

Fig 2 Use of assembly extractor tool

### Synthesizer (assembly 10)

- 32 To remove the synthesizer (assembly 10), proceed as follows:
- 32.1 Remove the motherboard (with all assemblies) (Para 31).
  - 32.2 Prise off all clips from the motherboard socket that terminate the flying leads (EMER Tels F 602, Fig 2005).
  - 32.3 Remove the five 2.5 mm pan-head screws and washers securing the synthesizer to the motherboard and remove the synthesizer.

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

#### CAUTION

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

- 33 To remove synthesizer sub-assemblies 10a, 10b and 10c, proceed as follows:
- 33.1 Set the FSS to represent 45.975 MHz.
  - 33.2 Refer to EMER Tels F 602, Fig 2010, locate the FSS and note that the index marks on the fixed and moveable parts of each switch are aligned, this is 37.000 MHz position.
  - 33.3 Turn each switch in a clockwise direction, as follows:
    - 33.3.1 MHz switch : to the 8th position from the present setting.
    - 33.3.2 100 kHz switch : to the 9th position from the present setting.
    - 33.3.3 kHz switch : to the 3rd position from the present setting.

### Synthesizer sub-assembly 10a

- 34 To remove synthesizer sub-assembly 10a, proceed as follows:
- 34.1 Remove the synthesizer sub-assemblies 10a, 10b and 10c (Para 33).
  - 34.2 Remove the cover (three screws).
  - 34.3 Unsolder the flying leads (numbered 3 and 13) from sub-assembly 10a.
  - 34.4 Unsolder (or cut) the eight interconnecting leads between sub-assemblies 10a and 10b.
  - 34.5 Remove the three screws and washers securing sub-assembly 10a to sub-assembly 10b, and remove sub-assembly 10a.

Synthesizer sub-assemblies 10b and 10c

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

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

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

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

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

**Motherboard**

36 To remove the motherboard proceed as follows:

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

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

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

**Audio socket, system switch (SSW) and wiring harness**

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

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

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

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

37.4 Remove the escutcheon plate.

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

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

**Knobs**

38 To remove the knobs, proceed as follows:

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

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

## REPLACEMENT

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

### Battery fixing Insert

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

- 40.1 Ensure that the new insert and the casting boss are free of grease.
- 40.2 Apply adhesive Loctite Studlock (grade 270) to the casting boss.
- 40.3 Fit the new insert to the mandrel (Table 2, Serial 10) and screw it into the casting boss.
- 40.4 Allow approximately three hours for the adhesive to set before removing the mandrel.

### Knobs

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

### Synthesizer sub-assemblies 10b and 10c

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

- 42.1 If a new sub-assembly 10b is being fitted, fit a protection clip to ML1.
- 42.2 Set the three Frequency Setting Switches (FSS) to the setting specified in Para 33.
- 42.3 Replace the earth link which connects sub-assemblies 10a, 10b and 10c, as detailed in EMER Tels F 602, Fig 2010, Note 2.
- 42.4 Carry out the removal procedure detailed in Para 35 in reverse order.
- 42.5 Remove the protection clip from ML1 and cut the pins of ML1 to within 0.8 mm.

### Synthesizer sub-assembly 10a

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

- 43.1 Carry out the removal procedure detailed in Para 34 in reverse order.
- 43.2 Set the FSS to 37.000 MHz (EMER Tels F 602, Fig 2010).

### Synthesizer (assembly 10)

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

- 44.1 Using the mechanical alignment jig (Table 2, Serial 9), position the synthesizer with respect to the motherboard.
- 44.2 Secure the synthesizer with five untightened 2.5 mm screws and washers.
- 44.3 Fit the jig (Fig 3) ensuring that all four dowels are properly located in the relevant holes and tighten the five 2.5 mm screws.

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

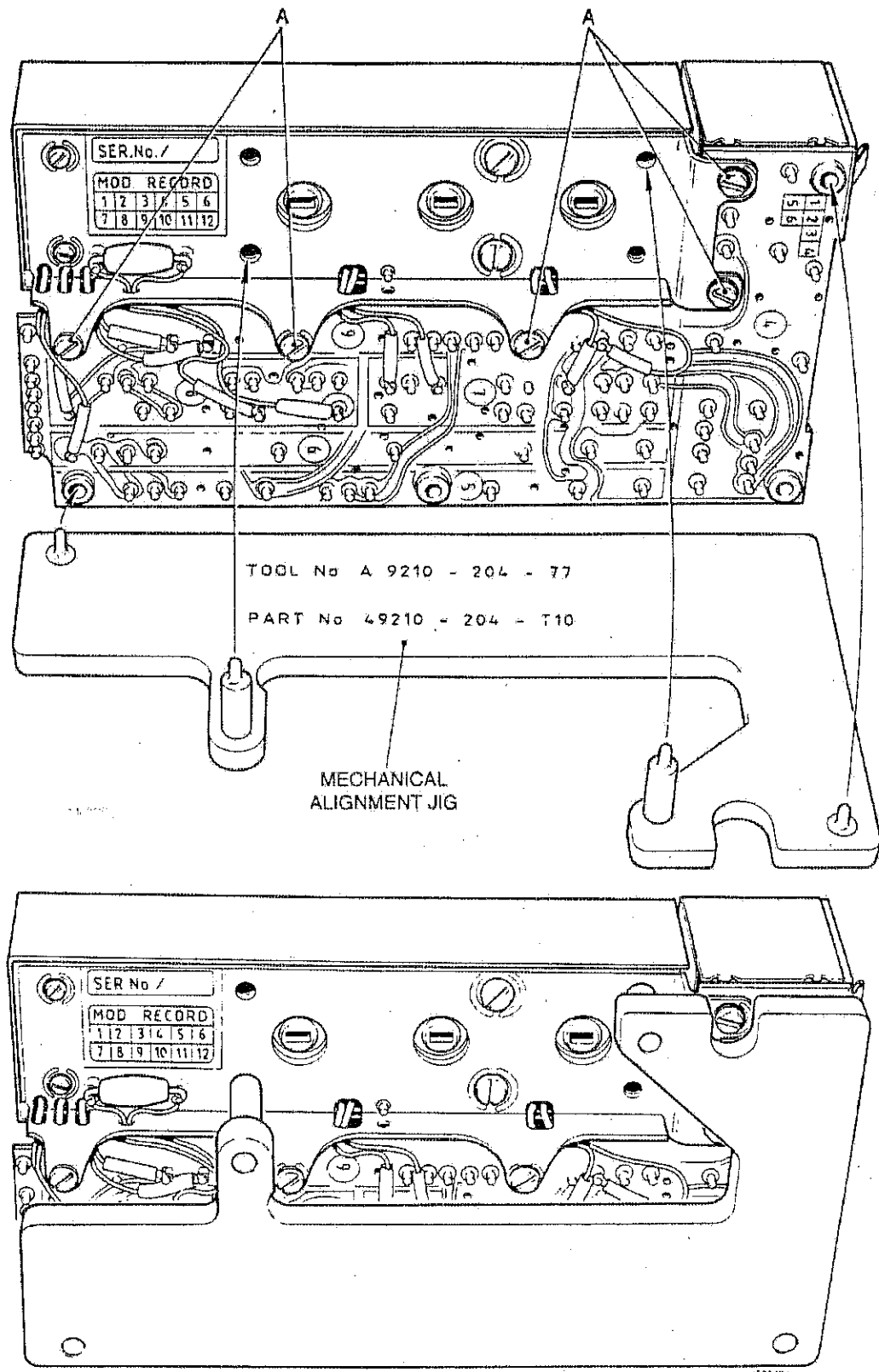


Fig 3 Fitting synthesizer-to-motherboard mechanical alignment jig

### Audio socket, system switch (SSW) and wiring harness

- 45 To replace the audio socket, SSW and wiring harness, proceed as follows:
- 45.1 Fit the assembly to the inside of the RT-349 box and secure the audio socket with the retaining nut.
  - 45.2 Secure the SSW using the two 3.0 mm screws and Dowty sealing washers removed in Para 37. If necessary, use new Dowty sealing washers (EMER Tels F 602, Table 2002, item 9) lightly smeared with grease (XG271).
  - 45.3 Set the SSW to the O (off) position.
  - 45.4 Refer to EMER Tels F 602, Fig 2005, and set the SSW to the position where the fixed and moveable index marks are aligned.

### Fitting assemblies to the motherboard

- 46 To fit the assemblies to the motherboard, proceed as follows:
- 46.1 Replace the Synthesizer (assembly 10) (Para 44).
  - 46.2 Carefully fit sub-assembly 10a to the motherboard (Para 43).
  - 46.3 Carefully fit sub-assemblies 10b and 10c to the motherboard (Para 42).

### NOTES

- (1) The arrows on the top of the assembly screening covers point towards the front panel (antenna socket, audio socket and SSW).
- (2) If difficulty is experienced fitting assembly 4, remove assembly 6 first.
- (3) To ensure good contact, the contact finger on assembly 6 and the mating area on the side of assembly 4 must be kept clean using suitable degreasing agent (e.g. acetone).

### Motherboard (with all assemblies)

- 47 To replace the motherboard (with all assemblies), proceed as follows:
- 47.1 Fit the polarised cableform plug to the motherboard socket.
  - 47.2 Observing the following precautions, gently ease the motherboard assembly into the RT-349 box:
    - 47.2.1 To ensure satisfactory contact with the spring connector on assembly 4, slightly tilt the assembly towards the antenna socket pin.
    - 47.2.2 With reference to Para 44, replace the synthesizer sub-assembly ensuring that all switches engage correctly with the knobs.
    - 47.2.3 If required, fit new Dowty sealing washers (EMER Tels F 602, Table 2002, item 38) to each of the eight motherboard securing screws. Lightly smear the sealing washers with grease (XG271).

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

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

**Lid**

48 To replace the lid, proceed as follows:

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

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

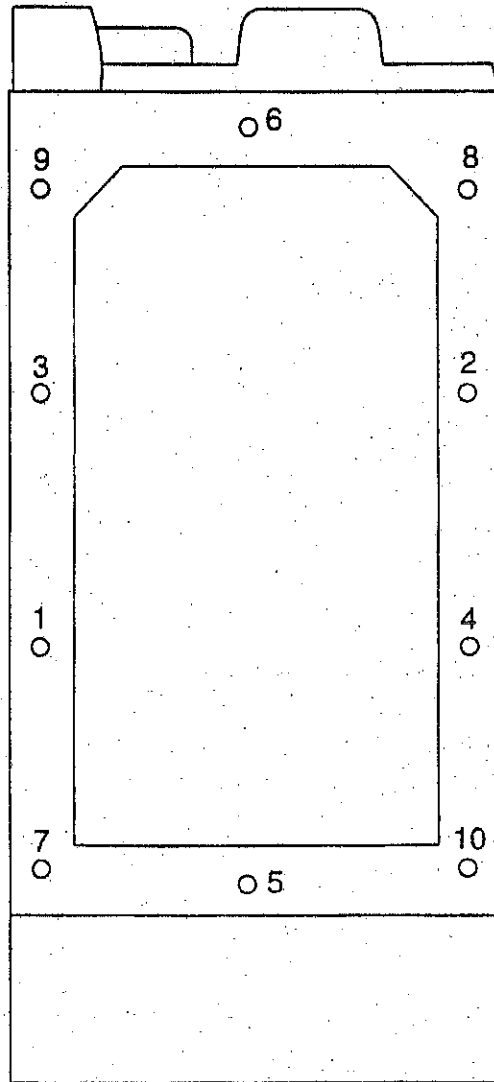


Fig 4 Screw tightening sequence





## SCREWS AND WASHERS

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

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

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

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

**GENERAL**

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

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

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

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

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

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

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

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

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

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

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



## SPECIFICATION TESTING - 8920C MANUAL MODE

### INTRODUCTION

#### CAUTION

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

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

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

#### CONDITION OF TEST

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

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

#### SPECIFICATION TEST INITIAL SETTING UP

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

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

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

#### NOTE

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

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

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

63.2.1 Press HELP to select RIU Manual Control.

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

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

#### EUT-to-8920C Interconnections

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

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

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

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

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

#### TEST 1 - PRELIMINARY TEST

##### Test limits

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

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

##### Initial settings

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

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

68.1 PSU.

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

68.2 2955B.

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

68.3 CIP.

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

68.4 EUT.

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

#### Test methods

- 69 To carry out the first check of Test 1 (Para 65), proceed as follows:
- 69.1 Connect the DMM to CIP MONITOR +VE with respect to -VE.
  - 69.2 Note the DMM indication which shall be zero (no current drawn by the EUT).
- 70 To carry out the second check of Test 1 (Para 66), proceed as follows:
- 70.1 Set the SSW on the EUT to W (Whisper).
  - 70.2 Press Tx TEST on the 2955B and observe that the transmit page is displayed with the AF generator off.
  - 70.3 Check the transmit frequency and power readings displayed on the 2955B display which shall be zero.
  - 70.4 Reconnect the DMM to the RIU DMM connectors.
  - 70.5 Press HELP to return to the Skeleton Test Menu.

#### TEST 2 - CURRENT CONSUMPTION

##### Test limits

- 71 With the d.c. supply set to 12 V  $\pm$ 0.2 V, the EUT current consumption limits shall be as follows:
- 71.1 Between 57 mA and 82 mA : receive mode.
  - 71.2 Between 4 mA and 9 mA : low battery state of the battery standby mode.
  - 71.3 Between 130 mA and 166 mA : transmit mode.

##### Initial settings

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

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

73.1 PSU

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

73.2 2955B

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

73.3 CIP.

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

73.4 EUT.

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

**Test methods**

- 74 To carry out the first check of Test 2 (Para 71.1), proceed as follows:
- 74.1 Connect the DMM to CIP MONITOR +VE with respect to -VE.
  - 74.2 Note the DMM indication which shall be LL 57 mV (57 mA), UL 82 mV (82 mA).
- 75 To carry out the second check of Test 2 (Para 71.2), proceed as follows:
- 75.1 Set the SSW on the EUT to L (Loud).
  - 75.2 Wait approximately 10 seconds and observe the DMM voltage indication which shall vary, approximately every second, between a high state (receive current, Para 71.1) and a low state which shall be LL 4 mV (4 mA), UL 9 mV (9 mA).
- 76 To carry out the third check of Test 2 (Para 71.3), proceed as follows:
- 76.1 Press and hold in the PRESSEL switch.
  - 76.2 Note the DMM voltage indication which shall be LL 130 mV (130 mA), UL 166 mV (166 mA).
  - 76.3 Release the PRESSEL switch.
  - 76.4 Reconnect the DMM to the RIU DMM connectors.
  - 76.5 Press HELP to return to the Skeleton Test Menu.

**TEST 3 - POWER OUTPUT INTO A 50 OHM LOAD**

**Test limits**

- 77 With the d.c. supply set to 9.5 V  $\pm$ 0.2 V, the EUT transmitted power output shall not be less than 100 mW at all frequencies.
- 78 With the d.c. supply set to 16 V  $\pm$ 0.2 V, the EUT transmitted power output shall not be greater than 475 mW at all frequencies.

**Initial settings**

- 79 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for Test 3.
- 80 Prior to carrying out Test 3, set up the 8920C and EUT controls and conditions as follows:

80.1 PSU.

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

80.2 2955B.

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

80.3 CIP.

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

80.4 EUT.

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

**Test methods**

**NOTE**

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

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

81.1 Press and hold in the PRESSEL switch.

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

81.3 Release the PRESSEL switch.

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

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

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

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

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

82.4 Press and hold in the PRESSEL switch.

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

82.6 Release the PRESSEL switch.

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



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

80.1 PSU.

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

80.2 2955B.

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

80.3 CIP.

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

80.4 EUT.

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

**Test methods**

**NOTE**

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

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

81.1 Press and hold in the PRESSEL switch.

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

81.3 Release the PRESSEL switch.

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

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

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

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

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

82.4 Press and hold in the PRESSEL switch.

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

82.6 Release the PRESSEL switch.

82.7 Carry out the procedure detailed in Para 82.4 to 82.6 for FSS settings of 45.050 MHz, 42.050 MHz, 39.050 MHz and 37.050 MHz.

82.8 Press HELP to return to the Skeleton Test Menu.

82.9 Set the PSU output voltage back to 12 V.

#### TEST 4 - ACCURACY OF RADIATED CARRIER

##### Test limits

83 The radiated frequency shall be within  $\pm 500$  Hz of the selected frequency.

##### Initial settings

84 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for Test 4.

85 Prior to carrying out Test 4, set up the 8920C and EUT controls and conditions as follows:

##### 85.1 PSU.

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

##### 85.2 2955B

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

##### 85.3 CIP.

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

##### 85.4 EUT.

- (1) FSS : 37.000 MHz
- (2) SSW : L (Loud)

##### Test method

86 To carry out this specification check (Para 83), proceed as follows:

86.1 Press and hold in the PRESSEL switch.

86.2 Check the Tx frequency reading on the 2955B display which shall be LL 36.999500 MHz, UL 37.000500 MHz.

86.3 Release the PRESSEL switch.

90.3 CIP.

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

90.4 EUT.

- |     |     |              |
|-----|-----|--------------|
| (1) | FSS | : 46.900 MHz |
| (2) | SSW | : L (Loud)   |

**Test methods**

91 To carry out both checks of Test 5 (Paras 87 and 88), proceed as follows:

91.1 Select the 2955B 300 Hz low pass filter.

91.2 Press and hold in the PRESSEL switch.

91.3 Check the modulation level reading on the 2955B display which shall be LL 1.55 kHz, UL 2.5 kHz.

91.4 Check the modulation frequency reading (due to the internal tone) on the 2955B display which shall be LL 148 Hz, UL 152 Hz.

91.5 Release the PRESSEL switch.

91.6 Repeat operations 91.2 to 91.5, but with the FSS on the EUT set, in turn, to 42.000 MHz, 42.075MHz and 37.000 MHz.

91.7 Press HELP to return to the Skeleton Test Menu.

**TEST 6 - MODULATION SENSITIVITY**

**Test limits**

92 The amplitude of a 1 kHz tone applied to the microphone socket to produce a deviation of the transmitter output of 3.5 kHz  $\pm$ 0.3 kHz shall be between 0.08 mV and 0.3 mV pd with the SSW set to W (Whisper).

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

**Initial settings**

94 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for Test 6.

95 Prior to carrying out Test 6, set up the 8920C and EUT controls and conditions as follows:

95.1 PSU.

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

95.2 2955B.

- (1) SET AF LOAD : 300R
- (2) Skeleton Test Set-up : Transmitter - Output and Modulation
- (3) AF ATTENUATION : 40 dB

95.3 CIP.

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

95.4 EUT.

- (1) FSS : 42.075 MHz
- (2) SSW : W (Whisper)

**Test methods**

96 To carry out the first check of Test 6 (Para 92), proceed as follows:

96.1 Set an AF generator frequency of 1 kHz and a level of approximately 170 mV, and set the AF generator on.

96.2 Press BAND PASS to select 0.3 - 3.4 kHz filter.

96.3 Press the PRESSEL switch, and adjust the VARIABLE rotary control on the 2955B until the display shows a modulation level of LL 3.2 kHz, LL 3.8 kHz.

96.4 Check the AF generator level which shall be LL 80 mV (0.08 mV pd), UL 300 mV (0.30 mV pd).

97 To carry out the second check of Test 6 (Para 93), proceed as follows:

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

97.2 With the test conditions set as above, press the PRESSEL switch and observe the modulation level reading on the 2955B which shall be LL 0.68 kHz, UL 1.48 kHz.

97.3 Press HELP to return to Manual Control and press SELECT to return to Skeleton Test Menu.

**TEST 7 - MODULATION CONTROL**

**Test limits**

98 With a 1 kHz  $\pm 10\%$  tone applied to the microphone socket at level of 20 mV  $\pm 2$  mV pd, the transmitter output deviation, due to this modulating tone only, shall not be greater than 6.5 kHz.

**Initial settings**

99 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for Test 7.

100 Prior to carrying out Test 7, set up the 8920C and EUT controls and conditions as follows:

100.1 PSU.

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

100.2 2955B.

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

100.3 CIP.

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

100.4 EUT.

- (1) FSS : 42.075 MHz
- (2) SSW : L (Loud)

**Test method**

101 To carry out this specification check (Para 98), proceed as follows:

101.1 Set an AF generator frequency of 1 kHz at a level of 200 mV and set the AF generator on.

101.2 Select the BAND PASS filter.

101.3 Press the PRESSEL switch, and observe the modulation level on the 2955B display which shall not be greater than 6.5 kHz.

101.4 Press HELP to return to the Skeleton Test Menu.

**Test limits**

102 With an AF input of 1 kHz  $\pm$ 10% at level of 10 mV rms, the AF output into 300 ohms with the EUT set to any frequency shall be between 240 mV and 360 mV.

**Initial settings**

103 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for Test 8.

104 Prior to carrying out Test 8, set up the 8920C and EUT controls and conditions as follows:

104.1 PSU.

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

104.2 2955B.

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

104.3 CIP.

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

104.4 EUT.

- (1) FSS : 42.050 MHz
- (2) SSW : L (Loud)

**Test method**

105 To carry out this specification check (Para 102), proceed as follows:

105.1 Set an AF generator frequency of 1 kHz at a level of 100 mV and set the AF generator on.

105.2 Press the PRESSEL switch, and observe the AF Volts reading on the 2955B display which shall be LL 240 mV, UL 360 mV.

105.3 Press HELP to return to the Skeleton Test Menu.

**TEST 8 - SIDETONE**

**Test limits**

102 With an AF input of 1 kHz  $\pm$ 10% at level of 10 mV rms, the AF output into 300 ohms with the EUT set to any frequency shall be between 240 mV and 360 mV.

**Initial settings**

103 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for Test 8.

104 Prior to carrying out Test 8, set up the 8920C and EUT controls and conditions as follows:

104.1 PSU.

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

104.2 2955B.

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

104.3 CIP.

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

104.4 EUT.

- (1) FSS : 42.050 MHz
- (2) SSW : L (Loud)

**Test method.**

105 To carry out this specification check (Para 102), proceed as follows:

105.1 Set an AF generator frequency of 1 kHz at a level of 100 mV and set the AF generator on.

105.2 Press the PRESSEL switch, and observe the AF Volts reading on the 2955B display which shall be LL 240 mV, UL 360 mV.

105.3 Press HELP to return to the Skeleton Test Menu.

## TEST 9 - RECEIVER SENSITIVITY

### Test limits

106 The signal+noise-to-noise ratio caused by an RF signal of 2  $\mu$ V emf, with standard modulation, shall not be less than 14 dB.

### Initial settings

107 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for Test 9.

108 Prior to carrying out Test 9, set up the 8920C and EUT controls and conditions as follows:

#### 108.1 PSU.

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

#### 108.2 2955B.

- (1) SET AF LOAD : 300R
- (2) Skeleton Test Set-up : Receiver - Audio Output

#### 108.3 CIP.

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

#### 108.4 EUT.

- (1) FSS : 37.025 MHz
- (2) SSW : \* (Noise on)

### Test method

109 To carry out this specification check (Para 106), proceed as follows:

109.1 Set an RF generator frequency of 37.025 MHz and a level of -106 dBm, and set the RF generator on.

109.2 Set a modulation frequency of 1 kHz at a level of 5 kHz and set the modulation on.

109.3 Adjust the VOLUME control on the 2955B until the tone can be heard.

109.4 Press dB on the 2955B to set dBR to zero.

109.5 Set the modulation off and note the dBR reading on the 2955B display which shall be less than -14 dB.

109.6 Repeat operations 109.1 to 109.5 for FSS and RF GEN settings, in turn, of 39.025 MHz, 42.025 MHz, 45.525 MHz and 46.925 MHz.

109.7 Press HELP to return to the Skeleton Test Menu.



**TEST 10 - LIMITING**

**Test limits**

110 With a modulated RF signal applied to the antenna socket on the EUT, the audio output in the receive mode shall not change by more than 1.5 dB when the RF signal level is increased from 2  $\mu$ V emf to 100 mV emf.

**Initial settings**

111 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for Test 10.

112 Prior to carrying out Test 10, set up the 8920C and EUT controls and conditions as follows:

112.1 PSU.

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

112.2 2955B.

- (1) SET AF LOAD : 300R
- (2) Skeleton Test Set-up : Receiver - Audio Output
- (3) RF SELECT : HI SENS

112.3 CIP.

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

112.4 EUT.

- (1) FSS : 42.050 MHz
- (2) SSW : \*\* (Noise on

**Test method**

113 To carry out this specification check (Para 110), proceed as follows:

113.1 Press SELECT on the 2955B to select the BNC RF connection path.

113.2 Set an RF generator frequency of 42.050 MHz at a level of -106.5 dBm and set the RF generator on.

113.3 Set a modulation frequency of 1 kHz at level of 5 kHz and set the modulation on.

113.4 Press dB on the 2955B to set dBR to zero.

113.5 Set RF generator level to -12.5 dBm and observe the dBR reading which shall not be greater than 1.5 dB.

113.6 Press SELECT on the 2955B to select the N-type RF IN/OUT connector.

113.7 Press HELP to return to Manual Control and press SELECT to return to Skeleton Test Menu.

## TEST 11 - SQUELCH SENSITIVITY

### Test limits

114 The sensitivity of the squelch circuit to an external 150 Hz  $\pm$ 2 Hz tone is such that at the 2 dB quieting level, the squelch will be closed, and at the 9 dB quieting level, the squelch will be open.

### Initial settings

115 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for Test 11.

116 Prior to carrying out Test 11, set up the 8920C and EUT controls and conditions as follows:

#### 116.1 PSU.

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

#### 116.2 2955B.

- (1) SET AF LOAD : 300R
- (2) Skeleton Test Set-up : Receiver - Audio Output

#### 116.3 CIP.

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

#### 116.4 EUT.

- (1) FSS : 42.050 MHz
- (2) SSW : \* (Noise on)

### Test method

117 To carry out this specification check (Para 114), proceed as follows:

117.1 Set an RF generator frequency of 42.050 MHz, set the RF level to -135 dBm and set the RF generator on.

117.2 Set a modulation frequency of 150 Hz at a level of 1.3 kHz and set the modulation on.

117.3 Press dB to set dBR to zero (the indication may be varying around zero).

117.4 Using the VARIABLE rotary control on the 2955B, increase the RF generator level to set the displayed dBR reading to -2 dB.

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

117.6 Note the squelch condition which shall be closed (no noise from the loudspeaker).

117.7 Set the SSW on the EUT to \* (Noise on).

117.8 Adjust the VARIABLE rotary control on the 2955B to set the dBR reading to -9 dB.

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

117.10 Note the squelch condition which shall be open (noise present from loudspeaker).

117.11 Press HELP to return to the Skeleton Test Menu.

## TEST 12 - AF POWER OUTPUT

### Test limits

118 With a RF signal modulated by 1 kHz  $\pm$  10% at 5 kHz deviation and 150 Hz  $\pm$  2 Hz at 1.5 kHz deviation, and at a level of 1 mV emf, the audio output shall be:

118.1 Between 460 mV and 640 mV into 300 ohms in L (Loud) mode.

118.2 Between 17.5 dB and 22.5 dB below the L mode level (Para 118.1) when in W (Whisper) mode.

### Initial settings

119 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for Test 12.

120 Prior to carrying out Test 12, set up the 8920C and EUT controls and conditions as follows:

#### 120.1 PSU.

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

#### 120.2 2955B.

- (1) SET AF LOAD : 300R
- (2) Skeleton Test Set-up : Receiver - Audio Output

#### 120.3 CIP.

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

#### 120.4 EUT.

- (1) FSS : 42.050 MHz
- (2) SSW : L (Loud)

### Test methods

121 To carry out the first check of Test 12 (Para 118.1), proceed as follows:

121.1 Set a RF generator frequency of 42.050 MHz at a level of -52.8 dBm and set the RF generator on.

121.2 Set a modulation frequency of 1 kHz at a level of 5 kHz and set the modulation on.

121.3 Set a second (MOD 2) modulation frequency of 150 Hz at a level of 1.5 kHz and set the second modulation generator on.

121.4 Observe the AF Volts reading on the 2955B display which shall be LL 460 mV, UL 640 mV.

122 To carry out the second check of Test 12 (Para 118.2), proceed as follows:

122.1 With the test conditions set as above for the first check, press dB on the 2955B to set dBR to zero.

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

122.3 Observe the dBR level on the 2955B display which shall be LL -22.5 dB, UL -17.5 dB.

122.4 Press HELP to return to the Skeleton Test Menu.

### TEST 13 - LOW BATTERY WARNING

#### Test limits

123 The low battery warning shall operate for a supply voltage of between 9.4 V d.c. and 9.8 V d.c.

#### Initial settings

124 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for Test 13.

125 Prior to carrying out Test 13, set up the 8920C and EUT controls and conditions as follows:

125.1 PSU.

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

125.2 2955B.

- (1) SET AF LOAD : 300R
- (2) Skeleton Test Set-up : Receiver - Audio Output

125.3 CIP.

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

125.4 EUT.

- (1) FSS : 42.050 MHz
- (2) SSW : L (Loud)

#### Test method

126 To carry out this specification check (Para 123), proceed as follows:

126.1 Adjust the VOLTAGE ADJUST control on the Farnell power supply to slowly reduce the EUT d.c. input supply until regular bursts of noise are heard from the loudspeaker. Observe the PSU voltage indication which shall be LL 9.4 V, UL 9.8 V.

126.2 Press HELP to return to the Skeleton Test Menu.

126.3 Set the PSU output voltage back to 12 V.

#### TEST 14 - BATTERY-SAVING PERIOD AND DELAY

##### Test limits

127 The time interval after transmitting and before battery saving occurs shall be between 9 and 17 seconds.

128 The supply switching period shall be between 1.25 seconds and 1.95 seconds.

##### Initial settings

129 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for Test 14.

130 Prior to carrying out Test 14, set up the 8920C and EUT controls and conditions as follows:

##### 130.1 PSU.

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

##### 130.2 2955B.

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

##### 130.3 CIP.

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

##### 130.4 EUT.

- (1) FSS : 42.050 MHz
- (2) SSW : W (Whisper)

##### Test methods

131 To carry out the first check of Test 14 (Para 127), proceed as follows:

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

131.2 Press and hold in the PRESSEL switch.

131.3 On releasing the PRESSEL switch, note the time it takes for the DMM voltage to start pulsing which shall be LL 9 seconds, UL 17 seconds.

132 To carry out the second check of Test 14 (Para 128), proceed as follows:

132.1 For the test conditions as described above (Para 131), note the time duration for 10 such pulses to occur which shall be LL 12 seconds, UL 20 seconds.

132.2 Reconnect the DMM to the RIU DMM connectors.

132.3 Press HELP to return to the Skeleton Test Menu.

### ADDITIONAL TESTS

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

#### Test 15 - variation of deviation with channel frequency

##### Test limits

134 With a standard AF tone applied to the microphone socket, the deviation of the transmitter output, due to this tone, shall not vary from its nominal value by more than  $\pm 15\%$  for any transmitter frequency.

##### Initial settings

135 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for Test 15.

136 Prior to carrying out Test 15, set up the 8920C and EUT controls and conditions as follows:

##### 136.1 PSU.

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

##### 136.2 2955B.

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

##### 136.3 CIP.

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

##### 136.4 EUT.

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

##### Test method

137 To carry out this specification test, proceed as follows:

137.1 Set an AF generator frequency of 1 kHz at a level of approximately 8 mV and set the AF generator on.

137.2 Select the BAND PASS filter.

137.3 Press the PRESSEL switch, and adjust the 2955B VARIABLE rotary control to set the modulation level to 5 kHz  $\pm 0.05$  kHz. Note the modulation level:

137.4 Press the PRESSEL switch and note the modulation level for EUT frequency settings of 39.050 MHz, 41.050 MHz, 43.050 MHz, 45.050 MHz and 46.950 MHz.

137.5 Add the maximum and minimum deviation readings together and divide the result by 2. Call this result 'A'.

137.6 Subtract result 'A' from the maximum deviation reading. Call this result 'B'.

137.7 Calculate the percentage deviation variation using the following formula, and the result shall be UL  $\pm 15\%$ :

$$\frac{B}{A} \times \frac{100}{1} = \pm\%$$

137.8 Press HELP to return to the Skeleton Test Menu.

### Test 16 - spurious responses

#### Test limits

138 The second channel rejection shall be greater than 100 dB at any frequency.

#### Initial settings

139 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for Test 16.

140 Prior to carrying out Test 16, set up the 8920C and EUT controls and conditions as follows:

#### 140.1 PSU.

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

#### 140.2 2955B.

- (1) SET AF LOAD : 300R
- (2) Skeleton Test Set-up : Receiver - Audio Output
- (3) RF SELECT : HI SENS

#### 140.3 CIP.

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

#### 140.4 EUT.

- (1) FSS : 37.025 MHz
- (2) SSW : \* (Noise on)

#### Test method

141 To carry out this specification test, proceed as follows:

141.1 Select 2955B RF IN/OUT BNC connector.

141.2 Set an RF generator frequency of 37.025 MHz at a level of -112.5 dBm and set the RF generator on.

- 141.3 Ensure the modulation is off and set dBR to zero.
- 141.4 Set the RF generator frequency to 79.825 MHz.
- 141.5 Increase the RF generator level until the dBR reading returns to zero.
- 141.6 Observe the RF generator level which shall be greater than -12.5 dBm.
- 141.7 Press SELECT to select the 2955B RF IN/OUT N connector.
- 141.8 Press HELP to enter RIU Manual Control, select RF SELECT - NORMAL and press SELECT to return to the Skeleton Test Menu.

### SPECIAL TESTS

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

143 Connect a Spectrum Analyser to RIU INST A connector.

#### NOTE

The INST A output is approximately 30 dB down on the signal at the RIU ANT IN connector.

#### Transmitter spurious radiation (non-harmonic) test

##### Test limits

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

#### Transmitter spurious radiation (harmonic) test

##### Test limits

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

#### Receiver spurious emission test

##### Test limits

146 The level of any internally generated unwanted signal, within the frequency range 1 MHz to 500 MHz, shall not exceed 100  $\mu$ V emf when measured at the antenna adaptor output terminated into a 50 ohm load.



## ALIGNMENT

## INTRODUCTION

147 All RT-349 radio alignment procedures may be carried out with the EUT unsealed (lid removed) except the adjustments associated with assembly 10 (Paras 167 to 174), which require the motherboard (with all assemblies) to be fitted into the motherboard assembly test jig (Paras 50 and 51). All alignment procedures may also be carried out when the motherboard (with all assemblies) is fitted into the motherboard assembly test jig.

148 When the motherboard assembly is refitted into the RT-349 box assembly, the SET SQU preset control setting may need to be rechecked. Some adjustment or re-alignment may be required after fitting replacement assemblies into the RT-349 and these should be carried out before any specification tests are attempted. A summary of the adjustments required for a particular assembly is given in Table 4. Special test probes are provided in the FRTK for use when monitoring motherboard parameters.

TABLE 4 ADJUSTMENT AND ALIGNMENT SUMMARY

| Replacement assembly fitted | Adjustment/alignment check if required                                                                  | Paragraph  |
|-----------------------------|---------------------------------------------------------------------------------------------------------|------------|
| 4                           | 4T3 (assembly 4)<br>SET SQU (assembly 5)                                                                | 150 to 153 |
| 5                           | SET SQU (assembly 5)                                                                                    | 154 to 157 |
| 6                           | 4T3 (assembly 4)<br>SET SQU (assembly 5)                                                                | 150 to 153 |
| 7                           | 7L1 and 7C3 (assembly 7)<br>7L2 and 7C4 (assembly 7)<br>SET 150 Hz (assembly 8)<br>SET MOD (assembly 8) | 158 to 162 |
| 8                           | SET 150 Hz (assembly 8)<br>SET MOD (assembly 8)                                                         | 163 to 166 |
| 9                           |                                                                                                         |            |
| 10                          | 7L1 and 7C3 (assembly 7)<br>7L2 and 7C4 (assembly 7)                                                    | 167 to 174 |

149 Adjustment holes in the assembly screening cans give access to preset controls used during manufacture. Some are blanked off and others are circled and inscribed in red. No adjustments to these controls should be necessary at Field level.

## ASSEMBLY 4 (4T3 SETTING)

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

## Initial settings

151 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for this alignment activity.

152 Prior to carrying out this alignment activity, set up the 8920C and EUT controls and conditions as follows:

152.1 PSU.

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

152.2 2955B.

- (1) SET AF LOAD : 300R
- (2) Skeleton Test Set-up : Receiver - Audio Output

152.3 CIP.

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

152.4 EUT.

- (1) FSS : 42.050 MHz
- (2) SSW : \* (Noise on)

**Method**

153 To carry out this alignment activity, proceed as follows:

153.1 Set the RF generator frequency to 42.050 MHz at a level of -106.8 dBm and set the RF generator on.

153.2 Set up a modulation frequency of 1 kHz at a deviation level of 5 kHz and set the modulation on.

153.3 Set the 2955B distortion meter on.

153.4 Using the plastic adjustment tool, adjust transformer 4T3 to achieve minimum distortion.

153.5 Set distortion meter off.

**ASSEMBLY 5 (SET SQU SETTING)**

154 The SET SQU control (assembly 5) may need to be reset when a new assembly 4, 5 or 6 is fitted.

**Initial settings**

155 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for this alignment activity.

156 Prior to carrying out this alignment activity, set up the 8920C and EUT controls and conditions as follows:

156.1 PSU.

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

156.2 2955B.

- (1) SET AF LOAD : 300R
- (2) Skeleton Test Set-up : Receiver - Audio Output

156.3 CIP.

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

156.4 EUT.

- (1) FSS : 42.050 MHz
- (2) SSW : \* (Noise on)

**Method**

157 To carry out this alignment activity, proceed as follows:

157.1 Set the RF generator frequency to 42.050 MHz at a level of -135 dBm and set RF generator on.

157.2 Set up a modulation frequency of 150 Hz at a level of 1.2 kHz and set modulation on.

157.3 Using the adjustment tool, set SET SQU fully clockwise.

157.4 Press dB on the 2955B to set dBR to zero.

157.5 Using the VARIABLE rotary control, increase the RF generator level until the reading is -6 dB.

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

157.7 Adjust SET SQU counter-clockwise until the noise returns (squelch opens).

157.8 Set the RF generator off and confirm that the squelch closes (noise stops).

### ASSEMBLY 7 (Rx and Tx OSCILLATOR SETTINGS)

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

#### Initial settings

159 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for this alignment activity.

160 Prior to carrying out this alignment activity, set up the 8920C and EUT controls and conditions as follows:

#### 160.1 PSU.

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

#### 160.2 2955B.

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

#### 160.3 CIP.

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

#### 160.4 EUT.

- (1) FSS : 37.500 MHz
- (2) SSW : \* (Noise on)

#### Methods

161 To carry out the Rx oscillator alignment activity, proceed as follows:

161.1 Connect the CRO input to either 3SK8/1 or 3TP1 (assembly 8 has to be removed from the motherboard to gain access to 3TP1) via a high impedance (x10, 11 pF) probe.

161.2 Set the CRO to 'positive trigger', and check that positive polarity is displayed upwards. Adjust the CRO timebase so that one cycle equals 9 cm and note that the waveform is as shown in Fig 6.

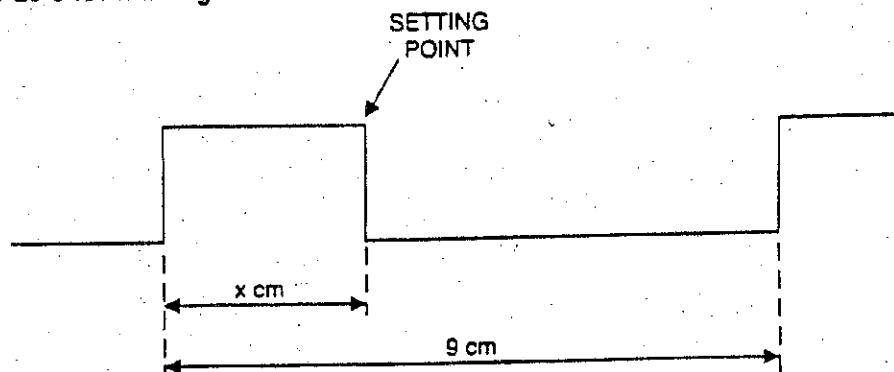


Fig 6 Tx and Rx oscillator alignment waveform

NOTE

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

- 161.3 Using the plastic adjustment tool, adjust 7L1 so that 'x' equals 4.5 cm  $\pm$ 0.5 cm.
- 161.4 Set FSS on the EUT to 46.500 MHz and, using the metal adjustment tool (Table 2, Serial 8), adjust 7C3 so that 'x' equals 4.5 cm  $\pm$ 0.5 cm.
- 161.5 If necessary, repeat operations 161.3 and 161.4 until the correct result is obtained.
- 161.6 Check that 'x' is between 2 cm and 7 cm for EUT FSS frequency settings of 37.000 MHz, 37.900 MHz, 42.000 MHz, 42.900 MHz, 46.000 MHz and 46.900 MHz.
- 161.7 If the correct result cannot be achieved for the frequencies covered in operation 161.6, (eg 'x' is less than 2 cm), repeat operations 161.3 to 161.5 to obtain a higher setting point of say 4.8 cm  $\pm$ 0.5 cm. Then repeat operation 161.6.
- 162 To carry out the Tx oscillator alignment activity, proceed as follows:
- 162.1 Set up and connect the 8920C, CRO and EUT as for the Rx oscillator alignment activity (Paras 161.1 to 161.6).
- 162.2 Press HELP, enter RIU Manual Control and select TRANSMIT - ON.
- 162.3 Press HELP to return to 2955B manual operation.
- 162.4 Carry out alignment operations as for Rx oscillator alignment (Paras 161.3 to 161.7), but adjusting coil 7L2 at 37.500 MHz and capacitor 7C4 at 46.500 MHz.
- 162.5 Press HELP to return to RIU Manual Control and select TRANSMIT - OFF.
- 162.6 Press SELECT on the 2955B to return to the Skeleton Test Menu.

**ASSEMBLY 8 (SET 150 Hz AND SET MOD SETTINGS)**

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

**Initial settings**

164 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for this alignment activity.

165 Prior to carrying out this alignment activity, set up the 8920C and EUT controls and conditions as follows:

165.1 PSU.

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

165.2 2955B.

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

165.3 CIP.

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

165.4 EUT.

- (1) FSS : 37.000 MHz
- (2) SSW : L (Loud)

**Method**

166 To carry out the SET 150 Hz and SET MOD alignment activities, proceed as follows:

166.1 Press BAND PASS to select 0.3 kHz to 3.4 kHz filter.

166.2 Set the SET 150 Hz control fully counter-clockwise in order to remove deviation caused by the 150 Hz tone.

166.3 Set an AF level of 100 mV and set the AF generator on.

166.4 Press and hold the PRESSEL switch and note the deviation reading on the 2955B display.

166.5 Note the deviation readings for EUT FSS settings, in turn, of 37.050 MHz, 39.050 MHz, 41.050 MHz, 43.050 MHz, 45.050 MHz and 46.975 MHz.

166.6 At the frequency which produces the highest deviation, adjust the SET MOD control to produce a deviation of  $\pm 5.7$  kHz.

166.7 Set the AF generator off.

166.8 Select the 300 Hz low pass filter.

166.9 Press the PRESSEL switch and note the deviation due to noise only.

166.10 Press the PRESSEL switch while adjusting the SET 150 Hz control for a modulation level of 2.45 kHz plus the deviation due to noise (Para 166.9).

### ASSEMBLY 10

167 After replacing a sub-assembly within the synthesizer, the following alignment procedures should be carried out with the motherboard (with all assemblies) fitted in the motherboard assembly test jig (Paras 50 and 51).

#### Initial settings

168 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for this alignment activity.

169 Prior to carrying out this alignment activity, set up the 8920C and EUT controls and conditions as follows:

#### 169.1 PSU.

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

#### 169.2 2955B.

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

#### 169.3 CIP.

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

#### 169.4 EUT.

- (1) FSS : 46.000 MHz
- (2) SSW : 0 (Off)

169.5 Ensure that the EUT is switched off and replace the normal assembly screening cover with the dummy synthesizer cover (Table 2; Serial 6) and hand-tighten the captive retainers.

169.6 Switch the EUT to \* (Noise on).

#### Set 6 volts

##### Method

170 To set the EUT internal 6 V d.c. level, proceed as follows:

170.1 Set the DMM to d.c. volts.

170.2 Connect the DMM positive lead to 3SK7/8 (VT COARSE).

170.3 Adjust 10aR18 (SET 6 V) for a DMM indication of LL 5.98 V, UL 6.00 V.

170.4 Remove the DMM leads and reconnect them to the RIU unit.

### Set reference oscillator frequency

#### Method

171 To set the reference oscillator frequency, proceed as follows:

171.1 Press SELECT on the 2955B to select the BNC RF connector and disconnect the cable from the BNC RF connector.

171.2 Connect a x1 probe to the 2955B BNC RF connector and connect the probe to 10TP5 (REF) on the dummy cover.

171.3 Adjust 10bC17 (SET REF) for 2955B frequency reading of LL 3.200000 MHz, UL 3.200100 MHz.

171.4 Remove the probe from 10TP5.

171.5 Remove the probe lead from the 2955B BNC RF connector and press SELECT on the 2955B to reselect the N-type RF connector.

171.6 Connect the RF cable (previously removed) to the 2955B BNC RF connector.

### Rx and Tx oscillators (assembly 7)

#### NOTES

(1) Assembly 7 components 7L1 and 7C3 interact with assembly 10 components 10aL1 and 10aC1 in the receive path, and assembly 7 components 7L2 and 7C4 interact with assembly 10 components 10aL6 and 10aC13 in the transmit path.

(2) Following Rx (Tx) oscillator (assembly 7) alignment, it may not be possible to set the RX (Tx) oscillator frequency without further adjustment of the Rx (Tx) oscillator (assembly 7), as the pulses on the oscilloscope set during assembly 7 alignment may not remain stable during assembly 10 adjustment.

172 Align the Rx and Tx oscillators (Paras 158 to 162).

### Set Rx oscillator frequency

173 To set the Rx oscillator frequency, proceed as follows:

173.1 Enter RIU Manual Control and select FREQUENCY B - RF AMP.

173.2 Follow the connection details displayed on screen and as shown in Fig 7. Connect a x1 probe from the 2955B RF IN/OUT BNC connector to 3SK4/12 (RXO) on the EUT.

173.3 Connect the CRO input to either 3SK8/1 or 3TP1 via a high impedance (x10, 11 pF) probe.

#### NOTE

Assembly 8 has to be removed from the motherboard to gain access to 3TP1.

173.4 Set the FSS on the EUT to 37.000 MHz and SSW to \* (Noise on).



173.5 Adjust SET FREQ RX (10aC1) to its mid position and adjust RX L1 (10aL1) for a 2955B frequency reading of LL 58.399800 MHz, UL 58.400100 MHz. Ensure that the oscilloscope displays stable pulses throughout the adjustment.

173.6 Set the FSS on the EUT to 46.975 MHz.

173.7 If necessary, adjust SET FREQ RX (10aC1) for a 2955B Tx frequency reading of LL 68.374800 MHz, UL 68.375100 MHz. Ensure that the oscilloscope displays stable pulses throughout the adjustment.

173.8 Repeat operations 173.4 to 173.7 until no further adjustment is necessary. If a satisfactory adjustment is not possible, it may be necessary to realign the Rx oscillator (Paras 161.3 to 161.7) before repeating operations 173.4 to 173.7.

#### NOTE

Adjustments 161.3 to 161.7 and 173.4 to 173.7 can be performed with the test system in its current configuration.

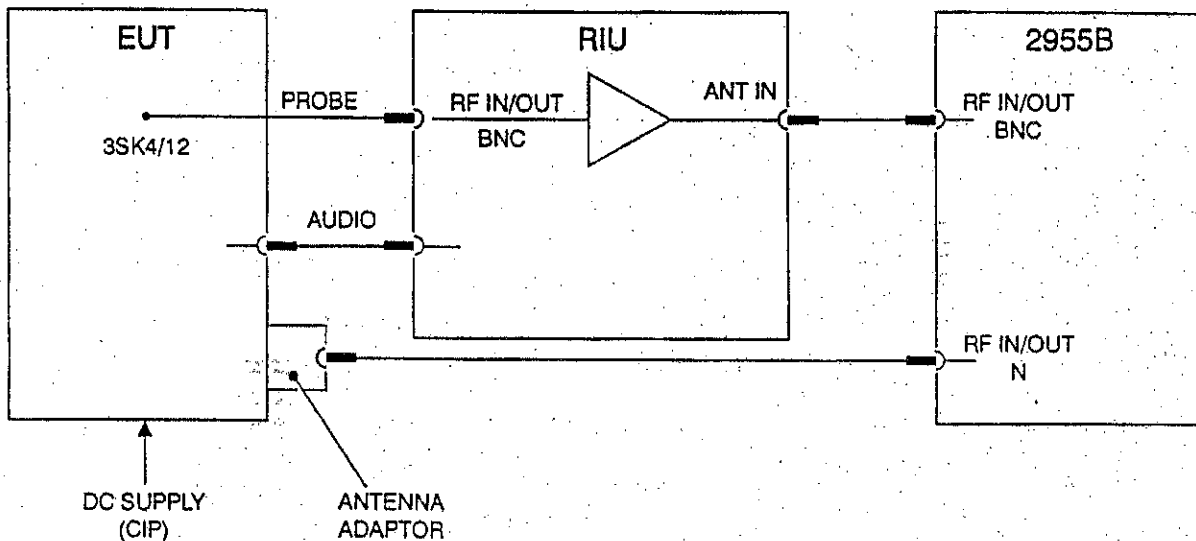


Fig 7 Frequency measurement B interconnection diagram

#### Set Tx oscillator frequency

174 To set the Tx oscillator frequency, proceed as follows:

174.1 Connect the x1 probe to 3SK4/6 (TXO).

174.2 Set the FSS on the EUT to 46.975 MHz.

174.3 Adjust SET FREQ Tx (10aC13) to its mid position.

174.4 Set Tx ON and adjust TX L6 (10aL6) for a frequency reading of LL 46.974800 MHz, UL 46.975100 MHz. Ensure that the oscilloscope displays stable pulses throughout the adjustment.

174.5 Set the FSS on the EUT to 37.000 MHz.

174.6 If necessary, adjust SET FREQ RX (10aC13) for a 2955B Tx frequency reading of LL 36.999800 MHz, UL 37.000100 MHz. Ensure that the oscilloscope displays stable pulses throughout the adjustment.

174.7 Repeat operations 174.2 to 174.6 until no further adjustment is necessary. If a satisfactory adjustment is not possible, it may be necessary to realign the Tx oscillator (Para 162.4) before repeating operations 174.2 to 174.6.

NOTE

Adjustments 162.4 and 174.2 to 174.6 can be performed with the test system in its current configuration using the TX ON/OFF softkeys.

174.8 Set Tx OFF when adjustments are complete.

174.9 Exit Frequency Measurement B to RIU Manual Control. Disconnect the probe from the EUT and return the RF cables to the normal connection configuration for the RT-349. Disconnect the oscilloscope from the EUT.

174.10 Finally, check for correct operation of the complete synthesizer, as follows:

174.10.1 Press SELECT to return to the Skeleton Test Menu.

174.10.2 Ensure that the SET AF LOAD selection is 300R, and select the Receiver -Audio Output skeleton test set up.

174.10.3 Disconnect the cable from the 2955B AF INPUT BNC socket.

174.10.4 Connect the lead of a x10 probe to the 2955B AF INPUT connector and connect the probe to 3SK8/1.

174.10.5 Select the 2955B SCOPE function and check for stable pulses at a frequency of 3.125 kHz for various FSS settings in Rx and Tx mode (for PRESSEL switch depressed and released).

174.10.6 Disconnect the probe lead and probe and reconnect the 2955B AF IN cable.

174.11 Switch the EUT off and replace the synthesizer dummy cover with the normal screening cover.

**CRYSTAL AGEING ADJUSTMENT**

175 The following adjustments may be made to compensate for crystal ageing when the transmit frequency exceeds  $\pm 500$  Hz of its nominal setting.

175.1 Resetting of Rx oscillator frequency as per Para 173.

175.2 Resetting of Tx oscillator frequency as per Para 174.

**ADJUSTMENTS NOT NORMALLY CARRIED OUT**

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

**Set 9 volts (assembly 9)**

Initial settings

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

178 Prior to carrying out this adjustment activity, set up the 8920C and EUT controls and conditions as follows:

178.1 PSU.

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

178.2 2955B.

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

178.3 CIP.

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

178.4 EUT.

- (1) FSS : 42.050 MHz
- (2) SSW : \* (Noise on)

Method

179 To carry out the adjustment, proceed as follows:

179.1 Connect the DMM positive lead to 3SK5/2 (9V CONST). If this adjustment is to be carried out with the motherboard assembly in the radio box assembly, assembly 5 will have to be removed to enable access to 3SK5/2.

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

179.3 Reconnect the DMM leads to the DMM connectors on the RIU unit.

**Set low battery warning voltage (assembly 9)**

Initial settings

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

181 Prior to carrying out this adjustment activity, set up the 8920C and EUT controls and conditions as follows:

181.1 PSU.

- (1) Voltage : 9.6 V
- (2) Current Limit : 1 A

181.2 2955B.

- (1) SET AF LOAD : 300R
- (2) Skeleton Test Set-up : Receiver - Audio Output

181.3 CIP.

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

181.4 EUT.

- (1) FSS : 42.050 MHz
- (2) SSW : L (Loud)
- (3) ANT : Remove RF cable

Method

182 To carry out the adjustment, proceed as follows:

182.1 Set SET LB fully counter-clockwise.

182.2 Slowly rotate SET LB clockwise and stop at the position where regular bursts of noise are heard from the loudspeaker.

182.3 Reconnect the RF cable to EUT.

182.4 Reset the PSU output voltage to 12 V.

**Set audio output (assembly 5)**

Initial settings

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

184 Prior to carrying out this adjustment activity, set up the 8920C and EUT controls and conditions as follows:

184.1 PSU.

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

184.2 2955B.

- (1) SET AF LOAD : 300R
- (2) Skeleton Test Set-up : Receiver - Audio Output

184.3 CIP.

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

184.4 EUT.

- (1) FSS : 42.050 MHz
- (2) SSW : \* (Noise on)

Method

185 To carry out the adjustment, proceed as follows:

185.1 Set a modulation level of 1 kHz and deviation of 5 kHz, and set modulation to on.

185.2 Set a RF generator frequency of 42.050 MHz at a level of -52.8 dBm (1 mV emf) and set the RF generator on.

185.3 Adjust the SET AF control for an AF level indication of LL 520 mV, UL 580 mV.

**Set 150 Hz rejection (assembly 5)**

Initial settings

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

187 Prior to carrying out this adjustment activity, set up the 8920C and EUT controls and conditions as follows:

187.1 PSU.

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

187.2 2955B.

- (1) SET AF LOAD : 300R
- (2) Skeleton Test Set-up : Receiver - Audio Output

187.3 CIP.

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

187.4 EUT.

- (1) FSS : 42.050 MHz
- (2) SSW : \* (Noise on)

Method

188 To carry out the adjustment, proceed as follows:

188.1 Set a modulation level of 150 Hz at a deviation level of 1.5 kHz, and set modulation to on.

188.2 Set a RF generator frequency of 42.050 MHz at a level of -52.8 dBm (1 mV emf) and set the RF generator on.

188.3 Adjust the SET REJ control for a minimum AF Volts indication on the 2955B.

**FUNCTIONAL TESTS**

**GENERAL**

189 The following functional tests should be carried out for periodically checking the serviceability of RT-349 radios and as the first level of RT-349 failure diagnosis. Before carrying out the functional tests, ensure that the manual mode setup and preliminary specification test Test 1 (Paras 65 to 70) have been carried out.

**FUNCTIONAL TEST 1 (POWER OUTPUT)**

**Test limits**

190 With a d.c. supply of 12 V  $\pm$ 0.2 V, the transmitter power output shall be between 130 mW and 350 mW at any permitted frequency.

**Initial settings**

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

192 Prior to carrying out this functional test, set up the 8920C and EUT controls and conditions as follows:

192.1 PSU.

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

192.2 2955B.

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

192.3 CIP.

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

192.4 EUT.

- (1) FSS : 42.050 MHz
- (2) SSW : \* (Noise on)

**Test method**

**NOTE**

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

193 To carry out this functional test, proceed as follows:

193.1 Press the PRESSEL switch and check the following:

193.1.1 Transmitter frequency indication which shall be the nominal setting on the EUT.

193.1.2 Transmitter power indication which shall be LL 122 mW (130 mW), UL 336 mW (350 mW).

193.2 Repeat Para 193.1 operations, but for EUT frequency settings of 37.000 MHz and 46.975 MHz

193.3 Press HELP to return to the Skeleton Test Menu.

### FUNCTIONAL TEST 2 (150 Hz MODULATION)

#### Test limits

194 The frequency of the internal tone shall be between 148 Hz and 152 Hz.

195 The deviation of the transmitter output caused by the internal 150 Hz tone shall be between 1.55 kHz and 2.5 kHz.

#### Initial settings

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

197 Prior to carrying out this functional test, set up the 8920C and EUT controls and conditions as follows:

197.1 PSU.

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

197.2 2955B.

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

197.3 CIP.

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

197.4 EUT.

- (1) FSS : 42.050 MHz
- (2) SSW : L (Loud)



### Test method

198 To carry out the first and second checks of Functional Test 2 (Paras 194 and 195), proceed as follows:

198.1 Press LOW PASS to select a 300 Hz low pass filter.

198.2 Press the PRESSEL switch and note the modulation frequency indication which shall be LL 148 Hz, UL 152 Hz and the modulation level which shall be LL 1.55 kHz, UL 2.5 kHz.

198.3 Press HELP to return to the Skeleton Test Menu.

### FUNCTIONAL CHECK 3 (AUDIO MODULATION)

#### Test limits

199 With an AF input of 3 mV rms pd, the transmitter frequency deviation shall be between 4.1 kHz and 6.4 kHz.

#### Initial settings

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

201 Prior to carrying out this functional test, set up the 8920C and EUT controls and conditions as follows:

201.1 PSU.

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

201.2 2955B.

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

201.3 CIP.

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

201.4 EUT.

- (1) FSS : 42.050 MHz
- (2) SSW : L (Loud)

#### Test method

202 To carry out this functional test, proceed as follows:

202.1 Press BAND PASS twice to select the 0.3 kHz to 3.4 kHz filter.

202.2 Set an AF frequency of 1 kHz at a level of 30 mV and set the AF generator on.

202.3 Press the PRESSEL switch and observe the modulation level indication which shall be LL  $\pm 4.1$  kHz, UL  $\pm 6.4$  kHz.

202.4 Press HELP to return to the Skeleton Test Menu

#### FUNCTIONAL TEST 4 (SIDETONE)

##### Test limits

203 With an AF input of 1 kHz  $\pm$ 10% at a level of 10 mV rms, the AF output into 300 ohms, with the EUT set to any frequency, shall be between 240 mV and 360 mV.

##### Initial settings

204 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for Functional Test 4.

205 Prior to carrying out this functional test, set up the 8920C and EUT controls and conditions as follows:

##### 205.1 PSU.

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

##### 205.2 2955B.

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

##### 205.3 CIP.

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

##### 205.4 EUT.

- (1) FSS : 42.050 MHz
- (2) SSW : L (Loud)

##### Test method

206 To carry out this functional test, proceed as follows:

206.1 Set an AF frequency of 1 kHz at a level of 100 mV and set the AF generator on.

206.2 Press and hold the PRESSEL switch and observe the AF output indication which shall be LL 240 mV, UL 360 mV.

206.3 Press HELP to return to the Skeleton Test Menu.

**FUNCTIONAL TEST 5 (AF OUTPUT IN NOISE-ON (\*) AND/OR L MODES)**

**Test limits**

207 With an RF signal of 1 mV, modulated by both a 1 kHz  $\pm 10\%$  at 5 kHz deviation and a 150 Hz  $\pm 2$  Hz at 1.5 kHz deviation, the audio output in 'L' or '\*' mode shall be between 460 mV and 640 mV into 300 ohms.

**Initial settings**

208 Ensure that Specification Test 1 has been carried out before setting up the 8920C and EUT controls and conditions for Functional Test 5.

209 Prior to carrying out this functional test, set up the 8920C and EUT controls and conditions as follows:

209.1 PSU.

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

209.2 2955B.

- (1) SET AF LOAD : 300R
- (2) Skeleton Test Set-up : Receiver - Audio Output

209.3 CIP.

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

209.4 EUT.

- (1) FSS : 42.050 MHz
- (2) SSW : \* (Noise on)

**Test method**

210 To carry out this functional test, proceed as follows:

210.1 Set an RF generator frequency of 42.050 MHz at a level of -52.8 dBm and set the RF generator to on.

210.2 Set a modulation frequency of 1 kHz at a level of 5 kHz and set the modulation on.

210.3 Set a second modulation frequency of 150 Hz at a level of 1.5 kHz and set the modulation on.

210.4 Observe the 2955B AF level indication which shall be LL 460 mV and UL 640 mV.

210.5 Set the SSW on the EUT to L (Loud), observe the 2955B AF level indication which shall be as Para 210.4 and check for the presence of the 1 kHz tone.

210.6 Press HELP to return to the Skeleton Test Menu.

**FAULT FINDING**

**INTRODUCTION**

211. The location and correction of faults in accordance with the Field repair policy is:

211.1 To assembly level within the RT-349.

211.2 To sub-assembly level for assembly 10 (synthesizer).

211.3 To sub-assembly level or mechanical parts for the box assembly.

**NOTE**

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

Commanding Officer  
Electronics Branch REME  
Leigh Sinton Road  
Malvern  
Worcs  
WR14 1LL

**FAULT IDENTIFICATION**

212 From the results obtained from the functional tests (Paras 189 to 210), the nature of the fault is identified using Table 5. The right-hand column of Table 5 indicates the Table 4 action(s) to be taken to locate and rectify the fault. The complete motherboard assembly must be fitted into the motherboard assembly test jig (Table 2, Serial 1) when carrying out the actions in Table 6.

213 If assembly 10 is identified as faulty, Paras 217 to 228 provide the information necessary for fault location to synthesizer sub-assembly level.

**Initial settings**

214 Set up the 8920C and EUT controls and conditions as follows:

214.1 PSU.

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

214.2 2955B.

- (1) SET AF LOAD : 300R
- (2) Skeleton Test Set-up : As required

214.3 CIP.

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

214.4 EUT.

- (1) FSS : Position at which fault occurs
- (2) SSW : Position at which fault occurs