

ANNEX A TO
SECTION 3

1. Subject. Clansman Common Items (1 x period 40 mins).
2. Reference to Manuals. Infantry Training volume VIII Pamphlet No 41 Part 4 (71147) Chapter 1 Sections 1 and 2.
3. Stores Required. Defined by Nos of students.
4. Place of Work. Classroom/Radio room.
5. Prelims Before Class Arrive.
 - a. Lay out class.
 - b. Check kit for servicability/cleanliness.
 - c. Door board.

| Time | Subject | Remarks |
|------|---|---------|
| (a) | (b) | (c) |
| | <p>PRELIMS</p> <ol style="list-style-type: none"> a. Check class present. b. No smoking. c. Take notes. d. Reference to manuals. <p>REVISION</p> <p>Nil.</p> <p>APPROACH</p> <p>In every infantry battalion there are various types of Clansman radio which can only be used provided that there is the facility to power them, speak on them and sometimes amplify or remote them.</p> <p>Lead on to reason why and incentive.</p> <p>AIM</p> <p>To teach Clansman common items.</p> | |
| | <p>STAGE ONE - Audio Equipment</p> <p>Explain that the following items can be used on all types of Clansman radios and are interchangeable:</p> | |

| Time | Subject | Remarks |
|------|---|---|
| (a) | (b) | (c) |
| | <p><u>Headgear</u></p> <ul style="list-style-type: none"> a. 3 Types. b. Used for radio or harness. c. Plug into audio/headgear via a pressel box or directly into radio. <p><u>Manpack/'B' Veh Headgear</u></p> <ul style="list-style-type: none"> a. Describe 2 earphones. b. Describe 3 pin socket. c. Describe and explain boom mic. d. Explain 7pt connector to pressel box. <p><u>'A' Veh Crewman's Headgear.</u></p> <ul style="list-style-type: none"> a. Explain use in 'A' vehs. Noise excluding earshells with acoustic valves. b. Resp socket below boom mic mount. <p><u>'A' Veh Staff Users Headgear.</u></p> <p>Describe in detail:</p> <ul style="list-style-type: none"> a. Cable assembly switch electrical (pressel box). b. Single transducer headset. c. Respirator mic and adaptor ring. d. Handset GP. e. Handset remote. f. Handset pouch. g. Audio extension lead (AEL). h. Loudspeaker free standing (LSFS). i. Remote combining unit (RCU). j. Set combining box (SCB). | <p>SHOW REMOVAL OF R/H POINT OUT</p> <p>POINT OUT PASS ROUND</p> <p>SHOW WITH RESP</p> <p>FOR PRC 350</p> |

| Time | Subject | Remarks |
|------|---|---|
| (a) | (b) | (c) - |
| | <p>NOTE: If there is not enough equipment per man pass each item around during the descriptions.</p> <p><u>STAGE ONE CONFIRMATION</u></p> <p>Any questions?</p> <p><u>Question On.</u></p> <ul style="list-style-type: none"> a. Headgear) b. Pressel box) c. Handsets) d. RCU/SCB) <p>Get class to point out various parts.</p> | |
| | <p><u>STAGE 2 - Associated Ancillaries</u></p> <p>Explain that the following are constantly used with the radios - but not all are interchangeable.</p> <p>Describe in detail:</p> <ul style="list-style-type: none"> a. Plate adaptor carrier. b. GS carrier. c. Frame electrical. d. 4 AHC and 1 AHC btys (to include safety and fitting.) e. Hand generator. f. DCCU. g. Bty extension cables (350,351/2). h. PDB. i. Fuses (3, 10, 15 Amp). <p><u>STAGE 2 CONFIRMATION</u></p> <p>Any questions on whole lesson?</p> | <p>SHOULD INCLUDE VUFOIL ON CHARACTERISTICS</p> |

| Time | Subject | Remarks |
|------|--|------------------------------|
| (a) | (b) | (c) |
| | <p><u>Question On</u></p> <ul style="list-style-type: none"> a. Headgear. b. Handsets. c. Pressel box. d. LSFS. e. RCU/SCB. f. Plate adaptor carrier. g. Btys. h. Hand generator. i. PDB and fuses. | <p>PUT ON GS CARRIER</p> |
| | <p><u>PACK AWAY</u></p> <p>All kit to be left as it was at beginning.</p> <p><u>SUMMARY</u></p> <p>Remember differences in headgear/handsets. Uses of RCU/SCB. Safety points on btys and charging eqpt and types of fuses in PDB.</p> <p><u>LOOK AHEAD</u></p> <p>Next lesson PRC 349.</p> | |

ANNEX B TO
SECTION 3

1. Subject. UK/PRC 349 (1 x period 40 mins).
2. Reference to Manuals. Infantry Training Volume VIII Pamphlet No 41 Part 4 (71147) Chapter 2 Section 5.
3. Stores Required. PRC 349, throat mic, .5m Antenna, carrying case, btys. (Dependent on no of students.)
4. Place of Work. Classroom/Radio room.
5. Prelims Before Class Arrive.
 - a. Lay out class.
 - b. Check kit for servicability/cleanliness.
 - c. Door board.

| Time | Subject | Remarks |
|------|--|---------|
| (a) | (b) | (c) |
| | <p><u>PRELIMS</u></p> <p>a. Check class present.</p> <p>b. No smoking.</p> <p>c. Take notes.</p> <p>d. Ref to manuals.</p> <p><u>REVISION</u></p> <p>Throat mic.</p> <p><u>APPROACH</u></p> <p>Give a brief introduction, a Reason Why the infantry section needs the set. Give an Incentive.</p> | |
| | <p><u>STAGE ONE</u></p> <p>Explain: The UK/PRC 349 is light and efficient VHF/FM manpack set used by the inf sect and pl.</p> | |

| Time | Subject | Remarks |
|------|--|--|
| (a) | (b) | (c) |
| | <p><u>DATA</u></p> <p>a. Freq range - 37-46.975 MHZ.</p> <p>b. Channels - 400 at 25 KHZ spacing.</p> <p>c. Power supply - 12v Primary bty (life 20 hrs approx).</p> <p>d. Antennas - 0.5m and 1.0m whip.</p> <p>e. Basic Planning Range (with .5 and 1m whip) - 1.5km.</p> <p>f. Weight - 1.4 kg (with bty).</p> <p><u>FACILITIES</u></p> <p>Explain all facilities in detail.</p> <p><u>DESCRIPTION</u></p> <p>Describe set, Antenna, Harness, Throat Mic, Bty.</p> <p><u>STAGE ONE CONFIRMATION</u></p> <p>Any questions.</p> <p><u>Question On</u></p> <p>a. Data.</p> <p>b. Facilities.</p> <p>c. Description.</p> | <p>VUFO IL/ STRIPBOARD/ MAGBACKS</p> <p>AS ABOVE</p> <p>FOLLOW ON OWN SETS</p> <p>CLASS TO POINT OUT</p> |
| | <p><u>STAGE 2</u> - Setting Up and Operating</p> <p><u>Normal</u> - E Explain. D Demonstrate. I Imitate. P Practise.</p> <p><u>Operating</u> - Explain:</p> <p>a. Frequency setting.</p> <p>b. Tx/Rx Checks.</p> | <p>SET UP AND DISMANTLE AS MANY TIMES AS NECESSARY</p> <p>E D I P</p> |

| Time | Subject | Remarks |
|------|---|---------|
| (a) | (b) | (c) |
| | <p><u>General Info</u> - Explain:</p> <ul style="list-style-type: none"> a. Noise on. b. Bty low warning. c. Use of Antennas. <p><u>STAGE 2 CONFIRMATION</u></p> <p>Any questions.</p> <ul style="list-style-type: none"> a. Class set up 349's and dismantle a few times. b. Set to freq's confirm with Radio checks. c. Question on general info. | |
| | <p><u>FINAL CONFIRMATION</u></p> <p>Set up 349 on different freq's give Radio check.</p> <p>Question on:</p> <ul style="list-style-type: none"> a. Data. b. Facilities. c. General info. | |
| | <p><u>PACK AWAY</u></p> <p>All kit to be left as at beginning of period.</p> <p><u>SUMMARY</u></p> <p>To include freq range, power, setting up drill, Tx/Rx checks.</p> <p><u>LOOK AHEAD</u></p> <p>Next lesson PRC 350.</p> | |

ANNEX B TO
SECTION 3

1. Subject. UK/PRC 350 (1 x 40 mins).
2. Reference to Manuals. Infantry Training Volume VIII Pamphlet No 41 Part 4 (71147) Chapter 2 Section 6.
3. Stores Required. 350, 1.2m Antenna, btys, handset/headset, carrying straps, 2w SURF, (Dependent of no of students.)
4. Place of Work. Classroom/Radio room.
5. Prelims Before Class Arrive.
 - a. Lay out class.
 - b. Check kit for servicability/cleanliness.
 - c. Door board.

| Time | Subject | Remarks |
|------|---|---------|
| (a) | (b) | (c) - |
| | <p><u>PRELIMS</u></p> <p>a. Check class present.</p> <p>b. No smoking.</p> <p>c. Take notes.</p> <p>d. Reference to manuals.</p> <p><u>REVISION</u></p> <p>Clansman common items.</p> <p><u>APPROACH</u></p> <p>Give a brief introduction, why the student must know the radio. Give also an Incentive to learn it.</p> <p><u>AIM</u></p> <p>To teach the characteristics, description, setting up and operating of the UK/PRC 350.</p> | |
| | <p><u>STAGE ONE</u></p> <p>Explain: The UK/PRC 350 is a manpack radio for use at sect/pl level.</p> | |

| Time | Subject | Remarks |
|------|---|--|
| (a) | (b) | (c) - |
| | <p>DATA</p> <ul style="list-style-type: none"> a. Freq range - 36-56.975 MHZ. b. Channels - 840 at 25 KHZ. c. Power supply - 15v Primary bty 15v Rechargeable bty (12 hrs life approx). d. Antennas - 1.2m whip/wire, GMM, INV 'V', GSA. e. Basic Planning Range - 6km max. f. Weight - 3.6kg (with bty). <p>FACILITIES</p> <p>Explain all facilities in detail.</p> <p>DESCRIPTION</p> <p>Describe set, Antenna, carrying straps, bty and 2w SURF.</p> <p>STAGE ONE CONFIRMATION</p> <p>Any questions?</p> <p><u>Question On</u></p> <ul style="list-style-type: none"> a. Data. b. Facilities. c. Description. | <p>VUFOIL/ MAGBACKS/ STRIPBOARD</p> <p>AS ABOVE</p> <p>FOLLOW ON OWN SETS</p> <p>STUDENTS TO POINT OUT</p> |
| | <p>STAGE 2 - Setting Up and Operation</p> <p>Normal - E Explain D Demonstrate I Imitate P Practise</p> <p>Operating - Explain:</p> <ul style="list-style-type: none"> a. Frequency setting. b. Tx/Rx checks. | <p>SET UP AND DISMANTLE AS MANY TIMES AS NECESSARY</p> <p>E D I P</p> |

| Time | Subject | Remarks |
|------|--|--|
| (a) | (b) | (c) |
| | <p><u>SURF 2w.</u></p> <ul style="list-style-type: none"> a. Setting up. b. Tuning. <p><u>Yeh Installation.</u></p> <p>Setting up.</p> <p><u>General Info - Explain:</u></p> <ul style="list-style-type: none"> a. Bty low warning. b. Remote Antennas. c. Whisper, loud and noise on. d. Carrying positions. <p><u>STAGE 2 CONFIRMATION</u></p> <p>Any questions?</p> <p>Class set up 350's with 2w SURF. Sets to freq - give Radio checks. Question on general info.</p> | <p>E D I P</p> <p>EXPLAIN (VUFOIL ETC) VEH - IF POSSIBLE</p> <p>AS FOR 349</p> |
| | <p><u>FINAL CONFIRMATION</u></p> <p>Set up 350's on different freq's and give Radio checks.</p> <p><u>Question On.</u></p> <ul style="list-style-type: none"> a. Data. b. Facilities. c. General info. | |
| | <p><u>PACK AWAY</u></p> <p>All kit to be left as at beginning of period.</p> <p><u>SUMMARY</u></p> <p>To include freq range, power supply, setting up drill, Tx/Rx checks. 2w SURF.</p> | |

| Time | Subject | Remarks |
|------|---|---------|
| (a) | (b) | (c) |
| | <u>LOOK AHEAD</u> Next lesson PRC 351. | |

Army Code No. 71147
D/DAT/13/28/94



Infantry Training

Volume VIII

Infantry Signal Training

Pamphlet No. 41 Part 4

**Equipment and
its Operation
(Clansman)**

1982

Army Code No. 71147
D/DAT/13/28/94

Infantry Training Volume VIII
Infantry Signal Training

Pamphlet No 41 Part 4

Equipment and its Operation (Clansman)

**Prepared under the direction of
the Chief of the General Staff**

**Ministry of Defence
1982**

Crown Copyright Reserved

1982

FOREWORD

Any person wishing to propose amendments to this pamphlet is invited to write to the Chief Instructor of Signal Wing, School of Infantry, Warminster, Wiltshire. Any such proposals will be given consideration and if there is a requirement for them the appropriate amendments will be prepared by the School of Infantry for submission to Headquarters, Director of Infantry.

CONTENTS

| | Page |
|---|------|
| Foreword | iii |
| Contents | v |
| Abbreviations | viii |
| Associated Publications | x |
| Introduction | xi |
| CHAPTER 1—AUDIO EQUIPMENT AND ASSOCIATED ANCILLARIES | |
| Section 1 Audio Equipment | 1-1 |
| Section 2 Associated Ancillaries | |
| CHAPTER 2—RADIO | |
| Section 3 Introduction | 2-1 |
| Section 4 Radio General | |
| Section 5 UK/PRC 349 | |
| Section 6 UK/PRC 350 | |
| Section 7 UK/PRC 351/352 | |
| Section 8 UK/VRC 353 | |
| Section 9 UK/PRC 320 | |
| Section 10 UK/VRC 321 | |
| Section 11 UK/PRC 316 | |
| Section 12 UK/PRC 344 | |
| Section 13 LARKSPUR/CLANSMAN Inter-operability | |
| CHAPTER 3—VEHICLE INSTALLATION AND RADIO CONTROL HARNESS | |
| Section 14 Introduction | 3-1 |
| Section 15 B Vehicle Harness | |
| Section 16 A Vehicle Radio Control Harness | |
| Section 17 Harness Items | |
| CHAPTER 4—CLANSMAN TEST KITS | |
| Section 18 Introduction | 4-1 |
| Section 19 Test Kit Condition CLANSMAN Radio | |
| Section 20 Test Set Audio, Radio, Audio Accessories | |
| Section 21 Test Set Harness Connectors | |
| CHAPTER 5—ANTENNAS AND MASTS | |
| Section 22 Introduction | 5-1 |
| Section 23 VHF Ground Spike Antenna | |
| Section 24 VHF Elevated Ground Spike Antenna | |

| | |
|------------|--------------------------------------|
| Section 25 | VHF Ground Mounted Monopole |
| Section 26 | VHF Inverted 'V' Antenna |
| Section 27 | VHF Elevated Broadband Antenna |
| Section 28 | 5.4m Mast |
| Section 29 | 8m Telescopic Mast |
| Section 30 | 12m Telescopic Mast |

ANNEXES

| | | |
|---------|------------------------------------|------|
| Annex A | Functional Checks UK/PRC 349 | 2A-1 |
| Annex B | Functional Checks UK/PRC 350 | 2B-1 |
| Annex C | Functional Checks UK/PRC 351 | 2C-1 |
| Annex D | Functional Checks UK/PRC 352 | 2D-1 |
| Annex E | Fault Locating UK/VRC 353 | 2E-1 |
| Annex F | Functional Checks UK/PRC 320 | 2F-1 |
| Annex G | Functional Checks UK/VRC 321 | 2G-1 |
| Annex H | Functional Checks UK/PRC 344 | 2H-1 |

ILLUSTRATIONS

Figure No.

| | |
|----|---|
| 1 | CLANSMAN Headsets |
| 2 | Live MIC Switch on Pressel Box |
| 3 | Single Transducer Headset |
| 4 | Respirator Headset |
| 5 | Handset General Purpose |
| 6 | Handset Remote and Pouch |
| 7 | Remote Handset insulation piercing cable contacts |
| 8 | Audio Extension Lead |
| 9 | Loudspeaker Free Standing for Monitoring |
| 10 | Loudspeaker Free Standing for Radio |
| 11 | Remote Combining Unit |
| 12 | Set Combining Box |
| 13 | Plate Adaptor and Carrier GS |
| 14 | Frame Electrical |
| 15 | Nickel Cadmium Batteries 3.3 AHC and 1.1 AHC |
| 16 | Fitting a Battery (3.3 AHC) |
| 17 | Hand Generator and 1.1 AHC Battery |
| 18 | DCCU and ACCU |
| 19 | Battery Extension Cable |
| 20 | Power Distribution Box |
| 21 | UK/PRC 349 in Carrying Position |
| 22 | Setting up UK/PRC 349 |
| 23 | Connecting Battery to UK/PRC 349 |

| | |
|----|---|
| 24 | Frequency Setting UK/PRC 349 |
| 25 | Setting up UK/PRC 350 (Stage 1) |
| 26 | Setting up UK/PRC 350 (Stage 2) |
| 27 | Frequency Setting UK/PRC 350 |
| 28 | Connecting a 2 Watt SURF to the UK/PRC 350 |
| 29 | Vehicle Mounted UK/PRC 350 |
| 30 | UK/PRC 350 Carrying Position |
| 31 | UK/PRC 350 Alternative Carrying Position |
| 32 | UK/PRC 351 |
| 33 | Remote Operating UK/PRC 351 |
| 34 | Rebroadcast Using 2 × UK/PRC 351 |
| 35 | Vehicle Mounted UK/PRC 351 |
| 36 | Vehicle Interconnections UK/PRC 351 |
| 37 | TUAAM and Initiate Box |
| 38 | UK/PRC 351 Carrying Position |
| 39 | 20 Watt Amplifier |
| 40 | Setting Up UK/PRC 352 |
| 41 | UK/VRC 353 in Vehicle |
| 42 | UK/VRC 353 Vehicle Interconnections |
| 43 | UK/VRC 353 Controls and Connections |
| 44 | ARFAT and TUAAM Connections |
| 45 | UK/PRC 320 Carrying Position (<i>Morse Operating</i>) |
| 46 | UK/PRC 320 Controls and Connections |
| 47 | UK/PRC 320 Vehicle Station |
| 48 | UK/PRC 320 Vehicle Interconnections |
| 49 | UK/PRC 320 Remote Operating |
| 50 | UK/VRC 321 Controls and Connections |
| 51 | SURF 25 Watt and TURF 25 Watt |
| 52 | UK/PRC 316 |
| 53 | UK/PRC 316 Frequency Selection |
| 54 | UK/PRC 316 Antenna |
| 55 | UK/PRC 316 Controls and Connections |
| 56 | UK/PRC 316 Antenna Erection |
| 57 | Power Distribution Box |
| 58 | UK/PRC 344 Controls |
| 59 | UK/PRC 344 Antennas and Connections |
| 60 | 'B' Vehicle Installation |
| 61 | 'A' Vehicle Installation Layout |
| 62 | Vehicle Radio Installation |
| 63 | Crew Box 2 Set (<i>CB-2</i>) |
| 64 | Crew Box 3 Set (<i>CB-3</i>) |
| 65 | Commanders Personal Unit and Fixed Box |
| 66 | Remote Personal Unit |

| | |
|-----|---|
| 67 | Interconnecting Box 3 Radio (IB-3) |
| 68 | Interconnecting Box 2 Radio (IB-2) |
| 69 | Interconnecting Box Harness Adaptor |
| 70 | Control Radio Set Local/Remote Unit (<i>CRSL/R</i>) |
| 71 | Radio Adaptor Box |
| 72 | Amplifier Loudspeaker and Speaker |
| 73 | Test Set Condition, CLANSMAN Radio—Front Panel |
| 74 | Transmitter Output—Power Check |
| 75 | Communication Check |
| 76 | Antenna Check |
| 77 | Coaxial Cable Check |
| 78 | Test Set Audio, Radio, Audio Accessories |
| 79 | Controls and Connections |
| 80 | Test Set Battery Box |
| 81 | Test Card for Self Check and Battery Test |
| 82 | Test Set Harness Connectors |
| 83 | Test Set 18V DC Harness Connection |
| 84 | Test Set 24V DC Battery Connection |
| 85 | Continuity Testing |
| 86 | VHF Ground Spike Antenna—Components |
| 87 | VHF Ground Spike Antenna—Assembly |
| 88 | VHF Elevated Ground Spike Antenna—Components |
| 89 | VHF Elevated Ground Spike Antenna—Assembly using a 5.4 m Mast |
| 90 | VHF Elevated Ground Spike Antenna—Assembly for Suspension |
| 91 | VHF Ground Mounted Monopole—Components |
| 92 | VHF Ground Mounted Monopole—Assembly |
| 93 | VHF Inverted 'V' Antenna—Components |
| 94 | VHF Inverted 'V' Antenna—Erected |
| 95 | Transformer and Resistor Unit for Inverted 'V' Antenna |
| 96 | VHF Elevated Broadband Antenna—Components |
| 97 | 5.4m Mast—Components |
| 98 | 5.4m Mast—Erected |
| 99 | 8m Mast—Components |
| 100 | 8m Mast—Erected |
| 101 | 12m Mast—Components |
| 102 | 12m Mast—Erected |

LIST OF ABBREVIATIONS

| | |
|------|--------------------------|
| A | Ampere |
| AAFL | Amplifier AF Loudspeaker |
| AC | Alternating Current |

| | |
|--------|--------------------------------------|
| ACCU | AC Charging Unit |
| ACTIC | A and C radios together with IC |
| AEL | Audio Extension Lead |
| AF | Audio Frequency |
| AHC | Ampere Hour Capacity |
| AM | Amplitude Modulated |
| ARFAT | Adaptor RF Antenna Tuning |
| ATR | Adaptor Telegraph Radio |
| CBF | Commanders Box Fixed |
| CB2 | Crew Box 2 set |
| CB3 | Crew Box 3 set |
| CRSL/R | Control Radio Set Local/Remote |
| CPU | Commanders Personal Unit |
| CWI | Central Warning Indicator |
| DB | Drivers Box |
| DC | Direct Current |
| DCCU | DC Charging Unit |
| DSB | Double Side Band |
| DBS | Drivers Box Set (<i>selector</i>) |
| ECM | Electronic Countermeasure |
| ETI | Elapsed Time Indicator |
| FM | Frequency Modulated |
| GS | General Service |
| GSA | Ground Spike Antenna |
| IC | Inter-communication |
| IB2 | Inter-connecting Box 2 Radio |
| IB3 | Inter-connecting Box 3 Radio |
| IBHA | Inter-connecting Box Harness Adaptor |
| IBRA | Inter-connecting Box Radio Adaptor |
| PDB | Power Distribution Box |
| PSU | Power Supply Unit |
| RAB | Radio Adaptor Box |
| RATT | Radio Teletype |
| RCU | Remote Combining Unit |
| RF | Radio Frequency |
| ROS | Remote Operators Switch |
| RPU | Remote Personal Unit |
| RTT | Radio Telegraph/Telephony |
| RUT | Radio Under Test |
| RX | Receive |
| SCB | Set Combining Box |
| SSB | Single Side Band |
| SSW | Set System Switch |

| | |
|-------|---------------------------------------|
| SURF | Selector Unit RF |
| TKC | Test Kit Condition |
| T/R | Transmit/Receive |
| TUAAM | Tuner Unit Automatic Antenna Matching |
| TURF | Tuner Unit RF |
| TX | Transmit |
| WR | Working Radio |

ASSOCIATED PUBLICATIONS

| TITLE | Army Code No. |
|---|------------------|
| Infantry Training Volume VIII, Infantry Signalling Standards, Pamphlet No 40. | |

Reserved.

User Handbooks:

| | |
|--|---------------------------|
| UK/PRC 316 | 14961 |
| Reference Handbook for CLANSMAN Radio and Ancillary Equipment | 61004 |
| UK/PRC 320 | 61123 |
| UK/PRC 350 | 61124 |
| UK/PRC 351/352 | 61128 |
| CLANSMAN Radio Control Harness | 61172 |
| UK/VRC 321 | 61253 |
| UK/PRC 344 | 61351 |
| Antenna CLANSMAN VHF | 61388 |
| UK/VRC 353 | 61393 |
| UK/PRC 349 | 61646 |
| Test Set Condition | 61655 |
| Audio Accessories | 61656 |
| Test Set Harness Connector | 61657 |
| CLANSMAN Radio Installations in Trucks $\frac{1}{2}$ tonne and $\frac{3}{4}$ tonne FFR and GS | 61590 (Pts 1 and 7) |

INFANTRY TRAINING
Volume VIII – INFANTRY SIGNAL TRAINING
Pamphlet No. 41 Part 4
EQUIPMENT AND ITS OPERATION
(CLANSMAN)

INTRODUCTION

Background

1. The change from LARKSPUR radio to CLANSMAN radio is almost complete within the infantry and mechanized units.
2. This pamphlet has been compiled for the new range of equipment and to act as a sister edition to Pamphlet No 41 Part 2, Equipment and Its Operation (LARKSPUR).
3. Whatever the type of equipment, the basic radio principles regarding their use remain unchanged and as a consequence much of the general theory found in Pamphlet No 41 Part 2, may also be duplicated here.

Aim

4. The aim of this pamphlet is to provide those concerned with the training of infantry signallers and instructors with a convenient form of instructional material.

Content

5. The pamphlet is written in four parts as follows:
 - a. *Part 1.* 'Tactics, Training and Communication Security', with chapters as follows:
 - (1) Organization and Tactics.
 - (2) Organization of Training.
 - (3) Instructor Training.
 - (4) Communication Security.
 - (5) Administration.
 - b. *Part 2.* 'Equipment and Its Operation (LARKSPUR)', with chapters as follows:
 - (1) Radio.
 - (2) Harness.
 - (3) Vehicle Installations.
 - (4) Training Set Universal.

(5) Apparatus Loudspeaking.

(6) Mast Telescopic 27 ft and Antennas.

c. *Part 3.* 'Procedures, Antennas, Field Cables and Batteries', with chapters as follows:

(1) Voice Procedure.

(2) Telegraph Procedure.

(3) Message Centre Working.

(4) Antennas.

(5) Field Cables.

(6) Batteries.

d. *Part 4.* 'Equipment and Its Operation (CLANSMAN)', with chapters as follows:

(1) Audio Equipment and Associated Ancillaries.

(2) Radio.

(3) Vehicle Installation and Radio Control Harness.

(4) CLANSMAN Test Kits.

(5) Antennas and Masts.

Authority

6. The majority of material contained in this pamphlet is taken from existing coded publications; whereas every effort has been made to ensure its accuracy, where variations exist between this pamphlet and the publications listed as references, then the references are to be taken as authority.

7. Many of the references used as a source of material are on occasions difficult to obtain. However, for the most part this pamphlet can be taken as providing an adequate form of instructional material for instructing to the various levels of infantry signalling.

Layout

8. Each chapter of this pamphlet deals with a particular aspect of signalling. Generally the layout of each chapter is as follows:

a. Introduction.

b. Aim.

c. References.

d. Teaching technique (*where appropriate*).

e. Material (*remainder of chapter*).

9.–20. *Reserved.*

Chapter 1

AUDIO EQUIPMENT AND ASSOCIATED ANCILLARIES

SECTION 1 – AUDIO EQUIPMENT

Introduction

0101. Certain items of equipment used with the CLANSMAN range of radios are designed to be used with all the sets in the range. This helps to cut costs and simplifies the instruction on CLANSMAN radios.

Headgear Assemblies

0102. The three types of headgear provided for use with CLANSMAN radio and/or harness are shown in *Fig 1*. They plug direct into the radio, or into the harness control box sockets marked 'AUDIO' or 'HEADGEAR', via the pressel box.

0103. The headgear shown use rocking-armature receivers in noise-excluding ear pads, and a boom mounted microphone. There is a noise exclusion adjustment on the 'A' vehicle crewmans/staff users headgear.

Infantry and B Vehicle Headgear (*Fig 1*)

0104. This headgear has two earphones, the right hand earpiece is detachable to allow the operator to receive commander's briefings, etc., and maintain listening watch in comfort. (*To remove earpiece; undo press stud and push spring clip downwards.*) If the headgear is connected to a control box with monitor facility, then this facility will be lost if the earpiece is detached.

0105. The three pin socket situated above the boom microphone is for use with the respirator microphone. In cold conditions, should the microphone become iced up from constant use, the operator can by blowing hard, clear the ice and the excess water can then be shaken off. The handset is connected to the pressel box by means of a snatch connector.

'A' Vehicle Crewman's Headgear (*Fig 1*)

0106. The crewman's helmet is used by crew members of armoured vehicles and consists of a helmet fitted with noise excluding earshells and boom microphone. The earshells are fitted with acoustic valves, so that the user can adjust the level of external noise that he hears. The respirator socket is below the boom microphone mount.

'A' Vehicle Staff User's Headgear (Fig 1)

0107. This headgear is designed to be worn under the new Infantry Helmet and is to be used by staff officers, or 'A' vehicle commanders. It is fitted with the same components as the 'A' vehicle crewman's helmet.

Cable Assembly Switch Electrical (Pressel Box) (Fig 1)

0108. The purpose of the pressel box is to provide a pressel switch for headset users. To operate the pressel box the pressel bar must be firmly depressed in the centre. There is on the bottom side of the box a microphone live on/off switch (Fig 2). In order to use the pressel box for live intercom in harness the fixing screw should be slackened and the switch moved to the live position. The microphone is then live for intercom at all times, but to operate the working set the pressel bars must still be depressed. The box is fitted with a swivel mounted clothing clip and is connected between the headset cable and the appropriate harness/set audio connection.

Single Transducer Headset (Fig 3)

0109. This headset is a lightweight alternative to the handset enabling operators to keep both hands unencumbered. The single transducer is used both as a microphone and a receiver. A pressel switch is incorporated in the earpiece and the headgear can be plugged directly into the AUDIO or HEADGEAR sockets of radios or harness control boxes.

Note: There is no need to remove headset from the ear to talk as the voice is transmitted by vibrations of the jawbone.

Respirator Microphone (Fig 4)

0110. This microphone is used with an S6 Respirator and one of the 'A' or 'B' vehicle headsets. The three pin connector is plugged into the socket provided in the moulded housing of the headgear. The housing of the microphone clips on to the adaptor which mounts over the valve assembly of the respirator. Signallers' and commanders' respirators should be permanently fitted with the adaptor. The use of this microphone gives good speech reproduction when wearing the respirator.

Handset General Purpose (Fig 5)

0111. This handset is used with any CLANSMAN radio, directly or through a CLANSMAN harness control box and connects into 'AUDIO' or 'HEADGEAR' sockets. A pressel plate operates the radio transmit or intercom. A spring clip is provided for attaching the handset to clothing/webbing.

Handset Remote (Fig 6)

0112. This handset is used to remote any CLANSMAN radio by connecting either direct to the 'REMOTE' terminals on the radio, or through CLANSMAN control harness by connecting to the terminals on the *Interconnecting Box 2 Radio*. To remote the UK PRC 320 a *CRSL/R box* must be used.

0113. The handset is fitted with insulation piercing cable contacts and can be connected and used at distances up to 3km with D10 cable. (See Fig 7.)

0114. The handset contains a transistor amplifier to increase the signal power to the line and to provide a locally generated side tone. The amplifier obtains its DC supply along the cable from the radio or harness.

0115. A pressel switch operates the radio transmit or intercom and a call button operates the call tone, which is generated in the connected radio or IC channel. More than one handset remote may be used from the same radio.

Handset Pouch (Fig 7)

0116. A handset pouch is issued with the PRC 350 which enables a handset to be stowed out of the way but easily accessible for commanders' use.

Audio Extension Lead (AEL) (Fig 8)

0117. This lead is 10 metres long and permits short range remote use of CLANSMAN radios or harness control boxes using the standard range of audio gear. The monitoring facility remains available. The lead may also be used with the Loudspeaker Free Standing in the 'talk-back' role as shown in Fig 10.

Loudspeaker Free Standing

0118. This is a portable loudspeaker fitted with a volume control and supplied with a 0.5m jumper lead, necessary when using the Audio Extension Lead or working direct from a set.

0119. *The Loudspeaker* is used as follows:

a. For monitoring (see Fig 9).

- | | |
|----------------------------------|--|
| <i>in or near vehicle</i> | – Connect by 6 way cable assembly to AUDIO socket on radio or harness control box; or to LS socket on Vehicle Mounted Loudspeaker. |
| up to 50m remote | – Connect twin cable between terminals on loudspeaker and Amplifier AF Loudspeaker or to remote terminals on the radio set. |

b. For radio and

'talk-back' (see Fig 10) – Connect by jumper lead and Audio Extension Lead to AUDIO socket on radio or harness control box. In this role, the monitoring of an alternative signal is not possible.

Note: When connected directly from the set the signal is not amplified.

Remote Combining Unit

0120. *The Remote Combining Unit (RCU) (Fig 11)* permits one of two remote CLANSMAN radios to be selected and used on voice or morse as appropriate; and a second radio to be monitored, at distances of up to 3km over D10 cable.

0121. The RCU contains a transistor amplifier to increase the signal power to the line and to provide a locally generated side tone. The amplifier obtains its DC supply along the line from the radio or harness.

0122. When switched to 'CALL', a tone is generated within the connected working radio, which is heard by the local operator, and if the radio is in harness, by any crew member who has selected that radio as the Working or Monitor Set.

0123. *The Remote Combining Unit* provides the following facilities:

| | Switch Position | Facilities |
|-----|---------------------------|--|
| 'A' | *'MORSE'/'VOICE' | Work A set; signal in both ears. |
| 'A' | 'MORSE'/'VOICE' | Work A set; signal in left ear; monitor B set; signal in right ear. |
| | B' | |
| 'B' | 'MORSE'/'VOICE' | Work B set; signal in left ear; monitor A set; signal in right ear. |
| | A' | |
| 'B' | 'MORSE'/'VOICE' | Work B set; signal in both ears. |
| ANY | 'CALL' (SPRING LOADED) | 'CALL' tone heard by local operator by selected working set, who will switch to 'IC' to reply. Remote operator then switches to 'VOICE' for subsequent communications. *MORSE. HF radio only. Press key to send; release key to receive. VOICE. Press pressel to send; release to receive. |

0124. *The RCU* is used as follows:

a. *To a 2 radio Installation.* The line is connected to the *Inter-connecting Box 2 Radio (IB2)*. Morse or voice as appropriate, are available on either installed radio, together with IC and CALL within the harness, as determined by the IB2 switch positions.

b. *To any CLANSMAN Radio (Except PRC 320) – No Harness.* The line is connected direct to terminals on the radio. Morse or voice as appropriate are available on radio: and 'IC' and 'CALL' with the local operator.

c. *To PRC 320, No Harness.* The line is connected to the radio through the CRSL/R box. The CRSL/R is part of the PRC 320 system. Morse or voice are available on radio, and 'IC' and 'CALL' with the local operator.

Set Combining Box

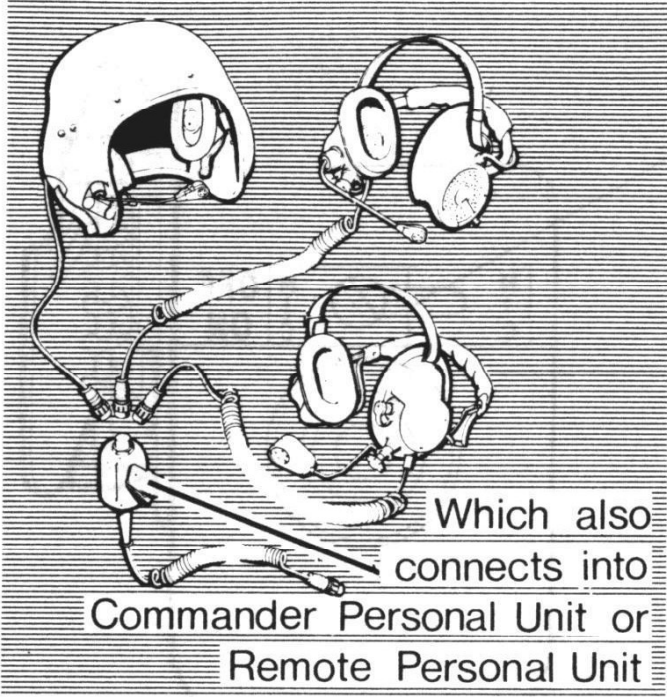
0125. *The Set Combining Box (SCB) (Fig 12)* is used when CLANSMAN radios are not in harness and IC is not needed. It enables an operator to use 2 radios, monitoring the receiver output of the radio not being worked. A third radio may be held in readiness for selection, its cable being plugged into a dummy socket on the box. Connection to the radios are made using cables from the standard CLANSMAN range, connected to the audio output of the radio. This cable length should not exceed 1m when connected to the PRC 350 or PRC 351/352.

0126. Any of the standard range of audio gear may be connected to the box. The radio volume controls are used to set the receive level. A nominal 18 Volt supply of limited current capability is available at the Audio Sockets of the *Set Combining Box (SCB)*, which is derived from the radio connected to the left hand set connector marked '*'.

0127. *The SCB* provides the following facilities:

| Switch Position | Facility |
|------------------------|---|
| 'OFF' | Work selected set; press to talk; signal in both ears. |
| 'ON' | Work selected set; press to talk; signal in left ear. Monitor other set; signal in right ear. |

Note: At present only one SCB is issued to a battalion.



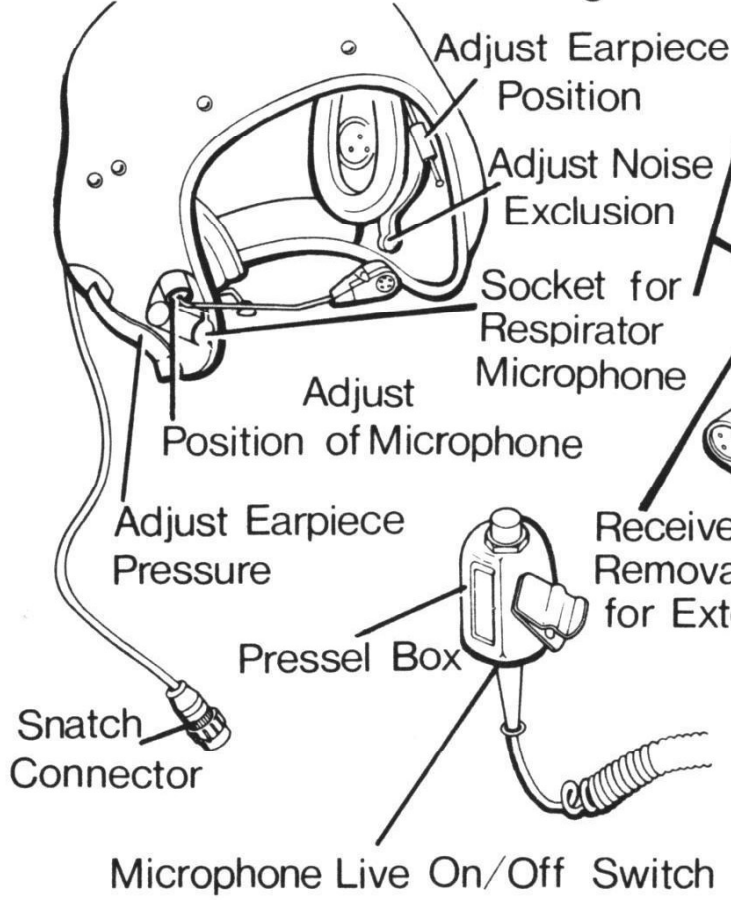
Which also connects into Commander Personal Unit or Remote Personal Unit

'A' Vehicle Staff User's Headgear

Adjust Position of Microphone



'A' Vehicle Crewman's Headgear



Infantry & 'B' Vehicle Headgear

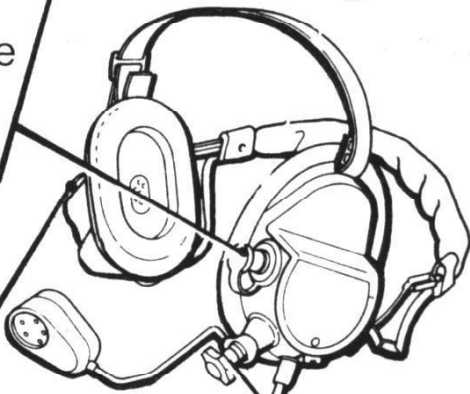


Fig 1.—CLANSMAN Headsets

Pre -set MIC Switch

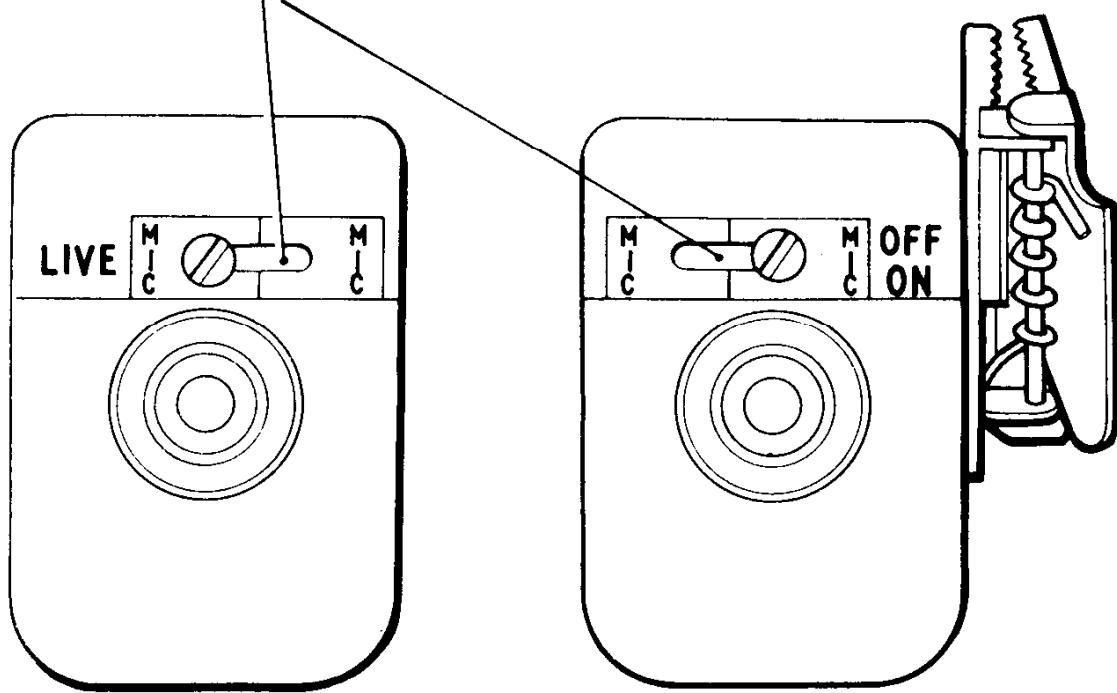


Fig 2.—Live Mic Switch on Pressel Box

Press to Talk

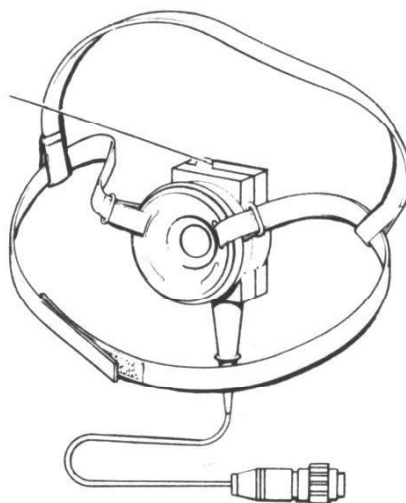


Fig 3.—Single Transducer Headset

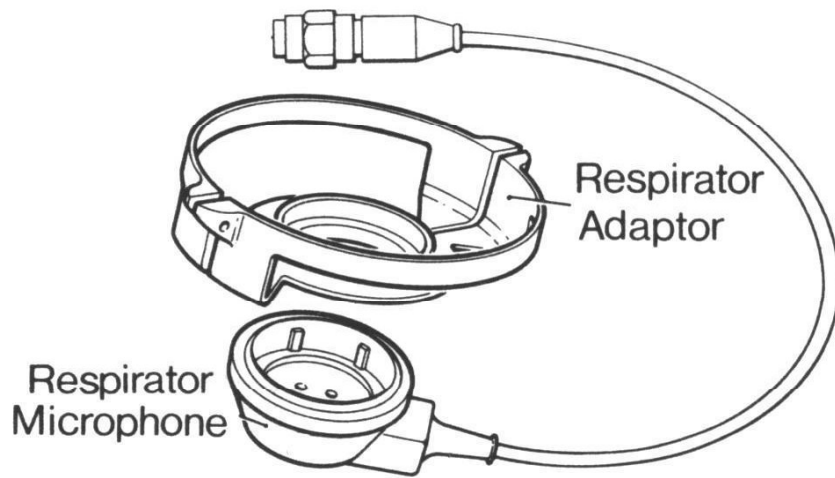


Fig 4.—Respirator Headset

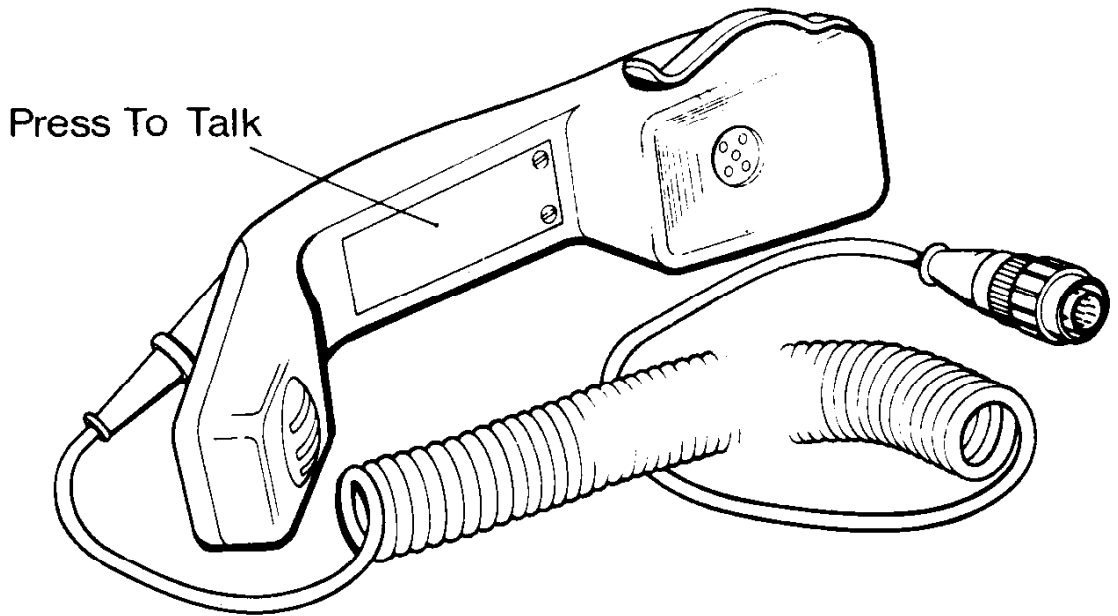


Fig 5.—Handset General Purpose

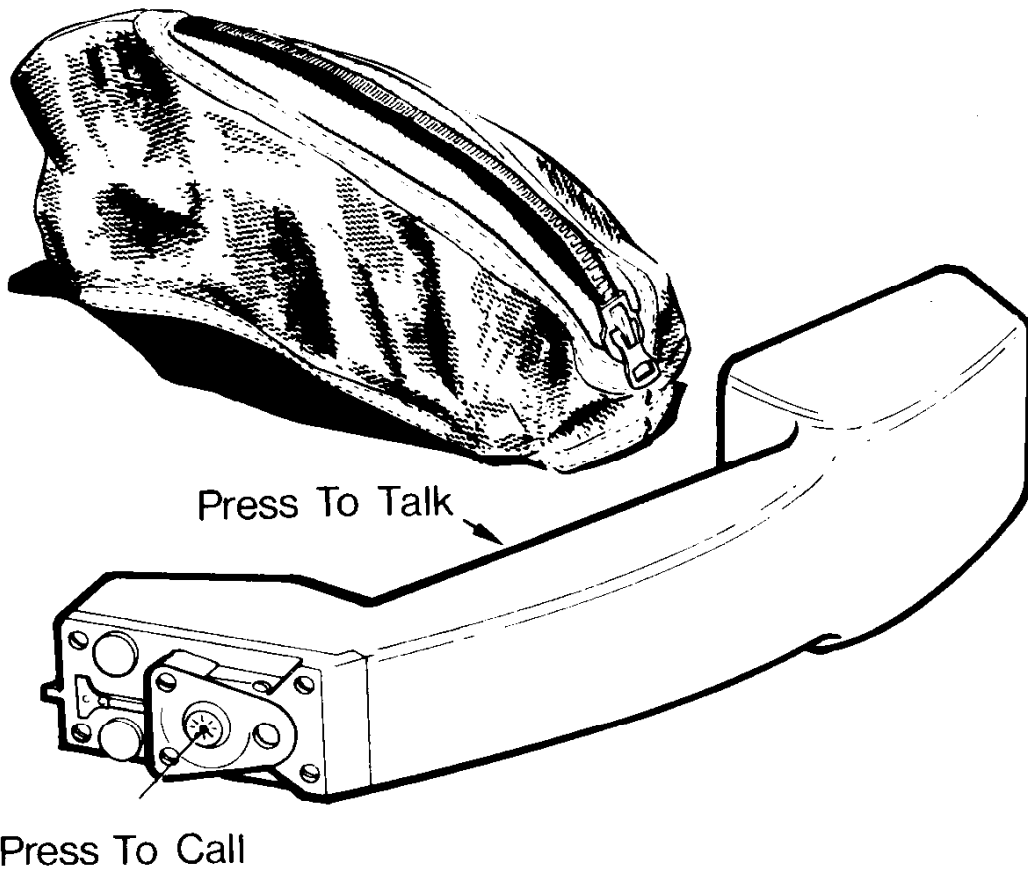


Fig 6.—Handset Remote and Pouch

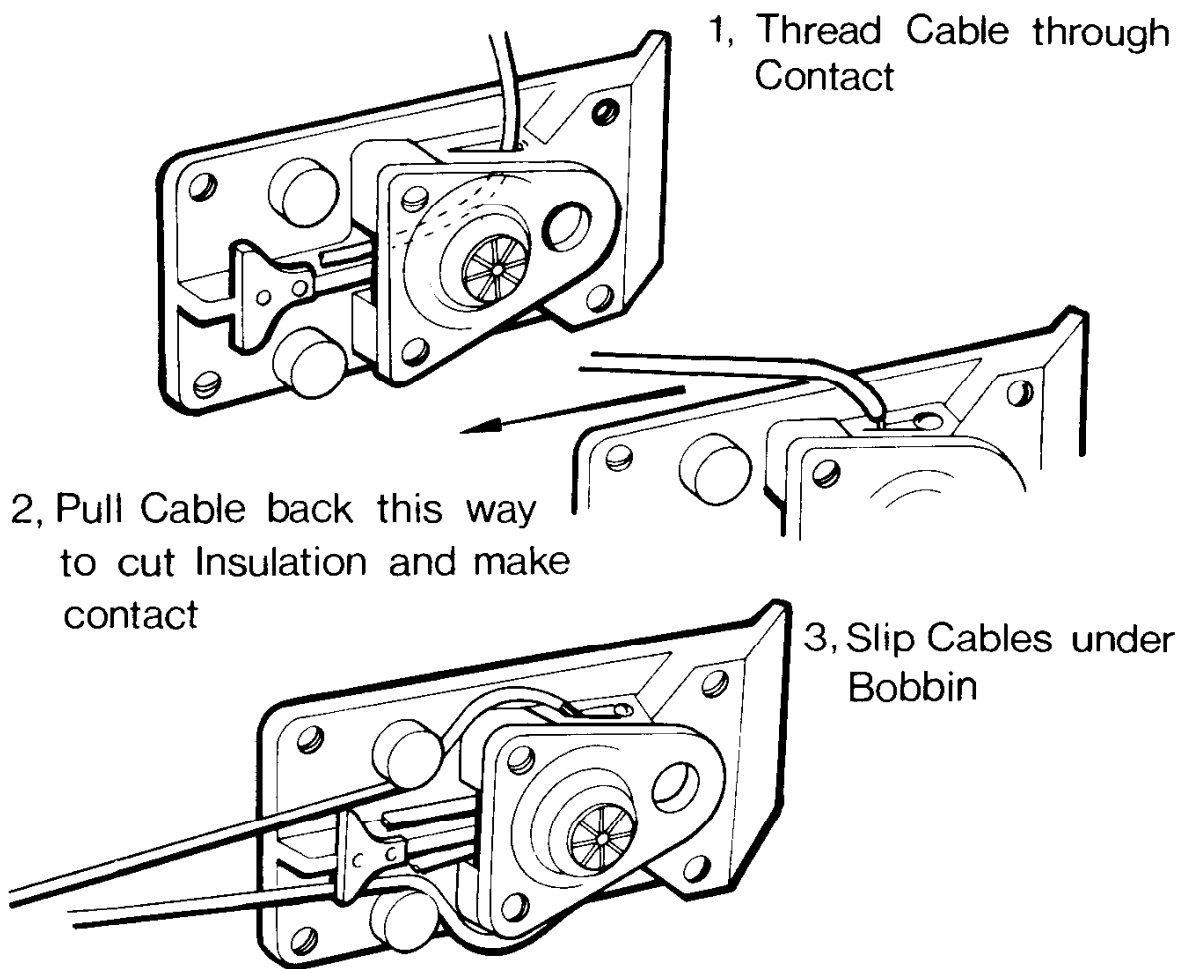


Fig 7.—Remote Handset insulation piercing cable contacts

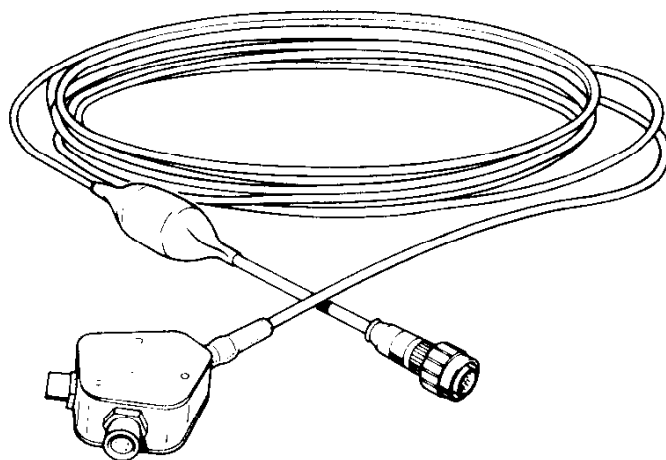


Fig 8.—Audio Extension Lead

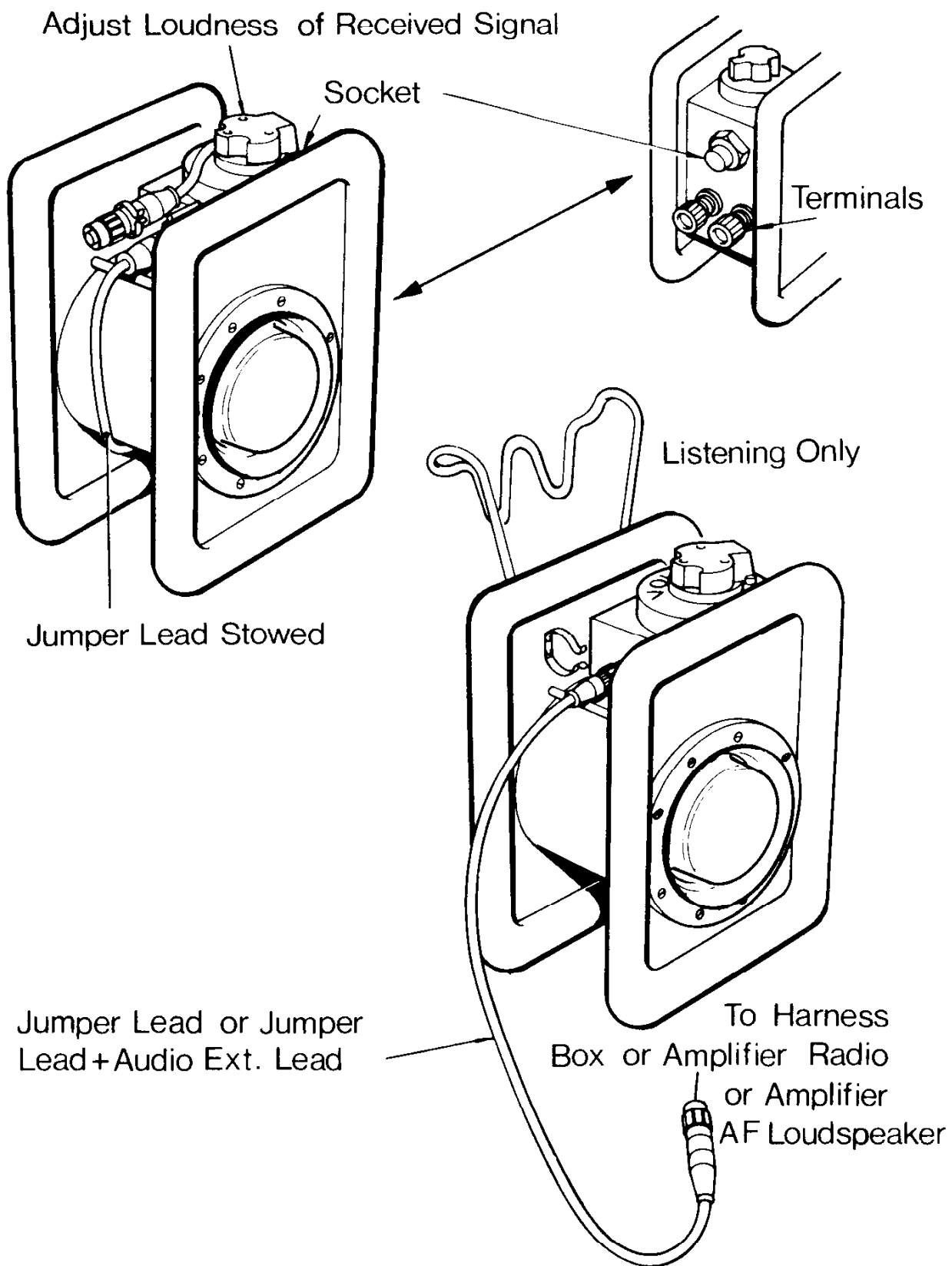


Fig 9.—Loudspeaker Free Standing for Monitoring

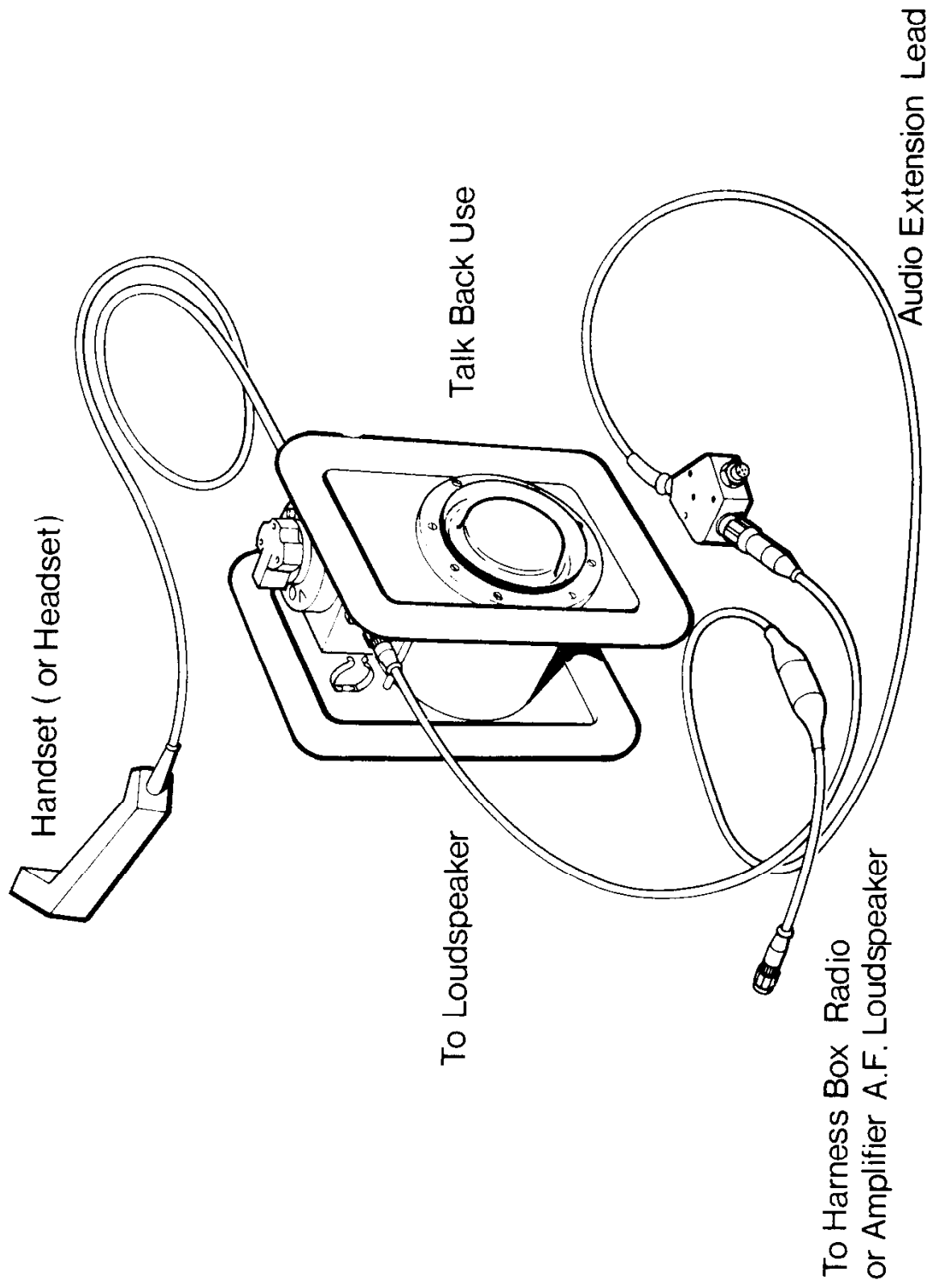


Fig 10.—Loudspeaker Free Standing for Radio

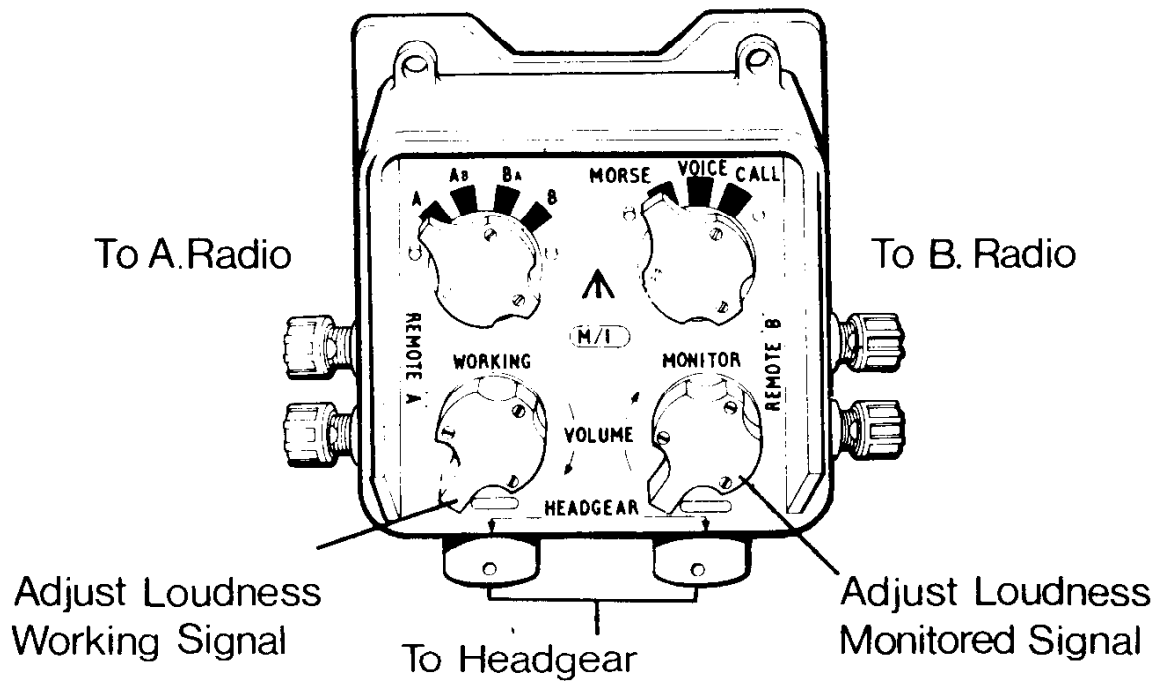


Fig 11.—Remote Combining Unit

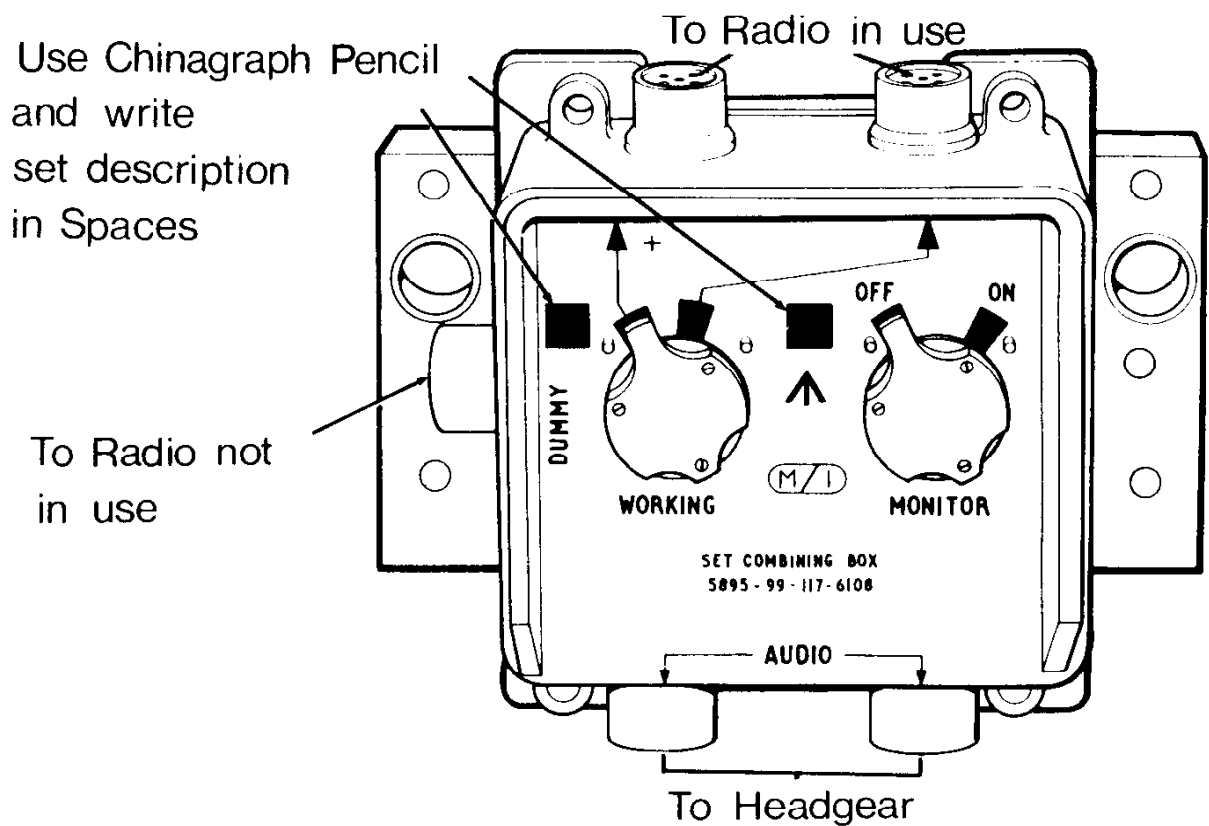


Fig 12.—Set Combining Box

SECTION 2 – ASSOCIATED ANCILLARIES

Introduction

0128. This section is concerned with associated ancillaries which are constantly used with the radios, but not necessarily common to all radios.

Plate Adaptor Carrier (Fig 13)

0129. *The Plate Adaptor* is used to adapt the following sets to be carried on the GS carrier: PRC 351/352, PRC 320 and PRC 344. The plate is screwed to the set by means of 4 captive screws and the plate then hooks into the carrier by means of screw clamps.

GS Carrier (Fig 13)

0130. *The GS Carrier* is a lightweight carrier which can be used to carry the PRC 351/352, PRC 320 and PRC 344. The carrier should be worn like a rucksack fairly high up on the shoulders and can be adjusted to an individual by means of the harness straps.

Frame Electrical (Fig 14)

0131. *The Frame Electrical* is used to clamp a manpack set on a GS carrier into a vehicle and thus enable it to be converted into a vehicle set. The GS carrier is fixed onto the frame electrical by means of 3 screw clamps.

Nickel Cadmium 3.3 AHC and 1.1 AHC Batteries (Fig 15)

0132. The present CLANSMAN secondary batteries are of nickel-cadmium construction and are for use with the UK/PRC 320, 344, 351 and 352 radio sets. Secondary batteries are being developed, for the UK PRC 349 and 350.

0133. *24V 3.3 AHC and 1.1 AHC*. These batteries are sealed and require very little maintenance on the part of the user. The internal construction is similar to that of the lead acetate batteries in as much as the positive and negative plates are immersed in an electrolyte solution. The plates are Nickel (*positive*) and Cadmium (*negative*) whilst the electrolyte is **Potassium Hydroxide**.

Characteristics

0134. The nickel-cadmium battery has the following characteristics:

- a. Can be installed in any position.
- b. Does not require topping up.
- c. Does not discharge a gas or corrosive liquid.
- d. Provides maintenance free operation.
- e. Constancy of discharge voltage.

- f. High rate charge capability.
- g. High rate discharge capability.
- j. Moderate self discharge life.
- k. Excellent life cycle.

Safety

0135. The electrolyte of the nickel-cadmium battery is a caustic solution and should not come in contact with any part of the body, especially the eyes. If any part of the body is splashed with the solution wash the affected part immediately with cold water. Medical aid should be sought immediately as serious and deep burns can be caused.

Fitting (Fig 16)

0136. The battery is fitted to the radio sets by means of two spring loaded clips on the radio set. The battery can only be fitted one way to the radio because of mounting lugs.

Charging Units

0137. **Hand Generator (Fig 17).** The hand generator is designed to be used with a 1.1 AHC CLANSMAN battery to operate a transmitter/receiver unit i.e. PRC 320, in emergencies or on long range patrols. The generator delivers an output of 28V at 330 mA which, together with the battery, can provide enough power to operate the main unit indefinitely. It can be used to charge any CLANSMAN manpack secondary battery (24V).

Fitting

0138. *The Hand Generator* clips directly to the bottom of the radio set by means of the securing clamps on the radio. The 1.1 AHC battery is then clamped onto the base of the hand generator.

Operation

0139. A lamp, with a shutter, is provided to indicate the correct winding speed. It is illuminated at low speed and is extinguished when the correct speed is attained.

Emergencies

0140. In emergencies the generator, without battery, can provide sufficient current to operate the receiver only.

Weight

0141. The generator, complete with a 1.1 AHC battery, weighs approximately 3.5kg.

Direct Current Charging Units (DCCU) (Fig 18)

0142. *The DCCU 28V and the DCCU 14V* have been designed to charge single discharged 3.3 AHC 24V batteries in approximately 4 hours and 1.1 AHC 24V batteries in approximately 1 hour, each unit will operate from any source, e.g. a vehicle battery supply. 12V 75 AHC/100 AHC signal batteries with or without a DC Generator. Protection circuitry guards against mis-connection and input surge protection is also built into the units.

Use and Operation

0143. Having secured the unit in its operational location carry out the following:
- a. Ensure both lamps switch and 'INPUT' switch are in the 'OFF' position (*upwards*).
 - b. Using the DCCU power lead; connect to the appropriate supply (*14V or 28V*) ensuring the correct polarity and then onto the DCCU itself.
 - c. Using the charging lead connect to the DCCU output and then onto the battery input socket.
 - d. Set the 'INPUT' switch to 'ON'.
 - e. Set the lamp switch to 'ON' (*down*). The charge proceeding yellow lamp will light to indicate that the battery is properly connected and is being charged: when the battery is nearing the completion of the charging cycle the yellow lamp will go out and the green (*charge complete*) light will be illuminated indicating that the battery is fully charged.
 - f. Set the lamp switch to 'OFF', except when connecting the battery or inspecting the charge state. No damage to the battery or the charging unit will occur if a fully charged battery is left connected.

AC Charging Unit (ACCU) (Fig 18)

0144. *The ACCU* enables up to 16 CLANSMAN 3 AHC and 1.1 AHC secondary batteries to be charged simultaneously, regardless of their state of discharge. The unit is housed in an aluminium case fitted with a removable cover for transit containing provision for stowage of cables. The unit, including cables, weighs 29.5kg.

0145. The charging procedure is as follows:

- a. Remove the cover from the charging unit.
- b. Adjust the voltage selector panel to correspond with the voltage being used.

WARNING. ENSURE THAT THE UNIT IS DISCONNECTED FROM THE SUPPLY WHILST MAKING ADJUSTMENTS.

- c. Remove the cover from the AC mains fuse and ensure that it is of the correct rating i.e. 20A for a 100–125V supply and 10A for a 200–250V supply.
- d. Open the sliding vent at the rear of the charging unit.
- e. Using the AC charging unit supply cable connect the input plug to the AC mains supply.
- f. Set the lamp switch 'ON' (*down*).
- g. Using the battery charging cables, connect the charging connector of each battery to be charged to an outlet connector and set the mains switch 'ON' (*down*). Each outlet has an associated yellow lamp which will light to indicate that the battery is properly connected and being charged, when the battery is fully charged this lamp will extinguish and the associated green lamp will illuminate.
- h. Replace charged batteries with discharged one (*there is no need to switch 'OFF' when doing this*). No damage to the battery or the charging unit will occur if a fully charged battery is left connected.

External Batteries

0146. The UK/PRC 320, 351 and 352 can be connected directly to an external 24V battery e.g. 2 × 12V 100 AHC provided that no other device is connected to the battery. (i.e. it must NOT be on float charge). The normal CLANSMAN batteries must be removed from the radio set.

NOTE. The leads for this type of connections are not yet on general issue and units are warned NOT to make up their own.

Battery Extension Cable (Fig 19)

0147. This cable is used in extremely cold conditions to remote the battery from the set, so that it can be carried in a warmer place.

Power Distribution Box (PDB) (Fig 20)

0148. **The Power Distribution Box** (PDB) is used to provide power to all VRCs and to the DCCU 28V when the secondary batteries are being float charged by using the normal vehicle charging system. The PDB is connected to the vehicle power system observing polarity. Power take off from the PDB to radios

and charging units such as the DCCU 28V are made by using the normal CLANSMAN 2 point power lead. Each of the 3 take off points on the PDB offers a fuse protected circuit. Fuse ratings for the various equipments are as follows:

DCCU – 3 amp rating
VRC 321 – 10 amp rating
VRC 353 – 15 amp rating

0149.–0165. *Reserved.*

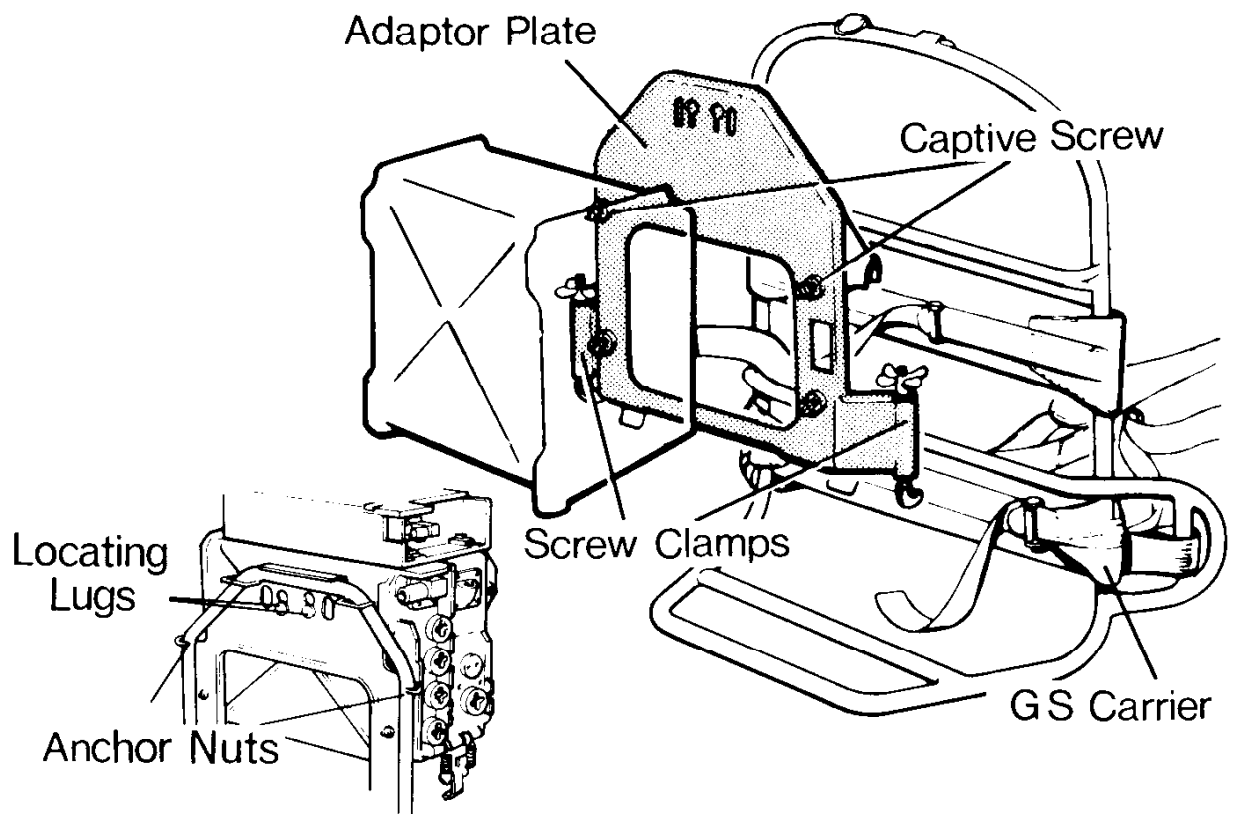


Fig 13.—Plate Adaptor and Carrier G.S.

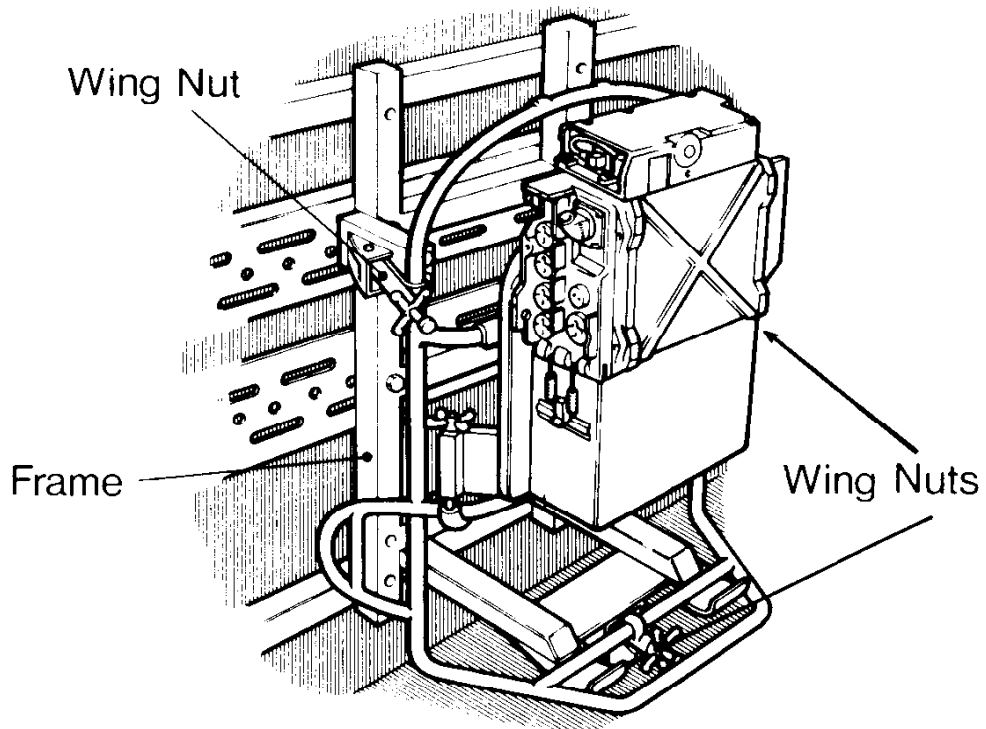


Fig 14.—Frame Electrical

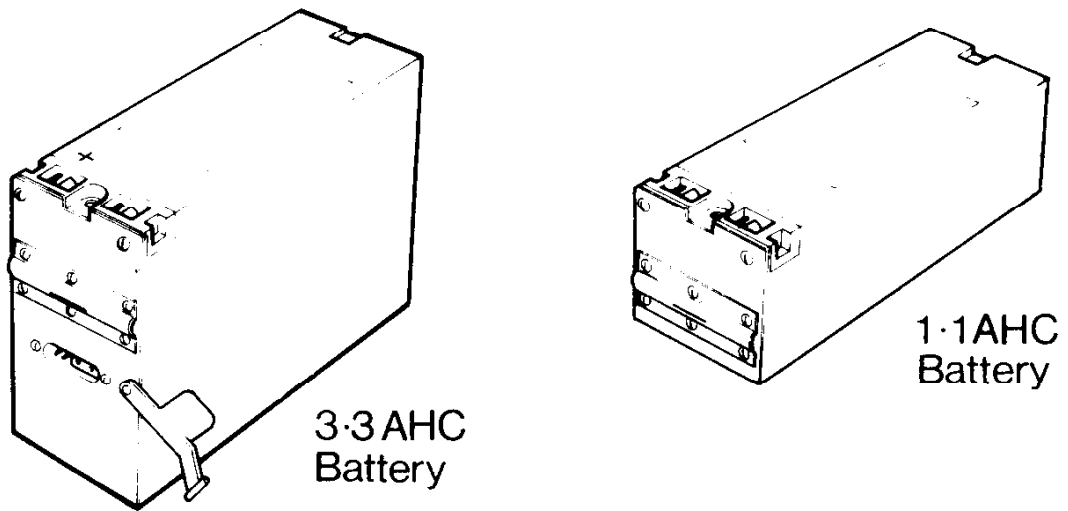


Fig 15.—Nickel Cadmium Batteries, 3.3 AHC and 1.1 AHC

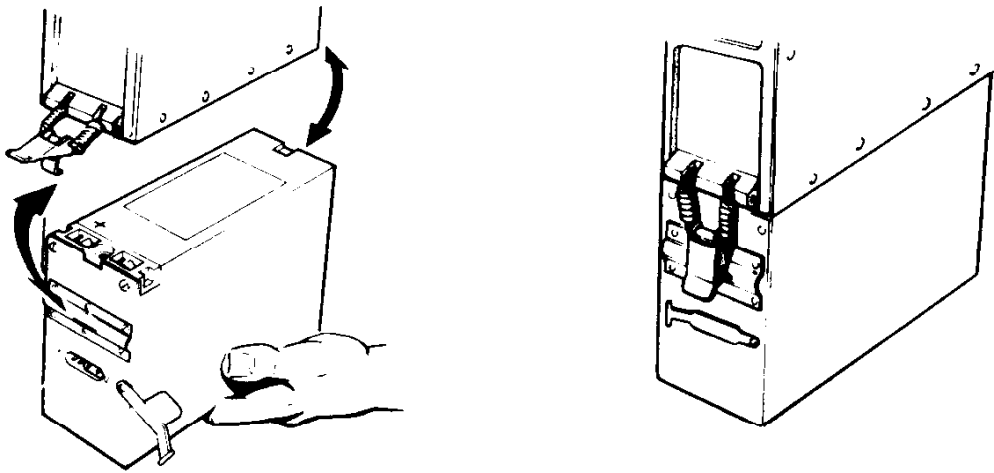


Fig 16.—Fitting a 3.3 AHC Battery

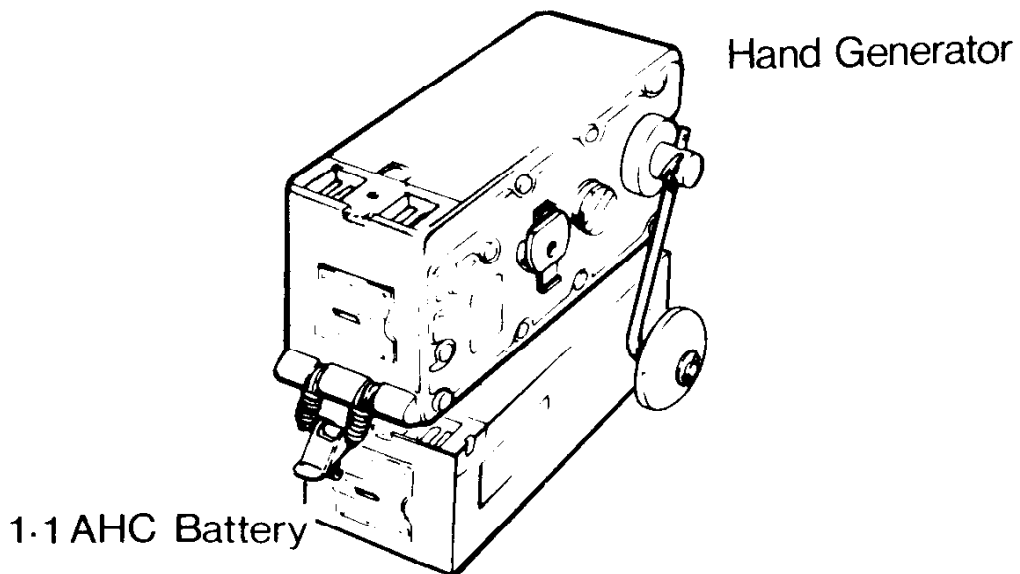


Fig 17.—Hand Generator and 1.1 AHC Battery

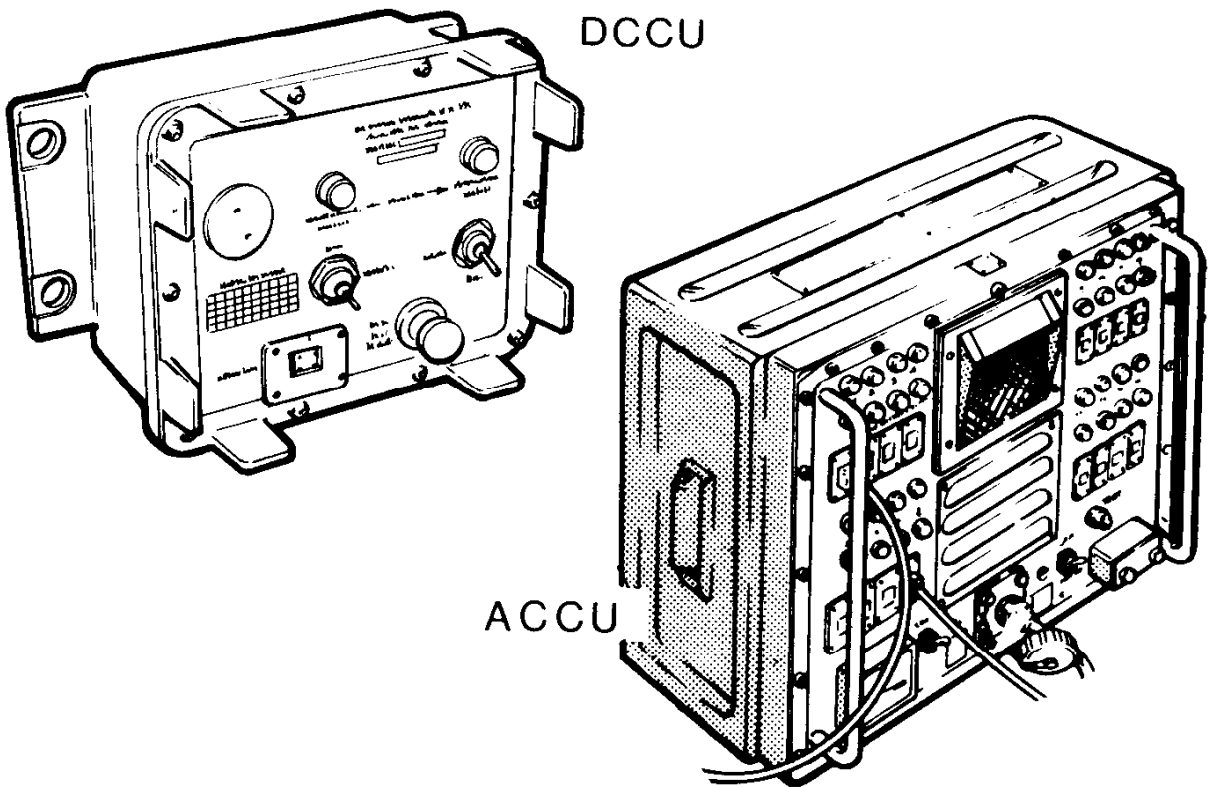


Fig 18.—DCCU and ACCU

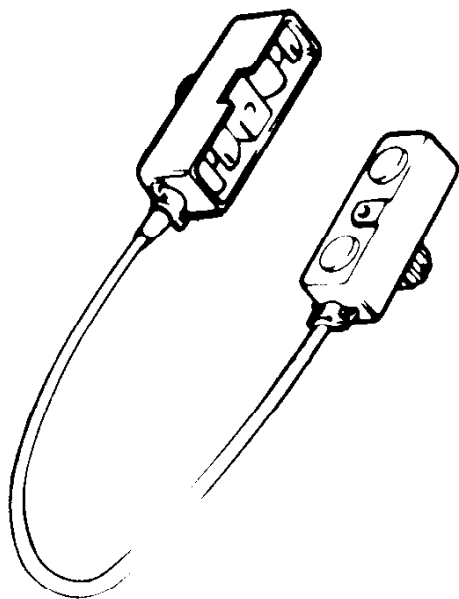


Fig 19.—Battery Extension Cable

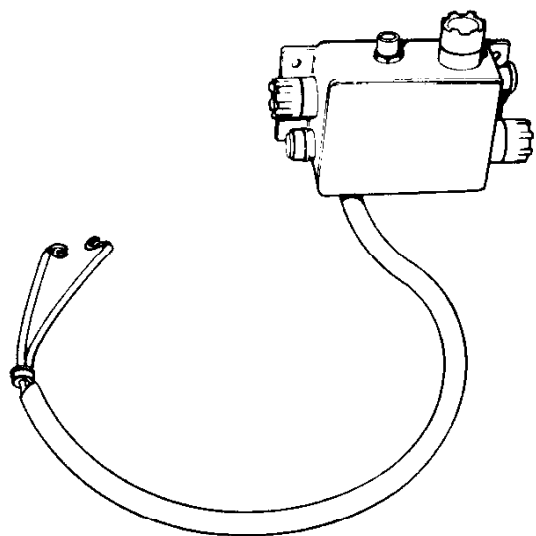


Fig 20.—Power Distribution Box

CHAPTER 2

RADIO

SECTION 3 – INTRODUCTION

General

0201. This chapter is concerned with the radios used in infantry and mechanized battalions. The information contained in the Chapter is taken from *User Handbooks and set out in a possible sequence of instruction in the various equipments.*

0202. Though primarily of value to the instructor it will also be of use to the student as an aide memoire.

Aim

0203. The aim of this Chapter is to summarize, for infantry instructors, essential elements of the User Handbook for infantry battalion radio.

Reference

0204. The following publications have been used in the compilation of this Chapter.

| a. User Handbooks: | Army Code No. |
|---|----------------------|
| (1) Radio Station UK/PRC 349 | 61646 |
| (2) Radio Station UK/PRC 350 | 61124 |
| (3) Radio Station UK/PRC 351/352 | 61128 |
| (4) Radio Station UK/VRC 353 | 61393 |
| (5) Radio Station UK/PRC 320 | 61123 |
| (6) Radio Station UK/VRC 321 | 61253 |
| (7) Lightweight HF Radio A16 UK/PRC 316 | 14961 |
| (8) Radio Station UK/PRC 344 | 61351 |
| (9) CLANSMAN Radio Control Harness | 61172 |

Teaching Technique

0205. *Indoor Instruction*

- a. An equipment to student ratio of one each to student should be achieved, if at all possible.
- b. *With this ratio up to 30 students can be instructed at any one time by one instructor. However, one or 2 assistants can be used to check and remedy faults when they occur.*

c. Prior to taking part in outdoor instruction instructors must be satisfied that the training objectives can be partially or wholly achieved by each student, particularly in terms of setting up, testing and operating.

0206. *Outdoor Instruction.*

a. Foot and vehicle borne radio exercises are the best way of confirmation in most of the objectives. It follows that stations should be limited to 2 or 3 men, if all students are to be effectively exercised and assessed.

b. All exercises should be written to include practising individuals in all the critical skills.

c. At the end of each exercise it should be possible to comment on the ability of each student in relation to the training objectives laid down.

Aids

0207. The use of aids is entirely up to the individual instructor. It should be remembered that aids should be used sensibly and never be a substitute for the equipment itself. For basic radio training large scale models are of value.

SECTION 4 – RADIO GENERAL

CLANSMAN

0208. The CLANSMAN range of radio, in certain cases, has replaced the LARKSPUR range. Its main advantages over LARKSPUR are:

a. Lighter.

b. Has a greater frequency range and more channels.

c. Simpler to use and, above all, when tuning, quicker and more accurate.

0209. The range provides communication facilities for all arms of the service and consists of VHF, HF and UHF radios which are covered in this chapter.

0210. There now exists a new NATO standardization nomenclature for radios which consists of 3 parts:

a. *National Identification Letters:*

UK – United Kingdom

b. *A 3 letter group to denote:*

(1) Type of installation:

P – Portable

V – Vehicle

U – Utility

(2) Type of equipment:

R – Radio

T – Telephone

(3) Purpose of equipment:

C – Communications

c. *A 3 figure group to identify the station:*

001–299 = Royal Navy

301–599 = Army

601–999 = Royal Air Force

d. Basically, in the Army, HF radios are in the 320 series, UHF in the 340 series and VHF in the 350 series. Thus the full nomenclature for the 351 is UK/PRC 351.

SECTION 5 – UK/PRC 349

Introduction

0211. The UK/PRC 349 is a light and efficient VHF/FM manpack set for use at section and platoon level.

Data

0212. **Frequency Range** 37 to 46.975 MHz
Channels 400 channels at 25 KHz
Power Supply 12V Primary Battery (*Battery life 20 hrs approx*)
 Penlight Batteries (*Used in adaptor case*)
 12V Rechargeable Battery
Antennas 0.5m and 1.0m Whip
Ranges Basic planning range 1.5km

| Terrain | Working Ranges (km) | |
|---------------------|---------------------|----------|
| | 0.5m Whip | 1.0 Whip |
| Rolling Countryside | 2.0 | 2.8 |
| Wooded Countryside | 1.2 | 1.5 |
| Built-up Area | 0.3 | 0.5 |

Note: Not all sets will have 1.0m Antennas issued.

Weight and dimensions (with battery)

| Height | Width | Depth | Weight |
|---------------|--------------|--------------|---------------|
| 246mm | 91mm | 41mm | 1.4kg |

Facilities Voice (FM) Narrow-band
 Whisper
 Loud
 Confidence Check
 Battery low warning

Description. (Fig 21 shows PRC 349 in carrying position)

Setting Up and Operating

0213. **Setting Up (Fig 22).**

- a. Ensure set is switched off (*system switch to '0'*).
- b. Connect battery (*screws into casing Fig 23*).
- c. Connect antenna (*screws in*).
- d. Connect AF gear.
- e. Insert into holster.

0214. **Frequency setting.** (See Fig 24.) Press ball of thumb onto control and twist until required figure appears in aperture. Frequency setting can be carried out in the dark by counting, from the extreme left, the appropriate number of click positions for each control.

Note: The top and centre switches each have 10 positions; the bottom switch has 4 positions.

Operator Checks (System switch illustrated at Fig 22)

0215. **Receive.**

- a. Set System Switch to *.
- b. A loud continuous hiss should be heard in the headset, if not refer to fault location chart at Annex A.

0216. **Transmit.**

- a. Set System Switch to L (*Loud*).
- b. Depress the pressel switch and speak into microphone.
- c. Sidetone should be heard in headset, if not refer to fault location chart at Annex A.
- d. Repeat with System Switch on 'W' (*Whisper*).
Set is now ready to operate.

General Information

0217. **Whisper and Loud Facilities (W & L).** With the system switches on the set at 'W', the operator can produce, with a whisper, full modulation and range.

0218. Received signals are less likely to be overheard, under conditions of high ambient noise, e.g. in a vehicle the system switch should be set to 'L' and the operator speaks normally.

0219. **'Noise on' (*).** Used to confirm that the battery and receiver are satisfactory – a loud hiss will be heard in the absence of a signal. This position is also used for inter-operability with older sets such as LARKSPUR.

0220. **Battery 'Low' Warning.** As the battery approaches exhaustion, an interrupted hiss is heard in the headset, when the system switch is set at either 'W' or 'L'. A battery change should take place as soon as is possible.

0221. **Antennas.** The set must NOT be operated on any frequency, at 2 metres or less from a 50 watt transmitter (VRC 353) working in the 30–76 MHz frequency band. At no time must the set be used without an antenna, or with antennas not designed for the set.

0222.–0230. *Reserved.*



Fig 21.—UK/PRC 349 in carrying position

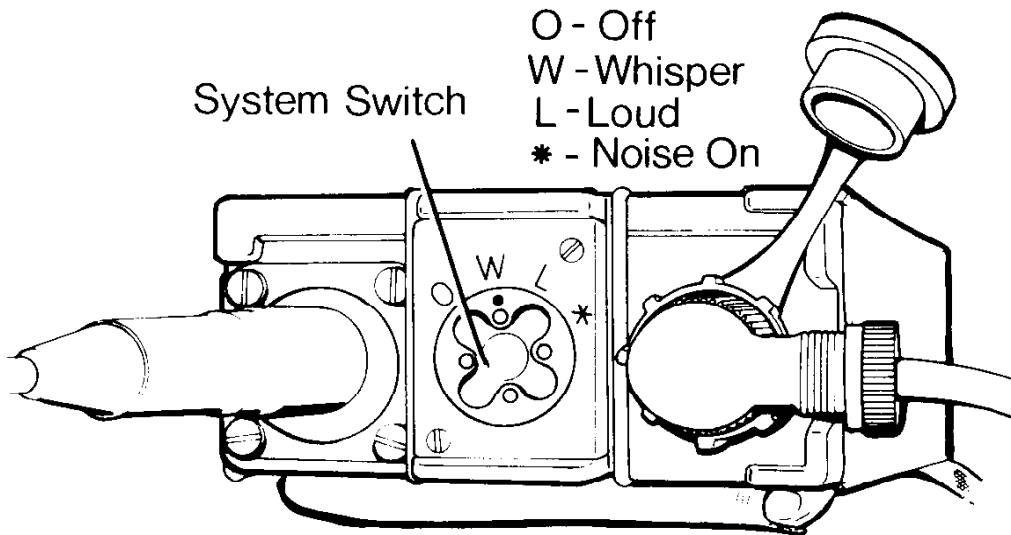
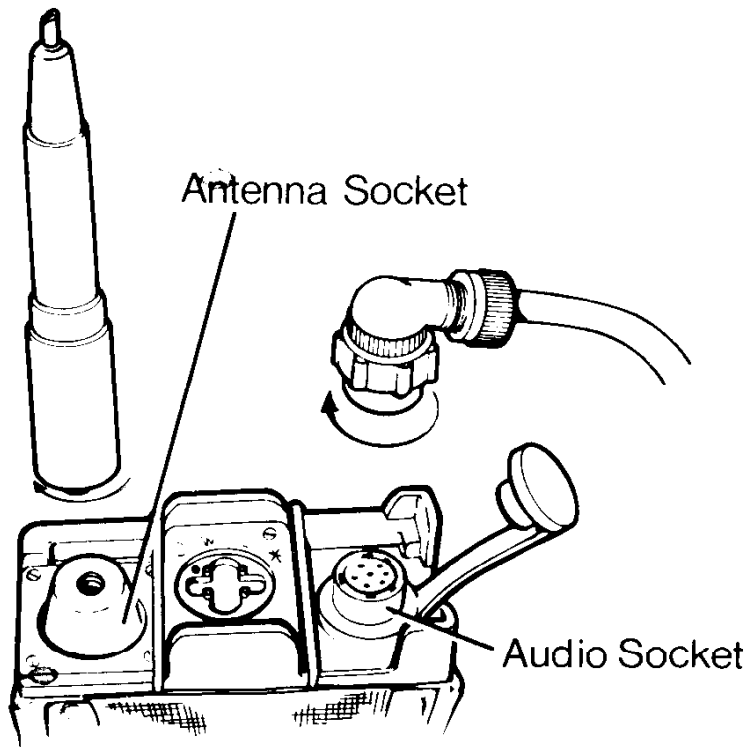


Fig 22.—Setting up UK/PRC 349

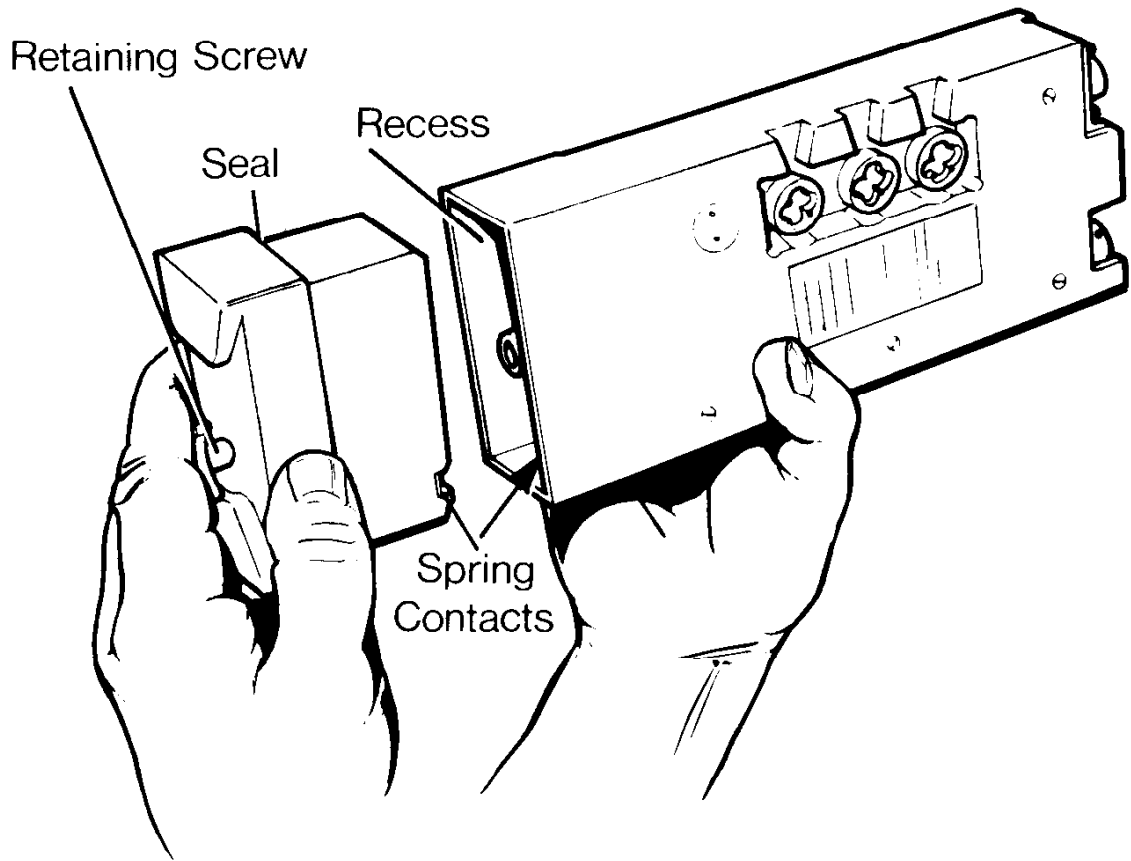


Fig 23.—Connecting Battery to UK/PRC 349

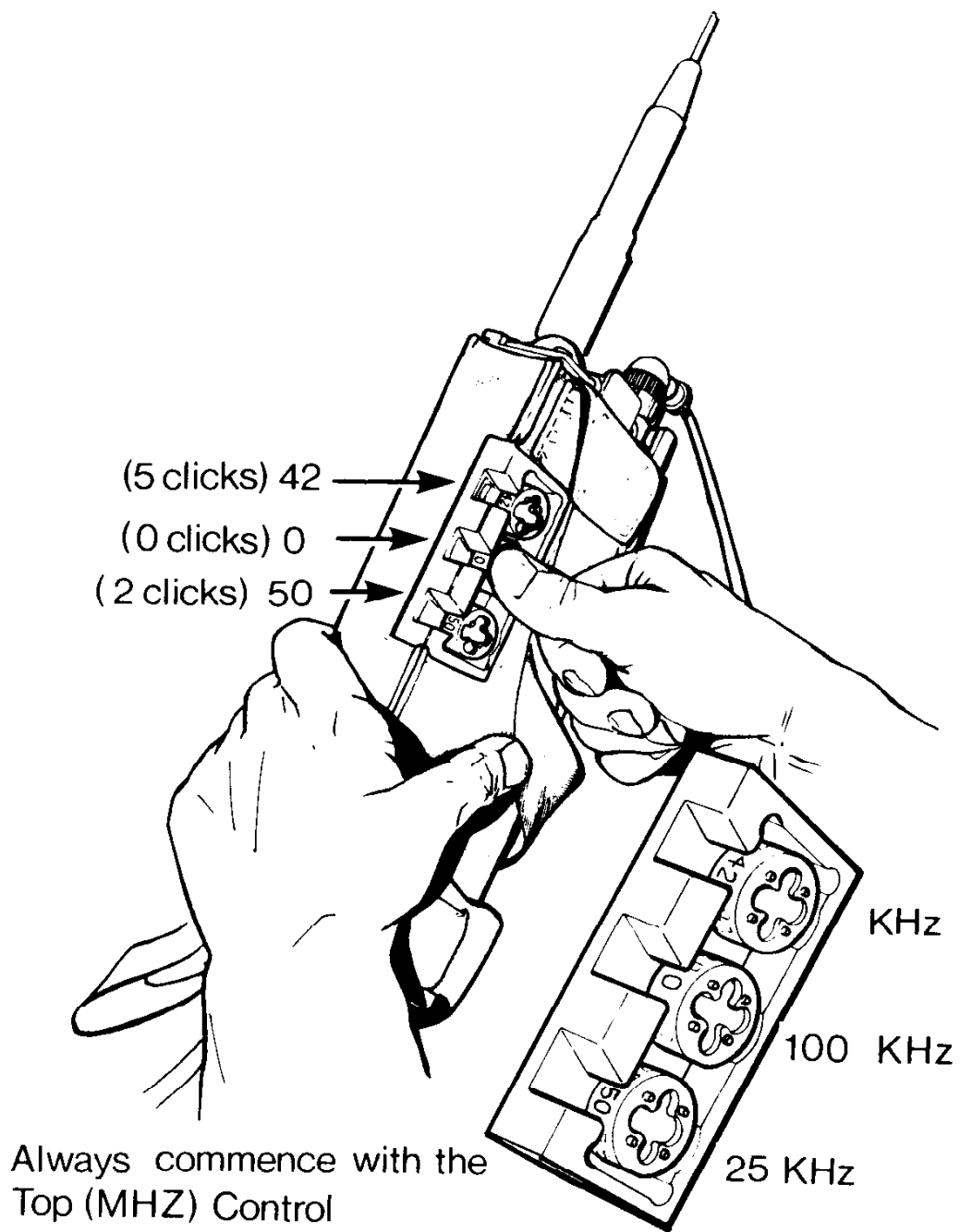


Fig 24.—Frequency Setting UK/PRC 349

SECTION 6 – UK PRC 350

Introduction

0231. The UK/PRC 350 is a VHF/FM manpack radio for use at platoon and section level.

Data

0232. **Frequency Range** 36 to 56.975 MHz
Channels 840 at 25 KHz
Power Supply 15V Primary battery
 15V Rechargeable battery (Battery life approx 12 hrs)
Antennas 1.2m Whip | Ground Mounted }
 Monopole } With 400mm
 1.2m Wire | Inverted 'V' } adaptor from GSA
 Ground Spike Antenna
Ranges Basic Planning range 6km max

| Terrain | Working Range km | |
|---------------------|------------------|----------|
| | 1.2m Whip | GSA |
| Rolling Countryside | 5.7 | 5km Plus |
| Wooded Countryside | 3.5 | |
| Built-up Area | 1.5–5 | |

Weight and Dimensions (with battery)

| | | | |
|---------------|--------------|--------------|---------------|
| Height | Width | Depth | Weight |
| 200mm | 120mm | 60mm | 3.6kg |

Facilities Voice (FM) Narrow-band
 Whisper
 Loud
 Confidence Check
 Battery low warning
 Can be vehicle mounted
 SURF 2W can be used

Description

Setting Up and Operating (Fig 25 & 26)

0233. **Setting Up.**

- a. Ensure set is switched off (systems switch to 'O').
- b. Connect battery (clips on to underside of set).

- c. Connect antenna (*push in, twist and screw down*).
- d. Connect AF gear.
- e. Connect straps.

0234. **Frequency Setting.** (See Fig 27.) Press ball of thumb onto control and twist until required figure appears on window. Frequency setting can be carried out in the dark by counting, from the extreme left, the appropriate number of click positions for each control.

Operator Checks

0235. **Receive.**

- a. Set system switch to * (*noise on*).
- b. A loud continuous hiss should be heard in the headset, if not refer to fault location chart at Annex B.

0236. **Transmit.**

- a. Set system switch to 'L' (*Loud*).
- b. Depress the pressel switch and speak into the microphone.
- c. Sidetone should be heard in headset, if not refer to fault location chart at Annex B.
- d. Repeat with system switch on 'W' (*Whisper*).

The set is now ready to operate.

0237. **Selective Unit Radio Frequency (SURF) 2 Watt.** When working 2 or more VHF stations in close proximity a SURF 2W can be fitted to the set in order to achieve minimum distance spacing (*cutting down of mutual interference*).

0238. **Setting Up.**

- a. Connect SURF to set (*see Fig 28*).
- b. Disconnect the antenna from set and reconnect to the antenna socket of the SURF.
- c. Connect the coaxial lead from RF socket on the set to the RF socket on the SURF.

0239. **Tuning.**

- a. Select frequency on set.
- b. Press pressel switch.
- c. Adjust tuning control on SURF for peak reading in meter.
- d. Snap metal cover shut when peak reading is obtained and release pressel.

Vehicle Installation

0240. *Setting Up.*

- a. Fit set to vehicle wing with installation kit provided (*see Fig 29*).
- b. Connect passive audio lead to set.
- c. Connect AF gear to outlet box on passive audio lead.

General Information

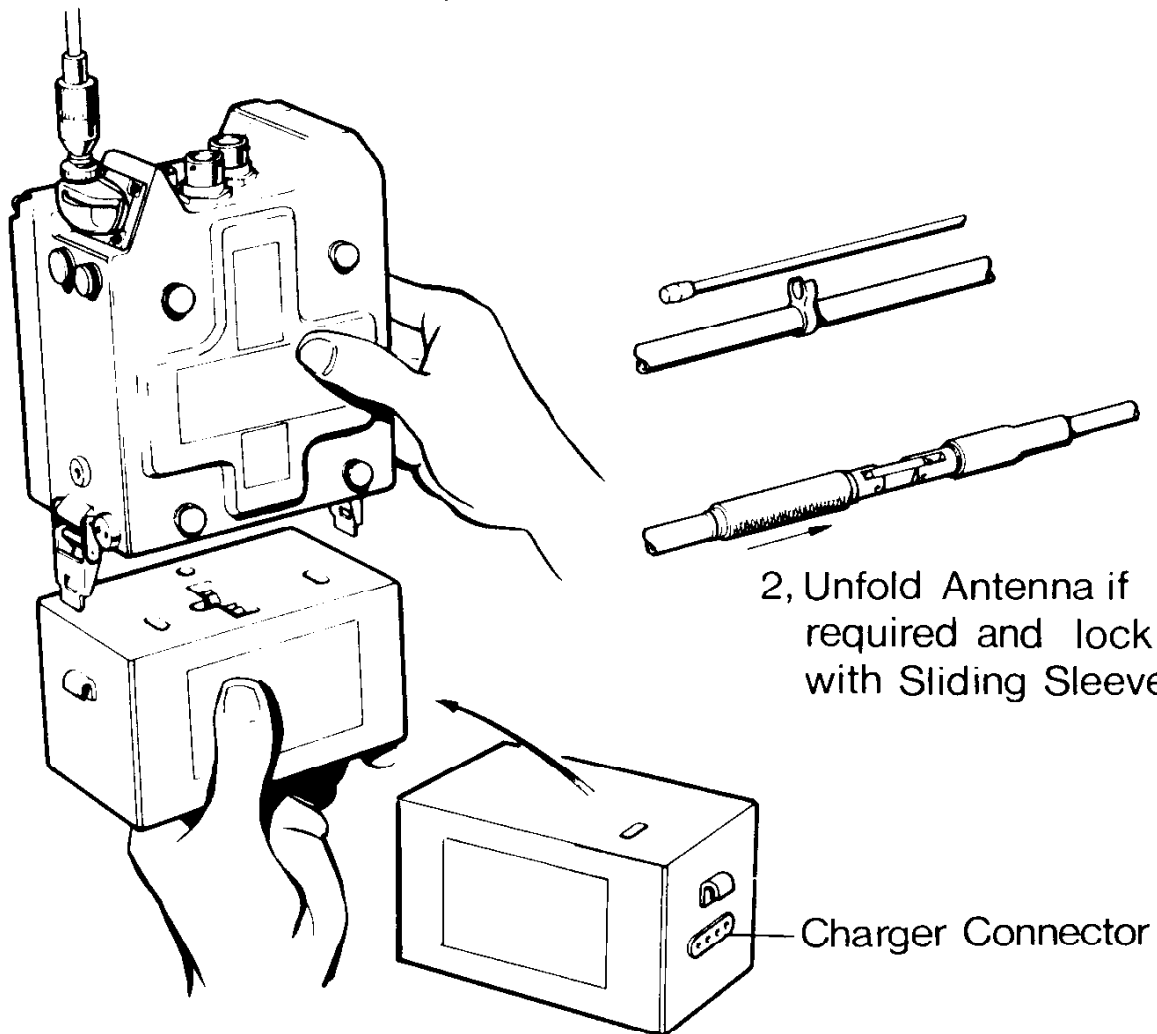
0241. ***Battery 'Low' Warning.*** As the battery approaches exhaustion, an interrupted hiss is heard in the headset when the system switch is set at either 'W' or 'L'. A battery change should take place as soon as possible.

0242. ***Remote Antennas.*** At no time should the 1.2m whip antenna be left connected whilst a remote antenna is in use. Failure to remove the whip antenna will result in both antennas radiating and considerable loss of signal.

0243. ***Carrying positions (see Figs 30 and 31).***

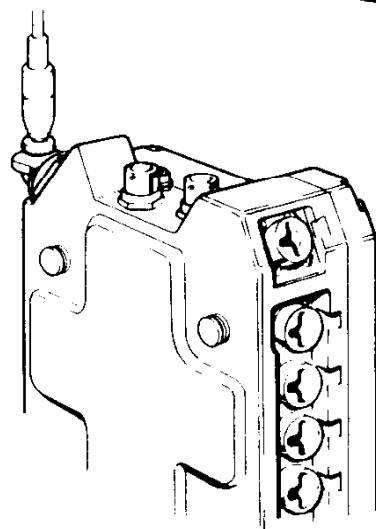
0244.–0250. *Reserved.*

1, Connect Battery. Secure Fastening Clip



2, Unfold Antenna if required and lock with Sliding Sleeve

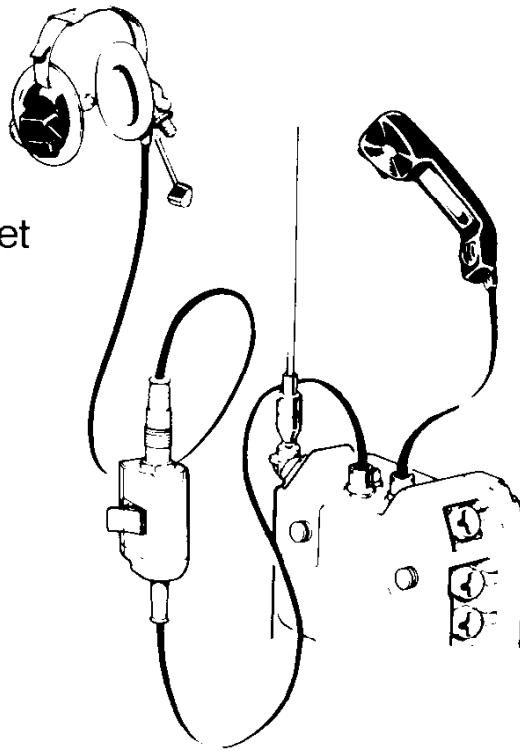
Charger Connector



3, Fit Antenna and tighten Locknut

Fig 25.—Setting up UK/PRC 350 (Stage 1)

4, Connect Handset



5, Attach Harness

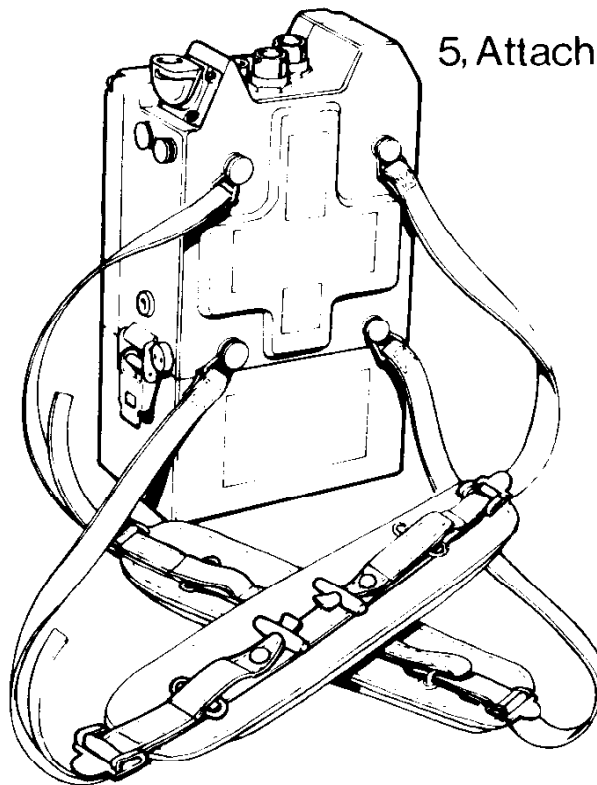


Fig 26.—Setting up UK/PRC 350 (Stage 2)

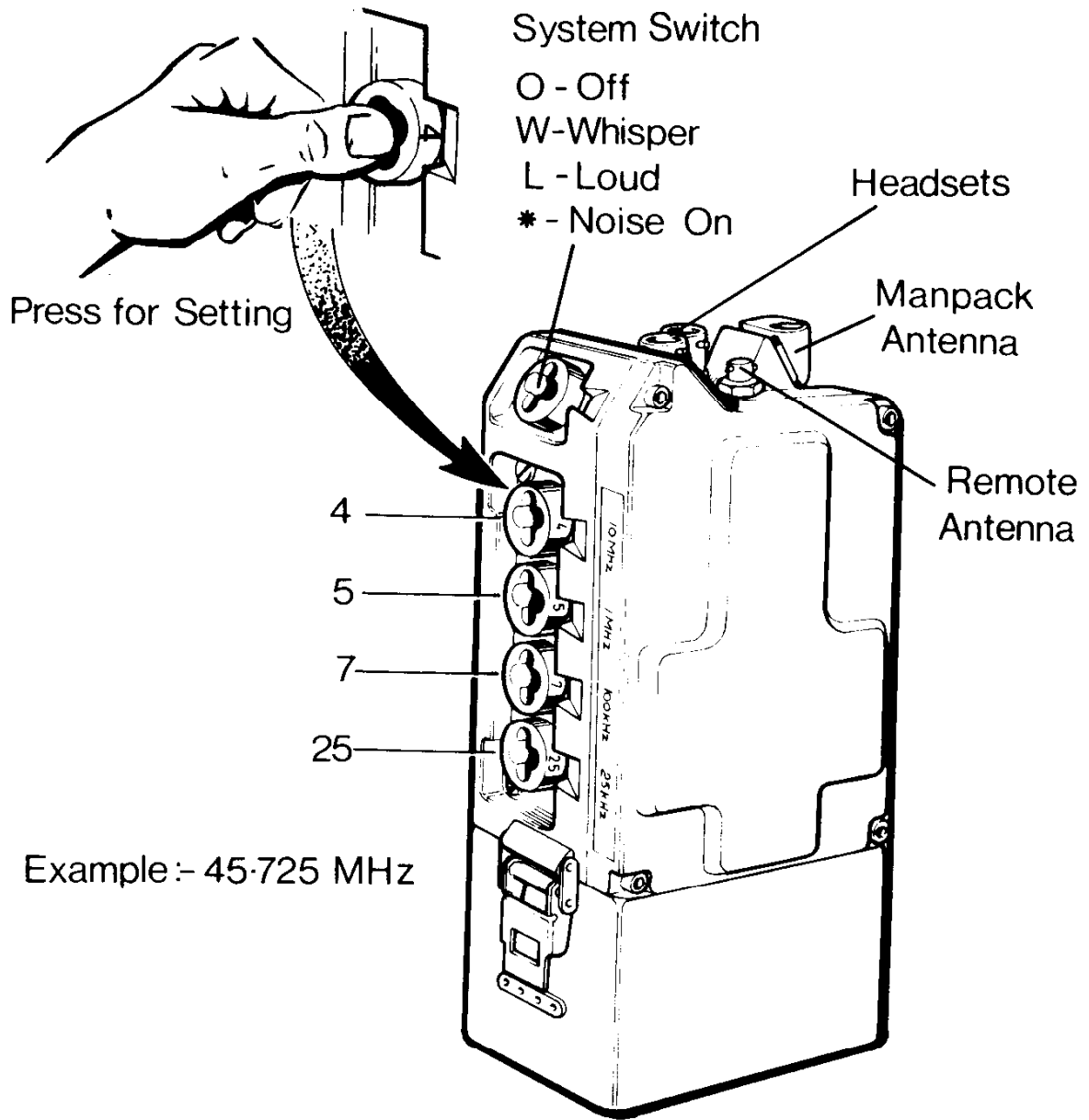


Fig 27.—Frequency Setting UK/PRC 350

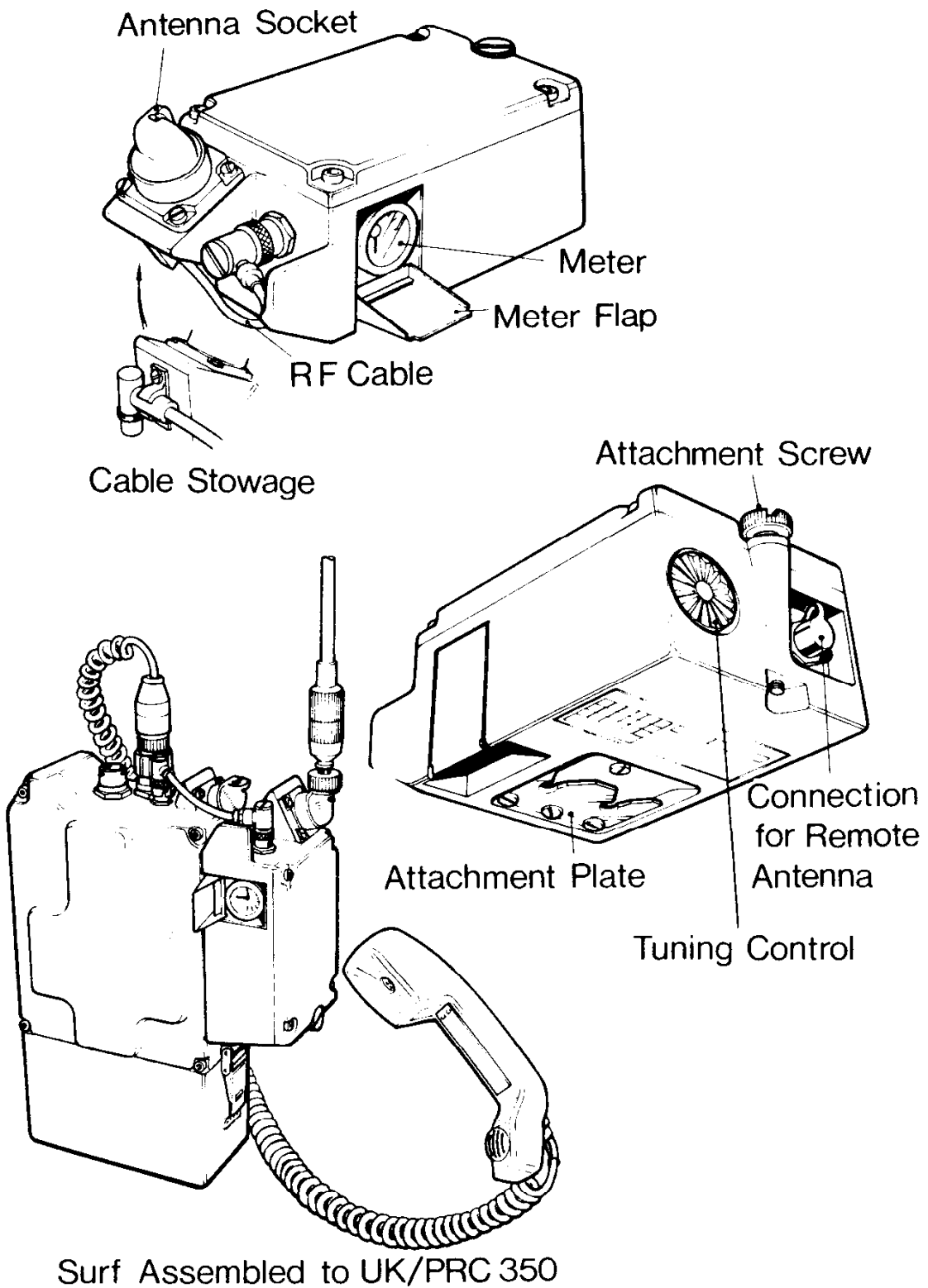


Fig 28.—Connecting a 2 Watt SURF to UK/PRC 350

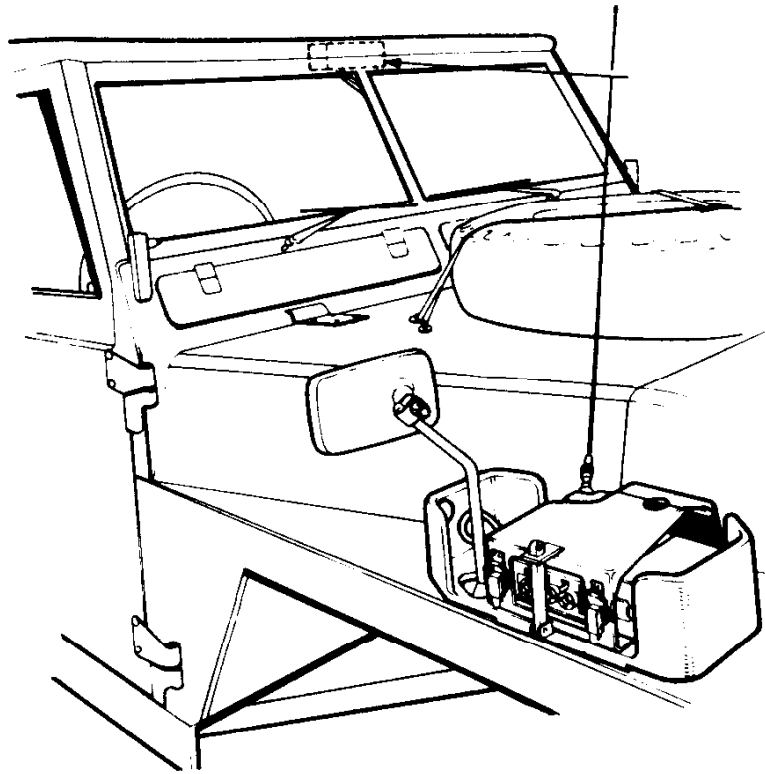


Fig 29.—Vehicle Mounted UK/PRC 350



Fig 30.—UK/PRC 350 Carrying position



Fig 31.—UK/PRC 350 Alternative carrying position

SECTION 7 – UK/PRC 351 AND UK/PRC 352

Introduction

0251. The UK/PRC 351 is a low power VHF/FM transmitter receiver which is the primary manpack set in use at platoon, company and battalion level.

Data

0252. **Frequency Range** 30 to 75.975 MHz

Channels 1840 at 25 KHz

Power Supply 24V 1 AHC Secondary Battery (*normally used with hand generator*)
24V 3.3 AHC Secondary Battery (*Life approx 18 hrs*)

Antennas 1.2m Whip Antenna
1.2m Wire
Ground Spike Antenna
Broadband Antenna
Inverted V
TUAAM with 2m Rod
Ground Mounted Monopole

Ranges Basic planning range 8km – manpack
16km – vehicle

| Terrain | Working Range km | |
|--|------------------|---------|
| | Manpack | Vehicle |
| Rolling countryside (<i>Good site</i>) | 8 | 16 |
| Rolling countryside (<i>Bad site</i>) | 3–7 | 12 |
| Built-up Area | 4 | 8 |

Weight and Dimensions (Basic station)

| | | | |
|---------------|--------------|--------------|---------------|
| Height | Width | Depth | Weight |
| 260mm | 215mm | 80mm | 8.2kg |

| | |
|-------------------|--|
| Facilities | Voice (FM) Narrow band Whisper Loud Confidence Check Battery low warning Can be vehicle mounted SURF 4W can be used Remote Rebroadcast Intercom Call |
|-------------------|--|

Description (Fig 32)

0253. **System Switch.** A 4 position switch which provides:

- O – Off Battery supply cut off
- W – Whisper
- L – Loud
- * – Noise on (confidence check)

0254. **Remote Operating Switch (see Fig 33).** A 5 position switch which provides:

- L – Local
- R – Remote
- A – Automatic Rebroadcast
- I – Intercom
- C – Call

Setting Up and Operating

0255. **Setting Up**

- a. Ensure set is switched off (*systems switch to 'O'*).
- b. Connect battery (*Fig 32*).
- c. Connect Antenna (*push in, twist and screw down*).
- d. Connect AF gear.

0256. **Frequency Setting (Fig 32).** Using thumb, twist frequency selection switches (FSS) until required figures appear in window.

0257. **Switching On.**

- a. Set System Switch (SSW) to 'L' (*Loud*).
- b. Set Remote Operation Switch (ROS) to 'L' (*Local*).

0258. **Testing.** Carry out tests using flow charts (*Annex C*). The set is now ready to operate.

0259. Remote Operating (Fig 33).

- a. Connect D10 to remote terminals on the set and to remote handset. *(Parallel connections are required, and with the ROS set to 'R' and the cable connected a 2 KHz tone will be heard if the polarity is incorrect.)* The set can be remoted up to 3km.
- b. Set ROS to 'R' (*Remote*) and handset user will have full receive and transmit capability.
- c. Set ROS to 'I' (*Intercom*) and the handset user has an intercom link with the set user.
- d. Set ROS to 'C' (*Call*) and a tone is generated in the remote handset to alert the users.

Note. The handset remote will generate a single tone in the audio gear if the remote switch is on 'I' or 'R'.

0260. Rebroadcast. Connect the 2 sets together, using D10 cable, connecting the remote terminals in parallel. If the polarity is incorrect a 2 KHz tone will be heard. *(Fig 34 shows a typical layout).* If the antennas of the Rebroadcast station are less than 50 metres apart a SURF 4W should be fitted to each set. Frequency separation for rebroadcast is 10% and the following combinations should be avoided:

$$F1=2\times F2 \quad \text{or} \quad F2=2\times F1$$

(e.g. 32 MHz and 64 MHz)
F1 ± 23.05 MHz (e.g. F1—39.95 then for F2 avoid 63 MHz)

0261. Vehicle Station (Fig 35 & 36). The UK/PRC 351 and UK/PRC 352 radio equipments can be clipped into vehicles and operated in that mode using the vehicle antenna and ancillary equipment.

0262. Setting Up.

- a. Clamp UK/PRC 351 onto Frame Electrical. Connect cable from DCCU to charging socket on 3.3 AHC battery.
- b. Connect vehicle coax to the TUAAM and RF and socket on the set.
- c. Connect control cable from the initiate box to socket 2 on the set. *(Note: cable must not be connected to socket 1.)*
- d. Connect headsets to socket 1 on the radio and/or to the AUDIO socket on the initiate box.

When using the UK/PRC 352 the coax is connected to the RF out socket on the 20W amplifier.

Description Fig 40 shows the PRC 352 set up.

0269. Control switch (see Fig 40)

A 5 position switch providing the following functions:

- | | | |
|-------|-------|--------------------|
| O | —Off | Reverts to PRC 351 |
| T | —Test | |
| 30–40 | MHz | Frequency Band |
| 40–55 | MHz | Frequency Band |
| 55–76 | MHz | Frequency Band |

Setting Up and Operating

0270. Setting Up.

- Ensure set and amplifier are switched off.
- Connect 20W amplifier to PRC 351.
- Connect battery to 20W amplifier.
- Connect coax from set to amplifier.
- Connect ground spike antenna to amplifier.
- Connect AF gear.
- Select frequency.

0271. Switching On.

- Set system switch to 'L'.
- Set remote operating switch to 'L'.
- Select appropriate frequency band on amplifier.

0272. Testing. Carry out tests using flow charts (**Annex D**). To test the receive facility a second set is needed. The set is now ready to operate.

Note: The set must not be used with a whip antenna when using the 20W amplifier.

0273. Vehicle Operation. See PRC 351.

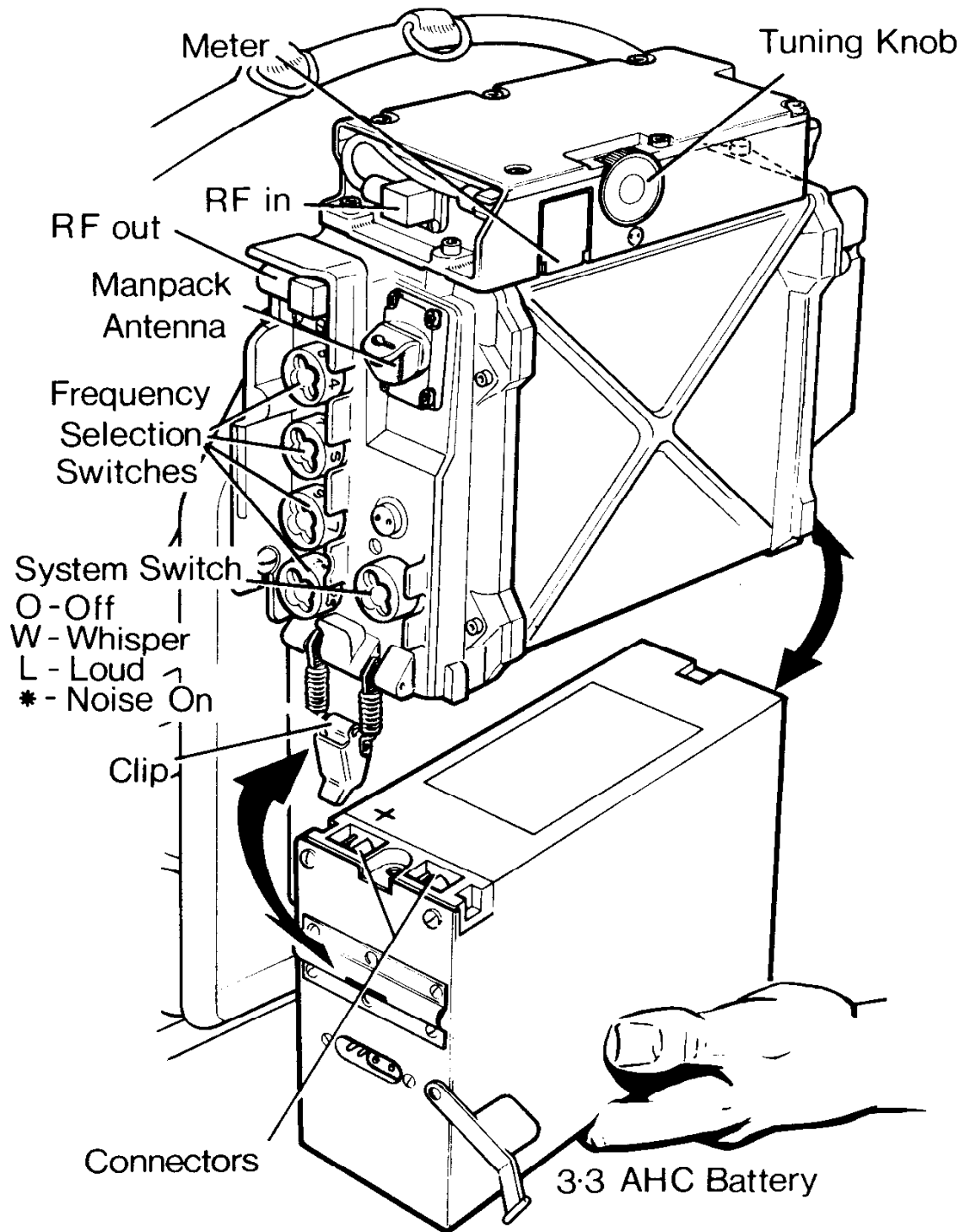
General Information

0274. Battery Low Warning. As the battery approaches exhaustion an interrupted hiss is heard in the headset when the system switch is set to either 'W' or 'L'. A battery change should take place as soon as possible.

0275. Remote Antennas. At no time should the 1.2m antenna be left connected whilst a remote antenna is in use.

0276. SURF 4W. The SURF 4W is not to be used in vehicle installations.

0277.–0280. Reserved.



Connect Battery and Fasten Clips

Fig 32.—UK/PRC 351

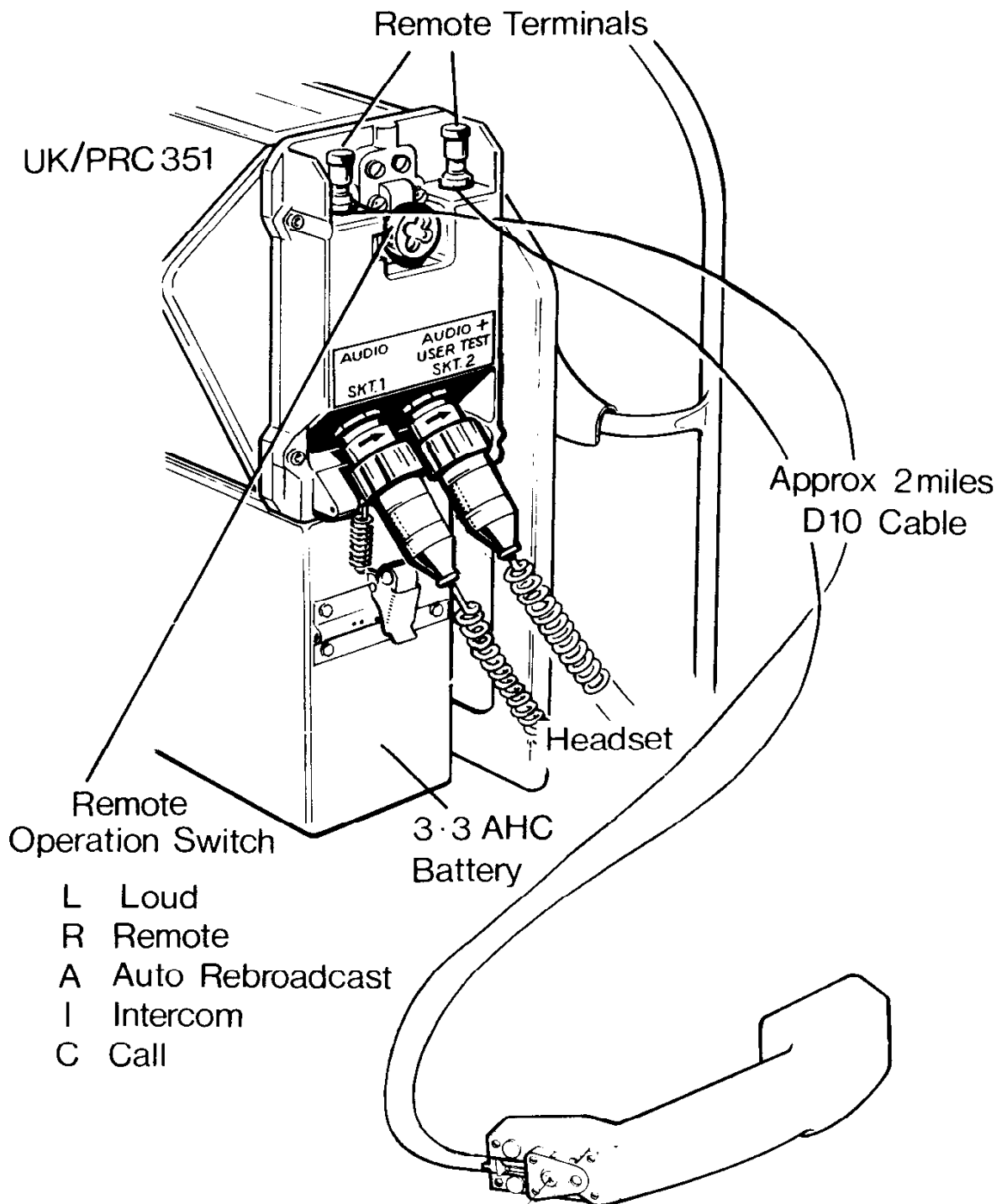


Fig 33.—Remote operating UK/PRC 351

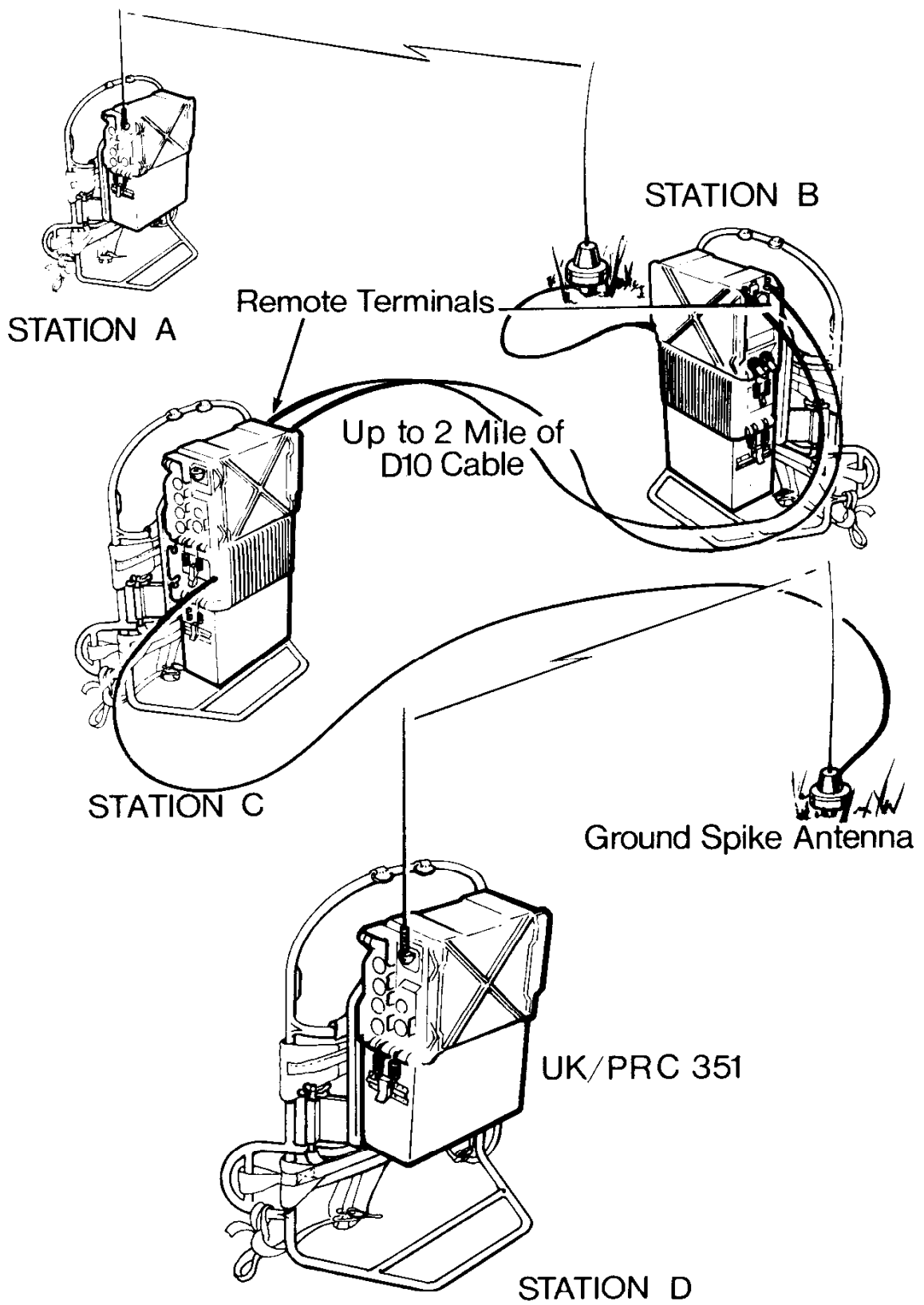


Fig 34.—Rebroadcast using 2×UK/PRC 351

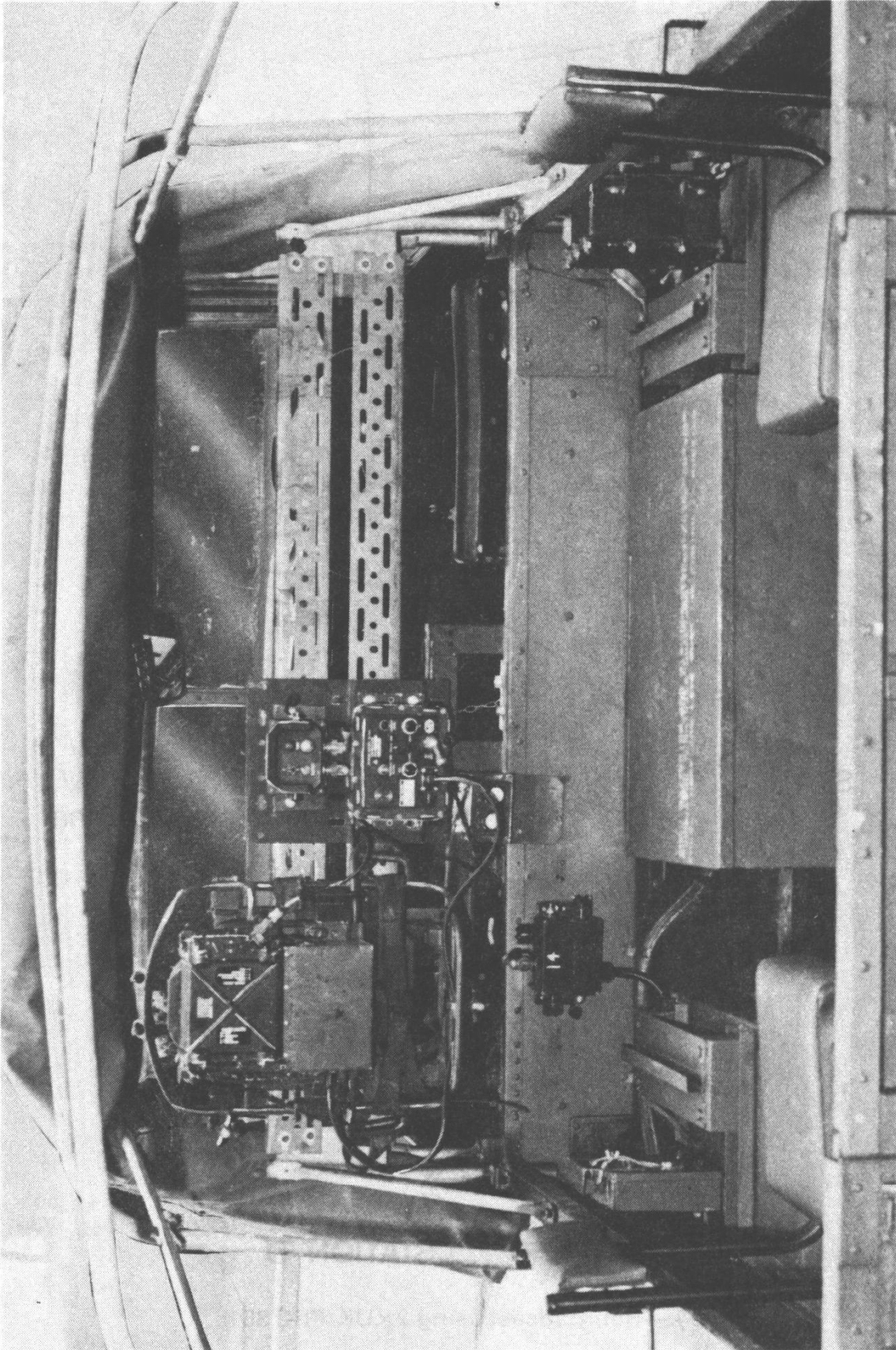


Fig 35.—Vehicle Mounted UK/PRC 351

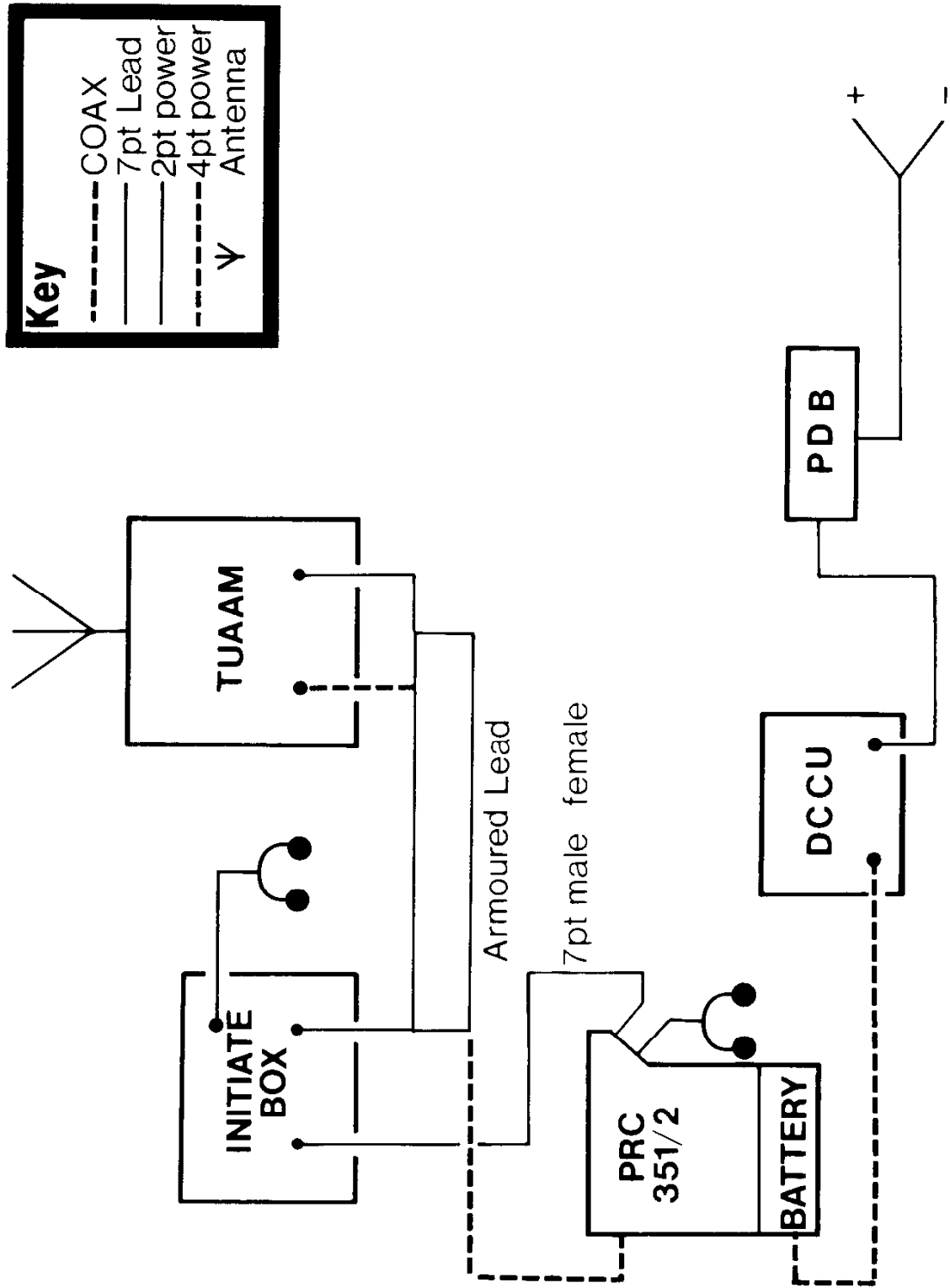


Fig 36.—Vehicle Interconnections UK/PRC 351

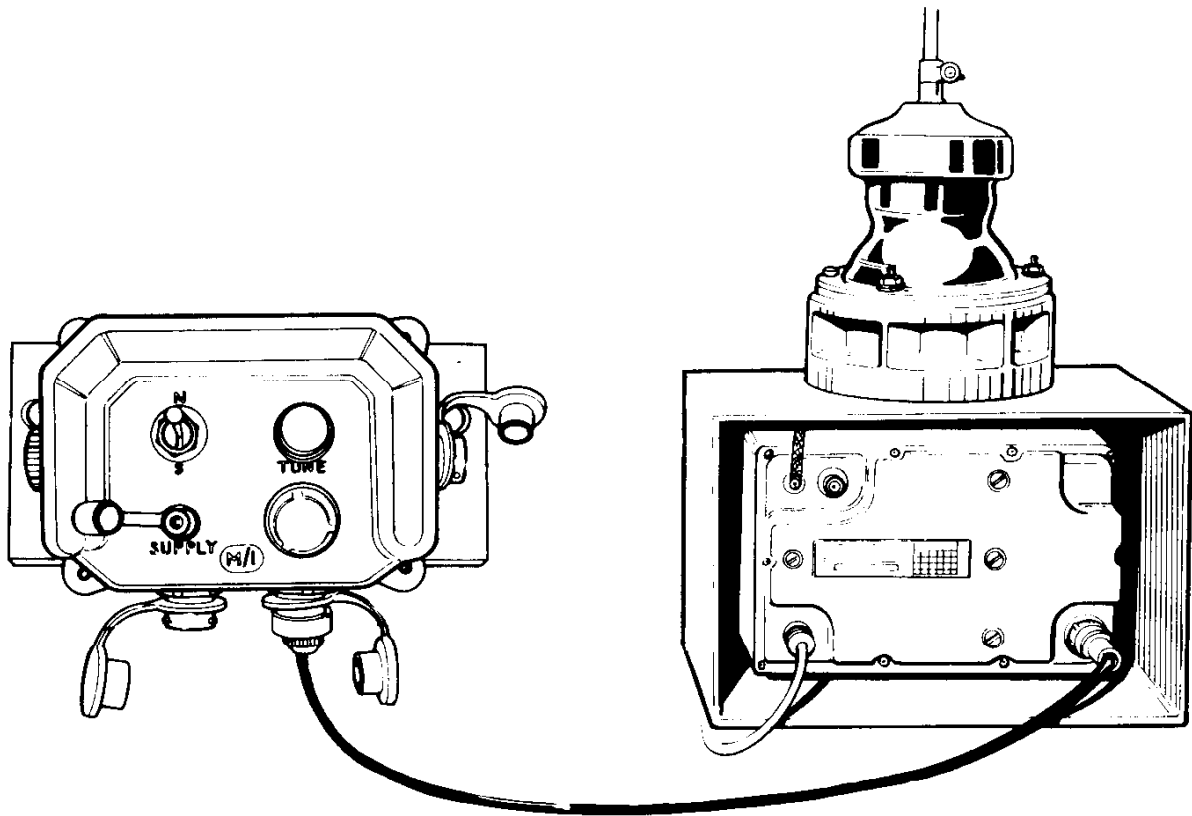


Fig 37.—TUAAM and Initiate Box

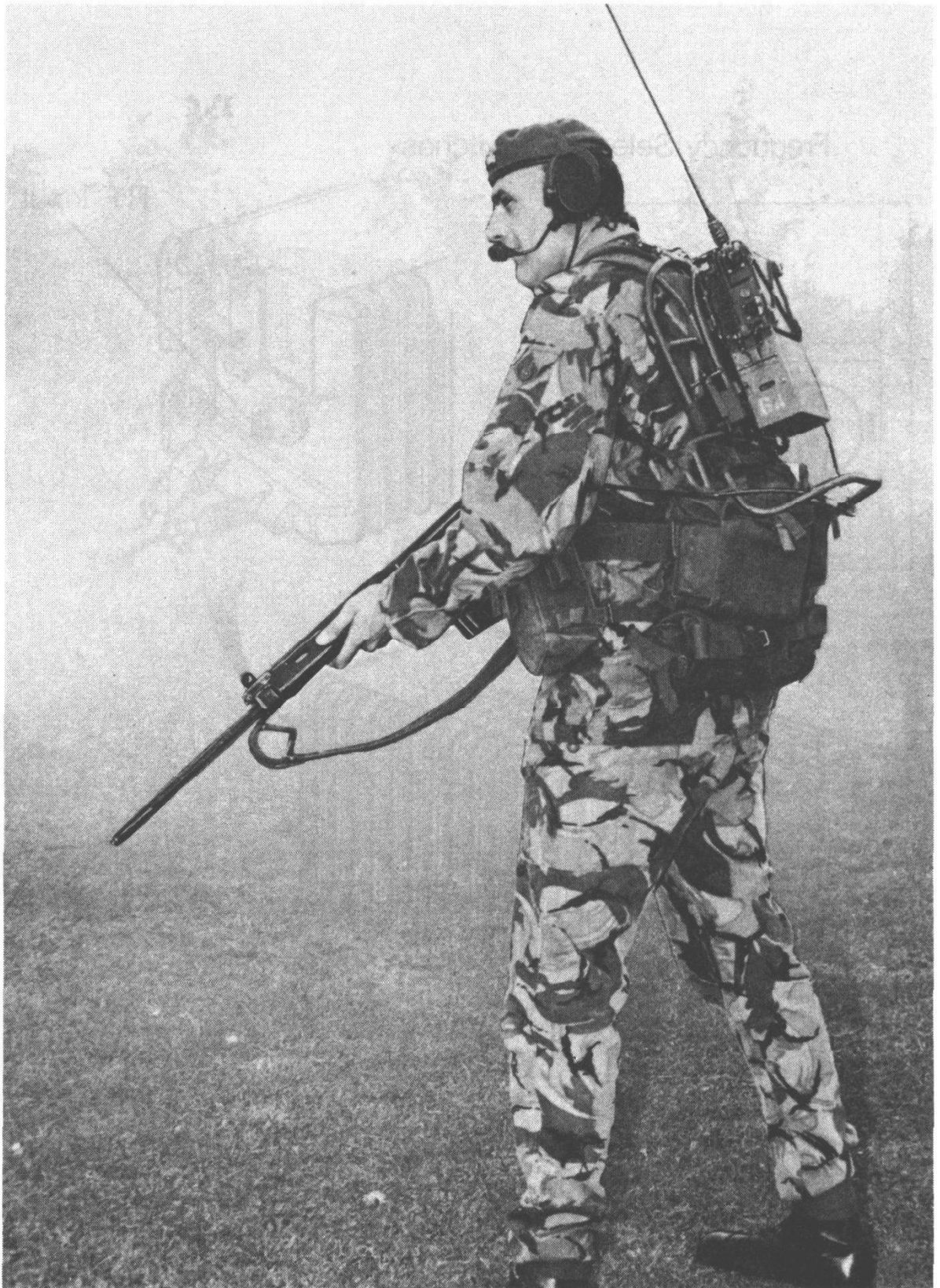


Fig 38.—UK/PRC 351 Carrying position

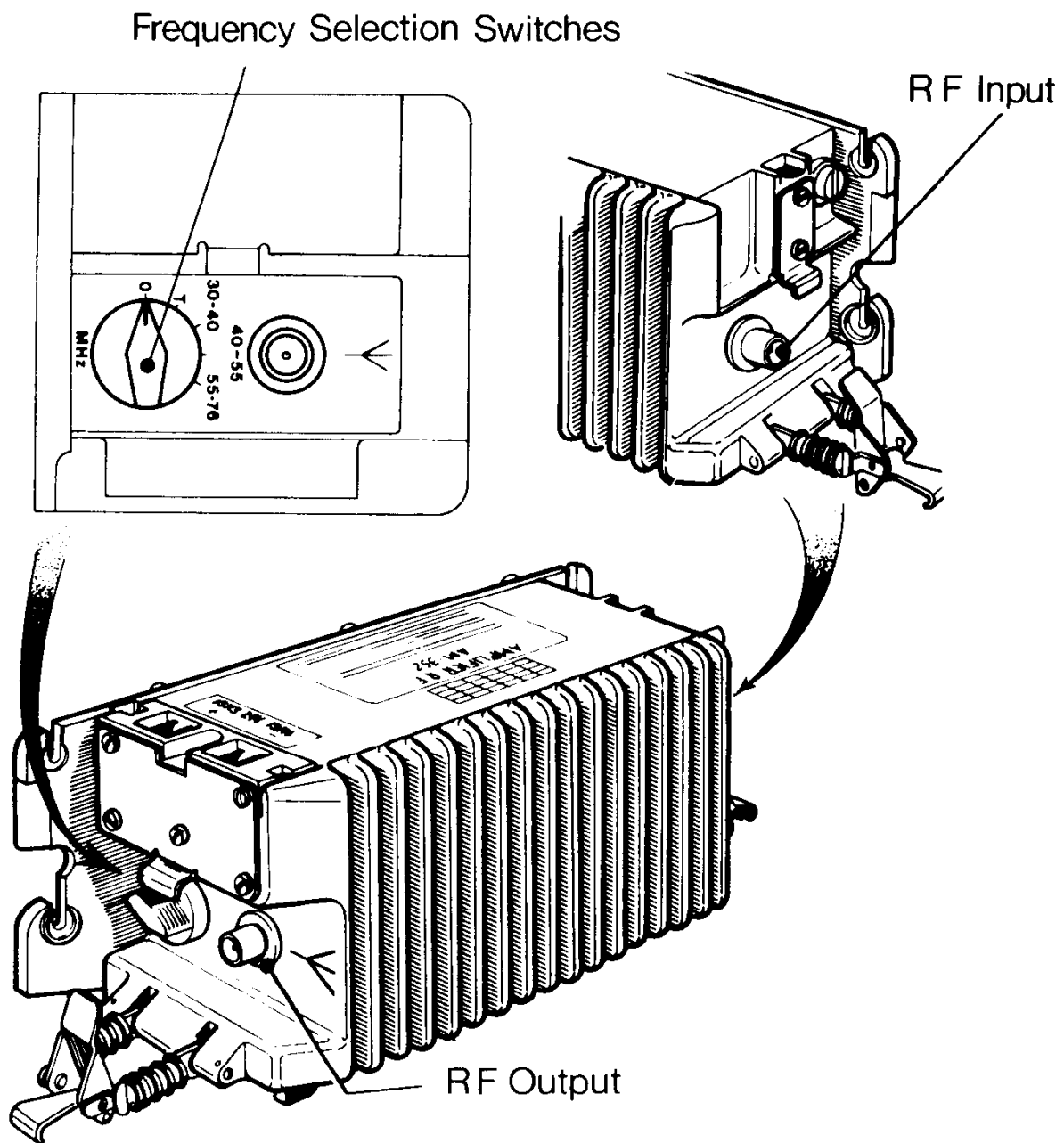


Fig 39.—20 Watt Amplifier



Fig 40.—Setting up UK/PRC 352

SECTION 8 – UK/VRC 353

Introduction

0281. The UK/VRC 353 is a VHF/FM transmitter/receiver designed for vehicle and ground station use throughout all arms of the Army.

Data

| | | |
|-------|------------------------|--|
| 0282. | Frequency Range | 30–75.975 MHz |
| | Channels | 1840 at 25 KHz 920 at 50 KHz |
| | Systems | Narrow – Normal CLANSMAN working Wide Tone – For working to wide tone systems (<i>i.e. NATO Forces Radio</i>) Wide – LARKSPUR working Narrow Data – For R SIGNALS use only. Wide Data – Clansman Secure Speech |
| | Power Supply | 2×12V Batteries AC PSU from mains <i>(VRC 353 will accept 20–30 volts)</i> |
| | Antennas | TUAAM with 2m Rod Ground Mounted Monopole Broadband Antenna GSA (15W and below) Inverted V |
| | Ranges | Basic Planning Ranges 50W 32km 15W 18km |

Weight and Dimensions

| | Height | Width | Depth | Weight |
|-------------------------|---------------|--------------|--------------|---------------|
| VRC 353 | 215mm | 240mm | 360mm | 22.2kg |
| TUAAM & Antenna Base | 400mm | 250mm | 190mm | 8.7kg |
| ARFAT | 70mm | 160mm | 120mm | 0.9kg |

| | |
|-------------------|---|
| Facilities | Automatic Rebroadcast Remote Operation Intercom Call Break in |
|-------------------|---|

Description (*Fig 41 shows the VRC 353 installed in a vehicle*)

0283. **Vehicle Interconnections** (*Fig 42*).

0284. **VRC 353 Controls and Connections.**

| Fig 43 Ref | Controls and Connections | |
|---------------|--|--|
| 1 | MODE SWITCH NARROW WIDE TONE WIDE NARROW DATA WIDE DATA | The normal CLANSMAN operating position when working analogue, channels are confined to 25 KHz. 50 KHz channel spacing using the 150 Hz tone squelch system. For use with equipments using 50 KHz channel spacing and 150 Hz tone squelch. Used when working to non-tone squelch equipments e.g. LARKSPUR. For future applications. For data working. Notes: When the MODE switch is set to DATA the radio can only be operated from special equipment connected to the HARNESS connector. |
| 2 | TX LAMP The lamp lights when the radio is transmitting. | |
| 3 | METER The meter is calibrated from 16 to 32 divisions and is used in conjunction with the TEST switch. | |
| 4 | ELAPSED TIME INDICATOR A digital read-out of the total running hours of the radio set. | |
| 5 | POWER OFF MIN 1W 15W 50W Ø TUNE | Power off but meter reading available for 28V test. On with 100 milliwatts output. On with 1 Watt output. On with 15 Watts output. On with 50 Watts output. This position is for RADIO & ELECTRONIC SILENCE. During Radio and Electronic Silence with the power switch in the Ø position, the radio can receive signals but cannot be caused to transmit. This is a spring biased position used to initiate tuning of the TUAAM and is only used with the TUAAM/ARFAT antenna system. |

| Fig 43 Ref | Controls and Connections | |
|---------------|---|---|
| 6 | TEST A 10-position rotary switch labelled as follows: | |
| | LAMPS OFF | In this position all illumination on the radio is switched off. Received signal strength is indicated on the meter. Note also that the transmission indicator lamp does not light up during transmission when the switch is in this position. Do not attempt to tune the radio with the switch in this position as it is essential that the lamp comes on whilst the set is tuning. |
| | FANS OFF | In this position the cooling fans will not switch on and transmission is inhibited except for automatic tuning. Other conditions will be as for LAMPS OFF. |
| | | This position is for use ONLY when (<i>Audio</i>) SILENCE is essential. |
| | | Note: Excessive use of this position will increase likelihood of failure of the radio and may cause the safety trip to operate which will initially prevent the radio from transmitting and finally switch the radio off until it is cool. |
| | 28V SPLY | In this position the meter indicates the applied voltage. If reading is less than 22v recharging of the batteries is essential. |
| | RX SIG | In this position the meter indicates the received signal strength. |
| | TX O/P | In this position the meter indicates the RF output from the radio. The meter indication should be in the green area irrespective of the setting of the POWER switch whilst the radio is transmitting. |
| | AFC TX | In this position if the set is transmitting and the meter does not read within 3 divisions of centre scale, the transmitter is out of alignment and the set may not transmit at a later occasion. |

| Fig 43 Ref | Controls and Connections | |
|---------------|--------------------------|--|
| | SYNTH | If the frequency window illumination flashes and the meter reads in the red or left hand half of scale in this switch position the synthesiser is out of lock possibly due to a frequency outside the range 30 to 75.975 MHz having been selected. Otherwise the set needs to be repaired. |
| | TEMP | If the frequency window illumination flashes and the meter reads in the red or left hand half of the scale in this switch position the set is overheating. Check that the air flow through the set is not restricted. Under this condition the set will not go to transmit. In emergency ONLY the set may be made to transmit for a short period by turning the TEST switch to OVERRIDE and operating the pressel but the set may be damaged by doing this. |
| | ARFAT | If the frequency window illumination flashes and the meter reads in the red or left hand half of scale in this switch position there is a fault in the antenna system. This is detected because the ARFAT will have overheated indicating a fault in the antenna system beyond the VRC 353. This fault position is redundant when using a remote antenna. |
| | OVERRIDE | In this position standard functions are overridden: <ul style="list-style-type: none"> a. All illumination is switched off. b. The fans operate. c. Audio muting is removed even in the absence of an incoming signal to give confidence that the receiver is operating by listening to its own noise. d. The transmit inhibit caused by overheating or ARFAT faults is removed. e. A reading is obtained on the meter. If in the red or left hand half of the scale when the pressel is operated the transmitter is out of lock. It will not transmit. |

| Fig 43 Ref | Controls and Connections | |
|-----------------------|--|--|
| 7 | GAIN | Varies the gain to the 2 output sockets. |
| 8 | REMOTE LOCAL REM AUTO BK IN IC CALL | A 6-position switch the last position of which is spring loaded. No harness, no remote, the set is operated directly from the audio sockets. Local, Harness or Remote except AUTO rebro. Automatic rebroadcast, Local or Remote. For setting up Automatic Rebroadcast. For intercommunication over remote line without transmitting over the air. Spring loaded switch for calling the remote operator when intercommunication is required. |
| 9 | D10 CABLE STRIPPER | For stripping insulation from ends of remote cable. |
| 10 | REMOTE | Pair of spring terminals for remote line connections. Up to 3 Kms with D10 cable. |
| 11 | EARTH TERMINAL | Terminal for earth connection. |
| 12 | ANT/ARFAT | A coaxial connector for ARFAT or remote antenna. |
| 13 | ARFAT | A 12-way connector used to supply power and control information between the set and the ARFAT. |
| 14 | AIR INTAKE GRILL | Fans provide protection from overheating. The air intake grill on the front panel and 2 fan outlet housings at the rear of the set provide physical protection to the heat exchanger. |
| 15 | AUDIO | Pair of sockets for connection of audio gear. |
| 16 | HARNESS | A 7-pin plug for connecting radio into Harness. |
| 17 | 28V | A 2-pin plug for 28V supply connection. |

| | | |
|---|--|---|
| Fig 43 Ref | Controls and Connections | |
| 18 | FREQUENCY SELECTOR | Inner and Outer control knobs for frequency selection. |
| 19 | FREQUENCY DISPLAY WINDOWS | Two windows where the frequency to which the radio is tuned is displayed. |
| <p>Note: If the set detects a fault the frequency window illumination will be made to flash and the audio output will be alternately muted and not muted in time with the light.</p> | | |

Connecting up the Radio Station

0285. In vehicles fitted with Harness follow the instructions in the order shown in the table below:

| ORDER | OPERATION | ILLUSTRATION REFERENCE | |
|-------|--|---------------------------|----------|
| | | FIGURES | |
| | | 43 | 44 |
| 1 | Connect Earth Braid. | 11 | |
| 2 | Set POWER switch to OFF. | 5 | |
| 3 | Connect DC supply lead to 28V socket. | 17 | |
| 4 | Connect Harness cable to the 7-pin Harness socket. | 16 | |
| 5 | Connect the 12-way interconnecting cable from the ARFAT socket on the VRC 353 to the 12-way socket marked VRC 353 on the ARFAT. | 13 | 20 |
| 6 | Connect coaxial cable from ANT/ARFAT socket on the VRC 353 to the coaxial cable socket marked VRC 353 on the ARFAT. | 12 | 21 |
| 7 | Connect the 7-way interconnecting cable from the 7-way socket marked TUAAM on the ARFAT to the 7-way socket (ISK1) on the TUAAM. | | 22 24 |

| ORDER | OPERATION | ILLUSTRATION REFERENCE | |
|-------|--|------------------------|----------|
| | | FIGURES | |
| | | 43 | 44 |
| 8 | Connect coaxial cable from the coaxial socket marked TUAAM on the ARFAT to the coaxial socket (ISK2) on the TUAAM. | | 23 25 |
| 9 | Connect the coaxial cable from the antenna base No. 31 to the coaxial socket (ISK3) on the TUAAM. | | 26 |
| 10 | Screw the whip antenna sections together and mount on the antenna base. | | 27 |

0286. In vehicles without Harness, connect as normal except that at operation (4), connect Headgear to the socket marked AUDIO.

Note: Alternative antenna systems can be used; information on these will be found in Chapter 5.

Setting Up and Antenna Tuning

0287. **General Instruction.** Follow the instructions in the order shown in the table below:

| ORDER | OPERATION | ILLUSTRATION REFERENCE FIG 43 |
|-------|--|----------------------------------|
| 1 | Set the REMOTE switch to REM if Harness is in use. Set the REMOTE switch to LOCAL if local audio gear is in use. | 8 |
| 2 | Set the TEST switch to RX SIG (<i>when panel illumination prohibited set to LAMPS OFF</i>). | 6 |
| 3 | Set MODE switch to the appropriate mode of operation, e.g., NARROW. | 1 |
| 4 | Set up Frequency. | 18, 19 |
| 5 | Set POWER switch to minimum RF output level needed. The OFF position disconnects power supply. | 5 |
| 6 | Wait 40 seconds before using the VRC 353. | |
| 7 | If a TUAAM, ARFAT and 2m end-fed whip antenna are in use, initiate automatic antenna tuning. | 5 |
| 8 | Adjust GAIN control (<i>NOT applicable if AUDIO gear is connected via Harness</i>). | 7 |

0288. **Setting Up Frequency.** Use the following sequence:

| ORDER | OPERATION |
|-------|---|
| 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 same window. |
| 5 | Similarly rotate knobs until the required 'Hundreds of kHz' and '25 kHz' appear in the right hand window. |

0289. **Antenna Tuning using the TUAAM and ARFAT.** The TUAAM can tune to the matching transformer and internal pigtail between the transformer and antenna socket, in the antenna Base No. 31. It is important to check that there is an antenna fitted in the antenna base.

0290. **Power Tuning.** Rotate the POWER switch to the TUNE position and return it immediately to the minimum RF output power required. This will cause the TUAAM to tune to the antenna. The TX indicator lamp will light while the TUAAM is tuning. This should be completed in approximately 3 seconds. Wait until the TX indicator lamp has gone out before using the VRC 353.

0291. **Silent Tuning.** During Radio Silence conditions rotate the POWER switch to the TUNE position and return it immediately to the 0 position. This will cause the TUAAM to tune in to a dummy load which will allow the radio only to receive signals. The TX indicator lamp will light while the TUAAM is tuning. This should be completed in approximately 3 seconds. At the end of Radio Silence use the Power Tuning procedure shown above to cause the TUAAM to tune to its antenna.

0292. It is important that the following rules are observed.

- a. Do not change frequency while the TUAAM is tuning.
- b. The TUAAM will be caused to tune if:
 - (1) The power supply to the VRC 353 is interrupted.
 - (2) The control cable connections between the VRC 353 and the TUAAM are interrupted.
- c. If the TX lamp stays alight for 10–12 seconds this indicates that the TUAAM was unable to match to its antenna and has carried out a silent tune into its dummy load. The antenna system should be checked for completeness or damage at the earliest opportunity.

d. If the TX lamp stays on for longer than 12 seconds a fault is indicated in the TUAAM, ARFAT, Cables or VRC 353.

e. When not using the vehicle mounted whip, it is always necessary to disconnect the ARFAT/TUAAM control lead; if this is not done the set will be an ECM hazard. With the lead connected, if the set is caused to go into its antenna tuning cycle it will be unable to find a tuning point as the ARFAT is not in circuit (*coax removed*). The 50W RF is passed directly to the antenna being used so that the station will become a continuously transmitting beacon. The VRC 353 will continue to transmit until the control lead is disconnected or the ARFAT/TUAAM coax reconnected. The output is 50W on any power setting, including '0'. All operators should be aware of this hazard and each set be wired with the 12 point control lead and the vehicle coax taped together so that the removal of one without the other is difficult.

0293. ***Fault Locating (See Annex E).***

Rebroadcast

0294. ***Automatic Rebroadcast.*** Automatic rebroadcast means that when one set receives, it passes the received signals together with the DC switching current along the cable, which automatically switches the remote set to Transmit. For automatic rebroadcast the cable must be terminated by another VRC 353, a PRC 351, or an Interconnecting Box 2-radio (IB2) connected to another VHF radio. Set the REMOTE switch to the AUTO position. Automatic rebroadcast with an HF radio is not possible.

0295. ***Remote Rebroadcast.*** Connect the cable to the terminals marked REMOTE on the VRC 353. The second of the 2 radios to be connected to the remote cable should be used to check the polarity of the cable. This is done by connecting the audio gear to one of the audio sockets on the set and with the REMOTE switch at REM or AUTO listening for a call tone. If this is heard the polarity of the wires is NOT correct and they should be removed from the terminals and each inserted into the opposite terminal to which it was connected before. If a local monitor is required connect the audio equipment to the AUDIO sockets on the VRC 353.

0296. ***Manual Rebroadcast.*** For manual rebroadcast the cable will normally be terminated by an IB2 connected to an HF radio. An operator will control the IB2 Transmit switch. Set the REMOTE switch to the REM position. Manual rebroadcast, although possible with a VHF remote radio, is not normally desirable, but could be used if the automatic circuitry was not functioning correctly.

0297. ***Telegraph Operation.*** When the VRC 353 equipment is required to be used for passing telegraph information, an Adaptor Telegraph Radio (ATR) Unit will be required. Information on the use of this Unit will be found in the user handbook supplied with it.

0298. **Ground Station Operation.** The equipment can be removed from a vehicle for operation as a ground station, e.g., for use in a building, or in the open as a rebroadcast station.

0299. **Connecting Up.** Place the VRC 353 radio in a suitable operating position and carry out the following:

| ORDER | OPERATION |
|-------|--|
| 1 | Set the POWER switch to the OFF position. |
| 2 | Connect the batteries using the special battery lead to the 28V socket on the front panel. |
| 3 | Connect the coaxial cable from the Antenna to the ANT/ARFAT socket. |
| 4 | Connect the audio gear to the AUDIO sockets on the VRC 353. <i>(An audio extension lead is available which can be inserted between the audio gear and the audio sockets where required).</i> |

02100. **Setting Up.**

| ORDER | OPERATION |
|-------|--|
| 1 | Set switch to LOCAL except where Remote operation is required. |
| 2 | Set the TEST switch to RX SIG. |
| 3 | Set MODE switch to NARROW unless alternative position is required. |
| 4 | Set up frequency. |
| 5 | Set POWER switch to minimum RF output level needed. |
| 6 | Adjust GAIN control to required audio level. |
| 7 | Wait 40 seconds. |

02101. **Operation.** The set is now ready for operation. Press the pressel switch to transmit; the TX lamp should glow. A ground station may be operated from a remote position or as a rebroadcast station.

02102. **Remote Control.** Connect the cable to the terminals marked REMOTE on the VRC 353. If the remote unit is already connected to the cable a check must be made to ensure the wires have been connected to the correct terminals. This is done by connecting audio gear to one of the radio sockets on the set and with the REMOTE switch at REM or AUTO listening for a call tone. If this is heard the polarity of the wires is NOT correct and they should be removed from the

terminals and each inserted into the opposite terminal to which it was connected before.

02103. If a local monitor is required connect the audio equipment to the AUDIO sockets on the VRC 353. Set the REMOTE switch to the REM position when the termination of the cable at the remote position is by one of the following:

- a. *Remote Control Harness, Remote Personal Unit,*
- b. *Remote Combining Unit, or Adaptor Radio Telegraph.*

02104. The Remote operator must press his pressel switch to transmit over the radio link. For speech to a local operator without transmitting over the link the remote operator must press his CALL button. The local operator must then switch to IC for intercommunication.

02105. The operator at the radio may call the remote operator without transmitting over the air by switching the REMOTE Switch to IC and depressing it to the CALL position. The switch will return to the IC position. The operator is required to operate his pressel switch in the normal manner.

02106. ***Intercommunication from a Remote Position.*** For intercommunication between the Local Monitor and the Remote Operator, hold the REMOTE switch in the CALL position, then release the switch so that it returns to the IC position. When the remote operator wishes to reply he will switch to IC before doing so. Each operator must press his pressel whilst speaking.

02107.–02110. *Reserved.*

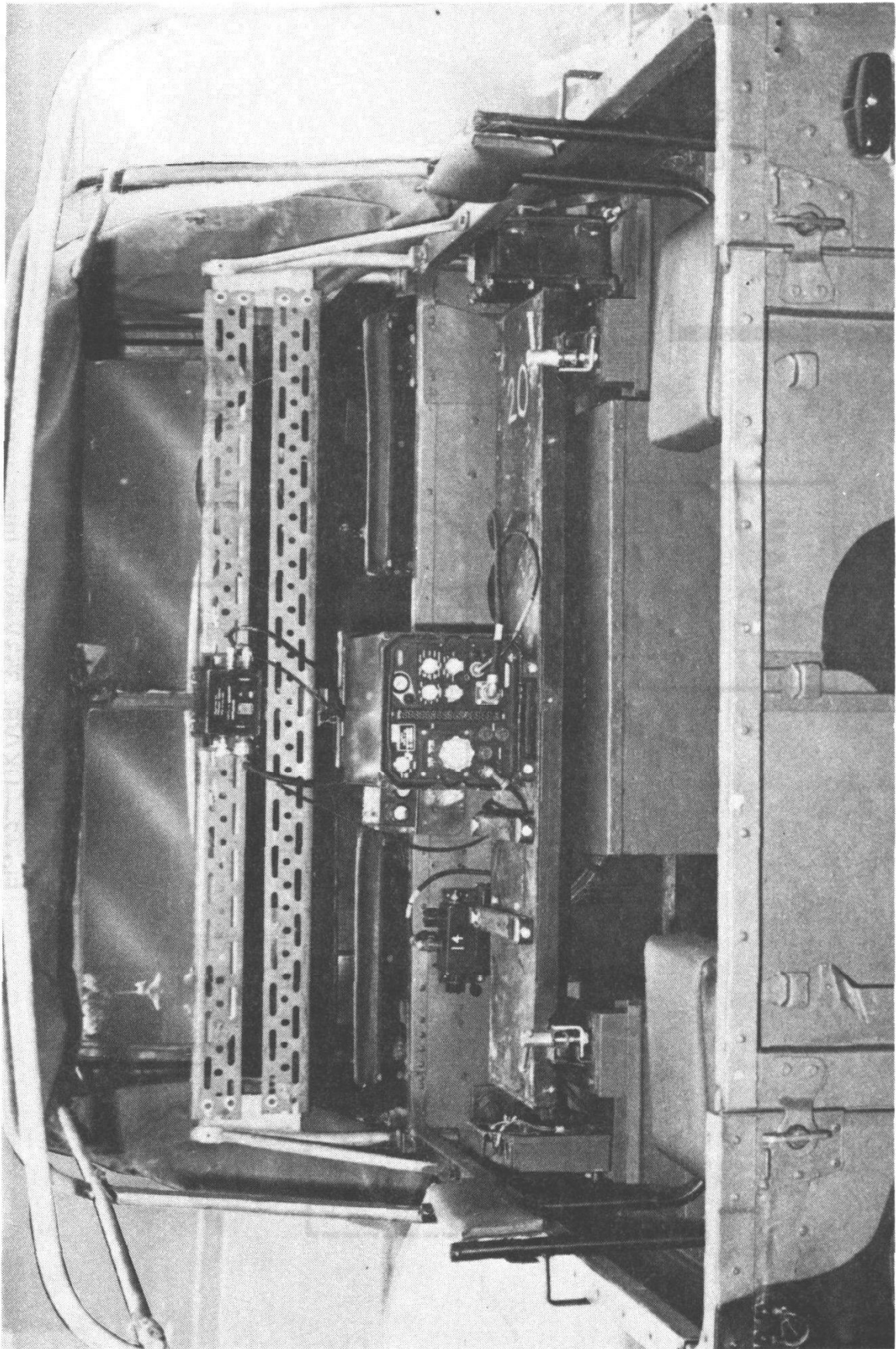


Fig 41.—UK/VRC 353 in Vehicle

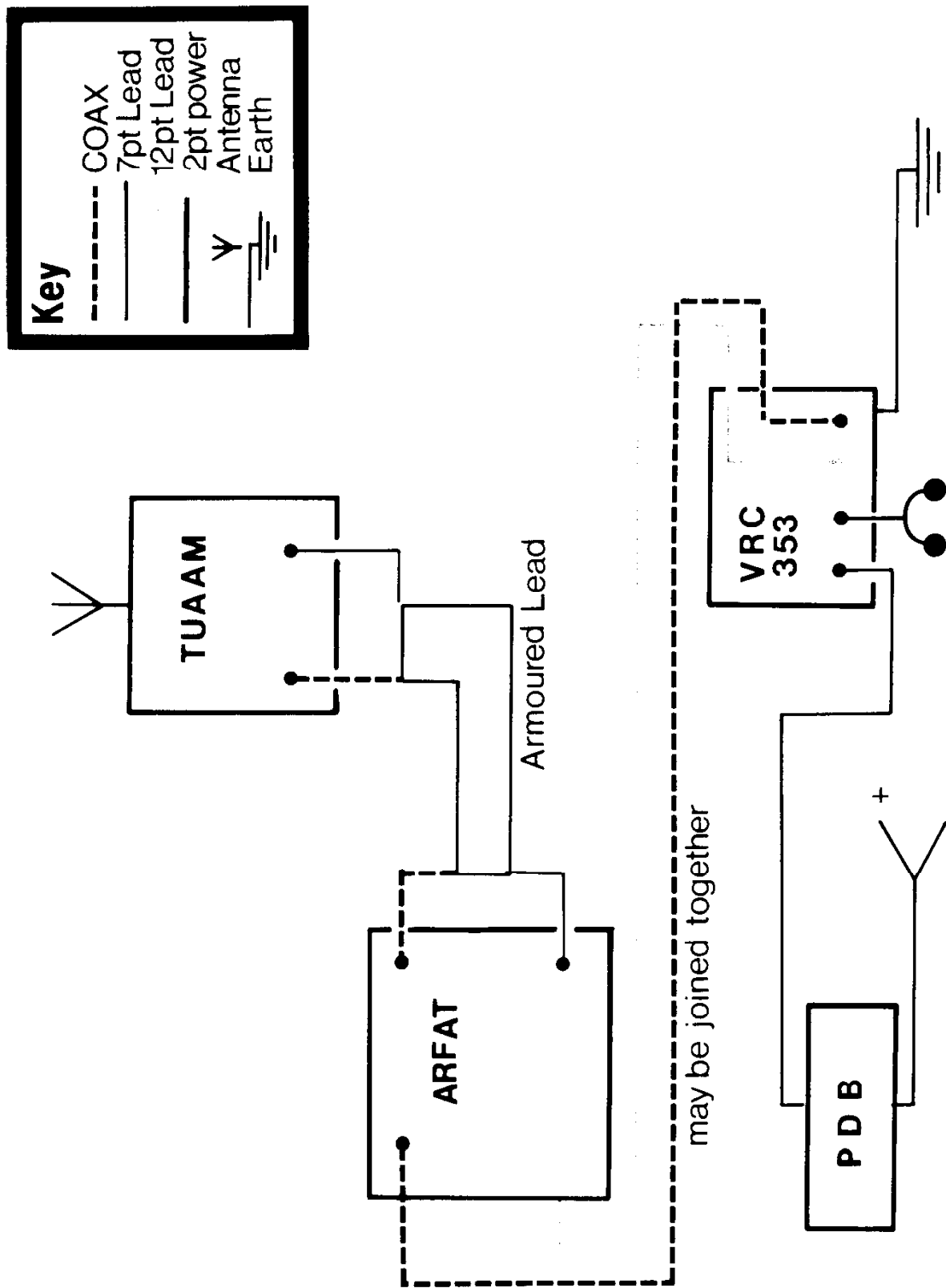


Fig 42.—UK/VRC 353 Vehicle Interconnections

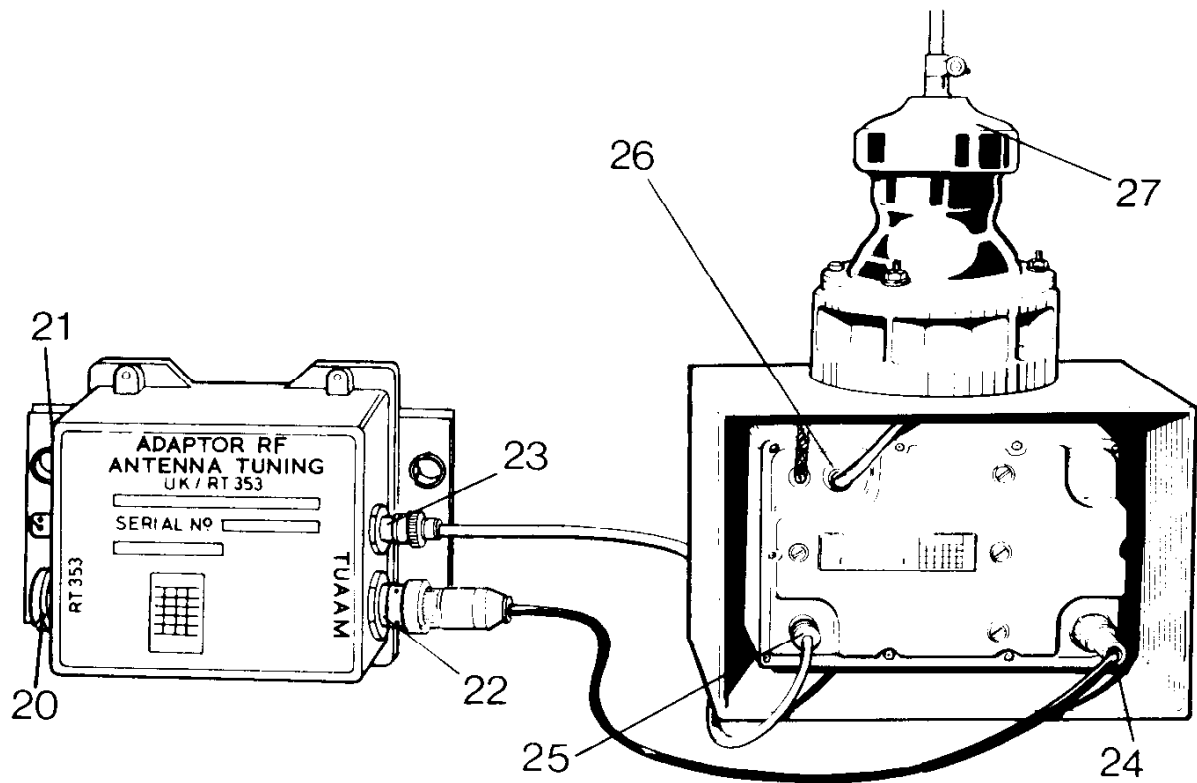


Fig 44.—ARFAT and TUAAM Connections

SECTION 9 – UK/PRC 320

Introduction

02111. The UK/PRC 320 is a lightweight HF manpack radio which can be used as a ground or vehicle station.

Data

02112. **Frequency Range** 2 to 29.999 MHz
Channel 280,000 at 100 Hz
Power Supply 3.3 AHC Secondary Battery (*Battery life approx 12 hrs*)
 1 AHC Secondary Battery (*with hand generator*)
 2 × 12V 75 AHC secondary batteries (*using external supply cable*)
Antennas 2.4m Whip
 7.9m Vertical
 Endfed Antennas
 Dipole Antenna
 2m Rod vehicle antenna

Ranges

| Antenna | Range in km |
|--------------------|-------------------|
| 2.4m Whip | Up to 20km |
| 7.9m Vertical | 30km |
| Endfed Antennas | Dependant on Type |
| Dipole | 300km+ |
| 2m Rod Vehicle Rod | Up to 30km |

Weight and Dimensions

| | Height | Width | Depth | Weight |
|-----------------|---------------|--------------|--------------|---------------|
| PRC 320 | 390mm | 250mm | 120mm | 5.0kg |
| 3.3 AHC Bty | 130mm | 180mm | 70mm | 3.4kg |
| Frame and Plate | 450mm | 440mm | 40mm | 2.4kg |

Facilities

Voice – AM, SSB
 CW – Narrow, Wide
 Battery Check
 Can be vehicle mounted
 Frequency check
 HP and LP

Description (*Fig 45 shows PRC 320 in carrying position and morse operating*).

02113. **PRC 320 controls and Antenna Connections.**

| Ref Fig 46 | Controls |
|---------------|---|
| A | <p>METER a. When set on 'BATT CHK' meter indicates battery state. b. Tune antenna to maximum reading.</p> |
| E | <p>FREQUENCY RANGE SWITCH For selecting required frequency band.</p> |
| J | <p>FREQUENCY SWITCHES Six decade switches for selecting frequency.</p> |
| H | <p>POWER SWITCH A 5 position switch: OFF – all power disconnected AWT – antenna tuning position LP – low power HP – high power Batt Chk – in this position reading in meter will give battery state. A fully charged battery will register over second mark on scale with pressel switch depressed.</p> |
| G | <p>GAIN Normal volume control</p> |
| F | <p>SYSTEM SWITCH (Mode select) A 5 position switch AM – for use with older equipment CW(W) – for use with older equipment SSB – normal CLANSMAN working CW(N) – normal CLANSMAN working FREQ CHK</p> |
| C | <p>ANTENNA TUNE</p> |
| D | <p>ATU RANGE SWITCH Used in conjunction with loading chart on set</p> |
| B | <p>ATU LOAD SWITCH Used in conjunction with loading chart on set</p> |

| Ref Fig 46 | Antenna Connections |
|---------------|--|
| K | EARTH POINT |
| L | ANTENNA COUPLING CLUSTER |
| M | COAXIAL LINK (<i>Rear of set</i>) For connecting transmitter/receiver to ATU |

Setting Up and Operating.

02114. **Setting up.**

- a. Ensure set is off.
- b. Connect battery.
- c. Connect antenna.
- d. Connect AF gear.

Note: If an endfed or whip antenna is used the Coaxial must be fitted. (*See Fig 46*)

If a dipole antenna is used disconnect Coaxial and connect coax to T/R socket.

02115. **Frequency Setting.**

- a. Select frequency band on Frequency Range Switch.
- b. Turn Frequency Selection Switches (FSS).
- c. Until required frequency is lined up.

02116. **Switching On.**

- a. Select required mode (AM, CW(W), SSB, CW(N)) (6).
- b. Set power switch (4) to BATT CHK, press pressel and check battery reading (second mark on scale or above).
- c. Set power switch to ANT.
- d. Select range and loading combination on ATU.
- e. Press pressel switch/morse key and tune for maximum deflection in meter (select lowest number if two settings give the same reading).
- f. Set power switch to LP or HP.

02117. **Testing.**

- a. Select the frequency of a known station and receive a signal (*6.090 MHz in the European area gives Radio Luxembourg*).

- b. Using Flow Charts (**Annex F**) carry out tests as required.
- c. The set is now ready for use.

02118. **Vehicle Station.** (See Fig 47 and 49.) The UK/PRC 320 can be clipped into vehicles and operated on the move using the HF Antenna pod on the vehicle and ancillary equipment.

- a. Clamp UK/PRC 320 onto Frame Electrical Equipment.
- b. Connect cable from DCCU to charging socket on 3.3 AHC battery.
- c. Erect 2m rod antenna and fit into vehicle antenna pod.
- d. Connect antenna to set (*ensuring the P11 cable length is 18 inches maximum, and that the cable is properly insulated using insulating bushes*).
- e. The set is now ready for use.

02119. **Remote Operating.** (See Fig 49.) Remote operation can be set up using the CRSL/R and RCU.

- a. Set up radio as normal.
- b. Connect CRSL/R to audio socket on set using 7 point provided.
- c. Connect RCU to the CRSL/R using D10 cable (*up to 3km*).
- d. Connect AF gear and morse key to RCU.

02120. The facilities provided by the CRSL/R in each position are as follows:

- a. **'LOCAL'** – The radio is controlled by the local operator's pressel switch. Both operators hear the receive signal and transmitter sidetone.
- b. **'REM'** – The radio is controlled by the remote operator's pressel switch. Local operator can override remote operator by operating his pressel. Both operators hear receive signal and transmitting sidetone.
- c. **'I/C'** – Intercommunication between both operators on operation of their respective pressels. Both operators hear receive signal superimposed on their intercommunication.
- d. **'CALL'** – Local operator calls remote by tone. Switch spring loaded return to I/C position. Remote operator can call local operator in any position of CRSL/R function switch by depressing call button on handset.

02121. The facilities provided by the RCU being used in conjunction with the CRSL/R are as follows:

- a. If the D10 cable has been connected to the 'LINE A' terminals, set the selector switch to 'A'. If the cable has been connected to the 'LINE B' terminals, set the switch to 'B'.
- b. Set the function switch to 'MORSE'. The equipment is now ready for operation in the CW mode and can be controlled from either the local or

the remote position by means of the CRSL/R function switch, as previously prescribed. When working the equipment set the WORKING control to obtain the required volume in the remote handset or headset. To call the operator on local, turn the function switch to the spring loaded 'CALL' position.

c. If required, the RCU can be operated in the speech mode by setting the function switch to 'VOICE' and the UK/PRC 320 to 'SSB' or 'AM'.

General Information

02122. **Frequency Check.** If frequency instability is suspected, the operator can check frequency accuracy by using the frequency check facility.

a. Set the frequency to that of a check station transmitting CW only so that pure tone is heard in the headset.

b. Set mode selector to FREQ CHK, and listen to the 2 tones now present.

c. If the tones fluctuate slowly the frequency accuracy is satisfactory.

d. If a rapid warble is heard the frequency is off tune and equipment requires workshop attention. (*Worldwide frequencies are 5.00, 10.00 and 15.00 MHz.*)

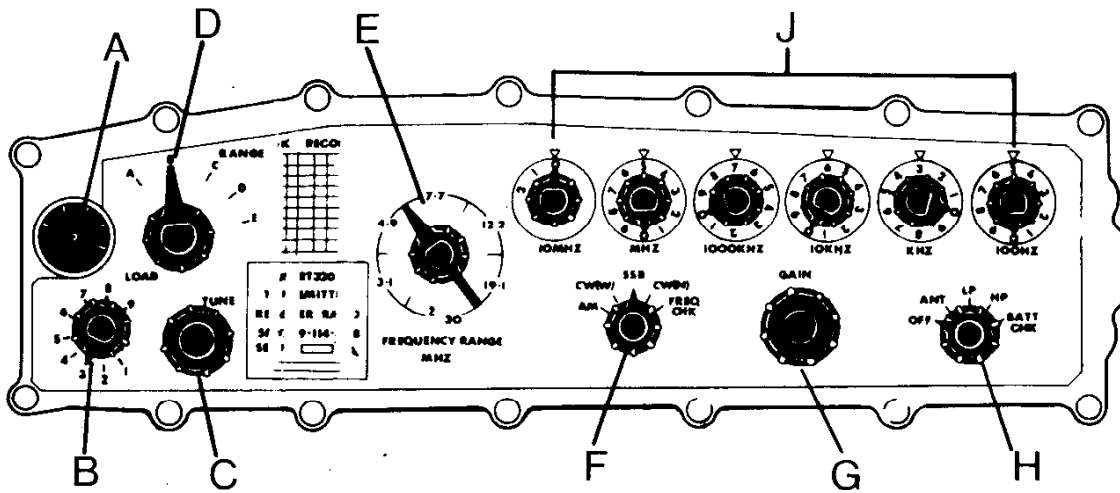
02123. **Earthing.** The set should be earthed at all times to obtain maximum performance. A solar shield is provided to protect the radio from direct radiation by the sun. No harm is done if the shield is left fitted to the radio when it is not needed.

02124.–02125. *Reserved.*



Morse Operating

Fig 45.—UK/PRC 320 Carrying position



- Key**
- | | | | |
|---|--------------|---|------------------------|
| A | Meter | E | Frequency Range Switch |
| B | Load Switch | F | Mode Switch |
| C | Tune Control | G | Gain Control |
| D | Range Switch | H | Power Switch |
| | | J | Decade Switches |

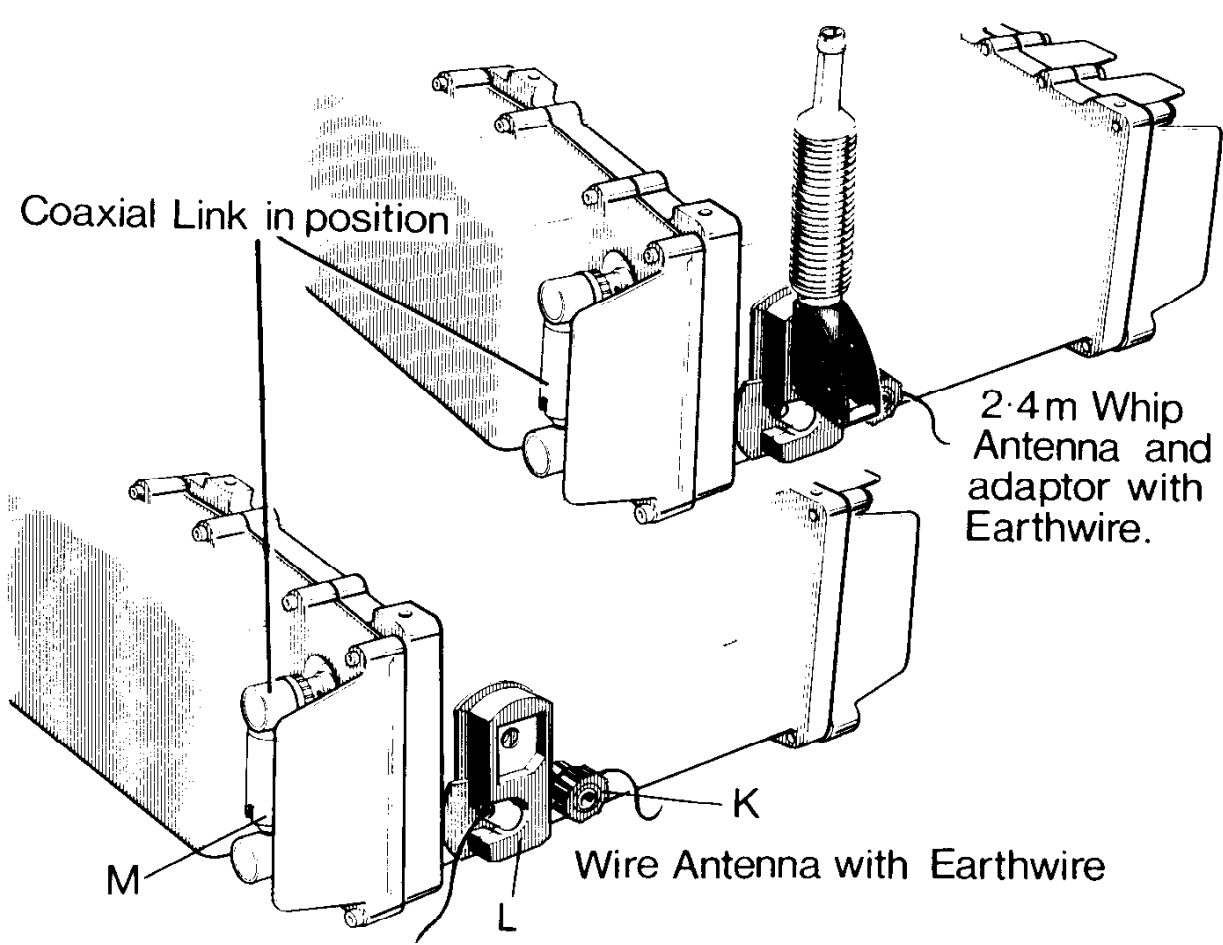


Fig 46.—UK/PRC 320 Controls and Connections

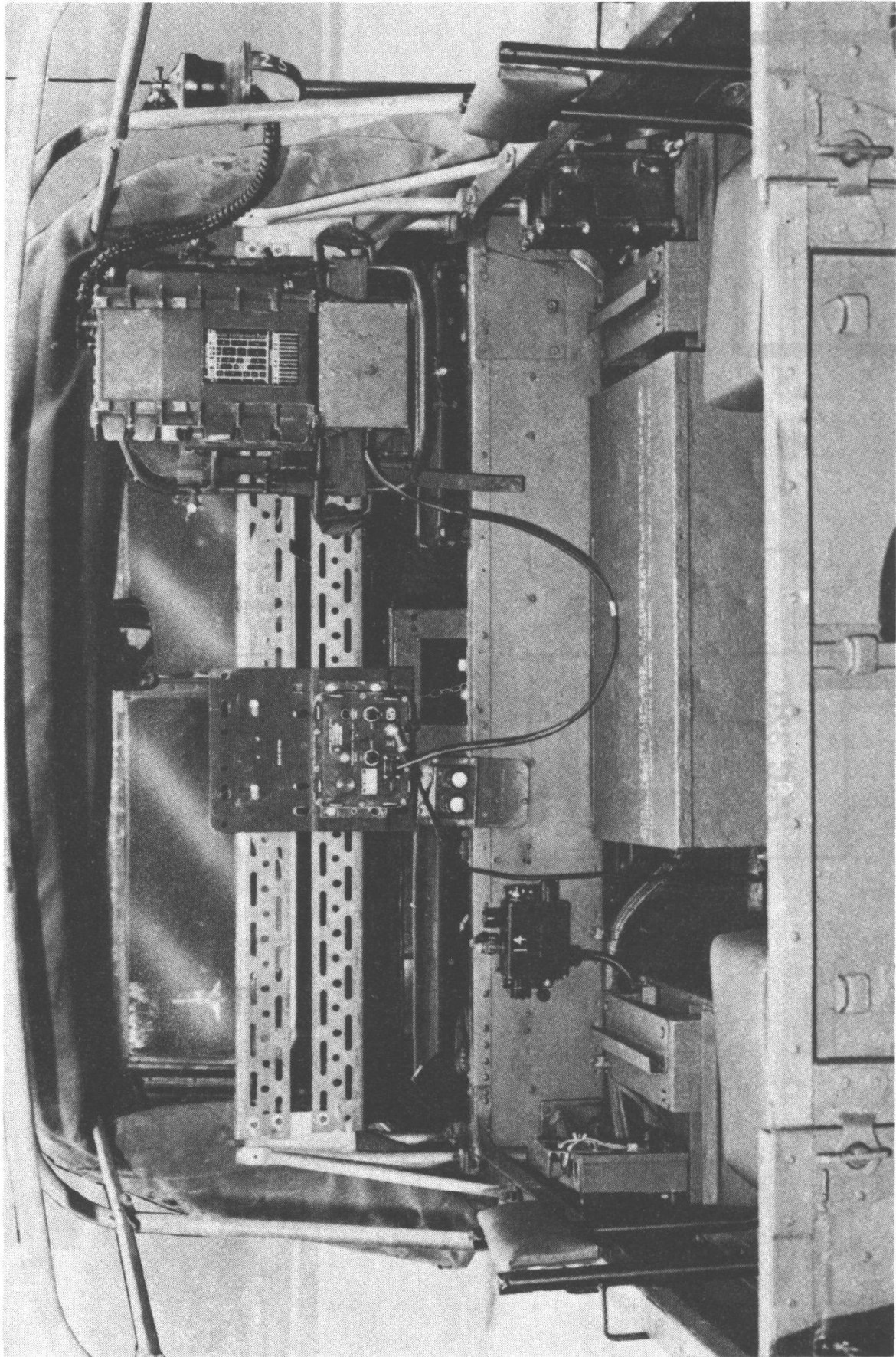


Fig 47.—UK/PRC 320 Vehicle Station

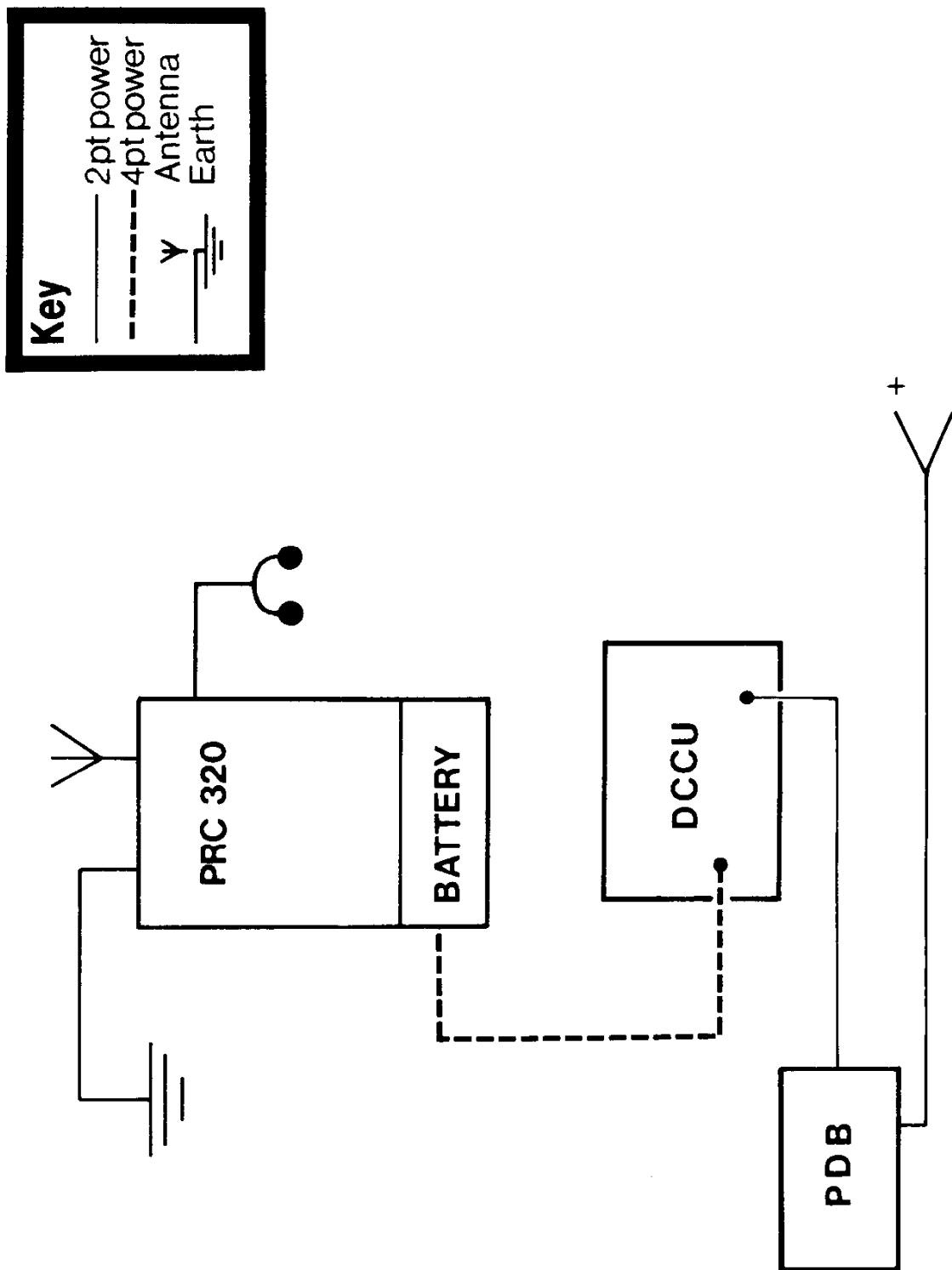


Fig 48.—UK/PRC 320 Vehicle Interconnections

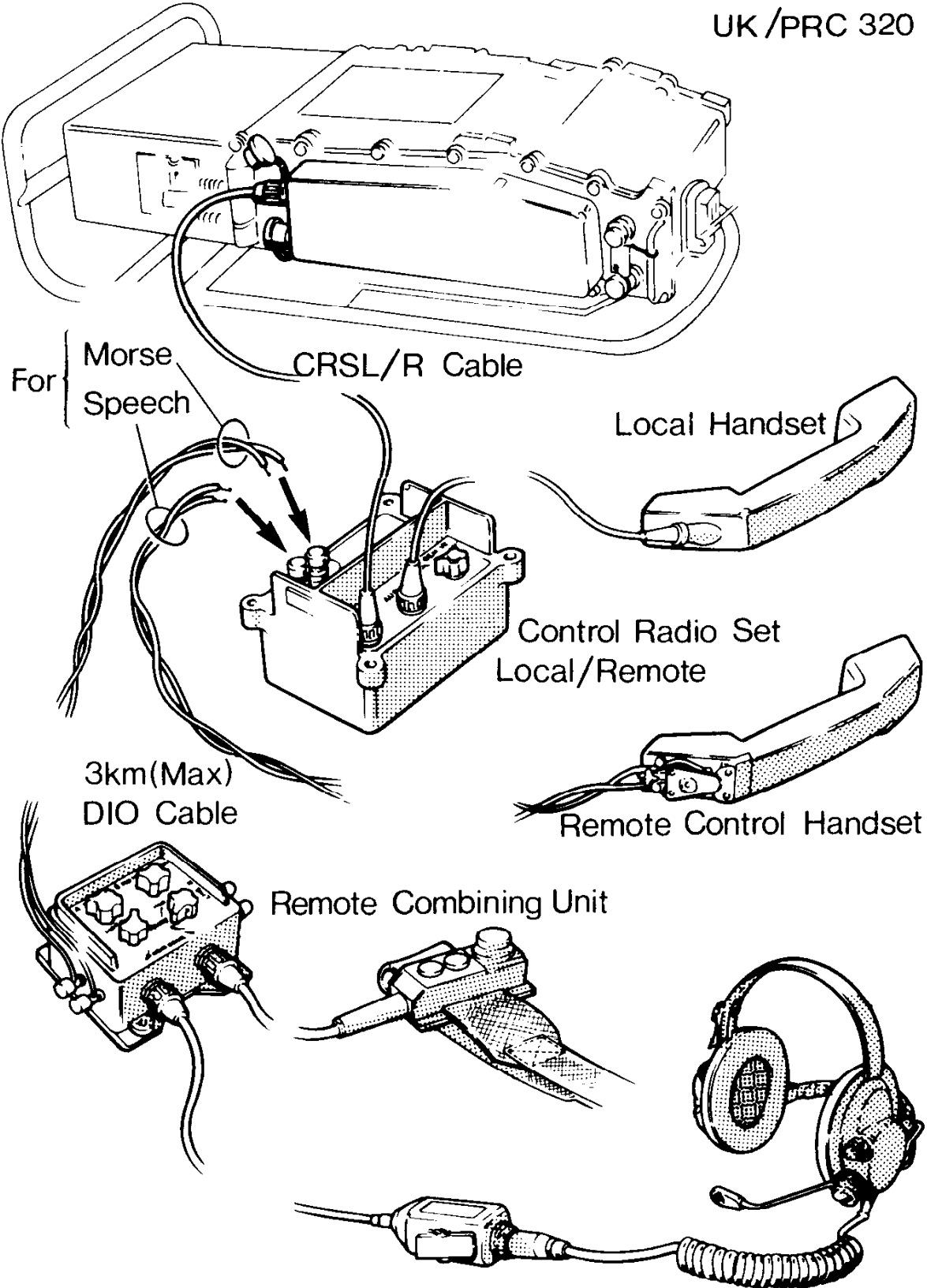


Fig 49.—UK/PRC 320 Remote Operating

SECTION 10 – UK/VRC 321

Introduction

02126. The UK/VRC 321 is a vehicle borne HF transmitter/receiver for use by all arms of the Army.

Data

| | | |
|--------|------------------------|--|
| 02127. | Frequency Range | 1.5 to 29.9999 MHz |
| | Channels | 285,000 at 100 Hz |
| | Power Supply | 2 × 12V 100 AHC Batteries AC Power Supply Unit (<i>The set will accept voltages between 20–30 Volt</i>) |
| | Antennas | 3 or 4m Rod Antenna Endfed Antenna Dipole Antenna |
| | Ranges | Ground Wave 50km Sky Wave >1000km |

Weight and Dimensions

| | Height | Width | Depth | Weight |
|----------|---------------|--------------|--------------|---------------|
| VRC 321 | 215 | 230 | 355 | 23kg |
| SURF 25W | 215 | 150 | 355 | 10kg |
| TURF 25W | 215 | 140 | 280 | 9kg |
| AC PSU | 215 | 305 | 355 | 35kg |

| | |
|-------------------|---|
| Facilities | Voice – AM, SSB, DSB CW – Narrow, Wide RATT using ATR Intercom and call Remote operation HP and LP |
|-------------------|---|

Description

02128. **Controls and Connections.**

| Fig 50 Ref | Controls and Connections | | | | | | | | | | | | | | | | | |
|--------------------------------|---|--|--|------------------|--|--|--------------------------------|--------------------------------------|-------------------------------------|-----------|----------------------|--|-----------|------------------------|------------------------|--------------|------------------------|--|
| 1 | 10A FUSE and spare | | | | | | | | | | | | | | | | | |
| 2 | 28V CHECK pushbutton When depressed, Meter (4) reads supply volts, (<i>overriding any position of OFF-LP-HP-TUNE Switch</i>). | | | | | | | | | | | | | | | | | |
| 3 | OFF-LP-HP-TUNE Switch OFF Equipment switched off LP Low power transmit – or receive with pressel HP High power transmit – released TUNE LP CW transmit, with pressel operated, to enable tuning of SURF 25-W and TURF 25-W. Interrupted audio tone in headset | | | | | | | | | | | | | | | | | |
| 4 | METER | <table border="1"> <thead> <tr> <th colspan="3" data-bbox="702 1126 1423 1205">METER INDICATION</th> </tr> <tr> <th data-bbox="395 1205 702 1328">OFF-LP-HP-TUNE Switch position</th> <th data-bbox="702 1205 1059 1328">Pressel Operated (<i>Transmit</i>)</th> <th data-bbox="1059 1205 1423 1328">Pressel Released (<i>Receive</i>)</th> </tr> </thead> <tbody> <tr> <td data-bbox="395 1328 702 1406"><i>LP</i></td> <td data-bbox="702 1328 1059 1406"><i>Forward minus</i></td> <td data-bbox="1059 1328 1423 1406"></td> </tr> <tr> <td data-bbox="395 1406 702 1485"><i>HP</i></td> <td data-bbox="702 1406 1059 1485"><i>Reflected power</i></td> <td data-bbox="1059 1406 1423 1485"><i>Signal Strength</i></td> </tr> <tr> <td data-bbox="395 1485 702 1563"><i>*TUNE</i></td> <td data-bbox="702 1485 1059 1563"><i>Reflected power</i></td> <td data-bbox="1059 1485 1423 1563"></td> </tr> </tbody> </table> | | METER INDICATION | | | OFF-LP-HP-TUNE Switch position | Pressel Operated (<i>Transmit</i>) | Pressel Released (<i>Receive</i>) | <i>LP</i> | <i>Forward minus</i> | | <i>HP</i> | <i>Reflected power</i> | <i>Signal Strength</i> | <i>*TUNE</i> | <i>Reflected power</i> | |
| METER INDICATION | | | | | | | | | | | | | | | | | | |
| OFF-LP-HP-TUNE Switch position | Pressel Operated (<i>Transmit</i>) | Pressel Released (<i>Receive</i>) | | | | | | | | | | | | | | | | |
| <i>LP</i> | <i>Forward minus</i> | | | | | | | | | | | | | | | | | |
| <i>HP</i> | <i>Reflected power</i> | <i>Signal Strength</i> | | | | | | | | | | | | | | | | |
| <i>*TUNE</i> | <i>Reflected power</i> | | | | | | | | | | | | | | | | | |
| 5 | Frequency Setting Switches – MHz, 100 kHz, 10 kHz, 1 kHz, 100 Hz | | | | | | | | | | | | | | | | | |
| 6 | GAIN control Adjusts loudness of received signal and sidetone at LOCAL headset | | | | | | | | | | | | | | | | | |
| 7 | REMOTE Terminals Remote connection of Remote Handset, Remote Combining Unit, Remote Personal Unit, IB-2, VRC 321, ATR or PRC 320 and CRSL/R using up to 3Km of D10 cable. | | | | | | | | | | | | | | | | | |

| Fig 50 Ref | Controls and Connections |
|-----------------------|--|
| 8 | <p>REMOTE Switch</p> <p>LOCAL Radio can be used only from headset or handset plugged into AUDIO sockets on front panel.</p> <p>RX ONLY Used when the radio is the RECEIVE station in a duplex arrangement and the TRANSMITTER is connected via the remote terminals. Operating the local pressel puts the remote transmitter to transmit, speaking into the local microphone modulates the remote transmitter.</p> <p>REMOTE Radio used through remote terminals or through CLANSMAN Harness.</p> <p>IC Intercommunication with remote operator, no transmission over the radio. Received signal heard by local operator.</p> <p>CALL Spring loaded position. Calls remote operator.</p> |
| 9 | <p>RF Coaxial connector for cable to either SURF 25-W or TURF 25-W.</p> |
| 10 | <p>HARNESS Cable Assembly to Control Harness when used.</p> |
| 11 | <p>CONTROL Cable Assembly to AMP RF 250-W when used.</p> |
| 12 | <p>Mode Switch</p> <p>AM Voice – amplitude modulation</p> <p>CW(W) Wideband CW</p> <p>SSB Voice – single sideband (USB) or RATT</p> <p>CW(N) Narrowband CW</p> |
| 13 | <p>28V Two pin plug for 28 volt DC supply connection.</p> |
| 14 | <p>Earth Terminal</p> |
| 15 | <p>AUDIO Pair of sockets for Headset, Handset, Morse Key or ATR connection.</p> |
| 16 | <p>D10 cable stripper For stripping insulation from D10 field cable before connecting to remote terminals</p> |

| Fig 50 Ref | Controls and Connections |
|---------------|---|
| 17 | <p>ETI (Elapsed Time Indicator) An electrochemical device showing total operating time of VRC 321. It is important that the positive terminal of the ETI is connected to the red cap., DO NOT REMOVE.</p> |

***Note. TUNE.** With the meter switch in this position, the meter scale is reversed. Therefore a high reading indicates a low reflected power.

02129. **TURF 25-W**

| Fig 51 Ref | Controls and Connections |
|---------------|---|
| 1 | <p>Tuning Data Disc A rotatable disc giving tuning data for the 4 × 1 metre whip. Rotate to show the frequency nearest to the frequency of operation. Read across for TUNE, MATCH and SELECT settings.</p> |
| 2 | <p>RF Coaxial (BNC) socket For cable to VRC 321 or SURF 25-W where used.</p> |
| 3 | <p>MATCH A 2 turn continuously variable control set in accordance with tuning data and operating instructions. Reads from 10 to 29.</p> |
| 4 | <p>LOCK Locks TUNE and MATCH controls to prevent accidental movement when set up for operation.</p> |
| 5 | <p>TUNE A multi-turn control with a retractable quick wind handle. Position indicated by figures 00 to 99 behind a panel window. Set in accordance with tuning data and operating instructions.</p> |
| 6 | <p>Meter Indicator for tuning when VRC 321 is on TUNE, and for RF output power when VRC 321 is on LP or HP transmit.</p> |

| Fig 51 Ref | Controls and Connections |
|---------------|--|
| 7 | ANTENNA COAX-FED Coaxial connector for cable to a dipole or other coaxially fed antenna. |
| 8 | SELECT A 6 position switch set in accordance with tuning data. Positions A-E for antenna connected to the rear terminal. Position F for coaxial fed antennas connected to ANTENNA COAX FED socket. |

02130. ***SURF 25W***

| Fig 51 Ref | Controls and Connections |
|---------------|--|
| 1 | RANGE MHz Selects range covering frequency in use. The DIR position connects the VRC 321 directly to the TURF 25-W. |
| 2 | TURF/ARF Coaxial (BNC) socket for connection to TURF 25-W. |
| 3 | OPERATE AND LOCK – TUNE Switch TUNE Allows movement of TUNE Control (4) OPERATE AND LOCK TUNE control locked. |
| 4 | TUNE Tune to operating frequency using VRC 321 meter. |
| 5 | VRC 321 Coaxial (BNC) socket for connection to VRC 321. |
| 6 | Earth Terminal. |

02131. ***Notes on SURF 25-W***

- a. Due to the sharp electrical characteristics of the SURF 25-W it is important that care be taken when tuning.
- b. Frequency separation between HF/HF should not be less than 10%–15%.

- c. Two VRC 321 co-located on different frequencies and in separate vehicles should ideally be not less than 15 metres apart and have a 10% frequency separation.
- d. All HF/HF installations must have a SURF 25-W with each set.

Setting Up and Operating

02132. *Setting Up.*

- a. Earth set and check it is switched off.
- b. Connect power cable to set.
- c. Select required mode.
- d. Select Local or Remote Switch.
- e. Connect AF gear.
- f. Connect TURF to set using Coax lead.
- g. Connect antenna or antenna base to TURF.

02133. *Frequency Setting.*

- a. Depress 28V check push button and using meter ensure correct voltage is applied to set.
- b. Switch power switch to LP.
- c. Select required frequency on the frequency setting switches. The set is tuned when the unready tone ceases.
- d. Set power switch to TUNE, this enables the SURF 25W/TURF 25W to be tuned.

02134. *Tuning TURF 25W (See Fig 51).*

- a. For 4 × 1m rod antenna rotate the tuning data disc to read the frequency nearest the one in use. Read across for tune and match numbers, select letter and set controls accordingly (*for other antennas use Data Chart on TURF*).
- b. Press pressel switch and adjust TUNE control first and the MATCH control for maximum readings. Continue to adjust both controls alternatively until meter reading has reached its highest point.
- c. The set is now ready to operate.

02135. ***SURF 25W (See Fig 51).*** If the SURF 25W is in use it is fitted between the TURF and the set.

02136. *Tuning SURF 25W.*

- a. Set range switch to frequency.
- b. Switch locking switch to tune.

- c. Press pressel switch and set TUNE control for maximum reading on the SET meter.
- d. Release pressel and switch locking switch to operate.

Operation with CLANSMAN Radio Control Harness

02137. Tune the VRC 321, SURF 25-W and TURF 25-W as previously instructed with the following differences:

- a. Connect headset to the appropriate harness box.
- b. Switch the remote switch to REMOTE.
- c. The loudness of received signal and sidetone are now adjusted by means of the gain control on the harness box.

Remote Operation

02138. Facilities are provided for transmission or reception of Voice, CW or RTT traffic from a point up to 3Km from the VRC 321 using D10 field cable.

02139. Operation of the remote transmitter in a duplex station is also possible over the same distance.

02140. Local and remote operators have CALL and intercommunication (IC) facilities as well as the ability to transmit and receive.

02141. ***Tuning and Matching during Radio Silence.***

- a. Switch to RX only and SSB.
- b. Set up set as normal but do not tune antenna.
- c. Rotate tuning data disc on TURF to nearest frequency, then read and set controls accordingly.
- d. Adjust appropriate gain control so that received signals can be heard on low volume.
- e. Adjust TURF 25W TUNE control for maximum volume of received signals.
- f. Lock controls and select required mode.
- g. The set is now ready to Receive.

General Information

02142. ***Antenna Counterpoise.*** An antenna counterpoise can be used to provide an artificial earth for surface wave antennas on ground of poor conductivity. *(If in doubt use the counterpoise; its use will never reduce the performance of the radio.)*

02143. **Remote Antennas.**

a. The TURF-25 and antennas may be used up to 100m from the VRC-321. The coaxial cable is made up from standard 20m lengths each of which is terminated with Type C plugs and sockets. A 3m length of coaxial cable is connected at each end to adapt to the BNC connections on the VRC-321 and TURF 25-W.

b. The tuning of the remote TURF is the same as for the standard station except that the VRC-321 is switched to REMOTE and is controlled from the TURF 25-W position by a Remote Handset, Remote Personal Unit or Remote Combining Unit with headset connected via D10 cable to the REMOTE terminals on the VRC-321.

c. When the TURF has been tuned, switch the VRC-321 to LP or HP as required and to LOCAL if necessary.

02144. **Vehicle Installation.** When installing the UK/VRC-321, TURF 25-W and SURF 25-W the following notes should be observed:

a. The installation must be earthed to the vehicle. This connection is taken from the rear of the TURF 25-W to a point as close as possible to the antenna base.

b. Care should be taken to ensure that the earth lead from rear of TURF 25-W is clear of the antenna terminal and lead. Use alternative earth terminal if necessary.

c. Insulating bushes should be fitted to the antenna lead.

d. Other Unit Earths are normally taken to the terminal at the centre front of the radio table.

02145. **Testing. (See Annex G).**

02146.–02149. *Reserved.*

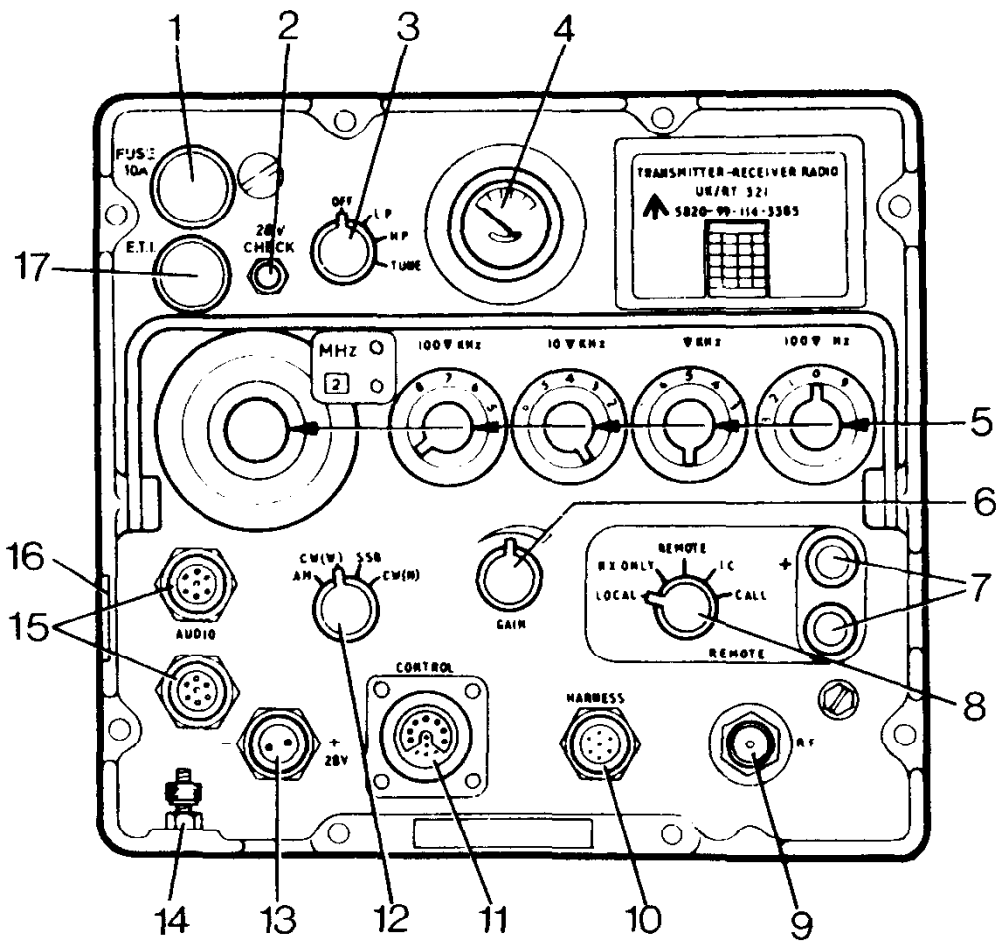


Fig 50.—UK/VRC 321 Controls and Connections

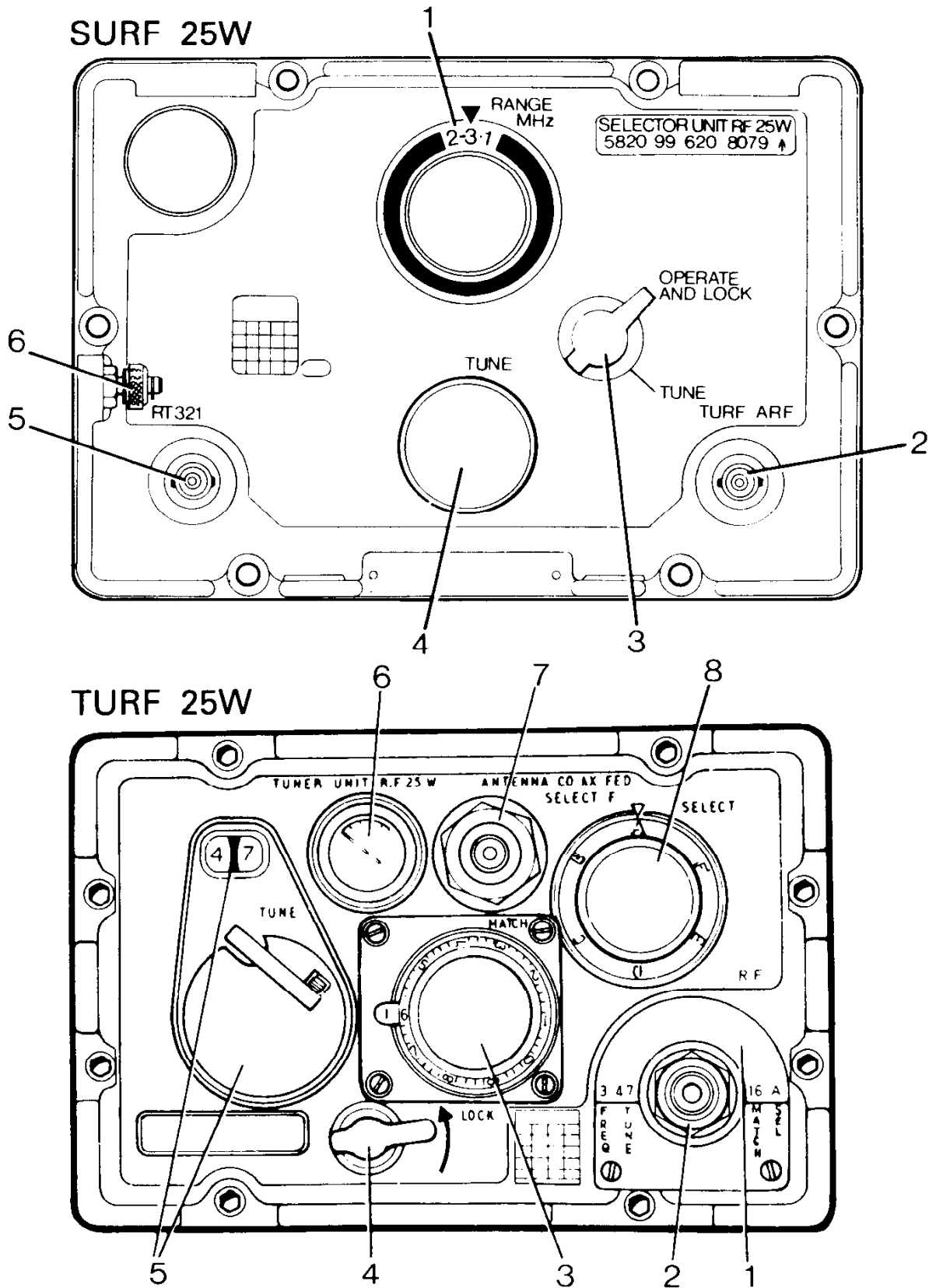


Fig 51.—SURF 25 Watt and TURF 25 Watt

c. If not:

- (1) Check battery.
- (2) Check antenna connections.
- (3) Check 'GAIN' control.
- (4) Check 'TUNE' control.
- (5) Replace headgear.
- (6) Replace set.

NOTE: The key position will give narrow bandwidth reception. The battery will give wideband reception.

02164. AF Gear.

a. Depress key. Meter (*see Fig 55*) shows antenna current, sidetone heard in headgear.

b. If not:

- (1) Check battery.
- (2) Check antenna connection.
- (3) Check 'TUNE' control.
- (4) Check antenna is correct length and raised above the ground.
- (5) Replace headgear.
- (6) Replace set.

02165. Tuning.

- a.** Switch to required system, i.e. key, battery or voice.
- b.** Set the basic channel switch to the required frequency.
- c.** If required, set the Offset switch to the required position.
- d.** Adjust 'PEAK NOISE' switch for the maximum noise in the headgear. The 'GAIN' control should be set so that the noise is just audible.
- e.** Adjust the 'GAIN' control for loudness and clarity of signal.
- f.** Operate as normal.

02166.-02170. Reserved.

SECTION 11 – UK/PRC 316

Introduction

02150. The PRC 316 (formerly designated the SR A16) is a lightweight HF patrol radio. (See Fig 52.)

a. It is a small, compact transmitter/receiver, designed primarily for use when halted within parachute battalions in the air assault role or on long range patrols particularly within jungle conditions.

b. It is not intended for use in very cold conditions, at temperatures of lower than minus 10°C. It was originally part of the LARKSPUR range of sets (SR A16) but has been given a CLANSMAN number (PRC 316) although not a part of the CLANSMAN range.

02151. This radio has been designed to meet the need for a simple transmitter/receiver capable of providing 'CW' communications between distant stations, and voice communication over shorter distances.

Data

02152. **Weights**

- | | |
|----------------------|-------|
| a. Radio | 2.2kg |
| b. Battery (Mallory) | 2.2kg |
| c. Antenna | 1.0kg |
| d. Headgear Type (A) | 0.2kg |
| e. Headgear Type (B) | 0.5kg |

02153. **Facilities.** Although primarily a 'CW' set, it will also give short range, double side-band 'AM' voice communications.

02154. **Frequencies. (Fig 53.)**

a. There are 9, switched, crystal-controlled basic frequencies in the 2–7 MHz band.

b. Each of these frequencies may be varied using the offset frequency switch. This switch will give us 2 frequencies above, and 2 frequencies below, the basic frequency, thus providing a total of 9 times 5 equalling 45 channels.

02155. **Power Supply.** There are 4 main sources of power:

- The Mallory primary battery which plugs into the set.
- The Leclanche primary battery which plugs into the set.
- The SR A13 battery using the SR A13 connector special purpose.
- Any convenient 12 volt DC supply through an adaptor plug and external lead.

02156. **Ranges.** On 'CW' a range of hundreds of kilometres may be achieved by day and night. This applies to voice also, but voice is primarily for short range communication, as for example to support aircraft.

02157. **Power Output.** Four watts peak on both key and voice.

02158. **Ancillaries.**

a. **Antenna (See Fig 54).** A dipole antenna is provided which is adjustable in length to suit the frequency in use. The halves of the dipole, both of which have a throwing cord and are wound on a reel, are secured direct to the terminals of the radio. The use of insulated wire allows the antenna to function when draped over wet vegetation.

b. **SR A13 Antenna Items.** The radio is also provided with a 50 Ohm co-axial socket to allow its use with the SR A13 antenna items. Therefore it can be used as mobile groundwave station with the SR A13 TRFA and rod antenna.

c. **Headgear.** Two types of headgear are provided:

(1) A single unit microphone/receiver with a pressel switch, which may be worn as a receiver for key operations or slung round the neck for voice operation.

(2) A conventional double receiver/boom microphone assembly.

Description (See Fig 55)

02159. **The radio consists of 3 units:**

a. A moulded plastic case which houses the controls, receiver circuits and those circuits that are common to both the receiver and transmitter.

b. A cast alloy case housing the transmitter and antenna connections.

c. An alloy battery housing to which a. and b. are secured.

02160. The radio is sealed and can be used in the temperature range -10°C to $+55^{\circ}\text{C}$.

02161. It can be transported in unpressurized aircraft at altitudes of up to 3050m.

02162. **Setting Up**

a. Connect battery.

b. Remove antenna reels, set to correct length, erect and connect. (See Figs 56 and 57.)

c. Plug in headgear.

02163. **Receive.**

a. Switch to either key, battery or voice.

b. Loud signals or receiver hiss should be heard in the headgear.

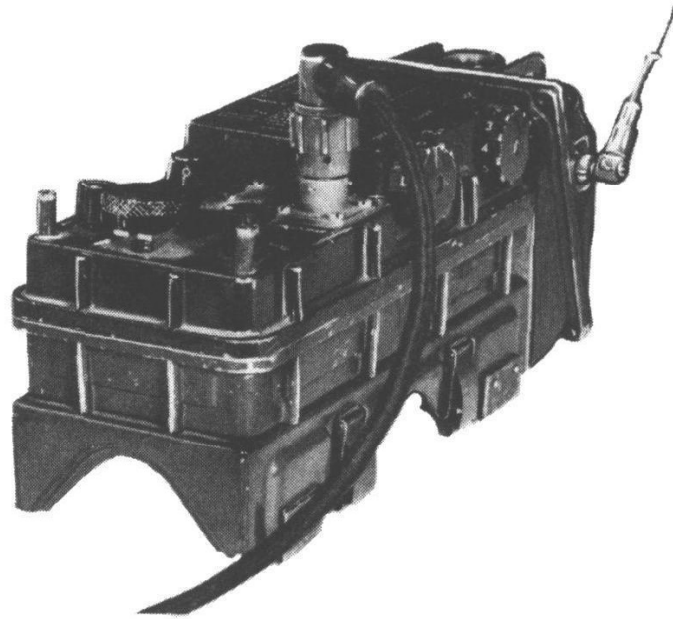


Fig 52.—UK/PRC 316

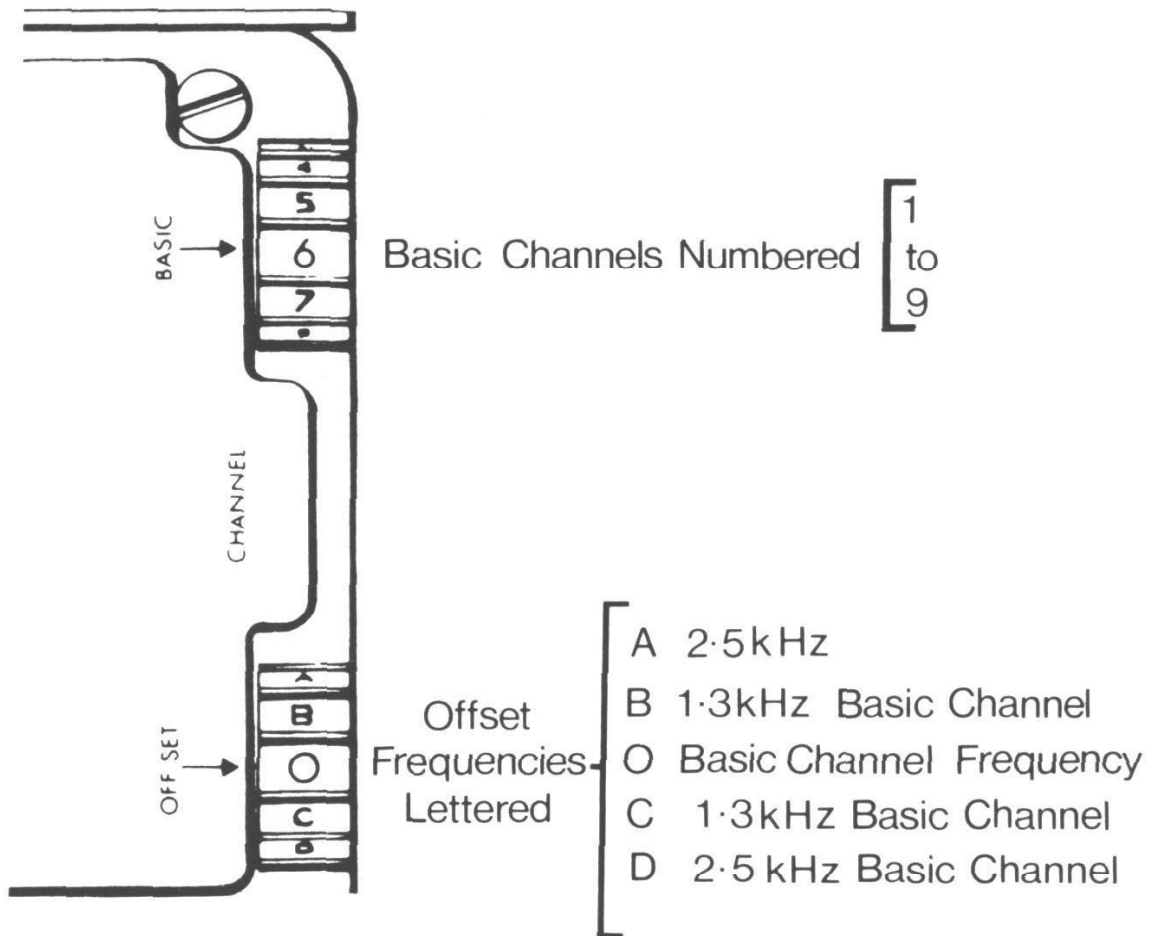


Fig 53.—UK/PRC 316 Frequency Selection

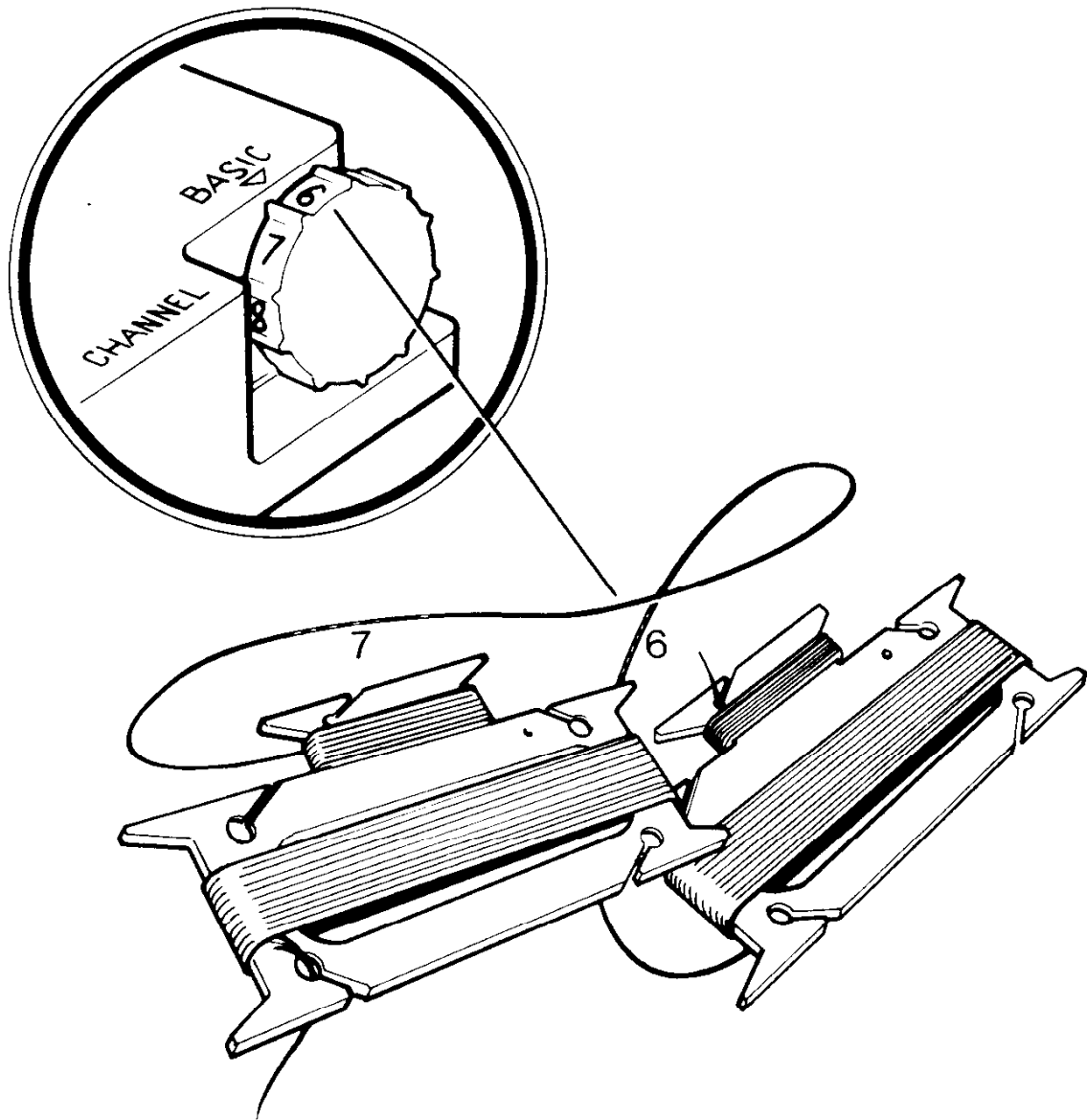
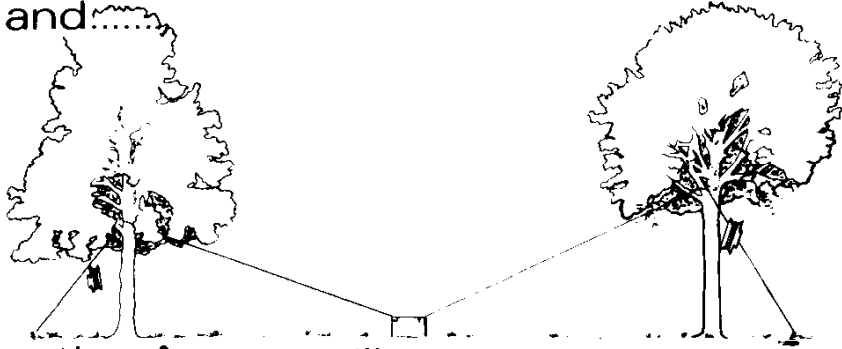


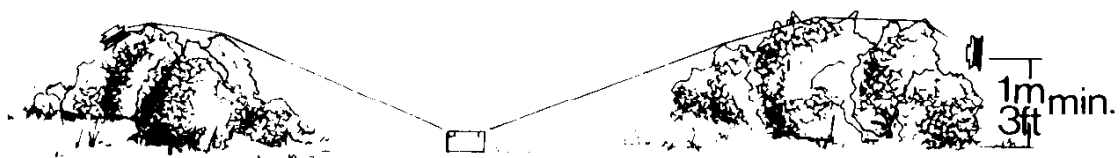
Fig 54.—UK/PRC 316 Antenna



4: If the Tree Spacing is less than the Total Length of the Antenna, Tie the Weight to the Tree End of the Antenna and Throw the Wire over a suitable Branch and.....



5: Erect the Antenna like this



6: If Trees or other Supports are not Available the Antenna Wires may be Draped over Bushes, Keeping Wires and Reels as High as Possible



7: Or it may be Necessary to Use a Combination of 3, 5, & 6.

Fig 57.—UK/PRC 316 Antenna Erection (continued)

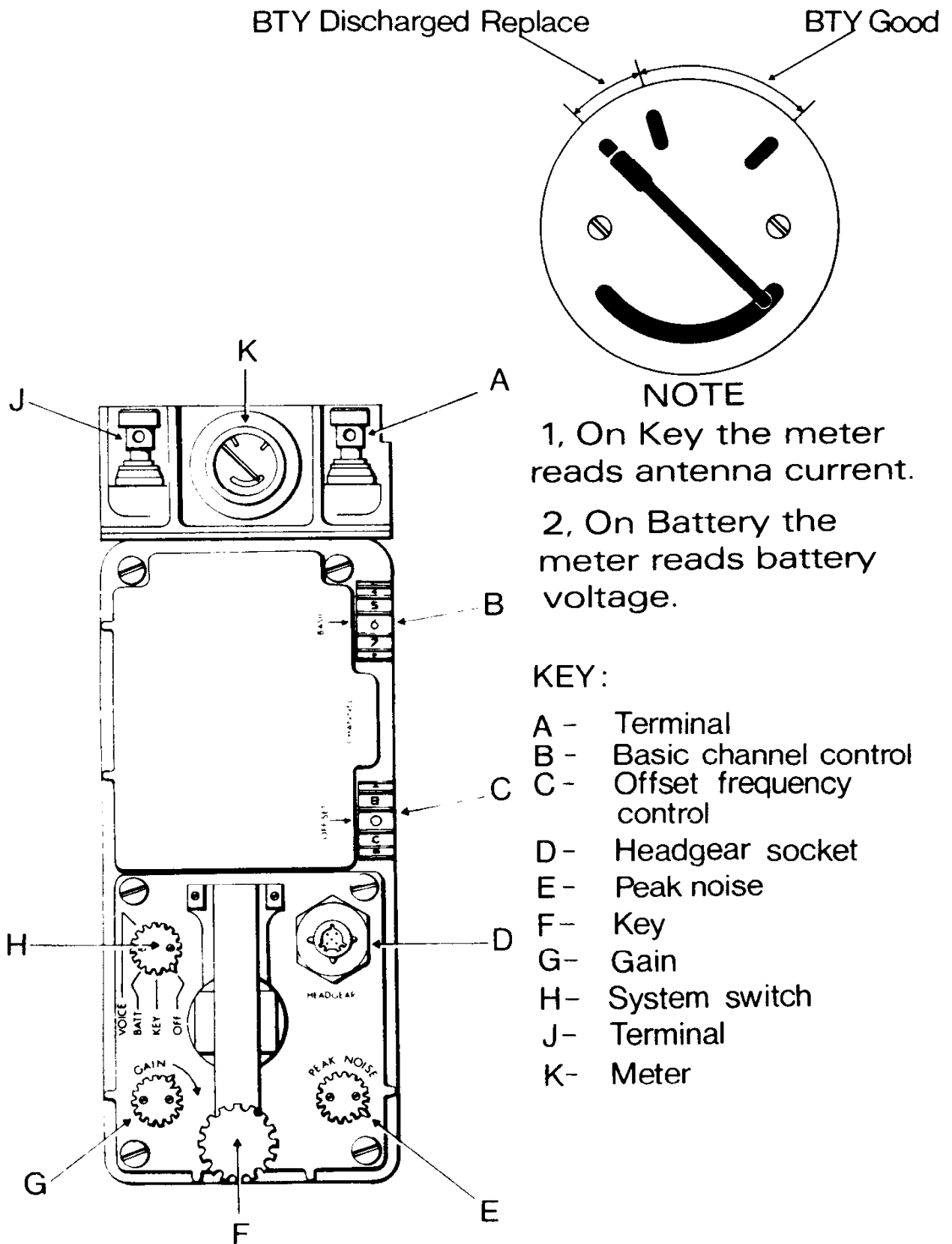
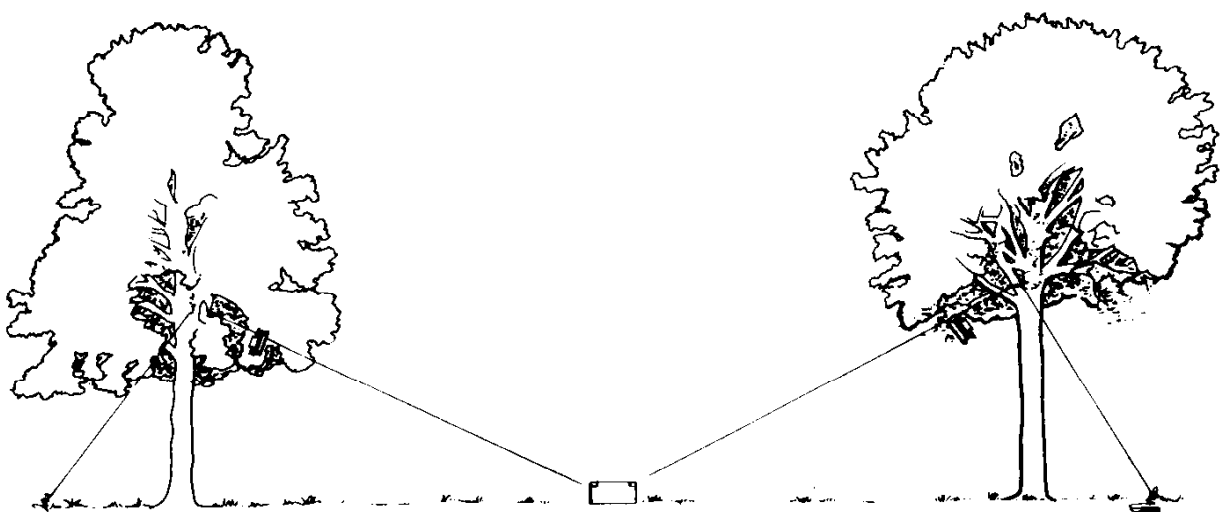


Fig 55.—UK/PRC 316 Controls and Connections



1: Roughly Check the Total Antenna Length Against the Tree Spacing

2: If the Tree Spacing is Greater, Unwind the Throwing Cords, and with a Suitable Weight at the Free End, Throw the Cord over a Branch about 10 m (30ft) above the Ground and.....



3: Erect the Antenna like this

Fig 56.—UK/PRC 316 Antenna Erection

SECTION 12 – UK/PRC 344

Introduction

02171. The UK/PRC 344 is a lightweight UHF AM manpack radio designed to provide ground to air communications.

Data

02172. **Frequency Range** 255 – 399.95 MHz
Channels 3500 at 50 kHz
Power supply 24V AHC Battery (Battery life normal working 11½ hrs, continuous beacon 3 hrs)
Antennas (Fig 62) Battle Antenna
 Omnidirectional Antenna

Ranges

| | Distance (km) | Height (ft) |
|-------------------------------------|---------------|-------------|
| Ground to Air | 20 | 100 |
| | 40 | 500 |
| | 80 | 5,000 |
| | 160 | 20,000 |
| Ground to Ground (Line of sight) | 8 | N/A |

Facilities

Voice (AM DSB)
 Beacon
 Rebroadcast
 Remote operation
 Break-in
 IC
 Call

Description (See Figs 58 and 59)

02173. **Controls and Connections.**

| Ref | Control | Function |
|-----|-----------------------------|--|
| 1 | VOLUME switch | Rotary switch with 6 positions labelled: (1) OFF: Equipment switched off. (2) 1 to 5: Equipment switched on with, at position 1, minimum volume of received signals and sidetone in all positions of the mode selector switch (<i>REF 2</i>) except BEACON (<i>sidetone only</i>), increasing in steps to maximum volume at position 5. |
| 2 | Mode selector switch | Rotary switch with 6 positions labelled: (1) <i>LOCAL</i> : (a) Equipment controlled only via a headset or handset connected to one of the HEADSETS sockets. (b) Operation of the pressel (<i>REF 5</i>) switches the equipment from receive to transmit. (c) Local operator hears received signals and hears sidetone when transmitting. (d) Remote operator cannot hear received signals. (e) Remote operator cannot activate call tone. (2) <i>MUTE O/R</i> : As LOCAL, but mute inoperative for reception of weak signals. (3) <i>REM</i> : (a) Equipment normally controlled by remote operator's remote control handset. (b) Local operator can break in on remote operator's transmission: (i) Remote operator can hear local operator's and his own sidetone but cannot transmit. (ii) Remote operator can activate call tone, which can be heard by local operator but does not break into local operator's transmission. |

| Ref | Control | Function |
|-----|---------|--|
| | | <p>(c) Remote operator can call local operator when equipment is receiving or transmitting.</p> <p>(d) Between 17V and 18V is supplied to power the remote control handset via the PRC 344 REMOTE terminals. If the line connections are crossed, a 2 kHz tone is heard by both local and remote operators.</p> <p>(4) <i>AUTO</i>: WARNING When set up for automatic rebroadcasting, if one equipment is switched to LOCAL or MUTE O/R, the other will switch to transmit.</p> <p>(a) Split automatic rebroadcast facilities are available by using another PRC 344 connected by the REMOTE terminals of each equipment.</p> <p>(b) The facilities referred to in (a) are also available to a connected UK/PRC-351, providing always that the received signal to the PRC 344 is a CLANSMAN signal, i.e., one that contains a 150 Hz pilot tone, receipt of which, via the PRC 344, causes the PRC 351 to switch to transmit.</p> <p>(c) The remotely connected equipment can also be in a CLANSMAN harness installation connected via a harness adaptor box.</p> <p>(d) Operators at either station can break in and transmit over both the primary and rebroadcast frequencies.</p> <p>(e) Either operator may call the other during the setting-up procedure. (<i>When rebroadcasting is taking place, intercommunication is normally made via a field telephone.</i>)</p> <p>(f) Between 17V and 18V d.c. is applied to the REMOTE terminals. If the line connections are crossed, a 2 kHz tone is heard by both local and remote station operators.</p> |

| Ref | Control | Function |
|-----|-------------------------------|--|
| | | <p>(5) <i>IC</i>: Provides intercommunication and call facility between remote and local operators. Receiver operative but transmitter not.</p> <p>(6) <i>BEACON</i>: Transmits continuous 1 kHz tone.</p> |
| 3 | LAMP/CALL switch | <p>Toggle switch with 3 positions, spring loaded to return-to-centre Off position. Two operating positions are:</p> <p>(1) <i>LAMP</i>: Illuminations frequency display windows for night operation.</p> <p>(2) <i>CALL</i>: When the mode selector switch is set to REM, AUTO or IC, a kHz tone is generated to call the remote operator, as described under REF 2.</p> |
| 4 | FREQ selector switches | <p>Three thumb wheel switches, each with an associated display window in the front panel. The switch on the left has 18 positions, numbered 22 to 39, and selects frequencies from 220 MHz to 390 MHz in 10 MHz steps. That in the centre has 10 positions, numbered 0 to 9, and selects frequencies from 0 MHz to 9 MHz in 1 MHz steps. That on the right has 20 positions, numbered 00 to 95, and selects frequencies from 0.00 MHz to 0.95 MHz in 0.05 MHz steps. Thus if the 3 windows display 31, 9, and 05 respectively, the frequency selected is 319.05 MHz.</p> |
| 5 | Antenna Socket | <p>Socket for connecting:</p> <p>(1) Battle Antenna.</p> <p>(2) Omnidirectional Antenna.</p> |
| 6 | Handset/headset | <p>When a handset or headset is plugged into one of the HEADSETS sockets, operation of the pressel switches the PRC 344 from receive to transmit. It can be used in all positions of the mode selector switch (<i>REF 2</i>) except BEACON. When operating in the latter mode, the handset or headset should be disconnected to avoid inadvertent transmission of extraneous signals.</p> |

Setting Up and Operating

02174. *Setting Up.*

- a. Ensure set is switched off.
- b. Connect battery.
- c. Connect antenna.
- d. Connect AF gear.

02175. *Frequency Setting.*

- a. Rotate frequency selection switches until required frequency is lined up in windows.
- b. Frequency setting can be carried out in the dark by switching on the lamp to illuminate frequency display.

02176. *Switching On.*

- a. Set volume switch to ON and adjust GAIN.
- b. Select LOCAL on mode switch.

02177. *Testing.* Carry out tests using flow charts (*ANNEX H*). The set is now ready to operate.

02178. *Remote Operating.*

- a. Set mode selector switch to REM.
- b. Connect D10 to remote terminals on set and to remote handset.

02179. *Rebroadcast.* Normal automatic rebroadcast can be obtained by using the PRC 344 with another PRC 344 or PRC 351/2 (*provided the signal received by the PRC 344 contains a 150 kHz pilot tone*).

02180. *Vehicle Station.* A normal CLANSMAN clip in manpack installation using the DCCU and an omnidirectional antenna on the vehicle.

02181.–02185. *Reserved.*

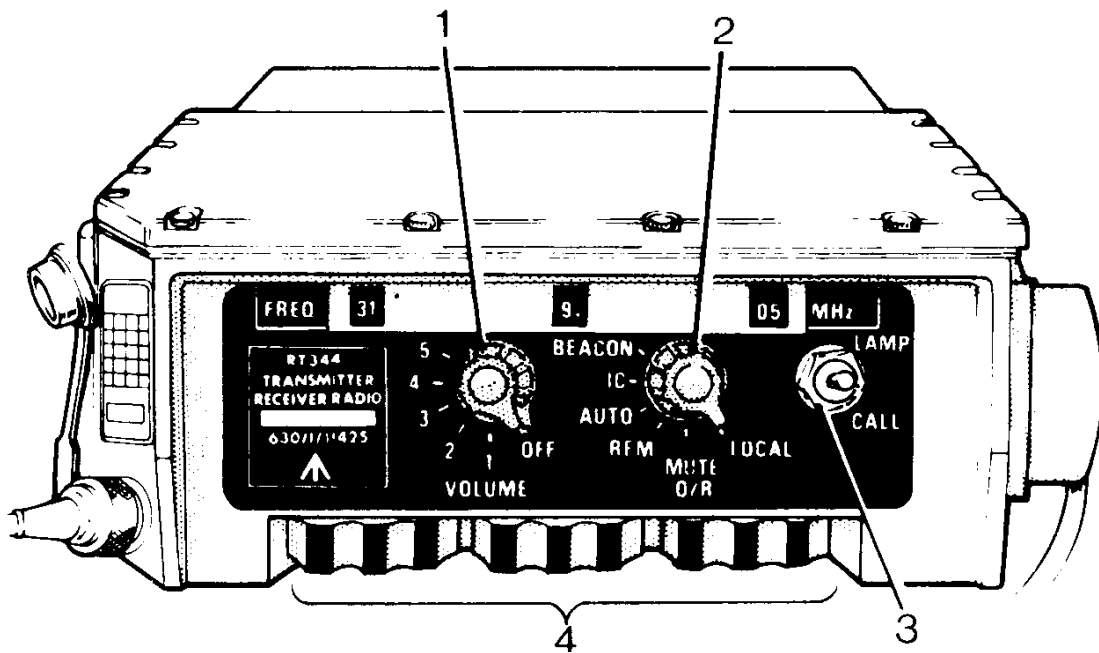


Fig 58.—UK/PRC 344 Controls

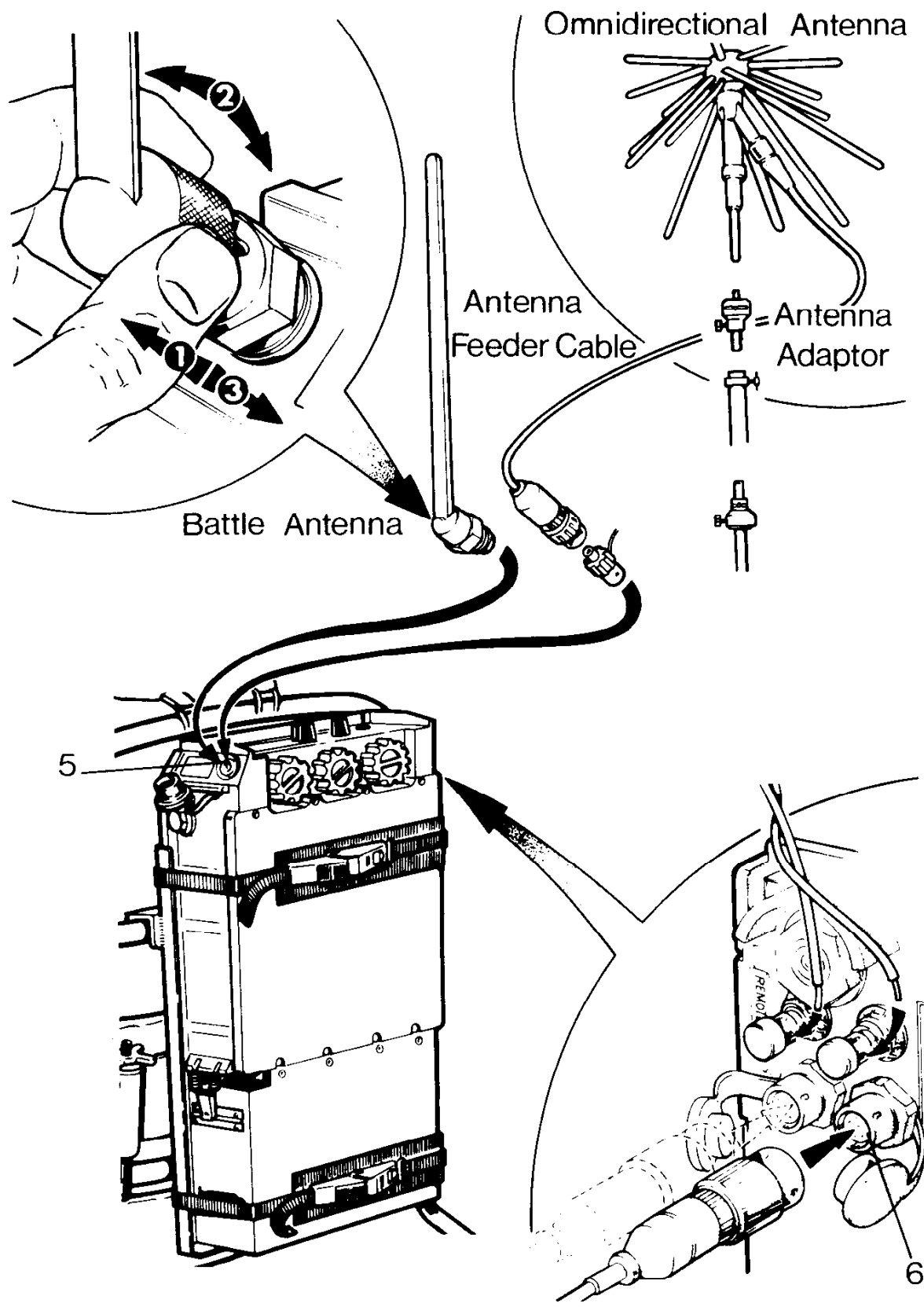


Fig 59.—UK/PRC 344 Antennas and Connections

SECTION 13 – LARKSPUR/CLANSMAN INTER-OPERABILITY

Introduction

02186. During the introduction into service of CLANSMAN there will be a period when units will have to retain some LARKSPUR equipment, resulting in the need to operate mixed nets. This Chapter deals with the tuning and netting drills necessary for successful communication on such radio nets. This Chapter is to be read in conjunction with the User Handbooks of the various sets.

Operating Procedures

02187. Trials were conducted to establish a number of basic rules which, provided they are followed, will enable units to establish and maintain successful communications on nets with a mixture of CLANSMAN and LARKSPUR radios. These rules are as follows:

- a. The selected frequency for the net must lie within the frequency coverage of both LARKSPUR and CLANSMAN sets.
- b. All UK/VRC 353 stations must only be operated in the WIDE mode, when used on mixed nets.
- c. Deployment ranges must be governed by the range of LARKSPUR equipment and not stretched to conform with the greater ranges provided by the CLANSMAN radios.
- d. Careful antenna siting, especially at rebroadcast installations, is essential.
- e. It must be remembered that the UK/PRC 351/2 are not designed to rebroadcast LARKSPUR.
- f. Whenever a rebroadcast net is required, it is strongly recommended that a UK/VRC 353 rebroadcast installation is deployed in preference to a LARKSPUR installation. If a LARKSPUR rebroadcast installation has to be used then the LARKSPUR sets must net to CLANSMAN sets.
- g. LARKSPUR sets must always net to a CLANSMAN set, even if a CLANSMAN set is not the control station.
- h. The control station, where possible, should be a CLANSMAN set.

Tuning Drills

02188. It is essential that the tuning drills, as laid down in the appropriate handbooks are adhered to. In the case of the SR C42, it is stated in the User Handbook, that during the first hour of operation retuning is necessary every 10 minutes. A similar frequency of checks is also necessary with the SR A41 and SR A42 although it is not stated as such in the Handbook.

02189. The frequency drift of the LARKSPUR radios becomes more pronounced on mixed nets because the advanced frequency synthesized design of the CLANSMAN radios enables them to remain *'spot on'* frequency at all times.

02190. **SR A41/A42.** Where the net is to include a SR A41 or SR A42, a tuning and netting call, less the unmodulated carrier, must be sent on first establishing communications. If communications to a LARKSPUR manpack are deteriorating, it is essential that a tuning and netting call be sent. This may be necessary several times within the first 12 hours.

02191. **SR C42/C45.**

a. The set must be tuned in the way laid down in the User Handbook. It is essential that the drill for setting the squelch is strictly adhered to, to ensure optimum receiver sensitivity. It is mandatory that check tuning drills be carried out strictly in accordance with the User Handbook.

b. Section 12 of the User Handbook states *'The correct tuning point is obtained when the centre meter indicates zero'*. The correct interpretation of this statement is the position of rest of the needle when the set is switched off and the set is level. It should be noted that operators must try and get to know the *'rest position'* of their individual SR C42 or SR C45, because the rest position does not necessarily correspond with the centre of the luminous spot on the meter.

Inter-Operability Charts

02192. **Table 1.** Table 1 is an inter-operability chart for current HF radios. The chart indicates compatibility (*on the mode listed*) at assigned frequency intervals ending in whole kHz.

TABLE 1

| RADIO | CW/WIDE | CW/NARROW | AM | SSB | RTT |
|---|---------------------------|-----------|-----|-----|-----|
| (a) | (b) | (c) | (d) | (e) | (f) |
| VRC 322, 1.5–29.9999 MHz 100 Hz channels | CLANSMAN fully compatible | | | | |
| VRC 321, 1.5–29.9999 MHz 100 Hz channels | CLANSMAN fully compatible | | | | |
| PRC 320, 2–29.9999 MHz 100 Hz channels | CLANSMAN fully compatible | | | | NO |
| PRC 316, 2–6 MHz 45 preset channels | YES | YES | YES | NO | NO |
| SR A13, 2–8 MHz | YES | NO | YES | NO | NO |
| SR C11/R210, 2–16 MHz | YES | NO | YES | NO | NO |
| SR C11/R210(SSB), 2–16 MHz 1 kHz channel | YES | NO | YES | YES | YES |
| SR C13, 1.5–12 MHz | YES | NO | YES | NO | NO |
| SR D11, 2–22 MHz 1 kHz, channels | YES | NO | YES | YES | YES |

NOTES

1. CW (*Narrow*) position on CLANSMAN reduces the bandwidth to less than 400 Hz. To use this position, all the stations on a net must have comparable stability.
2. SSB using USB and suppressed carrier.
3. Difficulty may be experienced due to the relative instability of transmitter.
4. Compatible DSB uses full carrier and upper side band only.
5. Processes DSB as an SSB problem may arise when receiving unstable transmissions.
6. Using 850 Hz shift.
7. Has the stability to allow the use of CW (*Narrow*) on sets with this facility.

8. Requires to be offset by –2 kHz to comply with JSP 2.
 9. Not normally used in the RTT role; can be used with appropriate adaptor.
 10. Restricted to basic channels when working sets with 1 kHz channels. Full use of offsets is possible when working to CLANSMAN sets.
02193. **Table 2.** Table 2 is an inter-operability chart for most current VHF radios. The chart indicates compatibility of particular radios operating to radios using the indicated form of squelch control.

TABLE 2

| Radio | Voice Clear operation | | | |
|-------------|----------------------------|---------------------------|-----------------------------|----------|
| | Wide Band FM noise squelch | Wide band FM tone squelch | Narrow band FM tone squelch | Auto RRB |
| (a) | (b) | (c) | (d) | (e) |
| PRC 349 | NO | YES | YES | NO |
| PRC 350 | YES | YES | YES | NO |
| PRC 351/352 | YES | YES | YES | YES |
| VRC 353 | YES | YES | YES | YES |
| SR A40 | YES | NO | NO | NO |
| SR A41 | YES | NO | NO | YES |
| SR B47 | YES | NO | NO | YES |
| SR C45 | YES | NO | NO | YES |

NOTES

1. Activated by an external 150 Hz squelch tone; also RRB station will not receive unless activated by 150 Hz squelch tone.
2. Operation possible in 'NOISE ON' position.
3. Degradation of the circuit will result.

General Notes

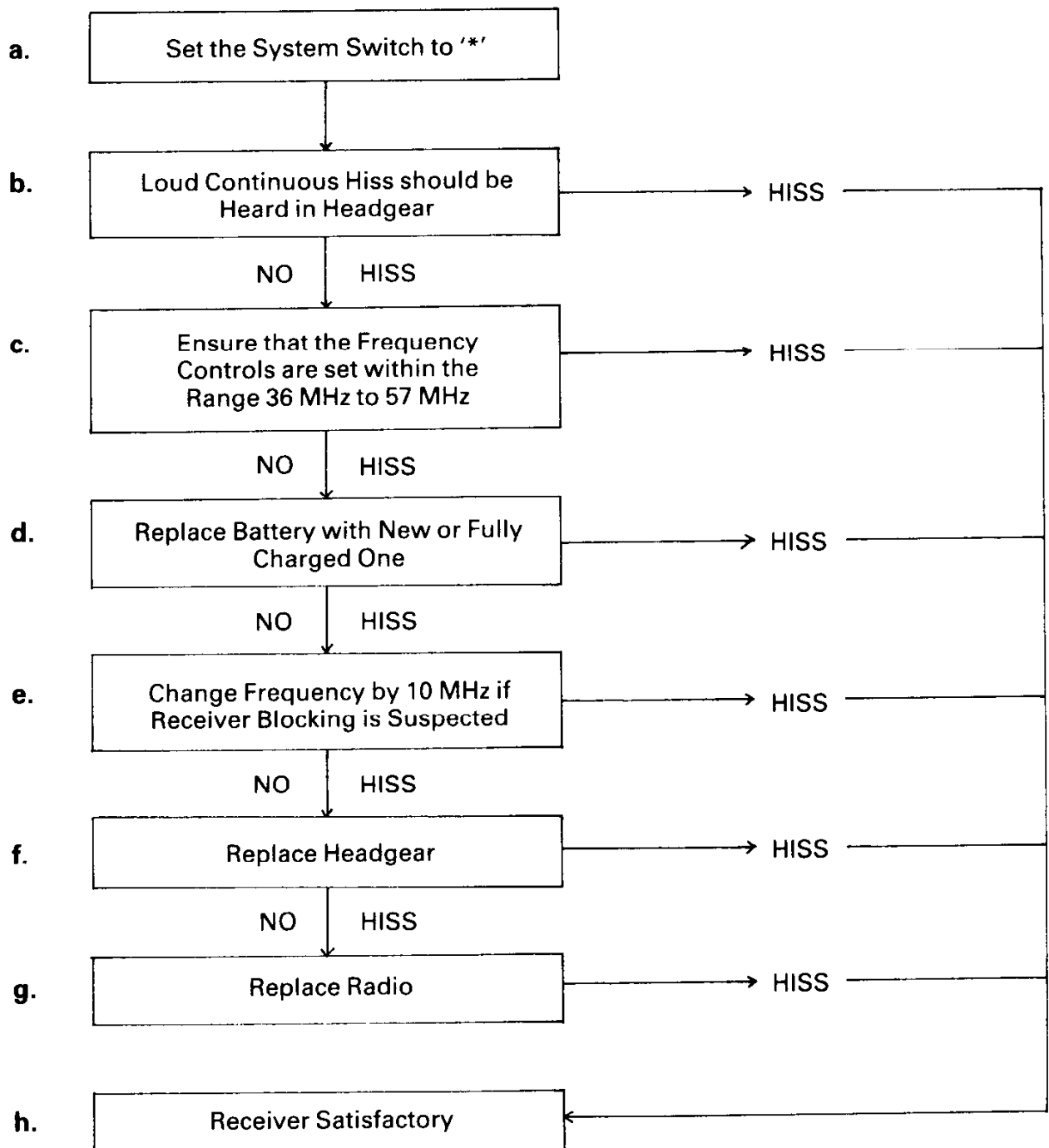
- a. LARKSPUR sets will require frequent re-tuning.
- b. CLANSMAN sets are to be control wherever possible.
- c. RTT is possible using the appropriate adaptor with certain equipment.

02194.–02200. *Reserved.*

FUNCTIONAL CHECKS – UK/PRC 350

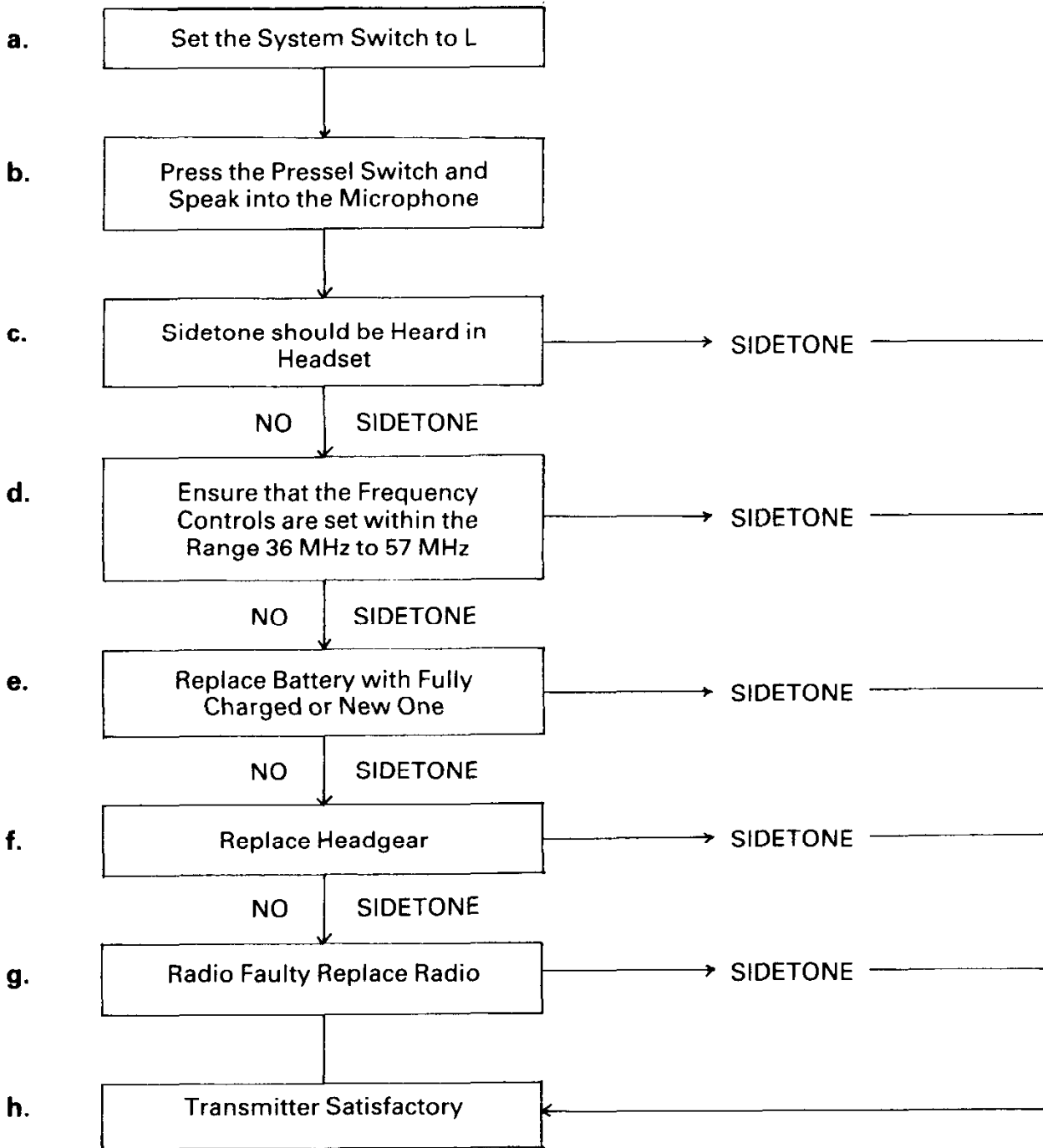
RECEIVER FAULT LOCATION

1. The following procedure should be carried out if a receiver fault is suspected.
2. Connect the Battery and Headset to the Radio.



TRANSMITTER FAULT LOCATION

1. The following procedure should be carried out if a transmitter fault is suspected.
2. Connect the Battery and Headset to the Radio.

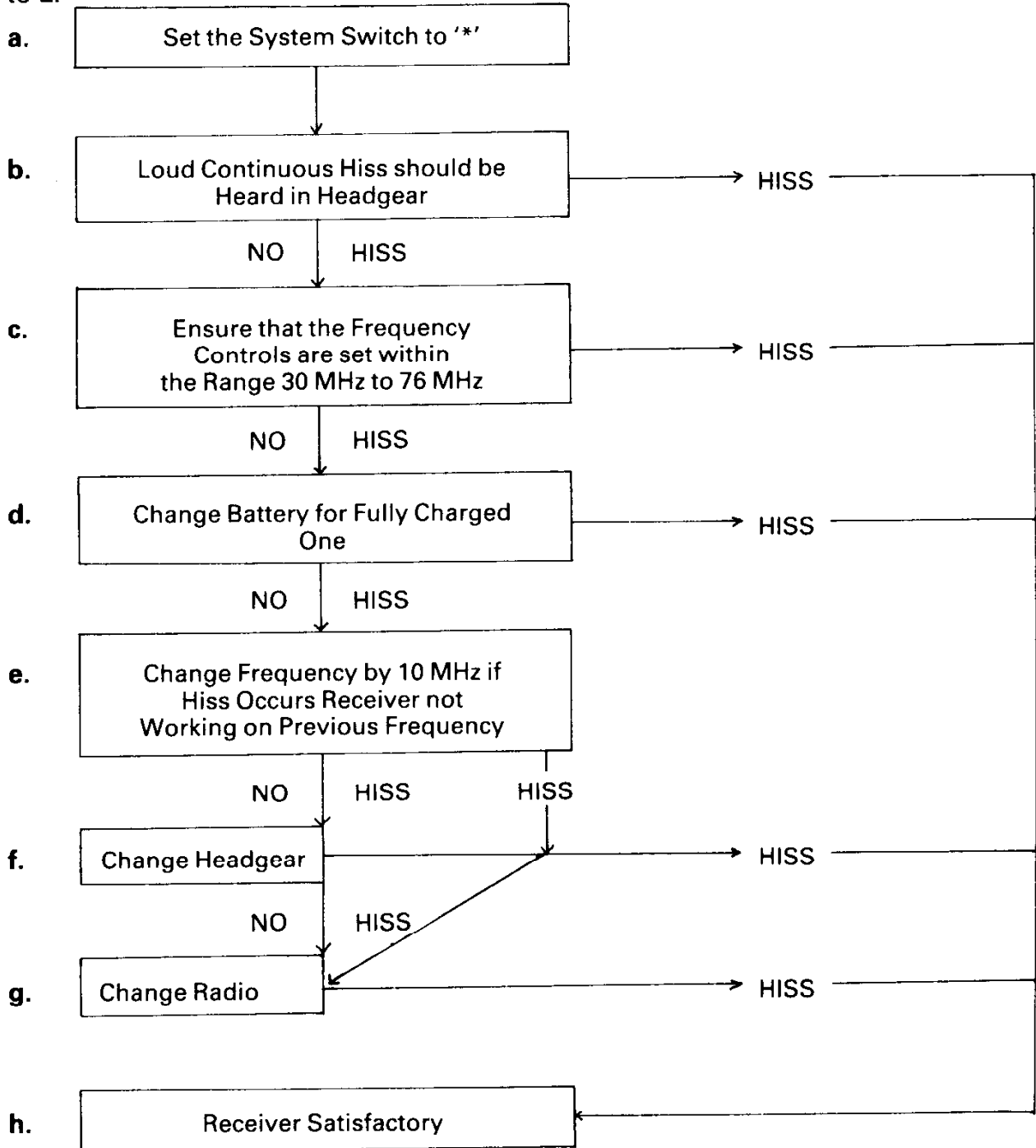


3. Repeat with SYSTEM switch at 'W'.

FUNCTIONAL CHECKS – UK/PRC 351

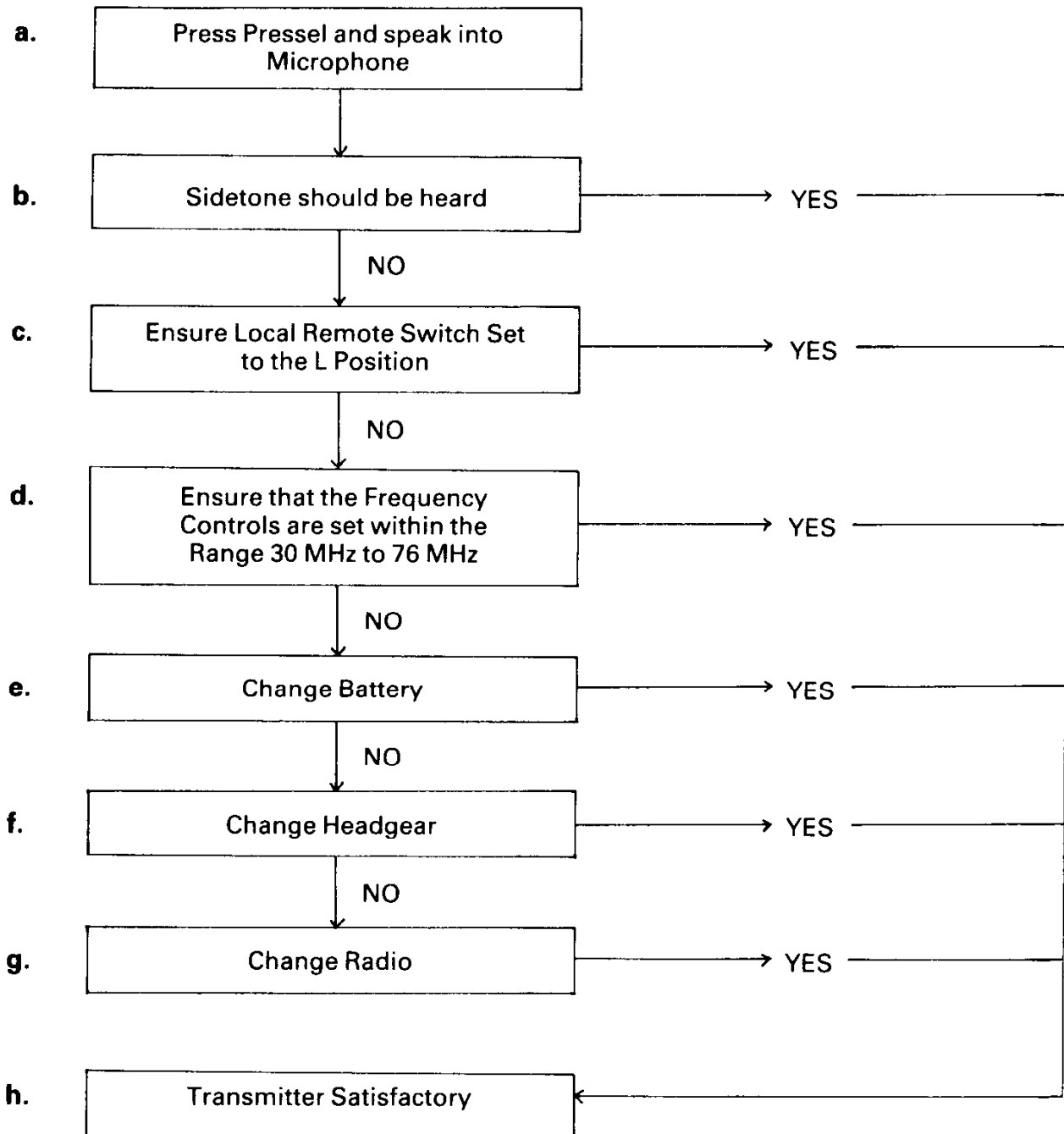
UK/PRC 351 Receiver Test, Local Operation – 1

1. This procedure should be carried out at 4 frequencies approximately 31, 47, 49 and 75 MHz. Connect the battery and headset to the PRC 351. Set the ROS to L.



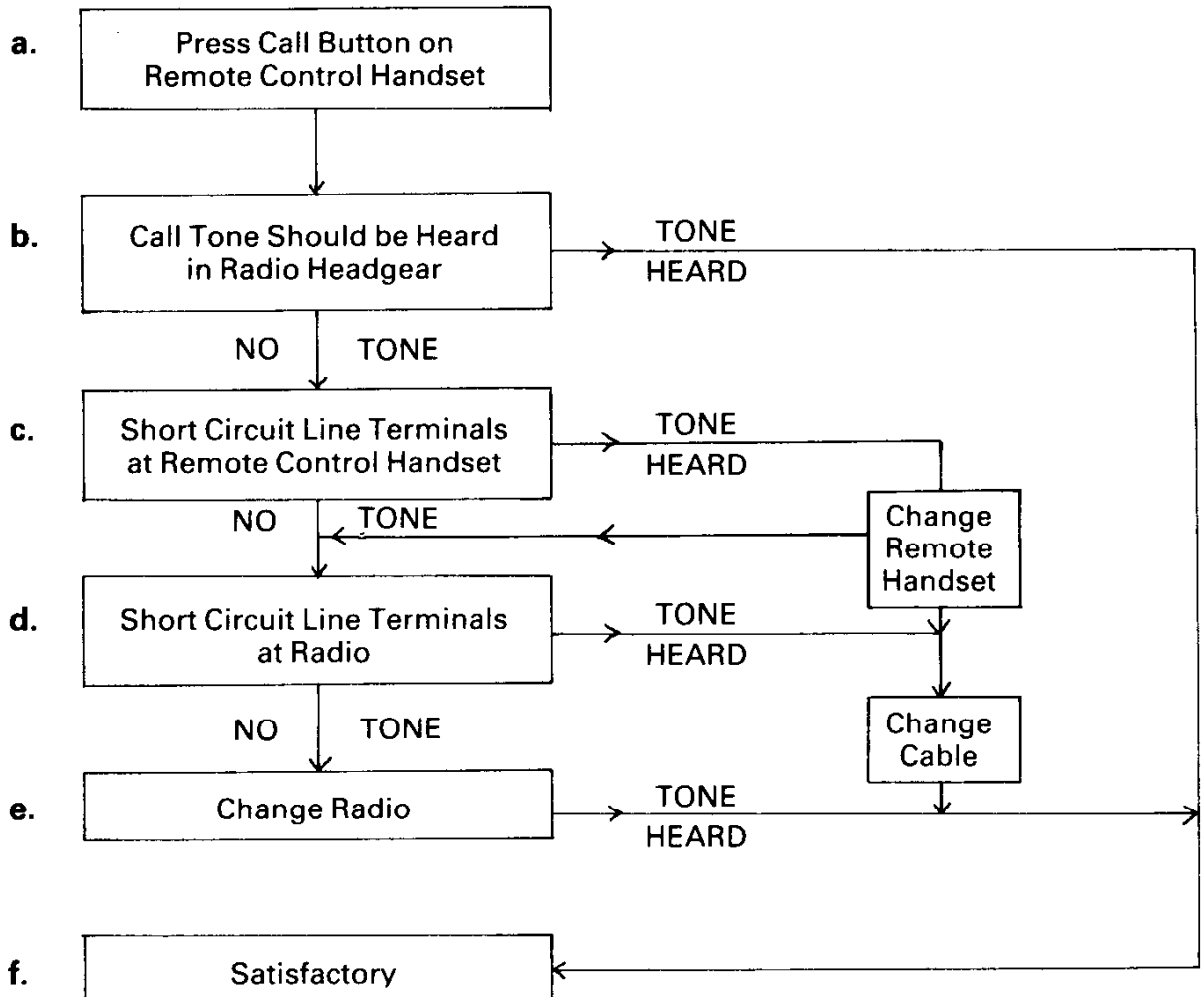
UK/PRC 351 Transmitter Test Local Operation – 2

1. This procedure should be carried out at 4 frequencies, approximately 31, 47, 49 and 75 MHz. Fit whip antenna into antenna socket (*ISK1*). Set the ROS to L (*LOCAL*). Set the SSW to L (*LOUD*).



Remote Control Tests – Call From Remote – 3

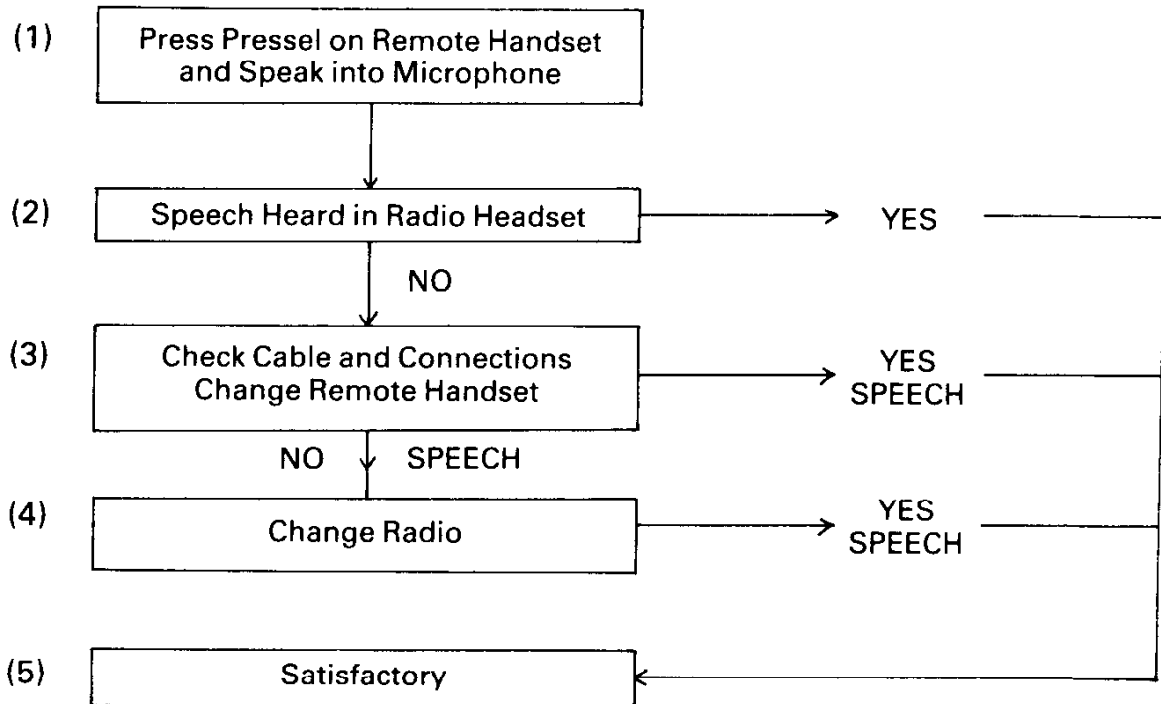
1. Test radio for Local Operation as detailed in tests 1 and 2. Leave Headset/Handset attached to radio. Connect Remote Control Handset using short length of cable.
2. Set the ROS to R.A. and 1 in turn.



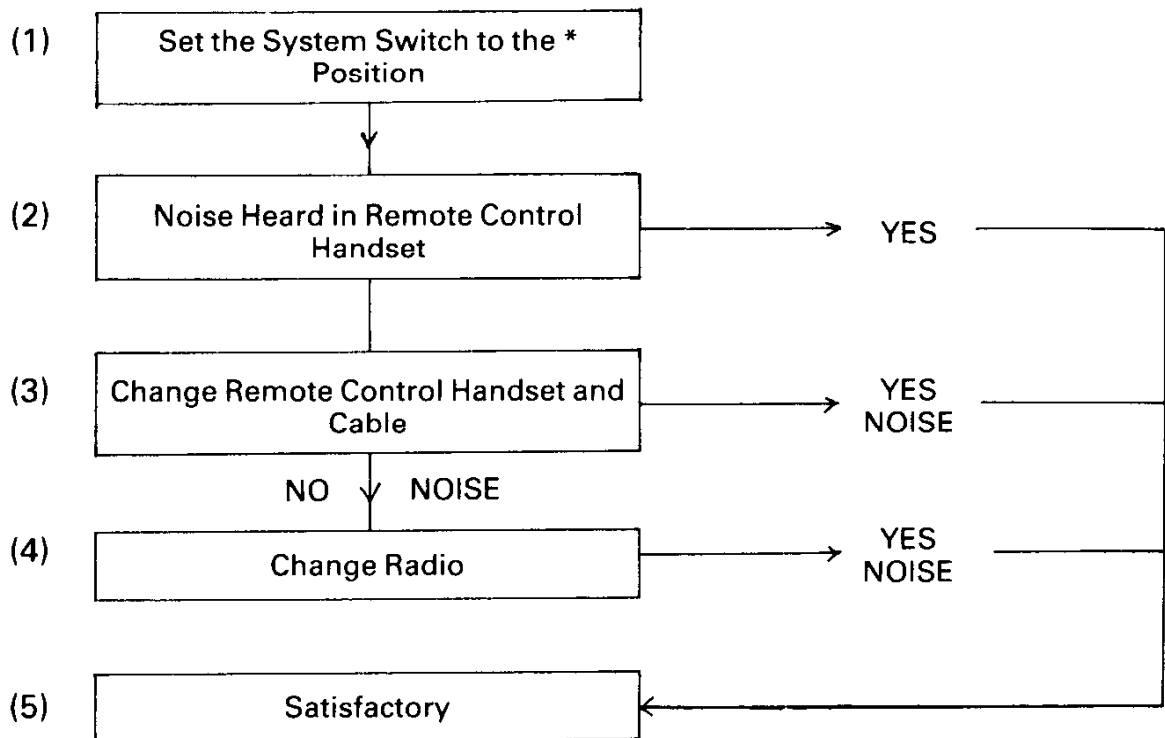
Remote Control Tests – Transmit and Receive – 4

1. Set the ROS to 'R' (*REMOTE*).

a. *Transmit.*

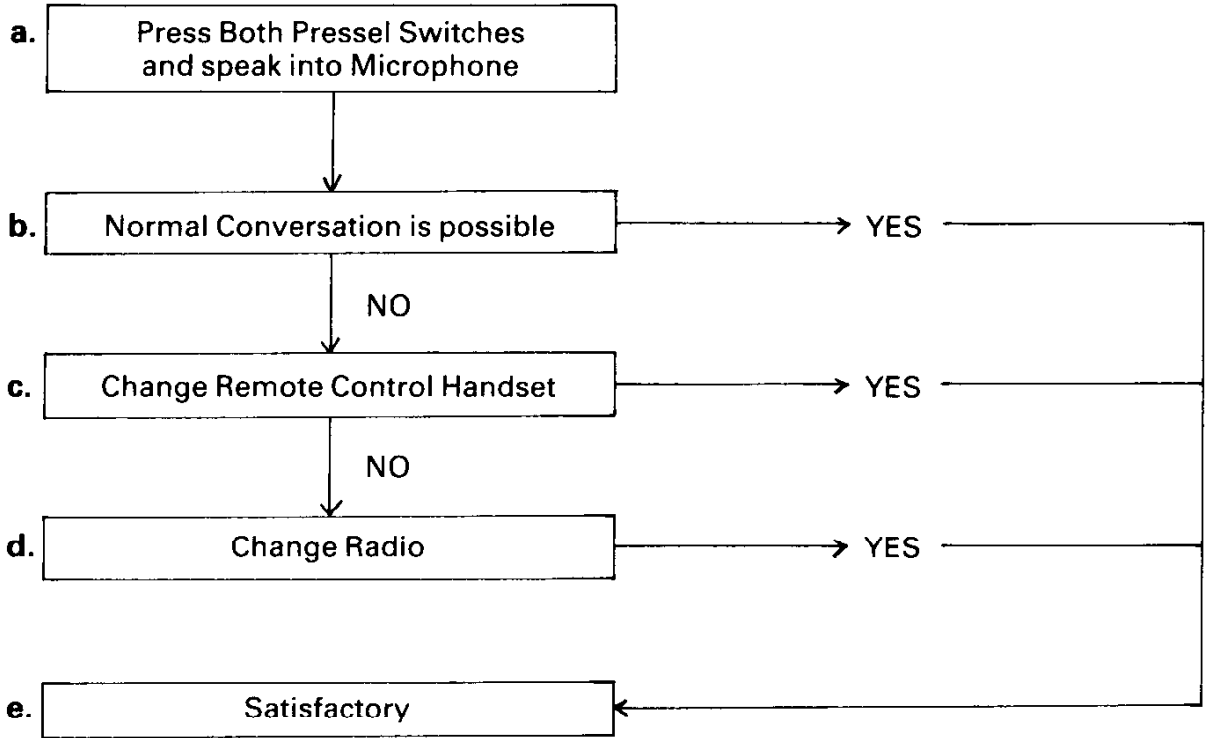


b. *Receive.*



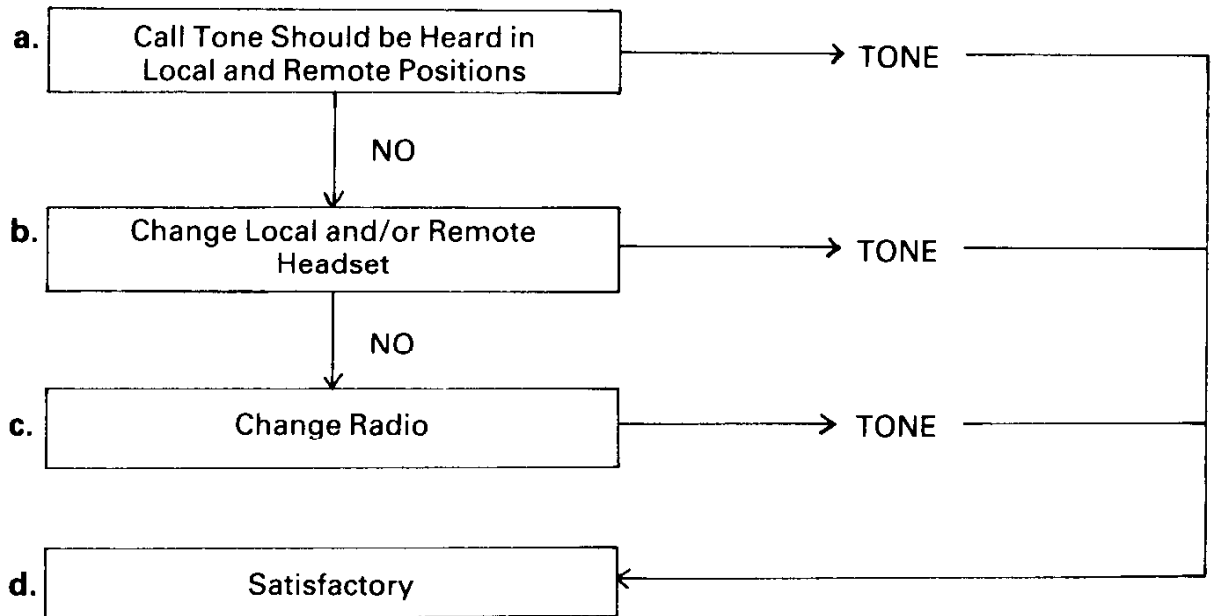
Remote Control Tests – Speech Test on Intercom – 5

1. Set the Local/Remote switch to the '1' position.



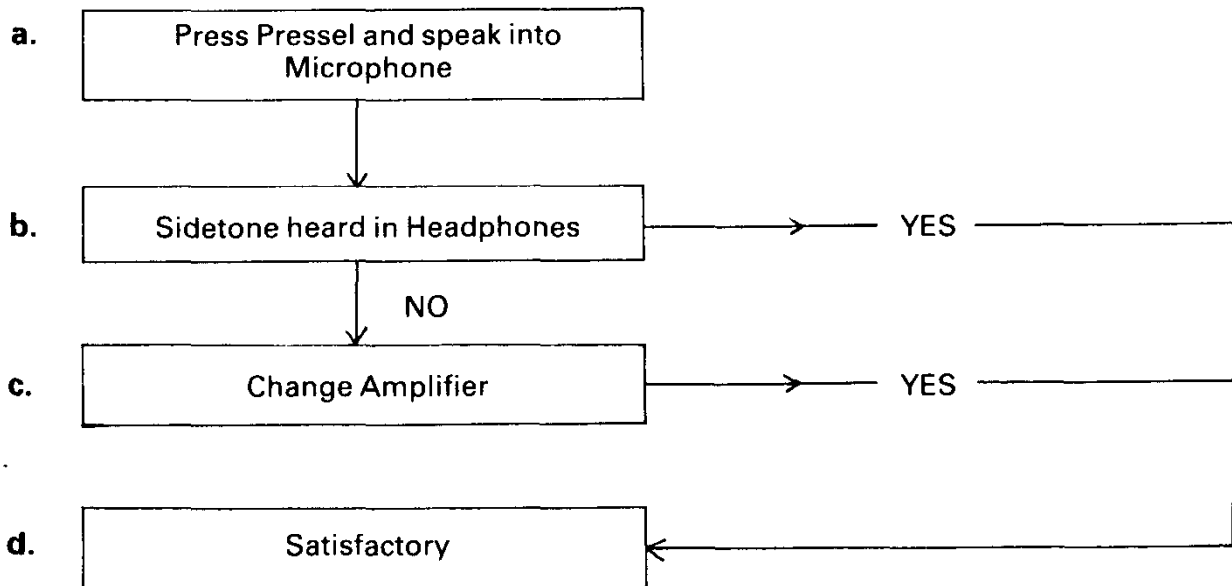
Remote Control Test – Call From Radio – 6

2. Set the Local/Remote switch to the C position.



UK/PRC 352 Transmitter Test 2

1. **Connect Ground Spike Antenna.** Set the frequency controls on the radio to 35 MHz 47 MHz and 65 MHz in turn. Set the Band switch to each of the 3 frequency bands in turn. Carry out the following procedure on each of the selected frequencies.



UK/PRC 352 Receiver Test

2. The PRC 352 receiver cannot be fully tested unless a signal is received at the Ground Spike Antenna i.e., a second radio set available.

UK/PRC 351/352 Auto rebroadcast Test

3. The automatic rebroadcast position of the ROS can only be fully tested using a complete rebroadcast system.

4. If a fault occurs; each station check all connections to cables etc., and carry out Fault Location procedure on their equipment. If fault persists change radio at station B and C in turn.

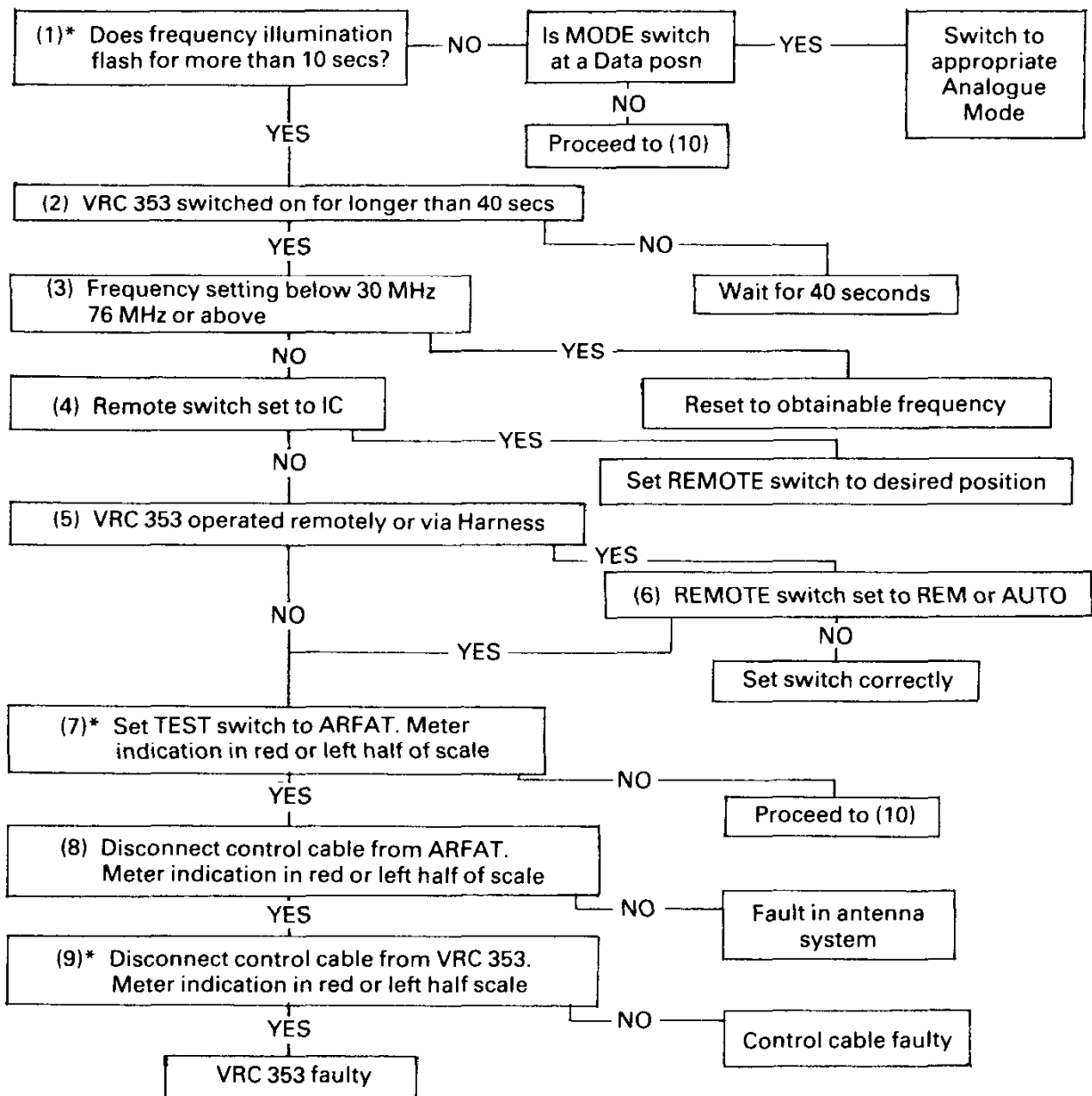
FUNCTIONAL CHECKS – UK/VRC 353

1. It is assumed that the VRC 353 has been connected up as detailed in the Handbook and that one or other of the following fault symptoms are apparent:

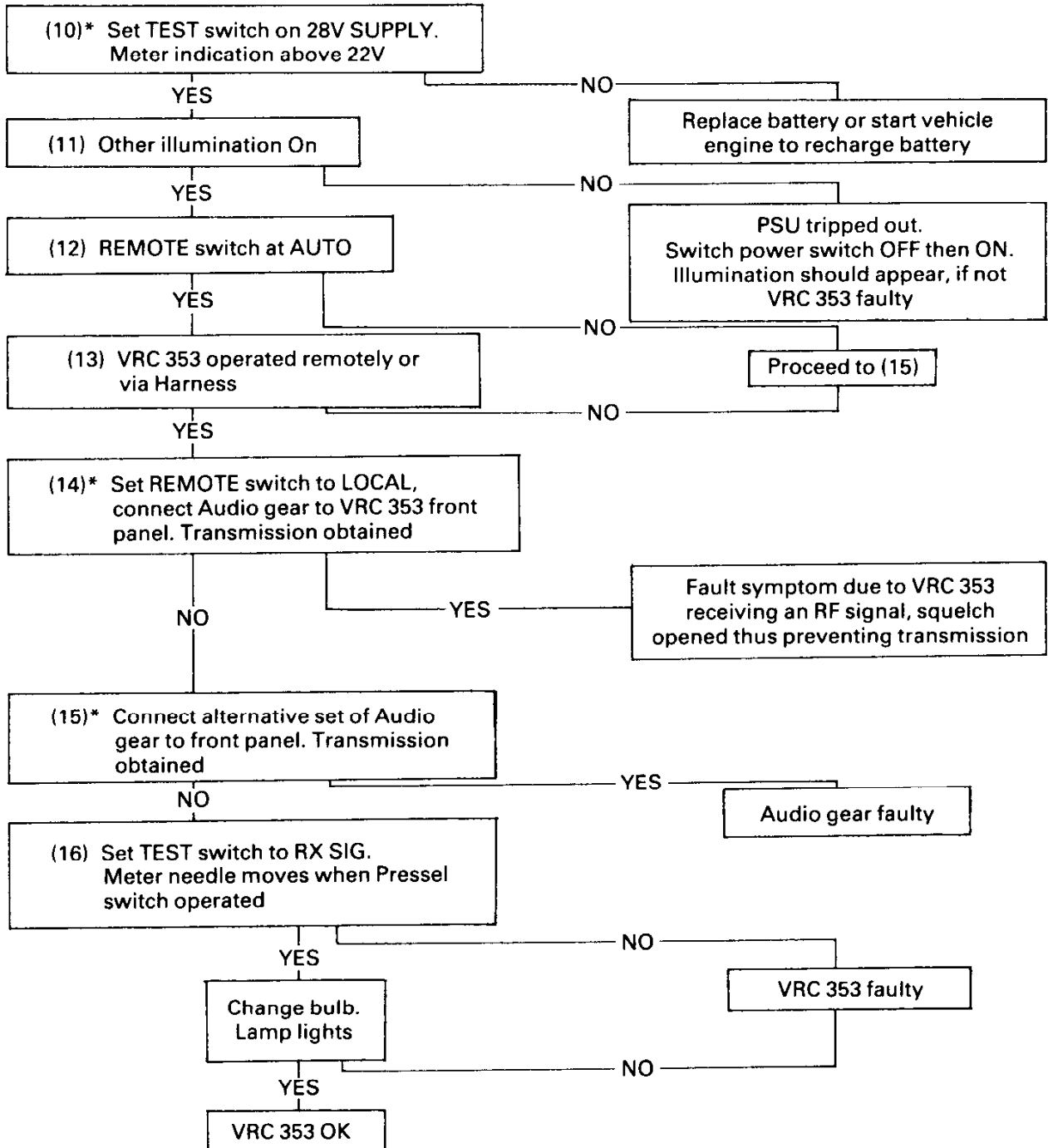
2. Fault 1, No Transmission.

Symptom: TX lamp does NOT light when *pressel* switch is pressed and the TEST switch is set to a position other than *LAMPS OFF* or *OVERRIDE*.

Note: Press *pressel* when asterisk * shown.

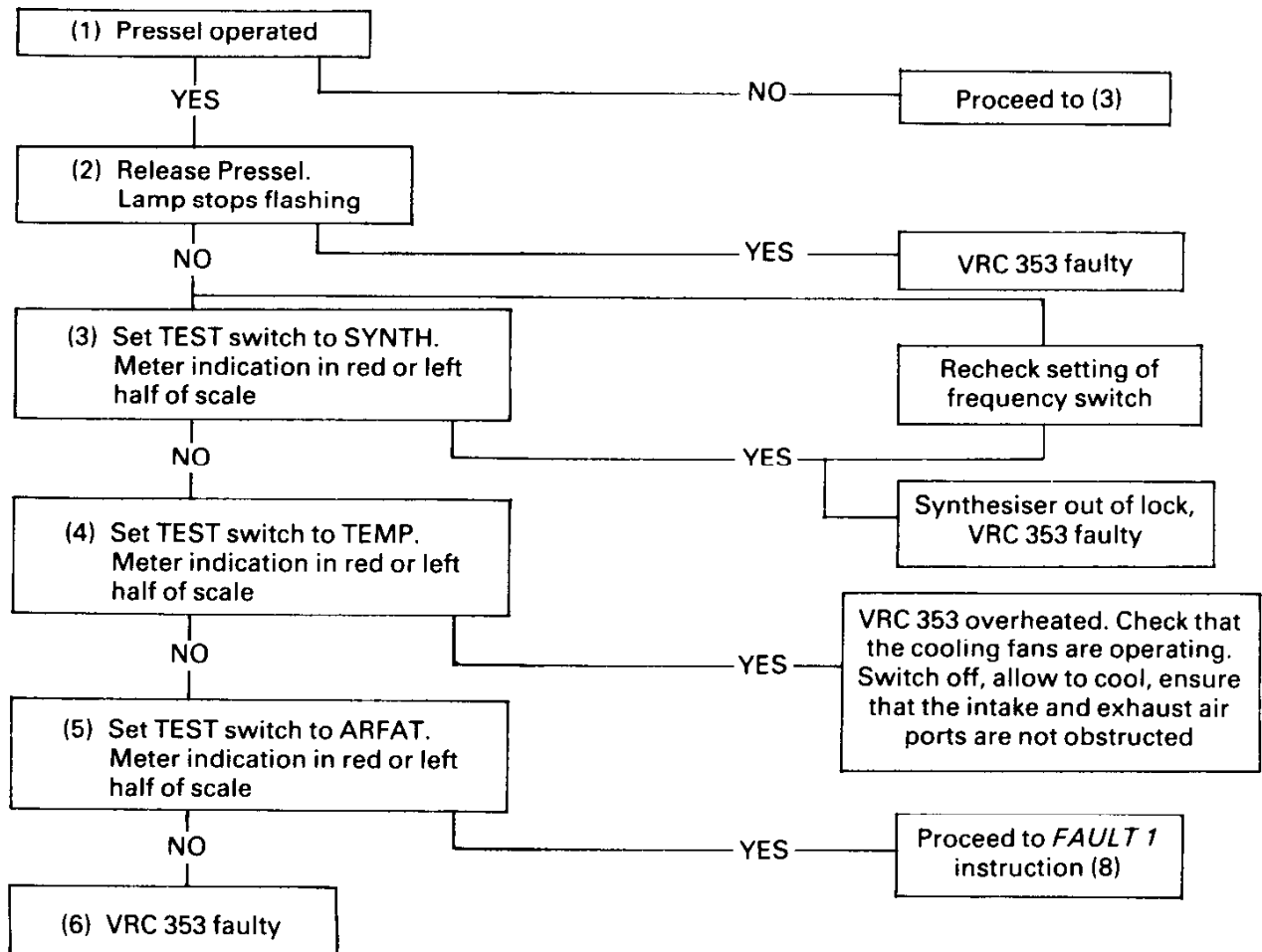


FAULT 1, No Transmission (Contd)



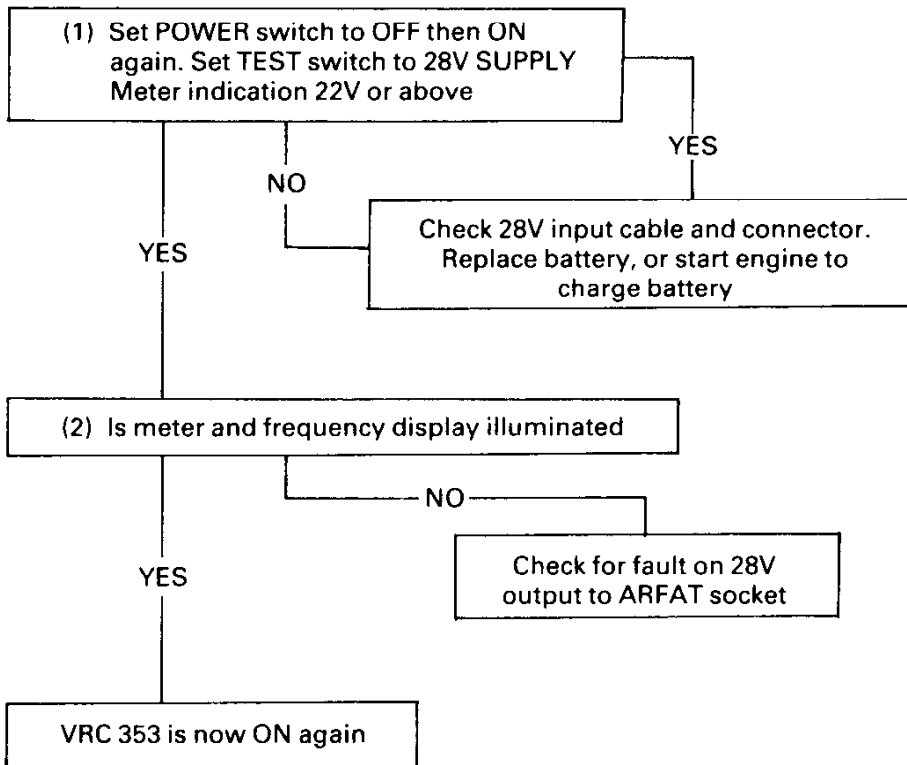
FAULT 2

Symptom: Frequency display illumination flashes for more than 10 seconds.



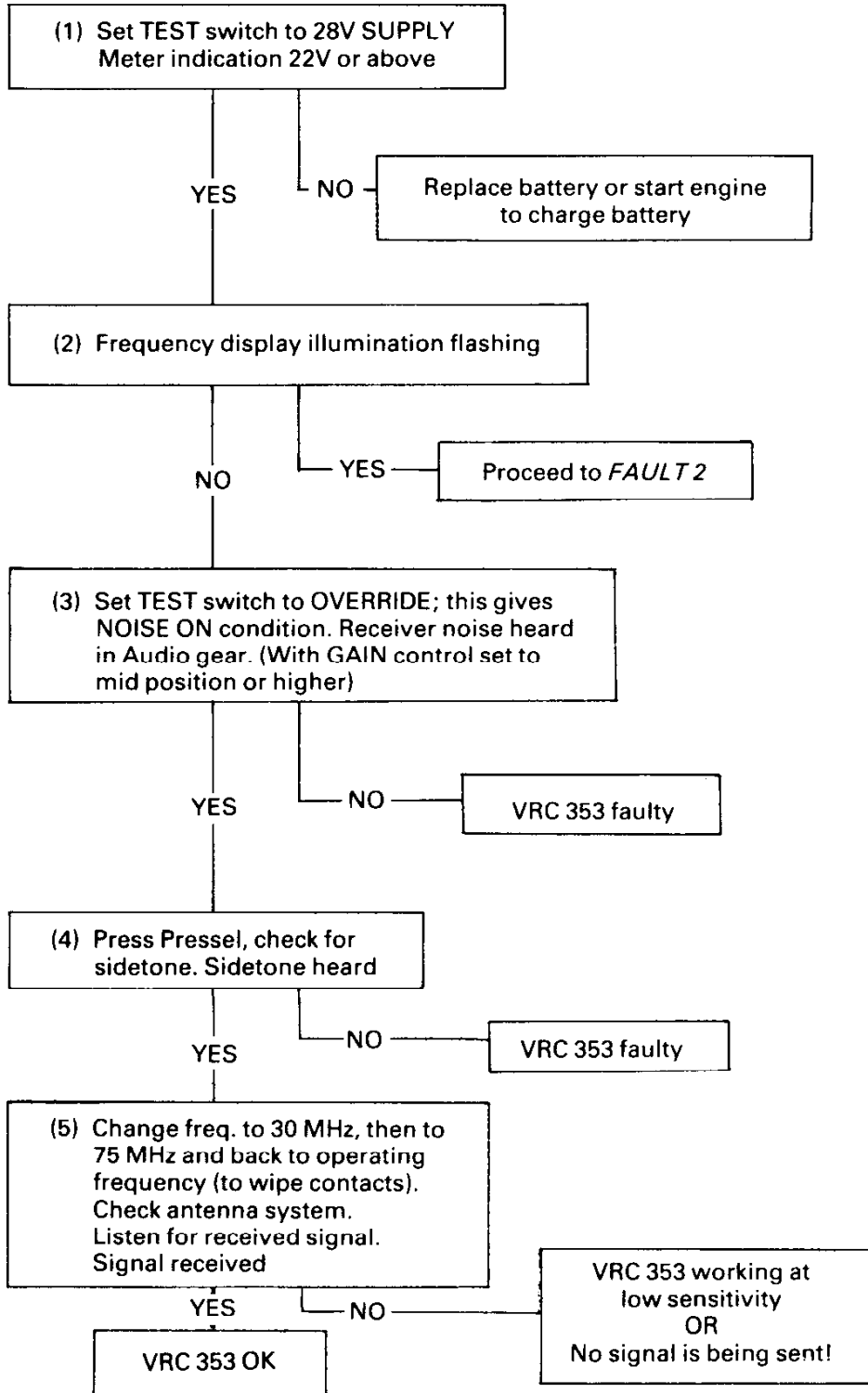
FAULT 3

Symptom: Radio will not switch ON, or repeatedly 'trips out'



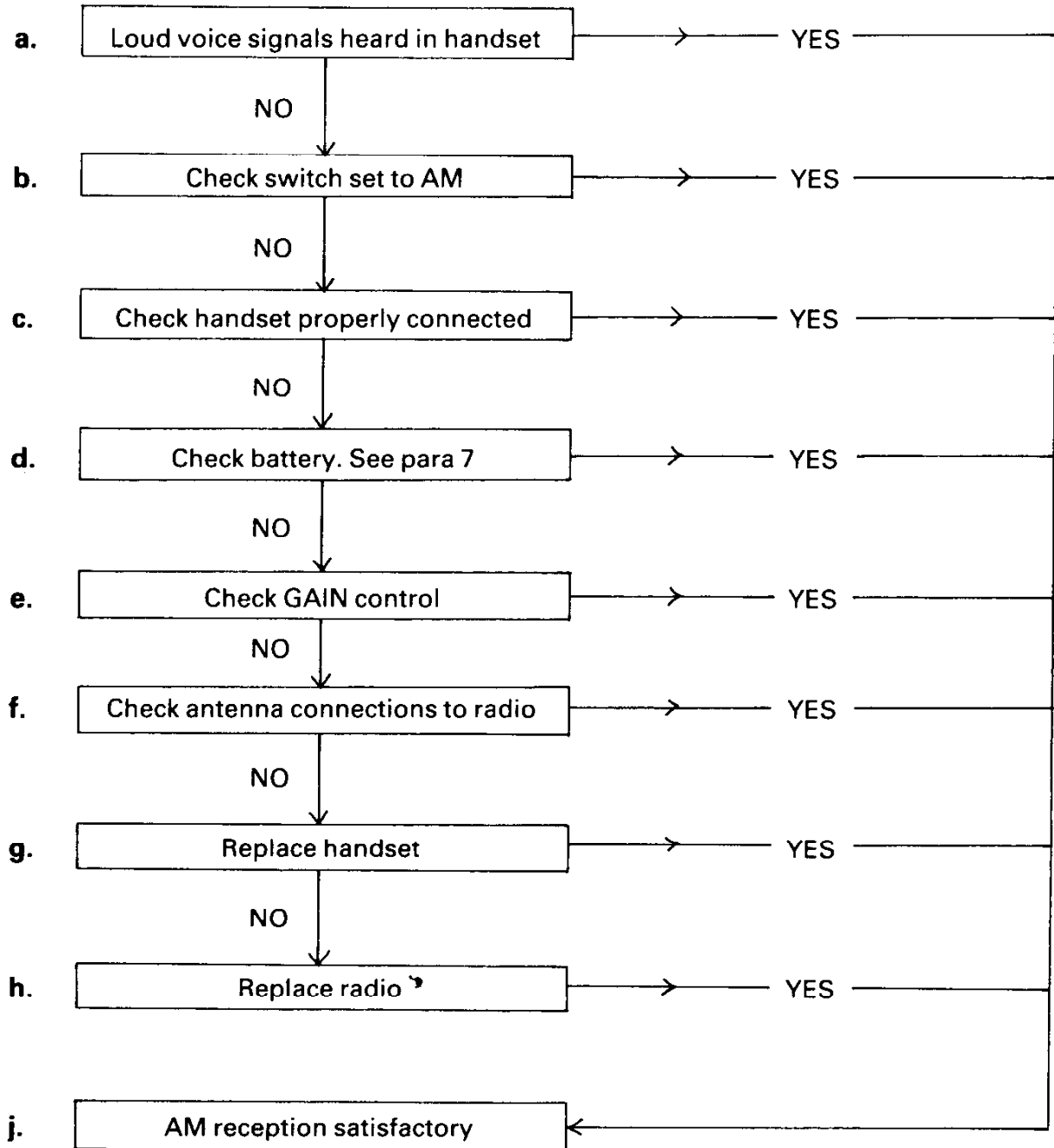
FAULT 4

Symptom: No Signal received

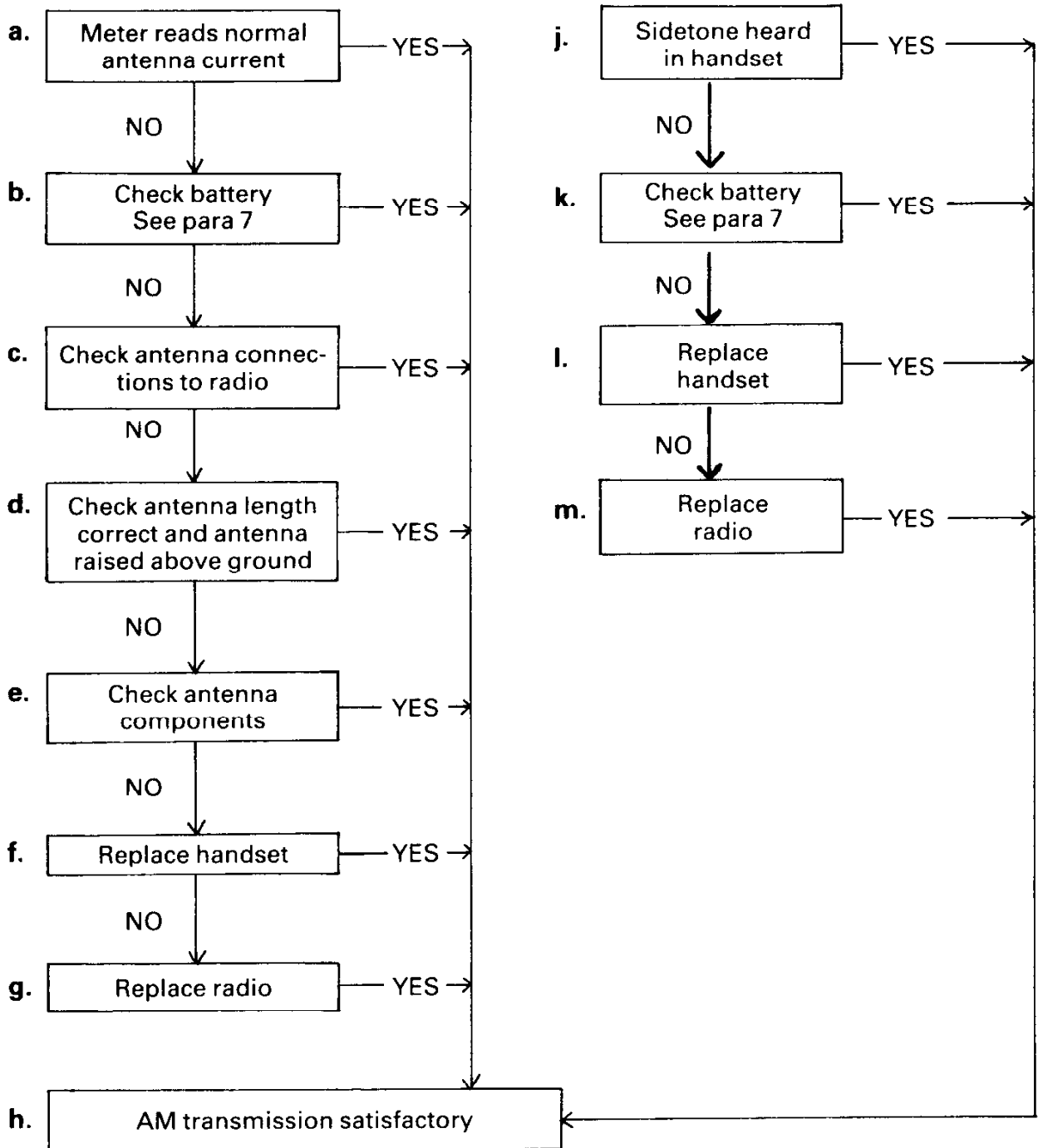


FUNCTIONAL CHECKS – UK/PRC 320

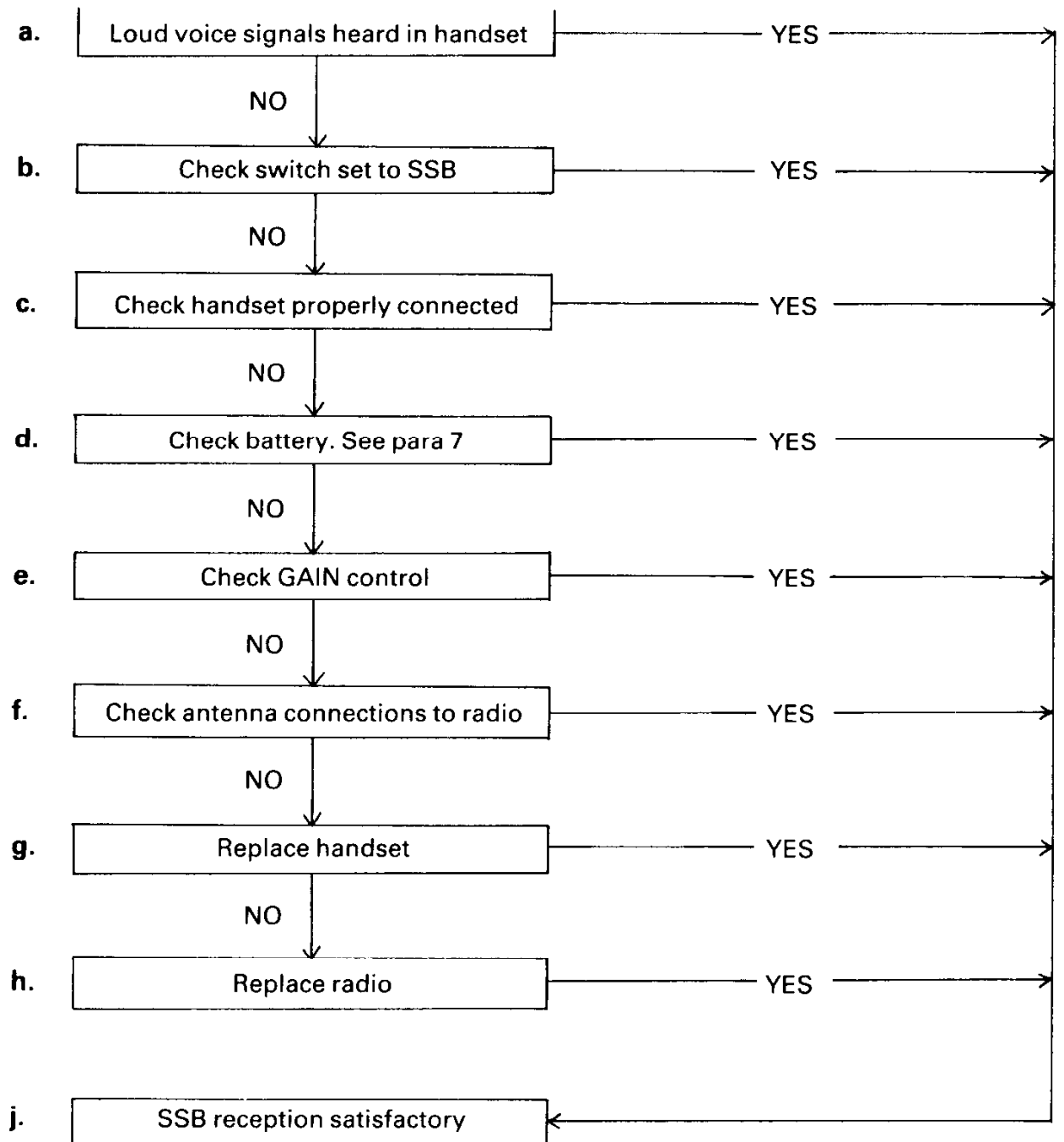
1. **A.M. reception.** Set the mode selector switch to AM and the GAIN control as required.



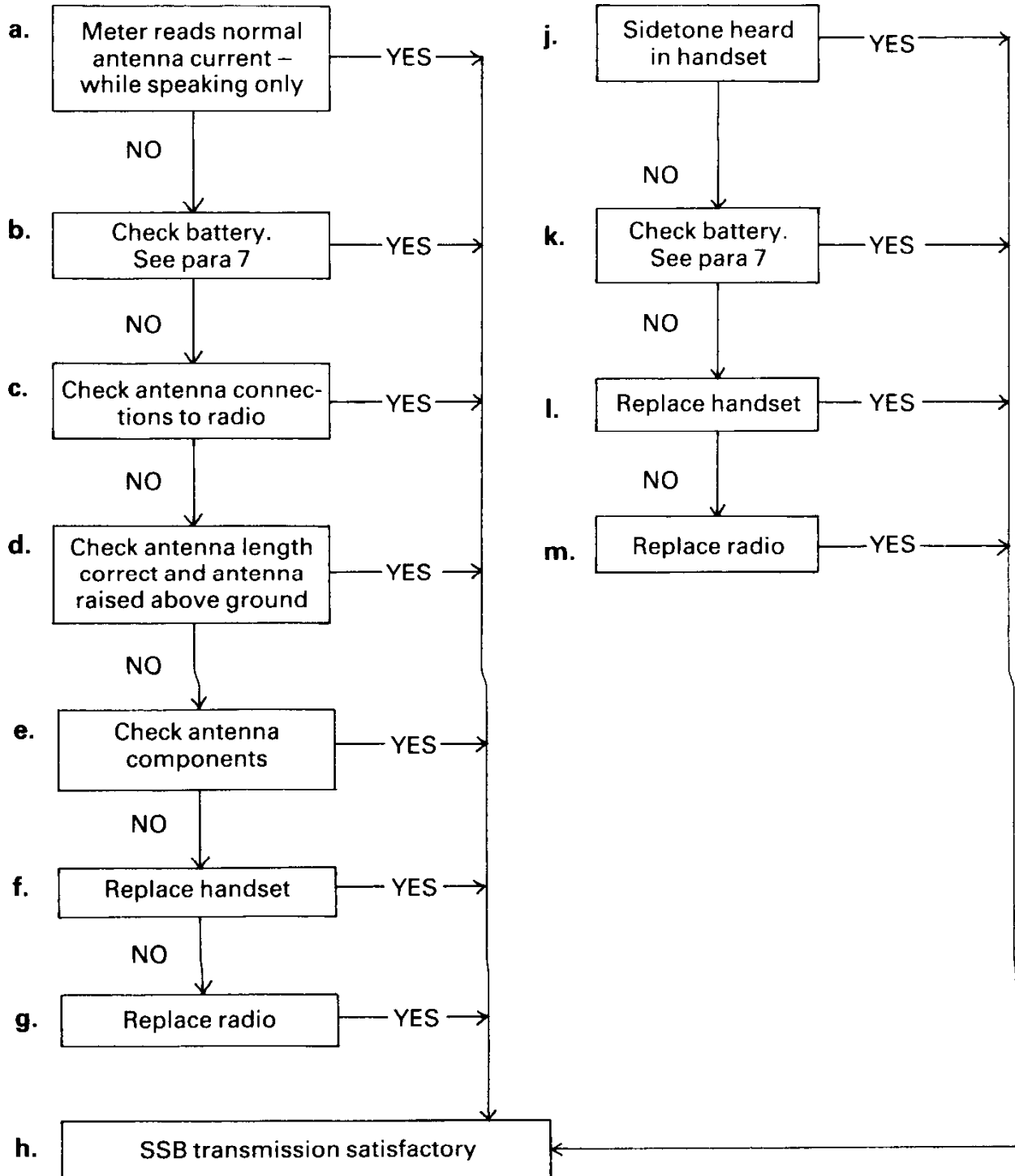
2. **AM transmission.** Set the mode selector switch to AM, the GAIN control as required, depress the pressel and speak into the microphone.



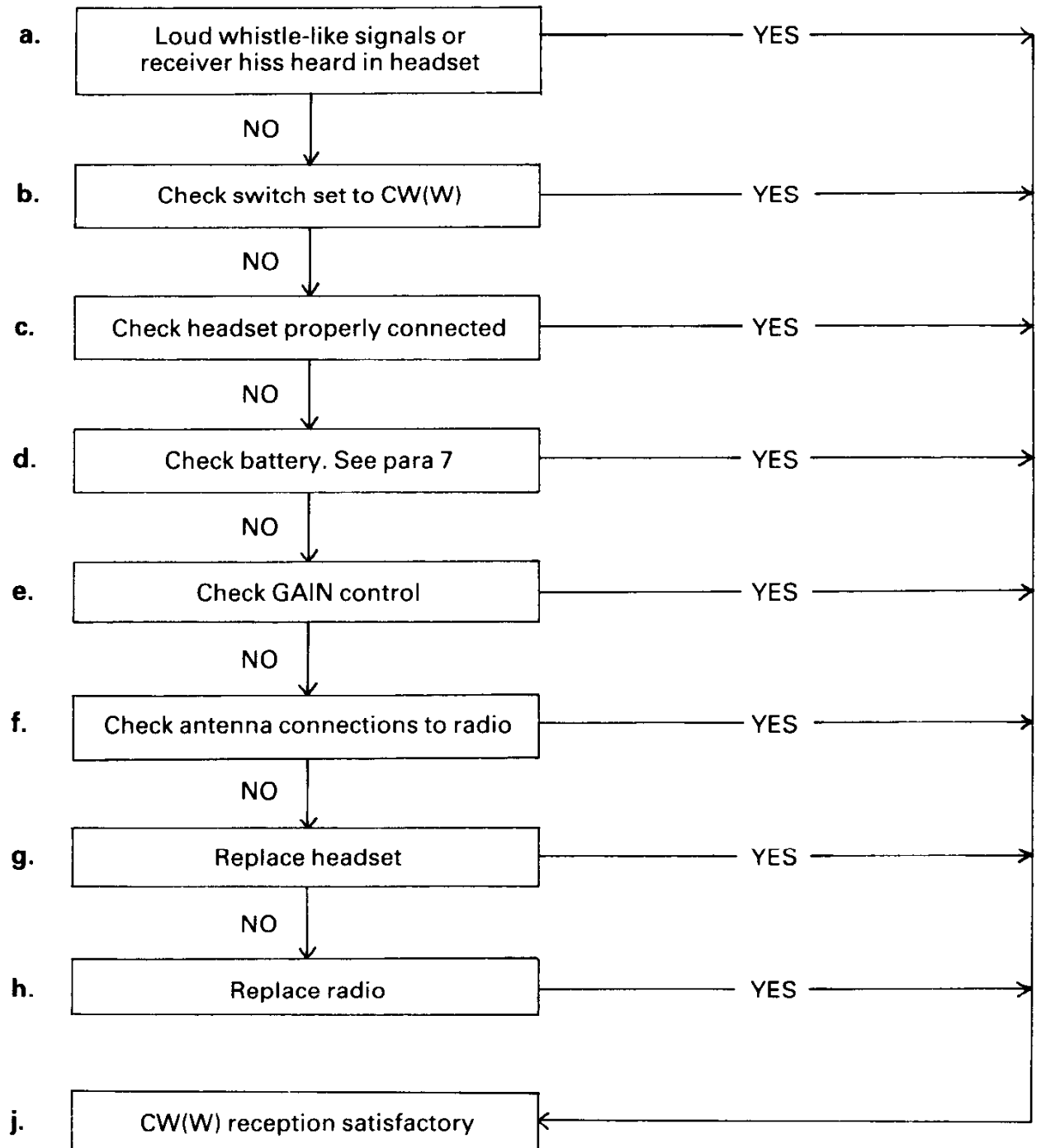
3. **SSB reception.** Set the mode selector switch to SSB and the GAIN control as required.



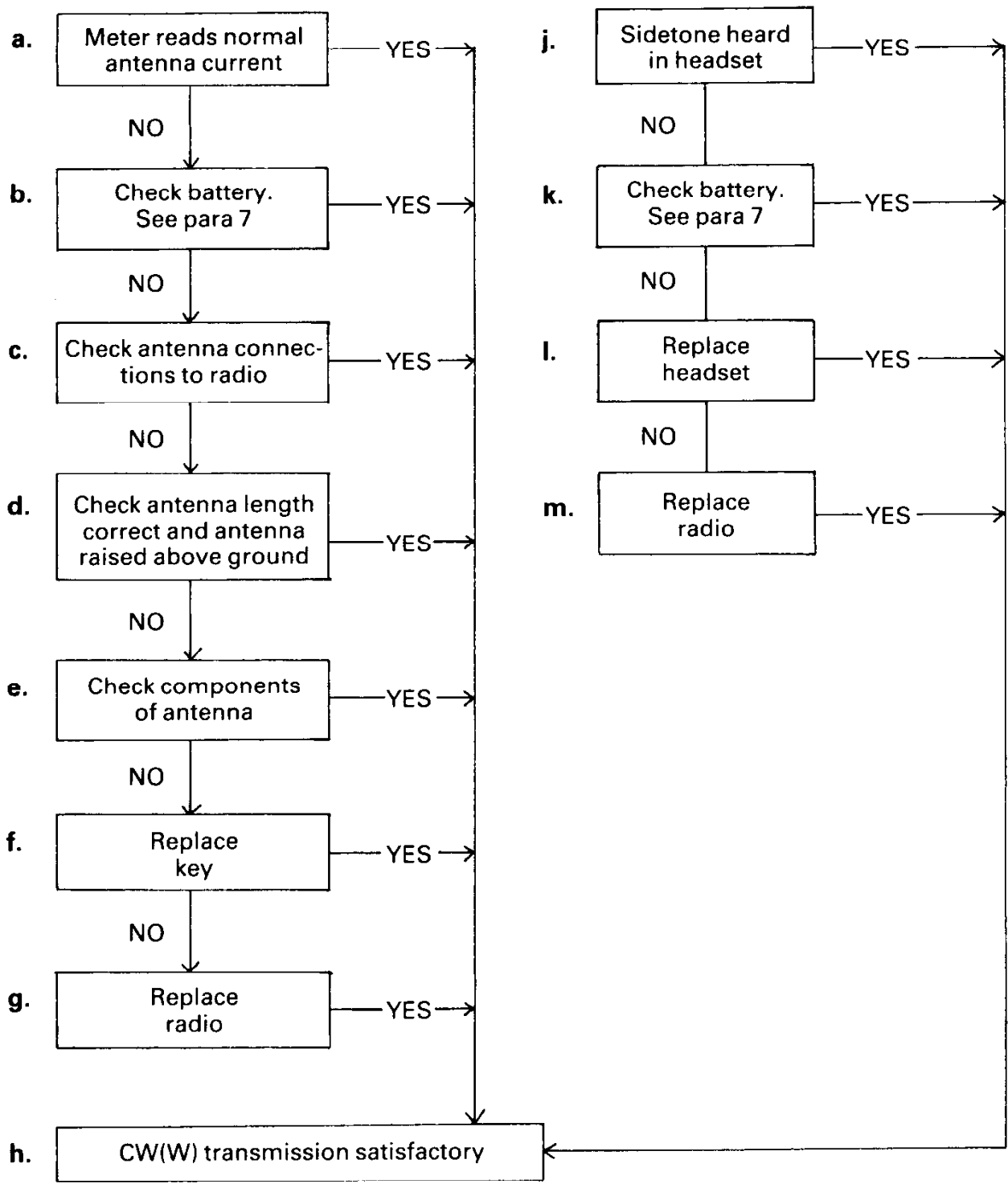
4. **SSB transmission.** Set the mode selector switch to SSB, the GAIN control as required, depress the pressel and speak into the microphone.



5. **CW reception.** Set the mode selector switch to CW(W) and the GAIN control as required. On completion of the check below, repeat it with the mode selector switch set to CW(N).

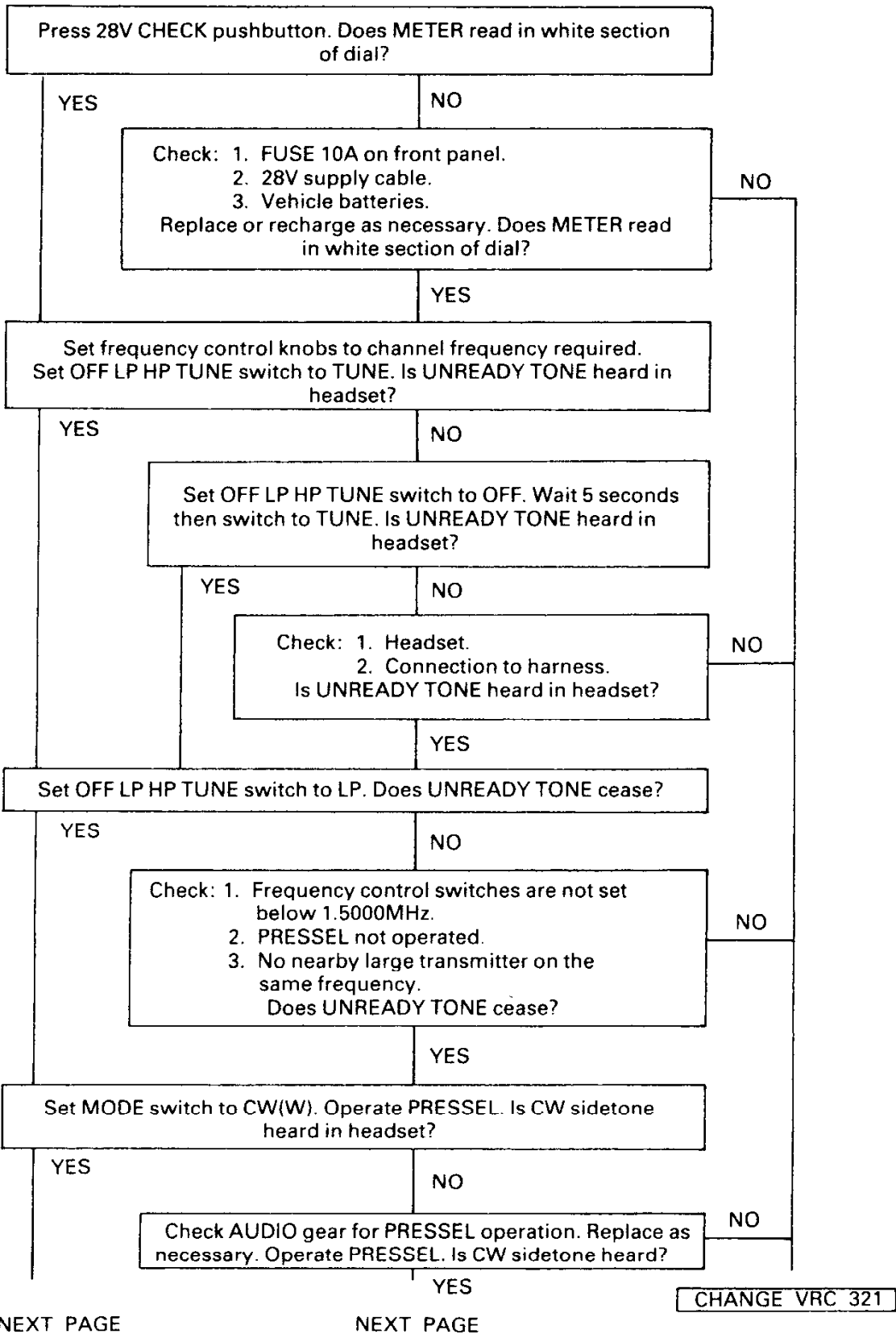


6. **CW transmission.** Set the mode selector switch to CW(W), the GAIN control as required and depress the morse key. On completion of the check below, repeat it with the mode selector switch set to CW(N).



7. **Battery Check.** Check the charge state of the battery as follows:
 - a. Set the transmitter power switch to BATT CHK and the mode selector switch to either of the CW positions.
 - b. Depress the pressel or the morse key and check that the meter needle registers on or above the second mark on the scale (*the first mark is zero*). Release the pressel. If the needle was below the second mark, replace the battery.
 - c. Tune the antenna as described in Chapter 2 and recheck the battery as described above.
8. **Frequency Check.** The operator can check the frequency accuracy of the PRC 320 by comparing its frequency with that of either a laboratory frequency standard or a standard frequency broadcast. It should be possible to hear one of the standard frequency broadcasts at any time of day, irrespective of location. Details are to be found in Sky Wave Charts, Army Code No. 60123 and Standard Frequency and Time Transmissions in Signals Communications in the Army, Volume III, Army Code No. 70026.

FUNCTIONAL CHECKS – UK/VRC 321

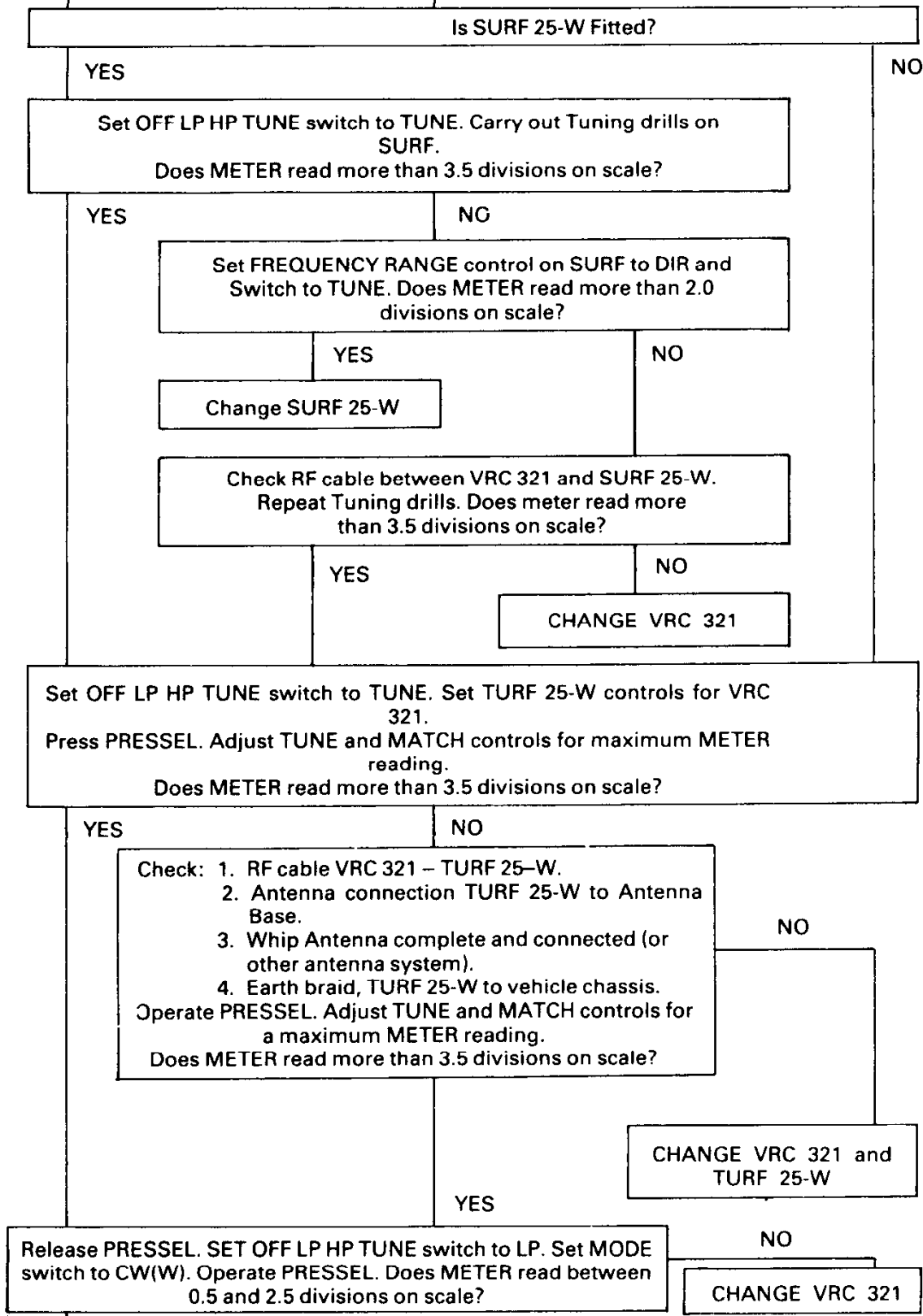


NEXT PAGE

NEXT PAGE

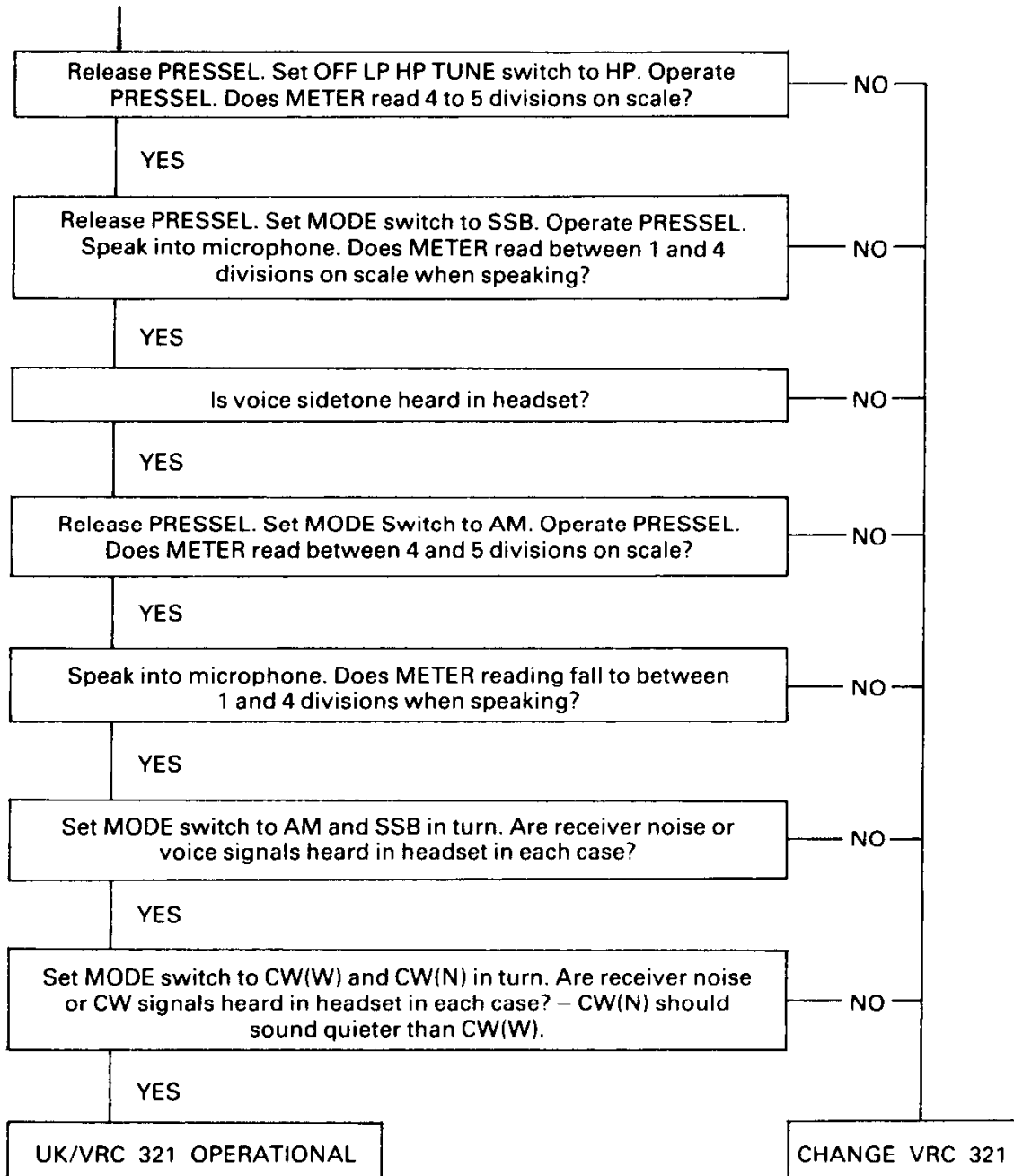
CHANGE VRC 321

FUNCTIONAL CHECKS (Contd)



YES NEXT PAGE

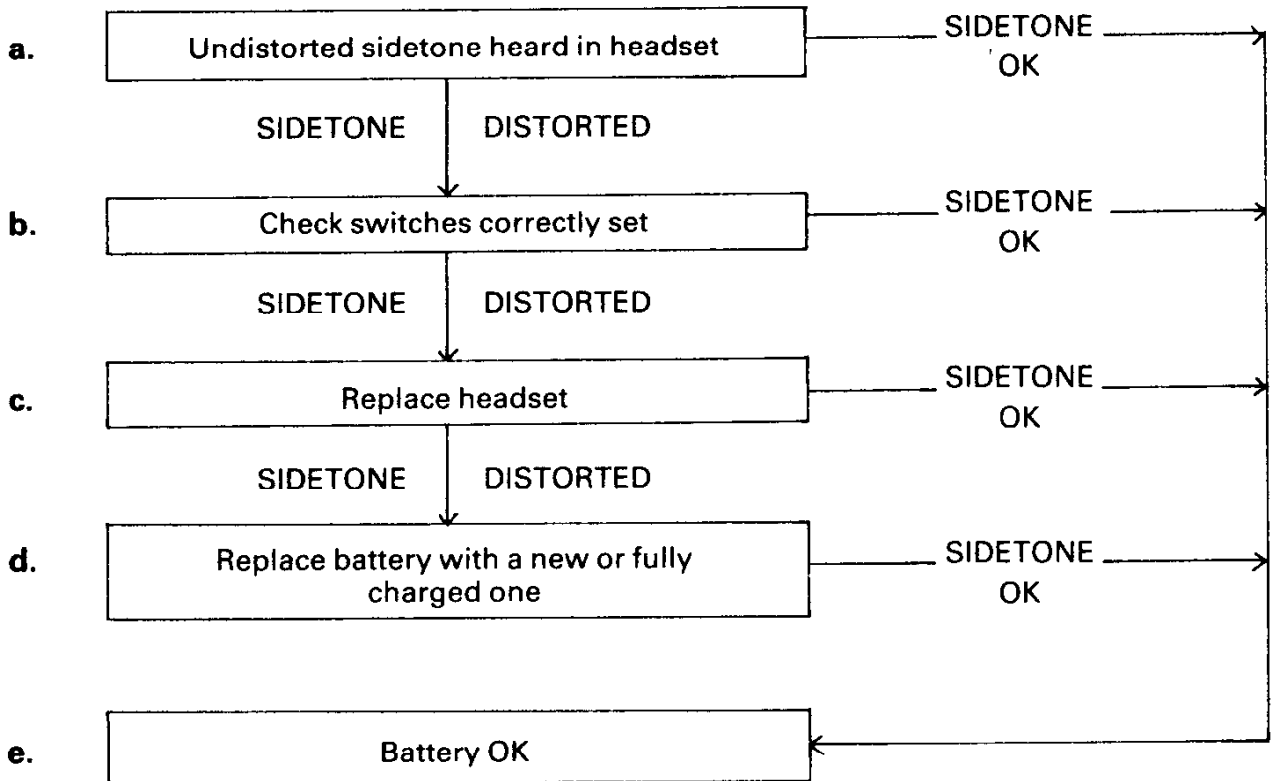
FUNCTIONAL CHECKS (Contd)



FUNCTIONAL CHECKS – UK/PRC 344

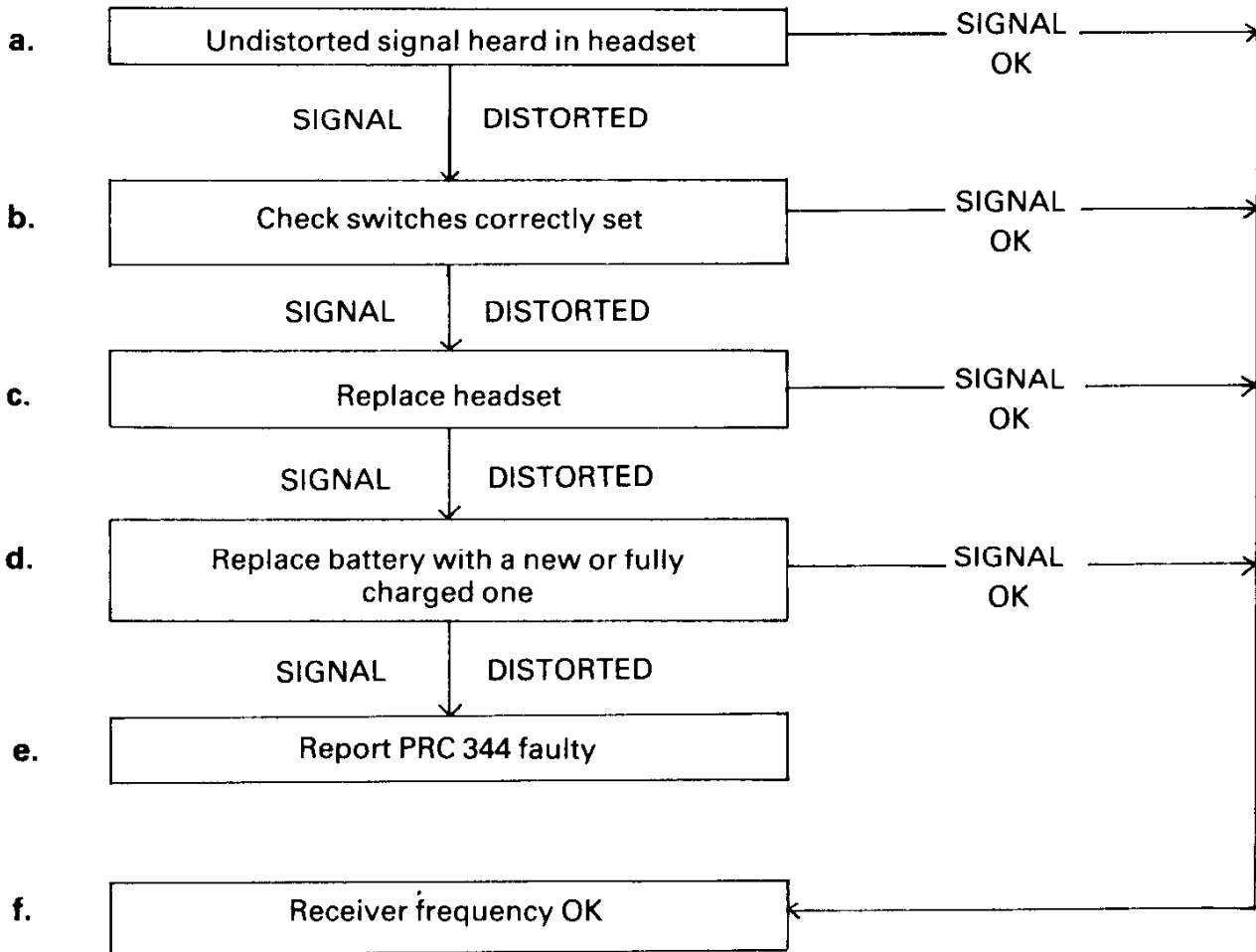
Battery Check

1. Turn the mode selector switch to 'LOCAL'.
2. Turn the 'VOLUME' switch to 3 and, when the equipment is operating, reset the switch to the position which gives the required volume in the headset.
3. Depress the pressel and speak into the microphone.



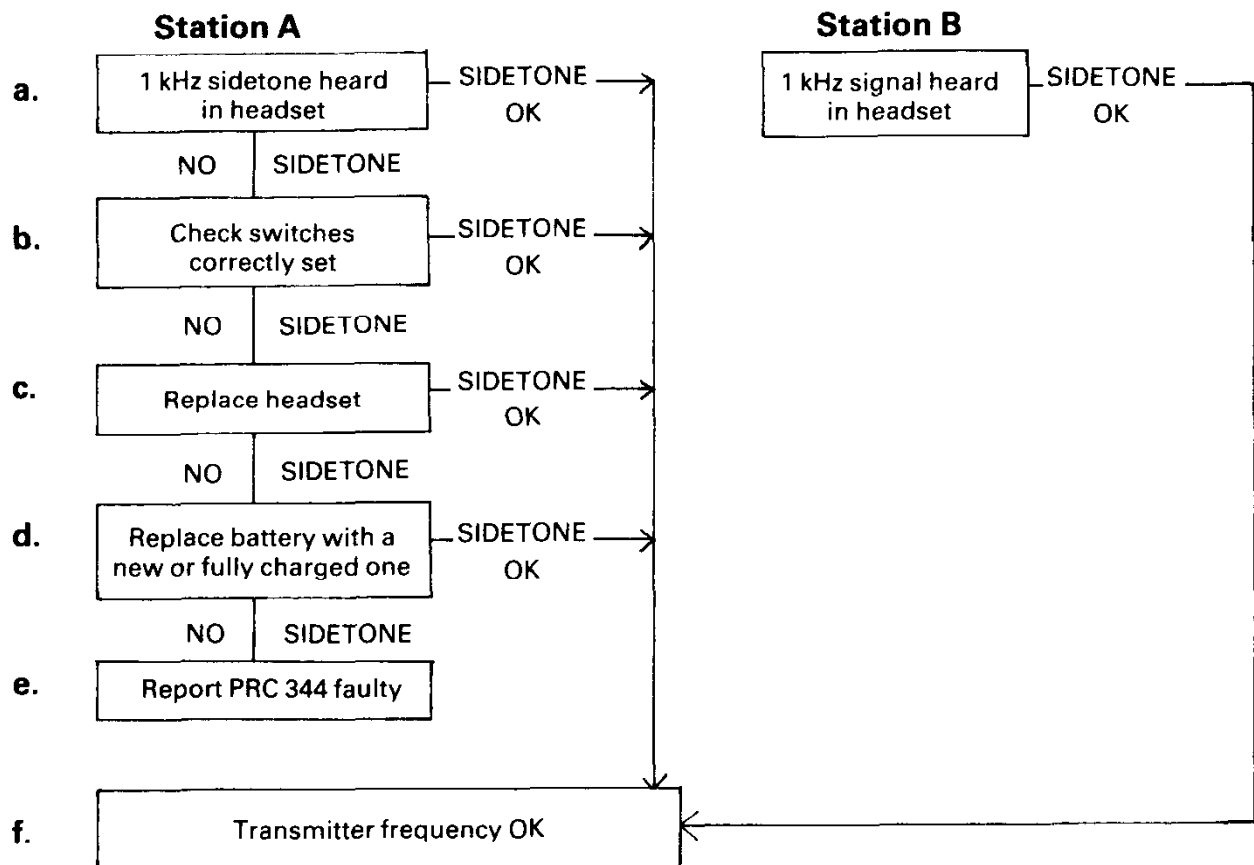
Receiver Frequency Check

1. Set up another PRC 344 at least 10m from set to be checked.
2. Do not connect antennas.
3. On Set A set mode selector to BEACON.
4. On Set B set mode selector to LOCAL and volume control to 3.



Transmitter Frequency Check

1. Set up 2×PRC 344 on same frequency.
2. Place sets at least 10m apart and do not connect antennas.
3. On A Set (*Transmit*) set mode to BEACON.
4. On B Set (*Receive*) set mode to LOCAL.
5. On both sets set volume to 3.



NOTE:

For all further checks refer to User Handbook Army Code 61351.

CHAPTER 3

B VEHICLE INSTALLATION AND CLANSMAN RADIO CONTROL HARNESS

SECTION 14 – INTRODUCTION

General

0301. This chapter is concerned with radio control harness, which through a system of control units and junction boxes, provides a means of controlling up to 3 radios from various positions in a vehicle.

0302. There are 2 types of harness designated as follows:

CLANSMAN Radio Control Harness – Primarily used for AFVs

CLANSMAN 'B' Vehicle Installation – Primarily used for FFR Landrovers

Aim

0303. The aim of this chapter is to provide an aide memoire for instructors teaching radio harness.

0304. Reference:

| User Handbooks | | Army Code |
|---|---------------|------------------------|
| 1. Radio Station | UK/PRC351/352 | 61128 |
| 2. Radio Station | UK/VRC 353 | 61393 |
| 3. Radio Station | UK/PRC 320 | 61123 |
| 4. Radio Station | UK/VRC 321 | 61253 |
| 5. CLANSMAN Radio Control Harness | | 61172 |
| 6. CLANSMAN Radio Installations in Trucks, $\frac{1}{2}$ tonne and $\frac{3}{4}$ tonne FFR and GS | | 61590 (Pts 1 and 7) |

Teaching Techniques

0305. In the main harness is taught at Regular User and Standard II signaller level. It is for the Signal Officer to decide who is to have the various harness skills laid down in the training objectives. Generally this decision will be governed by the role or likely role of the battalion. Users and signallers will only become proficient in the harness of their concern with regular practice; class room '*Mock Ups*' are of immense value in providing this.

SECTION 15 – B VEHICLE INSTALLATION

General

0306. The CLANSMAN 'B' Vehicle Installation consists of a normal 2 or 3 set fit, with the addition of the *Remote Combining Unit* or *Set Combining Box*.

0307. **Installation** (*Fig 60 shows interconnections of installation*). All sets to be used in the 'B' Vehicle Installation are fitted as normal using normal power supply and antenna outlets. If the PRC 320 is in use it should be fitted on the right hand side behind the driver.

0308. Once the sets are fitted the RCU can be connected into the vehicle. Normal interconnections between the 2 selected radios and the RCU are made using D10.

0309. For a 3 set installation which includes the PRC 320 a CRSL/R is needed if the HF set is to be connected to the RCU. (*It is recommended that the HF set is normally independent.*)

0310.–0320. *Reserved.*

SECTION 16 – CLANSMAN RADIO CONTROL HARNESS *('A' Vehicle) (Fig 61)*

General

0321. The CLANSMAN Radio Control Harness is an interconnected system of operating, junction and adaptor boxes, and audio gear, which permits the use of up to 3 CLANSMAN radios of the VRC 321, VRC 353 type, from various positions in a vehicle, and which also provides intercommunication between these positions which is independent of the radios. These facilities are also available in part to a remote user via a 2 wire line up to 3km (*2 miles*) long using D10 cable.

0322. The harness can also be used to provide rebroadcast facilities, which may be automatic or manually controlled, between 2 of the installed radios, or between any installed radio and a remote radio connected into the harness system by a 2 wire line as described above.

0323. The basic control harness is intended for use with a one or 2 radio installation, which form the majority of vehicle radio installations. It is a single system suitable for all such vehicle installations, the varying requirements being met by different arrangements of the standard range. The boxes are connected in series and the free ends may be joined by a standard cable, to give a measure of protection against cable failure.

0324. Three radio installations are built up from the basic 2 radio harness by adding boxes which provide the extra channels and control functions required.

0325. By using a *Harness Adaptor Box*, CLANSMAN manpack radios may be connected into the harness as if they were vehicle radios, and full facilities, including manual and automatic rebroadcast, where appropriate, are available.

0326. When using radio or IC, the operator hears transmit side tone in his headset. The side tone is heard in both ears if he is working radio or IC only.

When working radio or IC and monitoring another radio or IC, the working signal is heard in the left ear and the monitored signal in the right ear. This can be remembered by looking at the *Crew Box* volume controls, WORKING – left hand, MONITOR – right hand. An exception to this side tone rule is the rebroadcast operation from the *Interconnecting Box 2 Radio*.

0327. If, in certain armoured vehicles, a *Centralized Warning Indicator* (CWI) is fitted to give audible warning of certain incidents or failures, this warning can be fed into the harness system.

0328. The harness system operates from a nominal 28 volt DC supply derived from the vehicle electrical supply, or from a separate radio supply if it is fitted.

0329. The harness boxes are of cast light-alloy construction. Plug and socket connections are made at the sides, top or bottom of the boxes, and with minor exceptions, the controls are on the front face. Control boxes are flanged so as to protect knobs and switches. Boxes are fitted with flexible belting which retains the same stud fixing as the earlier LARKSPUR harness.

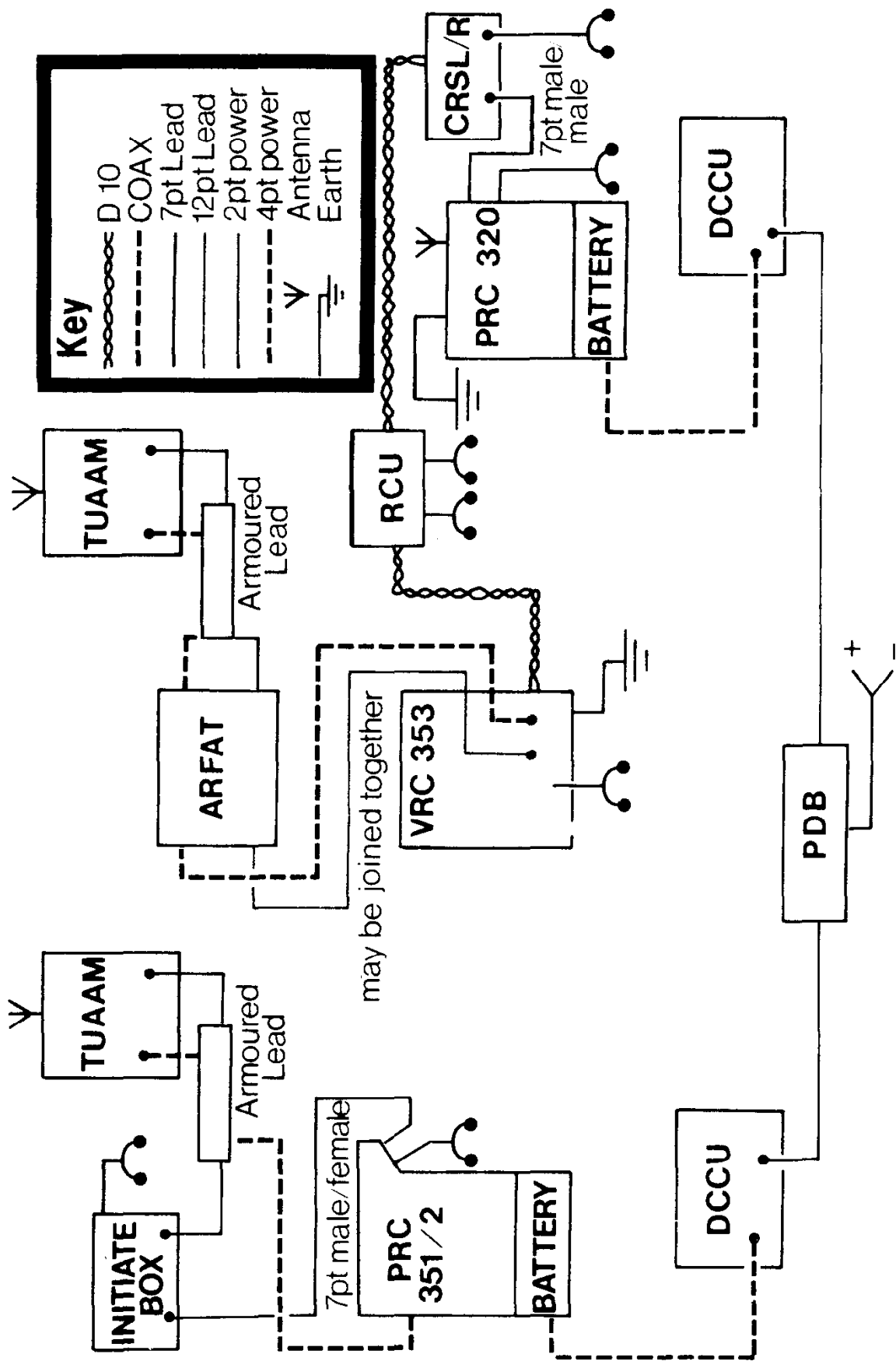


Fig 60.—'B' Vehicle Installation.

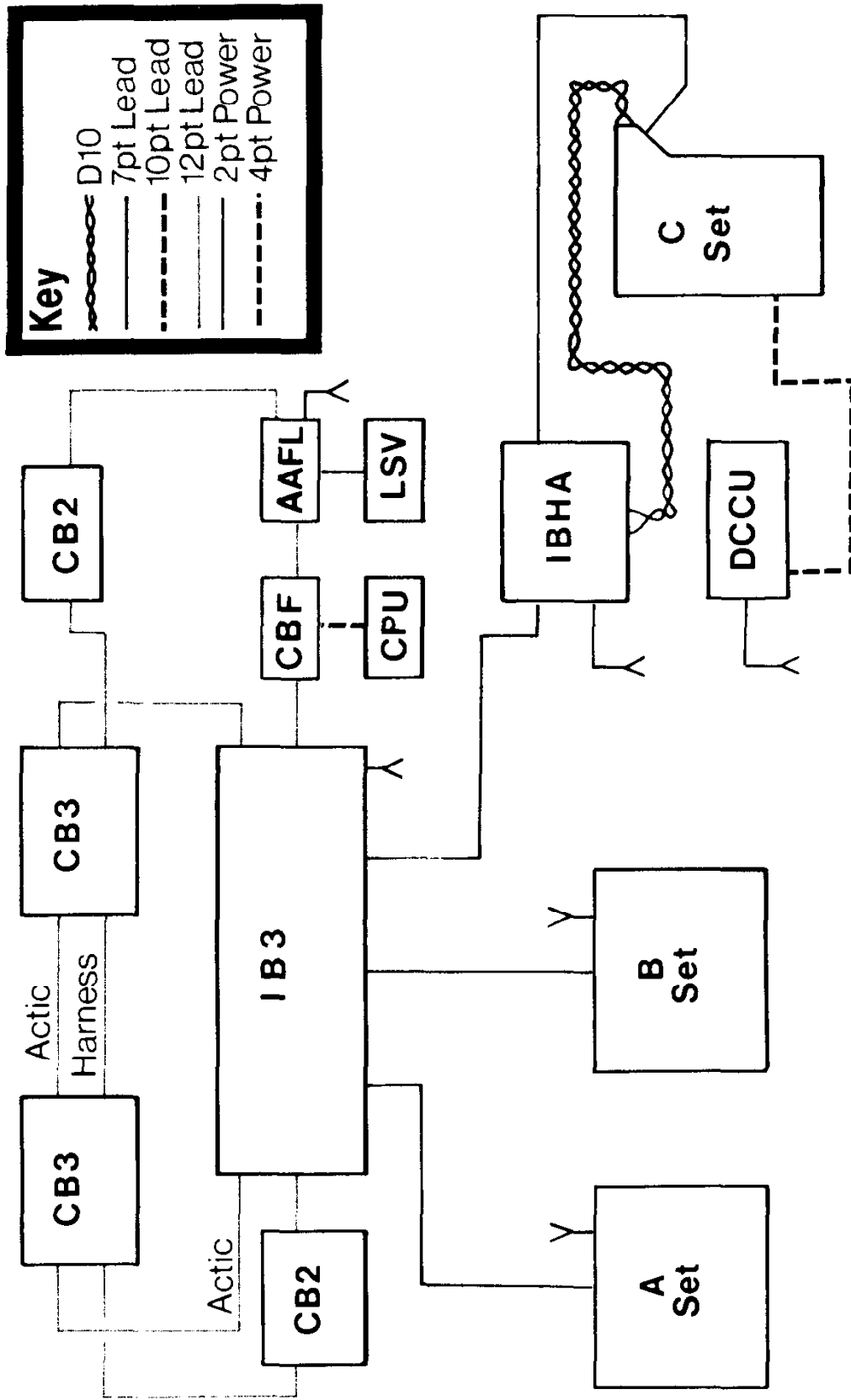


Fig 61.—'A' Vehicle Installation Layout.

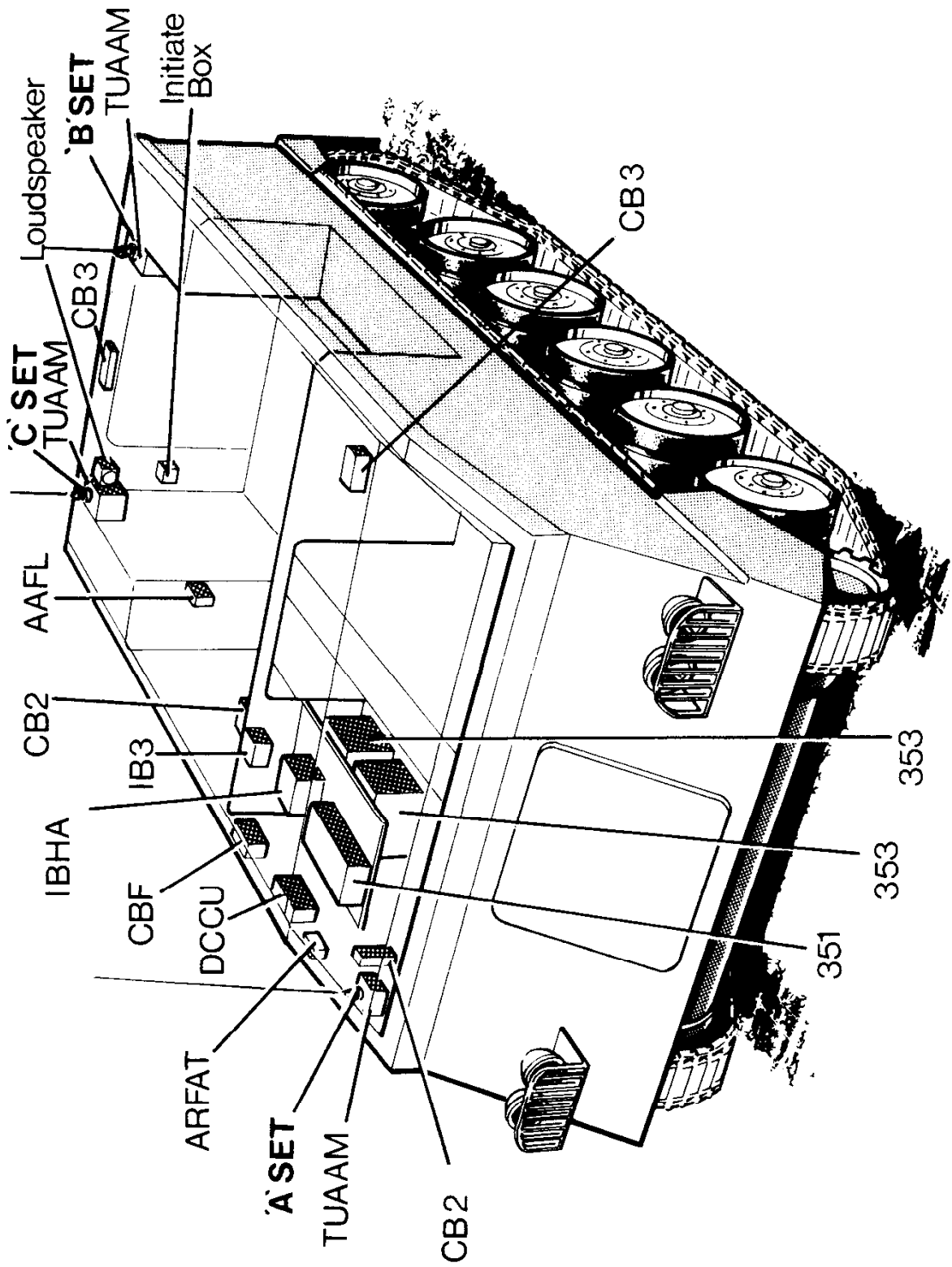


Fig 62.—Vehicle Radio Installation.

SECTION 17 – ITEMS OF THE HARNESS

General

0330. In this section an illustration and a brief written description of each item is given, and where appropriate, as in the case of an operating box, there is a diagram giving switch positions and related facilities.

0331. Cable assemblies are dealt with, and are referred to by the number of conductors in the cable and its application.

0332. CLANSMAN radio sets and CLANSMAN vehicle installations using the control harness are dealt with in separate chapters. The actual arrangement of radio sets and harness are shown in Figs 61 and 62.

0333. This section does not go into any detail regarding the operation of CLANSMAN radios, but it does refer to the switching of radios in connection with the rebroadcast and remote control facilities that can be provided by the control harness.

Crew Box 2 Set (Fig 63)

0334. **The Crew Box 2 Set (CB 2)** is the general purpose selection and control box. It enables the user to select and operate one of the 2 installed CLANSMAN radios and monitor the other and have intercommunication and O/R facilities.

0335. Facilities.

| Switch position | | Facility |
|-----------------|---------|---|
| Working | Monitor | |
| A _B | OFF | Work 'A' set; press to talk; signal in both ears. |
| A _B | ON | Work 'A' set; press to talk; signal in left ear. Monitor 'B' set; signal in right ear. |
| B _A | OFF | Work 'B' set; press to talk; signal in both ears. |
| B _A | ON | Work 'B' set; press to talk; signal in left ear. Monitor 'A' set; signal in right ear. |
| I _A | OFF | Intercomm; press to talk; signal in both ears. |
| I _A | ON | Intercomm; press to talk; signal in left ear. Monitor 'A' set; signal in right ear. |

| Switch position | | Facility |
|----------------------------------|---------|--|
| Working | Monitor | |
| O/R (Override, spring loaded) | – | Voice call without use of pressel; heard by all crew members. Revert to I _A for subsequent communication. An O/R call from any other control box in the harness replaces the signal in the CB-2 operator's right ear, irrespective of any switch settings. The loudness of the O/R call will depend on the MONITOR – VOL setting. |
| A _B or B _A | LIVE IC | Microphone live – talk on IC; monitor IC in right ear. Press to transmit on selected 'A' or 'B' set; signal in left ear. |
| A _B or B _A | + | Microphone live – talk on IC; monitor 'B' or 'A' set and IC in right ear. Press to transmit on selected 'A' or 'B' set; signal in left ear. |

Crew Box 3 Set (Fig 64)

0336. **The Crew Box 3 Set (CB3)** is used in the special case of a 3 radio installation and is used in conjunction with the *Interconnecting Box 3 Radio*. It enables the user to select and operate one of 3 installed CLANSMAN radios, to have intercommunication and O/R facilities, with the ability to simultaneously monitor one, 2 or all 3 of the installed radios.

0337. **Facilities.**

| Switch position | | Facility |
|-----------------|----------------|---|
| Working | Monitor | |
| A, B or C | A, B and C OFF | Work selected 'A', 'B' or 'C' set; press to talk; signal in both ears. |
| A or B | C ON | Work selected 'A' or 'B' set; press to talk; signal in left ear. Monitor 'C' set; signal in right ear. |

| Switch position | | Facility |
|-------------------------------|--------------------------------------|---|
| Working | Monitor | |
| B or C | A ON | Work selected 'B' or 'C' set; press to talk; signal in left ear. |
| A or C | B ON | Monitor 'A' set; signal in right ear. Work selected 'A' or 'C' set; press to talk; signal in left ear. |
| A or B | A and B ON | Monitor 'B' set; signal in right ear. Work selected 'A' or 'B' set; press to talk; signal in left ear. |
| I | A, B and C OFF | Monitor other set; signal in right ear. Intercomm; press to talk; signal in both ears. |
| I | A, B or C ON | Intercomm; press to talk; signal in left ear. Monitor 'A', 'B' or 'C' set; signal in right ear. |
| O/R (Override, spring loaded) | Any combination ON/OFF of A, B and C | Call to all crew members without use of pressel. Microphone automatically made live. Revert to I for subsequent communication. An O/R call from any other control box in the harness replaces the signal in the CB-3 operator's right ear, irrespective of any switch settings. The loudness of the O/R call will depend on the MONITOR – VOL setting. |

Commander's Box Fixed and Personal Unit (Fig 65) (CBF and CPU)

0338. The commander's boxes comprise a fixed box installed in the vehicle and a personal unit carried by the commander. These boxes are always used together and are connected by a 2m or 10m flexible lead. They are intended for use in a 2-radio installation.

0339. **The Commander's Fixed Box** is mounted on flexible belting which fits standard 2 stud fixing.

0340. **The Commander's Personal Unit** is carried by webbing around the commander's neck. A standard CLANSMAN headset is used. Webbing and headset cable are fitted with snatch release devices.

0341. The boxes together provide facilities similar to those of the crew box 2 set. The imperative controls, such as radio selection, press to talk and over-ride are carried in the personal unit.

0342. An independent pressel may be plugged into the fixed box and it is in parallel with the press to talk button on the personal unit. When not in use, the 'IND PRESSEL' switch should be off, to prevent accidental operation.

0343. In certain armoured vehicles, a *Centralized Warning Indicator* (CWI) at the commanders position gives visual warning of failures and incidents. It is connected into the harness at the *Commander's Fixed Box*, and in parallel with the warning light, operates the over-ride and feeds a high-pitched bleeping note to the right ear of harness users. The warning note is fed to all crew members.

0344. **Facilities.**

| Switch Positions | | | | Facility |
|------------------|-------------|---------------|---------|---|
| Fixed Box | | Personal Unit | | |
| Live IC | Ind Pressel | Radio | Monitor | |
| (a) | (b) | (c) | (d) | (e) |
| NORM | OFF | A | OFF | Work 'A' set; press to talk; signal in both ears. |
| NORM | OFF | B | OFF | Work 'B' set; press to talk; signal in both ears. |
| NORM | OFF | I | OFF | IC; press to talk; signal in both ears. |
| NORM | OFF | A | ON | Work 'A' set; press to talk; signal in left ear. |
| NORM | OFF | B | ON | Monitor 'B' set; signal in right ear. |
| NORM | OFF | B | ON | Work 'B' set; press to talk; signal in left ear. |
| NORM | OFF | I | ON | Monitor 'A' set; signal in right ear. |
| NORM | OFF | I | ON | IC; press to talk; signal in left ear. |
| NORM | OFF | I | ON | Monitor 'A' set; signal in right ear. |

| Switch Positions | | | | Facility |
|------------------|-------------|---------------|-----------|---|
| Fixed Box | | Personal Unit | | |
| Live IC | Ind Pressel | Radio | Monitor | |
| (a) | (b) | (c) | (d) | (e) |
| LIVE IC | OFF | A or B | OFF | IC without use of pressel; monitor IC in right ear. |
| LIVE IC | OFF | A or B | ON | Press to talk on selected 'A' or 'B' set; signal in left ear. IC without use of pressel; monitor 'A' or 'B' set and IC; signal in right ear. |
| NORM | IND PRESSEL | A or B | ON or OFF | Press to talk on selected 'A' or 'B' set; signal in left ear. Separate pressel or morse key, in parallel with press to talk button on personal box. Switch OFF when not used. |
| — | OVER-RIDE | — | — | IC; breaks in on all crew members. Microphone automatically made live. O/R from any other control box in the harness replaces the signal in the commander's right ear, irrespective of any switch settings. The loudness of the O/R will depend on the MONITOR VOLUME setting on the Fixed Box. |

ALARM: An audio alarm from the *Centralized Warning Indicator* heard in the right ear irrespective of any switch positions.

Remote Personal Unit (Fig 66)

0345. **The Remote Personal Unit** permits the operation of CLANSMAN radios, and call and IC with an operator at the radio, at distances of up to 3km over D10 cable. It is intended primarily for use with ear defending or head protecting

headgear so that the user need not remove his headgear when remote use is required.

0346. The cable is connected between the terminals on the unit and the REMOTE terminals on the radio, or the REMOTE terminals on the *Interconnecting Box 2* in an Installation.

0347. The unit is carried by webbing around the neck of the user and the headset plugs into it. Both webbing and headset cable are fitted with snatch release devices.

0348. The unit contains an amplifier to increase the signal power to the line and to provide a locally generated side tone. The amplifier obtains its DC supply along the cable from the radio or IB2.

0349. When the 'CALL' button is pressed, a tone is generated within the connected working radio, which is heard by the local operator and, if the radio is in harness, by any crew member who has selected that radio as the Working or Monitor Set. Similarly, if connected to the line terminals of an IB2 switched to 'REM' a tone will be heard by all crew members who have selected 'I'.

Interconnecting Box 3 Radio (Fig 67)

0350. **The Interconnecting Box 3 Radio** (IB3) is a junction and power supply unit for harness items in installations of up to 3 radios, where rebroadcast facilities are not important.

0351. The IB3 connects the radios into the harness so that:

- a. A, B or C radio, IC or O/R may be selected and operated from a *Crew Box 3 Set* connected to the harness and ACTIC sockets on the IB3.
- b. Normal A or B radio, IC or O/R may be selected and operated from any 2 radio control box connected to the HARNESS socket on the IB3.
- c. A or C radio, IC or O/R (*A, C, together with IC – ACTIC*) may be selected and operated from a 2 radio control box connected to the ACTIC socket on the IB3. The operator will read C for B on the control box selector switch.

0352. The IB3 does not provide remote control or rebroadcast facilities. These must be met by connections outside the harness to the remote terminals on the radios. However, line terminals are provided for communal IC purposes.

0353. 28 volts DC is fed from the vehicle supply into the box where it is switched and fused and fed out to the harness items. The IB3 does not supply power to the radios, *Amplifier A.F. Loudspeaker, Emergency Crew Control Boxes* or to the *Centralized Warning Indicator* system.

Interconnecting Box 2 Radio (Fig 68)

0354. **The Interconnecting Box 2 Radio (IB2)** is used in 2 radio installations and is a combined control, junction and power supply unit for harness items.

0355. It contains an IC amplifier and acts as the inlet and outlet to the main harness for radios, remote users and communal IC users.

0356. it enables the 2 installed radios, or one installed radio and a remote radio to be connected for manual or auto rebroadcast, as appropriate; or a remote user to be connected into the harness to use an installed radio or talk to the crew using IC. These facilities are controlled by an operator whose headset is plugged into the IB2.

0357. 28 volts DC is fed into the box from the vehicle supply, and a regulated 18 volts is distributed to all crew boxes. The harness is protected by a 1 amp fuse in the IB2. The IB2 does not supply power to the radios, *Amplifier A.F. Loudspeaker* or *Emergency Crew Control Boxes*, or the *Centralized Warning Indicator* system.

Operating Notes:

1. For normal harness use, switch 28V ON, and right hand switch to 'N' (*Normal*), and switch the radios as follows:

HF radios (*'RAB'* or *CLANSMAN*) to 'REM'.

VHF radios (*'RAB'* or *CLANSMAN*) to 'AUTO'.

2. If an interfering signal is received by a VHF radio switched to 'AUTO', it will not be possible for that radio to transmit without first switching it to 'REM'.

0358. **Facilities**

| | |
|---------|---|
| 'N' | Normal use of 'A' or 'B' installed radios from IB2, or from any harness box. All other controls and the REMOTE terminals are inoperative. |
| 'REM' | <i>REMOTE CONTROL.</i> A remote user can control the selected 'A' or 'B' radio and can call any operator monitoring these radios from a harness box. He also has full IC facilities to any crew member when IC is selected. |
| 'I' | <i>INTERCOM.</i> The following IC facilities are available to the IB2 operator, according to the switch positions. |
| I + N | IC within vehicle: no connection to remote user. |
| I + REM | IC within vehicle: to remove user and for communal IC. |
| I + RRB | IC to remote user: no connection to vehicle. |

| | | |
|----------------------|---|---|
| CALL | <p>Call the remote user. The outgoing call tone is heard by the IB2 operator, but is not heard in the harness.</p> <p>Revert to I for subsequent communication. The IB2 operator will hear O/R (<i>Over-ride</i>) from any harness box, in his right ear, at all times.</p> | <p>The IB2 operator can be called by a remote operator or station. (<i>Except from the PRC 351/352 which has IC but no call facility when in harness.</i>)</p> |
| LRB | <p><i>LOCAL REBROADCAST.</i> 'A' or 'B' installed radios are connected for Manual or Auto rebroadcast as selected.</p> | <p>On rebroadcast the IB2 operator hears the 'A' or Local set in his left ear and the 'B' or Remote set in his right ear. If rebroadcast is working, he hears the same signal in both ears.</p> |
| MANUAL | <p>Controlled by the IB2 operator.</p> | |
| TXA TXB | <p>'A' radio transmits the signal received by the 'B' radio. 'B' radio transmits the signal received by the 'A' radio.</p> | <p>'A' and 'B' radios cannot be operated from harness.</p> |
| BK-IN AUTO RRB | <p><i>BREAK-IN.</i> IB2 operator hears received signals from 'A' and 'B' radios. 'A' and 'B' radios are connected for auto rebroadcast. (See Page 2-47). No operator intervention is necessary. <i>REMOTE REBROADCAST.</i> The selected 'A' or 'B' radio is connected to a remote radio for Manual or Auto rebroadcast as selected.</p> | <p>IB pressel causes 'A' and 'B' radios to transmit. Pressel at harness box, switched to 'A' or 'B' causes 'A' and 'B' radios to transmit.</p> <p>See note against LOCAL REBROADCAST.</p> |
| MANUAL | <p>Controlled by the IB2 operator.</p> | |
| LOCAL REMOTE | <p>Selected 'A' or 'B' radio transmits the signal received by the remote radio. Remote radio transmits the signal received by the selected 'A' or 'B' radio.</p> | <p>Only local radio not selected for rebroadcast can be operated from harness.</p> |

| | | |
|-------|---|--|
| BK-IN | <i>BREAK-IN.</i> IB2 operator hears the received signals from local and remote radios. | IB2 pressel causes local and remote radios to transmit. Pressel at harness box, switched to local radio on RRB causes local and remote radios to transmit. |
| AUTO | 'A' or 'B' radio connected to remote radio for auto rebroadcast. No operator intervention is necessary. | Pressel at any harness box switched to local radio on RRB causes selected local and remote radios to transmit. |

Interconnecting Box Harness Adaptor (Fig 69)

0359. The *Interconnecting Box Harness Adaptor* adapts the CLANSMAN manpack radio PRC 320 or PRC 351/352 for connection into the harness system, and provides control and rebroadcast through the harness, as if the manpack radio was a vehicle radio. The unit also contains an amplifier which raises the audio output level of the manpack radio to that of a vehicle radio harness output.

0360. The radio is powered from its own battery, which may be float charged from a *DC Charging Unit*. The *DC Charging Unit* can obtain its 28V supply through the Harness Adaptor.

0361. The Harness adaptor is used in conjunction with the CRSL/R unit of the PRC 320, and is connected as shown in *Fig 70*. CRSL/R will be switched to 'REM'.

0362. The normal selection and operation of the PRC 351/352 is available from control boxes in the harness. The radio will be switched to 'REM'.

0363. Manual or auto, local or remote rebroadcast is possible through the *Inter-connecting Box 2 Radio*. The radio will be switched to 'REM' for manual rebroadcast and to 'AUTO' for auto rebroadcast, as for any other VHF radio.

Radio Adaptor Box (RAB) (Fig 71)

0364. *The Radio Adaptor Box (LARKSPUR to CLANSMAN Harness Adaptor Box)* is not a true item of CLANSMAN harness, but permits LARKSPUR radios (SR.C11, C13; SR.B47, B48; SR.C42, C45) to be used to their full potential in CLANSMAN harness.

0365. The toggle switch marked 'AUTO' 'REM/J1' is used as follows:

- 'AUTO' For normal harness use or when carrying out rebroadcast from the harness or the REMOTE terminals.
- 'REM/J1' For when the J1 box is connected or when an interfering signal received by a VHF radio prevents transmission in the 'AUTO' position.

NOTE: If the REMOTE terminals are used for carrying out local rebroadcast with a VRC 353 in an installation which includes a *Crew Box 3 Set*, an undesirable audio tone will be produced if the monitor switches of the CB3 appropriate to the sets in use for rebroadcast are operated when the VRC 353 is switched for '*Break-In*' operation. To prevent this malfunction do not monitor either set at a CB3 when the VRC is switched for '*Break-In*'.

Interconnecting Box Radio Adaptor (*IBRA*)

0366. The *IBRA* is not a true item of CLANSMAN harness, but permits any installed CLANSMAN radio to be used by vehicle crew members using LARKSPUR harness, headgear and remote control gear.

0367. *IBRA* converts a VRC into a C13/42/45 type radio, and a PRC into a B47/48 type radio. In the latter case, it is necessary to use a *LARKSPUR I Box* in the installation if the PRC plus *IBRA* combination is to be used as the 'A' set since the I/C amplifier in *IBRA* is used to increase the PRC audio output, and therefore is not available for I/C use.

0368. The type of radio input, VRC or PRC, is selected by a preset switch. Power supply is fed through the box to the radios.

Amplifier AF Loudspeaker (*Fig 72*)

0369. **The Amplifier AF Loudspeaker (*AAFL*)** connects into the main harness distribution ring and amplifies the selected A, B radio or IC signal sufficiently to drive 4 loudspeakers (*Vehicle Mounting*).

0370. A radio may be connected into the system at '*EXT INPUT*'; a local radio into the '*PRC*' socket, or a remote radio into the terminals; and its output broadcast by switching to '*EXT*'.

NOTE (1): IMPORTANT NOTE ON USE OF LIVE IC.

The above facility should only be used when hands free operation of the IC is essential due to extreme circumstances, i.e. battle conditions. Every extra live microphone on the IC circuit picks up extra vehicle noise and reduces the efficiency of the IC system. Prolonged, inessential use of this facility will cause crew fatigue and will reduce the hearing ability of the crew. This reduction in hearing may be temporary or permanent depending on the length of exposure to this high noise level. It can cause DEAFNESS.

NOTE (2): Increased noise pick up results when the microphone is exposed in a moving air stream as, for example, when the Driver or Commander is in the 'head out' position whilst the vehicle is moving. This wind noise can be effectively eliminated by use of a microphone cover, NSN 5965-99-620-5673 and should always be used in these circumstances.

0371.-0390. *Reserved.*

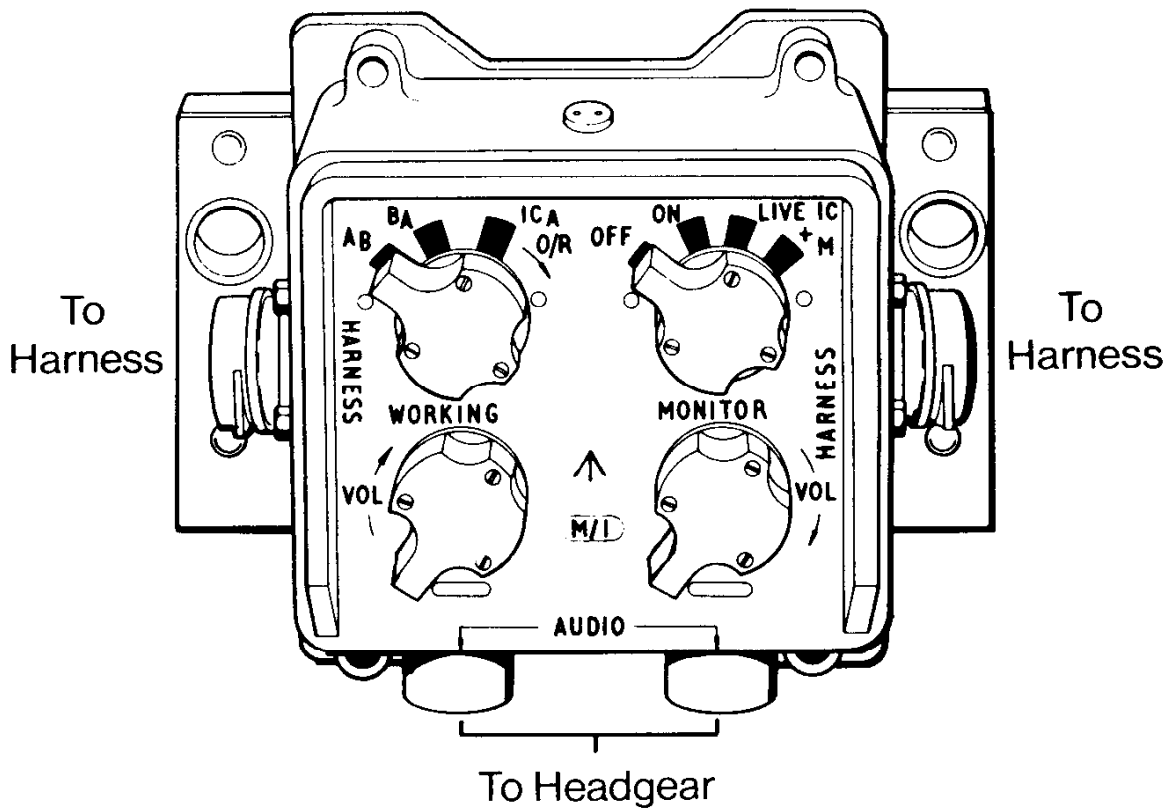


Fig 63.—Crew Box 2 set (CB-2)

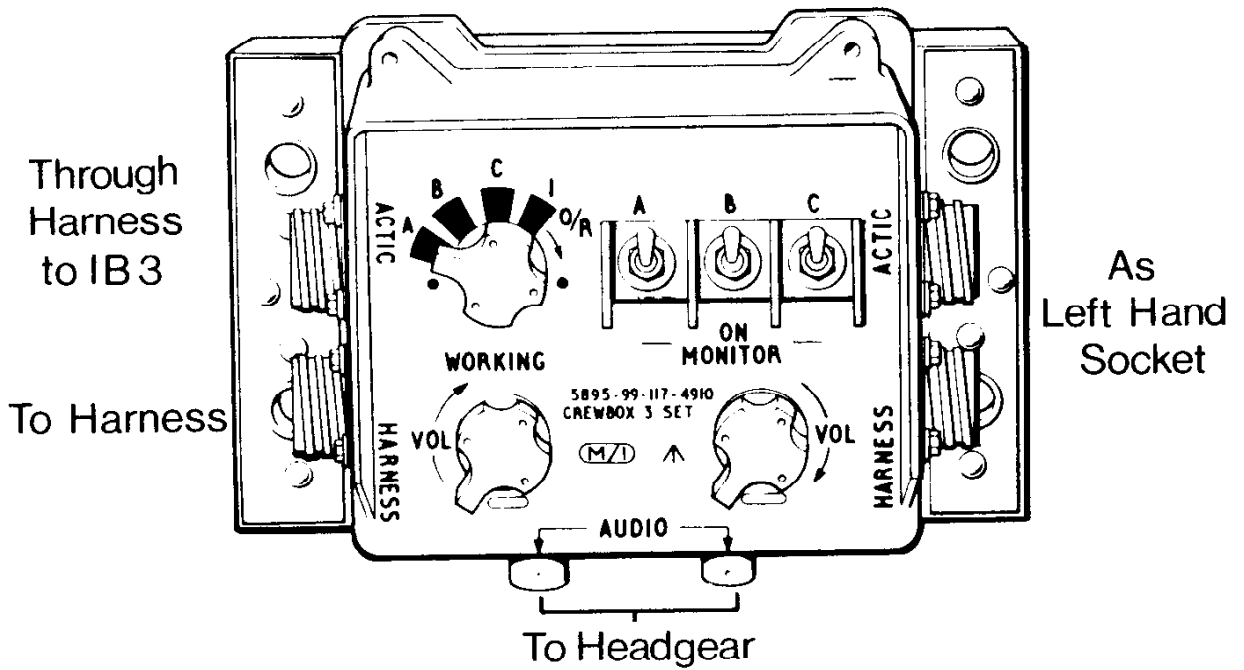


Fig 64.—Crew Box 3 set (CB-3)

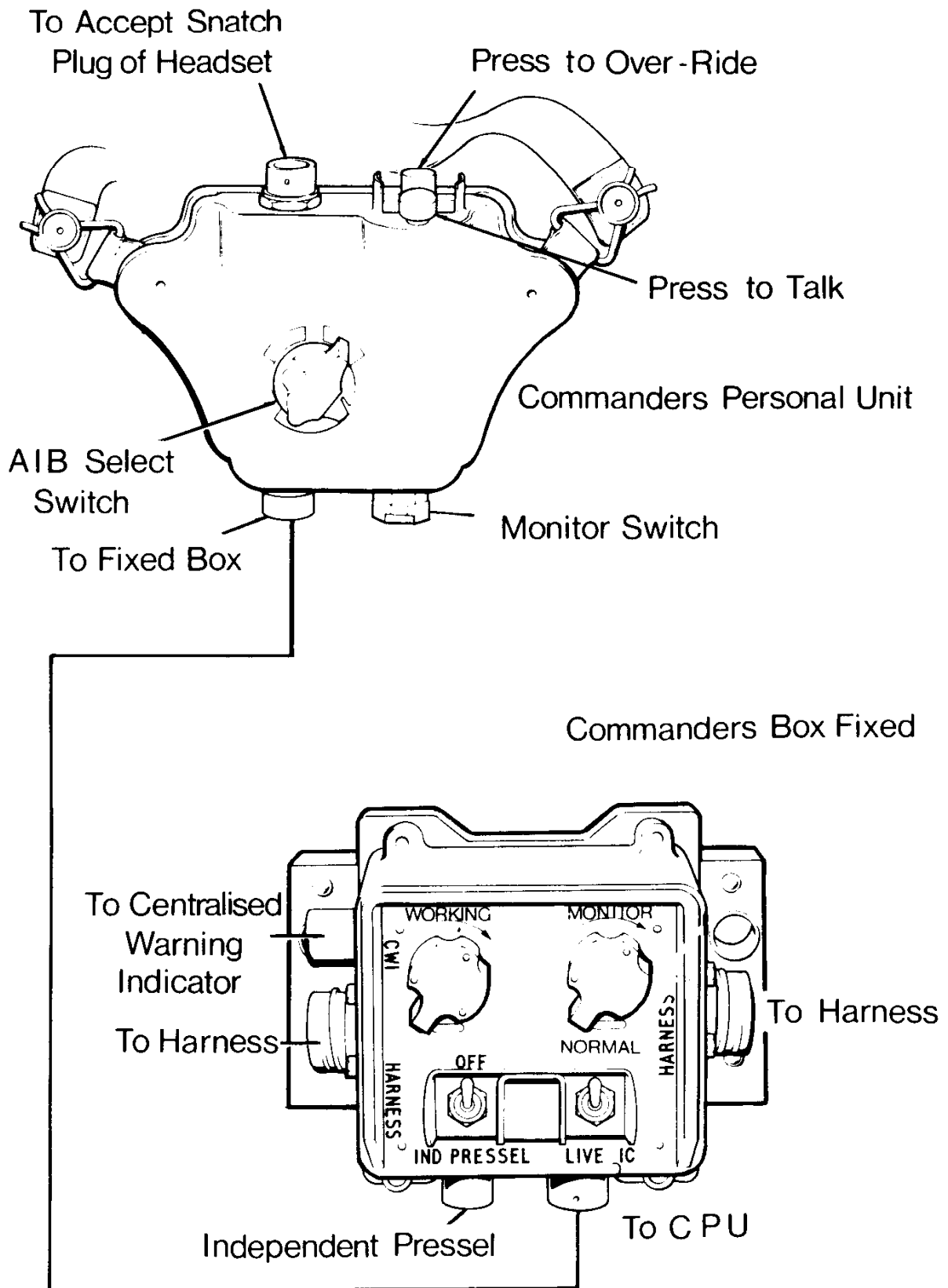


Fig 65.—Commanders' Personal Unit and Fixed Box

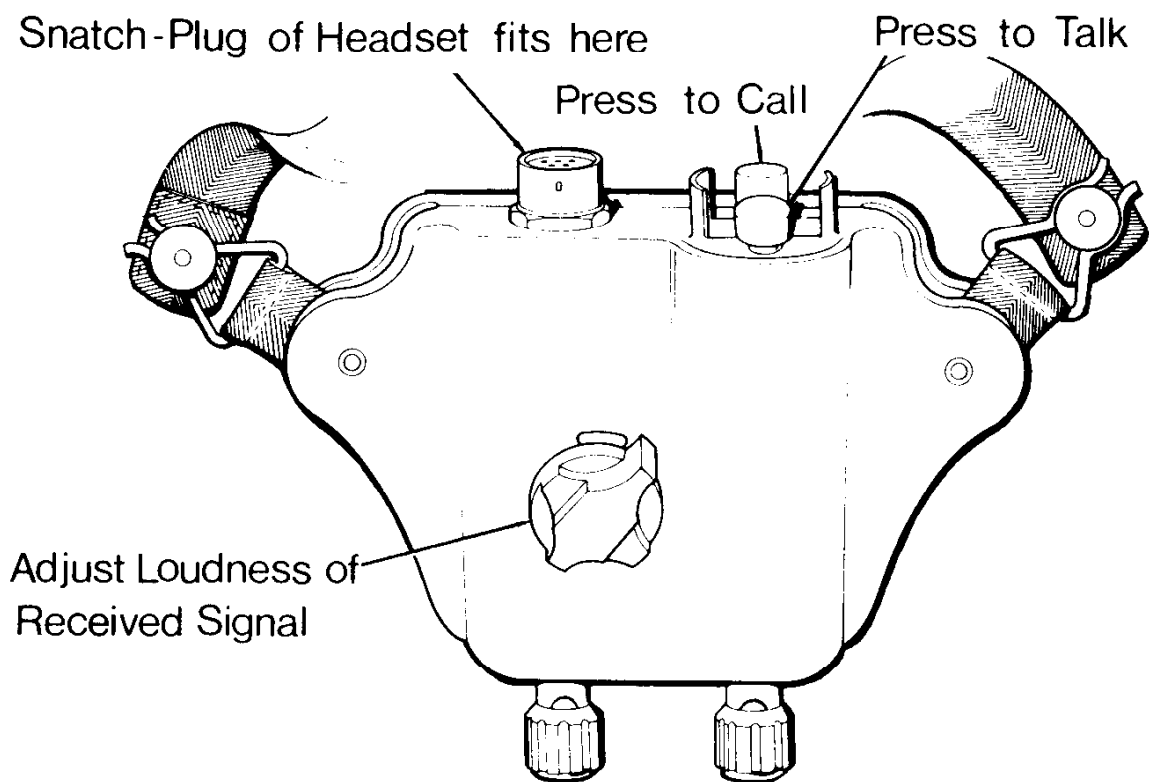


Fig 66.—Remote Personal Unit

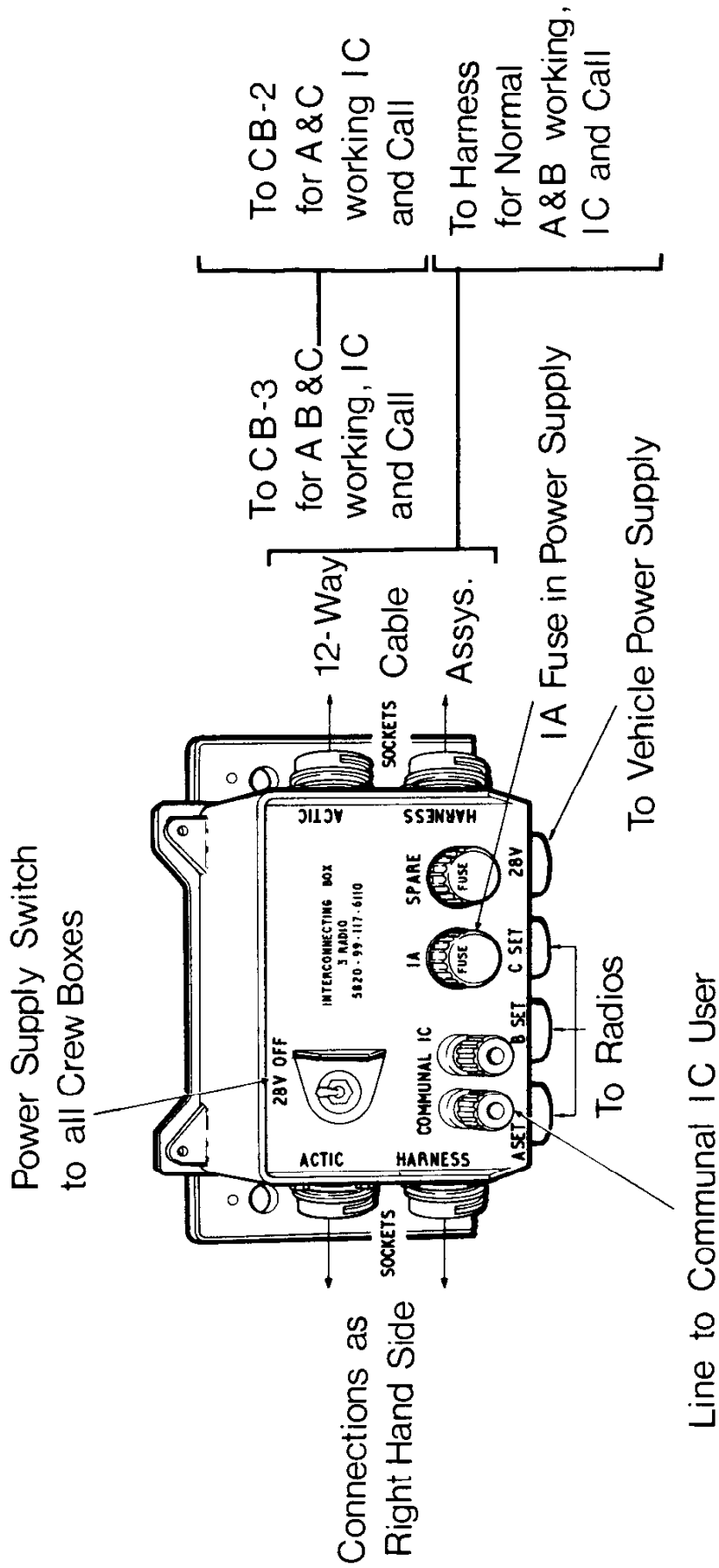


Fig 67.—Interconnecting Box 3 Radio (IB-3)

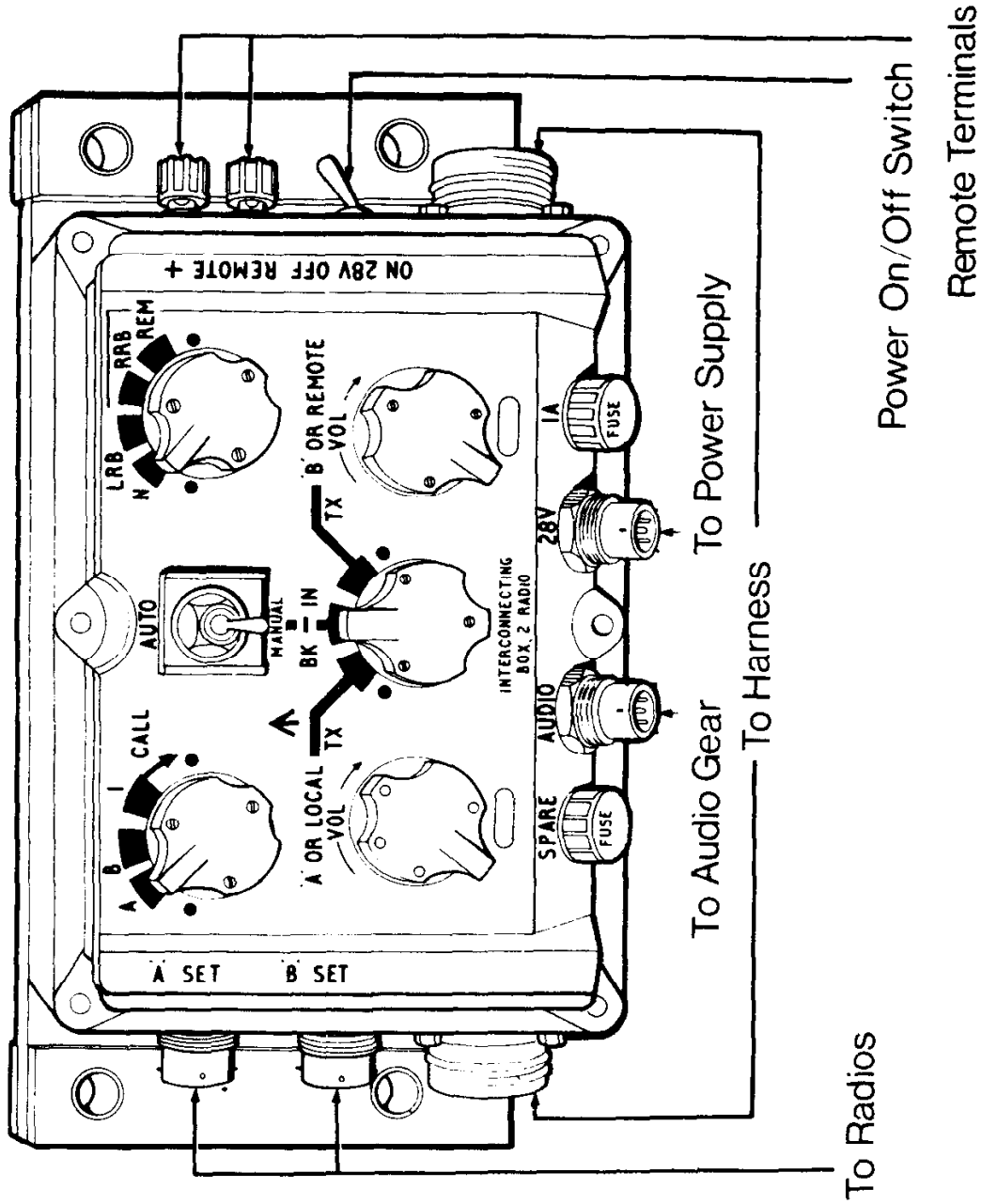


Fig 68.—Interconnecting Box 2 Radio (1B-2)

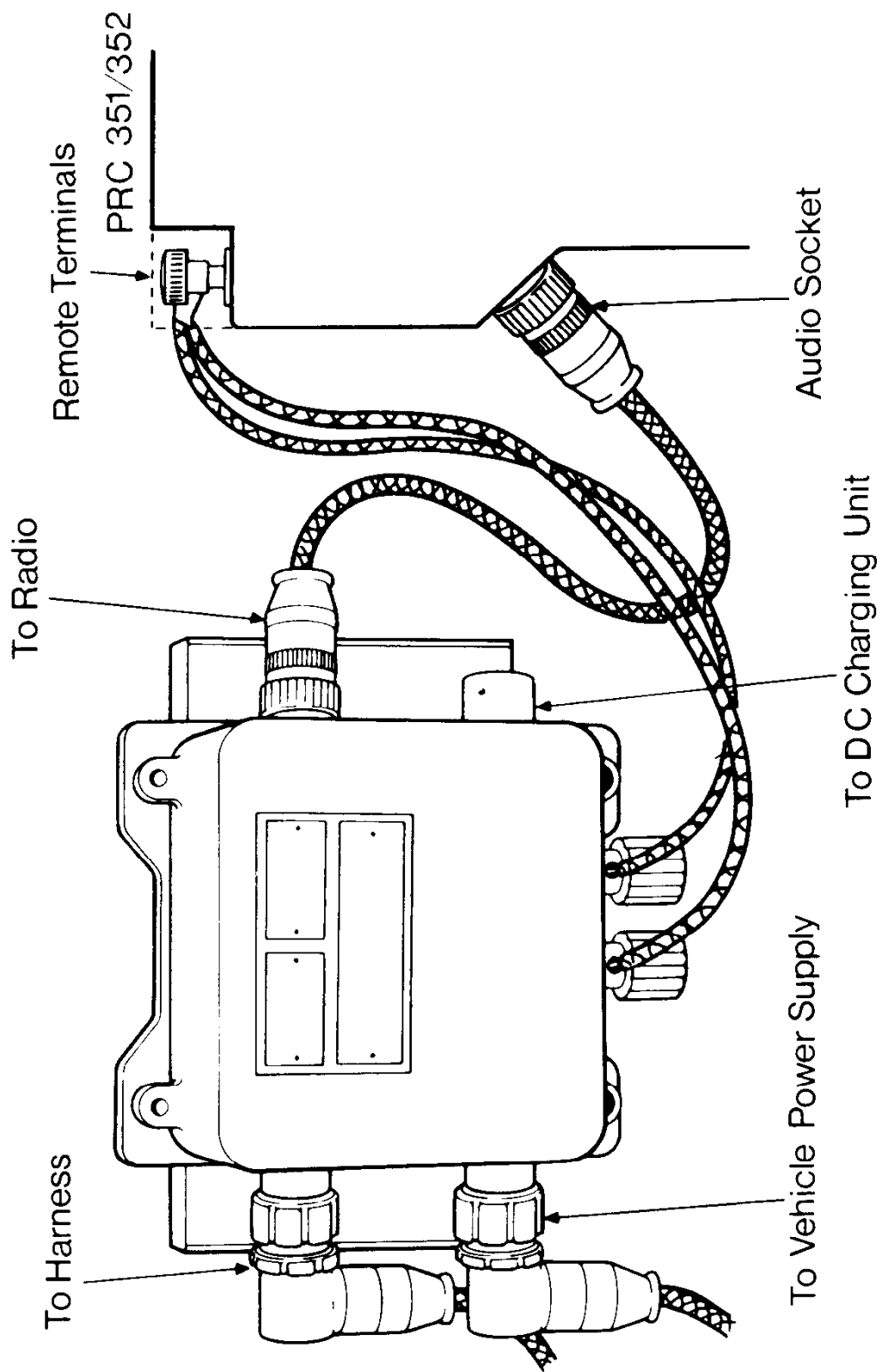


Fig 69.—Interconnecting Box Harness Adaptor

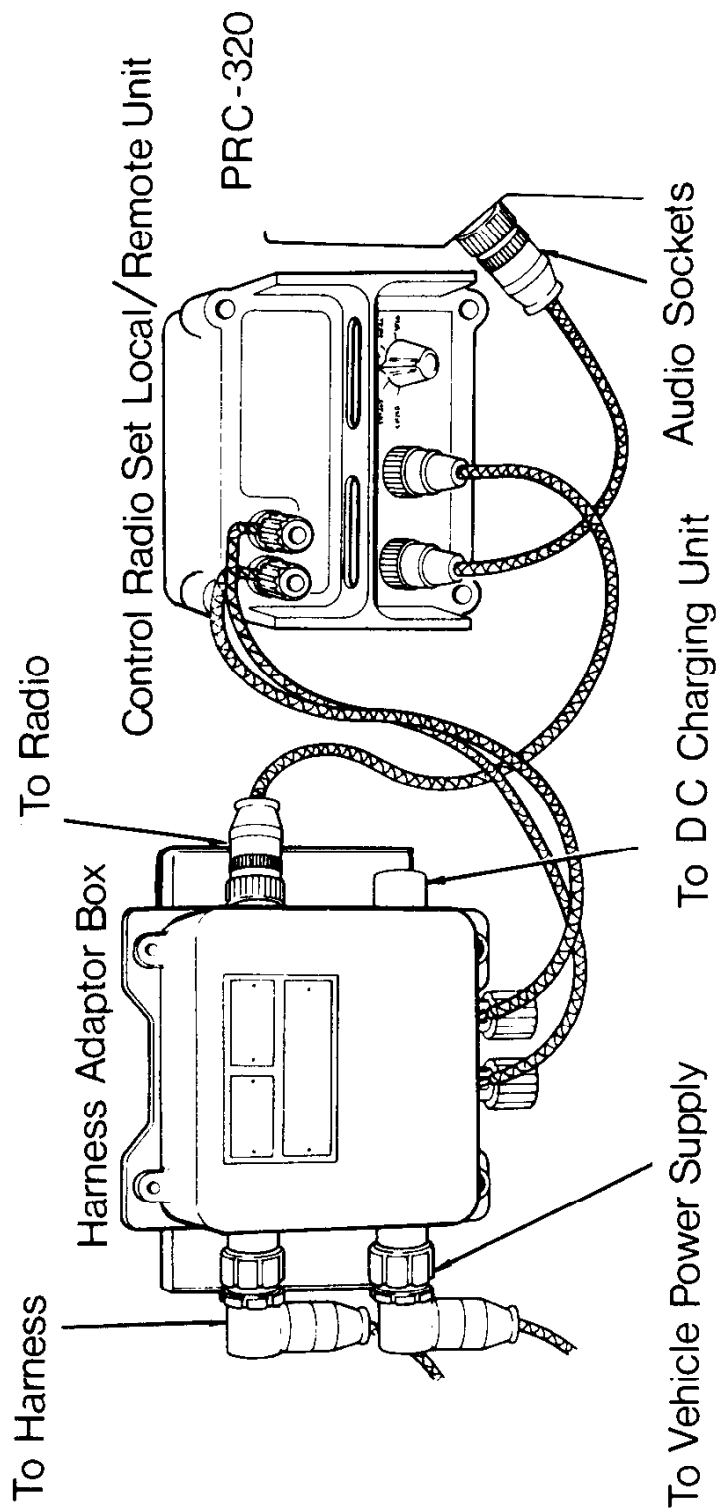


Fig 70.—Control Radio Set Local/Remote (CRSL/R)

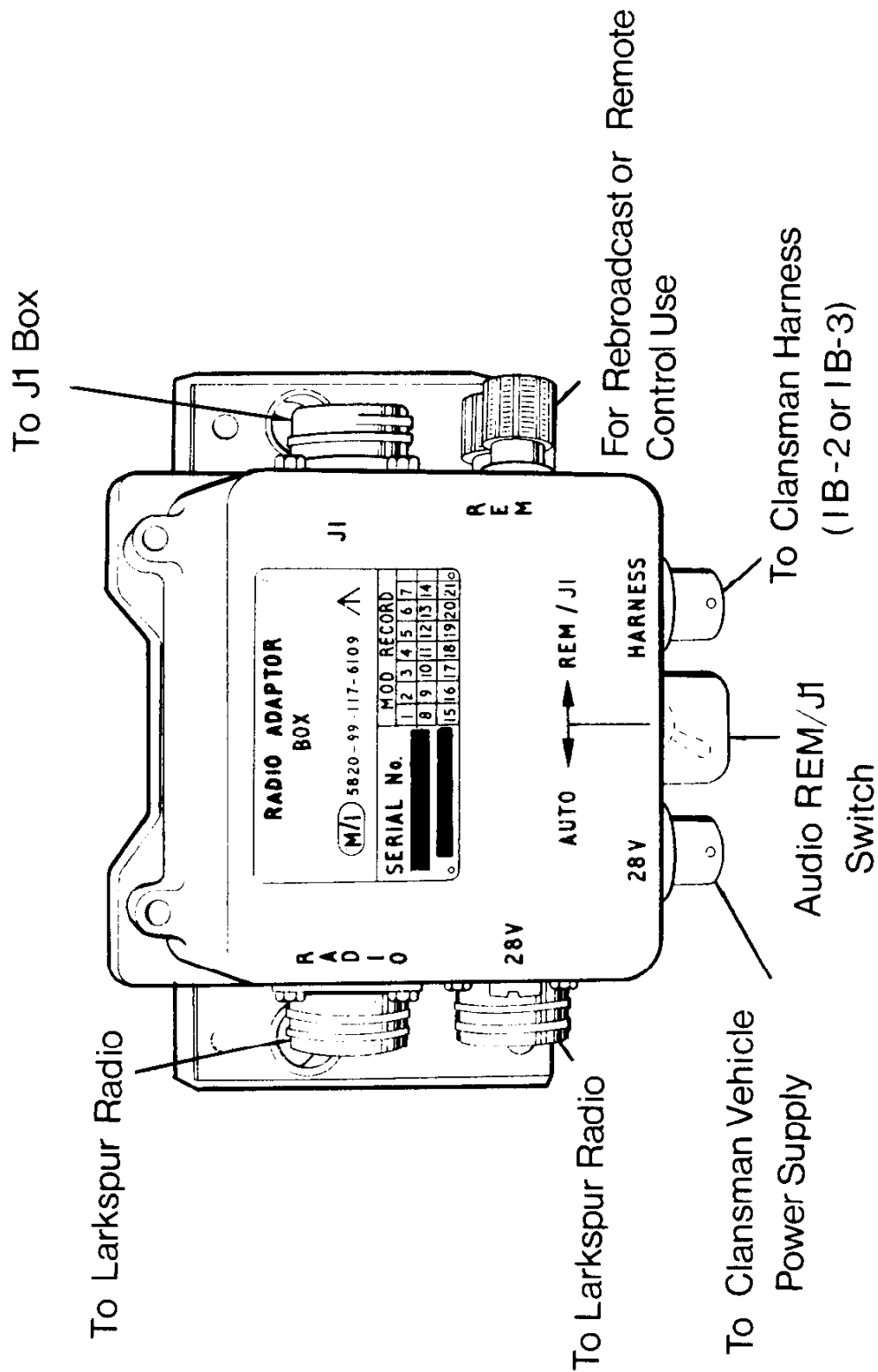


Fig 71.—Radio Adaptor Box

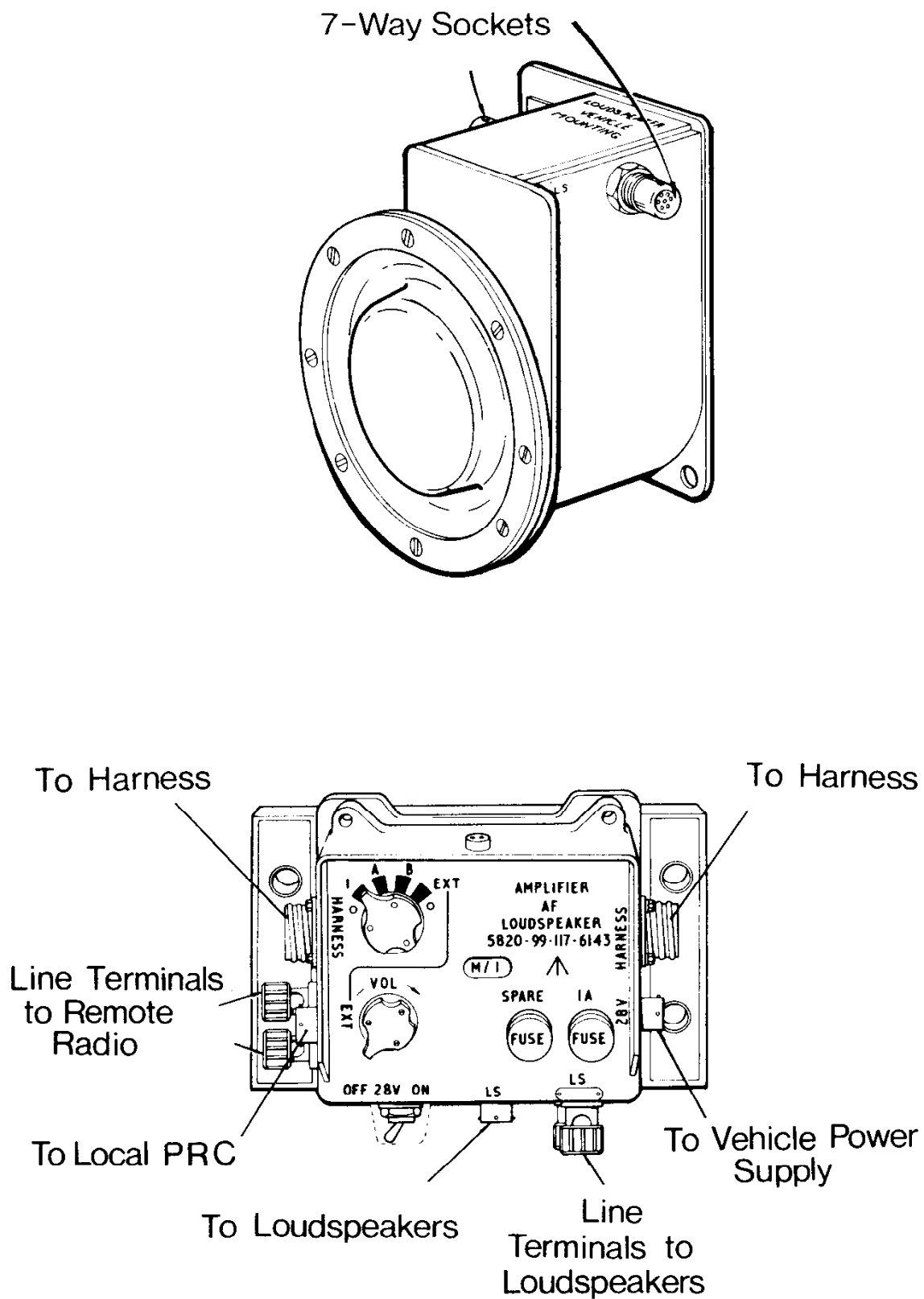


Fig 72.—Amplifier Loudspeaker and Speaker

CHAPTER 4

CLANSMAN TEST KITS

SECTION 18 – INTRODUCTION

General

0401. This chapter is concerned with test kits issued to infantry and mechanized units. The information contained in the chapter is taken from User Handbooks and set out in a possible sequence of instruction.

Aim

0402. The aim of this chapter is to enable the user of HF and VHF radios to carry out fundamental checks and user repairs of all equipment and ancillaries used.

References

0403. The following publications have been used in the compilation of this chapter.

a. Infantry Training Volume VIII, Infantry Signal Training, Pamphlet No. 40 Parts 1 and 2 – (to be promulgated).

| b. <i>User Handbooks:</i> | <i>Army Code.</i> |
|--------------------------------------|--------------------------|
| Test Set Condition | 61655 |
| Test Set Audio, Audio Accessories | |
| User Repair Information for CLANSMAN | |
| Audio Accessories | 61656 |
| Test Set Harness Connector | 61657 |

SECTION 19 – TEST KIT, CONDITION CLANSMAN RADIO

Description (*Fig 73*)

0404. **Role.** To enable users of CLANSMAN HF and VHF radios to check the battleworthiness of their sets.

0405. **Facilities.** This portable equipment allows the user to check transmitted power of the *radio under test* (RUT) and with a *working radio* (WR) the receiver sensitivity, modulation, demodulation, frequency setting and RF continuity of the antenna system. The working radio needs to have similar frequency coverage

to the radio under test except for the PRC 349. The PRC 349 cannot be used as a WR for other types of RUT. Abridged operating instructions are given on the lid of the *test kit condition* (TKC). The lid of the TKC contains all the necessary leads and ancillaries for all tests.

0406. **Power Supply.** No separate power source is necessary as the TKC is powered by either the RUT or WR depending on the test instruction, the voltage required is between 12–29 volts.

0407. **Weight and Dimensions.** The TKC complete with case and ancillaries are as follows:

- a. *Dimensions.* 265mm×220mm×355mm.
- b. *Weight.* 11.5kg.

Operation

0408. **Transmitter Output Power.** Connect the equipment as shown in *Fig 74* using the appropriate cables and adaptors provided.

0409. Set the '*TKC TX POWER CHECK/RX COMMS CHECK*' switch to '*TX POWER CHECK*'. Care should be taken to ensure that the switch is set to the required position and not somewhere in between.

0410. Set the '*TKC RADIO SELECTOR*' switch to the correct position for the RUT (*see Table 1*).

TABLE 1

| Radio | Freq | Power and/or Mode | SW Position |
|--------------|------|-------------------|-------------|
| (a) | (b) | (c) | (d) |
| PRC 320 | ALL | HP AM | 6 |
| | | SSB | |
| | | CW(N) PEAK | |
| CW(W) STEADY | | | |
| LP AM | ALL | SSB | 8 |
| | | CW(N) PEAK | 7 |
| | | CW(W) STEADY | |
| | | CW(W) STEADY | |

| Radio | Freq | Power and/or Mode | SW Position |
|---------|-------------------------|--------------------------------|-------------|
| (a) | (b) | (c) | (d) |
| VRC 321 | 1.5 MHz to 20 MHz | HP CW(N) CW(W) AM SSB | 12 |
| | 20 MHz to 30 MHz | HP CW(N) CW(W) AM SSB | 13 |
| | ALL | LP CW(N) CW(W) AM SSB | 14 |
| PRC 349 | ALL | W, L AND * | 15 |
| PRC 350 | ALL | W, L AND * | 2 |
| PRC 351 | ALL | W, L AND * | 3 |
| PRC 352 | ALL | W, L AND * | 4 |
| VRC 353 | ALL | 50W | 9 |
| | | 15W | 10 |
| | | 1W | 11 |

WARNING. The TKC MUST NOT be used during periods of RADIO SILENCE.

0411. Switch on the RUT in accordance with the relevant user handbook, setting the frequency switches to the desired TEST FREQUENCY and MODE and LOCAL.

0412. TKC TONE/SPEECH switch to TONE.

WARNING. DO NOT OPERATE THE TONE SWITCH/PRESSEL FOR MORE THAN 10 MINS CONTINUOUSLY or damage to TKC may occur.

0413. The 'TX POWER OUTPUT' is indicated on the TKC meter and is SATISFACTORY when the meter reads in the 'GREEN' segment.

0414. Repeat test at any other required frequency and all power outputs (except MIN on the UK/VRC 353).

Communication Check

0415. These checks are to be carried out at the positions given in Table 3 only.

- a. Connect the equipment as shown in *Fig 77* using the appropriate cables and adaptors provided.
- b. Set the 'TKC RADIO SELECTOR' switch to the correct position for RUT (and mode) given in *Table 1*.
- c. Set the 'TKC TX POWER CHECK/RX COMMS CHECK' to 'RX COMMS CHECK'.
- d. Set the 'TKC RECEIVER SENSITIVITY' controls to zero.
- e. Set the 'TKC ADJUST LEVEL' control to the midway position.
- f. Switch on the 'WR' and 'RUT' in accordance with previous information and switch to the positions given in *Table 3*.
- g. Set the 'RUT' to the desired test frequency and mode.
- h. Set the 'WR' to the test frequency 200 kHz and the same mode as the RUT.
- j. Transmit a modulated signal from 'RUT' by one of the following methods:
 - (1) By operating TKC TONE switch
 - (2) By operating the morse freq
 - (3) By any other method appropriate to the 'RUT'.

NOTE. *Method 1 to be used for testing the PRC 349.*

k. On all voice operated MODES if speech is used for modulation then a WARBLING TONE should be heard in the WR phones. On CW modes a constant frequency TONE should be heard in the WR phones. In all cases the signals should be clear and undistorted.

l. Remove the 'TKC AUDIO/POWER LEAD' from the 'RUT AUDIO SKT' and connect it to the 'WR AUDIO SKT'.

m. Transmit a modulated signal from the 'WR' in the same manner as the 'RUT' and listen in the 'RUT' phones. Signals should be as in para k.

n. Repeat paras g to l at any other required frequency and for all modes of operation. (Except data modes on the UK/VRC/353.)

TABLE 2

| Radio | Power and/or Mode | Tone | Speech |
|---------|--------------------------------|----------------------|----------|
| (a) | (b) | (c) | (d) |
| PRC 320 | LP AM SSB CW(W) CW(N) | 41 50 40 | 35 44 |
| VRC 321 | LP AM SSB CW(W) CW(N) | 28 43 38 41 | 22 37 |
| PRC 349 | W or L | 20 | 14 |
| PRC 350 | W or L | 33 | 27 |
| PRC 351 | W or L | 35 | 29 |
| PRC 352 | W or L | 35 | 29 |
| VRC 353 | 1 WATT | 35 | 29 |

TABLE 3

| RADIO | POSITION |
|-------|----------|
| 320 | LP |
| 321 | LP |
| 349 | W or L |
| 350 | W or L |
| 351 | W or L |
| 352 | W or L |
| 353 | 1 WATT |

Receiver Sensitivity

0416. There are two ways of conducting this check.

- a. **Method 1.** When only one operator is available using the 'TKC WARBLING TONE' oscillator as the modulating signal.
- b. **Method 2.** When two operators are available using speech as the modulating signal.

Method 1.

0417. a. Connect the equipment as shown in *Fig 75 ('TKC AUDIO/POWER' lead connected to the 'WR AUDIO SKT')*.
- b. Set the 'TKC RADIO SELECTOR' Switch to the correct position for the 'RUT' (and mode) as shown in *Table 1*.
 - c. Set the 'TKC TX POWER CHECK/RX COMMS CHECK' to 'RX COMMS CHECK'.
 - d. Set the 'TKC RECEIVER SENSITIVITY' controls to the correct setting for RUT (and mode) given in *Table 2*.
 - e. Switch on the 'RUT' in accordance with previous instructions, set to the desired test frequency and mode. Switch to position given in *Table 3*.
 - f. Switch on the 'WR', in accordance with previous instructions, set to the desired test frequency ± 200 kHz and the same mode as 'RUT'. Switch to the position shown in *Table 3*.
 - g. Operate the 'TKC TONE' switch and set the 'TKC ADJUST LEVEL' control until the TKC meter reads on the junction of the 'BAD/GOOD' segments.
- WARNING. DO NOT OPERATE TONE SWITCH/PRESSEL FOR MORE THAN 10 MINUTES CONTINUOUSLY or damage to the 'TKC' may occur.
- h. Operate the 'TKC TONE' switch. The Receiver Sensitivity is satisfactory if the tone can be heard in the RUT phones; any noise present can be ignored. For CW a tone of constant pitch will be heard and for all other modes a warbling tone will be heard.
 - j. Repeat d to h for any other test frequency and all modes of operation (EXCEPT DATA MODES ON THE VRC 353).

Method 2. (Para a–g and j as for Method 1.)

0418. Operate the 'WR' pressel and speak into the MIC. The speech heard in the 'RUT' phones should be intelligible.

NOTE.

1. If when checking an HF radio using method 1 the result obtained is inconclusive a more definite result will be obtained using method 2.
2. Method 1 is to be used for testing the PRC 349.

Antenna Check

0419. a. Connect the equipment as shown in *Fig 76* using the appropriate cables and adaptors provided.
- b. Carry out tests as for communications check.
- c. Further isolation of the fault is possible by substituting, or missing out, parts of the 'ANTENNA' system i.e. SURF or coaxial cables etc, until the faulty item is found.

TABLE 4

| RADIO | ANTENNA SYSTEM EQUIPMENTS |
|-------|----------------------------------|
| 320 | SURF 12W TURF (built into Radio) |
| 321 | SURF 25W TURF 25W |
| 350 | SURF 2W |
| 351 | SURF 4W or Initiate Box. TUAAM. |
| 352 | SURF 4W or Initiate Box. TUAAM. |
| 353 | ARFAT. TUAAM. |

Note. SURF not to be used in a TUAAM Antenna System.

Self-Checking Facilities

0420. **Power Supply.**

- a. Switch TKC radio selector switch to power supply.
- b. Meter should read in orange band (*this merely indicates that the TKC supply is correct. It is not an indication of the state of the radio battery*).

0421. **Co-axial Cables.**

- a. Connect the equipment as shown in *Fig 77*.
- b. 'SUPPLY' lamp will light if supply voltage is being applied to the cable checker.
- c. 'CABLE' lamp will light if the co-axial cable is serviceable, it will not light if the cable is faulty.
- d. To detect an intermittent fault, 'waggle' both ends of the cable.
- e. When testing the PRC 350 a short adaptor lead is used to connect between the antenna socket on the radio, and the 2m (*or 10m*) test cable. It is not possible to check this adaptor lead in isolation, using the cable checker. To test this combination of cables, first check the cables keeping them connected together. If the cable lamp does not light, then the adaptor

cable should be removed, and the 2m (*or 10m*) cable should be checked. If:

- (1) Cable lamp does not light, the 2m (*or 10m*) cable is faulty.
- (2) Cable lamp lights, the 2m (*or 10m*) cable is serviceable and the adaptor cable is faulty.

Deployment

0422. Checks using the TKC may be carried out:

- a. On the bench.** This method is suitable for checking manpack radios; or radios being tested in the store before and after use.
- b. In vehicles housing radio installations.** These radio stations can be checked in a number of different ways:
 - (1) Between 2 radios fitted in the same vehicle in a multi-radio installation.
 - (2) Using a manpack as a WR to check a radio in a vehicle installation.
 - (3) Between 2 separate vehicle installations.

0423. The most suitable should be chosen by the user, having considered the particular circumstances under which the checks have to be conducted.

Maintenance

0424. The TKC is a sealed equipment and therefore very little user maintenance is required. It must not be opened by any user other than a REME/R SIGNALS technician and then, only if a clean, dry and comparatively dust-free area is available.

0425. The TKC cannot be expected to work indefinitely without some falling-off in performance. Preventative maintenance is required to ensure that it retains its operational efficiency. To this end, positive action by the user is necessary to reduce the probability of the TKC failing due to:

- a.** Gradual deterioration in performance not normally detectable during operation but which can be minimized by regular specification testing.
- b.** Non-catastrophic failure (*e.g. badly frayed leads, failure of mode not actually in use*).

0426. The user should keep the TKC clean, the paintwork sound, and ensure that all cables are in good condition, all knobs, covers and lid screws are secure and serviceable.

0427. The TKC should be specification tested as laid down in EMER TELS M662 and a record card maintained by the user.

0428.–0430. *Reserved.*

Meter Indicates
Transmitter RF
Output Power

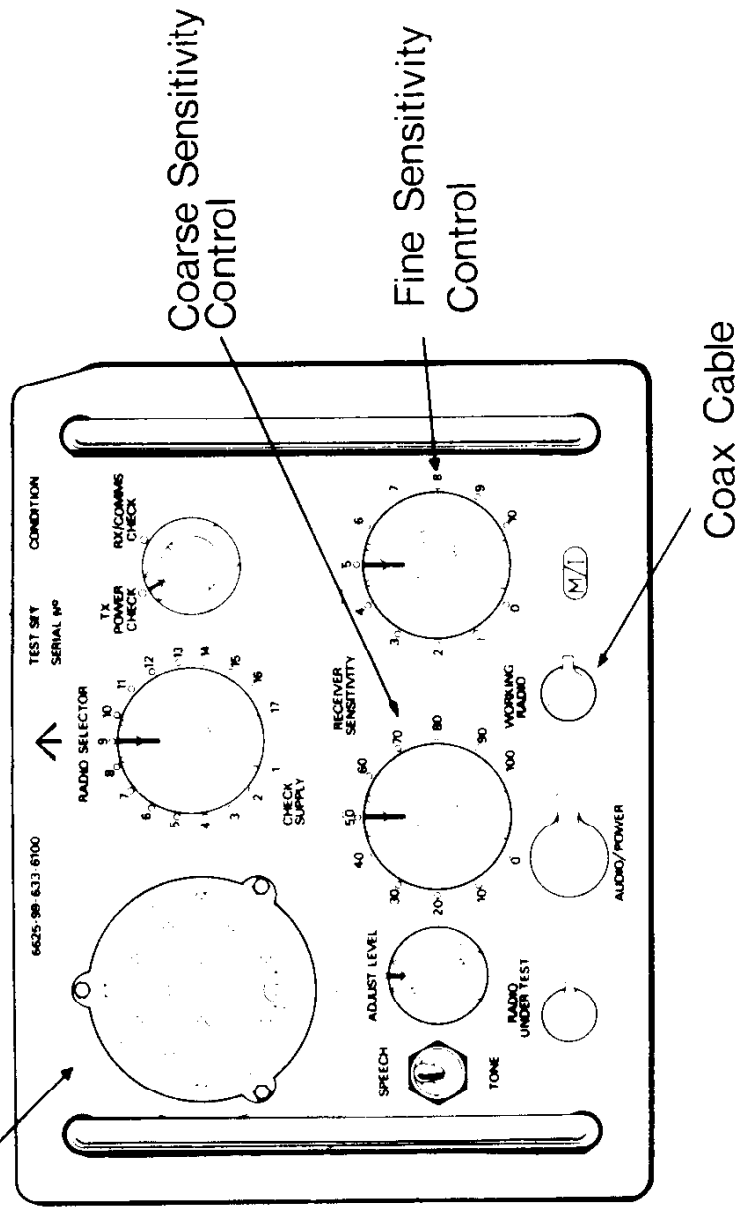


Fig 73.—Test Set Condition, CLANSMAN Radio, Front Panel

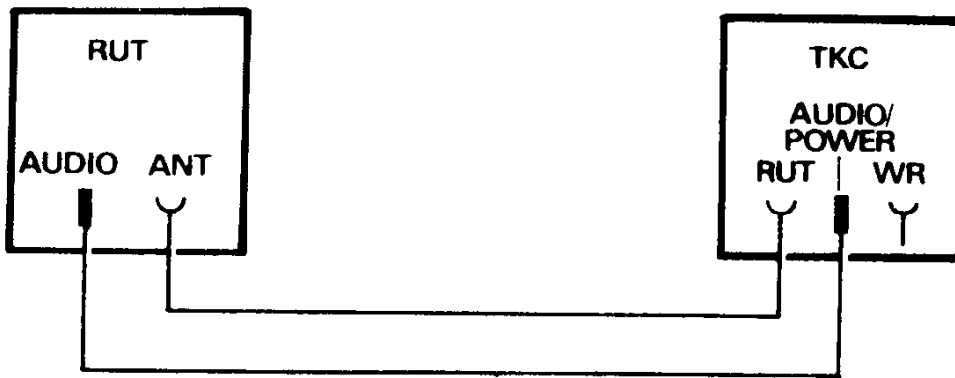


Fig 74.—Transmitter Output – Power Check

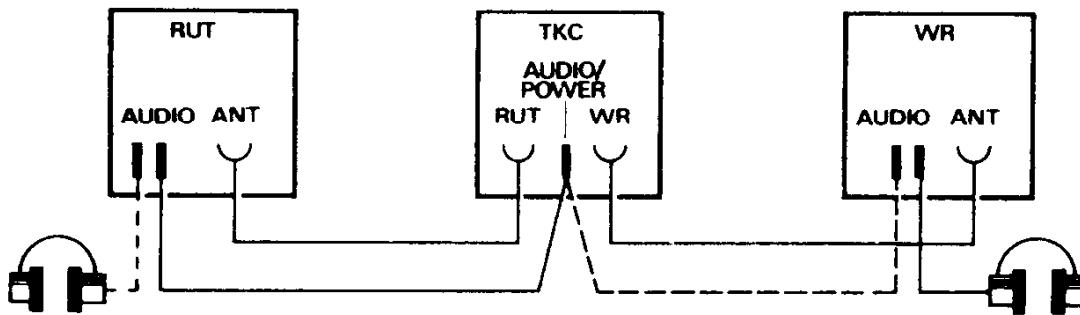


Fig 75.—Communication Check

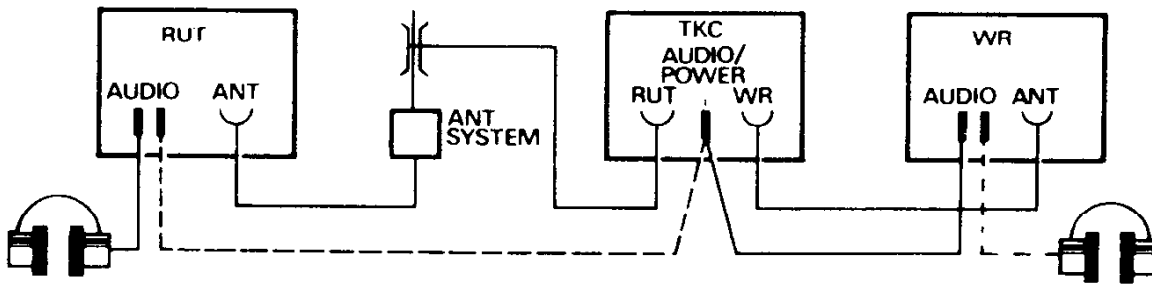


Fig 76.—Antenna Check

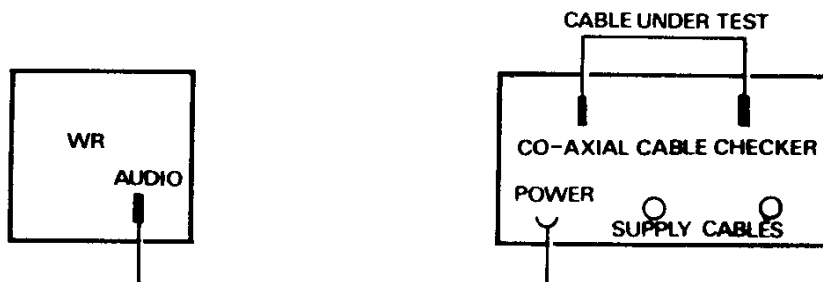


Fig 77.—Coaxial Cable Check

SECTION 20 – TEST SET AUDIO RADIO AUDIO ACCESSORIES 'CLANSMAN'

Role

0431. *The Test Set Audio, Radio Audio Accessories* is for use by regimental signallers, R SIGNALS and REME electronic tradesmen for the testing of CLANSMAN type audio gear and accessories.

Description (Fig 78)

0432. The table below gives a brief description of the various controls and connections shown in *Figs 79, 80, 81 and 82*.

| Ref | Designation | Function |
|-----|---------------------------|---|
| (a) | (b) | (c) |
| 1 | Test Card retaining screw | Secures test cards when not in use. |
| 2 | Co-axial cable inputs | Co-axial cables are tested using the ' <i>Shorting block</i> ' contained in the lid. |
| 3 | AUDIO 7-way socket | <p>SIMULATED HEADSET Connecting the Test Set to an equipment under test via this socket, is equivalent to connecting a headset or handset with pressel facilities to the equipment under test. It will simulate LEFT (<i>working</i>) and RIGHT (<i>monitor</i>) phones in conjunction with the AUDIO switch and Test Set loudspeaker. It will simulate a transmit condition in conjunction with the PRESSEL switch.</p> |
| 4 | MIC 3-way socket | <p>SIMULATED RESPIRATOR MICROPHONE This socket provides a modulating tone to the microphone lines of the headset under test via a 3-way lead. The lead also short circuits the boom microphone. The socket is also used to test respirator microphones.</p> |

| Ref | Designation | Function |
|-----|------------------|--|
| (a) | (b) | (c) |
| 5 | T/R 7-way socket | <p>SIMULATED TRANSMITTER/RECEIVER</p> <p>Connecting an equipment under test to this socket is equivalent to connecting the equipment under test to a radio. It will simulate a RECEIVE condition (<i>HIGH TONE</i>) on the LEFT or RIGHT phone lines in conjunction with the PHONE switch.</p> <p>It will simulate a transmit condition when the Pressel of the equipment under test is actuated. Under these conditions it provides Side Tone from a microphone. The high tone is also present under transmit conditions as a fault finding aid.</p> |
| 6 | PHONE switch | <p>PHONE LINE ROUTING</p> <p>Routes outgoing signals to left or right phone lines of T/R socket.</p> <p>Routes incoming signals on the left or right phone lines of the AUDIO socket to the Test Set loudspeaker, thus simulating a LEFT or RIGHT earphone.</p> |
| 7 | LINE terminals | <p>SIMULATED 'REMOTE' TERMINALS</p> <p>These terminals are used for supplying power to '<i>Remote</i>' items of equipment. Audio signals are also passed to or from '<i>Remote</i>' equipments via these terminals.</p> <p>When testing CRLS/R units the LINE terminals act as a '<i>Remote</i>' unit and draw Receive, Transmit or Call command currents.</p> |

| Ref | Designation | Function |
|-----|-----------------------|---|
| (a) | (b) | (c) |
| 8 | PRESSEL ON/OFF switch | <p>SIMULATED PRESSEL FACILITIES Used in conjunction with the AUDIO socket will simulate a receive condition in the 'OFF' position and transmit condition in the 'ON' position. The switch will usually produce a HIGH or LOW frequency tone respectively on the Loudspeaker.</p> |
| 9 | POWER ON switch | <p>POWER ON/OFF SWITCH This switch is biased in the 'OFF' position to conserve battery power. The switch must be operated for EACH test.</p> |
| 10 | Internal Loudspeaker | <p>AUDIO MONITOR The Loudspeaker monitors tones applied to the AUDIO socket or LINE terminals. Tones are generally as follows:</p> <ul style="list-style-type: none"> a. Low frequency tone-simulated modulation. b. High frequency tone-simulated received signal. c. Morse tone d. CALL tone <p style="text-align: right;">} frequencies vary } with equipment</p> |
| 11 | FUSE test contacts | <p>TESTING OF FUSES Continuity of fuses is indicated on the meter. FUSES RATED LESS THAN 100mA MUST NOT BE TESTED.</p> |

| Ref | Designation | Function |
|-----|------------------|---|
| (a) | (b) | (c) |
| 12 | FUNCTION switch | <p>SELECTS APPROPRIATE INTERNAL CIRCUITS FOR EQUIPMENTS UNDER TEST</p> <ul style="list-style-type: none"> a. 'AUDIO' – All units except remote equipments. b. 'REM' – All tests on remote equipment except CRSL/R. c. 'CRSL/R Rx' } Provide simulated Remote Control d. 'CRSL/R Tx' } Unit commands for testing the CRSL/R only. e. 'CRSL/R CALL' } |
| 13 | EXTERNAL BATTERY | <p>EXTERNAL BATTERY CONNECTIONS 20–32 volts DC</p> <p>This function will be used when the internal batteries cannot be used due to extreme climatic conditions, or when there are no internal batteries available. Do NOT use with charging equipment connected.</p> |
| 14 | Meter | <p>PROVIDES AN INDICATION</p> <ul style="list-style-type: none"> a. Pressel switch and morse key operation (<i>RED</i>) b. Remote transmit command currents (<i>GREEN</i>). c. Remote call command currents (<i>RED</i>) d. Continuity (<i>RED</i>). e. Battery condition (<i>RED, A or B</i>). |

| Ref | Designation | Function |
|-----|-----------------------------|---|
| (a) | (b) | (c) |
| 15 | Test Cards | <p>TESTING INSTRUCTIONS FOR EQUIPMENT</p> <p>The equipment listed in Section 1 can be tested on a Go/No-Go basis using the cards.</p> <p>No previous knowledge of testing is required.</p> |
| 16 | Internal Power Supply | <p>Self contained primary cells to provide power to the Test Set under portable conditions.</p> <p>To obtain access to the 27 volt supply remove the 4 cover screws.</p> |
| 17 | O/P LEVEL NORMAL/LOW switch | <p>AUDIO LEVEL</p> <p>This switch enables the operator to set the output level from the Test Set Loudspeaker to that most suitable for his working conditions.</p> |

Power Supplies

0433. a. **Internal.** Normal operation is from three 9 volt primary cells or similar commercial device (*Fig 80*).

b. **External.** Provision is made to use an external 24V DC 'CLANSMAN' secondary battery.

Weight and Dimensions

0434. The weight and dimensions of the test set are as follows:

- a. **Length.** 44cm
- b. **Width.** 18cm
- c. **Height.** 25cm
- d. **Weight.** 8.15kg

Operation of the Test Set

0435. The test set is operated as follows:

- a. Open the test card cover.

- b. Carry out the self check and battery test (*see Fig 81*) and note the output levels of the tones for comparison tests.
- c. Locate the test card(s) applicable to the equipment under test.
- d. Connect the equipment under test to the Test Set as instructed.
- e. Carry out the test instructions in sequence.
- f. Repair the equipment if any test produces an incorrect result (*see General Repair Instructions*).
- g. If the repairs are beyond the capability or permitted repair level, backload the faulty equipment to REME Unit technicians/2nd line repair point.

General Repair Instructions

0436. In order to aid the repair/replacement of parts, push-on types of connections are used. These give good electrical and mechanical joints and eliminate the need for soldering. However, care must be taken when separating a joint and excessive force must never be used. If any difficulty is experienced in separating joints, then the whole of the faulty item should be passed to the unit technician.

0437. Faulty cable sockets, or faults at the sockets themselves, are rectified by replacement of the complete cable assembly.

0438. Before attempting a repair on a suspect item of audio gear carry out the following procedures:

- a. Ensure that the controls of the radio set, or the harness box to which the suspect item is connected, are properly selected for the facility required.
- b. Check that the snatch plug of the audio gear connecting cable is correctly fitted into the appropriate audio socket.
- c. If one is available, substitute a known 'good' item for the suspect item to confirm that the suspect item is faulty.

Fault Location

0439. Using the AATS test the Headset Microphone (*BV and I*) according to the instructions on the relevant test cards.

0440. Continue testing until a test fails and then disconnect the headset from the AATS and refer to the relevant paragraph in the TEST SET AUDIO, RADIO AUDIO ACCESSORIES Handbook, to locate the part of the headset that is faulty.

0441. To use the AATS as a Continuity Tester:

- a. Continuity between 2 points can be checked using the AATS, the Co-axial Test Lead and the Fan-out Socket.
- b. Position the AATS function switch to AUDIO, phone switch to LEFT and pressel switch to OFF.

- c. Connect the Co-axial Test Lead to the appropriate co-axial socket on the AATS.
- d. Plug the headset 7 point connector (*PLA*) into the socket on the Fan-out.
- e. Insert the plug of the Co-axial Test Lead into the appropriate socket of the Fan-out, and the clip of the Co-axial Test Lead to the point to which continuity is to be checked.
- f. Switch on the AATS Power Switch and hold it on. The meter should read in the RED section (*or beyond*).
- g. If it does not read in the RED section (*or beyond*), it means that there is no connection between the points under test. For further details refer to User Handbook Army Code 61656.

0442.–0445. *Reserved.*

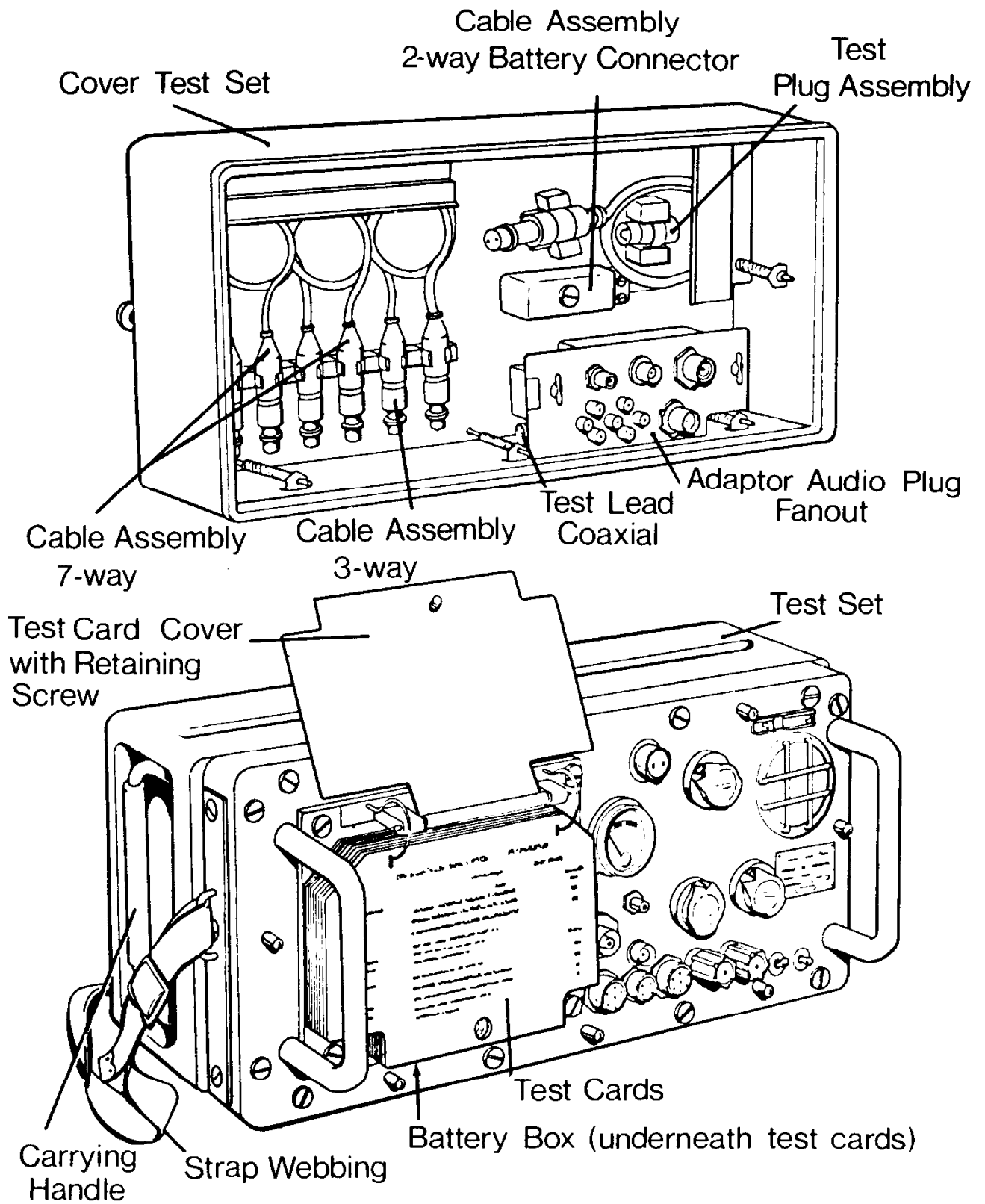
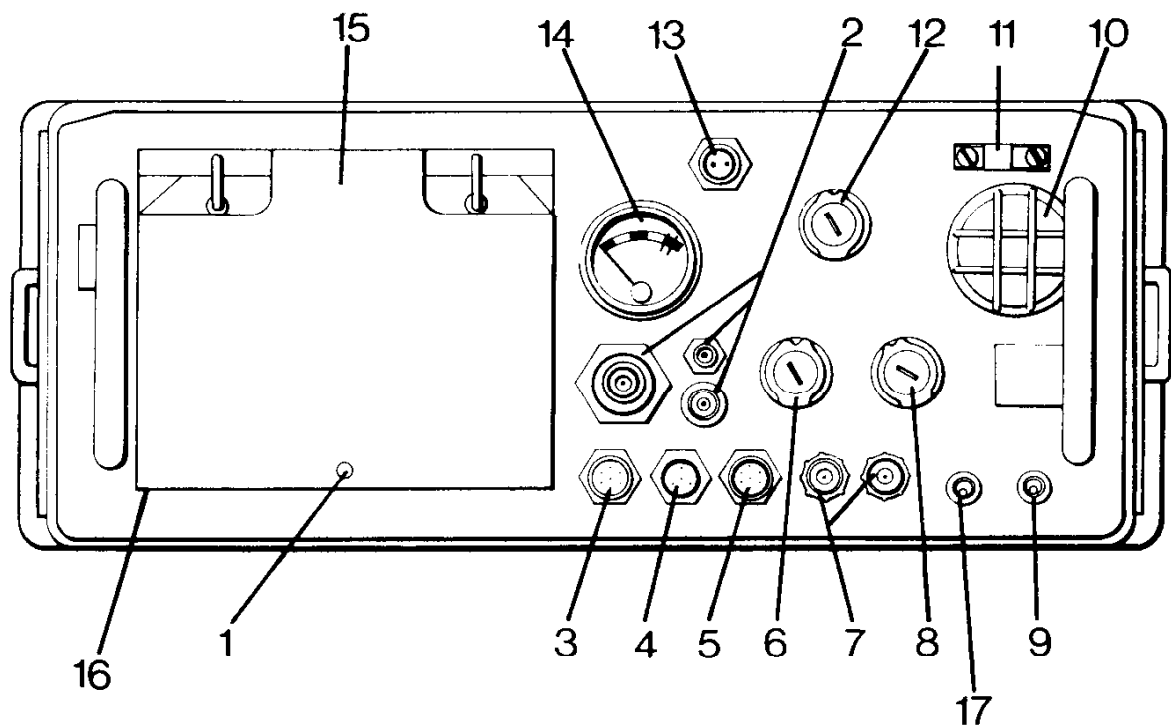
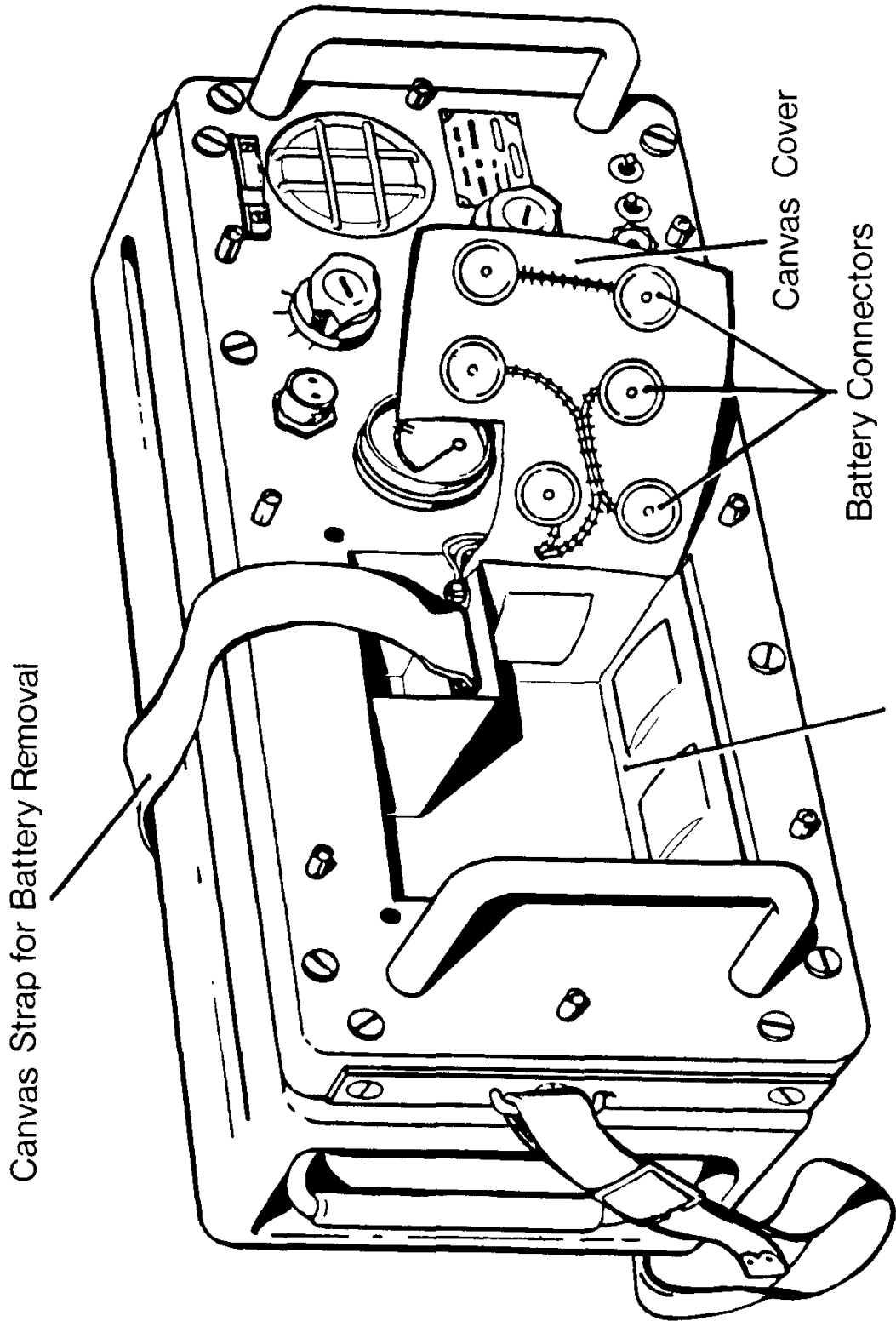


Fig 78.—Test Set Audio, Radio, Audio Accessories



- | | |
|-------------------------------------|--|
| 1, Test Card Retaining Screw | 10, Internal Loudspeaker |
| 2, Coaxial Cable Inputs | 11, Fuse Test Socket |
| 3, Audio 7-way Socket | 12, Function Switch |
| 4, Mic. 3-way Socket | 13, External Battery 2-way Plug |
| 5, T/R 7-way Socket | 14, Meter |
| 6, Phone Switch | 15, Test Cards |
| 7, Line Terminals | 16, Internal Power Supply |
| 8, Pressel On/Off Switch | 17, Normal/Low Switch |
| 9, Power On/Off Switch | |

Fig 79.—Controls and Connections



Canvas Strap for Battery Removal

Canvas Cover

Battery Connectors

Test Set Battery Box (3x9v Battery Storage)

Fig 80.—Test Set Battery Box

TEST SET SELF CHECK & BATTERY CHECK

Initial Test Set
Switch Positions:

| | | |
|----------|-------|---------|
| FUNCTION | PHONE | PRESSEL |
| AUDIO | RIGHT | OFF |

NOTE: An additional Switch 'O/P LEVEL' is provided to give an audio output convenient for local conditions. This should be set as required.

1. Join AUDIO and T/R Sockets with cable provided.
2. Switch on POWER and hold.
 - Meter remains in BLACK.
 - High pitch tone in Test Set speaker.
3. Switch PHONE to LEFT.
 - High pitch tone in Test Set speaker.
 - Meter remains in BLACK.
4. Switch PRESSEL to ON.
 - Low pitch tone in Test Set speaker.
 - Meter reads on BATT 'B' line or beyond to test CRL/R. All other items, meter to read BATT 'A' line or beyond.

To replace Batteries, see Card 2 of 2. Page 5

Card 1 of 2 ○ Page 4 Iss 2

○

BATTERY CHANGING

1. Remove Battery Cover by releasing 4 slotted knurled screws located at each corner.
2. Carefully lift canvas terminal strip and lay aside.
3. Remove BATT.1 (See Diag.) by pulling upwards on the canvas strap passing under the battery. Remove BATT.2 and BATT.3.
4. Replace the batteries with three 9 volt NATO No. 6135-99-945-6814 in the reverse order to above noting polarities as shown and ensuring that the canvas strap passes under BATT.1. Replace terminal strip and Battery Cover ensuring that it is firmly tightened down.

```

      BATT 3
      + 0  0 -
    -----
      BATT 2
      - 0  0 +
    -----
      BATT 1
      0 +
      0 -
    
```

○ Card 2 of 2 ○ Page 5 Iss 3

Fig 81.—Test Set Card for Self Check and Battery Test

SECTION 21 – TEST SET, HARNESS CONNECTORS ‘CLANSMAN’

General Description (Fig 82)

0446. **Purpose and Facilities.** The *TEST SET, HARNESS CONNECTORS* which consists of a *TEST SET CONTINUITY*, an *ADAPTOR TEST, SHORTING* and an *ADAPTOR TEST, CONNECTOR*, is used to test the serviceability of any CLANSMAN cable assembly having between 2 and 12 conductors and a braid. Coaxial cables cannot be tested. Indication of test results is by coloured lamps.

0447. Principles of operation

- a. Cable continuity is checked by independently testing each core, through the *ADAPTOR TEST, SHORTING*, using one of the cores as a common return. Selection of the core to be tested is by a rotary switch on the *TEST SET, CONTINUITY*.
- b. An internal sensing device, in conjunction with the *CORE TESTED* switch, checks the insulation between each core and between each core and the connector shell.
- c. The particular core tested in each position of the *CORE TESTED* switch is shown in the *CORE TEST DETAILS* on page 2–45.

0448. **Power requirements.** The *TEST SET, CONTINUITY* is designed to be powered by the 18V DC available at the *HARNESS* socket of any installed CLANSMAN harness containing an IB2 or IB3 box, but can quite safely be powered by a 24V DC source. Cables for both methods of supply are included in the *TEST SET, HARNESS CONNECTORS ‘CLANSMAN’ CES*.

0449. Weights and dimensions

| Item | Height | Width | Depth | Weight |
|-------------------------|--------|-------|-------|--------|
| Test Set | 85mm | 78mm | 200mm | 1.36kg |
| Adaptor Test, Shorting | 48mm | 102mm | 102mm | — |
| Adaptor Test, Connector | 48mm | 102mm | 102mm | — |

NOTE: The equipment is carried in a haversack, the weights and dimensions of which are not given.

Operation

0450. **Connections to Power Source.** The *TEST SET, CONTINUITY* may be connected to either:

- a. The 18V DC supply available at the *HARNESS* socket of any installed CLANSMAN harness containing an IB2 or IB3 box, using the *CABLE ASSEMBLY, 2 branches*, (see Fig 83).

- b. A 24V DC supply using the WIRING HARNESS, 2 conductors, (see Fig 84).

NOTE: Ensure that when a 24V DC battery is used as the power source the correct polarity is observed.

0451. **Continuity testing (Fig 85).** All controls are situated on the *TEST SET, CONTINUITY*.

- a. Connect the *TEST SET, CONTINUITY* to the appropriate power sources as above.
- b. Connect the *ADAPTOR TEST, CONNECTOR* to the *TEST SET, CONTINUITY* using the *CABLE ASSEMBLY*, 12 conductors.
- c. Connect the cable to be tested between the appropriate plugs/sockets of the *ADAPTOR TEST, CONNECTOR* and *ADAPTOR TEST, SHORTING*.
- d. Depress the *BRAID* switch in any one of the *CORE SELECTED* switch positions appropriate to the cable under test.
- e. A satisfactory test is indicated by illumination of the *PASS* (green) lamp and an unsatisfactory test by the illumination of the *FAIL* (red) lamp.
- f. Insulation.

NOTE. All controls are situated on the *TEST SET, CONTINUITY*.

- a. Connect the *TEST SET, CONTINUITY* to the power source in the appropriate manner as above.
- b. Connect the *ADAPTOR TEST, CONNECTOR* to the *TEST SET, CONTINUITY* using the *CABLE ASSEMBLY*, 12 conductors.
- c. Connect the cable to be tested to the appropriate plug/socket of the *ADAPTOR TEST, CONDUCTOR*.

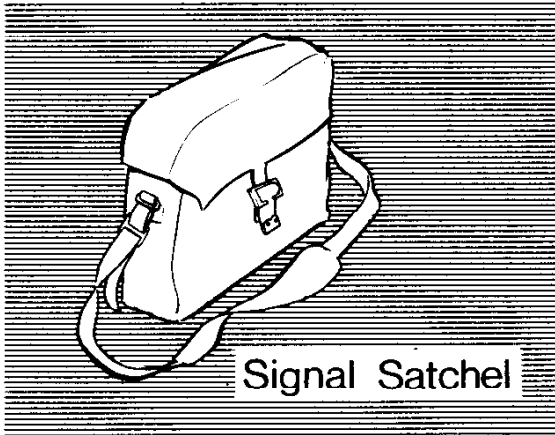
DO NOT connect the ADAPTOR TEST, SHORTING.

- d. Depress the *BRAID* switch in any one of the *CORE SELECTED* switch positions appropriate to the cable under test.
- e. A satisfactory test is indicated by illumination of the *PASS (green)* lamp and an unsatisfactory test by the illumination of the *FAIL (red)* lamp.

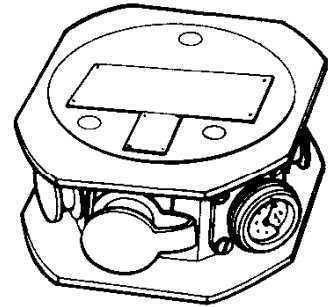
CORE TEST DETAILS

| Core test Number | Core Tested | | | | |
|------------------------------|-------------|-------------|-------------|--------------|--------------|
| | 2 way cable | 5 way cable | 7 way cable | 10 way cable | 12 way cable |
| 2 | B | B | B | B | P |
| 3 | | C | C | C | O |
| 4 | | D | D | D | M |
| 5 | | E | A | E | L |
| 6 | | | F | F | K |
| 7 | | | G | G | H |
| 8 | | | | H | E |
| 9 | | | | J | D |
| 10 | | | | K | C |
| 11 | | | | | B |
| 12 | | | | | A |
| Core tested in all positions | A | A | E | A | S |

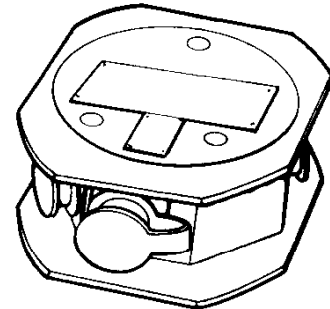
0452.-0460. *Reserved.*



Signal Satchel

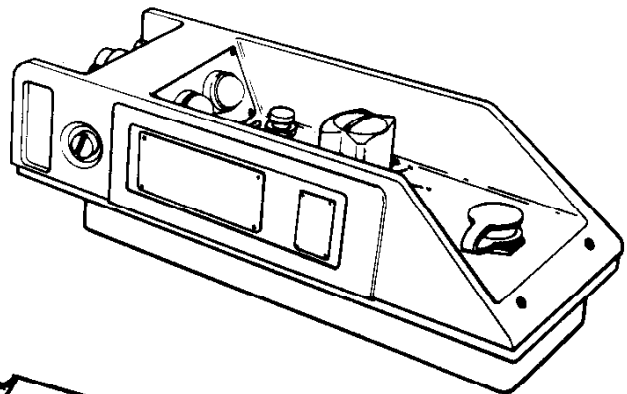
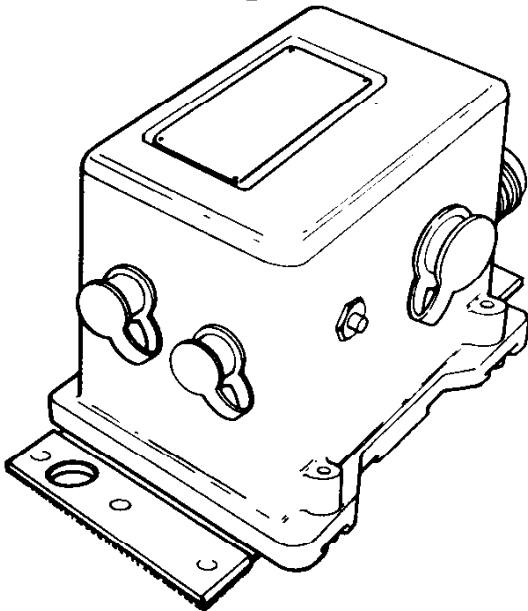


Adaptor Test Connector



Adaptor Test Shorting

Interconnecting Box Radio Adaptor



Test Set Cable
Assembly

Interconnecting Box

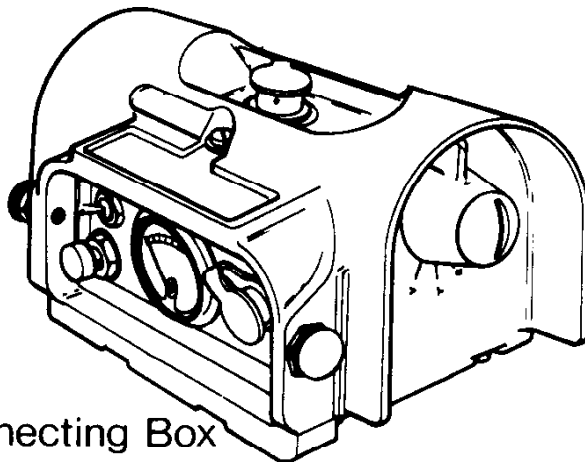


Fig 82.—Test Set Harness Connectors

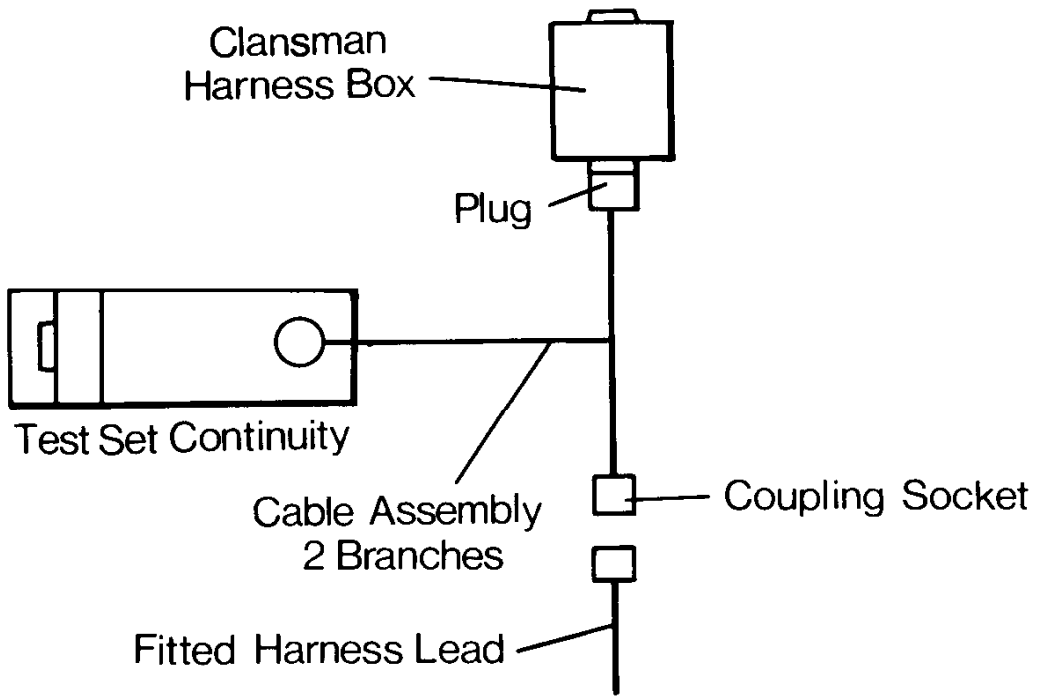


Fig 83.—Test Set 18V DC Harness Connection

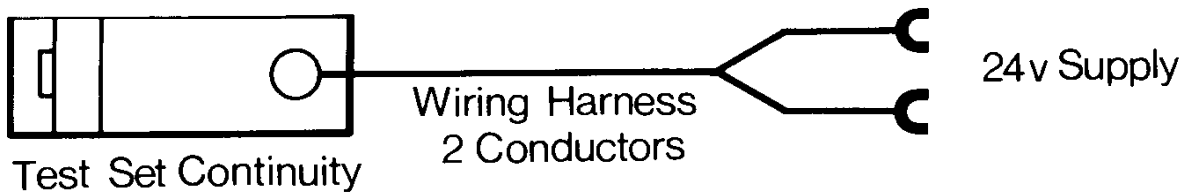


Fig 84.—Test Set 24V DC Battery Connections

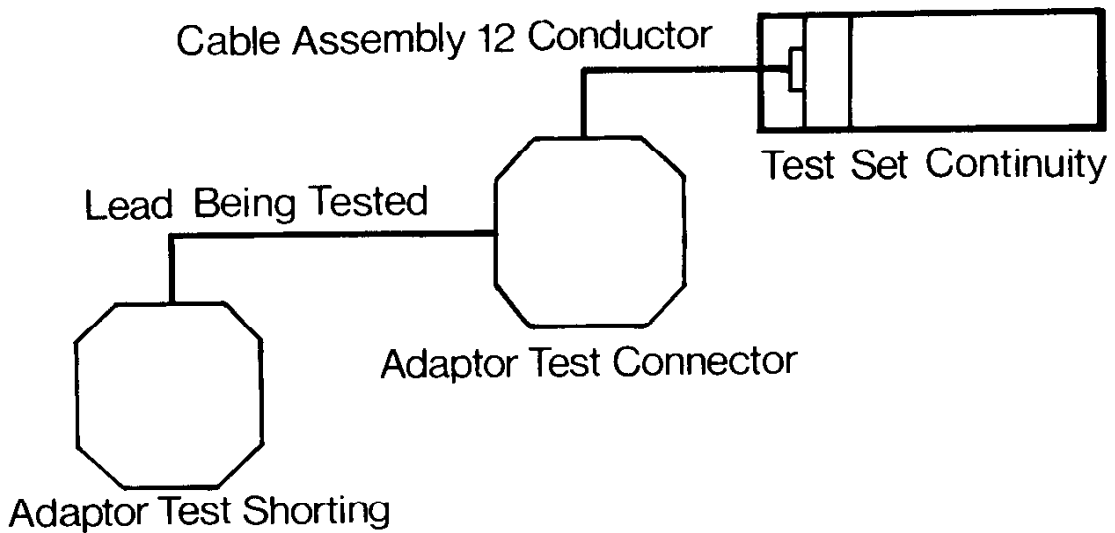


Fig 85.—Continuity Testing

CHAPTER 5

ANTENNAS AND MASTS

SECTION 22 – INTRODUCTION

General

0501. This chapter contains information on the range of VHF antennas and masts that have been designed for use with the CLANSMAN VHF series of radios. These are:

- a. VHF Ground Spike Antenna.
- b. VHF Elevated Ground Spike Antenna Kit.
- c. VHF Ground Mounted Monopole Antenna.
- d. VHF Inverted 'V' Antenna.
- e. VHF Elevated Broadband Antenna.
- f. 5.4m Mast.
- g. 8m Telescopic Mast.
- h. 12m Telescopic Mast.

0502. The antennas and masts are not restricted in use to CLANSMAN radios but can be used in conjunction with existing VHF radios often enhancing the performance normally obtained with these sets.

0503. The frequency range covered by each of these antennas is 30 MHz to 76 MHz.

Aim

0504. The aim of this chapter is to guide instructors and users so that masts and antennas will be used efficiently.

References

0505. The following references have been used in the compilation of this chapter:

- | | Army Code No. |
|--|----------------------|
| a. Signal Communications in the Army Volume II – Part 3 Antennas for Regi- mental Signalling | 70449 |
| b. 5.4m Mast | 61004 |
| | (Revised 1976) |

- c. User Handbook for:
- | | |
|---------------------------|-------|
| (1) CLANSMAN VHF Antennas | 61388 |
| (2) UK/PRC 320 | 61123 |
| (3) UK/VRC 321 | 61253 |

Teaching Techniques

0506. Practice in the erection of masts and antennas is best carried out in small supervised groups. Supervision should ensure correct use of the equipment and that all associated ancillaries are at hand.

0507.–0510. *Reserved.*

SECTION 23 – VHF GROUND SPIKE ANTENNA

Introduction

0511. *The VHF Ground Spike Antenna* is a portable ground mounted antenna designed for use with the PRC 350, PRC 351 and PRC 352 radios. It may also be used with the VRC 353 providing the power output does NOT exceed 15W.

0512. This antenna can be mounted in an elevated position when used in conjunction with the *Elevated Antenna Kit (Section 24 refers)*.

Description

0513. *Data*

a. *Physical*

- | | |
|--------------------------|--------|
| (1) Height fully erected | 2.4m |
| (2) Complete weight | 1.86kg |

b. *Components (Fig 86)*

- | | |
|-------------------------|---------------|
| Antenna Element | – 5 (1 spare) |
| Matching Unit | – 1 |
| Cable Assembly RF 400mm | – 1 |
| Cable Assembly RF 6m | – 1 |
| Case Carrying | – 1 |
| Ground Spike | – 1 |

Assembly (Fig 87)

0514. At the chosen site (*preferably open damp ground*) assemble and erect the antenna as follows (*sequence not important*):

- a. Connect straight plug of 6m cable to matching unit and fit cable strainer over plug.
- b. Fit matching unit into ground spike ensuring it is secured.

- c. Push ground spike and matching unit into ground ensuring clearance hole in ground spike is above the surface.
- d. Select number of antenna elements according to frequency in use:

| | |
|-----------|--------|
| 30–53 MHz | 4 Elms |
| 52–71 MHz | 3 Elms |
| 70–76 MHz | 2 Elms |
- e. Ensure elements are fitted firmly together and pushed firmly into the matching unit.
- f. Connect antenna to radio, depending on type, as follows:
 - (1) For PRC 351, PRC 352 or VRC 353 connect right-angle plug of 6m cable direct to antenna socket on radio, attaching cable strainer to suitable part of set.
 - (2) For PRC 350 connect right-angle plug of 6m cable to 400mm cable and 400mm cable to antenna socket on radio ensuring cable strainers are used.

Dismantling

0515. Dismantle antenna in reverse order of assembly ensuring all items are thoroughly cleaned, and that the protective dust cap is fitted to the antenna base before packing in carrying case.

0516.–0520. *Reserved.*

SECTION 24 – VHF ELEVATED GROUND SPIKE ANTENNA KIT

Introduction

0521. *The Elevated Kit* enables the *VHF Ground Spike Antenna* to be used in an elevated position, thereby increasing the range over that provided by the ground mounted antenna.

0522. The kit enables the antenna to be fitted to the top of a 5.4m mast or to be elevated using any convenient projection, such as the branch of a tree.

Description

0523. **Data.**

- a. *Physical.* Complete weight 2.07kg.
- b. *Components (Fig 88).*

| | |
|------------------------|-----|
| Adaptor | – 1 |
| Carrying Case | – 1 |
| Cable Assembly RF 1m | – 1 |
| Cable Assembly RF 1.4m | – 1 |

| | | |
|-----------------------|----|-----|
| Cable Assembly | 2m | - 1 |
| Cable Assembly RF 20m | | - 1 |
| Cord Assembly | | - 1 |
| Inductor Unit | | - 1 |

Assembly (Using 5.4m Mast)

0524. At the chosen site, assemble and erect the antenna as follows (*Fig 89*):

- a. Fit matching unit into adaptor and secure with locking key.
- b. Fit inductor unit to top section of 5.4m mast.
- c. Assemble but do not erect mast, using the adaptor in place of the top-plate supplied with the mast, securing the adaptor to the mast by the toggle attached to the adaptor.
- d. Select the number of antenna elements according to the frequency in use and fit them firmly into the matching unit.
- e. Select the cable assembly which has the number of beads equal to the number of antenna elements, and connect it between the matching unit and the inductor unit ensuring the cable strainers are fitted to the spring clips at either end.
- f. According to the distance to the radio, connect the straight plug of the 6m or 20m cable to the inductor unit socket and secure with the cable strainer.
- g. Erect the mast as shown in *Section 28*.
- h. Connect the antenna to the radio as instructed for the *Ground Spike Antenna*.

Assembly (suspension from overhead projection)

0525. At the chosen site, assemble and erect the antenna as follows (*Fig 90*):

- a. Fit the ring on the end of the throwing cord over the stub of the matching unit, and fit the matching unit into the adaptor securing it with the locking key.
- b. Select and fit antenna elements together but, before fitting them into the matching unit, slip the second ring on the throwing cord over the antenna element socket on the matching unit and push the spring clip attached to the cord, into the clearance hole in the matching unit.
- c. Select and fit the relevant cable assemblies between the matching unit and the inductor unit, and between the inductor unit and the radio, ensuring they are secured by the cable strainers.

- d. Throw the cord over the selected projection and raise the antenna to the required height, taking care to avoid damage to the antenna and ensuring the cable strainers are taking the weight.
- e. Secure the cord, ensuring the inductor unit is hanging freely above the ground.

Dismantling

0526. Dismantle the antenna in the reverse order of assembly ensuring all items are thoroughly cleaned, and that the protective dust caps are fitted to the antenna base and inductor unit before stowing all items in their correct cases.

0527.–0535. *Reserved.*

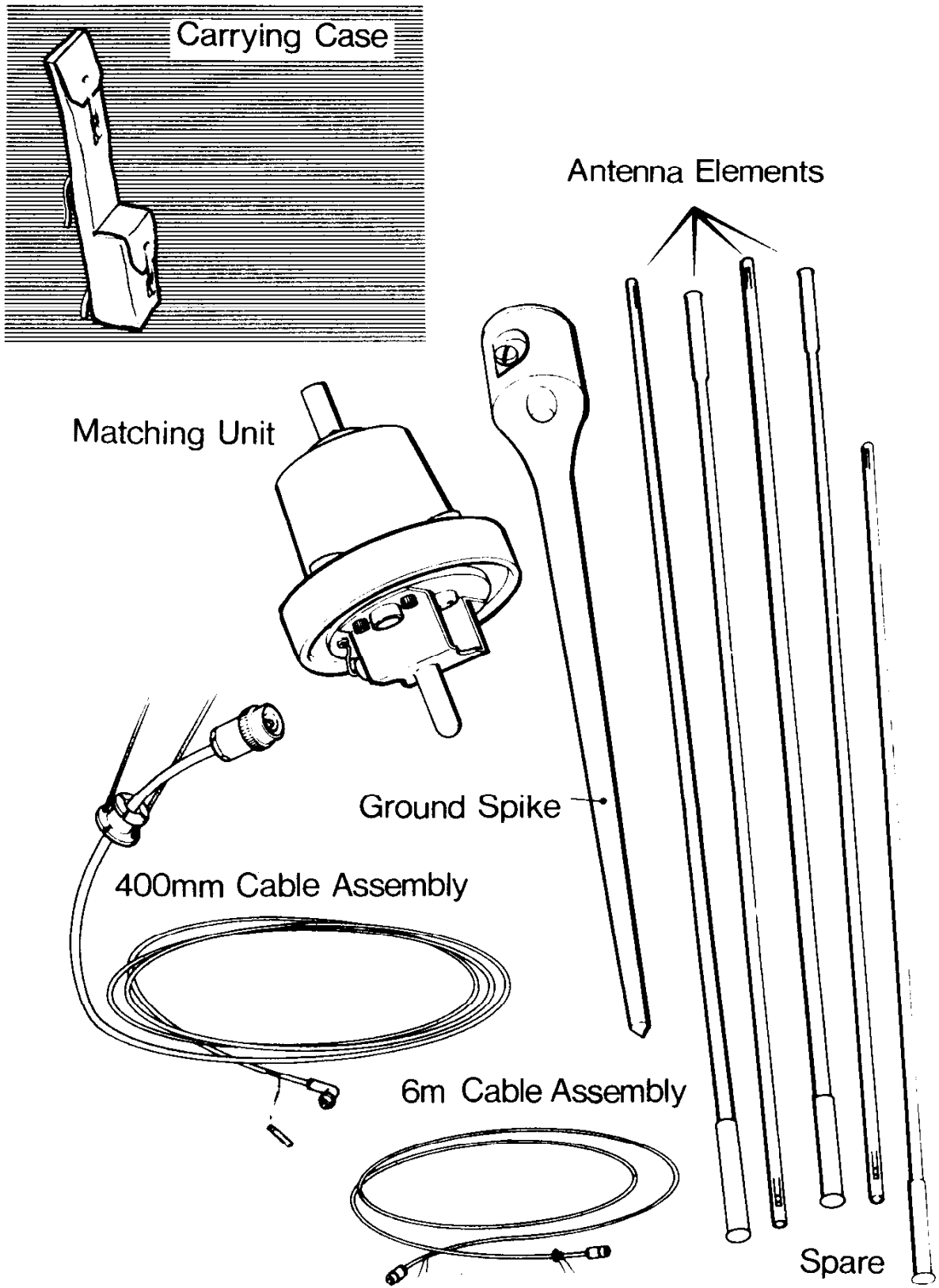


Fig 86.—VHF Ground Spike Antenna—Components

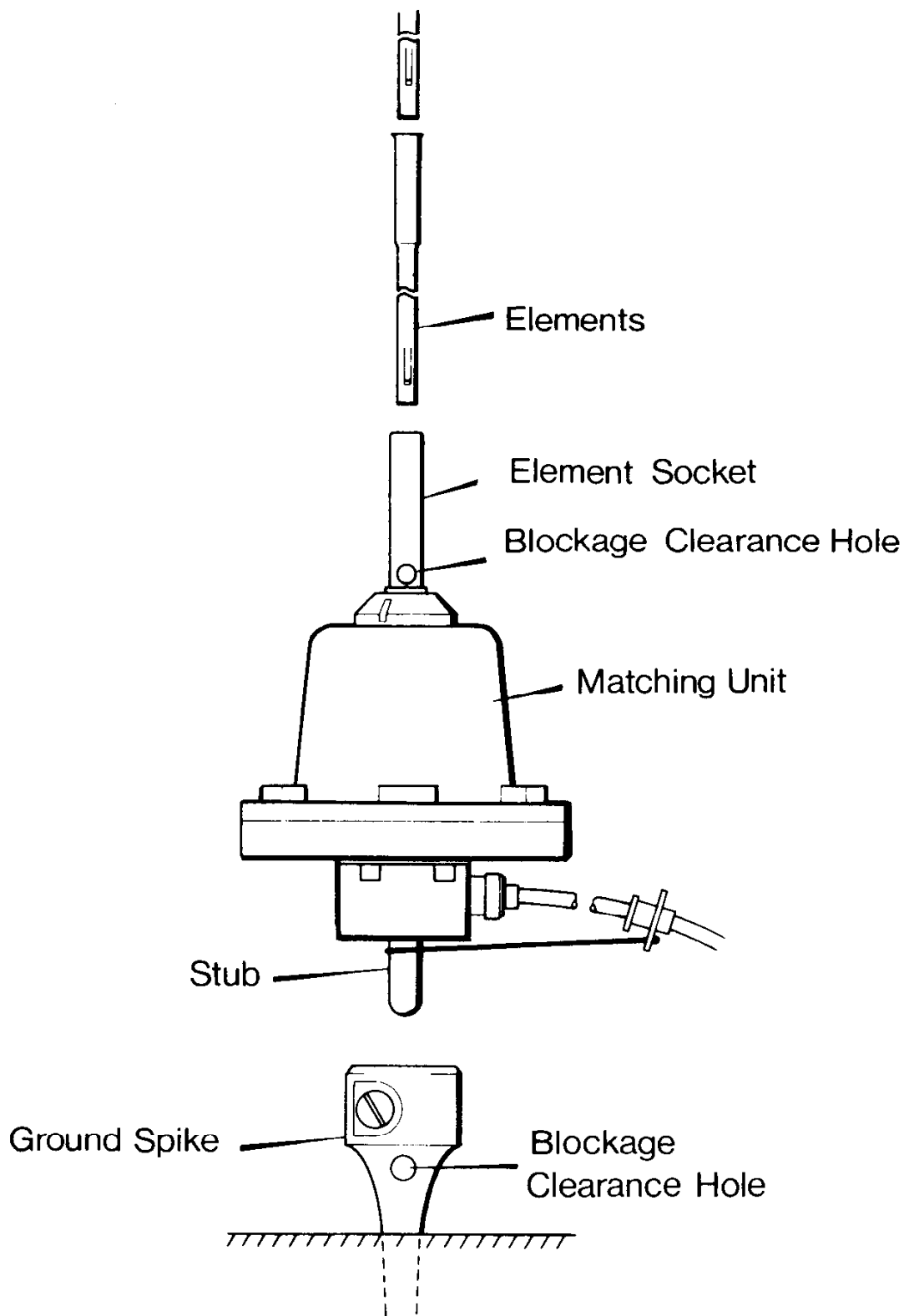
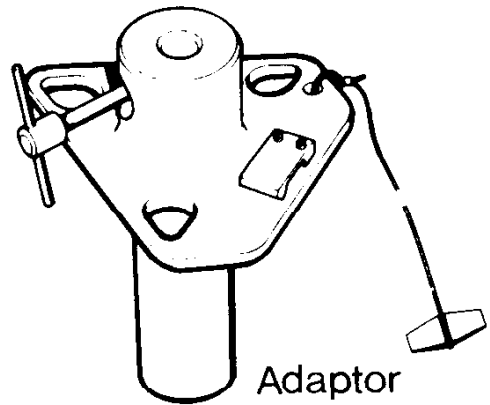
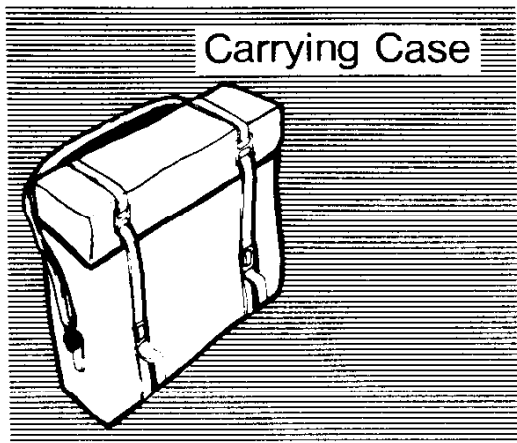
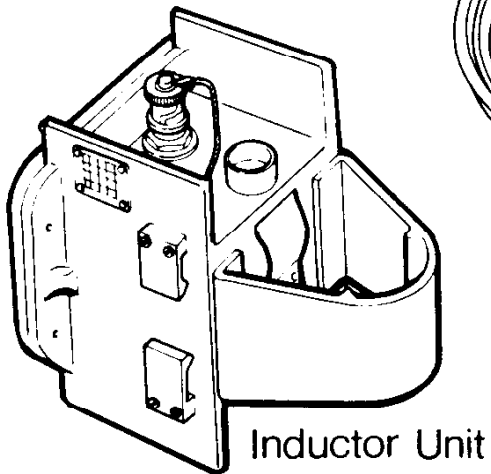
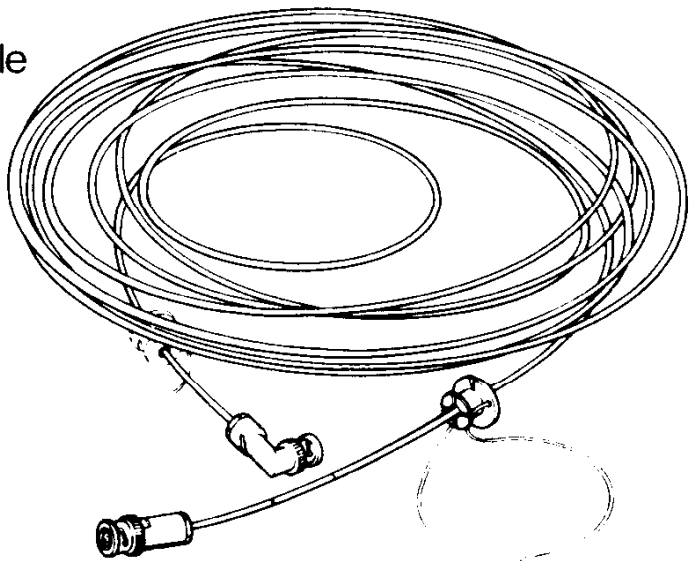


Fig 87.—VHF Ground Spike Antenna—Assembly



20m Cable



Three Cable Assemblies each identified by number of Beads located at cable ends

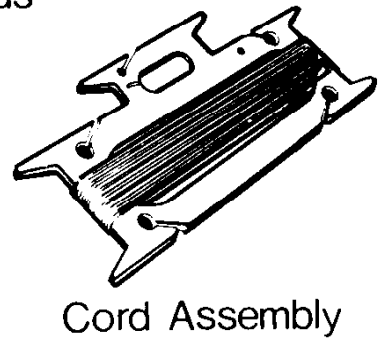
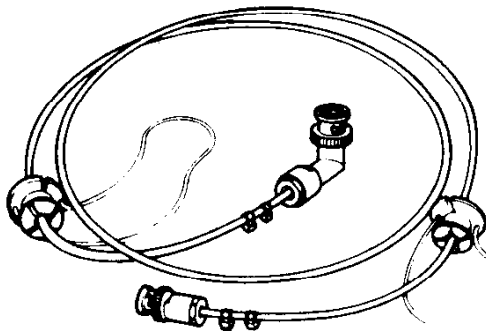
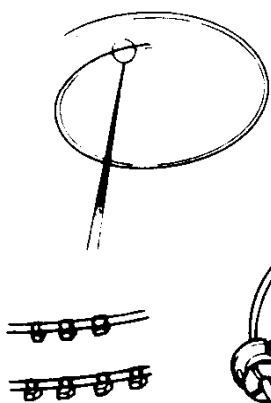


Fig 88.—VHF Elevated Ground Spike Antenna—Components

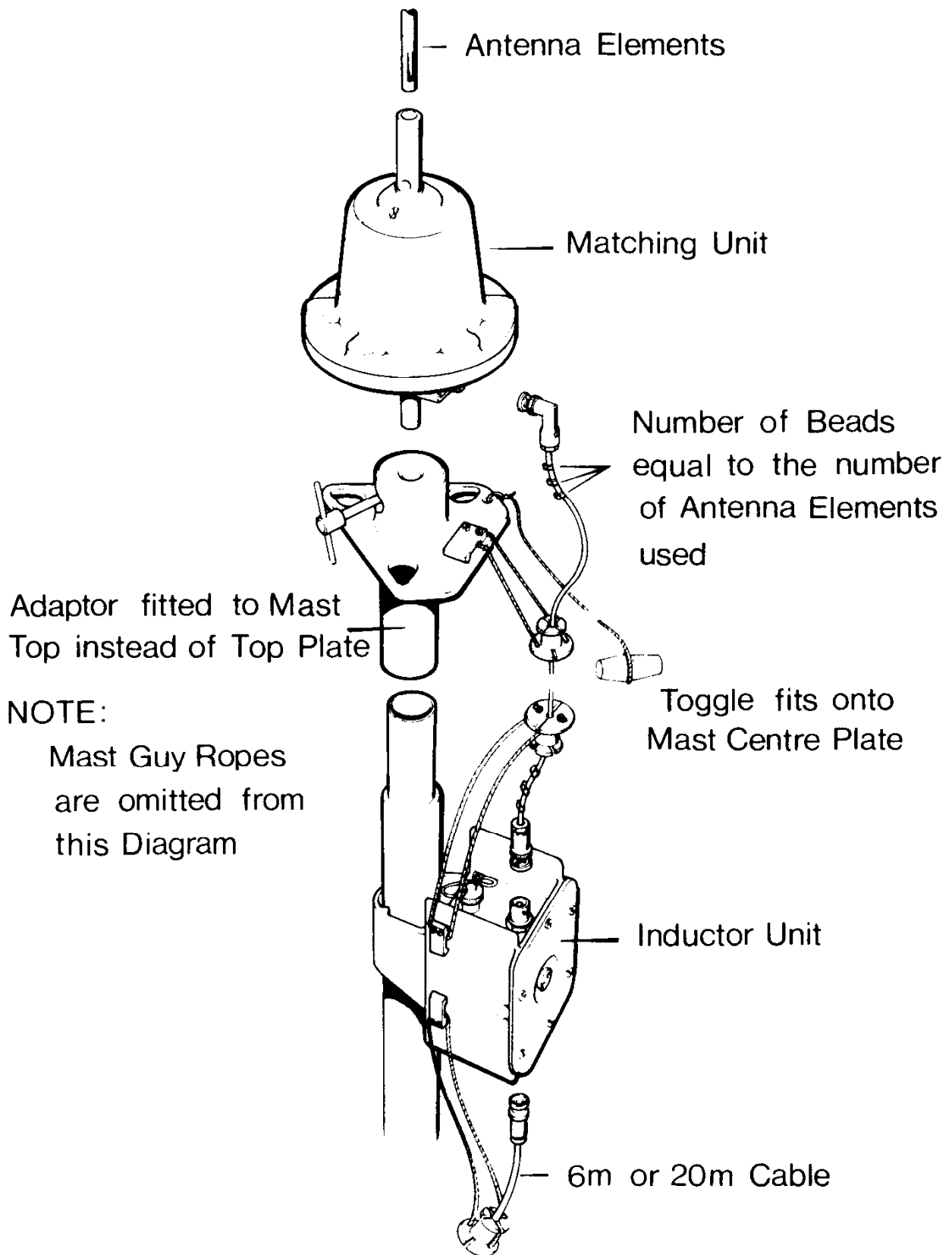


Fig 89.—VHF Elevated Ground Spike Antenna Assembly, Using a 5.4m Mast

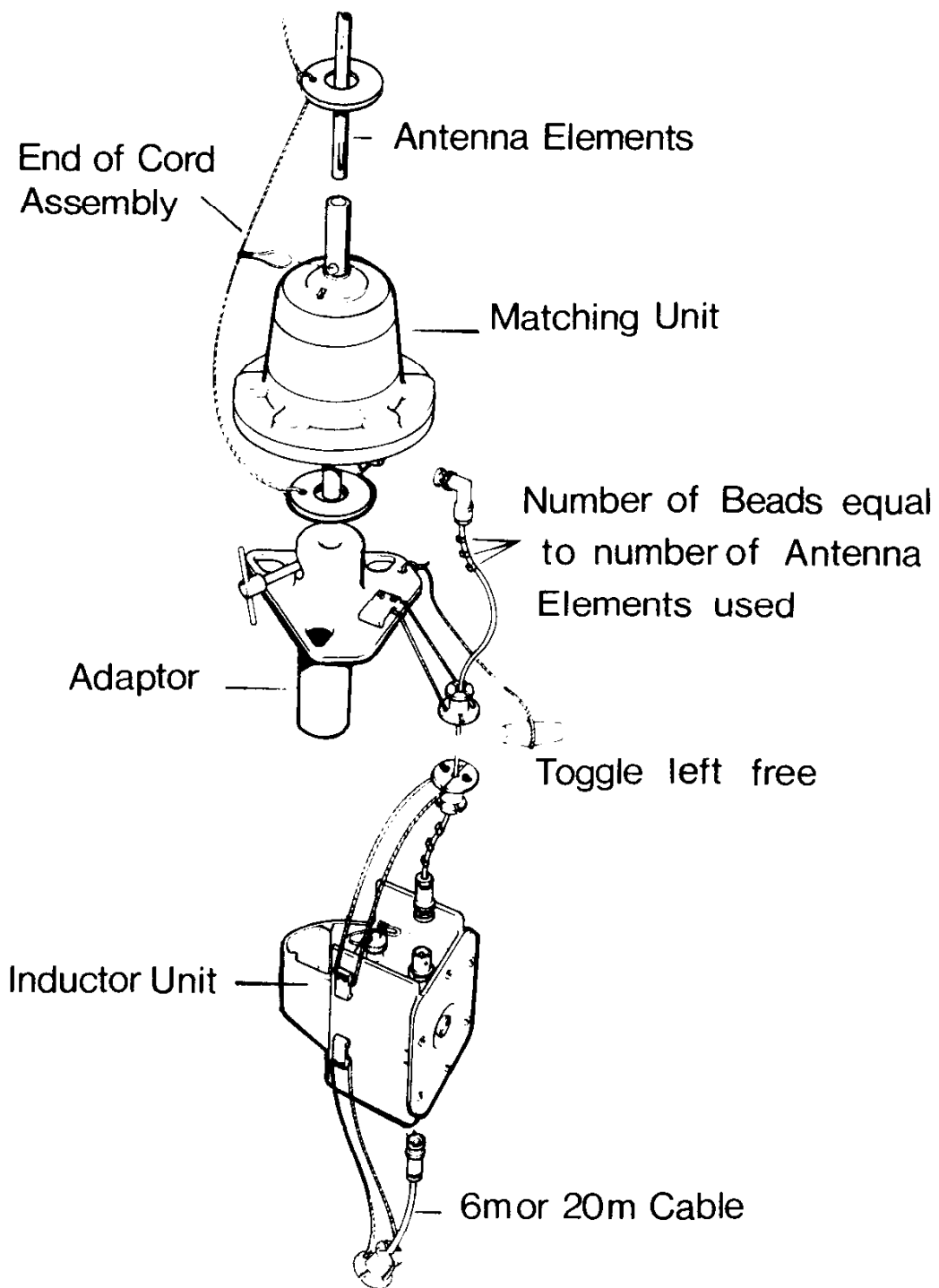


Fig 90.—VHF Elevated Ground Spike Antenna, Assembly, for Suspension

SECTION 25 – VHF GROUND MOUNTED MONOPOLE ANTENNA

Introduction

0536. *The VHF Ground Mounted Monopole* is an omnidirectional wide-band antenna consisting of a conical radiator mounted on a ground plane.

0537. The antenna was primarily designed for use with the PRC 351, PRC 352 and VRC 353 radios but it can be adapted for use with the PRC 350 using the 400mm cable assembly issued with the *Ground Spike Antenna*.

0538. The antenna is collapsible for transportation and can be carried and erected by one man.

Description

0539. *Data*

a. *Physical*

| | |
|------------------------|-------------|
| (1) Height | 1.2m |
| (2) Width when erected | 1.1m square |
| (3) Weight | 12.7kg |

b. *Components (Fig 91)*

| | |
|-----------------------|-----|
| Antenna Assembly | – 1 |
| Cable Assembly RF 6m | – 1 |
| Cable Assembly RF 15m | – 1 |
| Case Antenna | – 1 |
| Ground Spike | – 4 |
| Instruction Card | – 1 |

Assembly

0540. At the chosen site, preferably an open, level position, assemble and erect the antenna as follows (*Fig 92*):

- a. Connect the socket end of the 15m cable to the fixed plug on the antenna base ensuring the cable strainer is attached to the clip on the side of the antenna base.
- b. Stand the antenna upright and release the 2 straps which secure the folded antenna.
- c. Pull each of the 4 arms of the groundplane outwards and secure them by locking the toggle catches on the centre post to the hooks on the traverse ring.
- d. Secure the antenna to the ground by pushing the ground spikes through the holes in the tips of the groundplane arms.

e. Connect the antenna to the radio, depending on type, as follows:

(1) For the PRC 351, PRC 352 or VRC 353 radios connect the straight plug on the 6m cable to the 15m cable via the cable adaptor and connect the right angle plug of the 6m cable direct to the antenna socket on the radio ensuring all cable strainers are secured.

(2) To adapt the antenna to fit the PRC 350, the 400mm cable supplied with the *Ground Spike Antenna* is connected between the 6m cable and the antenna socket on the radio.

Dismantling

0541. Dismantle the antenna in reverse order of assembly ensuring that all items are thoroughly cleaned and that the protective dust caps are fitted to the antenna base and cable adaptor before stowing all items in the antenna case.

0542.–0550. *Reserved.*

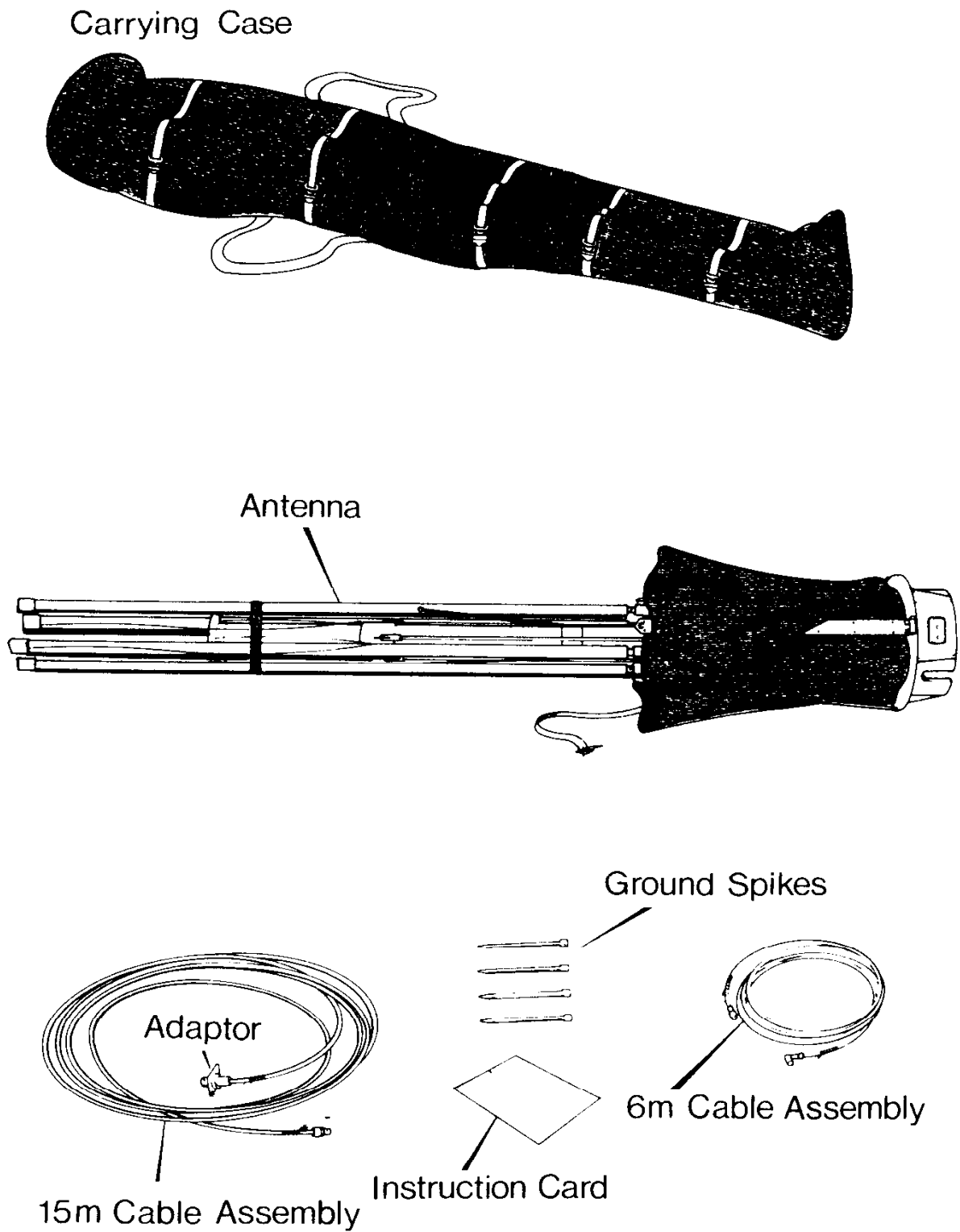


Fig 91.—VHF Ground Mounted Monopole—Components

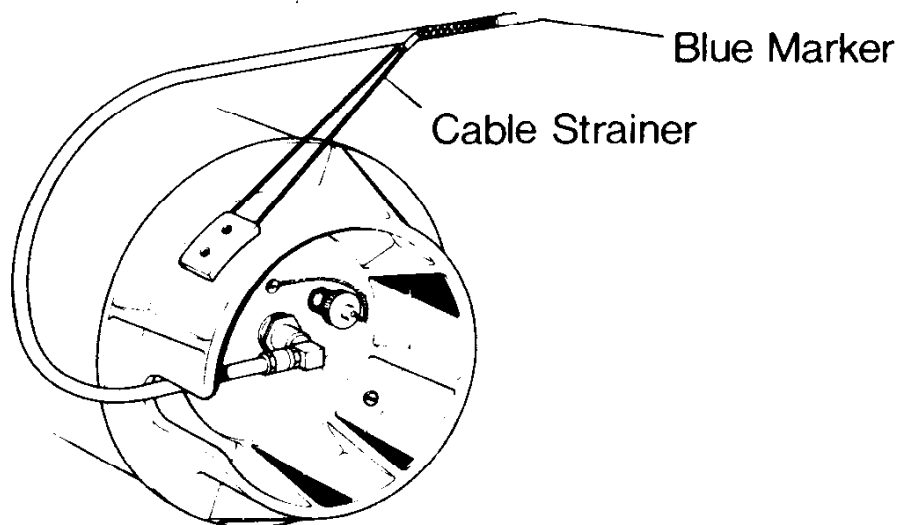
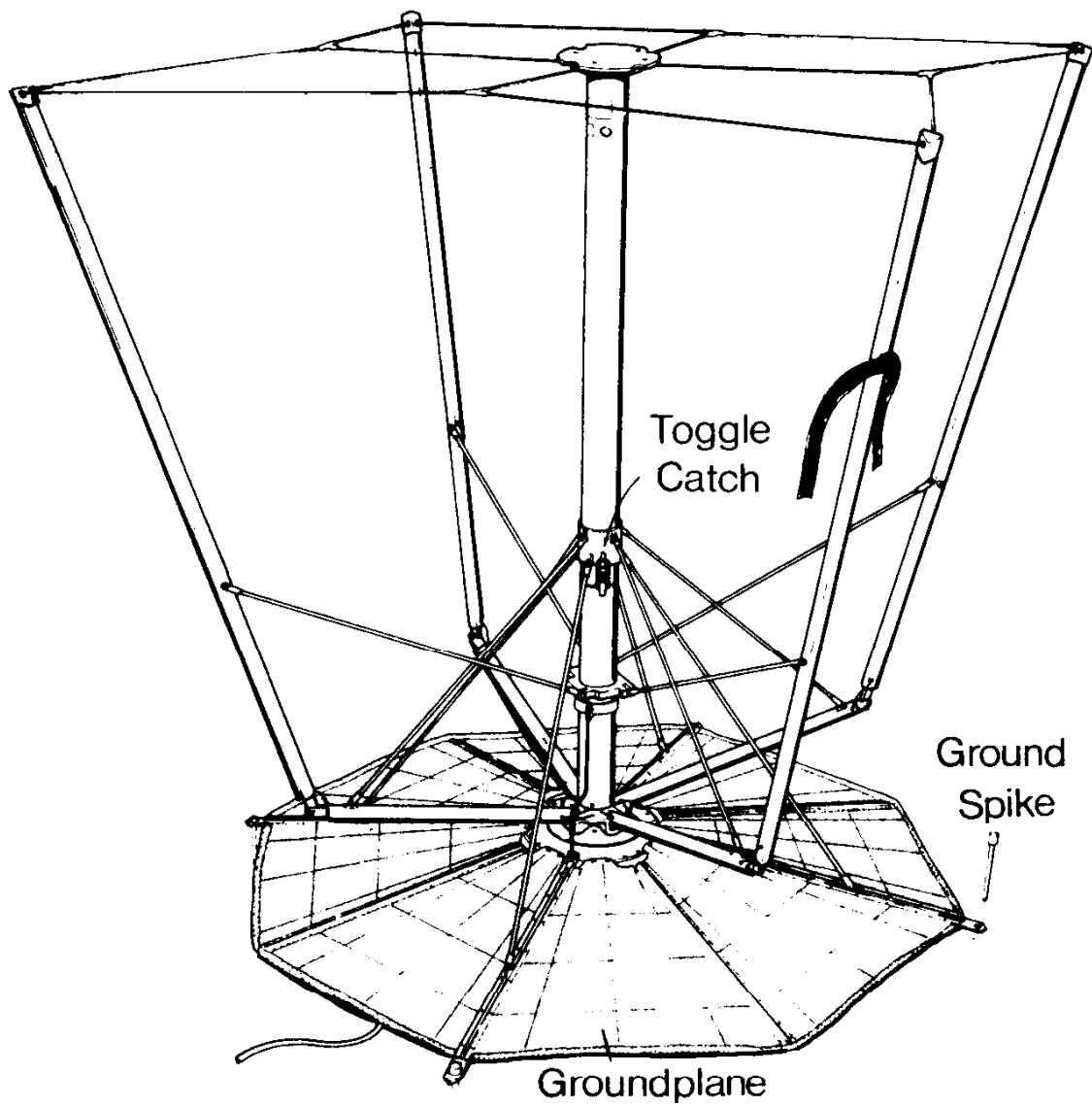


Fig 92.—VHF Ground Mounted Monopole—Assembly

SECTION 26 – VHF INVERTED ‘V’ ANTENNA

Introduction

0551. *The VHF Inverted ‘V’* is a directional wide-band long wire type antenna normally used for long range working.

0552. The antenna system is supported in the centre by a 9m mast and anchored at each end to pickets. The 9m mast is provided by using the 12m mast with the top and bottom sections in the retracted position.

0553. This antenna was designed for use with the PRC 351, PRC 352 and VRC 353 radios. It can be adapted for use with the PRC 350 using the 400mm cable issued with the *Ground Spike Antenna*.

0554. The erection of this antenna is a 2 man operation although it is possible for one man to erect it in ideal conditions.

Description

0555. **Data.**

a. *Physical*

| | |
|-------------------------|------|
| (1) Height when erected | 9m |
| (2) Length when erected | 33m |
| (e) Weight | 11kg |

b. *Components (Fig 93)*

| | |
|-----------------------|-----|
| Antenna Element | – 2 |
| Cable Assembly RF 6m | – 1 |
| Cable Assembly RF 15m | – 1 |
| Carrying Case | – 1 |
| Mast Cap | – 1 |
| Picket | – 2 |
| Resistance Unit | – 1 |
| Transformer Unit | – 1 |
| Instruction Sheet | – 1 |

Assembly

0556. At the chosen site, an unobstructed space 33m long and 9m high in line with the distant station, assemble and erect the antenna as follows (*Fig 94*):

a. Unwind one of the antenna wires from its dispenser and lay it along the ground in line with the distant station. Since this is a directional antenna, it should if possible be laid out on a compass bearing. This wire will be used as the earth.

b. Assemble and erect but do not raise the 12m mast at the centre of the earth wire which is indicated by the 2 marker beads.

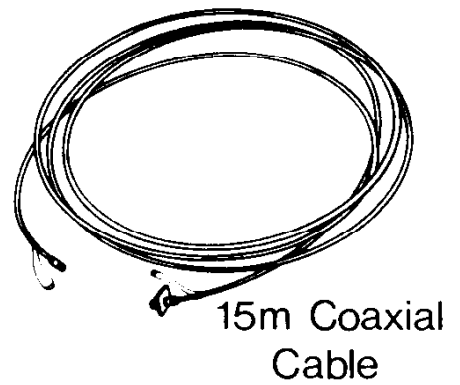
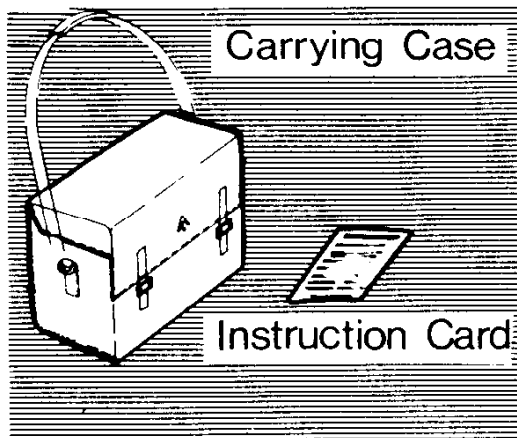
- c. Fit the mast cap assembly into the top section of the mast and secure it by tightening the clamp screw.
- d. Unwind the second antenna wire from its dispenser, laying it along side the earth wire.
- e. Place the antenna wire in the slot of the mast cap ensuring the mast cap is between the 2 bead markers at the centre of the wire.
- f. Raise and secure the mast to a height of 9m in accordance with Section 30. The height of 9m is attained by leaving the top and bottom sections in the retracted position.
- g. Pull the antenna wire taut by placing the plastic strainer plates over the pickets and drive the pickets into the ground with the flat face nearest to the mast (*Fig 95*).
- h. Fit both ends of the earth wire to the pickets by hooking the hole of the plastic strainer over one side of the U-shaped stop on the pickets (*Fig 95*). The earth wire will now be loose, this looseness should be taken up using a sheep shank knot and not coiled.
- j. Clamp the transformer and resistance units to the flat face of the pickets (*Fig 94*), ensuring the resistance unit is on the picket nearest to the distant station.
- k. Connect the earth and antenna wires to the appropriate terminals on the transformer and resistance units (*Fig 95*).
- l. Connect the socket of the 15m cable at the end without the adaptor to the plug on the transformer unit and secure it by looping the cable strainer over the U-shaped stop on the picket.
- m. Connect the antenna to the radio, depending on type, as follows:
 - (1) For the PRC 351, PRC 352 and VRC 353 radios, connect the straight plug on the 6m cable to the 15m cable via the adaptor and connect the right angle plug on the 6m cable direct to the antenna socket on the radio ensuring the cable strainers are used for security.
 - (2) To adapt the antenna for use with the PRC 350, the 400mm cable supplied with the *Ground Spike Antenna* must be connected between the radio and the 6m cable.

Dismantling

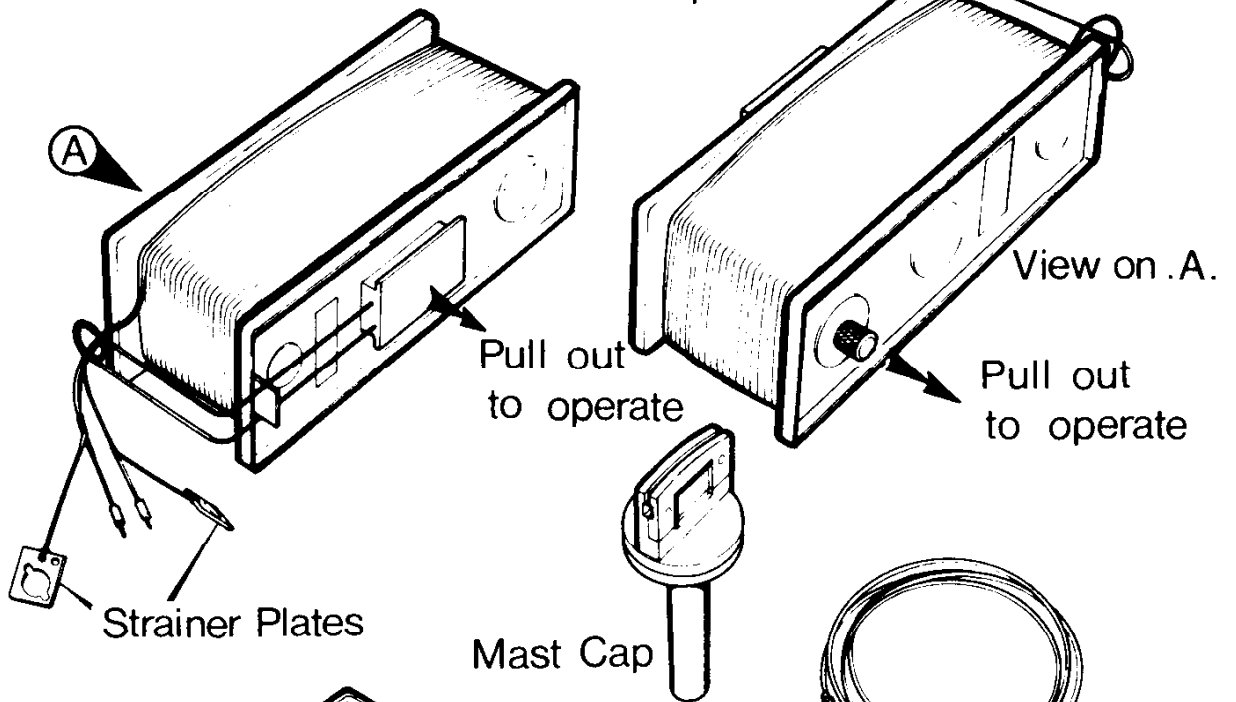
0557. Dismantle the antenna in reverse order of assembly ensuring all items are thoroughly cleaned and that the protective dust caps are fitted to the transformer unit and cable adaptor before stowing in the carrying case.

0558. Particular attention is to be paid to the reeling in of earth and antenna wires. Fold the wire so that the ends are level and pass the loop formed at the centre through the wire guide on the dispenser and then onto the button provided. Wind up keeping the wire taut.

0559.-0570. *Reserved.*

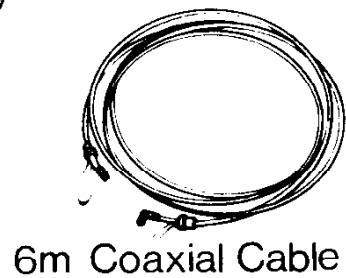


Antenna/Earth
Dispensers

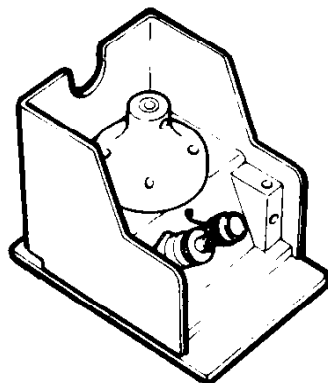
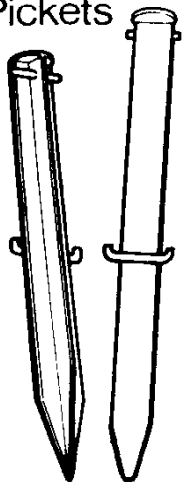


Strainer Plates

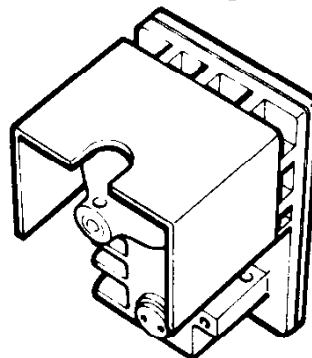
Mast Cap



Pickets



Transformer
R F Coupling



Resistance
Terminating
Unit

Fig 93.—VHF Inverted 'V' Antenna-Components

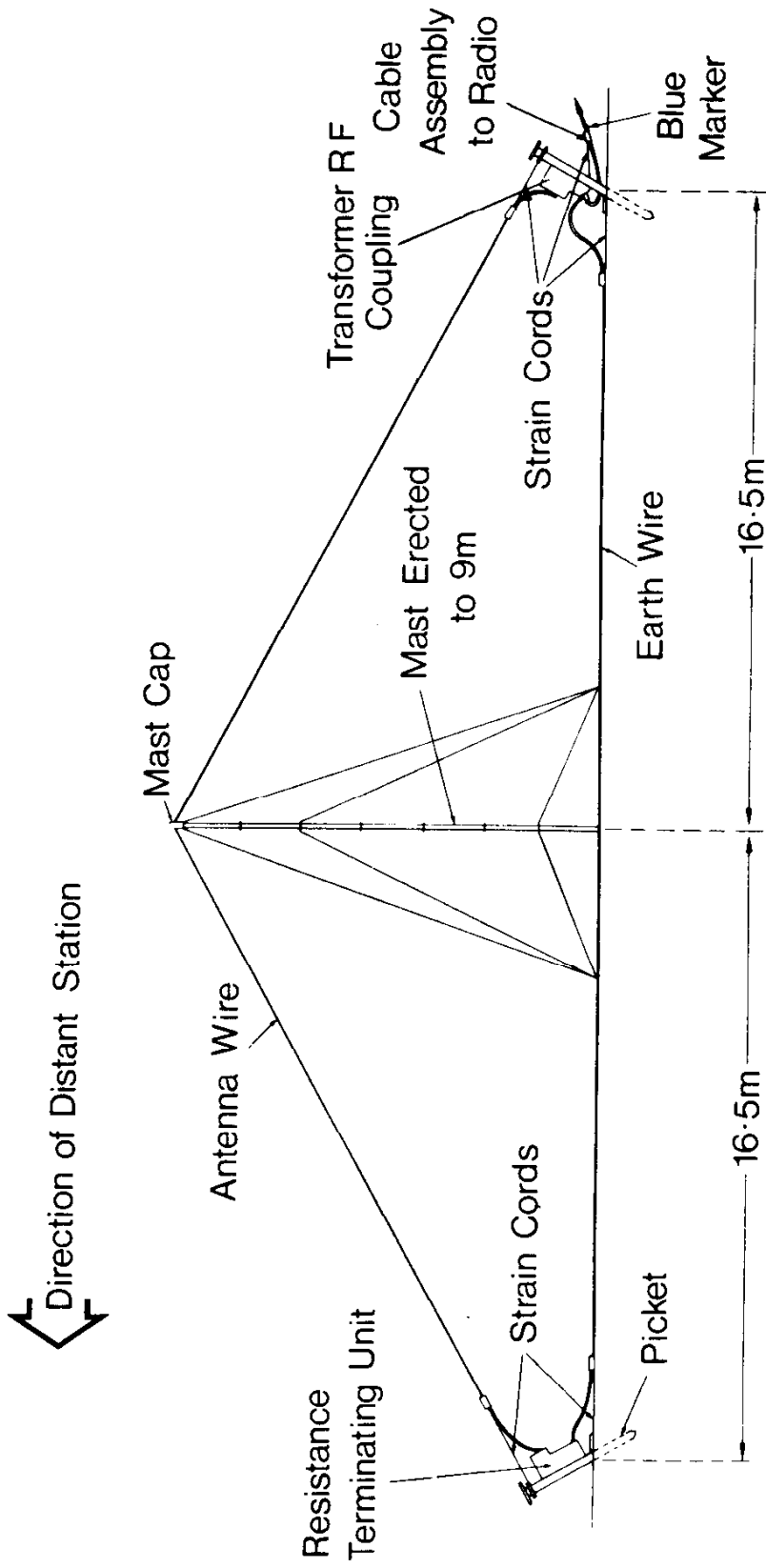


Fig 94.—VHF Inverted 'V' Antenna—Erected

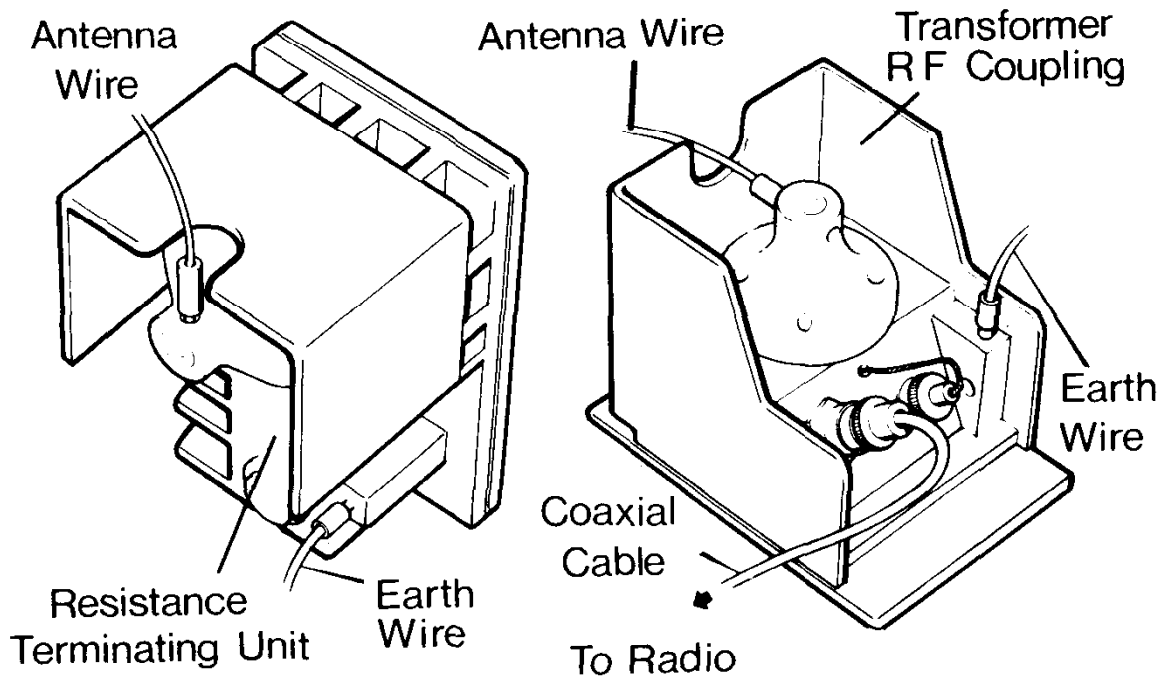
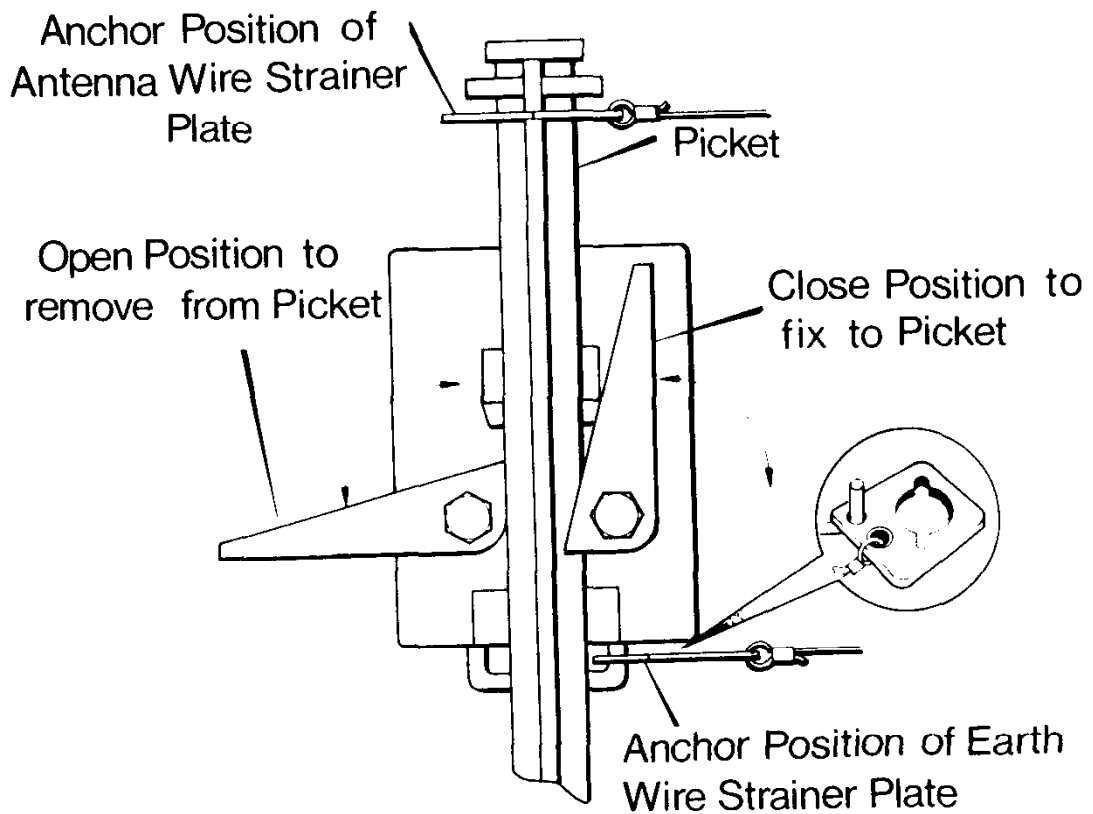


Fig 95.—Transformer and Resistor Unit for Inverted 'V' Antenna

SECTION 27 – VHF ELEVATED BROADBAND ANTENNA

Introduction

0571. *The VHF Broadband* is an omnidirectional centre fed dipole antenna which can be elevated using either the 8m or 12m mast. The use of one elevated antenna will increase the range of the radio in use by approximately 50%.

0572. This antenna was primarily designed for use with the VRC 353 but will still give an increased range when used with the PRC 351 or PRC 352. It can be adapted for use with the PRC 350 using the 400mm cable assembly issued with the *Ground Spike Antenna*.

0573. The antenna system can be erected by one man when used with the 8m mast, but it is suggested that if the 12m mast is used it then becomes a 2 man operation.

Description

0574. **Data.**

a. *Physical*

| | |
|---------------------------|-------|
| (1) Height excluding mast | 3.4m |
| (2) Weight | 6.3kg |

b. *Components (Fig 96)*

| | |
|-----------------------|-----|
| Antenna Element | – 1 |
| Antenna Whip Sections | – 2 |
| Base Antenna Element | – 1 |
| Cable Assembly RF 6m | – 1 |
| Cable Assembly RF 15m | – 1 |
| Case Ancillaries | – 1 |
| Case Antenna | – 1 |

Assembly

0575. At the chosen site, assemble and erect the antenna as follows:

- a. Assemble and erect but do not raise the 8m or 12m mast as detailed in *Sections 29 and 30*.
- b. Insert the antenna base into the top section of the mast and secure by tightening the clamp screw.
- c. Screw all 3 antenna elements together and screw complete antenna into the top of the antenna base.
- d. Connect the socket end of the 15m cable to the fixed plug on the antenna base ensuring the cable strainer is attached to the clip on the side of the antenna base.
- e. Raise and secure the mast to its full height as described in *Section 29 or 30*.

- f. Connect the antenna to the radio, depending on type, as follows:
- (1) For the PRC 351, PRC 352 or VRC 353 radios, connect the straight plug of the 6m cable to the socket of the 15m cable via the socket adaptor. Connect the right angle plug of the 6m cable direct to the antenna socket on the radio ensuring all cable strainers are used.
 - (2) To adapt this antenna for use with the PRC 350, the 400mm cable assembly issued with the *Ground Spike Antenna* is connected between the 6m cable and the radio antenna socket.

Dismantling

0576. Dismantle the antenna in the reverse order of assembly ensuring that all items are thoroughly cleaned and that the protective dust caps are fitted on the antenna base and cable adaptor before stowing all items in their relevant cases.

0577.–0590. *Reserved.*

SECTION 28 – 5.4m MAST

Introduction

0591. *The 5.4m Mast* is a lightweight mast comprising of 6 fibreglass tubular sections, which when fitted together can be used as an antenna support, a 5.4 vertical radiator or a 7.9 vertical radiator (*2.4m whip added*).

0592. This mast can be carried and erected by one well trained man. However, if 2 men are used, it both simplifies and cuts down the time of erection. This mast should only be used as a last resort especially on operations.

0593. **Data.**

a. *Physical*

| | |
|-----------------------------|-------|
| (1) Height when erected | 5.4m |
| (2) Length in carrying case | 9m |
| (3) Weight | 4.9kg |

b. *Components (Fig 97)*

| | |
|--------------|------------------------|
| Adaptor Mast | – 1 |
| Case Mast | – 1 |
| Former | – 3 |
| Guy Assembly | – 6 |
| Mast Section | – 6 |
| Peg Assembly | – 5 (<i>2 spare</i>) |
| Plate Guy | – 2 |
| Plate Tie | – 1 |

Assembly

0594. At the chosen site, assemble and erect the mast as follows (*Fig 98*):

- a. Lay all 6 sections of the mast end to end along the ground and fit together, interposing a guy plate between the third and fourth sections and the tie plate between the lowermost 2 sections.
- b. Fit the appropriate component(s) to the top of the mast:
 - (1) *For 5.4m vertical radiator.* Fit second guy plate and adaptor complete with down lead ensuring the down lead is threaded down through the small holes in the guy plates.
 - (2) *For 7.9m vertical radiator.* Fit second guy plate and adaptor complete with down lead and insert a 2.4m whip antenna in the top of the adaptor. Ensure the down lead is threaded down through the small holes in the guy plates.
 - (3) *For 5.4m Support.* Fit second guy plate and ensure the throwing cord of the relevant antenna is threaded down through the small holes in the guy plates and secured to the tie plate.
 - (4) *For VHF Elevated Ground Spike.* Fit the elevated ground spike adaptor instead of the second guy plate.
- c. Unwind the guys from the formers and feed the toggles through the underside of the elongated holes in the guy plates ensuring the toggles will not pull through the holes when the guys are under tension.
- d. Drive 3 pegs into the ground equally spaced in a circle 3m from the base of the mast ensuring that the wire hooks on the pegs are facing inwards.
- e. Stand the base of the mast on the reinforced lid of the mast case in the centre of the 3 pegs and attach the loop at the end of the upper and lower guys to the relevant pegs by means of the wire hooks.
- f. Tighten the guys to maintain the mast in a vertical position.

Dismantling

0595. Dismantle the mast in the reverse order of assembly ensuring that all items are thoroughly cleaned and that the guys are neatly wound onto the formers before stowing all items in the mast case.

0596.–05100. *Reserved.*

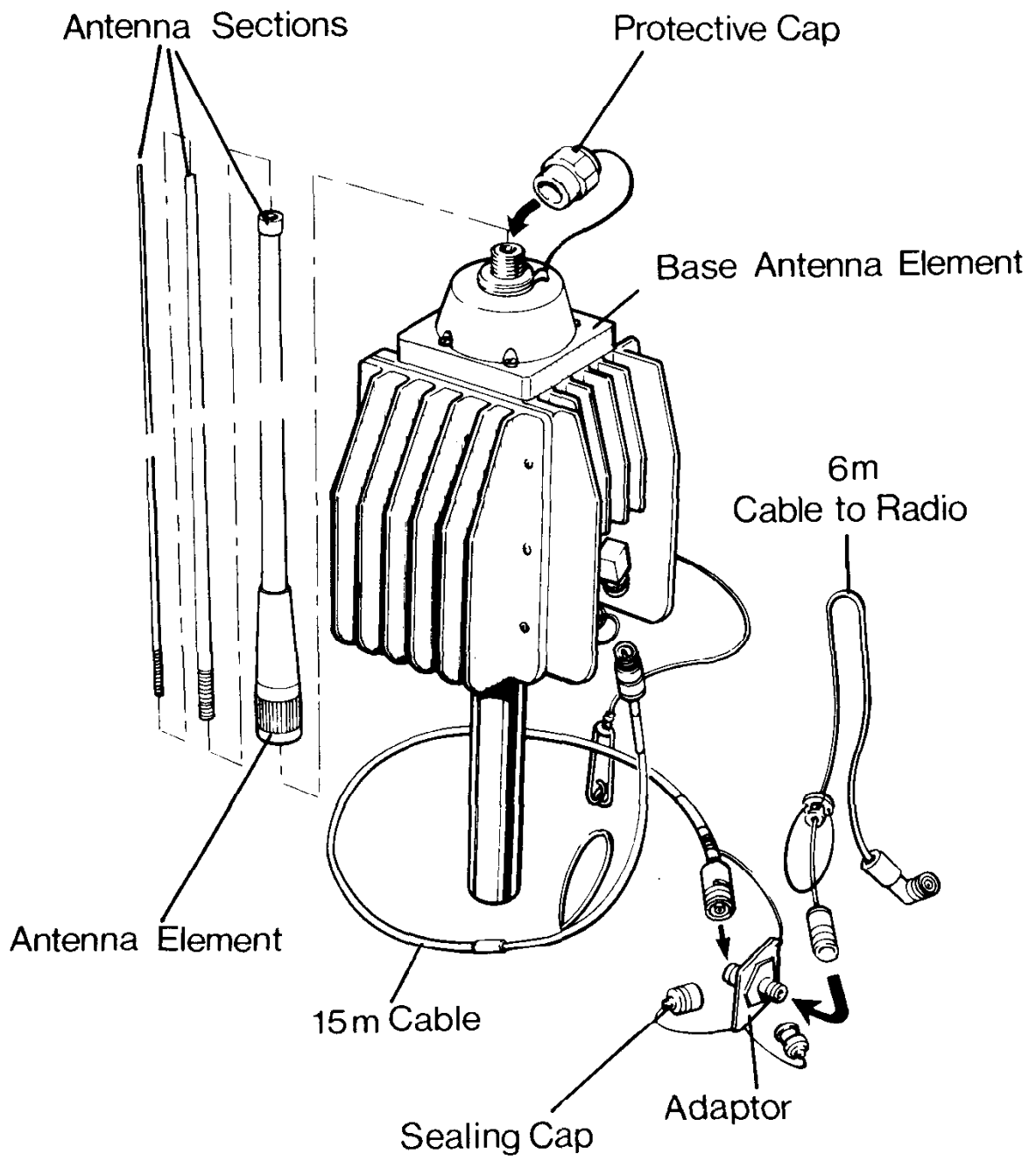


Fig 96.—VHF Elevated Broadband Antenna – Components

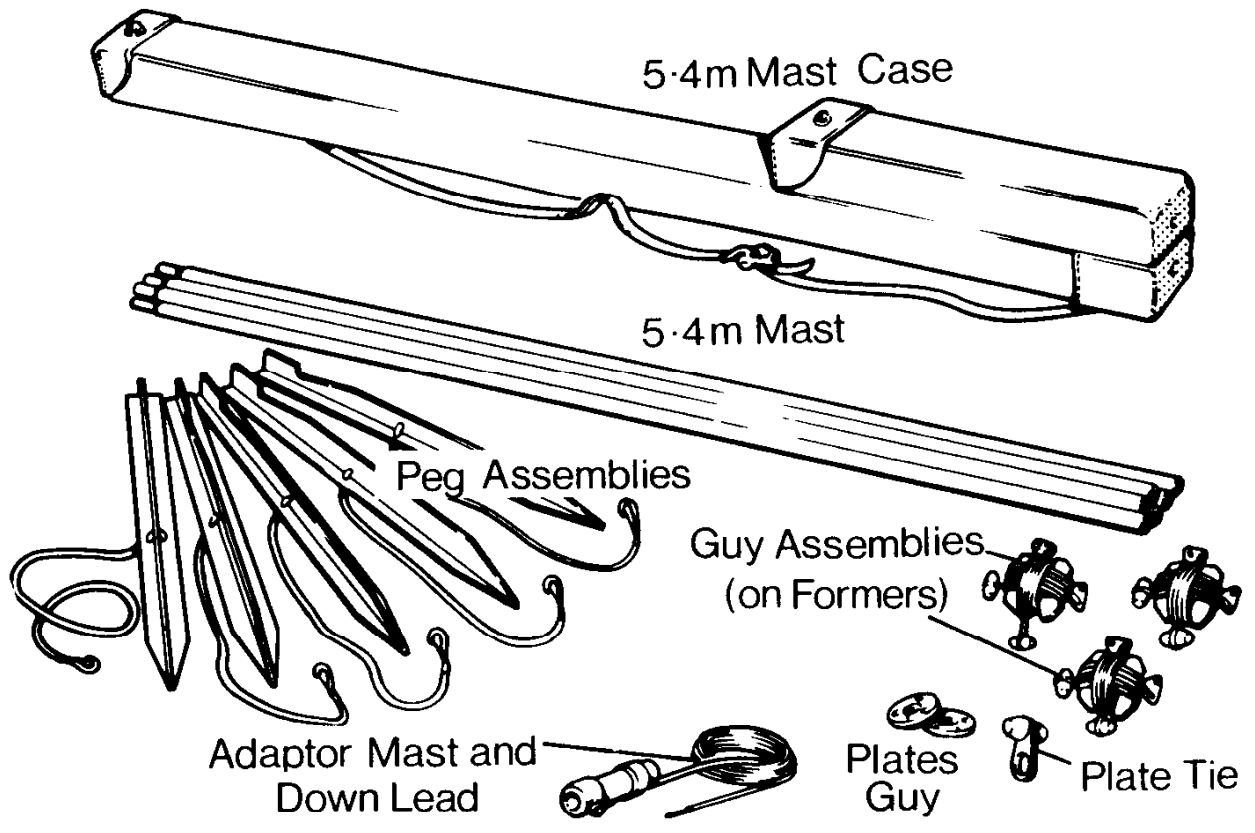


Fig 97.—5.4m Mast - Components

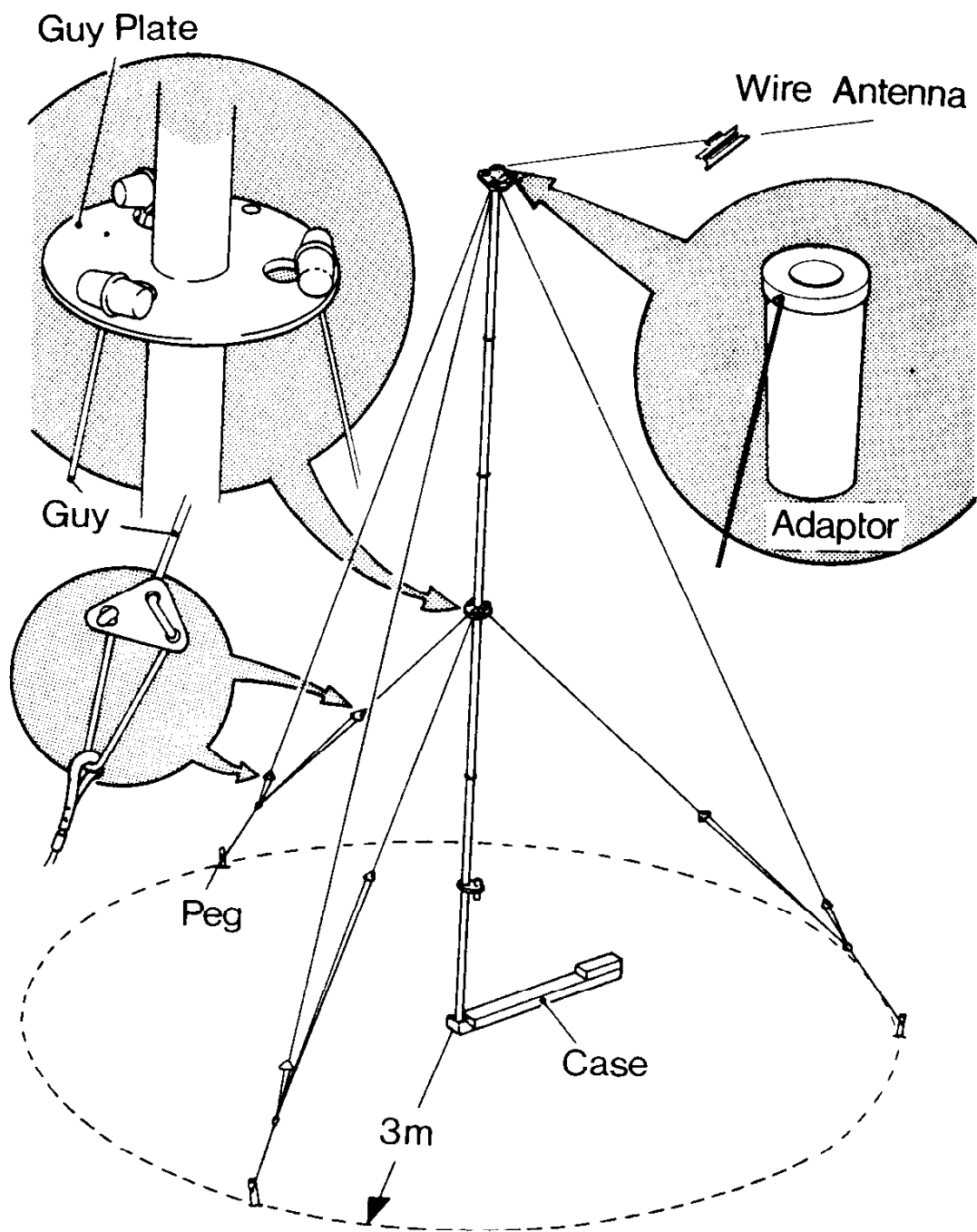


Fig 98.—5.4m Mast – Erected

SECTION 29 – 8m TELESCOPIC MAST

Introduction

05101. *The 8m Mast* is a light, alloy, 7 section telescope mast that may be used as a 'support' for an HF wire antenna or to elevate a VHF antenna.

05102. This mast is carried in a case and the accessory equipment in a webbing bag. It is manportable and can be erected by one man.

Description

05103. **Data.**

a. Physical

| | |
|----------------------------------|--------|
| (1) Height retracted | 1.4m |
| (2) Height extended | 8.0m |
| (3) Weight of complete equipment | 30.5kg |

b. Components (Fig 99)

| | |
|----------------|-----|
| Adaptor | – 1 |
| Bag Webbing | – 1 |
| Case Mast | – 1 |
| Guy Erecting | – 3 |
| Guy Middle | – 3 |
| Guy Upper | – 3 |
| Halyard | – 1 |
| Hammer | – 1 |
| Insulator | – 1 |
| Line Radius | – 1 |
| Mast Cover | – 1 |
| Mast Telescope | – 1 |
| Pin Steel | – 3 |
| Plate Mast | – 1 |
| Stake Guy | – 3 |
| Tool Kit | – 1 |

Assembly

05104. At the chosen site – preferably flat unobstructed ground, assemble and erect the mast as follows: (*See Fig 100.*)

a. Secure the baseplate to the ground by driving the 3 steel pins through the holes provided. Ensure that the slot in the baseplate is not facing downhill. If the mast is used as a support for a wire antenna, position the baseplate so that one of the pins is directly behind the line of the wire.

- b.** Insert the bobbin of the radius line into the centre of the baseplate and locate the 3 stakes at the full extent of the radius line, using the baseplate securing pins as a guide to the correct angle. Hammer the stakes into the ground at an angle of 30 degrees with the guy rings facing the baseplate. Rewind and stow the radius line.
- c.** Unwind and attach the erecting guys to the stakes by means of the snap hook ensuring that the guy tensioners are closest to the mast.
- d.** Insert the mast into the baseplate by tilting at an angle and engaging the spigot into the slot in the baseplate, slide the mast into the centre hole and bring it into a vertical position.
- e.** Clip the erecting guys to the 3 lower eyes on the mast and tighten all guys evenly until the mast is vertical as shown by the spirit level. These guys must be as tight as possible as they bear the entire load of the mast whilst erecting.
- f.** Unwind the middle guys (*indicated by the round tallies*) and clip the adjuster ends of each guy to the stakes. Clip the other end of each guy to the middle guy plate. Repeat this process with the upper guys (*indicated by the square tallies*) clipping them to the top guy plate.
- g.** If required, unwind the halyard and attach the 'S' hook to the fourth hole in the top guy plate on the mast. Ensure that the top guy plate is correctly orientated. Attach the wire antenna to the halyard.
- h.** If the mast is to be used as a support for a vertical wire antenna the base insulator must be fitted before attaching the mast to the baseplate. To do this, remove the spigot from the base of the mast and screw the base insulator into the mast in its place, rescrew the spigot into the base insulator. Insert the antenna adaptor into the socket at the top of the mast and tighten the clamp screw. Depending on the height of antenna required, insert the 2.4m whip antenna into the antenna adaptor. Attach the down lead to the adaptor and unwind the down lead so that it will pay out when the mast is raised.
- j.** Ensure that all guys, halyard and down lead are free from tangles and that all clamp levers on the mast are in the closed position.
- k.** Raise the mast by releasing the top clamp lever and lifting the top section until it is fully extended, close the clamp lever. Repeat this process with the remaining sections until the mast is fully extended.
- l.** Adjust the middle and upper guys to secure the mast in a vertical position.

Dismantling

05105. Dismantle the mast in the reverse order of assembly ensuring that all items are thoroughly cleaned and that the guys are wound onto the formers and tied with the cord before checking the items and stowing them in the carrying bag.

05106.–05110. *Reserved.*

SECTION 30 – 12m TELESCOPIC MAST

Introduction

05111. *The 12m Mast* is a light, alloy, 8 section telescopic mast that may be used as a support for an HF wire antenna or to elevate a VHF antenna.

05112. This mast is carried in a case and the accessory equipment in a metal box. It is man portable and although it is possible for one man to erect it, 2 men make the ideal team for all weather conditions.

05113. **Data.**

a. *Physical*

| | |
|----------------------------------|--------|
| (1) Height retracted | 1.8m |
| (2) Height extended | 11.4m |
| (3) Weight of complete equipment | 32.7kg |

b. *Components (Fig 101)*

| | |
|-----------------------|-------------------------|
| Mast Telescopic 12m | – 1 |
| Pin Cross Locking | – 16 (<i>8 spare</i>) |
| Carrying Strap | – 1 |
| Cover Nylon | – 1 |
| Adaptor Antenna | – 1 |
| Base Mast | – 1 |
| Equipment Box | – 1 |
| Guy Upper | – 6 |
| Guy Lower | – 2 |
| Guy Lower with anchor | – 1 |
| Halyard Antenna | – 1 |
| Hammer | – 1 |
| Insulator | – 1 |
| Line Radius | – 1 |
| Pins Steel | – 2 |
| Stake Guy | – 3 |
| Tool Kit | – 1 |

Assembly

05114. At the chosen site – preferably flat unobstructed ground, assemble and erect the mast as follows: *(See Fig 102)*

- a. Secure the baseplate to the ground by driving the 2 steel pins through the holes provided.
- b. Insert the base insulator into the ring of the radius line and insert the insulator into the base plate.
- c. Using the yellow guide lines on the baseplate, locate the 3 stakes at the full extent of the radius line and hammer the stakes into the ground at an angle of 30 degrees with the guy rings facing inwards. Rewind the radius line and re-insert the insulator in the baseplate.
- d. Attach the lower guys to the bottom eyelets on the stakes by means of the snap hooks and lay the tensioner ends of the guys by the baseplate.
- e. Insert the mast in the base insulator and hold upright, slip the guy tensioners on the lower guys into the sockets on the lower mast collar and tighten all guys evenly until the mast is in a vertical position as indicated by the spirit level. One of the guys has an extra tensioner, slip this into the lug on the baseplate and tension hard. This is the anchor guy and prevents the mast from being lifted from the baseplate during erection.
- f. Hook the 3 upper guys to the top guy collar and attach the tensioners to the upper fixing holes on the stakes ensuring the guys are fully unwound.
- g. Attach the antenna, antenna adaptor or halyard adaptor *(if issued)* to the top of the mast, the mast is now ready for erection.
- h. Unlatch the top guy collar, lift up the top section by hand until the cross hole shows clear. Remove a cross pin from its holder and insert it right through the hole and lock by turning the tail half a turn. Repeat this procedure until the mast is fully extended.
- j. Take up the slack on the upper group by pulling the guys through the tensioners attached to the stakes. Adjust so that the mast is in a vertical position.

Notes: (1) Use of extra guys. If the mast is being used as a support for an HF wire antenna it is recommended that the second set of upper guys be attached to the middle collar and middle fixing holes on the stakes. One set of guys must also be in line with and behind the antenna to take the strain.

(2) When using the mast as a support for the VHF inverted V antenna, the top and bottom mast sections must be left retracted. To do this, the yellow line-up dots must be in line to enable the cross pin to go through the hole in the second top section.

(3) In some circumstances, pulling out the mast sections is made easier by standing on the equipment box.

Dismantling

05115. Dismantle the mast in the reverse order of assembly ensuring that all items are thoroughly cleaned and that the guys are neatly wound onto the formers before checking the items against the list on the inside of the box lid.

05116.–05120. *Reserved.*

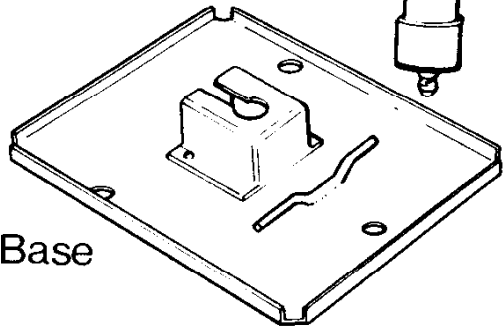
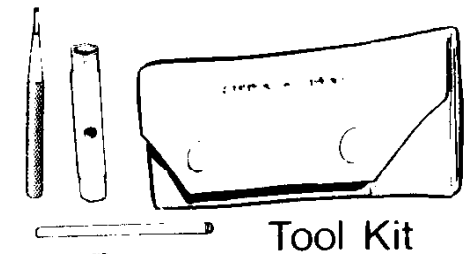
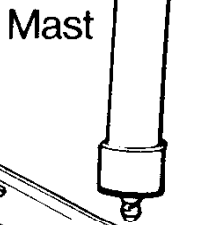
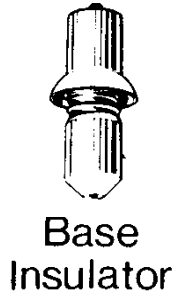
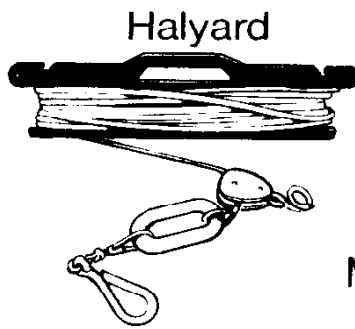
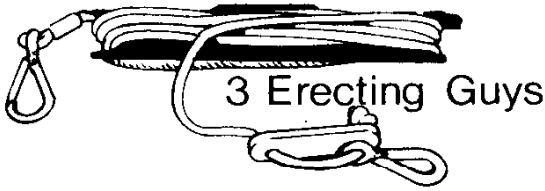
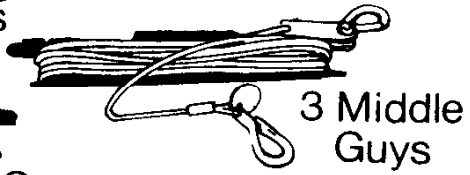
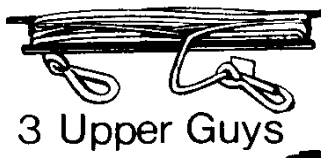
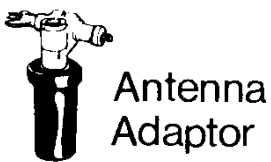
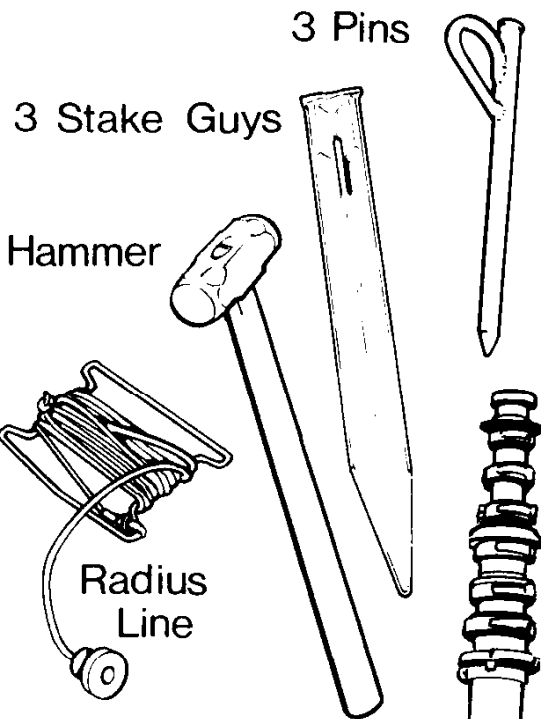
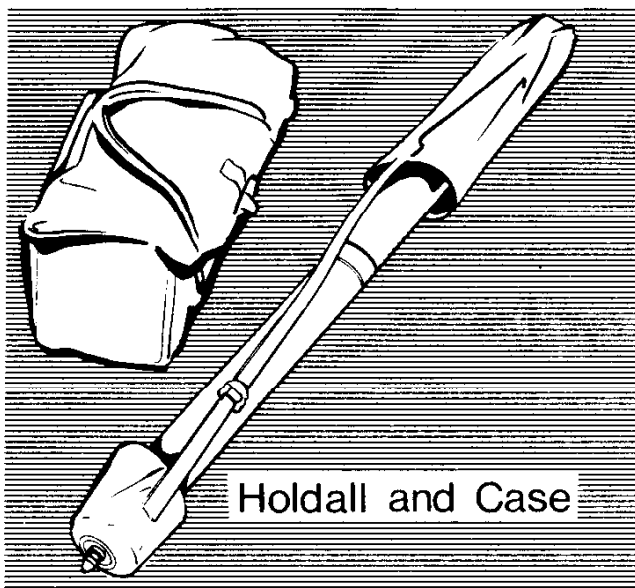


Fig 99.—8m Mast – Components

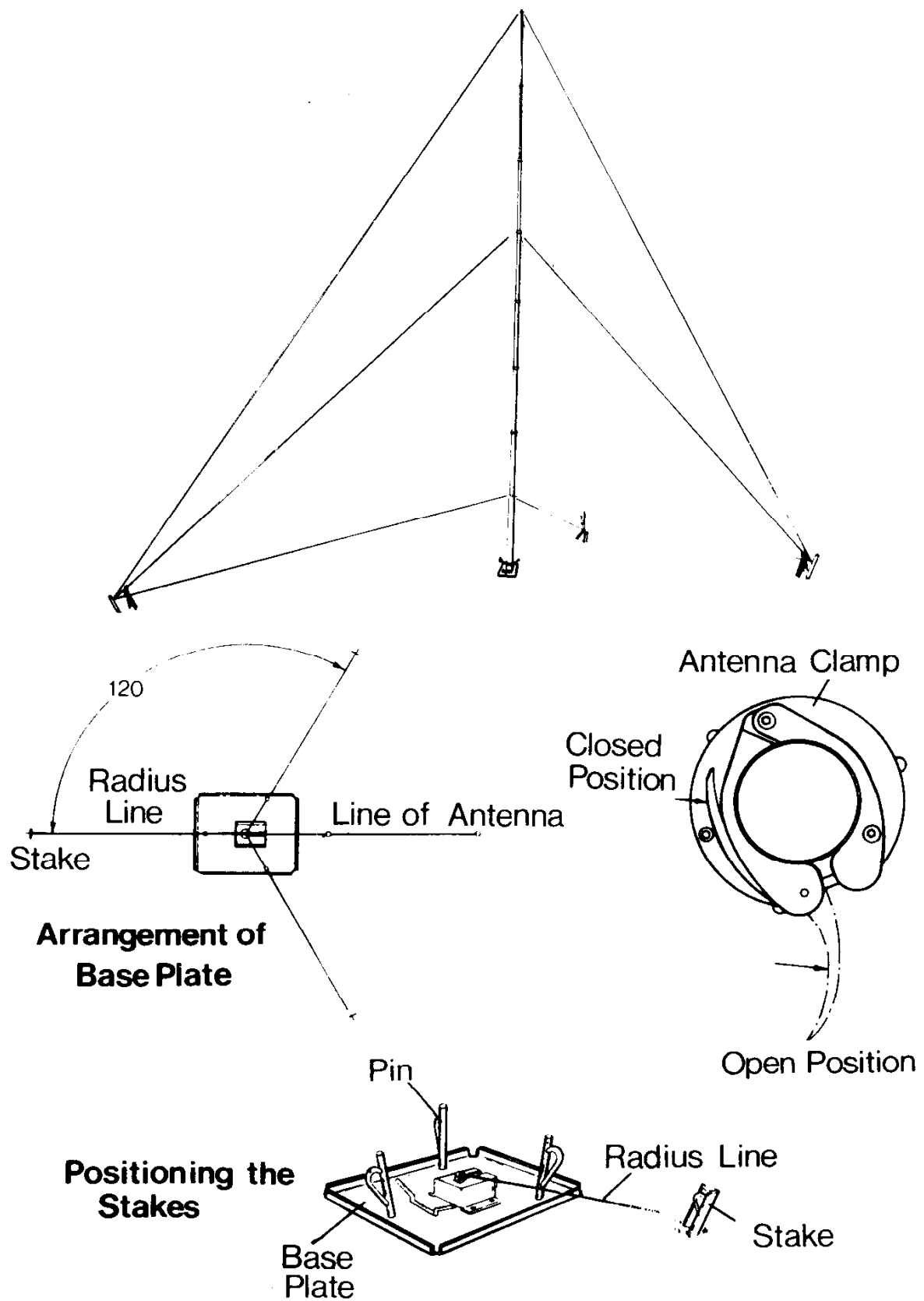


Fig 100.—8m Mast – Erected

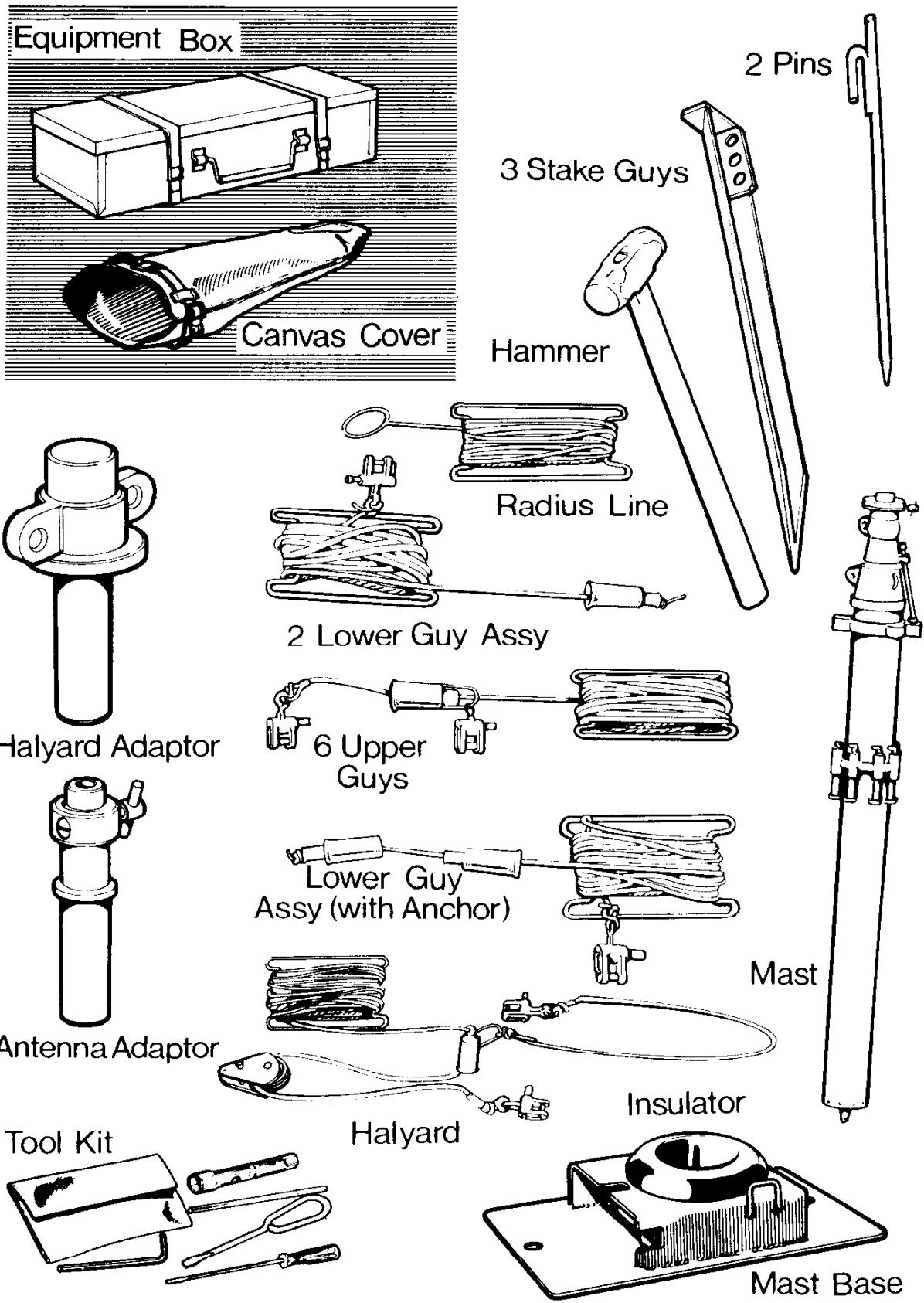


Fig 101.—12m Mast – Components

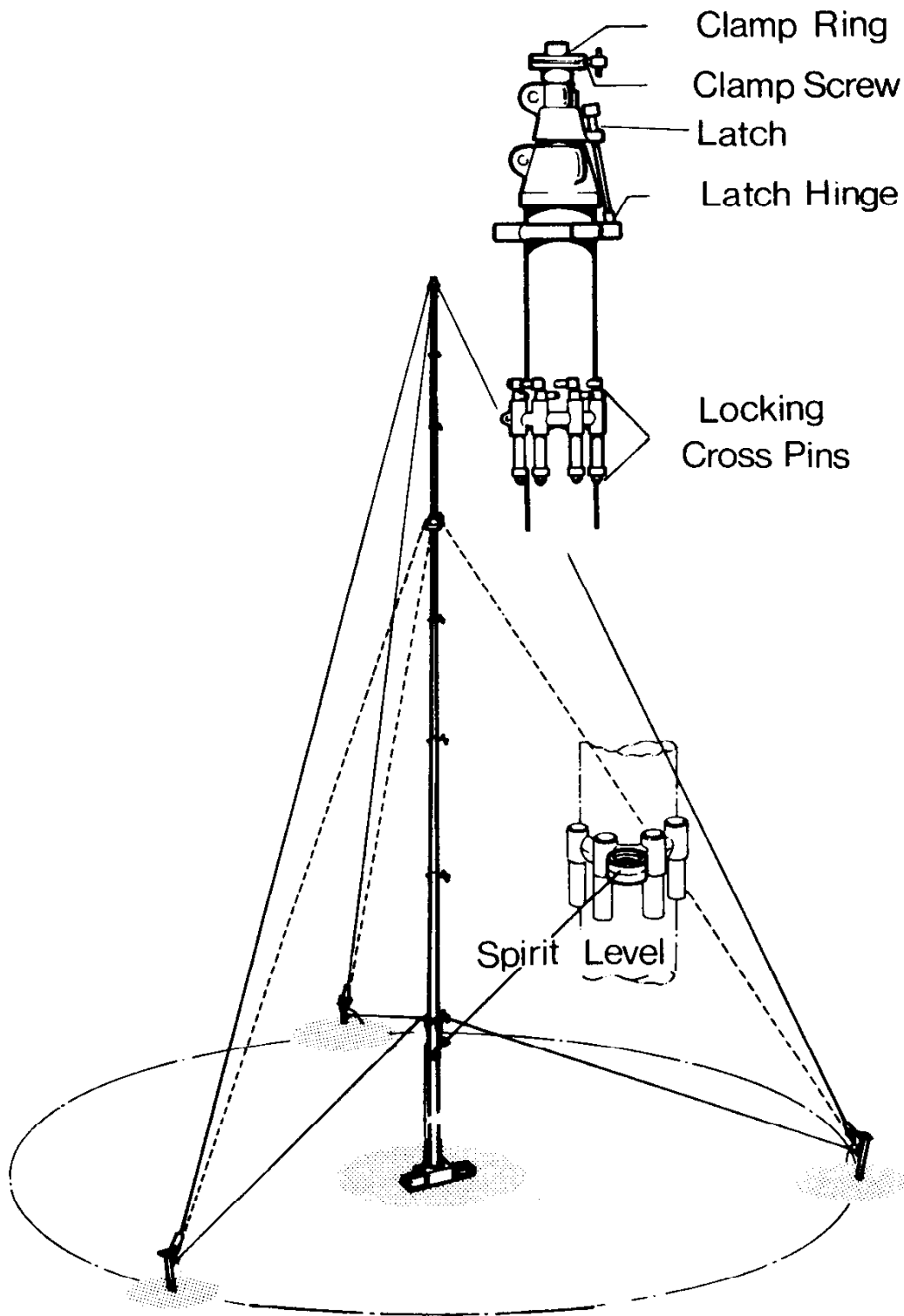


Fig 102.—12m Mast – Erected