



Ministry
of Defence

Ministry of Defence
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Corsham
Wiltshire
SN13 9NR
United Kingdom

Ref: FOI2019/00814

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

31 January 2019

Dear [REDACTED],

Thank you for your email of 18 January 2018 requesting the following information:

“Could you please provide me with copies of the following publications to assist in a personal project restoring equipment disposed of by yourselves.

5820-F-299-101 *PURPOSE AND PLANNING*
5820-F-299-111 *Equipment Support Policy Directives*
5820-F-299-201 *Operating Information*
5820-F-299-211 *Aide Memoire*
5820-F-299-302 *Technical Description*
5820-F-299-601 *Aide Memoire*
5820-F-299-711 *Illustrated Parts Catalogue*
5820-F-299-512 *Failure Diagnosis*
5820-F-299-513 *Failure Diagnosis*
5820-F-299-522 *Repair Instructions*
5820-F-299-523 *Repair Instructions*
5820-F-299-532 *Inspection Standards*
5820-F-299-533 *Inspection Standards*

im afraid the letters inserted in the catalogue number may not be correct as not much information is available on the publications.

the publications are for the UK/PRC346 TacGa radio and its associated equipment's.”

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

A search for the information has now been completed within the Ministry of Defence, and I can confirm that some information in scope of your request is held.

The information you have requested can be found in the attached files . Please note that this equipment was declared obsolete in February 2017, but we have been able to locate seven of the thirteen documents on your list.

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

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

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

Yours sincerely,

ISS Secretariat



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TacGA
THE TACTICAL GROUND AIR
COMMUNICATIONS SYSTEM

REPAIR INSTRUCTIONS

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BY COMMAND OF THE DEFENCE COUNCIL

Ministry of Defence
Issued by
ARMY TECHNICAL SUPPORT AGENCY
DIRECTORATE OF TECHNICAL SERVICES

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AMENDMENT RECORD

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REPAIR INSTRUCTIONS

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- 3 Tests after repair
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Annex A Detailed repair policy - repair charts

PREFACE

Sponsor : DGES(A)
Publication Agency : ATSA

INTRODUCTION

1 Service users should forward any comments on this publication through channels prescribed in AESP 0100-P-011-013. An AESP Form 10 is provided at the end of this publication; it should be photocopied and used for forwarding comments on this AESP.

2 AESPs are issued under Defence Council authority and where AESPs specify action to be taken, the AESP will of itself be sufficient authority for such action and also for the demanding of the necessary stores, subject to the provisions of Para 3 below.

3 The subject matter of this publication may be affected by Defence Council Instructions (DCIs), Standing Operating Procedures (SOPs) or by local regulations. When any such Instruction, Order or Regulation contradicts any portion of this publication it is to be taken as the overriding authority.

RELATED AND ASSOCIATED PUBLICATIONS

Related publications

4 The Octad for the subject equipment consists of the publications shown overleaf. All references are prefixed by the first eight digits of this publication. The availability of the publications can be checked by reference to the relevant Group Index (see AESP 0100-A-001-013).

Category/Sub-category			Information Level			
			1 User/Operator	2 Unit Maintenance	3 Field Maintenance	4 Base Maintenance
1	0	Purpose and Planning Information	101	101	101	101
	1	Equipment Support Policy Directives	111	111	111	111
2	0	Operating Information	201	*	*	*
	1	Aide Memoire	211	*	*	*
	2	Training Aids	*	*	*	*
3		Technical Description	201	302	302	*
4	1	Installation Instructions	*	*	*	*
	2	Preparation for Special Environments	*	*	*	*
5	1	Failure Diagnosis	201	512	513	*
	2	Repair Instructions	201	522	523	*
	3	Inspection Standards	*	532	533	*
	4	Calibration Procedures	*	*	*	*
6		Maintenance Schedules	*	*	*	*
7	1	Illustrated Parts Catalogues	711	711	711	711
	2	Commercial Parts Lists	*	*	*	*
	3	Complete Equipment Schedule, Production	*	*	*	*
	4	Complete Equipment Schedule, Service Edition (Simple Equipment)	741	741	741	741
	5	Complete Equipment Schedule, Service Edition (Complex Equipment)	*	*	*	*
8	1	Modification Instructions	*	*	*	*
	2	General Instruction, Special Technical Instructions and Servicing Instructions	*	*	*	*
	3	Service Engineered Modification Instructions (RAF only)	*	*	*	*

* Category/Sub-category not published

Associated publications

5 The following publications are associated with this Category:

<u>Reference</u>	<u>Title</u>
Signal Engineering Instruction 14411	Safety Precautions for Electrical Equipment
EMER Telecommunications C 740 - 743	Clansman Audio Accessories
EMER Telecommunications K 010	Clansman Charging Equipment
AESP 4940-P-200-201	General Purpose Electrical Cable Repair Kit (REME)
AESP 5825-D-100	Special Personal GPS Receiver (SPGR)
AESP 5985-C-090	Mast Telescopic 8 m
ACP 63723	Health and Safety Management in ESO/REME
BID 251-5	TBA



WARNING

HAZARDOUS SUBSTANCES. ENSURE ADEQUATE VENTILATION WHEN USING CLEANING SOLVENT (ISOPROPYL ALCOHOL) OR PAINT. DO NOT INHALE FUMES.

CAUTION

EQUIPMENT DAMAGE. Before disconnecting equipment items or assemblies, set the R/T unit mode switch to the OFF position.

ABBREVIATIONS

- ABR Adaptor box radio
- RF Radio frequency
- R/T Receiver-transmitter
- RUL Remote unit local
- SPGR Specialist personal GPS receiver



REPAIR INSTRUCTIONS

INTRODUCTION

- 1 Repairs at unit level (level 2) are limited to general exterior repairs and to those repairs specified at this Level in the accompanying Repair Charts.
- 2 Repair procedures deemed to be self-explanatory are omitted from this Category.

CAUTION

EQUIPMENT DAMAGE. Before disconnecting equipment items or assemblies, set the R/T unit mode switch to the OFF position.

Tests after repair

- 3 After repair, inspect the equipment as detailed in Cat 532 of this AESP.

Tools and materials

Tools

- 4 The tools required to carry out the repair procedures detailed in this category are listed in Table 1. Equivalent equipment may be used.

TABLE 1 TOOLS

Serial (1)	NATO stock number (2)	Description (3)	Use (4)
1	F1/5180-99-120-3922	Tool kit telecom (technician).	General repairs.
2	F1/5180-99-445-8208	Tool kit telecom (supplementary).	General repairs.
3	NYA	General purpose electrical cable repair kit	Cable repairs.

Consumable materials

- 5 The consumable materials required to carry out the repair procedures detailed in this category are listed in Table 2.

TABLE 2 CONSUMABLE MATERIALS

Serial (1)	NATO stock number (2)	Description (3)	Use (4)
1	6810-00-753-4993	Isopropyl alcohol, Grade A, MIL-A-10428.	General cleaning.
2	8010-99-224-2079	Paint primer.	Touching-up exterior.
3	8010-99-224-8663	Agent resistant Deep Bronze Green paint.	Touching-up exterior.

GENERAL REPAIRS

6 General repairs are limited to maintaining the appearance and functionality of the equipment chassis and external connectors. The procedures should be carried out as required.

Cleaning**WARNING**

HAZARDOUS SUBSTANCES. ENSURE ADEQUATE VENTILATION WHEN USING CLEANING SOLVENT (ISOPROPYL ALCOHOL) OR PAINT. DO NOT INHALE FUMES.

7 Use a lint-free cloth to remove any dust or stains from the equipment. The cloth may be dampened with isopropyl alcohol cleaning solvent (NSN 6810-00-753-4993).

Painting**WARNING**

HAZARDOUS SUBSTANCES. ENSURE ADEQUATE VENTILATION WHEN USING CLEANING SOLVENT (ISOPROPYL ALCOHOL) OR PAINT. DO NOT INHALE FUMES.

8 For touching up minor paint blemishes, clean the surface to be painted (Para 7). Remove any corrosion by lightly sanding the surface with fine grit sandpaper. Apply a coat of primer over the affected area. When dry, apply a coat of agent resistant Deep Bronze Green paint.

UK/RT 346 RECEIVER-TRANSMITTER (R/T) UNIT

9 Repairs to the UK/RT 346 receiver-transmitter (R/T) unit are limited to general exterior repairs and to the removal/replacement of the control knobs, connector dust caps and battery quick-release fasteners.

Mode switch knob

10 To remove the mode switch knob from the R/T unit use a No. 2 cross-tip screwdriver to remove the retaining screw from the mode switch knob (Fig 1) and remove the knob.

11 To replace the mode switch knob proceed as follows:

11.1 Install the knob on the control shaft and align the knob markings with the panel markings.

11.2 Hold the knob in the aligned position and secure the knob with the screw removed in Para 10.

DIM, SQUELCH and VOLUME control knobs

12 To remove one of the DIM, SQUELCH and VOLUME control knobs from the R/T unit use a 1/16 in. hex key wrench to loosen the retaining setscrew (Fig 1) and remove the knob.

13 To replace a control knob proceed as follows:

13.1 Fit the knob on the control shaft and align the knob markings with the panel markings.

13.2 Hold the knob in the aligned position and use a 1/16 in. hex key wrench to tighten the retaining setscrew and secure the knob to the control shaft.

Quick-release fasteners

14 To remove a battery quick-release fastener from the R/T unit undo the two cross-head screws (Fig 1) and remove the screws, lockwashers and quick-release fastener from the R/T unit.

15 Replacement of the quick-release fasteners is the reverse of the removal procedure.

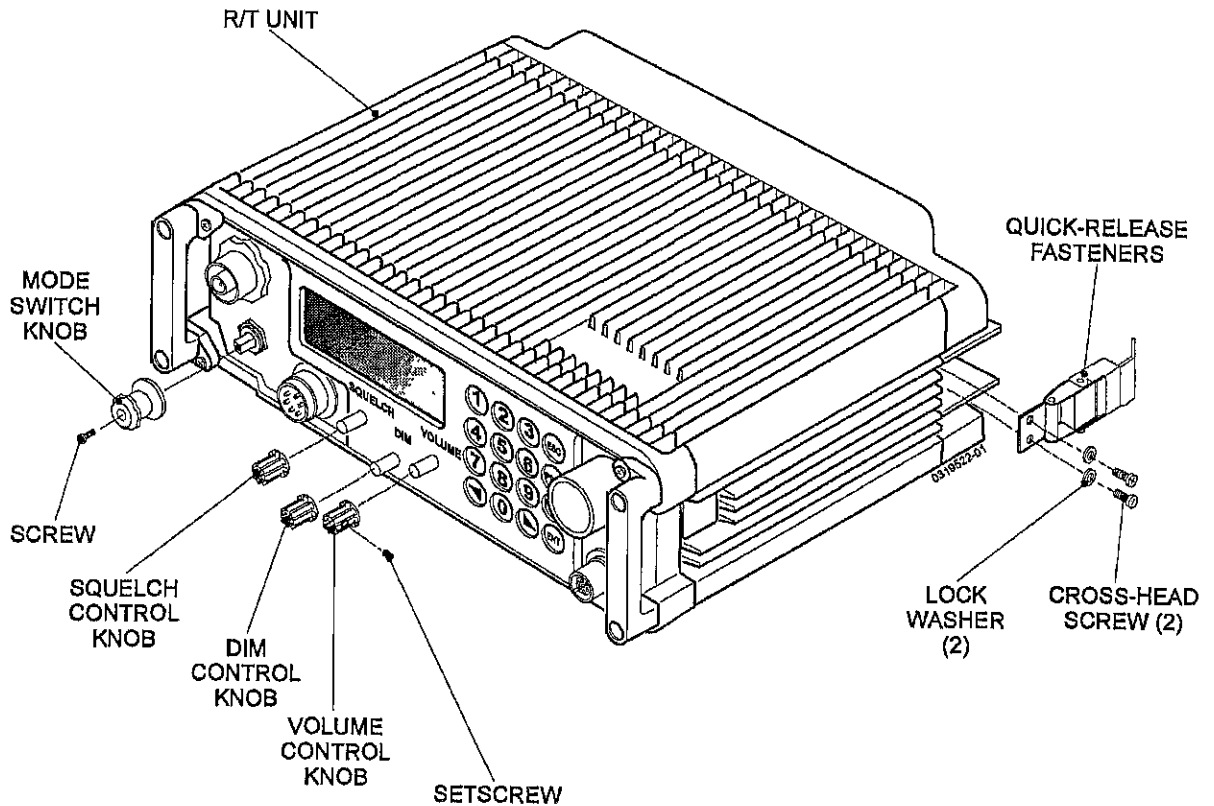


Fig 1 UK/RT 346 receiver-transmitter unit repair items

ADAPTOR BOX RADIO (ABR)

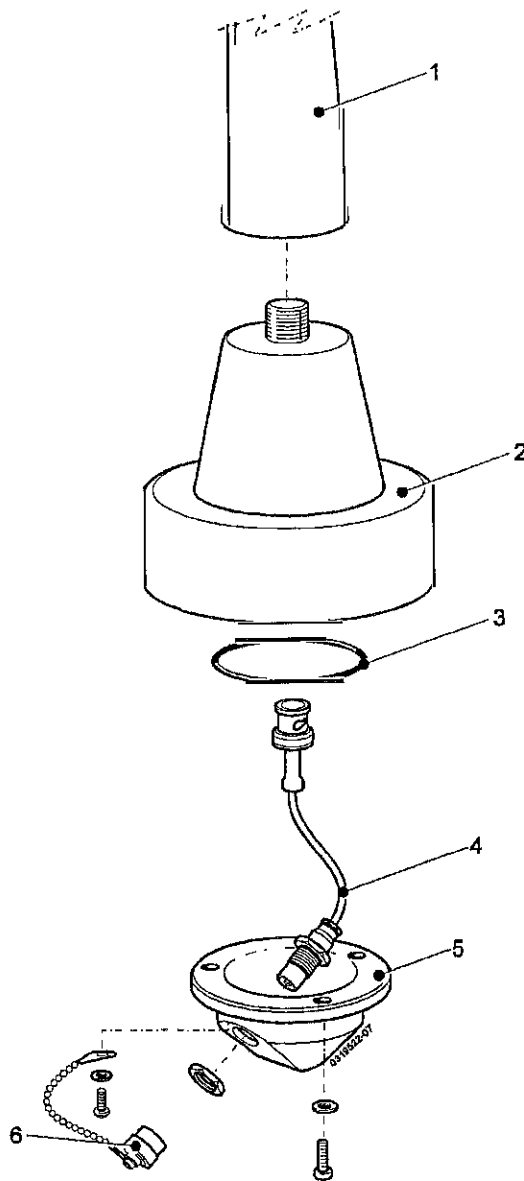
16 Repairs to the ABR are limited to general external repairs and to removal/replacement of the connector dust caps.

REMOTE UNIT LOCAL (RUL)

17 Repairs to the RUL are limited to general external repairs and to removal/replacement of the connector dust caps.

ELEVATED ANTENNA SYSTEM**Elevated antenna**

18 Repair items for the elevated antenna are shown in Fig 2.

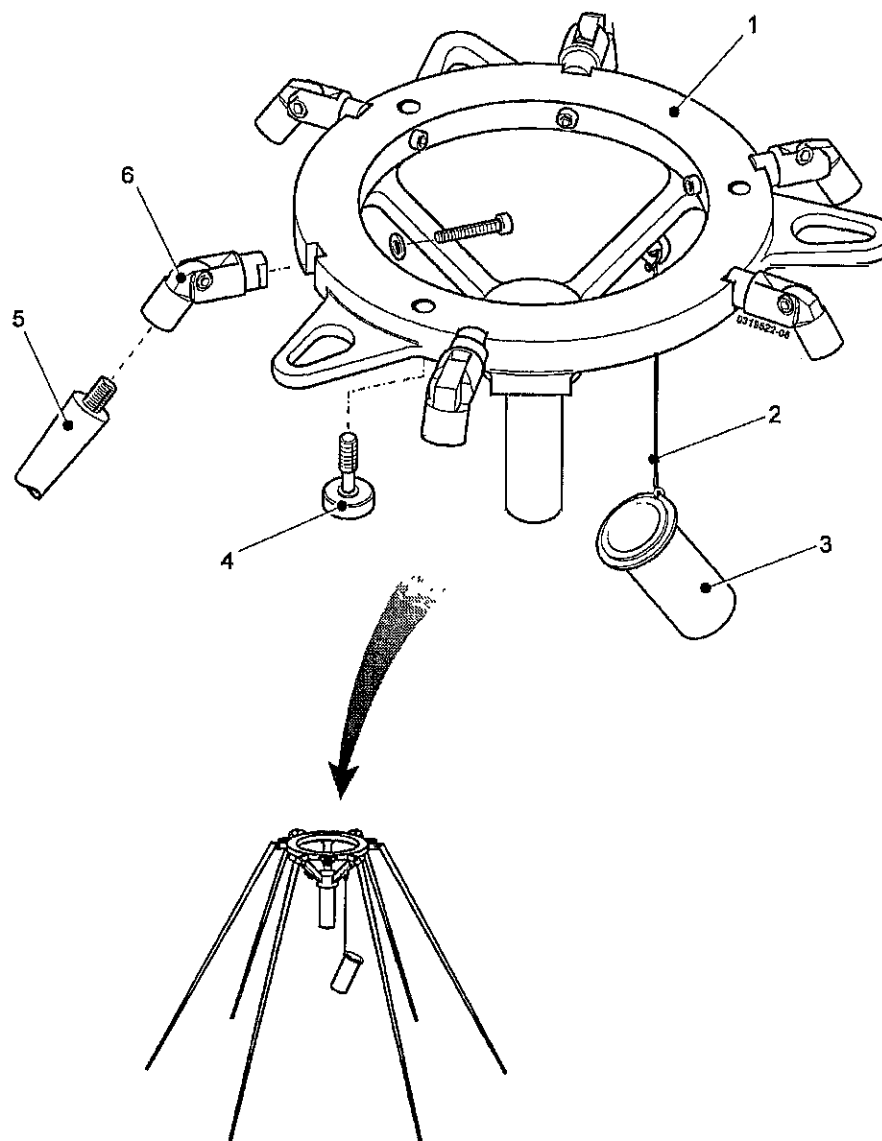


- 1 Antenna element
- 2 Antenna base
- 3 O ring
- 4 Adaptor cable
- 5 Adaptor cone
- 6 Connector dust cap

Fig 2 Elevated antenna repair items

Ground plane

19 Repair items for the ground plane are shown in Fig 3.



- 1 Hub
- 2 Cord, 2 mm dia
- 3 8 m mast adaptor
- 4 Antenna securing screw
- 5 Arm
- 6 Pivot assembly

Fig 3 Ground plane repair items

VEHICLE MOUNTED ANTENNA ASSEMBLY

Vehicle mounted antenna

20 Repair items for the Vehicle mounted antenna are shown in Fig 4.

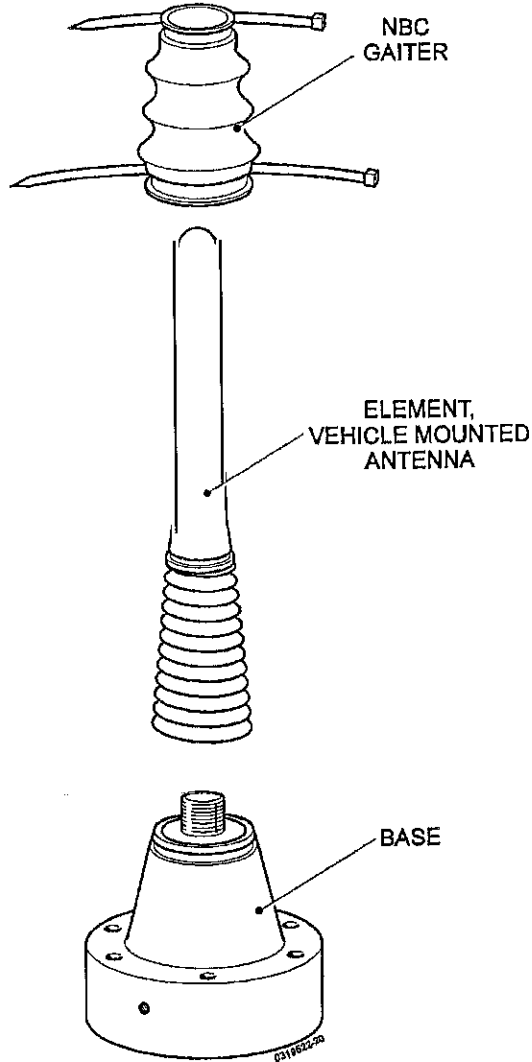


Fig 4 Vehicle mounted antenna repair items

Antenna mounting assembly

21 Repair items for the vehicle antenna mounting assembly are shown in Fig 5.

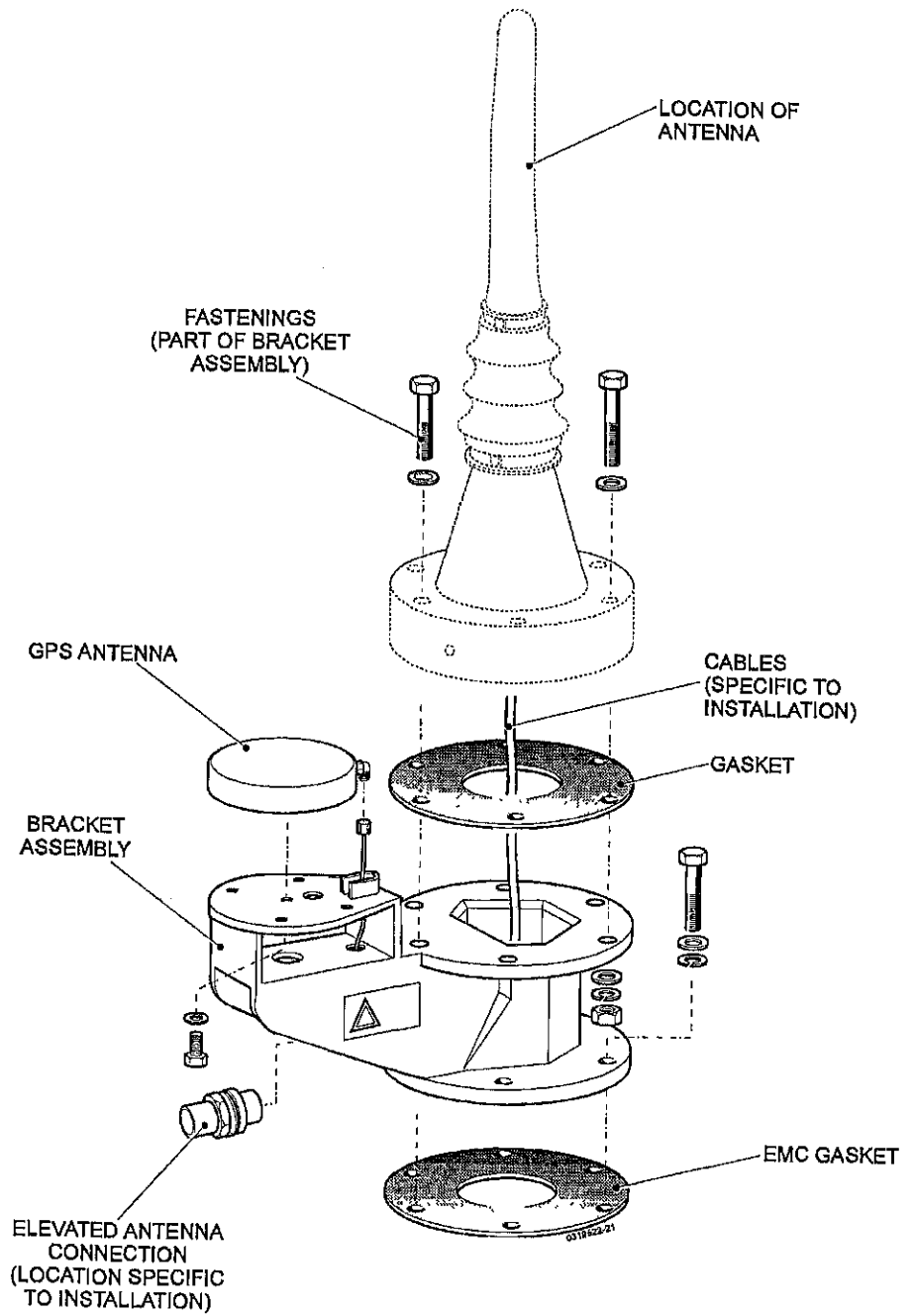


Fig 5 Vehicle antenna mounting assembly repair items

REPAIRABLE CABLES**NOTE**

Cables which are in-service items are not detailed in this Category.

22 The cables, together with their connectors and associated repair status are identified in Table 3. Connector contact locations are given in Figs 6 to 11.

23 Repairs to the cable length and to the identified connectors are to be carried out in accordance with AESP 4940-P-200-201 using the general purpose electrical cable repair kit. Repair items which are not provided within the repair kit are identified in Cat 711 of this AESP.

TABLE 3 CABLES - REPAIR STATUS

Serial (1)	Cable (2)	Connector (3)	Repair status (4)
1	UK/RT 346 to SPGR	n/a	Connectors not repairable.
2	SPGR snatch adaptor	n/a	Not repairable.
3	Audio splitter cable	n/a	Connectors not repairable.
4	Audio extension cable	Both ends similar	Repairable.
5	Breakout box	n/a	Not repairable.
6	Breakout box to ABR/RUL cable	Both ends similar	Repairable.
7	R/T unit fill cable	UK/RT 346 FILL BID 250/31 fill device	Repairable. Repairable.
8	ABR to CRCH cable	Both ends similar	Repairable.
9	SPGR fill cable	SPGR data port BID 250/2 power adaptor	Connector not repairable. NYA.
10	UK/RT 346 to filter box RF cable	Both ends similar	Connectors repairable.
11	Elevated antenna 15 m RF cable	Both ends similar	Connectors repairable. Strain reliefs not repairable.
12	Elevated antenna 30 m RF cable	Both ends similar	Connectors repairable. Strain reliefs not repairable.
13	Filter box to antenna	BNC type N type	Repairable. Repairable.
14	GPS antenna to SPGR	n/a	Not repairable.

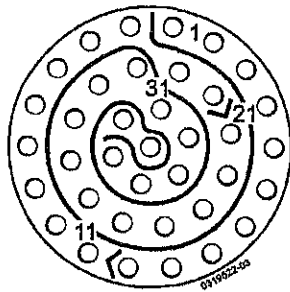


Fig 6 AUX connector contact locations
Male (external), Female (internal)

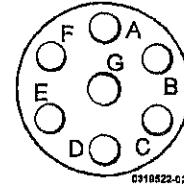


Fig 7 Audio connector contact locations
Male (external), Female (internal)

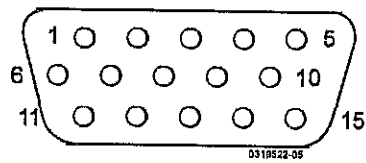


Fig 8 SPGR data connector contact locations
Male (external), Female (internal)

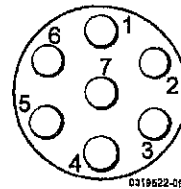


Fig 9 Snatch connector contact locations
Male (external), Female (internal)

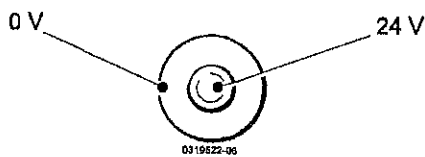


Fig 10 SPGR power jack contact locations

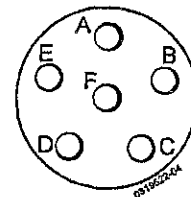


Fig 11 FILL connector contact locations
Female shell (external), Male shell (internal)

[REDACTED]



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ANNEX A

**TacGA
THE TACTICAL GROUND AIR COMMUNICATIONS SYSTEM**

DETAILED REPAIR POLICY - REPAIR CHARTS

NOTE

The repair charts provided in this publication may be amended to cover equipment modifications and changes in repair policy. Where repair charts apply to a particular build standard (field batch), they must be so annotated. The amendment state listed below applies to charts depicting the latest build standard.

CONTENTS

Para

- 1 Introduction
- 2 Interpretation of repair charts

Repair Chart No	Equipment Part	Page	Amdt State	Date
1	The TacGA system	3	-	Dec 99
2	Station kit UK/PRC 346	4	-	Dec 99
3	Manpack UK/PRC 346	5	-	Dec 99
4	Remote operation UK/PRC 346	6	-	Dec 99
5	Elevated antenna UK/PRC 346	7	-	Dec 99
6	Keyfill subsystem, UK/RT 346	8	-	Dec 99
7	Keyfill subsystem, precision lightweight GPS receiver II	9	-	Dec 99
8	Audio gear UK/PRC 346	10	-	Dec 99
9	Vehicle ancillaries UK/PRC 346	11/12	-	Dec 99

Fig

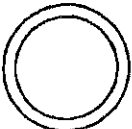


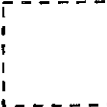



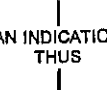
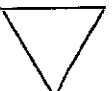





















Fig	Page
1 Key to repair chart symbols	2

INTRODUCTION

1 The repair charts provided in this publication are based on "Agreed Repair Charts" adapted for use in the field by simplifying the symbolic information and including additional information required in the course of repair. For detailed repair instructions refer to AESP 5820-F-299-522.

INTERPRETATION OF REPAIR CHARTS

2 The repair charts provide information on the structure of the equipment levels at which repairs must be attended (ie Unit, Field or Base), the availability of spares and other relevant details, such as test and diagnostic activities. A key to the symbols used in the repair charts is provided in Fig 1.

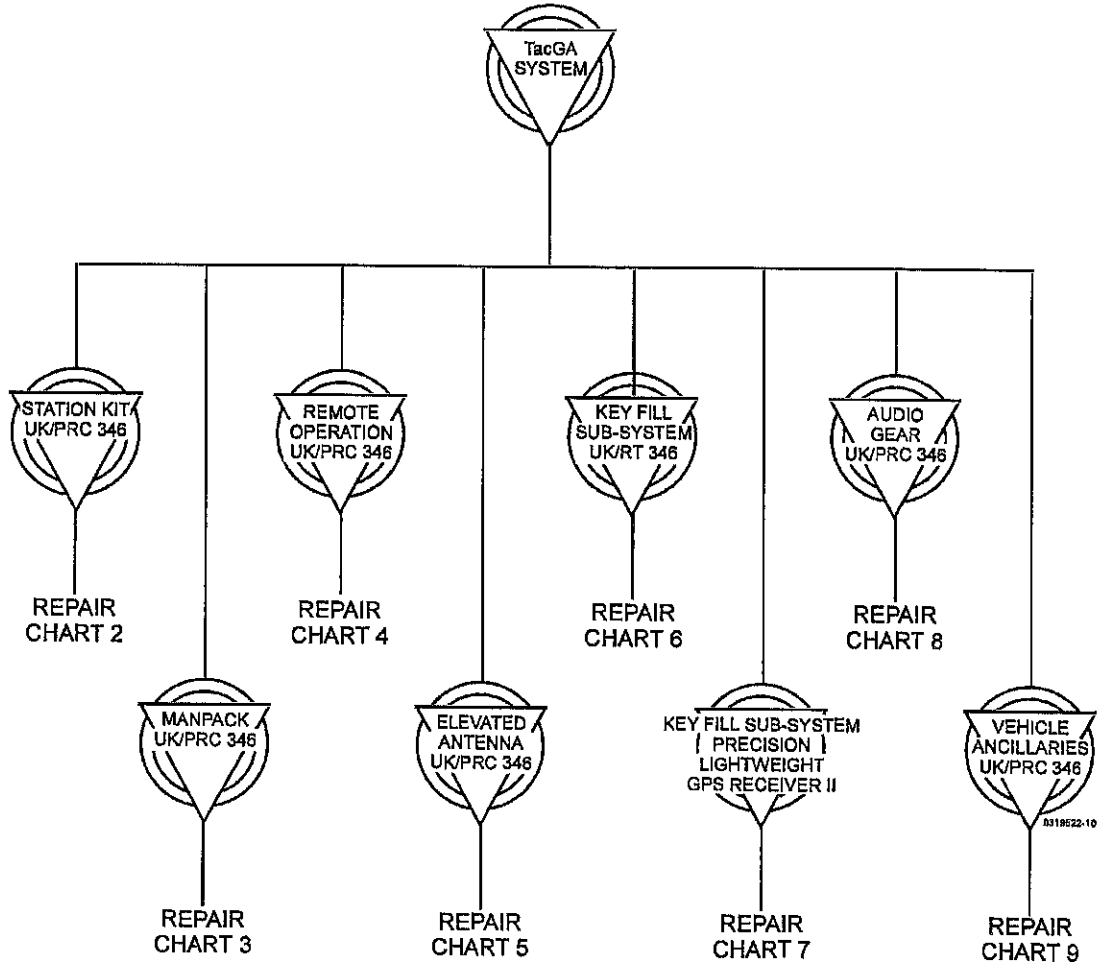
	INDICATES AN EQUIPMENT HELD ON USER CHARGE, WHICH WHEN DEFECTIVE MUST BE REPAIRED BY THE REPAIR ORGANISATION, OR IF A COMPLETE REPLACEMENT IS REQUIRED, IT MUST BE OBTAINED THROUGH THE NORMAL SUPPLY CHANNELS.		INDICATES AN ITEM WHICH CAN BE REPLACED BY THE REPAIR ORGANISATION AT BASE LEVEL. (NORMALLY RANGED AS A SPARE)
	INDICATES AN ANCILLARY ITEM OF THE EQUIPMENT WHICH WHEN DEFECTIVE MUST BE REPAIRED BY THE REPAIR ORGANISATION. (NORMALLY A C.E.S. ITEM)		INDICATES AN ITEM WHICH IS SUBJECT TO BASE REPAIR BUT IS NOT RANGED AS A SPARE.
	INDICATES AN ANCILLARY ITEM OF THE EQUIPMENT WHICH IS NOT SUBJECT TO REPAIR. (NORMALLY A C.E.S. ITEM)		CROSS HATCHING WITHIN ANY SYMBOL INDICATES THAT THE ITEM REPRESENTED IS A CONSUMABLE ITEM.
	INDICATES AN ITEM WHICH CAN BE REPLACED BY THE OPERATOR AT UNIT LEVEL. (NORMALLY RANGED AS A SPARE)	AN INDICATION THUS 	A DESIGNATION WITHOUT A SYMBOL SURROUND IS USED TO INDICATE A LOGICAL BREAKDOWN AREA WHICH DOES NOT EXIST AS AN ASSEMBLY.
	INDICATES AN ITEM WHICH CAN BE REPLACED BY THE REPAIR ORGANISATION AT UNIT LEVEL. (NORMALLY RANGED AS A SPARE)		SYMBOLS REPRESENTING ITEMS WHICH ARE STOWED OR CARRIED REMOTE FROM THE EQUIPMENT ARE JOINED TO THE CHART BY BROKEN LINES.
	INDICATES AN ITEM WHICH IS SUBJECT TO UNIT REPAIR BUT IS NOT RANGED AS A SPARE.		THE SYMBOLS SO ANNOTATED REPRESENT CENTRALISED REPAIR ITEMS (CENTREMS) SEE LIST OF CENTREMS FOR REPAIR / RETURN AGENCY.
	INDICATES AN ITEM WHICH CAN BE REPLACED BY THE REPAIR ORGANISATION AT FIELD LEVEL. (NORMALLY RANGED AS A SPARE)		INDICATES THAT TEST AND DIAGNOSTIC FACILITIES ARE REQ. BY THE OPERATOR. *
	INDICATES AN ITEM WHICH IS SUBJECT TO FIELD REPAIR BUT IS NOT RANGED AS A SPARE.		INDICATES THAT TEST AND DIAGNOSTIC FACILITIES ARE REQ. AT UNIT LEVEL. *
	INDICATES AN ITEM WHICH CAN BE REPLACED BY THE REPAIR ORGANISATION AT INTERMEDIATE LEVEL. (NORMALLY RANGED AS A SPARE)		INDICATES THAT TEST AND DIAGNOSTIC FACILITIES ARE REQ. AT FIELD LEVEL. *
	INDICATES AN ITEM WHICH IS SUBJECT TO INTERMEDIATE REPAIR BUT IS NOT RANGED AS A SPARE.		INDICATES THAT TEST AND DIAGNOSTIC FACILITIES ARE REQUIRED AT INTERMEDIATE LEVEL. *
			INDICATES THAT TEST AND DIAGNOSTIC FACILITIES ARE REQUIRED AT BASE LEVEL. *
			INDICATES THAT A RE-USABLE PACKAGE IS TO BE PROVIDED FOR GENERAL USE.
			INDICATES THAT A RE-USABLE PACKAGE IS TO BE PROVIDED FOR USE BETWEEN BASE AND CONTRACTORS.
			INDICATES THAT A RE-USABLE PACKAGE IS TO BE PROVIDED FOR AN ASSEMBLY WHICH IS CARRIED AS AN OPERATORS SPARE WITH A MOBILE EQUIPMENT OR SYSTEM.
			INDICATES THAT THE ITEM IS SCHEDULED FOR REPAIR BY CONTRACTORS.
			INDICATES A NOMINATED WORKSHOP WITH ECHELON 2 CALIBRATION FACILITIES.
			INDICATES A NOMINATED WORKSHOP WITH ECHELON 3 CALIBRATION FACILITIES.
			INDICATES THAT SCREENING FACILITIES ARE REQUIRED AT FIELD LEVEL. *
			SHELF LIFED ITEM. LIFE IN MONTHS TO BE INDICATED BY A FIGURE FOLLOWING THE SYMBOL.
			LIFE USAGE ITEM. LIFE IN HOURS, ROUNDS FIRED, MILEAGE etc., TO BE INDICATED.

0318622-18

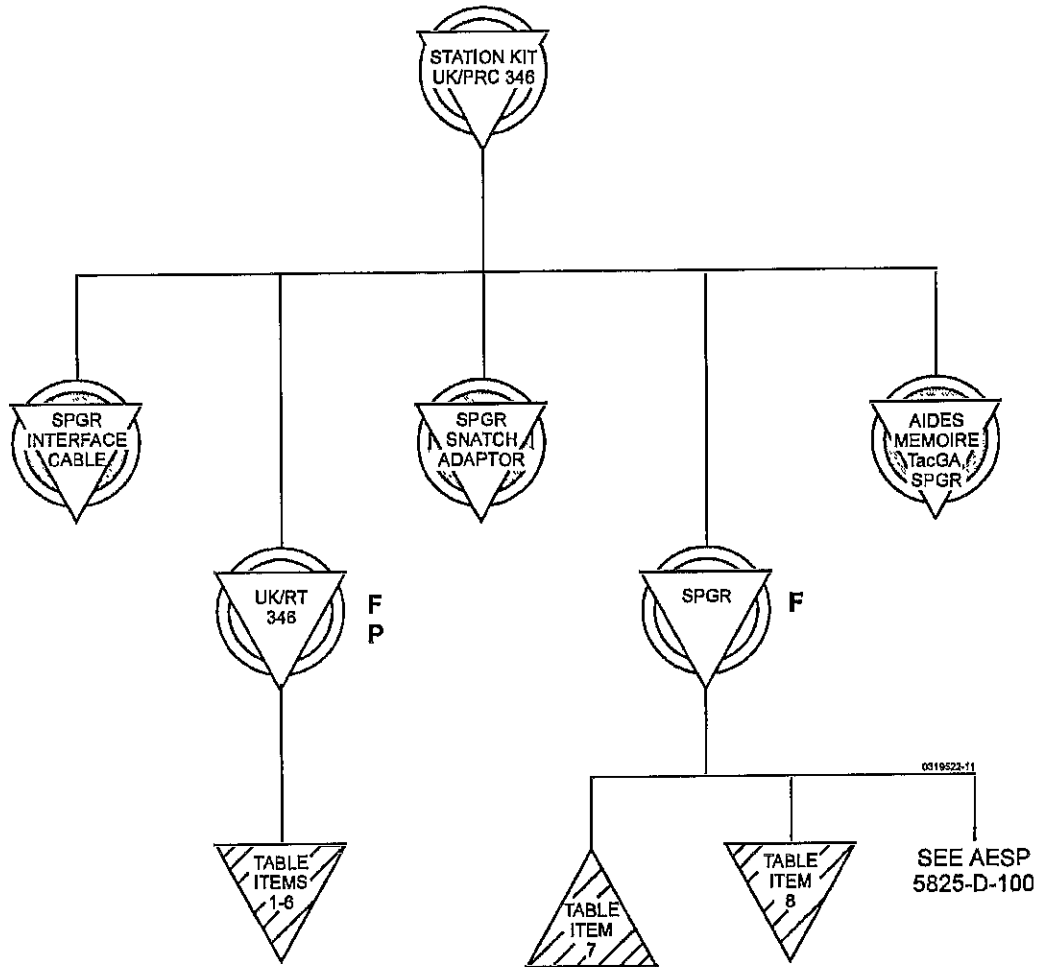
KEY TO REPAIR CHART SYMBOLS

<p>* THESE SYMBOLS MAY BE ADDITIONALLY ANNOTATED TO INDICATE THE TYPE OF TEST FACILITY REQUIRED THUS:-</p>	<ol style="list-style-type: none"> 1. GENERAL PURPOSE TEST EQUIPMENT 2. BUILT-IN TEST EQUIPMENT 3. SPECIAL TO TYPE TEST EQUIPMENT 4. SPECIAL TO SYSTEM TEST EQUIPMENT 5. AUTOMATIC TEST EQUIPMENT
<p>TEST FACILITIES</p>	

Fig 1 Key to repair chart symbols

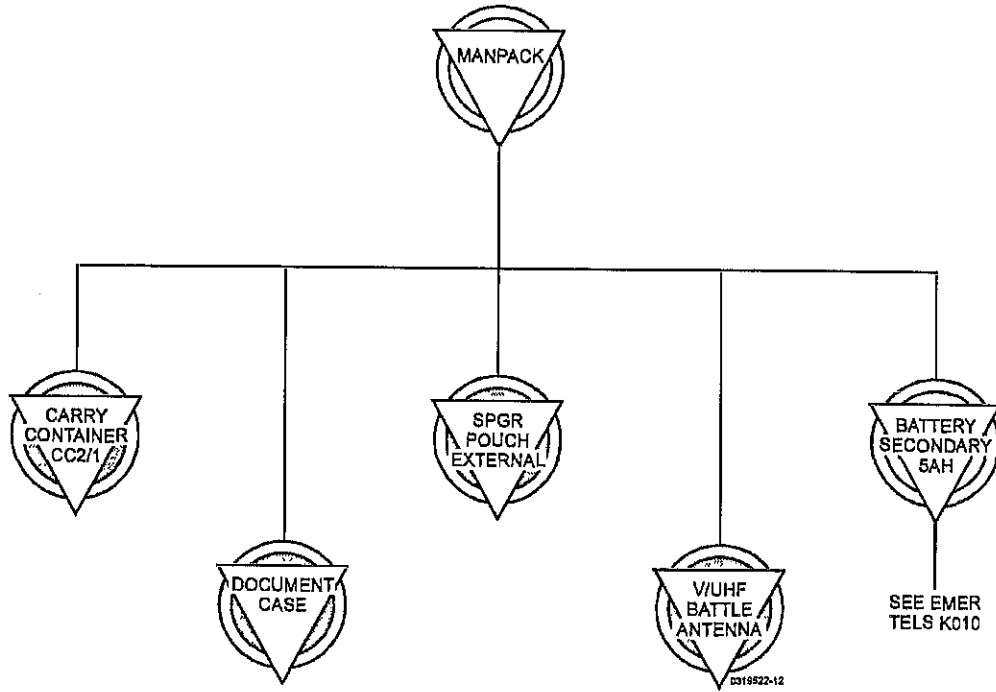


Repair Chart 1 The TacGA system

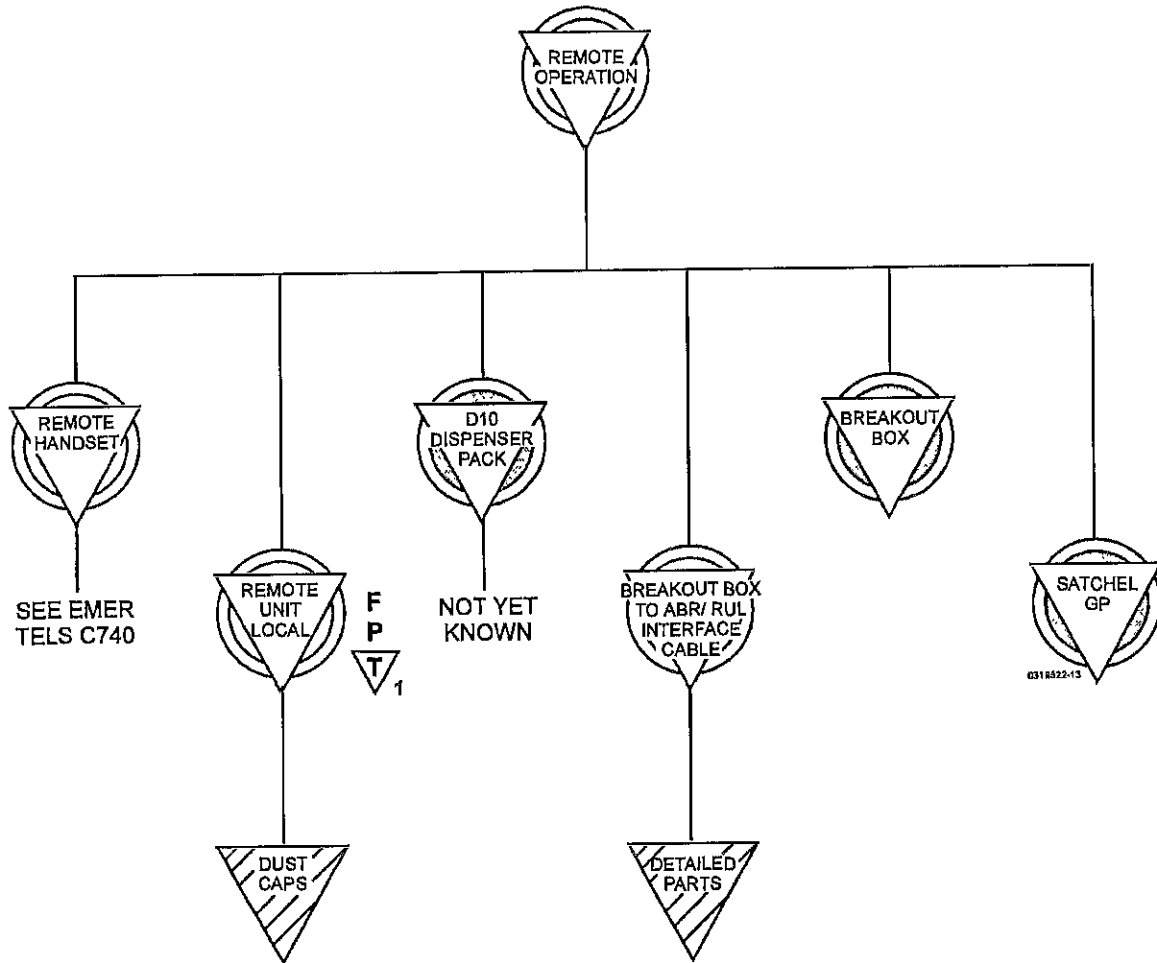


Serial	Description	Qty
1	Dust cap (ANT)	1
2	Dust cap (FILL and AUDIO)	2
3	Dust cap (AUX)	1
4	Knob switch	1
5	Knob potentiometer	3
6	Catch	2
7	Battery AA	6
8	Battery ½AA (memory)	1

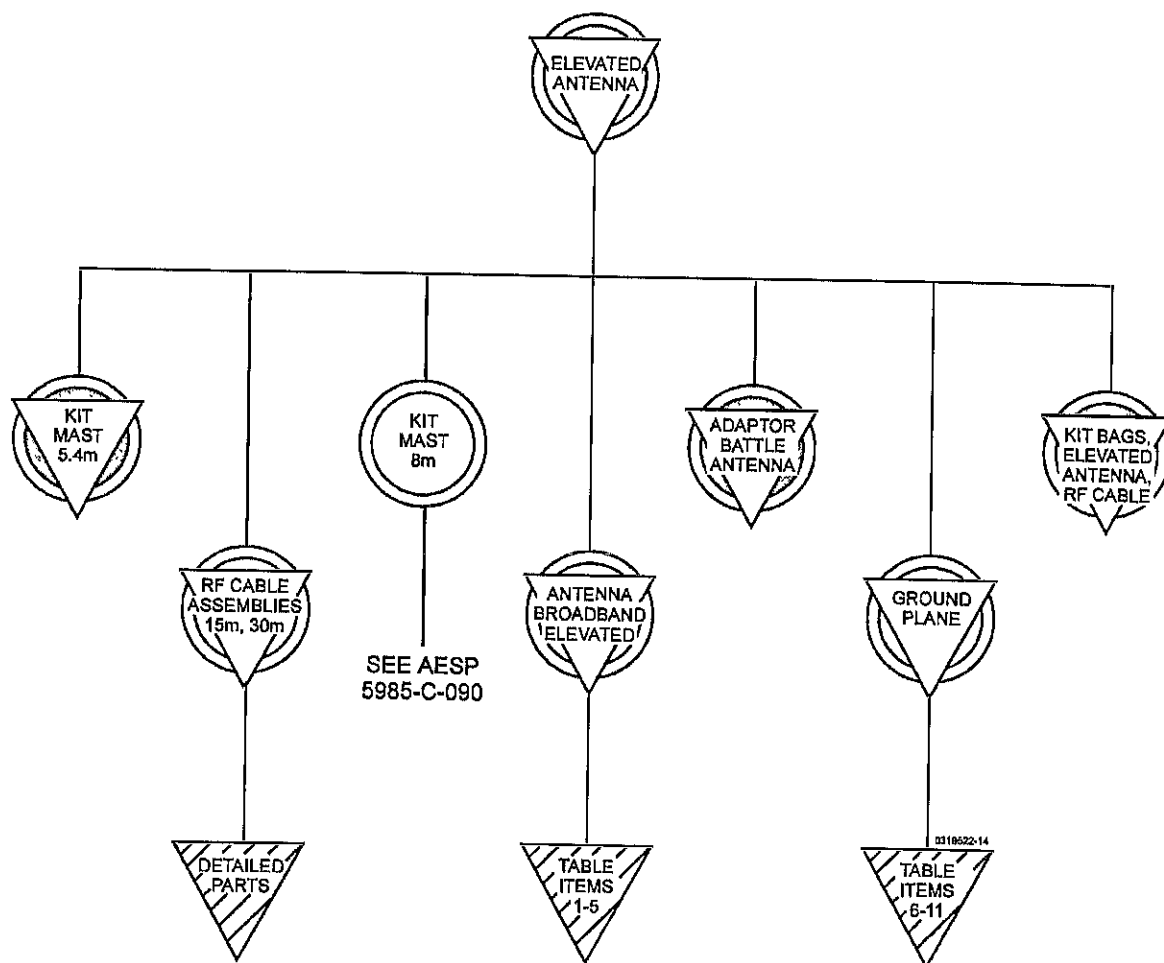
Repair Chart 2 Station kit UK/PRC 346



Repair Chart 3 Manpack UK/PRC 346

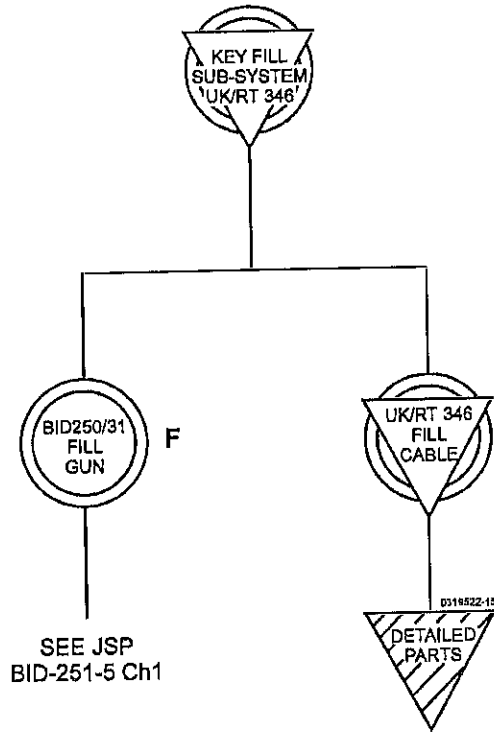


Repair Chart 4 Remote operation UK/PRC 346

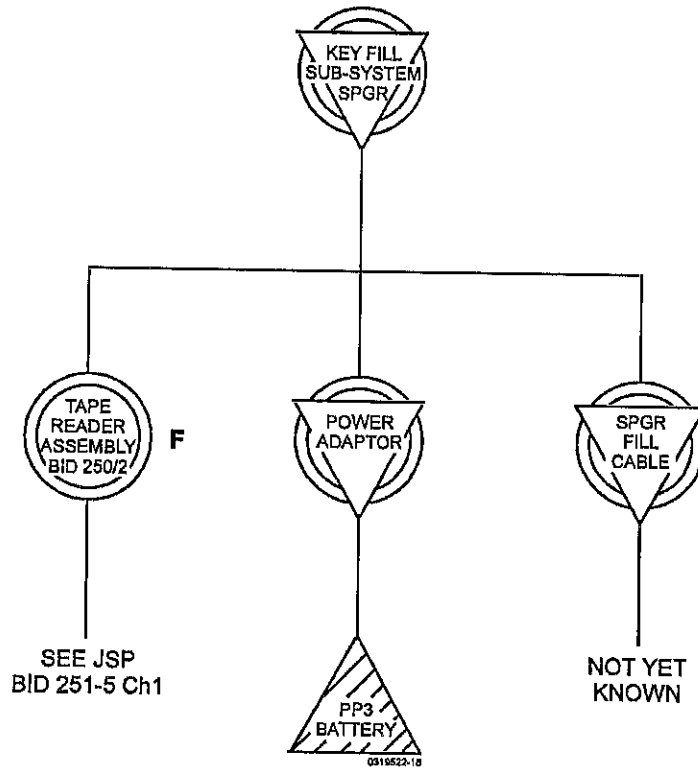


Serial	Description	Qty
1	Base unit	1
2	Element	1
3	Cable BNC	1
4	Adaptor housing	1
5	Dust cap	1
6	Hub	1
7	Cord 2 mm dia	a/r
8	Mast adaptor	1
9	Captive screw (antenna mounting)	3
10	Pivot assembly	6
11	Arm	6

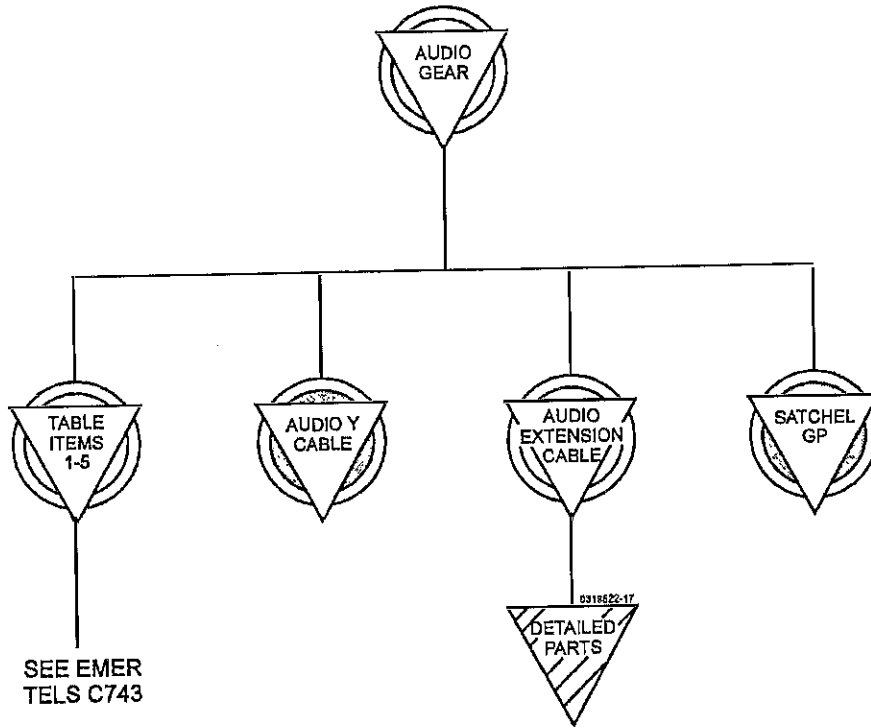
Repair Chart 5 Elevated antenna UK/PRC 346



Repair Chart 6 Keyfill subsystem, UK/RT 346

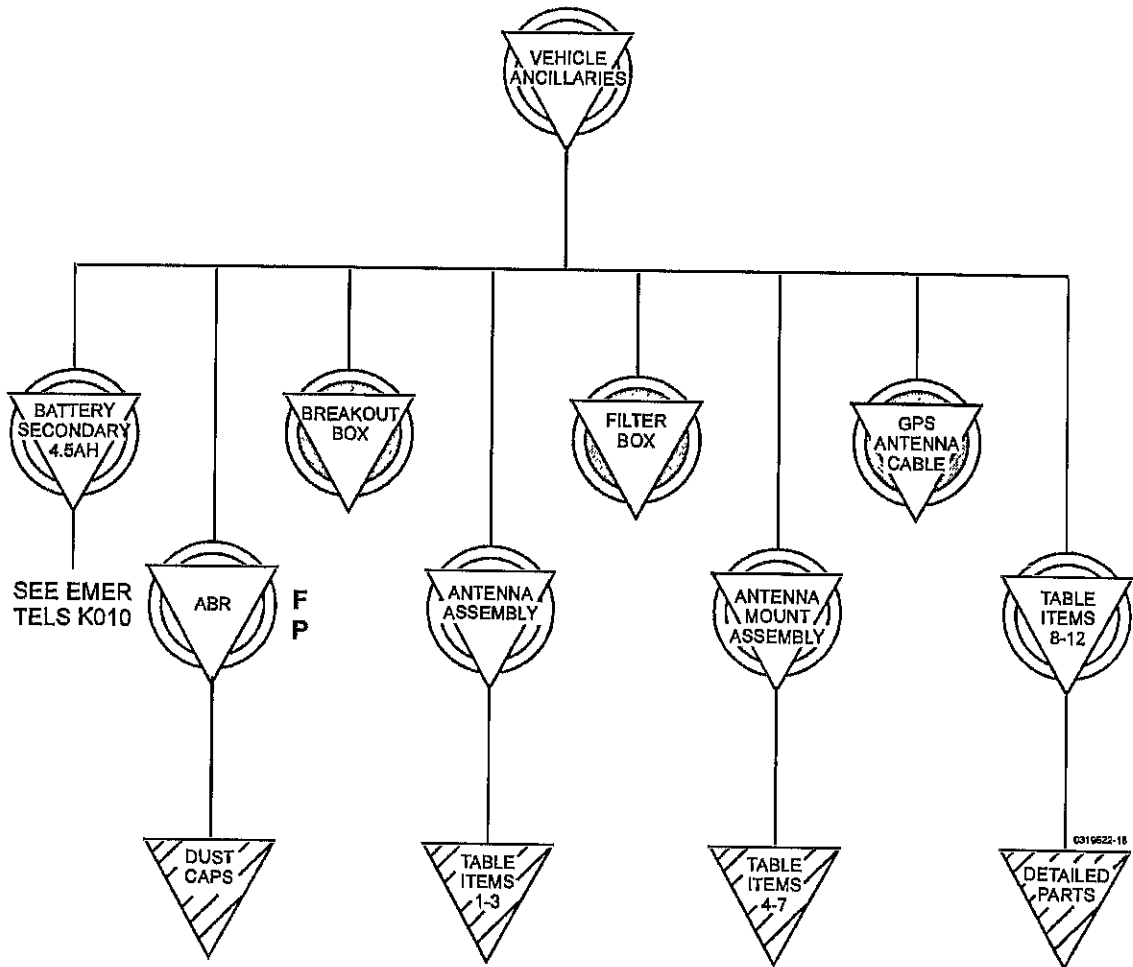


Repair Chart 7 Keyfill subsystem, precision lightweight GPS receiver II



Serial	Description	Qty
1	Headset BV&I	1
2	Pressel box, hand	1
3	Handset GP	1
4	Microphone, respirator	1
5	Adaptor ring, respirator microphone	1

Repair Chart 8 Audio gear UK/PRC 346



Serial	Description	Qty
1	Element, vehicle antenna	1
2	Gaiter assembly, NBC	1
3	Base, antenna	1
4	Gasket, EMC	2
5	Bracket assembly, antenna mounting	1
6	Antenna, GPS	1
7	Feedthrough connector, elevated antenna	1
8	Cable, antenna to filter box	1
9	Cable, elevated antenna feedthrough to filter box	1
10	Cable, UK/PRC 346 to filter box	1
11	Cable, breakout box to ABR/RUL	1
12	Cable, ABR to Clansman harness IB2/3	1

Repair Chart 9 Vehicle ancillaries UK/PRC 346

[REDACTED]



[REDACTED]

COMMENT(S) ON AESP

To: ATSA DTS 3.2
Ha Ha Road
Woolwich
LONDON SE18 4QF

From:
.....
.....
.....

Sender's Reference	BIN Number	Date
AESP Title:		
Chapter(s)/Instruction	Page(s)/Paragraph(s)	
If you require more space, please use the reverse of this form or a separate piece of paper. Comment(s):		

Signed: Telephone No:
Name (Capitals): Rank/Grade:
X

ATSA DTS 3.2 USE ONLY

To:
.....
.....
.....

From: ATSA DTS 3.2
Ha Ha Road
Woolwich
LONDON SE18 4QF

Thank you for commenting on AESP 5820-F-299-522

Your reference: Dated:

Action is being taken to:	Tick		Tick
Issue a revised/amended AESP		Under investigation	
Incorporate comment(s) in future amendments		No action required	
Remarks			

Signed: Telephone No:
Name (Capitals): Rank/Grade:

AESP Form 10 (Issue 4.1 dated Aug 99)

[REDACTED]



[REDACTED]



[REDACTED]

[REDACTED]



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TacGA
THE TACTICAL GROUND AIR
COMMUNICATIONS SYSTEM

EQUIPMENT SUPPORT POLICY DIRECTIVE

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BY COMMAND OF THE DEFENCE COUNCIL



Ministry of Defence
Issued by
ARMY TECHNICAL SUPPORT AGENCY
DIRECTORATE OF TECHNICAL SERVICES





AMENDMENT RECORD

Amdt No.	Incorporated By (Signature)	Date
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EQUIPMENT SUPPORT POLICY DIRECTIVE

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- 1 Introduction
- 2 Management Information
- 10 Maintenance (WARNINGS) (CAUTIONS)
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PREFACE

Sponsor : DGES(A)
Publication Agency : ATSA

INTRODUCTION

1 Service users should forward any comments on this publication through channels prescribed in AESP 0100-P-011-013. An AESP Form 10 is provided at the end of this publication; it should be photocopied and used for forwarding comments on this AESP.

2 AESPs are issued under Defence Council authority and where AESPs specify action to be taken, the AESP will of itself be sufficient authority for such action and also for the demanding of the necessary stores, subject to the provisions of Para 3 below.

3 The subject matter of this publication may be affected by Defence Council Instructions (DCIs), Standing Operating Procedures (SOPs) or by local regulations. When any such instruction, Order or Regulation contradicts any portion of this publication it is to be taken as the overriding authority.

RELATED AND ASSOCIATED PUBLICATIONS**Related publications**

4 The Octad for the subject equipment consists of the publications shown overleaf. All references are prefixed by the first eight digits of this publication. The availability of the publications can be checked by reference to the relevant Group Index (see AESP 0100-A-001-013).

Category/Sub-category			Information Level			
			1 User/Operator	2 Unit Maintenance	3 Field Maintenance	4 Base Maintenance
1	0	Purpose and Planning Information	101	101	101	101
	1	Equipment Support Policy Directives	111	111	111	111
2	0	Operating Information	201	*	*	*
	1	Aide Memoire	211	*	*	*
	2	Training Aids	*	*	*	*
3		Technical Description	201	302	302	*
4	1	Installation Instructions	*	*	*	*
	2	Preparation for Special Environments	*	*	*	*
5	1	Failure Diagnosis	201	512	513	*
	2	Repair Instructions	201	522	523	*
	3	Inspection Standards	*	532	533	*
	4	Calibration Procedures	*	*	*	*
6		Maintenance Schedules	*	*	*	*
7	1	Illustrated Parts Catalogues	711	711	711	711
	2	Commercial Parts Lists	*	*	*	*
	3	Complete Equipment Schedule, Production	*	*	*	*
	4	Complete Equipment Schedule, Service Edition (Simple Equipment)	741	741	741	741
	5	Complete Equipment Schedule, Service Edition (Complex Equipment)	*	*	*	*
8	1	Modification Instructions	*	*	*	*
	2	General Instruction, Special Technical Instructions and Servicing Instructions	*	*	*	*
	3	Service Engineered Modification Instructions (RAF only)	*	*	*	*

* Category/Sub-category not published

Associated publications

5 The following publications are associated with the TacGA communications system:

<u>Reference</u>	<u>Title</u>
Signal Engineering Instruction 14411	Safety Precautions for Electrical Equipment
EMER Telecommunications A 414	Printed Circuit Repair Techniques
EMER Telecommunications C 740 - 743	Clansman Audio Accessories
EMER Telecommunications K 010	Clansman Charging Equipment
EMER Telecommunications L220 - 229	Mast Telescopic 8 m (to be replaced by AESP 5985-C-090)
EMER Telecommunications M 650	Audio Ancillaries Test Set
EMER Telecommunications M 680	Clansman Harness Box Test Set
AC 61657	User Handbook Clansman Harness Box Test Set
AC 61656	User Handbook Audio Ancillaries Test Set
ACP 63723	Health and Safety Management in ESO/REME
AESP 4940-P-200-201	General Purpose Electrical Cable Repair Kit (REME)
AESP 5800-C-146-412	C ³ I in TUM/TUL (HS) Installation Instructions
AESP 5800-C-150-412	C ³ I Installations Truck Utility medium (TUM)
AESP 5800-H-281-301	ASV436 Harness and Installation Kits
AESP 5800-H-371-411	C ³ I Installations in Haglunds BV206(D)
AESP 5825-D-100	Special Personal GPS Receiver (SPGR)
AESP 5985-C-090	User Handbook Mast Telescopic 8 m
AESP 6130-M-102	Intelligent Battery Management System (IBMS)
AESP 6625-K-112	Test System Radio Communications (Marconi 8920C)
BID 250/1/1	User Handbook BID 250/31
BID/251-2	User Handbook BID 250/2
STANAG 4246 (SECRET)	HAVE QUICK and UHF Secure Communications Equipment

ABBREVIATIONS

GPS Global positioning system
VHF Very-high frequency

EQUIPMENT SUPPORT POLICY DIRECTIVE

INTRODUCTION

1. This Equipment Support Policy Directive (ESPD) defines the policy for the management and logistic support for the Tactical Ground to Air Radio (TacGA) – UK/PRC 346.

MANAGEMENT INFORMATION**2. Equipment Support Management, Equipment Sponsor, Project Management.**

2.1	Equipment Sponsor	DDOR (Comms & Surv)
2.2	Project Manager	BOWMAN 11b
2.3	Integrated Logistic Support (ILS) Manager	BOWMAN 21b
2.4	Equipment Support Manager	ES 31e(3)
2.5	Technical Advisor	Army Technical Support Agency Field Comms Support Group

3. Development and Manufacture. The PRC 346 is a Commercial Off The Shelf (COTS) equipment procured through a UK Prime Contractor, who is also acting as the Design Authority for the system on behalf of the MoD. The UK/RT 346 unit is procured from the United States through the Prime Contractor. The Design Authority is:

Hunting Engineering Ltd (HEL)
Amphill
Bedford

4. Planned Role. The PRC 346 radio will replace the PRC 344, the current ground to air radio. The PRC 346 is being procured primarily to enable the co-ordination of Close Air Support (CAS) operations and for communication with non-UK helicopters and UK helicopters that will not be equipped with BOWMAN VHF radio, such as RN Lynx and MERLIN. The PRC 346 includes a Specialist Personal GPS Receiver (SPGR) which can be dismantled from the radio for limited periods. A total of 1029 PRC 346 radios will be procured, of which 696 will be used in the manpack role and 282 will be vehicle mounted. The remainder will be held as Repair Pool (RP) or War Reserve (WR). Full deployment details are held on the GP11 database, managed by ES 31e(1).

5. Planned Life. The PRC 346 is expected to remain in service until at least the year 2009.

6. Planned Utilisation. The annual utilisation is estimated to be 980 hours per equipment.

7. Availability. The predicted availability of the equipment is 99%. The quantity of equipment returned to the Contractor for repair will be monitored by the Project Office and ESM to ensure that availability figures are being met.

8. Security. The security classification of the PRC 346 relates to the overall system when completely assembled in its Service operational role including all Classified and Unclassified fitted assemblies, but excluding associated installed equipment that does not form part of the basic system. The security grading will at all times be that of the most highly classified constituent part or assembly present in the system.

9. A full list of the Security Gradings associated with this equipment is detailed in the Army List of Classified Equipment (ALCE) – Annex A to D/BOWMAN/9/28 dated 13 Oct 97, which is summarised as follows:

9.1	In-service	[REDACTED]
9.2	Radio when holding TRANSEC key variable	[REDACTED]
9.3	Radio when not keyed	[REDACTED]
9.4	Technical Aspects including frequency information	[REDACTED]

MAINTENANCE

WARNINGS

- (1) **HARMFUL RADIATION.** ELECTROMAGNETIC RADIATION CAN CAUSE DAMAGE TO HUMAN TISSUE. WHEN THE RADIO IS TRANSMITTING, MAINTAIN A SAFE DISTANCE FROM THE ANTENNA, OF 220 mm (WHERE PRACTICAL) FOR THE MANPACK AND 300 mm FOR THE VEHICLE AND ELEVATED ANTENNAS.
- (2) **HAZARDOUS SUBSTANCES.** ENSURE ADEQUATE VENTILATION WHEN USING CLEANING SOLVENT (ISOPROPYL ALCOHOL) OR PAINT. DO NOT INHALE FUMES.
- (3) **HAZARDOUS SUBSTANCES.** THIS EQUIPMENT CONTAINS NICKEL CADMIUM (Ni-Cd) BATTERIES. FOR HANDLING AND DISPOSAL INSTRUCTIONS REFER TO ACP 63723 CHAPTER 16.

CAUTIONS

- (1) **DATA LOSS.** All values set in the current display are lost and revert to their previous settings unless the ENT key is pressed before the ESC key.
- (2) **EQUIPMENT DAMAGE.** Before disconnecting equipment items or assemblies, set the R/T unit mode switch to the OFF position.
- (3) **EQUIPMENT DAMAGE.** Do not select any of the MAINTENANCE menu options. Doing so can prevent the R/T unit from working or can hinder repair.
- (4) **EQUIPMENT DAMAGE.** Do not connect the BID250/31 fill device directly to the R/T unit. Ensure correct connection of the fill cable. Incorrect connection can damage the connectors.
- (5) **EQUIPMENT DAMAGE.** Before disconnecting, removing or replacing modules, assemblies or components, set the R/T unit mode switch to OFF, disconnect the power supply and earth the circuit.
- (6) **EQUIPMENT DAMAGE.** The modules within the R/T unit are sensitive to electrostatic discharge (ESD). To prevent damage due to ESD, refer to EMER TELS A 414 Chap 545.
- (7) **EQUIPMENT DAMAGE.** When positioning the front panel against the chassis, ensure that the front panel EMI gasket is correctly seated and remains in place, and ensure that no cables are trapped between the mating surfaces.
- (8) **EQUIPMENT DAMAGE.** Ensure that all cables are correctly routed as given. Incorrectly routed cables may be trapped and crushed when the front panel is closed.
- (9) **EQUIPMENT FAULT.** If a BIT FAULT message is displayed, the R/T unit will not function correctly.
- (10) **FILTER MISALIGNMENT.** Do not select the FILTER TUNING option or attempt to tune the filters without the correct test equipment. Doing so may degrade performance. If you inadvertently select the FILTER TUNING option to show the FILTER TUNING display, immediately press the ESC key to return to the MAINTENANCE menu.
- (11) **LIMITED DURATION.** Following emergency TOD acquisition, the TOD will remain synchronised between stations for a period of at least 4 hrs. After this period, accuracy may be reduced and the TOD should be re-acquired.

(continued)

CAUTIONS (continued)

(12) **LIMITED COMMUNICATION.** A forced TOD has a unique, arbitrary value and will not be synchronised with Zulu time (co-ordinated universal time). Once the TOD is manually forced on one station, the station will not communicate with a second radio station in HQ mode unless the unique TOD is transmitted to, and received by, the second station. The second station will, in turn, only be able to communicate in HQ mode with those stations which have also received the unique forced TOD.

(13) **MWOD COMPATIBILITY.** To communicate in HQ II mode, a valid MWOD with the same date code as the TOD must be present. If a valid MWOD is not present when attempting HQ communications, an error message will be displayed.

(14) **RISK OF ERROR.** Once the last WOD segment is entered none of them can be recalled. Any error will prevent HQ operation and all values must be re-entered. Before entering the last value, check that all the displayed values are correct.

(15) **RISK OF ERROR.** Once the DAY value is entered none of the segments can be recalled. Any error will prevent HQ operation and all values must be re-entered. Before entering the DAY value, check that all the displayed values are correct.

(16) **TIME DELAY.** Ensure that ZEROIZED is displayed before resetting the mode switch. If the switch is reset before the zeroising operation has completed, the MWODS will not be fully erased.

(17) **TOD DISRUPTION.** The MWOD electronic fill process may disrupt TOD accuracy. Following an electronic fill, the TOD must be validated or updated using the appropriate procedure.

(18) **UNAUTHORISED USE.** The UK/RT 346 receiver-transmitter unit is capable of extended frequency operation in the ranges 30 to 88 MHz, 100 to 174 MHz VHF AM/FM and 225 to 400 MHz UHF AM/FM. These frequency ranges extend beyond the declared employment bands. Inclusion of this facility does not automatically authorise its use. Such use shall be carefully co-ordinated and approved. The allocation of radio frequencies is governed by widespread military regulations and civilian laws. Any violation of such regulations or laws, or unauthorised use, may render the user liable to prosecution.

(19) **WOD ERASURE.** When a forced TOD is entered, the HQ I WOD is erased. To communicate in HQ I mode, a valid WOD with the same date code as the forced TOD must be entered following forced TOD entry. If a valid WOD is not present when attempting HQ communications, an error message will be displayed.

(20) **WOD COMPATIBILITY.** To communicate in HQ mode, a compatible WOD and TOD must be present. If a valid WOD is not present when attempting HQ communications, an error message will be displayed.

10. The levels of maintenance for the PRC 346 are as follows:

10.1 Unit Repair – Levels 1 and 2 Maintenance.

10.1.1 Main Items User Repair is limited to cleaning and functional testing of the radio in accordance with AESP 5820-F-299 Categories 201 and 522, and the replacement of consumable items as detailed in the Repair Charts. Under no circumstances are equipment covers to be removed at Unit Level. Failure to comply will invalidate warranty/contract agreements, resulting in additional costs to the MOD.

10.1.2 Ancillary Equipment Repair of in-service audio ancillary items, as identified in AESP Category 522, is in accordance with EMER TELS C742.

10.2 Field Repair – Levels 2 and 3 Maintenance. Nil

10.3 Contract Repair – Levels 3 and 4 Maintenance. The following items are subject to Contract /ABRO Repair:

10.3.1 PRC 346 – 5820-99-836-3761

10.3.2 Adapter Box Radio (ABR) – 5820-99-811-9389

10.3.3 Remote Unit Local (RUL) – 5820-99-926-3726

10.3.4 SPGR - Repairs to the SPGR will be carried out by Rockwell Collins (UK) Ltd. A repair contract will be arranged by the MoD PE Project Manager, SES 12. An ESPD detailing the Repair Policy for the SPGR will be produced by ES 32a(4) in due course.

10.3.5 BID/250/31 Fill Gun Assembly – Y2/5810-99-99-645-0303

10.3.6 BID/250/2 Tape Reader – Y2/5810-99-645-0302

10.4 Backloading Instructions.

10.4.1 In the event of a fault occurring which cannot be rectified without breaking the seal of the equipment, the complete equipment is to be sentenced "Beyond Local Repair" and an AFG 1043 generated.

10.4.2 The user should demand a replacement item, through the normal supply chain using an AFG 8620, quoting the AFG 1043 serial number and a Reason For Demand of '1' (to replace items unserviceable through fair wear and tear). Replacement equipment will be issued from the Repair Pool held at BOD Donnington.

10.4.3 The demand will automatically generate an AFG 8883, which will provide backloading instructions to the User for the return of the unserviceable carcass to BOD Donnington.

NOTE

Users are to ensure that keying information stored in the PRC 346 is removed, in accordance with AESP 5820-F-299-201 Chap 3 Paras 69-71, prior to returning the equipment to BOD Donnington.

10.4.4 The unserviceable equipment is to be returned to BOD Donnington, accompanied by copies of the AFG 8883 and Part A of the Equipment Failure Report (see Para 17). The EFR should include details relating to the failure, including Built In Test (BIT) Code information where possible.

10.4.5 BOD Donnington will arrange for the onward transmission of the equipment to the Contractor or ABRO for repair.

SUPPLY

11. Users should be particularly aware of the following inventory management procedures that apply to the PRC 346:

11.1 Replacement consumable items are to be demanded using the current stores procedures on a one for one basis to ensure that usage rates are accrued within the normal supply system.

11.2 In order to prevent delays in repairing the equipment and therefore enhance equipment availability the faulty equipment is to be returned to BOD Donnington within 28 days of receipt of the AFG 8883.

SPECIAL TOOLS AND TEST EQUIPMENT

12. The Special Tools and Test Equipment (STTE) required to support the PRC 346 are as follows:

12.1 Level 2: AATS to RUL adaptor – NSN not yet available.

12.3 Level 3: CBTS to ABR adaptor cable – NSN not yet available.

PUBLICATIONS

13. Details of the publications available in support of the PRC 346 and its associated ancillaries are contained within the preliminary pages to this document. In addition, the following CES are available:

13.3 Complete Equipment Schedules. Complete Equipment Schedules (CES) in support of PRC 346 installations are available as follows:

13.3.1 PRC 346 installation in BV206 - AESP 5800-H-371-741

13.3.2 PRC 346 installation in ASV436 - AESP 5800-H-281-741

13.3.3 PRC 346 installation in TUM - AESP 5800-C-150-741

13.3.4 PRC 346 installation in TUL - AESP 5800-C-160-741

13.3.5 PRC 346 installation in TUL/TUM (HS) FFR - AESP 5800-C-148-741

13.3.6 PRC 346 manpack - AESP 5820-F-299-741

SAFETY

14. A safety assessment of the equipment has been carried out by the Contractor. The following reports are available:

14.1 RF Radiation Hazard Assessment – Report No RH/08/98 Issue 1 dated 10 Sep 98

14.2 Safety Assessment Reference – Report No HEL/SAS/377/0001

TRAINING

15. An initial User instructor course will be provided by the Contractor for staff from training establishments. Training packages will be also be provided by the Contractor for future use by the training organisations.

RELIABILITY

16. Warranty. A two-year/2000 operating hours warranty period, effective from the date of acceptance of the first installation, is provided against manufacture and design defects. This excludes damage caused by improper use and poor maintenance. Repair decisions for equipment damaged following improper use and poor maintenance reside with the Project Manager.

17. Equipment Failure Reporting. 100% incident reporting and/or equipment failure reporting, in accordance with Material Regulations for The Army, Volume 2, Pamphlet 2, Section 1, is required until advised to the contrary. A copy of Part A of the Equipment Failure Report (AF G8267) is to be sent to:

FCSG, ATSA
Leigh Sinton Road
MALVERN
Worcs
WR14 1LL

Tel: Mil: Malvern Mil (749) [REDACTED]
Civ: 01684 [REDACTED]

Fax: Mil: Malvern Mil (749) [REDACTED]
Civ: 01684 [REDACTED]

18. It is essential that a copy of the EFR (AFG 8276A) is returned with the failed equipment. The EFR should include details relating to the failure, including Built In Test (BIT) Code information where possible.

19. Serious Defects. Standard procedures relating to Serious Defects are to apply (Annex F to Material Regulations for the Army, Volume 2, Pamphlet 2 refers). Serious defects/failures are to be reported to ATSA, FCSG immediately. Defective equipment is to be retained by the reporting unit until Disposal Instructions are issued by ATSA.

20. Examination. The PRC 346 is subject to an annual Periodic REME Examination (PRE) in accordance with EMER MGMT O 026 and AGAI Vol 4 Chap 142. The examination will involve testing the equipment in accordance with the Operator Instructions detailed in the AESP Category 201.

NOTE: The policy for PREs is currently being reviewed by ES11c. An AESP detailing the revised policy will be issued in due course.

CONFIGURATION MANAGEMENT

21. The equipment configuration is determined as follows:

21.1 The PRC 346 (TacGA) is compliant with STANAG 4246 (HAVEQUICK II).

21.2 The Post Design Services (PDS) authority (Design Sponsorship) resides with the Project Manager.

21.3 No modifications are to be carried out to this equipment without the prior approval of the equipment Configuration Control Board. Requests are to be directed through the ESM.

STORAGE

22. All items associated with this equipment are to be packaged in accordance with DEF STAN 81/41 to level J standard. This packaging is to be retained by the unit for use when items are returned for repair.

DISPOSAL

23. Declaration of Obsolescence/Obsolete. The ESM is responsible for declaring the equipment obsolescent/obsolete and for issuing Disposal Instructions.

REVIEW OF ESPD

24. The maintenance policy set out in this ESPD is based on the planned deployment and intended role of the equipment together with the estimate of its utilisation and reliability. The policy may be amended in the light of experience or changes in deployment or utilisation.

25. Whilst the Equipment Support Manager will carry out periodic reviews, it is also the responsibility of other MOD branches and theatre staff to recommend policy changes for matters of their concern as circumstances change.

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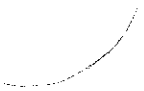
Action is being taken to:	Tick		Tick
Issue a revised/amended AESP		Under investigation	
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TacGA
THE TACTICAL GROUND AIR
COMMUNICATIONS SYSTEM

OPERATING INFORMATION

REPRINTED INCORPORATING AMDTS 1-2

This publication contains information covering the requirements of Categories 2, 3 and 5 at information level 1.

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AMENDMENT RECORD

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OPERATING INFORMATION

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- 2 UK/RT 346 R/T unit operational screen displays
- 3 Operating instructions
- 4 Operator maintenance
- 5 Destruction of equipment

PREFACE

Sponsor : DGES(A)
Publication Agency : ATSA

INTRODUCTION

1 Service users should forward any comments on this publication through channels prescribed in AESP 0100-P-011-013. An AESP Form 10 is provided at the end of this publication; it should be photocopied and used for forwarding comments on this AESP.

2 AESPs are issued under Defence Council authority and where AESPs specify action to be taken, the AESP will of itself be sufficient authority for such action and also for the demanding of the necessary stores, subject to the provisions of Para 3 below.

3 The subject matter of this publication may be affected by Defence Council Instructions (DCIs), Standing Operating Procedures (SOPs) or by local regulations. When any such instruction, Order or Regulation contradicts any portion of this publication it is to be taken as the overriding authority.

RELATED AND ASSOCIATED PUBLICATIONS

Related publications

4 The Octad for the subject equipment consists of the publications shown overleaf. All references are prefixed by the first eight digits of this publication. The availability of the publications can be checked by reference to the relevant Group Index (see AESP 0100-A-001-013).

Category/Sub-category			Information Level			
			1 User/Operator	2 Unit Maintenance	3 Field Maintenance	4 Base Maintenance
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	1	Aide Memoire	211	*	*	*
	2	Training Aids	*	*	*	*
3		Technical Description	201	302	302	*
4	1	Installation Instructions	*	*	*	*
	2	Preparation for Special Environments	*	*	*	*
5	1	Failure Diagnosis	201	512	513	*
	2	Repair Instructions	201	522	523	*
	3	Inspection Standards	*	532	533	*
	4	Calibration Procedures	*	*	*	*
6		Maintenance Schedules	*	*	*	*
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	3	Complete Equipment Schedule, Production	*	*	*	*
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8	1	Modification Instructions	*	*	*	*
	2	General Instruction, Special Technical Instructions and Servicing Instructions	*	*	*	*
	3	Service Engineered Modification Instructions (RAF only)	*	*	*	*

* Category/Sub-category not published

Associated publications

5 The following publications are associated with this Category:

<u>Reference</u>	<u>Title</u>
Signal Engineering Instruction 14411	Safety Precautions for Electrical Equipment
EMER Telecommunications C 740	Audio Gear Clansman
EMER Telecommunications K 010	Clansman Charging Equipment
EMER Telecommunications L220 - 229	Mast Telescopic 8 m (to be replaced by AESP 5985-C-090)
ACP 63723	Health and Safety Management in ESO/REME
AESP 5825-D-100	Special Personal GPS Receiver (SPGR)
AESP 5985-C-090	User Handbook Mast Telescopic 8 m
AESP 6130-M-102	Intelligent Battery Management System (IBMS)
BID 250/1/1	User Handbook BID 250/31
BID/251-2	User Handbook BID 250/2

WARNINGS

- (1) **HARMFUL RADIATION.** ELECTROMAGNETIC RADIATION CAN CAUSE DAMAGE TO HUMAN TISSUE. WHEN THE RADIO IS TRANSMITTING, MAINTAIN A SAFE DISTANCE FROM THE ANTENNA, OF 220 mm (WHERE PRACTICAL) FOR THE MANPACK AND 300 mm FOR THE VEHICLE AND ELEVATED ANTENNAS.
- (2) **HAZARDOUS SUBSTANCES.** THIS EQUIPMENT CONTAINS NICKEL CADMIUM (Ni-Cd) BATTERIES. FOR HANDLING AND DISPOSAL INSTRUCTIONS REFER TO ACP 63723 CHAPTER 16.

CAUTIONS

- (1) **UNAUTHORISED USE.** The UK/RT 346 receiver-transmitter unit is capable of extended frequency operation in the ranges 30 to 88 MHz, 100 to 174 MHz VHF AM/FM and 225 to 400 MHz UHF AM/FM. These frequency ranges extend beyond the declared employment bands. Inclusion of this facility does not automatically authorise its use. Such use shall be carefully co-ordinated and approved. The allocation of radio frequencies is governed by widespread military regulations and civilian laws. Any violation of such regulations or laws, or unauthorised use, may render the user liable to prosecution.
- (2) **EQUIPMENT DAMAGE.** Before disconnecting equipment items or assemblies, set the R/T unit mode switch to the OFF position.
- (3) **EQUIPMENT FAULT.** If a BIT FAULT message is displayed, the R/T unit will not function correctly.
- (4) **DATA LOSS.** All values set in the current display are lost and revert to their previous settings unless the ENT key is pressed before the ESC key.
- (5) **EQUIPMENT DAMAGE.** Do not select any of the MAINTENANCE menu options. Doing so can prevent the R/T unit from working or can hinder repair.
- (6) **WOD ERASURE.** When a forced TOD is entered, the HQ I WOD is erased. To communicate in HQ I mode, a valid WOD with the same date code as the forced TOD must be entered following forced TOD entry. If a valid WOD is not present when attempting HQ communications, an error message will be displayed.
- (7) **WOD COMPATIBILITY.** To communicate in HQ mode, a compatible WOD and TOD must be present. If a valid WOD is not present when attempting HQ communications, an error message will be displayed.
- (8) **MWOD COMPATIBILITY.** To communicate in HQ II mode, a valid MWOD with the same date code as the TOD must be present. If a valid MWOD is not present when attempting HQ communications, an error message will be displayed.
- (9) **TOD DISRUPTION.** The MWOD electronic fill process may disrupt TOD accuracy. Following an electronic fill, the TOD must be validated or updated using the appropriate procedure.
- (10) **EQUIPMENT DAMAGE.** Do not connect the BID250/31 fill device directly to the R/T unit. Ensure correct connection of the fill cable. Incorrect connection can damage the connectors.
- (11) **LIMITED DURATION.** Following emergency TOD acquisition, the TOD will remain synchronised between stations for a period of at least 4 hrs. After this period, accuracy may be reduced and the TOD should be re-acquired.

(continued)

CAUTIONS (continued)

(12) **LIMITED COMMUNICATION.** A forced TOD has a unique, arbitrary value and will not be synchronised with Zulu time (co-ordinated universal time). Once the TOD is manually forced on one station, the station will not communicate with a second radio station in HQ mode unless the unique TOD is transmitted to, and received by, the second station. The other second will, in turn, only be able to communicate in HQ mode with those stations which have also received the unique forced TOD.

(13) **RISK OF ERROR.** Once the last WOD segment is entered none of them can be recalled. Any error will prevent HQ operation and all values must be re-entered. Before entering the last value, check that all the displayed values are correct.

(14) **RISK OF ERROR.** Once the DAY value is entered none of the segments can be recalled. Any error will prevent HQ operation and all values must be re-entered. Before entering the DAY value, check that all the displayed values are correct.

(15) **TIME DELAY.** Ensure that ZEROIZED is displayed before resetting the mode switch. If the switch is reset before the zeroising operation has completed, the MWODS will not be fully erased.

ABBREVIATIONS

ABR	... ..	Adaptor box radio
AJ	... ..	Anti-jam
AM	... ..	Amplitude modulation
ATC	... ..	Air traffic control
AUD	... ..	Audio
BCN	... ..	Beacon
BIT	... ..	Built-in-test
BV&I	... ..	B vehicle and infantry
DCCU	... ..	Direct current charging unit
ENT	... ..	Enter
ESC	... ..	Escape
FM	... ..	Frequency modulation
FMT	... ..	Frequency managed training (HQII)
GMT	... ..	Greenwich mean time
GP	... ..	General purpose
GPS	... ..	Global positioning system
HF	... ..	High frequency
HQ	... ..	HAVE QUICK
IBMS	... ..	Intelligent battery management system
LCD	... ..	Liquid crystal display
mic	... ..	Microphone
MWOD	... ..	Multiple word of day
MWODS	... ..	Multiple words of day
Ni-Cd	... ..	Nickel-cadmium
OTA	... ..	Over-the-air
RF	... ..	Radio frequency
R/T	... ..	Receiver-transmitter
RUL	... ..	Remote unit local
Rx	... ..	Receive
SPGR	... ..	Specialist portable GPS receiver
T-net	... ..	Training net (HQI)
TOD	... ..	Time of day
Tx	... ..	Transmit
TXP	... ..	Transmit power
UHF	... ..	Ultra-high frequency
UTC	... ..	Co-ordinated universal time
VHF	... ..	Very-high frequency
WOD	... ..	Word of day
Z	... ..	(1) Zeroize (2) Zulu time

REPRESENTATION OF SCREEN DISPLAYS

6 The R/T unit displays operator information on an LCD panel display screen. The LCD panel display is represented in this Category in the form of a shaded rectangle, as in the example shown.

7 The LCD panel can display up to four lines of text. The operator information comprises a set of screens, some of which contain more than four lines of text. The additional lines are displayed by scrolling the screen. In this Category, text not visible in the current display is shown outside the display, with a dotted outline as shown.

HQ
1-LOAD WOD
2-LOAD MWOD
3-LOAD FMT NET
4-FORCE TOD
5-ERASE MWODS

[REDACTED]



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GENERAL INFORMATION
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	Communication facilities (WARNING) (CAUTION)
3	Multi-band fixed frequency voice/data communications
4	Anti-jam (AJ) HAVE QUICK communications
6	Radio configuration
7	Beacon operation
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9	Power management
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11	Vehicle mounted manpack configuration
13	Remote operation
14	Free-standing elevated antenna system
	Battery life
15	Manpack 5 AH battery
16	Mounted manpack 4.5 AH battery
17	The HAVE QUICK system
20	General description
23	UK/RT 346 receiver-transmitter (R/T) unit
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30	Power management
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62	BID 250/2 fill kit for use with the SPGR
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65	D10 field wire dispenser pack
66	Breakout box

(continued)

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PURPOSE AND FACILITIES

1 The TacGA communications system is a versatile, portable multi-band radio system for tactical ground-to-air-to-ground use, as illustrated in Fig 1. The system provides voice and data communications, and may be operated in either a normal V/UHF multi-band fixed frequency mode or in a UHF frequency-agile anti-jam (AJ) mode designated HAVE QUICK. The system also provides facilities for global positioning system (GPS) and emergency beacon operation.

2 A TacGA installation is designated a UK/PRC 346 radio station. A station may be configured for manpack or vehicle mounted manpack use. Options are provided for remote operation and for free-standing elevated antennas.

Communication facilities

WARNING

HARMFUL RADIATION. ELECTROMAGNETIC RADIATION CAN CAUSE DAMAGE TO HUMAN TISSUE. WHEN THE RADIO IS TRANSMITTING, MAINTAIN A SAFE DISTANCE FROM THE ANTENNA, OF 220 mm (WHERE PRACTICAL) FOR THE MANPACK AND 300 mm FOR THE VEHICLE AND ELEVATED ANTENNAS.

CAUTION

UNAUTHORISED USE. The UK/RT 346 receiver-transmitter unit is capable of extended frequency operation in the ranges 30 to 88 MHz, 100 to 174 MHz VHF AM/FM and 225 to 400 MHz UHF AM/FM. These frequency ranges extend beyond the declared employment bands. Inclusion of this facility does not automatically authorise its use. Such use shall be carefully co-ordinated and approved. The allocation of radio frequencies is governed by widespread military regulations and civilian laws. Any violation of such regulations or laws, or unauthorised use, may render the user liable to prosecution.

Multi-band fixed frequency voice/data communications

3 The UK/PRC 346 radio station provides normal voice/data radio communication in both AM and FM modes at fixed frequencies across the V/UHF band from 100 to 400 MHz. This allows communication on the VHF-AM Air Traffic Control band, the VHF-FM Maritime band and the UHF Airborne Communication band. The AM/FM mode, transmit (Tx) frequency, receive (Rx) frequency and transmit power are independently selectable by the user.

Anti-jam (AJ) HAVE QUICK communications

4 TacGA provides AJ communications using a system called HAVE QUICK. The HAVE QUICK system must be synchronised across all stations operating in AJ mode. Multiple communication channels can be set up without risk of cross-channel interference.

5 The HAVE QUICK radio parameters can be manually set by the user. A fixed frequency mode is provided for use when setting up HAVE QUICK operation, with an Active/Normal facility for switching between AJ and fixed frequency modes. Further information on the HAVE QUICK system is given in Paras 17 to 19.

Radio configuration

6 At power off, the current radio configuration is stored for immediate use when next powered up. Values for all radio operating parameters can be saved as a single preset configuration (preset). Up to 99 presets can be stored and recalled by the user.

Beacon operation

7 The UK/PRC radio station has the facility to transmit a beacon signal. The beacon mode (AM/FM), frequency and power level are user selectable and the beacon signal is user selectable as a constant 1 kHz tone or as a swept 150 to 3850 Hz tone.

GPS operation

8 The HAVE QUICK TOD (Para 18.2) is acquired and updated automatically through the Specialist personal GPS Receiver (SPGR). All functions of the SPGR external to TacGA remain available while it is connected to the UK/PRC 346 station; for operating information on the SPGR, refer to AESP 5825-D-100-201. Crypto variable key (CVK) fill of the SPGR is provided within TacGA.

Power management

9 To reduce power consumption and prolong battery life, the UK/PRC 346 station incorporates a power management system with continuous power, "sleep" and "polling" modes. The power management system is detailed in Para 30.

Deployment options

Manpack configuration

10 The basic UK/PRC 346 manpack radio station can be carried and operated by a single user. It provides the following facilities:

10.1 The radio station is located within a specialist carry container and may be used while the operator is wearing the carrier. The carrier has additional stowage provision for a spare battery and battle antenna. Two day sack external attachment points are provided.

10.2 In manpack configuration the UK/PRC 346 radio station employs an extended-life 5 AH rechargeable battery.

10.3 The manpack station may be used in conjunction with remote operation and/or 5.4 m high elevated antenna mast options.

Vehicle mounted manpack configuration

11 A UK/PRC 346 radio station may be installed in any of the following vehicles:

11.1 TUL/TUM Landrover. The remote operation kit and free-standing 8 m elevated antenna system may be optionally deployed.

11.2 BV206(D). The UK/PRC 346 station is located on the tractor rear bulkhead. The R/T audio is also available in the trailer. The free-standing 8 m elevated antenna system may be optionally deployed.

11.3 ASV436. The free-standing 8 m elevated antenna system may be optionally deployed.

12 In vehicle mounted manpack configuration the UK/PRC 346 radio station employs a standard Clansman type 4.5 AH rechargeable battery.

Remote operation

13 The manpack and TUL/TUM Landrover radio stations may be operated remotely using a field wire and remote handset from a distance of up to 2,000 m.

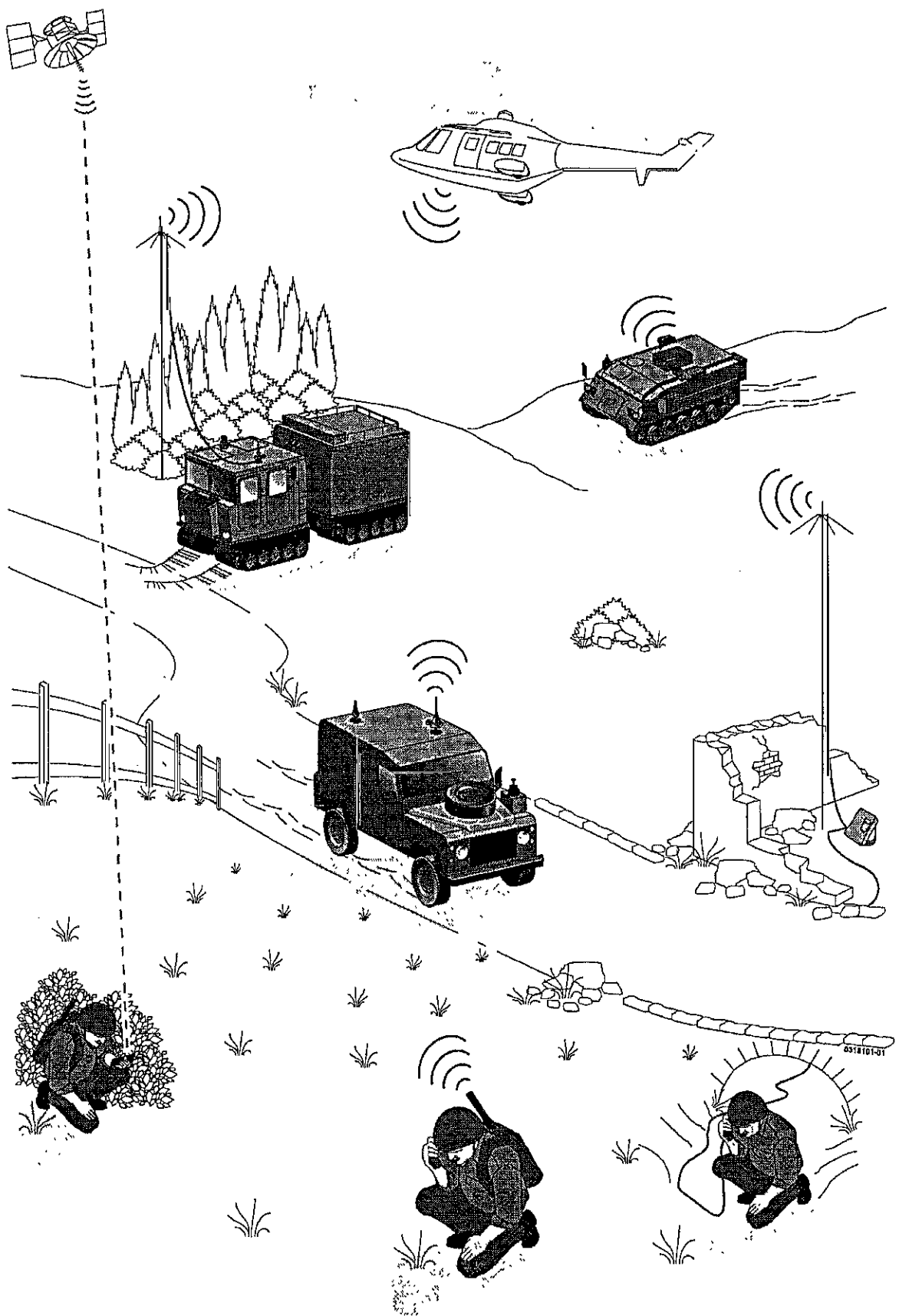


Fig 1 The TacGA communications system

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Free-standing elevated antenna system

14 In locations where the standard antenna position provides inadequate performance, the elevated antenna system provides the following options for mounting the antenna on an elevating mast:

14.1 5.4 m high mast system for use with the manpack station and V/UHF battle antenna.

14.2 8 m high mast system, including an elevated antenna, for use with the vehicle mounted stations.

Battery life

Manpack 5 AH battery

15 For an R/T unit with SPGR connected and with a power management polling duty cycle (Para 30) of 1:1 for 23 hrs and transmit at high power (8 W) for 1 hr, the nominal manpack battery life is 12 hr.

Mounted manpack 4.5 AH battery

16 For an R/T unit with SPGR connected and with a power management polling duty cycle (Para 30) of 1:1 for 23 hrs and transmit at high power (8 W) for 1 hr, the nominal mounted manpack battery life is as follows:

16.1 When operated independently from the vehicle DCCU, the life of a single 4.5 AH battery is 9 hr.

16.2 When on float charge the battery life is indefinite.

The HAVE QUICK system

17 HAVE QUICK (HQ) provides anti-jam (AJ) communications through the use of frequency hopping. In operation, the radio changes (hops) to a different operating frequency at irregular intervals, as shown in Fig 2. The frequency values and their timing are synchronised across all radios operating in HQ mode. In this way, the radios maintain communications whilst making it difficult to jam or monitor the communications.

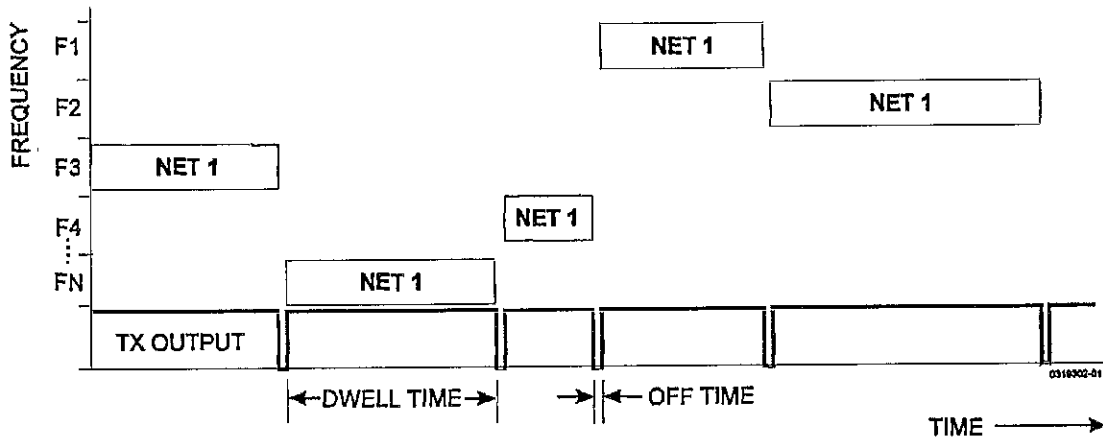


Fig 2 HAVE QUICK frequency hopping

18 TacGA supports both HQ I and HQ II modes. In order to function, the HAVE QUICK system requires the following information (parameters):

18.1 Net number. The group of frequencies to be used (hopset) and the entry point within the hopset are identified by the net number. By using different net numbers, two or more AJ communication channels can be set up without risk of cross-channel interference, as shown in Fig 3.

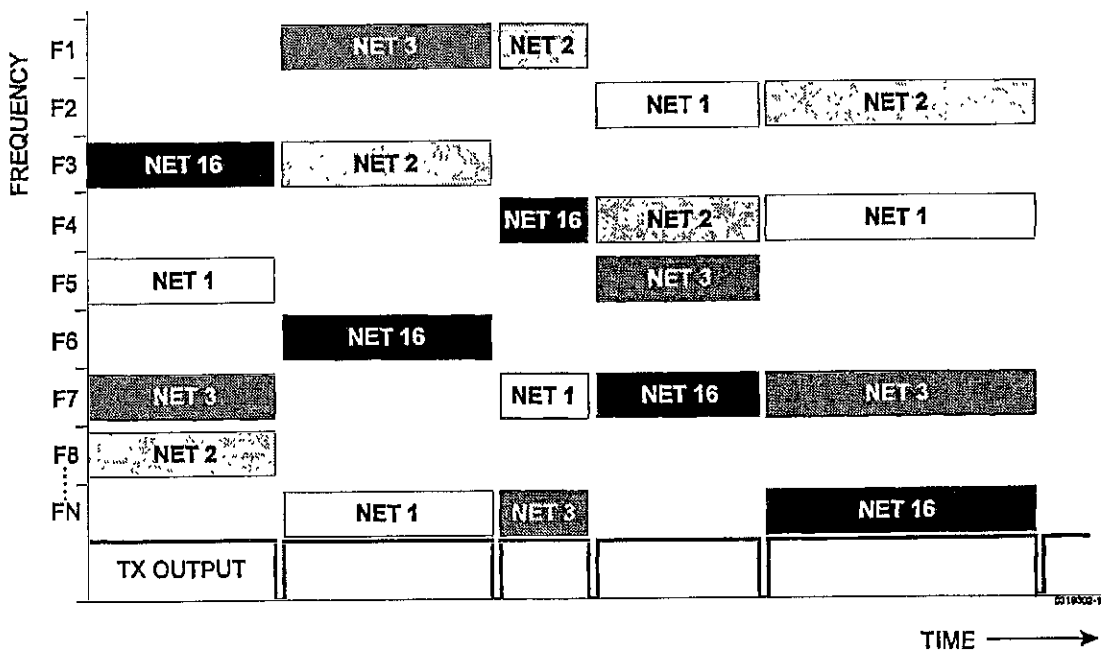


Fig 3 Operation on multiple HAVE QUICK communication channels (net numbers)

18.1.1 The net numbers used for training purposes are detailed in Table 1.

TABLE 1 HAVE QUICK TRAINING NET NUMBERS

Serial (1)	Training net (2)	Net numbers (3)					
1	T-net (HQI)	A00000	A00100	A00200	A00300	A00400	
2	FMT-net (HQII)	A00025	A00125	A00225	A00325	A00425	A00525
		A00625	A00725	A00825	A00925	A01025	A01125
		A01225	A01325	A01425	A01525		

18.2 Time of day (TOD). In order to synchronise the timing of hops, the radios must have a common time reference. This is provided by the time of day (TOD). For operation with full facilities the TOD must be acquired and updated automatically through the Specialist personal GPS Receiver (SPGR). In an emergency the TOD can be acquired, with some loss of system facilities, from an external source (eg another TacGA station) through an RF TOD transfer, or by forced manual entry where no other TOD is available.

18.3 Word of day (WOD) and Multiple word of day (MWOD). The sequence of frequencies (hop pattern) and the timing of the hops (dwell time) are determined by a coded "key" called the word of day (WOD).

18.3.1 WOD. HAVE QUICK I uses a single WOD. The WOD does not contain date information and can be used for as many days as desired until a new WOD is loaded. The WOD is entered manually by the user.

18.3.2 MWOD. HAVE QUICK II uses up to six WODs called Multiple WODs (MWODS). Each MWOD includes a date code (day of month) and is valid for a single day, from 00:00 to 23:59 hrs. At midnight TOD transitions, the next day's MWOD is automatically selected. The MWODS may be manually loaded, or electronically loaded (filled) from the (pre-loaded) BID 250/31 fill device. The six MWODS allow HAVE QUICK II operation for up to six calendar days from a single fill session.

18.3.3 Zeroizing. The WOD/MWODS keys are retained during power-off periods, for use when next required. Because the keys are classified, the WOD/MWODS must be erased (zeroized) by the user when no longer required.

19 TacGA also provides the following HQ facilities:

19.1 All HQ parameters can be manually set by the user. A fixed frequency mode is provided for use when setting up HQ operation, together with an Active/Normal facility for switching between AJ and fixed frequency modes.

19.2 Conferencing allows two stations to transmit simultaneously on the same channel without RF interference. The listening stations will receive both audio transmissions. Conferencing is not available where WOD element 19 ends in 25 or 75, or where speech security equipment is used. Conferencing is a feature of the HAVE QUICK system and no other specific operator action is required.

19.3 For further information on the TacGA implementation of HAVE QUICK, refer to Cat 302 of this AESP.

GENERAL DESCRIPTION

20 A UK/PRC 346 radio station comprises the UK/RT 346 radio station together with additional ancillary equipment kits appropriate to the required configuration.

21 The UK/RT 346 radio station comprises the following equipment items:

- 21.1 UK/RT 346 receiver-transmitter (R/T) unit.
- 21.2 Global Positioning System (GPS) equipment items.
- 21.3 Operator information.

22 The ancillary equipment kits provided within, or associated with, the TacGA system are as follows:

- 22.1 Audio gear.
- 22.2 Manpack ancillary equipment items.
- 22.3 Vehicle ancillary equipment items.
- 22.4 BID 250/31 fill kit for the HAVE QUICK word-of-day (WOD).
- 22.5 BID 250/2 fill kit for the GPS CVK.
- 22.6 Remote operation kit.
- 22.7 Free-standing elevated antenna system.

UK/RT 346 receiver/transmitter (R/T) unit

23 The UK/RT 346 R/T unit (Fig 4) provides the radio system functions for the UK/PRC 346 radio station.

24 Power is supplied from an external battery mounted on the rear panel and secured using two quick-release fasteners. Electrical connection to the battery is made automatically on installation through two power input terminals. The R/T unit is compatible with a range of Clansman type batteries.

25 All other user facilities are located on the front panel. The radio operating parameters are accessed via an LCD panel display and associated keypad. The display screens are menu driven and are detailed in Chapter 2 of this AESP.

26 In addition to the radio functions, the R/T unit incorporates the following facilities:

- 26.1 Built-in test (BIT) and diagnostic facilities.
- 26.2 Power management facilities.

Built-in-test (BIT) and diagnostics

27 The R/T unit has three modes of self-diagnosis as follows:

27.1 Power-up BIT. On powering up the R/T unit performs an automatic off-line self-test. Power-up off-line BIT may be terminated by the operator during execution, via the front panel keypad or the handset/headset pressel switch. In this situation, the R/T unit transmitter will not be keyed.

27.2 Operator-initiated BIT. When a self-test is selected by the operator, the R/T unit performs the off-line BIT tests. Interactive testing of the R/T unit display screen and keypad are provided by additional BIT menu options.

27.3 On-line BIT. The R/T unit continuously monitors its internal function during operation. If a fault is detected a status message is displayed.

28 If a fault is detected during BIT, the R/T unit will display a BIT fault message. This failure information is stored for use at field maintenance level.

29 The R/T unit monitors the power system and battery voltage, SPGR connection and HAVE QUICK parameter compatibility, and displays a status message if a problem is detected. The 10 most recent status messages are retained in a list for use in failure diagnosis.

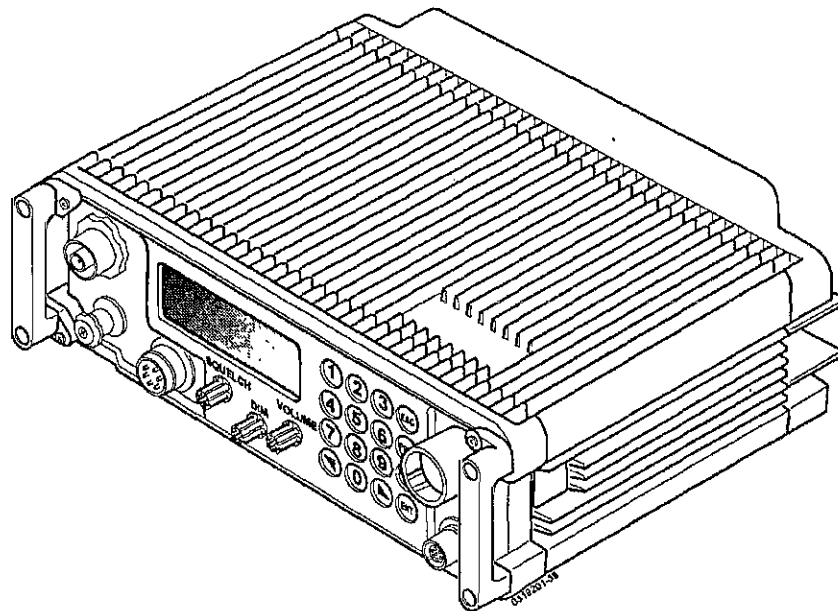


Fig 4 UK/RT 346 receiver-transmitter (R/T) unit

Power management

30 The R/T unit incorporates a power management facility to maximise battery life between charges. The following power modes are provided:

30.1 Continuous. Continuous fully-active operation. This mode consumes the most power.

30.2 Sleep. The R/T unit is not transmitting or receiving and consumes minimal power. On keying the pressel switch, the R/T unit reverts to fully-active mode. In sleep mode, the R/T unit can receive TOD updates from the SPGR. The following parameter can be set by the user:

30.2.1 Dwell time: The time period, after an RF event (Rx or Tx), for which the R/T unit remains in fully-active mode before reverting to sleep mode.

30.3 Polling. The R/T unit cycles between fully-active and sleep modes. Polling mode allows periodic Receiver squelch break detection by activating normal receive operation, whilst providing significant power saving. The following parameters can be set by the user and are stored in non-volatile memory:

30.3.1 Poll on: The time period spent in fully-active mode, during which the R/T unit will listen for RF activity.

30.3.2 Poll off: The time period spent in sleep mode.

30.3.3 Dwell time: The time period, after an RF event (Rx or Tx), for which the R/T unit remains in fully-active mode before reverting to polling mode.

31 The R/T unit continuously monitors the battery supply voltage and responds as follows:

31.1 When the battery voltage first drops to +22.5 V d.c. or below, the R/T unit displays a Status Message indicating that the battery is nearing the end of its useful charge.

31.2 When the battery voltage first drops to +20.5 V d.c. or below, the R/T unit displays a Status Message indicating that the battery is at the end of its useful charge.

31.3 When the battery voltage drops to +18.5 V d.c. or below, the R/T unit automatically powers itself off. This prolongs the overall life of a rechargeable battery by preventing deep discharges which would otherwise damage the battery.

Global positioning system (GPS) system

32 The global positioning system (GPS) equipment items (Fig 5) comprise the GPS Receiver and ancillary items.

Specialist personal GPS receiver (SPGR)

33 The SPGR supplied for use with TacGA is the Option 3 type device. The SPGR provides the following facilities:

33.1 HAVE QUICK Time-of-Day (TOD) signal for HAVE QUICK anti-jam (AJ) mode timing synchronisation. The SPGR connects to the R/T unit AUX connector using the SPGR interface cable and snatch adaptor.

33.2 All other functions of the SPGR remain available while it is connected to the R/T unit. The SPGR is an in-service item: for operating information external to TacGA refer to AESP 5825-D-100-201.

SPGR interface cable and snatch adaptor

34 The SPGR interface cable and snatch adaptor connect between the SPGR J2 data connector and the R/T unit AUX connector. The cable allows the SPGR to be positioned for optimal reception of the GPS signal by its internal antenna. The cable also provides external operating power to the SPGR from the R/T unit external battery whenever the R/T unit is powered on. In the event of excessive strain on the cable, the snatch connection between the cable and adaptor reduces the risks of injury to the user and of damage to the SPGR.

Batteries

35 The SPGR is provided with the following internal batteries:

35.1 AA batteries. The Option 3 SPGR is powered by six internal AA batteries for use independently from the R/T unit. The batteries are in-service items.

35.2 ½-AA memory battery. The SPGR is provided with an internal ½-AA size battery to maintain its internal memory when powered off. The battery is an in-service item.

Remote GPS antenna kit

36 The remote GPS antenna kit allows a range of mounting and connection options, for use of the SPGR in shielded or other locations where the direct GPS signal is insufficient. The kit comprises the remote GPS antenna, mounting plate, ground spike, 1.5 m adaptor cable, 28.5 m remote cable and kit bag. The kit bag is provided with an internal pocket for safe stowage of the GPS antenna.

36.1 Antenna mounting. The antenna's lower surface is a powerful magnet, allowing direct and secure location on any flat ferrous surface. For use elsewhere the mounting plate must be added. The plate is made of steel to retain the antenna and also provides a cable strain-relief hook. The spike is unscrewed in this role. For deployment on the ground or into other penetrable material, the whole plate and spike assembly is used.

36.2 Connection. The 1.5 m adaptor cable connects to the SPGR. For SPGR operation up to 30 m from the antenna, the 28.5 m remote cable connects between the adaptor cable and the remote antenna.

36.3 Position offset. The GPS location obtained is that of the remote antenna. To obtain the exact location of the SPGR when using fully deployed 28.5 m remote cable, an appropriate offset must be added. Deployment distances of 10 m or less may be ignored for offset calculation.

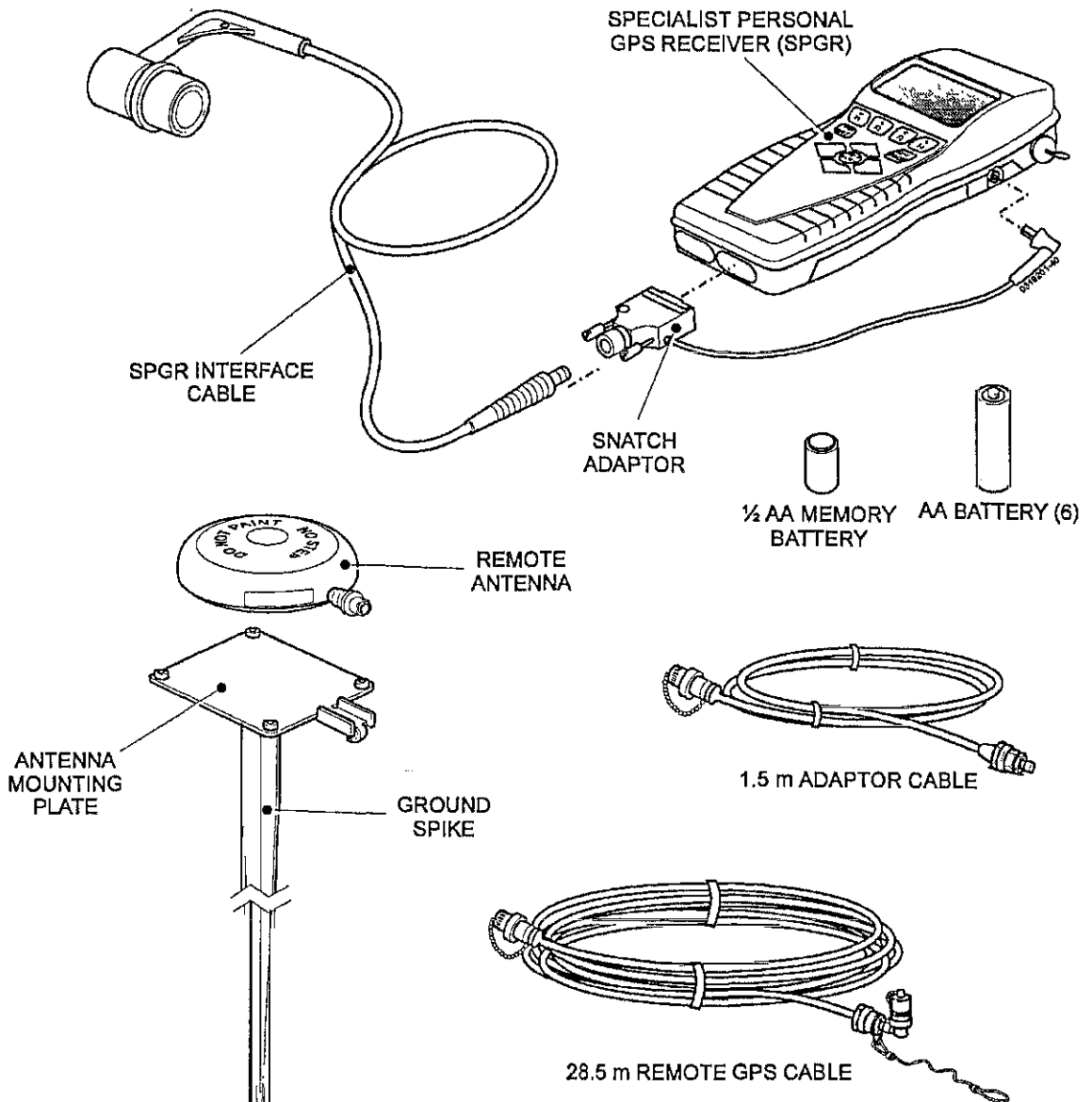


Fig 5 Global positioning system (GPS) equipment items

Operator information

37 Operator information issued with the UK/PRC 346 radio station comprises the following:

37.1 AESP 5820-F-299-211, TacGA The Tactical Ground Air Communications System - Aide Memoire.

37.2 AESP 5825-D-100-211, Specialist Personal GPS Receiver (SPGR) Quick Reference Guide.

Manpack ancillary equipment items

38 In manpack configuration, the UK/PRC 346 radio station comprises the UK/RT 346 station together with the audio gear and manpack ancillary equipment items. The manpack ancillary equipment items comprise the V/UHF battle antenna, 5 AH rechargeable battery, external SPGR pouch and carry container with document case.

39 The basic manpack UK/PRC 346 radio station can be carried and operated by a single user.

V/UHF battle antenna

40 The V/UHF battle antenna (Fig 6) mounts directly to the R/T unit front panel. A ball joint swivel mounting base enables the operator to align the antenna for optimum operation. The antenna operates across the full frequency range permitted and provides an omnidirectional transmitting pattern exhibiting linear polarisation along the antenna axis with a gain greater than -3.65 dBi. The antenna may optionally be mounted on the 5.4 m free-standing antenna mast using the battle antenna adaptor.

41 A spare antenna is provided for the manpack.

5 AH rechargeable battery

WARNING

HAZARDOUS SUBSTANCES. THIS EQUIPMENT CONTAINS NICKEL CADMIUM (Ni-Cd) BATTERIES. FOR HANDLING AND DISPOSAL INSTRUCTIONS REFER TO ACP 63723 CHAPTER 16.

42 The battery (Fig 6) is of the Nickel Cadmium (Ni-Cd) rechargeable type. It supplies +24 V d.c. nominal output, with a single-charge capacity of 5 AH.

43 A total of four batteries are provided for the manpack station: one in use, one spare carried within the carry container and two available for recharging. Recharging is carried out using the Intelligent Battery Management System (IBMS): for further information on the IBMS, refer to AESP 6130-M-102.

External SPGR pouch

44 The external SPGR pouch (Fig 6) can be strapped to the operator's chest harness webbing to provide a hands-free view of the SPGR display when operated independently from the radio station.

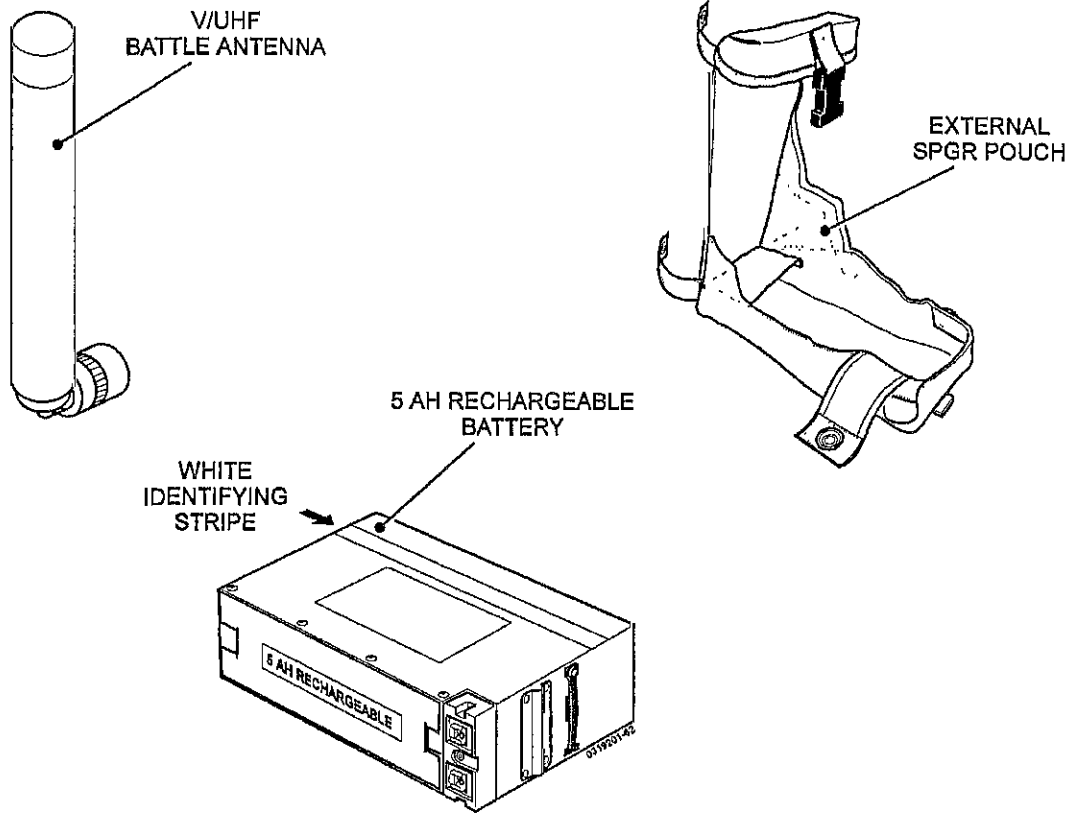


Fig 6 V/UHF battle antenna, 5 AH rechargeable battery and external SPGR pouch

Carry container and document case

45 The carry container houses the UK/PRC 346 radio station equipment for operation, storage and transport. The carry container provides the following facilities, as shown in Figs 7 and 8:

45.1 The carrier provides secure stowage locations for all the equipment items employed in the basic manpack station, in both operational and storage configurations.

45.2 The multiple zip pull arrangement around the cover allows convenient partial access to the interior for R/T unit setup or battery changes.

45.3 The carrier allows use of the station while it is being worn by the operator as follows:

45.3.1 The multiple zip pull arrangement around the cover allows the battle antenna to be positioned in the optimum orientation while maintaining protection for the interior.

45.3.2 The lower left hand cable entry grommet may be cut open to allow external access for the audio cabling and/or for the SPGR interface cable.

45.3.3 The upper right hand cable entry grommet provides access for a second cable, eg for the handset or the elevated antenna system RF cable.

45.3.4 All equipment items including cables are held securely in their operational positions.

45.4 The operational battery may be exchanged with the spare while all other operational equipment remains installed.

45.5 The shoulder harness is provided with adjustable tension straps. When packed for storage or transport, the shoulder harness is protected by a transit cover.

45.6 For remote operation, the carrier provides additional secure location for the breakout box, breakout box to ABR/RUL cable and remote unit local (RUL) required for connection to the field wire.

45.7 Attachment points for two day sacks from PLCE (personal load carrying equipment) and two general-purpose strap attachment points are provided externally.

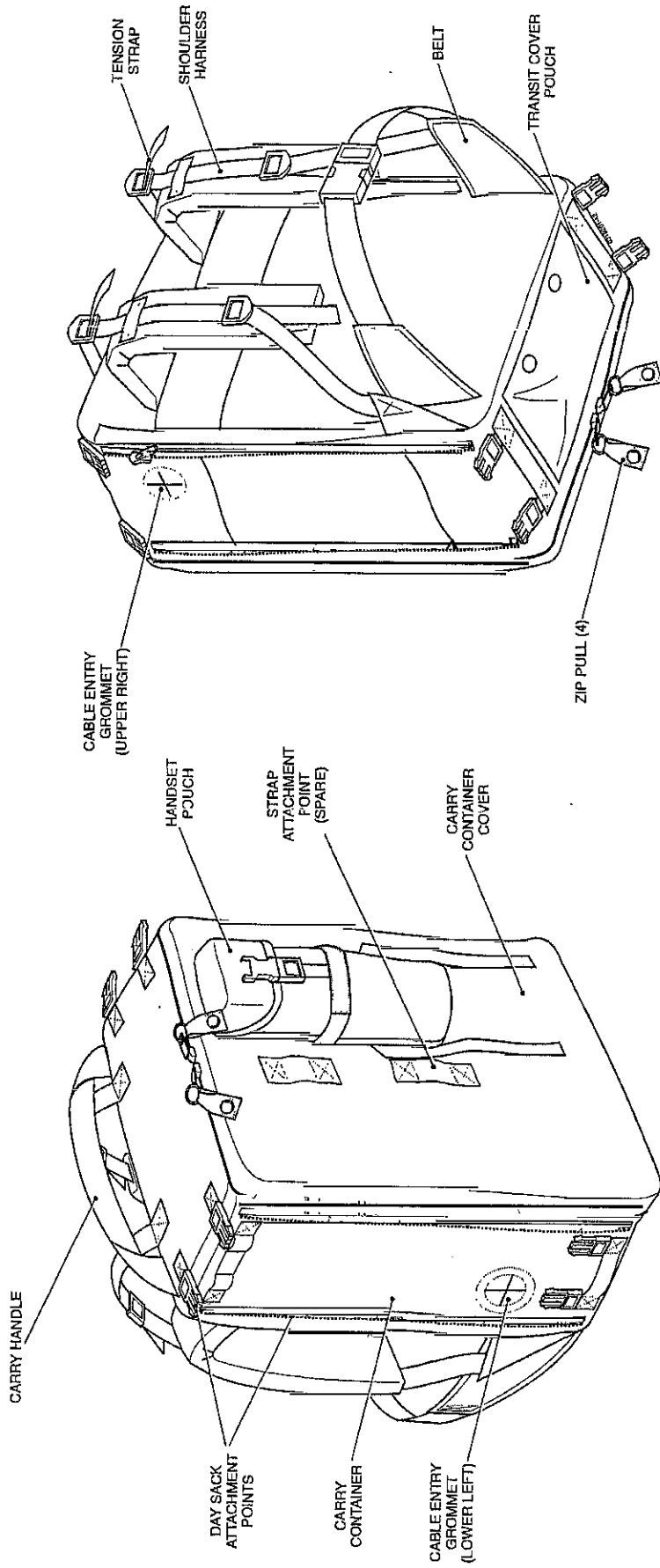


Fig 7 Carry container, exterior



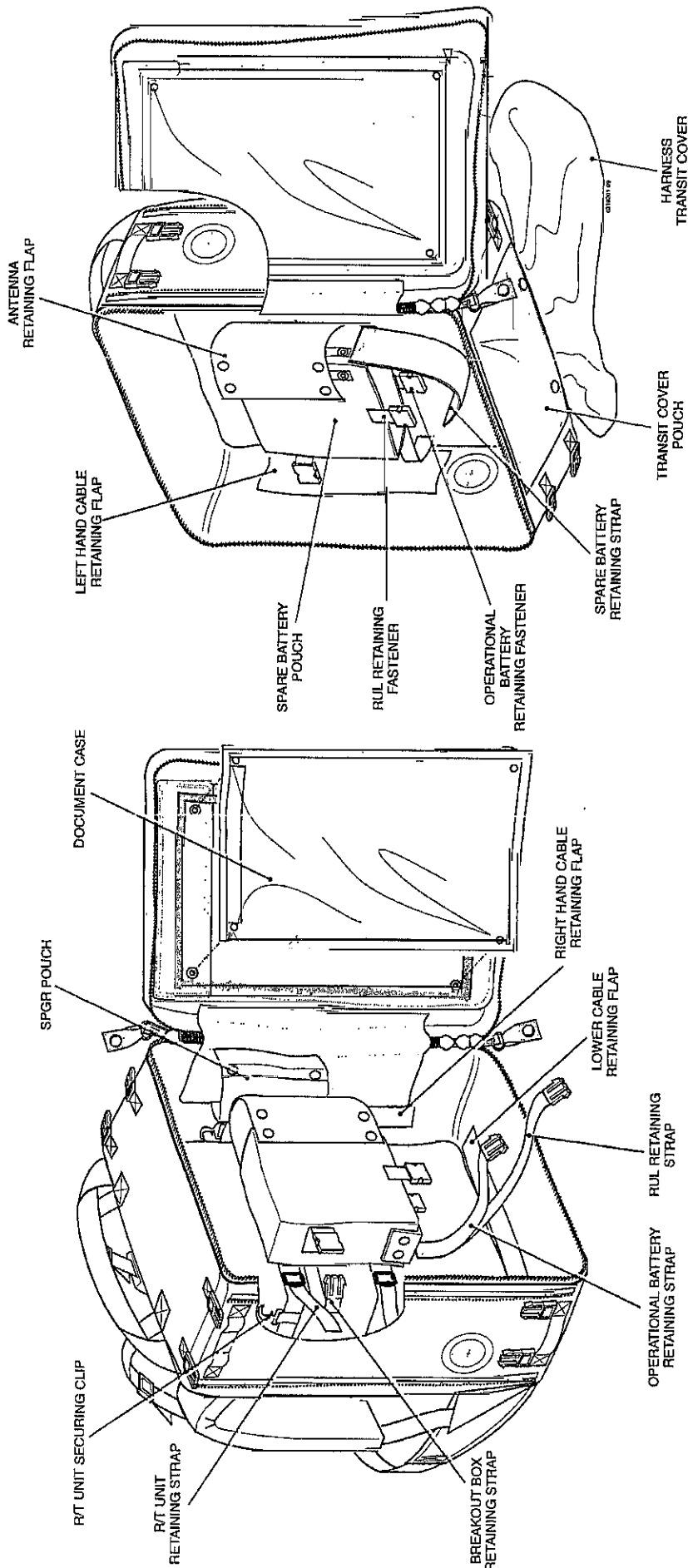


Fig 8 Carry container interior and document case

Vehicle ancillary equipment

46 This document provides operator information for the vehicle ancillary equipment items with respect to their use with TacGA. The vehicle ancillary equipment items are part of the vehicle installation information relating to the specific vehicle installation is detailed in the associated vehicle installation AESP identified in the list of Associated Publications to this document.

47 The vehicle ancillary equipment relevant to operation of the TacGA system is shown in Fig 9.

4.5 AH Clansman type rechargeable battery**WARNING**

HAZARDOUS SUBSTANCES. THIS EQUIPMENT CONTAINS NICKEL CADMIUM (Ni-Cd) BATTERIES. FOR HANDLING AND DISPOSAL INSTRUCTIONS REFER TO ACP 63723 CHAPTER 16.

48 The battery used in the vehicle mounted manpack stations is a standard Clansman type Ni-Cd rechargeable battery, supplying +24 V d.c. nominal to power the P/T unit with a single-charge capacity of 4.5 Ah. The battery is an in-service item.

49 Two batteries are provided. Recharging is carried out using the Direct Current Charging Unit (DCCU); for further information on the DCCU refer to EMER Telecommunications K 010. The DCCU can be used to charge either battery as follows:

49.1 Recharge the spare battery while the other is operational.

49.2 Float charge the operational battery, so that changing the battery is not necessary.

Adaptor box radio (ABR)

50 The ABR provides audio interfacing and distribution selection between the radio station and the IB2 or IB3 (as provided) of the vehicle Clansman Radio Control Harness (CRCH) for the following purposes:

50.1 Remote operation or monitoring of the UK/R/T 346 station via the CRCH.

50.2 Automatic radio rebroadcast of baseband audio traffic passed via the CRCH in either direction, using the IB2.

50.3 Simultaneous transmission of the same baseband traffic on two differing frequencies or nets by two stations within the vehicle, using the IB2 at manual break-in.

Antenna filter box and BNC RF cable

51 The filter box provides selection between the roof mounted antenna and the optional elevated antenna. The roof mounted antenna line is provided with Combat Net Radio (CNR) band suppression to prevent interference with the other radio stations within the vehicle.

52 The BNC RF cable connects between the selected antenna filter box connector and the P/T unit ANT connector.

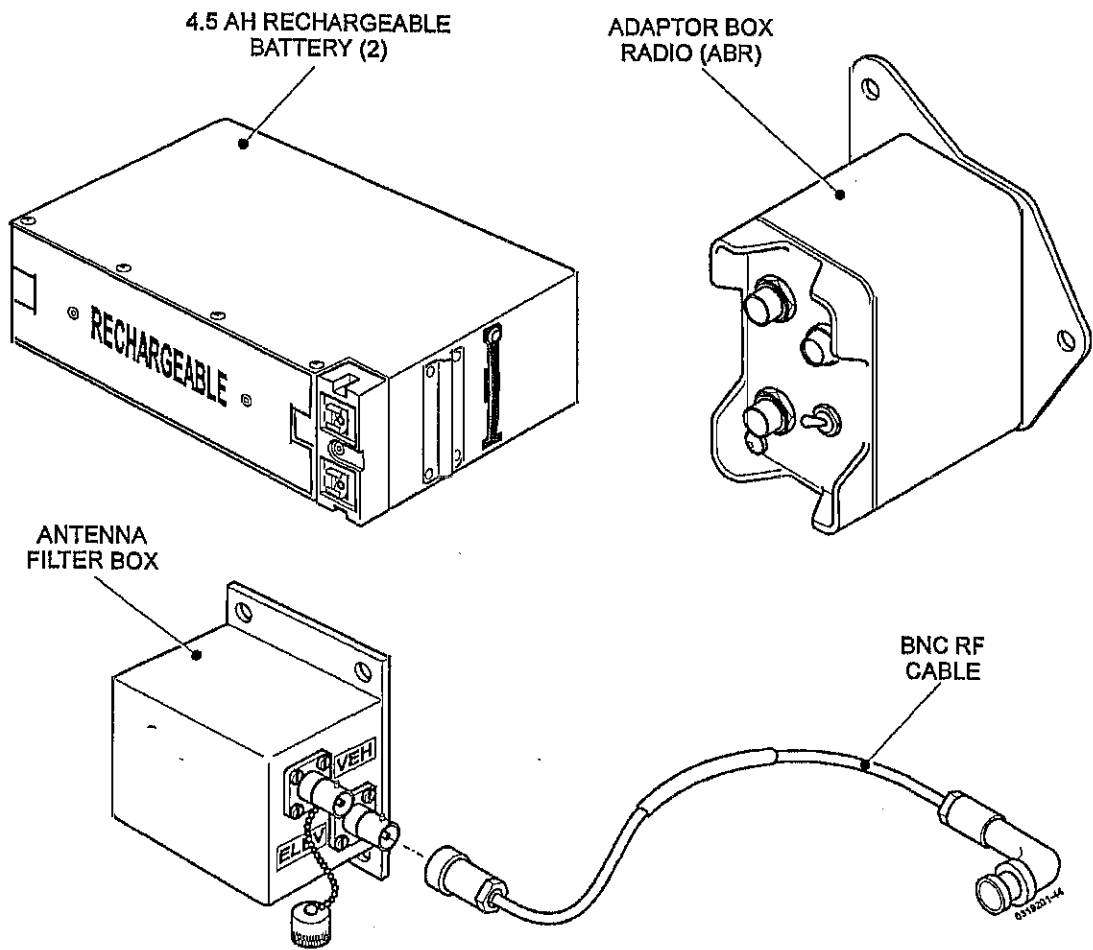


Fig 9 Vehicle station ancillary equipment

Audio gear

53 The audio gear comprises a set of ancillary equipment items (Fig 10) which may be connected as required to provide audio and pressel switch interfacing to the R/T unit for one or two operators. For further information on the in-service audio equipment items, refer to EMER Telecommunications C 740, Audio Gear Clansman. The handset used for remote operation is described in Para 64.

Handset general-purpose (GP)

54 The handset GP provides a handheld audio interface for the R/T unit. The handset incorporates a press-to-activate/release-to-stop action (pressel) switch which activates radio transmission when pressed. The handset is an in-service item (Para 53).

Headset B Vehicle and Infantry (BV&I) and pressel box

55 The headset BV&I provides a head-mounted audio interface for the R/T unit. It comprises a padded headphone assembly with an attached boom microphone. The headset connects to the R/T unit via the pressel box. A mic input connector is provided for use with the respirator microphone. The headset is an in-service item (Para 53).

56 The pressel box provides a press-to-activate/release-to-stop action (pressel) switch which activates radio transmission when used with the headset BV&I. The pressel box is an in-service item (Para 53).

Respirator microphone and adaptor ring

57 The respirator microphone locates on an NBC respirator using the adaptor ring. It connects to the mic input connector of the headset BV&I to allow use of the R/T when wearing the respirator. The microphone and adaptor ring are in-service items (Para 53).

Audio splitter cable

58 The audio splitter cable allows both the handset and headset to be functionally connected to the R/T unit, allowing access by two users at the same time.

Audio extension cable

59 The audio extension cable allows use of the headset, handset or both (using the splitter cable) at a distance of up to approximately 8 m from the R/T unit. The cable length is 7 m.

Satchel GP

60 A satchel GP is available for storage of the audio gear when not in use.

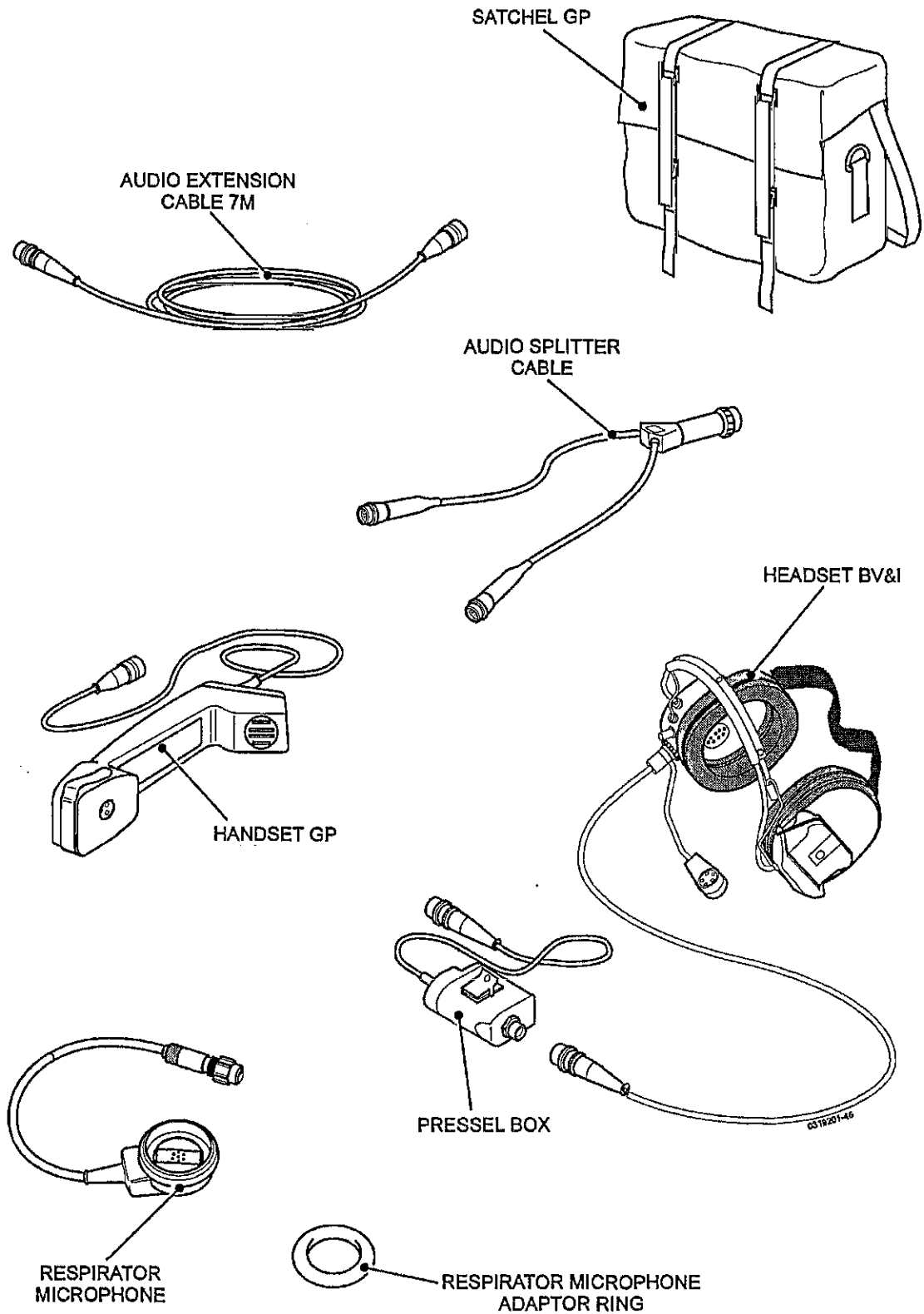


Fig 10 Audio gear

HAVE QUICK word-of-day (WOD) and CVK fill kits**BID 250/31 fill kit for use with the UK/RT 346 R/T unit**

61 The BID 250/31 fill kit allows for electronic loading (filling) of the HAVE QUICK multiple words of day (MWODS) directly into the UK/RT 346 R/T unit. The kit (Fig 11) comprises the following equipment items:

61.1 BID 250/31 fill system. The fill system is an in-service item: for further information refer to BID 250/1/1 (User Handbook BID 250/31).

61.2 BID 250/31 to R/T fill cable. Connects between the BID 250/31 fill system US style connector and the R/T unit UK style FILL connector. Note that the appearance of the two connector types is similar but significant mechanical differences exist.

CAUTION

EQUIPMENT DAMAGE. Do not connect the BID250/31 fill device directly to the R/T unit. Ensure correct connection of the fill cable. Incorrect connection can damage the connectors.

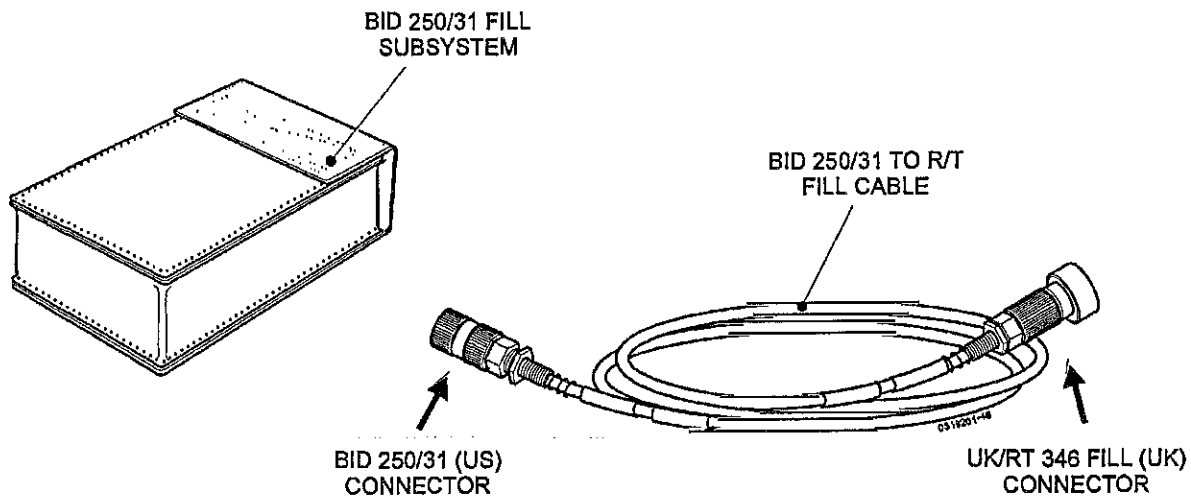


Fig 11 BID 250/31 fill kit

BID 250/2 fill kit for use with the SPGR

62 The BID 250/2 fill kit allows for loading (filling) of GPS Cryptographic Variable Key (CVK) data from paper tape into the SPGR. The kit (Fig 12) comprises the following equipment items:

62.1 BID 250/2 fill system. The fill system is an in-service item: for further information refer to BID/251-2 (User Handbook BID 250/2).

62.2 BID 250/2 power adaptor. Connects to the BID 250/2 fill system. The adaptor incorporates a renewable battery to provide the power signal required for correct operation of the BID 250/2 fill system. A 'power applied' indicator lamp illuminates on activation of the adaptor power switch.

62.3 SPGR to BID 250/2 cable. Connects between the power adaptor and the SPGR.

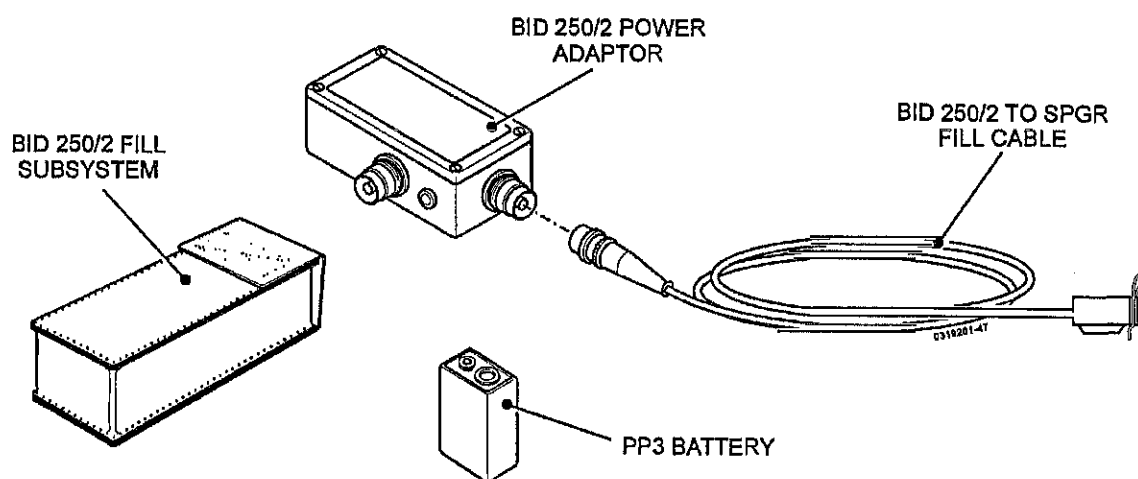


Fig 12 BID 250/2 fill kit

Remote operation kit

63 The remote operation kit (Fig 13) allows operation of the R/T unit from a distance of 2,000 m using field wire and a remote handset. Operation from up to 800 m is allowed using the D10 dispenser pack provided. Audio connection is also provided for one or two users local to the R/T unit. The kit comprises a remote handset, D10 field wire dispenser pack, breakout box, remote unit local (RUL) and breakout box to ABR/RUL cable.

Remote handset

64 The remote handset provides the operator audio interface for remote operation. The remote handset is an in-service item; for further information refer to EMER Telecommunications C 740.

D10 field wire dispenser pack

65 The D10 dispenser pack provides convenient storage and means of deployment for the 800 m length of D10 field wire integral with the dispenser pack. The pack is an in-service item.

Breakout box

66 The breakout box connects directly to the R/T unit and provides breakout connection to the RUL (for remote operation) or ABR (for vehicle installations). It also provides through connection to the GPS system for use in these configurations.

Breakout box to ABR/RUL cable

67 The breakout-box to ABR/RUL cable connects between the breakout box unit and the RUL (for remote operation) or ABR (for vehicle installations).

Remote unit local (RUL)

68 The RUL provides interfacing from the R/T unit to the remote operation D10 field wire and to the local operator audio gear. The following operating modes are provided:

68.1 Local. The local operator has pressel control of the radio; the remote operator cannot hear or transmit radio traffic. Either operator can call the other.

68.2 Remote. Both local and remote operators can hear and transmit radio traffic. Either operator can call the other.

68.3 Auto rebroadcast. Allows automatic radio rebroadcast on a second frequency or net by a second station, of baseband audio traffic passed via the field wire. Bidirectional link monitoring is provided for the managing operator.

68.4 Break in. Provides link management operator break-in, allowing two stations connected via the field wire to transmit the same baseband traffic on differing frequencies or nets. Link monitoring of both sides is provided for the managing operator.

68.5 Intercom. The R/T does not transmit. The local operator can hear Rx traffic. Either operator can speak to the other; during this time the local operator continues to hear the Rx traffic at a reduced level.

Satchel GP

69 A satchel GP is available for storage of the audio gear when not in use.

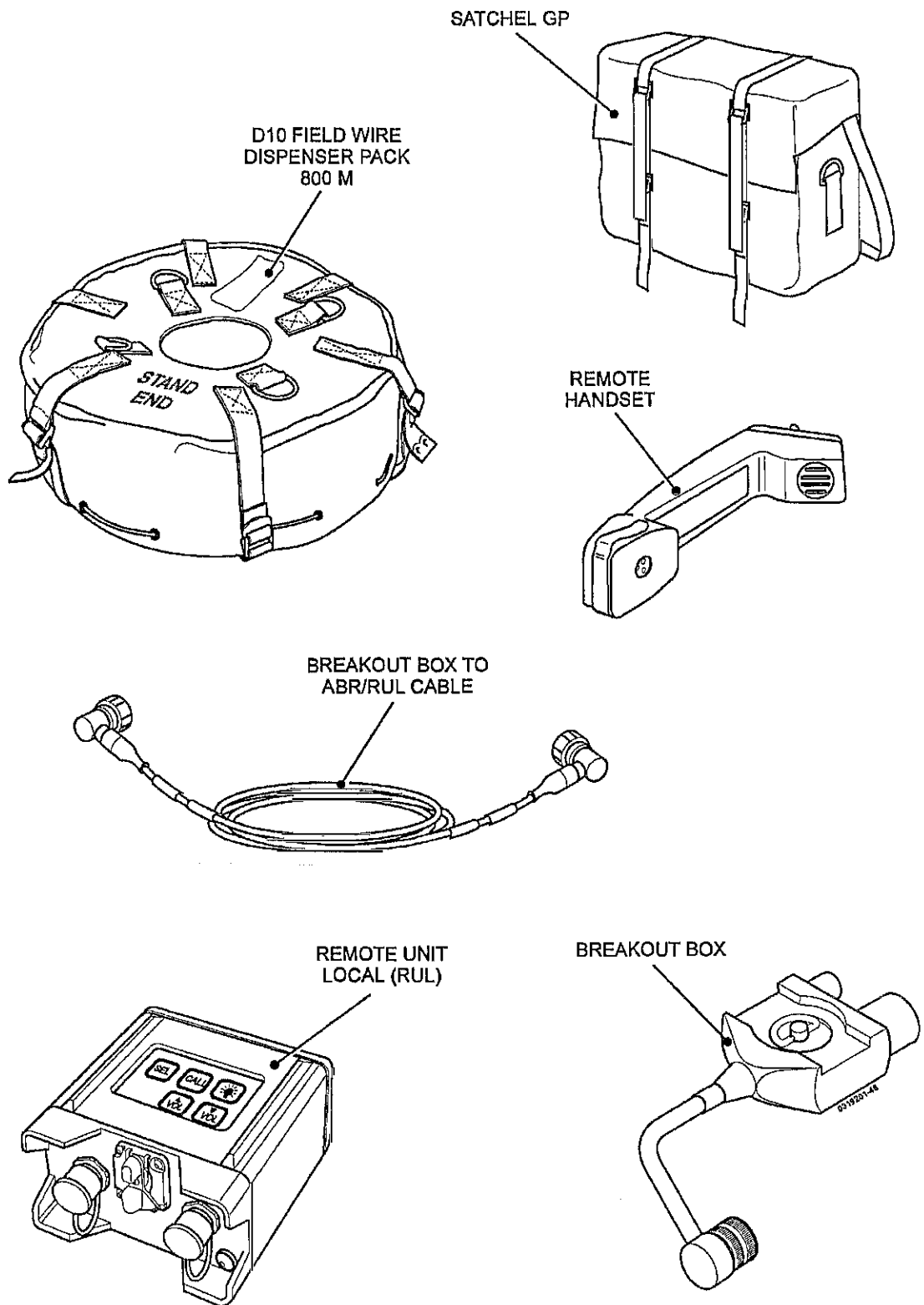


Fig 13 Remote operation kit

Elevated antenna system

70 The elevated antenna system (Fig 14) provides options for using a mast-mounted elevated antenna in locations where the standard antenna position provides inadequate performance. The system comprises a set of equipment items and kits from which the required equipment is selected.

71 Two options are provided for as follows:

71.1 Manpack station 5.4 m high system: Comprises the V/UHF battle antenna (supplied with the manpack station), battle antenna adaptor, ground plane, 5.4 m mast kit and 15 m RF cable.

71.2 Vehicle station 8 m high system: Comprises the elevated antenna, ground plane, 8 m mast kit and 30 m RF cable.

Elevated antenna

72 The elevated antenna allows use of the antenna mast with the vehicle stations. The antenna operates across the full range of frequencies used by TacGA.

Ground plane

73 The ground plane locates on top of the antenna mast and provides the correct radiating characteristics for the antenna. It comprises a central hub with six radial arms which are free to pivot in a vertical direction about tangential axes. In use the arms point downwards from the hub at an angle of approximately 45 deg from the horizontal. When deployed close to an obstacle such as a tree branch, on lowering the mast the arms of the ground plane can pivot upwards, thus allowing easy withdrawal of the ground plane in restricted locations. The ground plane arms are detachable for transport or storage. The ground plane is compatible with the 5.4 m and 8 m mast kits, and also with the in-service 12 m mast kit.

Battle antenna adaptor

74 The battle antenna adaptor locates on the ground plane and provides mechanical and electrical interfacing to the V/UHF battle antenna.

5.4 m antenna mast kit

75 The 5.4 m antenna mast kit is primarily for use with the manpack system. The mast kit is an in-service item.

8 m antenna mast kit

76 The 8 m antenna mast kit is for use with the vehicle system. The mast kit is an in-service item: for further information refer to AESP 5985-C-090 and to EMER Tels L220.

RF cable, 15 M

77 The 15 m length RF cable connects the battle antenna adaptor, mounted on the 5.4 m antenna mast, to the R/T unit.

RF cable, 30 M

78 The 30 m length RF cable connects the antenna, mounted on the 8 m antenna mast, to the R/T unit via the vehicle elevated antenna outlet.

Elevated antenna kit bags

79 The Elevated antenna bag provides protection and convenient storage for the elevated antenna, ground plane and battle antenna adaptor (where required). The RF cable bag (not illustrated) provides protection and convenient storage for the RF cable.

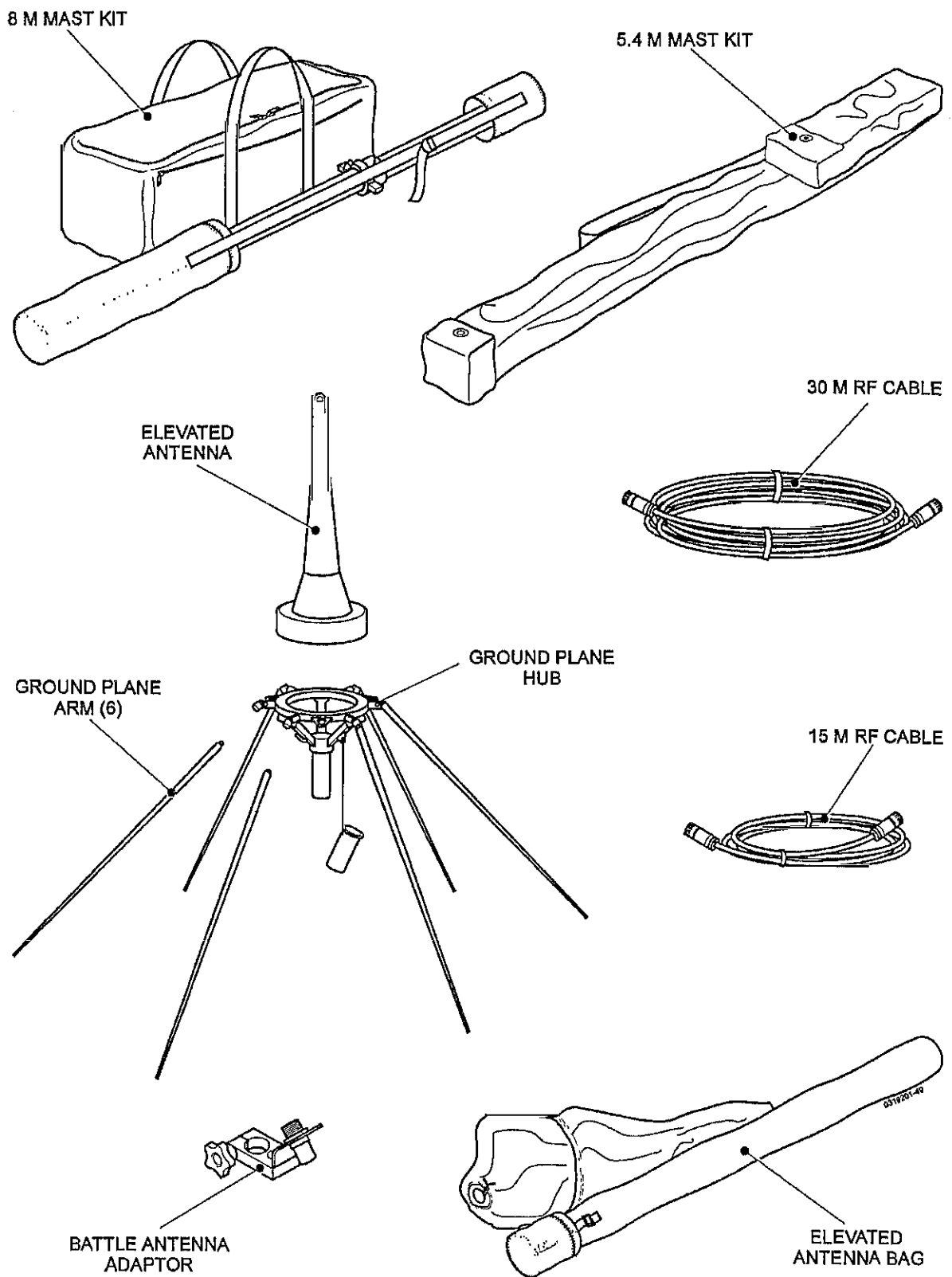


Fig 14 Elevated antenna system



CONTROLS, INDICATORS AND CONNECTORS

80 The controls, indicators and connectors are detailed here for the following equipment items:

80.1 UK/RT 346 R/T unit, front and rear panels.

80.2 ABR.

80.3 Antenna filter box.

80.4 RUL.



UK/RT 346 R/T unit

81 The battery and earth connectors are located on the rear panel. All other controls, indicators and connectors are located on the front panel.

Rear panel connectors

82 The UK/RT 346 R/T unit rear panel connectors comprise the battery power input terminals and fasteners, and earth terminal, as shown in Fig 15.

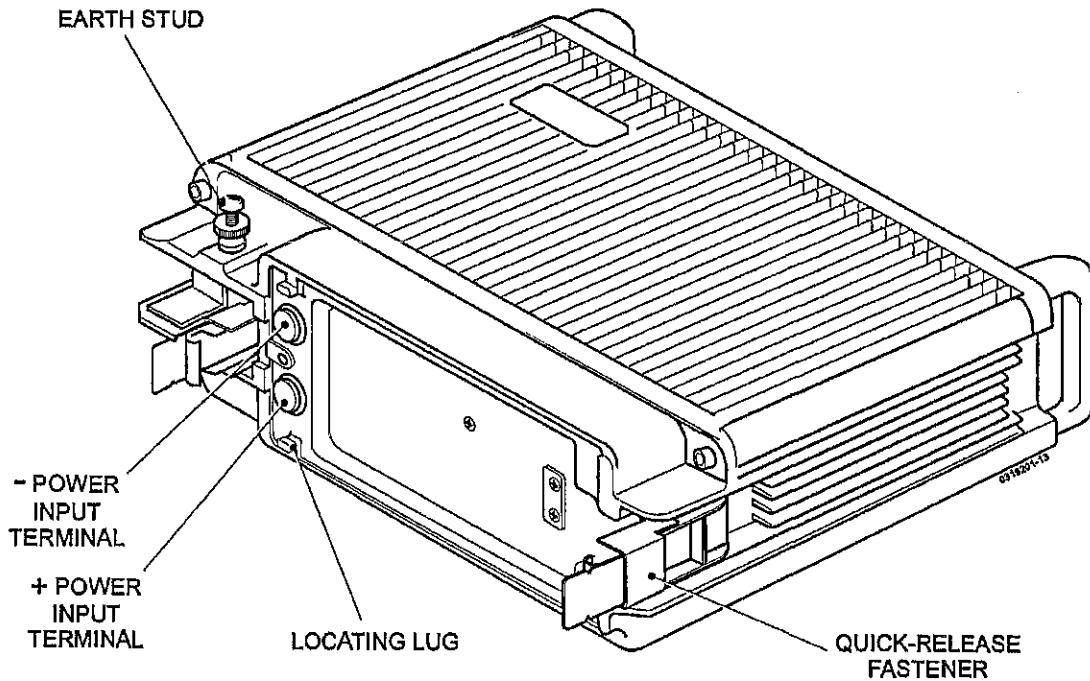


Fig 15 UK/RT 346 R/T unit rear panel connectors

Front panel controls, indicators and connectors



83 The UK/RT 346 R/T unit front panel controls, indicators and connectors are detailed in Table 2. Their location is shown in Fig 16. Note that for each item its Fig 16 key reference is identical to its Table 2 Serial reference.

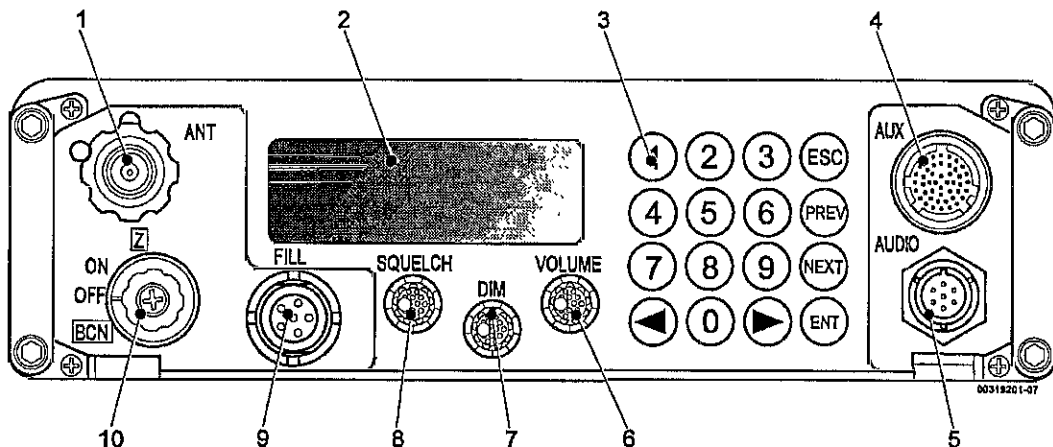
TABLE 2 UK/RT 346 R/T UNIT FRONT PANEL CONTROLS, INDICATORS AND CONNECTORS

Serial (1)	Description (2)	Function (3)
1	ANT connector.	Antenna RF input and output.
2	LCD panel display, 4 lines x 20 characters.	Displays the operator information for the R/T unit.
		The LCD panel incorporates an adjustable backlight. When active, the backlight extinguishes 10 sec after the last key press and illuminates again when any key is pressed.
3	Keypad:	Comprises sixteen pushbutton keys for operation of the R/T unit in conjunction with the display screens. The keys share the adjustable backlight with the LCD panel (Serial 2).
3.1	0 to 9 (numeric) keys.	With menu screens, select the desired menu option.
		With data screens, enter numeric data into the selected data entry field.
3.2	<	With data entry fields having a range of permitted values, selects and displays the previous or lower value.
3.3	>	With data entry fields having a range of permitted values, selects and displays the next or higher value.
3.4	ESC	Exits the current screen and returns to the previous menu.
3.5	PREV	Moves the cursor to the previous data entry field on the screen to allow editing of entries. Where the cursor is already at the first entry field, moves the cursor (wraps) to the last entry field.
3.6	NEXT	Moves the cursor to the next data entry field on the screen to allow editing of entries. Where the cursor is already at the last entry field, moves the cursor (wraps) to the first entry field.
		With data screens, any changes made by the operator to the current field are not entered before moving to the next data field, and the changes will be lost unless the ENT key is pressed before leaving the screen.
3.7	ENT	With menu screens, opens the selected screen.
		With data screens, enters and carries out any changes made by the operator on the current screen and moves to the next data field.
4	AUX connector.	GPS TOD signal input and external audio and control interfacing.

(continued)

TABLE 2 UK/RT 346 R/T UNIT FRONT PANEL CONTROLS, INDICATORS AND CONNECTORS (continued)

Serial (1)	Description (2)	Function (3)
5	AUDIO connector.	Operator audio gear interfacing.
6	VOLUME control.	Adjusts the audio output to the operator earpiece (speaker).
7	DIM control.	Turns the display and keypad backlight on and off, and adjusts the brightness of the backlight.
8	SQUELCH control.	Sets the Receiver quieting (squellch) level of the incoming signal.
9	FILL connector.	Connects to the BID 250/31 fill system when loading the MWODs required for HAVE QUICK II operation.
10	Mode switch:	Selects the R/T unit operating mode as follows:
10.1		Switches on transmission of the beacon signal. The knob must be pulled outward before it can be rotated to this position.
10.2	OFF	Powers down the R/T unit.
10.3	ON	Powers up the R/T unit for operation in all modes except Beacon mode.
10.4		Zeroizes all currently loaded HAVE QUICK MWODs. The knob must be pulled outward before it can be rotated to this position.



- | | | | |
|---|--------------------|----|-----------------|
| 1 | ANT connector | 6 | VOLUME control |
| 2 | LCD display screen | 7 | DIM control |
| 3 | Keypad | 8 | SQUELCH control |
| 4 | AUX connector | 9 | FILL connector |
| 5 | AUDIO connector | 10 | Mode switch |

Fig 16 UK/RT 346 (R/T) unit front panel controls, indicators and connectors.

Adaptor box radio (ABR)

84 The ABR controls, connectors and indicators are located on the front panel. Their location is shown in Fig 17 and their functions are detailed in Table 3.

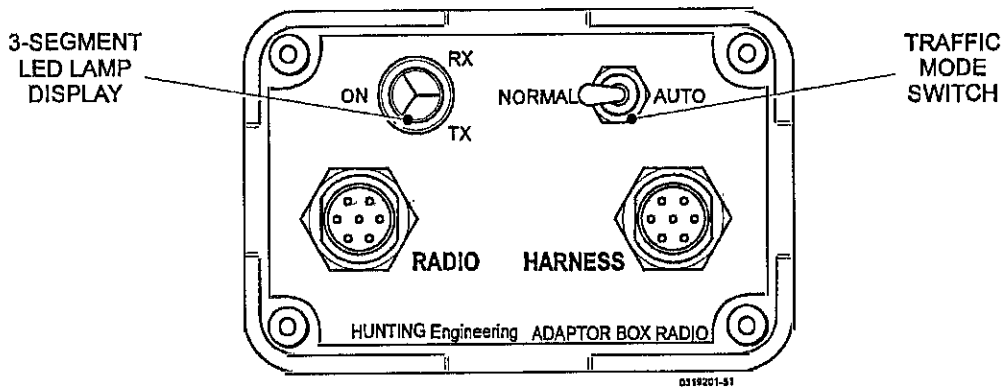


Fig 17 Adaptor box radio (ABR) switch, indicators and connectors

TABLE 3 ADAPTOR BOX RADIO (ABR) SWITCH, INDICATORS AND CONNECTORS

Serial (1)	Description (2)	Function (3)
1	Three-segment LED lamp array:	
1.1	ON (green) segment.	Power on indicator. Illuminates when power is received from the R/T unit.
1.2	RX (yellow) segment.	Rx unsquelched indicator. Illuminates when the UK/PRC 346 station receives a signal.
1.3	TX (red) segment.	Tx on indicator. Illuminates when the UK/PRC 346 operator selects transmission.
2	Traffic mode switch.	Enables the vehicle harness IB2 or IB3 to effect NORMAL or REBRO (rebroadcast) modes.
3	RADIO connector.	Connects to the R/T unit via the breakout box to ABR/RUL cable and the breakout box.
4	HARNESS connector.	Connects to the vehicle Clansman Radio Control Harness interconnecting box (IB2 or IB3 - RADIO).

Antenna filter box

85 The filter box (Fig 18) is provided with two connectors for connection of the desired antenna to the R/T unit ANT connector as follows:

85.1 VEH: Vehicle roof mounted antenna connection (CNR band suppressed).

85.2 ELEV: Elevated antenna connection (unfiltered).

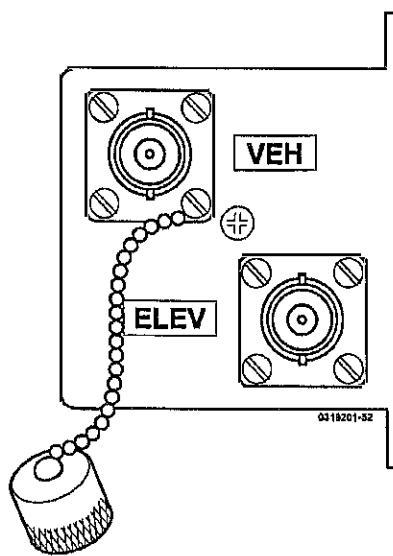


Fig 18 Filter box connectors

Remote unit local (RUL)

86 The RUL controls and indicators are contained in an illuminated membrane display/keypad located on the front panel. The connectors are located on the end panels.

87 The RUL front panel controls and indicators are identified in Fig 19 and detailed in Table 4. Note that for each item its Fig 19 key reference is identical to its Table 4 Serial reference.

88 The RUL end panel connectors are identified in Fig 20 and detailed in Table 5.

TABLE 4 REMOTE UNIT LOCAL (RUL) CONTROLS AND INDICATORS

Serial (1)	Description (2)	Function (3)
1	Mode indicators: LOC REM AUTO BK-IN IC	Illuminate to show the current operating mode: Local mode. Remote mode. Auto rebroadcast mode. Break-in mode. Intercom mode.
2	SEL button	Toggles through the RUL operating modes.
3	CALL button	When pressed, sends a call tone to the remote handset. When released, sets the RUL to IC mode.
4	Lamp button	Toggles the RUL keypad illumination on/off.
5	VOL ▲ and ▼	Respectively increase and decrease the audio volume output to the remote handset.
6	FLT indicator	Illuminates when the following circumstances occur: A short circuit fault on the field wire circuit is detected. The remote handset CALL button is pressed and held down for more than 5 sec. The field wire connections to the terminal are reversed.
7	CALL indicator	Flashes when a call signal is received from the remote handset. Remains flashing when the remote call signal ceases. Extinguishes when the local user presses the RUL SEL button.

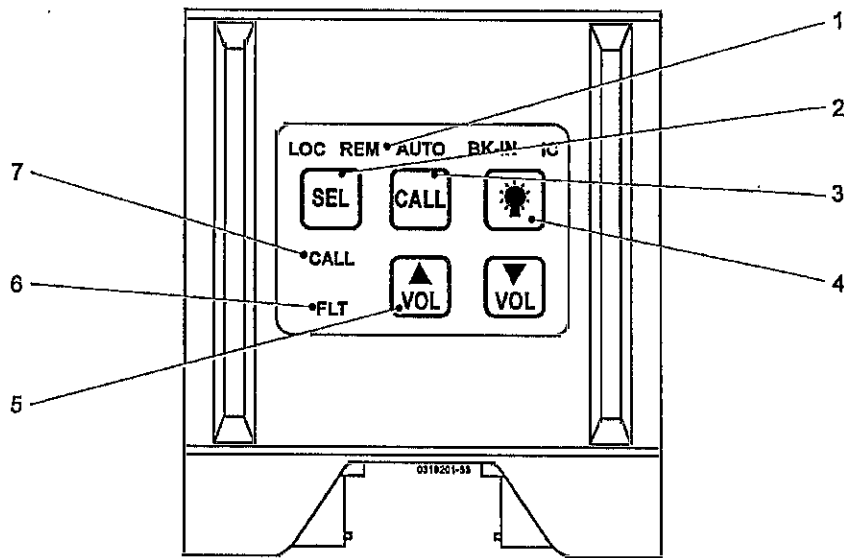


Fig 19 Remote unit local (RUL) front panel controls and indicators

TABLE 5 RUL CONNECTORS

Serial (1)	Description (2)	Function (3)
1	Field wire terminal	D 10 field wire insulation displacement terminal (IDT) connection.
2	RADIO	R/T unit audio interface via the breakout box to ABR/RUL cable and breakout box.
3	AUDIO	Local operator audio gear.
4	Chassis earth.	Chassis earth (vehicle installations only).

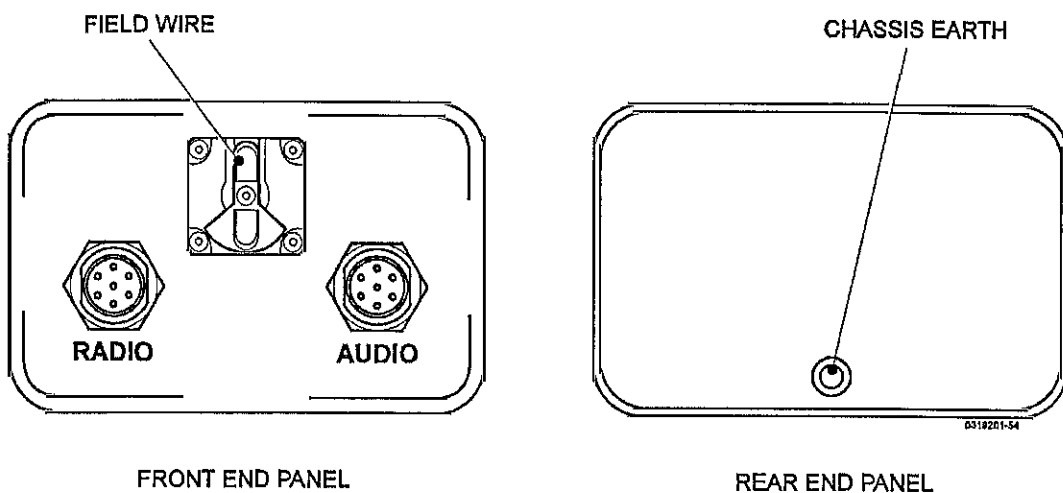


Fig 20 RUL end panel connectors

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CHAPTER 2

UK/RT 346 R/T UNIT OPERATIONAL SCREEN DISPLAYS

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(continued)

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INTRODUCTION

1 The operational modes of the R/T unit are controlled via a set of screens displayed in the LCD panel. The screens provided for each position of the mode switch are shown in Fig 1. The four menu screens: MAIN MENU, DATABASE, HQ and BIT lead to additional operational screens as described.

2 The screens are listed alphabetically in Table 1, together with references to further explanation for each screen.

3 Using the MAIN MENU and OPERATE screens, an operator can carry out all the functions relating to the setup, operation and evaluation of the UK/RT 346 R/T unit.

Appearance of screen displays

4 The LCD panel screens display information in the form of text. Up to four lines of twenty characters may be displayed. The screen title is displayed at the left hand end of the first (top) line. The MAIN MENU screen is shown below.

SCREEN TITLE →

MAIN MENU	
1-OPERATE	2-N/A
3-PRESET	4-MAINT
5-DATABASE	6-BIT

Moving around a screen

5 Each screen contains one or more information fields.

6 The cursor: The currently selected field is identified (highlighted) by a cursor which appears in reverse video. In the example shown, the option field 1 – OPERATE is selected.

MAIN MENU	
1-OPERATE	2-N/A
3-PRESET	4-MAINT
5-DATABASE	6-BIT

6.1 To move the cursor forward to the next field, use the NEXT key. At the end of the current line, the cursor wraps to the first field on the next line. At the end of the last displayed line, the screen scrolls to display the next line. At the end of the last line, the cursor wraps to the first field in the screen.

6.2 To move the cursor back to the previous field, use the PREV key in a similar manner.

7 Screen scrolling: To scroll the screen vertically and display additional lines of text, use the cursor (Para 6).



Navigating between the screens using menus

8 There are two types of screen as follows:

- 8.1 Menu screens (menus), containing option fields (options).
- 8.2 Operational screens, containing data fields.

9 The menu screens are used to navigate between the operational screens. To display the desired screen, select the associated menu option.

9.1 To select (highlight) the desired menu option either press the indicated numeric key or use the PREV and NEXT keys (Para 6.1). To display the specified screen press the ENT key.

9.2 To return to the previous menu screen, press the ESC key.

10 Some menu options lead to further menu screens. The overall menu tree is shown in Fig 1. The menu and operational screens are listed alphabetically in Table 1.

Data entry

11 The procedures for entering text and numeric data in the operational screens are as follows:

CAUTION

DATA LOSS. All values set in the current display are lost and revert to their previous settings unless the ENT key is pressed before the ESC key.

11.1 Text data entry: Text data fields provide a set of text values from which the desired value may be selected as follows:

11.1.1 Move the cursor to the desired text field (Para 6).

11.1.2 Use the < and > keys to display each available value in turn until the desired value is displayed.

11.1.3 To enter (store) the displayed value, press the ENT key.

11.1.4 To erase any values changed but not yet entered (ie since the ENT key was last pressed) and return to the previous menu, press ESC.

11.2 Numeric data entry: Numeric data is entered using the numeric keys 0 to 9 as follows:

11.2.1 Move the cursor to the desired numeric field. The first digit only is highlighted.

11.2.2 To move between the digits (eg if the first digit is already correct, or to correct a mistake), use the < and > keys.

11.2.3 To set the selected digit, press the desired numeric key. The key value is displayed and the cursor moves to the next digit.

11.2.4 Set each digit in turn until the correct numeric value is displayed.

11.2.5 To enter (store) the displayed value, press the ENT key.

11.2.6 To erase any values changed but not yet entered (ie since the ENT key was last pressed) and return to the previous menu, press ESC.

TABLE 1 R/T UNIT DISPLAY SCREENS - ALPHABETICAL LIST

Serial (1)	Screen title (2)	Notes (3)	Open from (4)	Reference (5)	Fields ref (6)
1	(Chequerboard pattern)	Display test.	BIT	Para 75	—
2	BATTERY VOLTAGE		BIT	Para 73	—
3	BEACON		Mode switch to <u>BCN</u> position	Para 81	—
4	BEACON SETUP		DATABASE	Para 30	Table 8
5	BIT	Menu.	MAIN MENU	Para 62	Table 14
6	BIT FAULT		BIT status	Para 71	—
7	DATABASE	Menu.	MAIN MENU	Para 26	Table 7
8	ERASE MWODS		HQ	Para 58	—
9	FMT FREQ LOADING		HQ	Para 52	—
10	FORCE TOD		HQ	Para 55	—
11	HQ	Menu.	DATABASE	Para 40	Table 11
12	KEYBOARD TEST		BIT	Para 77	—
13	LOAD WOD		HQ	Para 43	Table 12
14	LOAD MWOD		HQ	Para 46	Table 13
15	MAIN MENU	Menu.	Mode switch to ON position	Para 13	Table 2
16	MAINTENANCE	No operator use.	MAIN MENU	Para 24	—
17	MWOD FILL		LOAD MWOD	Para 49	—
18	OFFLINE BIT		BIT	Para 65	—
19	OPERATE AM and FM modes HQ mode		MAIN MENU	Para 16 Para 18 Para 19	Table 3 Table 4
20	PRESET AM and FM modes HQ mode		MAIN MENU	Para 20 Para 22 Para 23	Table 5 Table 6
21	STATUS MSG		DATABASE	Para 36	Table 10
22	TERM CONFIG		DATABASE	Para 33	Table 9
23	UK/RT 346	BIT status.	BIT	Para 68	—
24	XFER DATABASE	Not used.	DATABASE	Para 29	Table 7
25	ZEROIZE		Mode switch to <u>Z</u> position	Para 84	—

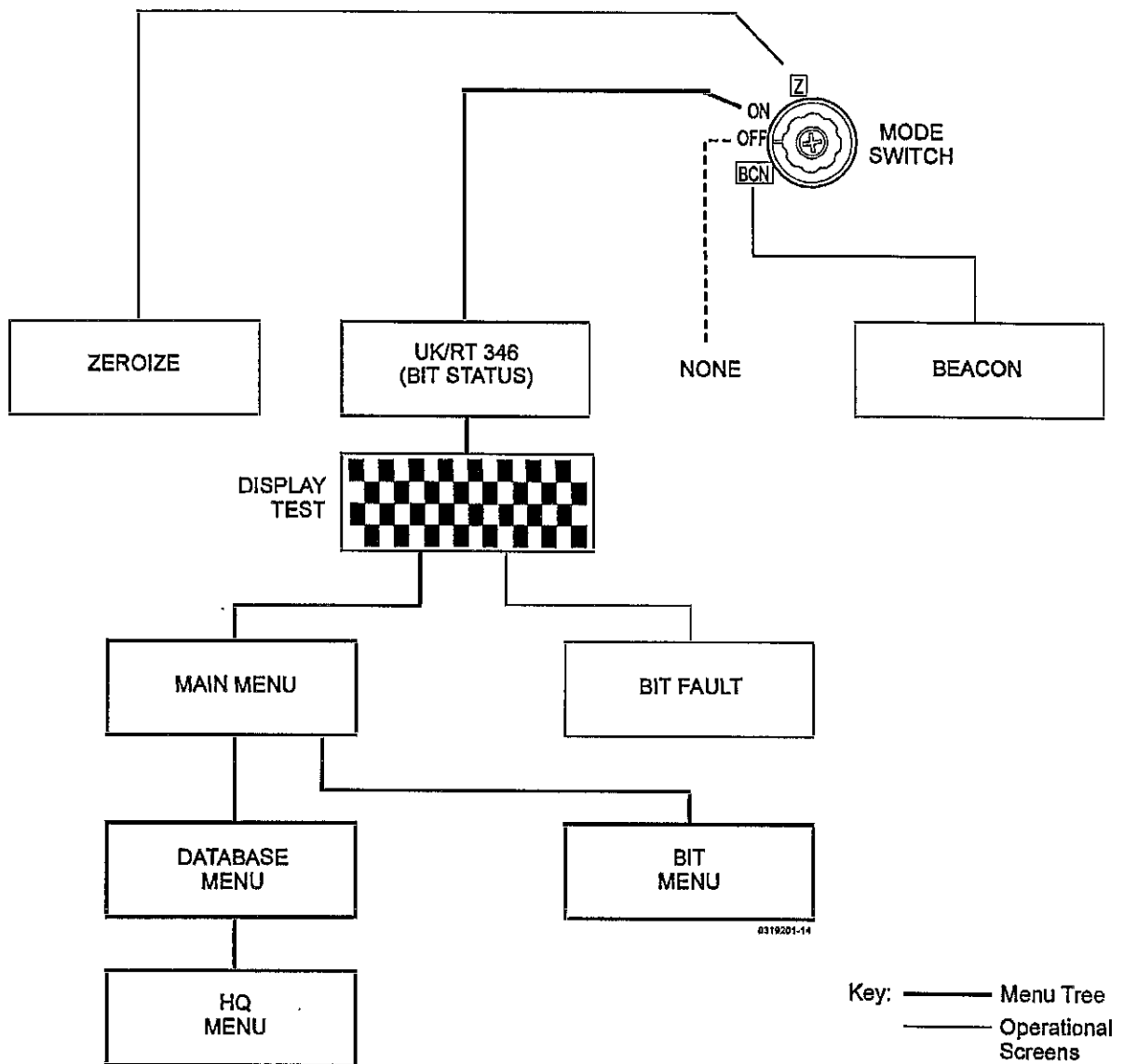


Fig 1 Mode switch startup screens and menu tree

MAIN MENU OPTIONS

12 The menu tree for the MAIN MENU is shown in Fig 2.

MAIN MENU screen

13 The MAIN MENU screen provides access to all screens except the BEACON and ZEROIZE screens.

14 To open the MAIN MENU, proceed as follows:

14.1 Set the mode switch to the ON position, to power up the R/T unit and run the power-up BIT.

14.2 Press the ESC key once to terminate the power-up BIT or to acknowledge any STATUS MSG. The BIT status screen (Para 68) is displayed.

14.3 Press the ESC key again to open the MAIN MENU.

15 The MAIN MENU display fields are detailed in Table 2.

MAIN MENU	
1-OPERATE	2-N/A
3-PRESET	4-MAINT
5-DATABASE	6-BIT

TABLE 2 MAIN MENU

Serial (1)	Display field (2)	Description/function (3)
1	MAIN MENU	Screen title.
2	1 - OPERATE	Displays the OPERATE screen (Para 18) for selection of the current operating parameters.
3	2 - N/A	Not used.
4	3 - PRESET	Displays the PRESET screen (Para 22) for viewing or setting the presets (preset parameter values).
5	4 - MAINTENANCE	Displays the MAINTENANCE menu (Para 24). For details of the maintenance options refer to Cat 513 of this AESP.
6	5 - DATABASE	Displays the DATABASE menu (Para 28) for selection of the R/T unit and HAVE QUICK setup parameters.
7	6 - BIT	Displays the BIT menu (Para 64) for selection of the built-in test (BIT) facilities.

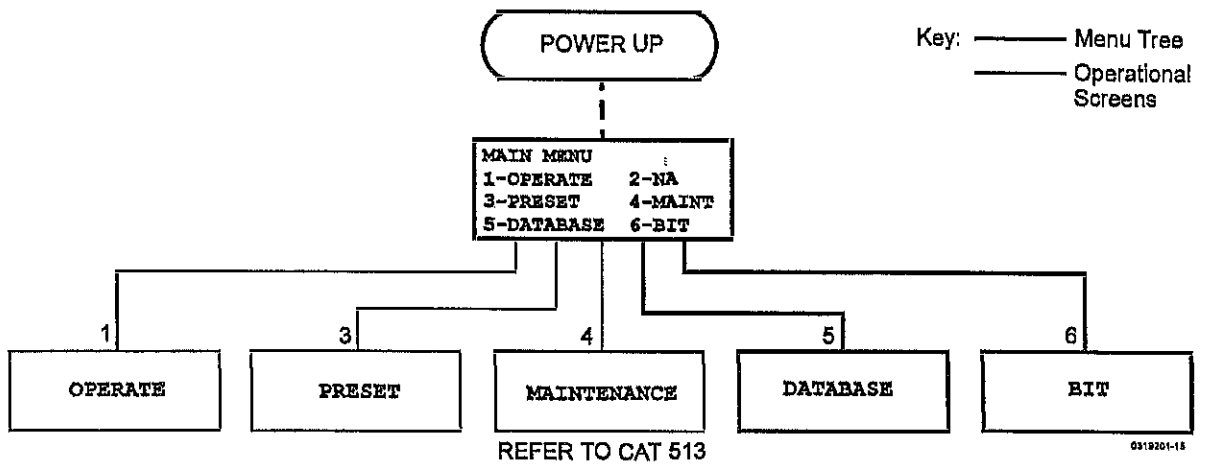


Fig 2 MAIN MENU tree

OPERATE screen

16. The OPERATE screen provides facilities to view and set the main parameters for radio operation. The appearance and function of the OPERATE screen differs according to whether the R/T unit is in AM, FM or HAVE QUICK (HQ) mode.

17. To open the OPERATE screen, from the MAIN MENU (Para 13) select option 1 – OPERATE.

AM and FM modes

18. The OPERATE screen display fields when in AM and FM modes are detailed in Table 3.

R/T MODE ——— OPERATE RX-0 1735Z ——— TIME OF DAY
 P01 AM V W-T TXP:MD
 T247.825 R247.825

TABLE 3 OPERATE SCREEN - AM AND FM MODES

Serial (1)	Display field (2)	Description/function (3)
1	OPERATE	Screen title.
2	R/T mode	Shows the current radio Rx/Tx state and the relative signal level (a value in the range 0 to 5). The values for the radio state are as follows: RX An incoming signal has broken squelch. SQ The radio Rx signal is squelched. When in SQ state, the number displayed is arbitrary and should be disregarded. TX The radio is transmitting. PS The R/T unit power management is set to Polling mode. PS is displayed periodically if the R/T unit is configured for POLL ON (Para 33).
3	Time of day	Shows the time of day (TOD) in 24-hour time. The values for the last character position are as follows: Z The TOD shown is Zulu time (GMT) as received from the Specialist Personal GPS Receiver (SPGR) or, where the SPGR is not in use, from another radio station. (blank) The TOD has not been entered or was manually entered via a FORCE TOD entry. Where no TOD has been entered, shows the elapsed time in minutes since the R/T was last powered up.

(continued)

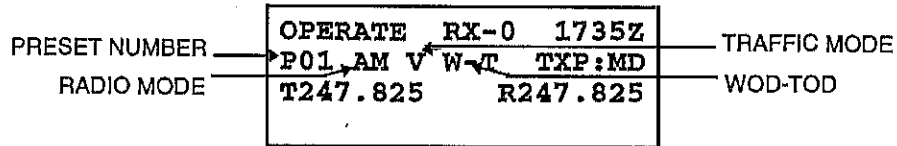


TABLE 3 OPERATE SCREEN - AM AND FM MODES (continued)

Serial (1)	Display field (2)	Description/function (3)
4	Preset number	<p>Selects/displays the Preset currently being used. Up to 99 presets may be configured using the PRESET screen (Para 22). The values available are as follows:</p> <p>P## The preset which the R/T unit is currently using for operation. To select/display a given preset for operation, enter the desired numeric value and press the ENT key.</p> <p>P-M An operational parameter has been manually entered, and the current set of operating parameters is not saved as a preset.</p>
5	Radio mode	<p>Selects/displays the current radio mode. When a new value is entered, the radio begins to operate in the newly selected/displayed mode. The values available are:</p> <p>AM Normal (insecure) amplitude modulation.</p> <p>FM Normal (insecure) frequency modulation.</p> <p>HQ HAVE QUICK anti-jam mode (Para 19).</p>
6	Traffic mode	<p>Selects/displays the audio traffic mode. The values available are as follows:</p> <p>V Voice mode.</p> <p>D Data mode.</p>
7	WOD-TOD	<p>Indicates the presence and validity of the HAVE QUICK WOD and TOD.</p> <p>ZERO Indicates that the R/T unit has no WOD or TOD present, ie they have been zeroized (erased).</p> <p>When at least one WOD or TOD value is present, the field comprises three sub-fields as follows:</p>
7.1	WOD	<p>Indicates the presence or absence of a WOD or valid MWOD as follows:</p> <p>– (Dash) there is no WOD or valid MWOD present.</p> <p>w (Lower case) an MWOD is present but has no matching TOD.</p> <p>W (Upper case) a WOD or MWOD is present with a matching TOD.</p>

(continued)

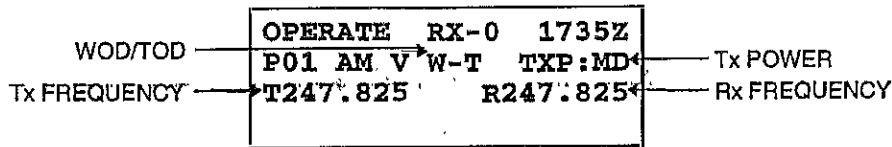


TABLE 3 OPERATE SCREEN - AM AND FM MODES (continued)

Serial (1)	Display field (2)	Description/function (3)									
7.2	-	Display separator character.									
7.3	TOD	<p>Indicates the absence or presence of a valid TOD with three possible indications:</p> <ul style="list-style-type: none"> - (Dash) there is no TOD present. t (Lower case) a TOD is present but is not Zulu time (GMT). It has either been forced or the R/T unit is searching for an updated TOD. A TOD update occurs automatically at two-hour intervals, or when requested by the user (Table 4 Serial 12). T (Upper case) a valid TOD is present. 									
8	Tx power	<p>Selects/displays the transmit power level. The values available are as follows:</p> <table border="0" style="width: 100%;"> <tr> <td style="width: 10%;">HI</td> <td style="width: 60%;">High power</td> <td style="width: 30%;">8 W.</td> </tr> <tr> <td>MD</td> <td>Medium power</td> <td>2 W.</td> </tr> <tr> <td>LO</td> <td>Low power</td> <td>0.4 W.</td> </tr> </table>	HI	High power	8 W.	MD	Medium power	2 W.	LO	Low power	0.4 W.
HI	High power	8 W.									
MD	Medium power	2 W.									
LO	Low power	0.4 W.									
9	Tx frequency and Rx frequency	<p>Select/display the current radio transmit and receive frequencies.</p> <p>When a new transmit frequency is entered, the receive frequency is automatically set to match the new frequency. The receive frequency may subsequently be set by the user to a different value.</p> <p>The cursor is used to select each digit in turn. The first digit must be in the range 0 to 3. Tuning range and accuracy are as follows:</p> <p><u>30 to 88 MHz</u> This band is not used by TacGA.</p> <p><u>100 to 117.975 MHz</u> Frequency tuning is in 25 kHz steps. The second from last digit of the frequency will only accept values of 0, 2, 5 and 7. The last digit is automatically set to 0 or 5.</p> <p><u>118.000 to 156.000 MHz</u> Frequency tuning is entered/displayed in 1 kHz steps. However, the radio circuit tunes to the nearest 5 kHz channel.</p> <p><u>156.025 to 174 MHz and 225 to 400 MHz</u> Frequency tuning is in 25 kHz steps. The second from last digit of the frequency will only accept values of 0, 2, 5 and 7. The last digit is automatically set to 0 or 5.</p>									

HQ (HAVE QUICK) mode

19 The OPERATE screen display fields when in HQ (HAVE QUICK) mode are detailed in Table 4.

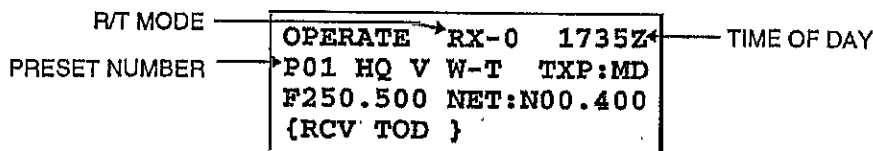


TABLE 4 OPERATE SCREEN - HQ MODE

Serial (1)	Display field (2)	Description/function (3)
1	OPERATE	Screen title.
2	R/T mode	<p>Shows the current radio state and the relative signal level (a value in the range 0 to 5). The values for the radio state are as follows:</p> <p>RX An incoming signal has broken squelch.</p> <p>SQ The radio is squelched. When in SQ state, the number displayed is arbitrary and should be disregarded.</p> <p>TX The radio is transmitting.</p> <p>PS The R/T unit power management is set to Polling mode. PS is displayed periodically if the R/T unit is configured for POLL ON (Para 33).</p>
3	Time of day	<p>Shows the time of day (TOD) in 24-hour time. The values for the last character position are as follows:</p> <p>Z The TOD shown is Zulu time (GMT) as received from the Specialist Personal GPS Receiver (SPGR) or, where the SPGR is not in use, from another radio station.</p> <p>(blank) The TOD has not been entered or was manually entered via a FORCE TOD entry. Where no TOD has been entered, shows the elapsed time in minutes since the R/T was last powered up.</p>
4	Preset number	<p>Selects/displays the Preset currently being used. Up to 99 presets may be configured using the PRESET screen (Para 22). The values available are as follows:</p> <p>P## The preset which the R/T unit is currently using for operation. To select/display a given preset for operation, enter the desired numeric value and press the ENT key.</p> <p>P-M An operational parameter has been modified, and the current set of operating parameters is not saved as a preset.</p>

(continued)

RADIO MODE	OPERATE RX-0 1735Z	WOD-TOD
TRAFFIC MODE	P01 HQ V W T TXP MD F250.500 NET:N00.400 {RCV TOD }	Tx POWER

TABLE 4 OPERATE SCREEN - HQ MODE (continued)

Serial (1)	Display field (2)	Description/function (3)
5	Radio mode	Selects/displays the mode currently being used. To set the R/T to HAVE QUICK mode, select/display HQ.
6	Traffic mode	Indicates that the radio is in Voice mode. Data mode is not available for HAVE QUICK operation.
7	WOD/TOD	Indicates the presence and validity of the HAVE QUICK WOD and TOD. When the R/T unit has no WOD or TOD, the word ZERO is displayed indicating that it has been zeroized. When at least one WOD or TOD value is present, the field comprises three sub-fields as follows:
7.1	WOD	Indicates the absence or presence of a WOD or valid MWOD with three indications: - (Dash) there is no WOD or valid MWOD present. w (Lower case) an MWOD is present but has no matching TOD. W (Upper case) a WOD or MWOD is present with a matching TOD.
7.2	-	Display separator character.
7.3	TOD	Indicates the absence or presence of a valid TOD with three possible indications: - (Dash) there is no TOD present. t (Lower case) a TOD is present but is not Zulu time (GMT). It has either been forced or the R/T unit is searching for an updated TOD. A TOD update occurs automatically at two-hour intervals, or when requested by the user (Serial 12). T (Upper case) a valid TOD is present.
8	Tx Power	Selects/displays the transmit power level. The values available are as follows: HI High power 8 W. MD Medium power 2 W. LO Low power 0.4 W.

(continued)

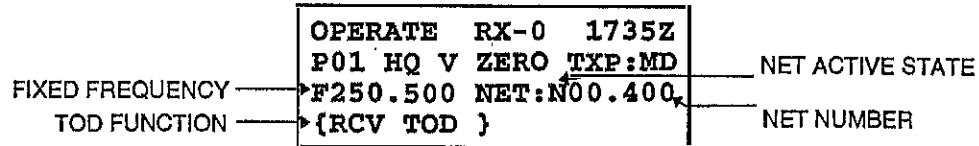


TABLE 4 OPERATE SCREEN - HQ MODE (continued)

Serial (1)	Display field (2)	Description/function (3)
9	Fixed frequency	<p>Displays the fixed operating frequency used when the net is not active (Serial 10).</p> <p>The cursor is used to select each digit in turn. The first digit must be in the range 0 to 3. Tuning range and accuracy are as follows:</p> <p><u>225.000 to 399.975 MHz</u> Frequency tuning is in 25 kHz steps. The second from last digit of the frequency will only accept values of 0, 2, 5 and 7. The last digit is automatically set to 0 or 5.</p> <p>If a frequency value is entered outside the 225.000 to 399.975 MHz range, the initial operating frequency is set to 225.000 MHz.</p>
10	Net active state	<p>Selects/displays the state of the R/T unit's HQ operation. The values for the text sub-field are as follows:</p> <p>A (Active) HQ frequency-agile operation is active.</p> <p>N (Non-Active) HQ frequency-agile operation is not active and fixed frequency operation is selected.</p>
11	Net number	<p>Selects/displays the current HAVE QUICK NET number. The last two digits must be set to 00, 25 or 50.</p>
12	TOD function	<p>Controls the time of day (TOD) value for synchronising the R/T units. It has the following values:</p> <p>RCV TOD With the R/T unit set to an in band (UHF) fixed frequency (eg with the net active state set to N), readies the R/T unit to receive a full TOD over the air.</p> <p>With HQ active (net active state A), requests an immediate TOD update from the SPGR.</p> <p>SEND TOD With the R/T unit set to an in band (UHF) fixed frequency (eg with the net active state set to N), transmits the currently held TOD for reception by other R/T units.</p> <p>With HQ active (net active state A), the command is invalid.</p>

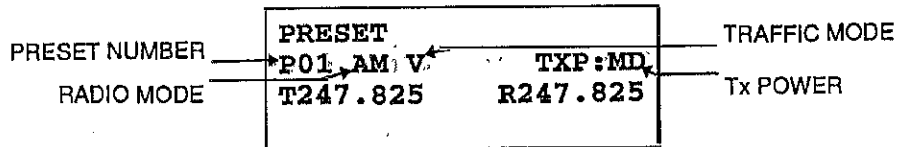
PRESET screen

20 The PRESET screen provides facilities to set up, store and view up to 99 sets of preset configuration parameters (presets) for operation of the R/T unit. The appearance and function of the PRESET screen differs according to whether the R/T unit is in AM, FM or HAVE QUICK modes.

21 To open the PRESET screen, from the MAIN MENU (Para 13) select option 3 – PRESET.

AM and FM modes

22 The PRESET screen display fields when in AM or FM mode are detailed in Table 5.

**TABLE 5 PRESET SCREEN - AM AND FM MODES**

Serial (1)	Display field (2)	Description/function (3)
1	PRESET	Screen title.
2	Preset number	Selects the Preset to be displayed/configured. To select/display a given preset, enter the desired numeric value. Up to 99 presets may be configured.
3	Radio mode	Selects/displays the radio mode. The values available are: AM Normal (insecure) amplitude modulation. FM Normal (insecure) frequency modulation. HQ HAVE QUICK anti-jam mode (not used for AM/FM modes).
4	Traffic mode	Selects/displays the audio traffic mode. The values available are as follows: V Voice mode. D Data mode.
5	Tx power	Selects/displays the transmit power level. The values available are as follows: HI High power 8 W. MD Medium power 2 W. LO Low power 0.4 W.

(continued)

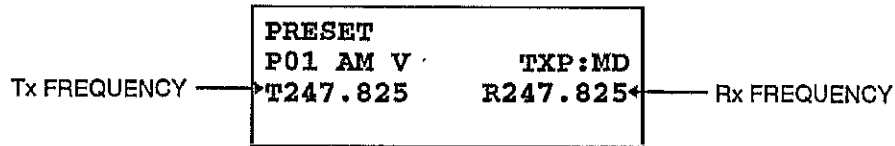


TABLE 5 PRESET SCREEN - AM AND FM MODES (continued)

Serial (1)	Display field (2)	Description/function (3)
6	Tx frequency and Rx frequency	<p>Select/display the radio transmit and receive frequencies.</p> <p>When a new transmit frequency is entered, the receive frequency is automatically set to match the new frequency. The receive frequency may subsequently be set by the user to a different value.</p> <p>The cursor is used to select each digit in turn. The first digit must be in the range 0 to 3. Tuning range and accuracy are as follows:</p> <p><u>30 to 88 MHz</u> This band is not used by TacGA.</p> <p><u>100 to 117.975 MHz</u> Frequency tuning is in 25 kHz steps. The second from last digit of the frequency will only accept values of 0, 2, 5 and 7. The last digit is automatically set to 0 or 5.</p> <p><u>118.000 to 156.000 MHz</u> Frequency tuning is entered/displayed in 1 kHz steps. However, the radio circuit tunes to the nearest 5 kHz channel.</p> <p><u>156.025 to 174 MHz and 225 to 400 MHz</u> Frequency tuning is in 25 kHz steps. The second from last digit of the frequency will only accept values of 0, 2, 5 and 7. The last digit is automatically set to 0 or 5.</p>

HQ (HAVE QUICK) mode

23 The PRESET screen display fields when in HQ (HAVE QUICK) mode are detailed in Table 6.

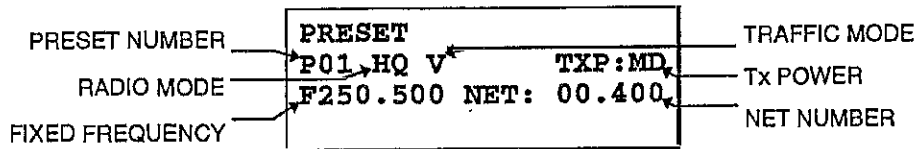


TABLE 6 PRESET SCREEN - HQ MODE

Serial (1)	Display field (2)	Description/function (3)
1	PRESET	Screen title.
2	Preset number	Selects the Preset to be displayed/configured. To select/display a given preset, enter the desired numeric value. Up to 99 presets may be configured.
3	Radio mode	Selects/displays the mode currently being used. To set the R/T to HAVE QUICK mode, select/display HQ.
4	Traffic mode	Indicates that the radio is in Voice mode. Data mode is not available for HAVE QUICK operation.
5	Tx power	Selects/displays the transmit power level. The values available are as follows: HI High power 8 W. MD Medium power 2 W. LO Low power 0.4 W.
6	Fixed frequency	Displays the fixed operating frequency used when the net is not active. The cursor is used to select each digit in turn. The first digit must be in the range 0 to 3. Tuning range and accuracy are as follows: <u>225.000 to 399.975 MHz</u> Frequency tuning is in 25 kHz steps. The second from last digit of the frequency will only accept values of 0, 2, 5 and 7. The last digit is automatically set to 0 or 5. If a frequency value is entered outside the 225.000 to 399.975 MHz range, the initial operating frequency is set to 225.000 MHz.
7	Net number	Selects/displays the current HAVE QUICK NET number. The last two digits must be one of 00, 25, or 50.

MAINTENANCE menu

CAUTION

EQUIPMENT DAMAGE. Do not select any of the MAINTENANCE menu options. Doing so can prevent the R/T unit from working or can hinder repair.

24 The MAINTENANCE menu is not required in normal operation. If the menu is displayed in error, immediately press the ESC key to return to the MAIN MENU screen. For details of the maintenance options refer to Cat 513 of this AESP.

<p>MAINTENANCE 1-REVIEW BIT RESULTS 2-ERASE BIT RESULTS 3-VIEW R/T EOT DATA</p>

DATABASE MENU OPTIONS

25 The menu tree for the DATABASE menu is shown in Fig 3:

DATABASE menu

26 The DATABASE menu provides access to the HAVE QUICK and beacon operating parameters.

27 To open the DATABASE menu, from the MAIN MENU (Para 13) select option 5 – DATABASE.

28 The display fields are detailed in Table 7.

DATABASE
1-HQ
2-XFER DATABASE
3-BEACON SETUP
4-TERM CONFIG
5-STATUS MSG

TABLE 7 DATABASE MENU

Serial (1)	Display field (2)	Description/function (3)
1	DATABASE	Screen title.
2	1 – HQ	Displays the HQ menu (Para 42) for setup of HAVE QUICK operation.
3	2 – XFER DATABASE	Displays the XFER DATABASE screen (Para 29). This option is not used.
4	3 – BEACON PRESETS	Displays the BEACON SETUP screen (Para 30) for setup of the beacon facilities.
5	4 – TERM CONFIG	Displays the TERM CONFIG screen (Para 33) for general management of the R/T unit.
6	5 – STATUS MSG	Displays the STATUS MSG screen (Para 36) for display of R/T unit status messages.

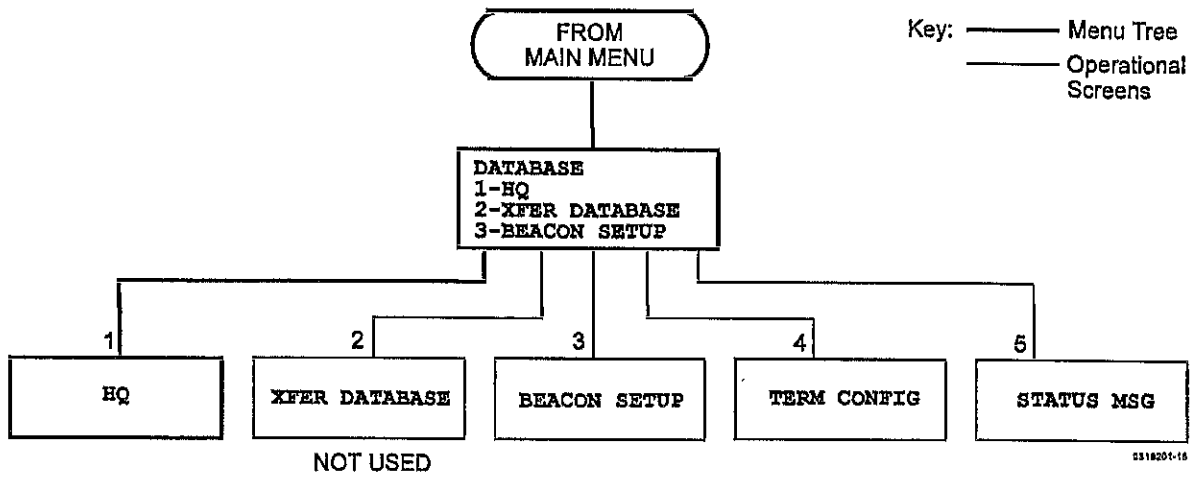


Fig 3 DATABASE menu tree

XFER DATABASE screen

29. The XFER DATABASE screen is not used by TacGA. If the screen is displayed in error, immediately press the ESC key to return to the DATABASE screen.

XFER DATABASE
PRESS ENT TO XFER

BEACON SETUP screen

- 30 The BEACON SETUP screen is used to manually set up the beacon transmit parameters.
- 31 To open the BEACON SETUP screen, from the DATABASE menu (Para 28) select option 3 - BEACON SETUP.
- 32 The BEACON SETUP screen display fields are detailed in Table 8.

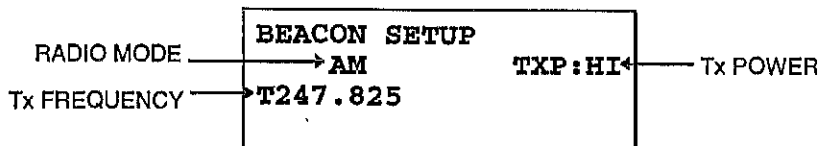


TABLE 8 BEACON SETUP SCREEN

Serial (1)	Display field (2)	Description/function (3)									
1	BEACON SETUP	Screen title.									
2	Radio mode	Selects/displays the beacon modulation mode. The values available are AM or FM.									
3	Tx power	<p>Selects/displays the transmit power level. The values available are as follows:</p> <table border="0"> <tr> <td>HI</td> <td>High power</td> <td>8 W.</td> </tr> <tr> <td>MD</td> <td>Medium power</td> <td>2 W.</td> </tr> <tr> <td>LO</td> <td>Low power</td> <td>0.4 W.</td> </tr> </table>	HI	High power	8 W.	MD	Medium power	2 W.	LO	Low power	0.4 W.
HI	High power	8 W.									
MD	Medium power	2 W.									
LO	Low power	0.4 W.									
4	Tx frequency	<p>Selects/displays the beacon transmit frequency.</p> <p>The cursor is used to select each digit in turn. The first digit must be in the range 0 to 3. Tuning range and accuracy are as follows:</p> <p><u>30 to 88 MHz</u> This band is not used by TacGA.</p> <p><u>100 to 117.975 MHz</u> Frequency tuning is in 25 kHz steps. The second from last digit of the frequency will only accept values of 0, 2, 5 and 7. The last digit is automatically set to 0 or 5.</p> <p><u>118.000 to 156.000 MHz</u> Frequency tuning is entered/displayed in 1 kHz steps. However, the radio circuit tunes to the nearest 5 kHz channel.</p> <p><u>156.025 to 174 MHz and 225 to 400 MHz</u> Frequency tuning is in 25 kHz steps. The second from last digit of the frequency will only accept values of 0, 2, 5 and 7. The last digit is automatically set to 0 or 5.</p>									

TERM CONFIG screen

33 The TERM CONFIG screen is used to configure the R/T unit general management parameters; comprising power management, beacon modulation and GPS communications enable.

34 To open the TERM CONFIG screen, from the DATABASE menu (Para 28) select option 4 -- TERM CONFIG.

35 The TERM CONFIG screen display fields are detailed in Table 9.

TERM CONFIG	
PWR MGT MODE:	POLLING
POLL ON/OFF	15/45
DWELL TIME	30
BEACON MODE: FIXED	
GPS COMM:	ENABLED

TABLE 9 TERM CONFIG SCREEN

Serial (1)	Display field (2)	Description/function (3)
1	Term config	Screen title.
2	PWR MGT MODE	<p>Selects/displays the power management mode of the R/T unit (Chap 1 Para 30). The values available are as follows:</p> <p>CONT Sets the R/T unit to continuous fully-active operation.</p> <p>POLLING Sets the R/T unit to polling mode.</p> <p>SLEEP Sets the R/T unit to sleep mode.</p>
3	POLL ON/OFF	When in polling mode, sets/displays the time period in seconds spent in fully-active mode (ON) and in sleep mode (OFF).
4	DWELL TIME	When in sleep or polling mode, sets/displays the dwell time in seconds after an RF event (Rx or Tx).
5	BEACON MODE	<p>Selects the beacon audio tone. The values available are as follows:</p> <p>FIXED Sets a fixed 1 kHz audio tone (preferred for TacGA applications).</p> <p>SWEPT Sets a swept frequency audio tone from 150 to 3850 Hz.</p>
6	GPS COMM	<p>Enables or disables communication with the SPGR via the R/T unit AUX connector, for reception of HQ TOD updates. The values available are:</p> <p>ENABLE Communication with the SPGR is enabled, allowing the transfer of TOD updates.</p> <p>DISABLE Communication with the SPGR is disabled. HQ TOD updates are not transferred to the R/T unit.</p> <p>When the setting is changed and stored in memory it does not take effect immediately. To start operation with the new setting, cycle the R/T unit power by setting the mode switch to OFF and back to ON.</p>

[REDACTED]



[REDACTED]

STATUS MSG screen

36 The R/T unit generates status messages as an aid to failure diagnosis. The STATUS MSG screen allows display of the 10 most recent status messages.

37 To open the STATUS MSG screen, from the DATABASE menu (Para 28) select option 5 – STATUS MSG.

38 The STATUS MSG screen display fields are detailed in Table 10. The status messages are detailed in Chap 4, Table 1. The keypad keys act as follows:

38.1.1 To read the next or previous message, use the NEXT or PREV key.

38.1.2 To close the STATUS MSG screen and return to the previously displayed screen, press the ESC key.

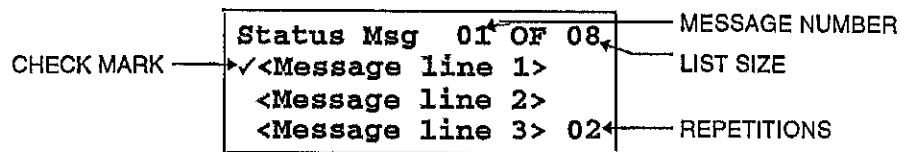


TABLE 10 STATUS MSG SCREEN

Serial (1)	Display field (2)	Description/function (3)
1	STATUS MSG	Screen title.
2	Message number	Indicates the sequential number in the message list of the message currently being viewed. To display the next or previous message in the list, use the NEXT or PREV key.
3	List size	Indicates the total number of messages in the list.
4	Check mark: ✓	Where present, the check mark indicates that the message was present when the STATUS MSG screen was last viewed. The check mark is applied to all messages in the list whenever the operator leaves the STATUS MSG screen, regardless of whether or not the operator has viewed all the messages.
5	Message lines 1 to 3	All messages are of three lines or less, therefore the full message is visible.
6	Repetitions	The number of consecutive repetitions in the list of the currently displayed message.

HAVE QUICK MENU OPTIONS

39 The HAVE QUICK menu tree is shown in Fig 4:

HQ menu

40 The HQ menu provides access to the operational screens for configuring HAVE QUICK operation.

41 To open the HQ menu, from the DATABASE menu (Para 28) select option 1 – HQ.

42 The HQ menu display fields are detailed in Table 11.

HQ
1-LOAD WOD
2-LOAD MWOD
3-LOAD FMT NET
4-FORCE TOD
5-ERASE MWODS

TABLE 11 HQ MENU

Serial (1)	Display field (2)	Description/function (3)
1	HQ	Screen title.
2	1 – LOAD WOD	Displays the LOAD WOD screen (Para 43) for loading a single word of day (WOD).
3	2 – LOAD MWOD	Displays the LOAD MWOD screen (Para 46) for loading multiple WODs (MWOD).
4	3 – LOAD FMT NET	Displays the FMT FREQ LOADING screen (Para 52) for loading the frequency managed training (FMT) radio frequencies.
5	4 – FORCE TOD	Displays the FORCE TOD screen (Para 55) for manual entry of the time of day (TOD).
6	5 – ERASE MWODS	Displays the ERASE MWOD screen (Para 58) for deleting the current set of MWODs from memory.

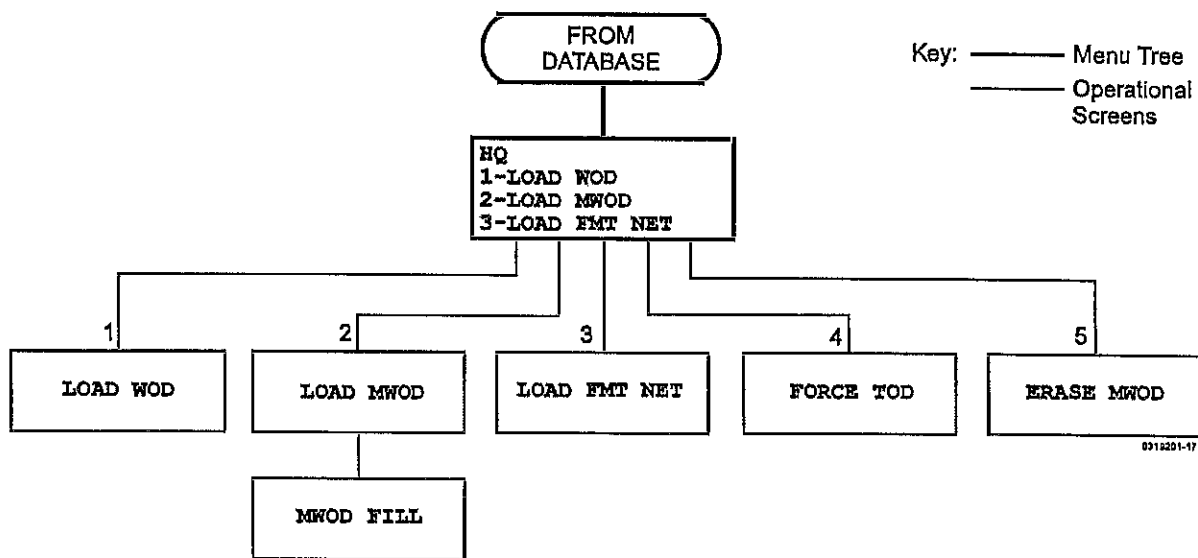


Fig 4 HQ (HAVE QUICK) menu tree

LOAD WOD screen

- 43 The LOAD WOD screen is used to manually load a single WOD.
- 44 To open the LOAD WOD screen, from the HQ menu (Para 40) select option 1 – LOAD WOD.
- 45 The LOAD WOD screen display fields are detailed in Table 12.

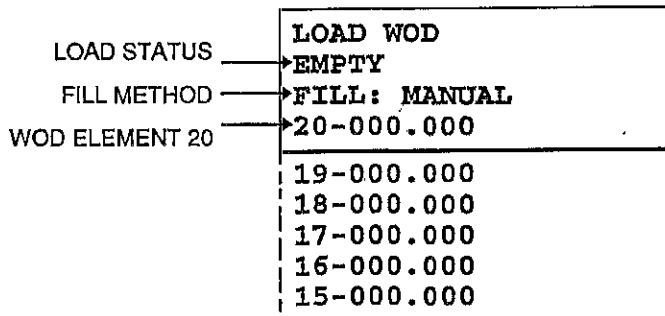


TABLE 12 LOAD WOD SCREEN

Serial (1)	Display field (2)	Description/function (3)
1	LOAD WOD	Screen title.
2	Load status	Indicates whether or not a WOD has been loaded. The values available are as follows: LOADED The WOD is present (loaded). It may or may not be valid. EMPTY No WOD is present.
3	Fill method	Indicates that the WOD loading method is MANUAL (electronic fill is not available for a single WOD).
4	WOD elements 20 to 15	The six lines set the six elements of the WOD for loading into memory locations 20 to 15. When the screen is opened all elements display the value 000.000, even if a WOD is currently loaded. If element 20 has the value "300.0##" entered, the WOD will not be saved until all locations have been loaded and the ENT key is pressed. In locations 20 to 16, pressing the ENT key stores any value entered and moves to the next location. In location 15, pressing the ENT key loads the WOD elements entered and returns all the displayed values to zeros.

LOAD MWOD screen

46 The LOAD MWOD screen provides facilities to load multiple WODs (MWOD) manually or automatically.

47 To open the LOAD MWOD screen, from the HQ menu (Para 40) select option 2 – LOAD MWOD.

48 The various display fields are detailed in Table 13.

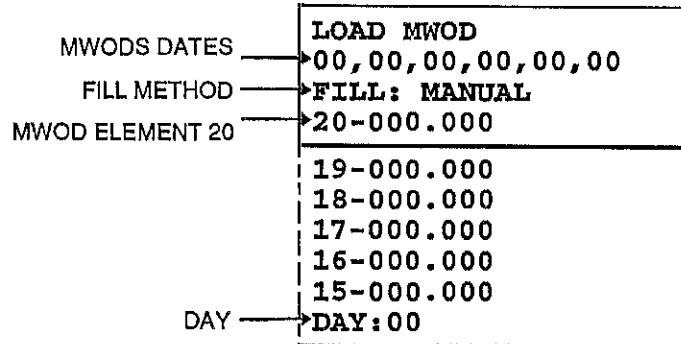


TABLE 13 LOAD MWOD SCREEN

Serial (1)	Display field (2)	Description/function (3)
1	LOAD MWOD	Screen title.
2	MWODS dates	The six two-digit fields (##) indicate the dates assigned to the loaded MWODs. Each WOD date is in the form of 01 to 31. For any WODs not filled the date shows 00.
3	Fill method	Indicates the MWOD loading method. The following values are provided: MANUAL Allows manual loading and editing of one or more MWODs. ELECTRONIC Opens the MWOD FILL screen (Para 49) to carry out electronic fill of MWODs.
4	MWOD elements 20 to 15	When carrying out a manual load of an MWOD, these lines set the six elements for the MWOD into memory locations 20 to 15. Pressing the ENT key stores any value entered and moves to the next location.
5	DAY	Sets the day of the month (in the range from 01 to 31) for the MWOD being loaded. Pressing the ENT key loads the MWOD and returns all displayed values to zero.

MWOD FILL screen

49. The MWOD FILL screen is used to carry out electronic fill of MWODs from a BID 250/31 fill device.
50. To open the MWOD FILL screen, from the LOAD MWOD screen (Para 46) set the FILL field to ELECTRONIC and press the ENT key.

```
MWOD FILL
PRESS ENT TO BEGIN
AWAITING FILL DATA
```

51. To initiate electronic fill, press the ENT key. The R/T unit starts the fill process and displays the current process status. To return to the OPERATE screen, press the ESC key.

FMT FREQ LOADING screen

52. The FMT FREQ LOADING screen is used to manually load the sixteen frequency managed training (FMT) net frequencies used for HAVE QUICK II training operation.
53. To open the FMT FREQ LOADING screen, from the HQ menu (Para 40) select option 3 – LOAD FMT NET.
54. The frequency fields 20 to 5 display the sixteen FMT net frequencies for viewing and updating as required.

```
FREQUENCY 20 → FMT FREQ LOADING
                  20-225.000
                  19-225.025
                  18-225.050
                  17-225.075
                  16-225.100
                  15-225.125
                  14-225.150
                  13-225.175
                  12-225.200
                  11-225.225
                  10-225.250
                  9-225.275
                  8-225.300
                  7-225.320
                  6-225.350
                  5-225.375
```


FORCE TOD screen

55 The FORCE TOD screen is used for manual entry of the time of day (TOD), where a TOD is not available from another source.

56 To open the FORCE TOD screen, from the HQ menu (Para 40) select option 4 – FORCE TOD.

**FORCE TOD
TODAY: ##**

57 The TODAY field acts as follows:

57.1 The TODAY field displays the current TOD code and can be used to enter a new (forced) TOD code. The forced TOD code must be present in a known saved MWOD.

57.2 On pressing the ENT key, the R/T unit carries out the following actions:

57.2.1 Loads the displayed TOD code.

57.2.2 Where a single HQ I WOD is present, erases the WOD.

57.2.3 Opens the STATUS MSG screen (Para 36) with the message "TOD received".

57.3 To return to the HQ menu, press the ESC key.

ERASE MWOD screen

58 The ERASE MWODS screen is used to delete the current set of MWODs from the R/T unit memory. Its function is identical to that of the Zeroize function (Para 84).

59 To open the ERASE MWOD screen, from the HQ menu (Para 40) select option 5 – ERASE MWODS.

60 To erase all MWODs and return to the HQ menu, press the ENT key.

**ERASE MWOD
ENTER TO CONFIRM
ESC TO EXIT**

BIT MENU OPTIONS

61 The menu tree for the BIT menu is shown in Fig 5.

BIT menu

62 The BIT menu provides facilities to carry out diagnostic checks on the R/T unit.

63 To open the BIT menu, select the MAIN MENU (Para 13) option 6 – BIT.

64 The BIT menu display fields are detailed in Table 14.

BIT
1-OFFLINE BIT
2-BATTERY VOLTAGE
3-DISPLAY TEST
4-KEYBOARD TEST

TABLE 14 BIT MENU

Serial (1)	Display field (2)	Description/function (3)
1	BIT	Screen title.
2	1 – OFFLINE BIT	Displays the OFFLINE BIT screen (Para 65) to initiate the off-line built-in test (BIT) programme.
3	2 – BATTERY VOLTAGE	Displays the BATTERY VOLTAGE screen (Para 73) to check the battery voltage.
4	3 – DISPLAY TEST	Displays a flashing chequerboard test pattern (Para 75) to check the operation of the LCD panel.
5	4 – KEYBOARD TEST	Displays the KEYBOARD TEST screen (Para 77) to check operation of the keypad.

OFFLINE BIT screen

65 The OFFLINE BIT screen initiates the off-line BIT process, which carries out comprehensive tests of the R/T unit and provides failure information for maintenance use.

66 To open the OFFLINE BIT screen, select the BIT menu option 1 – OFFLINE BIT.

67 To initiate the off-line BIT, select option 1 – BIT.

67.1 In the event of completing a test with no fault detected the BIT menu (Para 62) is displayed.

67.2 In the event of a detected fault the BIT FAULT screen (Para 71) is displayed.

OFFLINE BIT
1-BIT

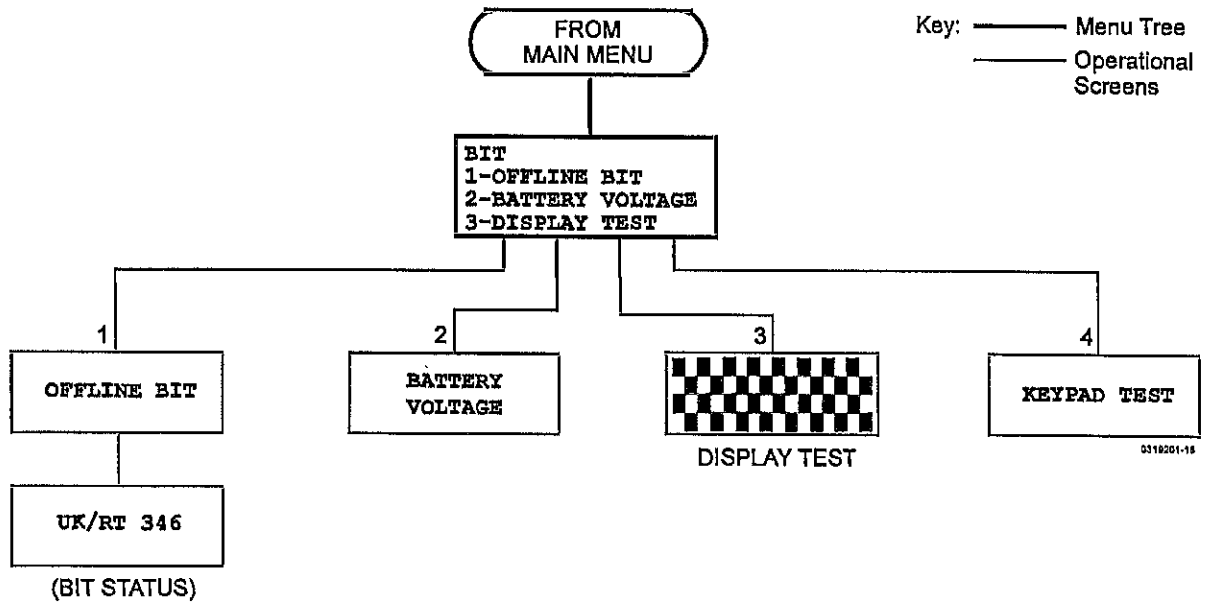


Fig 5 BIT (built in test) menu tree

UK/RT 346 (BIT status) screen

68 The UK/RT 346 (BIT status) screen displays the current software version and BIT status of the R/T unit.

69 The BIT status screen is displayed during execution of both power-up and off-line BIT. During the power-up BIT, the display test screen alternates with the status screen until the BIT is completed.

70 The BIT status display fields are detailed in Table 15.

	UK/RT 346	HQ II
	VER: 01.40	
BIT STATUS	BIT IN PROGRESS	
OPERATOR MESSAGE	HIT KEY/PTT TO ABORT	

TABLE 15 UK/RT 346 (BIT STATUS) SCREEN

Serial (1)	Display field (2)	Description/function (3)
1	UK/RT 346	Screen title. MXF-430UK(V)1 is the manufacturer's designation for the UK/RT 346 receiver-transmitter unit.
2	HQ II	Indicates that the R/T unit is compatible with HAVE QUICK II.
3	VER: 01.40	The current software version installed in the R/T unit.
4	BIT status	Indicates the status of the current BIT process.
5	Operator message	Displays any special instruction, option or other message to the operator.

BIT FAULT screen**CAUTION**

EQUIPMENT FAULT. If a BIT FAULT message is displayed, the R/T unit will not function correctly.

71 In the event that the internal BIT detects a fault, the BIT FAULT screen is displayed. The BIT fault display and associated BIT fault codes are detailed in Chap 4 Table 2.

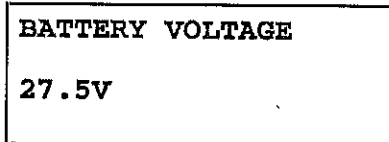
72 To confirm the fault, set the mode switch to OFF and then back to ON. If the power-up BIT detects the fault again, the R/T unit is faulty and should not be used.

BIT FAULT: 647 1-TX 2-RF/IF 3-AUDIO
--

BATTERY VOLTAGE screen

73 The BATTERY VOLTAGE screen displays the current battery voltage.

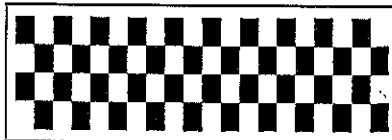
74 To open the BATTERY VOLTAGE screen, select the BIT menu (Para 62) option 2 – BATTERY VOLTAGE.



Chequerboard (display test) screen

75 The flashing alternating chequerboard pattern allows visual detection of any failed LCD panel pixel elements.

76 To open the display test screen, select the BIT menu (Para 62) option 3 – DISPLAY TEST. While running, the display test screen alternates with the BIT status screen. To return to the BIT menu, press any key. The display test screen also alternates with the BIT status screen during Power-up BIT.

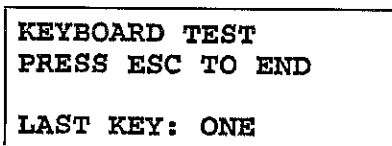


KEYBOARD TEST screen

77 The KEYBOARD TEST screen provides an interactive test of the keypad.

78 To open the KEYBOARD TEST screen, select the BIT menu (Para 62) option 4 – KEYBOARD TEST.

79 The last line (Line 4) of the screen displays the most recent key to be pressed, allowing the action of each of the fifteen keys (other than the ESC key) to be confirmed. To confirm action of the ESC key and return to the BIT menu, press the ESC key.



BEACON AND ZEROIZE SCREENS

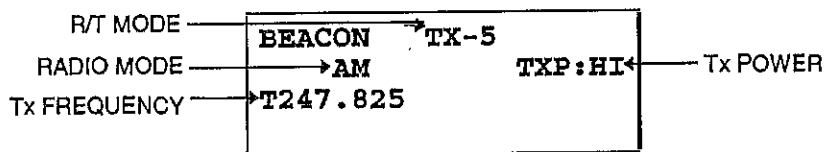
80 The BEACON and ZEROIZE screens are accessed via the front panel mode switch (Fig 1).

BEACON screen

81 The BEACON screen displays the radio parameters for the current beacon transmission.

82 The BEACON screen opens when beacon transmission is started using the mode switch. On opening, the BEACON screen displays the parameter values entered in the BEACON SETUP screen (Para 30).

83 The BEACON screen display fields are detailed in Table 16. The beacon transmit parameters cannot be changed from the BEACON screen.

**TABLE 16 BEACON SCREEN**

Serial (1)	Display field (2)	Description/function (3)									
1	BEACON	Screen title.									
2	R/T mode	TX indicates that the R/T unit is transmitting. The number shows the relative signal level in the range from 0 to 5.									
3	Radio mode	Displays the beacon modulation mode. The possible values are AM or FM.									
4	Tx power	Displays the transmit power level. The possible values are as follows: <table border="0"> <tr> <td>HI</td> <td>High power</td> <td>8 W.</td> </tr> <tr> <td>MD</td> <td>Medium power</td> <td>2 W.</td> </tr> <tr> <td>LO</td> <td>Low power</td> <td>0.4 W.</td> </tr> </table>	HI	High power	8 W.	MD	Medium power	2 W.	LO	Low power	0.4 W.
HI	High power	8 W.									
MD	Medium power	2 W.									
LO	Low power	0.4 W.									
5	Tx frequency	Displays the beacon transmit frequency.									

ZEROIZE screen

84 The ZEROIZE screen resets (zeroizes) the stored HAVE QUICK WOD and MWOD values.

85 To display the ZEROIZE screen and initiate the zeroizing operation, pull and rotate the mode switch to the Z position.

86 The zeroize operation may take up to 20 seconds. During this period the the MWODS field displays "ZEROIZING."

```
ZEROIZE
MWODS: ZEROIZING
```

87 On completion of the process, the MWODS field displays "ZEROIZED." Line 4 displays "F2:GPS CVK:" to indicate that any GPS CVK in the SPGR may now require zeroizing.

```
ZEROIZE
MWODS: ZEROIZED

F2:GPS CVK:
```

[REDACTED]



[REDACTED]

CHAPTER 3
OPERATING INSTRUCTIONS
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(continued)

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Para

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(continued)

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[REDACTED]



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INTRODUCTION

1 This chapter gives the operating instructions for the UK/PRC 346 radio station. Battery charging, remote operation, mast mounted antenna options and use of the NBC respirator microphone are detailed in separate sections after the main instructions. This chapter is divided into sections covering the following topics:

- 1.1 Unpacking and repacking.
- 1.2 Assembly and configuration of the manpack station and of the vehicle station audio gear.
- 1.3 Preparation for use comprising:
 - 1.3.1 Equipment checks and power-up.
 - 1.3.2 R/T unit setup for normal, HAVE QUICK and distress beacon operation, and R/T unit power management.
 - 1.3.3 Operational check.
- 1.4 In operation procedures comprising:
 - 1.4.1 R/T unit control adjustments and battery voltage check.
 - 1.4.2 Vehicle station audio distribution.
 - 1.4.3 Normal, HAVE QUICK and distress beacon operation.
- 1.5 Closing down the UK/PRC 346 radio station, comprising erasure (zeroizing) of the HAVE QUICK MWODS, power down and preparation of the manpack station for transport or temporary storage.
- 1.6 Battery charging for the manpack and vehicle mounted stations R/T unit batteries.
- 1.7 Remote operation siting, preparation for use and operation.
- 1.8 Mast mounted antenna systems siting, deployment and ground plane lowering.
- 1.9 NBC respirator microphone installation.

UNPACKING AND REPACKING

Unpacking and inspection

2 The packing arrangement for the UK/RT 346 receiver/transmitter (R/T) unit is shown in Fig 1 and that for the ancillary equipment items is shown in Fig 2.

3 When unpacking an equipment item, ensure that the equipment data including part number and serial number matches the details of the voucher or other accounting documents. Retain the original packaging material. Check the contents against the CES to ensure that all items are present.

4 To ensure that no damage has occurred to the equipment during shipping, after unpacking carry out the visual inspection procedure detailed in Chapter 4 Para 5.

Preparation for reshipment

5 To prepare an equipment item for reshipment, proceed as follows:

5.1 UK/RT 346 R/T unit. Refer to Fig 1. Markings shall be applied to the specified area and in accordance with requirements. Pack a defective item returned for repair in the packaging material from the replacement item. Where the original container is not available, use a reusable telescoping container NSN 8115-01-015-1315 to pack the item in accordance with Fig 1.

5.2 Ancillary items. Refer to Fig 2. Markings shall be applied to the specified area and in accordance with requirements. Pack a defective item returned for repair in the packaging material from the replacement item. Where the original container is not available, pack the item in accordance with Fig 2.

Short term storage

6 Short term storage covers the storage of equipment which can be available for operation within 24 hours. Before placing in short term storage, the next scheduled preventive maintenance checks and services should be carried out, all known deficiencies corrected, and all current modification works carried out. The short term storage site shall provide the required protection from the elements and allow access for visual inspection and exercising when applicable.

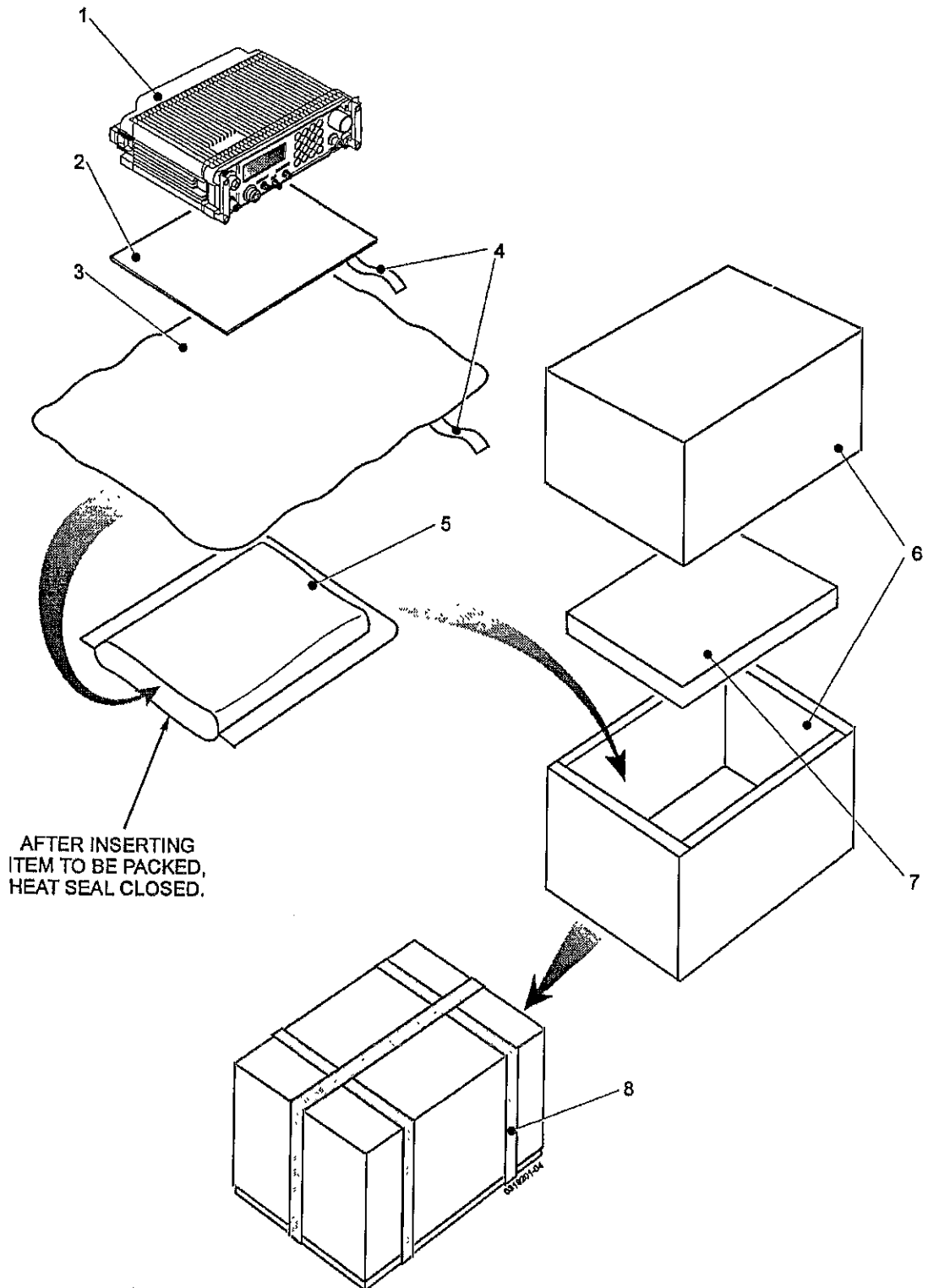
Rechargeable battery storage

7 Store NiCad rechargeable batteries as follows:

7.1 Ensure the battery terminals are protected against short circuit.

7.2 To protect the battery from damage or crushing, pack in a reinforced container.

7.3 Store in a dry, ventilated area at a temperature of between 10 and 25 deg C.



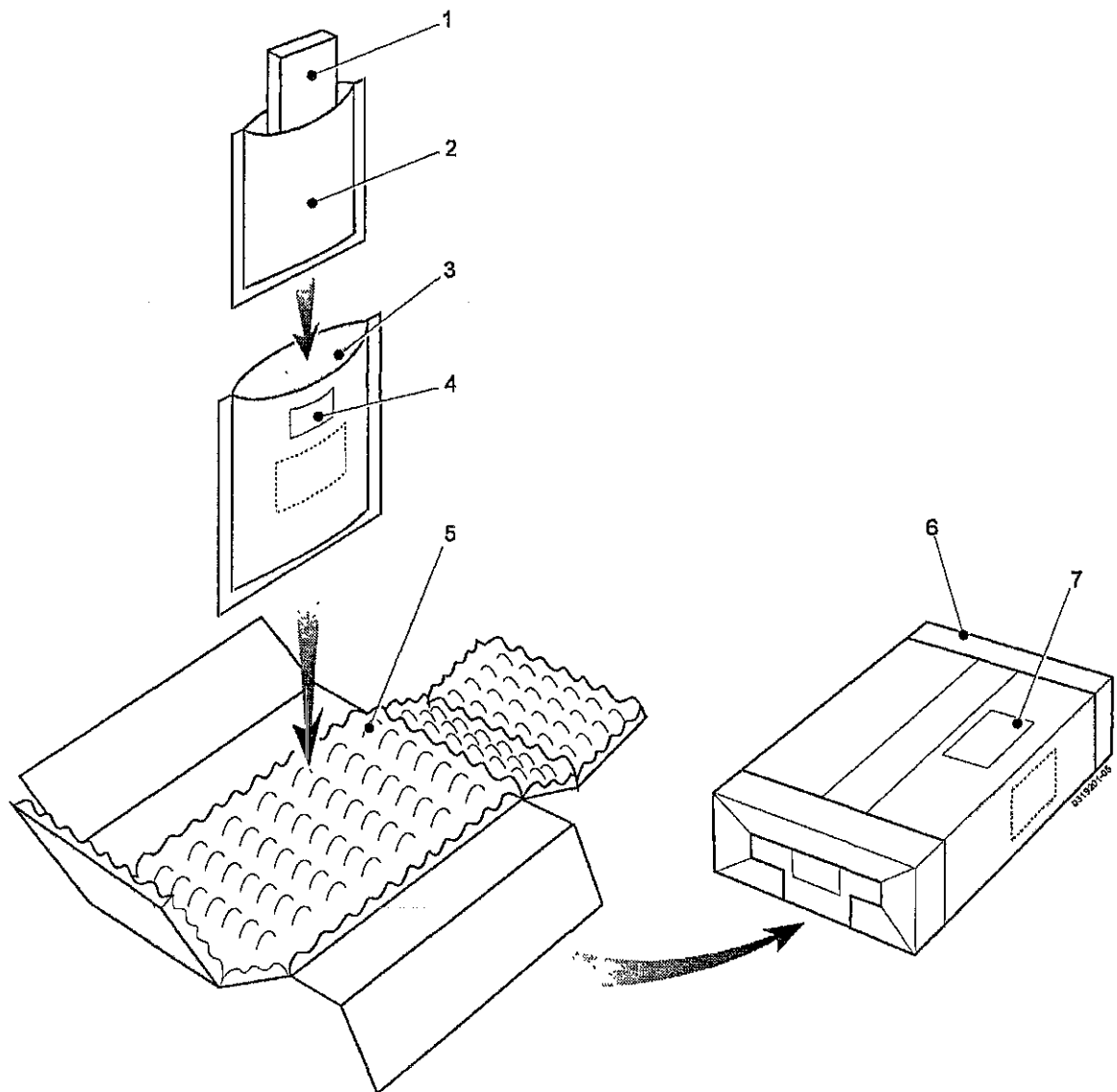
- | | | | |
|---|---|---|--------------------------------|
| 1 | UK/RT 346 R/T unit | 5 | Water-vapourproof bag |
| 2 | Polyethylene, static-dissipative | 6 | Reusable telescoping container |
| 3 | 1/8 in. static-dissipative
polyethylene foam | 7 | Dunnage to fill void |
| 4 | 1/2 in. reinforced tape | 8 | 1 in. reinforced tape |

Fig 1 UK/RT 346 receiver-transmitter (R/T) unit - unpacking and repacking

[REDACTED]



[REDACTED]



- | | | | |
|---|--------------------------------------|---|---------------|
| 1 | Equipment item to be packed/unpacked | 4 | Label |
| 2 | Anti-static bag | 5 | Box with foam |
| 3 | Bag | 6 | Tape |
| | | 7 | Label |

Fig 2 Ancillary equipment items - unpacking and repacking

ASSEMBLY AND CONFIGURATION

8 Separate instructions are given here for the assembly and configuration of the manpack station and of the vehicle station.

Manpack station

9 The manpack station is installed in the carry container. The basic UK/PRC 346 installation comprises the following equipment items:

9.1 UK/PRC 346 radio station kit comprising UK/RT 346 receiver-transmitter (R/T) unit, Specialist Personal GPS Receiver (SPGR) and SPGR interface cable. For convenience of the user, the kit also includes batteries for use of the SPGR external to the TacGA system.

9.2 Manpack kit comprising carry container, document wallet, external SPGR pouch, four 5 AH rechargeable batteries and two V/UHF battle antennas. One or two batteries as required are installed in the carry container, while the remainder are available for charging. Alternative batteries may be used where required.

NOTE

Use of the external SPGR pouch is described in Annex C to this chapter.

9.3 Audio gear comprising one or more of the following as required: handset GP, headset BV&I with pressel box, audio extension cable, audio splitter cable, NCB respirator microphone with adaptor ring and satchel GP.

10 The following kits may be optionally provided:

10.1 R/T unit fill kit comprising BID 250/31 fill system and UK/RT 346 to BID 250/31 fill cable. Installation and use of the fill kit are detailed in the MWOD electronic fill procedure (Para 37).

10.2 5.4 m antenna mast system (Para 95).

10.3 Remote operation kit (Para 82).

11 Installation of the equipment items is most conveniently carried out in the order given. Individual items may be removed and replaced in situ.

R/T unit

12 To install the R/T unit in the carry container, refer to Fig 3 and proceed as follows:

12.1 Lay the carry container on a flat surface with the shoulder harness underneath and unzip the cover.

12.2 Align the R/T unit with the smooth underside facing down and the front panel facing towards the top end of the carry container. Insert the R/T unit underneath the spare battery pouch.

12.3 Attach the retaining clips to the R/T unit handles and tighten the R/T unit retaining straps.

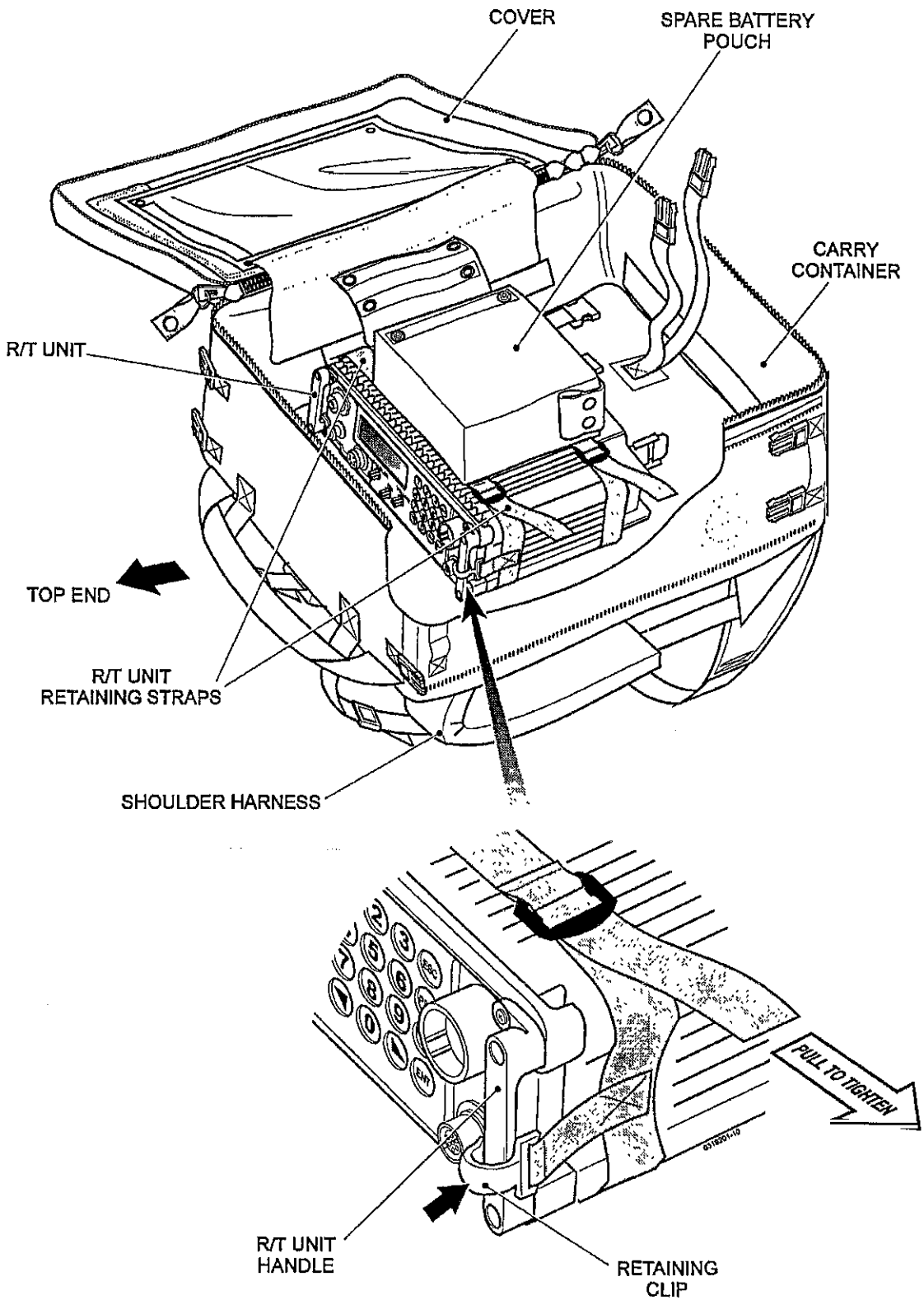


Fig 3 Manpack station - R/T unit installation

Operational battery**WARNING.**

HAZARDOUS SUBSTANCES. THIS EQUIPMENT CONTAINS NICKEL CADMIUM (Ni-Cd) BATTERIES. FOR HANDLING AND DISPOSAL INSTRUCTIONS REFER TO ACP 63723 CHAPTER 16.

13 To install the operational battery on the R/T unit, proceed as follows:

13.1 Inspect the battery exterior and spring contacts for damage. If damaged, dispose of the battery according to local instructions and obtain a serviceable battery.

13.2 Check that the battery is fully charged. .

13.3 Check that the R/T unit front panel mode switch is set to the OFF position.

13.4 Release the two quick-release fasteners on the R/T unit rear panel from the stowed position (Fig 4).

13.5 Carefully align the battery with the R/T unit rear panel terminals and adjacent locating lugs (Fig 5), and secure with the two quick-release fasteners.

13.6 Clip the operational battery retaining strap (Fig 6) to the spare battery pouch and tighten the strap.

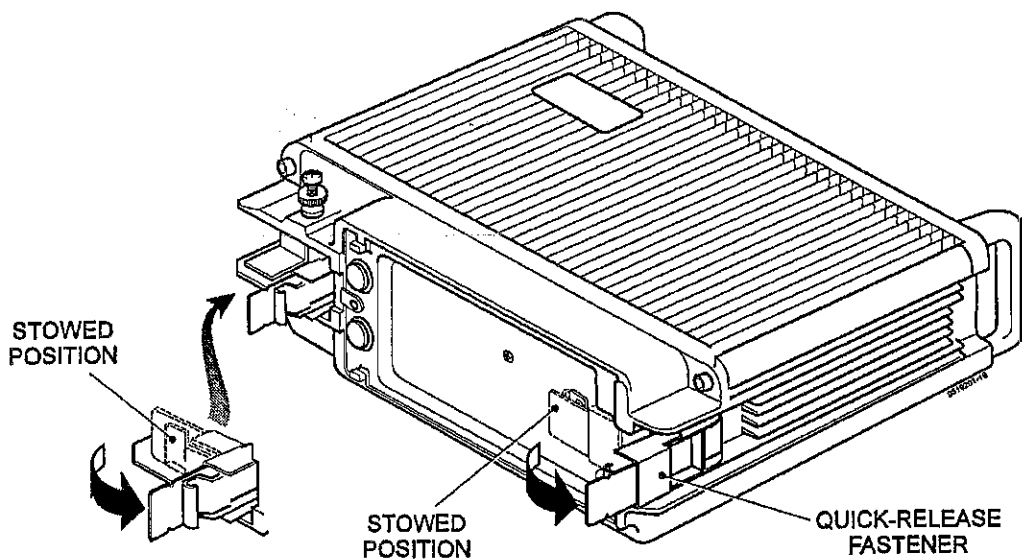


Fig 4 R/T unit battery quick-release fasteners deployment

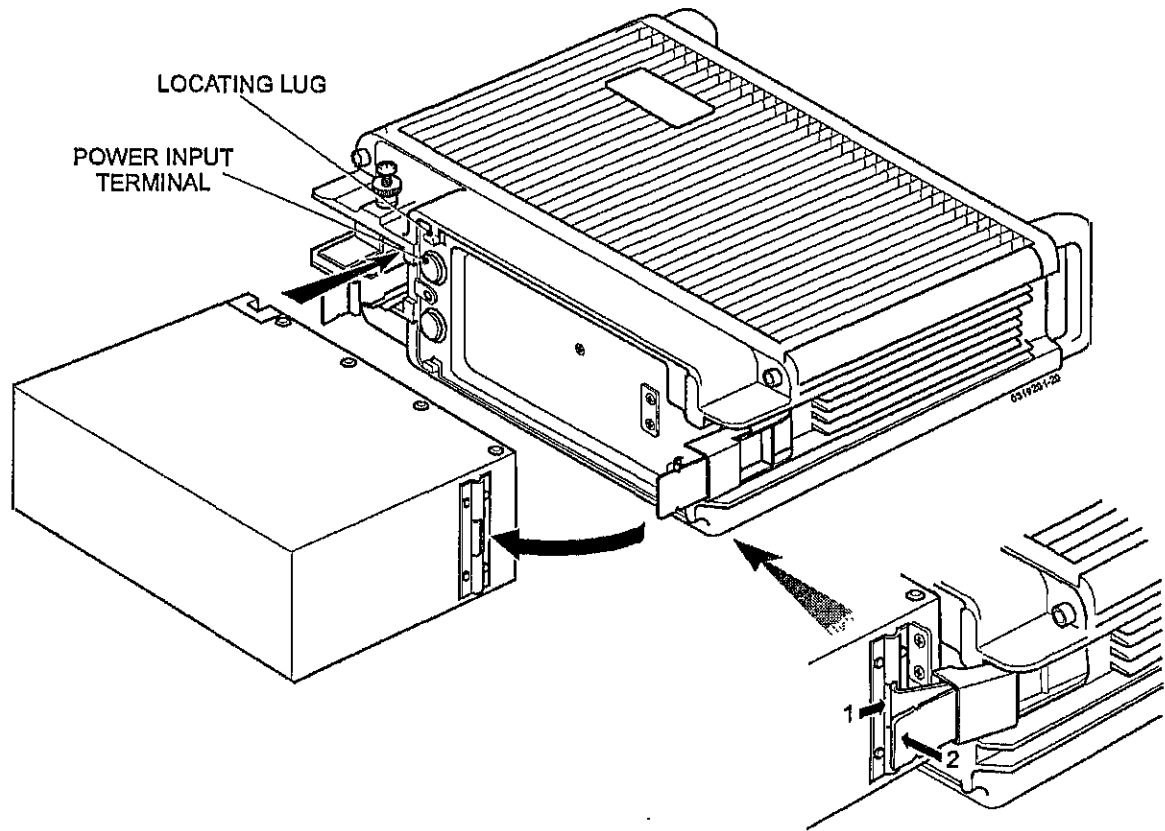


Fig 5 Operational battery installation on R/T unit

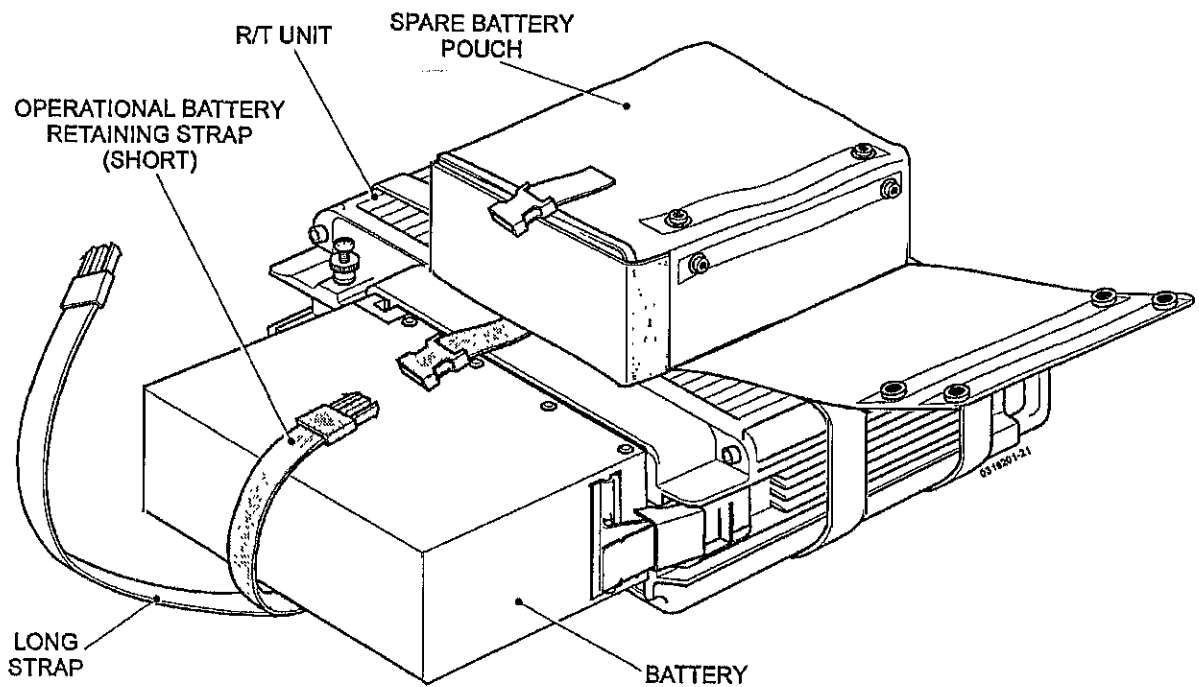


Fig 6 Manpack station - securing the operational battery

Spare battery (optional)**WARNING**

HAZARDOUS SUBSTANCES. THIS EQUIPMENT CONTAINS NICKEL CADMIUM (Ni-Cd) BATTERIES. FOR HANDLING AND DISPOSAL INSTRUCTIONS REFER TO ACP 63723 CHAPTER 16.

14 To install the spare battery in the carry container where required, refer to Fig 7 and proceed as follows:

14.1 Inspect the battery exterior and spring contacts for damage. If damaged, dispose of the battery according to local instructions and obtain a serviceable battery.

14.2 Ensure that the battery is fully charged.

14.3 Insert the battery in the carry container spare battery pouch. Secure the battery retaining strap using the two press studs.

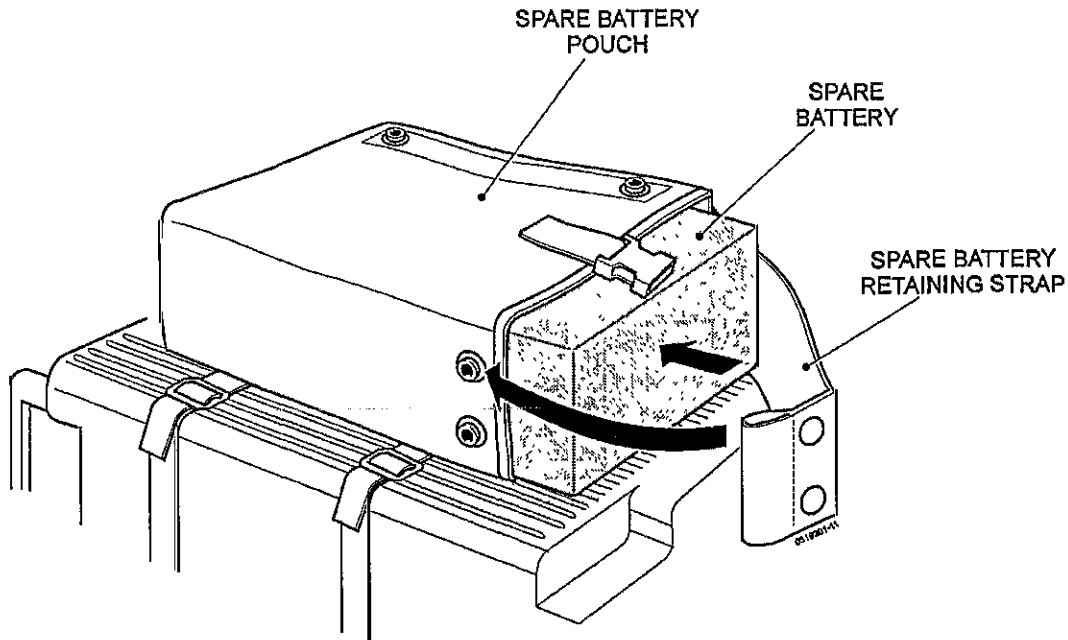


Fig 7 Manpack station - spare battery stowage

Specialist personal GPS receiver (SPGR) and cabling

15 To install the SPGR and associated cabling in the carry container, refer to Fig 8 and proceed as follows:

15.1 Remove the protective caps from the appropriate connectors and connect the SPGR interface cable to the R/T unit AUX connector. Connect the snatch adaptor to the SPGR right hand data connector and to the SPGR battery cassette external power socket located on the cassette upper right hand side. Connect the interface cable to the snatch adaptor.

15.2 Insert the SPGR in the carry container SPGR pouch and secure the pouch closed.

15.3 Secure the SPGR interface cable under the carry container cable retaining flaps as shown. Coil the excess length of the SPGR interface cable and secure under the carry container lower cable retaining flap as shown.

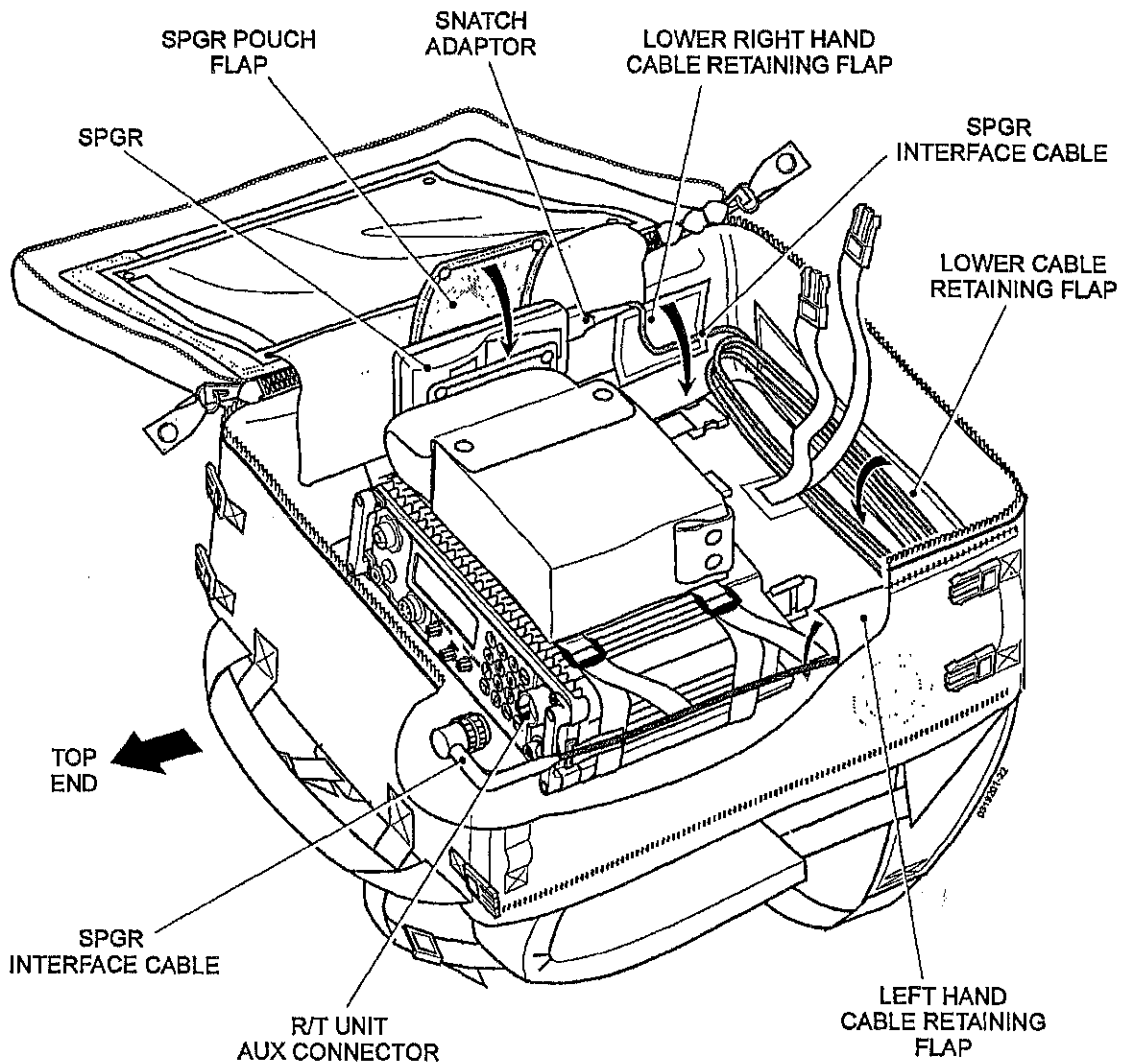


Fig 8 Manpack station - SPGR and SPGR interface cable installation

Audio gear

16 The audio gear may be installed to suit the current operational requirement for normal operation, for use by two operators, for operation at a distance of up to approximately 8 m from the R/T unit, for operation with the carry container closed and/or where the remote operation kit is installed.

16.1 Normal operation. For normal operation, connect the desired audio gear to the appropriate location as follows:

16.1.1 Manpack and TUL/TUM vehicle stations: R/T unit AUDIO connector.

16.1.2 ASV436 and BV206(D) vehicle stations: The desired CB2 or CB3 audio socket.

16.2 Use by two operators. For use by two operators, connect the audio splitter cable to the R/T unit AUDIO connector. Connect the handset GP to one branch of the splitter cable. Connect the pressel box and headset BV&I to the other branch.

16.3 Operation at a distance of up to 8 m from the R/T unit. For operation at a distance of up to 8 m from the R/T unit, connect the audio extension cable as required.

16.4 Operation with carry container closed. For operation with the carry container closed, proceed as follows:

16.4.1 Using a knife, from inside the carry container insert the knife into each slit in turn in the lower left hand grommet (Fig 9) and carefully cut through the container wall to open up the grommet.

16.4.2 Insert the desired audio cable through the grommet. Connect the cable to the R/T unit AUDIO connector and secure it under the left hand cable retaining flap.

16.4.3 Where the pressel box is installed, secure it as required using the spring clip.

16.4.4 Where the handset GP is installed, secure it in the carry container external handset pouch until required for use.

16.5 Remote operation. For operation where the remote operation kit is installed, connect the desired audio gear to the RUL AUDIO connector.

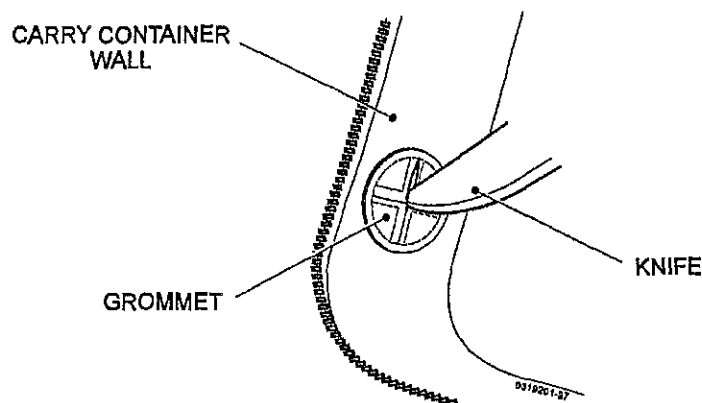


Fig 9 Carry container lower left hand grommet - opening up.

V/UHF battle antennas, operational and spare

17 Two V/UHF battle antennas are provided, one operational and one spare. The operational antenna may be stowed for transport or storage, or deployed for use. The carry case cover may be closed when the antenna is deployed.

18 To stow both V/UHF battle antennas in the carry container, refer to Fig 10 and proceed as follows:

18.1 Place one antenna alongside the spare battery pouch. Place the second antenna on top of the first one. Secure the antenna retaining flap using the outer two press studs.

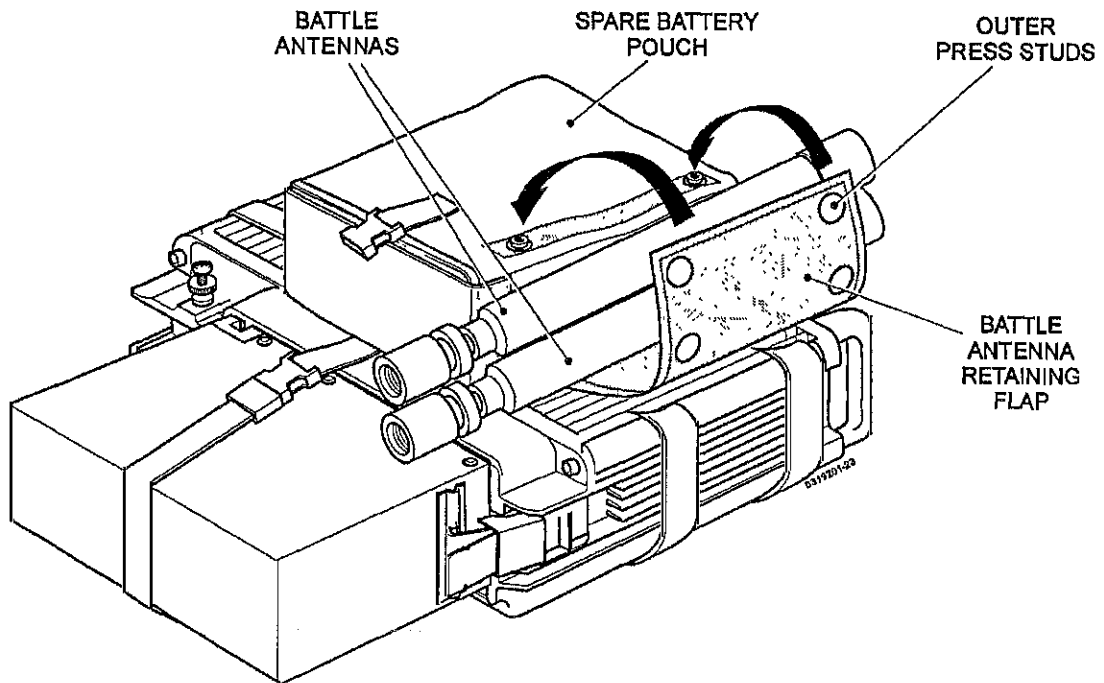


Fig 10 Manpack station - stowing two battle antennas

19 To deploy the operational V/UHF battle antenna on the R/T unit and stow a single (spare) V/UHF battle antenna in the carry container, proceed as follows:

19.1 Place the spare antenna alongside the spare battery pouch (Fig 11). Secure the antenna retaining flap using the inner two press studs.

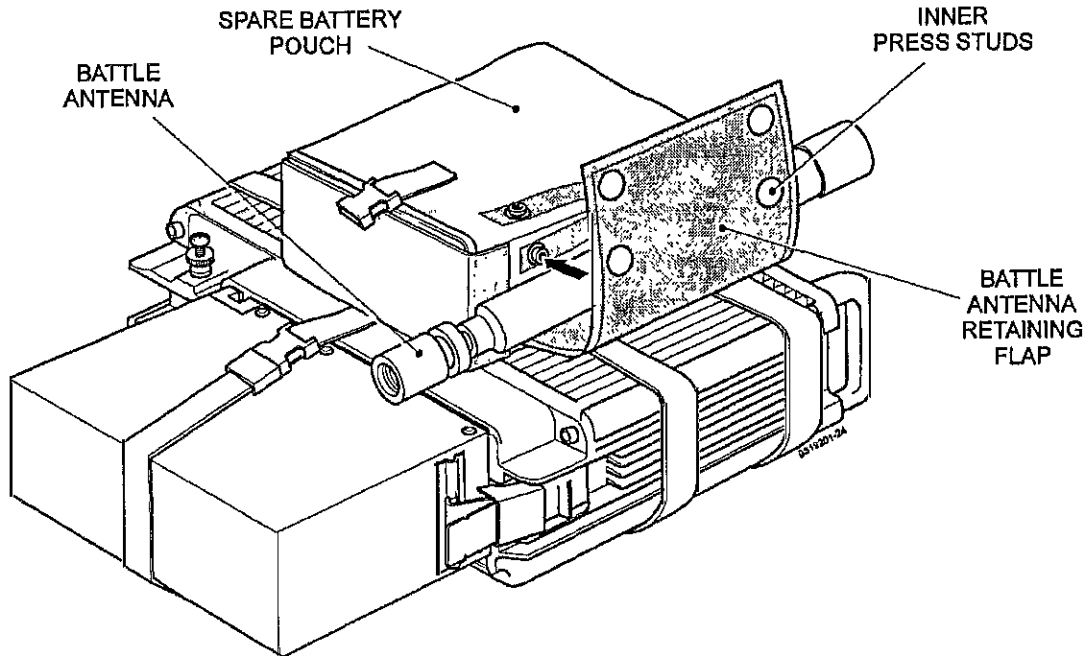


Fig 11 Manpack station - stowing a single battle antenna

19.2 Remove the protective caps from the appropriate connectors, fit the operational V/UHF battle antenna to the R/T unit ANT connector (Fig 12) and tighten the antenna connector shell.

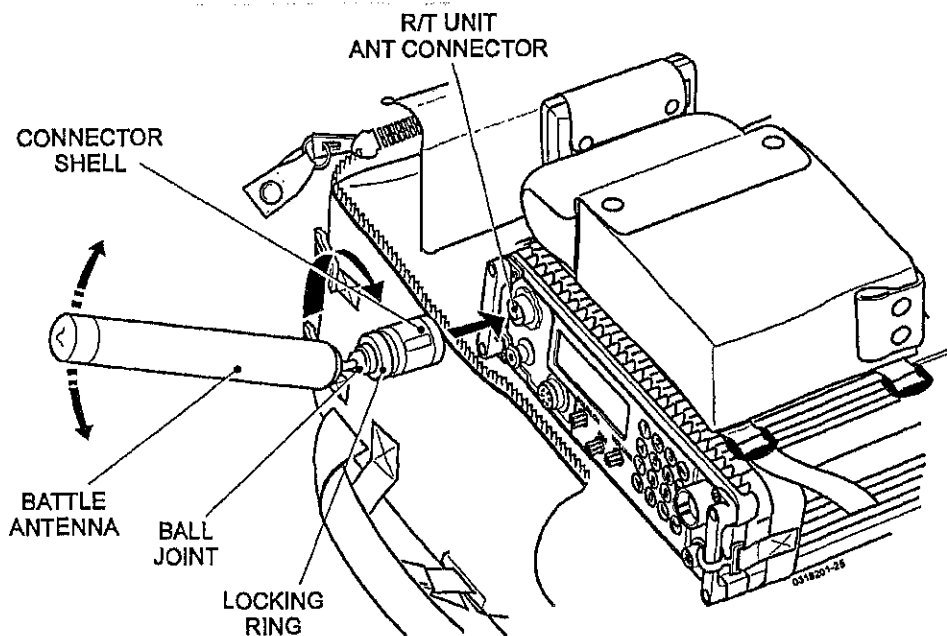


Fig 12 Manpack station - operational V/UHF battle antenna deployment

NOTES

- (1) When deployed for use, the antenna must be in an approximately upright position.
- (2) Where the carry container cover is to be closed, the antenna must be aligned such that it does not prevent closure.
- (3) Where the station is to be operated with the cover closed, the antenna may be aligned such that it protrudes from the container in contact with the cover retaining zipper (Fig 13).

19.3 Align the operational antenna in the desired position and tighten the locking ring (Fig 12).

Documents, document case and carry container cover

20 Insert the TacGA Aide Memoire and the SPGR Quick Reference Guide in the document case and close the case. Secure the case to the inside of the carry container cover using the four press studs.

21 Close the cover and secure using the zip fasteners. Where the battle antenna is deployed such that it protrudes from the container in contact with the cover retaining zipper, bring the two zip sliders up to the antenna, pass the slider tabs over the antenna and secure together (Fig 13).

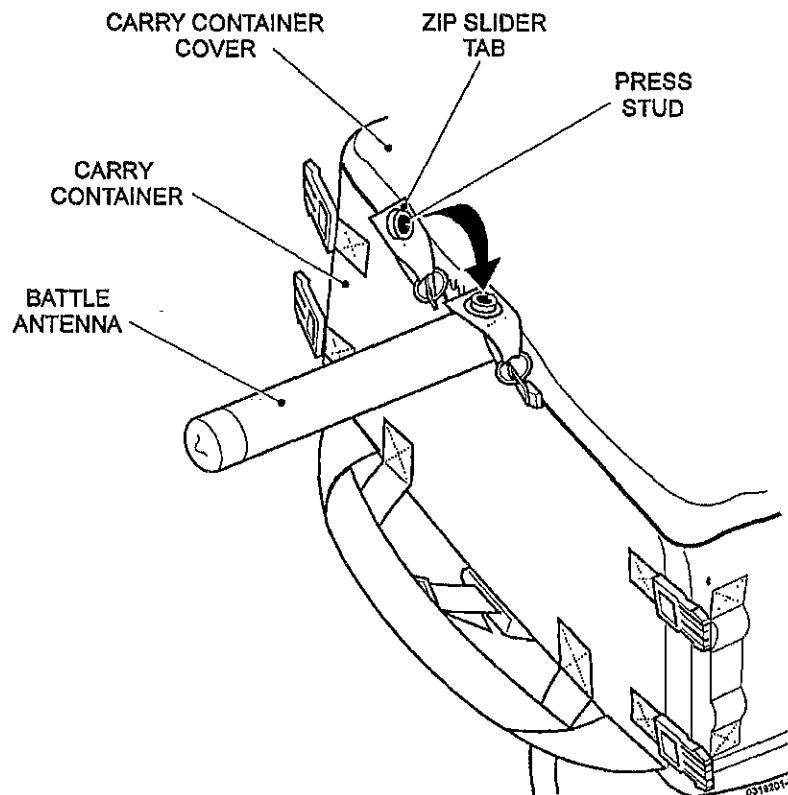


Fig 13 Manpack station - securing the carry container cover with operational battle antenna deployed

Carry container harness

22 To prepare the carry container harness for use; refer to Fig 14 and proceed as follows:

22.1 Turn the carry container so that the harness transit cover is facing up. Undo the harness transit cover. Roll it up towards the top of the container as shown and secure it in the transit cover pouch.

22.2 Pass the shoulder harness tension straps through the securing buckles and adjust for comfort.

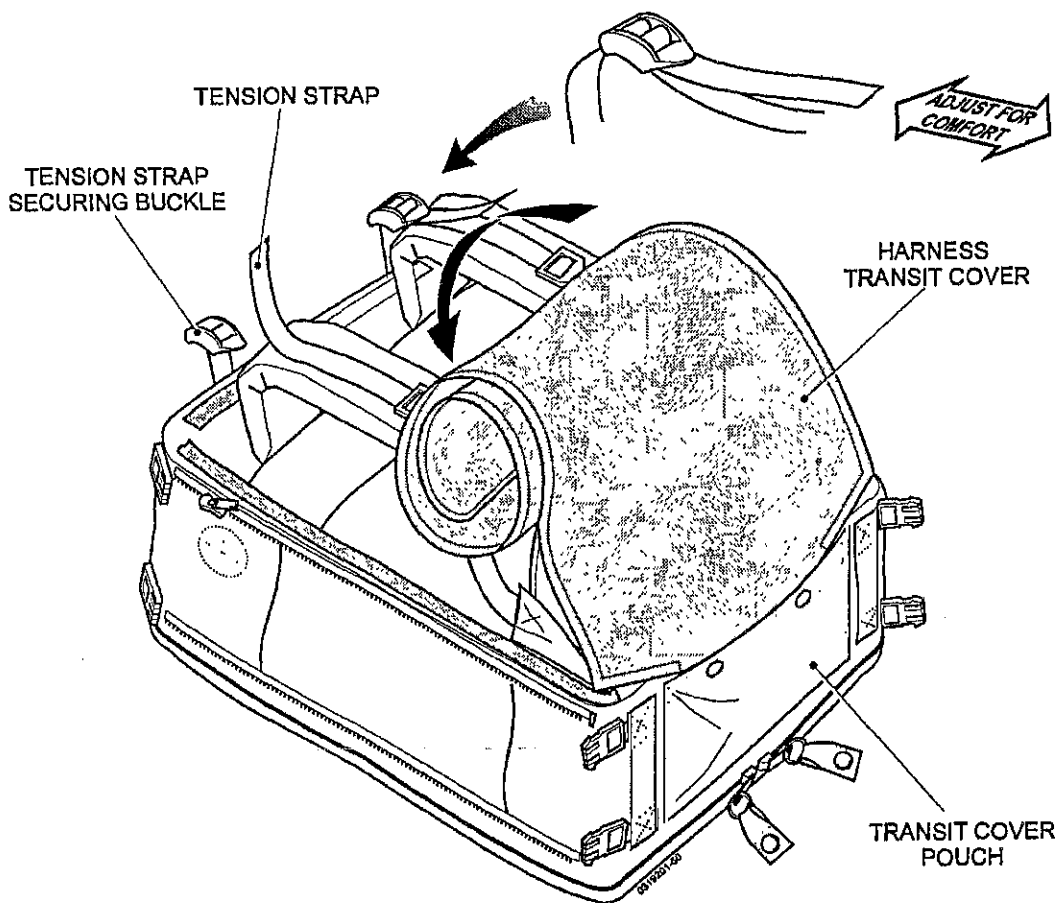


Fig 14 Manpack station - carry container harness deployment

BV206(D) and ASV436 mounted manpack stations

23 To configure the basic BV206(D) or ASV436 vehicle station for use, configure the audio gear as required.

24 The following equipment options may be installed on, or used with, the BV206(D) and ASV436 vehicle stations:

24.1 8 m antenna mast system comprising 8 m mast kit, ground plane, battle antenna adaptor, 30 m RF cable, BNC-to-C adaptor and antenna kit bags (Para 95).

TUL/TUM mounted manpack stations

25 To configure the basic TUL/TUM vehicle station for use, configure the audio gear as required. The audio gear can be configured to suit the current operational requirement for normal operation, use by two operators, operation at a distance of up to 8 m from the R/T unit and/or where the remote operation kit is installed.

25.1 Normal operation. For normal operation, connect the desired audio gear to the R/T unit AUDIO connector.

25.2 Use by two operators. For use by two operators, connect the audio splitter cable to the R/T unit AUX connector. Connect the handset GP to one branch of the splitter cable. Connect the pressel box and headset BV&I to the other branch.

25.3 Operation at a distance of up to 8 m from the R/T unit. For operation at a distance of up to 8 m from the R/T unit, connect the audio extension cable as required.

25.4 Remote operation. For operation where the remote operation kit is installed, connect the desired audio gear to the RUL mating connector.

26 The following equipment options may be installed on, or used with, the TUL/TUM vehicle station:

26.1 8 m antenna mast system comprising 8 m mast kit, ground plane, battle antenna adaptor, 30 m RF cable, BNC-to-C adaptor and antenna kit bag (Para 95).

26.2 Remote operation kit (Para 82).

PREPARATION FOR USE

- 27 To prepare the UK/PRC 346 radio station for operation, carry out the following procedures:
- 27.1 Ensure that the R/T unit operational and spare batteries are fully charged (Para 28).
 - 27.2 Power up and test the R/T unit, SPGR and (for the BV206 and ASV436 vehicle stations) Adaptor Box Radio (ABR) (Paras 29 to 31).
 - 27.3 Set up one or more of the following R/T unit operating modes and facilities as required:
 - 27.3.1 Normal (AM/FM) communication preset parameters (Para 32).
 - 27.3.2 HAVE QUICK communication parameters (Paras 33 to 39).
 - 27.3.3 Beacon signal (Para 40).
 - 27.3.4 Power management (Para 41).
 - 27.4 Carry out an operational check (Para 42) by contacting a second, known good radio station.

Battery charge state

- 28 Where a rechargeable battery has been in use or has been stored for a period of time, ensure that the R/T unit operational and spare batteries have been fully recharged according to local procedures.

Power up and testing

Radio station power up and R/T unit test

29 To power up the UK/PRC 346 radio station and run the R/T unit built-in test (BIT) proceed as follows:

29.1 Check that the R/T unit battery and SPGR are correctly installed.

29.2 Set the R/T unit front panel mode switch to the ON position to power up the R/T unit, initiate the start-up BIT and apply power to the SPGR.

29.3 The R/T unit power-up BIT alternately displays the UK/RT 346 (BIT status) and chequerboard (display test) screens, for a total period of approximately 12 seconds. The status screen displays the BIT IN PROGRESS message:

UK/RT 346	HQ II
VER: 01.40	
BIT IN PROGRESS	
HIT KEY/PTT TO ABORT	

29.4 While the BIT is in progress, adjust the R/T unit DIM control for the desired display brightness and check the display for correct pixel operation.

29.5 If the BIT FAULT screen appears, turn the power OFF and then ON again. If the BIT FAULT screen appears again, the R/T unit is defective and must be replaced. An example BIT FAULT display is shown below:

BIT FAULT: 647
1-XMTR
2-RF/IF
3-AUDIO

29.6 On successful completion of the power-up BIT, the MAIN MENU screen is displayed:

MAIN MENU	
1-OPERATE	2-N/A
3-PRESET	4-MAINT
5-DATABASE	6-BIT

SPGR test

30 Refer to the SRGR User Guide and run the SPGR BIT.

Adaptor box radio (ABR) test (BV206(D) and ASV436 vehicles only)

31 To power up the ABR and check the ABR function, proceed as follows:

31.1 Set the ABR traffic mode switch to the NORMAL position.

31.2 Set the R/T unit SQUELCH control fully clockwise.

31.3 Set the R/T unit mode switch to OFF and then back to ON to power up the ABR. Check that on power-up the ABR lamp cluster illuminates all three segments.

31.4 Check that the ABR power on indicator (green) segment remains illuminated.

Preset radio parameters (presets) loading

CAUTION

UNAUTHORISED USE. The UK/RT346 receiver-transmitter unit is capable of extended frequency operation in the ranges 30 to 88 MHz, 100 to 174 MHz VHF AM/FM and 225 to 400 MHz UHF AM/FM. These frequency ranges extend beyond the declared employment bands. Inclusion of this facility does not automatically authorise its use. Such use shall be carefully co-ordinated and approved. The allocation of radio frequencies is governed by widespread military regulations and civilian laws. Any violation of such regulations or laws, or unauthorised use, may render the user liable to prosecution.

32 The UK/RT 346 R/T unit can hold up to 99 sets of preset radio operating parameters for recall when required. To load the preset parameters, proceed as follows:

32.1 Power up the R/T unit (Para 29) to display the MAIN MENU.

MAIN MENU	
1-OPERATE	2-N/A
3-PRESET	4-MAINT
5-DATABASE	6-BIT

32.2 From the MAIN MENU, use the 3 key or the NEXT and PREV keys to highlight option 3 - PRESET. Press the ENT key to open the PRESET screen.

PRESET NUMBER →	PRESET	
	P01 AM V	TXP:HI
	T250.500	R250.500

32.3 Enter each preset as follows:

32.3.1 Use the PREV and NEXT keys to move the cursor to the preset number field. Use the numeric, < and > keys to enter the number of the desired preset. Press the ENT key to display the current parameters for the selected preset.

NOTES:

(1) AM and FM modes: When the Tx frequency (T) value is updated, the Rx frequency (R) value will also be updated to the same value. Where differing frequencies are to be used for Tx and Rx, set the Tx frequency first.

(2) HQ mode: When in HQ mode, the voice/data value is always set to V (voice).

32.3.2 Use the PREV and NEXT keys to move the cursor to the next field to be updated. Use the <, > and/or numeric keys as required to display the new value. Press ENT to enter the new value. Repeat this step for each value to be entered.

32.4 When all the values for the current preset are correct, repeat step 32.3 for the next preset.

32.5 When all the required presets have been entered, press the ESC key to return to the MAIN MENU.

HAVE QUICK parameters loading

33 To set up the radio station for HAVE QUICK operation, proceed as follows:

33.1 Set up the radio parameters and net number. These may be either loaded in the appropriate preset (Para 32) or entered when in operation (Para 55).

33.2 Open the HQ menu.

33.3 Load one or more words of day (WODs) using one of the following procedures as required:

33.3.1 Single WOD manual load (Para 35).

33.3.2 Multiple WOD (MWOD) manual load (Para 36).

CAUTION

TOD DISRUPTION. The MWOD electronic fill process may disrupt TOD accuracy. Following an electronic fill, the TOD must be validated or updated using the appropriate procedure.

33.3.3 MWOD electronic fill via the BID 250/31 fill device and fill cable (Para 37).

33.4 Close the HQ menu and return to the MAIN MENU.

33.5 Load the time of day (TOD) using one of the following procedures as required:

33.5.1 TOD acquisition from the GPS system (Para 39).

CAUTION

LIMITED DURATION. Following emergency TOD acquisition, the TOD will remain synchronised between stations for a period of at least 4 hrs. After this period, accuracy may be reduced and the TOD should be re-acquired.

33.5.2 When in operation via an emergency TOD acquisition by transfer from another UK/PRC 346 radio station (Para 59).

CAUTION

(1) **WOD COMPATIBILITY.** To communicate in HQ mode, a compatible WOD and TOD must be present. If a valid WOD is not present when attempting HQ communications, an error message will be displayed.

(2) **LIMITED COMMUNICATION.** A forced TOD has a unique, arbitrary value and will not be synchronised with Zulu time (co-ordinated universal time). Once the TOD is manually forced on one station, the station will not communicate with a second radio station in HQ mode unless the unique TOD is transmitted to, and received by, the second station. The other second will, in turn, only be able to communicate in HQ mode with those stations which have also received the unique forced TOD.

33.5.3 When in operation via an emergency manual (forced) TOD entry (Para 62).

Opening the HQ menu

34 To open the HAVE QUICK menu, proceed as follows:

34.1 Power up the R/T unit (Para 29) to display the MAIN MENU.

MAIN MENU	
1-OPERATE	2-N/A
3-PRESET	4-MAINT
5-DATABASE	6-BIT

34.2 From the MAIN MENU, use the 5 key or the NEXT and PREV keys to highlight option 5 - DATABASE. Press the ENT key to open the DATABASE menu.

DATABASE
1-HQ
2-XFER DATABASE
3-BEACON SETUP
4-TERM CONFIG
5-STATUS MSG

34.3 From the DATABASE menu, use the 1 key or the NEXT and PREV keys to highlight option 1 - HQ. Press the ENT key to open the HQ menu.

HQ
1-LOAD WOD
2-LOAD MWOD
3-LOAD FMT NET
4-FORCE TOD
5-ERASE MWODS

WOD manual load

35 To manually load a single Word of Day (WOD), proceed as follows:

35.1 Open the HQ menu (Para 34). From the HQ menu, use the 1 key or the NEXT and PREV keys to highlight option 1 - LOAD WOD. Press the ENT key to open the LOAD WOD screen.

LOAD WOD
EMPTY
FILL: MANUAL
20-000.000
19-000.000
18-000.000
17-000.000
16-000.000
15-000.000

35.2 On opening, the cursor is located on line 4, at the first digit after 20-. Use the numeric, > and < keys to display the desired segment value.

35.3 Press the ENT key to enter the displayed value. Press the NEXT key to move to the next line.

35.4 Repeat the procedure from step 35.2 for all but the last segment (19 to 16). To correct a previously-entered value, use the PREV key to move back up the list.

CAUTION

RISK OF ERROR. Once the last WOD segment is entered none of them can be recalled. Any error will prevent HQ operation and all values must be re-entered. Before entering the last value, check that all the displayed values are correct.

35.5 Repeat step 35.2 only for the last segment (15) but do not press the ENT key at this stage.

35.6 Check that all the displayed values are correct. When correct, press the ENT key to load the WOD and zero all displayed segments.

35.7 Press the ESC key to return to the HQ menu.

MWOD manual load

36 To manually load up to six WODs (MWOD), carry out the following procedures:

36.1 Open the HQ menu (Para 34). From the HQ menu, use the 2 key or the NEXT and PREV keys to highlight option 2 - LOAD MWODS. Press the ENT key to open the LOAD MWOD screen.

```
LOAD MWOD
00,00,00,00,00,00
FILL: MANUAL
20-000.000
19-000.000
18-000.000
17-000.000
16-000.000
15-000.000
DAY:00
```

36.2 Press the NEXT key to move the cursor to line 4, on the first digit after 20-.

36.3 To load an MWOD, proceed as follows:

36.3.1 Use the numeric, > and < keys to display the desired segment value and press the ENT key to enter the displayed value. Press the NEXT key to move to the next line.

36.3.2 Repeat the procedure from step 36.3.1 for the remaining segments (19 to 15).

36.3.3 In the DAY field, use the numeric, < and > keys to display the desired day of the month (in the range from 01 to 31) for the WOD being loaded.

CAUTION

RISK OF ERROR. Once the DAY value is entered none of the segments can be recalled. Any error will prevent HQ operation and all values must be re-entered. Before entering the DAY value, check that all the displayed values are correct.

36.3.4 Press the ENT key to enter the day value and load the complete MWOD.

36.3.5 The display for all segment values is zeroed and the date code for the new MWOD is displayed on line 2.

36.4 Repeat step 36.3 for the remaining MWODs.

36.5 On completion, press the ESC key to return to the HQ menu.

MWOD electronic fill**CAUTION:**

TOD DISRUPTION. The MWOD electronic fill process may disrupt TOD accuracy. Following an electronic fill, the TOD must be validated or updated using the appropriate procedure.

NOTE

The MWOD electronic fill uses the BID 250/31 fill device and BID 250/31 to R/T fill cable.

37 To load the MWODs into the R/T unit, proceed as follows:

37.1 Check that the BID 250/31 fill device has been prepared with the correct MWODS.

CAUTION

EQUIPMENT DAMAGE. Do not connect the BID250/31 fill device directly to the R/T unit. Ensure correct connection of the fill cable. Incorrect connection can damage the connectors.

37.2 Check that the BID 250/31 fill device store switch is set to the TRANSIT position and use the BID 250/31 to R/T fill cable (Chap 1 Fig 11) to connect the fill device to the R/T unit FILL connector.

37.3 Open the R/T unit HQ menu (Para 34). From the HQ menu, use the 2 key or the NEXT and PREV keys to highlight option 2 - LOAD MWODS. Press the ENT key to open the LOAD MWOD screen.

```
LOAD MWOD
00,00,00,00,00,00
FILL: ELECTRONIC
20-000.000
```

37.4 On opening, the cursor is located on Line 3, at the FILL field. Use the < or > key to select ELECTRONIC and press the ENT key to display the MWOD FILL screen. Line 3 displays the message PRESS ENT TO BEGIN and line 4 displays the message AWAITING FILL DATA.

```
MWOD FILL

PRESS ENT TO BEGIN
AWAITING FILL DATA
```

37.5 To load one MWOD, proceed as follows:

37.5.1 Set the fill device store switch to select the desired crypto (MWOD) store (1 to 6).

37.5.2 Press the R/T unit ENT key to start the fill process and display the message FILL IN PROGRESS.

37.5.3 Wait until Line 4 displays the message MWOD FILL COMPLETE, indicating a successful load.

```
MWOD FILL

PRESS ENT TO BEGIN
MWOD FILL COMPLETE
```

- 37.5.4 If the MWOD FILL FAILURE message is displayed, wait a few seconds until the R/T unit re-displays the message AWAITING FILL DATA. Check that the BID 250/31 fill device has been prepared with the correct MWODS. Repeat the procedure from Para 37.5.
- 37.6 For each MWOD to be loaded, wait a few seconds until the R/T unit re-displays the message AWAITING FILL DATA, and repeat Para 37.5.
- 37.7 On completion, set the fill device store switch to the TRANSIT position and disconnect the fill cable from the R/T unit.
- 37.8 Press the R/T unit ESC key to return to the LOAD MWOD screen. The day for each MWOD is displayed. Press ESC repeatedly until the MAIN MENU screen is displayed.
- 37.9 From the MAIN MENU, select option 1 - OPERATE. In the OPERATE screen, check that the WOD-TOD field displays an upper case 'W'.
- 37.10 Update the TOD using the desired method (Paras 39, 59 or 62).

Frequency managed training (FMT) frequency loading

38 The HAVE QUICK FMT net uses sixteen RF frequencies. To enter or modify the frequencies, proceed as follows:

38.1 Open the HQ menu (Para 34). From the HQ menu, use the 3 key or the NEXT and PREV keys to highlight option 3 - LOAD FMT NET. Press the ENT key to open the FMT FREQ LOADING screen.

FMT FREQ LOADING	
FREQUENCY 20 →	20-225.000
	19-225.025
	18-225.050
	17-225.075
	16-225.100
	15-225.125
	14-225.150
	13-225.175
	12-225.200
	11-225.225
	10-225.250
	9-225.275
	8-225.300
	7-225.320
	6-225.350
	5-225.375

- 38.2 On opening, the cursor is located on line 2, at the first digit after 20--.
- 38.3 Use the numeric, > and < keys to display the desired frequency value. On completion, press the ENT key to enter the displayed value.
- 38.4 Press the NEXT key to move to the next line.
- 38.5 Repeat steps 38.3 and 38.4 for all but the last frequency (19 to 6).
- 38.6 Repeat step 38.3 only for the last frequency (5) but do not press the ENT key at this stage.
- 38.7 Check that all the displayed values are correct. When correct, press the ENT key to load the frequencies and return the cursor to line 2.
- 38.8 Press the ESC key to return to the HQ menu.

GPS TOD acquisition

39 To set up the radio station for GPS TOD acquisition proceed as follows:

39.1 From the MAIN MENU, use the 5 key or the NEXT and PREV keys to highlight option 5 - DATABASE. Press the ENT key to open the DATABASE menu.

```

DATABASE
1-HQ
2-XFER DATABASE
3-BEACON SETUP
4-TERM CONFIG
5-STATUS MSG
  
```

39.2 From the DATABASE menu, use the 4 key or the NEXT and PREV keys to highlight option 4 - TERM CONFIG. Press the ENT key to open the TERM CONFIG screen.

```

TERM CONFIG
PWR MGT MODE: POLLING
POLL ON/OFF 15/45
DWELL TIME 30
BEACON MODE: FIXED
GPS COMM: ENABLED
  
```

39.3 Use the NEXT key to scroll down the screen until the GPS COMM: field is selected.

39.4 Check that the field is set to ENABLE. If the field is set to DISABLE, press the > key to display ENABLE and then press the ENT key to enable GPS communications.

39.5 Press the ESC key to return to the DATABASE screen, and again to return to the MAIN MENU.

39.6 From the MAIN MENU, use the 1 key or the NEXT and PREV keys to highlight option 1 - OPERATE. Press the ENT key to open the OPERATE screen.

```

RADIO MODE — OPERATE SQ-# 2315
P-M^HQ V W-T TXP:HI
F225.000 NET:A00.400
{RCV TOD }
  
```

39.7 If the radio mode is not set to HQ, press the NEXT key to move the cursor to the radio mode field, use the > key to display HQ and then press the ENT key to set the R/T unit to HQ mode.

39.8 If line 4 does not display {RCV TOD}, use the NEXT key to move the cursor to line 4, use the > key to display {RCV TOD} and then press the ENT key to set the R/T unit to receive the TOD.

39.9 Check that the SPGR is connected and powered up (Para 30).

39.10 Set the SPGR to the correct I/O "A" port configuration and enable the HAVE QUICK "ACTIVE" condition as described in AESP 5825-D-100-201 (SPGR Operating Information).

39.11 The R/T unit OPERATE screen time field displays a trailing Z, indicating that Zulu time has been loaded.

39.12 Press the ESC key to return to the MAIN MENU.

Beacon setup

40 To prepare the R/T unit beacon for use, proceed as follows:

40.1 From the MAIN MENU, use the 5 key or the NEXT and PREV keys to highlight option 5 - DATABASE. Press the ENT key to open the DATABASE menu.

```
DATABASE
1-HQ
2-XFER DATABASE
3-BEACON SETUP
4-TERM CONFIG
5-STATUS MSG
```

40.2 From the DATABASE menu, use the 4 key or the NEXT and PREV keys to highlight option 4 - TERM CONFIG. Press the ENT key to open the TERM CONFIG screen.

```
TERM CONFIG
PWR MGT MODE: POLLING
POLL ON/OFF 15/45
DWELL TIME 30
BEACON MODE: FIXED
GPS COMM: ENABLED
```

40.3 Use the NEXT key to scroll down the screen until the BEACON MODE field is selected.

40.4 Use the > or < key to display FIXED or SWEEP as required. The FIXED signal is the universally recognised 1 kHz tone. Press the ENT key to enter the displayed value.

40.5 Press the ESC key to return to the DATABASE menu.

40.6 From the DATABASE menu, use the 3 key or the NEXT and PREV keys to highlight option 3 - BEACON SETUP. Press the ENT key to open the BEACON SETUP screen.

```
BEACON SETUP
FM TXP: HI
T300.050
```

40.7 The screen opens with the radio mode field selected. Use the > or < key to display the desired modulation (AM or FM). Press the ENT key to enter the displayed value.

40.8 Press the NEXT key to move to the Tx power (TXP) field and use the < or > key to display the desired beacon transmit power level as shown:

HI	High power	8 W.
MD	Medium power	2 W.
LO	Low power	0.4 W.

40.9 Press the ENT key to enter the displayed value.

40.10 Press the NEXT key to move to the Tx frequency (T) field and use the numeric, < and > keys to display the desired beacon frequency.

40.11 Press the ENT key to enter the displayed value.

40.12 Press the ESC key to return to the DATABASE menu, and again to return to the MAIN MENU.

R/T unit power management setup

41 To set up the R/T unit power management functional mode, proceed as follows:

41.1 From the MAIN MENU, use the 5 key or the NEXT and PREV keys to highlight option 5 - DATABASE. Press the ENT key to open the DATABASE menu.

```

DATABASE
1-HQ
2-XFER DATABASE
3-BEACON SETUP
4-TERM CONFIG
5-STATUS MSG
  
```

41.2 From the DATABASE menu, use the 4 key or the NEXT and PREV keys to highlight option 4 - TERM CONFIG. Press the ENT key to open the TERM CONFIG screen.

```

TERM CONFIG
PWR MGT MODE: POLLING
POLL ON/OFF    15/45
DWELL TIME    30
BEACON MODE:  FIXED
GPS COMM:     ENABLED
  
```

41.3 The screen opens with the PWR MGT MODE: field selected. Use the > or < key to display the desired power management mode (SLEEP, CONT or POLLING). Press the ENT key to enter the displayed mode and move to the POLL ON time field.

41.4 Set the polling mode ON time and OFF time as follows:

41.4.1 Use the numeric, < and > keys to display the desired ON time (in seconds) and press the ENT key.

41.4.2 Press the NEXT key to move to the OFF time field. Use the numeric, < and > keys to display the desired the OFF time (in seconds) and press the ENT key.

41.5 Press the NEXT key to move to the DWELL TIME field. Use the numeric, < and > keys to display the desired dwell time (in seconds) for which the R/T unit remains active after a radio event (Rx or Tx) and press the ENT key.

41.6 Press the ESC key to return to the DATABASE screen, and again to return to the MAIN MENU.

Operational check

42 To check that the UK/PRC 346 radio station has been set up correctly and is fully operational, proceed as follows:

CAUTION

UNAUTHORISED USE. The UK/RT346 receiver-transmitter unit is capable of extended frequency operation in the ranges 30 to 88 MHz, 100 to 174 MHz VHF AM/FM and 225 to 400 MHz UHF AM/FM. These frequency ranges extend beyond the declared employment bands. Inclusion of this facility does not automatically authorise its use. Such use shall be carefully co-ordinated and approved. The allocation of radio frequencies is governed by widespread military regulations and civilian laws. Any violation of such regulations or laws, or unauthorised use, may render the user liable to prosecution.

42.1 Ensure that a second, known good radio station is available and agree the operating modes and frequencies to be used with the operator of the second station.

42.2 Carry out the following in-operation procedures:

42.2.1 Where necessary, power up the station (Para 29).

42.2.2 Adjust the R/T unit controls (Para 46).

42.2.3 For mounted manpack stations provided with the ABR, proceed as follows:

42.2.3.1 Connect the operator headset BV&I and pressel box to the CRCH.

42.2.3.2 Set the ABR traffic mode switch to AUTO.

42.2.4 Confirm normal (Para 51 to 53) and/or HAVE QUICK (Para 54 to 57) communications by setting the R/T unit to the required mode and contacting the second station. For mounted manpack stations provided with the ABR, check the following:

42.2.4.1 During Rx, the ABR RX (yellow) lamp illuminates and the Rx traffic is present in the headset.

42.2.4.2 During Tx, the ABR TX (red) lamp illuminates and the Tx traffic and sidetone are present in the headset.

42.3 Set the control and switch settings and the audio configuration as next required.

42.4 If the station is not required for immediate operation, power down the station (Para 67).

IN OPERATION PROCEDURES

43. To carry out radio communication using the UK/PRC 346 radio station, proceed as follows:
- 43.1 Check that the required preparation procedures (Paras 27 to 42) have been carried out.
 - 43.2 If necessary, power up the radio station (Para 29).
 - 43.3 Adjust the R/T unit controls (Para 46).
 - 43.4 For mounted manpack stations provided with the ABR, configure the vehicle CRCH harness as required (Para 48).
 - 43.5 Carry out normal (Para 51 to 53) and/or HAVE QUICK (Para 54 to 63) communications as required.
- 44 Where HAVE QUICK communication is required and the GPS TOD signal cannot be acquired or updated via the SPGR for any reason, carry out one or more of the following procedures as required:
- 44.1 Emergency TOD transfer (Para 59), including TOD acquisition from another station (Para 60) and TOD send (Para 61).
 - 44.2 Emergency forced TOD manual entry (Para 62).
- 45 Beacon operation is detailed in Para 65.

R/T unit controls adjustment

- 46 Adjust the R/T unit controls as follows:
- 46.1 Adjust the DIM control for the desired display brightness.
 - 46.2 Set the SQUELCH control fully anticlockwise. Adjust the VOLUME control knob for the desired audio signal level. Rotate the SQUELCH control until the audio is quiet.
 - 46.3 If the MAIN MENU is not displayed, press the ESC key as required until it is displayed.

MAIN MENU	
1-OPERATE	2-N/A
3-PRESET	4-MAINT
5-DATABASE	6-BIT

- 46.4 From the MAIN MENU, use the 1 key or the NEXT and PREV keys to select option 1 - OPERATE. Press the ENT key to display the OPERATE screen.

OPERATE	SQ-#	2315Z
P-M	AM V	W-T TXP:HI
T300.500	R275.050	

R/T unit battery voltage check

47 To check the output voltage of the external battery supplying the R/T unit power, proceed as follows:

47.1 Where necessary, press the ESC key to display the MAIN MENU.

```
MAIN MENU
1-OPERATE  2-N/A
3-PRESET   4-MAINT
5-DATABASE 6-BIT
```

47.2 From the MAIN MENU screen, use the 6 key or NEXT and PREV keys to select option 6 - BIT. Press the ENT key to open the BIT menu.

```
BIT
1-OFF-LINE BIT
2-BATTERY VOLTAGE
3-DISPLAY TEST
4-KEYBOARD TEST
```

47.3 From the BIT menu, use the 2 key or NEXT and PREV keys to select option 2 - BATTERY VOLTAGE. Press the ENT key to open the BATTERY VOLTAGE screen.

```
BATTERY VOLTAGE
27.5V
```

47.4 Observe the battery voltage. Press the ESC key once to return to the BIT menu and again to return to the MAIN MENU.

BV206(D) and ASV436 mounted manpack stations - audio distribution

48 In the BV206(D) and ASV436 vehicles, the UK/PRC 346 radio station is connected to the vehicle Clansman Radio Control Harness (CRCH) at either an IB2 or an IB3 radio port. The UK/PRC 346 station appears to the harness as a Clansman radio.

BV206(D) vehicle

49 The R/T unit is located in the tractor, with audio available in the trailer. To set up the vehicle audio distribution system for TacGA, proceed as follows:

49.1 Set the ABR mode switch to NORMAL or AUTO as required.

49.2 Follow normal CRCH procedures for accessing connected radios.

ASV436 vehicle

50 To set up the vehicle audio distribution system for TacGA, proceed as follows:

50.1 Set the ABR mode switch to NORMAL or AUTO as required.

50.2 Follow normal CRCH procedures for accessing connected radios.

Normal (AM/FM) communications

CAUTION

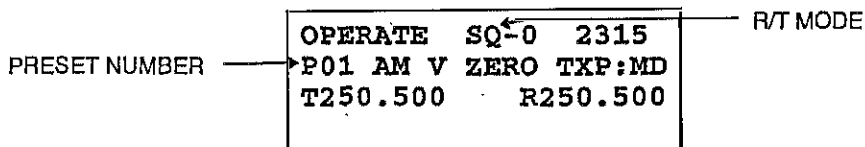
UNAUTHORISED USE. The UK/RT346 receiver-transmitter unit is capable of extended frequency operation in the ranges 30 to 88 MHz, 100 to 174 MHz VHF AM/FM and 225 to 400 MHz UHF AM/FM. These frequency ranges extend beyond the declared employment bands. Inclusion of this facility does not automatically authorise its use. Such use shall be carefully co-ordinated and approved. The allocation of radio frequencies is governed by widespread military regulations and civilian laws. Any violation of such regulations or laws, or unauthorised use, may render the user liable to prosecution.

51 The radio operating parameters may be recalled from any of 99 presets, or may be set manually as required. Operating procedures are given for both options.

Preset AM/FM operation

52 To carry out normal voice communications using preset parameters, proceed as follows:

52.1 Check that the procedures detailed in Paras 42.1 to 42.3 have been carried out. The R/T unit OPERATE screen should be displayed.



52.2 Use the PREV and NEXT keys to move to the preset number field.

52.3 Use the numeric, < and > keys to display the number of the desired preset. Press the ENT key to set the R/T unit operation to the specified preset and to display the preset values.

52.4 Rotate the SQUELCH control anticlockwise until the squelch breaks and noise is heard in the speaker. Rotate the control clockwise again until the audio is just squelched and the R/T mode field shows SQ - 0.

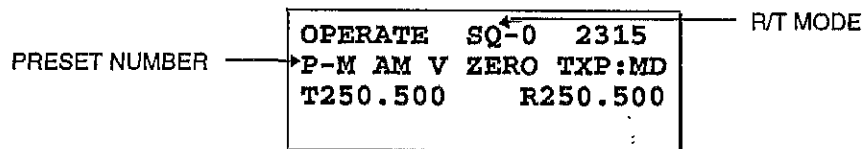
52.5 To transmit, press and hold the audio pressel switch and talk into the microphone.

52.6 To receive, release the pressel switch and listen for the Rx audio signal.

Manual AM/FM operation

53 To carry out normal voice communications using manually set parameters, proceed as follows:

53.1 Check that the procedures detailed in Paras 42.1 to 42.3 have been carried out. The R/T unit OPERATE screen should be displayed.



53.2 Use the PREV and NEXT keys to move to the parameter to be set. The parameter fields are detailed in Chapter 2 Table 3. Use the numeric and/or < and > keys to display the desired value. Press the ENT key to set the R/T unit operation to the new value and to display P-M in the preset number field.

53.3 Repeat Para 53.2 for each parameter to be set.

53.4 Rotate the SQUELCH control anticlockwise until the squelch breaks and noise is heard in the speaker. Rotate the control clockwise again until the audio is just squelched and the R/T mode field shows SQ-0.

53.5 To transmit, press and hold the audio pressel switch and talk into the microphone.

53.6 To receive, release the pressel switch and listen for the Rx audio signal.

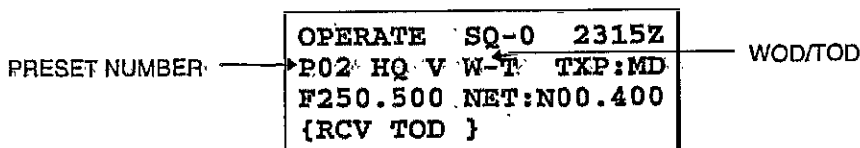
HAVE QUICK communications

54 The radio operating parameters may be recalled from any of 99 presets; or may be set manually as required. Operating procedures are given for both options.

Preset HAVE QUICK operation

55 To carry out normal voice communications using preset parameters, proceed as follows:

55.1 Check that the procedures detailed in Paras 42.1 to 42.3 have been carried out. The R/T unit OPERATE screen should be displayed.



55.2 Use the PREV and NEXT keys to move to the preset number field.

55.3 Use the numeric, < and > keys to display the number of the desired preset. Press the ENT key to set the R/T unit operation to the specified preset and to display the preset values.

55.4 Check that the WOD/TOD field displays the correct status as follows:

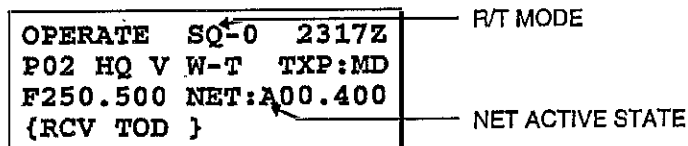
Display	Status
W	Valid WOD or MWOD present.
w	MWOD present but not valid for the currently loaded TOD.
T	TOD set to Zulu time.
t	TOD forced to arbitrary time.

55.5 Use the PREV and NEXT keys to move to the "NET:" field and select the net active state field. Use the > key to display A. Press the ENT key to enter active AJ (anti-jamming) HQ operation.

NOTE

A warning Status Message (Chap 4) is displayed when AJ mode is selected and a valid TOD or WOD is not present or an invalid net number is entered. The WOD/TOD and net number fields are detailed in Chapter 2 Table 4.

55.6 Rotate the SQUELCH control anticlockwise until the squelch breaks and noise is heard in the speaker. Return the control slowly clockwise until the audio is just squelched and the R/T mode field shows SQ-0.



55.7 To transmit, press and hold the audio gear pressel switch and talk into the microphone.

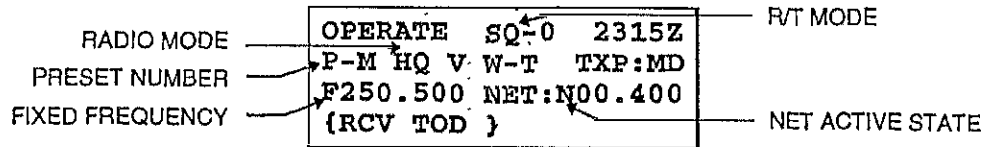
55.8 To receive, release the pressel switch and listen for the Rx audio signal.

56 To stop HAVE QUICK operation, use the PREV and NEXT keys to move to the NET field and select the net active state field. Use the > key to display N. Press the ENT key to exit active AJ (anti-jamming) HQ operation and return to normal AM operation on the fixed frequency.

Manual HAVE QUICK operation

57 To carry out HAVE QUICK voice communications using preset parameters, proceed as follows:

57.1 Check that the procedures detailed in paras 42.1 to 42.3 have been carried out. The R/T unit OPERATE screen should be displayed.

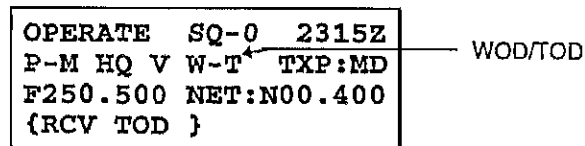


57.2 Use the PREV and NEXT keys to move to the radio mode field. Use the < or > key to display HQ.

57.3 Press the ENT key to set the R/T unit to fixed-frequency HQ mode at the frequency shown, display P-M in the preset number fields and display N in the net active state field.

57.4 Check that the WOD/TOD field displays the correct status as follows:

Display	Status
W	Valid MWOD present.
w	Valid single WOD present.
T	TOD set to Zulu time.
t	TOD forced to arbitrary time.



57.5 Use the PREV and NEXT keys to move to the next parameter to be set. The parameter fields are detailed in Chapter 2 Table 4. Use the numeric and/or < and > keys to display the desired value. Press the ENT key to set the HQ parameter to the new value and to display P-M in the preset number field.

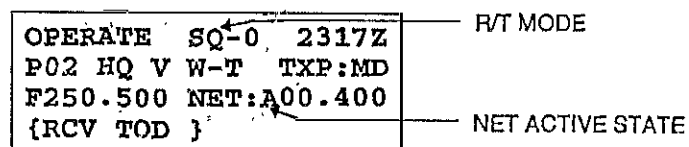
57.6 Repeat Para 57.5 for each parameter to be set.

57.7 Use the PREV and NEXT keys to move to the "NET:" field and select the net active field. Use the > key to display A. Press the ENT key to enter active AJ (anti-jamming) HQ operation.

NOTE

A warning Status Message (Chap 4) is displayed when AJ mode is selected and a valid TOD or WOD is not present or an invalid net number is entered. The WOD/TOD and net number fields are detailed in Chapter 2 Table 4.

57.8 Rotate the SQUELCH control anticlockwise until the squelch breaks and noise is heard in the speaker. Return the control slowly clockwise until the audio is just squelched and the R/T mode field shows SQ-0.



57.9 To transmit, press and hold the audio pressel switch and talk into the microphone.

57.10 To receive, release the pressel switch and listen for the Rx audio signal.

58 To stop HAVE QUICK operation, use the PREV and NEXT keys to move to the NET field and select the net active state field. Use the > key to display N. Press the ENT key to exit active AJ (anti-jamming) HQ operation and return to normal AM operation on the fixed frequency.

```

OPERATE  SQ-0  2317Z
P02 HQ V W-T  TXP:MD
F250.500 NET:A00.400
{RCV TOD }
  
```

NET ACTIVE STATE

HAVE QUICK emergency TOD transfer

CAUTION

LIMITED DURATION. Following emergency TOD acquisition, the TOD will remain synchronised between stations for a period of at least 4 hrs. After this period, accuracy may be reduced and the TOD should be re-acquired.

59 Where the GPS TOD is not available from the SPGR, it may be acquired from another TacGA station in the local system. The sending and receiving stations must carry out the TOD transfer using the following procedure:

59.1 Both stations mutually employ a predetermined (fixed) contact frequency.

59.2 The stations make contact on the predetermined frequency.

59.3 The receiving station prepares to receive the TOD.

59.4 The sending station sends the TOD.

TOD acquisition from another station

60 To send the current TOD to another station, proceed as follows:

60.1 Check that the procedures detailed in Paras 42.1 to 42.3 have been carried out. The R/T unit OPERATE screen should be displayed.

```

RADIO MODE  ——— OPERATE  SQ-0  2315Z
FIXED FREQUENCY ——— P-M HQ V W-T  TXP:MD
                ——— F250.500 NET:N00.400
                ——— {RCV TOD }
                ——— TOD FUNCTION
  
```

60.2 Use the PREV and NEXT keys to move to the radio mode field. Use the < or > key to display HQ. Press the ENT key to set the R/T unit to fixed-frequency HQ mode at the frequency shown.

60.3 Use the PREV and NEXT keys to move to the fixed frequency field. Use the numeric, < and > keys to display the predetermined contact frequency. Press the ENT key to set the R/T unit to the contact frequency.

60.4 Use the PREV and NEXT keys to move to the TOD function field. Use the > or < key to display RCV TOD. Do not press the ENT key at this time.

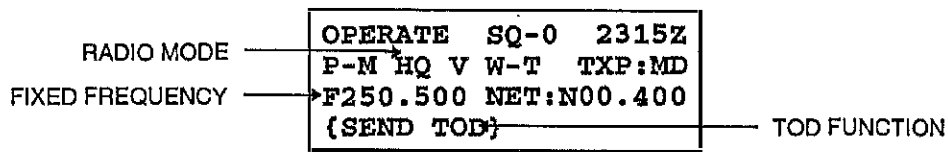
60.5 Contact the operator of the sending station.

- 60.6 Press the ENT key to start the TOD receive function.
- 60.7 The TOD receive function will remain active for a period of 1 min. On successfully receiving the TOD, the STATUS MSG screen opens with the message "TOD received."
- 60.8 Contact the operator of the sending station and confirm TOD receipt.
- 60.9 Press the ESC key to return to the OPERATE screen. Check that the WOD-TOD fields displays an upper case 'W'.

TOD send

61 To send the current TOD to another station, proceed as follows:

61.1 Check that the procedures detailed in Paras 42.1 to 42.3 have been carried out. The R/T unit OPERATE screen should be displayed.



- 61.2 Use the PREV and NEXT keys to move to the radio mode field. Use the < or > key to display HQ. Press the ENT key to set the R/T unit to fixed-frequency HQ mode at the frequency shown.
- 61.3 Use the PREV and NEXT keys to move to the fixed frequency field. Use the numeric, < and > keys to display the predetermined contact frequency. Press the ENT key to set the R/T unit to the contact frequency.
- 61.4 Contact the operators of the receiving stations.
- 61.5 Use the PREV and NEXT keys to move to the TOD function field. Use the > or < key to display SEND TOD. Press the ENT key to send the TOD.

HAVE QUICK emergency forced TOD manual entry**CAUTION:**

LIMITED COMMUNICATION. A forced TOD has a unique, arbitrary value and will not be synchronised with Zulu time (co-ordinated universal time). Once the TOD is manually forced on one station, the station will not communicate with a second radio station in HQ mode unless the unique TOD is transmitted to, and received by, the second station. The other second will, in turn, only be able to communicate in HQ mode with those stations which have also received the unique forced TOD.

62 Where no station has the current TOD, a single station may have the TOD value set manually (forced) for sending to all other stations in the local system.

HQ I forced TOD entry**CAUTION**

WOD ERASURE. When a forced TOD is entered, the HQ I WOD is erased. To communicate in HQ I mode, a valid WOD with the same date code as the forced TOD must be entered following forced TOD entry. If a valid WOD is not present when attempting HQ communications, an error message will be displayed.

63 To initiate HQ I operation where a GPS TOD is not available, proceed as follows:

63.1 From the MAIN MENU, use the 5 key or the NEXT and PREV keys to highlight option 5 - DATABASE. Press the ENT key to open the DATABASE menu.

DATABASE
1-HQ
2-XFER DATABASE
3-BEACON SETUP
4-TERM CONFIG
5-STATUS MSG

63.2 From the DATABASE menu, use the 1 key or the NEXT and PREV keys to highlight option 1 - HQ. Press the ENT key to open the HQ menu.

HQ
1-LOAD WOD
2-LOAD MWOD
3-LOAD FMT NET
4-FORCE TOD
5-ERASE MWODS

63.3 From the HQ menu, use the 4 key or the NEXT and PREV keys to highlight option 4 - FORCE TOD. Press the ENT key to open the FORCE TOD screen.

FORCE TOD
TODAY: 17

63.4 The screen opens with the TODAY field selected. Using the numeric, < and > keys, enter the desired TOD code.

63.5 Press the ENT key to force the TOD to the new value, erase any HQ I WOD where present, and open the STATUS MSG screen.

```

Status Msg 03 of 03
TOD received
                                01

```

63.6 Press the ESC key to confirm the message and return to the HQ menu.

NOTE

If a valid WOD was loaded prior to forcing the TOD, the WOD must be re-entered (Para 35).

63.7 Press the ESC key again twice to return to the MAIN MENU.

63.8 From the MAIN MENU, use the 1 key or the NEXT and PREV keys to select option 1 - OPERATE. Press the ENT key to open the OPERATE screen.

HQ II forced TOD entry

CAUTION

MWOD COMPATIBILITY. To communicate in HQ II mode, a valid MWOD with the same date code as the TOD must be present. If a valid MWOD is not present when attempting HQ communications, an error message will be displayed.

64 To initiate HQ II operation when a GPS TOD is not available, carry out the following procedures:

64.1 From the MAIN MENU, use the 5 key or the NEXT and PREV keys to highlight option 5 - DATABASE. Press the ENT key to open the DATABASE menu.

```

DATABASE
1-HQ
2-XFER DATABASE
3-BEACON SETUP
-----
4-TERM CONFIG
5-STATUS MSG
-----

```

64.2 From the DATABASE menu, use the 1 key or the NEXT and PREV keys to highlight option 1 - HQ. Press the ENT key to open the HQ menu.

```

HQ
1-LOAD WOD
2-LOAD MWOD
3-LOAD FMT NET
-----
4-FORCE TOD
5-ERASE MWODS
-----

```

64.3 From the HQ menu, use the 1 key or the NEXT and PREV keys to highlight option 2 - LOAD MWODS. Press the ENT key to open the LOAD MWOD screen.

DATE CODES →

LOAD MWOD 00,00,00,00,00,00 FILL: MANUAL 20-000.000
--

64.4 Note the date code of any MWOD. Press the ESC key to return to the HQ menu.

64.5 From the HQ menu, use the 4 key or the NEXT and PREV keys to highlight option 4 - FORCE TOD. Press the ENT key to open the FORCE TOD screen.

FORCE TOD TODAY: 17

64.6 The screen opens with the TODAY field selected. Using the numeric, < and > keys, enter the date code noted in Para 64.4.

64.7 Press the ENT key to force the TOD to the new date, erase any HQ I WOD where present, and open the STATUS MSG screen.

Status Msg 03 of 03 TOD received 01
--

64.8 Press the ESC key to confirm the message and return to the HQ menu. Press the ESC key again twice to return to the MAIN MENU.

64.9 From the MAIN MENU, use the 1 key or the NEXT and PREV keys to select option 1 - OPERATE. Press the ENT key to open the OPERATE screen.

Beacon operation

65 Carry out the following procedures to transmit the beacon signal as previously set up (Para 40).

65.1 Pull the R/T unit front panel mode switch and rotate it to the **BCN** position.

65.2 Beacon transmission is activated, with the beacon tone audible in the speaker. The BEACON screen opens, displaying the beacon transmit parameters.

BEACON TX-5 FM TXP:HI T250.000

NOTE

The beacon parameters can not be changed from the BEACON operation screen.

65.3 To stop beacon transmission, pull and rotate the mode switch to the ON position without stopping at the OFF position. This will not interrupt the operation of the radio.

CLOSING DOWN

66 To close down the UK/PRC 346 radio station, carry out one or more of the following procedures as required:

66.1 Where closing down at the end of a HAVE QUICK mission, check whether the current WOD/MWODS will be required again. Where they are no longer required, delete the WOD/MWODS from the R/T unit memory (Para 69).

66.2 Where closing down the SPGR independent GPS operation, check whether the current CVK will be required again. Where the CVK is no longer required, delete it from the SPGR memory (Annex A).

66.3 Where closing down for listening watch maintenance, set the R/T unit power management to Polling mode (Para 41).

66.4 Where closing down with the R/T unit in continuous power mode or where operation is not required for a period of time, power down the station (Para 67).

66.5 Where the manpack station is to be transported or temporarily stored, prepare it as required (Para 72).

Power down

67 On power down, the R/T unit retains the current operating parameters for restoration when next powered up.

NOTE

When the SPGR is used with the R/T unit powered off, the SPGR will draw power from its internal AA batteries.

68 To power down the station, proceed as follows:

68.1 To power down the SPGR, hold down the SPGR POWER button and press the ENTER button.

68.2 To power down the R/T unit, SPGR external supply and (where fitted) the ABR or RUL, set the R/T unit front panel mode switch to the OFF position.

[REDACTED]



UK RESTRICTED

Deleting the WOD/MWODS

69 At the end of a HAVE QUICK mission, delete the WOD/MWOD values from the R/T unit memory using either of the following facilities:

69.1 Erase MWOD screen (Para 70).

69.2 Zeroize function (Para 71).

Erase MWOD

70 To delete all WOD/MWODS using the ERASE MWOD screen, proceed as follows:

70.1 From the HQ menu, use the 5 key or the NEXT and ENT keys to select option 5 - ERASE MWODS. Press the ENT key to open the ERASE MWOD screen.

```
ERASE MWOD
ENTER TO CONFIRM
ESC TO EXIT
```

70.2 Press the ENT key to erase the WOD and MWODS and return to the HQ menu.

Zeroizing

71 To delete all HAVE QUICK WOD/MWODS using the Zeroize function, proceed as follows:

71.1 Pull and rotate the R/T unit mode switch to the **Z** position to start the zeroize operation and display the ZEROIZE screen.

```
ZEROIZE
MWODS: ZEROIZING
```

71.2 While the operation proceeds, the display shows ZEROIZING.

CAUTION

TIME DELAY. Ensure that the zeroize operation is completed before resetting the mode switch. If the switch is reset before completion, the MWODS may not be fully erased.

71.3 The zeroize operation takes approximately 5 seconds to complete. On completion the display shows "ZEROIZED."

```
ZEROIZE
MWODS: ZEROIZED

F2:GPS CVK:
```

71.4 Set the mode switch to the OFF position.

Manpack station - preparation for transport or temporary storage

72 To prepare the manpack station for transport or temporary storage, proceed as follows:

72.1 If required, erase the MWODS from the R/T unit memory (Para 69).

72.2 Check that the R/T unit mode switch is in the OFF position.

72.3 Disconnect the operational V/UHF battle antenna from the R/T unit ANT connector and secure it under the carry container antenna securing flap, alongside the spare antenna.

72.4 Secure the SPGR in the carry container SPGR pouch or external SPGR pouch as required.

72.5 Disconnect the audio gear from the R/T unit AUDIO connector. Secure the handset GP in the carry container handset pouch. Place the remaining audio gear inside the carry container or in the satchel GP as required.

72.6 Place the protective caps over the R/T unit exposed connectors.

72.7 Secure the carry container cover.

72.8 Deploy the carry container harness transit cover as follows:

72.8.1 Refer to Fig 15. Lay the carry container with the shoulder harness facing up. Open the transit cover storage pouch and pull out the harness transit cover. Undo the shoulder harness top tension straps.

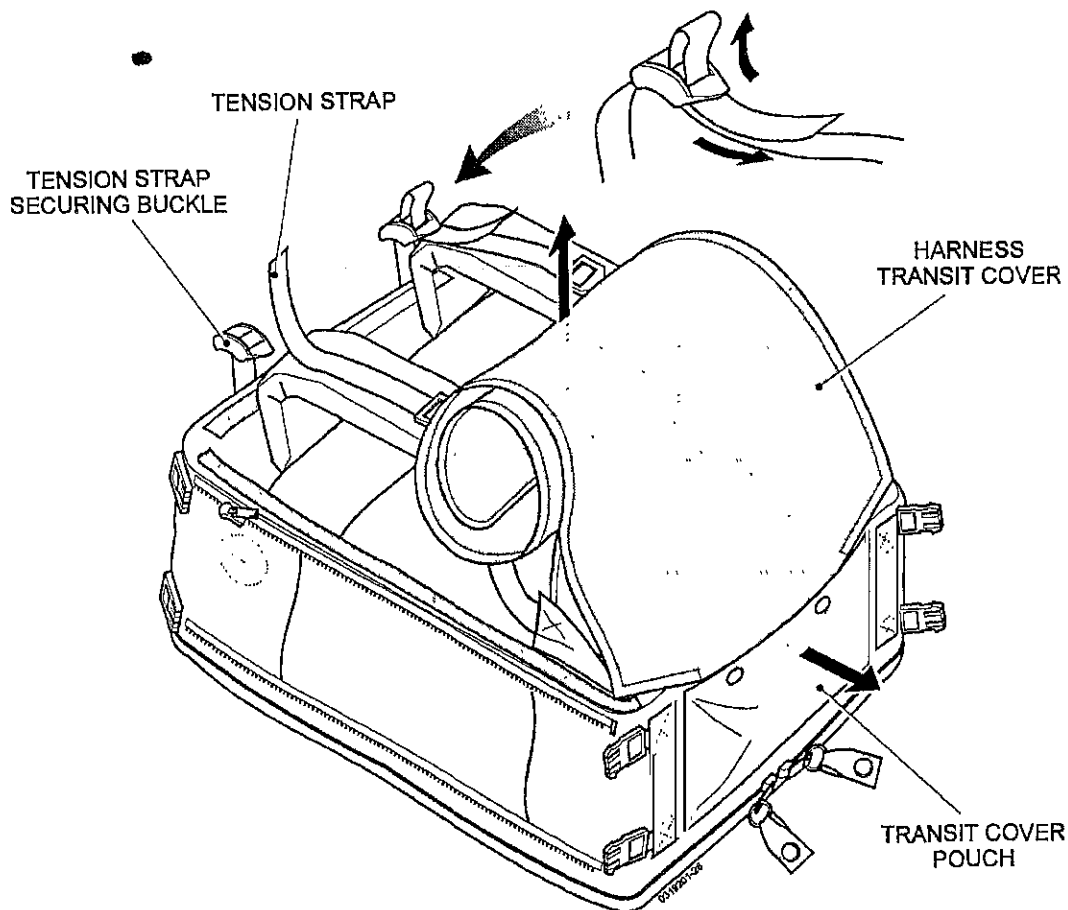


Fig 15 Manpack station - releasing the transit cover and tension straps

72.8.2 Refer to Fig 16. Lay the shoulder straps down the length of the carry container (Step 1) and fold the ends of the belt diagonally across the container as shown (Steps 2 and 3).

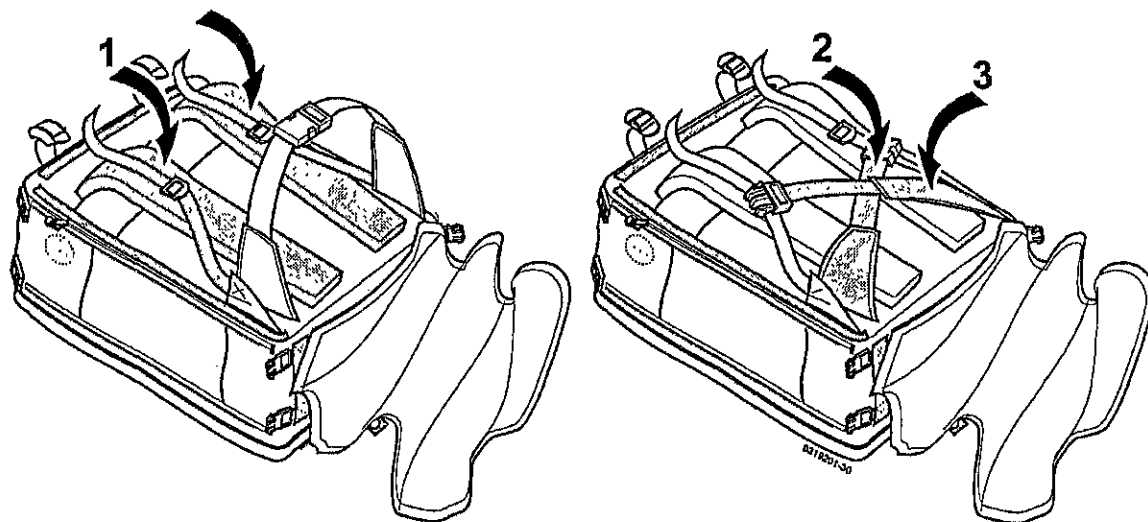


Fig 16 Manpack station - folding the harness

72.8.3 Refer to Fig 17. With one hand holding the harness in the folded position, use the other hand to draw the transit cover over the harness. Using the Velcro strips, secure the transit cover to the carry container.

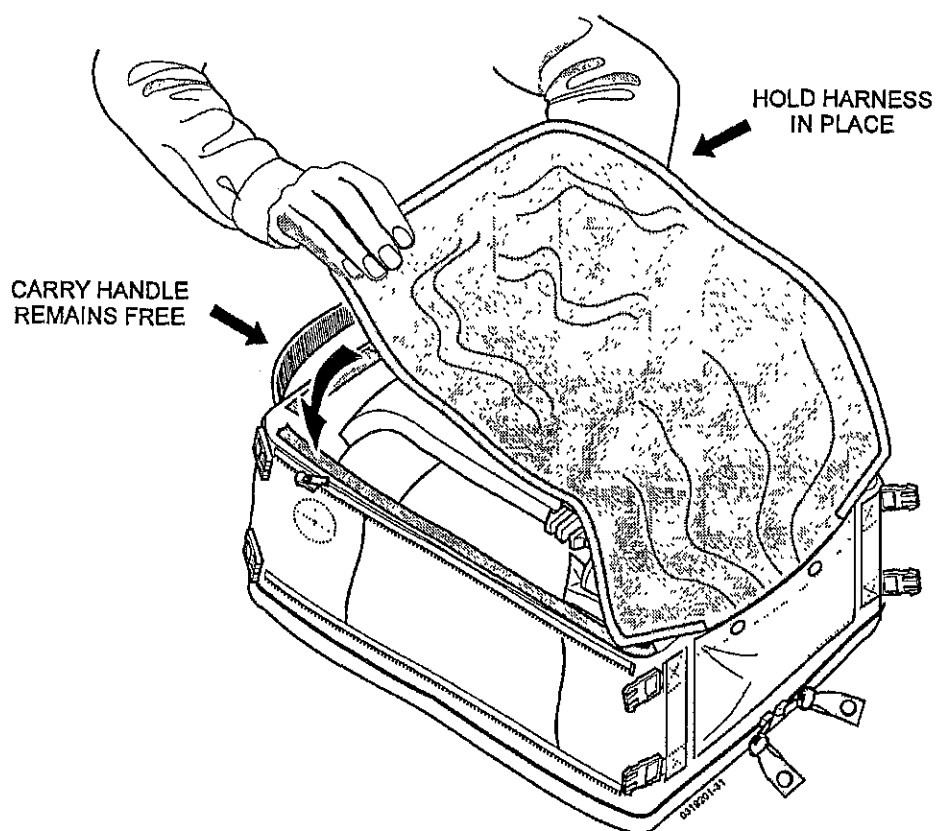


Fig 17 Manpack station - closing the transit cover

BATTERY CHARGING

73 Separate battery charging procedures are given for the manpack and vehicle mounted stations.

Manpack station (5 AH rechargeable)

74 The manpack station is issued with four 5 AH rechargeable batteries. Two may be placed on charge while the third is deployed on the R/T unit and the fourth stored in the carry container.

Battery removal/replacement

75 To remove the battery from the R/T unit, proceed as follows:

75.1 Check that the R/T unit front panel mode switch is set to the OFF position.

75.2 Unzip the lower half of the carry container cover to gain access to the battery.

75.3 Undo the battery retaining strap, undo the battery quick-release fasteners and remove the battery.

76 To replace the battery, proceed as follows:

76.1 Inspect the battery exterior and spring contacts for damage. If damaged, dispose of the battery according to local instructions and obtain a serviceable battery.

76.2 Check that the R/T unit front panel mode switch is set to the OFF position.

76.3 Carefully align the battery with the R/T unit rear panel terminals and adjacent locating lugs (Fig 18), and secure with the two quick-release fasteners.

76.4 Clip the battery retaining strap (Fig 7) to the spare battery pouch and tighten the strap. Secure the carry container cover back in place.

76.5 Check the battery voltage (Para 47).

Charging procedure

77 Battery charging is carried out using the Intelligent Battery Management System (IBMS). For further information on the IBMS, refer to AESP 6130-M-102. To charge the battery, proceed as follows:

77.1 Insert the battery onto an available IBMS tray slot.

77.2 Set the IBMS to the required charge rate and press the START switch.

Vehicle mounted manpack stations (4.5 AH rechargeable)

78 The vehicle station is provided with two 4.5 AH rechargeable batteries. In normal configuration the operational battery is continuously float charged via the vehicle DCCU and the second battery is retained as a spare. The spare can be charged offline when required.

Battery removal/replacement

79 To remove the battery from the R/T unit, proceed as follows:

79.1 Check that the R/T unit front panel mode switch is set to the OFF position.

79.2 Disconnect the battery charge connector from the battery.

79.3 Loosen the R/T unit rear right hand knurled knob securing the earth strap and disconnect the strap.

- 79.4 Loosen the mounting bracket R/T unit retaining clamps and withdraw the R/T unit from the mounting bracket.
- 79.5 Undo the R/T unit battery quick-release fasteners and remove the battery.
- 80 To replace the battery, proceed as follows:
- 80.1 Inspect the battery exterior and spring contacts for damage. If damaged, dispose of the battery according to local instructions and obtain a serviceable battery.
- 80.2 Check that the R/T unit front panel mode switch is set to the OFF position.
- 80.3 Carefully align the battery with the R/T unit rear panel terminals and adjacent locating lugs (Fig 18), and secure with the two quick-release fasteners.
- 80.4 Slide the R/T unit into position in the mounting bracket and secure in place.
- 80.5 Reconnect the R/T unit earth strap.
- 80.6 Reconnect the battery charge connector.
- 80.7 Check the battery voltage (Para 47).

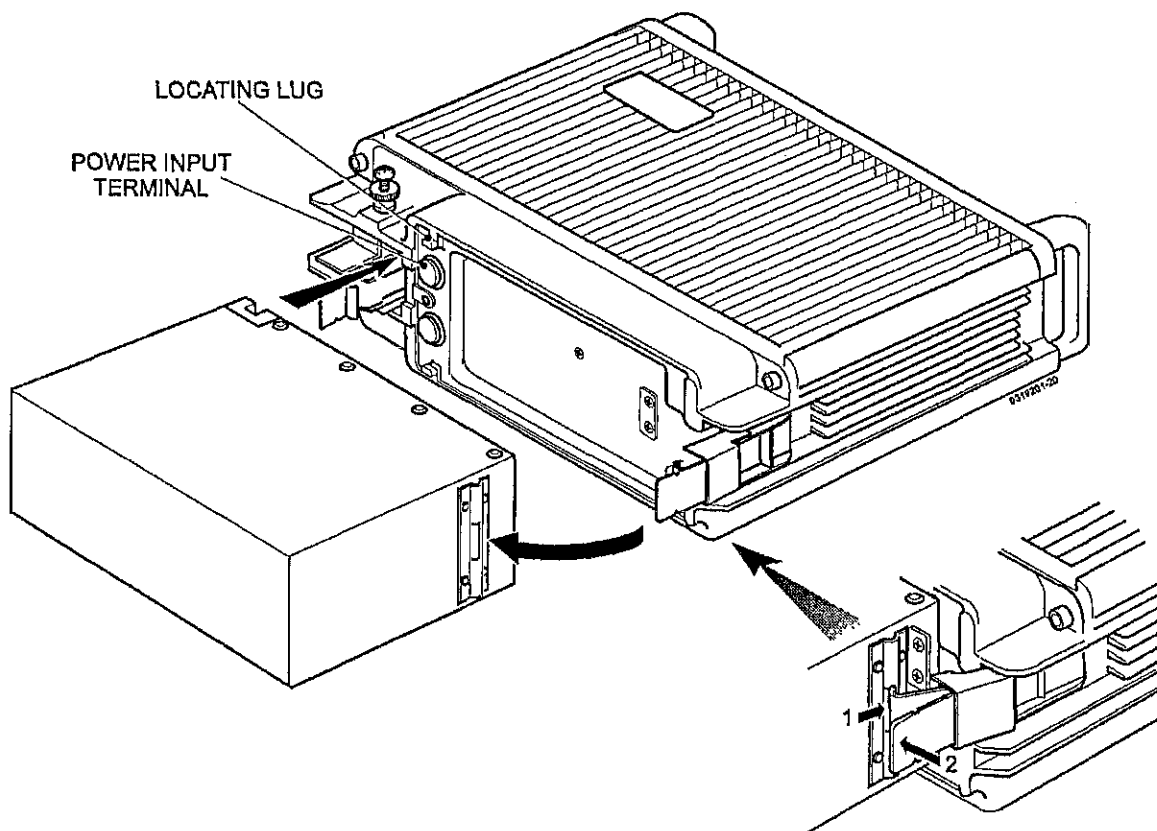


Fig 18 R/T unit battery replacement

Charging procedure

81 The R/T unit main battery is continuously float-charged while in situ and no operator action is required. The spare battery is charged using the vehicle Direct Current Charging Unit (DCCU). For further information on the DCCU, refer to Emer Telecommunications K 010. To recharge the spare battery, proceed as follows:

- 81.1 Connect the charge lead between the battery charge connector and the DCCU.
- 81.2 Power on the DCCU to illuminate the yellow charging lamp and initiate battery charging.
- 81.3 On successful charging of the battery, the DCCU green successful charge lamp illuminates.

REMOTE OPERATION

82 The remote operation kit may optionally be used with the manpack and TUL/TUM stations only.

Siting

83 The remote operation kit may be used from any distance up to 2,000 m from the R/T unit using an appropriate length of field wire. The D10 dispenser pack issued with the remote kit allows operation from any distance up to 800 m from the R/T unit.

Preparation for use

84 To prepare the remote operation kit for use, proceed as follows:

- 84.1 Install the remote operation kit on the manpack (Para 85) or TUL/TUM (Para 86) station.
- 84.2 Install the local operator audio gear as required (Para 87).
- 84.3 Install the field wire and remote handset (Para 88).

Manpack station installation

85 To install the remote operation kit on the manpack station, proceed as follows:

85.1 Refer to Fig 19. Disconnect the SPGR interface cable from the R/T unit AUX connector. Check that the carry container breakout box retaining strap and fastener are free.

85.2 Connect the breakout box to the R/T unit AUX connector and secure using the carry container breakout box retaining strap. Connect the SPGR interface cable to the breakout box aux through (34-way) fixed connector.

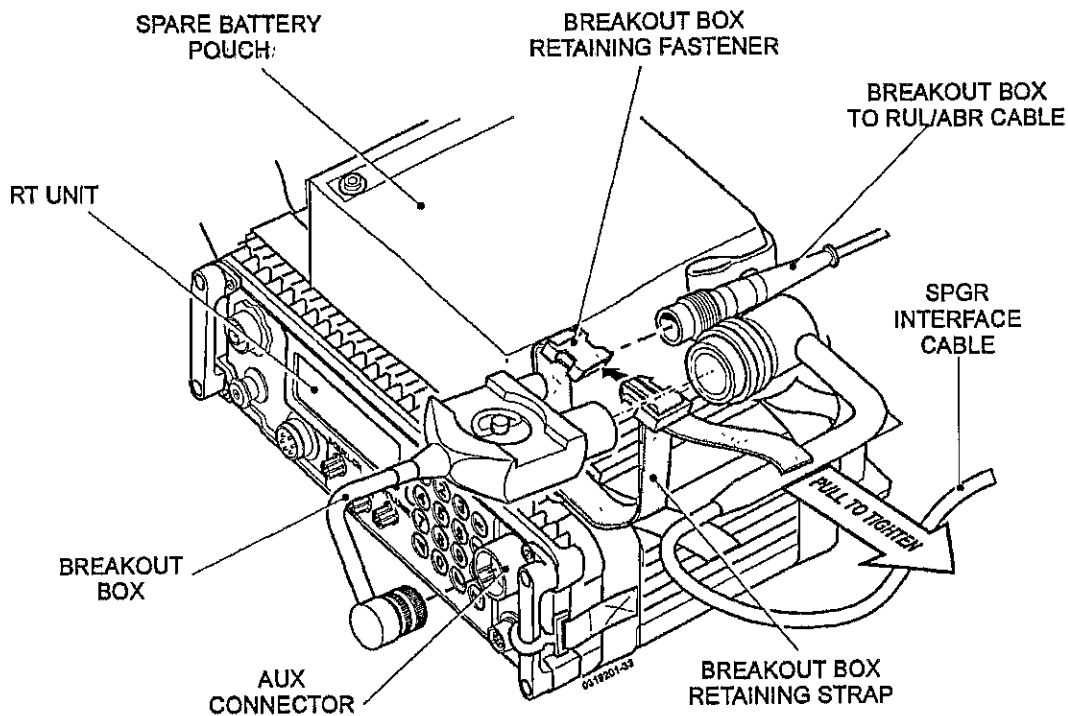


Fig 19 Breakout box installation - manpack station

NOTE

The breakout box to RUL/ABR cable connectors are similar in appearance to the audio gear connectors. However, they have a different keyway arrangement and the cable is not compatible with the R/T unit AUDIO connector.

85.3 Connect the breakout box to RUL/ABR cable between the breakout box audio breakout (7-way) connector (Fig 19).

85.4 Where the remote kit is to be operated with the carry container cover in the closed position, employ the lower left hand grommet as follows:

85.4.1 Refer to Fig 20. Using a knife, from inside the carry container insert the knife into each slit in turn in the lower left hand grommet and carefully cut through the container wall to open up the grommet.

85.4.2 Pass the unconnected end of the breakout box to RUL cable through the grommet, leaving enough slack to secure the cable under the left hand cable retaining flap.

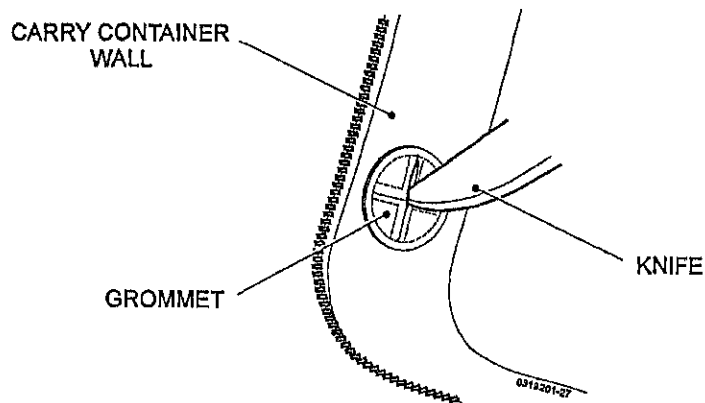


Fig 20 Carry container lower left hand grommet - opening up

85.5 Refer to Fig 21. Connect the breakout box to RUL/ABR cable to the RUL RADIO connector.

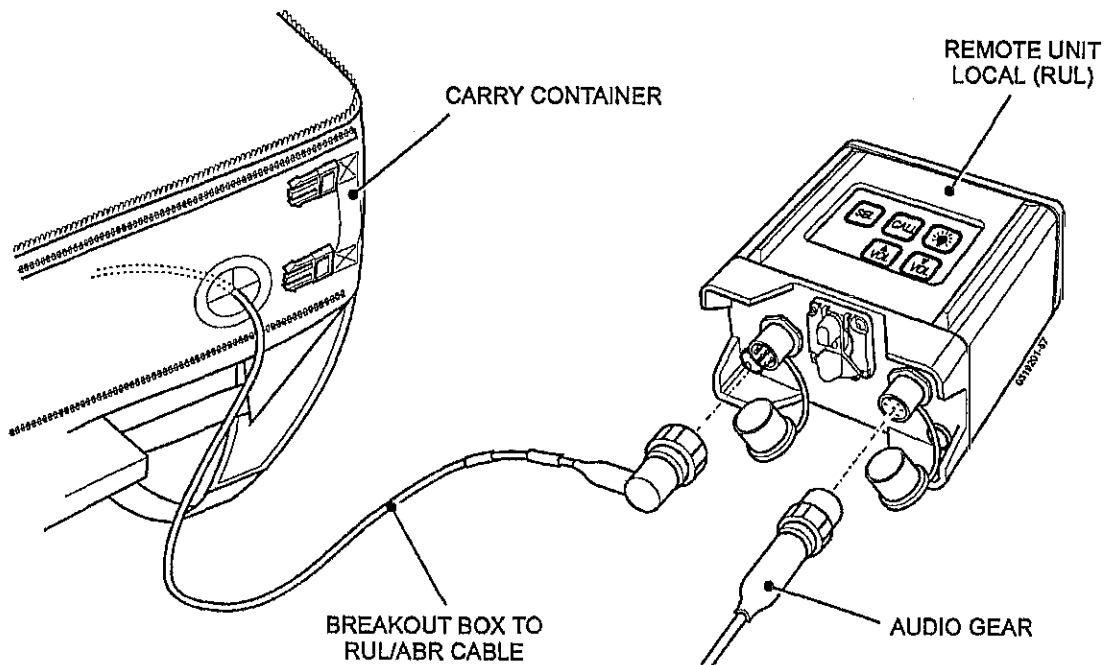


Fig 21 RUL connection - manpack station

TUL/TUM vehicle station installation

86 To install the remote operation kit on the TUL/TUM station, proceed as follows:

86.1 Refer to Fig 22. Disconnect the SPGR interface cable from the R/T unit AUX connector. Connect the breakout box to the R/T unit AUX connector and secure to the vehicle bracket breakout box mounting hole using the breakout box twist fastener. Connect the SPGR interface cable to the breakout box aux through (37-way) fixed connector.

86.2 Refer to Fig 22. Loosen the vehicle RUL securing knob. Locate the RUL on the vehicle RUL mounting bracket and tighten the securing knob.

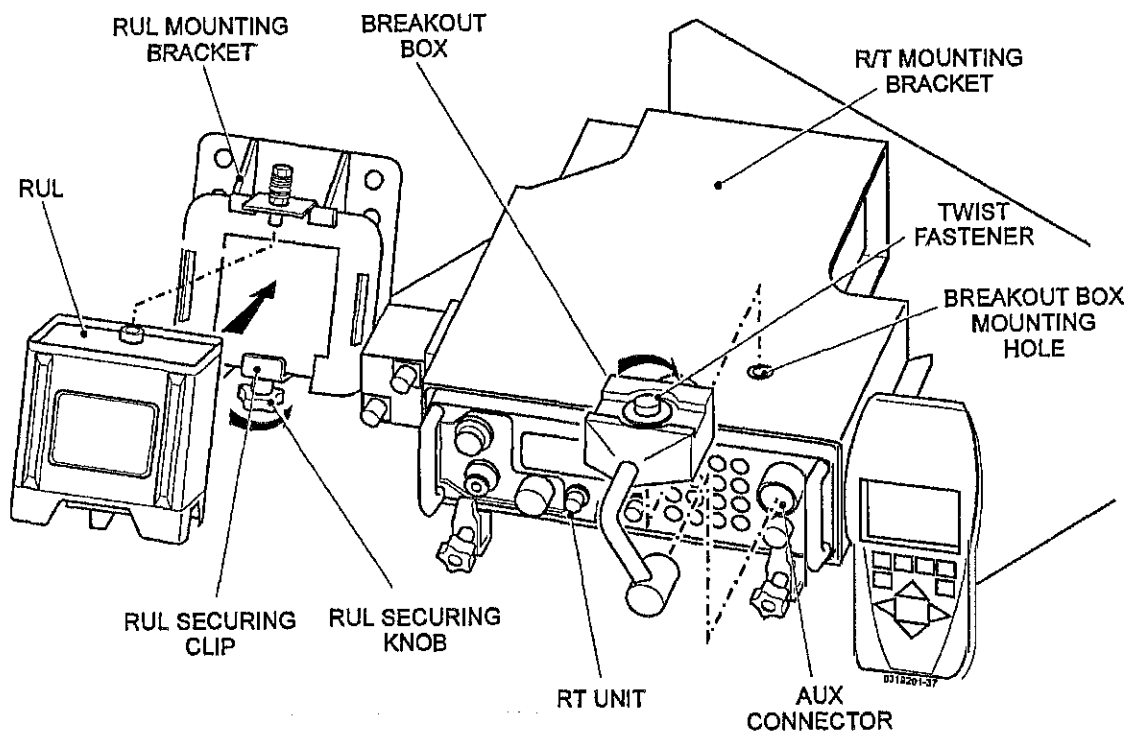


Fig 22 Breakout box and RUL installation - TUL/TUM mounted manpack station

NOTE

The breakout box to RUL/ABR cable connectors are similar in appearance to the audio gear connectors. However, they have a different keyway arrangement and the cable is not compatible with the R/T unit AUDIO connector.

86.3 Refer to Fig 23. Connect the breakout box to RUL/ABR cable to the breakout box audio breakout (7-way) fixed connector. Connect the cable to the RUL mating connector.

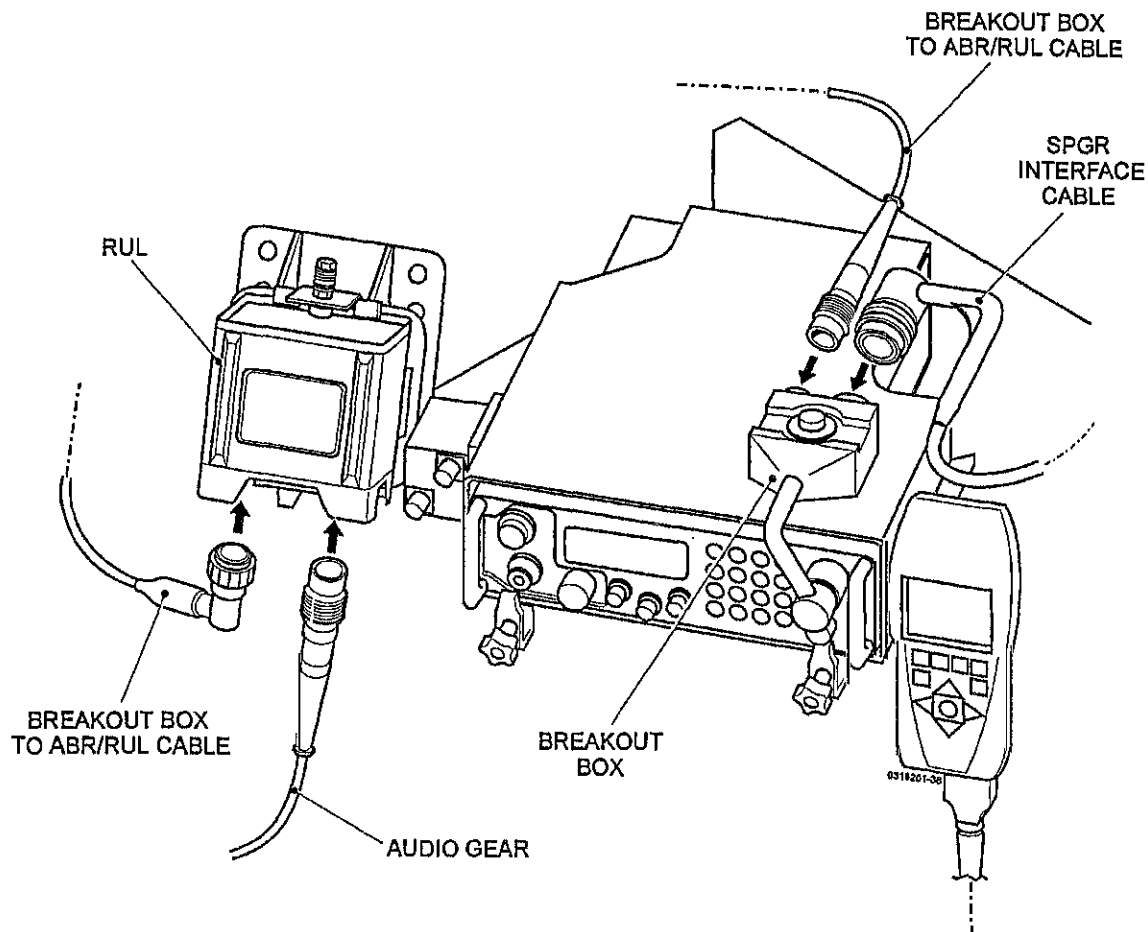


Fig 23 Remote kit cable installation - TUL/TUM mounted manpack station

Local operator audio gear installation

87 To install the local R/T unit operator audio gear for correct RUL operation, proceed as follows:

87.1 Disconnect the audio gear from the R/T unit AUDIO connector. Replace the R/T unit AUDIO connector cover.

87.2 Connect the desired audio gear to the RUL mating connector.

D10 field wire and remote handset installation

88 To install the D10 field wire and remote handset, proceed as follows:

88.1 Connect the remote handset to the field wire outer end.

88.2 Connect the D10 field wire inner end to the RUL field wire connector (Fig 24).

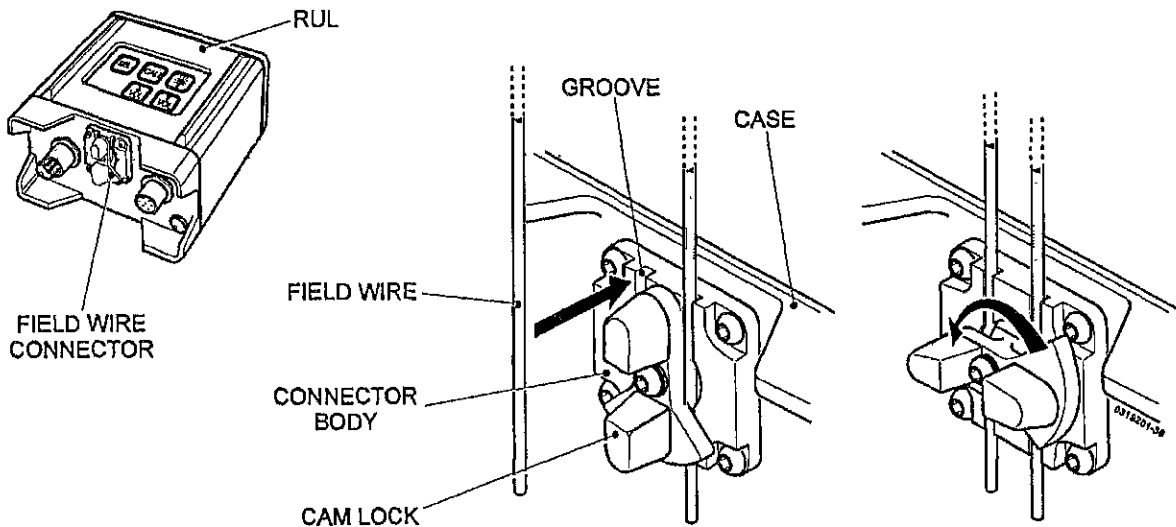


Fig 24 Field wire connection to RUL

88.3 Set the R/T unit mode switch to the ON position to apply power to the RUL.

88.4 Observe the RUL FLT indicator and listen in the audio gear earpiece. If the FLT indicator lamp illuminates and a tone is heard in the earpiece, exchange the two field wires at the RUL connector.

88.5 Return the R/T unit mode switch to the OFF position.

88.6 Deploy the D10 field wire as required, to any distance up to the wire length available, but not more than 2,000 M.

Operation

NOTE

The RUL auto rebroadcast and break-in modes are not detailed here. Use of these modes is similar to the equivalent use of the ABR and IB2 combination as described in Annex B to this chapter.

89 To select the desired operating mode, press the RUL SEL button until the desired mode is indicated. To operate the radio in the selected mode, refer to the appropriate subsection below.

Local mode

90 The local operator has pressel control of the radio. The remote operator can CALL the local operator to generate an audio tone in the local operator earpiece and illuminate the RUL CALL legend.

Remote mode

91 Remote mode provides the following operator facilities:

91.1 Both local and remote operators can monitor Rx traffic, and Tx using the pressel switch.

91.2 The local operator can initiate the call function (Para 93).

91.3 The remote operator can CALL the local operator, as in local mode.

Intercom mode

92 The R/T does not transmit. The following operator facilities are provided:

92.1 The local operator monitors Rx traffic.

92.2 Either operator can speak to the other using the pressel switch. The local operator continues to hear the Rx traffic at a reduced level.

Call function

93 The local operator can send a call tone to the remote RUL operator and automatically select intercom mode. To initiate the procedure, press the CALL button.

Manpack station remote kit - preparation for transport or temporary storage.

94 For the RUL and associated cables, two options are available as follows:

94.1 Disconnect the remote operation kit and stow the RUL and cables in the satchel GP supplied.

94.2 Disconnect the field wire from the RUL. With the RUL connected to the manpack station and/or to the local audio gear as required, stow the RUL in the manpack carry container as shown in Fig 25.

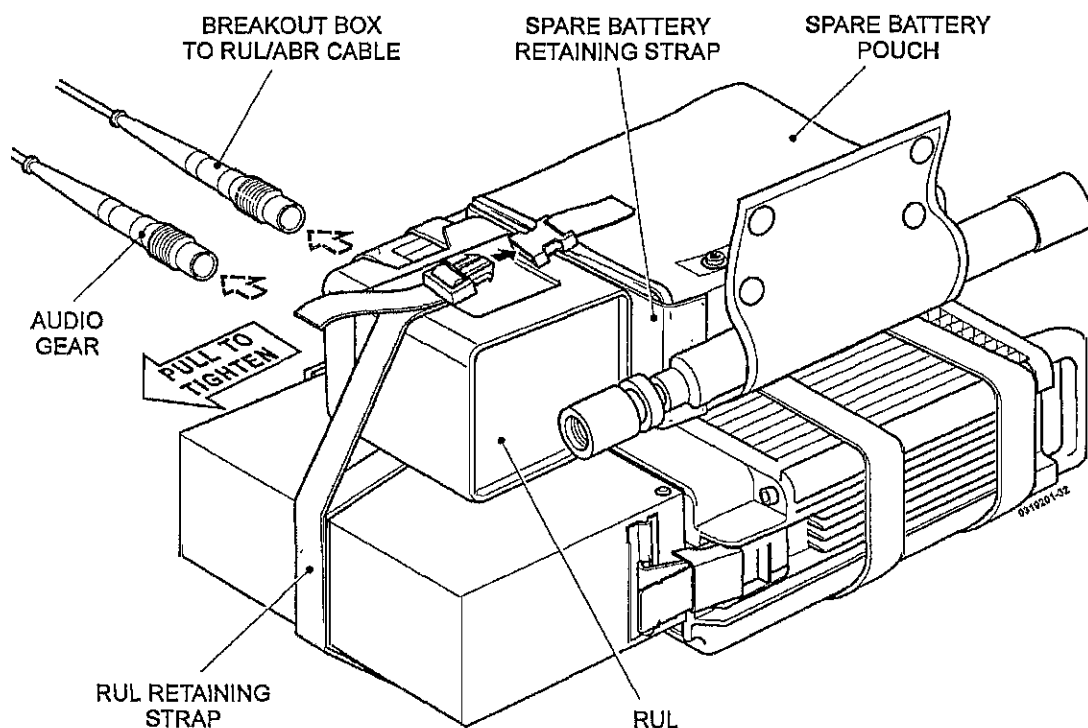


Fig 25 RUL storage in the manpack carry container

MAST MOUNTED ANTENNA SYSTEMS - DEPLOYMENT

95 The TacGA elevated antenna system comprises a set of equipment items and kits from which the equipment required for a given option is selected.

96 The options provided and the equipment required for each option are as follows:

96.1 Manpack station 5.4 m high system: V/UHF battle antenna (supplied with the station), battle antenna adaptor, ground plane, 5.4 m antenna mast kit and 15 m RF cable.

96.2 Vehicle station 8 m high system: Elevated antenna, ground plane, 8 m antenna mast kit and 30 m RF cable.

Siting

97 When selecting a site the following considerations should be taken into account:

97.1 The antenna and ground plane should be sited as far as possible from screening obstacles, especially from obstacles containing conductive materials such as metalwork.

97.2 With some loss of performance, the TacGA ground plane can be sited adjacent to non-conductive obstacles such as tree branches or brickwork. On withdrawal, the ground plane arms can fold upwards to allow clearance of obstacles and prevent snagging.

Manpack station 5.4 m antenna mast deployment

98 To deploy the 5.4 m mast mounted antenna on the manpack station, proceed as follows:

98.1 Assemble the 5.4 m antenna mast in the lowered position as follows:

98.1.1 Remove all mast items from the case.

98.1.2 Fit together the first three mast sections.

98.1.3 Fit one of the two guy plates over the third mast section (Fig 26) and then add the remaining three mast sections.

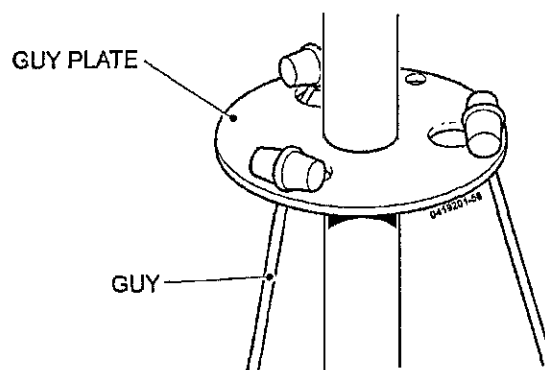


Fig 26 5.4 m mast guy plate deployment

98.2 Refer to Fig 27 and assemble the ground plane, battle antenna adaptor, V/UHF battle antenna and 15 m RF cable to the mast as follows:

98.2.1 Assemble the ground plane by screwing the six arms into the six pivot mounts located around the rim of the hub.

98.2.2 Slide the battle antenna adaptor onto the hub spigot and secure in place.

98.2.3 Connect the battle antenna to the adaptor and tighten the antenna connector securing ring.

98.2.4 Align the battle antenna vertically with respect to the ground plane and tighten the antenna locking ring.

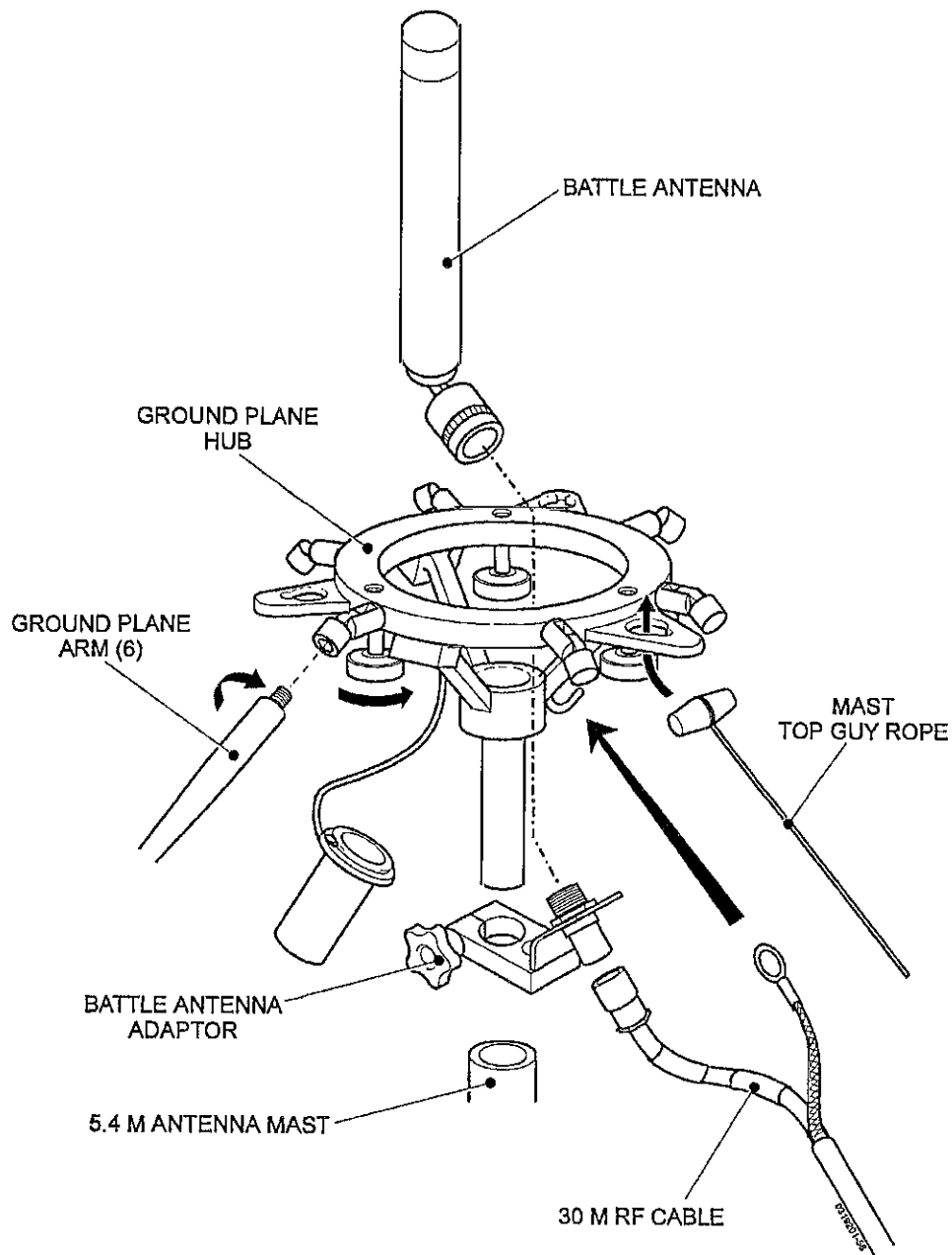


Fig 27 Manpack station ground plane assembly - deployment

98.2.5 Insert the hub spigot into the top of the mast.

98.2.6 Pass the 15 m RF cable strain-relief loop over the hook on the ground plane hub and connect the cable to the battle antenna adaptor.

98.2.7 Remove three of the guys from the storage formers and pass the guy toggles through the ground plane hub eyelets. Locate the toggles so that they will not pull back through the eyelets when the guys are under tension.

98.3 Remove the remaining three guys from the storage formers and pass the guy toggles through the guy plate eyelets (Fig 26). Locate the toggles so that they will not pull back through the eyelets when the guys are under tension.

98.4 Refer to Fig 28 and erect the mast as follows:

98.4.1 Drive into the ground three of the stakes, equally spaced around a circle of 6 m diameter. Where the ground is soft, dig holes for the stakes and embed them to a depth sufficient to withstand the tension of the guys.

98.4.2 Place the reinforced lid of the case in the centre of the circle. Stand the mast base on the lid and attach the loop at the end of the upper and lower guy of each pair to the hook on each of the stakes. Tighten the guys to maintain the mast in an upright position.

98.5 Ensure that any unused mast equipment items are stored in a safe place.

98.6 Insert the RF cable through the carry container upper right hand grommet (Chap 1 Fig 7) and connect it up to the R/T unit ANT connector.

5.4 m antenna mast equipment items

99 The 5.4 m antenna mast comprises the equipment items detailed in Table 3.

TABLE 1 5.4 M ANTENNA MAST EQUIPMENT ITEMS

Serial (1)	Service description (2)	Common name (3)	Nato stock number (4)	Quantity (5)
1	Mast section assembly	Section	5820-99-621-9017	6
2	Guy assembly	Guy	5820-99-621-9018	6
3	Stake, peg assembly	Stake	4030-99-621-9019	5
4	Adaptor, mast assembly	Adaptor	5820-99-621-9020	1
5	Plate, guy	Guy plate	5820-99-621-9021	2
6	Former	Former	5820-99-621-9022	3
7	Plate, tie	Tie plate	5820-99-621-9023	1
8	Case, mast	Mast case	5820-99-621-9024	1

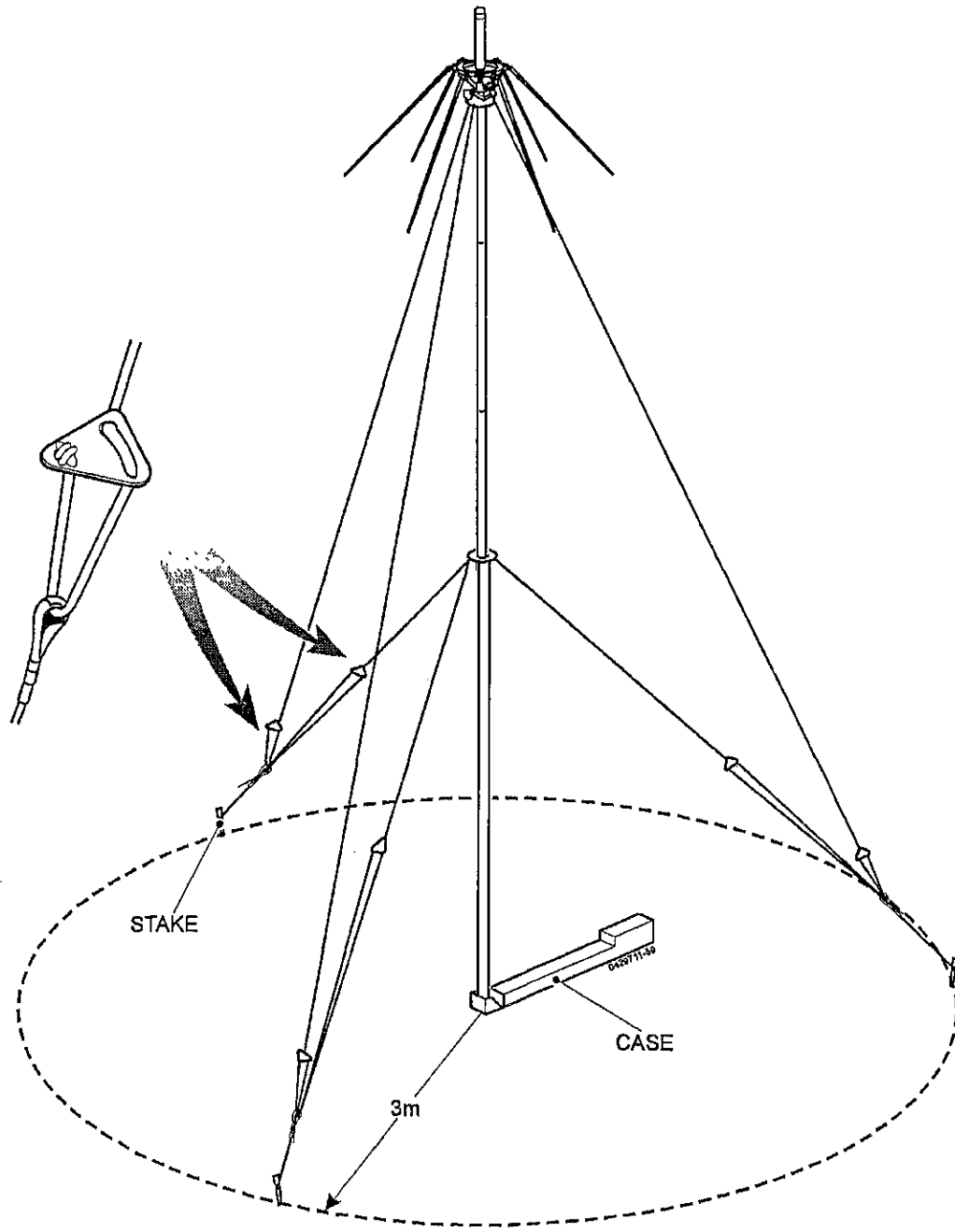


Fig 28 5.4 m mast erection

Vehicle station 8 m mast elevated antenna deployment

100 To deploy the 8 m mast elevated antenna on the vehicle mounted manpack station, proceed as follows:

100.1 Assemble the 8 m antenna mast in the lowered position.

100.2 Refer to Fig 29 and assemble the ground plane, mast antenna and 30 m RF cable to the mast as follows:

100.2.1 Assemble the ground plane by screwing the six arms into the six pivot mounts located around the rim of the hub.

100.2.2 Place the spigot adaptor over the hub spigot and locate the ground plane assembly in the top of the 8 m mast.

100.2.3 Secure the elevated antenna to the upper face of the ground plane hub using the three captive screws.

100.2.4 Pass the 30 m RF cable strain-relief loop over the hook on the ground plane hub and connect the cable to the base of the antenna.

100.3 Raise the mast to the desired height.

100.4 Connect the RF cable to the vehicle elevated antenna coaxial outlet as follows:

100.4.1 TUL/TUM vehicle: The elevated antenna coaxial outlet is located on the vehicle antenna support bracket.

100.4.2 Wolf vehicle: The elevated antenna coaxial outlet is located on the vehicle antenna support bracket.

100.4.3 BV206 vehicle: The elevated antenna coaxial outlet is located on the vehicle antenna support bracket.

100.4.4 ASV436 vehicle: The elevated antenna armoured coaxial outlet is located on the right hand side of the vehicle antenna armoured mount.

100.5 Disconnect the R/T unit antenna input cable from the filter box VEH connector and reconnect it to the filter box ELEV connector.

Shutting downLowering the ground plane

101 The ground plane arms are pivoted to allow upward and inward movement. When lowering the mast assembly in an obstructed location, no special precautions need be taken to avoid snagging the ground plane: the arms will fold upwards and inwards to allow clearance of obstacles.

Reconnecting the vehicle antenna

102 Disconnect the R/T unit antenna input cable from the filter box ELEV connector and reconnect it to the filter box VEH connector.

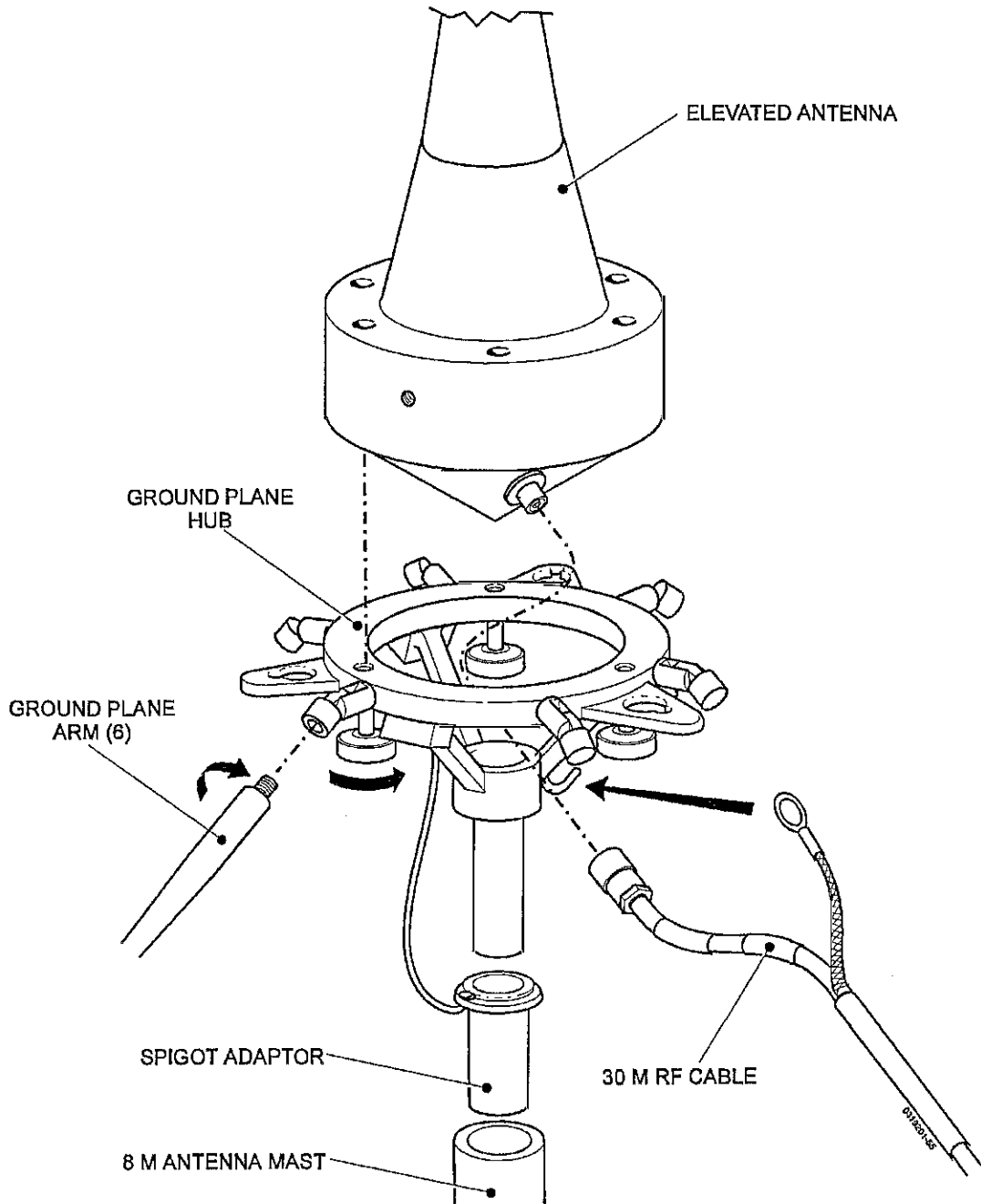


Fig 29 Vehicle station 8 m elevated antenna deployment

Manpack station 5.4 m elevated mast

103 Ensure that the following actions are carried out:

- 103.1 Wind the six guys neatly on the three storage formers.
- 103.2 Remove the three stakes from the ground and clean off all soil remnants.
- 103.3 Replace the V/UHF battle antenna on the manpack station.

NBC RESPIRATOR MICROPHONE INSTALLATION

104 To install the respirator microphone for use with an NBC respirator proceed as follows:

- 104.1 Connect the headset BV&I with pressel box to the radio station.
- 104.2 Install the adaptor ring and respirator microphone onto the S10 mask.
- 104.3 Connect the respirator microphone to the headset right hand earpiece mic connector.



ANNEX A

SPGR CVK FILL PROCEDURES



[REDACTED]

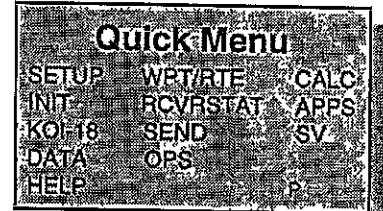


[REDACTED]

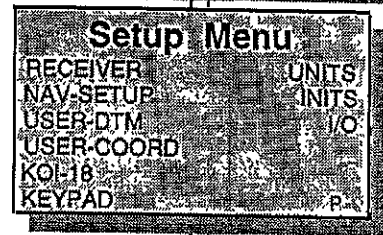
1. **General:** To provide Military personnel with more accurate information, supplied by Military Satellites, the SPGR can be loaded with a Crypto Key which permits access to this information.
2. Prior to loading the Crypto Key, the SPGR must be configured to interface with in-service Crypto equipment.
3. **SPGR Port Configuration:** Crypto loading is carried out on COM port C (Indicated by one 'Pimple'). All Port configuration is carried out in the "I/O" menu (input/output).

With the SPGR switched ON and set to the Main Navigation screen, press the following buttons to step to the Input/output (I/O) menu:

Menu/Page button (to access Quick Menu option).
Using the arrow keys, move to and highlight 'SETUP' - press ENTER to confirm.

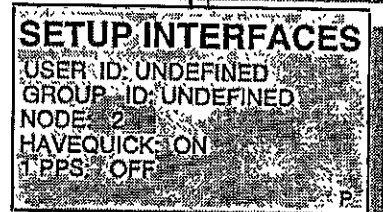


Again using the arrow keys, move and highlight 'I/O' - press ENTER to confirm.

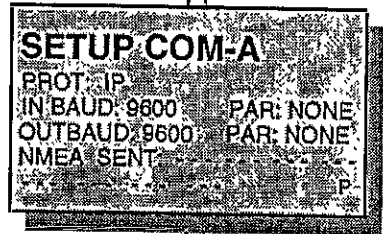


You should now be at the 'SETUP INTERFACES' Menu.

Press 'PAGE' button to step to Page 2 of the I/O Setup.

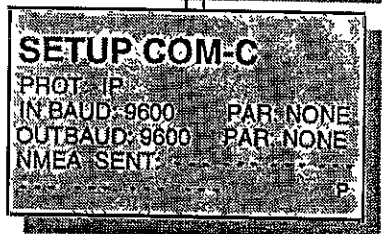


You should now have the 'SETUP COM-A' screen. As stated previously, COM C is used to load Cryptographic KEYMAT. We must now SETUP this Port. With "COM-A" highlighted, press ENTER once to enter edit mode. Using the Up/Down arrow keys will now toggle this field through COM A, B and C. Select COM-C and press ENTER to confirm. Using the arrow keys will now allow you to move to the relevant fields within COM-C for editing.

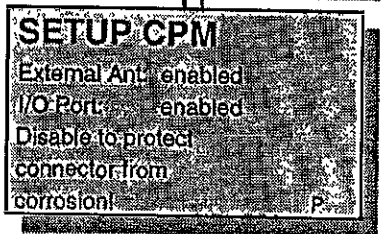


To edit each field, press ENTER once, the Up/Down arrow keys will now change the selection in this field. To select and store the changed information, press ENTER once more. You can now change the information for COM-C to the following:

PROT: IP - (Instrumentation)
IN BAUD: 9600 PAR: NONE
OUT BAUD: 9600 PAR: NONE
NMEA SENT: No entry required



Press 'PAGE' button to step to Page 3 of the I/O Setup. You should now have the 'SETUP CPM' screen (Corrosion Protection Mode). The SPGRs remote antenna and serial ports may be turned off to protect the connectors from corrosion.



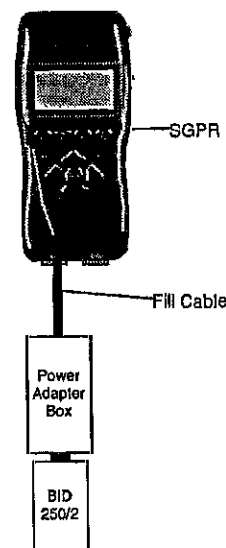
THE I/O PORT MUST BE ENABLED TO ALLOW A SUCCESSFUL FILL.

If being used in the Manpack role, the External Antenna should be disabled.

4. **SPGR Fill Set-up:** To permit the BID250/2 to be used as a stand alone item, it is necessary to supply the unit with power. For this purpose, a Power Adapter Box is supplied and is connected between the SPGR and BID250/2.

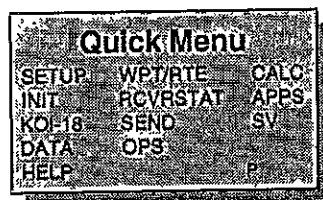
5. Once the SPGR Port has been configured and the Crypto equipment has been connected as shown, the SPGR can be Filled with KEYMAT.

6. Because the SPGR is an American equipment, the SPGR Menus make reference to the American Military Crypto equipment KOI-18. This equipment is similar to the BID250/2 in all aspects, except that the BID250/2 is not powered. You should therefore read BID250/2 every time you see KOI-18.

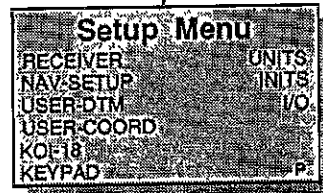


7. **SPGR Fill Procedure:** Use the following procedure to load Crypto into the SPGR from the BID250/2:

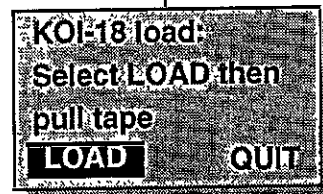
From the Main Navigation Screen, press 'Menu/Page'
Using the arrow keys, highlight 'KOI-18'
Press ENTER to confirm. The KOI-18 load screen is now displayed.



The KOI-18 load screen can also be accessed by going to the Setup Menu and selecting the KOI-18 option.



Which ever method you select, the KOI-18 load screen will be displayed. Using the arrow keys, highlight the 'LOAD' option. Prepare your SPGR KEYMAT. to pull through the BID250/2. Press the 'FILL' button on the Power Adapter Box, ensuring the LED is illuminated. Press the ENTER button on the SPGR to initiate the LOAD. Pull the SPGR KEYMAT tape through the BID250/2.



The SPGR will display a confirmation message:

KEY LOADED



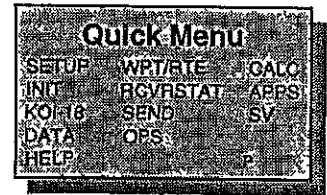
If not check all connections and KEYMAT orientation - TRY AGAIN!

When returning to the Main Navigation Screen, you will now see a small KEY in the top Right corner. This is to remind the user that the SPGR has a valid KEY loaded and should be handled in accordance with procedures published by the relevant Authority.

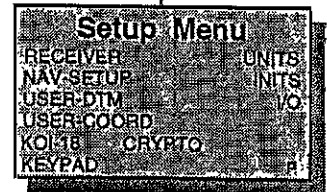


8. **Crypto Zeroize:** To Erase the KEYMAT from the SPGR memory, carry out the following steps:

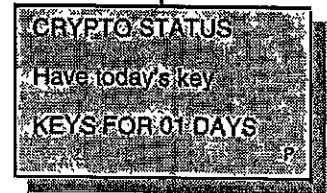
Menu/Page button (to access Quick Menu option). Using the arrow keys, move to and highlight 'SETUP' - press ENTER to confirm.



When there is Crypto loaded in the SPGR, a new menu option is available "CRYPTO" In the Setup Menu, use the arrow keys to move to and highlight 'CRYPTO' - press ENTER to confirm.



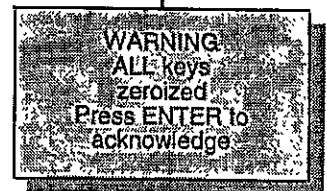
You should now be at the 'CRYPTO STATUS' Menu. Press 'PAGE' button to step to the "CRYPTO ZEROIZE" page.



Using the arrow keys, move to and highlight the "ACTIVATE" option. Press ENTER to confirm and erase ALL KEYMAT.



The SPGR will appear to reset itself and a warning screen will declare that ALL keys are Zeroized. Press ENTER to acknowledge.



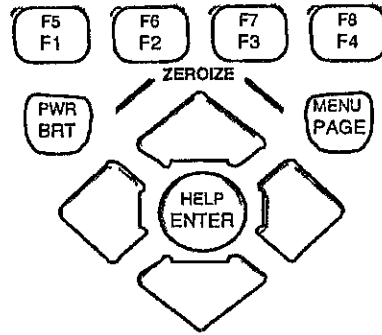
When returning to the Main Navigation Screen, you will now see that the small KEY is no longer in the top Right corner, signifying that ALL KEYMAT has been erased.



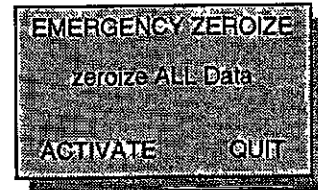
9. **Emergency Zeroize:** To Emergency erase the KEYMAT from the SPGR memory, carry out the following steps - WARNING: This will also erase ALL stored positional data!

Moulded into the case of the SPGR, under the Function keys, you will see the word - 'ZEROIZE' and two lines pointing to the PWR/BRT & MENU/PAGE buttons.

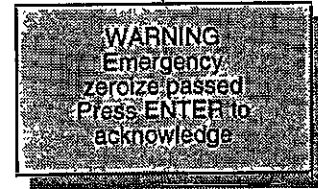
Pressing these two buttons at the same time will ZEROIZE the SPGR.



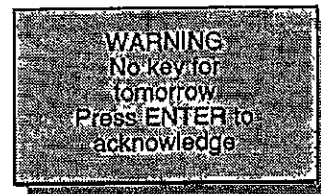
A message will be displayed requesting that you Activate or Quit ZEROIZATION. Select ACTIVATE to continue



When successful, you will see the message: WARNING, Emergency Zeroize Passed, Press ENTER to acknowledge



10. **Other Crypto Warnings:** After a Crypto Key load is attempted, warnings that may occur are shown:





ANNEX B

**AUTO REBROADCAST AND BREAK-IN OPERATION
MOUNTED MANPACK STATIONS WITH ABR**

CONTENTS

Para

- 1 Introduction
- 2 Auto rebroadcast
- 4 Break in



[REDACTED]



[REDACTED]

INTRODUCTION

1 The auto rebroadcast and break in functions using the mounted manpack and ABR require that the vehicle is provided with the following equipment:

- 1.1 The clansman radio control harness (CRCH) is fitted with the control box type IB2.
- 1.2 A second, onboard VHF radio is available to the CRCH.

AUTO REBROADCAST

2 To carry out the automatic rebroadcast by the UK/PRC 346 station of an incoming signal received by a second, in harness radio from a third, offboard radio, proceed as follows:

- 2.1 Ensure a headset is connected to the operators connector on the IB2.
- 2.2 Set up the second, in harness (VHF) radio and establish a link with the third, offboard radio.
- 2.3 Configure the IB2 to AUTO and for LOCAL REBROADCAST.
- 2.4 Adjust the second, in harness radio for auto rebro as necessary.
- 2.5 Set the ABR traffic mode switch to the AUTO position.
- 2.6 Solicit an inbound signal from the third, offboard radio.
- 2.7 Check that the ABR TX (red) lamp illuminates and the UK/RT 346 display shows TX. This indicates that the incoming signal is being received by the second radio and forwarded to the IB2 and ABR.

3 To carry out automatic rebroadcast in the reverse direction, ie to a third, offboard radio by a second, in harness radio of an incoming signal received by the UK/PRC 346 station, proceed as follows:

- 3.1 Carry out steps 2.1 to 2.5 as above.
- 3.2 Set the UK/PRC 346 radio to receive the required signal. Solicit a signal compatible with the selected UK/RT 346 mode, or if no signal is available on the required channel the link can be set up and checked by unsquelching the UK/RT 346.
- 3.3 Check that the UK/RT 346 display shows RX and the ABR RX (yellow) lamp illuminates. Where practicable, check that the second station has a sidetone signal present in an attached handset. Check that the third, offboard station is receiving the rebroadcast signal.

3.4 To pause or terminate the rebroadcast activity, squelch the UK/RT 346.

4 On completing rebroadcast operations, proceed as follows:

- 4.1 Reset the ABR traffic mode switch to the NORMAL position.
- 4.2 Reset the IB2 to NORMAL.
- 4.3 Power off the radios and harness as required.

BREAK IN

5 To carry out simultaneous break-in operation from two onboard radios, proceed as follows:

- 5.1 Set the ABR traffic mode switch to the AUTO position.
- 5.2 Configure the second, in harness radio to AUTO.
- 5.3 Set the IB2 to MANUAL - BREAK IN.

NOTE

For break in operation use a headset and pressel box. Do not use the handset GP.

- 5.4 Connect the break-in operator's headset to IB2.
- 5.5 Check that incoming traffic on each of the two radios is audible in the break-in operator's left and right earpieces respectively.
- 5.6 Press the break-in operator's pressel switch and speak into the mic. Check that the ABR TX lamp illuminates and sidetone is present in both radio set earpieces.

6 On completion of break in operation, proceed as follows:

- 6.1 Reset the ABR traffic mode switch to the NORMAL position.
- 6.2 Reset the IB2 to NORMAL.
- 6.3 Power off the radios and harness as required.



ANNEX C

EXTERNAL SPGR POUCH

CONTENTS

Para		Page
1	External SPGR pouch	
Fig		Page
1	External SPGR pouch	1/2



[REDACTED]



[REDACTED]

EXTERNAL SPGR POUCH

- 1 The external SPGR pouch (Fig 1) can be strapped to the operator's chest harness webbing to provide a hands-free view of the SPGR display when operated independently from the radio station.
- 2 To install the SPGR in the pouch, open the securing strap, insert the SPGR and close the flap.
- 3 To secure the SPGR when not in use, secure the pouch in the closed position.

NOTE

The SPGR cannot be connected to the UK/PRC 346 station when installed in the external SPGR pouch.

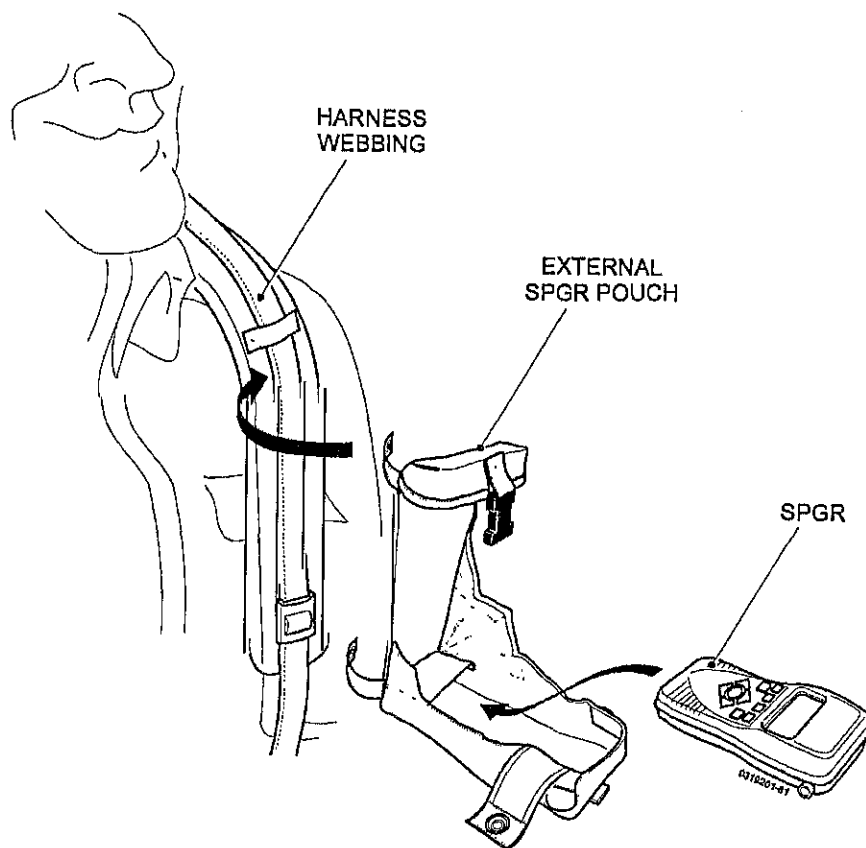


Fig 1 External SPGR pouch

[REDACTED]



[REDACTED]

CHAPTER 4
OPERATOR MAINTENANCE
CONTENTS

Para

1	General maintenance
2	Cleaning
3	Inspection procedures
4	Visual inspection
6	UK/RT 346 receiver-transmitter (R/T) unit
7	Ancillary equipment items
8	Equipment installation
9	Operational check (CAUTION)
	Failure diagnosis
10	Initial failure diagnosis procedures
	System level failure diagnosis procedures
11	General failure diagnosis
12	Breakout box failure diagnosis
13	Remote operation kit failure diagnosis
14	R/T unit status messages
15	R/T unit built-in test (BIT) procedures
16	Off-line BIT
17	Display test
18	Keyboard test
19	Repair procedures (CAUTION)
22	Tests following repair

Table

		Page
1	UK/RT 346 R/T unit status messages	6
2	UK/RT 346 R/T unit BIT fault codes	9

[REDACTED]



[REDACTED]

GENERAL MAINTENANCE

1 General maintenance procedures are provided to maintain the cleanliness and functionality of the equipment exterior and electrical connectors. The procedures should be carried out as required.

Cleaning

2 Use a lint-free cloth to remove any dust or stains from the equipment. The cloth may be dampened with a non-corrosive cleaning solvent.

INSPECTION PROCEDURES

3 Inspection procedures for the UK/PRC 346 radio station at level 1 comprise a visual inspection and an operational check.

Visual inspection

4 When carrying out the following inspection procedures, inspect the equipment items as follows:

4.1 Inspect equipment cases for physical marks, scratches, dents or cracks.

4.2 Inspect cables for splits, abrasion or crushing.

4.3 Inspect connectors for dirt, damaged contacts and damaged or missing shells.

4.4 Check that any controls are clean, undamaged, secure and correctly aligned. Operate the controls to check for correct mechanical action.

5 Inspection of the following equipment items and assemblies are to be carried out as required:

5.1 UK/RT 346 receiver-transmitter (R/T) unit.

5.2 Ancillary equipment items.

5.3 Equipment interconnections.

UK/RT 346 receiver-transmitter (R/T) unit

6 Inspect the R/T unit as follows:

6.1 Inspect the R/T unit as detailed in Para 4.

6.2 Inspect the casing for damage or missing parts. The overall appearance should be clean and free from corrosion.

6.3 Visually inspect the seals between the chassis and the front and rear panels for apparent water-tight integrity.

6.4 Check that the labels (one on top, two at rear) are present, secure and legible.

6.5 Inspect the LCD panel and keypad keys for distortion, cracks, marks and correct location.

6.6 Check that the battery quick-release fasteners are securely mounted, clean and undamaged, and operate correctly.

6.7 Check that the rear panel power input terminals have a bright, clean appearance and are undamaged.

Ancillary equipment items

7 Inspect the ancillary equipment items as follows:

7.1 General. Inspect all ancillary equipment items as detailed in Para 4.

7.2 V/UHF battle antennas. Carefully inspect the antenna body, locking ring, connector shell and contacts for any signs of dirt or damage. Check operation of the locking ring.

7.3 SPGR. Refer to AESP 5825-D-100-201.

7.4 Batteries. Inspect the batteries as follows:

7.4.1 Carefully inspect the battery case for any signs of damage, discoloration or fluid leakage.

7.4.2 Check that the labels (one on top, one adjacent to the output terminals) are present, secure and legible.

7.4.3 Check that the main output terminals have a bright, clean appearance and are undamaged.

7.4.4 Inspect the trickle-charge connector.

Equipment installation

8 Inspect the equipment installation as follows:

8.1 Check that all items of equipment are securely mounted.

8.2 Check that the correct electrical connections are securely made.

Operational check**CAUTION**

UNAUTHORISED USE. The UK/RT346 receiver-transmitter unit is capable of extended frequency operation in the ranges 30 to 88 MHz, 100 to 174 MHz VHF AM/FM and 225 to 400 MHz UHF AM/FM. These frequency ranges extend beyond the declared employment bands. Inclusion of this facility does not automatically authorise its use. Such use shall be carefully co-ordinated and approved. The allocation of radio frequencies is governed by widespread military regulations and civilian laws. Any violation of such regulations or laws, or unauthorised use, may render the user liable to prosecution.

9 Carry out an operational check on the radio station (Chap 3 Para 42) in the following circumstances:

9.1 Where a line replaceable unit (LRU) has been removed and replaced.

9.2 Where a fault is suspected.

9.3 As required.

FAILURE DIAGNOSIS

Initial failure diagnosis procedures

- 10 To carry out an initial failure diagnosis of the UK/PRC 346 radio station, proceed as follows:
 - 10.1 Check the R/T unit battery voltage (Chap 3 Para 47).
 - 10.2 Check that all cable connections are secure.
 - 10.3 Check that all the required installation, preparation and operating procedures have been carried out correctly. Repeat the installation, preparation and operating procedures to confirm the fault.
 - 10.4 Check the R/T unit Status Message screen (Chap 2 Para 36) for relevant messages. The status messages, the reason or cause of failure for each message and action to be taken are detailed in Table 1.
 - 10.5 Carry out the system-level failure diagnosis procedures (Paras 11 to 13) to isolate the fault to equipment item or assembly level.

System-level failure diagnosis procedures

NOTE

Before replacing a suspect equipment item, check the associated cable connections.

General failure diagnosis

- 11 To diagnose a fault in the UK/PRC 346 radio station at system level, proceed as follows:
 - 11.1 Run the R/T unit BIT (built-in test) (Para 15).
 - 11.2 Exchange the handset (or headset and pressel box) with a known good unit and carry out an operational check (Chap 3 Para 42).

Breakout box failure diagnosis

- 12 To diagnose a fault in a station fitted with the breakout box, proceed as follows:
 - 12.1 Connect the local audio gear directly to the R/T unit AUDIO connector and carry out an operational check. If the fault clears, check the breakout box and any audio equipment connected via the breakout box.

Remote operation kit failure diagnosis

- 13 To diagnose a fault in the remote operation kit, Check the RUL fault light (FLT). According to the result, refer to Para 13.1 or 13.2 as appropriate:
 - 13.1 If the RUL FLT light is not illuminated, check the breakout box (Para 12).
 - 13.2 If the RUL FLT light is illuminated, proceed as follows:
 - 13.2.1 Check that the D10 wire connections have not been swapped over at the RUL or at the remote handset.
 - 13.2.2 Check that the D10 wire has not been damaged along its length. Switch the UK/PRC 346 R/T unit off.
 - 13.2.3 Wait until the RUL lamps extinguish, then switch the R/T unit back on. If the RUL fault light illuminates again, obtain a replacement RUL.

R/T unit status messages

14 A status message is displayed by the R/T unit when a given operational fault or error occurs. The ten most recent status messages are retained in a list and can be viewed using the STATUS MSG screen (Chap 2 Para 36). The status messages, the reason or cause of failure for each message and action to be taken are detailed in Table 1.

TABLE 1 UK/RT 346 R/T UNIT STATUS MESSAGES

Serial (1)	Status Message (2)	Reason/cause (3)	Action (4)
	<u>GENERAL STATUS MESSAGES</u>		
1	GPS - R/T communications link failure.	The R/T unit attempted communications with the Specialist Portable GPS Receiver (SPGR) but no response was received.	Check the SPGR cable connections between the SPGR A port (right hand) connector and the R/T unit AUX connector. Where operation without connection to the SPGR is required, set the TERM CONFIG screen GPS COMM value to DISABLE and recycle the R/T unit power.
2	High Tx Current.	The R/T unit Tx circuit has drawn excessive current.	Run the OFF-LINE BIT (Para 15) to check the status of the R/T unit. If a fault is indicated replace the R/T unit.
3	Power Regulator fault detected.	A fault has been detected in the R/T unit power regulator.	Run the OFF-LINE BIT (Para 15) to check the status of the R/T unit. If a fault is indicated replace the R/T unit.
4	Battery voltage between 22.5 V and 20.5 V.	The battery voltage dropped below 22.5 V for the first time. The battery is nearing the end of its useful charge.	Replace the battery soon.
5	Battery Voltage less than 20.5 V.	The battery voltage dropped below 20.5 V for the first time. The battery is at the end of its useful charge.	Replace the battery immediately.
6	Remote Link Down.	This status message is not applicable to the TacGA radio system.	If the message recurs, replace the R/T unit.

(continued)

TABLE 1 UK/RT 346 R/T UNIT STATUS MESSAGES (continued)

Serial (1)	Status Message (2)	Reason/cause (3)	Action (4)
	<p><u>HAVE QUICK STATUS MESSAGES</u></p>		
7	TOD received.	The R/T unit has received the TOD from the GPS, from another radio station, or via manual (forced) entry.	No action required.
8	HQ WOD/MWOD Needed.	The OPERATE screen net active status was set to A (active) with no valid WOD/MWOD present. The WOD-TOD field displays ZERO, --T, or w-T.	<p>HQ operation requires a valid WOD or MWOD.</p> <p>Load a WOD or MWOD whose date code matches the TOD.</p>
9	HQ TOD Needed.	The OPERATE screen net active status was set to A (active) with no TOD present. The WOD-TOD field displays ZERO or w--.	<p>HQ operation requires a valid TOD.</p> <p>Load a TOD whose date code matches a valid WOD/MWOD.</p>
10	HQ invalid NET.	The OPERATE screen net active status was set to A (active) where the net number present is not valid for the current WOD/MWOD.	<p>Check the OPERATE screen net number value.</p> <p>Where operational WOD/MWODs are loaded, the Net number must not end in 75. All other numbers are valid.</p> <p>Where training WOD/MWODs are loaded, the valid T-Net and FMT-Net numbers are given in Chap 1 Table 2.</p>

R/T unit built-in test (BIT) procedures

15 To check the operation of the R/T unit, carry out the following procedures:

15.1 Where necessary, power up the R/T unit as follows:

15.1.1 Set the mode switch to the ON position.

15.1.2 Press the ESC key once to abort the startup BIT and again to open the MAIN MENU.

```

MAIN MENU
1-OPERATE  2-N/A
3-PRESET  4-MAINT
5-DATABASE 6-BIT
  
```

15.2 From the MAIN MENU screen, use the 6 key or NEXT and PREV keys to select option 6 - BIT. Press the ENT key to open the BIT menu.

```

BIT
1-OFF-LINE BIT
2-BATTERY VOLTAGE
3-DISPLAY TEST
4-KEYBOARD TEST
  
```

15.3 Carry out the following BIT procedures:

15.3.1 Off-line BIT to check the internal functions of the R/T unit (Para 16).

15.3.2 Display test to check the LCD panel (Para 17).

15.3.3 Keyboard test to check the keypad keys (Para 18).

15.4 When the BIT tests are complete, press the ESC key to return to the MAIN MENU screen.

Off-line BIT

16 To run the off-line BIT, proceed as follows:

16.1 From the BIT menu screen, use the 1 key or NEXT and PREV keys to select option 1 - OFF-LINE BIT. Press the ENT key to open the OFF-LINE BIT screen.

```

OFF-LINE BIT
1-BIT
  
```

16.2 The screen opens with 1 - BIT selected. Press the ENT key to start the off-line BIT.

16.3 The BIT status screen is displayed, indicating the BIT status as BIT IN PROGRESS.

```

UK/RT 346      HQ II
VER: 01.40
BIT IN PROGRESS
HIT KEY/PTT TO ABORT
  
```

16.4 The off-line BIT takes approximately 20 seconds to complete. If no failures are detected, the BIT menu is re-opened. If a failure in the R/T unit is detected, the BIT FAULT screen is displayed. Repeat the BIT test to confirm the fault and redisplay the BIT FAULT screen.

BIT FAULT: 647 1-TX 2-RF/IF 3-AUDIO
--

16.5 The BIT FAULT screen gives the following fault details for use by repair personnel:

16.5.1 Line 1 displays a three-digit BIT FAULT code number. Each digit identifies a suspect equipment item (assembly or module) as detailed in Table 2. The first digit of the BIT FAULT code indicates the equipment item most likely to have failed and the last digit indicates the least likely item.

16.5.2 Below the BIT FAULT code, the suspect items are listed in order of probability of failure. Each item is identified by an abbreviation of its name. The correspondence between the code and the abbreviation is detailed in Table 2.

16.5.3 In the example shown above, the first item is code 6, abbreviation TX. This identifies the transmitter module, which is the item most likely to have failed. The second most likely is code 4, abbreviation RF/IF, which is the RF/IF module, and the third and least likely is code 7, abbreviation AUDIO, which is the audio module.

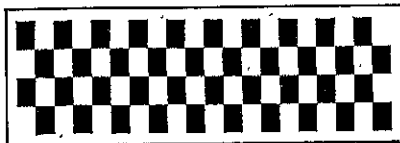
TABLE 2 UK/RT 346 R/T UNIT BIT FAULT CODES

Serial (1)	Code (2)	Abbreviation (3)	Suspect equipment item (4)
1	1	PANEL	Front panel assembly.
2	2	CTRLR	Controller module.
3	3	SYNTH	Synthesizer module.
4	4	RF/IF	RF/IF module.
5	5	TXDRV	Tx driver module.
6	6	TX	Transmitter module.
7	7	AUDIO	Audio module.
8	B	PWREG	Power regulator module.
9	0	NONE	Indicates that no further module or subassembly is suspect.

Display test

17 To check the LCD panel display function, proceed as follows:

17.1 From the BIT menu screen, use the 3 key or NEXT and PREV keys to select option 3 - DISPLAY TEST. Press the ENT key to open the display test screen.



17.2 Each square of the chequerboard comprises an 8 x 8 block of display elements (pixels). Check that the pattern alternates cleanly and that all the pixels are functioning correctly.

17.3 Press the ESC key to return to the BIT menu.

Keyboard test

18 To check the keypad function, proceed as follows:

18.1 From the BIT menu, use the 4 key or the NEXT and PREV keys to select option 4 - KEYBOARD TEST. Press the ENT key to open the KEYBOARD TEST screen.

KEYBOARD TEST
PRESS ESC TO END
LAST KEY: ONE

18.2 Press each keypad key (except the ESC key) in turn. For each key, check that the key is correctly identified in the LAST KEY field.

18.3 Press the ESC key to return to the BIT menu.

REPAIR PROCEDURES

19 Repairs are limited to the removal and replacement of equipment items and assemblies found defective during the failure diagnosis procedures.

CAUTION

EQUIPMENT DAMAGE. Before disconnecting equipment items or assemblies, set the R/T unit mode switch to the OFF position.

20 To remove an equipment item or assembly, proceed as follows:

20.1 Before removing the R/T unit, zeroize the WOD/MWOD (Chap 3 Para 69).

20.2 Set the R/T unit mode switch to the OFF position.

20.3 Remove the defective equipment item or assembly.

21 To replace an equipment item or assembly, carry out the appropriate installation procedures (Chap 3).

TESTS FOLLOWING REPAIR

22 Following repair of the radio station, carry out the operational check detailed in Chap 3 Para 42.

CHAPTER 5
DESTRUCTION OF EQUIPMENT
CONTENTS

Para

- 1 Mandatory directive
- 3 Degree of damage
- 5 Priorities of destruction
- 6 Methods of destruction
- 8 Mechanical
- 9 Burning (WARNING)
- 10 Gunfire (WARNING)

Table

	Page
1 Priorities of destruction	2

MANDATORY DIRECTIVE

1 Destruction of the equipment when subject to capture by the enemy will be undertaken by the user arm ONLY WHEN, in the judgement of the unit commander concerned, such action is necessary in accordance with orders of, or policy established by, the Army or Divisional Commanders.

2 The reporting of the destruction of equipment is to be done through command channels.

Degree of damage

3 The degree of damage inflicted to prevent the equipment being used by an enemy shall be as follows:

3.1 Methods of destruction should achieve such damage to equipment and essential spare parts, that it will not be possible to restore the equipment to a useable condition in the combat zone either by repair or cannibalisation.

3.2 Classified equipment must be destroyed in such degree as to prevent, whenever possible, duplication or determination of operation or function by the enemy.

3.3 Any classified documents, notes, instructions or any other written material pertaining to function, operation, maintenance or employment, including drawings or parts lists, must be destroyed in a manner as to render them useless to the enemy.

4 In general, destruction of essential parts, followed by burning will usually be sufficient to render the equipment useless. However, selection of the particular method of destruction requires imagination and resourcefulness in the utilisation of the facilities at hand under the existing conditions. Time is usually critical.

PRIORITIES OF DESTRUCTION

5 The priorities of destruction should be considered, as follows:

5.1 Priority must be given to the destruction of classified equipment and associated documents.

5.2 When lack of time and/or means prevents complete destruction of equipment, priority must be given to the destruction of essential parts. The same parts are to be destroyed on all like equipment and in spare parts storage areas.

5.3 A guide to priorities of destruction of the equipment is shown in Table 1.

TABLE 1 PRIORITIES OF DESTRUCTION

Serial (1)	Item (2)	Priority (3)
1	UK/RT 346 receiver/transmitter (R/T) unit	1st
2	Specialist Personal GPS Receiver (SPGR)	2nd
3	Remote Unit Local (RUL)	3rd
4	Minor ancillary equipment items	4th

METHODS OF DESTRUCTION

6 If destruction is ordered, due consideration should be given to:

6.1 Selection of a point of destruction that will cause greatest obstruction to enemy movement and also prevent hazard to friendly troops.

6.2 Observance of appropriate safety precautions.

7 The following information is for guidance only. Of the possible methods of destruction, those most generally applicable are mechanical, burning and gunfire.

Mechanical

8 This method requires the use of an axe, pick, crowbar or similar implement. The equipment should be destroyed in accordance with the priorities given in Table 1.

Burning**WARNING**

GASOLINE. DUE CONSIDERATION MUST BE GIVEN TO THE HIGHLY FLAMMABLE NATURE OF GASOLINE. CARELESSNESS IN ITS USE CAN RESULT IN SERIOUS BURNS.

9 This method requires the use of gasoline, oil or other flammables. To destroy the equipment by burning, proceed as follows:

9.1 If quantities of combustibles are limited, smash all vital elements such as switches, instruments and control levers.

9.2 Place ammunition and charges in and about the equipment so that the greatest damage will result from the explosion.

9.3 Pour gasoline and oil liberally over the equipment.

9.4 Ignite the equipment, using one of the following methods and exercise all necessary personal safety precautions:

- 9.4.1 An incendiary grenade.
- 9.4.2 A burst from a flame thrower.
- 9.4.3 A combustible train of suitable length.
- 9.4.4 Any other appropriate means.

Gunfire

WARNING

PERSONAL SAFETY. FIRING ARTILLERY AT RANGES OF 500 YARDS OR LESS AND FIRING RIFLE GRENADES OR ANTI-TANK ROCKETS SHOULD BE FROM COVER.

- 10 When destroying the equipment by gunfire, proceed as follows:
 - 10.1 Smash all vital elements, such as switches, instruments and control levers.
 - 10.2 Destroy the equipment by gunfire, using any of the following methods:
 - 10.2.1 Tank guns.
 - 10.2.2 Self-propelled guns.
 - 10.2.3 Artillery.
 - 10.2.4 Rifle grenades.
 - 10.2.5 Anti-tank rockets from launchers.

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COMMENT(S) ON AESP

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Woolwich
LONDON SE18 4QF

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Sender's Reference	BIN Number	Date
AESP Title:		
Chapter(s)/Instruction	Page(s)/Paragraph(s)	
If you require more space, please use the reverse of this form or a separate piece of paper. Comment(s):		

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ATSA DTS 3.2 USE ONLY

To:
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Thank you for commenting on AESP 5820-F-299-201

Your reference: Dated:

Action is being taken to:	Tick		Tick
Issue a revised/amended AESP		Under Investigation	
Incorporate comment(s) in future amendments		No action required	
Remarks			

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AESP Form 10 (Issue 3 dated Oct 97)

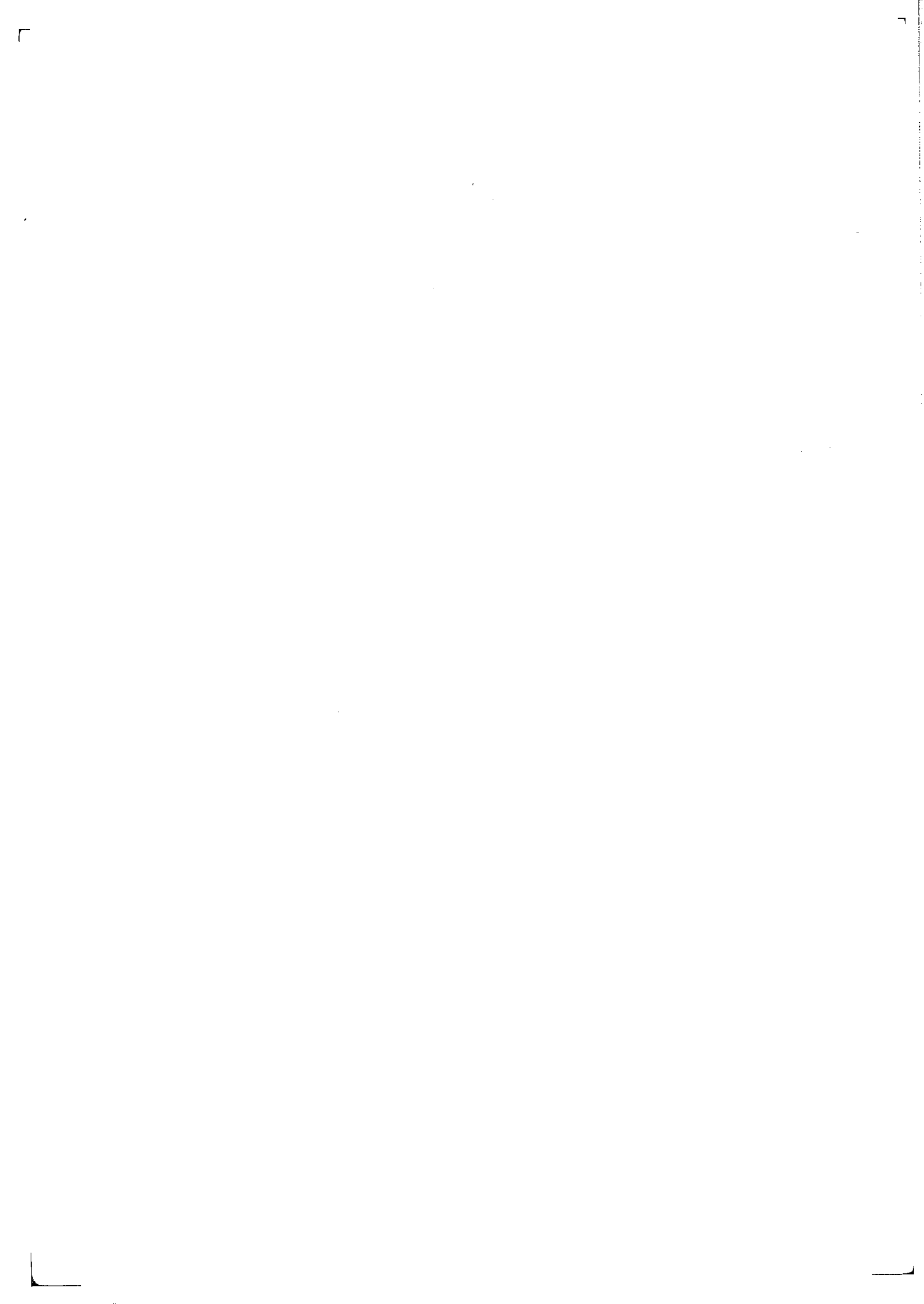
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TacGA
THE TACTICAL GROUND AIR
COMMUNICATIONS SYSTEM

ILLUSTRATED PARTS CATALOGUE

REPRINTED INCORPORATING AMDTS 1-3

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Ministry of Defence
Issued by

ARMY TECHNICAL SUPPORT AGENCY
DIRECTORATE OF TECHNICAL SERVICES

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AMENDMENT RECORD

Amdt No.	Incorporated By (Signature)	Date
1	[Redacted]	22/8/00
2	[Redacted]	23/7/0
3	[Redacted]	17/11/0
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ILLUSTRATED PARTS LIST INFORMATION

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- 1 General information
- 2-0 TacGA - The Tactical Ground Air Communication System
- 2-1 Station kit UK/PRC 346
- 2-2 Manpack
- 2-3 Remote Operation
- 2-4 Elevated Antenna
- 2-5 Key Fill Sub-system - UK/RT 346
- 2-6 Key Fill Sub-system - Precision lightweight GPS Receiver II
- 2-7 Audio Gear
- 2-8 Vehicle Mounted Ancillaries
- 2-9 Remote GPS Antenna
- 3 Indexes
- 3-1 Index of NSNs to chapter, Fig and item number
- 3-2 Index of part/drawing number to chapter, Fig and item number

PREFACE

Sponsor : Army Technical Support Agency
Publication Agency : Army Technical Support Agency

INTRODUCTION

1 Service users should forward any comments on this publication through the channels prescribed in AESP 0100-P-011-013. An AESP Form 10 is provided at the end of this publication; it should be photocopied and used for forwarding comments on this AESP.

2 The subject matter of this publication may be affected by Defence Council Instructions (DCIs), Standing Operating Procedures (SOPs) or by local regulations. When any such Instruction, Order or Regulation contradicts any portion of this publication it is to be taken as the overriding authority.

3 This illustrated Parts Catalogue (IPC) is designed as an aid to the identification of component parts or assemblies of parts of the equipment, and to provide information necessary for demanding spares.

4 This IPC may list some or all of the parts comprising the equipment concerned, but only those parts assigned a NATO Stock Number, Service Catalogue or Reference Number will normally be available as spares. Should there be a requirement for an item not assigned a number, demands may be submitted quoting the AESP, Item Number, Figure Reference and Item Name. Where a manufacturer's reference is known, this should also be quoted.

Quantity

5 The figure in the 'Number off' column specifies the quantity for the unit (or assembly, sub-assembly etc); it does not indicate the quantity to be demanded.

Demands

6 When demanding Spare Parts the following particulars must be quoted:

- 6.1 Management Code (Man Code).
- 6.2 NATO Stock Number.
- 6.3 Item Name.
- 6.4 Name of equipment for which the part is required.
- 6.5 Manufacturer's reference, if known.

NOTE

Alternatives quoted apply only to the Equipment covered by this IPC.

Modification State

7 When appropriate, a list at the front of each chapter or sub-chapter will indicate the modification numbers which have been incorporated in the IPC by amendment action, subsequent to initial issue.

PREFACE (Continued)

Annotations

- 8 The following notations are used in this publication:
- 8.1 AR When appearing in the 'Number off' column indicates that the quantity is 'as required'.
 - 8.2 NI (Not Illustrated) when appearing with a number in the 'Fig Item' column indicates that the item is not illustrated.
 - 8.3 NP (Non-provisioned) when appearing in the 'NATO Stock Number' column indicates that the item may be illustrated, but not available from stock as a replacement item.
 - 8.4 Ref In the 'Number off' column indicates that the item is listed for reference purposes only.

Abbreviations

- 9 Abbreviations and symbols used in this IPC have been approved and are listed separately.

Amendments

10 Amendments to the catalogue will be published as and when necessary. They will be numbered consecutively, and the Amendment Record Sheet is to be completed for each Amendment List embodied.

11 New or amended material will be highlighted by side lining to show the extent of the amendment.

Indentations

12 Items are listed in a logical assembly/disassembly order and are indented by the 'Dot System' in which each 'dot' depicts the relationship of the item to the main assembly.

MAIN ASSEMBLY

Attaching parts for main assembly.

. **FIRST LEVEL OF BREAKDOWN** (Sub-assembly or detail part of main assembly).

. Attaching parts for first level.

. . **SECOND LEVEL OF BREAKDOWN** (Sub-sub-assembly or detail part of Sub-assembly).

. . Attaching parts for second level.

. . . **THIRD LEVEL OF BREAKDOWN** (Sub-sub-sub-assembly or detail part of Sub-sub-assembly).

. . . Attaching parts for third level.

NOTES

(1) Attaching parts for the Main Assembly are listed at the end of the text of the Main Assembly.

(2) Catalogue numbers quoted in this catalogue will supersede any number that may have been allotted previously.

RELATED AND ASSOCIATED PUBLICATIONS

13 The octad for the subject equipment consists of the publications shown in Table 1. All references are prefixed by the first eight digits of this publication. The availability of the publications can be checked by reference to the relevant Group Index (see AESP 0100-P-001-013).

TABLE 1 CATEGORIES AND INFORMATION LEVELS

Category/Sub-category		Information Level				
		1 User/operator	2 Unit Maintenance	3 Field Maintenance	4 Base Maintenance	
1	0	Purpose and Planning Information	101	101	101	101
	1	Equipment Support Policy Directives	111	111	111	111
2	0	Operating Information	201	*	*	*
	1	Aide Memoire	211	*	*	*
	2	Training Aids	*	*	*	*
3		Technical Description	201	302	302	*
4	1	Installation Instructions	*	*	*	*
	2	Preparation for Special Environments	*	*	*	*
5	1	Failure Diagnosis	201	512	513	*
	2	Repair Instructions	201	522	523	*
	3	Inspection Standards	*	532	533	*
	4	Calibration Standards	*	*	*	*
6		Maintenance Schedules	*	*	*	*
7	1	Illustrated Parts Catalogues	711	711	711	711
	2	Commercial Parts Lists	*	*	*	*
	3	Complete Equipment Schedule, Production	*	*	*	*
	4	Complete Equipment Schedule, Service Edition (Simple Equipment)	741	741	741	741
	5	Complete Equipment Schedule,	*	*	*	*
8	1	Modification Instructions	*	*	*	*
	2	General Instructions, Special Technical Instructions and Servicing Instructions	*	*	*	*
	3	Service Engineered Modification Instructions (RAF only)	*	*	*	*

* Category/Sub-category not published

Associated publications

<u>14</u> <u>Reference</u>	<u>Title</u>
Signal Engineering Instruction 14411	Safety Precautions for Electrical Equipment
Signal Engineering Instruction 14411	Safety Precautions for Electrical Equipment
EMER Telecommunications A 414	Printed Circuit Repair Techniques
EMER Telecommunications C 740	Audio Gear Clansman
EMER Telecommunications K 010	Clansman Charging Equipment
EMER Telecommunications L220 - 229	Mast Telescopic 8 m (to be replaced by AESP 5985-C-090)
EMER Telecommunications M 650	Audio Ancillaries Test Set
EMER Telecommunications M 680	Clansman Harness Box Test Set
AC 61657	User Handbook Clansman Harness Box Test Set
AC 61656	User Handbook Audio Ancillaries Test Set
AESP 4940-P-200-201	General Purpose Electrical Cable Repair Kit (REME)
AESP 5800-C-146-412	C ³ I Installations in TUM/TUL (HS) FFR
AESP 5800-C-150-412	C ³ I Installations in Truck Utility Medium (TUM)
AESP 5800-C-160-412	C ³ I Installations in Truck Utility Long (TUL)
AESP 5800-H-281-301	ASV436 Harness and Installation Kits
AESP 5800-H-371-411	C ³ I Installations in Haglunds BV206(D)
AESP 5825-D-100	Special Personal GPS Receiver (SPGR)
AESP 5985-C-090	User Handbook Mast Telescopic 8 m
AESP 6130-M-102	Intelligent Battery Management System (IBMS)
AESP 6625-K-112	Test System Radio Communications (Marconi 8920C)
ACP 63723	Health and Safety Management in ESO/REME
BID 250/1/1	User Handbook BID 250/31
BID/251-2	User Handbook BID 250/2
BID/251-5	Not Yet Known
STANAG 4246 (SECRET)	HAVE QUICK and UHF Secure Communications Equipment

LIST OF ABBREVIATIONS AND SYMBOLS

Ah	... ..	Amp hour
Al	... ..	Aluminium
Amdt	... ..	Amendment
amp	... ..	amplifier
AR	... ..	As Required
AWG	... ..	American Wire Gauge
Be Cu	... ..	Beryllium Copper
blk	... ..	blackened (black)
BSP	... ..	British Standard Pipe Thread
cap hd	... ..	capstan head
CES	... ..	Complete Equipment Schedule
ch hd	... ..	cheese head
crs	... ..	corrosion resistant steel
csk	... ..	countersunk
csk hd	... ..	countersunk head
Cu	... ..	Copper
c/w	... ..	complete with
C ³ I	... ..	Command, Control, Communication and information
dia	... ..	diameter
Dwg	... ..	Drawing
ext	... ..	external
F	... ..	Farad
fwd	... ..	forward
h	... ..	height (high)
hd	... ..	head
hex	... ..	hexagon
hex hd	... ..	hexagon head
HTS	... ..	High Tensile Steel
id	... ..	inside diameter
ident	... ..	identification
in.	... ..	inch
int	... ..	internal
JIC	... ..	Joint Industries Conference
k	... ..	kilo
kg	... ..	kilogramme
LED	... ..	Light Emitting Diode
lg	... ..	length (long)
LH	... ..	Left Hand
lhs/LHS	... ..	Left Hand Side
m	... ..	metre
max	... ..	maximum
mm	... ..	millimetre

n	... ..	nano
ND	... ..	Not Drawn (No manufacturer's drawing)
neg	... ..	negative
No.	... ..	Number
o/a	... ..	over-all
od	... ..	outside diameter
o/s	... ..	over size
p	... ..	pico
PEC	... ..	Panel Electronic Circuit
pl	... ..	plated
pos	... ..	positive
pr	... ..	pair
RFI	... ..	Radio Frequency Interface
RH	... ..	Right Hand
rhs/RHS	... ..	Right Hand Side
RUL	... ..	Remote Unit Local
s/d	... ..	sodium dichromate
sect	... ..	section
skt	... ..	socket
skt hd	... ..	socket head
SPGR	... ..	Special Purpose Global positioning Receiver
sq	... ..	square
SWG	... ..	Standard Wire Gauge
TacGA	... ..	Tactical Ground Air communication system
TBA	... ..	To Be Arranged
thd	... ..	thread(ed)
thk	... ..	thickness
6UN	... ..	Unified 6-Thread Series
UNC	... ..	Unified Coarse Thread
UNF	Unified Fine Thread
V	Volt
7TW	Seven Way 'T' Box
w	watt
w	width
Zn	Zinc
μ	Micro

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GENERAL INFORMATION
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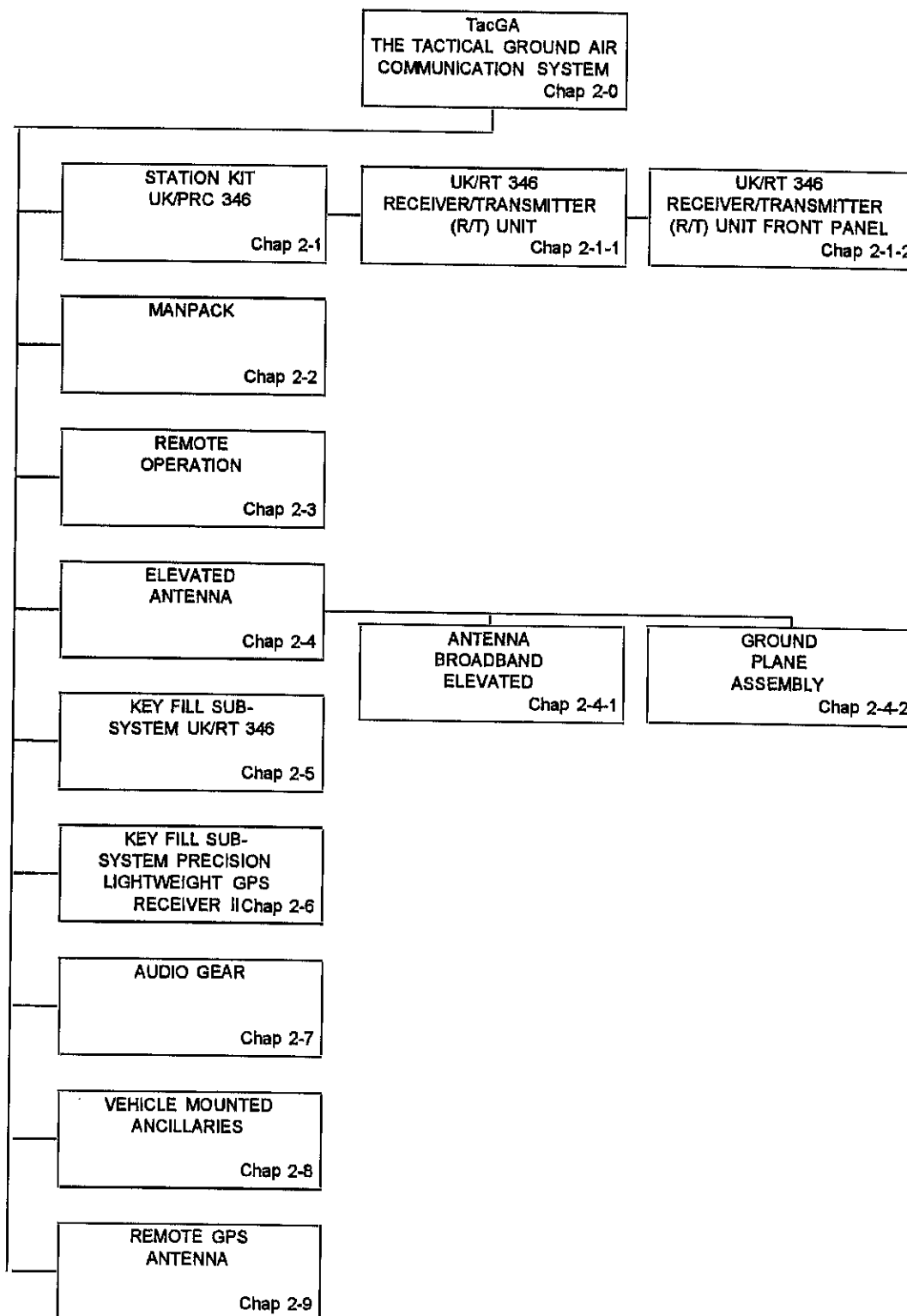


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**FAMILY TREE
CHAPTER PLAN**



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CHAPTER 2-0

TacGA THE TACTICAL GROUND AIR COMMUNICATION SYSTEM

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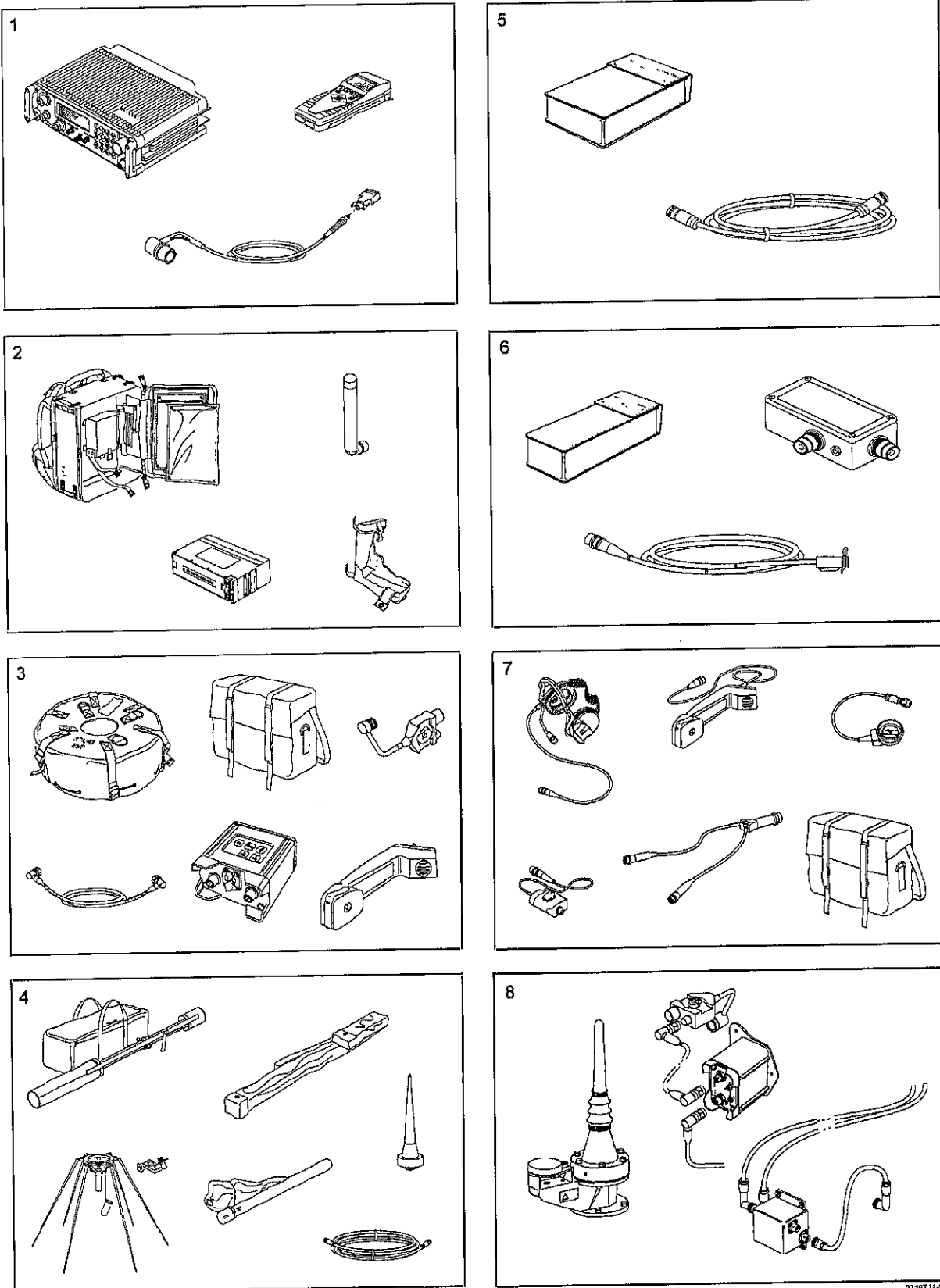
2-1	STATION KIT UK/PRC 346
2-2	MANPACK
2-3	REMOTE OPERATION
2-4	ELEVATED ANTENNA
2-5	KEY FILL SUB-SYSTEM
2-6	KEY FILL SUB-SYSTEM Precision Lightweight GPS Receiver II
2-8	VEHICLE MOUNTED ANCILLARIES
2-9	REMOTE GPS ANTENNA



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0319711-02

Fig 1 TacGA The tactical ground air communication system

PARTS LIST

Fig. 1 Item	DMC Army	NATO stock number	Item name	Part No./ Dwg No.	No. off	Annotation (NSCM)
			TacGA THE TACTICAL GROUND AIR COMMUNICATION SYSTEM		REF	
1	Z99	5820-99-573-5059	. STATION KIT UK/PRC 346	337-120916	1	See Chap 2-1
2	Z99	5820-99-573-5060	. MANPACK	337-120923	1	See Chap 2-2
3	Z99	5820-99-573-5061	. REMOTE OPERATION	337-120925	1	See Chap 2-3
4	Z99	5820-99-573-5062	. ELEVATED ANTENNA	337-120924	1	See Chap 2-4
5	Z99	5820-99-573-5063	. KEY FILL SUB-SYSTEM UK/RT346	337-120921	1	See Chap 2-5
6	Z99	5820-99-573-5064	. KEY FILL SUB-SYSTEM, Precision lightweight GPS receiver II	337-120922	1	See Chap 2-6
7	Z99	5820-99-573-5065	. AUDIO GEAR	337-120915	1	See Chap 2-7
8		NIV	. VEHICLE MOUNTED ANCILLARIES			See Chap 2-8
NI 9	Z99	5820-99-660-3561	. REMOTE GPS ANTENNA			See Chap 2-9

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CHAPTER 2-1
Station Kit UK/PRC 346
CONTENTS

Record of Modifications	Page
	3
Chapter	
2-1	STATION KIT UK/PRC 346
2-1-1	UK/RT 346 Receiver/transmitter (R/T) unit
2-1-2	UK/RT 346 Receiver/transmitter (R/T) unit Front Panel



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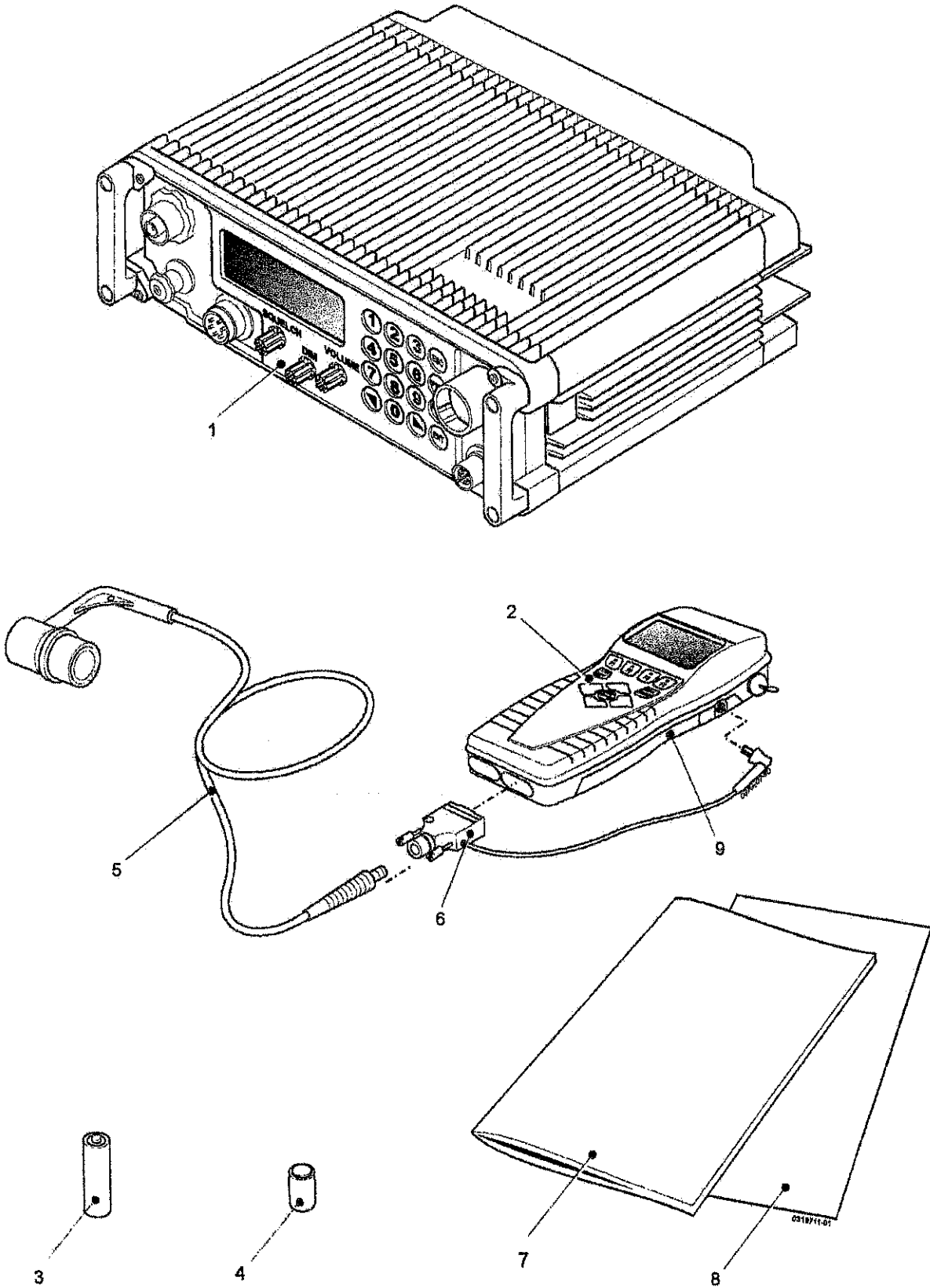


Fig 1 Station kit UK/PRC 346

PARTS LIST

Fig. 1 Item	DMC Army	NATO stock number	Item name	Part No./ Dwg No.	No. off	Annotation (NSCM)
	Z99	5820-99-573-5059	STATION KIT UK/PRC 346	337-120916	REF	
1	Z99	5820-99-836-3761	. TRANSMITTER-RECEIVER, RADIO, UK/RT	902305-801	1	
2	W10	5825-99-517-5141	. RECEIVER, GPS, Specialist Personal	822-1096-004	1	
3	Y3B AT	6135-99-195-6708	. BATTERY, SECONDARY, alkaline, 1.5V AA	RS 114 1708	8	
4		6135-14-469-5737	. BATTERY, SECONDARY, Lithium, 3.6V 1/2AA		1	
5	Z42	5995-99-573-5717	. CABLE ASSEMBLY, special purpose, SPGR-RT	377-125028	1	
6	Z32	5935-99-573-5718	. CONNECTOR, special, snatch (SPGR)	377-125029	1	
7		NP	. AIDE MEMOIRE, TacGA system	5820-F-299-211	1	
8	W10	7610-01-458-7452	. QUICK REFERENCE GUIDE, SPGR	523-0778-280	1	
9		6130-01-455-8259	. BATTERY, POWER SOURCE, 6 CELL	00-09011-000	1	

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CHAPTER 2-1-1

PARTS LIST

UK/RT 346 RECEIVER/TRANSMITTER (R/T) UNIT

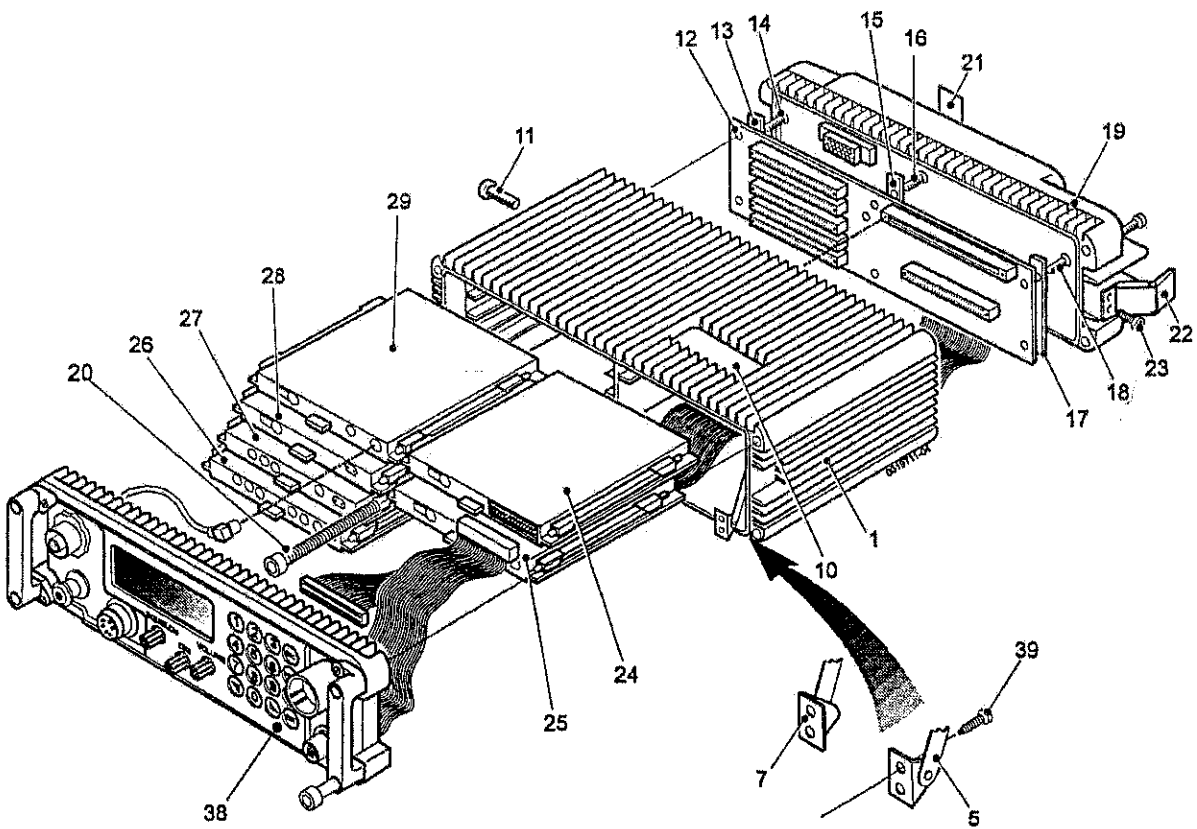
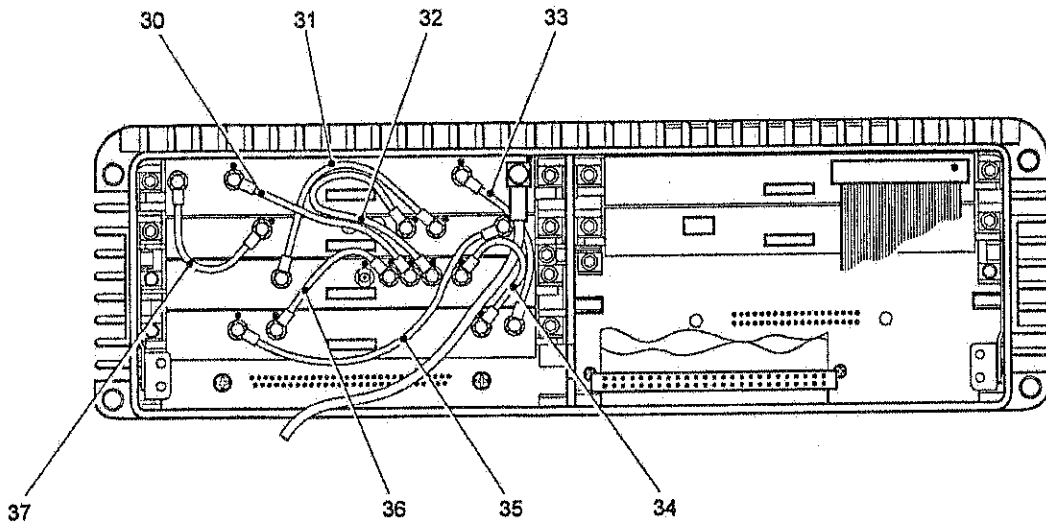


Fig 1 UK/RT 346 receiver/transmitter (R/T) unit assembly

PARTS LIST

Fig. 1 Item	DMC Army	NATO stock number	Item name	Part No./ Dwg No.	No. off	Annotation (NSCM)
			UK/RT 346 RECEIVER/ TRANSMITTER (R/T) UNIT	902305-801	REF	
1		NP	. CHASSIS, UK/RT 346 (incorporating Items 2-9)	519408-801	1	
NI 2		NP	. . INSERT, Screw thread	3591- 3CNW380	8	
NI 3	MLR S	5315-00-847-3735	. . PIN, Spring	MS16562- 190	3	
NI 4		NP	. . INSERT, Screw thread	3585- 04CNW112	6	
5		NP	. . ARM, Support	947707-801	1	
NI 6		5315-00-058-9698	. . PIN, Spring	MS16562- 191	1	
7		NP	. . ARM, Support	947707-802	1	
NI 8		5315-00-058-9698	. . PIN, Spring	MS16562- 191	1	
NI 9		NP	. . CHASSIS, UK/RT 346	519408-1	1	
10		NP	. PLATE, Identification	156857	1	
11		5305-00-245-4621	. SCREW, MACHINE, steel, watertight, cross recess, UNC 0.164 x 0.3 in. lg, c/w O ring	MS3212-22	1	
12		NP	. CIRCUIT CARD ASSEMBLY, Motherboard	725889-801	1	
13		NP	. STIFFENER	519370-1	1	
14	Y2	5305-00-225-6400	. SCREW, MACHINE, steel, flat csk hd, cross recess, UNC 0.112 x 0.3 in. lg	MS24693- C3	2	
15		NP	. STIFFENER	519370-3	1	
16		5305-00-066-7325	. SCREW, MACHINE, steel, flat csk hd, cross recess, UNC 0.112 x 0.438 in. lg	MS24693- C5	2	
17		NP	. STIFFENER	519370-2	1	

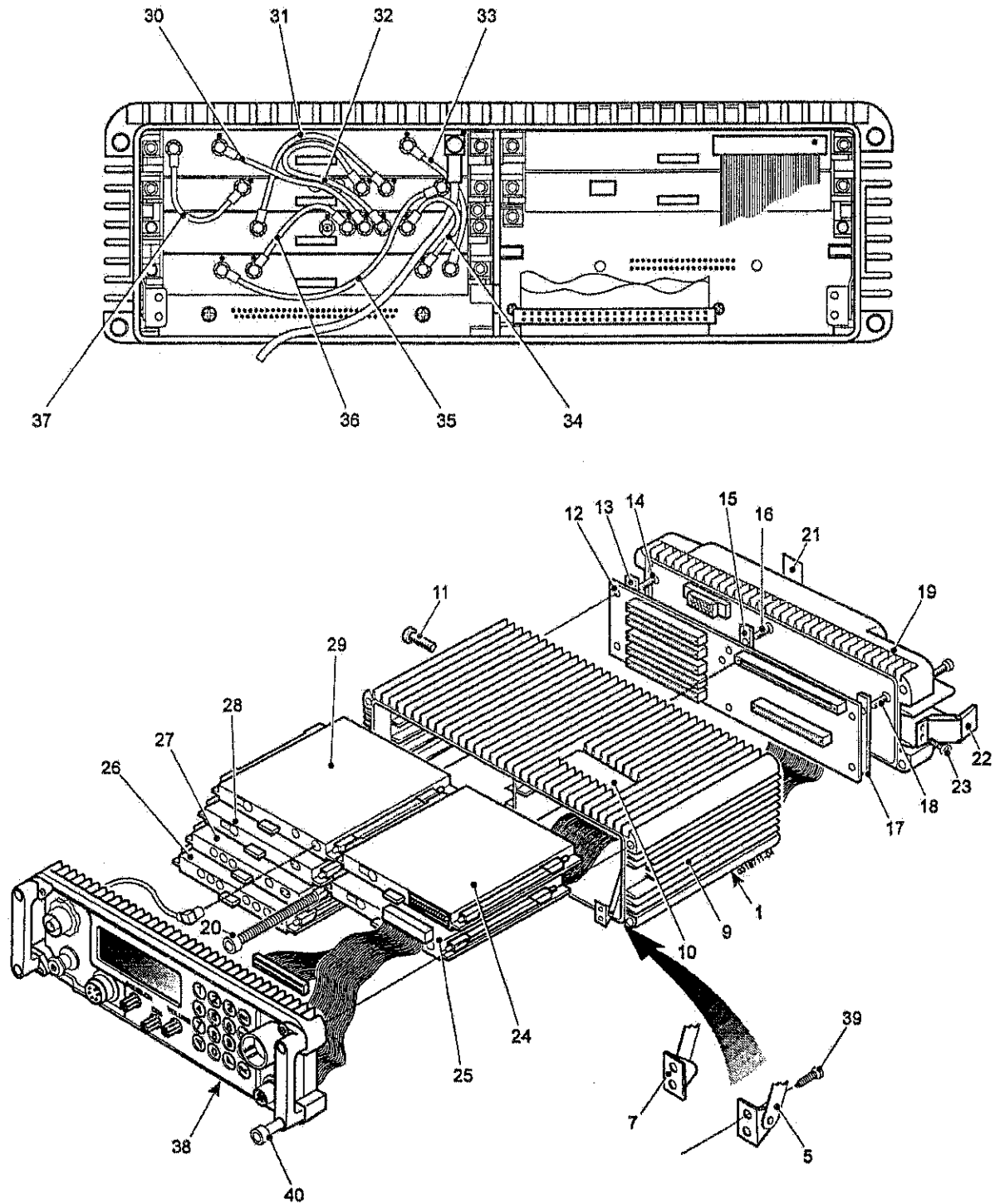


Fig 1 UK/RT 346 receiver/transmitter (R/T) unit assembly

PARTS LIST

Fig. 1 Item	DMC Army	NATO stock number	Item name	Part No./ Dwg No.	No. off	Annotation (NSCM)
			UK/RT 346 RECEIVER/ TRANSMITTER (R/T) UNIT (Continued)	902305-801	REF	
18		5305-00-225-6400	. SCREW, MACHINE, steel, flat csk hd, cross recess, UNC 0.112 x 0.3 in. lg	MS24693- C3	2	
19		NP	. MODULE, Power regulator	725887-801	1	
20		NP	. SCREW, CAP, skt hd	137088-2	1	
21		NP	. LABEL, Equipment modification record	156860-1	1	
22	Z99	5820-99-573-5745	. CATCH	HC83314- 2SSBP	2	
23	4V5	5305-00-054-6651	. SCREW, MACHINE, steel, pan hd, cross recess, UNC 0.138 x 0.3 in. lg	MS51957- 27	4	
24		NP	. CIRCUIT CARD ASSEMBLY, Programmed controller	725024-811	1	
25		NP	. CIRCUIT CARD ASSEMBLY, Audio	725010-802	1	
26		NP	. CIRCUIT CARD ASSEMBLY, Synthesizer	724785-801	1	
27		NP	. CIRCUIT CARD ASSEMBLY, RF/IF	724787-801	1	
28		NP	. CIRCUIT CARD ASSEMBLY, Driver	724789-801	1	
29		NP	. CIRCUIT CARD ASSEMBLY, Transmitter	724791-801	1	
30		NP	. CABLE ASSEMBLY, Coaxial (brown and bright green idents)	422595-802	1	
31		NP	. CABLE ASSEMBLY, Coaxial (orange ident)	422595-804	1	
32		NP	. CABLE ASSEMBLY, Coaxial (red ident)	422595-803	1	

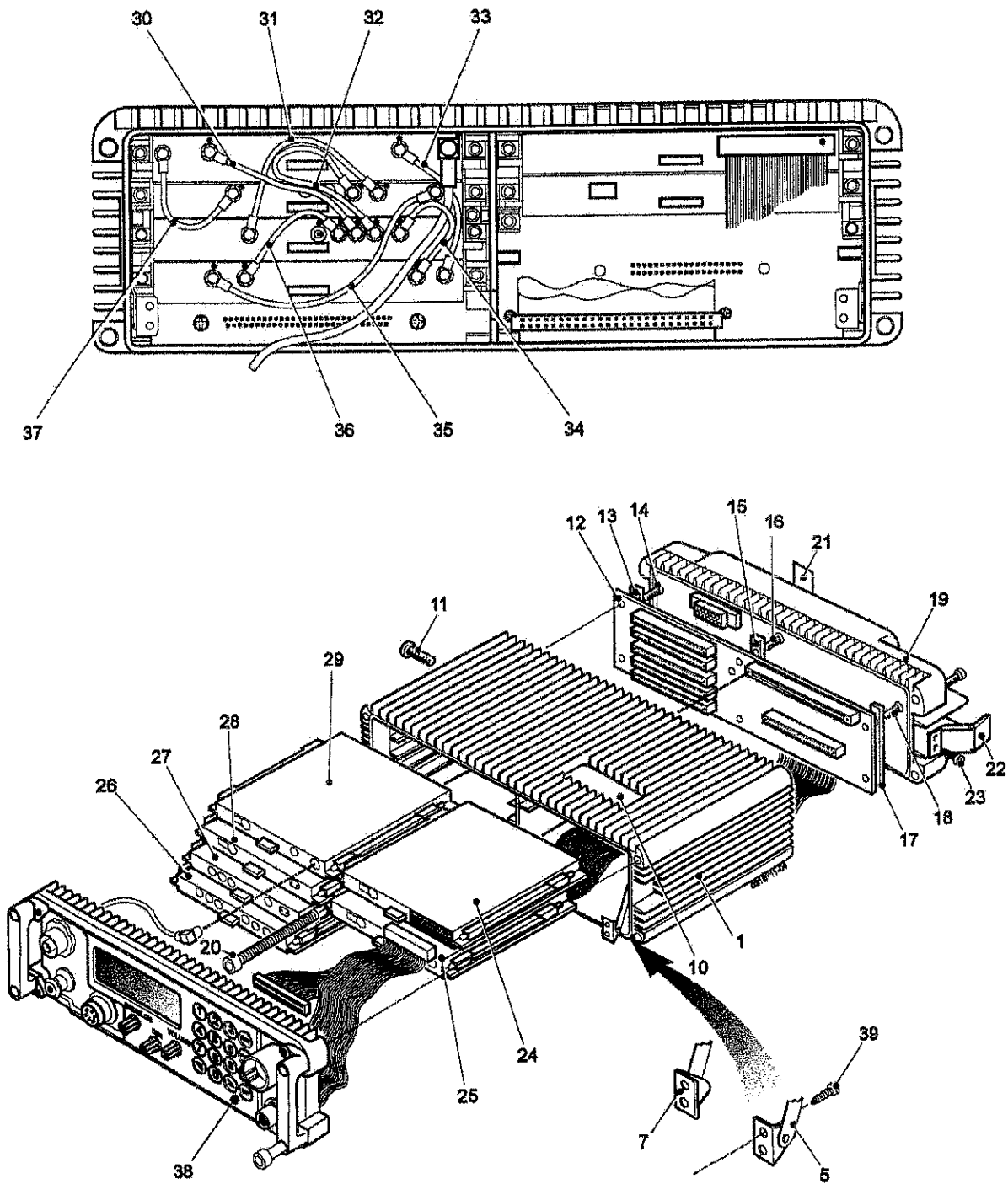


Fig 1 UK/RT 346 receiver/transmitter (R/T) unit assembly

PARTS LIST

Fig. 1 Item	DMC Army	NATO stock number	Item name	Part No./ Dwg No.	No. off	Annotation (NSCM)
			UK/RT 346 RECEIVER/ TRANSMITTER (R/T) UNIT (Continued)	902305-801	REF	
33		NP	. CABLE ASSEMBLY, Coaxial (skyblue ident)	422595-810	1	
34		NP	. CABLE ASSEMBLY, Coaxial (violet ident)	422595-807	1	
35		NP	. CABLE ASSEMBLY, Coaxial (yellow ident)	422595-818	1	
36		NP	. CABLE ASSEMBLY, Coaxial (green ident)	422595-805	1	
37		NP	. CABLE ASSEMBLY, Coaxial (black ident)	422595-801	1	
38		NP	. FRONT PANEL ASSEMBLY	725886-801	1	
39		5305-00-054-5637	. SCREW, MACHINE, steel, pan hd, cross recess, UNC 0.086 x 0.25 in. lg	MS51957-3	4	

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PARTS LIST

UK/RT 346 RECEIVER/TRANSMITTER (R/T) UNIT FRONT PANEL

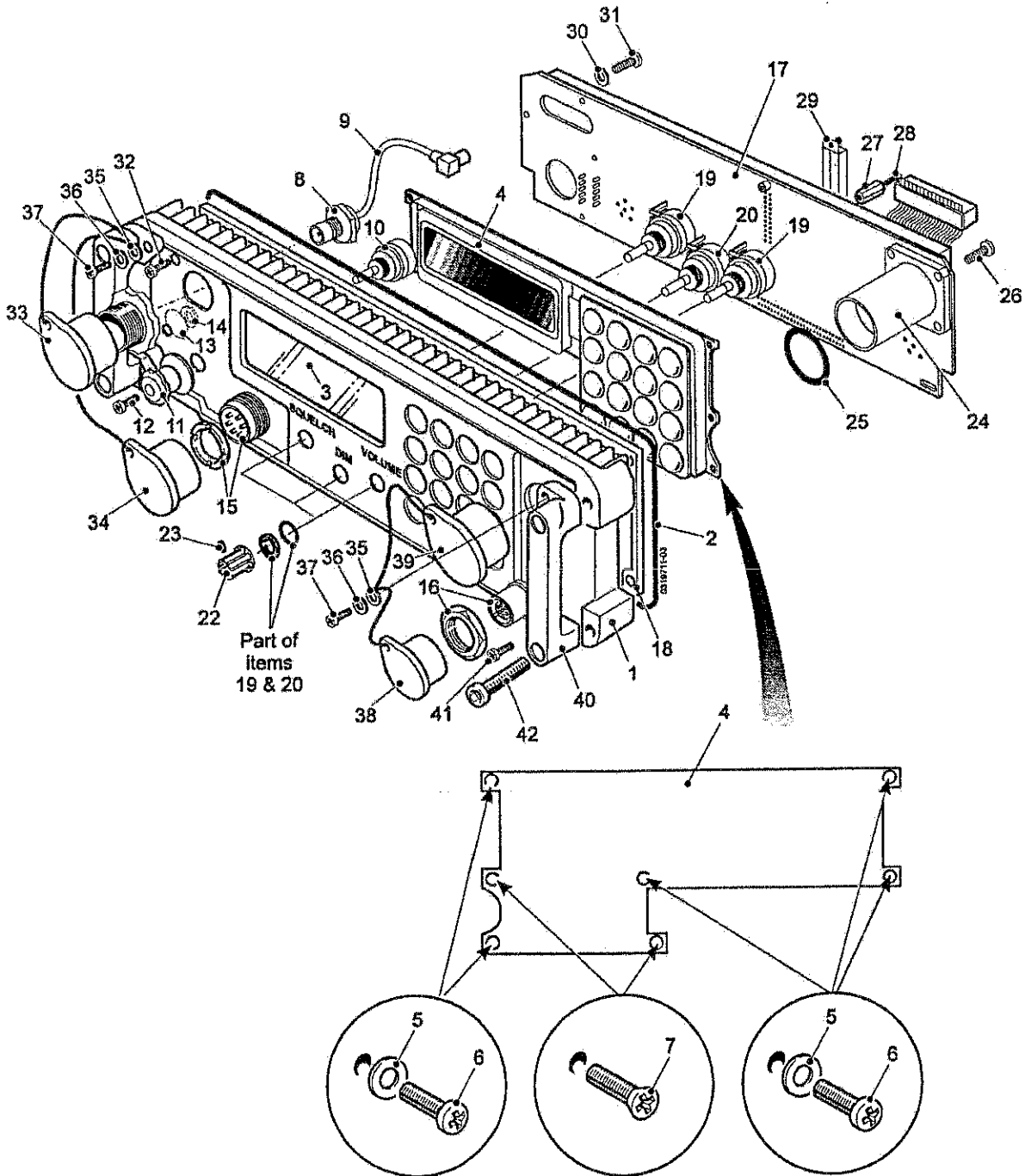


Fig 1 Front panel assembly

PARTS LIST

Fig. 1 Item	DMC Army	NATO stock number	Item name	Part No./ Dwg No.	No. off	Annotation (NSCM)
			UK/RT 346 RECEIVER/ TRANSMITTER (R/T) UNIT FRONT PANEL ASSEMBLY	725886-801	REF	
1		NP	. PANEL, Front	660561-801	1	
2		NP	. GASKET 'O' Ring	336468-3	1	
3		NP	. WINDOW, Protective	336455-3	1	
4		NP	. DISPLAY, Liquid crystal with keypad	726028-801	1	
5	Y2	5310-00-043-4708	. WASHER, FLAT	NAS620C2	5	
6		5305-00-054-5637	. SCREW, MACHINE, steel, pan hd, cross recess, UNC 0.086 x 0.25 in. lg	MS51957-3	5	
7	Z14	5305-00-054-5636	. SCREW, MACHINE, steel, pan hd, cross recess, UNC 0.086 x 0.157 in. lg	MS51959-2	2	
8		NP	. ADAPTER	513770-1	1	
9		NP	. CABLE ASSEMBLY, Coaxial	422595-812	1	
10		NP	. SWITCH, Rotary, Cole	1800-5250- 02	1	
11	Z99	5355-01-409-0793	. KNOB, Modified	145165-1	1	
12		5305-00-490-4581	. SCREW, MACHINE, steel, UNC, 0.138 in. x 0.438 in. lg.	MS51957- 29B	1	
13		NP	. FILTER	828069-3	1	
14		NP	. WASHER, Special	519846-1	1	
15		NP	. CONNECTOR, Filter, MIL-CON	MC283F-3- 025-5	1	
16		NP	. CONNECTOR, Filter, MIL-CON	170153-1	1	
17		NP	. CIRCUIT CARD ASSEMBLY, Front Panel Interface	725888-801	1	

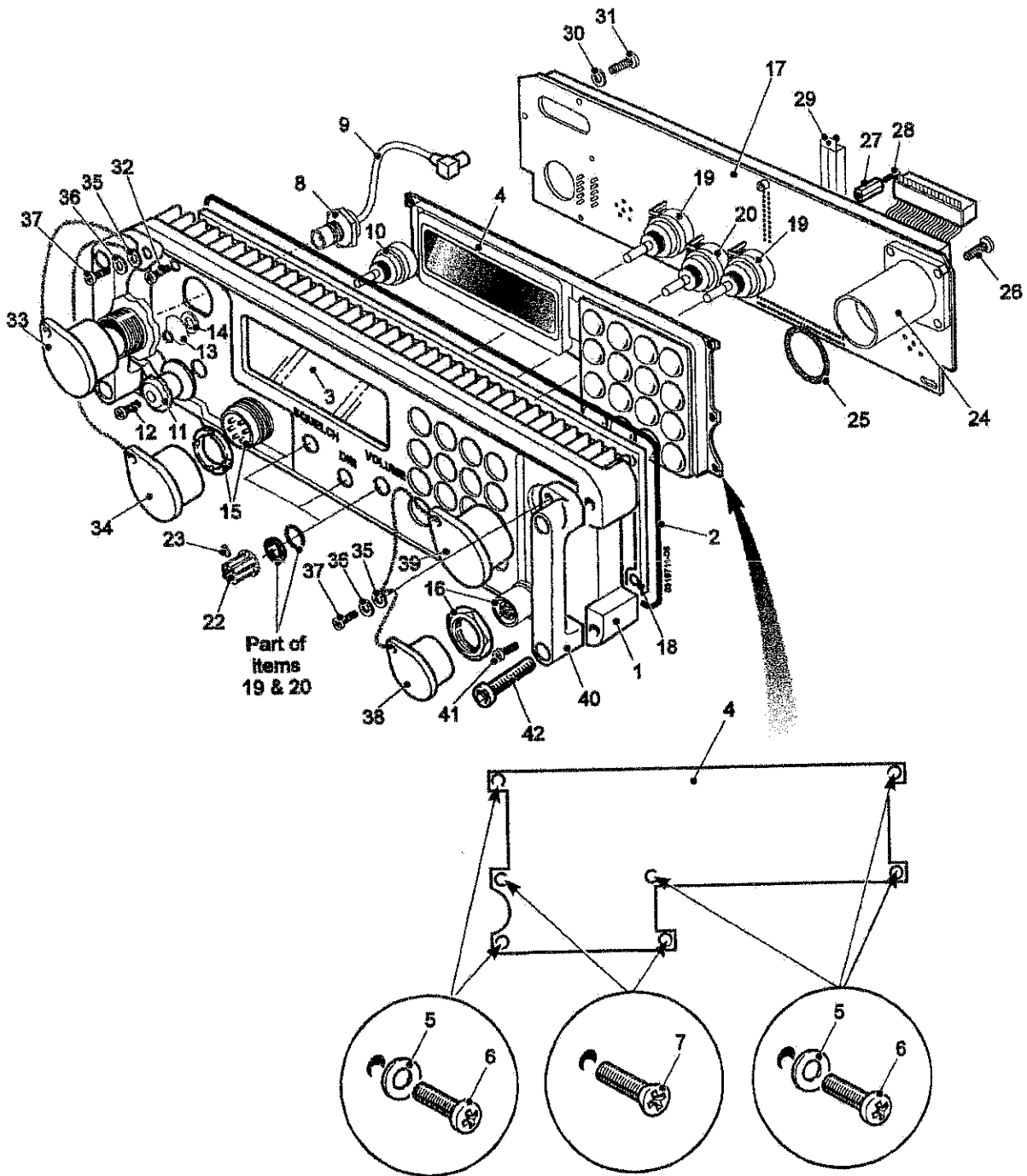


Fig. 1 Front panel assembly

PARTS LIST

Fig. 1 Item	DMC Army	NATO stock number	Item name	Part No./ Dwg No.	No. off	Annotation (NSCM)
			UK/RT 346 RECEIVER/ TRANSMITTER (R/T) UNIT FRONT PANEL ASSEMBLY (continued)	725886-801	REF	
18		TBA	. GUARD, Perimeter	947979-801	1	
19		NP	. RESISTOR, Variable, Composition	CM47386-1	2	
20		NP	. RESISTOR, Variable, Composition	CM47386-2	1	
NI 21		NP	. INSULATOR, TUBE	336782-1	1	
22	Z99	5355-01-409-0798	. KNOB	145164-1	3	
23	4V5	5305-00-719-5329	. SETSCREW, Socket, steel, UNC 0.138 x 0.125 in. lg.	MS51963- 20	3	
24		NP	. CONNECTOR, Filtered AUX. Jerrik	840-082	1	
25		NP	. 'O' RING, Apple	1.0831DX.0 39CS.70BN B	1	
26	G1	5305-00-054-5647	. SCREW, MACHINE, steel, pan hd, cross recess, UNC, 0.112 x 0.25 in. lg	MS51957- 13	4	
27		NP	. SPACER	130810-7	1	
28	Y2	5305-00-763-6009	. SCREW, MACHINE, steel, csk hd, UNC, 0.112 x 0.156 in. lg.	MS24693- C1	1	
29		NP	. INSULATOR	336631-1	1	
30		TBA	. WASHER, FLAT	NAS620C2	1	
31		5305-00-054-5637	. SCREW, MACHINE, steel, pan hd, cross recess, UNC 0.086 x 0.25 in. lg	MS51957-3	1	
32		NP	. SCREW, CAP	NAS1352C 04-3	1	
33	Z99	5935-01-252-0554	. CAP ASSEMBLY, Connector	812187-802	1	

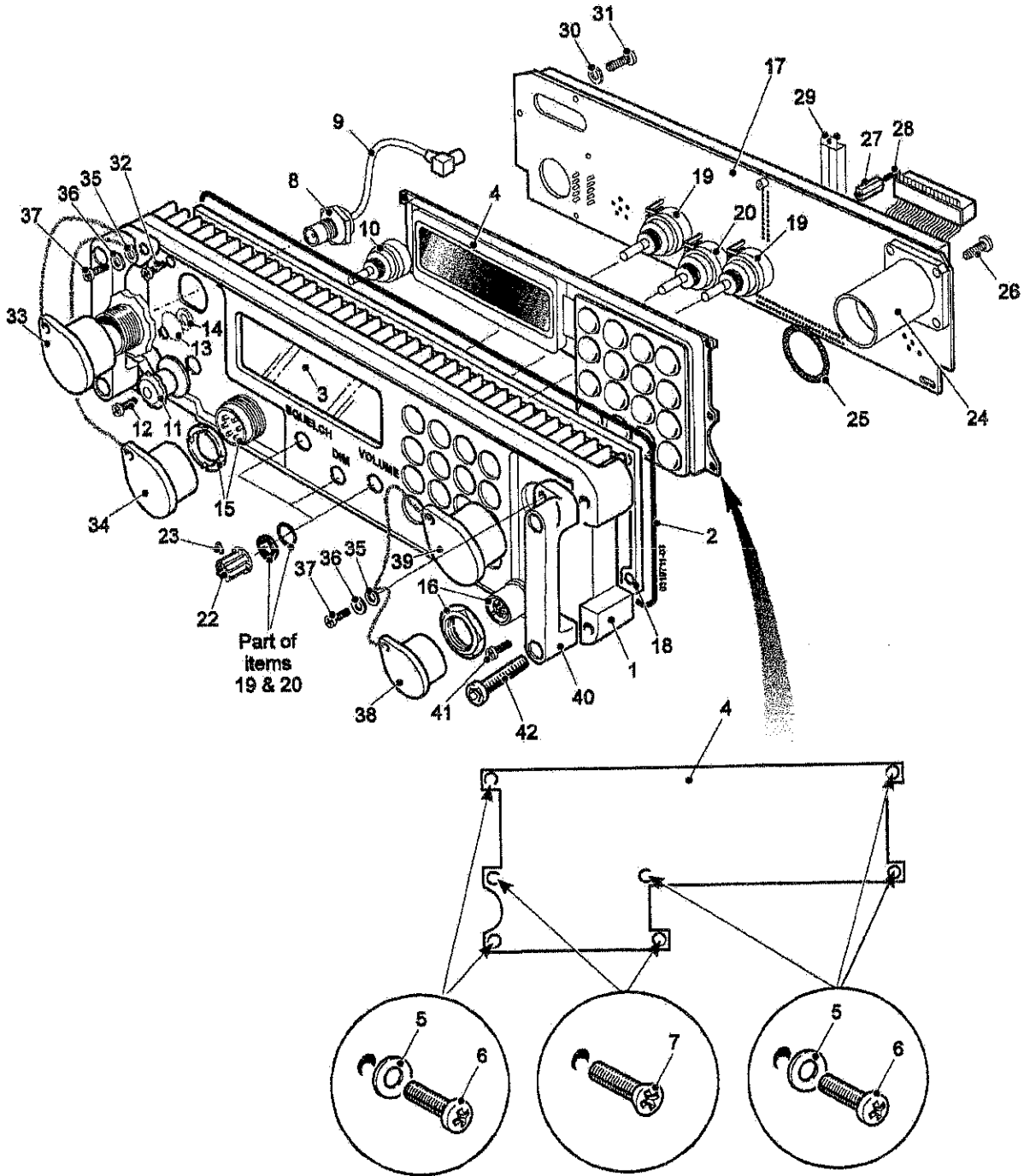


Fig. 1 Front panel assembly

PARTS LIST

Fig. 1 Item	DMC Army	NATO stock number	Item name	Part No./ Dwg No.	No. off	Annotation (NSCM)
			UK/RT 346 RECEIVER/ TRANSMITTER (R/T) UNIT FRONT PANEL ASSEMBLY, (Continued)	725886-801	REF	
34	Z99	5935-01-252-0521	. CAP ASSEMBLY, Connector	812187-805	1	
35		NP	. RETAINER	514919-2	2	
36		NP	. WASHER, FLAT	NAS620C4P	2	
37		5305-00-433-3744	. SCREW, MACHINE, steel, UNC, 0.112 x 0.6 in. lg	MS51957- 18B	2	
38	Z99	5935-01-252-0554	. CAP ASSEMBLY, Connector	812187-802	1	
39	Z99	5935-01-252-0553	. CAP ASSEMBLY, Connector	812187-801	1	
40		NP	. HANDLE	336548-1	2	
41		5305-00-242-7275	. SCREW, MACHINE, steel, UNC 0.112 x 0.35 in. lg	MS51957- 15B	2	
42		NP	. SCREW, CAP, skt hd	NAS1351N3 -32B	4	





CHAPTER 2-2

MANPACK

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**RECORD OF MODIFICATIONS
INCORPORATED IN THIS SUB-CHAPTER**

Modification No.	Amdt No.	Items affected



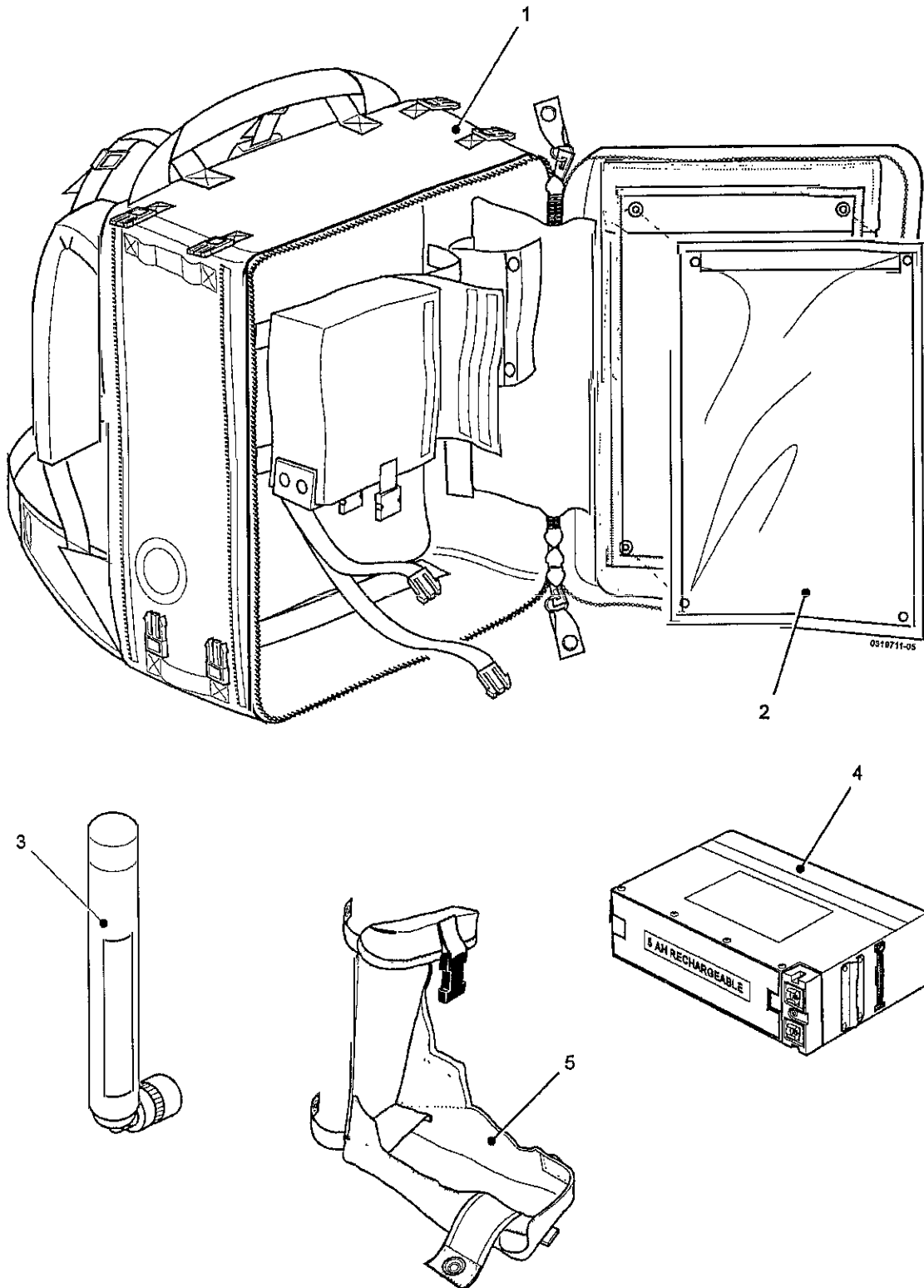


Fig 1 Manpack

PARTS LIST

Fig. 1 Item	DMC Army	NATO stock number	Item name	Part No./ Dwg No.	No. off	Annotation (NSCM)
	Z99	5820-99-573-5060	MANPACK UK/PRC 346	337-120923	REF	
1	Z99	5820-99-573-5074	. CARRY CONTAINER, Type CC2/1	IAC-E-16398	1	
2	Z99	5820-99-573-5075	. CASE, DOCUMENT	IAC-C-15715	1	
3	Z99	5985-99-603-6072	. ANTENNA, BATTLE, V/UHF ASSEMBLY	337-120929	2	
4	Z9 BAT	6140-99-573-5037	. BATTERY, SECONDARY, nickel cadmium, 24V 5Ah	410450	4	
5	Z99	5820-99-538-7710	. POUCH, SPGR, external	IAC-E-16547	1	

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CHAPTER 2-3
REMOTE OPERATION
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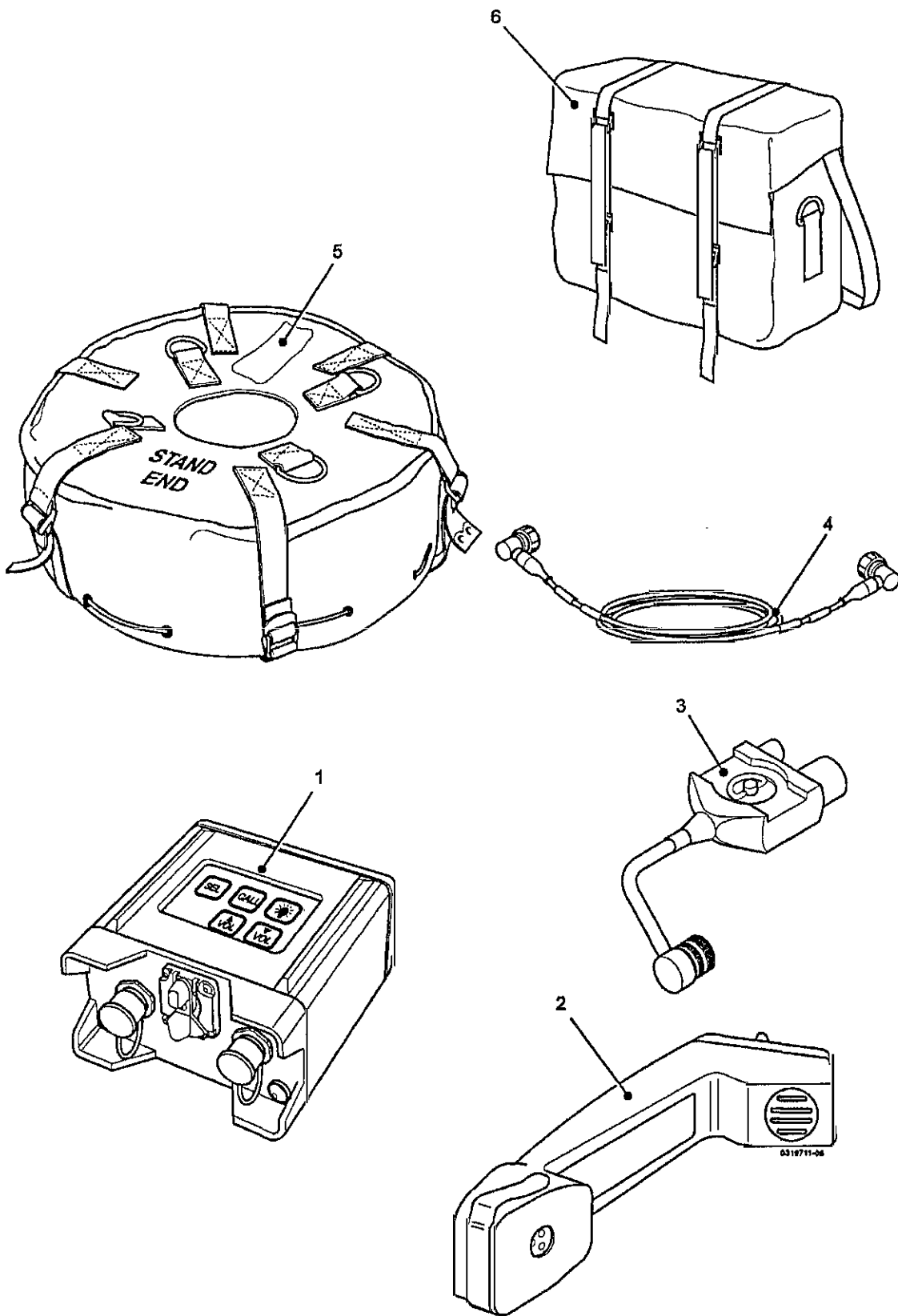


Fig 1 Remote operation

PARTS LIST

Fig. 1 Item	DMC Army	NATO stock number	Item name	Part No./ Dwg No.	No. off	Annotation (NSCM)
	Z99	5820-99-573-5061	REMOTE OPERATION UK/PRC 346	337-120925	REF	
1	Z99	5820-99-926-3726	. REMOTE UNIT LOCAL	KR125021	1	
2	Z42	5965-99-620-5670	. HANDSET, Remote		1	
3	Z99	5820-99-302-1882	. BREAKOUT BOX	337-125020	1	
4	Z99	5995-99-573-5067	. CABLE ASSEMBLY, Special purpose (breakout box - ABR/RUL)	337- 125010/1	1	
5	Y3	8130-99-115-8152	. DISPENSER COIL, D10, 800m	IT/B229729	1	
6	Z1	5820-99-621-9028	. BAG, ANCILLARIES, General purpose	SD/D24405 0	1	

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CHAPTER 2-4
ELEVATED ANTENNA
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- 2-4 ELEVATED ANTENNA
- 2-4-1 ANTENNA BROADBAND ELEVATED
- 2-4-2 GROUND PLANE ASSEMBLY



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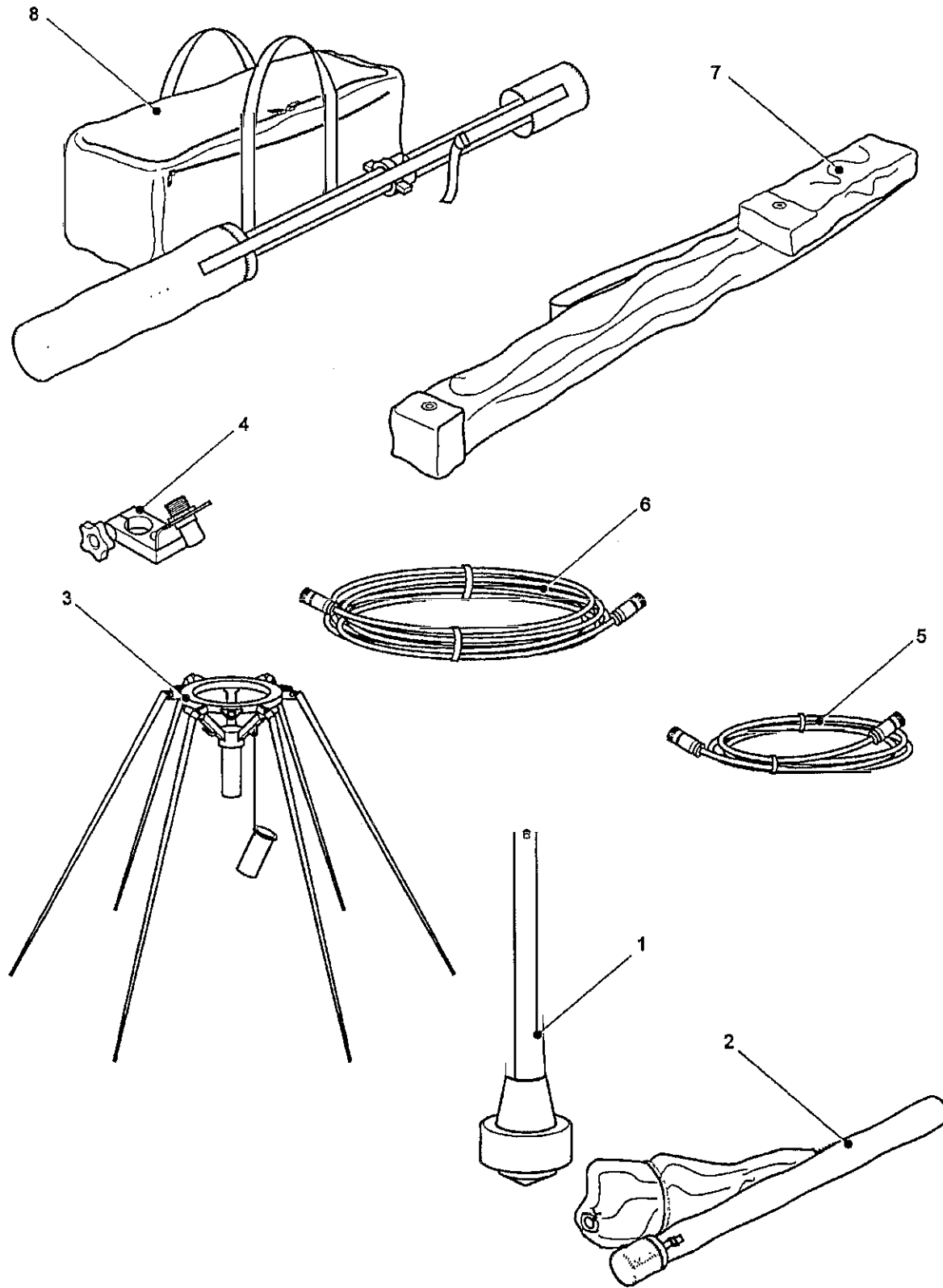


Fig 1 Elevated antenna

PARTS LIST

Fig. 1 Item	DMC Army	NATO stock number	Item name	Part No./ Dwg No.	No. off	Annotation (NSCM)
	Z99	5820-99-573-5062	ELEVATED ANTENNA UK/PRC 346	337-120924	REF	
1	Z99	5985-99-573-5076	. ANTENNA, Broadband, Elevated	041-001	1	See Chap 2-4-1
2	Z99	5820-99-573-8020	. BAG, Elevated antenna	IAC-E- 16496	1	
3	Z99	5820-99-573-5071	. GROUND PLANE ASSEMBLY	041-002	1	See Chap 2-4-2
4	Z99	5820-99-573-5072	. ADAPTOR, Battle antenna	337-120927	1	
5	Z42	5995-99-573-5069	. CABLE ASSEMBLY Radio frequency, 15m	337- 125030/1	1	
6	Z42	5995-99-573-5070	. CABLE ASSEMBLY Radio frequency, 30m	337- 125013/1	1	
7	Z99	5820-99-621-9027	. KIT MAST 5.4m	SDA244008		optional
8	Z99	5820-99-645-0038	. KIT MAST, TELESCOPIC 8 METRE	MA716A		optional
NI 9	Z99	5820-99-573-8019	. BAG, cable carrier	IAC-E- 16497		

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CHAPTER 2-4-1
ANTENNA BROADBAND ELEVATED



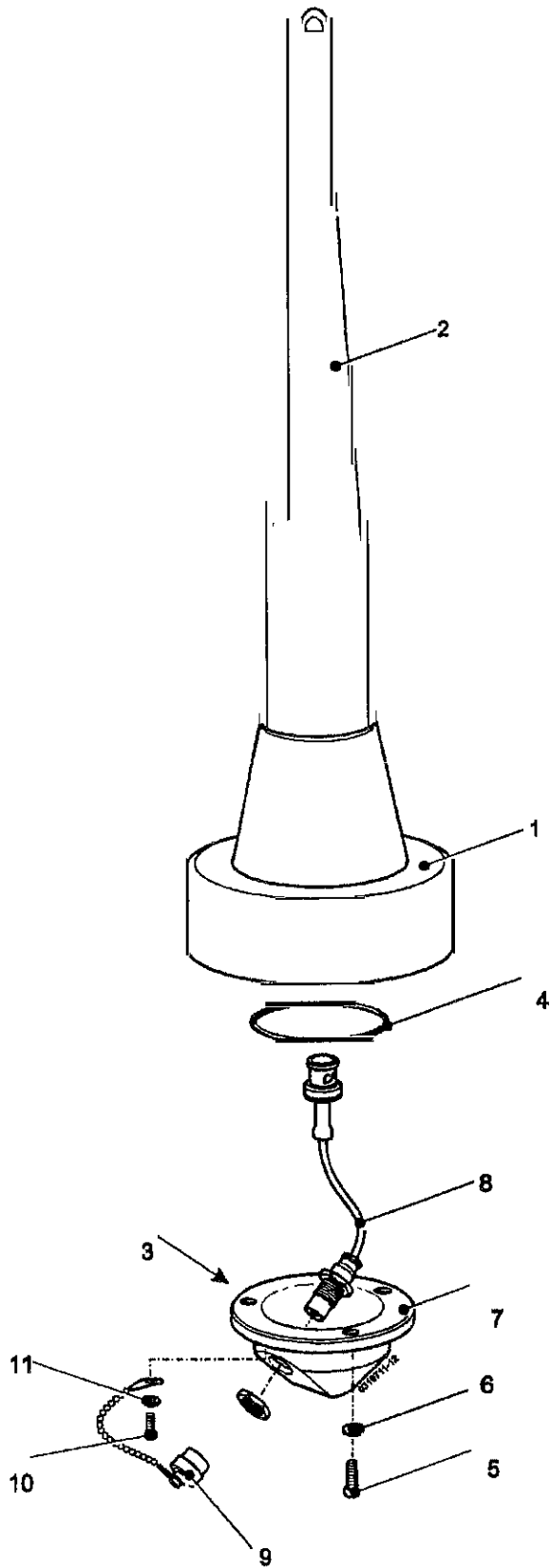


Fig 1 Antenna Broadband Elevated

PARTS LIST

Fig. 1 Item	DMC Army	NATO stock number	Item name	Part No./ Dwg No.	No. off	Annotation (NSCM)
	Z99	5985-99-573-5076	ANTENNA, BROADBAND, ELEVATED	041-001	REF	
1	Z99	5985-99-573-8192	. BASE UNIT ASSEMBLY	041-003	1	
2	Z99	5985-99-573-8193	. ELEMENT, 306 mm	041-018DT	1	
3			. CABLE ADAPTOR ASSEMBLY	041-037	1	
4	Z99	5330-99-707-3182	. 'O' RING, Nitrile, 70 mm	NIT-0610 : 30-041	1	
5	G1	5305-99-122-5338	. SCREW CAP, skt hd, M5 x 16 mm lg	RS 296-1799	3	
6	G1	5310-99-211-3383	. WASHER, LOCK, internal tooth, M5	RS 187-0591	3	
7		5985-99-391-7038	. . ADAPTOR, BNC CONNECTOR CABLE	041-029	1	
8	Z99	5995-99-778-1163	. . BNC CABLE ASSEMBLY	041-030	1	
9	Z99	5935-12-340-3577	. . DUST CAP	62C-0-0-1/3	1	
10	Z99	5305-99-950-6148	. . SCREW, pan hd, M3 x 8 mm lg	RS 281-186	1	
11	G1	5310-99-623-2893	. . WASHER, LOCK, internal tooth, M3	RS 187-0557	1	

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CHAPTER 2-4-2
GROUND PLANE ASSEMBLY
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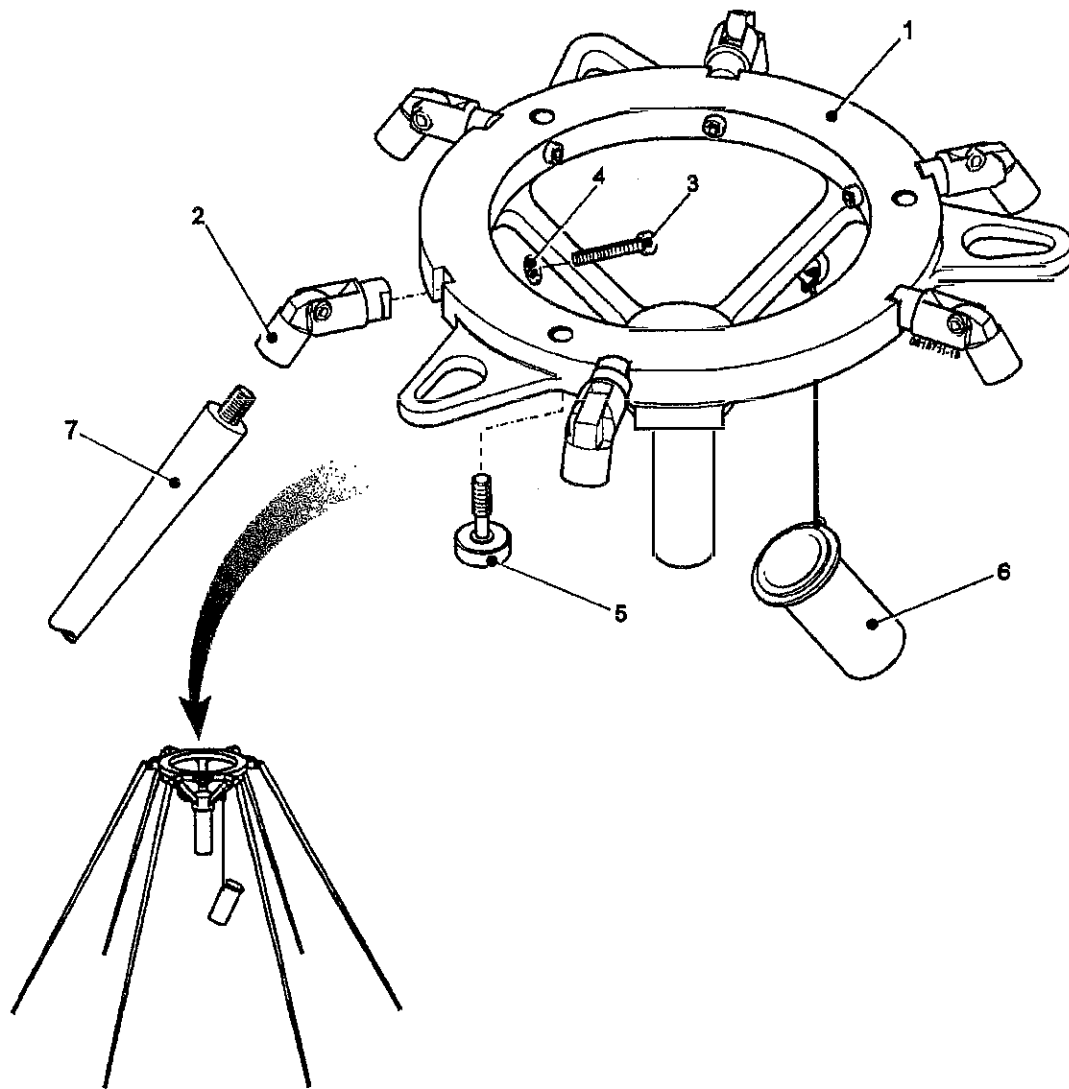


Fig 1 Ground Plane Assembly

PARTS LIST

Fig. 1 Item	DMC Army	NATO stock number	Item name	Part No./ Dwg No.	No. off	Annotation (NSCM)
	Z99	5820-99-573-5071	GROUND PLANE ASSEMBLY	041-002	REF	
1	Z99	5985-99-573-8194	. CASTING, Machined	041-016	1	
2	Z99	5985-99-573-8196	. PIVOT ASSEMBLY, Ground plane	041-039	6	
3	G1	5305-99-122-6447	. SCREW, Cap, skt hd, M5 x 25 mm lg		6	
4	G1	5310-99-211-3383	. WASHER, LOCK, internal tooth, M5	RS 187-0591	6	
5	G1	5305-99-573-8219	. SCREW, CAPTIVE	041-026	3	
6	Z99	5985-99-573-8195	. ADAPTOR, MAST & CORD	041-020	1	
7	Z99	5985-99-573-8197	. ELEMENT, GROUND PLANE	041-004	6	

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CHAPTER 2-5
KEY FILL SUB-SYSTEM
UK/RT346
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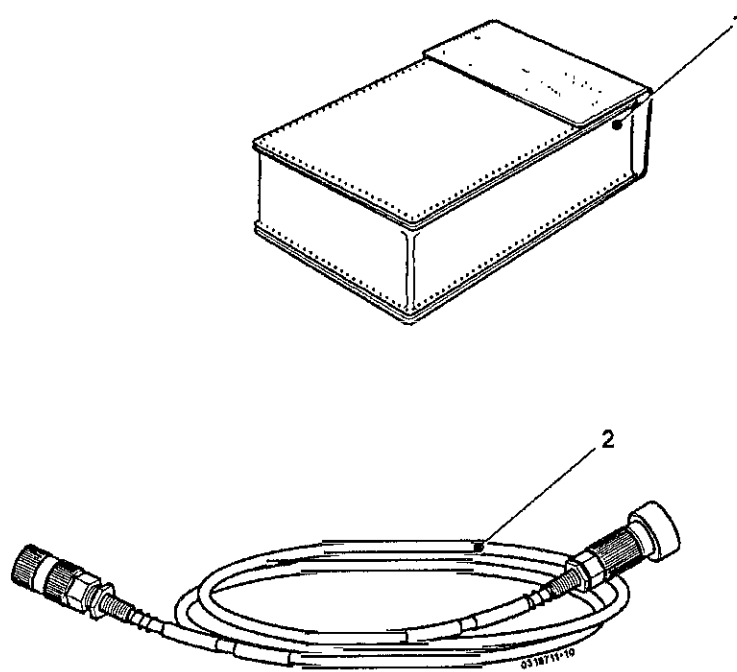


Fig 1 Key fill sub-system



PARTS LIST

Fig. 1 Item	DMC Army	NATO stock number	Item name	Part No./ Dwg No.	No. off	Annotation (NSCM)
	Z99	5820-99-573-5063	KEY FILL SUB-SYSTEM UK/RT 346	337-120921	REF	
1	Y2	5810-99-645-0303	FILL GUN, BID 250/31	SC-A1-30600	1	
2	Y2	5995-99-500-0017	CABLE ASSEMBLY, SPECIAL PURPOSE, UK/PRC 346	SD2/267920	1	

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CHAPTER 2-6
KEY FILL SUB-SYSTEM
PRECISION LIGHTWEIGHT GPS RECEIVER II
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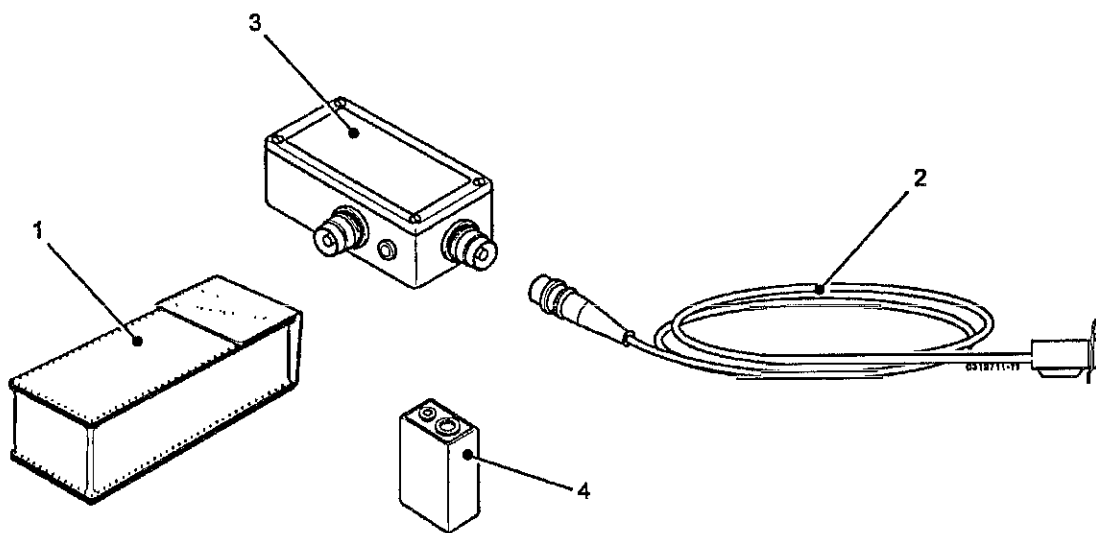


Fig 1 Key fill sub-system Precision lightweight GPS receiver II

PARTS LIST

Fig. 1 Item	DMC Army	NATO stock number	Item name	Part No./ Dwg No.	No. off	Annotation (NSCM)
	Z99	5820-99-573-5064	KEY FILL SUB-SYSTEM PRECISION LIGHTWEIGHT GPS RECEIVER II	337-120922	REF	
1	Y2	5810-99-645-0302	TAPE READER ASSEMBLY, BID 250/2	SD1-251076	1	
2	3W 10	5995-01-450-9254	CABLE ASSEMBLY, SPECIAL PURPOSE, GPS fill	988-3116- 001	1	Rockwell Collins
3	Z99	5963-99-611-1455	ADAPTOR POWER	D93- SK0107	1	
4	Y3B AT	6135-99-634-8080	BATTERY, 9V, PP3	TBA	1	





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AUDIO GEAR
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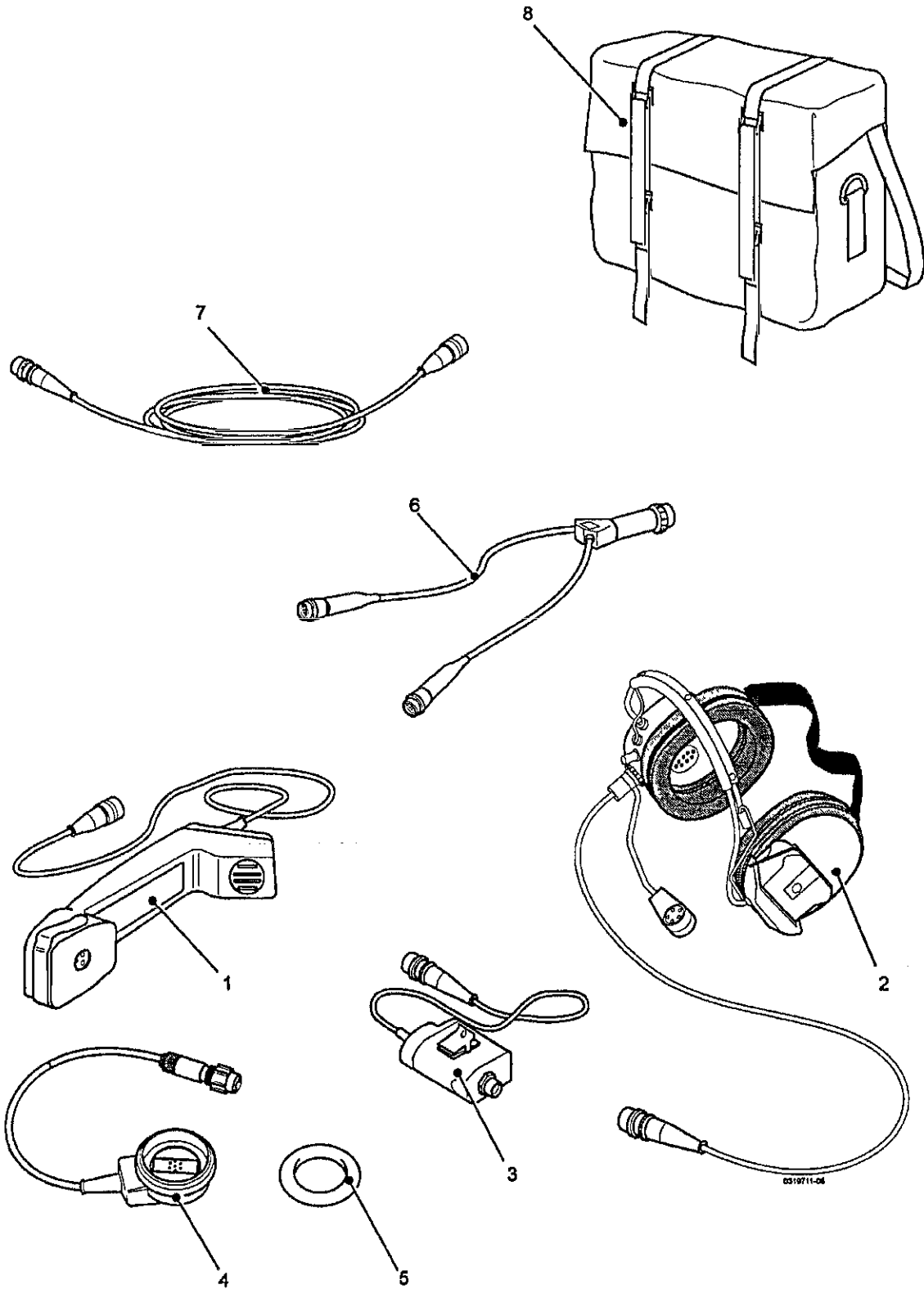


Fig 1 Audio gear

PARTS LIST

Fig. 1 Item	DMC Army	NATO stock number	Item name	Part No./ Dwg No.	No. off	Annotation (NSCM)
	Z99	5820-99-573-5065	AUDIO GEAR UK/PRC 346	337-120915	REF	
1	Z42	5965-99-620-5669	. HANDSET, General purpose	SDC242200	1	
2	Z42	5965-99-620-8320	. HEADSET, MICROPHONE	SD/D22988 0	1	
3	Z42	5965-99-763-7913	. CABLE ASSEMBLY Switch, Electrical	SD/C26944 6 PD	1	
4	Z42	5965-99-738-0886	. MICROPHONE, Respirator		1	
5	Z42	5975-99-647-7368	. ADAPTOR RING, Respirator microphone			
6	Z42	5995-99-573-5066	. CABLE ASSEMBLY, SPECIAL PURPOSE, Audio Y lead	337- 125011/1	1	
7	Z42	5995-99-573-5068	. CABLE ASSEMBLY, SPECIAL PURPOSE, Audio extension	337- 125012/1	1	
8	Z1	5820-99-621-9028	. BAG, ANCILLARIES, General purpose	SD/D24405 0	1	

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CHAPTER 2-8
VEHICLE MOUNTED ANCILLARIES
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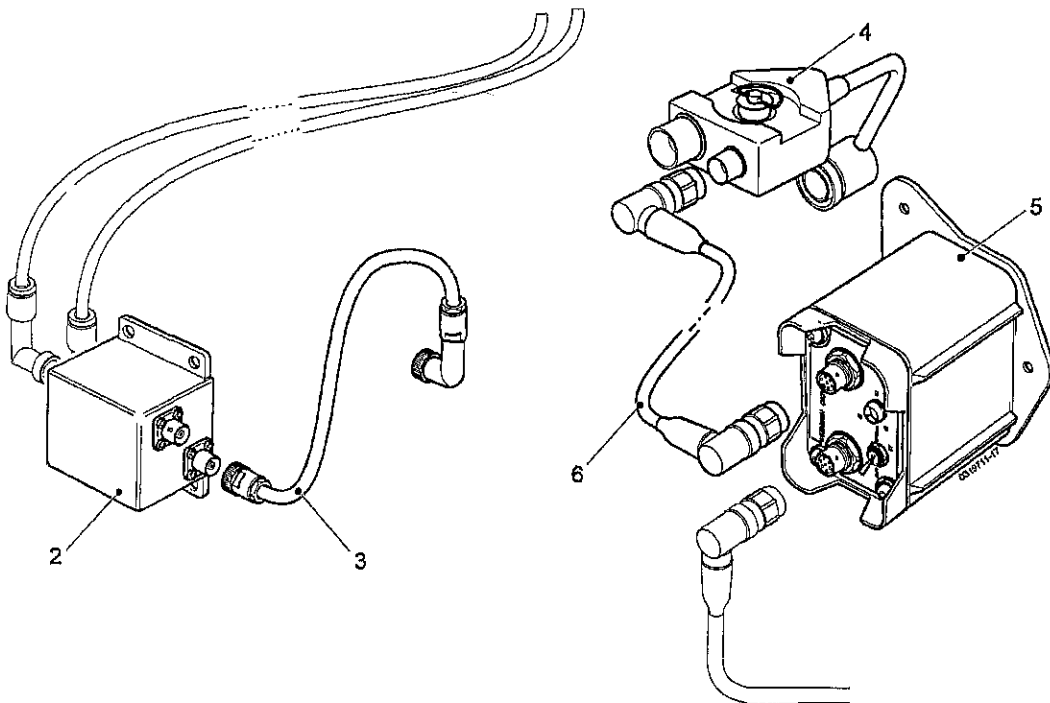
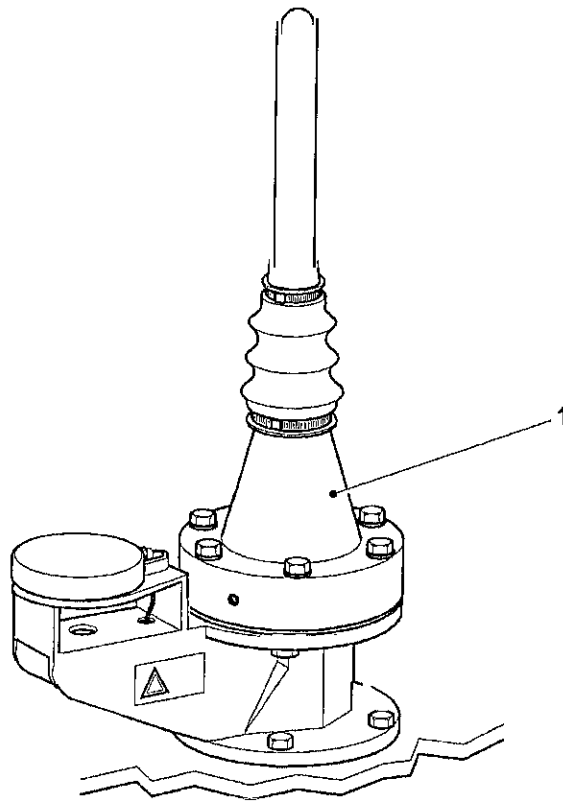


Fig 1 Vehicle mounted ancillaries

PARTS LIST

Fig. 1 Item	DMC Army	NATO stock number	Item name	Part No./ Dwg No.	No. off	Annotation (NSCM)
			VEHICLE MOUNTED ANCILLARIES		REF	
1			VEHICLE ANTENNAS ASSEMBLY		REF	See Fig 1
2	Z99	5915-99-573-5746	FILTER BOX	F2-50BNC	1	
3	Z42	5995-99-573-5713	CABLE ASSEMBLY, radio frequency		1	
4		5820-99-302-1882	BREAKOUT BOX		1	
5	Z99	5820-99-811-9389	ADAPTOR BOX, radio		1	
6(1)	Z42	5995-99-573-5067	CABLE ASSEMBLY, Breakout box to ABR/RUL	FV2232810 /1		
6(2)	Z42	5995-99-573-5710	CABLE ASSEMBLY, Breakout box to ABR/RUL	FV2232810 /2	1	

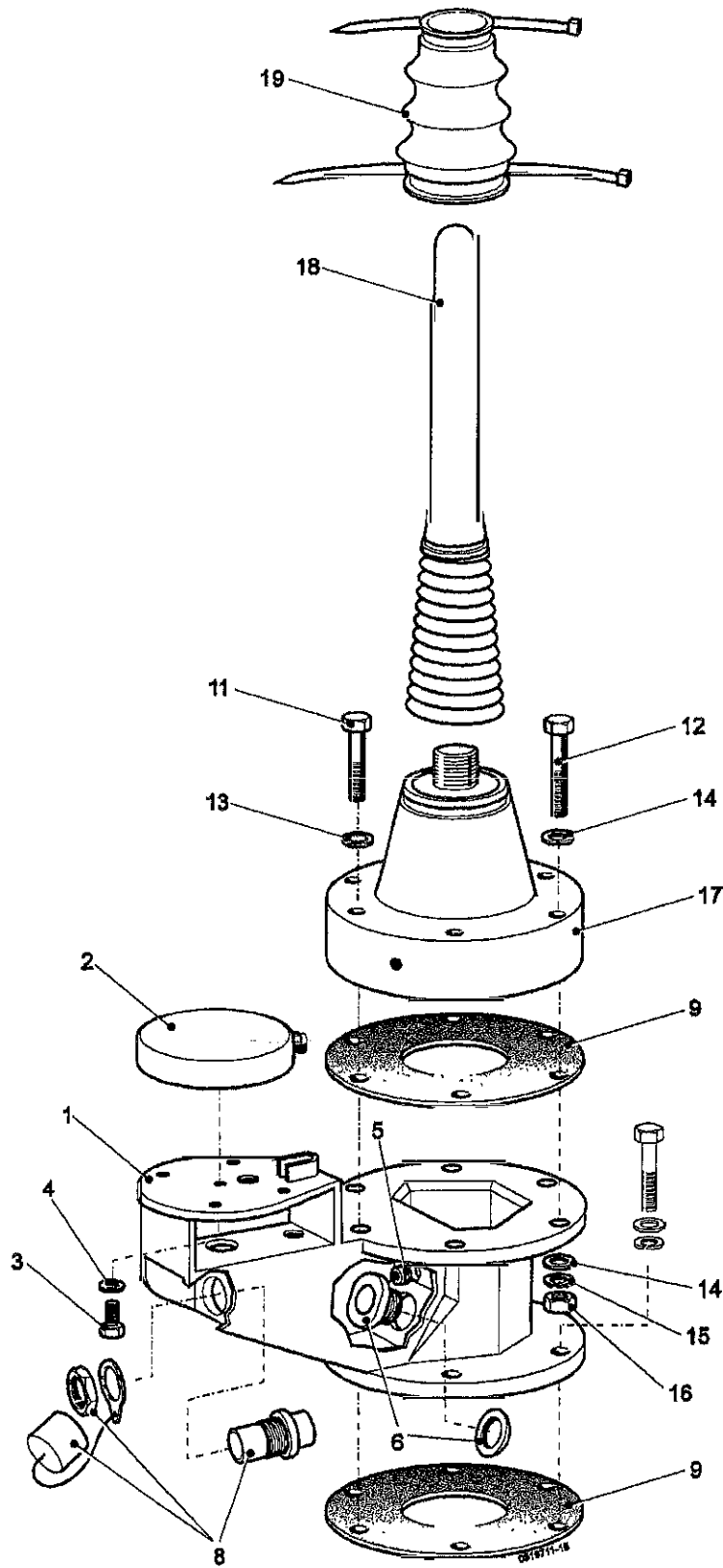


Fig 2 Antenna Assembly

PARTS LIST

Fig. 2 Item	DMC Army	NATO stock number	Item name	Part No./ Dwg No.	No. off	Annotation (NSCM)
			VEHICLE ANTENNAS ASSEMBLY			
1	Z99	5985-99-573-7511	. ANTENNA BRACKET	FV2232834	1	
2	Z99	5985-99-923-9047	. ANTENNA, GPS		1	
3		5305-99-136-4901	. SCREW, hex hd, 10-32 UNF x 5/16"		1	
4	G1	5310-99-914-3879	. WASHER, FLAT, 10-32 UNF		1	
5			. GROMMET, special purpose,	FV2232892	1	
6			. CLAMP, cable, (machined)	FV2232862	1	
NI 7			. SEALANT	DEF CON 17150	A/R	Sillite clear
8		5935-99-573-5715	. ADAPTOR, bulkhead,	FV2232817 /1	1	
9			. GASKET, antenna base	FV2232835	2	
NI 10	Z99	5985-99-573-5076	. ANTENNA, broadband	040-001	1	Comprising items 17, 18 & 19
11	G1	5306-99-135-5250	. BOLT, hex hd, M6 x 60		1	
12	G1	5305-99-122-5251	. BOLT, hex hd, M6 x 65		5	
13	G1	5310-12-156-4956	. WASHER, LOCK, internal tooth, M6		1	
14	G1	5310-99-139-0070	. WASHER, FLAT, M6		10	
15	7RU	5310-99-137-9232	. WASHER, LOCK, s/c, M6		5	
16	7RU	5310-99-122-5295	. NUT, hex, M6		5	
17	Z99	5985-99-573-8192	. . BASE UNIT ASSEMBLY	040-003	1	
18	Z99	5985-99-365-4163	. . ANTENNA ELEMENT, vehicle	040-004	1	
19	Z99	5360-99-242-8611	. . GAITER, NBC, c/w cable ties	041-038	1	

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REMOTE GPS ANTENNA
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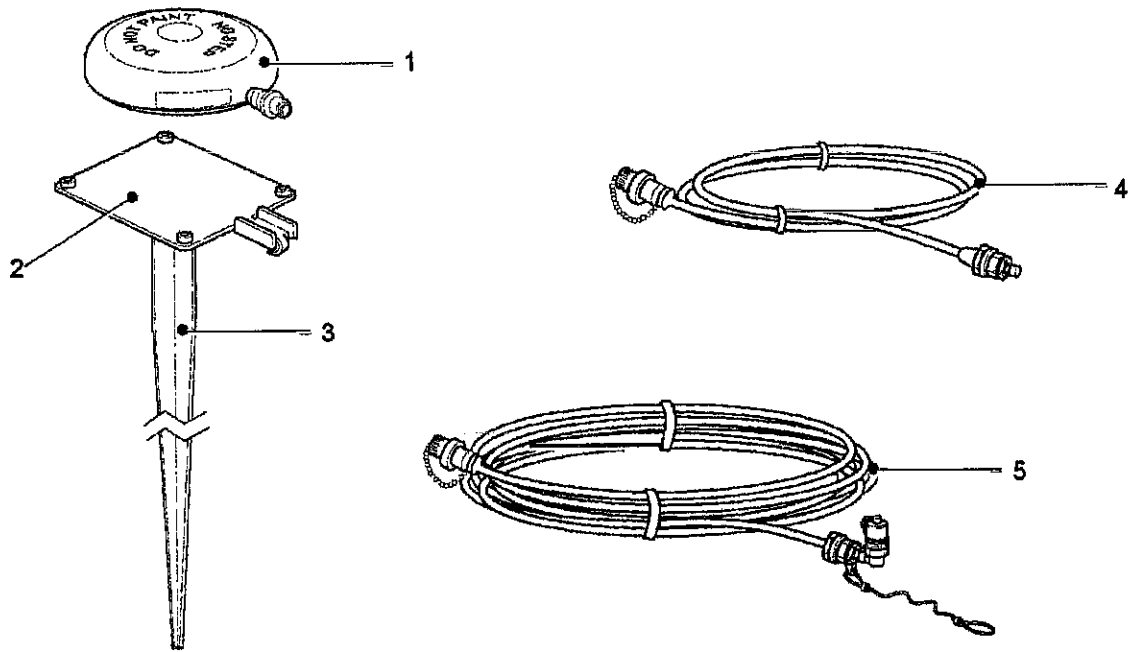


Fig 1 Remote GPS Antenna

PARTS LIST

Fig. 1 Item	DMC Army	NATO stock number	Item name	Part No./ Dwg No.	No. off	Annotation (NSCM)
	Z99	5820-99-660-3561	. REMOTE GPS ANTENNA		REF	
1	Z99	5985-99-805-8968	. . GPS ANTENNA ASSEMBLY, remote	KR125166	1	
2	Z99	5820-99-126-3194	. . PLATE, MOUNTING	KR125165	1	
3	Z99	5820-99-609-8633	. . GROUND SPIKE	KR125164	1	
4	Z42	5995-99-463-4079	. . CABLE ASSEMBLY . GPS adaptor, 1.5 m	KR125167	1	
5	Z42	5995-99-802-0931	. . CABLE ASSEMBLY, remote GPS, 28.5 m	KR125168	1	
NI 6	Z99	5820-99-690-6719	. . BAG, remote GPS carrier	IAC-E-16832	1	

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1 This chapter identifies the number of indexes provided in support of the main Parts List.

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5985-99-923-9047	8	2-2	6135-99-195-6708	1	1-3
5995-01-450-9254	6	1-2	6135-99-634-8080	6	1-4
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TacGA
THE TACTICAL GROUND AIR
COMMUNICATIONS SYSTEM

FAILURE DIAGNOSIS

REPRINTED INCORPORATING AMDTS 1-2

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PREFACE

Sponsor : DGES(A)
Publication Agency : ATSA

INTRODUCTION

1 Service users should forward any comments on this publication through channels prescribed in AESP 0100-P-011-013. An AESP Form 10 is provided at the end of this publication; it should be photocopied and used for forwarding comments on this AESP.

2 AESPs are issued under Defence Council authority and where AESPs specify action to be taken, the AESP will of itself be sufficient authority for such action and also for the demanding of the necessary stores, subject to the provisions of Para 3 below.

3 The subject matter of this publication may be affected by Defence Council Instructions (DCIs), Standing Operating Procedures (SOPs) or by local regulations. When any such instruction, Order or Regulation contradicts any portion of this publication it is to be taken as the overriding authority.

RELATED AND ASSOCIATED PUBLICATIONS

Related publications

4 The Octad for the subject equipment consists of the publications shown overleaf. All references are prefixed by the first eight digits of this publication. The availability of the publications can be checked by reference to the relevant Group Index (see AESP 0100-A-001-013).

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* Category/Sub-category not published

Associated publications

5 The following publications are associated with this Category:

<u>Reference</u>	<u>Title</u>
Signal Engineering Instruction 14411	Safety Precautions for Electrical Equipment
EMER Telecommunications C 740 - 743	Clansman Audio Accessories
EMER Telecommunications L220 - 229	Mast Telescopic 8 m (to be replaced by AESP 5985-C-090)
AC 61656	User Handbook Audio Ancillaries Test Set
ACP 63723	Health and Safety Management in ESO/REME
AESP 4940-P-200-201	General Purpose Electrical Cable Repair Kit (REME)
AESP 5825-D-100	Special Personal GPS Receiver (SPGR)
AESP 5985-C-090	User Handbook Mast Telescopic 8 m
BID 250/1/1	User Handbook BID 250/31
BID/251-2	User Handbook BID 250/2

WARNING

HARMFUL RADIATION. ELECTROMAGNETIC RADIATION CAN CAUSE DAMAGE TO HUMAN TISSUE. WHEN THE RADIO IS TRANSMITTING, MAINTAIN A SAFE DISTANCE FROM THE ANTENNA, OF 220 mm (WHERE PRACTICAL) FOR THE MANPACK AND 300 mm FOR THE VEHICLE AND ELEVATED ANTENNAS.

CAUTIONS

(1) UNAUTHORISED USE. The UK/RT 346 receiver-transmitter unit is capable of extended frequency operation in the ranges 30 to 88 MHz, 100 to 174 MHz VHF AM/FM and 225 to 400 MHz UHF AM/FM. These frequency ranges extend beyond the declared employment bands. Inclusion of this facility does not automatically authorise its use. Such use shall be carefully co-ordinated and approved. The allocation of radio frequencies is governed by widespread military regulations and civilian laws. Any violation of such regulations or laws, or unauthorised use, may render the user liable to prosecution.

(2) EQUIPMENT DAMAGE. Before disconnecting equipment items or assemblies, set the R/T unit mode switch to the OFF position.

ABBREVIATIONS

ABR	... ..	Auxiliary box radio
AM	... ..	Amplitude modulation
BCN	... ..	Beacon
BIT	... ..	Built-in-test
CRCH	... ..	Clamsman radio control harness
FM	... ..	Frequency modulation
HQ	... ..	HAVE QUICK
MWOD	... ..	Multiple word of day
n/c	... ..	Not connected
RF	... ..	Radio frequency
R/T	... ..	Receiver-transmitter
RUL	... ..	Remote unit local
Rx	... ..	Receive
SPGR	... ..	Specialist portable GPS receiver
TOD	... ..	Time-of-day
Tx	... ..	Transmit
UTC	... ..	Co-ordinated universal time
WOD	... ..	Word of day
Z	... ..	(1) Zeroize
		(2) Zulu time

FAILURE DIAGNOSIS

INTRODUCTION

1 The failure diagnosis procedures detailed here are to be carried out when the tests detailed in Cat 532 of this AESP indicate abnormal operation of the UK/PRC 346 radio station or when the radio station is inoperable.

Failure diagnosis procedure format

2 Failure diagnosis for the UK/PRC 346 radio station is presented primarily in the form of tables which detail the faults which may occur and for each fault identifies the possible cause and appropriate corrective action required.

3 Connector pin signals for the connecting cables, including the breakout box and BID250/2 power adaptor, are given in Paras 12 to 21 and the pin locations in Figs 1 to 6.

Tools and equipment

4 The tools and equipment required to carry out the inspection standards detailed in this category are listed in Table 1.

TABLE 1 TOOLS AND EQUIPMENT

Serial (1)	NATO stock number (2)	Description (3)	Use (4)
1	-	Radio set capable of transmitting signals to and receiving signals from the TacGA radio system, including normal and HQII signals.	Functional talk checks. NOTE: The operator of the radio set must be informed of the AM/FM operating frequencies and/or HQ WOD/MWODS (as required) to be used for the checks.
2	5820-99-573-5063	BID 250/31 fill kit.	HQ II MWOD electronic fill.
3	6625-99-620-3593	Test set audio ancillaries (AATS).	RUL functional check.
4	Z99/5963-99-562-1826	Test adaptor RUL-AATS (UK/PRC 346).	RUL functional check.
5	Z99/5995-99-261-5158	Cable assembly, test adaptor to RUL.	RUL functional check.

FAILURE DIAGNOSIS PROCEDURES**NOTE**

Before replacing a suspect equipment item, check the associated cable connections.

- 5 To carry out initial failure diagnosis of the UK/PRC 346 radio station, proceed as follows:
- 5.1 Run the R/T unit off-line BIT (built-in test) as detailed in Cat 201 Chap 4 of this AESP.
- 5.2 Exchange the handset (or headset and pressel box) with a known good unit and carry out an operational check.
- 5.3 According to the station configuration, refer to the appropriate paragraph as follows:
- 5.3.1 Manpack station: Para 6.
- 5.3.2 Vehicle station with ABR: Paras 7 and 8.
- 5.3.3 Remote operation kit: Paras 9 and 10.
- 5.3.4 Elevated antenna system: Para 11.

Manpack station

- 6 To identify a fault in the manpack station, refer to Table 2.

TABLE 2 UK/PRC 346 STATION - FAILURE DIAGNOSIS

Serial (1)	Fault (2)	Possible cause (3)	Action (4)
	<u>START UP</u>		
1	No display visible on R/T unit display screen.	R/T unit switched off. Defective or flat battery. Defective R/T unit.	Set R/T unit mode switch to ON. Replace the battery. Replace the R/T unit.
2	BIT Failure: the R/T unit display shows a BIT FAULT message and the possible affected modules.	Defective R/T unit.	Set the R/T unit mode switch to OFF and repeat the test. If the fault persists, replace the R/T unit.
	<u>NORMAL MODE Tx/Rx</u>		
3	No audible signal in handset/headset earpiece.	SQUELCH control incorrectly adjusted. Defective audio gear or R/T unit.	Adjust SQUELCH control. Replace the defective item.
4	Failure to transmit.	Defective audio gear or R/T unit.	Replace the defective item.

(continued)

TABLE 2 UK/PRC 346 STATION - FAILURE DIAGNOSIS (continued)

Serial (1)	Fault (2)	Possible cause (3)	Action (4)
5	OPERATE screen indicates Tx power below selected level.	Defective R/T unit.	Replace the R/T unit.
6	No sidetone heard in earpiece during Tx.	Defective audio gear or R/T unit.	Replace the defective item.
7	OPERATE screen indicates Rx signal level inadequate.	Defective antenna, RF cabling or R/T unit.	Replace the defective item.
8	No receive audio in earpiece. <u>HQ MODE</u>	Defective audio gear or R/T unit.	Replace the defective item.
9	Electronic fill failure.	BID 250/31 device not pre-loaded with MWODS. Defective R/T unit, BID 250/31 or fill cable.	Load BID 250/31. Replace the defective item.
10	No GMT (Z) time displayed.	SPGR not receiving TOD. Defective R/T unit, SPGR, interface cable or snatch adaptor.	Check/remedy GPS system. Replace the defective item.
11	OPERATE screen Line 2 (Crypto key field) does not display "W-T".	Incorrect WOD/TOD loading procedures. Defective SPGR.	Reload WOD/TOD using correct procedures. Replace the SPGR.
12	No HQII reception. <u>ERASING MWODS (ZEROISING)</u>	Invalid HQII variables entered. Defective R/T unit.	Reload correct variables as necessary. Replace the R/T unit.
13	MWODS and/or TOD still stored in memory.	Insufficient time allowed for zeroising. Defective R/T unit.	Set the R/T unit mode switch to the Z position. Wait until the screen shows ZEROIZED. Reset the mode switch as desired. Replace the R/T unit.

Vehicle station with ABRNormal radio operation

7 To identify a fault when carrying out normal radio operation for vehicle stations fitted with the ABR, proceed as follows:

- 7.1 Connect the audio gear direct to the R/T unit AUDIO connector and check for correct operation.
- 7.2 According to the outcome, carry out one of the following:
 - 7.2.1 Where the fault persists, refer to Table 2.
 - 7.2.2 Where the fault clears, refer to Table 3.

TABLE 3 VEHICLE AUDIO/ABR - RADIO FAILURE DIAGNOSIS

Serial (1)	Fault (2)	Possible cause (3)	Action (4)
1	One or more ABR lamps fail to illuminate.	Defective UK/PRC 346 equipment item.	Refer to Serial 5.
2	ABR RX (yellow) lamp fails to extinguish.	R/T unit unsquelched. Defective UK/PRC 346 equipment item.	Rectify condition of R/T unit. Refer to Serial 5.
3	ABR TX (red) lamp fails to extinguish.	Audio gear pressel switch active. Defective UK/PRC 346 equipment item.	Rectify condition of pressel switch. Refer to Serial 5.
4	R/T fails to display TX (ABR TX lamp illuminated).	Defective UK/PRC 346 equipment item.	Refer to Serial 5.
5	Defective UK/PRC 346 equipment item.	Defective breakout box or breakout box to ABR cable. Defective ABR. Defective R/T unit.	Check breakout box and/or breakout box to ABR cable as necessary. Replace ABR. Replace R/T unit.

Rebroadcast and break in operation

8 To identify a fault when carrying out rebroadcast or break in operation for vehicle stations fitted with the ABR and IB2, proceed as follows:

8.1 Carry out the failure diagnosis for normal radio operation (Para 7).

8.2 Where the fault persists, refer to Table 4.

TABLE 4 MOUNTED MANPACK WITH ABR AND IB2 - REBROADCAST AND BREAK IN FAILURE DIAGNOSIS

Serial (1)	Fault (2)	Possible cause (3)	Action (4)
1	<p><u>ABR TRAFFIC MODE SWITCH SET TO AUTO</u></p> <p>ABR TX (red) lamp fails to illuminate.</p>	<p>Signal destined for ABR not present on CRCH, due to incorrect operating/test procedure.</p> <p>Defective audio equipment item.</p>	<p>Carry out correct procedure.</p> <p>Refer to Serial 3.</p>
2	<p>Signal not passed from ABR to CRCH (ABR RX (yellow) lamp illuminates).</p>	<p>Defective audio equipment item.</p>	<p>Refer to Serial 3.</p>
3	<p>Defective audio equipment item.</p>	<p>Defective ABR to CRCH cable.</p> <p>Defective CRCH.</p> <p>Defective ABR.</p>	<p>Check cable.</p> <p>Check CRCH.</p> <p>Replace ABR.</p>
4	<p><u>ABR TRAFFIC MODE SWITCH SET TO NORMAL</u></p> <p>UK/PRC 346 on Rx rebroadcast activity continues when not selected.</p>	<p>Defective ABR.</p>	<p>Replace ABR.</p>

Remote operation kit

9 To diagnose a fault in the remote operation kit, refer to Table 5.

TABLE 5 REMOTE OPERATION KIT - FAILURE DIAGNOSIS

Serial (1)	Procedure (2)	Result (3)	Possible cause (4)	Action (5)
1	Is the RUL FLT light illuminated?	Yes	—	Refer to Serial 2.
		No	—	Refer to Serial 5.
2	Is the fault tone audible in the earpiece?	Yes	—	Refer to Serial 3.
		No	—	Refer to Serial 4.
3	Exchange the field wire connections to the RUL.	Fault persists	D10 line short circuit.	Check/repair D10 line.
			RUL suspect.	Refer to Para 9.
4	Switch off the UK/PRC 346 R/T unit. Wait until the RUL lamps extinguish, then switch the R/T unit back on.	Fault persists	RUL suspect.	Refer to Para 9.
5	Connect the local audio gear directly to the R/T unit AUDIO connector and carry out an operational check.	Fault persists	R/T unit or audio gear suspect.	Refer to Table 2.
			Breakout box failed.	Replace breakout box.
			RUL suspect.	Refer to Para 9.

RUL functional tests

10 The functional tests of the RUL are carried out using the test set audio ancillaries (AATS) and AATS to RUL adaptor. To carry out the functional testing of the RUL, proceed as follows:

10.1 To carry out the test set SELF CHECK, refer to the test set accompanying instructions Page 4 Para 4.

10.2 Connect the RUL RADIO connector to the AATS to RUL adaptor. Connect the adaptor to the test set T/R connector.

10.3 Connect the RUL AUDIO connector to the test set HEADSET connector.

10.4 Set the POWER switch on. Check that all RUL lamps illuminate, the LOC lamp remains illuminated and after 2 sec all other RUL lamps extinguish. Set the POWER switch off.

10.5 For each of the following tests, refer to the Table given. For each test Serial set up the switches as given, set the POWER switch on, obtain the result given and set the POWER switch off.

10.6 Carry out the tests detailed in Table 6.

TABLE 6 RUL FUNCTIONAL TESTS (1)

Serial (1)	RUL Mode (2)	RUL I/f Squelch (3)	Test set			
			Function (4)	Phone (5)	Pressel (6)	Result (7)
1	IC	OFF	CRL/R.RX	LEFT	OFF	Meter settles in BLACK. High pitch tone in test set speaker.
2	IC	OFF	CRL/R.RX	LEFT	ON	Meter settles in BLACK. Low pitch tone in test set speaker.
3	LOC	OFF	CRL/R.RX	LEFT	ON	Meter reads beyond GREEN. Low pitch tone in test set speaker.
4	BK-IN	OFF	CRL/R.RX	RIGHT	ON	Meter reads beyond GREEN. Low pitch tone in test set speaker. RUL VOL ▲ and ▼ keys adjust the tone volume.
5	LOC	OFF	CRL/R.RX	RIGHT	ON	Meter reads beyond GREEN. Low pitch tone in test set speaker. RUL VOL ▲ and ▼ keys adjust the tone volume.
6	REM	OFF	CRL/R.RX	RIGHT	ON	Meter reads beyond GREEN. Low pitch tone in test set speaker.

- 10.7 Connect the RUL field wire terminals to the test set LINE terminals.
- 10.8 Carry out the tests detailed in Table 7.

TABLE 7 RUL FUNCTIONAL TESTS (2)**NOTE**

Before proceeding to Serial 5 or to Serial 6, press the RUL CALL button to extinguish the CALL and FLT lamps.

Serial (1)	RUL Mode (2)	RUL i/f Squelch (3)	Test set			
			Function (4)	Phone (5)	Pressel (6)	Result (7)
1	IC	OFF	CRL/R.TX	LEFT	OFF	Meter settles in BLACK. Low pitch tone in test set speaker.
2	LOC	OFF	CRL/R.TX	LEFT	OFF	Meter settles in BLACK.
3	LOC	OFF	CRL/R.TX	LEFT	ON	Meter reads beyond GREEN. slight tone in test set speaker.
4	IC	OFF	CRL/R.CALL	LEFT	OFF	Meter settles in BLACK. Call tone in test set speaker. RUL CALL lamp flashes. After 5 sec, the RUL FLT lamp illuminates.
5	REM (See Note)	OFF	CRL/R.CALL	LEFT	OFF	Meter settles in BLACK. Call tone in test set speaker. RUL CALL lamp flashes. After 5 sec, the RUL FLT lamp illuminates.
6	LOC (See Note)	OFF	CRL/R.CALL	LEFT	OFF	Meter settles in BLACK. Call tone in test set speaker. RUL CALL lamp flashes. After 5 sec, the RUL FLT lamp illuminates.

- 10.9 Disconnect the RUL AUDIO connector from the test set HEADSET connector.
- 10.10 Press the RUL CALL button to extinguish the CALL and FLT lamps.
- 10.11 Carry out the tests detailed in Table 8.

TABLE 8 RUL FUNCTIONAL TESTS (3)

NOTES

- (1) Before proceeding to Serial 1, press the RUL CALL button to extinguish the CALL and FLT lamps.
- (2) For Serial 3, if the RUL CALL lamp flashes and the FLT lamp illuminates, reverse the field wire connections to the RUL, press the RUL CALL button and repeat the test.

Serial (1)	RUL Mode (2)	RUL i/f Squelch (3)	Test set			Result (7)
			Function (4)	Phone (5)	Pressel (6)	
1	REM (See Note 1)	OFF	CRL/R.TX	LEFT	ON	Meter reads beyond GREEN. Low pitch tone in test set speaker.
2	AUTO	OFF	CRL/R.TX	LEFT	ON	Meter reads beyond GREEN. Low pitch tone in test set speaker.
3	AUTO (See Note 2)	ON	REM	LEFT	OFF	Meter reads in GREEN. No tone in test set speaker.
4	AUTO	OFF	CRL/R.TX	LEFT	ON	First momentary press of RUL lamp button extinguishes all RUL lamps. Second momentary press of RUL lamp button illuminates AUTO lamp.
5	CALL (IC)	OFF	CRL/R.RX	LEFT	ON	Meter remains in BLACK. Call tone in test set speaker. RUL CALL lamp flashes. After 5 sec, the RUL FLT lamp illuminates.
6	REM	OFF	CRL/R.RX	LEFT	OFF	Meter settles in BLACK. No tone in test set speaker.

Elevated antenna

- 11 To diagnose a fault in the elevated antenna system, proceed as follows:
 - 11.1 Check all RF cables and connections.
 - 11.2 Remove the antenna base and inspect the antenna cable adapter items.

CABLE CONNECTOR PIN SIGNALS

12 The connector pin signals present on the ancillary cables, including the breakout box and SPGR fill adaptor, are detailed in the following paragraphs. Physical connector terminal identification diagrams are given as Figs 1 to 6.

SPGR interface cable

13 The SPGR interface cable signal lines are identified in Table 9. The connector contact locations are shown in Figs 1 and 4.

TABLE 9 SPGR INTERFACE CABLE - CONNECTOR PIN SIGNALS

Serial (1)	Signal (2)	AUX connector pin (3)	Snatch connector pin (4)
1	TOD	10	6
2	Ground	11	5
3	Supply 0 V	16	1
4	Supply +24 V	17	7
5	Not used	23	3
6	CLOCK	24	2
7	Ground	33	n/c
8	Earth	Screen	n/c

SPGR snatch adaptor

14 The SPGR snatch adaptor signal lines are identified in Table 10. The connector contact locations are shown in Figs 3, 4 and 5.

TABLE 10 SPGR SNATCH ADAPTOR - CONNECTOR PIN SIGNALS

Serial (1)	Signal (2)	Snatch connector pin (3)	SPGR D sub connector pin (4)	SPGR power jack connector pin (5)
1	Supply 0 V	1	n/c	Outer
2	CLOCK	2	15	n/c
3	Not used	3	14	n/c
4	Ground	5	3, 13	n/c
5	TOD	6	7	n/c
6	Supply +24 V	7	n/c	Inner

Audio extension and splitter cables

15 The audio extension and splitter cables are connected pin-for-pin. The cables are fully screened. The connector contact locations are shown in Fig 2.

Breakout box

16 The breakout box signal lines are identified in Table 11. The connector contact locations are shown in Figs 1 and 2.

TABLE 11 BREAKOUT BOX - CONNECTOR PIN SIGNALS

Serial (1)	Signal (2)	R/T AUX connector pin (3)	SPGR AUX connector pin (4)	ABR/RUL AUDIO connector pin (5)
1	Return	2	n/c	B
2	PHONE	9	9	D
3	TOD	10	10	n/c
4	Return	11	11	n/c
5	Return	16	16	E
6	Supply +24 V	17	17	C
7	SQIND	18	18	G
8	MIC	22	22	A
9	SDAT OUT	23	23	n/c
10	SDAT IN	24	24	n/c
11	PRESSEL	30	30	F
12	SDAT IN/OUT screen	33	33	n/c
13	Earth	Screen	Screen	Screen

Breakout box to ABR/RUL cable

17 The breakout box to ABR/RUL cable is connected pin-for-pin. The cable is fully screened. The connector contact locations are shown in Fig 2.

R/T unit fill cable

18 The R/T unit fill cable is connected pin-for-pin. The cable is fully screened. The connector contact locations are shown in Fig 6.

SPGR fill cable

19 The SPGR fill cable signal lines are identified in Table 12. The cable is fully screened. The connector contact locations are shown in Figs 3 and 6. Unused connector pins are not connected (n/c).

TABLE 12 SPGR FILL CABLE - CONNECTOR PIN SIGNALS

Serial (1)	Signal (2)	Power adaptor connector pin (3)	SPGR data connector pin (4)
1	REF	A	4
2	SENSE	B	5
3	REQ	C	9
4	DATA	D	8
5	CLOCK	E	10
6	Earth	Screen	Screen

BID 250/2 power adaptor

20 The BID 250/2 power adaptor signal lines are identified in Table 13. The connector contact locations are shown in Fig 6.

TABLE 13 BID 250/2 POWER ADAPTOR - CONNECTOR PIN SIGNALS

Serial (1)	Signal (2)	BID 250/2 FILL connector pin (3)	SPGR FILL connector pin (4)
1	REF	A	A
2	SENSE	B	B
3	REQ	C	C
4	DATA	D	D
5	CLOCK	E	E
6	POWER	F	n/c

ABR to CRCH IB2/3 cable

21 The ABR to CRCH IB2/3 cable signal lines are identified in Table 14. The connector contact locations are shown in Fig 2.

TABLE 14 ABR TO CRCH IB2/3 CABLE - CONNECTOR PIN SIGNALS

Serial (1)	Signal (2)	ABR HARNESS connector pin (3)	IB2/3 connector pin (4)
1	MIC +	A	A
2	MIC -	B	B
3	n/c	C	C
4	PHONE +	D	D
5	PHONE -	E	E
6	n/c	F	F
7	n/c	G	G

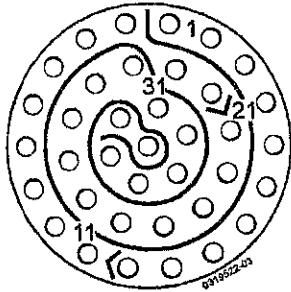


Fig 1 AUX connector contact locations
Male (external), Female (internal)

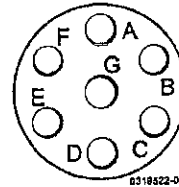


Fig 2 Audio connector contact locations
Male (external), Female (internal)

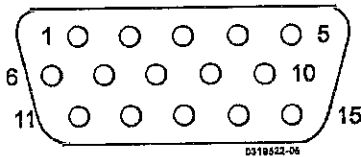


Fig 3 SPGR data connector contact locations
Male (external), Female (internal)

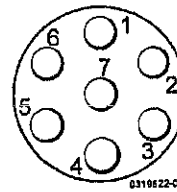


Fig 4 Snatch connector contact locations
Male (external), Female (internal)

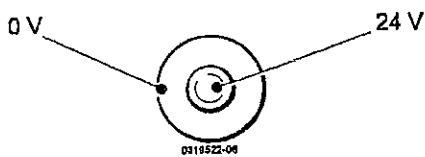


Fig 5 SPGR power jack contact locations

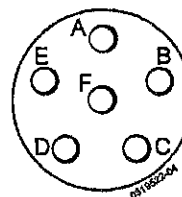


Fig 6 FILL connector contact locations
Female shell (external), Male shell (internal)

REMOTE GPS ANTENNA KIT

Description

22 The remote GPS antenna kit allows a range of mounting and connection options, for use of the SPGR in shielded or other locations where the direct GPS signal is insufficient. The kit comprises the remote GPS antenna, mounting plate, ground spike, 1.5 m adaptor cable and 28.5 m remote cable as follows:

22.1 The remote GPS antenna differs from the vehicle GPS antenna (Paras 64 to 67) in its mounting and connection arrangement. The antenna's lower surface is a powerful magnet, allowing direct and secure location on any flat ferrous surface. For use elsewhere the mounting plate must be added. The plate is made of steel to retain the antenna and also provides a cable strain-relief hook. The spike is unscrewed in this role. For deployment on the ground or into other penetrable material, the whole plate and spike assembly is used.

22.2 The 1.5 m adaptor cable connects to the SPGR.

22.3 The 28.5 m remote cable connects between the adaptor cable and the remote antenna to allow SPGR operation up to 30 m from the antenna. The cable is of a similar type to the 5.4 m elevated antenna cable.

22.4 The GPS location obtained is that of the remote antenna. To obtain the exact location of the SPGR when using the 28.5 m remote cable, an appropriate offset must be added.

Failure diagnosis

23 To carry out failure diagnosis of the remote GPS antenna kit, carry out the following checks:

23.1 Check that the SPGR functions correctly when located in an open situation or when connected to a known good antenna.

23.2 Check the continuity of the 1.5 m GPS adaptor cable and of the 28.5 m remote GPS cable.

Repair procedures

24 Repair of the remote GPS antenna kit is self-evident. No information is provided in Cat 522 of this AESP, as all required information is provided in this Category.

Tests following repair

25 Following repair, carry out the inspections detailed in Cat 532 of this AESP.

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COMMENT(S) ON AESP

To: ATSA DTS 3.2
Ha Ha Road
Woolwich
LONDON SE18 4QF

From:
.....
.....

Sender's Reference	BIN Number	Date
AESP Title:		
Chapter(s)/Instruction	Page(s)/Paragraph(s)	
If you require more space, please use the reverse of this form or a separate piece of paper. Comment(s):		

Signed: Telephone No:
Name (Capitals): Rank/Grade:
X

ATSA DTS 3.2 USE ONLY

To:
.....
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From: ATSA DTS 3.2
Ha Ha Road
Woolwich
LONDON SE18 4QF

Thank you for commenting on AESP 5820-F-299-512

Your reference: Dated:

Action is being taken to:	Tick		Tick
Issue a revised/amended AESP		Under investigation	
Incorporate comment(s) in future amendments		No action required	
Remarks			

Signed: Telephone No:
Name (Capitals): Rank/Grade:

AESP Form 10 (Issue 3 dated Oct 97)

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TacGA
THE TACTICAL GROUND AIR
COMMUNICATIONS SYSTEM

FAILURE DIAGNOSIS

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Ministry of Defence
Issued by
ARMY TECHNICAL SUPPORT AGENCY
DIRECTORATE OF TECHNICAL SERVICES

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AMENDMENT RECORD

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Comments on AESP	Final leaf

FAILURE DIAGNOSIS

Chapter

- 1 UK/RT 346 receiver-transmitter unit - failure diagnosis
- 2 Adaptor box radio (ABR) - failure diagnosis

PREFACE

Sponsor : DGES(A)
Publication Agency : ATSA (DTS4)

INTRODUCTION

1 Service users should forward any comments on this publication through channels prescribed in AESP 0100-P-011-013. An AESP Form 10 is provided at the end of this publication; it should be photocopied and used for forwarding comments on this AESP.

2 AESPs are issued under Defence Council authority and where AESPs specify action to be taken, the AESP will of itself be sufficient authority for such action and also for the demanding of the necessary stores, subject to the provisions of Para 3 below.

3 The subject matter of this publication may be affected by Defence Council Instructions (DCIs), Standing Operating Procedures (SOPs) or by local regulations. When any such Instruction, Order or Regulation contradicts any portion of this publication it is to be taken as the overriding authority.

RELATED AND ASSOCIATED PUBLICATIONS**Related publications**

4 The Octad for the subject equipment consists of the publications shown overleaf. All references are prefixed by the first eight digits of this publication. The availability of the publications can be checked by reference to the relevant Group Index (see AESP 0100-A-001-013).

Category/Sub-category		Information Level				
		1 User/Operator	2 Unit Maintenance	3 Field Maintenance	4 Base Maintenance	
1	0	Purpose and Planning Information	101	101	101	101
	1	Equipment Support Policy Directives	111	111	111	111
2	0	Operating Information	201	*	*	*
	1	Aide Memoire	211	*	*	*
	2	Training Aids	*	*	*	*
3		Technical Description	201	302	302	*
4	1	Installation Instructions	*	*	*	*
	2	Preparation for Special Environments	*	*	*	*
5	1	Failure Diagnosis	201	512	513	*
	2	Repair Instructions	201	522	523	*
	3	Inspection Standards	*	532	533	*
	4	Calibration Procedures	*	*	*	*
6		Maintenance Schedules	*	*	*	*
7	1	Illustrated Parts Catalogues	711	711	711	711
	2	Commercial Parts Lists	*	*	*	*
	3	Complete Equipment Schedule, Production	*	*	*	*
	4	Complete Equipment Schedule, Service Edition (Simple Equipment)	741	741	741	741
	5	Complete Equipment Schedule, Service Edition (Complex Equipment)	*	*	*	*
8	1	Modification Instructions	*	*	*	*
	2	General Instruction, Special Technical Instructions and Servicing Instructions	*	*	*	*
	3	Service Engineered Modification Instructions (RAF only)	*	*	*	*

* Category/Sub-category not published



Associated publications

5 The following publications are associated with this Category:

<u>Reference</u>	<u>Title</u>
Signal Engineering Instruction 14411	Safety Precautions for Electrical Equipment
AESP 6600-A-100-013	Control of Electrostatic Devices (ESSDs)
AESP 6625-K-112	Test System Radio Communications (Marconi 8920C)



WARNING

- (1) **ELECTRIC SHOCK HAZARD. BEFORE DISCONNECTING, REMOVING OR REPLACING MODULES OR ASSEMBLIES, SET THE MODE SWITCH TO OFF AND DISCONNECT THE POWER SUPPLY.**

CAUTIONS

- (1) **FILTER MISALIGNMENT. Do not select the FILTER TUNING option or attempt to tune the filters without the correct test equipment. Doing so may degrade performance. If you inadvertently select the FILTER TUNING option to show the FILTER TUNING display, immediately press the ESC key to return to the MAINTENANCE menu.**
- (2) **EQUIPMENT DAMAGE. The modules within the R/T unit are sensitive to electrostatic discharge (ESD). To prevent damage due to ESD, refer to AESP 6600-A-100-013.**
- (3) **INCORRECT ELAPSED TIME. Do not reset the EOT unless authorized to do so.**

ABBREVIATIONS

BCN	... ..	Beacon
BIT	... ..	Built-in-test
CCA	... ..	Circuit card assembly
DMM	... ..	Digital multimeter
EOT	... ..	Elapsed operation time
ESD	... ..	Electrostatic discharge
IF	... ..	Intermediate frequency
mic	... ..	Microphone
MWOD	... ..	Multiple word of day
OP	... ..	Operation
RF	... ..	Radio frequency
R/T	... ..	Receiver-transmitter
Rx	... ..	Receive
SINAD	Signal plus noise and distortion
Tx	Transmit
Z	Zeroize

COMMENT(S) ON AESP

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CHAPTER 1

UK/RT 346 RECEIVER-TRANSMITTER UNIT - FAILURE DIAGNOSIS

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INTRODUCTION

1 Failure diagnosis at field level (level 3) is limited to the UK/RT 346 receiver/transmitter (R/T) unit. Procedures are given to diagnose and remedy faults down to module level or, for the front panel assembly, to component or sub-assembly level.

Failure diagnosis procedure format

2 The majority of failure diagnosis procedures are presented in the form of tables indicating, for each fault condition, the possible causes of failure and remedial action to be taken. Failure diagnosis procedures for the front panel assembly components and sub-assemblies are detailed in Paras 21 to 28.

3 Additional information to aid fault diagnosis is provided as follows:

3.1 If the power-up BIT or off-line BIT detects a fault, the likely locations of the fault are indicated by the R/T unit display. The BIT diagnostic result display content is detailed in Para 5.

3.2 The R/T unit display/keypad user interface provides a MAINTENANCE menu with options to review the ten most recent BIT results, erase the BIT results, initiate a filter tuning process and check the EOT (elapsed operation time) of the R/T unit. These maintenance mode menu options are detailed in Paras 6 to 15.

3.3 The test point locations for the R/T unit are detailed in Fig 1 and those for the front panel assembly in Fig 2. Module interconnection and CCA schematic diagrams are provided as Figs 5 to 10, and the motherboard CCA assembly layout is provided as Fig 11.

Test equipment and materials

4 The test equipment and materials required for carrying out failure diagnosis on the UK/RT 346 R/T unit are listed in Table 1. Operation of the Radio Test System 8920C is described in the 8920C Operating Manual (AESP 6625-K-112).

TABLE 1 TEST EQUIPMENT AND MATERIALS

Serial (1)	NATO stock number (2)	Description (3)	Use (4)
1	Z4/6625-99-152-4750	Test Set Radio Comms GP (8920C)	Minimum performance and fault isolation tests.
2	Z4/6625-99-940-4784	Audio lead (part of 8920C)	Connects the R/T unit audio input/output to the 8920C.
3	Z42/5995-99-215-5140	Power lead (part of 8920C)	Connects the 8920C power supply output to the R/T unit.
4	Z4/6625-99-918-3495	Remote lead and Pressel switch (part of 8920C)	Keys the R/T unit transmitter through the 8920C.
5	Z4/6625-99-125-8252	BNC-to-BNC coaxial lead (part of 8920C)	Connects the R/T unit antenna output to the 8920C.
6	F1/5180-99-120-3922	Tool kit telecom (technician)	General maintenance.
7	F1/5180-99-445-8208	Tool kit telecom (supplementary)	General maintenance.
8		Plain or tinned copper wire No. 20 gauge	Connects DMM probe to connector socket (Table 3)

BIT DIAGNOSTIC RESULTS

5 If the R/T unit off-line BIT (power-up BIT or operator-initiated BIT) detects a fault, the R/T unit shows a BIT FAULT display. An example display is shown here.

BIT FAULT: 647 1-TX 2-RF/IF 3-AUDIO
--

5.1 Line 1 displays a three-digit BIT FAULT code number. Each digit identifies a suspect equipment item (assembly or module) as detailed in Table 2. The first digit of the BIT FAULT code indicates the equipment item most likely to have failed and the last digit indicates the least likely item.

5.2 Below the BIT FAULT code, the suspect items are listed in order of probability of failure. Each item is identified by an abbreviation of its name. The correspondence between the code and the abbreviation is detailed in Table 2.

5.3 In the example shown the first item is code 6, abbreviation TX. This identifies the transmitter module, which is the item most likely to have failed. The second most likely is code 4, abbreviation RF/IF, which is the RF/IF module, and the third and least likely is code 7, abbreviation AUDIO, which is the audio module.

TABLE 2 BIT FAULT CODES

Serial (1)	Code (2)	Abbreviation (3)	Suspect equipment item (4)
1	1	PANEL	Front panel assembly.
2	2	CTRLR	Controller module.
3	3	SYNTH	Synthesizer module.
4	4	RF/IF	RF/IF module.
5	5	TXDRV	Tx driver module.
6	6	TX	Transmitter module.
7	7	AUDIO	Audio module.
8	B	PWREG	Power regulator module.
9	0	NONE	Indicates that no further module or sub assembly is suspect.

MAINTENANCE MENU OPTIONS

6 The maintenance menu provides access to facilities for reviewing the BIT results, erasing the BIT results, initiating a filter tuning process, and checking the Elapsed Operation Time (EOT) of the R/T unit.

7 To access the MAINTENANCE menu proceed as follows:

7.1 Set the R/T unit mode switch to ON.

7.2 Press the R/T unit ESC key twice to display the MAIN MENU:

MAIN MENU	
1-OPERATE	2-N/A
3-PRESET	4-MAINT
5-DATABASE	6-BIT

7.3 From the MAIN MENU, press the 4 key to display the MAINTENANCE menu:

MAINTENANCE	
1-REVIEW BIT RESULTS	
2-ERASE BIT RESULTS	
3-VIEW R/T EOT DATA	
4-FILTER TUNING	

7.4 The MAINTENANCE menu options available are as follows:

Option	Reference
Review BIT Results	Para 8
Erase BIT Results	Para 10
Elapsed Operation Time (EOT)	Para 12
Filter Tuning	Para 15

7.5 To return to the MAIN MENU from the MAINTENANCE menu press the ESC key.

Review BIT faults

8 The ten most recent BIT fault codes and the number of consecutive occurrences for each code are stored in the R/T unit memory.

9 To review the BIT fault codes stored in memory proceed as follows:

9.1 From the MAINTENANCE menu, press the 1 key to show the REVIEW BIT FAULTS display.

REVIEW BIT FAULTS	
0-###:##	1-###:##
2-###:##	3-###:##
4-###:##	5-###:##
6-###:##	7-###:##
8-###:##	9-###:##

9.2 The display indicates the last 10 fault codes and the number of consecutive occurrences for each entry. The three-digit "###" field shows the fault code (Para 5) and the two-digit "##" field shows the number of consecutive occurrences of that fault (up to 99). To view the fault codes outside the current display area, scroll through the list using the PREV and NEXT keys.

9.3 To return to the MAINTENANCE menu press the ESC key.

Erase BIT results

10 When the BIT results are no longer required they may be erased from memory.

11 To erase the BIT results stored in memory proceed as follows:

11.1 From the MAINTENANCE menu, press the 2 key to display the ERASE BIT RESULTS screen:

```
ERASE BIT RESULTS
ENTER TO CONFIRM
ESC TO EXIT
```

11.2 To erase the BIT results and return to the MAINTENANCE menu press the ENT key.

Elapsed operation time (EOT)

12 The UK/RT 346 R/T unit retains in memory a record of the elapsed operation time (EOT) of the unit since production acceptance tests finished. The EOT may be checked whenever maintenance personnel need to monitor or record the EOT of the R/T unit or of a replaced module. The EOT may be updated by authorized personnel in specified circumstances only.

13 To check the EOT proceed as follows:

13.1 At the MAINTENANCE menu, press the 3 key. The display shows the ELAPSED R/T OP TIME screen.

```
ELAPSED R/T OP TIME
##### HOURS
PRESS ENT TO UPDATE
PRESS ESC TO EXIT
```

13.2 Record the numbers of hours shown on line 2.

13.3 To return to the MAINTENANCE menu press the ESC key.

CAUTION

INCORRECT ELAPSED TIME. Do not reset the EOT unless authorized to do so.

14 To reset the elapsed time, enter the number of hours and press the ENT key.

Filter tuning**CAUTION**

FILTER MISALIGNMENT. Do not select the FILTER TUNING option or attempt to tune the filters without the correct test equipment. Doing so may degrade performance. If you inadvertently select the FILTER TUNING option to show the FILTER TUNING display, immediately press the ESC key to return to the MAINTENANCE menu.

```
FILTER TUNING
PRESS KEY TO BEGIN
```


15 Filter tuning is required whenever the Controller module, RF/IF module or Tx driver module is replaced. The filter tuning procedure is detailed in Para 76.

FAILURE DIAGNOSIS PROCEDURES

WARNING

ELECTRIC SHOCK HAZARD. BEFORE DISCONNECTING, REMOVING OR REPLACING MODULES OR ASSEMBLIES, SET THE MODE SWITCH TO OFF AND DISCONNECT THE POWER SUPPLY.

CAUTION

EQUIPMENT DAMAGE. The modules within the R/T unit are sensitive to electrostatic discharge (ESD). To prevent damage due to ESD, refer to AESP 6600-A-100-103.

16 Failure diagnosis procedures are provided as follows:

- 16.1 R/T unit Initial failure diagnosis (Para 18).
- 16.2 Power-up failure diagnosis (Para 19).
- 16.3 Zeroize failure diagnosis (Para 20).
- 16.4 Front panel component checks (Para 21).

17 The R/T unit test points associated with the procedures are identified in Fig 1. Before replacing a suspect module or assembly, check the motherboard circuit card assembly (CCA) and the appropriate RF cable assemblies for signs of damage. If a fault persists after replacing all possible suspect modules and cable assemblies, replace the motherboard CCA.

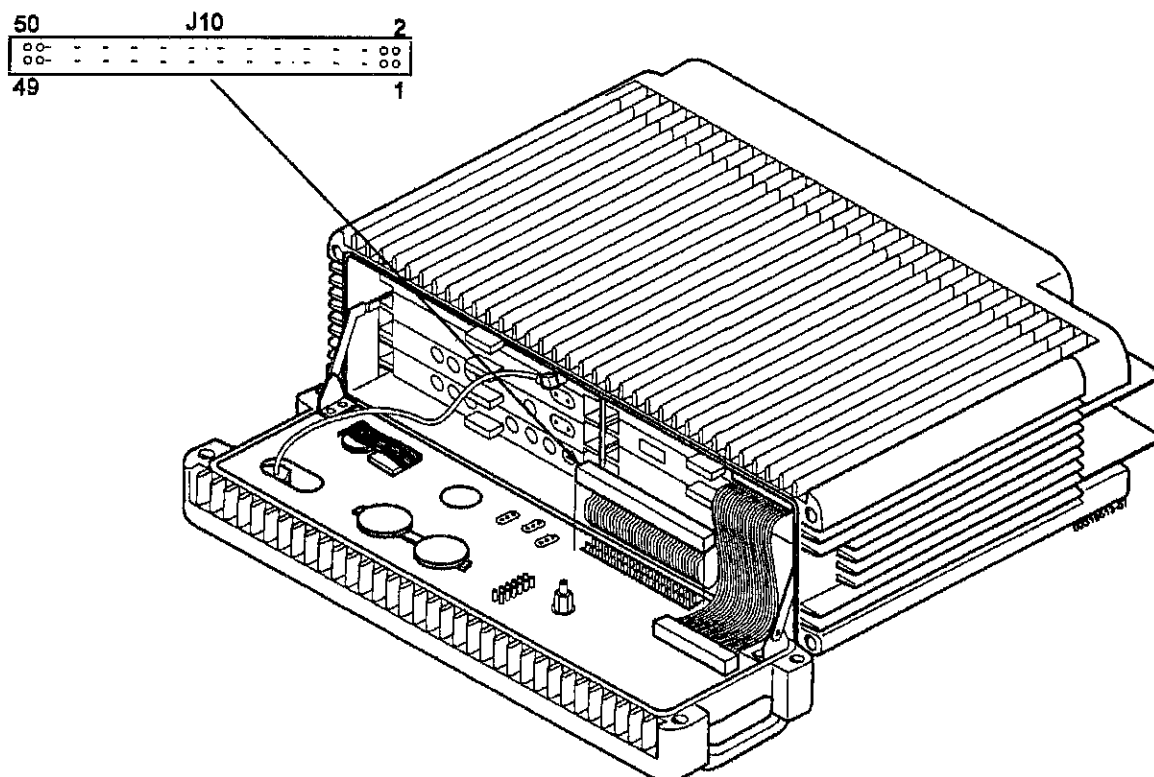


Fig 1 R/T unit test points

Initial failure diagnosis

18 To perform an initial failure diagnosis on the R/T unit, carry out the functional tests detailed in Table 3.

TABLE 3 INITIAL FAILURE DIAGNOSIS

Serial (1)	Test/ operation (2)	Result (3)	Possible cause (4)	Action (5)
1	Test 1 Paras 39.1 to 39.6	Display blank or erratic on power-up. BIT results not displayed. Display shows fault code.	Defective module as listed on the display.	Refer to Table 4. Refer to Para 5 for details of the fault codes. Replace the first module listed on the display and repeat the test. If the fault persists, replace the next module in the order listed on the display and repeat the test.
2	Test 1 Para 39.7	Display test fails.	Defective Display/keypad. Defective controller module. Defective front panel interface CCA.	Replace the display/keypad assembly. Replace the controller module. Replace the front panel interface CCA.
3	Test 1 Para 39.8 to 39.10	Keypad test fails.	Defective display/keypad. Defective controller module. Defective front panel interface CCA.	Replace the display/keypad assembly. Replace the controller module. Replace the front panel interface CCA.
4	Test 2 Para 44.1 and 44.2	Current consumption typically 380 mA	Defective power regulator module	Replace the power regulator module.

(continued)

TABLE 3 INITIAL FAILURE DIAGNOSIS (continued)

Serial (1)	Test/ operation (2)	Result (3)	Possible cause (4)	Action (5)
5	Test 3 Paras 48.1 and 48.2	Squelch does not adjust.	Defective SQUELCH control. Defective front panel interface CCA.	Check the SQUELCH control (Para 23) and replace if defective. Replace the front panel interface CCA.
6	Test 3 Paras 48.3 and 48.4	Volume does not adjust.	Defective VOLUME control. Defective front panel interface CCA. Defective audio module.	Check the VOLUME control (Para 24) and replace if defective. Replace the front panel interface CCA. Replace the audio module.
7	Test 3 Paras 48.5 and 48.6	Backlighting fails to illuminate or cannot be adjusted.	Defective DIM control. Defective display/keypad. Defective front panel interface CCA.	Check the DIM control (Para 25) and replace if defective. Replace the display/keypad assembly. Replace the front panel interface CCA.
8	Test 3 Paras 48.7 and 48.8	MWOD variables do not zeroize when the mode switch is set to Z.		Refer to Table 5.
9	Test 4 Paras 53.1 to 53.15	SINAD less than 10 dB.	Poor Rx sensitivity.	Replace the RF/IF module. Replace the synthesizer module. Replace the audio module.
10	Test 5 Paras 57.1 to 57.3	Current consumption in excess of 2.7 A.	Defective transmitter module. Defective Tx driver module. Defective power regulator module.	Replace the transmitter module. Replace the Tx driver module. Replace the power regulator module.

(continued)

TABLE 3 R/T UNIT INITIAL FAILURE DIAGNOSIS (continued)

Serial (1)	Test/ operation (2)	Result (3)	Possible cause (4)	Action (5)
11	Test 6 Paras 62	Low power output observed during performance test.	Incorrect power output level adjustment. Defective antenna connector assembly. Defective transmitter module. Defective Tx driver module.	Check the power output level adjustment (Para 75). Check the front panel antenna connector assembly for signs of damage and replace if defective. Replace the transmitter module. Replace the Tx driver module.
12	Test 6 Para 62		To Be Advised	To Be Advised
13	Test 7 Para 67		To Be Advised	To Be Advised
14	Test 8 Para 72		To Be Advised	To Be Advised
15	Test To Be Advised	R/T unit does not load variables.	Defective controller module. Defective FILL connector. Defective mode switch. Defective front panel.	Replace the controller module. Check the FILL connector (Para 27) and replace if defective. Check the mode switch (Para 22) and replace if defective. Replace the front panel.
16	Test To Be Advised	Keying handset/ headset or transmit/ receive audio fails.	Defective AUDIO connector. Defective front panel interface CCA. Defective audio module.	Check the AUDIO connector (Para 26) and replace if defective. Replace the front panel interface CCA. Replace the audio module.

(continued)

TABLE 3 R/T UNIT INITIAL FAILURE DIAGNOSIS (continued)

Serial (1)	Test/ operation (2)	Result (3)	Possible cause (4)	Action (5)
17	Test To Be Advised	Display shows the message: "High Tx Current".	Defective transmitter module.	Press the pressel switch to verify the fault. If the fault message persists, replace the transmitter module.
18	Test To Be Advised	Display shows the message: "Power Regulator fault detected".	Defective Tx driver module. Defective power regulator module.	Replace the Tx driver module. Replace the power regulator module.

Power-up failure diagnosis

19 To perform a power-up failure diagnosis, refer to Table 4.

TABLE 4 POWER-UP FAILURE DIAGNOSIS

Serial (1)	Test/operation (2)	Result (3)	Possible cause (4)	Action (5)
1	Using a DMM, measure the dc voltage at AUX connector pin 27 (BITE FLAG).	At least +4.5 V dc. Less than +4.5 V dc.		Open the front panel (Cat 523) and go to Serial 9. Open the front panel (Cat 523) and go to Serial 2.
2	Disconnect the power supply. Check the mode switch (Para 22).	Continuity at least 1 ohm. Continuity less than 1 ohm.	Defective mode switch.	Replace the mode switch. Go to Serial 11. Go to Serial 3.
3	Disconnect ribbon-cable connector J10 (Fig 1) from the front panel assembly.			
	NOTE When making measurements on J10, insert a length of wire (Table 1 Item 8) into the specified connector sockets (to make contact with the DMM probe).			
4	Reconnect the power supply and set the mode switch to ON.			
5	Measure the voltages at the specified pins on ribbon-cable connector J10.	Pin Voltage 42 6.3 ± 0.5 V dc. 44 -12 ± 1.0 V dc. 15 5.0 ± 0.5 V dc. 20 24.0 ± 2.5 V dc.	Defective controller module. Defective synthesizer module. Defective power regulator module.	Replace the controller module. Go to Serial 10. Replace the synthesizer module. Go to Serial 10. Replace the power regulator module. Go to Serial 10.
		Any other values.		Go to Serial 6.

(continued)

TABLE 4 POWER-UP FAILURE DIAGNOSIS (continued)

Serial (1)	Test/operation (2)	Result (3)	Possible cause (4)	Action (5)
6	Set the R/T unit mode switch to OFF. Remove all the chassis mounted modules.			
7	Set the R/T unit mode switch to ON. Measure the voltages on J10 (Serial 5). After the measurement set the mode switch to OFF. NOTE After carrying out the repairs in this serial, ensure that all modules and all front panel connectors are fully seated.	Voltage values as detailed for serial 5. Any other values.	Unidentified module is defective. Defective motherboard. Defective power regulator module.	Go to Serial 8. Replace the motherboard. Go to Serial 10. Replace the power regulator module. Go to Serial 10.
8	Reinsert one of the modules and recheck the voltages on J10.	Voltage values as detailed for serial 5. Any other values.	Unidentified module is defective. The last inserted module is defective.	Repeat this Serial for the next module. Replace the defective module. Go to Serial 10.
9	NOTE This test is made when the BITE FLAG signal in Serial 1 is high. Measure the voltages on ribbon-cable connector J10 (Serials 3 to 5). After the measurement set the mode switch to OFF.	Voltage values as detailed for serial 5. Any other values.	Defective display/keypad. Defective front panel interface CCA. Defective controller module. Defective motherboard CCA.	Replace the display/keypad assembly. Go to Serial 10. Replace the front panel interface CCA. Go to Serial 10. Replace the controller module. Go to Serial 10. Replace the motherboard CCA. Go to Serial 10.
10	Check that the mode switch is set to OFF. Remove any lengths of wire remaining in J10. Replace J10.			
11	Close the front panel (Cat 523).			

[REDACTED]



[REDACTED]

Zeroize failure diagnosis

20 To perform a zeroize failure diagnosis, refer to Table 5.

TABLE 5 - ZEROIZE FAILURE DIAGNOSIS

Serial (1)	Test/operation (2)	Result (3)	Possible cause (4)	Action (5)
1	Set the mode switch to OFF and disconnect the power supply.			
2	Set the mode switch to Z. Using the DMM, measure the resistance between pin 14 (ZEROIZE) on the AUX connector and chassis ground.	Less than 0.9 ohm. Greater than 1.1 ohm.	Suspect controller module. Suspect mode switch. Suspect front panel interface CCA.	Check/replace the controller module. Check the mode switch (Para 22) and replace if defective. Check/replace the front panel interface CCA.

Front panel component checksPreliminary actions

21 Before carrying out any front panel component checks, set the R/T unit mode switch to OFF, disconnect the power supply from the R/T unit and open the front panel (Cat 523).

Mode switch S1

22 To check the mode switch S1 refer to Fig 2 and proceed as follows:

22.1 Use a No. 1 cross-tip screwdriver to remove the screw (Fig 2 Item 7) securing the mode switch protective cover (Fig 2 Item 6) and raise the cover. Retain the screw.

22.2 Disconnect the mode switch plug from the interface CCA mode switch socket (Fig 2 Item 4) attached to the interface CCA.

22.3 For each position setting of the mode switch:

22.3.1 Rotate the mode switch to the position being checked.

22.3.2 Use the DMM to check the resistance between pin 11 and the corresponding pin for the switch position (Fig 2 and Table 6). The resistance shall be less than 1 ohm.

22.4 When the check is completed, reconnect the mode switch plug.

22.5 Lower the protective cover over the mode switch and secure the cover with the screw removed in Para 22.1.

TABLE 6 MODE SWITCH CHECKS

Serial (1)	Position (2)	Plug pin No. (3)
1	BCN	12
2	OFF	13
3	ON	1
4	Z	2

SQUELCH control R1

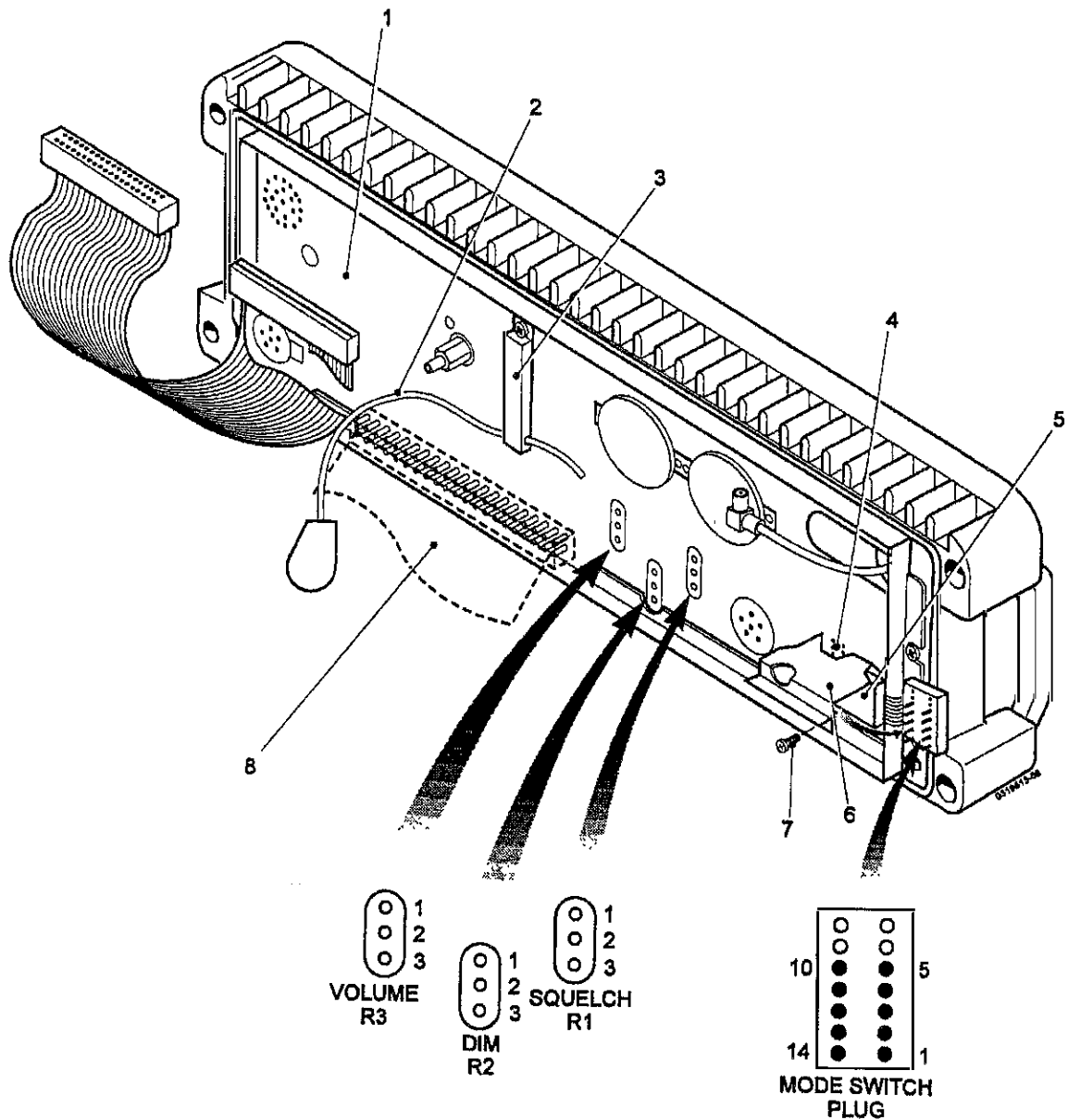
23 To check the SQUELCH control R1 refer to Fig 2 and proceed as follows:

23.1 Disconnect the 50-way ribbon cable (Fig 2 Item 8) from the front panel assembly.

23.2 Set the SQUELCH control fully counter-clockwise.

23.3 Connect the DMM between R1 pin 1 (0 V) and pin 2 (SQ CTAP).

23.4 Rotate the SQUELCH control fully clockwise and check that the resistance varies uniformly from 0 to 5 k ohm \pm 0.5 k ohm.



- | | | | |
|---|--|---|--|
| 1 | Interface CCA | 5 | Mode switch |
| 2 | Mic audio cable
(part of motherboard CCA) | 6 | Protective cover |
| 3 | Mic audio cable restraint | 7 | Screw |
| 4 | Interface CCA mode switch socket | 8 | Location of 50-way ribbon cable
(part of motherboard CCA) |

Fig 2 Front panel assembly test points

VOLUME control R3

- 24 To check the VOLUME control R3 refer to Fig 2 and proceed as follows:
- 24.1 Disconnect the 50-way ribbon cable (Fig 2 Item 8) from the front panel assembly.
 - 24.2 Set the VOLUME control fully counter-clockwise.
 - 24.3 Connect the DMM between R3 pin 1 (0 V) and pin 2 (VOL CTAP).
 - 24.4 Rotate the VOLUME control fully clockwise and check that the resistance varies uniformly from 0 to 5 k ohm ± 0.5 k ohm.

DIM control R2

- 25 To check the DIM control R2 refer to Fig 2 and proceed as follows:
- 25.1 Disconnect the 50-way ribbon cable (Fig 2 Item 8) from the front panel assembly.
 - 25.2 Set the DIM control fully counter-clockwise.
 - 25.3 Connect the DMM between R2 pin 1 (0 V) and pin 2 (DIM TOP/TAP).
 - 25.4 Rotate the DIM control fully clockwise and check that the resistance varies uniformly from 0 to 250 ohm ± 25 ohm.

AUDIO connector J2

- 26 To check the AUDIO connector J2 proceed as follows:
- 26.1 Disconnect the mic audio cable (Fig 2 Item 2) from the rear of the AUDIO connector.
 - 26.2 Use the DMM to check that the continuity between each of the AUDIO connector pins and the interface CCA connection (Fig 6) is less than 1 ohm.
 - 26.3 When the check is completed, reconnect the mic audio cable to the rear of the AUDIO connector.

FILL connector J6

- 27 To check the FILL connector J6 use the DMM to check that the continuity between each of the FILL connector pins and the interface CCA connection (Fig 6) is less than 1 ohm.

AUX connector J1

- 28 To check the AUX connector J1 use the DMM to check that the continuity between each of the AUX connector pins and the interface CCA connection (Fig 6) is less than 1 ohm.

TEST PROCEDURES

29 The tests are carried out using the Test Set Radio 8920C (Table 1 Item 4).

29.1 The 8920C is used in manual mode. The RIU settings are made via the 2955B screen and keypad.

29.2 Initial settings for the 8920C and EUT are given at the beginning of each test procedure. This allows individual tests to be carried out in isolation.

General procedures

Test conditions

30 All tests shall be carried out in an ambient temperature range of +15°C to +35°C.

Test setup procedure

31 To set up and initialise the test equipment, proceed as follows:

31.1 With reference to Fig 3 and Table 1, connect the EUT and the 8920C test system as follows:

31.1.1 Connect the power lead between the CIP unit DC SUPPLY connector and the EUT power input terminals.

31.1.2 Connect the audio lead between the CIP unit AUDIO connector and the EUT AUDIO connector.

31.1.3 Connect the remote lead and Pressel switch to the CIP unit REMOTE SWITCH connector.

31.1.4 Connect the BNC-to-BNC coaxial lead between the RIU unit ANT IN connector and the EUT ANT connector.

31.2 Switch on the 2955B, RIU, DMM and the Farnell AP60-50 power supply unit (PSU). Allow 15 minutes for the equipment to warm up and stabilise. During the warm-up period, carry out the procedures detailed in Para 31.3.

31.3 Select the required skeleton test setup for the 2955B current test. To select a skeleton test setup, proceed as follows:

31.3.1 If the 8920C is not in Manual control mode, on the 2955B Main Menu select 3 to enter the 8920C manual mode.

31.3.2 To display the 8920C Skeleton Test Menu, on the 2955B Manual Screen press HELP and/or on the RIU Manual Control screen press SELECT.

31.3.3 In the Skeleton menu, set the AF load to 100R.

31.3.4 To select the required skeleton test setup for the current test (ie Current Consumption for Test 1), press the appropriate 2955B key.

31.4 Following completion of the warm-up period (Para 31.2), set the PSU output voltage and current as follows:

NOTE

The PSU is released from automatic (BUS) control during the first selection of the Current Consumption Skeleton Test setup (ie Test 1).

31.4.1 If the PSU green ENABLED LED is illuminated, press the OUTPUT ENABLE switch to disable the PSU output and extinguish the ENABLED LED.

31.4.2 Use the VOLTAGE ADJUST control to set the required EUT supply voltage to 26.0 V \pm 0.5 V dc as indicated on the PSU display.

31.4.3 Use the CURRENT ADJUST control to set the required EUT supply current limit to 5.0 A \pm 0.5 A as indicated on the PSU display.

31.4.4 Press OUTPUT ENABLE to enable the PSU output and illuminate the green ENABLED LED.

31.5 The equipment is now ready to carry out the tests detailed in Tests 1 (Para 34).

NOTE

To prepare the EUT for Tests 3 to 7, refer to Para 32 as directed.

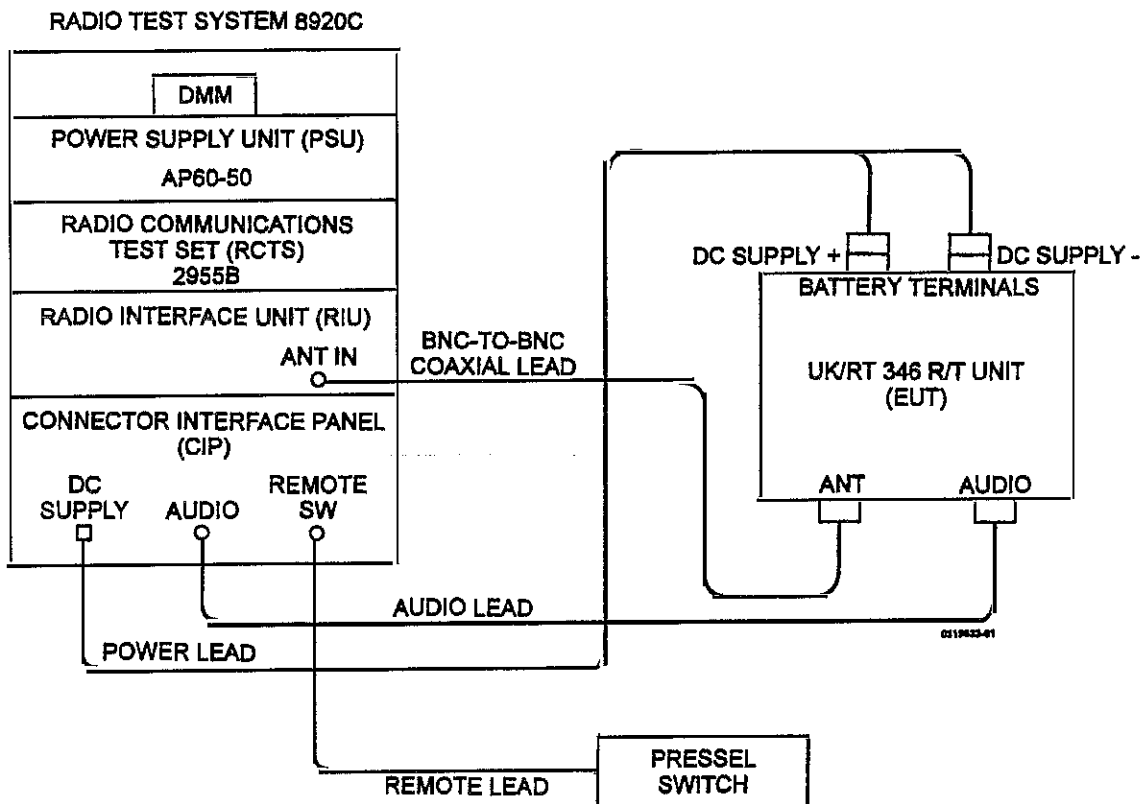


Fig 3 R/T unit initial test setup

EUT presets

32 To prepare the EUT for Tests 3 to 7, enter the preset values detailed in Table 7 as follows:

32.1 Ensure that Test 1 has been carried out. From the MAIN MENU, press the 3 key to display the PRESET screen containing the current operating parameters. An example is shown here:

PRESET	SQ-4	2315Z
P99	FM D W-T	TXP:HI
T300.500		R300.500

32.2 For each preset in turn check that the correct values (as detailed in Table 7) are displayed. For example, the display for Preset 01 should be as shown. If the display is incorrect, carry out steps 32.2.1 to 32.2.4:

32.2.1 Move the cursor to the desired field using the NEXT or PREV keys.

32.2.2 Use the number keys to enter numeric values or use the arrow keys to toggle through the available selections for the current field.

32.2.3 To store the new data for the current field, press the ENT key.

32.2.4 Repeat steps 32.2.1 to 32.2.3 as necessary.

PRESET	XXX	XXXXZ
P01	AM V XXX	TXP:HI
T059.500		R059.500

32.3 Press ESC as required to return to the MAIN MENU.

32.4 The presets are now ready for Tests 3 to 7.

TABLE 7 R/T UNIT PRESET TEST VALUES

Serial (1)	Preset (2)	Modulation (3)	Mode (4)	Tx Pwr (5)	Freq (MHz) (6)
1	01	AM	V	HI	59.500
2	02	AM	V	HI	137.000
3	03	AM	V	HI	312.500
4	04	AM	V	MD	399.975
5	05	AM	V	LO	399.975
6	06	FM	V	HI	59.500
7	07	FM	V	HI	137.000
8	08	FM	V	HI	312.500
9	09	FM	V	MD	399.975
10	10	FM	V	LO	399.975

Shutdown procedure

- 33 To shut down the equipment following completion of testing, carry out the following procedure:
- 33.1 Set the EUT mode switch to OFF.
- 33.2 Shut down the 8920C.
- 33.3 Disconnect the equipment.

Test 1 - Off-line self testTest limits

- 34 The off-line BIT checks the R/T unit for possible malfunctions. On completion it shall return to the BIT menu (indicating no faults identified).
- 35 All screen display elements (pixels) shall be active.
- 36 During the off-line keypad test, the R/T shall correctly identify each keypad key when pressed.

Initial settings

- 37 Carry out the test setup procedure as detailed in Para 31.
- 38 Prior to carrying out Test 1, set up the 8920C and EUT controls and conditions as follows:
- 38.1 PSU
- | | |
|-------------|--------|
| (1) Voltage | : 26 V |
| (2) Current | : 5 A |
- 38.2 2955B
- | | |
|--------------------------|-----------------------|
| (1) SET AF LOAD | : 100R |
| (2) Skeleton Test Set-up | : Current Consumption |
- 38.3 CIP
- | | |
|---------------------|---------|
| (1) AUDIO/HARNESS | : RADIO |
| (2) POWER | : OFF |
| (3) LINE RESISTANCE | : OC |
- 38.4 EUT
- | | |
|----------|-------|
| (1) Mode | : OFF |
|----------|-------|

Test method

- 39 To carry out Test 1 proceed as follows:
- 39.1 Set the EUT mode switch to the ON position. Press the ESC key twice to display the MAIN MENU:

MAIN MENU	
1-OPERATE	2-N/A
3-PRESET	4-MAINT
5-DATABASE	6-BIT

- 39.2 If a Status Msg is displayed, press the ESC key to re-display the MAIN MENU.

39.3 From the MAIN MENU, press the 6 key to display the BIT menu:

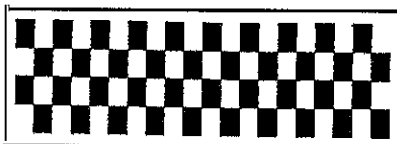
```
BIT
1-OFFLINE BIT
2-BATTERY VOLTAGE
3-DISPLAY TEST
4-KEYPAD TEST
```

39.4 From the BIT menu, press the 1 key to display the OFFLINE BIT menu:

```
OFFLINE BIT
1-BIT
```

39.5 From the OFFLINE BIT menu, press ENT to run the BIT. The BIT status screen is displayed, alternating with the checkerboard pattern as shown:

```
UK/RT 346      HQ II
VER: ##.##
BIT IN PROGRESS
HIT KEY/PTT to ABORT
```



39.6 The BIT status screen indicates BIT IN PROGRESS and shows the current software version. After approximately 30 seconds, the BIT menu (Para 39.3) shall be re-displayed, indicating that the R/T unit has completed and passed OFFLINE BIT.

39.7 From the BIT menu, press the 3 key to initiate the DISPLAY TEST. An alternating checkerboard pattern is displayed and while running, the display test screen alternates with the BIT status screen as shown above. All display elements (pixels) shall be present and toggling as a clean pattern. On confirmation of the pixel pattern, press the ESC key to return to the BIT menu.

39.8 From the BIT menu, press the 4 key to initiate the KEYPAD TEST. The KEYPAD TEST screen is displayed as shown:

```
KEYPAD TEST
PRESS ESC TO END

LAST KEY:###
```

39.9 Press each key in turn (except ESC) on the 16-button keypad. For each key, the name of the key shall be displayed.

39.10 Press the ESC key once to return to the BIT menu, and again to return to the MAIN MENU.

Test completion

40 On completing Test 1, to prepare the EUT for the remaining tests set the R/T unit power management mode to continuous (CONT) as follows:

40.1 From the MAIN MENU, press the 5 key to display the DATABASE menu:

```
DATABASE
1-HQ
2-XFER DATABASE
3-BEACON SETUP
4-TERM CONFIG
5-STATUS MSG
```

40.2 From the DATABASE menu press the 4 key to display the TERM CONFIG screen:

```
TERM CONFIG
PWR MGT MODE: CONT
POLL ON/OFF 15/45
DWELL TIME 30
BEACON MODE: FIXED
GPS COMM: ENABLED
```

40.3 Check that the cursor is resting on the PWR MGT MODE field and press the arrow keys to display CONT as shown.

40.4 Press the ENT key to set the power management mode to continuous.

40.5 Press the ESC key twice to return to the MAIN MENU.

Test 2 - Receive current consumption

Test limits

41 With an R/T unit supply voltage of 26 V dc, the maximum current consumption in receive mode is not greater than 380 mA.

Initial settings

42 Before carrying out Test 2, ensure that Test 1 has been carried out.

43 Set up the 8920C and EUT controls and conditions for Test 2 as follows:

43.1 PSU

- (1) Voltage : 26 V
- (2) Current : 5 A

43.2 2955B

- (1) SET AF LOAD : 100R
- (2) Skeleton Test Set-up : Current Consumption

43.3 CIP

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

43.4 EUT

- (1) Mode : ON
- (2) VOLUME : Mid-range
- (3) SQUELCH : Mid-range
- (4) DIM : Full anti-clockwise

Test method

44 To carry out Test 2 proceed as follows:

44.1 Disconnect the 8920C VOLTAGE HI and LO leads from the DMM. Connect the DMM HI lead to the CIP MONITOR +ve and the DMM LO lead to the CIP MONITOR -ve. The DMM voltage indication shall be not greater than 38 mV, indicating an Rx current of less than $38 \text{ mV} \times 10 = 380 \text{ mA}$.

44.2 Restore the previous 8920C connections to the DMM. Press HELP to return to the Skeleton Test menu.

Test 3 - Front panel controlsTest limits

45 The front panel controls operate correctly, with no associated mechanical or electrical problems.

Initial settings

46 Before carrying out Test 3, carry out the following:

46.1 Ensure that Test 1 has been carried out.

46.2 Set up the EUT presets as detailed in Para 32.

47 Set up the 8920C and EUT controls and conditions for Test 3 as follows:

47.1 PSU

- | | |
|-------------|--------|
| (1) Voltage | : 26 V |
| (2) Current | : 5 A |

47.2 2955B

- | | |
|--------------------------|---------------------------|
| (1) SET AF LOAD | : 100R |
| (2) Skeleton Test Set-up | : Receiver – Audio output |

47.3 CIP

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

47.4 EUT

- | | |
|---------------|------------------------------|
| (1) Mode | : ON |
| (2) VOLUME | : Mid-range |
| (3) SQUELCH | : Mid-range |
| (4) DIM | : Mid-range |
| (5) Frequency | : Select presets as directed |

Test method

48 To carry out Test 3 proceed as follows:

48.1 Set the EUT to Preset 3. The front panel display shall indicate the transmit and receive frequency as 312.500 MHz AM.

48.2 Adjust the SQUELCH control anti-clockwise. Squelch break shall be heard through the 8920C speaker.

48.3 Adjust the EUT VOLUME control throughout its range. The audio level shall change accordingly.

48.4 Set the VOLUME control fully clockwise. Set the SQUELCH control fully clockwise. The audio output shall be muted.

48.5 Set the EUT to Preset 8. The front panel display shall indicate the transmit and receive frequency as 312.500 MHz FM. Repeat steps 48.2 to 48.4.

48.6 Set the DIM control fully clockwise and press the ESC key on the R/T keypad. The display and keypad backlighting shall illuminate. Adjust the DIM control anti-clockwise. The display and keypad backlighting shall dim accordingly. With no further keypad actions, the backlighting shall remain illuminated for at least 30 seconds and for less than 60 seconds after pressing the ESC key.

NOTE

The Zeroize operation may take up to 20 seconds.

48.7 Pull and rotate the mode switch on the EUT to the Z position to display the ZEROIZE screen. The EUT shall display each key variable in turn with the status ZEROIZED as shown.

ZEROIZE
MWODS: ZEROIZED
F2:GPS CVK:

48.8 On completion, set the EUT Mode switch to the ON position to return to the MAIN menu.

Test 4 - Receiver sensitivity (AM, FM)

Test limits

49 With an RF input signal of -100 dBm, modulated by a 1 kHz tone at 30% modulation level applied to the EUT antenna connector, the SINAD shall be at least 10 dB for AM operation.

50 With an RF signal of -110 dBm, modulated by a 1 kHz tone at 5 kHz deviation applied to the EUT antenna connector, the SINAD shall be at least 10 dB for FM operation.

Initial settings

51 Before carrying out Test 4, carry out the following:

51.1 Ensure that Test 1 has been carried out.

51.2 Set up the EUT presets as detailed in Para 32.

52 Set up the 8920C and EUT controls and conditions for Test 4 as follows:

52.1 PSU

(1) Voltage : 26 V
(2) Current : 5 A

52.2 2955B

(1) SET AF LOAD : 100R
(2) Skeleton Test Set-up : Receiver – Audio output

52.3 CIP

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

52.4 EUT

(1) Mode : ON
(2) VOLUME : Mid-range
(3) SQUELCH : Full anti-clockwise (squelch off)
(4) DIM : Full anti-clockwise
(5) Presets : Select presets as directed

Test method

53 To carry out Test 4 proceed as follows:

53.1 Set the EUT to preset 01.

53.2 Set the RF generator frequency to 59.500 MHz at a level of -100 dBm and set the RF generator on.

53.3 Set the modulation frequency to 1 kHz at a level of 30% for AM. Ensure that the modulation is set to OFF for the next step.

53.4 Reselect the RF generator. Press the dB button as necessary to toggle from dBV to dB, to set a zero dB (nominal) reference for the next step.

53.5 Set the modulation on. The 2955B dBm value shall indicate a SINAD of at least 10 dB.

53.6 Set the modulation off.

53.7 Repeat the steps given in Paras 53.2 to 53.6 for EUT presets 02 and 03, and with RF generator frequency settings in turn of 137.000 MHz and 312.500 MHz. The 2955B dBm value shall indicate a SINAD of at least 10 dB for each preset.

53.8 Set the EUT preset to 06.

53.9 Set the RF generator frequency to 59.500 MHz at a level of -110 dBm.

53.10 Set the modulation frequency to 1 kHz at 5 kHz deviation for FM. Ensure that the modulation is set to OFF for the next step.

53.11 Reselect the RF generator and press the dB button to toggle from dBV to dB to set a zero dB (nominal) reference for the next step.

53.12 Set the modulation on. The 2955B dBm value shall indicate a SINAD of at least 10 dB.

53.13 Set the modulation off.

53.14 Repeat the steps given in Paras 53.9 to 53.13 for EUT presets 07 and 08, and with RF generator frequency settings in turn of 137.000 MHz and 312.500 MHz. The 2955B dBm value shall indicate a SINAD of at least 10 dB for each preset.

53.15 On the 2955B, press HELP to return to the Skeleton Test menu.

Test 5 - Current consumption in transmit

Test limits

54 With the EUT supply voltage set to 26 V dc, the maximum current consumption during transmit shall be not greater than 2.7 A.

Initial settings

55 Before carrying out Test 5, carry out the following:

55.1 Ensure that Test 1 has been carried out.

55.2 Set up the EUT presets as detailed in Para 32.

56 Set up the 8920C and EUT controls and conditions for Test 5 as follows:

56.1 PSU

- (1) Voltage : 26 V
- (2) Current : 5 A

56.2 2955B

- (1) SET AF LOAD : 100R
- (2) Skeleton Test Set-up : Current Consumption

56.3 CIP

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

56.4 EUT

- (1) Mode : ON
- (2) VOLUME : Mid-range
- (3) SQUELCH : Full anti-clockwise (squench off)
- (4) DIM : Full clockwise
- (5) Frequency : Select R/T preset 03.

Test method

57 To carry out Test 5 proceed as follows:

57.1 Disconnect the 8920C VOLTAGE HI and LO leads from the DMM. Connect the DMM HI lead to the CIP MONITOR +ve and the DMM LO lead to the CIP MONITOR -ve.

57.2 Press and hold the CIP pressel Tx Enable button or the remote switch. The DMM voltage indication shall be not greater than 270 mV ($mV \times 10 = A$).

57.3 Release the CIP pressel Tx Enable button or the remote switch. Restore the previous 8920C connections to the DMM. Press HELP to return to the Skeleton Test menu.

Test 6 - Transmitter RF power output and frequency accuracy - AM/FMTest limits

58 The true transmitter RF power output into a 50 ohm load, at any AM/FM channel frequency within the EUT operating bands shall be as follows:

NOTE

Due to the insertion loss of the 8920C, the manual mode RF output power measurements will indicate a value which is typically 90% of the EUT output power. (ie manual mode value x 1.1 = EUT output power).

58.1	VHF: 30.000 - 87.975 MHz	HI = 8 W, MD = 2 W, LO = 0.4 W
58.2	VHF: 100.000 - 174.000 MHz	HI = 8 W, MD = 2 W, LO = 0.4 W
58.3	UHF: 225.000 - 399.975 MHz	HI = 8 W, MD = 2 W, LO = 0.4 W

59 The frequency of the unmodulated transmitter AM output shall be within ± 1 ppm of the selected frequency.

Initial settings

60 Before carrying out Test 6, carry out the following:

- 60.1 Ensure that Test 1 has been carried out.
- 60.2 Set up the EUT presets as detailed in Para 32.

61 Set up the 8920C and EUT controls and conditions for Test 6 as follows:

61.1 PSU

- (1) Voltage : 26 V
- (2) Current : 5 A

61.2 2955B

- (1) SET AF LOAD : 100R
- (2) Skeleton Test Set-up : Transmitter - Output and Modulation

61.3 CIP

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

61.4 EUT

- (1) Mode : ON
- (2) VOLUME : Mid-range
- (3) SQUELCH : Full clockwise
- (4) DIM : Full clockwise
- (5) Frequency : Select presets as directed

Test method

62 To carry out Test 6 proceed as follows:

62.1 Set the EUT preset to 01.

62.2 Set the AF generator output to 1 kHz at 20.0 mV (for 2 mV input at the EUT AUDIO connector) and set the AF generator on.

62.3 Press and hold in the Pressel switch. The 2955B Tx power indication shall show $7.2\text{ W} \pm 2\text{ W}$.

62.4 Set the 2955B for AM modulation readings. Observe that the modulation level is 60 to 90%. The 2955B Tx frequency indication shall show 59.499940 to 59.500060 MHz.

62.5 Release the Pressel switch.

62.6 Repeat the steps given in Paras 62.3 to 62.5 for EUT presets 02 to 05. With 60 to 90% modulation applied, the 2955B Tx power indication for each preset shall show the following values:

P##	Power	Frequency
02	$7.2\text{ W} \pm 2\text{ W}$	136.999863 to 137.000137 MHz
03	$7.2\text{ W} \pm 2\text{ W}$	312.499688 to 312.500312 MHz
04	$1.8\text{ W} \pm 0.5\text{ W}$	399.974600 to 399.975400 MHz
05	$0.36\text{ W} \pm 0.15\text{ W}$	399.974600 to 399.975400 MHz

62.7 Turn the AF generator off.

62.8 Set the 2955B for FM modulation readings.

62.9 Set the EUT preset to 06.

62.10 Press and hold in the Pressel switch. With unmodulated AF input, the 2955B Tx power indication shall show $7.2\text{ W} \pm 2\text{ W}$.

62.11 Release the Pressel switch.

62.12 Repeat the steps given in Paras 62.9 to 62.11 for EUT presets 07 to 10. The 2955B Tx power indication for each preset shall show the following values:

P##	Power
07	$7.2\text{ W} \pm 2\text{ W}$
08	$7.2\text{ W} \pm 2\text{ W}$
09	$1.8\text{ W} \pm 0.5\text{ W}$
10	$0.36\text{ W} \pm 0.15\text{ W}$

62.13 On the 2955B, press HELP to return to the Skeleton Test menu.

Test 7 - AM/FM modulation levels and variation with channel frequencyTest limits

63 With a modulation source impedance of 300 ohms, an audio input level of 2 mV at 1 kHz shall produce an AM modulation level between 60% and 90% and an FM deviation level between 4.0 kHz and 6.0 kHz.

64 The modulation variation over the complete frequency bands shall remain between 60% and 90% (for AM) and between 4.0 kHz and 6.0 kHz (for FM).

Initial settings

65 Before carrying out Test 7, carry out the following:

65.1 Ensure that Test 1 has been carried out.

65.2 Set up the EUT presets as detailed in Para 32.

66 Set up the 8920C and EUT controls and conditions for Test 7 as follows:

66.1 PSU

- (1) Voltage : 26 V
- (2) Current : 5 A

66.2 2955B

- (1) SET AF LOAD : 100R
- (2) Skeleton Test Set-up : Transmitter -- Output and Modulation

66.3 CIP

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

66.4 EUT

- (1) Mode : ON
- (2) VOLUME : Mid-range
- (3) SQUELCH : Full clockwise
- (4) DIM : Full clockwise
- (5) Frequency : Select R/T presets as directed

Test method

67 To carry out Test 7 proceed as follows:

67.1 Set the EUT preset to 03 (AM frequency of 312.500 MHz).

67.2 Set the AF generator output to 1 kHz at 20.0 mV (2 mV at EUT AUDIO connector input) and set the AF generator on.

67.3 Set the 2955B for AM modulation readings.

67.4 Press and hold in the Pressel switch. The 2955B modulation level indication shall show 60% to 90%.

67.5 Release the Pressel switch.

67.6 Repeat the steps given in Paras 67.4 and 67.5 for EUT presets 01, 02 and 04 (AM frequencies of 59.500 MHz, 137.000 MHz and 399.975 MHz respectively). For each preset, the 2955B modulation level indication shall show 60% to 90%.

- 67.7 Set the EUT preset to 08 (FM frequency of 312.500 MHz).
- 67.8 Set the 2955B for FM modulation readings.
- 67.9 Press and hold in the Pressel switch. The 2955B modulation level indication shall show a deviation level of 4.6 to 6.6 kHz (nominal 5.6 kHz).
- 67.10 Release the Pressel switch.
- 67.11 Enable the 8920C bandpass filter. Repeat the steps given in Paras 67.9 and 67.10 for EUT preset 06 (FM frequency of 59.500 MHz). The 2955B modulation level indication shall show a deviation level of 4.6 to 6.6 kHz.
- 67.12 Disable the 8920C bandpass filter.
- 67.13 Repeat the steps given in Paras 67.9 and 67.10 for EUT presets 07 and 09 (FM frequencies of 137.000 MHz and 399.975 MHz respectively). For each preset, the 2955B modulation level indication shall show a deviation level of 4.6 to 6.6 kHz.
- 67.14 On the 2955B, press HELP to return to the Skeleton Test menu.

Test 8 – Beacon modulation

Test limits

68 In beacon AM mode, the output shall have a modulation depth of 70% to 100%, modulated by a continuous 1 kHz \pm 100 Hz tone.

69 In beacon FM mode, the output shall be deviated 4.0 kHz to 7.0 kHz by a continuous 1 kHz \pm 100 Hz tone.

Initial settings

70 Before carrying out Test 8, ensure that Test 1 has been carried out.

71 Set up the 8920C and EUT controls and conditions for Test 8 as follows:

71.1 PSU

- (1) Voltage : 26 V
- (2) Current : 5 A

71.2 2955B

- (1) SET AF LOAD : 100R
- (2) Skeleton Test Set-up : Transmitter – Output and Modulation

71.3 CIP

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

71.4 EUT

- (1) Mode : ON
- (2) VOLUME : Mid-range
- (3) SQUELCH : Fully clockwise
- (4) DIM : Fully clockwise

Test method

72 To carry out Test 8 proceed as follows:

72.1 On the EUT, from the MAIN MENU, press the 5 key to open the DATABASE menu. Press the 3 key to open the BEACON SETUP screen.

72.2 From the BEACON SETUP screen, set the EUT mode to AM, TXP to HI and Tx frequency to 312.500 MHz as shown.

BEACON SETUP
AM TXP:HI
T312.500

72.3 Press the ESC key to return to the DATABASE menu. Press the 4 key to open the TERM CONFIG menu. Use the NEXT key to scroll down the list of options until the BEACON MODE is displayed. Check that the BEACON MODE is set to FIXED.

72.4 Set the 2955B for AM modulation readings.

72.5 Set the EUT mode switch to BCN (pull and rotate anti-clockwise). The 2955B Tx AM modulation level indication shall be from 70% to 100%, and the Tx audio modulation frequency shall be 1.0 kHz \pm 100 Hz. The 2955B Tx power indication shall show 7.2 W \pm 2 W (indicating 8 W true output power).

72.6 Set the EUT mode switch to ON.

72.7 Repeat the steps given in Paras 72.2 to 72.5, setting the EUT and 2955B for FM modulation. The 2955B Tx FM deviation level indication shall be from 4.0 kHz to 7.0 kHz, and the Tx audio modulation frequency shall be 1.0 kHz \pm 100 Hz. The 2955B Tx power indication shall show 7.2 W \pm 2 W (see Note to Para 58).

72.8 Set the EUT mode switch to ON. Press the ESC key to return to the MAIN MENU.

72.9 On the 2955B, press HELP to return to the Skeleton Test menu.

Shut down

73 On completion of all tests refer to Para 33 and shut down all equipment.

CALIBRATION ADJUSTMENTS

Equipment setup

74 To set up the R/T unit for calibration, proceed as follows:

74.1 Carry out the test setup procedures detailed in Para 31.

74.2 Set up the 8920C and R/T unit (EUT) controls and conditions as follows:

74.2.1 PSU

- (1) Voltage : 26 V
- (2) Current : 5 A

74.2.2 2955B

- (1) SET AF LOAD : 100R
- (2) Skeleton Test Set-up : Transmitter - Output and Modulation

74.2.3 CIP

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

74.2.4 EUT

- (1) Mode : OFF
- (2) VOLUME : Mid-range
- (3) SQUELCH : Full clockwise
- (4) DIM : Full clockwise
- (5) Frequency : Select R/T unit frequency as instructed.

RF power output and AM modulation

75 Carry out the RF power output and AM modulation calibration adjustments whenever a new Tx driver or transmitter module is installed in the R/T unit. To adjust the RF power output and the AM modulation proceed as follows:

75.1 Set up the equipment as detailed in Para 74.

75.2 Set the R/T unit mode switch to the ON position. After running the power-up BIT, the display shows the MAIN MENU:

MAIN MENU	
1-OPERATE	2-N/A
3-PRESET	4-MAINT
5-DATABASE	6-BIT

75.3 From the MAIN MENU, press the 1 key to select the OPERATE screen with the last used parameters. An example OPERATE screen display is shown:

OPERATE	SQ4	2315Z
P-M	AM D W-T	TXP:LO
T300.500	R300.500	

75.4 Use the NEXT and PREV keys to move the cursor to the type of modulation (AM/FM) field. Press the arrow keys to select FM. Press the ENT key.

75.5 Move the cursor to the voice/data (V/D) field. Press the arrow keys to select V. Press the ENT key.

75.6 Move the cursor to the TXP data field. Press the arrow keys to select HI (high transmit power). Press the ENT key.

NOTE

To move the cursor from one character to another within a multiple-entry field (such as the transmit and receive frequency fields) use the arrow keys.

75.7 Move the cursor to the first (left hand) digit of the transmit frequency (T###.###) field. Press the following sequence of keys to enter 300.000:

3 > 0 > 0 > 0 > 0 > 0 > 0 > ENT

75.8 Move the cursor to the first (left hand) digit of the receive frequency (R###.###) field. Press the ENT key to confirm the displayed receive frequency of 300.000.

75.9 Check that the following is displayed. If necessary, repeat Paras 75.4 to 75.8 to correct the display.

OPERATE	####	####Z
###	FM V	### TXP:HI
T300.000	R300.000	

75.10 Press and hold the 8920C unit Pressel switch. Observe the 2955B Tx power indication and adjust the R/T unit Tx driver module adjuster R327 (Fig 4) until the 2955B Tx power indication shows 7.2 ± 0.5 Watts (indicating 8.0 ± 0.5 Watts true power). Release the Pressel switch.

- 75.11 Set the 2955B AF generator output to 1 kHz at 20.0 mV (to give 2 mV at the EUT mic audio input) and set the AF generator on.
- 75.12 Set the 2955B for AM modulation readings.
- 75.13 On the R/T unit, use the NEXT/PREV keys to move the cursor to the type modulation (AM/FM) field and press the arrow keys to select AM. Press the ENT key.
- 75.14 Press and hold the 8920C unit Pressel switch. Observe the 2955B modulation level indication and adjust the R/T unit Tx driver module adjuster R329 (Fig 4) until the 2955B modulation level indication shows 78 to 82 percent modulation. Release the Pressel switch.
- 75.15 Power-down and disconnect the equipment.

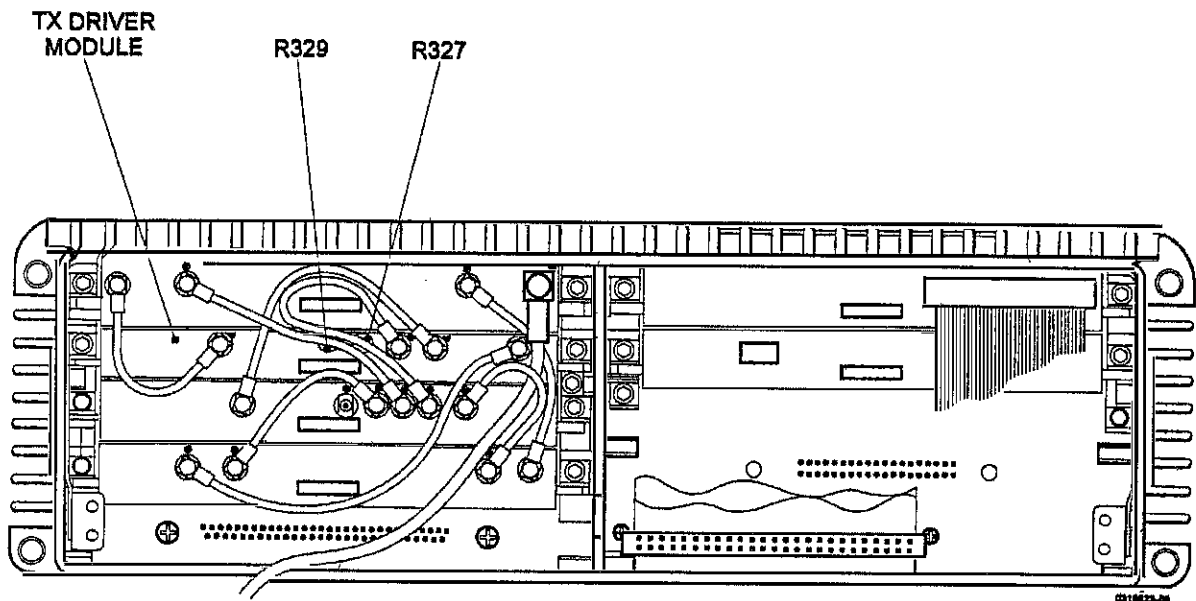


Fig 4 RF power output and AM modulation adjustments

Filter tuning**CAUTION**

FILTER MISALIGNMENT. Do not select the **FILTER TUNING** option or attempt to tune the filters without the correct test equipment. Doing so may degrade performance. If you inadvertently select the **FILTER TUNING** option to show the **FILTER TUNING** display, immediately press the **ESC** key to return to the **MAINTENANCE** menu.

76 Carry out the filter tuning procedure whenever the controller, RF/IF or Tx driver module is replaced. To tune the filters, proceed as follows:

76.1 Set up the equipment as detailed in Para 74.

76.2 Set the R/T unit mode switch to the ON position. After running the power-up BIT, the display shows the MAIN MENU:

```
MAIN MENU
1-OPERATE  2-N/A
3-PRESET   4-MAINT
5-DATABASE 6-BIT
```

76.3 From the MAIN MENU, press the 4 key to display the MAINTENANCE menu:

```
MAINTENANCE
1-REVIEW BIT RESULTS
2-ERASE BIT RESULTS
3-VIEW R/T EOT DATA
4-FILTER TUNING
```

76.4 From the MAINTENANCE menu, press the 4 key to display the FILTER TUNING screen:

```
FILTER TUNING
PRESS KEY TO BEGIN
```

76.5 Press any key (except the ESC key) to initiate filter tuning. The display shows "IN PROGRESS":

```
FILTER TUNING
IN PROGRESS
```

76.6 After completion of tuning, the display shows "COMPLETED":

```
FILTER TUNING
COMPLETED
```

76.7 Press the **ESC** key once to return to the **MAINTENANCE** menu and again to return to the **MAIN MENU**. Power-down and disconnect the equipment.

EXTERNAL CONNECTOR PIN SIGNALS

Front panel AUX connector (J1)

77 The signals present on the front panel AUX connector (J1) are detailed in Table 8.

TABLE 8 AUX CONNECTOR (J1) SIGNALS

Serial (1)	Pin (2)	Signal Id (3)	Type (4)	Voltage levels (5)	Impedance (6)	Description (7)
1	1	DGL/ANLG SEL	Input/ Output	Open collector Gnd = digital Open = analogue	10 k ohm (S) pull up resistor	Auxiliary control of digital/analogue mode selection. Internal "Wired OR" connection for external R/T unit control or control of ancillary device.
2	2	Ground				
3	3	TX DATA	Input	MIL-STD-188-114A ±5 V logic levels	CMOS (I)	Digital data input for transmission by FM-FSK, AM-ASK or PSK (PSK mode only with modem option). Asynchronous or self clocking data rates to 8 kbps or 15 kbps CVSD NRZ data with Audio CCA. Synchronous data rates to 16 kbps based on selected operating modes with COMSEC option.
4	4	CLK OUT	Output	MIL-STD-188-114A ±5 V logic levels	CMOS (S)	Clock to data device for synchronous digital data with COMSEC option.
5	5	RX DATA	Output	MIL-STD-188-114A ±5 V logic levels	CMOS (S)	Digital data input for transmission by FM-FSK, AM-ASK or PSK (PSK mode only with modem option). Asynchronous or self clocking data rates to 8 kbps or 15 kbps CVSD NRZ data with Audio CCA. Synchronous data rates to 16 kbps based on selected operating modes with COMSEC option.
6	6	DELAYED PTT	Output	5 V CMOS logic Gnd = PTT active 5 V = PTT inactive	CMOS (S)	Used if the external device requires a delay to allow the R/T unit to transmit preamble.
7	7	CD#				Not used.

(continued)

TABLE 8 AUX CONNECTOR (J1) SIGNALS (continued)

Serial (1)	Pin (2)	Signal id (3)	Type (4)	Voltage levels (5)	Impedance (6)	Description (7)
8	8	Reserved				Not used.
9	9	RETRAN OUT	Output	1 V p-p audio for 90% AM or 5.6 kHz FM 300 - 3000 Hz or up to 16 kbps data per MIL-STD-188-114A	150 ohm (S)	Relay mode analogue applications and up to 16 kbps digital. Connects to pin 22 on relaying radio.
10	10	EXT TOD IN	Input	5 V dc CMOS logic	10 k ohm (I) pull up resistor	External hard wired Time of Day (TOD) input for HAVE QUICK application. TOD data format IAW STANAG 4246.
11	11	Ground				
12	12	ON/OFF	Input	Gnd = OFF Open = ON	200 k ohm (I) pull up resistor	Remote control on/off via external switch or open collector transistor control. R/T unit MODE switch must be set to one of the ON positions for remote control shut off override.
13	13	RX SIG LVL	Output	0.1 - 4.0 V dc 4 V dc = large signal	1 k ohm (S)	RSSI analogue output from the RF/IF module giving a relative signal strength.
14	14	ZEROIZE	Input	Gnd = zeroize Open = inactive	CMOS (I) 10 k ohm (I) pull up resistor	In parallel with the mode switch to zeroize all TRANSEC and COMSEC Crypto Variable keys.
15	15	RMT SEL A	Input	Gnd = 300 baud Open = 9600 baud	CMOS (I) 10 k ohm (I) pull up resistor	Establishes data transfer rate to remote control operation. Signal level is read only during R/T unit power on initialisation.
16	16	Ground				
17	17	SWITCHED 24V	Output	24 V nominal 0.75 A maximum.	Less than 10 ohm (S)	24 V @ 0.75 A max. Switched on whenever the R/T unit is switched on.

(continued)

TABLE 8 AUX CONNECTOR (J1) SIGNALS (continued)

Serial (1)	Pin (2)	Signal id (3)	Type (4)	Voltage levels (5)	Impedance (6)	Description (7)
18	18	SQIND	Output	5 V CMOS logic Gnd = Squelch Break 5 V = Squelch Active	CMOS (S)	Used to signal an external device or relaying radio that squelch is open for Voice Plain Text modes of operation. In relay mode, connects to relaying unit PTT.
19	19	DMA OUT	Output	5 V CMOS logic	CMOS (S)	32 Hz reference signal used for HAVE QUICK hop clock timing operations.
20	20	AUXSEL	Input	Gnd = 300 baud Open = 9600 baud	CMOS (I) 10 k ohm (I) pull up resistor	Establishes data transfer rate for remote control operation. Signal level is read only during R/T unit power on initialisation.
21	21	Not used				Not used.
22	22	WB ANALOG IN	Input	1 V p-p for 90% AM or 5.6 kHz FM up to 16 kbps MIL-STD-188-114A	1000 ohm (L)	10 Hz - 10.24 kHz audio or up to 16 kbps digital signal for relay mode. Connects to pin 9 on receiving radio.
23	23	SDAT OUT				Serial data output for use with SPGR.
24	24	SDAT IN	Input	MIL-STD-188-114A ±5 V logic levels	CMOS (I)	Serial data input for use with SPGR.
25	25	EXT TOD OUT	Output	5 V CMOS Logic	1 k ohm	External hard wired Time of Day (TOD) output for HAVE QUICK application. Time of Day (TOD) data format IAW STANAG 4246.
26	26	RMT SEL B	Input	Gnd = 300 baud Open = 9600 baud	CMOS (I) 10 k ohm (I) pull up resistor	Establishes data transfer rate for remote control and database transfer operations. Signal level is read only during R/T unit power on initialisation.
27	27	BITE FLAG	Output	5 V CMOS logic 5 V = BIT passed Gnd = Fault detected	CMOS (S)	Indicates pass/fail status of Built In Test (BIT).

(continued)

TABLE 8 AUX CONNECTOR (J1) SIGNALS (continued)

Serial (1)	Pin (2)	Signal id (3)	Type (4)	Voltage levels (5)	Impedance (6)	Description (7)
28	28	CTS	Output	EIA-RS232 and MIL-STD-188-100 compatible -5 V = inactive +5 V = active	1 k ohm (S)	Indicates terminal ready for data input with COMSEC and/or modem options. In modem mode relay, CTS indicates data in buffer to be relayed. Connects to pin 29 in relay mode.
29	29	RTS	Input	EIA-RS232 and MIL-STD-188-100 compatible -5 V = inactive +5 V = active	1 k ohm (I)	Data device RTS for modem option. Connects to pin 28 in relay mode.
30	30	EXT RT PTT	Input/output	Open = inactive Gnd = PTT active	CMOS 100 k ohm (I) pull up resistor	In analogue/non-modem relay mode SQIND activates this line to place unit in transmit. Also used as a secondary PTT. Output indication that HDST PTT has been activated.
31	31	Reserved				
32	32	Reserved				
33	33	Ground				
34	34	AUX TXD-	Input	EIA-RS422 and MIL-STD-188-114 compatible	10 k ohm (I)	Negative side of balanced output used for acknowledgements to remote control packet signals and information to remote display. 300 or 9600 baud as selected by strapping connections.
35	35	AUX TXD+	Input	EIA-RS422 and MIL-STD-188-114 compatible	10 k ohm (I)	Positive side of balanced output used for acknowledgements to remote control packet signals and information to the remote display. 300 or 9600 baud as selected by strapping connections.

(continued)

TABLE 8 AUX CONNECTOR (J1) SIGNALS (continued)

Serial (1)	Pin (2)	Signal id (3)	Type (4)	Voltage levels (5)	Impedance (6)	Description (7)
36	36	AUX RXD-	Output	EIA-RS422 and MIL-STD-188-114 compatible	10 k ohm (S)	Negative side of balanced output used for acknowledgements to remote control packet signals and information to remote display. 300 or 9600 baud as selected by strapping connections.
37	37	AUX RXD+	Output	EIA-RS422 and MIL-STD-188-114 compatible	10 k ohm (S)	Positive side of balanced output used for acknowledgements to remote control packet signals and information to the remote display. 300 or 9600 baud as selected by strapping connections.

Front panel AUDIO connector (J2)

78 The signals present on the Front panel AUDIO connector (J2) are detailed in Table 9.

TABLE 9 AUDIO CONNECTOR (J2) SIGNALS

Serial (1)	Pin (2)	Signal id (3)	Type (4)	Voltage levels (5)	Impedance (6)	Description (7)
1	A	MIC A	Input	2 mV rms for 80% AM or 5.6 kHz FM	150 ohm	Audio gear microphone signal input.
2	B	MIC GND	Ground			Audio gear microphone signal return.
3	C	SWITCHED 24V	Output	24 V dc nominal at 0.75 A maximum	<10 ohm	24 V dc at 0.75A maximum. Switched on whenever the R/T unit is switched on.
4	D	AUDIO 1 (HDST EARPIECE 1)	Output	1.2 V p-p audio into 75 ohm	75 to 300 ohm	Audio output to the audio gear (capable of driving wide impedance range).
5	E	GND	Ground			
6	F	PTT	Input	5 V dc = inactive 0 V dc = active (Tx keyed)	100 k ohm	Handset push-to-talk. Activates the transmit function.
7	G	AUDIO 2 (HDST EARPIECE 2)	Output	1.2 V p-p audio into 75 ohm	75 to 300 ohm	Audio output to the audio gear (capable of driving wide impedance range).

Front panel FILL connector (J6)

79 The signals present on the Front panel FILL connector (J6) are detailed in Table 10.

TABLE 10 FILL CONNECTOR (J6) SIGNALS

Serial (1)	Pin (2)	Signal id (3)	Type (4)	Voltage levels (5)	Impedance (6)	Description (7)
1	A	REF	Output	5 V dc	100 k ohm	DS-102 reference for the fill device.
2	B	SENSE	Output	5 V dc	100 k ohm	DS-102 sense indicating the fill device is attached.
3	C	REQ	Input	5 V dc - 0 V dc pulse	100 k ohm	DS-102 request from the R/T unit to the fill device to load variables.
4	D	DATA	Input	0 - 5 V dc data	100 k ohm	DS-102 data from the fill device to load variables.
5	E	CLOCK	Input	0 - 5 V dc clock	100 k ohm	DS-102 clock from the fill device to clock data (variables) into the R/T unit.
6	F	Not used				

Front panel ANT connector

80 The signals present on the Front panel ANT connector are detailed in Table 11.

TABLE 11 ANT CONNECTOR SIGNALS

Serial (1)	Pin (2)	Signal id (3)	Type (4)	Voltage levels (5)	Impedance (6)	Description (7)
1	1	RF CONNECTOR	Input/output	RCV: -120 to +30 dBm XMIT: +26 to +38 dBm	50 ohm unbalanced	Antenna interface.

Rear panel power input terminals

81 The signals present on the rear panel power input terminals are detailed in Table 12.

TABLE 12 POWER INPUT TERMINAL SIGNALS

Serial (1)	Pin (2)	Signal id (3)	Type (4)	Voltage levels (5)	Impedance (6)	Description (7)
1		+24V INPUT	Source	+24 V dc nominal +32 V dc maximum +18.5 V dc minimum		+ power supply input terminal.
2		RTN	Ground	Ground		- power supply input terminal.

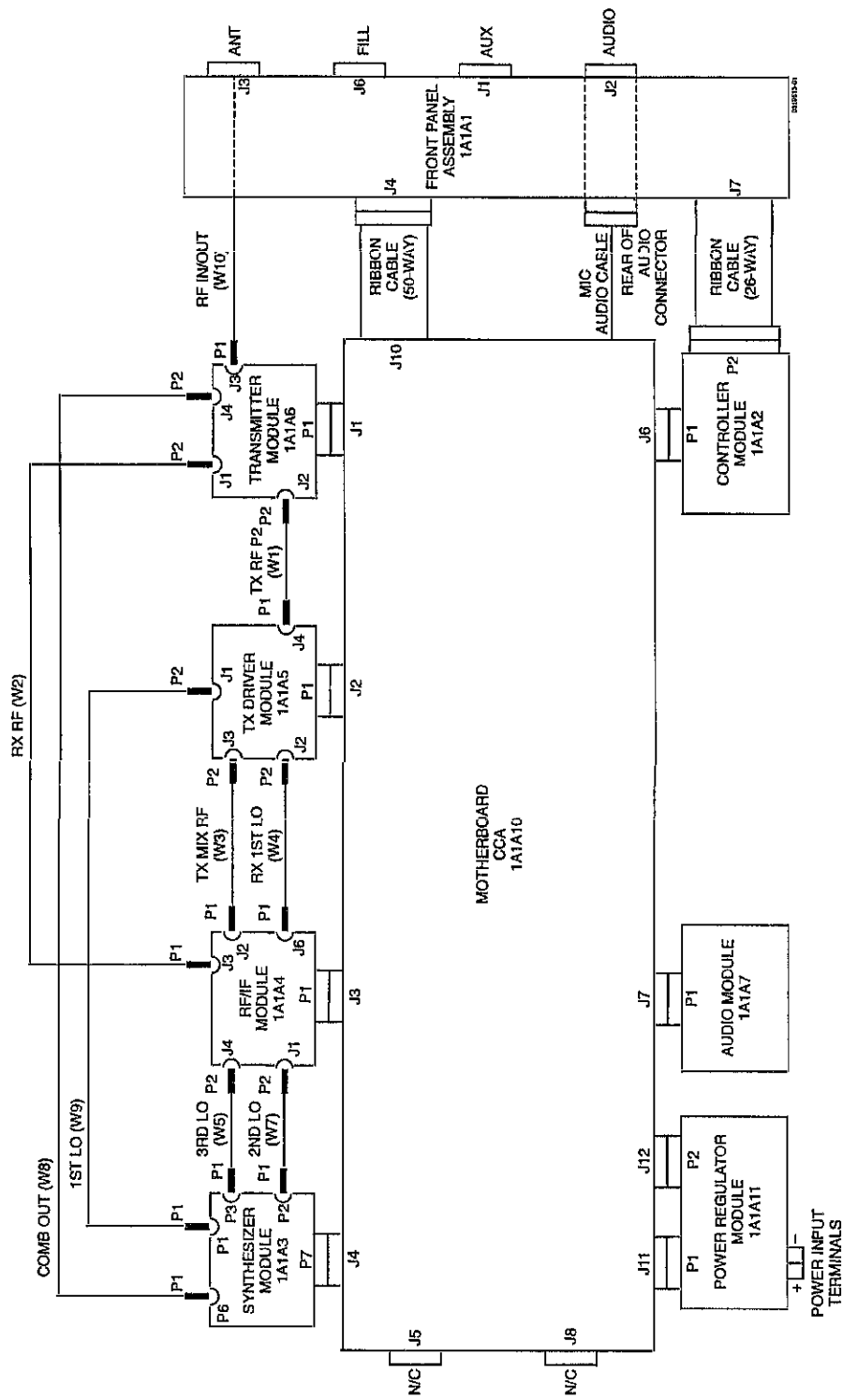


Fig 5 RV unit interconnection diagram



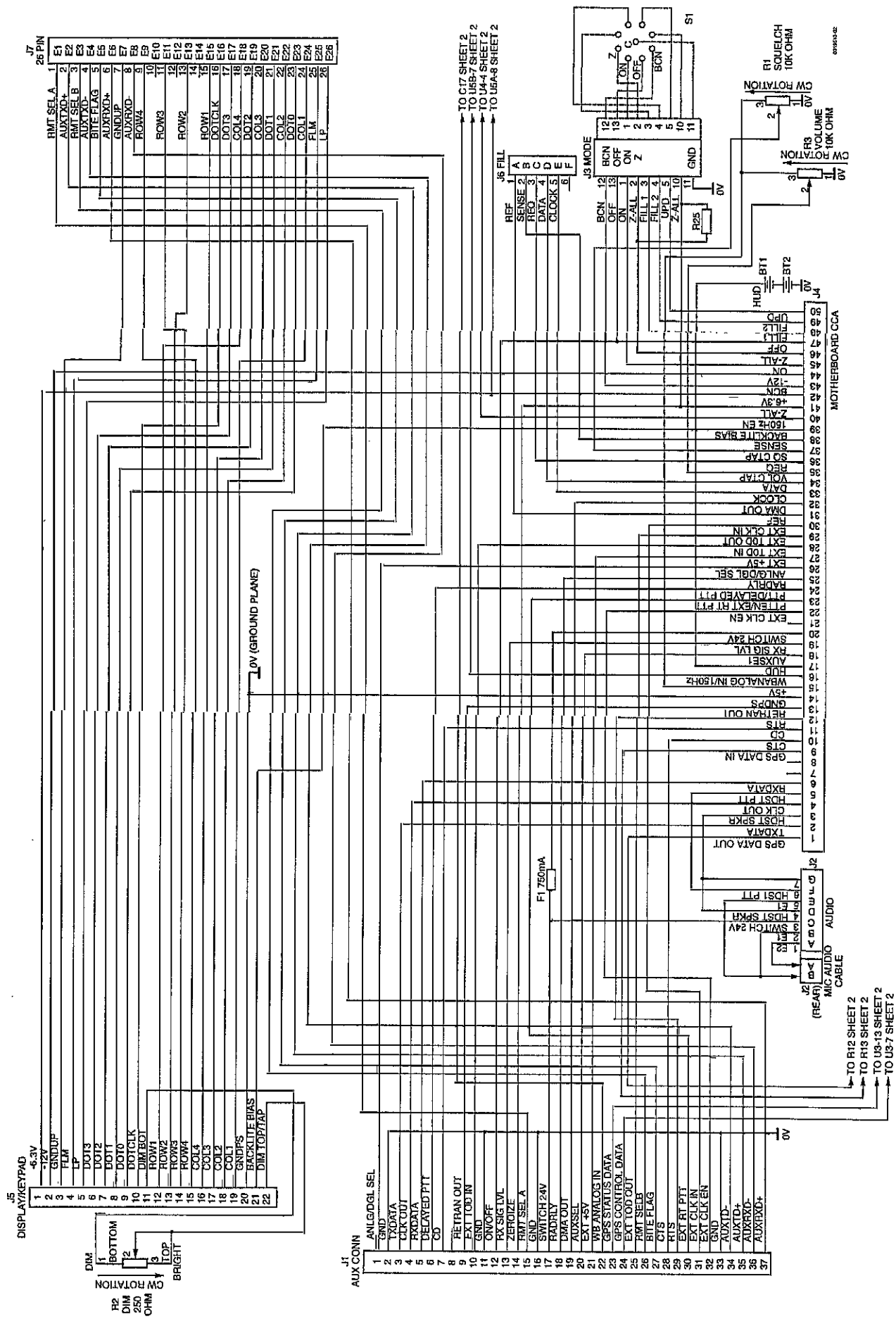


Fig 6 Front panel interface CCA schematic - sheet 1



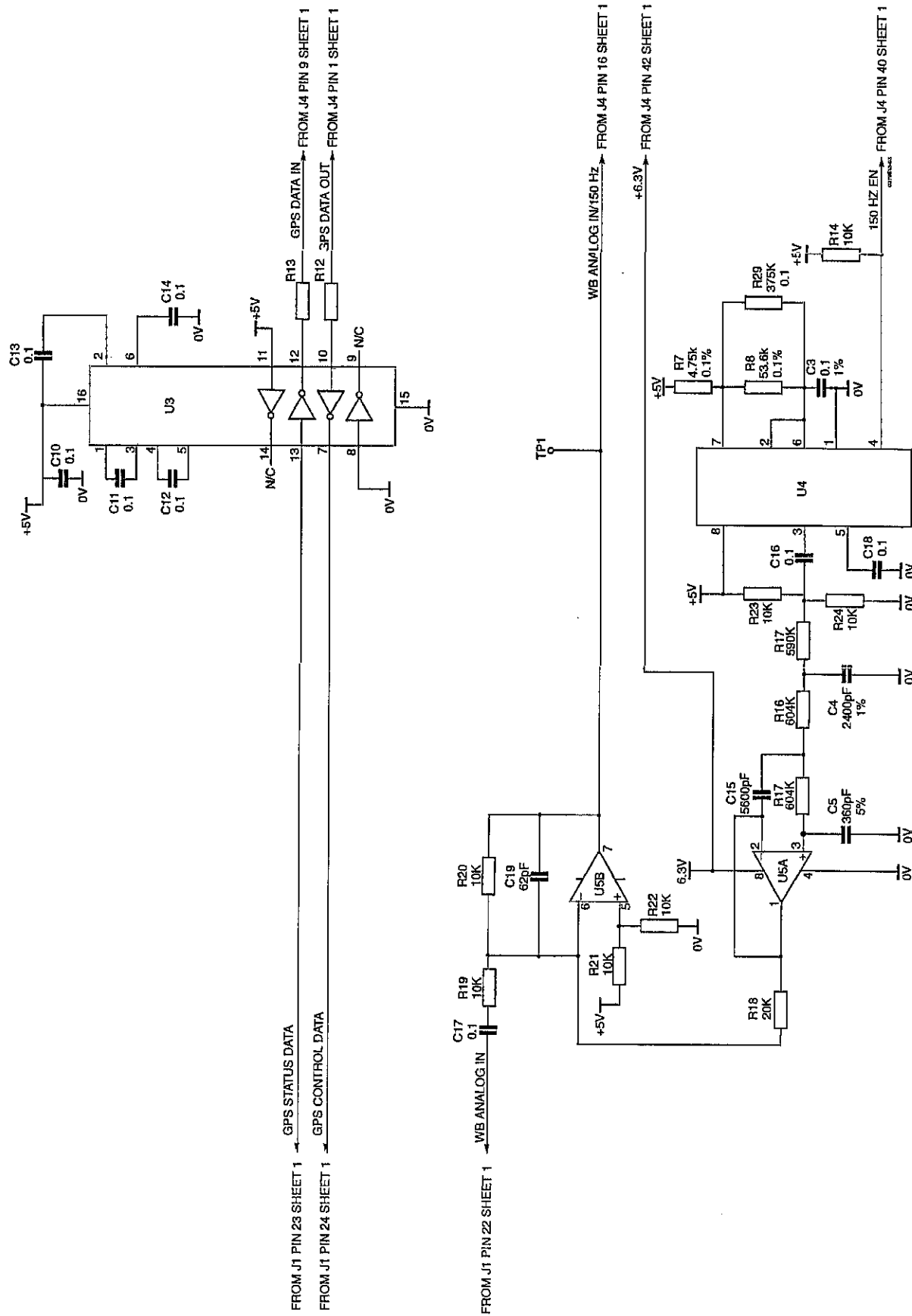


Fig 7 Front panel interface CCA schematic - sheet 2



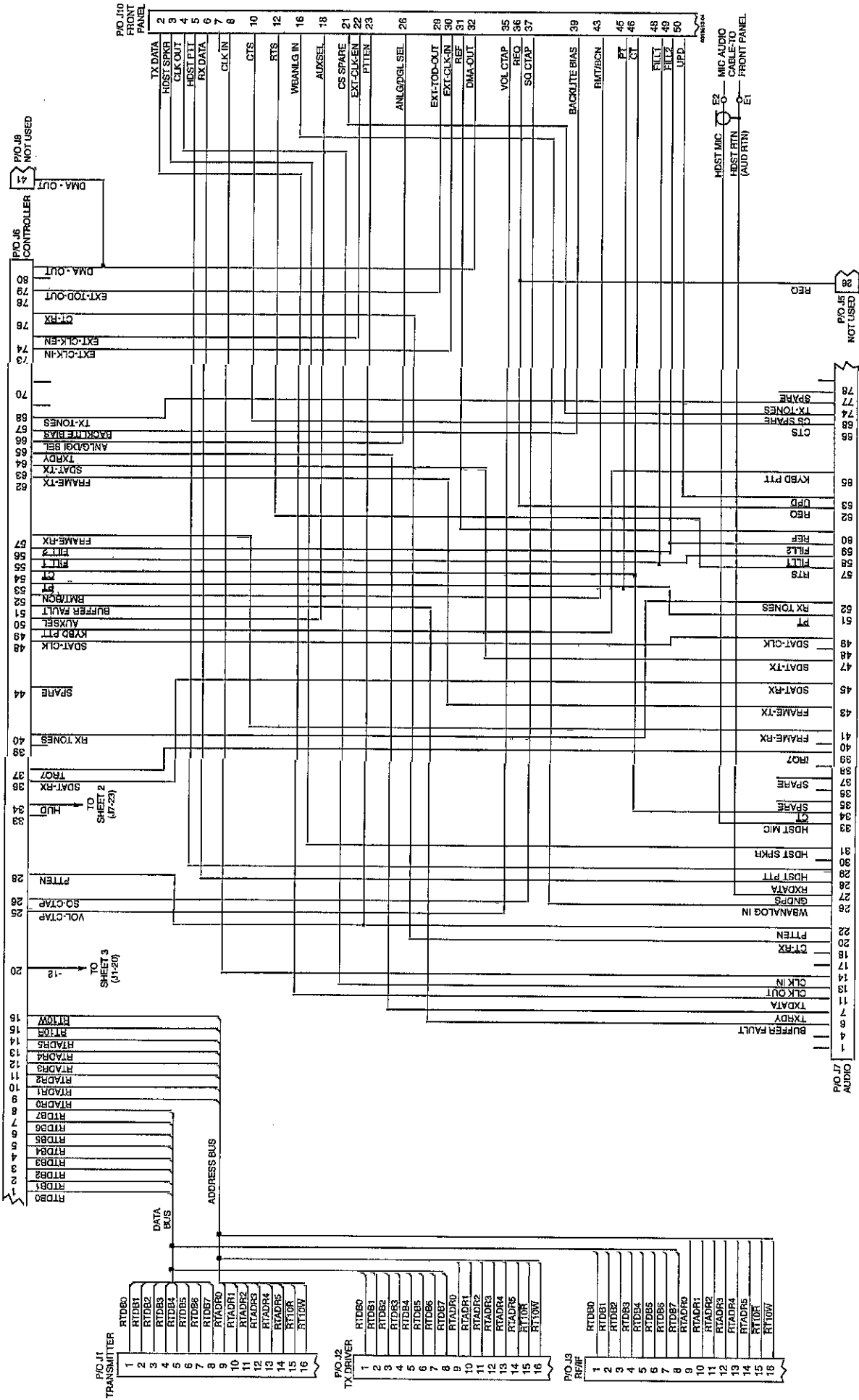


Fig 8 Motherboard CCA schematic - sheet 1



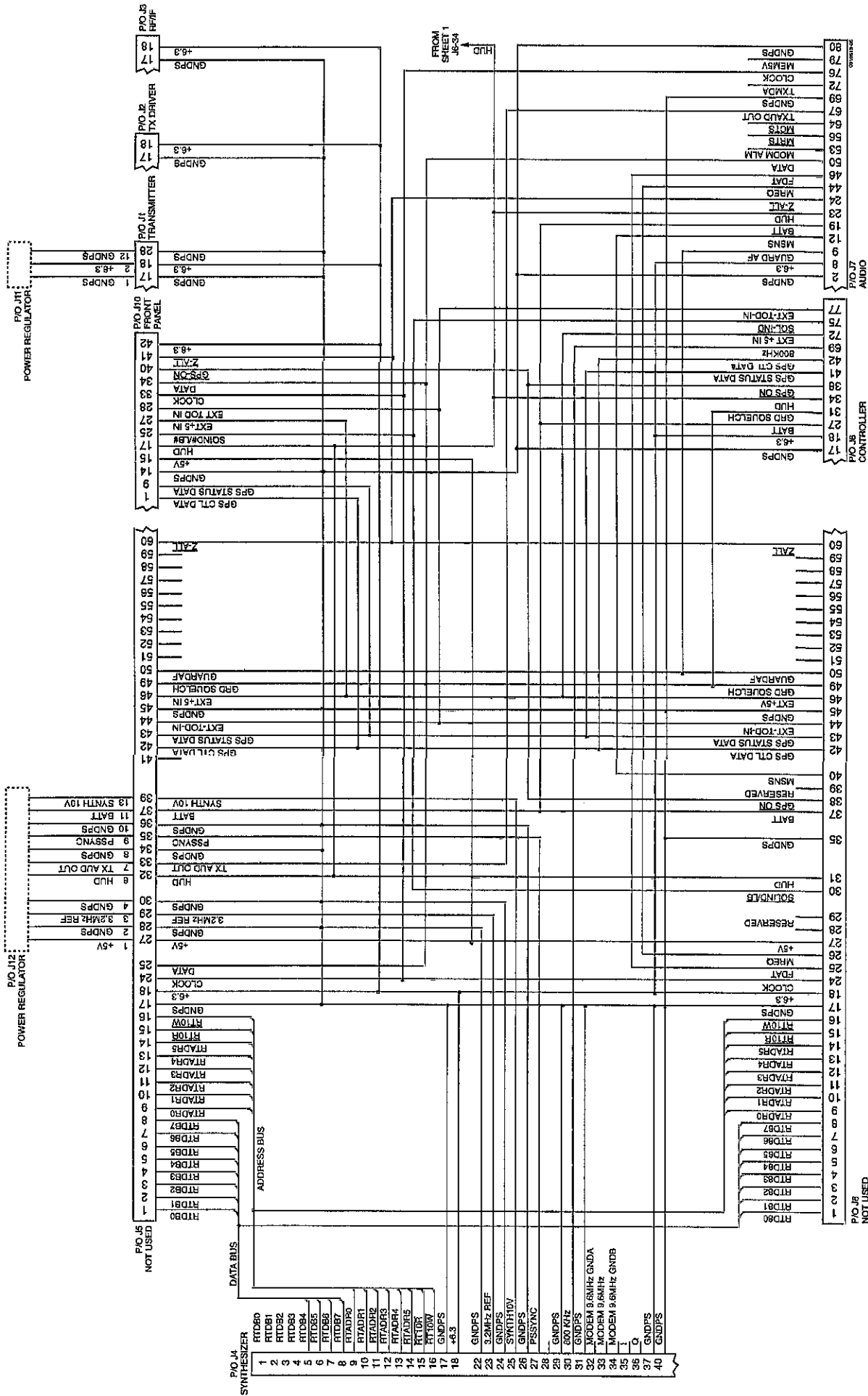


Fig 9 Motherboard CCA schematic - sheet 2



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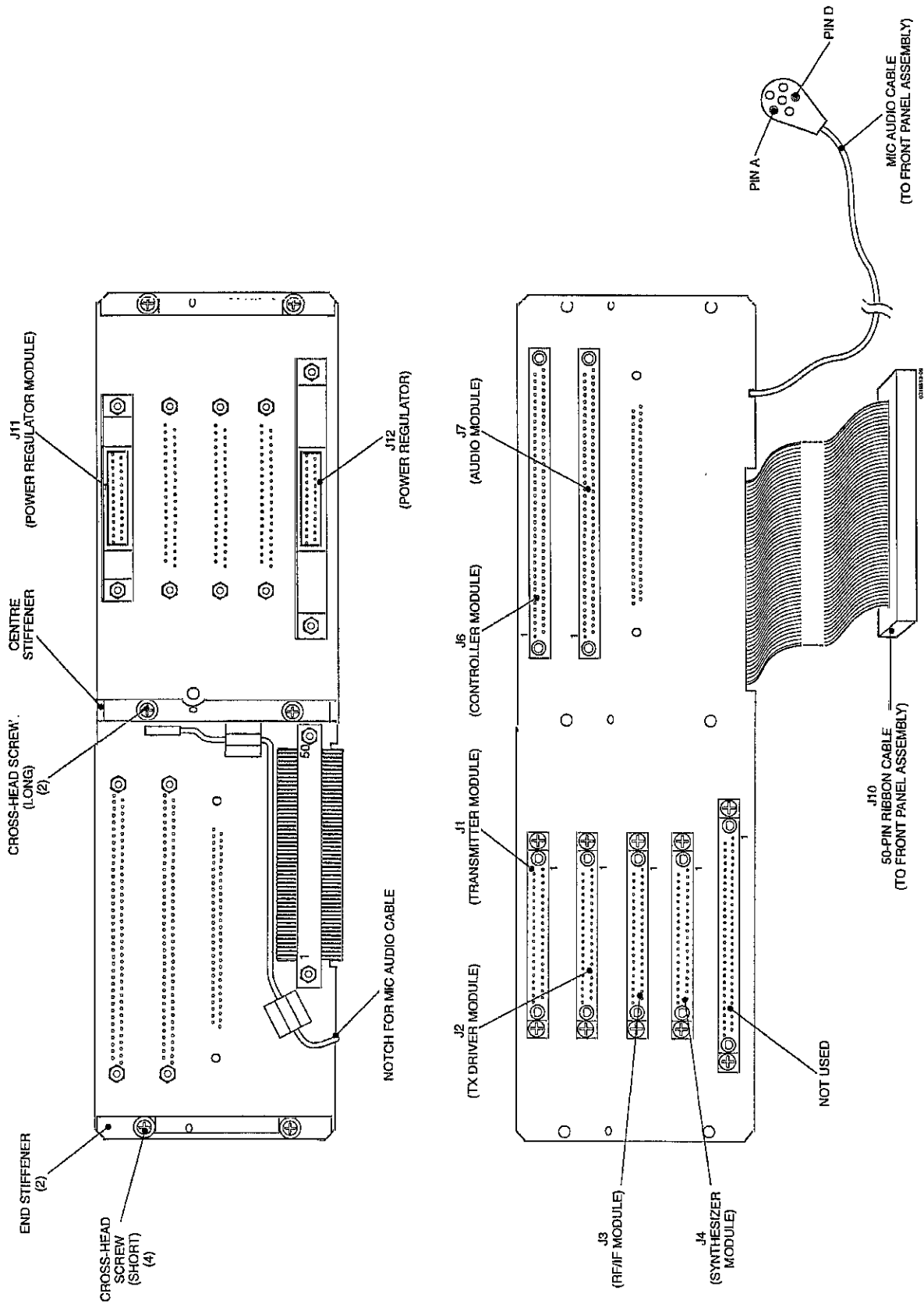


Fig 11 Motherboard CCA - component identification



CHAPTER 2

ADAPTOR BOX RADIO (ABR) - FAILURE DIAGNOSIS

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- 1 Introduction
- 2 Test equipment
- 3 Functional tests

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INTRODUCTION

1 Failure diagnosis of the ABR at field level (level 3) is confined to carrying out the functional tests.

Test equipment

2 The test equipment required for carrying out failure diagnosis on the ABR is detailed in Table 1.

TABLE 1 TEST EQUIPMENT

Serial (1)	NATO stock number (2)	Description (3)	Use (4)
1	5820-99-811-9389	Test set, control boxes radio, Clansman harness (CBTS)	Functional tests
2	5995-99-612-0387	CBTS to ABR adaptor cable	Functional tests

FUNCTIONAL TESTS

3 The functional tests of the ABR are carried out using the Test set, control boxes radio, Clansman harness (CBTS) and CBTS to ABR adaptor cable. To carry out functional testing of the ABR, proceed as follows;

3.1 Set the CBTS switches as follows:

3.1.1 Set all switches to the OFF position.

3.1.2 Set the METER switch to the VEHICLE position, set the SUPPLY switch to 28V and switch the test set ON.

3.1.3 Adjust the SET SUPPLY control for $24\text{ V} \pm 1\text{ V}$.

3.1.4 Set the METER switch to the OFF position and switch the test set OFF.

3.2 Connect CBTS test set cable NSN 5995-99-630-6545, between the ABR HARNESS connector and the CBTS RADIO A connector.

3.3 Connect the CBTS to ABR adaptor cable (Table 1 Serial 2) between the ABR RADIO connector and the CBTS SUPPLY and Larkspur RADIO connectors.

3.4 Switch the CBTS ON. Check that all three ABR lamps illuminate for approximately two seconds after switch on, and then revert to green lamp illuminated only.

3.5 Check that the CBTS Power Lamp is illuminated and that all other lamps are extinguished.

3.6 Carry out the following tests. The switch settings and test result for each test are given in Table 2. All lamps should remain extinguished except where otherwise indicated.

- Test 1 : CRCH to TacGA Radio (Mic)
 Test 2 : TacGA Radio to CRCH (Phones)
 Test 3 : TacGA Radio to CRCH (Phones, check AUTO/NORMAL switch operation)
 Test 4 : TacGA Radio to CRCH (Mic)
 Test 5 : TacGA Radio to CRCH (Mic, check PTT signal)

TABLE 2 ABR FUNCTIONAL TESTS (1)

Test (1)	ABR (2)	CBTS						Result (9)
		OSC/ AUX (3)	RADIO (4)	METER (5)	AUDIO (6)	PRESSEL (7)	Common Line (8)	
1	AUTO	1 kHz	MIC RB A	1 V AC	RAB MIC	ON	OFF	Meter reading = 200 to 600 mV PRESSEL ON VCR ON ABR TX LAMP ON
2	AUTO	1 kHz	PRC PHONE	5 V AC	RAB PHONE	OFF	ON	Meter reading = 1.5 to 3.0 V ABR RX LAMP ON
3	NORMAL	1 kHz	PRC PHONE	5 V AC	RAB PHONE	OFF	ON	Meter reading = 1.5 to 3.0 V
4	AUTO	1 kHz	MIC TX A	5 V AC	RAB PHONE	OFF	OFF	Meter reading = 1.1 to 1.5 V
5	AUTO	1 kHz	MIC TX A	COMMAND	RAB PHONE	OFF	ON	Meter reading = 10 mA \pm 10% ABR RX LAMP ON

3.7 Connect test set cable NSN 5996-99-638-3172 between the CBTS CONTINUITY terminals RED and BLACK to short-circuit them.

3.8 Carry out the following tests. The switch settings and test result for each test are given in Table 3. All lamps should remain extinguished except where otherwise indicated.

- Test 6 : ABR to CRCH (Mic, check short circuit current)
 Test 7 : ABR CALL tone to CRCH (Mic)

TABLE 3 ABR FUNCTIONAL TESTS (2)

Test (1)	ABR (2)	CBTS						Result (9)
		OSC/ AUX (3)	RADIO (4)	METER (5)	AUDIO (6)	PRESSEL (7)	Common Line (8)	
6	AUTO	1 kHz	MIC TX A	COMMAND	RAB PHONE	OFF	ON	Meter reading = 30 mA \pm 10% ABR RX LAMP ON
7	AUTO	OFF	MIC TX A	5 V AC	RAB PHONE	OFF	OFF	Meter reading = 1.0 to 1.4 V

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TacGA
THE TACTICAL GROUND AIR
COMMUNICATIONS SYSTEM

PURPOSE AND PLANNING INFORMATION

REPRINTED INCORPORATING AMDT No. 1

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ARMY TECHNICAL SUPPORT AGENCY
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AMENDMENT RECORD

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PREFACE

Sponsor : DGES(A)
Publication Agency : ATSA

INTRODUCTION

1 Service users should forward any comments on this publication through channels prescribed in AESP 0100-P-011-013. An AESP Form 10 is provided at the end of this publication; it should be photocopied and used for forwarding comments on this AESP.

2 AESPs are issued under Defence Council authority and where AESPs specify action to be taken, the AESP will of itself be sufficient authority for such action and also for the demanding of the necessary stores, subject to the provisions of Para 3 below.

3 The subject matter of this publication may be affected by Defence Council Instructions (DCIs), Standing Operating Procedures (SOPs) or by local regulations. When any such instruction, Order or Regulation contradicts any portion of this publication it is to be taken as the overriding authority.

RELATED AND ASSOCIATED PUBLICATIONS

Related publications

4 The Octad for the subject equipment consists of the publications shown overleaf. All references are prefixed by the first eight digits of this publication. The availability of the publications can be checked by reference to the relevant Group Index (see AESP 0100-A-001-013).

Category/Sub-category		Information Level				
		1 User/Operator	2 Unit Maintenance	3 Field Maintenance	4 Base Maintenance	
1	0	Purpose and Planning Information	101	101	101	101
	1	Equipment Support Policy Directives	111	111	111	111
2	0	Operating Information	201	*	*	*
	1	Aide Memoire	211	*	*	*
	2	Training Aids	*	*	*	*
3		Technical Description	201	302	302	*
4	1	Installation Instructions	*	*	*	*
	2	Preparation for Special Environments	*	*	*	*
5	1	Failure Diagnosis	201	512	513	*
	2	Repair Instructions	201	522	523	*
	3	Inspection Standards	*	532	533	*
	4	Calibration Procedures	*	*	*	*
6		Maintenance Schedules	*	*	*	*
7	1	Illustrated Parts Catalogues	711	711	711	711
	2	Commercial Parts Lists	*	*	*	*
	3	Complete Equipment Schedule, Production	*	*	*	*
	4	Complete Equipment Schedule, Service Edition (Simple Equipment)	741	741	741	741
	5	Complete Equipment Schedule, Service Edition (Complex Equipment)	*	*	*	*
8	1	Modification Instructions	*	*	*	*
	2	General Instruction, Special Technical Instructions and Servicing Instructions	*	*	*	*
	3	Service Engineered Modification Instructions (RAF only)	*	*	*	*

* Category/Sub-category not published

Associated publications

5 The following publications are associated with the TacGA communications system:

<u>Reference</u>	<u>Title</u>
Signal Engineering Instruction 14411	Safety Precautions for Electrical Equipment
EMER Telecommunications C 740	Audio Gear Clansman
EMER Telecommunications K 010	Clansman Charging Equipment
EMER Telecommunications L220 - 229	Mast Telescopic 8 m (to be replaced by AESP 5985-C-090)
EMER Telecommunications M 650	Audio Ancillaries Test Set
EMER Telecommunications M 680	Clansman Harness Box Test Set
AC 61657	User Handbook Clansman Harness Box Test Set
AC 61656	User Handbook Audio Ancillaries Test Set
ACP 63723	Health and Safety Management in ESO/REME
AESP 4940-P-200-201	General Purpose Electrical Cable Repair Kit (REME)
AESP 5800-C-146-412	C ³ I Installations in TUM/TUL (HS) FFR
AESP 5800-C-150-412	C ³ I Installations in Truck Utility Medium (TUM)
AESP 5800-C-160-412	C ³ I Installations in Truck Utility Long (TUL)
AESP 5800-H-281-301	ASV436 Harness and Installation Kits
AESP 5800-H-371-411	C ³ I Installations in Haglunds BV206(D)
AESP 5825-D-100	Specialist Personal GPS Receiver (SPGR)
AESP 5985-C-090	User Handbook Mast Telescopic 8 m
AESP 6130-M-102	Intelligent Battery Management System (IBMS)
AESP 6600-A-100-013	Control of Electrostatic Devices (ESSDs)
AESP 6625-K-112	Test System Radio Communications (Marconi 8920C)
BID 250/1/1	User Handbook BID 250/31
BID/251-2	User Handbook BID 250/2
BID/251-5	Not Yet Known
STANAG 4246 (SECRET)	HAVE QUICK and UHF Secure Communications Equipment

WARNING

HAZARDOUS SUBSTANCES. THIS EQUIPMENT CONTAINS NICKEL CADMIUM (Ni-Cd) BATTERIES. FOR HANDLING AND DISPOSAL INSTRUCTIONS REFER TO ACP 63723 CHAPTER 16.

CAUTIONS

- (1) **UNAUTHORISED USE.** The UK/RT 346 receiver-transmitter unit is capable of extended frequency operation in the ranges 30 to 88 MHz, 100 to 174 MHz VHF AM/FM and 225 to 400 MHz UHF AM/FM. These frequency ranges extend beyond the declared employment bands. Inclusion of this facility does not automatically authorise its use. Such use shall be carefully co-ordinated and approved. The allocation of radio frequencies is governed by widespread military regulations and civilian laws. Any violation of such regulations or laws, or unauthorised use, may render the user liable to prosecution.
- (2) **WOD ERASURE.** When a forced TOD is entered, the HQ I WOD is erased. To communicate in HQ I mode, a valid WOD with the same date code as the forced TOD must be entered following forced TOD entry. If a valid WOD is not present when attempting HQ communications, an error message will be displayed.
- (3) **WOD COMPATIBILITY.** To communicate in HQ mode, a compatible WOD and TOD must be present. If a valid WOD is not present when attempting HQ communications, an error message will be displayed.
- (4) **MWOD COMPATIBILITY.** To communicate in HQ II mode, a valid MWOD with the same date code as the TOD must be present. If a valid MWOD is not present when attempting HQ communications, an error message will be displayed.
- (5) **TOD DISRUPTION.** The MWOD electronic fill process may disrupt TOD accuracy. Following an electronic fill, the TOD must be validated or updated using the appropriate procedure.
- (6) **LIMITED DURATION.** Following emergency TOD acquisition, the TOD will remain synchronised between stations for a period of at least 4 hrs. After this period, accuracy may be reduced and the TOD should be re-acquired.
- (7) **LIMITED COMMUNICATION.** A forced TOD has a unique, arbitrary value and will not be synchronised with Zulu time (co-ordinated universal time). Once the TOD is manually forced on one station, the station will not communicate with a second radio station in HQ mode unless the unique TOD is transmitted to, and received by, the second station. The other second will, in turn, only be able to communicate in HQ mode with those stations which have also received the unique forced TOD.

ABBREVIATIONS

ABR	... ..	Adaptor box radio
AJ	... ..	Anti-jam
AM	... ..	Amplitude modulation
ATC	... ..	Air traffic control
BER	... ..	Bit error rate
BIT	... ..	Built-in-test
CES	... ..	Complete equipment schedule
CNR	... ..	Combat net radio
C/N ₀	... ..	Carrier-to-noise ratio
CRCH	... ..	Clansman radio control harness
DCCU	... ..	Direct current charging unit
EMC	... ..	Electromagnetic compatibility
EMI	... ..	Electromagnetic interference
FM	... ..	Frequency modulation
FSK	... ..	Frequency shift keying
GMT	... ..	Greenwich mean time
GPS	... ..	Global positioning system
IBMS	... ..	Intelligent battery management system
HQ	... ..	HAVE QUICK
LISO ₂	... ..	Lithium-sulphur dioxide
LRU	... ..	Line replaceable unit
MWODS	... ..	Multiple words of day
NBC	... ..	Nuclear, biological and chemical
N/B	... ..	Narrow band
Ni-Cd	... ..	Nickel-cadmium
NSN	... ..	NATO stock number
RF	... ..	Radio frequency
R/T	... ..	Receiver-transmitter
RUL	... ..	Remote unit local
Rx	... ..	Receive
SINAD	... ..	Signal plus noise and distortion
SPGR	... ..	Specialist portable GPS receiver
TOD	... ..	Time of day
Tx	... ..	Transmit
UHF	... ..	Ultra-high frequency
VHF	... ..	Very-high frequency
VSWR	... ..	Voltage standing wave ratio
W/B	... ..	Wideband
WOD	... ..	Word of day

[REDACTED]



[REDACTED]

PURPOSE AND PLANNING INFORMATION

EQUIPMENT IDENTITY

1 The equipment identity is as follows:

- 1.1 Equipment designation: TacGA Ground-to-Air-to-Ground Communications System
- 1.2 Manufacturer: HEL

INSTALLED EQUIPMENT

2 The designation and NATO stock numbers (NSNs) of the kits comprising the TacGA radio system are listed in Table 1. For the designations and NSNs of the line replaceable units (LRUs) used in these kits, refer to Cat 741 (CES) of this AESP.

TABLE 1 EQUIPMENT KITS

Serial (1)	Service description (2)	Common name (3)	NATO stock number (4)
1	Station kit UK/PRC 346	UK/PRC 346 station kit	5820-99-573-5059
2	Manpack UK/PRC 346	Manpack kit	5820-99-573-5060
3	Remote operation UK/PRC 346	Remote operation kit	5820-99-573-5061
4	Elevated antenna UK/PRC 346	Elevated antenna system	5820-99-573-5062
5	Key fill sub-system, UK/RT 346	BID 250/31 fill kit	5820-99-573-5063
6	Key fill sub-system, Precision Lightweight GPS Receiver II	BID 250/2 fill kit	5820-99-573-5064
7	Audio gear UK/PRC 346	Audio gear	5820-99-573-5065
8	IK for UK/RT 346 in ASV436	ASV436 vehicle station installation kit	5820-99-573-7503
9	IK for UK/RT 346 in BV206(D)	BV206(D) vehicle station installation kit	5820-99-573-7504
10	IK for UK/RT 346 in TUL/TUM (HT) FFR	TUL/TUM Landrover hard top vehicle station installation kit	5820-99-573-7505
11	IK for UK/RT 346 in TUL/TUM (HS) FFR	Landrover HS vehicle station installation kit	5820-99-627-7001
12	IK for ground plane in TUL/TUM (HS) FFR (ST)	Landrover HS soft top ground plane installation kit	5820-99-922-3707
13	IK for ground plane in TUL/TUM (HS) FFR (HT)	Landrover HS hard top ground plane installation kit	5820-99-519-0443

ROLE AND PURPOSE

3 The TacGA communications system is a versatile, portable multi-band radio system for tactical ground-to-air-to-ground use, as illustrated in Fig 1. TacGA provides the following facilities:

3.1 Voice and data communications, in either a normal VHF/UHF multi-band fixed frequency mode or in a UHF frequency-agile anti-jam (AJ) mode designated HAVE QUICK.

3.2 Global positioning system (GPS) signal reception.

3.3 Direction-finding beacon transmission.

4 A TacGA installation is designated a UK/PRC 346 radio station. A station may be configured as follows:

4.1 One-man portable manpack station.

4.2 Vehicle mounted manpack station.

4.3 Optional remote operation.

4.4 Optional free-standing elevated antenna.

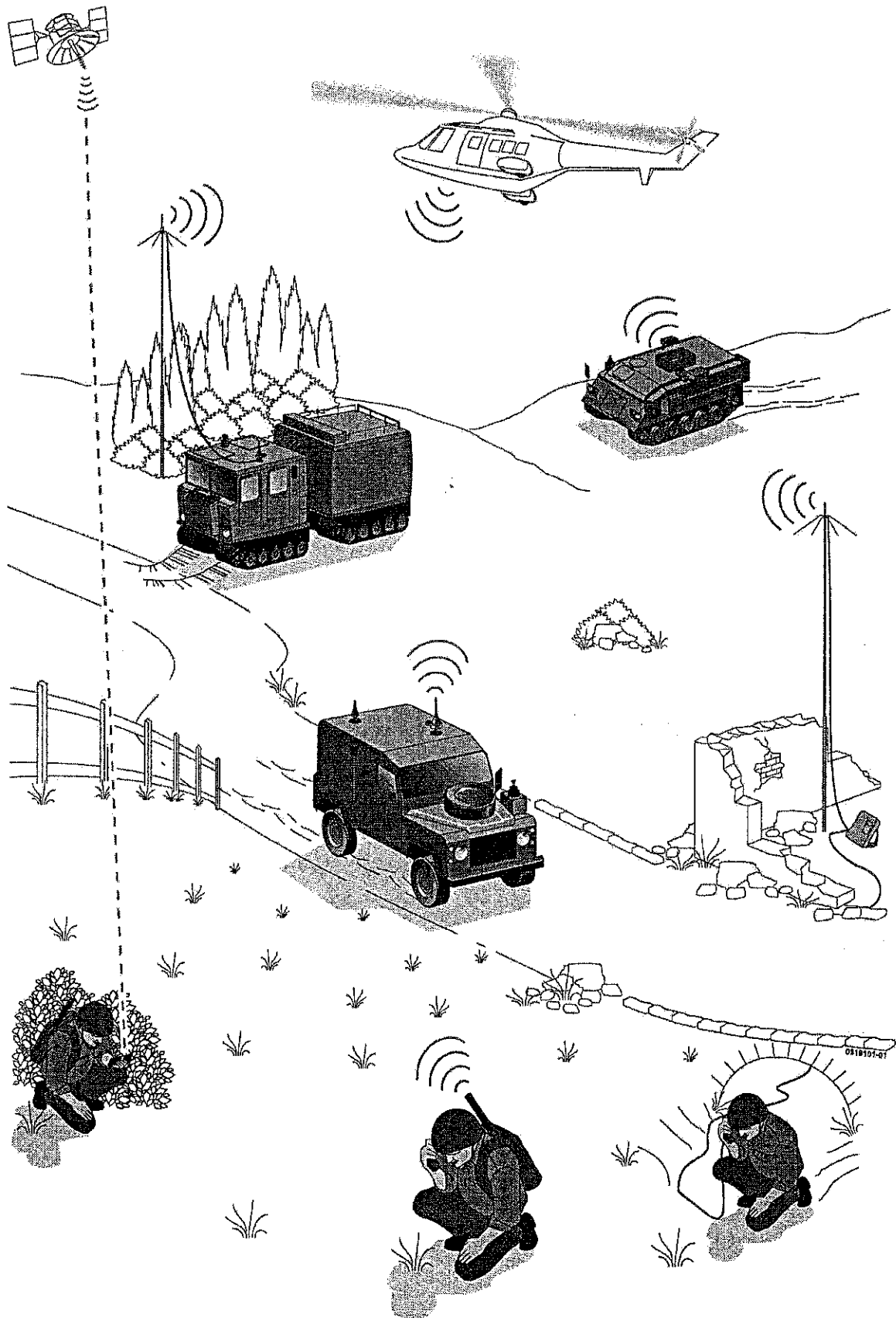


Fig 1 The TacGA communications system

BRIEF DESCRIPTION

5 The main radio and control functions are embodied in a single UK/RT 346 receiver-transmitter unit. The unit is a member of the Raytheon MXF-400 family which has a proven, modular design. Wherever possible, the ancillary equipment employs in-service items. For vehicle installations, the station appears to the vehicle Clansman Radio Control Harness (CRCH) as a standard Clansman radio.

6 The TacGA system comprises a set of Complete Equipment Schedules (CES). The desired configuration of UK/PRC 346 radio station is assembled by selection of the appropriate CES, as shown in Fig 2. A UK/PRC station comprises the following CES:

- 6.1 UK/PRC 346 Station kit.
- 6.2 Audio gear.
- 6.3 Either the manpack kit or a vehicle IK.
- 6.4 Additional optional CES as required.

7 The purpose of each CES and its main equipment items are summarised below. For the full list of equipment items in each CES, refer to Cat 741 of this AESP.

UK/PRC 346 Station kit

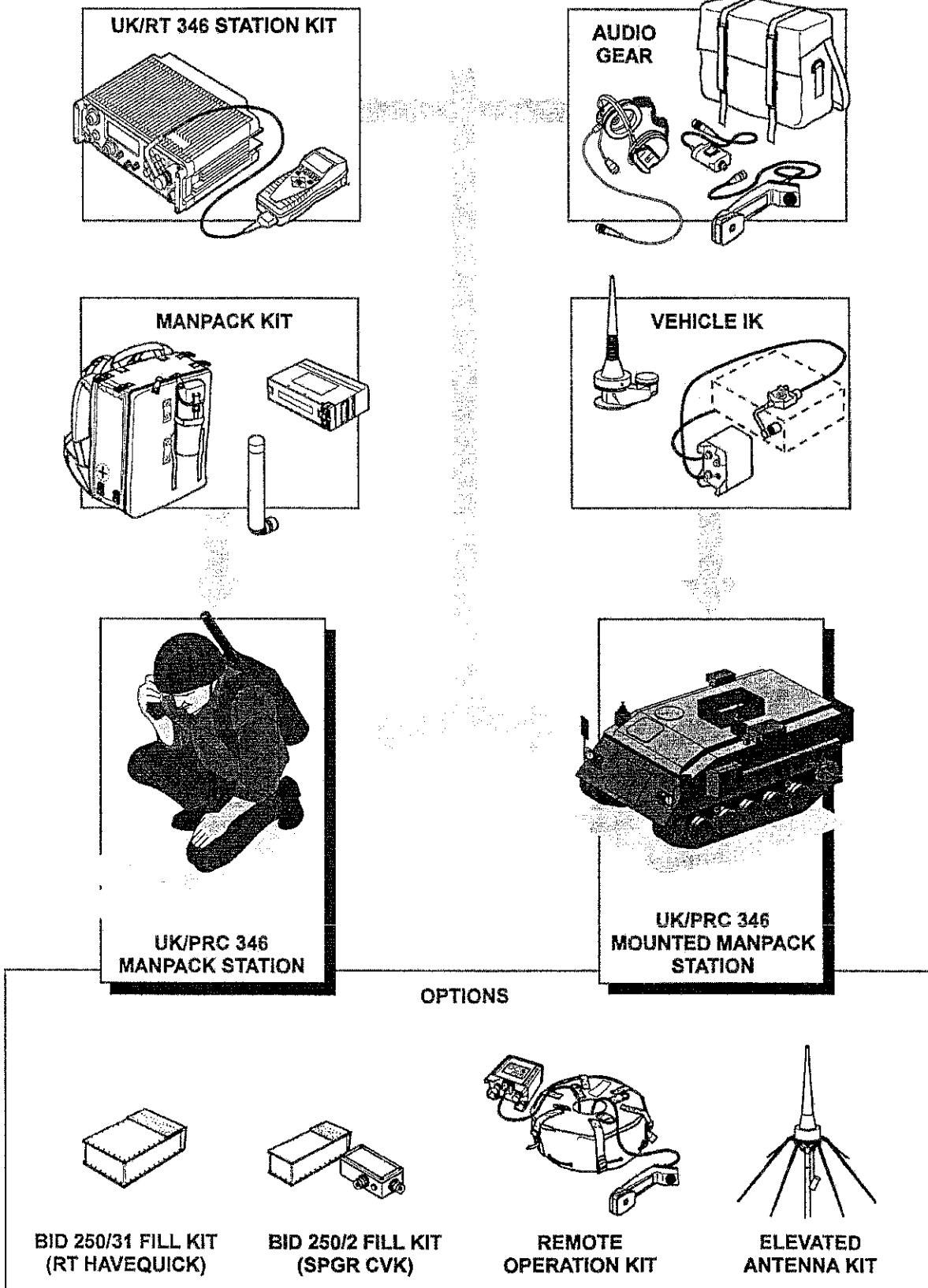
8 The UK/PRC 346 station kit comprises the core operating facilities of the station. The main equipment items are as follows:

- 8.1 UK/RT 346 receiver-transmitter (R/T) unit. Provides all radio and beacon operating facilities.
- 8.2 Specialist personal GPS receiver (SPGR). The Option 3 model SPGR provides GPS signal reception for HAVE QUICK station operation. Six AA batteries are provided for independent use in the GPS role.

Audio gear

9 The audio gear provides the operator audio interface for the station. The main equipment items are as follows:

- 9.1 Handset GP. The handset is a standard Clansman in-service item.
- 9.2 Headset BV&I. The headset and the associated pressel box are standard Clansman in-service items.
- 9.3 Respirator microphone. The microphone allows use of the headset BV&I with an S10 anti-gas respirator mask.
- 9.4 Audio cables. A 7 m extension cable and a 'Y' splitter cable are provided, allowing simultaneous use by a second local operator.
- 9.5 Satchel GP. Provides storage for the audio gear. Alternatively, the audio gear can be stowed in the manpack carry container.



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Fig 2 The TacGA complete equipment schedules (CES)

Manpack kit

10 The manpack kit provides the specific equipment items required for one-man portable operation of the UK/PRC 346 station. The main equipment items are as follows:

10.1 Carry container and document case. Houses the UK/PRC 346 station equipment for operation, storage and transport.

10.2 V/UHF battle antenna. Connects directly to the R/T unit for radio Rx/Tx operation across the full band employed by TacGA.

10.3 5 AH rechargeable battery. Provides power to the UK/PRC 346 station. Four batteries are provided: one operational, one spare stowed in the carry container and two spares available for recharging. Battery charging is accomplished using the in-service Intelligent Battery Management System (IBMS).

10.4 External SPGR pouch. Can be strapped to the operator's chest harness webbing to provide a hands-free view of the SPGR display when operating independently from the radio station.

Vehicle installation kits (IK)

11 The TacGA vehicle IKs comprise special-to-vehicle cabling and bracketry in addition to the following main equipment items:

11.1 Vehicle and GPS antennas. Mounted on the vehicle roof. The antennas provide respectively for radio Rx/Tx operation across the full band employed by TacGA and for GPS signal reception by the SPGR.

11.2 Auxiliary Box Radio (ABR). Provides audio interfacing to the vehicle Clansman Radio Control Harness (CRCH). Fitted to the ASV436 and BV206(D) vehicles only.

11.3 4.5 AH rechargeable battery. Provides power to the mounted UK/PRC 346 station. Two batteries are provided: one operational and one spare available for recharging. Battery charging is accomplished using the vehicle's Direct Current Charging Unit (DCCU).

BID 250/31 fill kit

12 The BID 250/31 fill kit is used within TacGA to load the Multiple Words of Day (MWODS) classified keys into the R/T unit for HAVE QUICK operation. The main equipment item is the BID250/31 fill subsystem.

BID 250/2 fill kit

13 The BID 250/2 fill kit is used within TacGA to load secure keys into the SPGR for GPS operation. The main equipment item is the BID250/2 fill subsystem.

Remote operation kit

14 The remote operation kit allows operator audio and Rx/Tx operation of the R/T unit from a maximum distance of at least 2,000 m. The main equipment items are as follows:

14.1 Remote unit local (RUL). Provides the remoting functions and driver circuitry.

14.2 D10 field wire dispenser pack, 800 m. Provides convenient storage and means of deployment for the 800 m length of D 10 field wire integral with the pack. The packs may be daisy-chained to a total of 2,000 m.

14.3 Satchel GP. Provides storage for the RUL and ancillaries. Alternatively, the RUL and ancillaries can be stowed in the manpack carry container.

Elevated antenna system

15 The elevated antenna system provides options for using a mast-mounted antenna in locations where the standard antenna position provides inadequate performance. The system comprises a set of equipment kits and items from which the equipment required for a given option is selected. The main equipment items are as follows:

15.1 5.4 m antenna mast. Primarily for use with the manpack station complete with V/UHF battle antenna, in locations where the standard antenna position provides inadequate performance.

15.2 8 m antenna mast. For use with the vehicle mounted manpack stations and elevated antenna, in locations where the standard antenna position provides inadequate performance.

15.3 Elevated antenna. Primarily for use with the vehicle mounted manpack stations. The elevated antenna provides for radio Rx/Tx operation across the full band employed by TacGA.

15.4 Ground plane. Used for all elevated antenna options.

PHYSICAL DATA

16 The physical characteristics of the manpack station (comprising the station kit UK/PRC 346, manpack kit and audio gear) are as follows:

Weight: 15.6 kg

Dimensions (packed configuration):

Length: 470 mm

Width: 330 mm

Depth: 270 mm

17 Physical data for the individual equipment items is given in Table 2.

TABLE 2 PHYSICAL DATA

Serial (1)	Physical characteristic (2)	Data (3)
1	<u>UK/RT 346 R/T unit</u> Weight: Without battery: With 5 AH battery: Overall dimensions (without battery): Height: Width: Depth:	 4.77 kg (10.8 lbs) 8.3 kg (18.8 lbs) 8.1 cm (3.25 in.) 26.8 cm (10.6 in.) 20.7 cm (8.1 in.)
2	<u>5 AH NiCad battery</u> Weight:	3.54 kg (7.7 lbs)
3	<u>VHF/UHF battle antenna</u> Length:	336 mm (13 in.) typical
4	<u>Vehicle Antenna</u> Height above vehicle roof:	427 mm
5	<u>Elevated Antenna</u> Height above top of mast assembly:	500 mm
6	<u>Ground plane</u> Diameter (arms in operating position):	1.46 m
7	<u>Audio extension cable</u> Length:	7 m
8	<u>Audio splitter cable</u> Length:	230 mm

PERFORMANCE

18 The performance characteristics of the UK/PRC 346 station are as follows:

18.1 Operating modes:

AM/FM, normal voice and data traffic modes.
HQ I and II anti-jam mode.
Beacon transmit.

18.2 Frequency bands. 100 to 174 MHz and 225 to 399.975 MHz.

18.3 Range:

Manpack station: 150 nautical miles in standard conditions.
Vehicle mounted manpack stations: Greater than 150 nautical miles in standard conditions.
Elevated antenna: Greater than 150 nautical miles in standard conditions.

18.4 Remote operation field wire length:

800 m using the D10 dispenser pack provided.
At least 2,000 m using additional D10 field wire.

18.5 Battery life. The nominal life for each type of battery is given in Table 3. The life is given for an R/T unit with a power management duty cycle of 1:1 receive:sleep for 23 hrs and transmit at high power (8 W) for 1 hr, with SPGR connected and an ambient temperature of 10 deg C. The life given is the time taken to discharge from the fully-charged state to an output voltage of +18.5 V d.c. When float-charged in a vehicle mounted manpack station, the life of the 4.5 AH battery is indefinite.

TABLE 3 BATTERY LIFE

Serial (1)	NATO stock number (2)	Capacity (3)	Description (4)	Use (5)	Nominal life (6)
1	6140-99-620-8057	4.5 AH	Rechargeable Nickel Cadmium (NiCad).	Vehicle mounted manpack stations	9 hrs.
2	6140-99-573-5037	5 AH	Rechargeable Nickel Cadmium (NiCad).	Manpack station	12 hrs.

OPERATIONAL DATA**Communication facilities**Multi-band fixed frequency voice/data communications

19 The UK/PRC 346 radio station provides normal voice/data radio communication in both AM and FM modes at fixed frequencies across the VHF/UHF band from 100 to 400 MHz. This allows communication on the VHF-AM Air Traffic Control band, the VHF-FM Maritime band and the UHF Airborne Communication band.

Anti-iam (AJ) HAVE QUICK communications

20 TacGA provides AJ communications using a system called HAVE QUICK (HQ). The system has the following features:

20.1 TacGA supports HQ I and HQ II modes.

20.2 The HQ system must be synchronised across all stations operating in AJ mode. Synchronisation is normally provided via the Global Positioning System (GPS) time signal.

20.3 Multiple communication channels can be set up without risk of cross-channel interference.

20.4 Up to two stations can transmit on the same channel without risk of RF interference.

21 HQ operation requires the following information (parameters):

21.1 Net number: Entered manually. Each communication channel requires a different net number.

21.2 Word of Day (WOD):

21.2.1 HQ I: A single WOD entered manually.

21.2.2 HQ II: Up to 6 multiple WODs (MWODS) allowing HQ II operation for one day (midnight to midnight) for each MWOD. The MWODS are entered using the BID 250/31 fill device. The fill device must be pre-loaded with the required MWODS before filling the R/T unit.

21.2.3 The WOD/MWODS are classified. Following completion of a HAVE QUICK mission, they must be erased (zeroized).

21.3 Time of Day (TOD): Acquired from the GPS satellite signal using the SPGR. In an emergency the TOD for a given communication channel can be manually forced.

Beacon transmission

22 The UK/PRC 346 radio station has the facility to transmit a beacon signal. The beacon mode (AM/FM), radio frequency and power level are user selectable and the beacon signal is user selectable as a constant 1 kHz tone or as a swept 150 to 3850 Hz tone.

Deployment options

Manpack station

23 The basic UK/PRC 346 manpack radio station can be carried and operated by a single user. The manpack station provides the following facilities:

23.1 The radio station is located within a specialist carry container and may be used while the operator is wearing the carrier. The carrier has additional stowage provision for a spare battery and battle antenna. External attachment points are provided for two day sacks and two general-purpose straps.

23.2 The manpack station may be used in conjunction with remote operation and/or 5.4 m high elevated antenna mast options.

Vehicle mounted manpack stations

24 Table 4 details the types of vehicle fitted with UK/PRC 346 mounted manpack stations, together with the station options available for each type of vehicle. The associated vehicle installation kits (IK) are detailed in Table 9.

TABLE 4 VEHICLE MOUNTED MANPACK STATIONS

Serial (1)	Vehicle (2)	Notes (4)
1	Landrover TUL/TUM: hard top	For all TUL/TUM stations the remote operation kit and free-standing 8 m elevated antenna system may be optionally deployed.
2	Landrover TUL/TUM high specification (HS) FFR: hard top, soft top and winterised	
3	BV206(D)	<p>The UK/PRC 346 station is located on the tractor rear bulkhead. The station audio is also available in the trailer using the vehicle harness facility.</p> <p>The free-standing 8 m elevated antenna system may be optionally deployed.</p> <p>For vehicle harness provided with the IB2, the UK/PRC 346 station supports automatic rebroadcasting.</p>
4	ASV436	The free-standing 8 m elevated antenna system may be optionally deployed.

Remote operation

25 The manpack and TUL/TUM Landrover radio stations may be operated remotely using the D10 field wire and remote handset provided from a distance of up to 800 m or, using additional field wire, from a maximum distance of at least 2,000 m.

26 The remote operation kit also supports automatic rebroadcasting through the field wire interface.



Free-standing elevated antenna system

27 In locations where the standard antenna position provides inadequate performance, the elevated antenna system provides the following options for mounting the antenna on an elevating mast to improve the communications path capability:

- 27.1 5.4 m high system for use with the manpack station and VHF/UHF battle antenna.
- 27.2 8 m high system, including an elevated antenna, for use with the vehicle mounted stations.

NBC respirator use

28 The station can be operated by a user wearing the respirator type S10.



ENVIRONMENTAL DATA

29 Environmental data is given in Table 5.

TABLE 5 ENVIRONMENTAL DATA

Serial (1)	Environment (2)	Remarks (3)
	<u>UK/RT 346</u>	
1	Finish	Agent resistant Deep Bronze Green paint.
2	Operating temperature range	-30 deg C to +55 deg C.
	Storage temperature range	-45 deg C to +65 deg C.
3	Operating altitude	Up to 15,000 ft.
4	Humidity	Up to 100% at temperatures between 26 deg C and 35 deg C.
5	Water resistance	Up to 3 feet below surface for a 2 hour duration.
6	Drop	Withstands a 4 ft drop to each face, edge or corner.
7	Electromagnetic interference (EMI) and compatibility (EMC)	Per MIL-STD-461C, Part 4.
	<u>Elevated antenna</u>	
8	Operating temperature range	-40 deg C to +60 deg C.

TRANSPORTATION DATA

30 The TacGA Radio System equipment is suitable for transportation by land, sea or air.

PACKAGING DATA

31 Equipment kits specific to the TacGA system are supplied packed to DEF STAN 81-41 Level 'J'. Kits should not be broken down on receipt, and should remain in the original packaging until reaching the designated units.

32 Packaging materials should be retained for storage or reshipment.

MANNING REQUIREMENTS

33 The basic UK/PRC 346 radio station can be operated by a single user. The manpack station can be carried and operated by a single user.

34 The manpower required to carry, deploy and operate the optional subsystems are as follows:

34.1 Remote operation. Second person to carry, deploy, operate and dismantle.

34.2 5.4 m elevated antenna system. Second person to carry. Can be operated and deployed by a single person.

34.3 8 m elevated antenna system. Second person to carry, deploy and dismantle. Can be operated by a single person.

ELECTRICAL DATA

35 Electrical data for the UK/RT 346 R/T unit is listed in Table 6 and for the ancillary items in Table 7.

TABLE 6 UK/RT 346 RECEIVER/TRANSMITTER UNIT ELECTRICAL DATA

Serial (1)	Characteristic (2)	Performance data (3)
	<u>Radio characteristics</u>	
1	Operating Frequency Ranges	VHF: 30.000 - 87.975 MHz (CNR Band). This band is not used by TacGA. VHF: 100.000 - 174.000 MHz (ATC/Maritime Band). UHF: 225.000 - 399.975 MHz (Ground-to-Air Band).
2	Channel Spacing	30 to 88 MHz Band: 25 kHz. (This band is not used by TacGA). 100 to 117.975 MHz Band: 25 kHz. 118.000 to 156.000 MHz Band: 5 kHz. 156.025 to 174 MHz Band: 25 kHz. 225 to 400 MHz Band: 25 kHz.
3	Operating Modes	Fixed Frequency, Single Channel. AJ UHF AM - HAVE QUICK I & II.
4	Frequency Accuracy	±1.0 part/million resolution over all operating conditions.
5	Modulation	Selectable AM or FM.
	<u>Transmitter characteristics</u>	
6	Power Output, selectable in 3 increments	High: 38 dBm (8 W). Medium: 33 dBm (2 W). Low: 26 dBm (0.4 W).
7	Voice Modulation (300 to 3000 Hz)	AM: 80% typical. FM: ±5.6 kHz Deviation typical.

(continued)

TABLE 6 UK/RT 346 RECEIVER/TRANSMITTER UNIT ELECTRICAL DATA (continued)

Serial (1)	Characteristic (2)	Performance data (3)
8	Data Modulation (16 kbps)	AM: 90%. FM/FSK: ± 6 kHz Deviation.
9	Beacon Modulation	Continuous tone: 1 kHz. AM 90% typical, FM ± 6 kHz Deviation typical. Swept tone: 150 to 3,850 Hz.
10	CNR Squelch Tone modulation (150 Hz)	FM: ± 1.5 kHz deviation typical (automatically enabled for FM voice communications in the 30-88 MHz frequency range). This facility is not required in the band allocations used by TacGA.
11	Audio Input Levels	N/B: 2 mV RMS for 80% modulation. W/B: 1.0 V pp for 80% modulation, 150 ohm resistive impedance.
12	Audio Response	N/B: 300 - 3000 Hz, ± 3 dB relative to 1 kHz. W/B: 30 to 10,240 Hz, +2, -4 dB.
13	Audio Modulation Distortion	Less than 5%.
14	Broadband Noise Floor	-110 dBm/Hz, ± 10 MHz.
	<u>Receiver characteristics</u>	
15	AM Sensitivity: (10 dB SINAD)	-100 dBm, 30 % modulation at 1 kHz.
16	FM Sensitivity: (10 dB SINAD)	-110 dBm, ± 5.6 kHz deviation at 1 kHz.
17	FSK Bit Error Rate (BER) Performance (16 kbps)	No more than 1×10^{-3} with a carrier-to-noise ratio (C/N ₀) of at least 54.5 dB-Hz.
18	Squelch	Adjustable from noise to >16 dB SINAD.
19	Audio Output	N/B: 0.5 mW, 300 ohm resistive load, continuously adjustable to less than .01 μ W. W/B: 1.0 V pp nominal, 600 ohm resistive load.
20	Audio Response	N/B: 300 - 3000 Hz, ± 3 dB relative to 1 kHz. W/B: 30 to 10,240 Hz, +2, -4 dB.
21	Audio Distortion	Less than 5%.

TABLE 7 ANCILLARY EQUIPMENT ELECTRICAL DATA

Serial (1)	Characteristic (2)	Performance data (3)
1	<u>VHF/UHF battle antenna</u> Gain Impedance Frequency Range Pattern	-3.65 dBd including VSWR mismatch losses. 50 ohm. 100 to 400 MHz. Omni-directional with normally vertical polarisation.
2	<u>Vehicle antenna</u> Gain: 100-174 MHz: 225-400 MHz Impedance Frequency Range Pattern	Average -2.1 dBd. Average -1.43 dBd. 50 ohm. 100 to 400 MHz. Omni-directional, vertical polarisation.
3	<u>Elevated antenna</u> Gain: 100-174 MHz: 225-400 MHz Impedance Frequency Range Pattern	NYK NYK 50 ohm. 100 to 400 MHz. Omni-directional, vertical polarisation
4	<u>ABR</u>	Standard Clansman audio connection, including full two-way traffic coupling and rebroadcast.
5	<u>RUL</u>	Full two-way traffic coupling and local/remote intercom. Supplies automatic rebroadcast and break in with cooperative ancillaries.
6	<u>Antenna filter box</u> Passband: Insertion loss: VSWR: Attenuation below 93 MHz (HF/VHF): Attenuation above 420 MHz (UHF):	100-400 MHz nominal. Typically 1.5 dB. Maximum 1.3:1. Minimum 33 dB. Minimum 26 dB.
7	<u>BID 250/2 power adaptor</u>	Output 5 V at maximum 100 mA.

POWER REQUIREMENTS

36 A UK/PRC 346 radio station may be powered by any of the following:

36.1 A battery of any type given in Table 3.

36.2 For a vehicle mounted manpack station, by the vehicle Direct Current Charging Unit (DCCU) via a float-charge connection to the battery.

37 The power supply requirements for the UK/PRC 346 radio station are listed in Table 8.

TABLE 8 POWER REQUIREMENTS

Serial (1)	Electrical characteristic (2)	Description (3)
1	<u>Input Voltage:</u>	+21 to +32 V d.c. (+24 V d.c. nominal)
2	<u>UK/PRC 346 Power Consumption</u> , with a nominal +24 V d.c. power supply and a SPGR attached and active: NOTE When connected, the RUL unit will consume additional power. 2.1 Transmit at high power (8 W AM/FM): 2.2 Continuous (receive): 2.3 Polling (1:1 duty cycle): 2.4 Sleep mode:	Maximum 3 A, 72 W Typically 2.5 A, 60 W Nominal 440 mA, 10.5 W Nominal 380 mA, 9 W Approx 290 mA, 7 W
3	<u>RUL Power Consumption</u> additional, when connected:	Average 50 mA, 1.2 W

ASSOCIATED EQUIPMENT

38 The equipment associated with the TacGA system is listed in Table 9.

TABLE 9 ASSOCIATED EQUIPMENT

Serial (1)	Description (2)	NATO stock number (3)	Reference (4)
1	Clansman Radio Control Harness (CRCH)	n/a	EMER Comms Inst
2	Direct Current Charging Unit (DCCU) 28 V	6130-99-117-0450	EMER Telecommunications K 010
3	Intelligent Battery Management System (IBMS)	n/a	AESP 6130-M-101
4	Marconi 8920C Radio Communications Test System	6625-99-660-2640	AESP 6625-K-112
5	IK for UK/RT 346 in ASV436	5820-99-573-7503	AESP 5800-H-281-301 Inst Instr No B34
6	IK for UK/RT 346 in BV206(D)	5820-99-573-7504	AESP 5800-H-371-411 Inst Instr No B39
7	IK for UK/RT 346 in TUM/TUL (HT) FFR	5820-99-573-7505	AESP 5800-C-150-412 Inst Instr No 01 AESP 5800-C-160-412 Inst Instr No 01
8	IK for UK/RT 346 in TUM/TUL (HS) FFR	5820-99-627-7001	AESP 5800-C-146-412 Inst Instr No B39 Inst Instr No B42 (winterised)
9	IK for ground plane in TUM/TUL (HS) FFR (ST)	5820-99-922-3707	AESP 5800-C-146-412 Inst Instr No B40
10	IK for ground plane in TUM/TUL (HS) FFR (HT)	5820-99-519-0443	AESP 5800-C-146-412 Inst Instr No B41

MAINTENANCE DATA

39 No scheduled maintenance is required.

[REDACTED]



[REDACTED]

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Sender's Reference	BIN Number	Date
AESP Title:		
Chapter(s)/Instruction	Page(s)/Paragraph(s)	
If you require more space, please use the reverse of this form or a separate piece of paper. Comment(s):		

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Incorporate comment(s) in future amendments		No action required	
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AESP Form 10 (Issue 3 dated Oct 97)

[REDACTED]



[REDACTED]



[REDACTED]



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TacGA
THE TACTICAL GROUND AIR
COMMUNICATIONS SYSTEM

EQUIPMENT SUPPORT POLICY DIRECTIVE

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Issued by
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EQUIPMENT SUPPORT POLICY DIRECTIVE

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2	Management Information
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11	Supply
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16	Reliability
21	Configuration Management
22	Storage
23	Disposal
24	Review of ESPD

PREFACE

Sponsor : DGES(A)
Publication Agency : ATSA

INTRODUCTION

1 Service users should forward any comments on this publication through channels prescribed in AESP 0100-P-011-013. An AESP Form 10 is provided at the end of this publication; it should be photocopied and used for forwarding comments on this AESP.

2 AESPs are issued under Defence Council authority and where AESPs specify action to be taken, the AESP will of itself be sufficient authority for such action and also for the demanding of the necessary stores, subject to the provisions of Para 3 below.

3 The subject matter of this publication may be affected by Defence Council Instructions (DCIs), Standing Operating Procedures (SOPs) or by local regulations. When any such instruction, Order or Regulation contradicts any portion of this publication it is to be taken as the overriding authority.

RELATED AND ASSOCIATED PUBLICATIONS**Related publications**

4 The Octad for the subject equipment consists of the publications shown overleaf. All references are prefixed by the first eight digits of this publication. The availability of the publications can be checked by reference to the relevant Group Index (see AESP 0100-A-001-013).

Category/Sub-category			Information Level			
			1 User/Operator	2 Unit Maintenance	3 Field Maintenance	4 Base Maintenance
1	0	Purpose and Planning Information	101	101	101	101
	1	Equipment Support Policy Directives	111	111	111	111
2	0	Operating Information	201	*	*	*
	1	Aide Memoire	211	*	*	*
	2	Training Aids	*	*	*	*
3		Technical Description	201	302	302	*
4	1	Installation Instructions	*	*	*	*
	2	Preparation for Special Environments	*	*	*	*
5	1	Failure Diagnosis	201	512	513	*
	2	Repair Instructions	201	522	523	*
	3	Inspection Standards	*	532	533	*
	4	Calibration Procedures	*	*	*	*
6		Maintenance Schedules	*	*	*	*
7	1	Illustrated Parts Catalogues	711	711	711	711
	2	Commercial Parts Lists	*	*	*	*
	3	Complete Equipment Schedule, Production	*	*	*	*
	4	Complete Equipment Schedule, Service Edition (Simple Equipment)	741	741	741	741
	5	Complete Equipment Schedule, Service Edition (Complex Equipment)	*	*	*	*
8	1	Modification Instructions	*	*	*	*
	2	General Instruction, Special Technical Instructions and Servicing Instructions	*	*	*	*
	3	Service Engineered Modification Instructions (RAF only)	*	*	*	*

* Category/Sub-category not published

Associated publications

5 The following publications are associated with the TacGA communications system:

<u>Reference</u>	<u>Title</u>
Signal Engineering Instruction 14411	Safety Precautions for Electrical Equipment
EMER Telecommunications A 414	Printed Circuit Repair Techniques
EMER Telecommunications C 740 - 743	Clansman Audio Accessories
EMER Telecommunications K 010	Clansman Charging Equipment
EMER Telecommunications L220 - 229	Mast Telescopic 8 m (to be replaced by AESP 5985-C-090)
EMER Telecommunications M 650	Audio Ancillaries Test Set
EMER Telecommunications M 680	Clansman Harness Box Test Set
AC 61657	User Handbook Clansman Harness Box Test Set
AC 61656	User Handbook Audio Ancillaries Test Set
ACP 63723	Health and Safety Management in ESO/REME
AESP 4940-P-200-201	General Purpose Electrical Cable Repair Kit (REME)
AESP 5800-C-146-412	C ³ in TUM/TUL (HS) Installation Instructions
AESP 5800-C-150-412	C ³ Installations Truck Utility medium (TUM)
AESP 5800-H-281-301	ASV436 Harness and Installation Kits
AESP 5800-H-371-411	C ³ Installations in Haglunds BV206(D)
AESP 5825-D-100	Special Personal GPS Receiver (SPGR)
AESP 5985-C-090	User Handbook Mast Telescopic 8 m
AESP 6130-M-102	Intelligent Battery Management System (IBMS)
AESP 6625-K-112	Test System Radio Communications (Marconi 8920C)
BID 250/1/1	User Handbook BID 250/31
BID/251-2	User Handbook BID 250/2
STANAG 4246 (SECRET)	HAVE QUICK and UHF Secure Communications Equipment

ABBREVIATIONS

GPS Global positioning system
VHF Very-high frequency

EQUIPMENT SUPPORT POLICY DIRECTIVE

INTRODUCTION

1. This Equipment Support Policy Directive (ESPD) defines the policy for the management and logistic support for the Tactical Ground to Air Radio (TacGA) – UK/PRC 346.

MANAGEMENT INFORMATION2. Equipment Support Management, Equipment Sponsor, Project Management.

2.1	Equipment Sponsor	DDOR (Comms & Surv)
2.2	Project Manager	BOWMAN 11b
2.3	Integrated Logistic Support (ILS) Manager	BOWMAN 21b
2.4	Equipment Support Manager	ES 31e(3)
2.5	Technical Advisor	Army Technical Support Agency Field Comms Support Group

3. Development and Manufacture. The PRC 346 is a Commercial Off The Shelf (COTS) equipment procured through a UK Prime Contractor, who is also acting as the Design Authority for the system on behalf of the MoD. The UK/RT 346 unit is procured from the United States through the Prime Contractor. The Design Authority is:

Hunting Engineering Ltd (HEL)
Amphill
Bedford

4. Planned Role. The PRC 346 radio will replace the PRC 344, the current ground to air radio. The PRC 346 is being procured primarily to enable the co-ordination of Close Air Support (CAS) operations and for communication with non-UK helicopters and UK helicopters that will not be equipped with BOWMAN VHF radio, such as RN Lynx and MERLIN. The PRC 346 includes a Specialist Personal GPS Receiver (SPGR) which can be dismounted from the radio for limited periods. A total of 1029 PRC 346 radios will be procured, of which 696 will be used in the manpack role and 282 will be vehicle mounted. The remainder will be held as Repair Pool (RP) or War Reserve (WR). Full deployment details are held on the GP11 database, managed by ES 31e(1).

5. Planned Life. The PRC 346 is expected to remain in service until at least the year 2009.

6. Planned Utilisation. The annual utilisation is estimated to be 980 hours per equipment.

7. Availability. The predicted availability of the equipment is 99%. The quantity of equipment returned to the Contractor for repair will be monitored by the Project Office and ESM to ensure that availability figures are being met.

8. Security. The security classification of the PRC 346 relates to the overall system when completely assembled in its Service operational role including all Classified and Unclassified fitted assemblies, but excluding associated installed equipment that does not form part of the basic system. The security grading will at all times be that of the most highly classified constituent part or assembly present in the system.

9. A full list of the Security Gradings associated with this equipment is detailed in the Army List of Classified Equipment (ALCE) – Annex A to D/BOWMAN/9/28 dated 13 Oct 97, which is summarised as follows:

9.1	In-service	[REDACTED]
9.2	Radio when holding TRANSEC key variable	[REDACTED]
9.3	Radio when not keyed	[REDACTED]
9.4	Technical Aspects including frequency information	[REDACTED]

MAINTENANCE

WARNINGS

- (1) **HARMFUL RADIATION.** ELECTROMAGNETIC RADIATION CAN CAUSE DAMAGE TO HUMAN TISSUE. WHEN THE RADIO IS TRANSMITTING, MAINTAIN A SAFE DISTANCE FROM THE ANTENNA, OF 220 mm (WHERE PRACTICAL) FOR THE MANPACK AND 300 mm FOR THE VEHICLE AND ELEVATED ANTENNAS.
- (2) **HAZARDOUS SUBSTANCES.** ENSURE ADEQUATE VENTILATION WHEN USING CLEANING SOLVENT (ISOPROPYL ALCOHOL) OR PAINT. DO NOT INHALE FUMES.
- (3) **HAZARDOUS SUBSTANCES.** THIS EQUIPMENT CONTAINS NICKEL CADMIUM (Ni-Cd) BATTERIES. FOR HANDLING AND DISPOSAL INSTRUCTIONS REFER TO ACP 63723 CHAPTER 16.

CAUTIONS

- (1) **DATA LOSS.** All values set in the current display are lost and revert to their previous settings unless the ENT key is pressed before the ESC key.
- (2) **EQUIPMENT DAMAGE.** Before disconnecting equipment items or assemblies, set the R/T unit mode switch to the OFF position.
- (3) **EQUIPMENT DAMAGE.** Do not select any of the MAINTENANCE menu options. Doing so can prevent the R/T unit from working or can hinder repair.
- (4) **EQUIPMENT DAMAGE.** Do not connect the BID250/31 fill device directly to the R/T unit. Ensure correct connection of the fill cable. Incorrect connection can damage the connectors.
- (5) **EQUIPMENT DAMAGE.** Before disconnecting, removing or replacing modules, assemblies or components, set the R/T unit mode switch to OFF, disconnect the power supply and earth the circuit.
- (6) **EQUIPMENT DAMAGE.** The modules within the R/T unit are sensitive to electrostatic discharge (ESD). To prevent damage due to ESD, refer to EMER TELS A 414 Chap 545.
- (7) **EQUIPMENT DAMAGE.** When positioning the front panel against the chassis, ensure that the front panel EMI gasket is correctly seated and remains in place, and ensure that no cables are trapped between the mating surfaces.
- (8) **EQUIPMENT DAMAGE.** Ensure that all cables are correctly routed as given. Incorrectly routed cables may be trapped and crushed when the front panel is closed.
- (9) **EQUIPMENT FAULT.** If a BIT FAULT message is displayed, the R/T unit will not function correctly.
- (10) **FILTER MISALIGNMENT.** Do not select the FILTER TUNING option or attempt to tune the filters without the correct test equipment. Doing so may degrade performance. If you inadvertently select the FILTER TUNING option to show the FILTER TUNING display, immediately press the ESC key to return to the MAINTENANCE menu.
- (11) **LIMITED DURATION.** Following emergency TOD acquisition, the TOD will remain synchronised between stations for a period of at least 4 hrs. After this period, accuracy may be reduced and the TOD should be re-acquired.

(continued)

CAUTIONS (continued)

(12) **LIMITED COMMUNICATION.** A forced TOD has a unique, arbitrary value and will not be synchronised with Zulu time (co-ordinated universal time). Once the TOD is manually forced on one station, the station will not communicate with a second radio station in HQ mode unless the unique TOD is transmitted to, and received by, the second station. The second station will, in turn, only be able to communicate in HQ mode with those stations which have also received the unique forced TOD.

(13) **MWOD COMPATIBILITY.** To communicate in HQ II mode, a valid MWOD with the same date code as the TOD must be present. If a valid MWOD is not present when attempting HQ communications, an error message will be displayed.

(14) **RISK OF ERROR.** Once the last WOD segment is entered none of them can be recalled. Any error will prevent HQ operation and all values must be re-entered. Before entering the last value, check that all the displayed values are correct.

(15) **RISK OF ERROR.** Once the DAY value is entered none of the segments can be recalled. Any error will prevent HQ operation and all values must be re-entered. Before entering the DAY value, check that all the displayed values are correct.

(16) **TIME DELAY.** Ensure that ZEROIZED is displayed before resetting the mode switch. If the switch is reset before the zeroising operation has completed, the MWODS will not be fully erased.

(17) **TOD DISRUPTION.** The MWOD electronic fill process may disrupt TOD accuracy. Following an electronic fill, the TOD must be validated or updated using the appropriate procedure.

(18) **UNAUTHORISED USE.** The UK/RT 346 receiver-transmitter unit is capable of extended frequency operation in the ranges 30 to 88 MHz, 100 to 174 MHz VHF AM/FM and 225 to 400 MHz UHF AM/FM. These frequency ranges extend beyond the declared employment bands. Inclusion of this facility does not automatically authorise its use. Such use shall be carefully co-ordinated and approved. The allocation of radio frequencies is governed by widespread military regulations and civilian laws. Any violation of such regulations or laws, or unauthorised use, may render the user liable to prosecution.

(19) **WOD ERASURE.** When a forced TOD is entered, the HQ I WOD is erased. To communicate in HQ I mode, a valid WOD with the same date code as the forced TOD must be entered following forced TOD entry. If a valid WOD is not present when attempting HQ communications, an error message will be displayed.

(20) **WOD COMPATIBILITY.** To communicate in HQ mode, a compatible WOD and TOD must be present. If a valid WOD is not present when attempting HQ communications, an error message will be displayed.

10. The levels of maintenance for the PRC 346 are as follows:

10.1 Unit Repair – Levels 1 and 2 Maintenance.

10.1.1 Main Items User Repair is limited to cleaning and functional testing of the radio in accordance with AESP 5820-F-299 Categories 201 and 522, and the replacement of consumable items as detailed in the Repair Charts. Under no circumstances are equipment covers to be removed at Unit Level. Failure to comply will invalidate warranty/contract agreements, resulting in additional costs to the MOD.

10.1.2 Ancillary Equipment Repair of in-service audio ancillary items, as identified in AESP Category 522, is in accordance with EMER TELS C742.

10.2 Field Repair – Levels 2 and 3 Maintenance. Nil

10.3 Contract Repair – Levels 3 and 4 Maintenance. The following items are subject to Contract /ABRO Repair:

10.3.1 PRC 346 – 5820-99-836-3761

10.3.2 Adapter Box Radio (ABR) – 5820-99-811-9389

10.3.3 Remote Unit Local (RUL) – 5820-99-926-3726

10.3.4 SPGR - Repairs to the SPGR will be carried out by Rockwell Collins (UK) Ltd. A repair contract will be arranged by the MoD PE Project Manager, SES 12. An ESPD detailing the Repair Policy for the SPGR will be produced by ES 32a(4) in due course.

10.3.5 BID/250/31 Fill Gun Assembly – Y2/5810-99-99-645-0303

10.3.6 BID/250/2 Tape Reader – Y2/5810-99-645-0302

10.4 Backloading Instructions.

10.4.1 In the event of a fault occurring which cannot be rectified without breaking the seal of the equipment, the complete equipment is to be sentenced "Beyond Local Repair" and an AFG 1043 generated.

10.4.2 The user should demand a replacement item, through the normal supply chain using an AFG 8620, quoting the AFG 1043 serial number and a Reason For Demand of '1' (to replace items unserviceable through fair wear and tear). Replacement equipment will be issued from the Repair Pool held at BOD Donnington.

10.4.3 The demand will automatically generate an AFG 8883, which will provide backloading instructions to the User for the return of the unserviceable carcass to BOD Donnington.

NOTE

Users are to ensure that keying information stored in the PRC 346 is removed, in accordance with AESP 5820-F-299-201 Chap 3 Paras 69-71, prior to returning the equipment to BOD Donnington.

10.4.4 The unserviceable equipment is to be returned to BOD Donnington, accompanied by copies of the AFG 8883 and Part A of the Equipment Failure Report (see Para 17). The EFR should include details relating to the failure, including Built In Test (BIT) Code information where possible.

10.4.5 BOD Donnington will arrange for the onward transmission of the equipment to the Contractor or ABRO for repair.

SUPPLY

11. Users should be particularly aware of the following inventory management procedures that apply to the PRC 346:

11.1 Replacement consumable items are to be demanded using the current stores procedures on a one for one basis to ensure that usage rates are accrued within the normal supply system.

11.2 In order to prevent delays in repairing the equipment and therefore enhance equipment availability the faulty equipment is to be returned to BOD Donnington within 28 days of receipt of the AFG 8883.

SPECIAL TOOLS AND TEST EQUIPMENT

12. The Special Tools and Test Equipment (STTE) required to support the PRC 346 are as follows:

12.1 Level 2: AATS to RUL adaptor – NSN not yet available.

12.3 Level 3: CBTS to ABR adaptor cable – NSN not yet available.

PUBLICATIONS

13. Details of the publications available in support of the PRC 346 and its associated ancillaries are contained within the preliminary pages to this document. In addition, the following CES are available:

13.3 Complete Equipment Schedules. Complete Equipment Schedules (CES) in support of PRC 346 installations are available as follows:

13.3.1 PRC 346 installation in BV206 - AESP 5800-H-371-741

13.3.2 PRC 346 installation in ASV436 - AESP 5800-H-281-741

13.3.3 PRC 346 installation in TUM - AESP 5800-C-150-741

13.3.4 PRC 346 installation in TUL - AESP 5800-C-160-741

13.3.5 PRC 346 installation in TUL/TUM (HS) FFR - AESP 5800-C-148-741

13.3.6 PRC 346 manpack - AESP 5820-F-299-741

SAFETY

14. A safety assessment of the equipment has been carried out by the Contractor. The following reports are available:

14.1 RF Radiation Hazard Assessment – Report No RH/08/98 Issue 1 dated 10 Sep 98

14.2 Safety Assessment Reference – Report No HEL/SAS/377/0001

TRAINING

15. An initial User instructor course will be provided by the Contractor for staff from training establishments. Training packages will be also be provided by the Contractor for future use by the training organisations.

RELIABILITY

16. Warranty. A two-year/2000 operating hours warranty period, effective from the date of acceptance of the first installation, is provided against manufacture and design defects. This excludes damage caused by improper use and poor maintenance. Repair decisions for equipment damaged following improper use and poor maintenance reside with the Project Manager.

17. Equipment Failure Reporting. 100% incident reporting and/or equipment failure reporting, in accordance with Material Regulations for The Army, Volume 2, Pamphlet 2, Section 1, is required until advised to the contrary. A copy of Part A of the Equipment Failure Report (AF G8267) is to be sent to:

FCSG, ATSA
Leigh Sinton Road
MALVERN
Worcs
WR14 1LL

Tel: Mil: Malvern Mil (749) [REDACTED]
Civ: 01684 [REDACTED]

Fax: Mil: Malvern Mil (749) [REDACTED]
Civ: 01684 [REDACTED]

18. It is essential that a copy of the EFR (AFG 8276A) is returned with the failed equipment. The EFR should include details relating to the failure, including Built In Test (BIT) Code information where possible.

19. Serious Defects. Standard procedures relating to Serious Defects are to apply (Annex F to Material Regulations for the Army, Volume 2, Pamphlet 2 refers). Serious defects/failures are to be reported to ATSA, FCSG immediately. Defective equipment is to be retained by the reporting unit until Disposal Instructions are issued by ATSA.

20. Examination. The PRC 346 is subject to an annual Periodic REME Examination (PRE) in accordance with EMER MGMT O 026 and AGAI Vol 4 Chap 142. The examination will involve testing the equipment in accordance with the Operator Instructions detailed in the AESP Category 201.

NOTE: The policy for PREs is currently being reviewed by ES11c. An AESP detailing the revised policy will be issued in due course.

CONFIGURATION MANAGEMENT

21. The equipment configuration is determined as follows:

21.1 The PRC 346 (TacGA) is compliant with STANAG 4246 (HAVEQUICK II).

21.2 The Post Design Services (PDS) authority (Design Sponsorship) resides with the Project Manager.

21.3 No modifications are to be carried out to this equipment without the prior approval of the equipment Configuration Control Board. Requests are to be directed through the ESM.

STORAGE

22. All items associated with this equipment are to be packaged in accordance with DEF STAN 81/41 to level J standard. This packaging is to be retained by the unit for use when items are returned for repair.

DISPOSAL

23. Declaration of Obsolescence/Obsolete. The ESM is responsible for declaring the equipment obsolescent/obsolete and for issuing Disposal Instructions.

REVIEW OF ESPD

24. The maintenance policy set out in this ESPD is based on the planned deployment and intended role of the equipment together with the estimate of its utilisation and reliability. The policy may be amended in the light of experience or changes in deployment or utilisation.

25. Whilst the Equipment Support Manager will carry out periodic reviews, it is also the responsibility of other MOD branches and theatre staff to recommend policy changes for matters of their concern as circumstances change.

COMMENT(S) ON AESP

To: ATSA DTS 3.2
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LONDON SE18 4QF

From:
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Sender's Reference	BIN Number	Date
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If you require more space, please use the reverse of this form or a separate piece of paper. Comment(s): 		

Signed: Telephone No:
 Name (Capitals): Rank/Grade:
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ATSA DTS 3.2 USE ONLY

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Woolwich
LONDON SE18 4QF

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Remarks			

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 Name (Capitals): Rank/Grade:

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