. Removal of the cover (secured by six screws) also gives access to V1, V2, varactor amplifier (3k) and the ganged tuning capacitor.

138 To remove the local oscillator (3h), remove screws specified in Para 137 and unsolder all the connectors. To remove the varactor amplifier (3k), remove the four securing screws fitted through the main chassis (3a) base into the pillars supporting varactor amplifier (3k) and remove the sub-assembly and pillars clear of the main chassis. When the varactor amplifier is clear of the chassis, unsolder all the connectors to release the sub-assembly.

139 Input filter (3j) and plug PL1 are removed complete, by removing the four securing screws and withdrawing the sub-assembly clear of the main chassis before unsoldering all the connectors.

140 The tuning motor and gear assembly is secured to a bracket fixed to the main chassis by three bolts. Unsolder the motor supply connectors at (3a)Cl6 and (3a)Cl7. The motor may also be removed without the bracket by releasing the four retaining clamps.

141 The turret cover is removed by releasing the two spring clips to give additional access to the turret lids. Each turret lid bandpass is secured to the frame by seven screws and the longer turret lid RF by nine screws.

CAUTION

> **The turret must not be rotated by hand or damage will result to the mechanical stop mechanism. Rotate the turret by turning the drive motor shaft in its normal direction of rotation.**

142 The turret control PEC (3g) is secured by two screws to pillars on the end of the turret frame adjacent to the drive motor. The input socket (3g)SK1 is connected directly to the PEC.

143 The relay associated with the turret system is located beneath the turret control PEC (3g) and is secured in position by the pillars supporting the PEC.

144 The drive motor is secured to a casting by two screws; the supply connectors are unsoldered at the motor terminals.

NOTE

> The axial shaft of the motor is deliberately offset to the nylon gear wheel to reduce the effect of backlash.

145 The micro-switch associated with the turret system is secured to the side of the motor casting just to the rear of the nylon turret drive gear.

146 The rotary switch driven by the turret shaft is secured to the turret frame end casting by two screws and a special push fit nut and is interconnected electrically with turret control PEC (3g). To remove the nut it must be rotated through 90 degrees.

Transmitter (4)

WARNING

> **HEALTH HAZARD. THE TRANSMITTER VALVE CONTAINS BERYLLIUM AND WHEN REPLACED OR DAMAGED, SHOULD BE DISPOSED OF IN ACCORDANCE WITH THE INSTRUCTIONS DETAILED IN HEALTH AND SAFETY MANAGEMENT IN THE EQUIPMENT SUPPORT ORGANISATION AND ES/REME UNITS - ARMY CODE No 63723, CHAPTER 15 - BERYLLIUM HAZARDS AND PRECAUTIONS.**

147 To separate the turret sub-assembly (4f) from the main chassis (4a) release the four bolts at the corners and ease the turret free. Removal of the turret permits access to temperature sensor (4k) and the turret contact blocks.

148 The temperature sensor (4k) is a small PEC secured to the heat transfer wall of the main assembly. The temperature sensing thyristors are located on the reverse side of the board and project into holes in the wall, these holes are filled with a heat conducting compound. A heat resistant gasket is inserted between the PEC and the wall of the main assembly. To remove the temperature sensor PEC (4k), release the two securing screws and unsolder the connectors. When replacing the temperature sensor PEC (4k) new heat sink compound (type DP 2623) must be used inside the two thyristor locating holes.

149 Two discrete components associated with the PA valve are also located beneath the turret sub-assembly, these are (4a)R4 and associated capacitor (4a)C49, the resistor is mounted within a heatsink attached to the heat transfer wall.

150 Removal of the transmitter side cover (secured by ten screws) permits access to the control board 1 (4c1), control board 2 (4c2) and the varactor plate (4b). The ganged tuning capacitor, PA valve and associated discrete components are also located beneath the side plate.

151 The control board 1 (4c1) and control board 2 (4c2) are PECs secured to a metal frame. External interconnection is by plug and socket. To remove both boards and bracket complete, disconnect both input sockets and remove the centrally located screw securing the mounting bracket to the main chassis.

152 Discrete components associated with the PA valve are located in the immediate vicinity of the valve and are removed and replaced by conventional methods. It must be emphasised that access is limited in this area and great care must be exercised to avoid damage to the cableform when soldering or desoldering.

153 Varactor plate (4b) is a small metal plate providing a mounting for the varactor diodes and associated components; it is located just forward of the PA valve base.

154 Access to the varactor (4b) is limited and component replacement requires great care.

155 Some components of end filter (4a)TS1 are accessible beneath the black plastic cover marked DANGER HIGH VOLTAGE and others on the reverse side are accessible when control board 1 (4c1) and control board 2 (4c2) are removed (Paras 150 and 151).

156 Harmonic filters (4e)TS1, (4e)TS2 and (4e)TS3 are located behind a metal cover to the right of the input filter (4a)TS1. They comprise components mounted on small PECs secured to mounting pillars on a metal plate (4e).

157 With the cover removed (eight screws), each filter is removed by releasing the two securing screws and withdrawing the PEC as the input and output connectors are unsoldered. The mounting plate (4e) may be removed by releasing the four screws securing it to the transmitter end plate; this permits access to the filter connectors.

158 The transmitter turret (4f) is similarly constructed to that on the receiver (3g) except that the transmitter turret (4f) has only one turret lid per band and the PEC associated with the control system is smaller.

159 Removal of the turret components is similar for both assemblies (Paras 142 to 146).

PSU (7)

CAUTION

The PSU (7) contains CMOS devices on board 7b. Before working on the PSU (7), consult EMER Tels A 414 Chap 545 - Handling Precautions, Static Sensitive Devices, which gives general handling information. The devices are ML2 to ML8 inclusive.

160 The blower drive supply (7n) comprises a series regulator transistor, with a thermistor mounted on chassis (7n2) and an associated PEC (7n1) secured to pillars on (7n2). Chassis (7n2) forms the end plate of PSU (7).

161 Unsolder all connections to PEC (7n1) and remove the four securing screws.

162 Unsolder the connections to (7n2)TR1 and associated thermistor and remove (7n2)TR1 and the associated thermistor. These items are not changed individually; failure of either one will require replacement of both. The thermister is secured to the transistor body with 'Araldite' adhesive.

NOTE

> The transistor mounting hardware includes a mica insulating washer for the body and a black plastic insulating bush for each securing screw.

163 Removing both side covers permits access to the remaining sub-assemblies and discrete components.

164 Transformer (7a)T2 and HV diode (7e) may be removed together by unsoldering all connectors to both items (accessible through the side panel) and removing seven screws, four securing screws through the base plate into (7a)T2, two screws fitted through the side plate into HV diode (7e) mounting plate and one screw in the end plate of the control board (7b) mounting tray.

165 Alternatively, the HV diode (7e) may be removed as a separate item by first removing the output section (7g) and choke section (7f) (Para 170), to permit access to (7e) side securing screw. Under these circumstances sufficient clearance may be obtained without unsoldering the connectors to (7f) and (7g).

166 The following discrete components are accessible after carrying out the procedure detailed in Para 163:

166.1	(7a)CI and (7a)C2	- Located directly below (7n1) and connected to (7a)L1 and (7a)L2 respectively.
166.2	(7a)C6 and (7a)C5	- (7a)C6 is secured to the side plate by an hexagonal nut and (7a)C5 by two screws.
166.3	(7a)C7 and (7d)	- C7 is secured to the side plate by three screws and (7d) by two screws. Removal of C7 necessitates carrying out the procedure detailed in Para 168 without unsoldering.
166.4	(7a)L3 and (7a)L4	- Secured to the baseplate by four screws and the terminal connectors through the sideplate.
166.5	(7a)TI	- Secured to the baseplate by two screws.
166.6	(7a)TR3 and (7a)TR4	- Both secured to the side-plate, but TR4 cannot be removed unless (7a)T1 is first moved to one side to the limit of its connectors. Note mounting insulation washers.
166.7	(7a)R2	- Located within a heatsink secured to the side-plate by two screws.

167 Following the removal of (7a)C5 and (7a)C6 as detailed in Para 166, the following discrete components are accessible:

167.1	(7a)C3 and (7a)C4	-	Connected between (7a)L1, (7a)L2 and chassis respectively.
167.2	(7a)Ll and (7a)L2	-	A combined unit secured by two screws to the base-plate below (7n).
167.3	(7a)Dl and (7a)D2	-	Secured to the base-plate by hexagonal nuts.
167.4	(7a)TRl	-	Fitted in a recess in the base-plate in which it is secured by two screws. Note mounting hardware.

168 Control board (7b) and its mounting tray are secured to the top of PSU (7) by five screws. When these are released and all connectors are unsoldered, the sub-assembly and tray may be removed. When replacing the board, note that the long securing screw passes through the heatsink associated with (7b)TRl and the short one secures the board to the tray only (adjacent to (7b)ML6).

NOTE

An updated design of control board (7b) incorporates CMOS ICs which replaces TTL ICs (refer to EMER Tels H 612 for details). The control board CMOS differs from the updated design in that the short screw is adjacent to ML8.

169 Removal of control board (7b) permits access to regulator drive (7c), located directly below it, which comprises a PEC within a metal mounting tray. Releasing the three securing screws from the mounting pillars within the tray enables the PEC to be removed following the unsoldering of all connectors.

170 Choke section (7f) and output section (7g) are removed together (to facilitate unsoldering of interconnections) as follows:

170.1 Remove the two screws securing the output socket and output section to the base-plate housing.

170.2 Unsolder the connectors from the input terminals Xl, X2 on the output section.

170.3 Unsolder the connectors from sub-assemblies (7f) and (7g) to (7a)9.

170.4 Remove the four screws securing the choke section (7f) to the base-plate.

170.5 Remove the countersunk screws in the cover support and remove the choke section (7f) and output section (7g).

170.6 When the choke section (7f) and output section (7g) are clear of the chassis they may be separated by releasing the two upper screws from the cover plate of the output selection. Complete removal of this plate enables the output socket to be removed.

SPECIFICATION TESTING - 8920C MANUAL MODE

INTRODUCTION

171 Specification testing, using the 8920C, can be carried out in either the manual (this Part 2) or automatic mode (Part 4 of this EMER). 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.

CONDITION OF TEST

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

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

SPECIFICATION TEST INITIAL SETTING UP

174 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.

NOTE

At all times throughout these procedures ensure that 7150+ DMM is only used with the leads and probe supplied with it.

175 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.

176 The PSU, 2955B and RIU initial settings for each test are performed using the methods detailed in Paras 178 to 181. 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.

177 The standard connections between the 8920C and EUT are given in Para 182. Any differences are highlighted in the particular test procedure.

PSU settings

NOTE

The PSU is released from automatic (BUS) control, during the first selection of Current Consumption Skeleton Setup (ie Test 1).

178 To set the PSU output voltage and current, proceed as follows:

178.1 Press OUTPUT ENABLE to disable the PSU output (green ENABLE led extinguished).

178.2 Using the VOLTAGE ADJUST control, set the required EUT supply voltage on the PSU display.

178.3 Using the CURRENT ADJUST control, set the required EUT supply current limit on the PSU display.

178.4 Press OUTPUT ENABLE to enable the PSU output (green ENABLE led illuminated).

2955B settings

179 The following procedures (Paras 180 and 181) cover the selection of a skeleton test set-up and additional skeleton facilities, eg AF ATTENUATION - 40dB. For details on setting up other 2955B functions, eg RF generator output, refer to AESP 6625-K-112-201 (8920C Operating Information) and the 2955B manufacturer's handbook.

Selecting a skeleton test set-up

180 To select a skeleton test set-up, proceed as follows:

NOTE

If the system is already in 8920C manual mode, proceed from Para 180.2.

180.1 Press 3 on the 8920C Main Menu to select the 8920C manual mode. Observe that the Skeleton Test Menu is displayed on the 2955B and proceed to Para 180.3.

180.2 To display the Skeleton Test Menu, press HELP on the 2955B Manual Screen or press SELECT on the RIU Manual Control screen.

180.3 Press the appropriate 2955B key to select the required skeleton test set-up for the current test.

Selecting additional skeleton test set-up facilities

181 To select facilities to be added to the skeleton test set-up for a particular test, proceed as follows:

181.1 Use the following procedure when entering RIU Manual Control for the first time during a test:

181.1.1 Press HELP to display the Skeleton Test Menu.

181.1.2 Press 8 to select RIU Manual Control.

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

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

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

181.2.1 Press HELP to select RIU Manual Control.

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

181.2.3 Press HELP to return to the 2955B Manual Screen or SELECT to enter the Skeleton Test Menu.

EUT-to-8920C interconnections

182 To carry out the specification test initial setting up procedure, proceed as follows:

182.1 Switch on the 2955B, RIU, digital multimeter (DMM) and Farnell AP60-50 Power Supply, 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.

182.2 Make the EUT-to-8920C interconnections, as follows:

182.2.1 Connect the power lead (Table 1, Serial 13) between the CIP DC SUPPLY connector and the 28 V connector on the EUT.

182.2.2 Connect the audio lead (Table 1, Serial 14) between the CIP AUDIO connector and an AUDIO socket (upper or lower) on the EUT.

182.2.3 Connect the harness lead (Table 1, Serial 15) between the CIP HARNESS connector and the HARNESS connector on the EUT.

182.2.4 Connect the remote leads (Table 1, Serial 17) between the CIP REMOTE terminals and the REMOTE TERMINALS on the EUT.

182.2.5 Connect the BNC-to-BNC coaxial lead (Table 1, Serial 18) between the RIU ANT IN connector and the ANT/ARFAT connector on the EUT.

182.2.6 Connect the earth lead (Table 1, Serial 19) between the CIP earth stud and the EUT chassis.

182.3 Press 3 on the 2955B to select MANUAL OPERATION.

ANALOGUE

Test 1 - Reverse polarity and 28V SPLY testmeter operation

Test limits

183 The EUT is protected from a reverse polarity power supply connection at the 28 V input connector.

184 The testmeter shall indicate the input voltage when the TEST switch is set to 28V SPLY.

Initial connections/settings

185 Carry out the setting up procedure as detailed in Para 182.

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

186.1 PSU.

(1)	Voltage	:	24 V
(2)	Current Limit	:	12 A

186.2 2955B.

(1)	SET AF LOAD	:	100R
(2)	Skeleton Test Set-up	:	Current Consumption

186.3 CIP.

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

186.4 EUT.

(1)	FREQUENCY	:	30.075 MHz
(2)	MODE	:	NARROW
(3)	POWER	:	OFF
(4)	TEST	:	28V SPLY
(5)	GAIN	:	Mid-position
(6)	REMOTE	:	LOCAL

187 Disconnect the power lead from the EUT 28 V connector and set the EUT POWER switch to MIN.

Test method

188 To carry out the first check of Test 1 (Para 183), proceed as follows:

188.1 Set the DMM to 'ohms check' and connect the negative (black) lead to pin B of the EUT 28 V connector and the positive (red) lead to pin A. The DMM shall indicate less than 10KΩ.

188.2 Reverse the DMM lead connections. The DMM shall indicate greater than 100KΩ.

188.3 Set the EUT POWER switch to OFF.

188.4 Reconnect the power lead to the EUT 28 V connector. Reconnect the DMM to the RIU DMM connectors and set the DMM to d.c. volts.

189 To carry out the second check of Test 1 (Para 184), proceed as follows:

189.1 Set the EUT POWER switch to MIN and note that the testmeter indicates LL 23 V, UL 26 V.

189.2 Set the PSU d.c. output voltage to 20 V.

189.3 Note that the testmeter indicates LL 19 V, UL 21 V.

189.4 Set the PSU output voltage to 24 V.

Test 2 - Tone modulation

Test limits

190 The tone modulation frequency shall be LL 147 Hz, UL 151 Hz, which shall produce a deviation of LL 1.5 kHz, UL 2.0 kHz (NARROW) or LL 3.1 kHz, UL 3.8 kHz (WIDE TONE).

191 The deviation produced for the WIDE mode selection shall be less than 500 Hz.

Initial settings

192 Ensure that Test 1 (Paras 183 to 189) has been carried out before setting up the test conditions for Test 2.

193 Set up the 8920C and EUT controls and conditions for Test 2 as follows:

193.1 PSU.

(1)	Voltage	: 24 V
(2)	Current Limit	: 12 A

193.2 2955B.

(1)	SET AF LOAD	: 100R
(2)	Skeleton Test Set-up	: Transmitter - Output and Modulation

193.3 CIP.

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

193.4 EUT.

(1)	FREQUENCY	: 50.050 MHz
(2)	MODE	: NARROW
(3)	POWER	: OFF
(4)	TEST	: TX O/P
(5)	GAIN	: Mid-position
(6)	REMOTE	: LOCAL

Test methods

194 To carry out the first checks of Test 2 (Para 190), proceed as follows:

194.1 Set the EUT POWER switch to 1 W.

194.2 Select the 300 Hz Low Pass filter on the 2955B.

194.3 Press and hold in the PRESSEL switch.

194.4 Note the modulation level indication on the 2955B display which shall be LL 1.5 kHz, UL 2.0 kHz.

194.5 Note the 2955B modulation frequency indication (due to the internal tone) on the 2955B display which shall be LL 147 Hz, UL 151 Hz.

194.6 Set the EUT MODE switch to WIDE TONE.

194.7 Press and hold in the PRESSEL switch and note the 2955B modulation level indication

which shall be LL 3.1 kHz, UL 3.8 kHz.

194.8 Set the EUT MODE switch to NARROW.

194.9 Repeat the operations 194.2 to 194.7 for EUT FREQUENCY settings of 35.000 MHz, 40.000 MHz, 45.000 MHz, 55.000 MHz, 60.000 MHz, 65.000 MHz and 70.000 MHz.

195 To carry out the second check of Test 2 (Para 191), proceed as follows:

195.1 Select the 15 kHz Low Pass filter on the 2955B.

195.2 Set the EUT MODE switch to WIDE and EUT FREQUENCY switch to 50.050 MHz.

195.3 Hold the EUT TEST switch at OVERRIDE (the EUT fans start running).

195.4 Press and hold in the PRESSEL switch and note the 2955B modulation level indication due to noise which shall be less than 500 Hz.

195.5 Release the PRESSEL and TEST switches.

195.6 Press HELP to return to the Skeleton Test Menu.

Test 3 - Audio modulation and response

Test limits

196 With an AF input of 1 kHz at 10 mV rms emf at AUDIO socket pin A with respect to pin B, the deviation shall be LL 4 kHz, UL 6 kHz for NARROW mode, and LL 8 kHz, UL 12 kHz for WIDE mode selection, with the GAIN switch set to mid-position in both cases. With the d.c. supply reduced to 18 V, the deviation shall be LL 5 kHz, UL 15 kHz for WIDE mode.

197 With an AF level input set at a level to produce a deviation of LL 4.9 kHz, UL 5.1 kHz for a modulation frequency of 1 kHz, the deviation produced for given frequencies at the same level shall be as follows:

Modulation frequency	Deviation
150 Hz	UL 1.6 kHz
300 Hz	LL 4 kHz, UL 6.5 kHz
600 Hz	LL 4 kHz, UL 6.5 kHz
1500 Hz	LL 4 kHz, UL 6.5 kHz
3000 Hz	LL 4 kHz, UL 6.5 kHz
6000 Hz	UL 1.6 kHz

Initial settings

198 Ensure that Test 1 (Paras 183 to 189) has been carried out before setting up the test conditions for Test 3.

199 Set up the 8920C and EUT controls and conditions for Test 3 as follows:

199.1 PSU.

(1)	Voltage	: 24 V
(2)	Current Limit	: 12 A

199.2 2955B.

(1)	SET AF LOAD	: 100R
(2)	Skeleton Test Set-up	: Transmitter - Output and Modulation
(3)	AF ATTENUATION	: 20 dB

199.3 CIP.

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

199.4 EUT.

(1)	FREQUENCY	: 50.050 MHz
(2)	MODE	: NARROW
(3)	POWER	: OFF
(4)	TEST	: RX SIG
(5)	GAIN	: Mid-position
(6)	REMOTE	: LOCAL

Test methods

200 To carry out the first check of Test 3 (Para 196), proceed as follows:

200.1 Set the AF generator frequency to 1 kHz at a level of 620 mV and set the AF generator on.

200.2 Select the 0.3 kHz to 3.4 kHz band pass filter.

200.3 Set the EUT POWER switch to 50 W.

200.4 Press the PRESSEL switch and note the 2955B modulation level indication which shall be LL 4 kHz, UL 6 kHz. Release the PRESSEL switch.

200.5 Set the EUT MODE switch to WIDE.

200.6 Select the 15 kHz low pass filter.

200.7 Press the PRESSEL switch and note the 2955B modulation level indication which shall be UL 8 kHz, UL 12 kHz. Release the PRESSEL switch.

200.8 Set the PSU output voltage to 18 V d.c.

200.9 Press the PRESSEL switch and note the 2955B modulation level indication which shall be LL 5 kHz, UL 15 kHz. Release the PRESSEL switch.

200.10 Set the PSU output voltage back to 24 V d.c.

201 To carry out the second check of Test 3 (Para 197), proceed as follows:

201.1 Press the PRESSEL switch and adjust the 1 kHz level (approximately 30 mV) for a deviation of LL 4.9 kHz, UL 5.1 kHz.

201.2 Set the modulation frequency, in turn, to the frequencies listed below and check that the resultant deviation, with the PRESSEL switch depressed, is within the specified limits:

Modulation frequency	**Deviation**
150 Hz	UL 1.6 kHz
300 Hz	LL 4 kHz, UL 6.5 kHz
600 Hz	LL 4 kHz, UL 6.5 kHz
1500 Hz	LL 4 kHz, UL 6.5 kHz
3000 Hz	LL 4 kHz, UL 6.5 kHz
6000 Hz	UL 1.6 kHz

201.3 Press HELP to return to RIU Manual Control and press SELECT to return to theSkeleton Test Menu.

Test 4 - Frequency accuracy

<u>Test limits</u>

202 The radiated frequency shall be within ±6 ppm of the selected frequency for a d.c. supply voltage of 24 V, and ±10 ppm for a d.c. supply voltage of 18 V. These limits shall apply throughout the operating range.

Initial settings

203 Ensure that Test 1 (Paras 183 to 189) has been carried out before setting up the test conditions for Test 4.

204 Set up the 8920C and EUT controls and conditions for Test 4 as follows:

204.1 PSU.

(1) Voltage : 24 V
(2) Current Limit : 12 A

204.2 2955B.

(1) SET AF LOAD : 100R
(2) Skeleton Test Set-up : Transmitter - Output and Modulation

204.3 CIP.

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

204.4 EUT.

(1) FREQUENCY : 50.050 MHz
(2) MODE : WIDE
(3) POWER : OFF
(4) TEST : TX O/P
(5) GAIN : Mid-position
(6) REMOTE : LOCAL

Test method

205 To carry out this specification check (Para 202), proceed as follows:

205.1 Set the EUT POWER switch to 50 W.

205.2 Press and hold in the PRESSEL switch.

205.3 Note the 2955B Tx frequency indication which shall be LL 50.049700 MHz, UL 50.050300 MHz.

205.4 Release the PRESSEL switch.

205.5 Repeat operations 205.2 to 205.4, but for following frequency settings, in turn. The frequencies displayed on the 2955B shall be within the limits shown.

Frequency Setting (MHz)	**2955B Display**	
	LL (MHz)	**UL (MHz)**
60.000	59.999640	60.000360
70.000	69.999580	70.000420
30.075	30.074820	30.075180
31.000	30.999814	31.000186
32.000	31.999808	32.000192
33.000	32.999802	33.000198
34.000	33.999796	34.000204
35.000	34.999790	35.000210
36.000	35.999784	36.000216
37.000	36.999778	37.000222
38.000	37.999772	38.000228
39.000	38.999766	39.000234
39.100	39.099765	39.100235
39.200	39.199765	39.200235
39.300	39.299764	39.300236
39.400	39.399764	39.400236
39.500	39.499763	39.500237
39.600	39.599762	39.600238
39.700	39.699762	39.700238
39.800	39.799761	39.800239
39.900	39.899761	39.900239
39.925	39.924761	39.925239
39.950	39.949760	39.950240
39.975	39.974760	39.975240
40.000	39.999760	40.000240
48.600	48.599708	48.600292
57.700	57.699654	57.700346
66.800	66.799599	66.800401
75.975	75.974544	75.975456
74.450	74.449553	74.450447
63.325	63.324620	63.325380
52.200	52.199687	52.200313
41.150	41.149753	41.150247

205.6 Set the PSU d.c. output voltage to 18 V.

205.7 Set the EUT frequency to 50.050 MHz.

205.8 Press the PRESSEL switch and note the 2955B Tx frequency indication which shall be LL 50.049700 MHz, UL 50.050300 MHz. Release the PRESSEL switch.

205.9 Set the PSU d.c. output voltage back to 24 V.

205.10 Press HELP to return to the Skeleton Test Menu.

Test 5 - RF power output into a 50Ω load

NOTE

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

Test limits

206 With the d.c. supply set to 24 V, the EUT transmitted output power into a 50 ohm load shall be as specified below for given selections of the POWER switch and over the EUT operating frequency range.

POWER switch setting	RF power output	
MIN	LL 19 mW (20 mW),	UL 240 mW (250mW)
1W	LL 0.48 W (0.5 W),	UL 2.4 W (2.5 W)
15W	LL 9.6 W (10 W),	UL 26 W (27 W)
50W	LL 38 W (40 W),	UL 72 W (75 W)

207 With the d.c. supply set to 18 V, the EUT transmitted output power into 50 ohms shall be greater than 28.8 W (30 W).

Initial settings

208 Ensure that Test 1 (Paras 183 to 189) has been carried out before setting up the test conditions for Test 5.

209 Set up the 8920C and EUT controls and conditions for Test 5 as follows:

209.1 PSU.

(1)	Voltage	: 24 V
(2)	Current Limit	: 12 A

209.2 2955B.

(1)	SET AF LOAD	: 100R
(2)	Skeleton Test Set-up	: Transmitter - Output and Modulation

209.3 CIP.

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

209.4 EUT.

(1)	FREQUENCY	: 50.050 MHz
(2)	MODE	: WIDE
(3)	POWER	: OFF
(4)	TEST	: TX O/P
(5)	GAIN	: Mid-position
(6)	REMOTE	: LOCAL

Test methods

210 To carry out the first check of Test 5 (Para 206), proceed as follows:

210.1 Set the EUT POWER switch to MIN.

210.2 Press and hold in the PRESSEL switch and note the 2955B Tx power indication which shall be LL 19 mW (20 mW), UL 240 mW (250 mW).

210.3 Release the PRESSEL switch.

210.4 Set the EUT POWER switch to 1W.

210.5 Press and hold in the PRESSEL switch and note the 2955B Tx power indication which shall be LL 0.48 W (0.5 W), UL 2.4 W (2.5 W).

210.6 Release the PRESSEL switch.

210.7 Set the EUT POWER switch to 15W.

210.8 Press and hold in the PRESSEL switch and note the 2955B Tx power indication which shall be LL 9.6 W (10 W), UL 26 W (27 W).

210.9 Release the PRESSEL switch.

210.10 Set the EUT POWER switch to 50W.

210.11 Press and hold in the PRESSEL switch and note the 2955B Tx power indication which shall be LL 38 W (40 W), UL 72 W (75 W).

210.12 Release the PRESSEL switch.

210.13 Repeat operations 210.1 to 210.12 for the following EUT frequency settings:

35.500 MHz
40.050 MHz
41.050 MHz
48.000 MHz
55.050 MHz
56.000 MHz
65.000 MHz
75.050 MHz
75.975 MHz

211 To carry out the second check of Test 5 (Para 207), proceed as follows:

211.1 Set the EUT frequency to 50.050 MHz.

211.2 Set the PSU d.c. output voltage to 18 V.

211.3 Press and hold in the PRESSEL switch and note the 2955B Tx power indication which shall be greater than 28.8 W (30 W).

211.4 Set the PSU d.c. output voltage back 24 V.

211.5 Press HELP to return to the Skeleton Test Menu.

Test 6 - RF power into mismatch, transmission inhibit whilst tuning, interruption of supply and normal delay

Test limits

212 The transmitter will work into any impedance without damage.

213 The transmitter will not transmit while the frequency synthesis loop is coarse tuning, but is capable of transmitting within 10 seconds of making the last setting of the FREQUENCY selector switch.

214 The transmitter will transmit at a minimum power level within LL 20 seconds, UL 40 seconds when the d.c. supply has been switched off for longer than 30 seconds, and within 10 seconds when the d.c supply has been switched off for less than 3 seconds.

Initial settings

215 Ensure that Test 1 (Paras 183 to 189) has been carried out before setting up the test conditions for Test 6.

216 Set up the 8920C and EUT controls and conditions for Test 6 as follows:

216.1 PSU.

(1) Voltage : 24 V
(2) Current Limit : 12 A

216.2 2955B.

(1) SET AF LOAD : 100R
(2) Skeleton Test Set-up : Transmitter - Output and Modulation

216.3 CIP.

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

216.4 EUT.

(1) FREQUENCY : 40.050 MHz
(2) MODE : WIDE
(3) POWER : OFF
(4) TEST : TX O/P
(5) GAIN : Mid-position
(6) REMOTE : LOCAL

Test methods

217 To carry out the first check of Test 6 (Para 212), proceed as follows:

217.1 Set the EUT POWER switch to 50W.

217.2 Disconnect the coaxial lead from the ANT/ARFAT connector on the EUT.

217.3 Enter RIU Manual Control and select TRANSMIT - ON. Press HELP to return to the 2955B Manual Screen.

217.4 When the EUT has been in transmit for greater than 60 seconds, enter RIU Manual Control and select TRANSMIT - OFF. Press HELP to return to the 2955B Manual Screen.

217.5 Reconnect the coaxial lead disconnected in operation 217.2.

217.6 Press and hold in the PRESSEL switch and note the 2955B Tx power indication which shall be LL 38 W (40 W), UL 72 W (75 W).

217.7 Repeat operation 217.6 for each of the EUT frequency settings given below:

35.000 MHz
40.050 MHz
41.000 MHz
48.000 MHz
55.000 MHz
56.000 MHz
65.000 MHz
75.000 MHz

217.8 Disconnect the coaxial lead from the ANT/ARFAT connector on the EUT and connect the BNC shorting connector (Table 1, Serial 20) to the ANT/ARFAT connector.

217.9 Repeat operations 217.3 to 217.4.

217.10 Remove the BNC shorting connector from the ANT/ARFAT connector and reconnect the coaxial lead.

217.11 Repeat operation 217.6.

218 To carry out the second check of Test 6 (Para 213), proceed as follows:

218.1 Set the EUT frequency to 41.050 MHz.

218.2 Enter RIU Manual Control and select TRANSMIT - ON.

218.3 Observe the 2955B Tx power indication whilst changing the EUT frequency to 40.050 MHz and note that the 2955B Tx power indication falls to zero during tuning, but shall return to LL 38 W (40 W), UL 72 W (75 W) within 10 seconds.

219 To carry out the third check of Test 6 (Para 214), proceed as follows:

219.1 Set the EUT POWER switch to OFF for LL 2.5 seconds, UL 3.0 seconds, and then to MIN.

219.2 Measure the time taken for the 2955B Tx power indication to reach LL 19 mW (20 mW). The time taken shall be less than 10 seconds.

219.3 Set the EUT POWER switch to OFF for greater than 30 seconds, and then to MIN.

219.4 Measure the time taken for the 2955B Tx power indication to reach LL 19 mW (20 mW). The time taken shall be LL 20 seconds, UL 40 seconds.

219.5 Press HELP to enter RIU Manual Control and select TRANSMIT - OFF. Press SELECT to return to the Skeleton Test Menu.

Test 7 - Receiver sensitivity and frequency

Test limits

220 With an RF input of 0.5 μV emf modulated by 1 kHz at 10 kHz deviation (WIDE) or 1 kHz at 5 kHz deviation (NARROW), the audio output signal + noise-to-noise ratio shall be GT 6 dB over the EUT operating frequency range.

Initial settings

221 Ensure that Test 1 (Paras 183 to 189) has been carried out before setting up the test conditions for Test 7.

222 Set up the 8920C and EUT controls and conditions for Test 7 as follows:

222.1 PSU.

(1) Voltage : 24 V
(2) Current Limit : 12 A

222.2 2955B.

(1) SET AF LOAD : 100R
(2) Skeleton Test Set-up : Receiver - Audio Output

222.3 CIP.

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

222.4 EUT.

(1) FREQUENCY : 30.025 MHz
(2) MODE : WIDE
(3) POWER : OFF
(4) TEST : RX SIG
(5) GAIN : Fully clockwise
(6) REMOTE : LOCAL

Test methods

CAUTION

EQUIPMENT DAMAGE. Do not depress the PRESSEL switch at any stage during this test.

223 To carry out this specification check (Para 220), proceed as follows:

223.1 Set the EUT POWER switch to MIN.

223.2 Set the RF generator frequency to 30.025 MHz at a level of -118.8 dBm, and set the RF generator on.

223.3 Set the modulation frequency to 1 kHz at a level of 10 kHz and set the modulation on.

223.4 Adjust the 2955B VOLUME control until the tone can be heard.

223.5 Set dBR to zero.

223.6 Set the modulation off and note 2955B dBR indication which shall not be greater than -6 dB.

223.7 Repeat the operations 223.2 to 223.6 for EUT and RF generator settings, in turn, as given below:

35.025 MHz
40.025 MHz
41.025 MHz
48.000 MHz
50.025 MHz
55.025 MHz
56.025 MHz
65.025 MHz
75.025 MHz

223.8 Set the EUT MODE switch to NARROW.

223.9 Set the 2955B modulation level to 5 kHz.

223.10 Repeat operations 223.2 to 223.6, maintaining a 2955B modulation level of 5 kHz.

223.11 Press HELP to return to the Skeleton Test Menu.

Test 8 - Demodulation response and limiting

Test limits

224 With an RF input of 5 µV emf modulated by an AF tone at 5 kHz deviation (NARROW), the output level at AUDIO socket pin D with respect to pin E shall be as defined below when compared with the output at 1 kHz:

AF tone	AF output level
150 Hz	GT 30 dB down
300 Hz	LL 3 dB down, UL 2 dB up
600 Hz	LL 3 dB down, UL 2 dB up
1.5 kHz	Less than 2 dB up or down
3 kHz	Less than 2 dB up or down
6 kHz	LL 20 dB down, UL 12 dB down

225 The audio output level from an RF signal modulated by 1 kHz does not vary by more than 2 dB when the input level is varied from LL 1 µV, UL 1 mV emf.

Initial settings

226 Ensure that Test 1 (Paras 183 to 189) has been carried out before setting up the test conditions for Test 8.

227 Set up the 8920C and EUT controls and conditions for Test 8 as follows:

227.1 PSU.

(1)	Voltage	: 24 V
(2)	Current Limit	: 12 A

227.2 2955B.

(1)	SET AF LOAD	: 100R
(2)	Skeleton Test Set-up	: Receiver - Audio Output

227.3 CIP.

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

227.4 EUT.

(1)	FREQUENCY	: 50.000 MHz
(2)	MODE	: NARROW
(3)	POWER	: OFF
(4)	TEST	: RX SIG
(5)	GAIN	: Fully clockwise
(6)	REMOTE	: LOCAL

Test methods

CAUTION

EQUIPMENT DAMAGE. Do not depress the PRESSEL switch at any stage during this test.

228 To carry out the first checks of Test 8 (Para 226), proceed as follows:

228.1 Set the EUT POWER switch to MIN.

228.2 Set the RF generator frequency to 50.000 MHz at a level of -98.8 dBm and set the RF generator on.

228.3 Set the modulation frequency to 1 kHz at a level of 5 kHz and set the modulation on.

228.4 Set dBR to zero.

228.5 Set the modulation frequency to 150 Hz.

228.6 Note the 2955B dBR indication which shall be less than -30 dB.

228.7 Set the modulating frequency to the following frequencies, in turn, and note the 2955B dBR indication for each setting which shall be within the limits specified:

Modulation frequency	**AF output level**
300 Hz	LL -3 dB, UL +2 dB
600 Hz	LL -3 dB, UL +2 dB
1.5 kHz	LL -2 dB, UL +2 dB
3 kHz	LL -2 dB, UL +2 dB
6 kHz	LL -20 dB, UL -12 dB

229 To carry out the second check of Test 8 (Para 225), proceed as follows:

229.1 Set the EUT frequency to 30 MHz.

229.2 Set the RF generator frequency to 30.000 MHz at a level of -112.8 dBm.

229.3 Set the modulation frequency to 1 kHz at a level of 5 kHz.

229.4 Set dBR to zero.

229.5 Using the VARIABLE rotary control, slowly increase the 2955B RF generator level to -52.8 dBm, noting that the 2955B dBR indication is LL -2 dB, UL 2 dB throughout the range of RF generator increase.

229.6 Press HELP to return to the Skeleton Test Menu.

234.5 Set the EUT MODE switch to NARROW and repeat operations 234.3 and 234.4, setting a modulation level of 1.5 kHz in 234.4.

235 To carry out the final check of Test 9 (Para 231), proceed as follows:

235.1 Set the EUT MODE switch to WIDE.

235.2 Set the modulation off.

235.3 Enter RIU Manual Control, select RF SELECT - HISENSE and press HELP to return to the 2955B Manual Screen.

235.4 Press SELECT to select the 2955B RF BNC connector.

235.5 Set the RF generator level to -12.5 dBm and note the EUT signal strength meter indication which shall be greater than 2/3 fsd.

235.6 Press SELECT to select the 2955B RF N-type connector.

235.7 Press HELP to return to RIU Manual Control and select RF SELECT - NORMAL. Press SELECT to return to the Skeleton Test Menu.

Test 10 - Tone detection operation

Test limits

236 Reception of an RF signal at 0.7 µV emf modulated by LL 147 Hz, UL 151 Hz at 1.65 kHz deviation shall cause a current of LL 8 mA, UL 11 mA to be drawn from a LL 17.5 V, UL 18.5 V supply connected across the REMOTE terminals with the EUT REMOTE switch set to AUTO.

Initial settings

237 Ensure that Test 1 (Paras 183 to 189) has been carried out before setting up the test conditions for Test 10.

238 Set up the 8920C and EUT controls and conditions for Test 10 as follows:

238.1 PSU.

(1)	Voltage	: 24 V
(2)	Current Limit	: 12 A

238.2 2955B.

(1)	SET AF LOAD	: (Not Applicable)
(2)	Skeleton Test Set-up	: Remote - Loc-Rem Line Current

238.3 CIP.

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

238.4 EUT.

(1)	FREQUENCY	:	30.025 MHz
(2)	MODE	:	NARROW
(3)	POWER	:	OFF
(4)	TEST	:	RX SIG
(5)	GAIN	:	Mid-position
(6)	REMOTE	:	AUTO

Test method

239 To carry this specification check (Para 236), set and connect the DMM for mA d.c., and proceed as follows:

239.1 Set the RF generator frequency to 30.025 MHz at a level of -115.8 dBm. Set the RF generator on.

239.2 Set the modulation frequency to 150 Hz at a level of 1.65 kHz. Set the modulation on.

239.3 Set the EUT POWER switch to MIN.

239.4 Enter RIU Manual Control, select REMOTE PATH - REBRO SLAVE and press HELP to return to the 2955B Manual Screen.

239.5 Note the DMM current indication which shall be LL 8 mA, UL 11 mA.

239.6 Press, in turn, SET MOD and FREQ, and rotate the VARIABLE control counter-clockwise to reduce the modulation frequency until the current indication falls to less than 4 mA. At this point, note the frequency which shall be less than 144 Hz.

239.7 Enter RIU Manual Control, select REMOTE PATH - AUDIO (to switch off the 'remote' 18 V supply) and press HELP to return to the 2955B Manual Screen.

239.8 Set up a modulation frequency of 150 Hz (to reset the original conditions).

239.9 Enter RIU Manual Control, select REMOTE PATH - REBRO SLAVE and press HELP to return to the 2955B Manual Screen.

239.10 Rotate the VARIABLE control clockwise to increase the modulation frequency until the DMM current indication is less than 4 mA. At this point, note the frequency which shall be greater than 154 Hz.

239.11 Press HELP to return to RIU Manual Control, select REMOTE PATH - AUDIO and press SELECT to return to the Skeleton Test Menu.

239.12 Set and connect the DMM for d.c. volts. Set the LINE RESISTANCE switch on the CIP to OC.

Test 11 - Remote terminal control characteristics

Test limits

240 With a short circuit applied across the REMOTE terminals, a current of less than 35 mA shall flow between the terminals for REMOTE switch settings of LOCAL, REM and AUTO.

241 For REMOTE switch settings of REM and AUTO, the EUT **must** be in the receive condition for a remote terminal current flow of less than 4 mA, and in the transmit condition for current flows within the range LL 8 mA, UL 14.5 mA.

242 Setting the EUT REMOTE switch to CALL shall place a short circuit condition across the REMOTE terminals and apply a LL 1.9 kHz, UL 2.1 kHz tone at the terminals.

Initial settings

243 Ensure that Test 1 (Paras 183 to 189) has been carried out before setting up the test conditions for Test 11.

244 Set up the 8920C and EUT controls and conditions for Test 11 as follows:

244.1 PSU.

(1) Voltage : 24 V
(2) Current Limit : 12 A

244.2 2955B.

(1) SET AF LOAD : 100R
(2) Skeleton Test Set-up : Remote - Rem-Loc Line Current

244.3 CIP.

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

244.4 EUT.

(1) FREQUENCY : 30.025 MHz
(2) MODE : WIDE
(3) POWER : OFF
(4) TEST : RX SIG
(5) GAIN : Mid-position
(6) REMOTE : LOCAL

Test method

245 To carry out the first check of Test 11 (Para 240), proceed as follows:

245.1 Set and connect the DMM for mA d.c.

245.2 Set the EUT POWER switch to MIN.

245.3 Set the CIP LINE RESISTANCE switch to CALL IN - SC.

245.4 Note the 2955B frequency indication which shall be LL 1.9 kHz, UL 2.1 kHz and that the tone is audible.

245.5 Note the DMM current indication which shall be LL 20 mA, UL 35 mA and that the EUT is in the receive condition (transmit lamp extinguished).

245.6 Set the EUT REMOTE switch to REM, AUTO, BK IN and IC, in turn. The conditions as specified in Paras 245.4 and 245.5 shall be maintained for each setting.

NOTE

There may be slight audio distortion of the tone for the BK IN and IC settings.

245.7 Press HELP to return to the Skeleton Test Menu.

246 To carry out the second check of Test 11 (Para 241), proceed as follows:

246.1 Select the Remote - Loc-Rem Line Current skeleton test set-up. Ensure that the RIU LINE CURRENT control is fully counter-clockwise.

246.2 Set the CIP LINE RESISTANCE switch to LC.

246.3 Set the EUT REMOTE switch to REM. Set R.F.generator to 30.075 MHz.

246.4 Turn the RIU LINE CURRENT control slowly clockwise and stop at the point where the EUT transmit lamp illuminates.

246.5 Note the DMM current indication which shall be LL 4 mA, UL 8 mA.

246.6 Continue turning the RIU LINE CURRENT control and stop at the point where the EUT transmit lamp extinguishes.

246.7 Note the DMM current indication which shall be LL 14.5 mA, UL 20 mA.

246.8 Set the RIU LINE CURRENT control fully counter-clockwise, set the EUT REMOTE switch to AUTO and repeat operations 246.4 to 246.7.

246.9 On completion, set the RIU LINE CURRENT control fully counter-clockwise and set the CIP LINE RESISTANCE switch to OC.

247 To carry out the third check of Test 11 (Para 242), proceed as follows:

247.1 Set and connect the DMM for d.c. volts. Set R.F.generator to 30.025MHz.

247.2 Set and hold the EUT REMOTE switch in the CALL position and note the 2955B frequency indication which shall be LL 1.9 kHz, UL 2.1 kHz and that the tone is audible.

247.3 Set and hold the EUT REMOTE switch in the CALL position and note the DMM voltage indication which shall be less than 1 V.

247.4 Press HELP to return to the Skeleton Test Menu.

Test 12 - Remote terminal resistance

Test limits

248 With the EUT REMOTE switch set to CALL, there shall be a resistance of less than 50 ohms across the REMOTE terminals.

249 With the EUT in the receive mode and not responding to a 150 Hz tone, a voltage of less than 22 V connected across the REMOTE terminals shall draw a current of less than 4 mA.

Initial settings

250 Ensure that Test 1 (Paras 183 to 189) has been carried out before setting up the test conditions for Test 12.

251 Set up the 8920C and EUT controls and conditions for Test 12, as follows:

251.1 PSU.

(1) Voltage : 24 V
(2) Current Limit : 12 A

251.2 2955B.

(1) SET AF LOAD : 100R
(2) Skeleton Test Set-up : Remote - Rem-Loc Line Current

251.3 CIP.

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

251.4 EUT.

(1) FREQUENCY : 30.000 MHz
(2) MODE : WIDE TONE
(3) POWER : OFF
(4) TEST : RX SIG
(5) GAIN : Mid-position
(6) REMOTE : LOCAL

Test method

252 To carry out the first check of Test 12 (Para 248), proceed as follows:

252.1 Connect the DMM (set to measure resistance) to the EUT REMOTE terminals.

252.2 Set and hold the EUT REMOTE switch in the CALL position and note the DMM resistance indication which shall be less than 50 ohms.

253 To carry out the second check of Test 12 (Para 249), proceed as follows:

253.1 Reconnect the DMM to the RIU, and set and connect the DMM to measure mA d.c.

253.2 Set the EUT POWER switch to MIN.

253.3 Enter RIU Manual Control, select REMOTE PATH - REBRO SLAVE and press HELP to return to the 2955B Manual Screen.

253.4 Note the DMM indication which shall be less than plus 4 mA. (A negative result on the DMM is a valid result and is less than plus 4 mA.

253.5 Enter RIU Manual Control, select REMOTE PATH - AUDIO and press SELECT to return to the Skeleton Test Menu.

253.6 Set and connect the DMM for d.c. volts.

Test 13 - TEST switch function and Testmeter indication.

Test limit

254 For each position of the TEST switch, the testmeter shall provide the specified indications, as follows:

TABLE 44 TEST SWITCH FUNCTION AND TESTMETER INDICATION

TEST switch position	Other conditions	Meter indication
LPS OFF	No front panel illumination	As for RX SIG position
FANS OFF	No front panel illumination Fans inhibited Transmission inhibited	As for RX SIG position
RX SIG	Reception of on-tune carrier varied between LL 0 mV, UL 100 mV rms emf	LT 1/3 fsd to GT 2/3 fsd
TX O/P	Transmit condition commanded	Green sector
AFC TX	Transmit condition commanded	±3 divisions of centre
SYNTH*	Permitted frequency selected Prohibited frequency selected	Green sector Red sector
TEMP*	EUT temperature within limits EUT temperature outside limits	Green sector Red sector
ARFAT* (or TURF)	ARFAT (or TURF) connector Pin L open circuit Pin L connected to Pin P (ARFAT overheat)	Green sector Red sector
	* Red sector indication due to SYNTH, TEMP or ARFAT (or TURF) produces an alarm condition causing the frequency dial illumination to flash on and off at LL 0.77 Hz, UL 1.9 Hz and all audio outputs to pulse on and off at the same rate Transmissions are inhibited in the alarm condition	
OVERRIDE	Alarm indication ceases Squelch lifted Transmission inhibit due to TEMP or ARFAT (or TURF) alarms is lifted Both fans run	

Initial settings

255 Ensure that Test 1 (Paras 183 to 189) has been carried out before setting up the test conditions for Test 13.

256 Set up the 8920C and EUT controls and conditions for Test 13, as follows:

256.1 PSU.

(1) Voltage : 24 V
(2) Current Limit : 12 A

256.2 2955B.

(1) SET AF LOAD : 100R
(2) Skeleton Test Set-up : Transmitter - Output and Modulation

256.3 CIP.

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

256.4 EUT.

(1) FREQUENCY : 30.075 MHz
(2) MODE : WIDE TONE
(3) POWER : OFF
(4) TEST : 28V SPLY
(5) GAIN : Fully clockwise
(6) REMOTE : LOCAL

Test method

257 To carry out the Test 13 specification checks (Para 254), proceed as follows:

257.1 Set the EUT POWER switch to MIN.

257.2 Set the EUT TEST switch to LPS OFF and note that the frequency dial and testmeter illumination is extinguished.

257.3 Set the EUT TEST switch to FANS OFF and note that the frequency dial and testmeter illumination remains extinguished.

257.4 Press and hold in the PRESSEL switch and note that the transmit lamp does not illuminate. Release the PRESSEL switch.

257.5 Press HELP, to return to the Skeleton Test Menu and select the Receiver - Audio Output skeleton test set-up.

257.6 Set the EUT TEST switch to RX SIG and note that the testmeter indication is less than 1/3 fsd and the 2955B AF Volts indication is less than 20 mV.

257.7 Press HELP, enter RIU Manual Control and select RF SELECT - HISENS. Press HELP to return to the 2955B Manual Screen.

257.8 Press SELECT to select the 2955B RF BNC connector.

257.9 Set the modulation frequency to 1 kHz at a level of 10 kHz and set the modulation on.

257.10 Set the RF generator frequency to 30.075 MHz at a level of -12.5 dBm and set the RF generator on.

257.11 Note that the testmeter indication is greater than 2/3 fsd and the tone is audible.

257.12 Press HELP, return to the Skeleton Test Menu and select the Transmitter - Output and Modulation skeleton test set-up.

257.13 Set the EUT TEST switch to TX O/P and note that the transmit lamp does not illuminate and the testmeter is indicating in the red sector.

257.14 Press and hold in the PRESSEL switch and note that the transmit lamp illuminates and the testmeter indicates in the green sector. Release the PRESSEL switch.

257.15 Set the EUT TEST switch to AFC TX, press and hold in the PRESSEL switch, and note that the testmeter indicates LL 3 divisions left of centre, UL 3 divisions right of centre. Release the PRESSEL switch. Repeat test for frequencies of 50.075 MHz and 70.075 MHz.

257.16 Set the EUT TEST switch to SYNTH, TEMP and ARFAT (or TURF), in turn, and note that the testmeter indicates in the green sector for each switch setting.

257.17 Press HELP, to return to the Skeleton Test Menu and select Receiver - Audio Output skeleton test set-up.

257.18 Set the EUT TEST switch to SYNTH and the EUT frequency to 00.000 MHz. Note that the testmeter indicates in the red sector and the frequency dial illumination flashes on and off while the testmeter illumination is steady. Also note that loudspeaker noise, pulses in synchronism with the frequency dial illumination.

257.19 Press HELP and select the Receiver - Harness Output skeleton test set-up from the Skeleton Test Menu.

257.20 Note that the loudspeaker noise pulses in synchronism with the frequency dial illumination.

257.21 Press HELP and select the Remote - Loc-Rem AF Output skeleton test set-up from the Skeleton Test Menu.

257.22 Note that the loudspeaker noise pulses in synchronism with the frequency dial illumination.

257.23 Set the EUT frequency to 30.075 MHz.

257.24 Connect the control lead (Table 1, Serial 16) between the CIP CONTROL connector and the EUT ARFAT (or TURF) connector.

257.25 Press HELP, to return to the Skeleton Test Menu and select the Receiver - Audio Output skeleton test set-up.

257.26 Set the EUT TEST switch to ARFAT (or TURF).

257.27 Press HELP, enter RIU Manual Control and select PIN L - O V. Press HELP to return to the 2955B Manual Screen. SeT R.F. generator to 30.025 MHz.

257.28 Note that the testmeter indicates in the red sector, and the frequency dial illumination flashes in synchronism with the loudspeaker tone pulses.

257.29 Press HELP, return to the Skeleton Test Menu and select the Transmitter - Output and Modulation skeleton test set-up.

257.30 Press HELP, enter RIU Manual Control and select PIN L - 0 V and TRANSMIT - ON. Press HELP to return to the 2955B Manual Screen.

257.31 Note that the transmit lamp does not illuminate. Set R.F. generator to 30.075MHz.

257.32 Set the EUT TEST switch to OVERRIDE and note that the illumination flashing ceases, the 2955B is indicating Tx power and both fans are operating.

257.33 Press HELP, enter RIU Manual Control, select PIN L - O/C and TRANSMIT - OFF. Press SELECT to return to the Skeleton Test Menu.

257.34 Remove the Control lead from between the CIP and EUT.

Test 14 - Audio inputs to AUDIO sockets and GAIN control function

Test limits

258 With the EUT GAIN control set to minimum, full deviation of LL 4 kHz, UL 6 kHz (NARROW) and LL 8 kHz, UL 12 kHz (WIDE) is produced by a 1 kHz modulating tone applied at AUDIO socket pin A with respect to pin B at any level between LL 2 mV, UL 80 mV.

259 The EUT GAIN control reduces the sensitivity of the input defined in Para 258 by LL 6 dB, UL 8 dB for GAIN control switch clockwise positions 4 to 7 and by LL 17 dB, UL 19 dB for positions 8 to 10 with respect to the sensitivity at positions 1 to 3.

Initial settings

260 Ensure that Test 1 (Paras 183 to 189) has been carried out before setting up the test conditions for Test 14.

261 Set up the 8920C and EUT controls and conditions for Test 14, as follows:

261.1 PSU.

(1) Voltage : 24 V
(2) Current Limit : 12 A

261.2 2955B.

(1) SET AF LOAD : 100R
(2) Skeleton Test Set-up : Transmitter - Output and Modulation

261.3 CIP.

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

261.4 EUT.

(1) FREQUENCY : 50.050 MHz
(2) MODE : WIDE
(3) POWER : OFF
(4) TEST : RX SIG
(5) GAIN : Fully counter-clockwise
(6) REMOTE : LOCAL

Test methods

262 To carry out the first check of Test 14 (Para 258), proceed as follows:

262.1 Set the EUT POWER switch to 50W.

262.2 Select the AF band pass filter on the 2955B.

262.3 Set the AF generator frequency to 1 kHz at a level of 62 mV and set the AF generator on.

262.4 Press and hold in the PRESSEL switch and note the 2955B modulation level indication which shall be LL 8 kHz, UL 12 kHz.

262.5 Increase the AF generator level to 496 mV.

262.6 Press and hold in the PRESSEL switch and note the 2955B modulation level indication which shall be LL 8 kHz, UL 12 kHz.

262.7 Decrease the AF generator level to 12.4 mV.

262.8 Press and hold in the PRESSEL switch and note the 2955B modulation level indication which shall be LL 8 kHz, UL 12 kHz.

262.9 Set the EUT MODE switch to NARROW and repeat operations 262.3 to 262.8 and note the 2955B modulation level indications which shall be LL 4 kHz, UL 6 kHz.

263 To carry out the second check of Test 14 (Para 259), proceed as follows:

263.1 Set the EUT MODE switch to WIDE.

263.2 Press HELP, enter RIU Manual Control and select AF ATTENUATION - 40 dB and TRANSMIT - ON. Press HELP to return to the 2955B Manual Screen.

263.3 Adjust the AF generator level to achieve a 2955B modulation level of LL 4.9 kHz, UL 5.1 kHz.

263.4 Press dB to set modulation dBr to zero.

263.5 Note that the modulation dBr indication is LL -0.9 dB, UL +0.9 dB for the next two positions clockwise.

263.6 Note that the modulation dBr indication is LL -8 dB, UL -6 dB for the next four positions clockwise.

263.7 Note that the modulation dBr indication is LL -19 dB, UL -17 dB for the final three positions clockwise.

263.8 Press HELP and select TRANSMIT - OFF. Press SELECT to return to the Skeleton Test Menu.

Test 15 - Audio inputs to REMOTE terminals

Test limits

264 Full deviation of LL 4 kHz, UL 6 kHz (NARROW) and LL 8 kHz, UL 12 kHz (WIDE) is produced by a 1 kHz modulating tone at LL 80 mV, UL 4 V balanced at the REMOTE terminals.

Initial settings

265 Ensure that Test 1 (Paras 183 to 189) has been carried out before setting up the test conditions for Test 15.

266 Set up the 8920C and EUT controls and conditions for Test 15, as follows:

266.1 PSU.

(1) Voltage : 24 V
(2) Current Limit : 12 A

266.2 2955B.

(1) SET AF LOAD : 100R
(2) Skeleton Test Set-up : Remote - Rem-Loc Line Current

266.3 CIP.

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

266.4 EUT.

(1) FREQUENCY : 50.050 MHz
(2) MODE : WIDE
(3) POWER : OFF
(4) TEST : RX SIG
(5) GAIN : Mid-position
(6) REMOTE : AUTO

Test method

267 To carry out the Test 15 specification check (Para 264), proceed as follows:

267.1 Set and connect the DMM for mA d.c.

267.2 Press Tx TEST on the 2955B to select the Transmitter Test page.

267.3 Set the EUT POWER switch to 50W.

267.4 Set the CIP LINE RESISTANCE switch to Tx 1400.

267.5 Select the AF band pass filter on the 2955B.

267.6 Set the AF generator frequency to 1 kHz at a level of 54 mV and set the AF generator on.

267.7 Note the 2955B modulation level indication which shall be LL 8 kHz, UL 12 kHz.

267.8 Increase the AF generator level to 2.7 V.

267.9 Note the 2955B modulation level indication which shall be LL 8 kHz, UL 12 kHz.

267.10 Set the EUT MODE switch to NARROW, repeat operations 267.6 to 267.9 and note the 2955B modulation level indications which shall be LL 4 kHz, UL 6 kHz.

267.11 Set the CIP LINE RESISTANCE switch to OC.

267.12 Press HELP to return to the Skeleton Test Menu.

267.13 Set and connect the DMM for d.c. volts.

Test 16 - Audio output at AUDIO sockets

Test limits

268 An RF input of 5 μV emf modulated by 1 kHz at 5 kHz deviation (NARROW) or at 10 kHz deviation (WIDE) shall produce an audio output of LL 2.15 V, UL 3.4 V into 100 ohms connected between AUDIO socket pins D and E, with the EUT GAIN control fully clockwise.

269 With the EUT REMOTE switch set to IC, the output defined in Para 268 is reduced by LL 8 dB, UL 12 dB.

270 The EUT GAIN control shall reduce the output defined in Para 268 by nine steps of LL 3 dB, UL 5 dB to a total of LL 34 dB, UL 42 dB.

271 The sidetone AF output at the AUDIO sockets shall be LL 2.19 V, UL 4.38 V for an input of 1 kHz at greater than 40 mV applied to pin A with respect to pin B.

272 The voltage at pin C of the AUDIO sockets shall be LL 26 V, UL 30 V with no load connected.

Initial settings

273 Ensure that Test 1 (Paras 183 to 189) has been carried out before setting up the test conditions for Test 16.

274 Set up the 8920C and EUT controls and conditions for Test 16, as follows:

274.1 PSU.

(1)	Voltage	: 24 V
(2)	Current Limit	: 12 A

274.2 2955B.

(1)	SET AF LOAD	: 100R
(2)	Skeleton Test Set-up	: Receiver - Audio Output

274.3 CIP.

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

274.4 EUT.

(1)	FREQUENCY	: 50.025 MHz
(2)	MODE	: WIDE TONE
(3)	POWER	: OFF
(4)	TEST	: RX SIG
(5)	GAIN	: Fully clockwise
(6)	REMOTE	: LOCAL

Test methods

275 To carry out the first check of Test 16 (Para 268), proceed as follows:

275.1 Set the EUT POWER switch to MIN.

275.2 Set the RF generator frequency to 50.025 MHz at a level of -98.8 dBm and set the RF generator on.

275.3 Set the modulation frequency to 1 kHz at a level of 10 kHz, and set the modulation on.

275.4 Note the 2955B AF Volts indication which shall be LL 2.15 V, UL 3.4 V.

275.5 Set dBR to zero.

276 To carry out the second check of Test 16 (Para 269), proceed as follows:

276.1 Set the EUT REMOTE switch to IC.

276.2 Note the 2955B dBR indication which shall be LL -12 dB, UL -8 dB.

277 To carry out the third check of Test 16 (Para 270), proceed as follows:

277.1 Set the EUT REMOTE switch to LOCAL.

277.2 Set dBR to zero, set the EUT GAIN control fully counter-clockwise and note the 2955B dBR indication which shall be LL -42 dB, UL -34 dB.

277.3 Set the dBR to zero, increase the gain by one switch position and note the 2955B dBR indication which shall be LL 3 dB, UL 5 dB.

277.4 Set dBR to zero and increase the gain by a further switch position and note the 2955B dBR indication which shall be LL 3 dB, UL 5 dB.

277.5 Repeat operation 277.4 for the remaining clockwise positions of the EUT GAIN control.

277.6 Repeat operations 277.2 to 277.5 for the alternative EUT AUDIO connector.

278 To carry out the fourth check of Test 16 (Para 271), proceed as follows:

278.1 Press HELP and select the Transmitter - Sidetone skeleton test set-up from the Skeleton Test Menu. Set R.F. generator frequency to 50.050MHz.

278.2 Set the AF generator frequency to 1 kHz at a level of 264 mV and set the AF generator on.

278.3 Press and hold in the PRESSEL switch, with the EUT GAIN control fully clockwise and note the 2955B AF Volts indication which shall be LL 2.19 V, UL 4.38 V.

279 To carry out the fifth check of Test 16 (Para 272), proceed as follows:

279.1 Press HELP and select the Voltage Pin C - Audio Socket skeleton test set-up from the Skeleton Test Menu. Set R.F. generator frequency to 50.025MHz.

279.2 Note the 2955B AF Volts indication which shall be LL 26 V, UL 30 V.

279.3 Press HELP to return to the Skeleton Test Menu.

Test 17 - Audio output at HARNESS connector

Test limits

280 With an RF input of 5 μV emf modulated by 1 kHz at 5 kHz deviation (NARROW) or 10 kHz deviation (WIDE), the audio output into 30 ohms connected between pins D and E of the HARNESS connector shall be LL 1.14 V, UL 2.1 V.

281 The output defined in Para 280 shall be independent of the EUT GAIN control setting.

282 With the EUT REMOTE switch set to IC, the output defined in Para 280 shall be reduced by LL 8 dB, UL 12 dB.

283 The output impedance between pins D and E of the HARNESS connector shall be less than 10 ohms.

Initial settings

284 Ensure that Test 1 (Paras 183 to 189) has been carried out before setting up the test conditions for Test 17.

285 Set up the 8920C and EUT controls and conditions for Test 17, as follows:

285.1 PSU.

(1)	Voltage	:	24 V
(2)	Current Limit	:	12 A

285.2 2955B.

(1)	SET AF LOAD	:	(Not Applicable)
(2)	Skeleton Test Set-up	:	Receiver - Harness Output
(3)	HARNESS LOAD	:	30R

285.3 CIP.

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

285.4 EUT.

(1)	FREQUENCY	:	50.025 MHz
(2)	MODE	:	WIDE TONE
(3)	POWER	:	OFF
(4)	TEST	:	RX SIG
(5)	GAIN	:	Fully clockwise
(6)	REMOTE	:	LOCAL

Test methods

286 To carry out the first check of Test 17 (Para 280), proceed as follows:

286.1 Set the EUT POWER switch to MIN.

286.2 Set the R.F. generator frequency to 50.025 MHz at a level of -98.8 dBm and set the RF generator on.

286.3 Set the modulation frequency to 1 kHz at a level of 10 kHz and set the modulation on.

286.4 Note the 2955B AF Volts indication which shall be LL 1.14 V, UL 2.1 V.

287 To carry out the second check of Test 17 (Para 281), proceed as follows:

287.1 Note the 2955B AF Volts indication while switching the EUT GAIN control through its full range and note that the indication remains constant.

288 To carry out the third check of Test 17 (Para 282), proceed as follows:

288.1 Set dBR to zero.

288.2 Set the EUT REMOTE switch to IC.

288.3 Note the 2955B dBR indication which shall be LL -12 dB, UL -8 dB.

289 To carry out the fourth check of Test 17 (Para 283), proceed as follows:

289.1 Set the EUT POWER switch to OFF.

289.2 Remove the HARNESS connector from the EUT and connect the DMM (set to measure resistance) between pins D and E of the EUT HARNESS socket. Note the DMM resistance indication which shall be less than 10 ohms.

289.3 Press HELP to return to RIU Manual Control and press SELECT to return to the Skeleton Test Menu.

Test 18 - Audio output at REMOTE terminals

<u>Test limits</u>

290 With an RF input of 5 μV emf modulated by 1 kHz at 5 kHz deviation (NARROW) or 10 kHz deviation (WIDE) the audio output into 300 ohms connected between the REMOTE terminals shall be LL 0.54 V, UL 1.05 V rms .

291 The output defined in Para 290 is independent of the EUT GAIN control.

292 When the EUT is in the CALL mode, the AF output at the REMOTE terminals when loaded into 300 ohms shall be greater than 0.3 V rms at LL 1.9 kHz, UL 2.1 kHz.

293 The AF response shall be within the limits specified below with respect to the response at 1 kHz when the modulating frequency is detailed:

Modulation frequency	AF output level
150 Hz	GT 30 dB down
300 Hz	LL 4 dB down, UL 3 dB up
600 Hz	LL 4 dB down, UL 3 dB up
1.5 kHz	LL 3 dB down, UL 3 dB up
3 kHz	LL 3 dB down, UL 3 dB up
6 kHz	LL 20 dB down, UL 10 dB down

Initial settings

294 Ensure that Test 1 (Paras 183 to 189) has been carried out before setting up the test conditions for Test 18.

295 Set up the 8920C and EUT controls and conditions for Test 18, as follows:

295.1 PSU.

(1)	Voltage	: 24 V
(2)	Current Limit	: 12 A

295.2 2955B.

(1)	SET AF LOAD	: (Not Applicable)
(2)	Skeleton Test Set-up	: Receiver - Remote Output

295.3 CIP.

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

295.4 EUT.

(1)	FREQUENCY	: 50.025 MHz
(2)	MODE	: WIDE TONE
(3)	POWER	: OFF
(4)	TEST	: RX SIG
(5)	GAIN	: Fully clockwise
(6)	REMOTE	: LOCAL

Test methods

296 To carry out the first check of Test 18 (Para 290), proceed as follows:

296.1 Set the EUT POWER switch to MIN.

296.2 Set the RF generator frequency to 50.025 MHz at a level of -98.8 dBm and set the RF generator on.

296.3 Set the modulation frequency to 1 kHz at a level of 10 kHz and set the modulation on.

296.4 Note the 2955B AF Volts indication which shall be LL 245 mV, UL 477 mV.

296.5 Set dBR to zero.

297 To carry out the second check of Test 18 (Para 291), proceed as follows:

297.1 Note the 2955B AF Volts indication while switching the EUT GAIN control through its full range and note that the indication remains constant.

298 To carry out the third check of Test 18 (Para 292), proceed as follows:

298.1 Remove the coaxial lead from the ANT/ARFAT socket on the EUT.

298.2 Set the EUT REMOTE switch to CALL.

298.3 Note the 2955B AF Volts indication which shall be greater than 130 mV.

298.4 Note the 2955B frequency indication which shall be LL 1.9 kHz, UL 2.1 kHz.

299 To carry out the fourth check of Test 18 (Para 293), proceed as follows:

299.1 Reconnect the coaxial lead to the ANT/ARFAT socket on the EUT.

299.2 Set the EUT REMOTE switch to LOCAL and note that the dBR reading is still 0 dB.

299.3 Set the modulating frequency, in turn, to 150 Hz, 300 Hz, 600 Hz, 1500 Hz, 3000 Hz and 6000 Hz and, for each frequency setting note the 2955B dBR indication which shall be as specified below:

Modulation frequency	**AF output level**
150 Hz	UL -30 dB down
300 Hz	LL -4 dB down, UL +3 dB up
600 Hz	LL -4 dB down, UL +3 dB up
1.5 kHz	LL -3 dB down, UL +3 dB up
3 kHz	LL -3 dB down, UL +3 dB up
6 kHz	LL -20 dB down, UL -10 dB down

299.4 Press HELP to return to RIU Manual Control and press SELECT to return to the Skeleton Test Menu.

Test 19 - CVA characteristics and AF output on IC

Test limits

300 With an input of 1 kHz at 2 mV applied to the AUDIO socket pin A with respect to pin B, the EUT REMOTE switch set to IC and the EUT GAIN control set to a position providing an output nearest to 54 mV, across a 100 ohm load connected at pins D and E of the AUDIO socket, the input level may be slowly increased by 32 dB and the output shall rise by less than 0.5 dB.

301 With no RF input, the EUT REMOTE switch set to BK IN or IC and the EUT GAIN control fully clockwise, a 1 kHz tone at LL 18 mV, UL 80 mV at the AUDIO socket pin A with respect to pin B, the output at pin D with respect to pin E into 100 ohms shall be LL 1.9 V, UL 3.8 V rms and at the REMOTE terminals into 300 ohms shall be LL 0.54 V, UL 1.05 V rms.

302 With conditions defined in Para 301, a 1 kHz tone at LL 80 mV, UL 4 V applied to the REMOTE terminals shall produce an output at AUDIO socket pins D and E at the level specified in Para 316.

303 When the squelch is lifted by an RF input, the outputs defined in Para 301 become LL 1.35 V, UL 2.7 V rms and LL 0.35 V, UL 0.75 V rms respectively.

Initial settings

304 Ensure that Test 1 (Paras 183 to 189) has been carried out before setting up the test conditions for Test 19.

305 Set up the 8920C and EUT controls and conditions for Test 19, as follows:

305.1 PSU.

(1)	Voltage	:	24 V
(2)	Current Limit	:	12 A

305.2 2955B.

(1)	Skeleton Test Set-up	:	Transmitter - Sidetone
(2)	SET AF LOAD	:	100R

305.3 CIP.

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

305.4 EUT.

(1)	FREQUENCY	:	50.025 MHz
(2)	MODE	:	WIDE TONE
(3)	POWER	:	OFF
(4)	TEST	:	RX SIG
(5)	GAIN	:	Fully counter-clockwise
(6)	REMOTE	:	IC

Test methods

306 To carry out the first check of Test 19 (Para 300), proceed as follows:

306.1 Set the EUT POWER switch to MIN.

306.2 Set AF generator 1 frequency to 1 kHz at a level of 12.4 mV and set the AF generator 1 on.

306.3 Press and hold in the PRESSEL switch and adjust the EUT GAIN control to set the 2955B AF Volts indication nearest to 62.3 mV and note the level as V1. Set dBR to zero. Release the PRESSEL switch.

NOTE

This GAIN control setting will usually be no more than two settings from fully counter-clockwise. It is better to select a level below rather than above 62.3 mV.

306.4 Set AF generator 1 level to 496 mV.

306.5 Press the PRESSEL switch and note the 2955B dBR indication which shall have not increased by more than 0.5 dB. Release the PRESSEL switch.

307 To carry out the second check of Test 19 (Para 301), proceed as follows:

307.1 Set the EUT GAIN control fully clockwise. Set R.F.generator frequency to 50.050 MHz.

307.2 Press and hold in the PRESSEL switch and note the 2955B AF Volts indication which shall be LL 2.19 V, UL 4.38 V. Release the PRESSEL switch.

307.3 Set the EUT REMOTE switch to BK IN, press the PRESSEL switch and note the 2955B AF Volts indication which shall be as specified in Para 307.2.

307.4 Press HELP and select the Remote - Loc-Rem AF Output skeleton test set-up from the Skeleton Test Menu.

307.5 Set the AF generator level to 496 mV and set the AF generator on. Press the PRESSEL switch and note the 2955B AF Volts indication which shall be LL 245 mV, UL 477 mV.

307.6 Set the EUT REMOTE switch to IC, press the PRESSEL switch and note the 2955B AF Volts indication which shall be as specified in Para 307.5.

308 To carry out the third check of Test 19 (Para 302), proceed as follows:

NOTE

RF interference may cause intermittent lifting of squelch to give a low indication.

308.1 Press HELP and select the Remote - Rem-Loc AF Output skeleton test set-up from the Skeleton Test Menu. Set R.F.generator frequency to 50.025 MHz.

308.2 Set the AF generator to on at a level 496 mV. Note the 2955B AF Volts indication which shall be LL 2.19 V, UL 4.38 V.

308.3 Set the EUT REMOTE switch to BK IN and note the 2955B AF Volts indication which shall be as specified in Para 308.2.

309 To carry out the fourth check of Test 19 (Para 303), proceed as follows:

309.1 Press HELP and select the Transmitter - Sidetone skeleton test set-up from the Skeleton Test Menu.

309.2 Press DUPLEX TEST on the 2955B to access the Duplex Test Page. Ensure that the 2955B distortion meter is off and the 15 kHz low pass filter is selected.

309.3 Set the RF generator frequency to 50 MHz at a level of -98.8 dBm and set the RF generator on.

309.4 Set the modulation off and set the AF generator frequency to 1 kHz at a level of 496 mV.

309.5 Press HELP, enter RIU Manual Control and select RF SELECT - HISENS. Press HELP to return to the Duplex Test page.

309.6 Set the EUT REMOTE switch to IC, press the PRESSEL switch and note the 2955B AF Volts indication which shall be LL 1.4 V, UL 2.8 V.

309.7 Press HELP, press SELECT and select the Remote - Loc-Rem AF Output skeleton test set-up. Repeat operations 309.2 to 309.5.

309.8 Press the PRESSEL switch, and note the 2955B AF Volts indication which shall be LL 159 mV, UL 341 mV.

309.9 Press HELP to return to RIU Manual Control, select RF SELECT - NORMAL and press SELECT to return to the Skeleton Test Menu.

Test 20 - TUAAM control

NOTE

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

Test limits

310 With pin M of the ARFAT socket connected to pin P, the EUT shall be in the transmit mode and the EUT power output shall be LL 38 W (40 W), UL 72 W (75 W) irrespective of the EUT power range selected.

311 With the EUT POWER switch set in the 0 (silent tune) position, the resistance between pins O and P of the ARFAT socket shall be less than 50 ohms. When the EUT POWER switch is set to any other position, the resistance shall be greater than 10 kohms.

312 With the EUT POWER switch held in the TUNE position, the 28 V shall be removed from pin S of the ARFAT socket and the EUT power output shall be less than 240 mW (250 mW).

Initial settings

313 Ensure that Test 1 (Paras 183 to 189) has been carried out before setting up the test conditions for Test 20.

314 Set up the 8920C and EUT controls and conditions for Test 20, as follows:

314.1 PSU.

(1) Voltage : 24 V
(2) Current Limit : 12 A

314.2 2955B.

(1) SET AF LOAD : 100R
(2) Skeleton Test Set-up : Transmitter - Output and Modulation

314.3 CIP.

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

314.4 EUT.

(1) FREQUENCY : 50.050 MHz
(2) MODE : WIDE TONE
(3) POWER : OFF
(4) TEST : TX O/P
(5) GAIN : Fully clockwise
(6) REMOTE : LOCAL

Test methods

315 To carry out the first check of Test 20 (Para 310), proceed as follows:

315.1 Disconnect the audio lead from the EUT. Connect the control lead (Table 1, Serial 16) between the CIP CONTROL connector and the EUT ARFAT (or TURF) connector.

315.2 Set the EUT POWER switch to MIN.
315.3 Press HELP, enter RIU Manual Control and select PIN M - 0V. Press HELP to return to the 2955B Manual Screen.

315.4 Note the 2955B Tx power output indication which shall be LL 38 W (40 W), UL 72 W (75 W).

315.5 Set the EUT POWER switch, in turn, to 1W, 15W and 50W and note that the output power indication remains within the limits specified in Para 315.4.

316 To carry out the second check of Test 20 (Para 311), proceed as follows:

316.1 Press HELP to enter RIU Manual Control and select, in this order, Pin M - O/C, Pin O - DMM and REMOTE PATH - REBRO SLAVE. Press HELP to return to the 2955B Manual Screen.

316.2 Connect the DMM negative lead to EUT chassis. Note the DMM indication which shall be greater than 11 V, with the EUT POWER switch set to MIN, 1W, 15W, 50W and TUNE.

316.3 Set the EUT POWER switch to O and note the DMM indication which shall be less than 5 V.

316.4 Reconnect the DMM negative lead to the RIU DMM black connector.

317 To carry out the third check of Test 20 (Para 312), proceed as follows:

317.1 Set the EUT POWER switch to 50W.

317.2 Press HELP and select PIN S - DMM. Press HELP to return to the 2955B Manual Screen.

317.3 Note the DMM voltage indication which shall be LL 26 V, UL 30 V.

317.4 Hold the EUT POWER switch at TUNE and note the DMM voltage indication which shall be less than 0.1 V. Release the EUT POWER switch.

317.5 Note the 2955B power output indication which shall be less than 240 mW (250 mW).

317.6 Press HELP and select PIN S - O/C. Press HELP to return to the 2955B Manual Screen.

317.7 Remove the control lead from the EUT and reconnect the audio lead to the EUT.

317.8 Hold the EUT POWER switch at TUNE, press the PRESSEL switch and note the 2955B Tx power indication which shall be less than 240 mW (250 mW). Release the PRESSEL switch.

317.9 Press HELP and press SELECT to return to the Skeleton Test Menu.

DATA

Data Test 1 - Squelch operation and 150 Hz tone detection

Test limits

318 With the equipment operating in WIDE DATA mode and with no signal input to the antenna, the output at pin E of the HARNESS socket shall be less than 0 V.

319 With conditions defined in Para 318, and with an unmodulated RF signal of level 40 μV rms emf, the output level shall be LL 0.1 V, UL 1.5 V.

320 With an RF signal of level 40 μV and modulated by 1 kHz to give 10 kHz deviation, the output level shall be LL 0.4 V, UL 1.5 V.

321 With an RF signal of level 40 μV and modulated by 150 Hz to give 3.25 kHz deviation, the output level shall be LL 3 V, UL 5 V.

Initial settings

322 Ensure that Test 1 (Paras 183 to 189) has been carried out before setting up the test conditions for Data Test 1.

323 Set up the 8920C and EUT controls and conditions for Data Test 1, as follows:

323.1 CIP.

(1) Voltage : 24 V
(2) Current Limit : 12 A

323.2 EUT.

(1) SET AF LOAD : (Not Applicable)
(2) Skeleton Test Set-up : Data - Voltage Pin E - Harness Socket

323.3 PSU.

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

323.4 2955B.

(1) FREQUENCY : 70.000 MHz
(2) MODE : WIDE DATA
(3) POWER : OFF
(4) TEST : RX SIG
(5) GAIN : Fully clockwise
(6) REMOTE : LOCAL

Test methods

324 To carry out the first check of Data Test 1 (Para 318), proceed as follows:

324.1 Set the EUT POWER switch to 50W.

324.2 Press SCOPE/BAR on the 2955B to select the internal CRO facility. Set the scales to 500 mV/div and 100 μS/div.

324.3 Temporarily remove the RIU AF IN connector and set the beam to the centre (AF zero) of the display to enable positive and negative measurements. Reconnect the RIU AF IN connector.

324.4 Note the 2955B AF Volts indication which shall be LL -0.6 Vdc, UL 0 Vdc (polarity indicated on scope).

325 To carry out the second check of Data Test 1 (Para 319), proceed as follows:

325.1 Set the RF generator frequency to 70 MHz at a level of -80.8 dBm and set the RF generator on.

325.2 Note the 2955B AF Volts indication which shall be LL 0.1 Vdc, UL 1.5 Vdc.

326 To carry out the third check of Data Test 1 (Para 320), proceed as follows:

326.1 Set the modulation frequency to 1 kHz with a level of 10 kHz and set the modulation on.

326.2 Note the 2955B AF Volts indication which shall be LL 0.4 Vdc, UL 1.5 Vdc.

326.3 Press HELP, select AF LOAD - 51R and then select the Receiver - Audio Output skeleton test set-up.

326.4 Set the RF generator and modulation on (as set in operations 325.1 and 326.1). Verify that a tone is heard.

327 To carry out the fourth check of Data Test 1 (Para 320), proceed as follows:

327.1 Press HELP and select the Data - Voltage Pin E-Harness Socket skeleton test set-up from the Skeleton Test Menu.

327.2 Set the RF generator on.

327.3 Change the modulating frequency to 150 Hz and set a level of 3.25 kHz. Set the modulation on.

327.4 Press SCOPE/BAR on the 2955B to select the internal CRO facility.

327.5 Set the CRO vertical scale to 2 V/div and note the AF level which shall be LL 3 Vdc, UL 5 Vdc.

327.6 Press HELP to return to the Skeleton Test Menu.

Data Test 2 - Sidetone response, tone modulation

Test limits

328 With the EUT MODE switch set to WIDE DATA and the EUT transmitting an unmodulated carrier, the resultant true sidetone shall produce an output at pin E of the HARNESS socket of LL 0.1 V, UL 1.5 V.

329 With the EUT MODE switch set to WIDE DATA and the EUT transmitting an unmodulated carrier, the deviation due to noise with or without the fans operating shall be less than 0.5 kHz.

330 With the EUT MODE switch set to WIDE DATA, the deviation due to the 150 Hz tone modulation shall be LL 3.1 kHz, UL 3.8 kHz.

Initial settings

331 Ensure that Test 1 (Paras 183 to 189) has been carried out before setting up the test conditions for Data Test 2.

332 Set up the 8920C and EUT controls and conditions for Data Test 2, as follows:

332.1 PSU.

(1)	Voltage	: 24 V
(2)	Current Limit	: 12 A

332.2 2955B.

(1)	SET AF LOAD	: (Not Applicable)
(2)	Skeleton Test Set-up	: Voltage Pin E - Harness Socket

332.3 CIP.

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

332.4 EUT.

(1)	FREQUENCY	: 70.000 MHz
(2)	MODE	: WIDE DATA
(3)	POWER	: OFF
(4)	TEST	: RX SIG
(5)	GAIN	: Fully clockwise
(6)	REMOTE	: LOCAL

Test methods

333 To carry out the first check of Data Test 2 (Para 328), proceed as follows:

333.1 Set the EUT POWER switch to 50W.

333.2 Press SCOPE on the 2955B to select the internal CRO facility. Set the scales to 500 mV/div and 100 µS/div.

333.3 Temporarily remove the RIU AF IN connector and set the beam to the centre (AF zero) of the display. Reconnect the RIU AF IN connector.

333.4 Press HELP, enter RIU Manual Control and select DATA TRANSMIT - ON. Press HELP to return to the 2955B Manual Screen. Note the 2955B AF Volts indication which shall be LL 0.1 V, UL 1.5 V.

333.5 Press HELP, select DATA TRANSMIT - OFF and SELECT to return to the Skeleton Test Menu.

334 To carry out the second check of Data Test 2 (Para 329), proceed as follows:

334.1 Select AF LOAD - 51R and then select the Transmitter - Output and Modulation skeleton test set-up from the Skeleton Test Menu.

334.2 Press HELP, enter RIU Manual Control and select PIN F - CLEAR SPEECH and DATA TRANSMIT - ON. Press HELP to return to the 2955B Manual Screen.

334.3 Note the 2955B modulation level indication due to noise which shall be less than 0.5 kHz.

334.4 Hold the EUT TEST switch at OVERRIDE and note the 2955B modulation level indication which shall be less than 0.5 kHz. Set the EUT TEST switch to Tx O/P.

335 To carry out the third check of Data Test 2 (Para 330), proceed as follows:

335.1 Press HELP, enter RIU Manual Control and select PIN F - 150 Hz. Press HELP to return to the 2955B Manual Screen.

335.2 Note the 2955B modulation level indication which shall be LL 3.1 kHz, UL 3.8 kHz.

335.3 Repeat operation 335.2 for EUT frequency settings, in turn, of 50.000 MHz and 30.000 MHz.

335.4 Press HELP, select DATA TRANSMIT - OFF and press SELECT to return to the Skeleton Test Menu.

Data Test 3 - Data modulation

Test limits

336 With the EUT MODE switch set to WIDE DATA and a 16 kilobits/sec pattern of 00001111 and amplitude LL 1.18 V, UL 1.22 V applied to pin A with respect to pin G of the HARNESS connector, the carrier shall be deviated by LL 7.2 kHz, UL 8.8 kHz.

Initial settings

337 Ensure that Test 1 (Paras 183 to 189) has been carried out before setting up the test conditions for Data Test 3.

338 Set up the 8920C and EUT controls and conditions for Data Test 3, as follows:

338.1 PSU.

(1) Voltage : 24 V
(2) Current Limit : 12 A

338.2 2955B.

(1) SET AF LOAD : (Not Applicable)
(2) Skeleton Test Set-up : Data - Transmit Modulation

338.3 CIP.

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

338.4 EUT.

(1) FREQUENCY : 70.050 MHz
(2) MODE : WIDE DATA
(3) POWER : OFF
(4) TEST : RX SIG
(5) GAIN : Fully clockwise
(6) REMOTE : LOCAL

Test methods

339 To carry out the Data Test 3 specification check (Para 336), proceed as follows:

339.1 Set the EUT POWER switch to 50W.

339.2 Press the PRESSEL switch and note the 2955B modulation level indication which shall be LL 7.2 kHz, UL 8.8 kHz.

339.3 Press HELP to return to the Skeleton Test Menu.

Data Test 4 - Data receiver sensitivity and error rates

Test limits

340 With the EUT MODE switch set to WIDE DATA, and an RF signal of 50 µV rms emf modulated by a 2 kHz square wave to give 8 kHz deviation applied to the antenna, the output at pin D with respect to pin G of the HARNESS connector shall be LL 810 mV, UL 990 mV peak-to-peak.

341 With the conditions defined in Para 340, the output at pin D with respect to G of the HARNESS connector when loaded by 300 ohms shall be LL 380 mV, UL 515 mV peak-to-peak.

342 With an RF signal of 50 µV rms emf modulated by 1 kHz to give 10 kHz deviation (WIDE DATA), the value of the nominal 1 kHz component of the waveform measured at pin D with respect to pin G of the HARNESS connector shall be LL 1.0 V, UL 1.25 V peak-to-peak.

343 With the EUT MODE switch set to WIDE DATA and an RF signal of 50 µV rms emf modulated by 1kHz to give 10 kHz deviation, the output at pin D with respect to pin E of the AUDIO connector and pin F connected to pin G of the HARNESS connector shall be less than 20 mV.

344 With an RF signal, frequency modulated by unfiltered data (16 kilobits/sec) to give 8 kHz deviation, applied to the EUT, the receiver sensitivity shall be such as to give the following error rates:

Signal source	**Error rate**
1.413 µV rms emf	Less than 0.3 %
1.000 µV rms emf	Less than 4.0 %
1.750 µV rms emf	Less than 14.0 %
0.500 µV rms emf	Less than 26.0 %

Initial settings

345 Ensure that Test 1 (Paras 183 to 189) has been carried out before setting up the test conditions for Data Test 4.

346 Set up the 8920C and EUT controls and conditions for Data Test 4, as follows:

346.1 PSU.

(1)	Voltage	:	24 V
(2)	Current Limit	:	12 A

346.2 2955B.

(1)	SET AF LOAD	:	(Not Applicable)
(2)	Skeleton Test Set-up	:	Data - Receive 2 kHz

346.3 CIP.

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

346.4 EUT.

(1)	FREQUENCY	:	70.025 MHz
(2)	MODE	:	WIDE DATA
(3)	POWER	:	OFF
(4)	TEST	:	RX SIG
(5)	GAIN	:	Fully clockwise
(6)	REMOTE	:	LOCAL

Test methods

347 To carry out the first check of Data Test 4 (Para 340), proceed as follows:

347.1 Set the EUT POWER switch to 50W.

347.2 Set the RF generator frequency to 70.025 MHz at a level of -78.8 dBm and set the RF generator on.

347.3 Note the 2955B AF Volts indication which shall be LL 0.360 V (810 mV p-p), UL 0.440 V (990 mV p-p).

348 To carry out the second check of Data Test 4 (Para 341), proceed as follows:

348.1 Press HELP, enter RIU Manual Control and select HARNESS LOAD - 300R. Press HELP to return to the 2955B Manual Screen.

348.2 Note the 2955B AF Volts indication which shall be LL 169 mV (380 mV p-p), UL 229 mV (515 mV p-p).

349 To carry out the third check of Data Test 4 (Para 342), proceed as follows:

349.1 Press HELP, press SELECT to enter the Skeleton Test Menu and select the Data - Receive 1 kHz skeleton test.

349.2 Set the RF generator on (as set in operation 347.2), and set a modulation frequency of 1 kHz at a level of 10 kHz. Set the modulation on.

349.3 Observe the 2955B internal CRO display, and with reference to Fig 3, note the level of the 1

349.3 Observe the 2955B internal CRO display, and with reference to Fig 3, note the level of the 1 kHz content which shall be LL 1.0 V p-p, UL 1.25 V p-p.

349.4 Set the RF generator and EUT frequency to 30.000 MHz and repeat the operations covered in Paras 347 to 349.

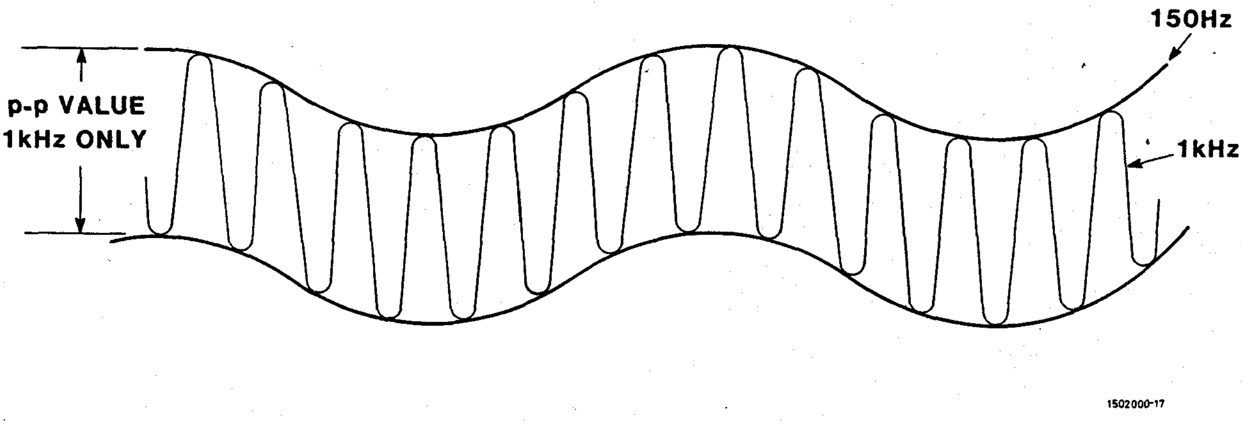


Fig 3 AF output data wave form

350 To carry out the fourth check of Data Test 4 (Para 343), proceed as follows:

350.1 Press HELP, select AF LOAD - 51R and then select the Receiver - Audio Output skeleton test set-up from the Skeleton Test Menu.

350.2 Set the RF generator frequency to 70.000 MHz at level -117.8 dBm.

350.3 Set the modulation frequency to 1 kHz at a level of 10 kHz and set the modulation on.

350.4 Press HELP, enter RIU Manual Control and select PIN F - CLEAR SPEECH. Press HELP to return to the 2955B Manual Screen.

350.5 Note the 2955B AF Volts indication which shall be less than 20 mV.

351 To carry out the fifth check of Data Test 4 (Para 344), proceed as follows:

351.1 Press HELP, enter the Skeleton Test Menu and select the Data - BER Test Receive skeleton test.

NOTE

This skeleton test performs the test by leading the operator through a sequence of displays. By following the displayed instructions, the results will be displayed on the 2955B screen.

351.2 Enter the test frequency via the 2955B keypad. If 70.000 MHz is to be used, press SELECT, otherwise press SELECT after the frequency has been entered.

351.3 Set the EUT switches as prompted. Press HELP to continue.

351.4 The BER test results are displayed, as follows:

Rx Delay is XX.X μs	
RF level -110 dBm	BER is XX.X%
RF level -113 dBm	BER is XX.X%
RF level -116 dBm	BER is XX.X%
RF level -119 dBm	BER is XX.X%

Note that the nominal Rx delay is 90 μs and the BER limits are:

RF level -110 dBm	BER to be less than 0.3%
RF level -113 dBm	BER to be less than 4%
RF level -116 dBm	BER to be less than 14%
RF level -119 dBm	BER to be less than 26%

351.5 Press HELP to return to the Skeleton Test Menu.

Data Test 5 - Data delay and frequency response

Test limits

352 The total delay through the EUT when in the WIDE DATA mode shall be LL 30 μsec, UL 90 μsec.

Initial settings

353 Ensure that Test 1 (Paras 183 to 189) has been carried out before setting up the test conditions for Data Test 5.

354 Set up the 8920C and EUT controls and conditions for Data Test 5, as follows:

354.1 PSU.

(1)	Voltage	:	24 V
(2)	Current Limit	:	12 A

354.2 2955B.

(1)	SET AF LOAD	:	(Not Applicable)
(2)	Skeleton Test Set-up	:	Data - Transmit Delay

354.3 CIP.

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

354.4 EUT.

(1)	FREQUENCY	:	48.000 MHz
(2)	MODE	:	WIDE DATA
(3)	POWER	:	OFF
(4)	TEST	:	RX SIG
(5)	GAIN	:	Fully clockwise
(6)	REMOTE	:	LOCAL

Test methods

355 To carry out the Data Test 5 specification check (Para 352), proceed as follows:

NOTE

The Data - Transmit Delay skeleton test performs the test by leading the operator through a sequence of displays. By following the displayed instructions, the results will be displayed on the 2955B screen.

355.1 Set the EUT switches as prompted with a test frequency of 48.000 MHz. Press HELP to continue.

355.2 Note the Tx Delay indication which shall be LL 30 μs, UL 90 μs. Press HELP to continue.

355.3 Connect the CRO to CIP, as prompted. Press HELP to continue.

355.4 Observe the data eye pattern and note that it is as shown in Fig 4.

355.5 Press HELP to terminate the test and return to the Skeleton Test Menu.

355.6 Disconnect the CRO from the CIP DEMOD connector.

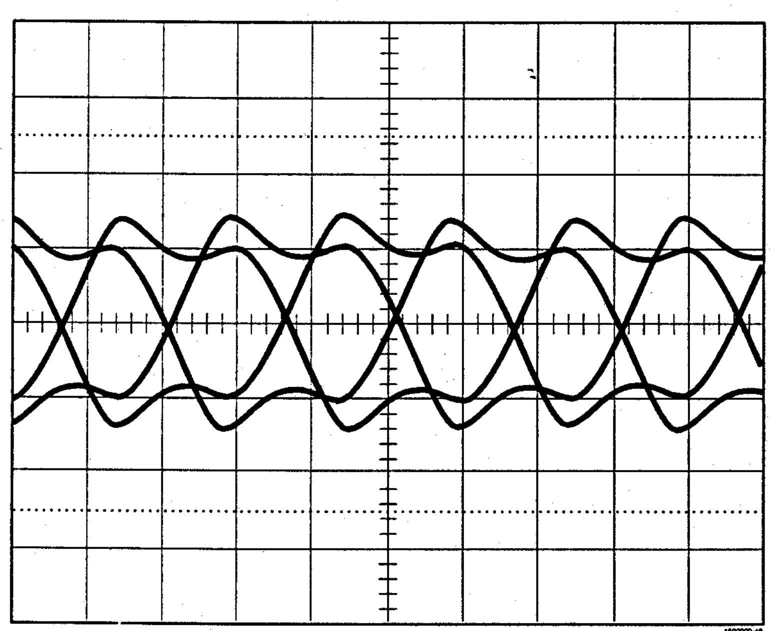


Fig 4 Eye pattern

ALIGNMENT

GENERAL

356 All the following alignment procedures are carried out with the EUT outer case removed.

357 Alignment of the major assemblies is carried out with these assemblies mounted on the test set (Table 3, Serial 1).

FRONT PANEL METER SETTING

Initial settings/connections

358 Make the EUT to test equipment interconnections, as follows:

358.1 Connect the power lead (Table 1, Serial 13) between the CIP DC SUPPLY connector and the EUT 28 V connector.

359 Ensure that specification Test 1 (Paras 183 to 189) has been carried out before setting up the test conditions for this alignment procedure.

360 Set up the 8920C and EUT controls and conditions, as follows:

360.1 PSU.

(1)	Voltage	: 24 V
(2)	Current Limit	: 12 A

360.2 EUT

(1)	FREQUENCY	: 30.000 MHz
(2)	MODE	: WIDE TONE
(3)	POWER	: OFF
(4)	TEST	: 28V SPLY
(5)	GAIN	: Mid-position
(6)	REMOTE	: LOCAL

Test method

361 To set the front panel testmeter, proceed as follows:

361.1 Set the EUT POWER switch to MIN.

361.2 Adjust R1 on the meter control board (1b) (located just below the elapsed time indicator) for a front panel testmeter indication of 24 (mid-scale).

361.3 Press HELP to return to the Skeleton Test Menu.

CRYSTAL OSCILLATOR

Initial settings/connections

362 Make the EUT to test equipment interconnections, as follows:

362.1 Connect the power lead (Table 1, Serial 13) between the CIP DC SUPPLY connector and the EUT 28 V connector.

362.2 Connect the coaxial lead (Table 1, Serial 18) between the RIU ANT IN connector and the EUT ANT/ARFAT connector.

362.3 Connect the audio lead (Table 1, Serial 14) between the CIP AUDIO connector and an EUT AUDIO connector (upper or lower).

363 Ensure that specification Test 1 (Paras 183 to 189) has been carried out before setting up the test conditions for this alignment procedure.

364 Set up the 8920C and EUT controls and conditions, as follows:

364.1 PSU.

(1)	Voltage	:	24 V
(2)	Current Limit	:	12 A

364.2 2955B.

(2)	SET AF LOAD	:	100R
(1)	Skeleton Test Set-up	:	Transmitter - Output Modulation

364.3 CIP.

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

364.4 EUT

(1)	FREQUENCY	:	50.000 MHz
(2)	MODE	:	WIDE TONE
(3)	POWER	:	OFF
(4)	TEST	:	28V SPLY
(5)	GAIN	:	Mid-position
(6)	REMOTE	:	LOCAL

Test method

365 To set the crystal oscillator frequency, proceed as follows:

365.1 Set the EUT POWER switch to MIN.

365.2 Wait for at least 40 seconds and press and hold in the PRESSEL switch.

365.3 Note and record the 2955B Tx frequency indication which shall be LL 49.999900 MHz, UL 50.000100 MHz.

365.4 Release the PRESSEL switch.

365.5 If the frequency is not within the specified limits, adjust the links on the base of board (1h) [located to the left of the synthesiser] according to the details in Table 45.

TABLE 45 LINK ADJUSTMENTS

Required change in frequency	0 V to pin(s)	Pin A to pin(s)
+75 Hz	B	-
-75 Hz	-	B
+150 Hz	C	-
-150 Hz	-	C
+225 Hz	B+C	-
-225 Hz	-	B + C
+300 Hz	D	-
-300 Hz	-	D
+375 Hz	B+D	-
-375 Hz	-	B + D
+450 Hz	C+D	-
-450 Hz	-	C + D
+525 Hz	B+C+D	-
-525 Hz	-	B + C + D

365.6 Record the frequency setting and link connection used.

365.7 Press HELP to return to the Skeleton Test Menu.

RECEIVER-TRANSMITTER TUNING SHAFT COUPLING

Initial settings/connections

366 Make the EUT to test equipment interconnections, as follows:

366.1 Connect the power lead (Table 1, Serial 13) between the CIP DC SUPPLY connector and the EUT 28 V connector.

366.2 Connect the Audio lead (Table 1, Serial 14) between the CIP AUDIO connector and the EUT AUDIO (upper or lower) connector.

367 Ensure that specification Test 1 (Paras 183 to 189) has been carried out before setting up the test conditions for this alignment procedure.

368 Set up the 8920C and EUT controls and conditions, as follows:

368.1 PSU.

(1)	Voltage	: 24 V
(2)	Current Limit	: 12 A

368.2 2955B.

(1)	SET AF LOAD	: 100R
(2)	Skeleton Test Set-up	: Transmitter - Output Modulation

368.3 CIP.

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

368.4 EUT

(1)	FREQUENCY	: 50.000 MHz
(2)	MODE	: WIDE TONE
(3)	POWER	: OFF
(4)	TEST	: 28V SPLY
(5)	GAIN	: Mid-position
(6)	REMOTE	: LOCAL

Test method

NOTE

This procedure is easier to perform with the RF counter resolution changed from 1 Hz to 10 Hz. This can be done by selecting the 2955B Help Screens from the Skeleton Test Menu pages and selecting Change Parameters.

369 To set the receiver/transmitter tuning shaft coupling, proceed as follows:

369.1 Remove the tuning board (2a) and the modulator board (2b) from their sockets on the motherboard (2e).

369.2 Disconnect the coaxial connector from (6)PL1 on the synthesizer (6).

369.3 Disable the 8920C PSU output by pressing the PSU OUT ENABLE switch and disconnect the coaxial connector from (3)PL5 on the receiver (3).

369.4 Connect the cable assembly (Table 2, Serial 5) between the RIU ANT IN connector and (3)PL5.

369.5 Slacken the bellows coupling clamp screws on the receiver/transmitter tuning shaft.

369.6 Press the PSU OUTPUT ENABLE switch to set the PSU output on (green LED on).

369.7 Set the EUT POWER switch to MIN.

369.8 Rotate the receiver tuning shaft for a minimum 2955B Tx frequency indication.

369.9 Disable the PSU output by pressing the PSU OUT ENABLE switch and remove the coaxial connector from (3)PL5 and connect it to (4)PL2. Press the PSU OUTPUT ENABLE switch again to set the PSU output on (green LED on).

369.10 Press HELP, enter RIU Manual Control and select TRANSMIT-ON. Press HELP to return to the 2955B Manual Screen.

369.11 While holding the receiver tuning shaft firmly, rotate the transmitter shaft to obtain a minimum frequency indication.

369.12 Press HELP to enter RIU Manual Control and select TRANSMIT-OFF. Press SELECT to return to the Skeleton Test Menu.

369.13 Set the EUT POWER switch to OFF.

369.14 Without disturbing the shaft setting, tighten the bellows coupling securing screws.

NOTE

On completion of this alignment procedure, the RF counter resolution must be reset to 1 Hz (unless transmitter alignment is to be carried out next).

TRANSMITTER ALIGNMENT

370 Alignment of the transmitter involves setting up the oscillator frequency and the output power.

Initial settings/connections

371 Disconnect all EUT to test equipment interconnections and carry out the following:

371.1 Set the PSU OUTPUT ENABLE to disable the PSU output (green ENABLE led off).

371.2 Connect the power lead (Table 1, Serial 13) between the CIP DC SUPPLY connector and the test set (Table 3, Serial 1) 28 V connector.

372 Ensure that specification Test 1 (Paras 183 to 189) has been carried out before setting up the test conditions for this alignment procedure.

373 Set up the 8920C and EUT controls and conditions, as follows:

373.1 PSU.

(1)	Voltage	:	24 V
(2)	Current Limit	:	12 A

373.2 2955B.

(1)	SET AF LOAD	:	100R
(2)	Skeleton Test Set-up	:	Transmitter - Output and Modulation

Test methods

NOTE

This procedure is easier to perform with the RF counter resolution changed from 1 Hz to 10 Hz. This can be done by selecting the 2955B Help Screens from the Skeleton Test Menu pages and selecting Change Parameters.

374 Carry out the following preliminary setting up procedure:

374.1 Mount the transmitter (4) and PSU (7) on the test set, without using the link box as detailed in Paras 22, 23.1, 23.2, 23.4 and 23.5.

374.2 Slacken the tuning drive gearing collar.

374.3 Fit the angle setting jig to the test set and connect the bellows coupling to the end of the transmitter tuning shaft.

374.4 Disconnect the cable from the 2955B RF IN/OUT BNC connector.

374.5 Press SELECT to select the 2955B RF IN/OUT BNC connector.

374.6 Connect the cable assembly (Table 2, Serial 5) between the 2955B RF IN/OUT BNC connector and (4)PL2.

374.7 Connect the cable assembly (Table 2, Serial 5) between the RIU ANT IN connector and (4)PL4.

374.8 Short circuit (4)PL3 to chassis (this sets Tx VCO at 0 V).

374.9 Connect the DMM to the DVM sockets on the test set.

374.10 Set the PSU OUTPUT ENABLE to ON (green ENABLE led illuminated)

374.11 Set the test set switches as follows:

374.11.1 28V to ON.

374.11.2 Tx POWER to 50W

374.11.3 SELECT UNIT to Tx VCO

374.12 Connect the MRP INTERLOCK connector to the RIU AUDIO connector pin F (fan out).

374.13 Press HELP, enter RIU Manual Control and select TRANSMIT - ON. Press HELP to return to the 2955B Manual Screen.

374.14 Set the angle setting jig to 0 and slacken the two smaller knurled thumbscrews.

374.15 Adjust the larger knurled thumbscrews on the angle setting jig for a minimum 2955B Tx frequency indication.

374.16 Tighten the smaller knurled thumbscrews.

375 Align the oscillator frequency, as follows:

CAUTION

EQUIPMENT DAMAGE. The Tx POWER switch must be set to off before changing bands.

375.1 Set the Tx POWER switch to off.

375.2 Set the BAND switch to 1.

375.3 Set the Tx POWER switch to 50 W.

375.4 Set the angle setting jig to 2.

375.5 Adjust (4g)L1 to obtain a 2955B Tx frequency indication of 30.71 MHz.

375.6 Set the angle setting jig to 3.

375.7 Adjust (4g)C1 to obtain a 2955B Tx frequency indication of 40.14 MHz.

375.8 Repeat operations 375.4 to 375.7 until no further adjustment is required.

375.9 Repeat operations 375.1 to 375.8 for Bands 2 and 3 for the frequencies given in Table 46.

CAUTION

EQUIPMENT DAMAGE. The Tx POWER switch must be set to off before changing bands.

TABLE 46 OSCILLATOR FREQUENCY SETTINGS

Band	Jig setting	Frequency	Adjust
1	2 3	30.71 MHz 40.14 MHz	(4g)L1 (4g)C1
2	2 3	41.97 MHz 54.83 MHz	(4h)L1 (4h)C1
3	2 3	57.31 MHz 74.46 MHz	(4j)L1 (4j)C1

376 Align the output power, as follows:

CAUTION

EQUIPMENT DAMAGE. The Tx POWER switch must be set to off before changing bands.

376.1 Set the Tx POWER switch to off.

376.2 Set the BAND switch to 1.

376.3 Set the Tx POWER switch to 50 W.

376.4 Press HELP, enter RIU Manual Control and select TRANSMIT-ON. Press HELP to return to the 2955B Manual Screen.

376.5 Set the angle setting jig to 2.

376.6 Adjust (4g)C2 for a maximum 2955B Tx power indication.

376.7 Set the angle setting jig to 3.

376.8 Adjust (4g)C2 for a maximum 2955B Tx power indication.

376.9 Repeat operations 376.6 to 376.8 for optimum results.

376.10 Repeat operations 376.1 to 376.9 for Bands 2 and 3.

376.11 If the output power results do not reach the specified limits, set the EUT POWER switch and the test set 28 V switches to OFF and remove the appropriate turret lid to adjust L2 by physically moving the coil turns.

376.12 Repeat operations 376.1 to 376.11 until the correct results are obtained.

NOTE

On completion of the alignment procedure, the RF counter resolution must be reset to 1 Hz.

150 Hz TONE LEVEL SETTING

Initial settings/connections

377 Make the EUT to test equipment interconnections, as follows:

377.1 Connect the power lead (Table 1, Serial 13) between the CIP DC SUPPLY connector and the EUT 28 V connector.

377.2 Connect the Audio lead (Table 1, Serial 14) between the CIP AUDIO connector and the EUT AUDIO (upper or lower) connector.

377.3 Connect the coaxial lead (Table 1, Serial 18) between the RIU ANT IN connector and the EUT ANT/ARFAT connector.

377.4 Connect the harness lead (Table 1, Serial 15) between the CIP HARNESS connector and the EUT HARNESS connector.

377.5 Connect DMM Hi to TP9 on the control board (2c).

377.6 Connect DMM Lo to control board (2c) chassis.

378 Ensure that specification Test 1 (Paras 183 to 189) has been carried out before setting up the test conditions for this alignment procedure.

379 Set up the 8920C and EUT controls and conditions, as follows:

379.1 PSU.

(1)	Voltage	: 24 V
(2)	Current Limit	: 12 A

379.2 2955B.

(1)	SET AF LOAD	: 100R
(2)	Skeleton Test Set-up	: Receiver - Audio Output

379.3 CIP.

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

379.4 EUT

(1)	FREQUENCY	: 50.000 MHz
(2)	MODE	: WIDE TONE
(3)	POWER	: OFF
(4)	TEST	: RX SIG
(5)	GAIN	: Mid-position
(6)	REMOTE	: LOCAL

Test method

380 To carry out the 150 Hz tone setting procedure, proceed as follows:

380.1 Fit the control board (2c) into the appropriate extender (part of Test kit).

380.2 Set the EUT POWER switch to MIN.

380.3 Set the RF generator frequency to 50 MHz at -93 dBm (10 μV emf) and set the RF generator on.

380.4 Set the modulation frequency to 149 Hz at level 3.25 kHz and set the modulation on.

380.5 Adjust (2c) R43 (TN) for a maximum DMM voltage indication.

380.6 Press HELP to return to the Skeleton Test Menu.

85 Hz SQUELCH LEVEL SETTING

Initial settings/connections

381 Make the EUT to test equipment interconnections, as follows:

381.1 Connect the power lead (Table 1, Serial 13) between the CIP DC SUPPLY connector and the EUT 28 V connector.

381.2 Connect the audio lead (Table 1, Serial 14) between the CIP AUDIO connector and the EUT AUDIO (upper or lower) connector.

381.3 Connect the coaxial lead (Table 1, Serial 18) between the RIU ANT IN connector and the EUT ANT/ARFAT connector.

381.4 Connect the harness lead (Table 1, Serial 15) between the CIP HARNESS connector and the EUT HARNESS connector.

381.5 Connect DMM Hi to TP10 on the control board (2c).

381.6 Connect DMM Lo to control board (2c) chassis.

382 Ensure that specification Test 1 (Paras 183 to 189) has been carried out before setting up the test conditions for this alignment procedure.

383 Set up the 8920C and EUT controls and conditions, as follows:

383.1 PSU.

(1)	Voltage	:	24 V
(2)	Current Limit	:	12 A

383.2 2955B.

(1)	SET AF LOAD	:	100R
(2)	Skeleton Test Set-up	:	Receiver - Audio Output

383.3 CIP.

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

383.4 EUT

(1)	FREQUENCY	:	50.000 MHz
(2)	MODE	:	WIDE TONE
(3)	POWER	:	OFF
(4)	TEST	:	RX SIG
(5)	GAIN	:	Mid-position
(6)	REMOTE	:	LOCAL

Test method

384 To carry out the 85 Hz tone setting procedure, proceed as follows:

384.1 Fit the control board (2c) into the appropriate extender (part of Test kit).

384.2 Adjust (2c) R40 (SQ) to its fully clockwise position (until the clutch slips) and then turn it four turns counter-clockwise.

384.3 Use the DMM to check that (2c)10 is at logic 0 with respect to (2c) D.

384.4 Press HELP to return to the Skeleton Test Menu.

MODULATION LEVEL SETTINGS

Initial settings/connections

385 Make the EUT to test equipment interconnections, as follows:

385.1 Connect the power lead (Table 1, Serial 13) between the CIP DC SUPPLY connector and the EUT 28 V connector.

385.2 Connect the audio lead (Table 1, Serial 14) between the CIP AUDIO connector and the EUT AUDIO (upper or lower) connector.

385.3 Connect the coaxial lead (Table 1, Serial 18) between the RIU ANT IN connector and the EUT ANT/ARFAT connector.

385.4 Connect the harness lead (Table 1, Serial 15) between the CIP HARNESS connector and the EUT HARNESS connector.

386 Ensure that specification Test 1 (Paras 183 to 189) has been carried out before setting up the test conditions for this alignment procedure.

387 Set up the 8920C and EUT controls and conditions, as follows:

387.1 PSU.

(1) Voltage : 24 V
(2) Current Limit : 12 A

387.2 2955B.

(1) SET AF LOAD : 100R
(2) Skeleton Test Set-up : Transmitter - Output and Modulation

387.3 CIP.

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

387.4 EUT

(1) FREQUENCY : 40.000 MHz
(2) MODE : WIDE .
(3) POWER : OFF
(4) TEST : RX SIG
(5) GAIN : Mid-position
(6) REMOTE : LOCAL

Test method

388 To carry out the modulation level settings procedure, proceed as follows:

388.1 Set the EUT POWER switch to 50W.

388.2 Set the AF generator frequency to 1 kHz at a level of 62 mV. Set the AF generator on.

388.3 Press and hold in the PRESSEL switch and adjust R8 (A) on the modulator board (2b) for a 2955B modulation level indication of LL 10.4 kHz, UL 10.6 kHz.

388.4 Set the EUT MODE switch to WIDE TONE.

388.5 Set the AF generator off.

388.6 Press and hold in the PRESSEL switch and adjust R5 (T) on the modulator board (2b) for a 2955B modulation level indication of LL 3.35 kHz, UL 3.45 kHz.

388.7 Set the EUT MODE switch to WIDE DATA.

388.8 Press HELP and select the Data - Transmit Modulation skeleton from the Skeleton Test Menu.

388.9 Press and hold in the PRESSEL switch.

388.10 Adjust R14 (D) on the modulator board (2b) for a 2955B modulation level indication of LL 7.9 kHz, UL 8.1 kHz.

388.11 Release the PRESSEL switch.

388.12 Press HELP to return to the Skeleton Test Menu.

CAPACITOR DRIVE SHAFT ALIGNMENT - TRANSMITTER AND RECEIVER

389 To carry out the capacitor drive shaft alignment, proceed as follows:

389.1 Referring to Fig 5, locate the transmitter (4) on the alignment jig (part of Test kit).

389.2 Slacken the drive assembly securing screws and locate the unit on the shaft setting gauge, ensuring that the shaft is located in the slot provided.

389.3 Locate the capacitor drive setting gauge (gauge marked TX) on the end of the capacitor shaft.

389.4 Tighten the drive assembly securing screws.

389.5 Repeat operations 389.2 to 389.4 for the receiver (3), using the appropriately marked gauges.

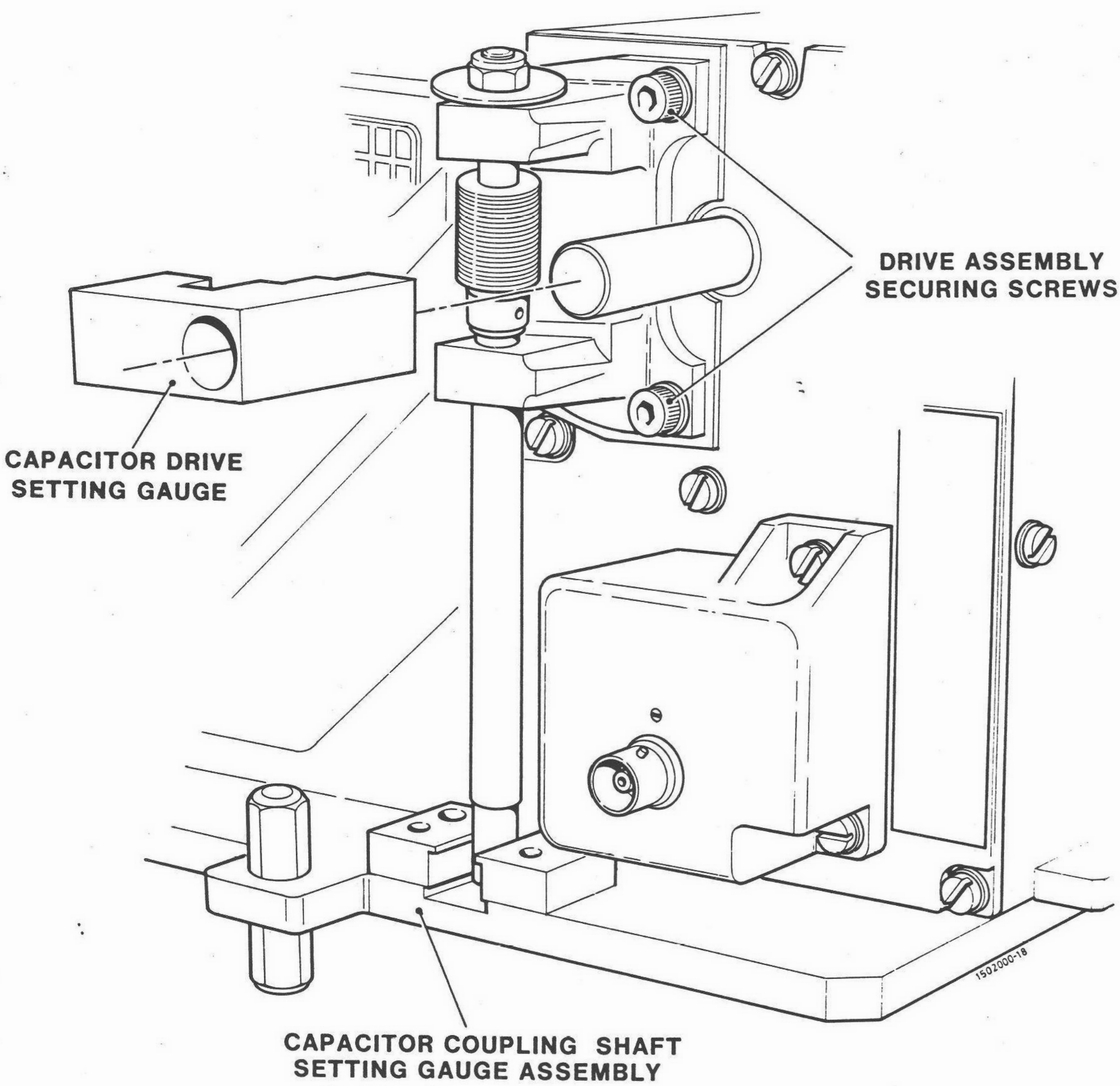


Fig 5 Capacitor drive shaft alignment

MODULATOR BOARD (2b) - DISCRIMINATOR ALIGNMENT

Initial settings/connections

390 Make the EUT to test equipment interconnections, as follows:

390.1 Connect the power lead (Table 1, Serial 13) between the CIP DC SUPPLY connector and the EUT 28 V connector.

390.2 Connect the audio lead (Table 1, Serial 14) between the CIP AUDIO connector and the EUT AUDIO (upper or lower) connector.

390.3 Connect the coaxial lead (Table 1, Serial 18) between the RIU ANT IN connector and the EUT ANT/ARFAT connector.

391 Ensure that specification Test 1 (Paras 183 to 189) has been carried out before setting up the test conditions for this alignment procedure.

392 Set up the 8920C and EUT controls and conditions, as follows:

392.1 PSU.

(1) Voltage : 24 V
(2) Current Limit : 12 A

392.2 2955B.

(1) SET AF LOAD : 100R
(2) Skeleton Test Set-up : Receiver - Audio Output

392.3 CIP.

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

392.4 EUT

(1) FREQUENCY : 50.000 MHz
(2) MODE : WIDE
(3) POWER : OFF
(4) TEST : RX SIG
(5) GAIN : Fully clockwise
(6) REMOTE : LOCAL

Test method

393 To carry out the modulation board (2b) discriminator alignment, proceed as follows:

393.1 Press the PSU OUTPUT ENABLE switch to disable the PSU output.

393.2 With the EUT removed from its case, extract the modulator board (2b), fit the appropriate extender (part of Test kit) to the EUT and fit the modulator board (2b) to the extender.

393.3 Disconnect the lead from the 2955B RF IN/OUT BNC connector.

393.4 Disconnect (3)SK2 from receiver (3) and connect (3)SK2 to the 2955B RF IN/OUT BNC connector, then press SELECT to enable the 2955B RF IN/OUT BNC connector.

393.5 Depress the PSU OUTPUT ENABLE to enable the PSU output (green ENABLE led on).

393.6 Set the EUT POWER switch to MIN.

393.7 Connect the DMM positive lead to test point M3 on the modulator board (2b) and connect the DMM negative lead to the EUT chassis.

393.8 Apply a short circuit between test point M2 on the modulator board (2b) and chassis via pin 7 of the extender card.

393.9 Set the RF generator frequency to 8.2 MHz at a level of -23 dBm (32 mV emf).

393.10 Press HELP, enter RIU Manual Control and select TRANSMIT-ON. Press HELP to return to the 2955B Manual Screen.

393.11 On the modulator board (2b), adjust L3 for a maximum DMM indication (approx. 1.6 V).

393.12 Disconnect the DMM positive lead from test point M3 and connect it to test point M2.

393.13 Remove the short circuit connection from test point M2 and connect it to test point M3.

393.14 Set the RF generator frequency to 11 MHz at a level of -23 dBm (32 mV emf) and adjust L2 for a maximum DMM indication (approx. 1.6 V).

393.15 Press HELP to enter RIU Manual Control and select TRANSMIT-OFF. Press HELP to return to the 2955B Manual Screen.

393.16 Set the PSU OUTPUT ENABLE to disable the PSU output (green ENABLE led off).

393.17 Disconnect the DMM positive lead from test point M2 and connect it to test point M4. Remove the short circuit from test point M3.

393.18 Set the PSU OUTPUT ENABLE to enable the PSU output (green ENABLE led on).

393.19 Press HELP, to enter RIU Manual Control and select TRANSMIT-ON. Press HELP to return to the 2955B Manual Screen.

393.20 On the modulator board (2b), adjust L2 for a DMM indication of 0.0 V ±20 mV.

393.21 Press HELP, to enter RIU Manual Control and select TRANSMIT-OFF. Press HELP to return to the 2955B Manual Screen.

393.22 Disconnect the DMM from the EUT. Disconnect the 2955B RF IN/OUT BNC from (3)SK2, and reconnect (3)SK2 to the receiver (3). Reconnect the BNC lead between the 2955B RF IN/OUT BNC connector and the RIU RF IN/OUT BNC connector.

393.23 Carry out the modulation level settings procedure (Para 385 to 388).

IF AMPLIFIER (5) ALIGNMENT

Initial settings/connections

394 Disconnect all EUT to test equipment interconnections and carry out the following:

394.1 Set the PSU OUTPUT ENABLE to disable the PSU output (green ENABLE LED off).

394.2 Connect the power lead (Table 1, Serial 13) between the CIP DC SUPPLY connector and the test set (Table 3, Serial 1) 28 V connector.

395 Ensure that specification Test 1 (Paras 183 to 189) has been carried out before setting up the test conditions for this alignment procedure.

396 Set up the 8920C and EUT controls and conditions, as follows:

396.1 <u>PSU.</u>

(1)	Voltage	:	24 V
(2)	Current Limit	:	12 A

396.2 <u>2955B</u>.

(1)	SET AF LOAD	:	100R
(2)	Skeleton Test Set-up	:	Receiver - Audio Output

Test method

397 To carry out the IF amplifier (5) alignment, proceed as follows:

397.1 Remove the IF amplifier cover nearest the solder terminals, and fit the alignment cover (Table 2, Serial 28).

397.2 Fit the PSU (7) to the test set (Para 21 and 22). Fit the IF amplifier (5) to the test set, using the link box (Para 25).

397.3 Connect the equipment as shown in Fig 6.

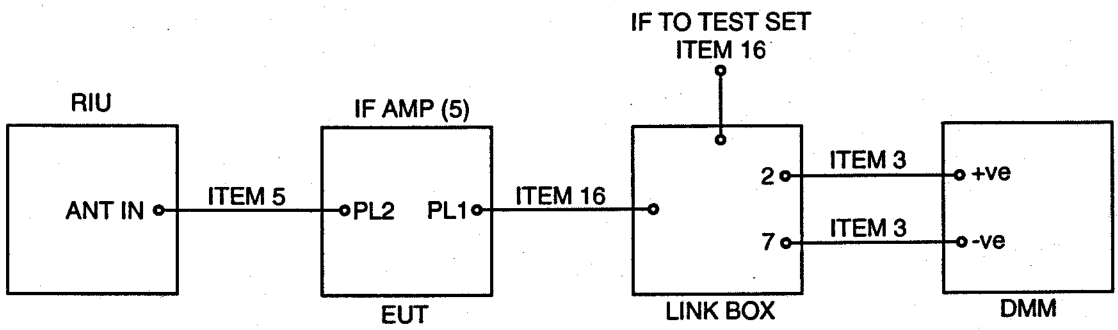


Fig 6 IF amplifier (5) alignment - test connections

397.4 Set the RF generator frequency to 9.68750 MHz at a level of -93 dBm (10 μV emf), unmodulated.

NOTE

To measure the small currents involved in this procedure, the Schlumberger 7150+ DMM needs to be set to 6 digit resolution. However, if available, adjustment may be made more easily using a Fluke 25 DMM.

397.5 Set the DMM to mA d.c. and select the DMM 6 digit mode. Set the PSU OUTPUT ENABLE to enable the PSU output (green ENABLE led on) and set the test set 28 V switch to ON.

397.6 Adjust the RF generator output level to until the DMM indicates LL 30 μA, UL 60 μA.

397.7 Adjust L2 for maximum indication on the DMM. As the meter indication increases to approximately 150 μA, decrease the RF generator level to maintain this current.

NOTE

The meter indication must always be due to the input RF signal, ie removal of the input signal results in a reduction in indication.

397.8 Repeat operation 397.7 for L1.

397.9 Repeat operations 397.7 and 397.8 until the maximum DMM indication is achieved, then adjust L3 for maximum indication.

397.10 Set the RF generator off and record the DMM indication which shall be less than 70 μA.

397.11 If the indication obtained in operation 397.10 is greater than 70 μA, adjust L2 to achieve an indication of 30 μA and then repeat operations 397.8 and 397.9 (alignment of L1 and L3).

NOTE

As a guide, L2 will normally be slightly proud and L1 virtually flush with the top of the respective can after alignment.

397.12 After any re-alignment of L1 and L2, repeat the RF generator part of operation 397.10.

397.13 Link pin 4 to pin 6 on the link box, ie WIDE MODE, and carry out the RF generator part of 397.10 and record the indication.

397.14 Adjust the RF generator output until the indication has increased by greater than 20 % of that obtained in operation 397.13.

397.15 Note the RF generator level which shall be less than -112.8 dBm (1 μV emf).

397.16 Switch the test set off and remove the link from between pin 4 and 6 of the link box.

DISCRIMINATOR

398 To align the discriminator, proceed as follows:

398.1 Press HELP, enter RIU Manual Control and select the Transmitter Output and Modulation skeleton test set-up from the Skeleton Test Menu. Press HELP to return to the 2955B Manual Screen.

398.2 Maintain the 8920C setup, and with the PSU (7) and IF amplifier (5) mounted on the test set, connect the equipment as shown in Fig 7, including the 6.8 kohm resistor (Table 1, Serial 21) and the 6.6 nF capacitor (Table 1, Serial 22).

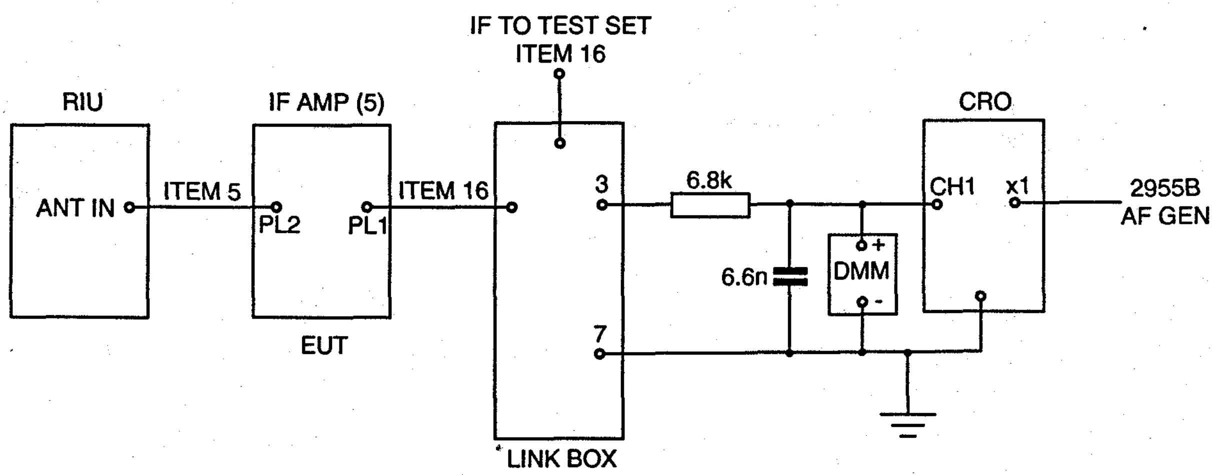


Fig 7 Discriminator alignment - test connections

398.3 Set the RF generator frequency to 9.6875 MHz deviated by 5 kHz at 1 kHz with an output level of -93 dBm (10 μV emf).

398.4 Set L4 and L5 fully counter-clockwise.

398.5 Switch the test set on and ensure that the RF generator and modulation are on.

398.6 Adjust L5 for a DMM indication of +0.7 V d.c.

398.7 Adjust L4 for a DMM indication of -0.05 V d.c.

398.8 Set the DMM to measure a.c. Volts.

398.9 Note the DMM indication which shall be LL 368 mV, UL 408 mV. If necessary, re-adjust L4 and L5 to obtain the correct indication.

398.10 Set the DMM to measure d.c. volts.

398.11 Note that the DMM indication is the same as that obtained for operation 398.6. If the indication is incorrect, repeat operations 398.6 to 398.8 until correct.

398.12 Connect pin 4 to pin 6 on the link box. Set the RF generator modulation to 10 kHz.

398.13 Note the DMM indication which shall be a nominal +50 mV ±100 mV d.c.

398.14 Set the DMM to measure a.c. volts.

398.15 Note the DMM indication which shall be LL 368 mV, UL 408 mV.

398.16 Set the RF generator off and set the DMM to measure d.c. volts.

398.17 Note the DMM indication which shall be a nominal 0 V ±50 mV. If necessary, adjust L3 by less than one turn for a 0 V indication. If more than one turn is required, repeat the IF amplifier (5) alignment (Para 394 to 397).

MANUAL TESTING/AUTOMATIC TESTING

500 MANUAL TESTING/AUTOMATIC TESTING

500.1 INTRODUCTION

The information contained in this regulation applies to the testing of the RT353 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 7, RT353 on the Select Radio Type menu, invokes the RT353 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)
RT353 EQUIPMENT LIST	SKIP	No equipment information is given.
INCORRECT KEYPRESS DEFAULTS TO SKIP DISPLAY	DISPLAY	An equipment list is displayed.
RT353 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 RT353 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 RT353 TEST CONNECTION DETAILS OPTION

When the operator selects the RT353 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	: RT353
NSN	: 5820-99-114-3159
TEST DATE	: xx/xx/xx
TIME	: xx:xx:xx
SERIAL NO.	:
MOD STRIKE	:
OPERATOR I.D.	:
STATION NO	:

PLEASE USE 2955B KEYPAD :-

PRESS DELETE FOR CORRECTIONS.
PRESS SELECT FOR NEXT LINE.

Note :- When the operator presses SELECT after completing the STATION NO 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)
30.075	Safety 1	183	50.000
30.075	Safety 2	254	30.000
30.075	1	254	30.000
30.075	2	254	30.000
30.075	3	189	50.000
30.075	4	189	50.000
30.075	5	254	30.000
50.075	5	254	
70.075	5	254	
30.075	6	254	30.000
30.075	7	254	30.000
30.075	8	254	30.000
30.025	9	254	30.000
30.075	10	254	30.000
30.025	11	254	30.000
30.025	12	254	30.000
50.025	13	268	50.000
50.025	14	220	30.000
50.025	15	280	50.000
50.025	16	281	50.000
50.025	17	282	50.000
50.025	18	280	50.000
50.050	19	271	50.000
50.025	20	272	50.000
50.050	21	271	50.000
50.025	22	272	50.000
50.050	23	196	50.000
50.050	24	196	50.000
50.050	25	196	50.000
50.050	26	258	50.000
50.050	27	258	50.000
50.025	28	268	50.000
50.025	29	290	50.000
50.050	30	301	50.000
50.050	31	301	50.000
50.050	32	301	50.000
50.050	33	301	50.000
50.025	34	302	50.000
50.025	35	302	50.000
50.025	36	300	50.000
50.025	37	292	50.000
50.050	38	264	50.000
50.050	39	264	50.000

TABLE 20 FIELD TEST NUMBER / MANUAL CROSS REFERENCES

Test Frequency (MHz)	Field Test Number	Manual Para. Number	Test Frequency (MHz)
50.050	40	264	50.000
50.050	41	264	50.000
50.025	42	269	50.000
50.050	43	190	50.000
50.050	44	190	50.000
50.050	45	206	50.000
50.050	46	206	50.000
50.050	47	206	50.000
50.050	48	206	50.000
50.050	49	202	50.000
50.050	50	202	50.000
50.050	51	207	50.000
50.050	52	191	50.000
50.050	53	191	50.000
50.050	54	311	50.000
50.050	55	310	50.000
50.050	56	311	50.000
50.050	57	312	50.000
50.050	58	311	50.000
50.050	59	311	50.000
50.050	60	312	50.000
50.050	61	312	50.000
30.025	62	236	30.000
30.025	63	242	30.000
30.025	64	240	30.000
30.025	65	240	30.000
30.025	66	240	30.000
30.075	67	241	30.000
30.075	68	241	30.000
30.075	69	241	30.000
30.025	70	220	30.000
30.025	71	220	30.000
30.075	72	206	30.000
30.075	73	202	30.000
40.050	74	206	40.000
40.050	75	214	40.000
40.025	76	220	40.000
40.050	77	213	40.000
41.050	78	206	41.000
41.025	79	220	41.000
41.150	80	202	40.000
52.200	81	202	50.000
63.325	82	202	60.000
74.450	83	202	70.000
75.970	84	202	70.000
66.800	85	202	60.000

TABLE 20 FIELD TEST NUMBER / MANUAL CROSS REFERENCES

Test Frequency (MHz)	Field Test Number	Manual Para. Number	Test Frequency (MHz)
57.700	86	202	50.000
48.600	87	202	50.000
39.500	88	202	40.000
35.500	89	206	35.000
36.025	90	220	35.000
55.050	91	206	
55.025	92	220	55.000
56.025	92	220	56.000
65.025	93	220	65.000
75.025	94	220	75.000
75.050	95	206	70.000
70.050	96	336	70.000
70.025	97	340	70.000
70.025	97	319 - 321	70.000
70.025	98	341	70.000
48.000	99	352	48.000
00.000	100	254	00.000

AMENDMENT SHEETS

SHEETS	ISSUE	DATE	COMMENT
ALL	1	Feb 1995	PART 2
1 12, 77 to 80, 82 to 89, 94 to 96, 100 to 103 105, 107 to 109, 111, 113 to 115, 120, 122 145 to 156	2	May 2002	MINOR CHANGES AND PART 4 ADDED TO DOCUMENT

STATION, RADIO, UK/VRC 353

TECHNICAL HANDBOOK - AUTOMATIC TESTING FIELD

Errata

Sponsor: DGEME
File ref: 3625

Publications Authority: Electronics Branch REME

(Disk Ref: EB/D/AE/07)

Note...
This Page 0/01, Issue 6 is to be filed immediately in front of Page 1, Issue 5 dated Jul 86.

1 The following amendments must be made to the regulation.

2 Remove and destroy Pages 3-4, Issue 5 dated Jul 86.
Insert Pages 3-4, Issue 6 dated Jan 91.

3 Remove and destroy Pages 35-38, Issue 5 dated Jul 86.
Insert Pages 35-38, Issue 6 dated Jan 91.

4 Remove and destroy Page 45, Issue 5 dated Jul 86.
Insert Page 45, Issue 6 dated Jan 91.

5 The test tape for use with this regulation has been raised to Issue 6.

Note...
H 614 Pt 3 should now consist of the following pages.

Pages 1-2, Issue 5 dated Jul 86
Pages 3-4, Issue 6, dated Jan 91
Pages 5-34, Issue 5 dated Jul 86
Pages 35-38, Issue 6 dated Jan 91
Pages 39-44, Issue 5 dated Jul 86
Page 45, Issue 6 dated Jan 91

STATION, RADIO, UK/VRC 353

TECHNICAL HANDBOOK - AUTOMATIC TESTING FIELD

Note...
These Pages 1-45, Issue 5 supersede Pages 1-41, Issue 4 dated Aug 83. The regulation has been amended throughout and relates to Issue 5 of the test tape.

CONTENTS

INTRODUCTION

1 The information contained in this regulation applies to the testing of the RT 353 using the Automatic Test Equipment (Clansman/Larkspur) (ATE).

2 For details of the operation of the ATE, reference should be made to Tels M 391.

GENERAL INSTRUCTIONS

3 The RT 353 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 inspection 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:

Coding	HM 0353	HL 0206
		Issue No. 6
Key	353	Inspection standard

5 Tests have 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 of this regulation 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 H 614 Part 1, have been considerably rationalized and adapted for ATE testing. Corresponding tests have been related by the insertion under the main test number of the relevant Tels H 614 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 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 sequence in two ways as follows:

11.1 The audible warning will bleep for approx 2 s and the OPERATOR ACTION lamp on the Programmer, Electronic Control front panel will illuminate.

11.2 The tape will stop and the CONT. ENCODE lamp on the programmer will illuminate.

The condition at Sub para 11.1 is indicated in Table 1 by the annotation @ and the condition at Sub para 11.2 by the annotation * .

TEST CONDITIONS

Power supplies

12 Under normal conditions, the d.c. supply to the equipment under test (e.u.t.) is 24 V unless otherwise stated in the test description.

RF input voltages

13 All r.f input voltages are quoted in terms of the open circuit voltage at the synthesiser attenuator output.

A.F. output termination

14 The e.u.t. receiver a.f. output is terminated in the ATE by 100 Ω unless otherwise stated.

Test equipment limitations

15 The Frequency Analyser FAXD 120S has been found unsuitable for testing v.h.f. Clansman radios. As a result, this test tape (RT 353 Issue 6) has been designed for use with ATEs fitted with the Modulation Meter 9008M only.

ATE TEST METHODS

General

16 ATE test methods are described in Tels M 391. However, in the subsequent paragraphs of this text, a number of tests in the RT 353 test programme are described in some detail to facilitate the interpretation of results.

Signal + noise/noise ratio

17 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 6 dB of attenuation. This value is recorded as the comparator high limit. In the second test, the modulation and the a.f. attenuation are removed. The resultant a.f. output shall be less than that recorded as the comparator high limit.

Current consumption

18 The e.u.t. current consumption, for the receive or transmit condition, is tested by measuring the voltage drop produced by the current across a 0.1 Ω resistor. Thus, a current of 1 A will produce a voltage drop of 100 mV.

Transmitter power measurement

19 Transmitter power is measured by applying the e.u.t. power output, via an attenuator, to a power monitor in the ATE and measuring the resultant d.c. voltage output.

20 For the MIN and 1 W positions of the POWER switch, the 20 dB attenuation route in the Switching Unit Monitor is used. For the 15 W and 50 W switch positions, the 30 dB route is used. The conversion laws are:

Via 20 dB attenuator, 1 W   100 mW
Via 30 dB attenuator, 1 W   10 mV

eg when using the 30 dB route, a power output of 45 W gives a digital voltmeter indication of 450 mV.

Modulation sensitivity

21 Modulation sensitivity may be measured using the Modulation Meter 9008M.

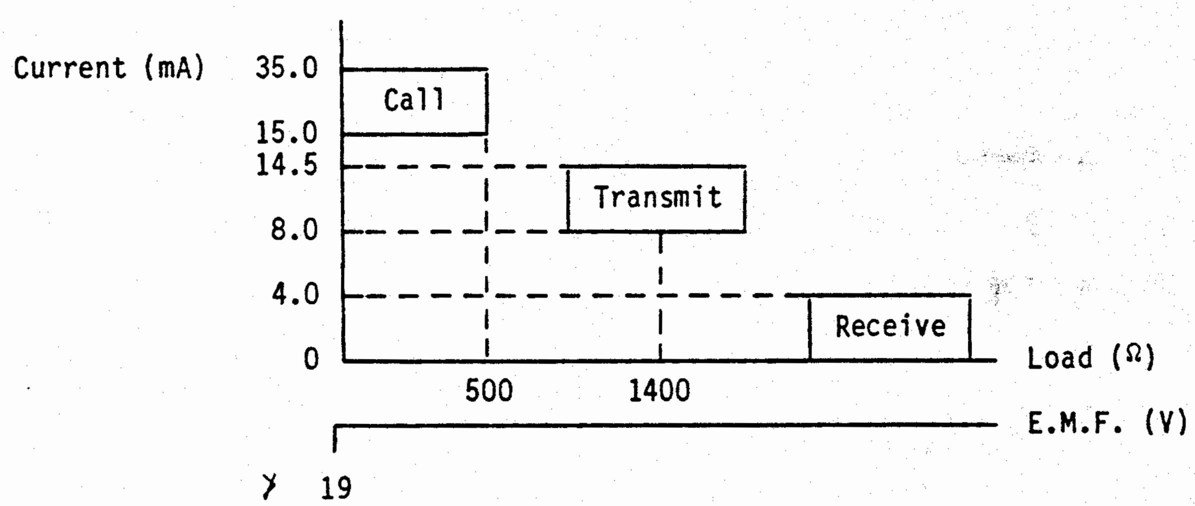
22 In these tests, with the e.u.t. in the transmit condition and a particular input at the microphone, the antenna r.f. output is measured. A d.c. level proportional to the deviation is routed to the digital voltmeter. The resultant indication shall be within the limits specified in the test description.

Overvolts safety test

23 Test 0002 ensures that the maximum voltage applied to the e.u.t. can never exceed 35 V. This figure is determined by the total value of the overvolts resistance between pins 7 and 8 of the power lead.

Remote line tests

24 Remote line control thresholds.



25 With the REMOTE switch at REM and a short circuit applied to the line terminals, the e.u.t. line current shall not exceed 35 mA (test 0170). The line current is measured by reading the voltage drop across a 1 Ω resistor located in the a.f. switching unit. Therefore, a line current of 35 mA produces a voltage of 35 mV.

26 When the line current is 4 mA (test 0173), the e.u.t. shall be in the receive condition. In this test the e.u.t. antenna is routed to the power monitor. The power monitor output shall be less than 2 mV.

27 In tests 0174 to 0175, line currents of 8 mA and 14.5 mA are applied to the remote terminals. These currents shall cause the e.u.t. to transmit, the power output required being that determined by the setting of the POWER switch.

Test switch function

28 The test sequence 0007 to 0022 tests the function of all positions of the TEST switch. These tests require the operator to intervene in the test programme by observing the e.u.t. front panel meter and frequency dial. The PASS/FAIL of these tests is decided by the operator.

29 In tests 0007 and 0019, the operator observes the alarm condition which is:

29.1 Frequency dial illumination flashing on and off.

29.2 Test meter indicates in the red section.

29.3 The audio output is intermittent.

INITIAL SETTING UP INSTRUCTIONS

Switching Unit Manual Control (SUMC)

30 Press MAINS ON switch.

Tape reader (reader)

31

31.1 Fit RT 353 test tape.

31.2 Set power switch to ON.

31.3 Press RUN.

Programmer Electronic Control (programmer)

32 Ensure all switches are deselected.

Switching Unit Monitor (SUM)

33 Select MANUAL, press RESET, select AUTO.

Printer Test Data (printer)

34 Set power switch to ON.

Thorn power supply (p.s.u.)

35

35.1 Switch to REMOTE.

35.2 Ensure that current, volts and overload controls are set to zero.

35.3 Switch ON.

Counter Electronic CT 574 (counter)

36 36.1 Set to REMOTE

36.2 Set sensitivity to '0.1'.

36.3 Set power switch to OFF.

Modulation Meter 9008M (9008M mod meter)

37

37.1 Set power switch to ON.

37.2 Select REMOTE.

37.3 Select 3 kHz a.f. filter OUT.

37.4 Select 150 Hz a.f. filter OUT.

Voltmeter Digital CT 577 (DVM)

38

38.1 Set power switch to ON.

38.2 Select MANUAL.

38.3 Select REMOTE.

38.4 Select DC FILTER OUT.

38.5 Select AC RESPONSE TIME 1 s.

Converter Signal Data (CSD)

39

39.1 Press 5 V button to ON.

39.2 Press 30 V button to OFF.

Signal Processor 9062 (processor)

40

40.1 Switch to OPERATE.

40.2 Switch attenuator to REMOTE.

40.3 Switch mode to REMOTE.

40.4 Fit 6 dB attenuator to output socket (see Para 17).

Synthesiser Frequency 9061 (synthesiser)

41 Select REMOTE.

Signal Generator Set 2-tone 9063 (2-tone sig gen)

42

42.1 Set power switch to ON.

42.2 Select REMOTE.

42.3 Set tones A and B to OFF.

TEST DESCRIPTION AND DETAILED OPERATING INSTRUCTIONS

43 Table 1 lists all the tests in the test programme and indicates where operator intervention is required to set e.u.t. and ATE controls.

TABLE 1 TEST DESCRIPTION AND DETAILED OPERATING INSTRUCTIONS

Test No.	Test description	Operator action
	START	Press START on programmer.
0000	Tape identification as per Para 4	@1 Connect RT 353 mechanical interface (MI) only to CSD. 2 Press 30 V button on CSD to ON. 3 Press RESET on CSD. 4 Press JOG on CSD to rotate MI controls clockwise. 5 Press FIT on CSD until all MI controls rotate to their fully anticlockwise position and stop. 6 Press STEP.
0001	Mechanical interface check The printout will show a MI ident number between 200 and 299.	
0002	Overvolts safety test With the e.u.t. power supply programmed for 39 V, the voltage applied to the e.u.t. shall not exceed 35 V.	@1 Connect RT 353 power lead to SUMC only. 2 Press STEP.

(continued)

TABLE 1 TEST DESCRIPTION AND DETAILED OPERATING INSTRUCTIONS (continued)

Test No.	Test description	Operator action
0003	Reverse polarity test The e.u.t. is protected from a reverse polarity supply connection at the 28 V connector.	@1 Set e.u.t. power switch to MIN. 2 Using a multimeter set to indicate 'ohms', measure the resistance across the 28 V e.u.t. connector. With the black lead connected to pin A (+ve) and the red lead connected to pin B (-ve), the indication shall be 1.8 kΩ to 2.2 kΩ. Reversing the multimeter connections shall give an indication greater than 1 MΩ. 3 Press STEP.
0004	Fit e.u.t.	@1 Press 30 V button on CSD to OFF. 2 Set e.u.t. frequency to 00.000 MHz and all other control switches fully anticlockwise. 3 Check all MI front panel switches are fully anticlockwise and fit to e.u.t. 4 Rotate all MI front panel switches over their full range of movement (if any MI switch is difficult to rotate, remove MI and repeat Paras 2 to 4). 5 Press 30 V button on CSD to ON. 6 Set Data Test Set (DTS) mode switch to ANALOGUE. 7 Set DTS 'Test Selector' switch to ATE. 8 Set Rx DELAY SWITCH to position 1 on DTS. 9 Set Tx DELAY SWITCH to position 1 on DTS. 10 Connect ATE AUDIO HARNESS socket to Clansman Interconnecting Box 20.

(continued)

TABLE 1 TEST DESCRIPTION AND DETAILED OPERATING INSTRUCTIONS (continued)

Test No.	Test description	Operator action
0004 (cont)		11 Connect power lead to DTS 28 V DC IN plug. 12 Connect DTS 28 V DC OUT socket to the e.u.t. 13 Connect DTS RADIO HARNESS socket to e.u.t. HARNESS PLUG. 14 Connect DTS TEST RIG HARNESS plug to Interconnecting Box 20 HARNESS plug. 15 Connect DTS AUTO COMMAND to Interconnecting Box 321 ATU socket. 16 Connect DTS CRO socket to CH1 I/P on CRO. 17 Connect audio socket SKT1 and SKT2 from interconnecting box to e.u.t. 18 Connect remote leads from interconnecting box to e.u.t. (A +ve). 19 Connect 353 ATU socket from interconnecting box to e.u.t. ARFAT socket. 20 Connect antenna coaxial from e.u.t. to SUMC. 21 Connect pin S of 353 ATU FAN OUT socket to pin S of 321 ATU FAN OUT socket using a shorting lead. 22 Select AUTO on CSD. 23 Press STEP.

(continued)

TABLE 1 TEST DESCRIPTION AND DETAILED OPERATING INSTRUCTIONS (continued)

Test No.	Test description	Operator action
0005	Power monitor zero	*1 Adjust power monitor zero controls on SUM for zero DVM indication. When the DVM indication is 0 V ± 1 mV the PASS lamp will illuminate. 2 Press PASS.
0006 (Para 88)	SYNTH (prohibited frequency) The e.u.t is tuned to 00.000 MHz, a prohibited frequency.	@1 Press LOUDSPEAKER button on SUMC to ON. 2 Observe test meter indication is in red sector, frequency dial illumination flashes on and off and the audio output is intermittent (alarm condition). 3 Press STEP.
0007 (Para 88)	LPS off The frequency dial and test meter illumination is extinguished.	@1 Observe frequency dial and test meter illumination on e.u.t. is extinguished. 2 Set counter sensitivity to '1'. 3 Press STEP.
0008 (Para 93)	Call frequency(remote terminals) - WIDE 50.000 MHz With the e.u.t. in the CALL mode, the CALL frequency shall be 1.8 kHz to 2.2 kHz.	
0012 (Para 88)	Fans off As for test 0007 with the e.u.t. switched to transmit. The transmitter shall be inhibited (DVM indication 0 V ± 2 mV).	@1 Set counter SENSITIVITY to '0.1'. 2 Observe frequency dial and test meter illuminations (e.u.t.) are extinguished. 3 Observe transmit lamp does not illuminate. 4 Press STEP.

(continued)

TABLE 1 TEST DESCRIPTION AND DETAILED OPERATING INSTRUCTIONS (continued)

Test No.	Test description	Operator action
0013 (Para 88)	<u>28 V supply</u> With e.u.t. supply voltage set to 28 V, the test meter indication shall be 26 V to 30 V.	*1 Observe test meter indication is 26 V to 30 V. 2 Press STEP.
0014 (Para 88)	<u>28 V supply (low voltage)</u> With e.u.t. supply voltage set to 20 V, the test meter indication shall be 19 V to 21 V.	*1 Observe test meter indication is 19 V to 21 V. 2 Press STEP.
0015 (Para 88)	<u>Tx O/P and safety test</u> The e.u.t. is switched to transmit. The transmit lamp shall illuminate and the test meter indicate the green sector. The e.u.t. is then switched to receive. The transmit lamp shall be extinguished, the test meter indicate the red sector and the counter indicates zero.	@1 Observe transmit lamp illuminates and meter indicates green sector. 2 Press STEP. 3 Observe: 3.1 Transmit lamp is extinguished. 3.2 Meter indicates red sector. 3.3 Counter indication is zero. <u>Caution...</u> <u>If any of these observations are incorrect, the e.u.t. is unsafe and further testing should not be carried out using the ATE.</u> 4 Press STEP.
0016 (Para 88)	<u>AFC Tx</u> The e.u.t. is switched to transmit. The meter shall indicate ± 3 div of centre.	@1 Observe test meter indication is ± 3 div of centre. 2 Press STEP.

(continued)

TABLE 1 TEST DESCRIPTION AND DETAILED OPERATING INSTRUCTIONS (continued)

Test No.	Test description	Operator action
0017 (Para 88)	<u>SYNTH (permitted frequency) - 30.000 MHz</u> The e.u.t. is tuned to a permitted frequency.	@1 Observe test meter indication is in the green sector. 2 Press STEP.
0018 (Para 88)	<u>Temp</u> With the test switch set to TEMP and an e.u.t. temperature within limits, the test meter shall indicate in the green sector.	@1 Observe test meter indication is in the green sector. 2 Press STEP.
0019 (Para 88)	<u>ARFAT</u> With the test switch set to the ARFAT position, the meter indicates in the green sector. ARFAT pin L connected to Pin P (ARFAT OVERHEAT), shall produce the alarm condition.	@1 Observe test meter indication is in the green sector. 2 Press STEP. 3 Observe: 3.1 Test meter indication is in red sector. 3.2 Frequency dial illumination flashes on and off. 3.3 The audio output is intermittent (alarm condition). 3.4 The transmit lamp is not illuminated. 4 Press STEP.
0020 (Para 88)	<u>Override</u> With the test switch set to OVERRIDE, both blowers run, alarm condition ceases and the e.u.t. transmits (DVM indicates 2 mV to 25 mV).	@1 Observe: 1.1 Both blowers run. 1.2 Alarm condition ceases. 1.3 The e.u.t. transmits. (DVM indicates 2 mV to 25 mV). 2 Press STEP.

(continued)

TABLE 1 TEST DESCRIPTION AND DETAILED OPERATING INSTRUCTIONS (continued)

Test No.	Test description	Operator action
0021 (Para 88)	Rx sig - (1) With no signal at the e.u.t. antenna, the test meter indication shall be less than 1/3 f.s.d.	@1 Observe test meter indication is less than 1/3 f.s.d. 2 Press STEP.
0022 (Para 88)	Rx sig - (2) With an antenna input of 100 mV (10 kHz deviation at 1 kHz) the test meter indication shall be greater than 2/3 f.s.d.	@1 Observe test meter indication is greater than 2/3 f.s.d. and a 1 kHz tone is heard. 2 Press STEP.
0023 (Para 81)	Transmission inhibit - 41.000 MHz The transmitter r.f. output shall be inhibited whilst tuning. The transmitter r.f. output shall be 28 W to 75 W within 10 s of making the frequency change (DVM indication 280 mV to 750 mV).	@1 Select 25 Hz sample on DVM. 2 Press STEP. 3 Observe DVM indication falls to approx zero, during tuning, then returns to 280 mV to 750 mV within 10 s of making the frequency change and an interrupted tone shall be heard during tuning. 4 Press LOUDSPEAKER button on SUMC (OFF). 5 Select MANUAL on DVM. 6 Press STEP.
0024 (Para 92)	Harness a.f. output - NARROW IC - 50.000 MHz - (1) With an antenna input signal of 5 μV (5 kHz deviation at 1 kHz), the e.u.t. harness a.f. output is measured via 8 dB of a.f. attenuation and recorded as the comparator high limit.	

(continued)

TABLE 1 TEST DESCRIPTION AND DETAILED OPERATING INSTRUCTIONS (continued)

Test No.	Test description	Operator action
0025 (Para 92) ■	<u>Harness a.f. output - NARROW IC - 50.000 MHz - (2)</u> As for test 0024 with the a.f. output measured via 12 dB of a.f. attenuation and recorded as the comparator low limit.	
0026 (Para 92) ■	<u>Harness a.f. output - NARROW IC - 50.000 MHz - (3)</u> As for test 0025 with the remote switch set to IC and the a.f. attenuation reduced to zero. The a.f. output shall be within the limits set in tests 0024 and 0025.	
0027 (Para 92)	<u>Harness a.f. output - NARROW - 50.000 MHz - (1)</u> With an antenna input signal of 5 µV (5 kHz deviation at 1 kHz) the e.u.t. harness a.f. ouput is measured with gain control fully clockwise. (DVM indication 1.00 V to 2.1 V).	
0028 (Para 92)	<u>Harness a.f. output - NARROW - 50.000 MHz - (2)</u> As for test 0027 with the gain control fully anticlockwise. (DVM indication 1.00 V to 1.21 V).	
0029 (Para 92)	<u>Harness a.f. output - WIDE - 50.000 MHz</u> With an antenna input signal of 5 µV (10 kHz deviation at 1 kHz), the e.u.t. harness a.f. output is measured with the gain control fully clockwise. (DVM indication 1.00 V to 2.1 V).	

(continued)

TABLE 1 TEST DESCRIPTION AND DETAILED OPERATING INSTRUCTIONS (continued)

Test No.	Test description	Operator action
0037 (Para 99)	Data receive sensitivity - WIDE DATA - 70.000 MHz A 50 µV signal, modulated by a 2 kHz square wave to give 8 kHz deviation, is applied to the e.u.t. antenna. The output at harness plug pin D w.r.t. pin G shall be 0.8 V to 1.0 V p-p.	@1 Connect DTS SYNTH output to processor EXT MOD input. 2 Set DTS ANALOGUE/DATA switch to DATA. 3 Disconnect processor output coax and connect a coax between the processor output and the 9008M mod meter 1 V input. 4 Press STEP. 5 Adjust Rx preset on DTS to produce 8 kHz deviation on 9008M mod meter. 6 Disconnect BNC coax between processor and 9008M mod meter and reconnect original coax. 7 Set CRO CH1 sensitivity to 0.2 V/cm. 8 Press STEP. 9 Observe signal on CRO is 0.8 V to 1.0 V p-p. 10 Press STEP.
0038 (Para 99)	Data receive sensitivity - WIDE DATA - 70.000 MHz Test 0037 is repeated with harness plug pin D w.r.t. pin G loaded with a 300 Ω resistor. The output shall be 350 mV to 550 mV p-p.	*1 Press and hold DATA LOAD button on DTS. 2 Observe signal on CRO is 350 mV to 550 mV p-p. 3 Release DATA LOAD button. 4 Press STEP.

(continued)

TABLE 1 TEST DESCRIPTION AND DETAILED OPERATING INSTRUCTIONS (continued)

Test No.	Test description	Operator action
0043	<u>Data delay - WIDE DATA - 48.000 MHz</u> The total data delay through the transmitter and receiver shall be 70 µs to 130 µs. (DVM indication greater than 2.83 V).	*1 Disconnect coax from processor EXT MOD. 2 Connect DTS CK output to CH2 and X inputs on CRO. 3 Set CRO TRIGGER SOURCE switch to EXT. 4 Set CRO CHANNEL MODE switch to ALT. 5 Adjust CRO timebase as required (20 µs/cm approx). 6 Adjust DTS Tx DELAY switch for maximum indication on DVM (greater than 2.83 V). DTS Tx DELAY switch position must lie between 1 and 8. 7 Observe the eye pattern on the CRO is approx that shown in Tels H 614 Part 1 Para 100 Fig 2. 8 Press PASS.
0044 (Para 88)	<u>Data modulation - WIDE DATA - 70.000 MHz (9008M mod meter)</u> With a 16 kbit 00001111 pattern input to harness plug pin A w.r.t. pin G, the carrier deviation shall be 7.0 kHz to 9.0 kHz. (DVM indication 700 mV to 900 mV).	

(continued)

TABLE 1 TEST DESCRIPTION AND DETAILED OPERATING INSTRUCTIONS (continued)

Test No.	Test description	Operator action
0063 (Para 78)	<u>Modulation sensitivity - WIDE - 50.000 MHz (9008M mod meter)</u> With a mic input of 10 mV at 1 kHz and the e.u.t. in the transmit condition, the deviation shall be 7 kHz to 13 kHz. (DVM indication 224 mV to 416 mV).	@1 Set DTS ANALOGUE/DATA switch to ANALOGUE. 2 Disconnect harness lead from e.u.t. 3 Press STEP. 4 If the printer prints and the tape stops, adjust power monitor zero controls on SUM for zero. When the DVM indication is 0 V ± 1 mV the PASS lamp will illuminate. 5 Press PASS.
0065 (Para 81)	<u>Interruption of supply - 40.000 MHz - (MIN)</u> The e.u.t. supply is interrupted for 30 s and then reconnected with the e.u.t. in the transmit mode. The e.u.t. shall not transmit within 15 s of reconnecting the supply. (DVM indication less than 2 mV).	
0066 (para 81)	<u>Interruption of supply - 40.000 MHz - (MIN)</u> Test 0065 is continued for a further 25 s with the e.u.t. in the transmit mode. The e.u.t. shall transmit within 40 s of reconnecting the supply. (DVM indication 2 mV to 25 mV).	
0067 (para 78)	<u>Modulation sensitivity - WIDE - 50.000 MHz - low voltage (18 V) - (9008M mod meter)</u> With a mic input of 10 mV at 1 kHz and the e.u.t. in the transmit condition with supply voltage reduced to 18 V, the deviation shall be 5 kHz to 15 kHz. (DVM indication 160 mV to 480 mV).	

(continued)

TABLE 1 TEST DESCRIPTION AND DETAILED OPERATING INSTRUCTIONS (continued)

Test No.	Test description	Operator action
0068 (Para 78)	<u>Modulation sensitivity - NARROW - 50.000 MHz - (9008M mod meter)</u> With a mic input of 10 mV at 1 kHz and the e.u.t in the transmit condition, the deviation shall be 3.5 kHz to 6.5 kHz. (DVM indication 350 mV to 650 mV).	
0069 (Para 77)	<u>Pilot tone frequency - NARROW - 50.000 MHz - (9008M mod meter)</u> The frequency of the pilot tone shall be 147 Hz to 151 Hz.	
0070 (Para 77)	<u>Pilot tone deviation - NARROW - 50.000 MHz - (9008M mod meter)</u> With the e.u.t. in the transmit mode, the deviation due to the pilot tone shall be 1.4 kHz to 2.1 kHz. (DVM indication 448 mV to 672 mV).	
0071 (Para 80)	<u>Transmitter power - 1 W - 50.000 MHz</u> The transmitter power output shall be 0.35 W to 2.5 W. (DVM indication 35 mV to 250 mV).	
0072 (Para 80)	<u>Transmitter power - MIN - 50.000 MHz</u> The transmitter power output shall be 14 mW to 250 mW. (DVM indication 1.4 mV to 25 mV).	

(continued)

TABLE 1 TEST DESCRIPTION AND DETAILED OPERATING INSTRUCTIONS (continued)

Test No.	Test description	Operator action
0073 (para 91)	<u>Sidetone - 50.000 MHz</u> With an a.f. input of 50 mV at 1 kHz to the mic and the gain control fully clockwise, the e.u.t. a.f. output is measured (DVM indication 1.5 V to 4.38 V).	
0074 (Para 91)	<u>Sidetone - 50.000 MHz - alternative a.f. socket</u> As for test 0073 using the alternative a.f. socket. (DVM indication 1.5 V to 4.38 V).	
0075 (Para 95)	<u>Transmitter power (key line) - 15 W - 50.000 MHz</u> The transmitter power output, with pin M of the ARFAT socket earthed, shall be 28 W to 75 W irrespective of the power range selected. (DVM indication 280 mV to 750 mV).	
0076 (Para 95)	<u>ARFAT socket pin O resistance - 15 W - 50.000 MHz</u> The resistance to earth from ARFAT socket pin O shall be greater than 10 kΩ. (DVM indication greater than 11 V).	
0077 (Para 80)	<u>Transmitter power - 15 W - 50.000 MHz</u> The transmitter power output shall be 7 W to 27 W. (DVM indication 70 mV to 270 mV).	

(continued)

TABLE 1 TEST DESCRIPTION AND DETAILED OPERATING INSTRUCTIONS (continued)

Test No.	Test description	Operator action
0083 (Para 89)	Modulation control - WIDE - 50.000 MHz - (1) - (9008M mod meter) With a mic input of 2 mV at 1 kHz and the gain control at maximum, the transmitter deviation shall be 7 kHz to 13 kHz (DVM indication 224 mV to 416 mV).	
0084 (Para 89)	Modulation control - WIDE - 50.000 MHz (2) - (9008M mod meter) As for test 0083 with the mic input increased to 80 mV. The transmitter deviation shall be 7 kHz to 13 kHz. (DVM indication 224 mV to 416 mV).	
0085 (Para 82)	Signal + noise/noise ratio - NARROW - 50.000 MHz - (1) A 0.5 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 6 dB of a.f. attenuation and recorded as the comparator high limit.	
0086 (Para 82)	Signal + noise/noise ratio - NARROW - 50.000 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 0085.	
0087 (Para 80)	Transmitter power - 50 W - 50.000 MHz The transmitter power output shall be 28 W to 75 W. (DVM indication 280 mV to 750 mV).	

(continued)

TABLE 1 TEST DESCRIPTION AND DETAILED OPERATING INSTRUCTIONS (continued)

Test No.	Test description	Operator action
0088 (Para 79)	<u>Transmitter frequency accuracy - 50.000 MHz</u> The transmitted frequency shall be 50.000 MHz ± 300 Hz.	
0089 (Para 79)	<u>Transmitter frequency accuracy - 50.000 MHz - 18 V supply</u> The transmitted frequency shall be 50.000 MHz ± 500 Hz.	
0090 (Para 80)	<u>Transmitter power - 50 W - 50.000 MHz - 18 V supply</u> The transmitter power output shall be 21 W to 75 W. (DVM indication 210 mV to 750 mV).	
0103 (Para 91)	<u>Receiver a.f. output - NARROW - 50.000 MHz</u> With an antenna input signal of 5 μV (5 kHz deviation at 1 kHz) and the gain control fully clockwise, the e.u.t. a.f. output into a 100 Ω load shall be 1.6 V to 3.67 V.	
0104 (Para 77)	<u>Noise deviation - WIDE - 50.000 MHz - (9008M mod meter)</u> The transmitter deviation with no mic input and the mode switch set to WIDE shall be less than 500 Hz. (DVM indication less than 160 mV).	
0107 (Para 91)	<u>Receiver a.f. output - WIDE - 50.000 MHz</u> As for test 0104 with an antenna input signal of 5 μV (10 kHz deviation at 1 kHz) and the switch set to WIDE. The e.u.t. a.f. output shall be 1.6 V to 3.67 V.	

(continued)

TABLE 1 TEST DESCRIPTION AND DETAILED OPERATING INSTRUCTIONS (continued)

Test No.	Test description	Operator action
0120 (Para 77)	Noise deviation (fans ON) - WIDE - 50.000 MHz - (9008M mod meter) With no mic input, the mod switch set to WIDE and the e.u.t. fans on, the transmitter deviation shall be less than 500 Hz. (DVM indication less than 160 mV).	
0125 (Para 93)	AF output (remote terminals) - WIDE TONE - 50.000 MHz With an antenna input of 5 µV (10 kHz deviation at 1 kHz) and the gain control fully clockwise the e.u.t. a.f. output at the remote terminals shall be 226 mV to 477 mV.	
0126 (Para 95)	Transmitter power (key line) - SILENT TUNE - 50.000 MHz The transmitter power output, with pin M of the ARFAT socket earthed, shall be 40 W to 75 W. (DVM indication 400 mV to 750 mV).	
0127 (Para 95)	ARFAT socket pin S voltage - SILENT TUNE - 50.000 MHz The voltage at pin S of the ARFAT socket shall be 26 V to 30 V.	
0128 (Para 95)	ARFAT socket pin O resistance - SILENT TUNE - 50.000 MHz The resistance to earth from ARFAT socket pin O shall be approx zero ohms. (DVM indication less than 0.75 V).	

(continued)

TABLE 1 TEST DESCRIPTION AND DETAILED OPERATING INSTRUCTIONS (continued)

Test No.	Test description	Operator action
0129 (Para 95)	ARFAT socket pin S voltage - TUNE - 50.000 MHz The voltage at pin S of the ARFAT socket shall be zero volts. (DVM indication less than 0.5 V).	
0130 (Para 95)	Transmitter power - TUNE - 50.000 MHz The transmitter power output shall be less than 300 mW. (DVM indication less than 3 mV).	
0131 (Para 95)	ARFAT socket pin O resistance - TUNE - 50.000 MHz The resistance to earth from ARFAT socket pin O shall be greater than 10 kΩ. (DVM indication greater than 11 V).	
0145 (Para 94)	AF output - BK IN - 50.000 MHz - (audio socket I/P and O/P - (1) With an a.f. input of 18 mV at 1 kHz and the gain control fully clockwise, the e.u.t a.f. output is measured into 100 Ω load and shall be 1.53 V to 4.38 V.	
0146 (Para 94)	AF output - BK IN - 50.000 MHz - (audio socket I/P and O/P - (2) As for test 0145 with the a.f. input increased to 80 mV. The e.u.t. a.f. output shall be 1.53 V to 4.38 V.	

(continued)

TABLE 1 TEST DESCRIPTION AND DETAILED OPERATING INSTRUCTIONS (continued)

Test No.	Test description	Operator action
0147 (Para 94)	AF output - BK IN - 50.000 MHz - (audio socket I/P and remote terminal O/P - (1) With an a.f. input of 18 mV at 1 kHz and the gain control fully clockwise, the e.u.t. a.f. output is measured at the remote terminals and shall be 226 mV to 477 mV.	
0148 (Para 94)	AF output - BK IN - 50.000 MHz - (audio socket I/P and remote terminal O/P) - (2) As for test 0147 with the a.f. input increased to 80 mV. The e.u.t. a.f. output at remote terminals shall be 226 mV to 477 mV.	
0149 (Para 94)	AF output - BK IN - 50.000 MHz - (remote terminal I/P, audio socket O/P) - (1) With an a.f. input of 80 mV at 1 kHz to the remote terminals, the e.u.t. a.f. output shall be 1.53 V to 438 V.	
0150 (Para 94)	AF output - BK IN - 50.000 MHz - (remote terminals I/P audio socket O/P) - (2) As for test 0149 with the a.f. input increased to 4 V. The e.u.t. a.f. output shall be 1.53 V to 4.38 V.	

(continued)

TABLE 1 TEST DESCRIPTION AND DETAILED OPERATING INSTRUCTIONS (continued)

Test No.	Test description	Operator action
0157 (Para 94)	AF output - IC - 50.000 MHz - (audio socket I/P and O/P) 32 dB range - (1) With an a.f. input of 2 mV at 1 kHz to the audio socket, the remote switch at IC and the gain control at Position 2, the e.u.t. a.f. output is measured and recorded as the comparator high limit.	
0158 (Para 94) ■	AF output - IC - 50.000 MHz - (audio socket I/P and O/P) 32 dB range - (2) As for test 0157 with the a.f. input increased by 32 dB. The e.u.t. a.f. output is measured via 1 dB of a.f. attenuation and shall be less than that recorded in test 0157.	
0159 (Para 93)	AF output (remote terminals) - WIDE - 50.000 MHz - CALL With the e.u.t. in the CALL mode the remote a.f. output shall be greater than 0.25 V (DVM indication greater than 110 mV).	
0160 (Para 90)	Remote operation - modulation sensitivity - WIDE - 50.000 MHz - (1) - (9008M mod meter) With an a.f. input of 80 mV at 1 kHz to the remote terminals, the transmitter frequency deviation shall be 7 kHz to 13 kHz. (DVM indication 224 mV to 416 mV).	

(continued)

TABLE 1 TEST DESCRIPTION AND DETAILED OPERATING INSTRUCTIONS (continued)

Test No.	Test description	Operator action
0161 (Para 90)	<u>Remote operation - modulation sensitivity - WIDE - 50.000 MHz - (2) - (9008M mod meter)</u> As for test 0160 with the a.f. input increased to 4 V. The transmitter frequency deviation shall be 7 kHz to 13 kHz. (DVM indication 224 mV to 416 mV).	
0162 (Para 90)	<u>Remote operation - modulation sensitivity - NARROW - 50.000 MHz - (2) (9008 mod meter)</u> With an a.f. input of 80 mV at 1 kHz to the remote terminals, the transmitter frequency shall be 3.5 kHz to 6.5 kHz (DVM indication 350 mV to 650 mV).	
0163 (Para 90)	<u>Remote operation - modulation sensitivity - NARROW - 50.000 MHz - (2) - (9008M mod meter)</u> As for test 0162 with the a.f. input increased to 4 V. The transmitter frequency deviation shall be 3.5 kHz to 6.5 kHz. (DVM indication 350 mV to 650 mV).	
0164 (Para 91)	<u>Receiver a.f. output - IC - 50.000 MHz - (1)</u> With an antenna input signal of 5 µV (5 kHz deviation at 1 kHz), the remote switch set to LOCAL and the gain control fully clockwise, the e.u.t. a.f. output is measured via 8 dB of a.f. attenuation and recorded as the comparator high limit.	

(continued)

TABLE 1 TEST DESCRIPTION AND DETAILED OPERATING INSTRUCTIONS (continued)

Test No.	Test description	Operator action
0165 (Para 91) ■	<u>Receiver a.f. output - IC - 50.000 MHz - (2)</u> As for test 0164 with the a.f. output measured via 12 dB of a.f. attenuation and recorded as the comparator low limit.	
0166 (Para 91) ■	<u>Receiver a.f. output - IC - 50.000 MHz - (3)</u> As for test 0164 with the a.f. attenuation reduced to zero and the remote switch set to IC. The a.f. output shall be within the limits set by tests 0164 and 0165.	
0167 (Para 85)	<u>Tone detection - AUTO - 30.000 MHz</u> With the remote switch set to AUTO, a 0.7 µV signal (1.65 kHz deviation at 149 Hz) is applied to the e.u.t. antenna. The line current, with an 18 V supply applied to the remote terminals, shall be 8 mA to 11 mA (DVM indication 8 mV to 11 mV).	
0168 (Para 87 (1)86(2))	<u>Call operation - short circuit condition - 30.000 MHz</u> With the remote switch set to CALL, the voltage at the remote terminals shall not exceed 1 V.	
0169 (Para 86)	<u>Auto operation - remote terminals short circuit - 30.000 MHz</u> With a short circuit applied to the remote terminals, the remote line current shall be less than 35 mA (DVM indication less than 35 mV).	

(continued)

TABLE 1 TEST DESCRIPTION AND DETAILED OPERATING INSTRUCTIONS (continued)

Test No.	Test description	Operator action
0170 (Para 86)	Remote operation - remote terminals short circuit - 30.000 MHz With a short circuit applied to the remote terminals, the remote line current shall be less than 35 mA (DVM indication less than 35 mV).	
0172	Power monitor zero With no r.f. input, the power monitor is adjusted until the d.c. output is 0 V ± 1 mV.	@1 If the printer prints and the tape stops, adjust power monitor zero controls on SUM for zero DVM indication. When DVM indication is 0 V ± 1 mV the PASS lamp will illuminate. 2 Press PASS.
0173 (Para 86)	Remote operation - line current 4 mA - 30.000 MHz With a line current of 4 mA, the e.u.t. shall not transmit. The transmitter power output shall not exceed 20 mW. (DVM indication less than 2 mV).	
0174 (Para 86)	Remote operation - line current 8 mA - 30.000 MHz With a line current of 8 mA, the e.u.t. shall transmit. The transmitter power output shall be 40 mW to 250 mW (DVM indication 4 mV to 25 mV).	
0175 (Para 86)	Remote operation - line current 14.5 mA - 30.000 MHz With a line current of 14.5 mA, the e.u.t. shall transmit. The transmitter power output shall be 40 mW to 250 mW. (DVM indication 4 mV to 25 mV).	

(continued)

TABLE 1 TEST DESCRIPTION AND DETAILED OPERATING INSTRUCTIONS (continued)

Test No.	Test description	Operator action
0176 (Para 86)	Local operation - remote terminals short circuit - 30.000 MHz With a short circuit applied to the remote terminals, the remote line current shall be less than 35 mA. (DVM indication less than 35 mV).	
0177 (Para 82)	Signal + noise/noise ratio - WIDE - 30.000 MHz - (1) A 0.5 µV signal (10 kHz deviation at 1 kHz) is applied to the e.u.t. antenna. The e.u.t. a.f. output is measured via 6 dB of a.f. attenuation and recorded as the comparator high limit.	
(0178 para 82)	Signal + noise/noise ratio - WIDE - 30.000 ,Hz - (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 0177.	
0181 (Para 82)	Signal + noise/noise ratio - NARROW - 30.000 MHz - (1) A 0.5 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 6 dB of a.f. attenuation and recorded as the comparator high limit.	
0182 (Para 82)	Signal + noise/noise ratio - NARROW - 30.000 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 0181.	

(continued)

TABLE 1 TEST DESCRIPTION AND DETAILED OPERATING INSTRUCTIONS (continued)

Test No.	Test description	Operator action
0183 (Para 80)	<u>Transmitter power - 50 W - 30.000 MHz</u> The transmitter power output shall be 28 W to 75 W. (DVM indication 280 mV to 750 mV).	
0184 (Para 79)	<u>Transmitter frequency accuracy - 30.000 MHz</u> The transmitted frequency shall be 30.000 MHz $\pm$ 180 Hz.	
0185 (Para 91)	<u>Voltage at pin C of audio skt 1</u> The voltage at pin C of audio skt 1 shall be 26 V to 30 V.	
0186 (Para 91)	<u>Voltage at pin C of audio skt 2</u> The voltage at pin C of audio skt 2 shall be 26 V to 30 V.	
0190 (Para 80)	<u>Transmitter power - 50 W - 40.000 MHz</u> The transmitter power output shall be 28 W to 75 W. (DVM indication 280 mV to 750 mV).	
0191 (Para 82)	<u>Signal + noise/noise ratio - NARROW - 40.000 MHz - (1)</u> A 0.5 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 6 dB a.f. attenuation and recorded as the comparator high limit.	
0192 (Para 82) ■	<u>Signal + noise/noise ratio - NARROW - 40.000 MHz - (2)</u> 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 0191.	

(continued)

TABLE 1 TEST DESCRIPTION AND DETAILED OPERATING INSTRUCTIONS (continued)

Test No.	Test description	Operator action
0193 (Para 80)	<u>Transmitter power - 50 W - 41.000 MHz</u> The transmitter power output shall be 28 W to 75 W. (DVM indication 280 mV to 750 mV).	
0194 (Para 82)	<u>Signal + noise/noise ratio - NARROW - 41.000 MHz - (1)</u> A 0.5 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 6 dB of attenuation and recorded as the comparator high limit.	
0195 (Para 82)	<u>Signal + noise/noise ratio - NARROW - 41.000 MHz - (2)</u> 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 0194.	
0196 (Para 79)	<u>Transmitter frequency accuracy - 41.100 MHz</u> The transmitted frequency shall be 41.100 MHz ± 246 Hz.	
0197 (Para 79)	<u>Transmitter frequency accuracy - 52.200 MHz</u> The transmitted frequency shall be 52.200 MHz ± 313 Hz.	
0198 (Para 79)	<u>Transmitter frequency accuracy - 63.325 MHz</u> The transmitted frequency shall be 63.325 MHz ± 370 Hz.	
0199 (Para 79)	<u>Transmitter frequency accuracy - 74.450 MHz</u> The transmitted frequency shall be 74.450 MHz ± 446 Hz.	

(continued)

TABLE 1 TEST DESCRIPTION AND DETAILED OPERATING INSTRUCTIONS (continued)

Test No.	Test description	Operator action
0200 (Para 79)	Transmitter frequency accuracy -75.975 MHz The transmitted frequency shall be 75.975 MHz ± 456 Hz.	
0201 (Para 79)	Transmitter frequency accuracy -66.800 MHz The transmitted frequency shall be 66.800 MHz ± 400 Hz.	
0202 (Para 79)	Transmitter frequency accuracy -57.700 MHz The transmitted frequency shall be 57.700 MHz ± 346 Hz.	
0203 (Para 79)	Transmitter frequency accuracy - 48.600 MHz The transmitted frequency shall be 48.600 MHz ± 291 Hz.	
0204 (Para 79)	Transmitter frequency accuracy - 39.500 MHz The transmitted frequency shall be 39.500 MHz ± 237 Hz.	
0213 (Para 82)	Signal + noise/noise ratio - NARROW - 35.000 MHz - (1) A 0.5 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 6 dB of a.f. attenuation and recorded as the comparator high limit.	
0214 (Para 82) ■	Signal + noise/noise ratio - NARROW - 35.000 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 0213.	

(continued)

TABLE 1 TEST DESCRIPTION AND DETAILED OPERATING INSTRUCTIONS (continued)

Test No.	Test description	Operator action
0215 (Para 80)	Transmitter power - 50 W - 35.000 MHz The transmitter power output shall be 28 W to 75 W. (DVM indication 280 mV to 750 mV).	
0218 (Para 80)	Transmitter power - 50 W - 55.000 MHz The transmitter power output shall be 28 W to 75 W. (DVM indication 280 mV to 750 mV).	
0219 (Para 82)	Signal + noise/noise ratio - WIDE - 55.000 MHz - (1) A 0.5 μV signal (10 kHz deviation at 1 kHz) is applied to the e.u.t. antenna. The e.u.t. a.f. output is measured via 6 dB of a.f. attenuation and recorded as the comparator high limit.	
0220 (Para 82) ■	Signal + noise/noise ratio - WIDE - 55.000 MHz - (2) As for test 0219 with the modulation removed and the a.f. attenuation reduced to zero. The resultant a.f. output shall be less than that recorded in test 0219.	
0222 (Para 82)	Signal + noise/noise ratio - WIDE - 65.000 MHz - (1) A 0.5 μV signal (10 kHz deviation at 1 kHz) is applied to the e.u.t. antenna. The e.u.t. a.f. output is measured via 6 dB of a.f. attenuation and recorded as the comparator high limit.	

(continued)

TABLE 1 TEST DESCRIPTION AND DETAILED OPERATING INSTRUCTIONS (continued)

Test No.	Test description	Operator action
0223 (Para 82)	<u>Signal + noise/noise ratio - WIDE - 65.000 MHz - (2)</u> As for test 0222 with the modulation removed and the a.f. attenuation reduced to zero. The resultant a.f. output shall be less than that recorded in test 0222.	
0225 (Para 80)	<u>Transmitter power - 50 W - 75.000 MHz</u> The transmitter power output shall be 28 W to 75 W. (DVM indication 280 mV to 750 mV).	
0226 (Para 82)	<u>Signal + noise/noise ratio - WIDE - 75.000 MHz - (1)</u> A 0.5 V signal (10 kHz deviation at 1 kHz) is applied to the e.u.t. antenna. The e.u.t. a.f. output is measured via 6 dB of a.f. attenuation and recorded as the comparator high limit.	
0227 (Para 82)	<u>Signal + noise/noise ratio - WIDE - 75.000 MHz - (2)</u> As for test 0226 with the modulation removed and the a.f. attenuation reduced to zero. The resultant a.f. output shall be less than that recorded in test 0226.	
0228	<u>Rewind and clear stores</u> ATE stores are cleared and tape automatically rewinds to start of test programme.	

(Disk Ref: EB/D/AE/07)

TABLE 2 TEST PROGRAMME MACHINE CODE

```
* RESTRICTED RT 353 ISSUE 6  JAN 91 TELS H 614 PT3 START.

MT0000  CS0000  VS0000  IS0000  HM0353  HL0206  LM0000  LL0000  *
TD1010  CF6850  SP0000  *

MT0001  CS0000  VS0000  IS0000  SG0002  HM0000  HL0299  LM0000  *
LL0200  TD1010  CF9870  SP0000  *

MT0002  CS0000  VS0000  IS0000  SP0000  *
IS0004  VS0390  SG0003  HC0005  AS6000  DV0004  HM0350  HL0000  *
LM0150  LL0000  TD1010  CF0070  VS0000  SP0000  *

MT0003  CS0000  VS0000  IS0000  SP0000  *

MT0004  CS0000  VS0000  IS0000  TD0100  MU0000  TD0100  ML0000  *
TD0050  MC0000  TD0050  MI0000  SP0000  *

MT0005  CS0000  VS0000  IS0000  DV0000  SG0006  RS2000  HM0010  *
HL0000  LM0010  LL0000  CF1160  *

MT0006  CS0000  IS0004  VS0240  TD0100  MU0000  TD0100  ML0000  *
TD0050  MC6013  TD0050  MI0009  SP0000  *

MT0007  CS0000  IS0004  VS0240  TD0100  MU0300  TD0100  ML0000  *
RS3000  TD0050  MC0013  TD0050  MI0009  SP0000  *

MT0008  CS0000  IS0004  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4513  TD0050  MI0009  AS0034  HB0010  RS0040  HM0000  *
HL2200  LM0000  LL1800  TD1010  FC0005  TD1010  FC0005  TD1020  *
CF6070  *

MT0012  CS0000  IS0004  VS0240  TD0100  MU0300  TD0100  ML0000  *
TD0050  MC1013  TD0050  MI0009  DV0000  RS3000  HM0020  HL0000  *
LM0020  LL0000  TD1020  CF1060  SP0000  *

MT0013  CS0000  IS0004  VS0280  TD0100  MU0300  TD0100  ML0000  *
TD0050  MC2013  TD0050  MI0009  SP0000  *

MT0014  CS0000  IS0004  VS0200  TD0100  MU0300  TD0100  ML0000  *
TD00050 MC2013  TD0050  MI0009  SP0000  *

MT0015  CS0000  IS0012  VS0240  TD0100  MU0300  TD0100  ML0000  *
TD0050  MC4013  TD0050  MI0009  AS0020  RS5000  TD1010  FC0005  *
SP0000  *
RS4000  TD1010  FC0005  TD1010  FC0005  SP0000  *

MT0016  CS0000  IS0012  VS0240  TD0100  MU0300  TD0100  ML0000  *
TD0050  MC5013  TD0050  MI0009  AS0020  RS3000  SP0000  *

MT0017  CS0000  IS0004  VS0240  TD0100  MU0300  TD0100  ML0000  *
TD0050  MC6013  TD0050  MI0009  AS0020  SP0000  *
```

(continued)

TABLE 2 TEST PROGRAMME MACHINE CODE (continued)

```
MT0018  CS0000  IS0004  VS0240  TD0100  MU0300  TD0100  ML0000  *
TD0050  MC7013  TD0050  MI0009  AS0020  SP0000  *

MT0019  CS0000  IS0012  VS0240  TD0100  MU0300  TD0100  ML0000  *
TD0050  MC8013  TD0050  MI0009  AS0020  SP0000  *
HA0002  SP0000  *

MT0020  CS0000  IS0012  VS0240  TD0100  MU0300  TD0100  ML0000  *
TD0050  MC9023  TD0050  MI0009  DV0002  RS3000  HM0250  HL0000  *
LM0020  LL0000  AS0020  CF1170  *

MT0021  CS0000  IS0004  VS0240  TD0100  MU0300  TD0100  ML0000  *
TD0050  MC3013  TD0050  MI0009  SP0000  *

MT0022  CS0000  IS0004  VS0240  TD0100  MU0300  TD0100  ML0000  *
TD0050  MC3013  TD0050  MI0009  SU0300  SL0000  SA2020  RS0002  *
DV0013  MF4410  MA2100  MM0500  AS4020  SP0000  *

MT0023  CS0000  IS0012  VS0240  TD0100  MU0410  TD0100  ML0000  *
TD0050  MC4042  TD0050  MI0009  DV0002  RS3000  HM7500  HL0000  *
LM2800  LL0000  AS0020  CF1170  *
TD0100  MU0400  TD0100  ML0000  LM0000  TD1015  CF1074  LM4000  *
CF1170  *

MT0024  CS0000  IS0004  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4044  TD0050  MI0009  SU0500  SL0000  SA0106  RS0002  *
AA0008  HB0030  AS4024  DV0013  MF4410  MA2050  MM0500  HM9999  *
HL9999  LM9999  LL9999  TD1020  CF0062  *

MT0025  AA0012  TD1010  CF0061  *

MT0026  TD0050  MC4414  AA0000  TD1010  CF0070  *

MT0027  CS0000  IS0004  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4044  TD0050  MI0009  SU0500  SL0000  SA0106  RS0002  *
DV0013  MF4410  MA2050  MM0500  HC0002  AS5020  HM0021  HL0000  *
LM0010  LL0000  TD1010  CF0070  *

MT0028  CS0000  IS0004  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4044  TD0050  MI0000  SU0500  SL0000  SA0106  RS0002  *
DV0013  MF4410  MA2050  MM0500  HC0002  AS5020  HM0021  HL0000  *
LM0010  LL0000  TD1010  CF0070  *

MT0029  CS0000  IS0004  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4042  TD0050  MI0009  SU0500  SL0000  SA0106  RS0002  *
DV0013  MF4410  MA2100  MM0500  HC0002  AS5020  HM0021  HL0000  *
LM0010  LL0000  TD1020  CF0070  *

MT0037  SP0000  *
CS0000  IS0004  VS0280  TD0100  MU0700  TD0100  ML0000  TD0050  *
MC4040  TD0050  MI0009  RS0002  DV0012  SU0700  SL0000  SA2000  *
HC0056  AS5020  MM0300  HA0020  FA0005  HM9999  HL9999  LM9999  *
LL9999  CF1164  SA2086  CF1164  *
```

(continued)

TABLE 2 TEST PROGRAMME MACHINE CODE (continued)

```
MT0038  CS0000  IS0004  VS0280  TD0100  MU0700  TD0100  ML0000  *
TD0050  MC4040  TD0050  MI0009  DV0012  SU0700  SL0000  SA2086  *
HC0056  AS5020  MM0300  HA0020  RS0002  HM9999  HL9999  LM9999  *
LL9999  CF1164  *

MT0043  CS0000  IS0012  VS0280  TD0100  MU0480  TD0100  ML0000  *
TD0050  MC4040  TD0050  MI0009  DV0003  AS5020  HC0036  KG0010  *
HA0030  HM9999  HL9999  LM0028  LL3000  CF0170  *

MT0044  CS0000  IS0012  VS0280  TD0100  MU0700  TD0100  ML0000  *
TD0050  MC4020  TD0050  MI0009  DV0002  HA0020  KG0010  HC0008  *
AS5020  FA0001  RS1000  HM9000  HL0000  LM7000  LL0000  TD1070  *
CF1070  *

MT0063  CS0000  IS0012  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4022  TD0050  MI0004  SP0000  *
DV0002  FA0006  MF4410  MA2100  HC0008  RS1000  AS5120  HM4160  *
HL0000  LM2240  LL0000  TD1065  CF1070  CS0000  IS0012  VS0240  *
SG0065  TD0100  ML0000  TD0050  MC4044  TD0050  MI0009  RS2000  *
HM0010  HL0000  LM0010  LL0000  TD1010  CF1060  TD1010  CF1160  *

MT0065  CS0000  IS0012  VS0240  TD0100  MU0400  TD0100  ML0000  *
TD0050  MC4014  TD0050  MI0009  DV0001  RS3000  HM0020  HL0000  *
LM0020  LL0000  SC2000  TD1020  VS0000  TD1300  VS0240  TD1150  *
CF1060  *

MT0066  HM0250  HL0000  LM0020  LL0000  TD1250  CF1070  *

MT0067  CS0000  IS0012  VS0180  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4022  TD0050  MI0004  DV0002  FA0006  MF4410  MA2100  *
HC0008  RS1000  AS5120  HM4800  HL0000  LM1600  LL0000  TD1065  *
CF1070  *

MT0068  CS0000  IS0012  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4024  TD0050  MI0004  DV0002  FA0005  MF4410  MA2100  *
HC0008  RS1000  AS5120  HM6500  HL0000  LM3500  LL0000  TD1070  *
CF1070  *

MT0069  CS0000  IS0012  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4024  TD0050  MI0009  HC2000  FA0000  RS1040  HM0000  *
HL0151  LM0000  LL0147  TD1020  FC0005  TD1010  FC0005  TD1010  *
CF6070  *

MT0070  CS0000  IS0012  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4024  TD0050  MI0009  FA0000  DV0002  AS5020  HC0008  *
RS1000  HM6720  HL0000  LM4480  LL0000  TD1065  CF1070  *

MT0071  CS0000  IS0012  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4024  TD0050  MI0009  DV0002  SC2000  RS3000  HM2500  *
HL0000  LM0350  LL0000  TD1025  CF1070  *

MT0072  CS0000  IS0012  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4012  TD0050  MI0009  DV0001  SC2000  RS3000  HM0250  *
HL0000  LM0014  LL0000  TD1025  CF1070  *
```

(continued)

TABLE 2 TEST PROGRAMME MACHINE CODE (continued)

```
MT0073  CS0000  IS0012  VS0240  TD0100  MU0050  TD0100  ML0000  *
TD0050  MC4012  TD0050  MI0009  DV0013  FA0003  RS1000  AS4120  *
MF4410  MA2500  HM0043  HL8000  LM0015  LL0000  TD1020  CF0070  *

MT0074  CS0000  IS0012  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4012  TD0050  MI0009  DV0013  FA0003  RS1000  AS4120  *
MF4410  MA2500  HC1000  HM0043  HL8000  LM0015  LL0000  TD1020  *
CF0070  *

MT0075  CS0000  IS0012  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4032  TD0050  MI0009  DV0002  RS2000  HA0004  HM7500  *
HL0000  LM2800  LL0000  TD1030  CF1070  *

MT0076  CS0000  IS0004  VS0240  TD0100  MU0500  TD0050  ML0000  *
TD0050  MC4032  TD0050  MI0009  DV0004  AS5020  HC0206  HM9999  *
HL9999  LM0110  LL0000  TD1010  CF0070  *

MT0077  CS0000  IS0012  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4032  TD0050  MI0009  DV0002  RS3000  HM2700  HL0000  *
LM0700  LL0000  TD1020  CF1070  *

MT0083  CS0000  IS0012  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4032  TD0050  MI0000  DV0002  MF4410  MA2020  FA0002  *
HC0008  AS5120  RS1000  HM4160  HL0000  LM2240  LL0000  TD1050  *
CF1070  *

MT0084  CS0000  IS0012  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4032  TD0050  MI0000  DV0002  MF4410  MA2800  FA0002  *
HC0008  AS5120  RS1000  HM4160  HL0000  LM2240  LL0000  TD1050  *
CF1070  *

MT0085  CS0000  IS0004  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4044  TD0050  MI0009  SU0500  SL0000  SA0126  MM0500  *
MF4410  MA2050  DV0013  AA0006  AS4020  RS0002  HM9999  HL9999  *
LM9999  LL9999  TD1020  CF1062  *

MT0086  MA0000  MM0100  MF0000  AA0000  LM0000  LL0000  TD1010  *
CF1030  *

MT0087  CS0000  IS0012  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4042  TD0050  MI0009  DV0002  RS3000  HM7500  HL0000  *
LM2800  LL0000  TD1020  CF1070  *

MT0088  CS0000  IS0012  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4042  TD0050  MI0009  AS0020  RS5000  HM5000  HL0300  *
LM4999  LL9700  TD1030  FC0005  TD1020  FC0005  TD1010  CF6070  *

MT0089  CS0000  IS0012  VS0180  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4042  TD0050  MI0009  AS0020  RS5000  HM5000  HL0500  *
LM4999  LL9500  TD1030  FC0005  TD1020  FC0005  TD1010  CF6070  *
```

(continued)

TABLE 2 TEST PROGRAMME MACHINE CODE (continued)

```
MT0090  CS0000  IS0012  VS0180  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4042  TD0050  MI0009  DV0002  RS3000  HM7500  HL0000  *
LM2100  LL0000  TD1020  CF1070  *

MT0103  CS0000  IS0012  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4044  TD0050  MI0009  SU0500  SL0000  SA0106  RS0002  *
DV0013  AS4020  MF4410  MA2050  MM0500  HM0036  HL7000  LM0016  *
LL0000  TD1010  CF0070  *

MT0104  CS0000  IS0012  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4044  TD0050  MI0009  DV0002  AS5020  HC0008  RS1000  *
FA0004  HM1600  HL0000  LM0000  LL0000  TD1065  CF1070  *

MT0107  CS0000  IS0004  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4042  TD0050  MI0009  SU0500  SL0000  SA0106  RS0002  *
DV0013  AS4020  MF4410  MA2100  MM0500  HM0036  HL7000  LM0016  *
LL0000  TD1010  CF0070  *

MT0120  CS0000  IS0012  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC9042  TD0050  MI0009  DV0002  AS5020  HC0008  RS1000  *
FA0004  HM1600  HL0000  LM0000  LL0000  TD1070  CF1070  *

MT0125  CS0000  IS0004  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4043  TD0050  MI0009  SU0500  SL0000  SA0106  RS0002  *
DV0012  MF4410  MA2100  MM0500  HC0001  AS5020  HM4770  HL0000  *
LM2260  LL0000  TD1010  CF1070  *

MT0126  CS0000  IS0012  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4052  TD0050  MI0009  DV0002  RS2000  HA0004  HM7500  *
HL0000  LM4000  LL0000  TD1040  CF1070  *

MT0127  CS0000  IS0004  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4052  TD0050  MI0009  DV0004  AS5020  HC0086  HM0300  *
HL0000  LM0260  LL0000  TD1010  CF0070  *

MT0128  CS0000  IS0004  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4052  TD0050  MI0009  DV0003  AS5020  HC0206  HM0007  *
HL5000  LM0000  LL0000  TD1010  CF0070  *

MT0129  CS0000  IS0004  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4062  TD0050  MI0009  DV0004  AS5020  HC0086  HM0005  *
HL0000  LM0000  LL0500  TD1030  CF0060  *

MT0130  CS0000  IS0012  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4062  TD0050  MI0009  DV0001  RS3000  HM0030  HL0000  *
LM0000  LL0000  TD1025  CF1070  *

MT0131  CS0000  IS0004  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4062  TD0050  MI0009  DV0004  AS5020  HC0206  HM9999  *
HL9999  LM0110  LL0000  TD1010  CF1070  *
```

(continued)

TABLE 2 TEST PROGRAMME MACHINE CODE (continued)

```
MT0145  CS0000  IS0006  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4313  TD0050  MI0009  MF4410  MA2180  DV0013  AS4120  *
RS1000  FA0006  HM0043  HL8000  LM0015  LL3000  TD1010  CF0070  *

MT0146  CS0000  IS0006  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4313  TD0050  MI0009  MF4410  MA2800  DV0013  AS4120  *
RS1000  FA0006  HM0043  HL8000  LM0015  LL3000  TD1030  CF0070  *

MT0147  CS0000  IS0006  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4313  TD0050  MI0009  MF4410  MA2180  DV0012  AS5100  *
HC0001  RS1000  FA0006  HM4770  HL0000  LM2260  LL0000  TD1030  *
CF1070  *

MT0148  CS0000  IS0006  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4313  TD0050  MI0009  MF4410  MA2800  DV0012  AS5100  *
HC0001  RS1000  FA0006  HM4770  HL0000  LM2260  LL0000  TD1030  *
CF1070  *

MT0149  CS0000  IS0006  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4313  TD0050  MI0009  MF4410  MA2085  AS4122  HB0002  *
DV0013  HM0043  HL8000  LM0015  LL3000  TD1020  CF0070  *

MT0150  CS0000  IS0006  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4313  TD0050  MI0009  MF4410  MA4425  AS4122  HB0002  *
DV0013  HM0043  HL8000  LM0015  LL3000  TD1020  CF0070  *

MT0157  CS0000  IS0004  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4413  TD0050  MI0002  MF4410  MA2020  DV0012  AS4120  *
RS1000  HM9999  HL9999  LM9999  LL9999  TD1010  CF1062  *

MT0158  AA0001  MA2796  LM0000  LL0000  TD1010  CF1070  *

MT0159  CS0000  IS0004  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4513  TD0050  MI0009  DV0012  HC0004  AS5020  HM9999  *
HL9999  LM1100  LL0000  TD1010  CF1070  *

MT0160  CS0000  IS0012  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4232  TD0050  MI0004  DV0002  MF4410  MA2085  AS5102  *
HB4002  HC0008  FA0002  HM4160  HL0000  LM2240  LL0000  TD1060  *
CF1070  *

MT0161  CS0000  IS0012  VS0240  TD0100  MU0500  TL0100  ML0000  *
TD0050  MC4232  TD0050  MI0004  DV0002  MF4410  MA4417  AS5102  *
HB4002  HC0008  FA0002  HM4160  HL0000  LM2240  LL0000  TD1060  *
CF1070  *

MT0162  CS0000  IS0012  VS0240  TD0100  MU0500  TD0100  ML0000  *
TD0050  MC4224  TD0050  MI0004  DV0002  MF4410  MA2085  AS5102  *
HB4002  HC0008  FA0005  HM6500  HL0000  LM3500  LL0000  TD1060  *
CF1070  *
```

(continued)

TABLE 2 TEST PROGRAMME MACHINE CODE (continued)

MT0163	CS0000	IS0012	VS0240	TD0100	MU0500	TD0100	ML0000	*
TD0050	MC4224	TD0050	MI0004	DV0002	MF4410	MA4417	AS5102	*
HB4002	HC0008	FA0005	HM6500	HL0000	LM3500	LL0000	TD1060	*
CF1070	*							
MT0164	CS0000	IS0004	VS0240	TD0100	MU0500	TD0100	ML0000	*
TD0050	MC4014	TD0050	MI0009	SU0500	SL0000	SA0106	RS0002	*
DV0013	AA0008	AS4020	MF4410	MA2050	MM0500	HM9999	HL9999	*
LM9999	LL9999	TD1030	CF0062	*				
MT0165	AA0012	TD1030	CF0061	*				
MT0166	TD0050	MC4414	AA0000	TD1030	CF0070	*		
MT0167	CS0000	IS0004	VS0240	TD0100	MU0300	TD0100	ML0000	*
TD0050	MC4214	TD0050	MI0004	SU0300	SL0000	SA0124	RS0002	*
DV0001	MF4[illegible]9	MA1165	MM0500	HB7000	HC0003	AS5020	HM0080	*
HL0000	LM0110	LL0000	TD1030	CF5040	*			
MT0168	CS0000	IS0004	VS0240	TD0100	MU0300	TD0100	ML0000	*
TD0050	MC4513	TD0050	MI0004	DV0003	AS5020	HC0004	HB0000	*
HM0010	HL0000	LM0010	LL0000	TD1010	CF0060	*		
MT0169	CS0000	IS0004	VS0240	TD0100	MU0300	TD0100	ML0000	*
TD0050	MC4213	TD0050	MI0004	DV0001	HB1000	HC0003	AS5020	*
HM0350	HL0000	LM0000	LL0000	TD1010	CF5070	*		
MT0170	CS0000	IS0004	VS0240	TD0100	MU0300	TD0100	ML0000	*
TD0050	MC4113	TD0050	MI0009	DV0001	HB1000	AS5020	HC0003	*
HM0350	HL0000	LM0000	LL0000	TD1030	CF5070	*		
MT0172	CS0000	IS0012	VS0240	SG0173	TD0100	MU0300	TD0100	*
ML0000	TD0050	MC4044	TD0050	MI0009	RS2000	HM0010	HL0000	*
LM0010	LL0000	TD1010	CF1060	TD1010	CF1160	*		
MT0173	CS0000	IS0004	VS0240	TD0100	MU0300	TD0100	ML0000	*
TD0050	MC4113	TD0050	MI0004	DV0000	HB5000	SC2000	RS2000	*
HM0020	HL0000	LM0020	LL0000	TD1030	CF1060	*		
MT0174	CS0000	IS0004	VS0240	TD0100	MU0300	TD0100	ML0000	*
TD0050	MC4113	TD0050	MI0004	DV0000	HB5200	SC2000	RS2000	*
HM0250	HL0000	LM0040	LL0000	TD1020	CF1070	*		
MT0175	CS0000	IS0004	VS0240	TD0100	MU0300	TD0100	ML0000	*
TD0050	MC4113	TD0050	MI0004	DV0000	HB5100	SC2000	RS2000	*
HM0250	HL0000	LM0040	LL0000	TD1020	CF1070	*		
MT0176	CS0000	IS0004	VS0240	TD0100	MU0300	TD0100	ML0000	*
TD0050	MC4043	TD0050	MI0009	DV0001	HB1000	AS5020	HC0003	*
HM0350	HL0000	LM0000	LL0000	TD1010	CF5070	*		

TABLE 2 TEST PROGRAMME MACHINE CODE (continued)

```
MT0177  CS0000  IS0004  VS0240  TD0100  MU0300  TD0100  ML0000  *
TD0050  MC4042  TD0050  MI0009  SU0300  SL0000  SA0126  MM0500  *
MF4410  MA2100  DV0013  AA0006  AS4020  RS0002  HM9999  HL9999  *
LM9999  LL9999  TD1030  CF1062  *

MT0178  MA0000  MM0100  MF0000  AA0000  LM0000  LL0000  TD1010  *
CF1070  *

MT0181  CS0000  IS0004  VS0240  TD0100  MD0300  TD0100  ML0000  *
TD0050  MC4044  TD0050  MI0009  SU0300  SL0000  SA0126  MM0500  *
MF4410  MA2050  DV0013  AA0006  AS4020  RS0002  HM9999  HL9999  *
LM9999  LL9999  TD1020  CF1062  *

MT0182  MA0000  MM0100  MF0000  AA0000  LM0000  LL0000  TD1010  *
CF1070  *

MT0183  CS0000  IS0012  VS0240  TD0100  MU0300  TD0100  ML0000  *
TD0050  MC4044  TD0050  MI0009  DV0002  RS3000  HM7500  HL0000  *
LM2800  LL0000  TD1040  CF1070  *

MT0184  CS0000  IS0012  VS0240  TD0100  MU0300  TD0100  ML0000  *
TD0050  MC4044  TD0050  MI0009  AS0020  RS5000  HM3000  HL0180  *
LM2999  LL9820  TD1030  FC0005  TD1030  FC0005  TD1010  CF6070  *

MT0185  CS0000  IS0012  VS0240  TD0100  MU0300  TD0100  ML0000  *
TL0050  MC4044  TD0050  MI0009  DV0004  AS5020  HC0005  HM0300  *
HL0000  LM0260  LL0000  TD1005  CF0070  *

MT0186  CS0000  IS0012  VS0240  TD0100  MU0300  TD0100  ML0000  *
TD0050  MC4044  TD0050  MI0009  DV0004  AS5020  HC1005  HM0300  *
HL0000  LM0260  LL0000  TD1005  DF0070  *

MT0190  CS0000  IS0012  VS0240  TD0100  MU0400  TD0100  ML0000  *
TD0050  MC4044  TD0050  MI0009  DV0002  RS3000  HM7500  HL0000  *
LM2800  LL0000  TD1040  CF1070  *

MT0191  CS0000  IS0004  VS0240  TD0100  MU0400  TD0100  ML0000  *
TD0050  MC4044  TD0050  MI0009  SU0400  SL0000  SA0126  MM0500  *
MF4410  MA2050  DV0013  AA0006  AS4020  RS0002  HM9999  HL9999  *
LM9999  LL9999  TD1020  CF1062  *

MT0192  MA0000  MM0100  MF0000  AA0000  LM0000  LL0000  TD1010  *
CF1070  *

MT0193  CS0000  IS0012  VS0240  TD0100  MU0410  TD0100  ML0000  *
TD0050  MC4044  TD0050  MI0009  DV0002  RS3000  HM7500  HL0000  *
LM2800  LL0000  TD1060  CF1070  *

MT0194  CS0000  IS0004  VS0240  TD0100  MU0410  TD0100  ML0000  *
TD0050  MC4044  TD0050  MI0009  SU0410  SL0000  SA0126  MM0500  *
MF4410  MA2050  DV0013  AA0006  AS4020  RS0002  HM9999  HL9999  *
LM9999  LL9999  TD1010  CF1062  *
```

(continued)

TABLE 2 TEST PROGRAMME MACHINE CODE (continued)

MT0195	MA0000	MM0100	MF0000	AA0000	LM0000	LL0000	TD1010	*
CF1070	*							
MT0196	CS0000	IS0012	VS0240	TD0100	MU0411	TD0100	ML0000	*
TD0050	MC4044	TD0050	MI0009	AS0020	RS5000	HM4110	HL0246	*
LM4109	LL9754	TD1030	FC0005	TD1030	FC0005	TD1010	CF6070	*
MT0197	CS0000	IS0012	VS0240	TD0100	MU0522	TD0100	ML0000	*
TD0050	MC4044	TD0050	MI0009	AS0020	RS5000	HM5220	HL0313	*
LM5219	LL9687	TD1030	FC0005	TD1030	FC0005	TD1010	CF6070	*
MT0198	CS0000	IS0012	VS0240	TD0100	MU0633	TD0100	ML2500	*
TD0050	MC4044	TD0050	MI0009	AS0020	RS5000	HM6332	HL5370	*
LM6332	LL4630	TD1030	FC0005	TD1030	FC0005	TD1010	CF6070	*
MT0199	CS0000	IS0012	VS0240	TD0100	MU0744	TD0100	ML5000	*
TD0050	MC4044	TD0050	MI0009	AS0020	RS5000	HM7445	HL0446	*
LM7444	LL9554	TD1030	FC0005	TD1030	FC0005	TD1010	CF6070	*
MT0200	CS0000	IS0012	VS0240	TD0100	MU0759	TD0100	ML7500	*
TD0050	MC4044	TD0050	MI0009	AS0020	RS5000	HM7597	HL5456	*
LM7597	LL4544	TD1030	FC0005	TD1030	FC0005	TD1010	CF6070	*
MT0201	CS0000	IS0012	VS0240	TD0100	MU0668	TD0100	ML0000	*
TD0050	MC4044	TD0050	MI0009	AS0020	RS5000	HM6680	HL0400	*
LM6679	LL9600	TD1030	FC0005	TD1030	FC0005	TD1010	CF6070	*
MT0202	CS0000	IS0012	VS0240	TD0100	MU0577	TD0100	ML0000	*
TD0050	MC4044	TD0050	MI0009	AS0020	RS5000	HM5770	HL0346	*
LM5769	LL9654	TD1030	FC0005	TD1030	FC0005	TD1010	CF6070	*
MT0203	CS0000	IS0012	VS0240	TD0100	MU0486	TD0100	ML0000	*
TD0050	MC4044	TD0050	MI0009	AS0020	RS5000	HM4860	HL0291	*
LM4859	LL9709	TD1030	FC0005	TD1030	FC0005	TD1010	CF6070	*
MT0204	CS0000	IS0012	VS0240	TD0100	MU0395	TD0100	ML0000	*
TD0050	MC4044	TD0050	MI0009	AS0020	RS5000	HM3950	HL0237	*
LM3949	LL9763	TD1030	FC0005	TD1030	FC0005	TD1010	CF6070	*
MT0213	CS0000	IS0004	VS0240	TD0100	MU0350	TD0100	ML0000	*
TD0050	MC4044	TD0050	MI0009	SU0350	SL0000	SA0126	MM0500	*
MF4410	MA2050	DV0013	AA0006	AS4020	RS0002	HM9999	HL9999	*
LM9999	LL9999	TD1070	CF1062	*				
MT0214	MA0000	MM0100	MF0000	AA0000	LM0000	LL0000	TD1010	*
CF1070	*							
MT0215	CS0000	IS0012	VS0240	TD0100	MU0350	TD0100	ML0000	*
TD0050	MC4042	TD0050	MI0009	DV0002	RS3000	HM7500	HL0000	*
LM2800	LL0000	TD1020	CF1070	*				

(continued)

TABLE 2 TEST PROGRAMME MACHINE CODE (continued)

```
MT0218  CS0000  IS0012  VS0240  TD0100  MU0550  TD0100  ML0000  *
TD0050  MC4042  TD0050  MI0009  DV0002  RS3000  HM7500  HL0000  *
LM2800  LL0000  TD1020  CF1070  *

MT0219  CS0000  IS0004  VS0240  TD0100  MU0550  TD0100  ML0000  *
TD0050  MC4042  TD0050  MI0009  SU0550  SL0000  SA0126  MM0500  *
MF4410  MA2100  DV0013  AA0006  AS4020  RS0002  HM9999  HL9999  *
LM9999  LL9999  TD1030  CF1062  *

MT0220  MA0000  MM0100  MF0000  AA0000  LM0000  LL0000  TD1010  *
CF1070  *

MT0222  CS0000  IS0004  VS0240  TD0100  MU0650  TD0100  ML0000  *
TD0050  MC4042  TD0050  MI0009  SU0650  SL0000  SA0126  MM0500  *
MF4410  MA2100  DV0013  AA0006  AS4020  RS0002  HM9999  HL9999  *
LM9999  LL9999  TD1030  CF1062  *

MT0223  MA0000  MM0100  MF0000  AA0000  LM0000  LL0000  TD1010  *
CF1070  *

MT0225  CS0000  IS0012  VS0240  TD0100  MU0750  TD0100  ML0000  *
TD0050  MC4042  TD0050  MI0009  DV0002  RS3000  HM7500  HL0000  *
LM2800  LL0000  TD1020  CF1070  *

MT0226  CS0000  IS0004  VS0240  TD0100  MU0750  TD0100  ML0000  *
TD0050  MC4042  TD0050  MI0009  SU0750  SL0000  SA0126  RS0002  *
DV0013  MM0500  MF4410  MA2100  AA0006  AS4020  HM9999  HL9999  *
LM9999  LL9999  TD1060  CF1062  *

MT0227  MA0000  MM0100  MF0000  AA0000  LM0000  LL0000  TD1010  *
CF1070  *

MT0228  CS0000  IS0000  VS0000  ↑↑0000  ↑↑0000  *

 END RT 353 ISSUE 6 JAN 91 TELS H 614 PT3 RESTRICTED           *
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END

STATION, RADIO, UK/VRC 353

TECHNICAL HANDBOOK - AUTOMATIC TESTING (8920C RADIO TEST SYSTEM)

CONTENTS

INTRODUCTION

1 The information contained in this regulation applies to the testing of the RT353 using the 8920C Radio Test Station. 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 7, RT353 on the Radio Selection menu, invokes the RT353 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	RUN ALL TESTS	All tests in the selected module are run.
Note ... Safety tests must be completed before Run All or Select Test options 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 SHUTDOWN

10 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.

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.

RT353 TEST CONNECTION DETAILS OPTION

12 When the operator selects the RT353 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 COUNT CLOCKWISE.

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:-

BNC-BNC CABLE BETWEEN RIU N-BNC ADAPTOR AND E.U.T. ANT/ARFAT/TURF CONNECTOR.

AUDIO LEAD BETWEEN CIP AUDIO SOCKET AND E.U.T. AUDIO SOCKET 1.

HARNESS LEAD BETWEEN CIP HARNESS SOCKET AND E.U.T HARNESS SOCKET.

CONTROL LEAD TO CIP CONTROL CONNECTOR BUT NOT TO E.U.T. ARFAT/TURF CONNECTOR.

-6- **PAGE 7**

CONNECT AS FOLLOWS :-

REMOTE LEAD RED BETWEEN
CIP REMOTE +VE AND E.U.T.
REMOTE +VE.

REMOTE LEAD BLUE BETWEEN CIP
REMOTE -VE AND E.U.T. REMOTE LOWER.

EARTH LEAD BETWEEN E.U.T. GROUND
TERMINAL AND CIP EARTH.

CONNECT RADIO POWER SUPPLY LEAD
BETWEEN RADIO SUPPLY SOCKET
AND CIP DC SUPPLY SOCKET.

-7- **PAGE 1**

CONTINUE

<u>LOG RADIO OPTION</u>

13 When the operator selects CONTINUE on the Page 7 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 : RT353

NSN : 5820-99-114-3159

TEST DATE : 20/09/94

TIME : 11:40:01

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	183
Safety 2	254
1	254
2	254
3	189
4	189
5	254
6	254
7	254
8	254
9	254
10	254
11	254
12	254
13	268
14	220
15	280
16	281
17	282
18	280
19	271
20	272
21	271
22	272
23	196
24	196
25	196
26	258
27	258
28	268
29	290
30	301
31	301
32	301
33	301
34	302
35	302
36	300
37	292
38	264
39	264
40	264
41	264
42	269
43	190
44	190
45	206
46	206
47	206
48	206
49	202

(continued)

TABLE 2 PART 4 TEST NUMBER/PART 2 PARAGRAPH NUMBER CROSS REFERENCES
(continued)

PART 4 TEST NUMBER	PART 2 PARAGRAPH NUMBER
50	202
51	207
52	191
53	191
54	311
55	310
56	311
57	312
58	311
59	311
60	312
61	312
62	236
63	242
64	240
65	240
66	240
67	241
68	241
69	241
70	241
71	220
72	220
73	202
74	206
75	214
76	220
77	213
78	206
79	220
80	202
81	202
82	202
83	202
84	202
85	202
86	202
87	202
88	202
89	206
90	220
91	206
92	220
93	220
94	220
95	206
96	336
97	340
98	341
99	352
100	254

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 4).	
Safety 1 (Para 183)	SAFETY TESTS The E.U.T. is protected from a reverse polarity supply connection at the 28 V connector by a diode. Diode forward and reverse bias tests are carried out using a DMM.	DISCONNECT RADIO POWER LEAD FROM CIP. CONNECT 7150 DMM PROBES TO DMM LEADS. CONNECT 7150 DMM RED LEAD TO RADIO POWER LEAD PIN 4. CONNECT 7150 DMM BLACK LEAD TO RADIO POWER LEAD PIN 8. **CONTINUE** SET RADIO AS FOLLOWS :- FREQUENCY....... 30.000MHZ. POWER .... MIN. MODE .... WIDE TONE TEST .... LPS OFF. REMOTE .... LOCAL. GAIN .... FULLY CLOCKWISE. **CONTINUE** CHANNEL - 30.000MHZ. REVERSE POLARITY - 1 EMER TEST SAFETY 1 TEST : PASS

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
Safety 1 (Para 183)	(Test continued)	CONNECT 7150 DMM RED LEAD TO RADIO POWER LEAD PIN 8 CONNECT 7150 DMM BLACK LEAD TO RADIO POWER LEAD PIN 4 **CONTINUE** CHANNEL - 30.000MHZ. REVERSE POLARITY - 2 EMER TEST SAFETY 1 TEST : PASS RECONNECT RADIO POWER LEAD TO THE CIP POWER SOCKET. DISCONNECT 7150 DMM PROBES FROM 7150 DMM LEADS. DISCONNECT 7150 DMM LEAD FROM 7150. RECONNECT 7150 SYSTEM DMM VOLTS HIGH AND DMM VOLTS LOW INPUTS. **CONTINUE**
Safety 2 (Para 254)	<u>Tx O/P and safety test</u> The E.U.T. is switched to transmit. The transmit lamp shall illuminate and the test meter indicate the green sector. The E.U.T. is then switched to receive. The transmit lamp shall be extinguished, the test meter shall indicate the red sector and the transmit frequency shall be 0 Hz.	SET RADIO AS FOLLOWS :- TEST .... TX O/P. **CONTINUE** CHANNEL - 30.000MHZ. TEST METER - TX O/P IN TX MODE 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 2 (Para 254)	(Test continued)	CHANNEL - 30.000MHZ TEST METER - TX O/P IN TX MODE EMER TEST SAFETY 2 IS E.U.T. TX LAMP ILLUMINATED? TEST: [ ] YES / NO CHANNEL - 30.000MHZ TEST METER - TX O/P IN TX MODE EMER TEST SAFETY 2 IS E.U.T. TEST METER READING IN THE GREEN SECTOR? TEST: [ ] YES / NO CHANNEL - 30.000MHZ TEST METER - TX O/P IN RX MODE EMER TEST SAFETY 2 IS E.U.T. TX LAMP EXTINGUISHED? TEST: [ ] YES / NO CHANNEL - 30.000MHZ TEST METER - TX O/P IN RX MODE EMER TEST SAFETY 2 IS E.U.T. TEST METER READING IN THE RED SECTOR? TEST: [ ] YES / NO

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
		CLANSMAN RT353 TESTS **RUN ALL TESTS** **SELECT TEST** **PRINT OPTION** **NEXT RADIO**
	RUN ALL TESTS	
1 (Para 254)	LPS off The frequency dial and test meter illumination is extinguished.	SET RADIO AS FOLLOWS :- TEST ....LPS OFF. **CONTINUE** CHANNEL - 30.000MHZ. TEST METER - LPS OFF EMER TEST 1 ARE FREQUENCY DIAL AND E.U.T. TEST METER ILLUMINATIONS EXTINGUISHED? **YES** TEST: ☐ **NO**
2 (Para 254)	Fans off As for test 1 with the E.U.T. switched to transmit. The transmitter shall be inhibited.	SET RADIO AS FOLLOWS :- TEST .... FANS OFF. **CONTINUE** CHANNEL - 30.000MHZ. TEST METER - FANS OFF EMER TEST 2 ARE FREQUENCY DIAL AND E.U.T. TEST METER ILLUMINATIONS EXTINGUISHED? **YES** TEST: ☐ **NO**

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
2 (Para 254)	(Test continued)	CHANNEL - 30.000MHZ. TEST METER - FANS OFF TX EMER TEST 2 IS E.U.T. TX LAMP EXTINGUISHED? TEST: ☐ **YES** **NO**
3 (Para 189)	28 V supply With the E.U.T. supply voltage set to 28 V, the test meter indication shall be 26 V to 30 V.	SET RADIO AS FOLLOWS :- TEST .... 28V SPLY. **CONTINUE** CHANNEL - 30.000MHZ. TEST METER - 28V SPLY EMER TEST 3 IS TESTMETER READING BETWEEN 26V AND 30V? TEST: ☐ **YES** **NO**
4 (Para 189)	28 V supply (low voltage) With the E.U.T. supply voltage set to 20 V, the test meter indication shall be 19 V to 21 V.	CHANNEL - 30.000MHZ. TEST METER - 20V SPLY EMER TEST 4 IS TESTMETER READING BETWEEN 19V AND 21V? TEST: ☐ **YES** **NO**
5 (Para 254)	AFC Tx The E.U.T. is switched to transmit the test meter shall indicate ± 3 div of centre.	SET RADIO AS FOLLOWS :- TEST .... AFC TX. **CONTINUE**

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
5 (Para 254)	(Test continued)	CHANNEL 30.000MHZ. TEST METER - AFC TX EMER TEST 5 IS E.U.T. TEST METER READING BETWEEN 3 DIVISIONS LEFT OF CENTRE AND 3 DIVISIONS RIGHT OF CENTRE? **YES** TEST: [ ] **NO**
6 (Para 254)	<u>SYNTH (permitted frequency) - 30.000 MHz</u> The E.U.T. is tuned to a permitted frequency. The test meter indication shall be in the green sector.	SET RADIO AS FOLLOWS :- TEST .... SYNTH. **CONTINUE** CHANNEL 30.000MHZ. TEST METER - SYNTH EMER TEST 6 IS E.U.T. TEST METER READING IN THE GREEN SECTOR? **YES** TEST: [ ] **NO**
7 (Para 254)	<u>Temp</u> With the E.U.T. test switch set to TEMP and the E.U.T. temperature within limits, the test meter indication shall be in the green sector.	SET RADIO AS FOLLOWS :- TEST .... TEMP. **CONTINUE**

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
7 (Para 254)	(Test continued)	CHANNEL - 30.000MHZ. TEST METER - TEMP EMER TEST 7 IS E.U.T. TEST METER READING IN THE GREEN SECTOR? YES TEST: [ ] NO
8 (Para 254)	<u>ARFAT (Part 1)</u> With the E.U.T. test switch set to ARFAT, the test meter indication shall be in the green sector.	SET RADIO AS FOLLOWS :- TEST .... ARFAT/TURF. **CONTINUE** CHANNEL - 30.000MHZ. TEST METER - ARFAT/TURF 1 EMER TEST 8 IS E.U.T. TEST METER READING IN THE GREEN SECTOR? YES TEST: [ ] NO
9 (Para 254)	<u>ARFAT (Part 2)</u> ARFAT pin L and pin P are connected (ARFAT OVERHEAT), this shall produce the following alarm conditions: The test meter indication is in the red sector, the frequency dial illumination flashes and the noise in the loudspeaker pulses in synchronism with the frequency dial illumination.	FIT CONTROL LEAD TO E.U.T. ARFAT/TURF CONNECTOR. **CONTINUE** CHANNEL - 30.000MHZ. TEST METER - ARFAT/TURF 2 EMER TEST 9 IS E.U.T. TEST METER READING IN THE RED SECTOR? YES TEST: [ ] NO

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
9 (Para 254)	(Test continued)	CHANNEL - 30.000MHZ. TEST METER - ARFAT/TURF 3 EMER TEST 9 IS FREQUENCY DIAL ILLUMINATION FLASHING ON AND OFF? TEST: ☐ **YES** **NO** CHANNEL - 30.000MHZ. TEST METER - ARFAT/TURF 4 EMER TEST 9 IS THE LOUDSPEAKER PULSING IN SYNCHRONISM WITH THE FREQUENCY DIAL ILLUMINATION? TEST: ☐ **YES** **NO** CHANNEL - 30.000MHZ. TEST METER - ARFAT/TURF TX EMER TEST 9 IS E.U.T. TX LAMP EXTINGUISHED? TEST: ☐ **YES** **NO**
10 (Para 254)	<u>Override</u> With the E.U.T. test switch set to OVERRIDE, both blowers run, the alarm condition ceases and the E.U.T. transmits. (The measured voltage shall be 20 mV to 250 mV).	SET RADIO AS FOLLOWS :- TEST .... OVERRIDE [HOLD] **CONTINUE**

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
10 (Para 254)	(Test continued)	CHANNEL - 30.000MHZ. TEST METER - OVERRIDE RX EMER TEST 10 IS FREQUENCY DIAL ILLUMINATION EXTINGUISHED? **YES** TEST: ☐ **NO** CHANNEL - 30.000MHZ. TEST METER - OVERRIDE RX EMER TEST 10 ARE E.U.T. BLOWERS ON? **YES** TEST: ☐ **NO** CHANNEL - 30.000MHZ. TEST METER - OVERRIDE TX POWER EMER TEST 10 TEST : PASS SET RADIO AS FOLLOWS :- TEST .... RX SIG. REMOVE CONTROL LEAD FROM E.U.T. ARFAT/TURF CONNECTOR. **CONTINUE**

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
11 (Para 254)	<u>Receive Signal - (1)</u> With no signal at the E.U.T. antenna, the test meter indication shall be less than 1/3 f.s.d.	CHANNEL - 30.000MHZ. TEST METER - RX SIG 1 EMER TEST 11 DOES THE E.U.T. TEST METER INDICATE LESS THAN 1/3 OF F.S.D.? **YES** TEST: [ ] **NO**
12 (Para 254)	<u>Receive Signal - (2)</u> With an antenna input of -30 dBm (10 kHz deviation at 1 kHz) the test meter indication shall be greater than 2/3 f.s.d.	CHANNEL - 30.000MHZ. TEST METER - RX SIG 2 EMER TEST 12 DOES THE E.U.T. TEST METER INDICATE GREATER THAN 2/3 OF F.S.D.? **YES** TEST: [ ] **NO** CHANNEL - 30.000MHZ. TEST METER - RX SIG TONE TEST IN PROGRESS EMER TEST 12 TEST : PASS
13 (Para 268)	<u>Receiver a.f. output - NARROW 50.000 MHz</u> With an antenna input signal of -99 dBm (5 kHz deviation at 1 kHz) and the gain control fully clockwise, the E.U.T. a.f. output into a 100 Ω load shall be 1.6 V to 3.67 V.	SET RADIO AS FOLLOWS :- FREQUENCY .... 50.000MHZ. MODE .... NARROW **CONTINUE** CHANNEL - 50.000MHZ. RX AF OUTPUT - NARROW TEST IN PROGRESS EMER TEST 13 TEST : PASS

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
14 (Para 220)	<u>Signal + noise/noise ratio - NARROW 50.000 MHz</u> With no input at the E.U.T. antenna, the E.U.T. a.f. output is measured and recorded as the 0 dB reference level. A -119 dBm signal (5 kHz deviation at 1 kHz) is applied to the E.U.T. antenna. The measured a.f. output shall be greater than 6 dB.	CHANNEL - 50.000MHZ. SIGNAL+NOISE/NOISE RATIO - NARROW TEST IN PROGRESS EMER TEST 14 TEST : PASS
15 (Para 280)	<u>Harness a.f. output - NARROW - 50.000 MHz - (1)</u> With an antenna input signal of -99 dBm (5 kHz deviation at 1 kHz) the E.U.T. harness a.f. output is measured with the gain control fully clockwise. The measured a.f. output shall be 1.0 V to 2.1 V.	CHANNEL - 50.000MHZ. HARNESS AF OUTPUT - NARROW 1 TEST IN PROGRESS EMER TEST 15 TEST : PASS
16 (Para 281)	<u>Harness a.f. output - NARROW - 50.000 MHz - (2)</u> As for test 15 with the gain control fully counter clockwise The measured a.f. output shall be 1.0 V to 2.1 V.	SET RADIO AS FOLLOWS :- GAIN .... FULLY COUNTER CLOCKWISE. **CONTINUE** CHANNEL - 50.000MHZ. HARNESS AF OUTPUT - NARROW 2 TEST IN PROGRESS EMER TEST 16 TEST : PASS

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
17 (Para 282)	<u>Harness a.f. output - NARROW IC - 50.000 MHz</u> With an antenna input signal of -99 dBm (5 kHz deviation at 1 kHz) the E.U.T. harness a.f. output is measured and recorded as the 0 dB reference level. The REMOTE switch is then set to IC. The a.f. output shall be -8 dB to -12 dB.	SET RADIO AS FOLLOWS :- GAIN .... FULLY CLOCKWISE **CONTINUE** CHANNEL - 50.000MHZ. HARNESS AF OUTPUT - NARROW IC TEST REFERENCE SETUP EMER TEST 17 SET RADIO AS FOLLOWS :- REMOTE .... IC **CONTINUE** CHANNEL - 50.000MHZ. HARNESS AF OUTPUT - NARROW IC TEST IN PROGRESS EMER TEST 17 TEST : PASS
18 (Para 280)	<u>Harness a.f. output - WIDE - 50.000 MHz</u> With an antenna input signal of -99 dBm (10 kHz deviation at 1 kHz) the E.U.T. harness a.f. output is measured with the gain control fully clockwise. The measured a.f. output shall be 1.0 V to 2.1 V.	SET RADIO AS FOLLOWS :- MODE .... WIDE REMOTE .... LOCAL **CONTINUE** CHANNEL - 50.000MHZ. HARNESS AF OUTPUT - WIDE TEST IN PROGRESS EMER TEST 18 TEST : PASS

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
19 (Para 271)	<u>Sidetone - 50.000 MHz</u> With an a.f. input of 50 mV at 1 kHz to the mic and the gain control fully clockwise. The E.U.T. a.f. output measured value shall be 1.5 V to 4.38 V.	SET RADIO AS FOLLOWS :- MODE .... WIDE TONE **CONTINUE** CHANNEL - 50.000MHZ. AUDIO OUTPUT SKT 1 - SIDETONE TEST IN PROGRESS EMER TEST 19 TEST : PASS
20 (Para 272)	<u>Voltage at pin C of audio SKT 1</u> The voltage at pin C of audio SKT 1 shall be 26 V to 30 V.	CHANNEL - 50.000MHZ. AUDIO SKT 1 PIN C VOLTAGE TEST IN PROGRESS EMER TEST 20 TEST : PASS
21 (Para 271)	<u>Sidetone - 50.000 MHz - alternative a.f. socket</u> As for test 19 using the alternative a.f. socket. The E.U.T. a.f. output measured value shall be 1.5 V to 4.38 V.	REMOVE AUDIO CONNECTOR FROM E.U.T. SKT 1 AND FIT TO E.U.T. SKT 2. **CONTINUE** CHANNEL - 50.000MHZ. AUDIO OUTPUT SKT 2 - SIDETONE TEST IN PROGRESS EMER TEST 21 TEST : PASS
22 (Para 272)	<u>Voltage at pin C of audio SKT 2</u> The voltage at pin C of audio SKT 2 shall be 26 V to 30 V.	CHANNEL - 50.000MHZ. AUDIO SKT 2 PIN C VOLTAGE TEST IN PROGRESS EMER TEST 22 TEST : PASS

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
22 (Para 272)	(Test continued)	REMOVE AUDIO CONNECTOR FROM E.U.T. SKT 2 AND FIT TO E.U.T. SKT 1. **CONTINUE**
23 (Para 196)	<u>Modulation sensitivity - WIDE - 50.000 MHz</u> With a mic input of 10 mV at 1 kHz and the E.U.T. in the transmit condition, the deviation shall be 7 kHz to 13 kHz.	SET RADIO AS FOLLOWS :- POWER .... 50W. MODE .... WIDE. GAIN .... MID-POSITION. **CONTINUE** CHANNEL - 50.000MHZ. MOD SENSITIVITY - WIDE TEST IN PROGRESS EMER TEST 23 TEST : PASS
24 (Para 196)	<u>Modulation sensitivity - WIDE - 50.000 MHz - low voltage (18 V)</u> With a mic input of 10 mV at 1 kHz and the E.U.T. in the transmit condition with the supply voltage reduced to 18 V, the deviation shall be 5 kHz to 15 kHz.	CHANNEL - 50.000MHZ. MOD SENSITIVITY - WIDE 18V TEST IN PROGRESS EMER TEST 24 TEST : PASS
25 (Para 196)	<u>Modulation sensitivity - NARROW - 50.000 MHz</u> With a mic input of 10 mV at 1 kHz and the E.U.T. in the transmit condition, the deviation shall be 3.5 kHz to 6.5 kHz.	SET RADIO AS FOLLOWS :- MODE .... NARROW. **CONTINUE** CHANNEL - 50.000MHZ. MOD SENSITIVITY - NARROW TEST IN PROGRESS EMER TEST 25 TEST : PASS

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
26 (Para 258)	<u>Modulation control - WIDE - 50.000 MHz - (1)</u> With a mic input of 2 mV at 1 kHz and the gain control at minimum, the transmitter deviation shall be 7 kHz to 13 kHz.	SET RADIO AS FOLLOWS :- MODE .... WIDE. GAIN .... FULLY COUNTER CLOCKWISE. **CONTINUE** CHANNEL - 50.000MHZ. MOD CONTROL WIDE 1 TEST IN PROGRESS EMER TEST 26 TEST : PASS
27 (Para 58)	<u>Modulation control - WIDE - 50.000 MHz - (2)</u> As for test 26 with the mic input increased to 80 mV. The transmitter deviation shall be 7 kHz to 13 kHz.	CHANNEL - 50.000MHZ. MOD CONTROL WIDE 2 TEST IN PROGRESS EMER TEST 27 TEST : PASS
28 (Para 268)	<u>Receiver a.f. output - WIDE - 50.000 MHz</u> With an antenna input of -99 dBm (10 kHz deviation at 1 kHz) the E.U.T. a.f. output shall be 1.6 V to 3.67 V.	SET RADIO AS FOLLOWS :- POWER .... 1W. GAIN .... FULLY CLOCKWISE. **CONTINUE** CHANNEL - 50.000MHZ. RX AF OUTPUT - WIDE TEST IN PROGRESS EMER TEST 28 TEST : PASS SET LINE RESISTANCE TO OC **CONTINUE**

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
29 (Para 290)	<u>AF output (remote terminals) - WIDE TONE 50.000 MHz</u> With an antenna input of -119 dBm (10 kHz deviation at 1 kHz) and the gain control fully clockwise, the E.U.T. a.f. output at the remote terminals shall be 226 mV to 477 mV.	SET RADIO AS FOLLOWS :- POWER .... MIN. MODE .... WIDE TONE. **CONTINUE** CHANNEL - 50.000MHZ REMOTE AF OUTPUT - WIDE TONE TEST IN PROGRESS EMER TEST 29 TEST : PASS
30 (Para 301)	<u>AF output - BK IN - 50.000 MHz - (audio socket I/P and O/P - (1)</u> With an audio input of 120 mV at 1 kHz and the gain control fully clockwise, the E.U.T. a.f. output measured into a 100 Ω load shall be 1.53 V to 4.38 V.	SET RADIO AS FOLLOWS :- REMOTE .... BK IN. **CONTINUE** CHANNEL - 50.000MHZ. AF OUTPUT - BK IN 1 TEST IN PROGRESS EMER TEST 30 TEST : PASS
31 (Para 301)	<u>AF output - BK IN - 50.000 MHz - (audio socket I/P and O/P - (2)</u> As for test 30 with the a.f. input increased to 80 mV. The E.U.T. a.f. output shall be 1.53 V to 4.38 V.	CHANNEL - 50.000MHZ. AF OUTPUT - BK IN 2 TEST IN PROGRESS EMER TEST 31 TEST : PASS

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
32 (Para 301)	AF output - BK IN - 50.000 MHz - (audio socket I/P and remote terminal O/P - (1) With an audio input of 80 mV at 1 kHz and the gain control fully clockwise, the E.U.T. a.f. output measured at the remote terminals shall be 226 mV to 477 mV.	CHANNEL - 50.000MHZ. AF OUTPUT - BK IN - REMOTE O/P 2 TEST IN PROGRESS EMER TEST 32 TEST : PASS
33 (Para 301)	AF output - BK IN - 50.000 MHz - (audio socket I/P and remote terminal O/P - (2) As for test 32 with the a.f. input reduced to 18 mV. The E.U.T. a.f. output measured at the remote terminals shall be 226 mV to 477 mV.	CHANNEL - 50.000MHZ. AF OUTPUT - BK IN - REMOTE O/P 1 TEST IN PROGRESS EMER TEST 33 TEST : PASS
34 (Para 302)	AF output - BK IN - 50.000 MHz - (remote terminal I/P, audio socket O/P - (1) With an a.f. input of 80 mV at 1 kHz to the remote terminals, the E.U.T. a.f. output shall be 1.53 V to 4.38 V.	CHANNEL - 50.000MHZ. AUDIO OUTPUT - BK IN 1 TEST IN PROGRESS EMER TEST 34 TEST : PASS
35 (Para 302)	AF output - BK IN - 50.000 MHz - (remote terminal I/P, audio socket O/P - (2) As for test 34 with the a.f. input increased to 4 V. The E.U.T. a.f. output shall be 1.53 V to 4.38 V.	CHANNEL - 50.000MHZ. AUDIO OUTPUT - BK IN 2 TEST IN PROGRESS EMER TEST 35 TEST : PASS

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
36 (Para 300)	<u>AF output - IC - 50.000 MHz - (audio socket I/P and O/P) 32 dB range</u> With an a.f. input of 2 mV at 1 kHz to the audio socket, the remote switch at IC and the gain control at position 2, the E.U.T. a.f. output is measured and recorded as the 0 dB reference level. The a.f. input is increased by 32 dB. The E.U.T. a.f. output shall be less 1 dB.	SET RADIO AS FOLLOWS :- REMOTE .... IC GAIN .... POSITION 2 **CONTINUE** CHANNEL - 50.000MHZ. AF O/P - IC 32DB RANGE TEST REFERENCE SETUP EMER TEST 36 CHANNEL - 50.000MHZ. AF O/P - IC 32DB RANGE TEST IN PROGRESS EMER TEST 36 TEST : PASS
37 (Para 292)	<u>AF output (remote terminals) - WIDE - 50.000 MHz - CALL</u> With the E.U.T. in the CALL mode the a.f. output shall be greater than 250 mV and the CALL frequency shall be 1.8 kHz to 2.2 kHz.	SET RADIO AS FOLLOWS :- REMOTE .... CALL [HOLD] GAIN .... FULLY CLOCKWISE **CONTINUE** CHANNEL - 50.000MHZ. AF O/P - REMOTE TERMINALS - WIDE CALL TEST IN PROGRESS EMER TEST 37 TEST : PASS

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
37 (Para 292)	(Test continued)	CHANNEL - 50.000MHZ AF O/P - REMOTE TERMINALS 2 TEST IN PROGRESS EMER TEST 37 TEST : PASS RELEASE E.U.T. REMOTE SWITCH. **CONTINUE**
38 (Para 264)	Remote operation - modulation <u>sensitivity - WIDE -</u> <u>50.000 MHz - (1)</u> With an a.f. input of 80 mV at 1 kHz to the remote terminals, the transmitter frequency deviation shall be 7 kHz to 13 kHz.	SET RADIO AS FOLLOWS :- POWER .... 50W. MODE .... WIDE. REMOTE .... AUTO GAIN .... MID-POSITION **CONTINUE** SET LINE RESISTANCE SWITCH TO LC. ADJUST LINE CURRENT FOR A DMM READING OF 12MA +/-0.1MA. PRESS YES IF ADJUSTMENT SUCCESSFUL. **YES** PRESS NO IF UNABLE TO SETUP REFERENCE CURRENT. **NO** CHANNEL - 50.000MHZ REMOTE OPERATION - MOD SENS WIDE 1 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 264)	<u>Remote operation - modulation sensitivity - WIDE - 50.000 MHz - (2)</u> As for test 38 with the a.f. input increased to 4 V. The transmitter frequency deviation shall be 7 kHz to 13 kHz.	CHANNEL - 50.000MHZ. REMOTE OPERATION - MOD SENS WIDE 2 TEST IN PROGRESS EMER TEST 39 TEST : PASS
40 (Para 264)	<u>Remote operation - modulation sensitivity - NARROW - 50.000 MHz - (1)</u> With an a.f. input of 4 V at 1 kHz to the remote terminals, the transmitter frequency deviation shall be 3.5 kHz to 6.5 kHz.	SET RADIO AS FOLLOWS :- MODE .... NARROW **CONTINUE** CHANNEL - 50.000MHZ. REMOTE OPERATION-MOD SENS NARROW 2 TEST IN PROGRESS EMER TEST 40 TEST : PASS
41 (Para 264)	<u>Remote operation - modulation sensitivity - NARROW - 50.000 MHz - (2)</u> As for test 40 with the a.f. input reduced to 80 mV. The transmitter deviation shall be 3.5 kHz to 6.5 kHz.	CHANNEL - 50.000MHZ. REMOTE OPERATION-MOD SENS NARROW 1 TEST IN PROGRESS EMER TEST 41 TEST : PASS ADJUST LINE CURRENT FULLY COUNTER CLOCKWISE. SET LINE RESISTANCE SWITCH TO OC. **CONTINUE**

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
42 (Para 269)	<u>Receiver a.f. output - IC - 50.000 MHz</u> With an antenna input signal of -99 dBm (5 kHz deviation at 1 kHz), the remote switch set to LOCAL and the gain control fully clockwise, the E.U.T. a.f. output is measured and recorded as the 0 dB reference level. The remote switch is set to IC. The E.U.T. a.f. output shall be -8 dB to -12 dB.	SET RADIO AS FOLLOWS :- POWER .... MIN. MODE .... WIDE. REMOTE .... LOCAL. GAIN .... FULLY CLOCKWISE. **CONTINUE** CHANNEL - 50.000MHZ. RX AF OUTPUT - IC TEST REFERENCE SETUP EMER TEST 42 SET RADIO AS FOLLOWS :- REMOTE .... IC. **CONTINUE** CHANNEL - 50.000MHZ. RX AF OUTPUT - IC TEST IN PROGRESS EMER TEST 42 TEST : PASS
43 (Para 190)	<u>Pilot tone frequency - NARROW - 50.000 MHz</u> The frequency of the pilot tone shall be 147 Hz to 151 Hz.	SET RADIO AS FOLLOWS :- POWER .... 1W. MODE .... NARROW. TEST .... TX O/P. REMOTE .... LOCAL. GAIN .... MID-POSITION. **CONTINUE** CHANNEL - 50.000MHZ. PILOT TONE FREQUENCY - NARROW TEST IN PROGRESS EMER TEST 43 TEST : PASS

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
44 (Para 190)	<u>Pilot tone deviation - NARROW - 50.000 MHz</u> With the E.U.T. in the transmit mode, the deviation due to the pilot tone shall be 1.4 kHz to 2.1 kHz.	CHANNEL - 50.000MHZ. PILOT TONE DEVIATION - NARROW TEST IN PROGRESS EMER TEST 44 TEST : PASS
45 (Para 206)	<u>Transmitter power - 1 W - 50.000 MHz</u> The transmitter power output shall be 0.35 W to 2.50 W.	SET RADIO AS FOLLOWS :- MODE .... WIDE. **CONTINUE** CHANNEL - 50.000MHZ. TX POWER - 1W TEST IN PROGRESS EMER TEST 45 TEST : PASS
46 (Para 206)	<u>Transmitter power - MIN - 50.000 MHz</u> The transmitter power output shall be 14 mW to 250 mW.	SET RADIO AS FOLLOWS :- POWER .... MIN. **CONTINUE** CHANNEL - 50.000MHZ. TX POWER - MIN TEST IN PROGRESS EMER TEST 46 TEST : PASS

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
47 (Para 206)	<u>Transmitter power - 15 W - 50.000 MHz</u> The transmitter power output shall be 7 W to 27 W.	SET RADIO AS FOLLOWS :- POWER .... 15W. **CONTINUE** CHANNEL - 50.000MHZ. TX POWER - 15W TEST IN PROGRESS EMER TEST 47 TEST : PASS
48 (Para 206)	<u>Transmitter power - 50 W - 50.000 MHz</u> The transmitter power output shall be 28 W to 75 W.	SET RADIO AS FOLLOWS :- POWER .... 50W. **CONTINUE** CHANNEL - 50.000MHZ. TX POWER - 50W TEST IN PROGRESS EMER TEST 48 TEST : PASS
49 (Para 202)	<u>Transmitter frequency accuracy 50.000 MHz</u> The transmitter frequency accuracy shall be 50.000 MHz ±300 Hz.	CHANNEL - 50.000MHZ. TX FREQUENCY ACCURACY TEST IN PROGRESS EMER TEST 49 TEST : PASS
50 (Para 202)	<u>Transmitter frequency accuracy 50.000 MHz - 18 V supply</u> The transmitter frequency accuracy shall be 50.000 MHz ±500 Hz.	CHANNEL - 50.000MHZ. TX FREQUENCY ACCURACY - 18V SUPPLY TEST IN PROGRESS EMER TEST 50 TEST : PASS

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
51 (Para 207)	<u>Transmitter power - 50 W 50.000 MHz - 18 V supply</u> The transmitter power output shall be 21 W to 75 W.	CHANNEL - 50.000MHZ. TX POWER 50W - 18V SUPPLY TEST IN PROGRESS EMER TEST 51 TEST : PASS
52 (Para 191)	<u>Noise deviation - WIDE - 50.000 MHz</u> The transmitter deviation with no mic input and the mode switch set to WIDE, shall be less than 500 Hz.	SET RADIO AS FOLLOWS :- POWER .... 1W. **CONTINUE** CHANNEL - 50.000MHZ. NOISE DEVIATION - WIDE TEST IN PROGRESS EMER TEST 52 TEST : PASS
53 (Para 191)	<u>Noise deviation (fans ON) - WIDE - 50.000 MHz</u> With no mic input, the mode switch set to WIDE and the E.U.T. fans ON, the transmitter deviation shall be less than 500 Hz.	SET RADIO AS FOLLOWS :- TEST .... OVERRIDE [HOLD] **CONTINUE** CHANNEL - 50.000MHZ. NOISE DEVIATION - FANS ON - WIDE TEST IN PROGRESS EMER TEST 53 TEST : PASS RELEASE E.U.T. TEST SWITCH. **CONTINUE**

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
54 (Para 311)	ARFAT socket pin 0 resistance - 15 W - 50.000 MHz The resistance to earth from ARFAT socket pin 0 shall be greater than 10 kΩ. (DMM reading greater than 11 V)	CONNECT CONTROL LEAD TO E.U.T. ARFAT/TURF CONNECTOR. CONNECT 7150 DMM BLACK LEAD BETWEEN RIU DMM BLACK TERMINAL AND EUT CHASSIS. **CONTINUE** SET RADIO AS FOLLOWS :- POWER .... 15W. MODE .... WIDE TONE. TEST .... TX O/P. GAIN .... FULLY CLOCKWISE. **CONTINUE** CHANNEL - 50.000MHZ. ARFAT/TURF PIN 0 RESIST. - 15W EMER TEST 54 TEST : PASS
55 (Para 310)	Transmitter power (key line) - 15 W - 50.000 MHz The transmitter power output, with pin M of the ARFAT socket earthed shall be 40 W to 75 W, irrespective of the power range selected.	CHANNEL - 50.000MHZ. TX POWER KEYLINE - 15W TEST IN PROGRESS EMER TEST 55 TEST : PASS
56 (Para 311)	Transmitter power (key line) - SILENT TUNE - 50.000 MHz The transmitter power output, with pin M of the ARFAT socket earthed shall be 40 W to 75 W.	SET RADIO AS FOLLOWS :- POWER .... 0. **CONTINUE**

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
56 (Para 311)	(Test continued)	CHANNEL - 50.000MHZ. TX POWER KEYLINE - SILENT TUNE TEST IN PROGRESS EMER TEST 56 TEST : PASS
57 (Para 312)	<u>ARFAT socket pin S voltage - SILENT TUNE - 50.000 MHz</u> The voltage at pin S of the ARFAT socket shall be 26 V to 30 V.	CHANNEL - 50.000MHZ. ARFAT/TURF PIN S VOLTAGE - SILENT TUNE TEST IN PROGRESS EMER TEST 57 TEST : PASS
58 (Para 311)	<u>ARFAT socket pin O resistance - SILENT TUNE - 50.000 MHz</u> The resistance to earth from ARFAT socket pin O shall be approximately zero ohms. (DMM reading less than 5 V)	CHANNEL - 50.000MHZ. ARFAT/TURF PIN O RESIST. - SILENT TUNE EMER TEST 58 TEST : PASS
59 (Para 311)	<u>ARFAT socket pin O resistance - TUNE - 50.000 MHz</u> The resistance to earth from ARFAT socket pin O shall be greater than 10 kΩ. (DMM reading greater than 11 V)	SET RADIO AS FOLLOWS :- POWER .... TUNE [HOLD] **CONTINUE** CHANNEL - 50.000MHZ. ARFAT/TURF PIN O RESISTANCE - TUNE EMER TEST 59 TEST : PASS

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
60 (Para 312)	<u>Transmitter power - TUNE - 50.000 MHz</u> The transmitter power output shall be less than 300 mW.	CHANNEL - 50.000MHZ. TX POWER - TUNE TEST IN PROGRESS EMER TEST 60 TEST : PASS
61 (Para 312)	<u>ARFAT socket pin S voltage - TUNE - 50.000 MHz</u> The voltage at pin S of the ARFAT socket shall be 0 V. (DMM reading less than 0.5 V)	DISCONNECT AUDIO CABLE FROM E.U.T. ENSURE POWER SWITCH IS STILL HELD AT TUNE. **CONTINUE** CHANNEL - 50.000MHZ. ARFAT/TURF PIN S VOLTAGE - TUNE TEST IN PROGRESS EMER TEST 61 TEST : PASS RELEASE E.U.T. POWER SWITCH. DISCONNECT CONTROL LEAD FROM E.U.T. ARFAT/TURF CONNECTOR. RECONNECT AUDIO CABLE TO E.U.T. **CONTINUE**
62 (Para 236)	<u>Tone detection - AUTO - 30.000 MHz</u> With the remote switch set to AUTO, a -116 dBm r.f. signal (1.65 kHz deviation at 149 Hz) is applied to the E.U.T. antenna. The line current, with an 18 V supply applied to the remote terminals, shall be 8 mA to 11 mA.	DISCONNECT 7150 DMM BLACK LEAD FROM RIU DMM BLACK TERMINAL AND EUT CHASSIS. **CONTINUE** SET RADIO AS FOLLOWS :- FREQUENCY ...... 30.000MHZ. POWER .... MIN. MODE .... NARROW. TEST .... RX SIG. REMOTE .... AUTO. GAIN .... MID-POSITION. **CONTINUE**

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
62 (Para 236)	(Test continued)	CHANNEL - 30.000MHZ. TONE DETECTION - AUTO TEST REFERENCE SETUP EMER TEST 62 CHANNEL - 30.000MHZ. TONE DETECTION - AUTO EMER TEST 62 TEST : PASS
63 (Para 242)	<u>Call operation - short circuit condition - 30.000 MHz</u> With the remote switch set to CALL, the voltage at the remote terminals shall not exceed 1 V.	SET LINE RESISTANCE SWITCH TO SC CALL IN. SET LINE CURRENT FULLY COUNTER CLOCKWISE. **CONTINUE** SET RADIO AS FOLLOWS :- MODE .... WIDE TONE. REMOTE .... CALL [HOLD]. **CONTINUE** CHANNEL - 30.000MHZ. CALL OPERATION S/C CONDITION TEST IN PROGRESS EMER TEST 63 TEST : PASS
64 (Para 240)	<u>Auto operation - remote terminals short circuit - 30.000 MHz</u> With a short circuit applied to the remote terminals, the remote line current shall be 20 mA to 35 mA.	SET RADIO AS FOLLOWS :- REMOTE .... AUTO. **CONTINUE**

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
64 (Para 240)	(Test continued)	CHANNEL - 30.000MHZ. AUTO OPERATION - REMOTE S/C 1 EMER TEST 64 TEST : PASS
65 (Para 240)	<u>Local operation - remote terminals short circuit - 30.000 MHz</u> With a short circuit applied to the remote terminals, the remote line current shall be 20 mA to 35 mA.	SET RADIO AS FOLLOWS :- REMOTE .... LOCAL. **CONTINUE** CHANNEL - 30.000MHZ. LOCAL OPERATION - REMOTE S/C EMER TEST 65 TEST : PASS
66 (Para 240)	<u>Remote operation - remote terminals short circuit - 30.000 MHz</u> With a short circuit applied to the remote terminals, the remote line current shall be 20 mA to 35 mA.	SET RADIO AS FOLLOWS :- REMOTE .... REM. **CONTINUE** CHANNEL - 30.000MHZ. REM OPERATION - REMOTE S/C EMER TEST 66 TEST : PASS
67 (Para 241)	<u>Remote operation - line current 14.5 mA - 30.000 MHz</u> With a line current of 14.5 mA, the E.U.T. shall transmit. The transmitter power output shall be 40 mW to 250 mW.	SET LINE RESISTANCE SWITCH TO LC. **CONTINUE** ADJUST LINE CURRENT UNTIL DMM READING IS 14.5 MA +/-0.1MA. PRESS YES IF ADJUSTMENT SUCCESSFUL. **YES** PRESS NO IF UNABLE TO SETUP REFERENCE CURRENT. **NO**

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
67 (Para 241)	(Test continued)	CHANNEL - 30.000MHZ. REM OPERATION-LINE CURRENT 14.5MA TEST IN PROGRESS EMER TEST 67 TEST : PASS
68 (Para 241)	<u>Remote operation - line current 8 mA - 30.000 MHz</u> With a line current of 8 mA, the E.U.T. shall transmit. The transmitter power output shall be 40 mW to 250 mW.	ADJUST LINE CURRENT UNTIL DMM READING IS 8 MA +/-0.1MA. PRESS YES IF ADJUSTMENT SUCCESSFUL. **YES** PRESS NO IF UNABLE TO SETUP REFERENCE CURRENT. **NO** CHANNEL - 30.000MHZ. REM OPERATION - LINE CURRENT 8MA TEST IN PROGRESS EMER TEST 68 TEST : PASS
69 (Para 241)	<u>Remote operation - line current 4 mA - 30.000 MHz</u> With a line current of 4 mA, the E.U.T. shall not transmit. The transmitter power output shall not exceed 20 mW.	ADJUST LINE CURRENT UNTIL DMM READING IS 4 MA +/-0.1MA PRESS YES IF ADJUSTMENT SUCCESSFUL. **YES** PRESS NO IF UNABLE TO SETUP REFERENCE CURRENT. **NO** CHANNEL - 30.000MHZ. REM OPERATION - LINE CURRENT 4MA TEST IN PROGRESS EMER TEST 69 TEST : PASS

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
69 (Para 241)	(Test continued)	SET LINE CURRENT FULLY COUNTER CLOCKWISE. SET LINE RESISTANCE SWITCH TO OC. **CONTINUE**
70 (Para 241)	<u>Signal + noise/noise ratio - WIDE - 30.000 MHz</u> With no input to the E.U.T. antenna, the E.U.T. a.f. output is measured and recorded as the 0 dB reference level. A -119 dBm r.f. signal (10 kHz deviation at 1 kHz) is applied to the E.U.T. antenna and the a.f. output is measured and shall be greater than 6 dB.	SET RADIO AS FOLLOWS :- MODE .... WIDE. REMOTE .... LOCAL. GAIN .... FULLY CLOCKWISE. **CONTINUE** CHANNEL - 30.000MHZ. SIGNAL+NOISE/NOISE RATIO - WIDE TEST IN PROGRESS EMER TEST 70 TEST : PASS
71 (Para 220)	<u>Signal + noise/noise ratio - NARROW - 30.000 MHz</u> With no input to the E.U.T. antenna, the E.U.T. a.f. output is measured and recorded as the 0 dB reference level. A -119 dBm r.f. signal (5 kHz deviation at 1 kHz) is applied to the E.U.T. antenna and the a.f. output is measured and shall be greater than 6 dB.	SET RADIO AS FOLLOWS :- MODE .... NARROW. **CONTINUE** CHANNEL - 30.000MHZ. SIGNAL+NOISE/NOISE RATIO - NARROW TEST IN PROGRESS EMER TEST 71 TEST : PASS

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
72 (Para 220)	<u>Transmitter power - 50 W - 30.000 MHz</u> The transmitter power output shall be 28 W to 75 W.	SET RADIO AS FOLLOWS :- POWER .... 50W. MODE .... WIDE. TEST .... TX O/P. GAIN .... MID-POSITION. **CONTINUE** CHANNEL - 30.000MHZ. TX POWER - 50W TEST IN PROGRESS EMER TEST 72 TEST : PASS
73 (Para 202)	<u>Transmitter frequency accuracy 30.000 MHz</u> The transmitter frequency accuracy shall be 30.000000 MHz ± 180 Hz, 29.999820 MHz to 30.000180 MHz.	CHANNEL - 30.000MHZ. TX FREQUENCY ACCURACY TEST IN PROGRESS EMER TEST 73 TEST : PASS
74 (Para 206)	<u>Transmitter power - 50 W - 40.000 MHz</u> The transmitter power output shall be 28 W to 75 W.	SET RADIO AS FOLLOWS :- FREQUENCY ...... 40.000MHZ. **CONTINUE** CHANNEL - 40.000MHZ. TX POWER - 50W TEST IN PROGRESS EMER TEST 74 TEST : PASS

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
75 (Para 214)	<u>Interruption of supply - 40.000 MHz - (MIN)</u> The E.U.T. supply is interrupted for 30 S and then reconnected with the E.U.T. in the transmit mode. The E.U.T. shall not transmit within 15 S of reconnecting the supply. The test is continued for a further 25 S with the E.U.T. in the transmit mode. The E.U.T. shall transmit within 40 S of reconnecting the supply. The transmitter power output up to 15 S after reconnecting the supply shall be less than 20 mW and from 15 S to 40 S after reconnecting the supply shall be from 20 mW to 250 mW.	SET RADIO AS FOLLOWS :- POWER .... MIN. **CONTINUE** CHANNEL - 40.000MHZ. INTERRUPTION OF SUPPLY 1 TEST IN PROGRESS EMER TEST 75 INTERRUPTION OF SUPPLY 1 30 SECOND TIMEOUT PLEASE WAIT TIMEOUT COUNT XX SECS. CHANNEL - 40.000MHZ. INTERRUPTION OF SUPPLY 1 TEST IN PROGRESS EMER TEST 75 TEST : PASS CHANNEL - 40.000MHZ. INTERRUPTION OF SUPPLY 2 TEST IN PROGRESS EMER TEST 75 TEST : PASS

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
76 (Para 220)	<u>Signal + noise/noise ratio - NARROW - 40.000 MHz</u> With no input to the E.U.T. antenna, the E.U.T. a.f. output is measured and recorded as the 0 dB reference level. A -119 dBm r.f. signal (5 kHz deviation at 1 kHz) is applied to the E.U.T. antenna and the a.f. output is measured and shall be greater than 6 dB.	SET RADIO AS FOLLOWS :- MODE .... NARROW. TEST .... RX SIG. GAIN .... FULLY CLOCKWISE. **CONTINUE** CHANNEL - 40.000MHZ. SIGNAL+NOISE/NOISE RATIO - NARROW TEST IN PROGRESS EMER TEST 76 TEST : PASS
77 (Para 213)	<u>Transmission inhibit - 41.000 MHz</u> The transmitter power output shall be inhibited whilst tuning. The transmitter power output shall be 28 W to 75 W within 10 S of making the frequency change.	SET RADIO AS FOLLOWS :- POWER .... 50W. MODE .... WIDE. TEST .... TX O/P. GAIN .... MID-POSITION. **CONTINUE** SIMULTANEOUSLY PRESS 2955B CONTINUE KEY AND CHANGE E.U.T. FREQUENCY TO 41.000MHZ. **CONTINUE** CHANNEL - 41.000MHZ. TX INHIBIT WHILST TUNING TEST IN PROGRESS EMER TEST 77 TEST : PASS

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
78 (Para 206)	<u>Transmitter power - 50 W - 41.000 MHz</u> The transmitter power output shall be 28 W to 75 W.	CHANNEL - 41.000MHZ. TX POWER 50W TEST IN PROGRESS EMER TEST 78 TEST : PASS
79 (Para 220)	<u>Signal + noise/noise ratio - NARROW - 41.000 MHz</u> With no input to the E.U.T. antenna, the E.U.T. a.f. output is measured and recorded as the 0 dB reference level. A -119 dBm r.f. signal (5 kHz deviation at 1 kHz) is applied to the E.U.T. antenna and the a.f. output is measured and shall be greater than 6 dB.	SET RADIO AS FOLLOWS :- POWER .... MIN. MODE .... NARROW. TEST .... RX SIG. GAIN .... FULLY CLOCKWISE. **CONTINUE** CHANNEL - 41.000MHZ. SIGNAL+NOISE/NOISE RATIO - NARROW TEST IN PROGRESS EMER TEST 79 TEST : PASS
80 (Para 202)	<u>Transmitter frequency accuracy 41.100000 MHz</u> The transmitter frequency accuracy shall be 41.100000 MHz ±246 Hz, 41.099754 MHz to 41.100246 MHz.	SET RADIO AS FOLLOWS :- FREQUENCY ...... 41.100MHZ. POWER .... 50W. MODE .... WIDE. TEST .... TX O/P. GAIN .... MID-POSITION. **CONTINUE** CHANNEL - 41.100MHZ. FREQUENCY ACCURACY TEST IN PROGRESS EMER TEST 80 TEST : PASS

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
81 (Para 202)	<u>Transmitter frequency accuracy 52.200000 MHz</u> The transmitter frequency accuracy shall be 52.200000 MHz ±313 Hz, 51.199687 MHz to 52.200313 MHz.	SET RADIO AS FOLLOWS :- FREQUENCY ...... 52.200MHZ. **CONTINUE** CHANNEL - 52.200MHZ. FREQUENCY ACCURACY TEST IN PROGRESS EMER TEST 81 TEST : PASS
82 (Para 202)	<u>Transmitter frequency accuracy 63.325000 MHz</u> The transmitter frequency accuracy shall be 63.325000 MHz ±380 Hz, 63.324620 MHz to 63.325380 MHz.	SET RADIO AS FOLLOWS :- FREQUENCY ...... 63.325MHZ. **CONTINUE** CHANNEL : 63.325MHZ. FREQUENCY ACCURACY TEST IN PROGRESS EMER TEST 82 TEST : PASS
83 (Para 202)	<u>Transmitter frequency accuracy 74.450000 MHz</u> The transmitter frequency accuracy shall be 74.450000 MHz ±446 Hz, 74.449554 MHz to 74.450446 MHz.	SET RADIO AS FOLLOWS :- FREQUENCY ...... 74.450MHZ. **CONTINUE** CHANNEL - 74.450MHZ. FREQUENCY ACCURACY TEST IN PROGRESS EMER TEST 83 TEST : PASS

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
84 (Para 202)	Transmitter frequency accuracy 75.975000 MHz The transmitter frequency accuracy shall be 75.975000 MHz ±456 Hz, 75.974544 MHz to 75.975456 MHz.	SET RADIO AS FOLLOWS :- FREQUENCY ...... 75.975MHZ. **CONTINUE** CHANNEL - 75.975MHZ. FREQUENCY ACCURACY TEST IN PROGRESS EMER TEST 84 TEST : PASS
85 (Para 202)	Transmitter frequency accuracy 66.800000 MHz The transmitter frequency accuracy shall be 66.800000 MHz ±400 Hz, 66.799600 MHz to 66.800400 MHz.	SET RADIO AS FOLLOWS :- FREQUENCY ...... 66.800MHZ. **CONTINUE** CHANNEL - 66.800MHZ. FREQUENCY ACCURACY TEST IN PROGRESS EMER TEST 85 TEST : PASS
86 (Para 202)	Transmitter frequency accuracy 57.700000 MHz The transmitter frequency accuracy shall be 57.700000 MHz ±346 Hz, 57.699654 MHz to 57.700346 MHz.	SET RADIO AS FOLLOWS :- FREQUENCY ...... 57.700MHZ. **CONTINUE** CHANNEL - 57.700MHZ. FREQUENCY ACCURACY TEST IN PROGRESS EMER TEST 86 TEST : PASS

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
87 (Para 202)	<u>Transmitter frequency accuracy 48.600000 MHz</u> The transmitter frequency accuracy shall be 48.600000 MHz ±291 Hz, 48.599709 MHz to 48.600291 MHz.	SET RADIO AS FOLLOWS :- FREQUENCY ...... 48.600MHZ. **CONTINUE** CHANNEL - 48.600MHZ. FREQUENCY ACCURACY TEST IN PROGRESS EMER TEST 87 TEST : PASS
88 (Para 202)	<u>Transmitter frequency accuracy 39.500000 MHz</u> The transmitter frequency accuracy shall be 39.500000 MHz ±237 Hz, 39.499763 MHz to 39.500237 MHz.	SET RADIO AS FOLLOWS :- FREQUENCY ...... 39.500MHZ. **CONTINUE** CHANNEL - 39.500MHZ. FREQUENCY ACCURACY TEST IN PROGRESS EMER TEST 88 TEST : PASS
89 (Para 206)	<u>Transmitter power - 50 W - 35.000 MHz</u> The transmitter power output shall be 28 W to 75 W.	SET RADIO AS FOLLOWS :- FREQUENCY ...... 35.000MHZ. **CONTINUE** CHANNEL - 35.000MHZ. TX POWER - 50W TEST IN PROGRESS EMER TEST 89 TEST : PASS

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
90 (Para 220)	<u>Signal + noise/noise ratio - NARROW - 35.000 MHz</u> With no input to the E.U.T. antenna, the E.U.T. a.f. output is measured and recorded as the 0 dB reference level. A -119 dBm r.f. signal (5 kHz deviation at 1 kHz) is applied to the E.U.T. antenna and the a.f. output is measured and shall be greater than 6 dB.	SET RADIO AS FOLLOWS :- POWER .... MIN. MODE .... NARROW. TEST .... RX SIG. GAIN .... FULLY CLOCKWISE. **CONTINUE** CHANNEL - 35.000MHZ. SIGNAL+NOISE/NOISE RATIO - NARROW TEST IN PROGRESS EMER TEST 90 TEST : PASS
91 (Para 206)	<u>Transmitter power - 50 W - 55.000 MHz</u> The transmitter power output shall be 28 W to 75 W.	SET RADIO AS FOLLOWS :- FREQUENCY ...... 55.000MHZ. POWER .... 50W. MODE .... WIDE. TEST .... TX O/P. GAIN .... MID-POSITION. **CONTINUE** CHANNEL - 55.000MHZ. TX POWER - 50W. TEST IN PROGRESS EMER TEST 91 TEST : PASS
92 (Para 220)	<u>Signal + noise/noise ratio - WIDE - 55.000 MHz</u> With no input to the E.U.T. antenna, the E.U.T. a.f. output is measured and recorded as the 0 dB reference level. A -119 dBm r.f. signal (10 kHz deviation at 1 kHz) is applied to the E.U.T. antenna and the a.f. output is measured and shall be greater than 6 dB.	SET RADIO AS FOLLOWS :- POWER .... MIN. TEST .... RX SIG. GAIN .... FULLY CLOCKWISE. **CONTINUE**

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
92 (Para 220)	(Test continued)	CHANNEL - 55.000MHZ. SIGNAL+NOISE/NOISE RATIO - WIDE TEST IN PROGRESS EMER TEST 92 TEST : PASS
93 (Para 220)	<u>Signal + noise/noise ratio - WIDE - 65.000 MHz</u> With no input to the E.U.T. antenna, the E.U.T. a.f. output is measured and recorded as the 0 dB reference level. A -119 dBm r.f. signal (10 kHz deviation at 1 kHz) is applied to the E.U.T. antenna and the a.f. output is measured and shall be greater than 6 dB.	SET RADIO AS FOLLOWS :- FREQUENCY ...... 65.000MHZ. **CONTINUE** CHANNEL - 65.000MHZ. SIGNAL+NOISE/NOISE RATIO - WIDE TEST IN PROGRESS EMER TEST 93 TEST : PASS
94 (Para 220)	<u>Signal + noise/noise ratio - NARROW - 75.000 MHz</u> With no input to the E.U.T. antenna, the E.U.T. a.f. output is measured and recorded as the 0 dB reference level. A -119 dBm r.f. signal (10 kHz deviation at 1 kHz) is applied to the E.U.T. antenna and the a.f. output is measured and shall be greater than 6 dB.	SET RADIO AS FOLLOWS :- FREQUENCY ...... 75.000MHZ. **CONTINUE** CHANNEL - 75.000MHZ. SIGNAL+NOISE/NOISE RATIO - WIDE TEST IN PROGRESS EMER TEST : 94 TEST : PASS
95 (Para 206)	<u>Transmitter power - 50 W - 75.000 MHz</u> The transmitter power output shall be 28 W to 75 W.	SET RADIO AS FOLLOWS :- POWER .... 50W. TEST .... TX O/P. GAIN .... MID-POSITION. **CONTINUE**

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
95 (Para 206)	(Test continued)	CHANNEL - 75.000MHZ. TX POWER - 50W TEST IN PROGRESS EMER TEST 95 TEST : PASS
96 (Para 336)	<u>Data modulation - WIDE DATA - 70.000 MHz</u> With a 16 kbit 00001111 pattern input to harness plug pin A w.r.t. pin G, the carrier deviation shall be 7.0 kHz to 9.0 kHz.	SET RADIO AS FOLLOWS :- FREQUENCY ...... 70.000MHZ. POWER .... 1W. MODE .... WIDE DATA. TEST .... RX SIG. GAIN .... FULLY CLOCKWISE. **CONTINUE** CHANNEL - 70.000MHZ. DATA MODULATION - WIDE DATA TEST IN PROGRESS EMER TEST 96 TEST : PASS
97 (Para 340)	<u>Data receive sensitivity - WIDE DATA - 70.000 MHz</u> A -79 dBm r.f. signal, modulated by a 2 kHz square wave to give 8 kHz deviation, is applied to the E.U.T. antenna. The output at harness plug pin D w.r.t. pin G shall be 0.8 V to 1.0 V p-p. The output frequency shall be 2 kHz ±100 Hz.	SET RADIO AS FOLLOWS :- POWER .... 50W. **CONTINUE** CHANNEL - 70.000MHZ. DATA RX SENS - WIDE DATA TEST IN PROGRESS EMER TEST 97 TEST : PASS

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
97 (Para 340)	(Test continued)	CHANNEL - 70.000MHZ. DATA RX SENSITIVITY -2 TEST IN PROGRESS EMER TEST 97 TEST : PASS
98 (Para 341)	<u>Data receive sensitivity - WIDE DATA - 70.000 MHz</u> Test 96 is repeated with with harness pin D w.r.t. pin G loaded with a 300 Ω resistor. The output shall be 350 mV to 550 mV p-p at a frequency of 2 kHz ±100 Hz.	CHANNEL - 70.000MHZ. DATA RX SENS-300 OHMS-WIDE DATA EMER TEST 98 TEST IN PROGRESS TEST : PASS CHANNEL - 70.000MHZ. DATA RX SENS - WIDE DATA TEST IN PROGRESS EMER TEST 98 TEST : PASS
99 (Para 352)	<u>Data delay - WIDE DATA - 48.000 MHz</u> The total delay through the transmitter and receiver shall be 30 μS to 90 μS.	SET RADIO AS FOLLOWS :- FREQUENCY ...... 48.000MHZ. **CONTINUE** CHANNEL 48.000MHZ. TX DATA DELAY TEST IN PROGRESS EMER TEST 99 TEST : PASS

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
99 (Para 352)	(Test continued)	<u>DATA EYE PATTERN</u> PLEASE NOTE : WHEN DATA EYE PATTERN TEST IS INITIATED A PREDEFINED PSEUDO RANDOM BINARY SEQUENCE IS GENERATED. **CONTINUE** <u>DATA EYE PATTERN</u> SET OSCILLOSCOPE AS FOLLOWS :- SENSITIVITY .... 0.1V/DIV. TIME BASE .... 50μS/DIV. CONNECT THE X10 SCOPE PROBE BETWEEN CHANNEL A AND THE CIP DE-MOD OUT CONNECTOR. NOTE : USE BNC PROBE ADAPTOR ON X10 PROBE TIP. **CONTINUE** CHANNEL - 48.000MHZ. TX DATA EYE PATTERN EMER TEST 99 IS DATA EYE PATTERN APPROX. THAT SHOWN IN EMER TELS H614 PART 2 FIG 4. **YES** TEST: [ ] **NO**

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
99 (Para 352)	(Test continued)	DATA EYE PATTERN DISCONNECT THE X10 SCOPE PROBE FROM CHANNEL A AND THE CIP DE-MOD OUT CONNECTOR. NOTE : REMOVE BNC PROBE ADAPTOR FROM X10 PROBE TIP. **CONTINUE**
100 (Para 254)	SYNTH (prohibited frequency) The E.U.T. is tuned to 00.000 MHz, a prohibited frequency. This shall produce the following alarm condition: The test meter indication is in the red sector, the frequency dial illumination flashes and the noise in the loudspeaker pulses in sympathy with the frequency dial illumination.	SET RADIO AS FOLLOWS :- FREQUENCY ...... 00.000MHZ. POWER .... MIN. MODE .... WIDE TONE. TEST .... SYNTH. **CONTINUE** CHANNEL - 00.000MHZ. TEST SWITCH - SYNTH 1 EMER TEST 100 IS E.U.T. TEST METER READING IN THE RED SECTOR? **YES** TEST: [ ] **NO** CHANNEL - 00.000MHZ. TEST SWITCH - SYNTH 2 EMER TEST 100 IS FREQUENCY DIAL ILLUMINATION FLASHING ON AND OFF? **YES** TEST: [ ] **NO**

(continued)

TABLE 3 TEST DESCRIPTION AND DISPLAYED OPERATOR INFORMATION (continued)

Test No.	Test Description	Displayed Operator Information
100 (Para 254)	(Test continued)	CHANNEL - 00.000MHZ. TEST SWITCH - SYNTH 3 EMER TEST 100 IS TEST METER ILLUMINATION ON AND STEADY? YES TEST: ☐ NO CHANNEL - 00.000MHZ. TEST SWITCH - SYNTH 4 EMER TEST 100 IS THE LOUDSPEAKER PULSING IN SYNCHRONISM WITH THE FREQUENCY DIAL ILLUMINATION? YES TEST: ☐ NO CHANNEL - 00.000MHZ. TEST SWITCH - SYNTH 5 EMER TEST 100 IS THE LOUDSPEAKER PULSING IN SYNCHRONISM WITH THE FREQUENCY DIAL ILLUMINATION? YES TEST: ☐ NO CHANNEL - 00.000MHZ. TEST SWITCH - SYNTH 6 EMER TEST 100 IS THE LOUDSPEAKER PULSING IN SYNCHRONISM WITH THE FREQUENCY DIAL ILLUMINATION? YES TEST: ☐ NO

STATION, RADIO, UK/VRC 353

TECHNICAL HANDBOOK - REPAIR CHARTS

Errata

Note...
This Page 0 is to be filed immediately in front of Page 1, Issue 4 dated Dec 79.

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

2. Page 16, Repair chart No 8, figure:

a. Bottom centre:

Delete: 'TABLE ITEMS, 1-2'

Insert: 'TABLE ITEMS 1&4'.

b. Bottom right:

Delete: 'TABLE ITEMS 3-4'

Insert: 'TABLE ITEMS 2&3'.

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STATION, RADIO, UK/VRC 353

TECHNICAL HANDBOOK - REPAIR CHARTS

Notes: 1. These Pages 1-6, Issue 4, supersede Pages 1-6, Issue 3 dated Oct 78. The repair charts have been amended.

2. The charts in this regulation may be amended to cover modifications and changes in repair policy. Where they apply to a particular build standard (Field Batch) they will be so annotated. Issue numbers and dates listed below apply to charts depicting the latest build standard.

CONTENTS

REPAIR CHARTS

TABLES

FIGURES

INTRODUCTION

1. The repair charts in this regulation are based on 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 the repair of the RT 353 which may briefly be summarised as follows:

a. Unit repairs

The RT 353 is a sealed equipment and consequently no attempt should be made at Unit level to carry out repairs other than the exchange of loose CES items, and the replacement of external components such as knobs, fuses, covers etc as detailed in the repair charts.

b. Field repairs

Repair at Field level will be by replacement of any of the 6 items designated Centrems, and by replacement of discrete components on the 3 major assemblies. In addition repairs to the front panel and chassis wired assembly will be by replacement of individual components or throwaway p.e.c.

c. Base repairs

Base repairs will consist of repair of faulty Centrems back loaded from Field workshops and complete overhauls.

INTERPRETATION OF REPAIR CHARTS

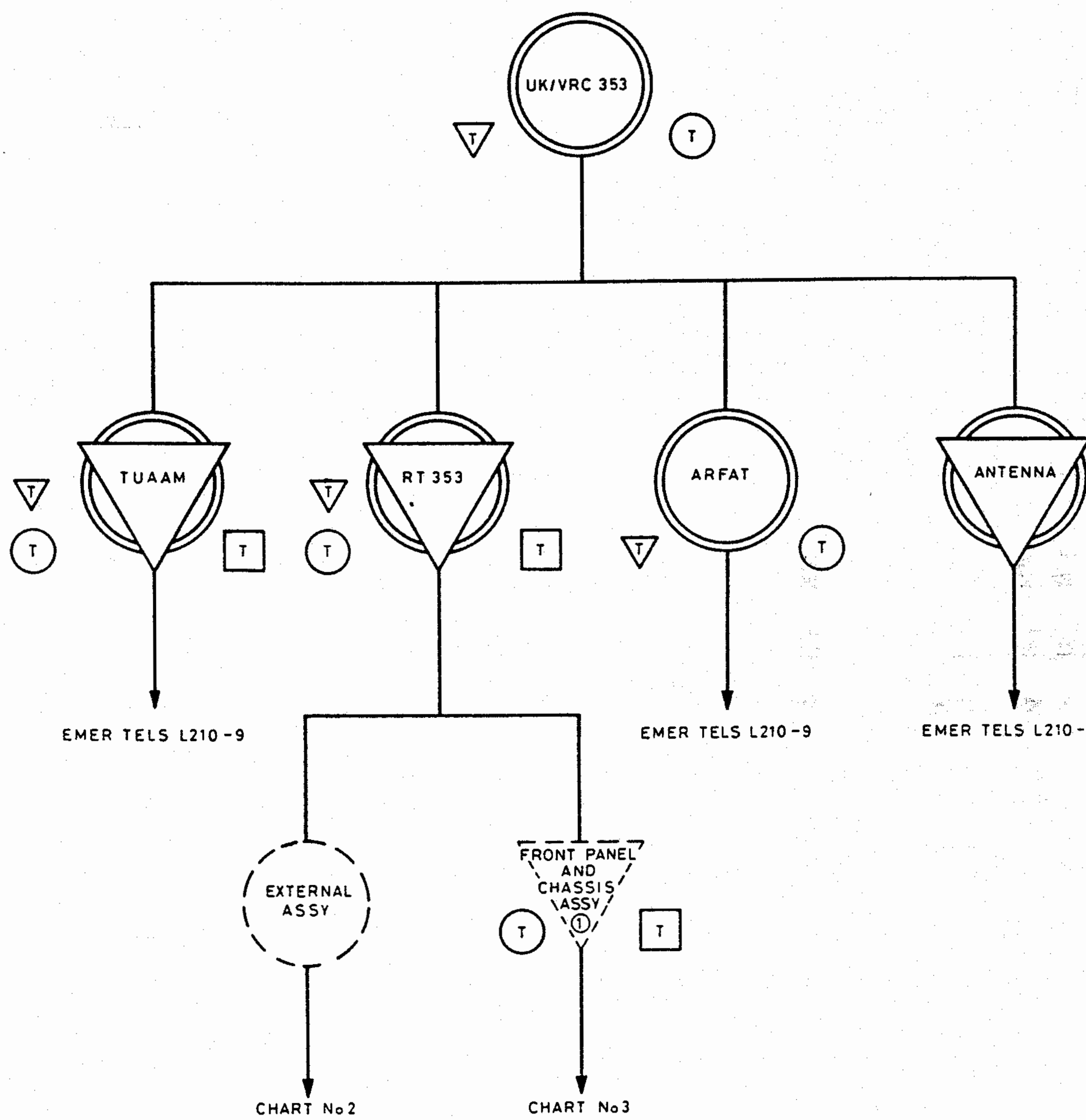
2. The repair charts depict the repair policy in diagrammatic form using a series of symbols as shown on Page 20. A symbol may contain reference to a table where the items represented are listed. The table may be located at the foot of the chart or on a facing page.

ASSOCIATED PUBLICATIONS

3. The following information may be found in the documents listed.

a. FORWARD assembly codes - Tels H 612 Page 2001.

b. NATO stock numbers - Illustrated parts catalogue No 61424.



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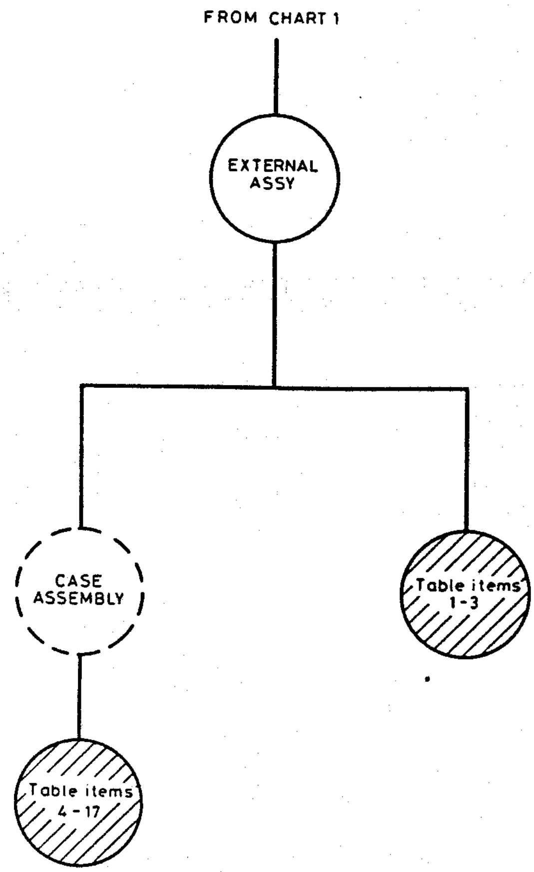
Repair chart No 1 - UK/VRC 353



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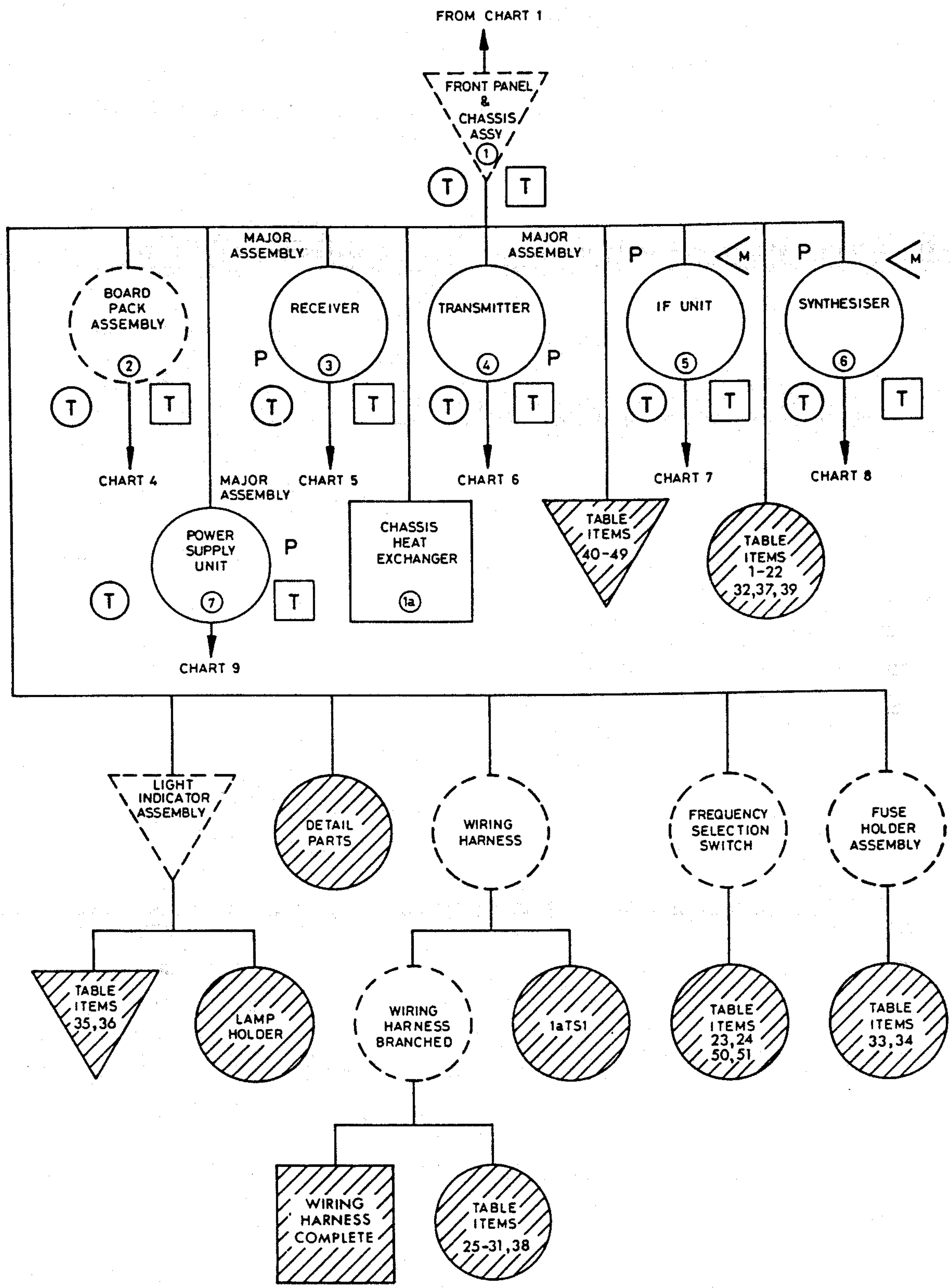
Repair chart No 2 - External assy (Part 1)

Item	Designation	Qty	Unit code/ cct ref
1	Ring, sealing toroidal	1	
2	Screw, shoulder	4	
3	Desiccant container	1	
4	Ring, sealing, metal	2	
5	Gasket, Al alloy/neoprene	2	
6	Ring sealing toroidal	2	
7	Screw, shoulder	8	
8	Case, radio	1	
9	Block locating (LH)	1	
10	Block locating (RH)	1	
11	Screw cap skt head	4	
12	Plug, screwed, seal testing	1	
13	Ring, sealing, toroidal	1	
14	Plug mounting assy	1	
15	Ring sealing toroidal	1	
16	Screw ext relieved body	1	
17	Washers Dowty	8	

Repair chart No 2 - External assy (Part 2)



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Repair chart No 3 - Front panel and chassis wired assembly (Part 1)

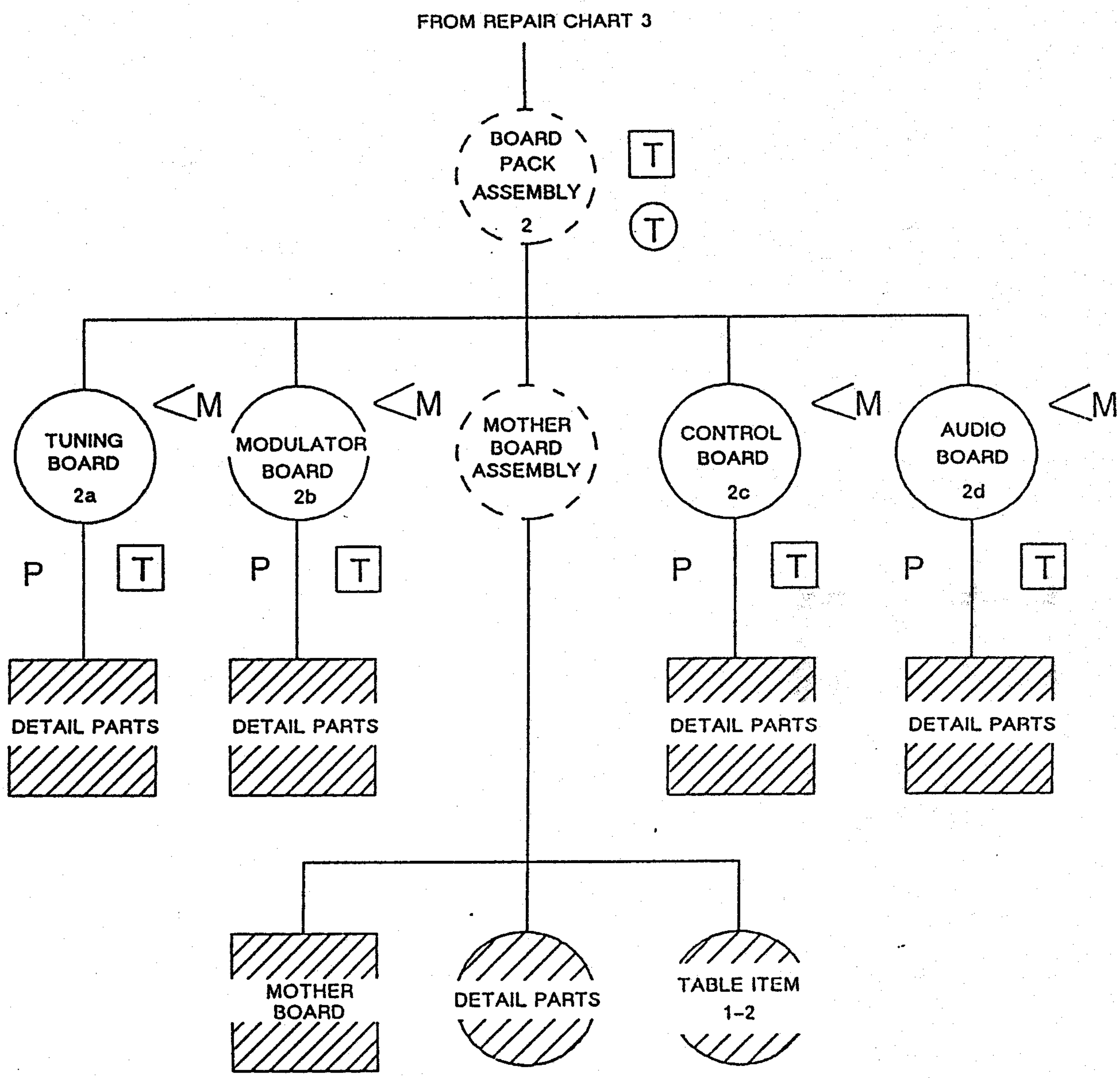
Item No	Designation	Qty	Unit code/ cct ref
1	Panel, electronic circuit	1	1b
2	Panel, electronic circuit	1	1c
3	Panel, electronic circuit	1	1d
4	Panel, electronic circuit	1	1e
5	Panel, electronic circuit	1	1f
6	Panel, electronic circuit	1	1g
7	Panel, electronic circuit	1	1h
8	Meter test	1	ME1
9	Thermostat	1	Tht 1
10	Audio sockets (including filters)	2	1aSK1/SK2
11	Plug, 28 V supply	1	1aPL1
12	Plug, harness (including filter)	1	1aPL2
13	Socket, double density (a.r.f.a.t.)	1	1aSK3
14	Motors, blower	2	1bBL1/BL2
15	Switch, wired assy (MODE)	1	1aS2
16	Switch, wired assy (POWER)	1	1aS3
17	Switch, wired assy (TEST)	1	1aS4
18	Switch, wired assy (GAIN)	1	1aS5
19	Switch, wired assy (REMOTE)	1	1aS6
20	Terminals, remote assy	2	1aSK5/SK6
21	Relay assy	1	1aRLA
22	Relay assy	1	1aRLB
23	Switch, wired assy	1	1aS1
24	Lamp assy (freq, switch illumination)	1	-
25	Connectors, r.f., miniature (right angle)	1	SKTS 10,
26	Connectors, r.f., miniature (straight entry)	7	SKTS 11, 12, 14-17, 19
27	Sockets, free	2	SKT 7, 8
28	Sockets, free	1	SKT 9
29	Plugs, fixed c/w metal bracket	2	1aPL5/PL6
30	Plug, fixed c/w metal bracket	1	1aPL4
31	Plug, fixed, 38 way (p.s.u.)	1	1aPL3
32	Elapsed time indicator	1	1aRE1
33	Fuse holder	1	-
34	Fuse link	1	1aFS1

Repair chart No 3 - Front panel and chassis wired assy (Part 2)

Item No	Designation	Qty	Unit code/ cct ref
35	Lens	1	-
36	Lamp 28 V 0.045 A	1	1aLP1
37	Chassis, electrical equipt	1	1aTS1
38	Plug, electrical, female shell	1	1aPL7
39	Nut, special (rear support)	1	-
40	Plate mounting (rear support)	1	-
41	Body short beak (knob plastic)	5	-
42	Plate retaining (for knob)	5	-
43	Coupler, bootproof knob (insert)	5	-
44	Screw, machine (for knob)	15	-
45	Spacer plastic round (top of air filter)	1	-
46	Screw machine (secures filter)	2	-
47	Handle, carrying	1	-
48	Bolt, special (for handle)	2	-
49	Spacer rd, aluminium captive (bottom air filter)	1	-
50	Freq setting switch (complete)	1	-
51	Coaxial knob assembly (knob F.S.S.)	1	-

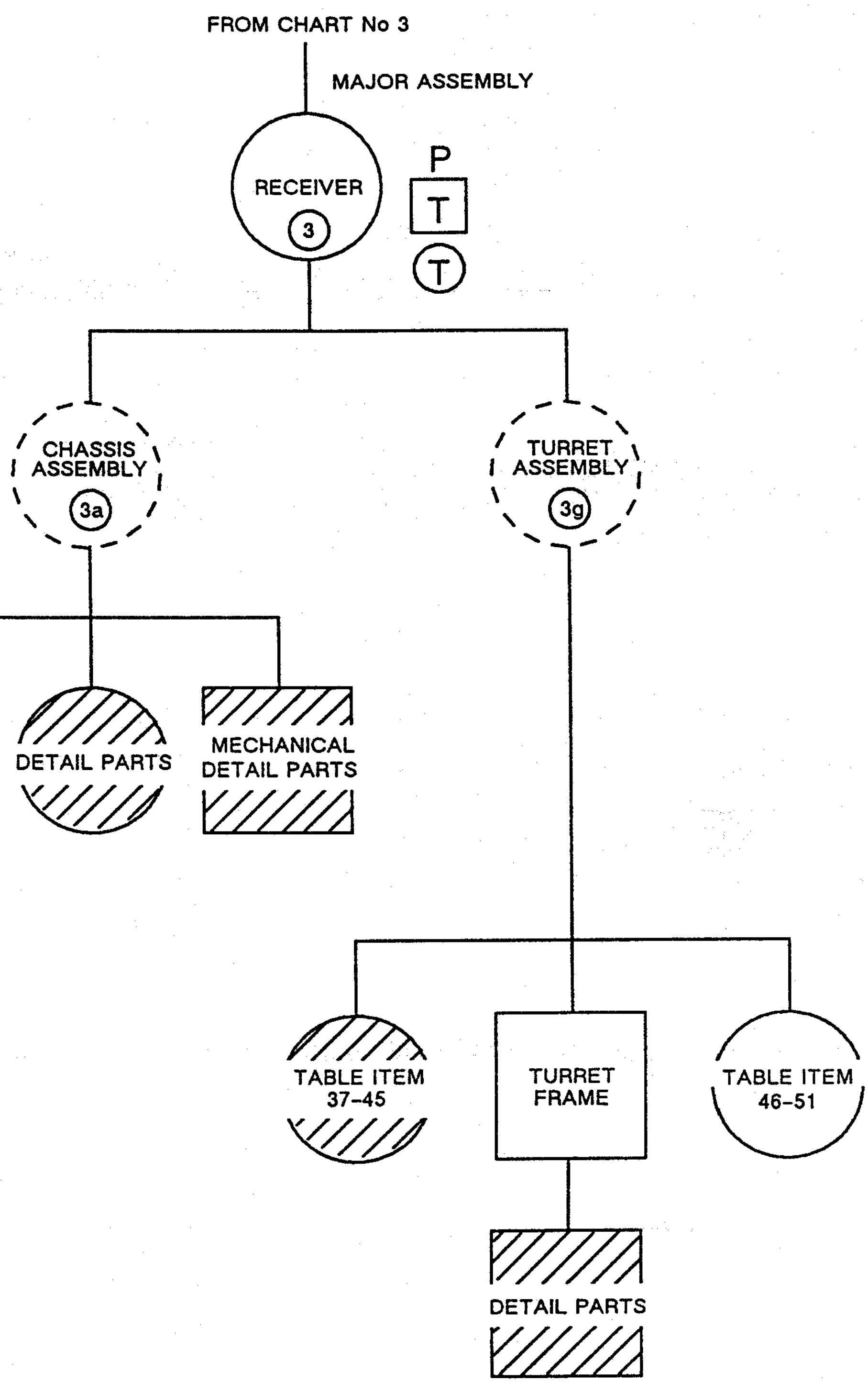
Repair chart No 3 - Front panel and chassis wired assy (Part 2) - cont

Note...
These Pages 9 to 16 Issue 5, supersede Pages 9 to 16 Issue 4.
Repair Chart Nos. 5, 6 and 8 (Parts 1 and 2) have been amended.



Item No.	Designation	Qty	Unit code/ cct ref
1	Transformer, audio	1	2T1
2	Transformer, remote	1	2T2

Repair Chart No. 4 - Board pack assembly



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Repair Chart No 5 - Receiver assembly (Part 1)

Item No	Designation	Qty	Unit code/ cct ref
1	Panel, electronic circuit	1	3b
2	Panel, electronic circuit (control i.f.)	1	3c
3	Panel, electronic circuit (signal i.f. output)	1	3d
4	Panel, electronic circuit (signal mixer)	1	3e
5	Panel, electronic circuit (buffer amp)	1	3f
6	Panel, electronic circuit (turret drive)	1	3gTS1
7	Panel, electronic circuit (varactor amp)	1	3k
8	Panel, electronic circuit (local osc)	1	3h
9	Capacitor, fixed 1000 pF	10	3aC2-5, 8, 11-15
10	Capacitor, fixed 0.01 µF	3	3aC6, 7, 10
11	Capacitor, fixed 1500 pF (lead through)	2	3aC16, 17
12	Capacitor, fixed 10 nF	1	3aC9
13	Capacitor, fixed 12 pF	1	3aC18
14	Cover, c/w Spring Clamps	1	-
15	Resistor, fixed 56 Ω ½ W	2	3aR10, 11
16	Resistor, fixed 82 Ω ½ W	1	3aR6
17	Resistor, fixed 220 Ω ½ W	1	3aR5
18	Resistor, fixed 1.2 kΩ ½ W	1	3aR8
19	Resistor, fixed 2.2 kΩ ½ W	1	3aR4
20	Resistor, fixed 6.8 kΩ ½ W	1	3aR9
21	Resistor, fixed 8.2 kΩ ½ W	1	3aR2
22	Resistor, fixed 100 kΩ ½ W	3	3aR1, 3, 7
23	Inductor, h.f., 4.7 µH	1	3aL1
24	Inductor, h.f., 8.2 µH	2	3aL4, 5
25	Inductor, h.f., 10 µH	1	3aL2
26	Inductor, h.f., 33 µH	1	3aL3

Repair Chart No 5 - Receiver assembly (Part 2)

Item No	Designation	Qty	Unit code/ cct ref
27	Inductor, h.f., ferrite	2	3aL7, 8
28	Diode, UM 7004C	1	3aD1
29	Transistor 2N2222	1	3aTR1
30	Valves, electronic Vx3555	2	3aV1, V2
31	Motor, 28 V d.c. (cap drive)	1	3aM1
32	Plug, fixed	1	3aPL1
33	Plug, fixed, miniature co-axial	1	3aPL2-6
34	Filter assembly	1	3j
35	Capacitor, drive gear assembly	1	-
36	Capacitor, drive assembly	3	-
37	Motor, 28 V d.c. (turret drive)	1	3gM1
38	Relay, RLA	1	3gRLA
39	Socket, free	1	3gSK1
40	Switch, micro, changeover	1	3gS2
41	Holder assembly valve	2	-
42	Label ident SN	1	-
43	Screw HK SKT (to secure turret to Rx body)	4	-
44	Washer spring tension (for item 49)	4	-
45	Switch wafer min rotary	1	3gS1
46	Turret Lid tuning	1	3m
47	Turret Lid tuning	1	3n
48	Turret Lid tuning	1	3p
49	Turret Lid tuning	1	3s
50	Turret Lid tuning	1	3t
51	Turret Lid tuning	1	3r

Repair Chart No 5 - Receiver assembly (Part 2) - cont

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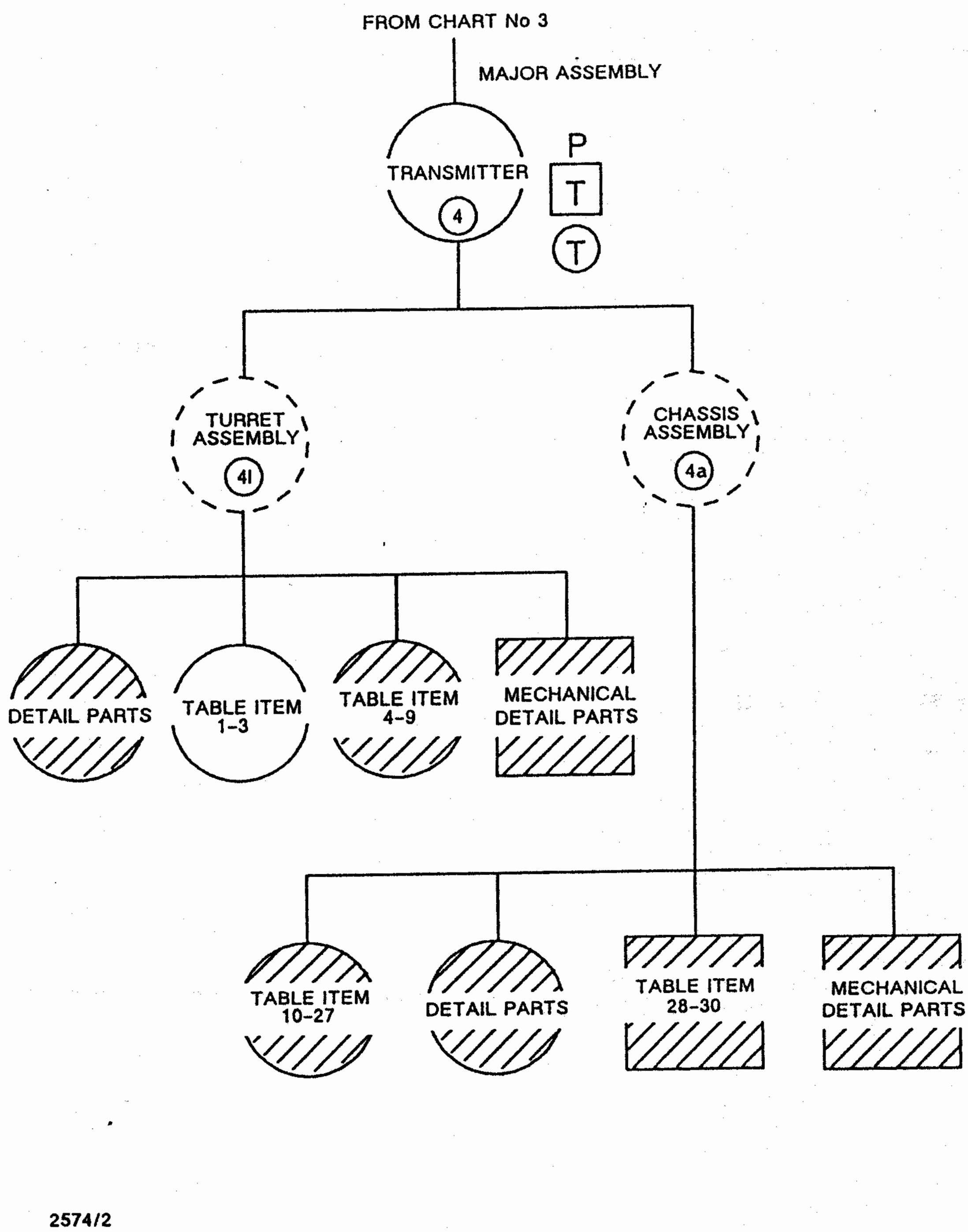
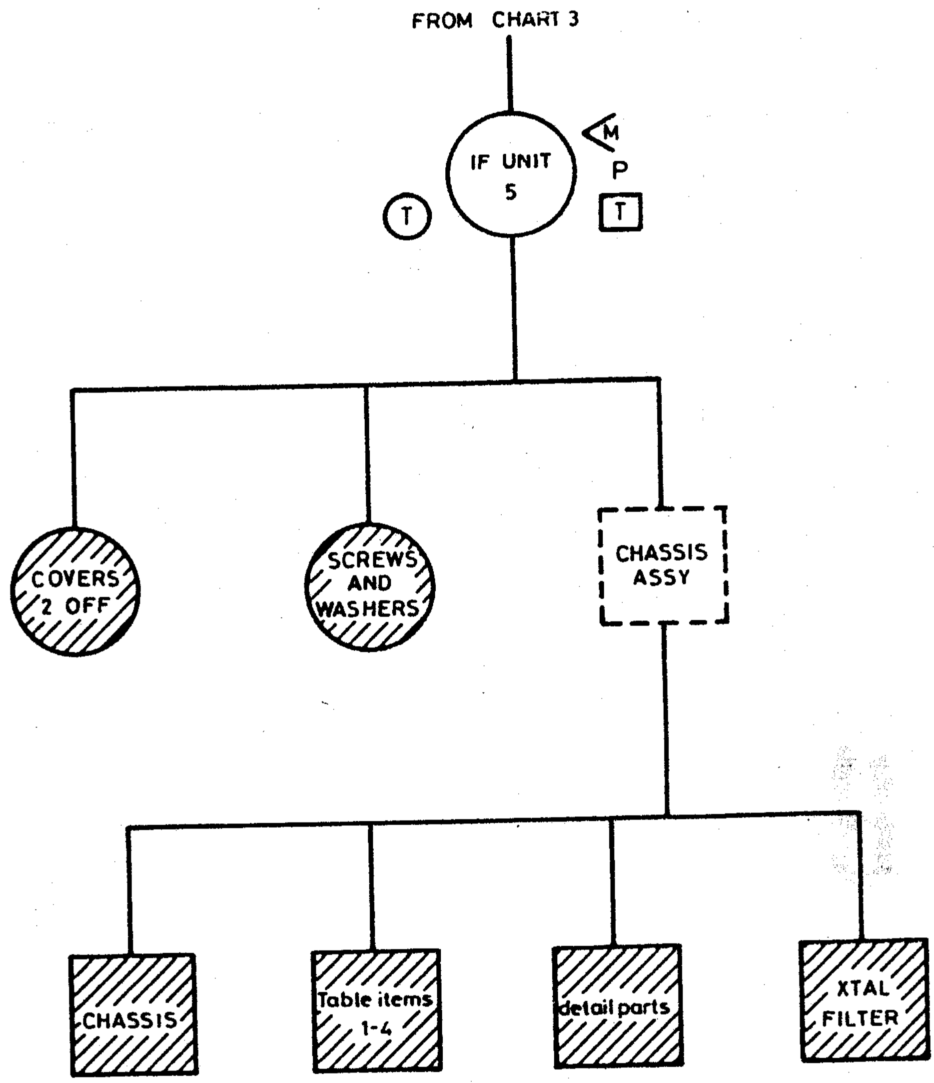


Repair Chart No 6 - Transmitter assembly (Part 1)

Item No	Designation	Qty	Unit code/ cct ref
1	Turret lid tuning	1	4g
2	Turret lid tuning	1	4h
3	Turret lid tuning	1	4j
4	Switch rotary min wafer	1	4fS1
5	Transmitter turret control	1	4fTS1
6	Switch micro changeover	1	4fS2
7	Motor 28 V d.c. short	1	4fM1
8	Relay, armature sealed	1	4fRLA
9	Cover	1	-
10	3rd harmonic filter assy (comp)	1	4e
11	End plate filtering assy	1	4aTS1
12	Varactor plate assembly	1	4b
13	Panel electronic circuit	1	4c1
14	Panel electronic circuit	1	4c2
15	Temperature sensor panel	1	4k
16	Chassis electronic assy (Back plate assy)	1	4aTS4
17	Screen fastening assy	1	4aTS3
18	Resistor fixed 47 kΩ	1	4aR8
19	Resistor fixed 1.3 kΩ 10 W	1	4aR4
20	Resistor fixed 33 Ω	1	4aR6
21	Capacitor 0.001 μF	6	C37, 40-44
22	Capacitor 0.01 μF	2	C47-46
23	Capacitor 0.22 μF	1	C49
24	Capacitor 330 pF	2	C32, 36
25	Capacitor 47 μF	1	C51
26	Inductor r.f. 10 μH	1	L13
27	Inductor l.f.	1	L17
28	Contact assemblies	2	-
29	Capacitor ganged	1	4aC48
30	Valve	1	4V1

Repair Chart No 6 - Transmitter assembly (Part 2)



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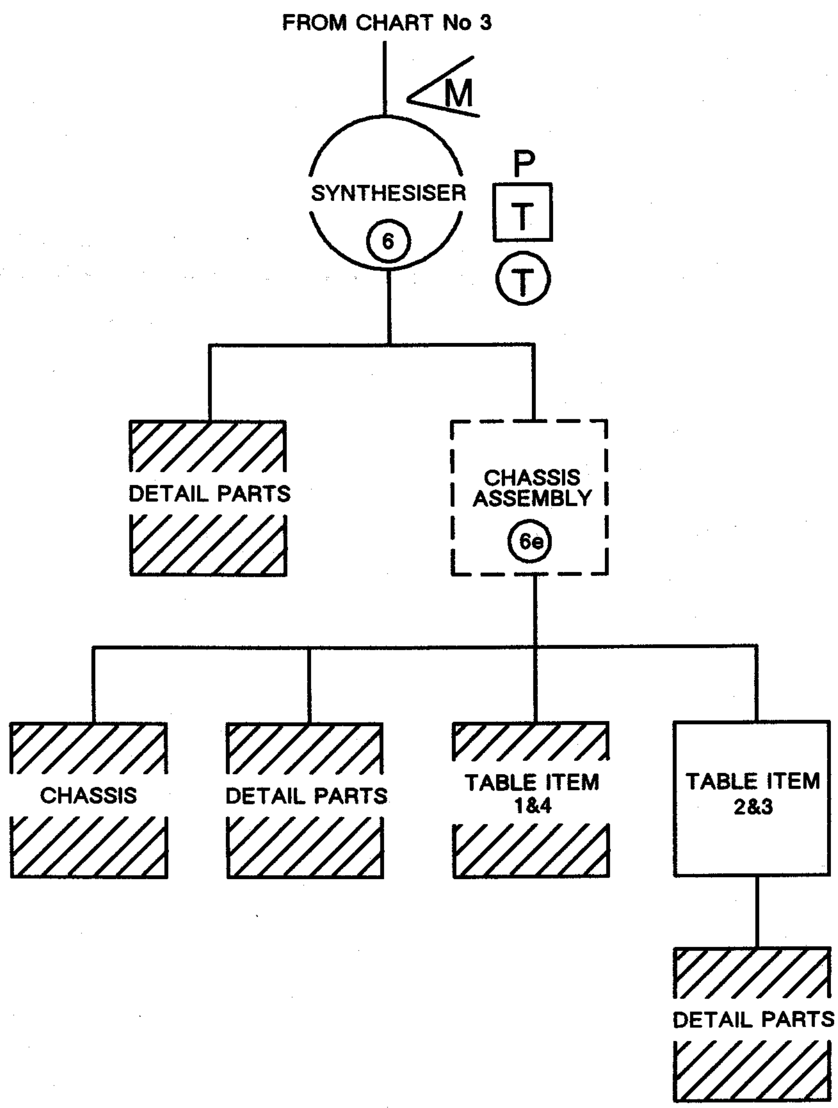
Item No	Designation	Qty	Unit code/ cct ref
1	Panel, electronic circuit	1	5b
2	Panel, fixed miniature co-axial	1	5PL2
3	Plug, fixed c/w bracket and cableform	1	5PL1
4	Panel, electronic circuit (control panel)	1	5e

Repair chart No. 7 - I.F. unit



Item No	Designation	Qty	Unit code/ cct ref
1	Panel, electronic circuit (buffer amp)	1	6a
2	Panel, electronic circuit (fixed divider)	1	6b
3	Panel, electronic circuit (variable divider)	1	6c
4	Panel, electronic circuit (comparator)	1	6d

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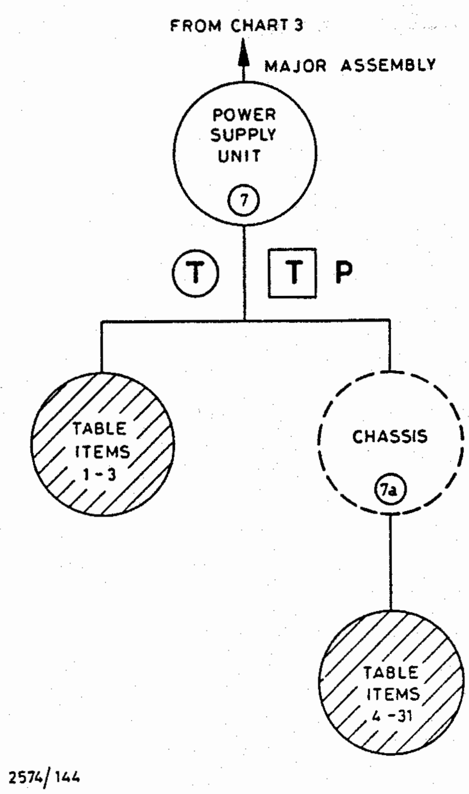
Repair Chart No 8 – Synthesiser unit



Repair chart No 9 - Power supply unit (Part 1)

Item No	Designation	Qty	Unit code/ cct ref
1	Label warning	2	-
2	Cover access (rear)	1	-
3	Cover access assembly	1	-
4	Panel, electronic cct	1	7b
5	Panel electronic cct	1	7c
6	Panel electronic cct	1	7d
7	Panel electronic cct	1	7e
8	Choke section assy	1	7f
9	Output section assy (potted)	1	7g
10	Panel electronic cct	1	7n1
11	Transistor	1	7n2TR1
12	Thermistor (+t^{o})	1	7n2TH1
13	Socket fixed	1	7aSK1
14	Socket free	1	7aSK2
15	Capacitor electrolytic (pack of 4)	1	7aC5
16	Capacitor fixed 220 nF	4	7aC1-C4
17	Capacitor electrolytic (pack of ten)	1	7aC7
18	Capacitor fixed 36 µF	1	7aC6
19	Inductors r.f.	2	7aL1, L2
20	Inductors l.f.	2	7aL3, L4
21	Inductor beads	4	7aL5-L8
22	Transformer, a.f. (inverter drive)	1	7aT1
23	Transformer, power	1	7aT2
24	Resistor, 1 Ω	1	7aR1
25	Diode, BYX 38	1	7aD1
26	Diode, 1N5911	1	7aD2
27	Diode	3	7aD3-D5
28	Resistor, 1.2 Ω	1	7aR2
29	Transistor 2N5671	2	7aTR3, 4
30	Transistor 2N5672	1	7aTR1
31	Transistor ST91194	1	7aTR2

Repair chart No 9 - Power supply unit (Part 2)

Table 1 - Centrems

Notes:

1. Items listed are to be repaired at 33 Central Workshop REME.
2. Items for repair are to be sent to No 1 RSSD, DONNINGTON, marked for the attention of 33 Central Workshop.
3. Overseas nominated workshop and RSSD - NIL.
4. Items detailed in the following list are subject to the procedure detailed in Mgmt N 504.

VRN	Designation
Z1/5820-99-633-6954	Amplifier, intermediate frequency
Z1/5820-99-633-6959	Panel, electronic circuit
Z1/5820-99-633-6956	Panel, electronic circuit
Z1/5820-99-633-6960	Panel, electronic circuit
Z1/5820-99 633-6961	Panel, electronic circuit
Z1/5820-99-110-3479	Synthesiser, electrical frequency

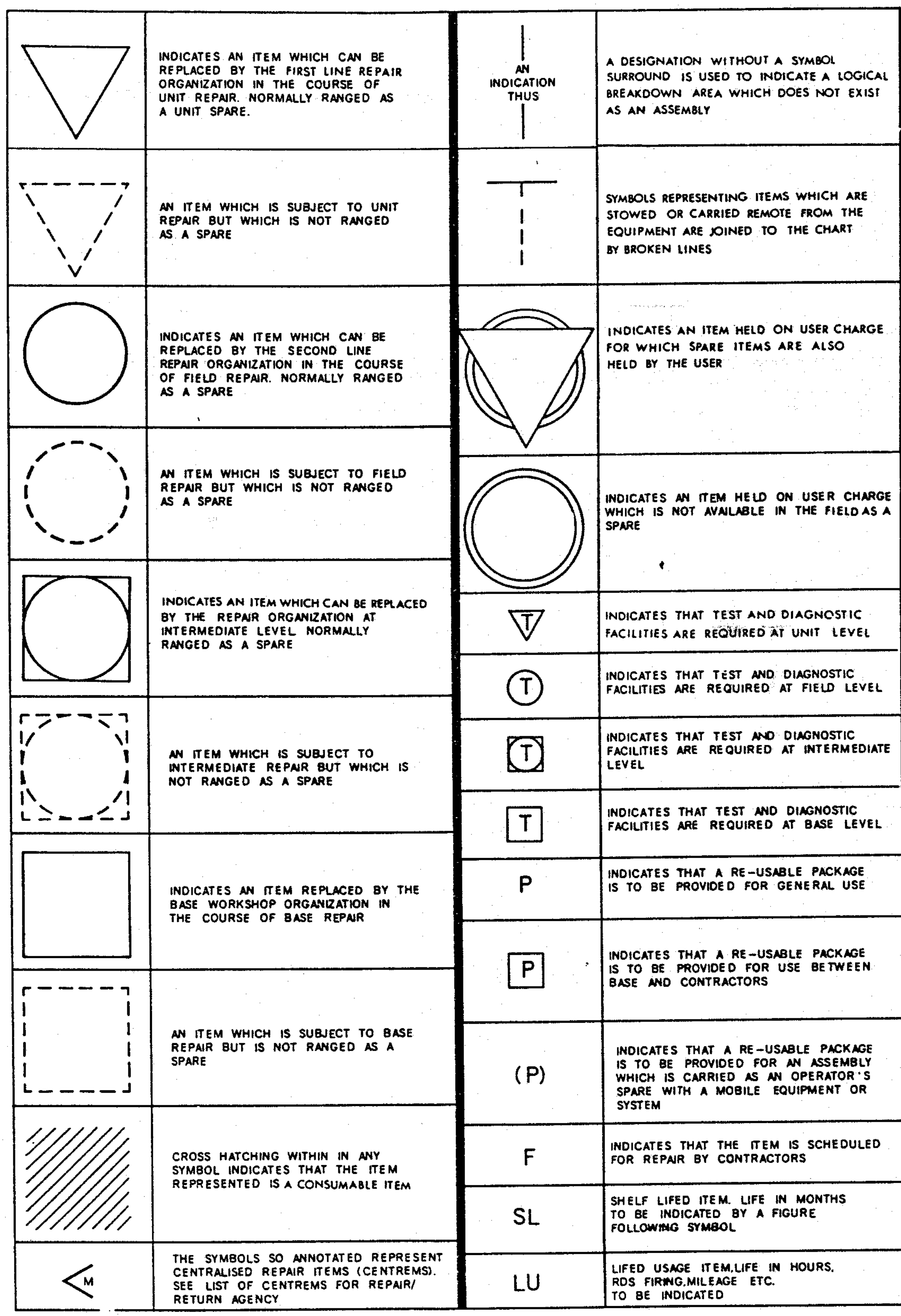


Fig 1 Key to repair chart symbols

2574/Tels

END

STATION, RADIO, UK/VRC 353

TECHNICAL HANDBOOK – DATA SUMMARY

EQUIPMENT IDENTITY

Station, radio, UK/VRC 353	NSN (NYA)
comprising:	
Tx/Rx UK/RT 353	Z1/5820-99-114-3959
T.U.A.A.M. with shock mounting	Z1/5821-99-630-6157
OR	
T.U.A.A.M. without shock mounting	Z1/5821-99-630-6156
A.R.F.A.T.	Z1/5820-99-630-6465

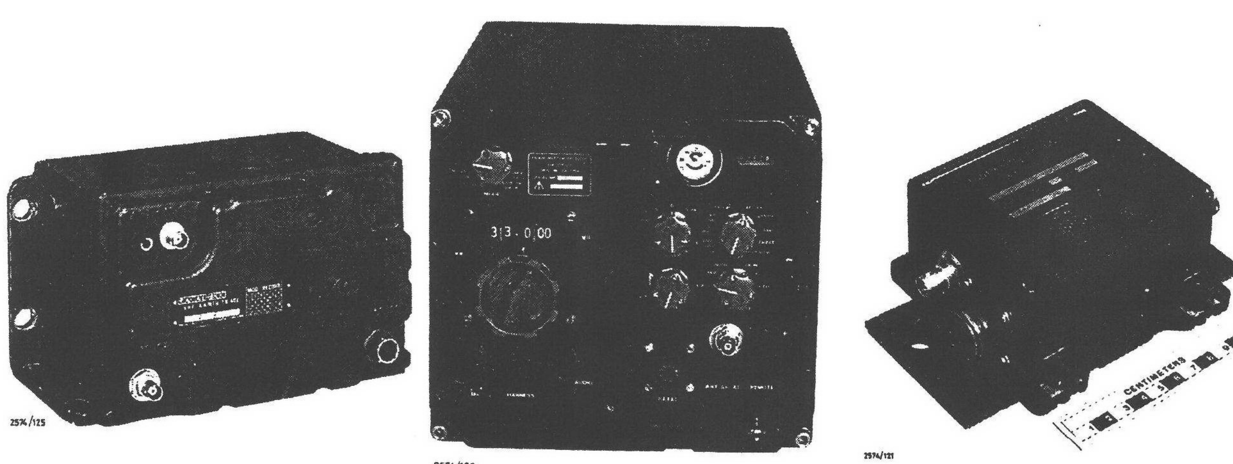


Fig 1 - General view of equipment

INSTALLED EQUIPMENT:

Transmitter receiver radio UK/RT 353
Tuning unit automatic antenna matching (t.u.a.a.m.)
Adaptor radio frequency antenna tuning (a.r.f.a.t.).

WARNINGS

High Voltage: The UK/RT 353 has an 800V d.c. internal supply and due care must be exercised when the equipment is uncased.

Beryllium: The UK/RT 353 uses components containing beryllium or beryllium oxide. In certain conditions they can constitute a hazard to health. Before working on the equipment, consult EMER Gen K 050 - Beryllium Toxic Hazard in Electronic Equipments - which gives general information, handling and disposal instructions.

ROLE

The UK/VRC 353 is a vehicle radio installation for use in armoured and soft skin vehicles of the Royal Marines, Army and RAF. The equipment will provide command and co-operation communi/cations for mounted troops, and replace the C42 Nos 1, 2 and 3, C45 Nos 1, 2 and 3 and the B47/B48 in some roles. It may also be used as part of a ground station.

BRIEF DESCRIPTION

UK/RT 353

The UK/RT 353 is a v.h.f. (f.m.) transmitter/receiver providing the following modes of operation over a nominal range of 32 km:

Voice: Narrow band (25kHz) and wide band (50kHz)
Facsimile: With special interface equipment
Telegraph: Up to 150 bauds in conjunction with the Adaptor Telegraph Radio
Data: Up to 750 bauds in conjunction with Adaptor Telegraph Radio, up to 20 kbits per second from high speed data equipment connected via harness socket.

The equipment may be used in one of three basic configurations. These are:

By a local operator (via AUDIO sockets)
By a harness operator (via HARNESS connector)
By a remote operator (via REMOTE terminals).

Tuning unit automatic antenna matching

Provides matching between the UK/RT 353 and vehicle mounted whip antenna.

Adaptor radio frequency antenna matching

Reduces the r.f. output power of the UK/RT 353 to an acceptable level during the tuning sequence of the t.u.a.a.m.

PHYSICAL DATA

	Height	*Width*	*Depth*	*Weight*
UK/RT 353	217 mm (8.5 in.)	243 mm (9.6 in.)	359 mm (14.1 in.)	22 kg (48.5 lb)
T.U.A.A.M.	143 mm (5.6 in.)	131 mm (5.15 in.)	235 mm (9.25 in.)	3.40 kg (7.5 lb)
A.R.F.A.T.	115 mm (4.5 in.)	164 mm (6.45 in.)	67 mm (2.6 in.)	0.9 kg (2.0 lb)

CLIMATIC RANGE

Temperature: Operating -40 to +53°C
Storage -40 to +65°C

Plus a temperature rise at the upper limit due to solar radiation falling directly on to the equipment for six hours per day.

Humidity: Operation and storage up to 100% humidity with temperature not normally exceeding 30°C.

Altitude: Operation and storage up to 3000 m (10,000 ft).

TRANSPORTATION DATA

Altitude: Air transportable up to 7,500 m (25,000 ft) unpressurised or up to 12,000 m (40,000 ft) pressurised. Sudden depressurisation at up to 12,000 m (40,000 ft) will not result in damage to surrounding objects.

Immersion: The equipment will withstand immersion to a covering depth of 1.6 m (5 ft) in salt or fresh water for at least 2 hours without affecting operation.

Handling: The equipment can be dropped from aircraft using normal parachute delivery techniques.

PACKAGING DATA

UK/RT 353	SRDE/PKG/1143159
T.U.A.A.M.	CPU/6306156
A.R.F.A.T.	SRDE/TS/1560.

OPERATIONAL DATA

UK/RT 353

The harness plug interconnects the radio to either the Clansman radio control harness, or the Clansman wide band data harness. Two remote terminals may be used to connect audio and control signals via D10 cable, from remote equipment situated up to 3 km (2 miles) away. The a.r.f.a.t. connector is used to supply the control signals to the a.r.f.a.t. and t.u.a.a.m.

T.U.A.A.M.

Interconnects the r.f. signal between the a.r.f.a.t. and the whip antenna.

A.R.F.A.T.

Connects the r.f. signals and control voltages between the RT 353 and the t.u.a.a.m.

Antenna

Antenna element: Z42/5985-99-630-8455 (2 off)
Antenna base assembly: Z42/5985-99-630-6495 (1 off)
Clansman alternative v.h.f. antenna systems.

PERFORMANCE

Ground stations:	Maximum range over average rolling terrain in Western Europe 32 km, using the omni-directional antenna.
Mobile station:	Maximum range over average rolling terrain in Western Europe using a whip antenna will produce a 75% probability of achieving communication at 32 km.

ELECTRICAL DATA

UK/RT 353

Frequency range:	30 to 75.975MHz, 25kHz channel spacing narrow band, 50kHz channel spacing wide band.
Accuracy:	Better than ±5 p.p.m.
Compatability:	The equipment will interoperate on voice with: a. All other v.h.f. Clansman equipment. b. All existing v.h.f. (f.m.) equipment using 50kHz channel spacing in the band 30 to 75.950MHz.

Transmitter

Power output:	Four levels, 100mW (MIN), 1W, 15W and 50W nominal, according to front panel switch setting.
Full deviation:	Full deviation is produced by a 1kHz input at any level between 28 and 80mV r.m.s. e.m.f. applied between pins A and B of AUDIO sockets with gain control at minimum. Full deviation is produced by a 1kHz input at any level between 80mV and 4V r.m.s. applied at either REMOTE terminals or HARNESS connector pins A and B.
Full data deviation:	Binary input of regular 00001111 pattern at 16 kbits per second (WIDE) 8 kbits per second (NARROW) at a level of 3.2V e.m.f. peak to peak applied at HARNESS connector pin A. When in the data mode automatic rebroadcast is not available unless an additional control box is employed.

Receiver

Sensitivity:	Analogue:	0.5μV e.m.f. for 6dB S+N/N ratio.
	Data:	Error rates as specified below for input of unfiltered data at 16kbits per second at levels detailed

Signal source	*Error rate*
1.413μV e.m.f.	Less than 0.3%
1.0μV e.m.f.	Less than 4%
0.71μV e.m.f.	Less than 14%
0.5μV e.m.f.	Less than 26%

Unwanted signal rejection: Greater than 61dB for all channels within ±2% of the channel frequency in use.

A.F. output: 2.7V r.m.s. nominal into 75Ω at AUDIO sockets.
1.7V r.m.s. nominal into 75Ω at HARNESS socket.
0.75V r.m.s. nominal into 300Ω at REMOTE terminals.

Remote control: Equipment will transmit when a d.c. current of 8-14.5mA is drawn from the REMOTE terminals with REMOTE switch in REM or AUTO position. Equipment will generate a call tone of 2kHz when a d.c. current greater than 20mA is drawn from the REMOTE terminals.

Metering facilities: Provided by a ten position front panel switch and meter as follows:

LPS OFF: All lamps off, meter reads received signal strength.

FANS OFF: Fans and lamps off, transmitter inhibited, meter reads received signal strength.

28V SPLY: Meter indicates supply voltage on marked scale.

RX SIG: Meter indicates received signal strength on arbitrary scale.

TX O/P: Meter indicates that the transmitter output valve is drawing the correct current.

AFC TX: The pointer should be within ±3 divisions of centre for correct operation of the transmitter frequency control loop.

SYNTH: The meter indicates whether the synthesiser is locked, normally pointer to right of centre.

TEMP: The meter indicates the internal temperature of the set, normally right of centre.

ARFAT: The meter indicates arfat temperature state, normally right of centre.

OVERRIDE: This is a bias switch position and overrides the TEMP and ARFAT alarms. The squelch circuit is overriden and the cooling fans switched on.

(These facilities can be used to isolate certain fault conditions which are indicated by an audible and visible alarm system)

Sidetone: True sidetone (provides a quick functional check of the equipment).

POWER REQUIREMENTS

Voltage: 24V d.c. nominal. 21.5V d.c. minimum, 35V d.c. maximum.

Current: 12A at 28V d.c. maximum.
8-10A nominal at 28V d.c. on transmit.
2.4A nominal at 28V d.c. on receive.

ASSOCIATED EQUIPMENT

Clansman radio control harness
Clansman infantry and 'B' vehicle headgear
Clansman alternative v.h.f. antenna systems
T.U.A.A.M. and A.R.F.A.T.: See Tels L 210 for electrical details.

MAINTENANCE

Unit repairs: Removal and repair of loose CES items, plus replacement of front panel knobs by first line REME support.

Field repairs: Replacement of faulty assemblies, sub-assemblies and certain discrete components. Some sub-assemblies are throwaway items. CENTREMs are repaired at nominated workshop only.

Base repairs: Overhaul of complete equipment, repair of CENTREMs and 'Major assemblies'.

ASSOCIATED PUBLICATIONS AND REFERENCES

User Handbook:	NYA
CES:	NYA
Illustrated Parts Catalogue:	NYA
Clansman Audio Accessories:	Tels C 740
Clansman Radio Control Harness:	Tels L 800
Clansman v.h.f. Antenna Systems:	Tels L 210.

EME 8/2574/Tels

END

UK/VRC 353

TECHNICAL HANDBOOK - UNIT REPAIRS

INTRODUCTION

1. This regulation details the extent of permitted unit repairs and the scope and extent of routine servicing necessary to maintain the equipment in a serviceable condition.

Associated publications

2. This regulation should be read in conjunction with the following publications:-

User Handbook, UK/VRC 353	-	SRDE Handbook 1178
CLANSMAN Condition Test Set	-	EMER Tels M660
Complete Equipment Schedule	-	CES No. NYA
Illustrated Parts Catalogue	-	W O code NYA

3. The following publications give details of equipments associated with UK/VRC 353:-

CLANSMAN Audio Accessories	-	EMER Tels C740
CLANSMAN Radio Control Harness	-	EMER Tels L800
CLANSMAN VHF Antenna Systems	-	EMER Tels L210

Warning

4. The cooling air flow through the RT 353 must not be obstructed. Th inlet grille on the front panel, and the blower outlets in the rear wall of the case must be kept clear at all times.

SCOPE OF UNIT REPAIRS

5. The RT 353 is a sealed equipment and consequently no attempt should be made at unit level to open the equipment.

6. Repairs at unit level will be confined to replacement of damaged front panel switch knobs, (except frequency selector knobs) Tx lamp cover and bulb, carrying handle, earth terminal and air inlet grille.

7. The equipment may be functionally tested at unit level by use of the Clansman Condition Test Set. These tests are detailed in the CLANSMAN Condition Test Set User handbook.

TOOLS AND TEST EQUIPMENT

ITEM		PART NO	PURPOSE	REMARKS
1	Condition Test Set	Z4/6625-99-620-3592	Testing of RT 353	EMER Tels M660
2	Test Set, Radio Audio Accessories	Z4/6625-99-620-3593	Dynamic testing of Audio Accessories	EMER Tels M650
3	Multimeter Set CT498A	Z4/6625-99-105-7049	Measurement of Voltage Current and Resistance	
4	Toolkit Telecommunications (Technical)	F1/5180-99-120-3922	-	-
5	Toolkit Telecommunications (Supplementary)	F1/5180-99-445-8208	-	-

INSTALLATION AND CONNECTING UP

8. In all installations the RT 353 is fitted on CLANSMAN mounting bars, the fitting procedure is as follows:-

a. Unscrew, and pull forward the clamping screws.

b. Locate the 'V' shaped slot entrances, in the rear base of the radio, with the alignment keys on the mounting bars.

c. Slide the radio along the bars until it locates against the dovetail wedges at the rear.

d. Push the clamping screws to locate them with the threaded holes, and tighten until the radio is secure.

e. If difficulty is encountered in sliding the radio onto the bars, remove the radio and slightly loosen the four hexagon socket headed bolts holding the bars to the baseplate. Slide the radio along the bars, then remove the radio and re-tighten the bolts; take care that the bars do not move whilst re-tightening. Refit the radio as in a. - d.

9. Details of connecting up the RT 353 into any CLANSMAN configuration are contained in the appropriate Comms Inst EMER, or the User Handbook.

10. Details of connecting up the RT 353 when using the CLANSMAN Condition Test Set are contained in EMER Tels M660-9.

SETTING UP

Location operation

11. With the equipment correctly connected up (para 9) carry out the following procedure:-

a. Set the REMOTE switch to LOCAL.

b. Set the POWER Switch to MIN (Frequency dial illumination should flash for approx 10 secs, then remain ON).

c. Set the required frequency as follows:-

(1) Set the inner control knob fully anti-clockwise.

(2) Rotate the outer control knob until the required 'Tens of MHz' appears in the left-hand window.

(3) Set the inner control knob one step clockwise.

(4) Rotate the outer control knob until required 'MHz' appears in the same window.

(5) Similarly rotate the inner and outer knobs until the 'Hundreds of kHz' and the desired '25kHz' appear in the right-hand window.

(6) Set inner control knob fully anti-clockwise.

(7) A slipping clutch operates at the extreme limits of each setting, thus by turning the outer knob anti-clockwise until the clutch slips for each setting of the inner knob, a '0' will be present in each window. This enables a frequency setting to be achieved with the TEST switch set to LPS - OFF (working under no light conditions) by counting from the '0' position.

d. Set the POWER Switch to TUNE (bias position) and release. Tx lamp will illuminate for approximately 5 secs and then extinguish.

e. Set the following switches to the positions shown

TEST Switch to RX SIG

POWER Switch to the required power level

GAIN Switch to mid-position (and adjust as required)

MODE Switch to NARROW.

f. The set is now ready for operation. The level of any received signal will be indicated on the meter. To transmit, press the pressel switch; the Tx lamp will light, and an indication of correct transmitter power output is obtained by setting TEST switch to Tx O/P.

Remote operation

12. With equipment correctly connected up (para 9) carry out the following procedures:-

a. Set REMOTE Switch to REM

b. The set is now ready for operation by the local operator, or any operator connected via a CLANSMAN Harness or the REMOTE terminals.

c. An operator connected via Harness or REMOTE terminals may attract the attention of the local operator by pressing a "Call" switch. This generates a 2kHz call tone which will be heard by all operators connected to the station. To communicate with remote/harness operators, the local operator must set the REMOTE switch to IC.

d. The local operator may call all remote/harness operators by setting the REMOTE switch to CALL (bias position). The switch will return to IC, to enable communication. (Any signal received whilst the set is in IC MODE will always be heard at a reduced level by the local operator).

Automatic rebroadcast

13. For automatic rebroadcast working the equipment must be connected to another RT 353 or compatible CLANSMAN VHF equipment via the REMOTE terminals or the HARNESS connector.

14. With the equipment correctly connected up (para 9) carry out the following procedures:-

a. Set REMOTE switch to AUTO.

b. Set the following switches to the positions shown

TEST switch to RX SIG

POWER switch to the required level

GAIN switch to mid-position (and adjust as required)

MODE switch as appropriate (NARROW/WIDE TONE for reception from CLANSMAN, WIDE for reception from NON-CLANSMAN).

c. The equipment is now ready for operation. The automatic rebroadcast link may be monitored by the local operator.

Break-in

15. The break-in facility enables the local operator to act in a supervisory role when working on an automatic rebroadcast link. This facility is available by setting the REMOTE switch to BK-IN. With REMOTE switch set to BK-IN the local operator will receive from either end of the automatic rebroadcast link. Depressing the local pressel will cause the transmitted information to be received simultaneously at both ends of the automatic rebroadcast link.

FAULT LOCATION PROCEDURES

16. Indications of certain fault conditions are produced in one or more of the following methods:-

a. Flashing of frequency dial illumination (at approx 1Hz).

b. Interruption of all audio outputs as a rate of approx 1Hz.

c. Front panel meter indications.

d. Non-illumination of Tx lamp.

17. Whilst setting up the equipment (paras 12-14) alarm conditions as in para 22.a. and b. may be present for a period of approx 10 secs. This is a normal function of the equipment, and is not a fault condition.

18. Fault sympton:- Set will not switch on, or repeatedly trips out.

Test a	Indication b	Symptom/Remedy c
1	Set POWER switch to OFF, then to MIN. Set TEST switch to 28V SPLY. Meter indicates 22V or above.	Proceed to Test 2.
	Meter indicates less than 22V	Replace battery, or start engine to charge battery.
	Meter does not indicate	Check supply to input socket. If supply is correct, RT 353 is faulty
2	Check illumination of meter and Frequency dial.	No illumination - RT 353 faulty. Illumination on and steady, RT 353 functioning.

19. Fault sympton:- No signal received with REMOTE switch set to LOCAL, REMOTE or AUTO,

Test a	Indication b	Symptom/Remedy c
1	Set TEST switch to 28V SPLY Meter indicates 22V or above Meter indicates less then 22V	Proceed to Test 2 Replace battery, or start engine to charge battery
2	Frequency illumination flashing	Proceed to Para 20 Test 2
3	Set TEST switch to OVERRIDE	This gives NOISE ON condition, receiver noise should be heard in Audio Gear, with GAIN control set to mid position or higher. Noise heard - proceed to Test 4. No noise, suspect headgear; if headgear serviceable - <u>RT 353 faulty</u>
4	Set REMOTE switch to LOCAL Press local pressel, speak into local microphone	Sidetone heard - proceed to Test 5. No sidetone, <u>RT 353 faulty</u>
5	With pressel released, apply signal at correct frequency from Condition Test Set, or alternatively, tune set to known transmitter	Signals received - set functional. No signals - <u>RT 353 faulty</u>

20. Fault sympton:- TX lamp not lit when pressel pressed (in any position other than LPS OFF, FANS OFF or OVERRIDE positions of Test switch).

NOTE: Press pressel when asterisk * shown.

Test a	Indication b	Symptom/Remedy c
1*	No TX lamp	Ensure set has been switched on for greater than 40 secs.
2	Frequency illumination flashing	(a) NO - proceed to Test 3 (b) YES- proceed to Test 2a
2a	Frequency set to below 30MHz or above 76MHz	(a) YES - reset frequency (b) NO - proceed to Test 2b

a	b	c
2b	Set TEST switch to TEMP Meter indicates in Green zone	Proceed to Test 2c
	Meter indicates in Red zone	Set overheating. Check blower inlet/outlets. Set TEST switch to OVERRIDE and check that blowers are operating. (Blowers not operating - RT 353 faulty) Return TEST switch to TEMP, (Blowers not operating - RT 353 faulty).
2c	Set TEST switch to SYNTH Meter indicated in Green zone	Proceed to Test 2d
	Meter indicated in Red zone	Synthesiser loop not locked- RT 353 faulty
2d	Set TEST switch to ARFAT Meter indicates in Green zone	Proceed to Test 3
	Meter indicates in Red zone	ARFAT overheating. Suspect TUAAM or interconnecting cables. If serviceable - RT 353 faulty.
3*	Set TEST switch to 27V SPLY Meter indicates above 22V	Proceed to Test 4
	Meter indicates below 22V	Replace battery or start vehicle engine to re-charge battery
4	Frequency dial illumination ON and steady	Proceed to Test 5
	Frequency dial illumination OFF	PSU tripped out. Set POWER switch to OFF, then to MIN. Frequency dial illumination should appear, if not, RT 353 faulty.
5*	Set REMOTE switch to LOCAL Press Local pressel, TX lamp does not light	Proceed to Test 6
	Press local pressel, TX lamp lights	Set REMOTE switch to REMOTE. Connect Remote Handset, press remote pressel, TX lamp does not illuminate - RT 353 faulty. TX lamp illuminates - suspect local pressel
6*	Replace local headset, Press local pressel. TX lamp does not light	Proceed to Test 7.
	TX lamp lights	Local headset used in Test 5 is faulty.

a	b	c
7	Set TEST switch to RX SIG. Meter indication increases when pressel pressed.	TX lamp faulty
	Meter indication does not change	RT 353 faulty

21. Fault sympton:- No response to indicated transmissions (TX lamp ON, sidetone present).

Test a	Indication b	Symptom/Remedy c
1	Set TEST switch to TX O/P. Press pressel and note meter indication	
	Meter in Green zone	Proceed to Test 2
	Meter in Red zone	Set TEST switch to 28V SPLY, press pressel. Meter should indicate 22V or above. Reading correct - RT 353 faulty Reading incorrect - battery voltage low.
2	Set POWER switch to TUNE (biassed) and release to 'O'	
	TX lamp illuminates for approx 5 secs then extinguishes	TUAAM tuning - correct indication, proceed to Test 3
	TX lamp does not illuminate	Suspect TUAAM or control cable RT 353/TUAAM. If correct, RT 353 faulty
	TX lamp illuminates, but does not extinguish	Suspect TUAAM control cable or co-ax connector. If correct RT 353 faulty
3	Check for RF Power output at Antenna using Condition Test Set	No Output - suspect antenna

22. Fault symptom:-

a. Frequency illumination flashes for longe than 10 secs, audio outputs interrupted at 1Hz.

b. Repeat tests detailed in Para 20, Test 2.

REPAIR PROCEDURE

23. Damaged switch knobs are replaced as follows:-

a. MODE, POWER, TEST, GAIN and REMOTE by removal of the three securing screws in the front face of the knob and pulling the knob free of the shaft. Replacement is by reverse procedure.

NOTE: The frequency selector knobs are NOT to be changed at unit level since this involves breaking the set sealing.

24. The air inlet grille may be removed for cleaning or replacement by releasing the two slot headed securing screws in the front panel.

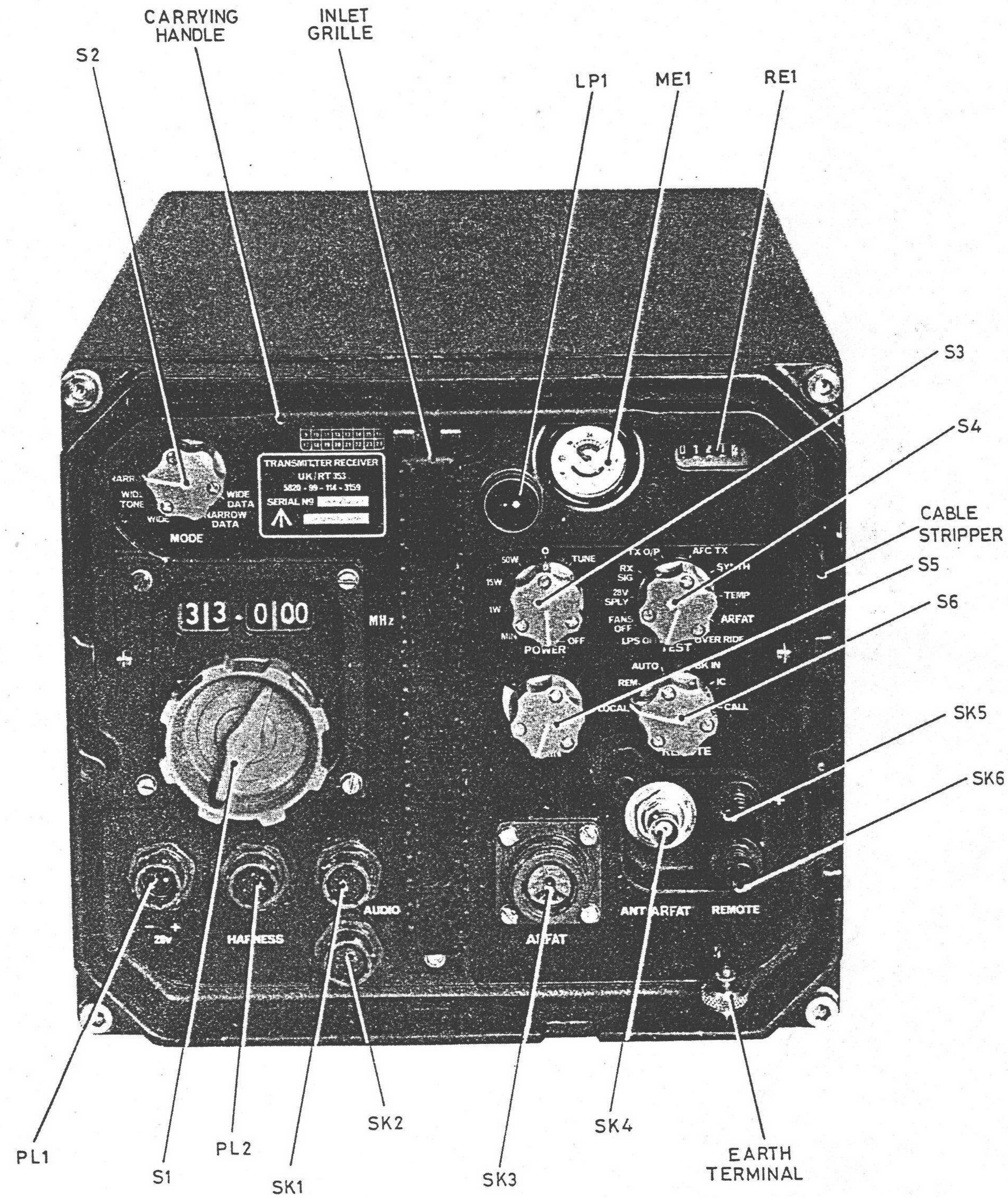
NOTE: The top screw also secures the carrying handle securing clip.

25. The carrying handle is secured by a recessed slot-headed screw through each side web of the front panel, and may be replaced by first removing the securing circlips.

26. The Tx lamp lens is removed by unscrewing, the bulb is a push fit within a recess in the lens assembly.

27. The knurled thumbscrew of the front panel earth terminal may be replaced by first removing the securing circlip.

28. No further repairs will take place at unit level.



NOTE :- ALL COMPONENTS ARE PART OF ASSEMBLY 1a

2574/120

Fig. 3001 - RT 353 Front panel

END