

Command Workshop

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**USER HANDBOOK
FOR
CLANSMAN
RADIO INSTALLATIONS
IN
ARMoured PERSONNEL CARRIER
FV 432**

**PART 1
GENERAL DESCRIPTION**

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CONTENTS

CHAPTER ONE

INTRODUCTION

Para		Page
101	General	1
103	Clansman	1
108	Handbook Construction	2

CHAPTER TWO

EQUIPMENT

201	Types of Equipment	5
202	Location of Equipment	6
203	Power Supply Circuit	9
204	Battery Charging	11
205	Rebroadcast Facilities	11
207	Remote Facilities	11

CHAPTER THREE

USER SERVICING

301	Preventative Maintenance	13
302	Sealed Items	13
303	Routine Tasks	13
304	Removal and Refitting of Units	14

ANNEX A

LIST OF ABBREVIATIONS

A1

ANNEX B

CLANSMAN CES 'BRICKS' FOR FV 432

B1

TABLES

TABLE

1	Clansman Radios	5
2	Location of Equipment	7

LIST OF ILLUSTRATIONS

	Page
Frontispiece The Armoured Personnel Carrier FV 432	(vi)
Fig No	
1 Block Diagram of User Handbook 'Parts' System	2
2 Block Diagram of Vehicle Mounted Clansman Radio Stations	6
3 Location of Clansman Radio Sets and Antenna Bases	7
4 Stowage Facilities on Rear Door	8
5 Power Supply Block Diagram	9
6 Communication Power Supply Items	10

LIST OF ASSOCIATED PUBLICATIONS

COMPLETE EQUIPMENT SCHEDULES

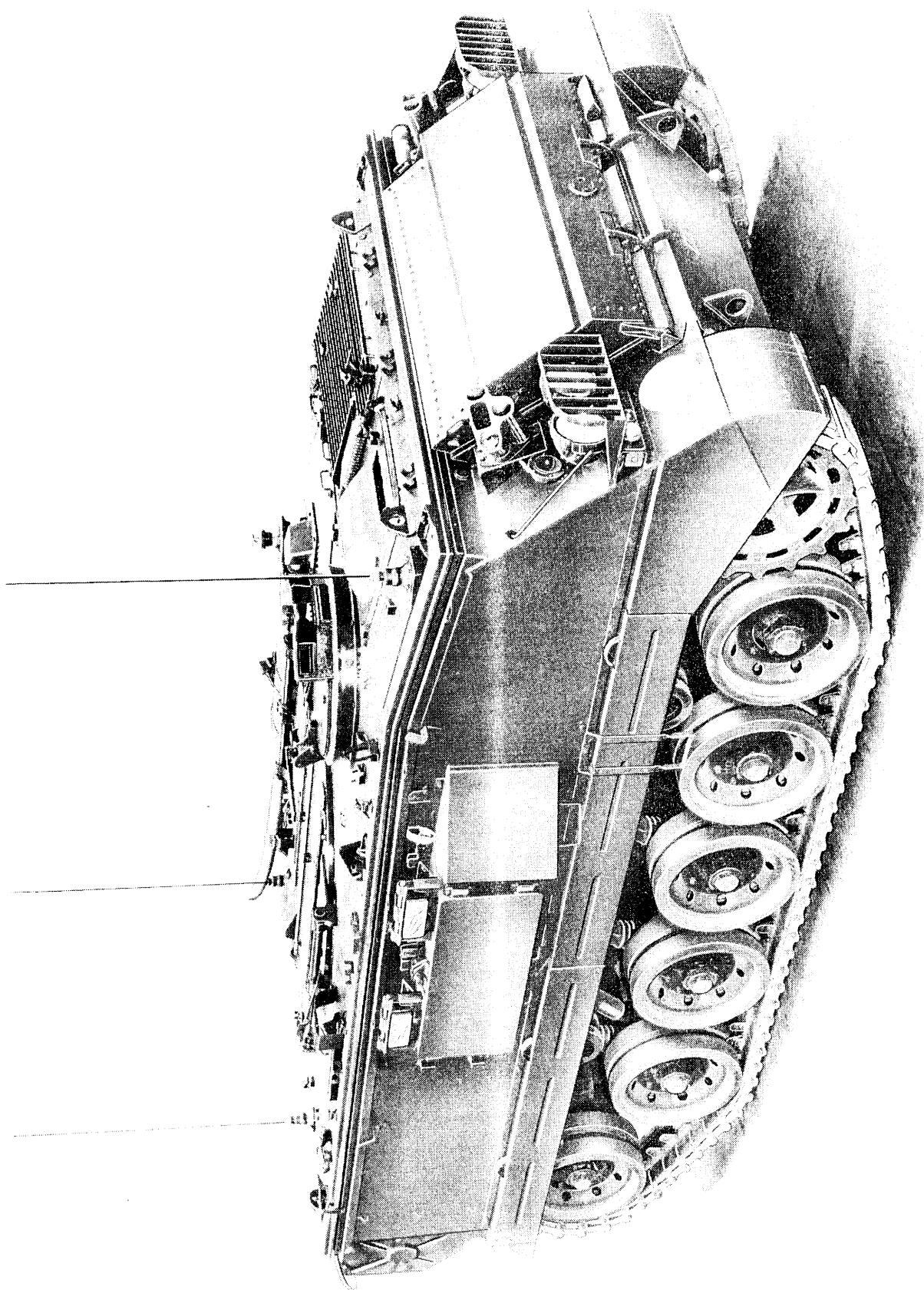
Carrier, Personnel, Full Tracked, FV 432 Mk 2/1	CES No 33061
Carrier, Personnel, Full Tracked (fitted with improved ventilation system) FV 432 Mk 2/1	CES No 33066
Installation Kit, Clansman Basic Harness - FV 432	CES No 44618

USER HANDBOOKS

Clansman Radio Control Harness	Army Code No 61172
Radio Three 'B' Harness (Larkspur) in APC FV 432	Army Code No 13980
Wireless Control Harness Type 'B' (Larkspur)	Army Code No 11195
Carrier Personnel Fully Tracked FV 432 Mk 1	Army Code No 14168
Carrier Personnel Fully Tracked FV 432 Mk 2 and Mk 2/1	Army Code No 14693
Reference Handbook for Clansman	Army Code No 61004
VHF Antennas for Clansman	Army Code No 61388
Clansman Secure Speech Harness (CSSH)	NYA

ELECTRICAL AND MECHANICAL ENGINEERING REGULATIONS

Basic Radio Three Set 'B' Harness (Larkspur)	COMNS INST H200-9
Wireless Control Harness Type 'B'	TELS L780-789



The Amoured Personnel Carrier FV 432

CHAPTER ONE

INTRODUCTION

GENERAL

101. The Armoured Personnel Carrier FV 432 has been in service for a number of years and during this time has contained Larkspur type 'B' control harness, a power supply distribution circuit and all the basic fittings to cater for a wide range of Larkspur type radio installations. The basic installation is fully described in the User Handbook for Radio Three Set 'B' Harness in APC FV 432 (Army Code No 13980) and the various radio installations are covered by separate user handbooks.

102. With the introduction of Clansman equipment, however, future installations will contain combinations of both Larkspur and Clansman equipment and finally Clansman only:

- a. Clansman radio with basic Larkspur harness.
- b. Larkspur radio with Clansman harness.
- c. Clansman radio with Clansman harness.

CLANSMAN

103. Clansman is an integrated range of combat net radio equipment designed to replace the current range of Larkspur radio equipment and provide all the net radio functions in a combat zone anywhere in the world.

104. The advantages of Clansman Radio Equipment when compared with the Larkspur range are:

- a. Increased efficiency.
- b. Increased reliability.
- c. Increased performance.
- d. Simpler to operate.
- e. Smaller and lighter in weight.
- f. Additional facilities.

105. Clansman equipment consists of:

- a. Manpack radios HF, VHF and UHF coverage.
- b. Vehicle radios HF and VHF coverage.
- c. A control harness.
- d. Audio ancillaries, ie Headgear, Handsets and Respirator Microphones.

106. A feature of the vehicular sets is that they can be used together in the same vehicle with the minimum amount of mutual interference. Sets can be operated either by themselves or through the control harness in the vehicle. Manpack radios may be used as Vehicle Stations in a 'clip-in' role where suitable installations exist.

107. The Clansman Radio Control Harness is an interconnected system of control junction and adaptor boxes and audio ancillaries which permits the use of up to three Clansman radios from various positions in a vehicle. It also provides intercommunication between these positions independent of the radios. Rebroadcast facilities are also available. With the use of an appropriate adaptor box (RAB or IBRA) a Larkspur radio may be installed and used with the Clansman Harness and a Clansman Radio can be used in a Larkspur Harness.

HANDBOOK CONSTRUCTION

108. There are many combinations of Clansman Radio fits in the FV 430 series of tracked vehicles, operating into both Larkspur and Clansman Harness. The equipment used in each fit is obtained from different combinations of CES kits or 'bricks' which ensures the most economical method of equipment provisioning. For details of the 'Brick' system see Annex B.

109. With this in view, the User Handbook has been divided into 'Parts' as shown in Fig 1, each 'Part' written specifically to complement individual or groups of CES kits or 'bricks' and planned to be an item in these kits. Hence the User will be issued with the information pertinent to his installation.

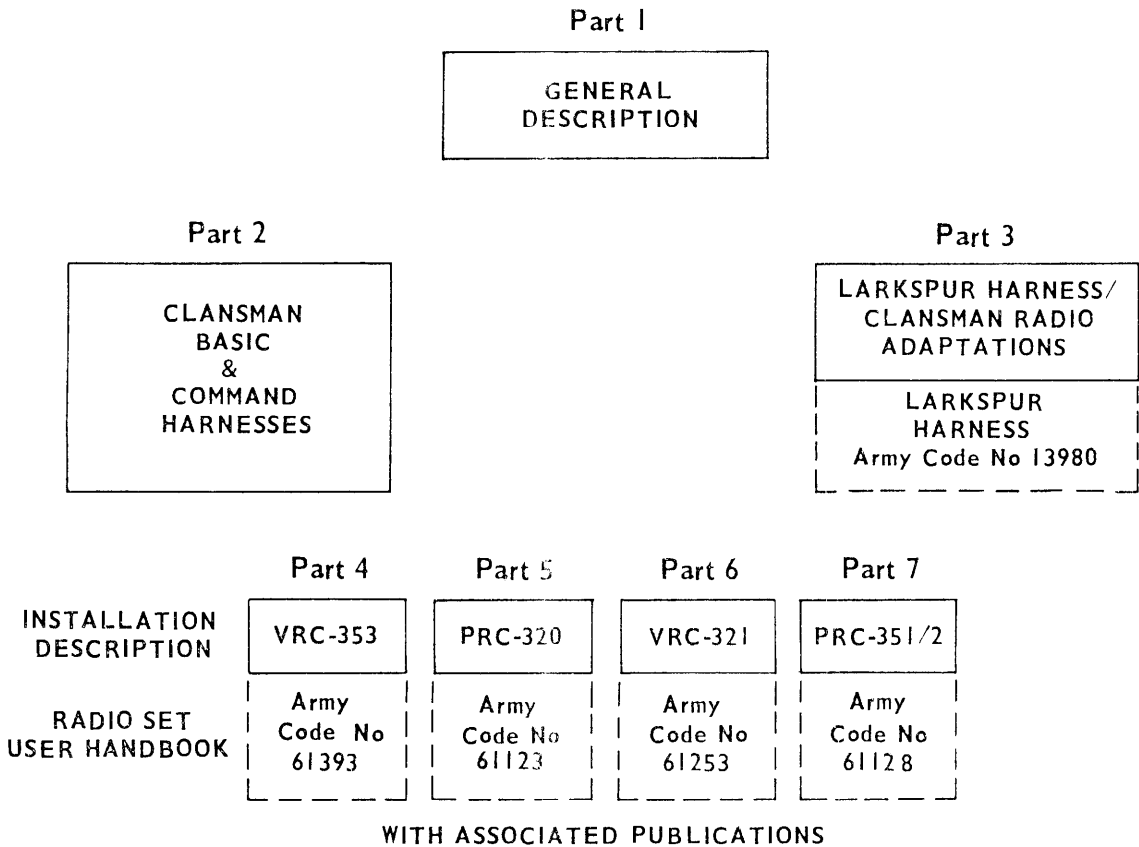


Fig 1 Block Diagram of User Handbook 'PARTS' System

110. The following examples should serve to illustrate this 'Parts' system.

a. A FV 432 with Clansman Harness, VRC 353 and VRC 321 would require:

- (1) Part 1 - General Description
- (2) Part 2 - Clansman Harness
- (3) Part 4 - Station Radio UK/VRC 353
- (4) Part 6 - Station Radio UK/VRC 321

b. A FV 432 with Larkspur Harness, VRC 353 and PRC 320 would require:

- (1) Part 1 - General Description
- (2) Part 3 - Larkspur Harness/Clansman Radio Adaptations
- (3) Part 4 - Station Radio UK/VRC 353
- (4) Part 5 - Station Radio UK/PRC 320

NOTE ...

It should be noted that Part 1 - 'General Description' (This part) will be required by every installation and gives an introduction to all FV 430 series installations.

111. In addition to the 'Parts', the User will receive the appropriate associated publications, the code numbers of which are given under the relevant Part Nos in Fig 1. The Clansman Secure Speech Harness (CSSH) will be the subject of a separate User Handbook at a later date.

EQUIPMENT

TYPES OF EQUIPMENT

201. Two types of radio sets are available in the Clansman range, namely vehicle/ground station sets and manpack sets. These are listed in Table 1 and their composition is shown in Fig 2. The following notes apply to the diagram:

NOTES ...

- (1) When two HF sets are installed and operated in close proximity, a SURF is inserted between each set and its TURF to reduce mutual interference.
- (2) SURFs 12W and 4W can be attached to the RT 320 and RT 351 respectively to enable two similar sets to be operated in close proximity. These particular SURFs are used ONLY in the dismounted role and should be disconnected when radios are vehicle mounted.

TABLE 1

CLANSMAN RADIOS

RADIO STATION	FREQUENCY RANGE (MHz)	RF POWER OUTPUT (W)
VEHICLE		
UK/VRC 321	1.5-30	40
UK/VRC 322	1.5-30	300
UK/VRC 353	30-75.975	50
MANPACK		
UK/PRC 320	2-30	30
UK/PRC 344	225-399.95	2
UK/PRC 349	37-46.975	250(mW)
UK/PRC 350	36-56.975	2
UK/PRC 351	30-75.975	4
UK/PRC 352	30-75.975	20

* SEE PARA 201 NOTE 1

** SEE PARA 201 NOTE 2

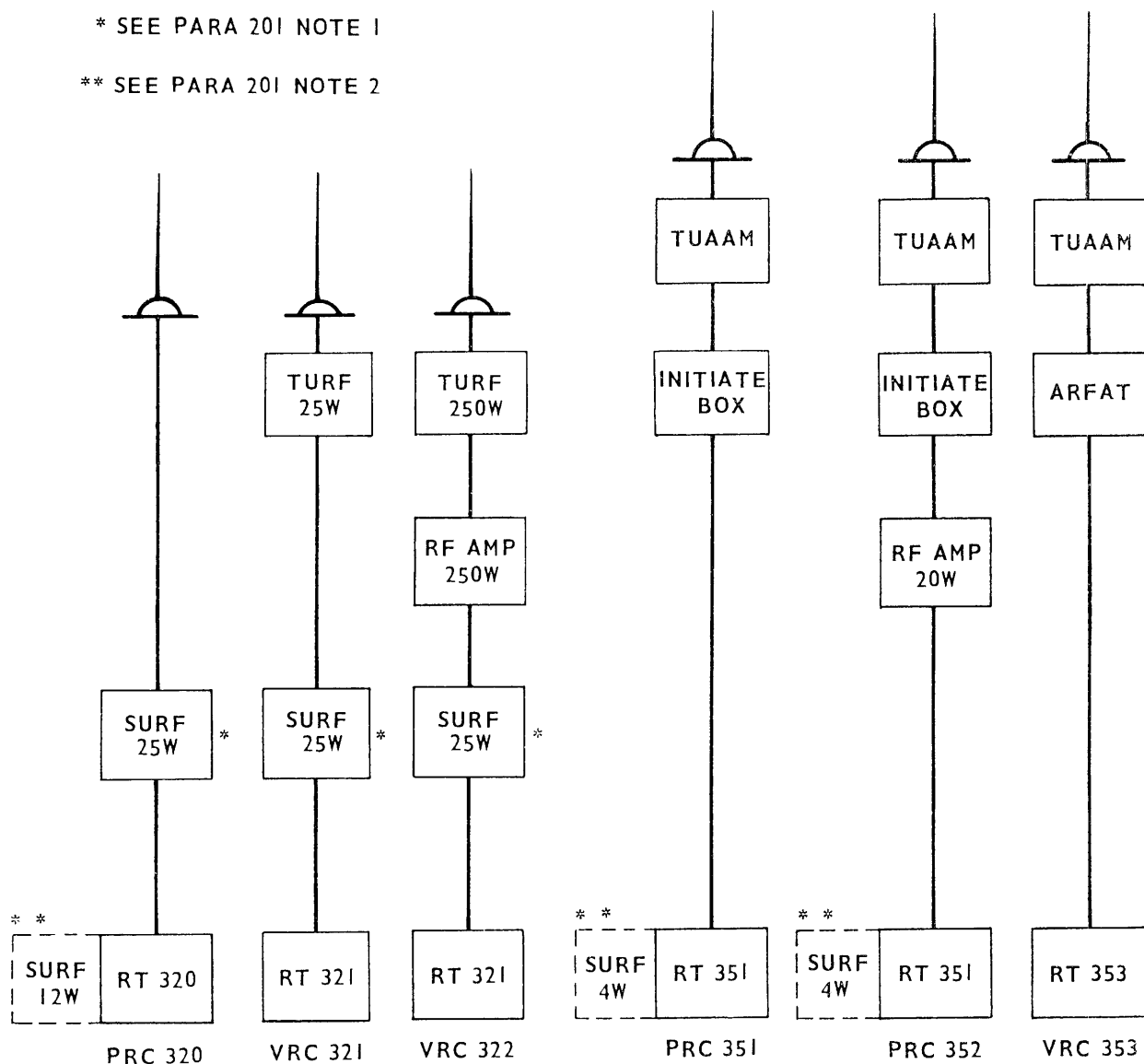


Fig 2 Block Diagram of Vehicle Mounted
Clansman Radio Stations

LOCATION OF EQUIPMENT (Fig 3)

202. Combinations of various Clansman sets have been installed and accepted in the FV 432 vehicle to meet the requirements of most arms of the Service. Table 2 gives a list of such radio installations approved using the Larkspur or Clansman Harness, along with their respective antenna positions. It should be noted that these antenna positions are not always directly related to the radio positions and the associated tuning and matching units are located at the antenna position, not set position. In addition to the vehicle mounted radios, some manpack radios may be carried stowed as shown in Fig 4.

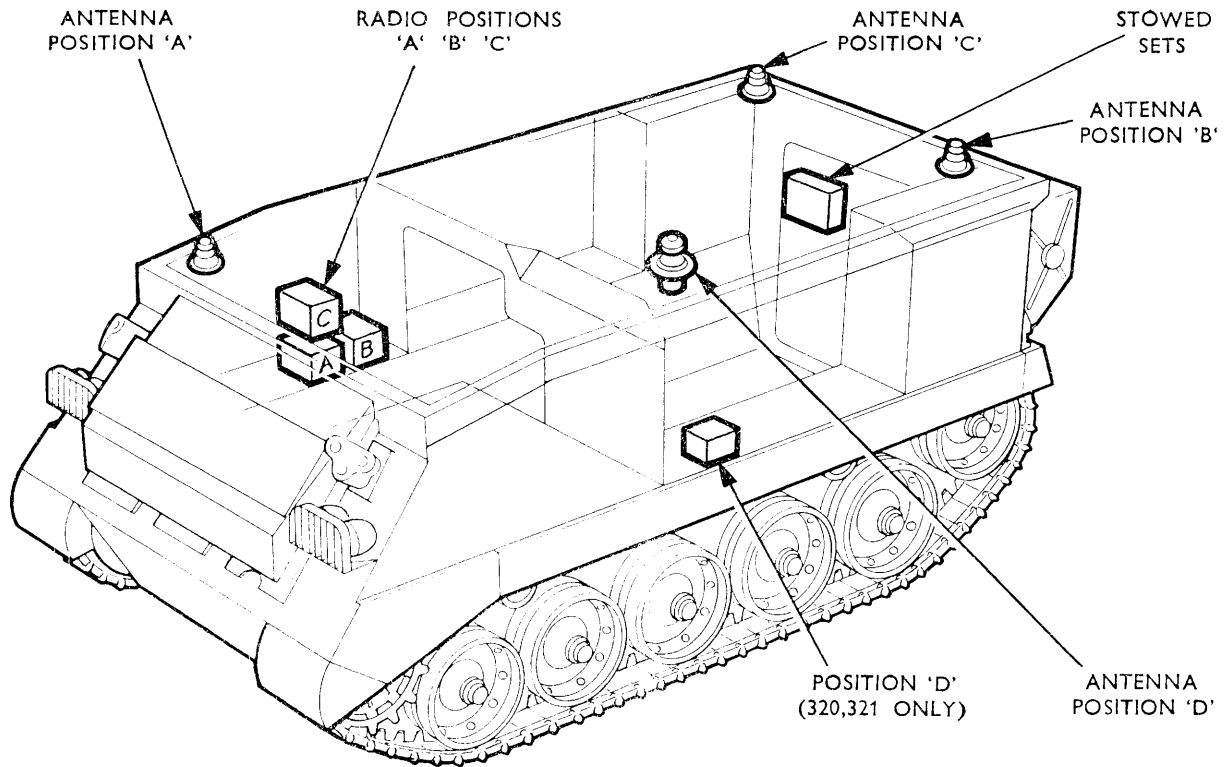


Fig 3 Location of Clansman Radio Sets and Antenna Bases

TABLE 2

LOCATION OF EQUIPMENT
(See Fig 3)

Radio Positions				Antenna Positions			
A	B	C	D				
VRC 353				A			
VRC 353	VRC 353			A	B		
VRC 353	VRC 353	VRC 353		A	B	C	
		PRC 351				C	
VRC 353		PRC 351		A		C	
SR C45Z		SR C45Z	VRC 321	A		B	D
SR C42Z		VRC 321		B		C	
VRC 353	VRC 353	SR C42Z		A	C	B	
VRC 353	VRC 353	PRC 351	PRC 320	A	B	C	D
		PRC 352				C	
VRC 353			PRC 320	A			D
		VRC 321				B	
VRC 353		PRC 351		A		C	
SR C42Z		SR C45Z	VRC 321	A		B	D
VRC 353	VRC 353	SR C42Z		A	B	C	
VRC 353	VRC 353	PRC 351	PRC 320	A	B	C	D
VRC 353	VRC 353	VRC 353	PRC 320	A	B	C	D
VRC 353	VRC 353	VRC 321	PRC 320	A	B	C	D
VRC 353	VRC 353	SR C45Z		A	B	C	
VRC 353	VRC 353	VRC 321		A	B	C	
VRC 353		PRC 352		A		C	

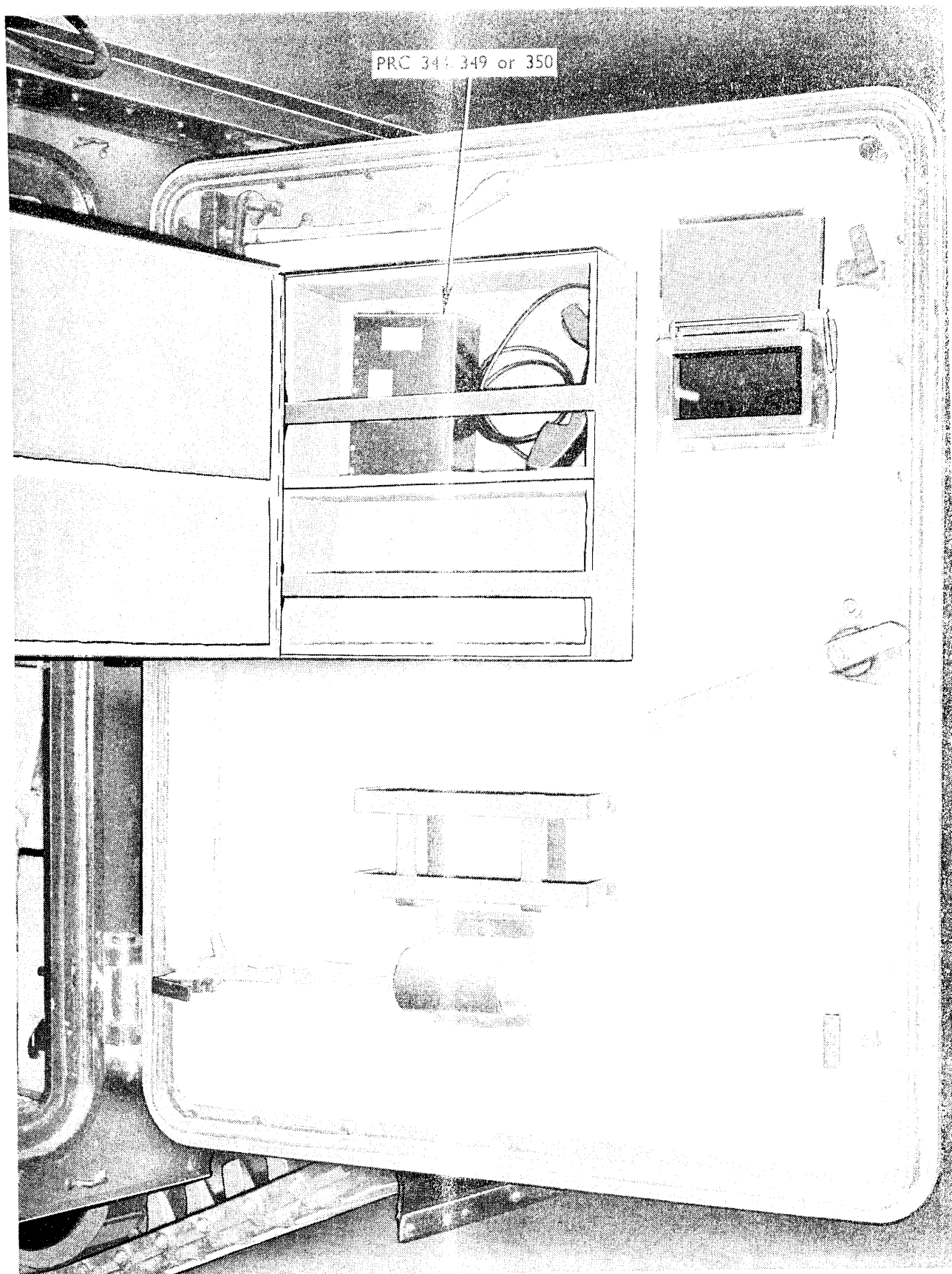


Fig 4 Stowage Facilities on Rear Door

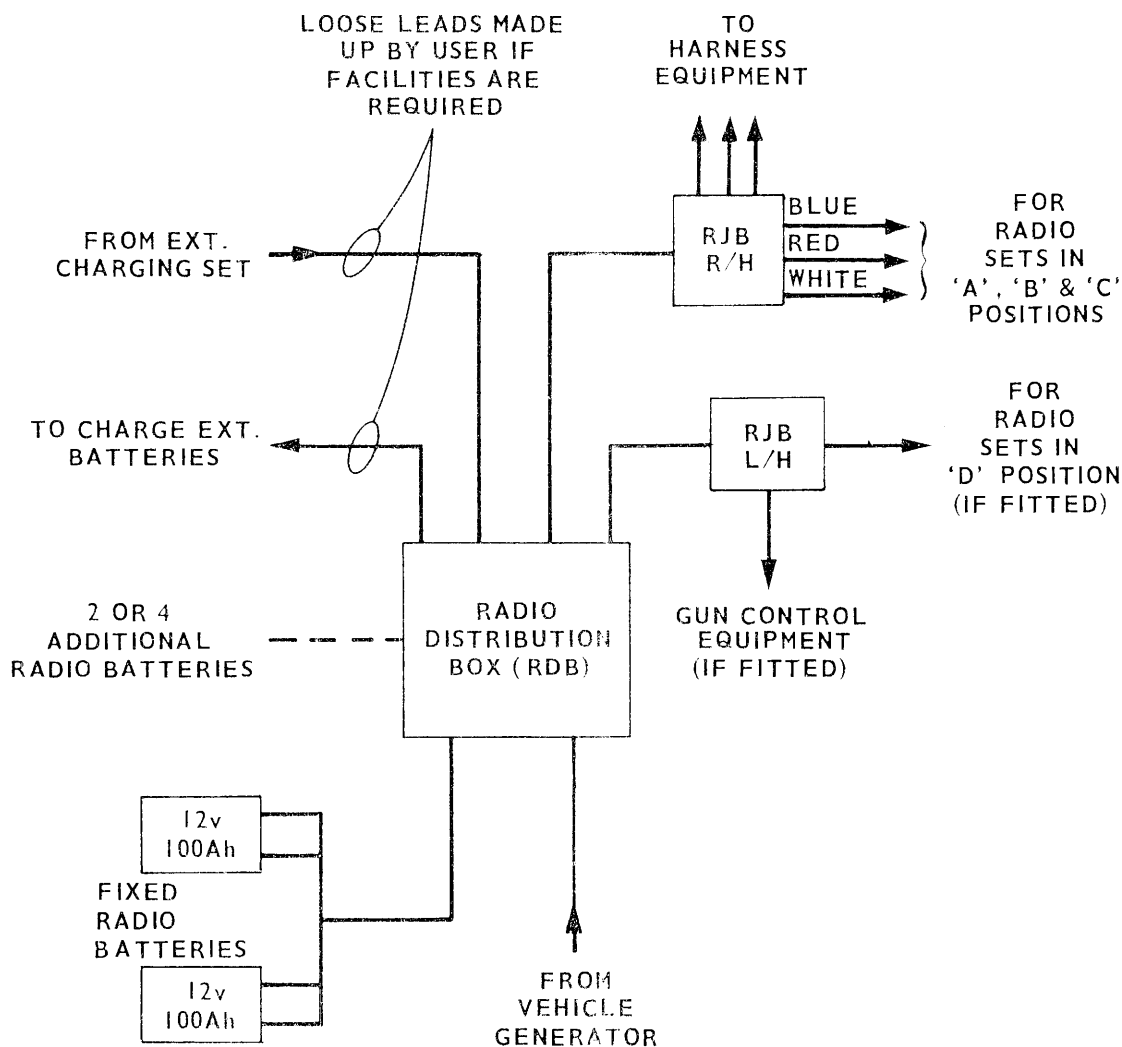


Fig 5 Power Supply Block Diagram

POWER SUPPLY CIRCUIT

203. The power supply circuit and the positions where the various items in the circuit are located in the vehicle are shown in Figs 5 and 6 respectively. The 24 volts required for the operation of the radio sets and the harness equipment is obtained from two 12V 100Ah batteries located under the driver's seat. These batteries are connected through a Radio Distribution Box (RDB) which contains the main ON/OFF switch and fuses for the circuit and a switch which selects either the vehicle generator or an external charging set for the float charging of internal or external batteries. Extra power leads must be fitted by the user, however, if these facilities are required. The RDB is connected to two Radio Junction Boxes (RJB), one of which is located on the wall above the RH sill and the other on the LH sill. When more than two radio sets are used, additional batteries may be installed on the floor. Depending on the installation, an appropriate kit containing connectors and battery fitments will be issued.

CAUTION ...

The MAIN switch on the Radio Distribution Box must be set to 'OFF' before a connexion is made to either this box or the two Radio Junction Boxes.

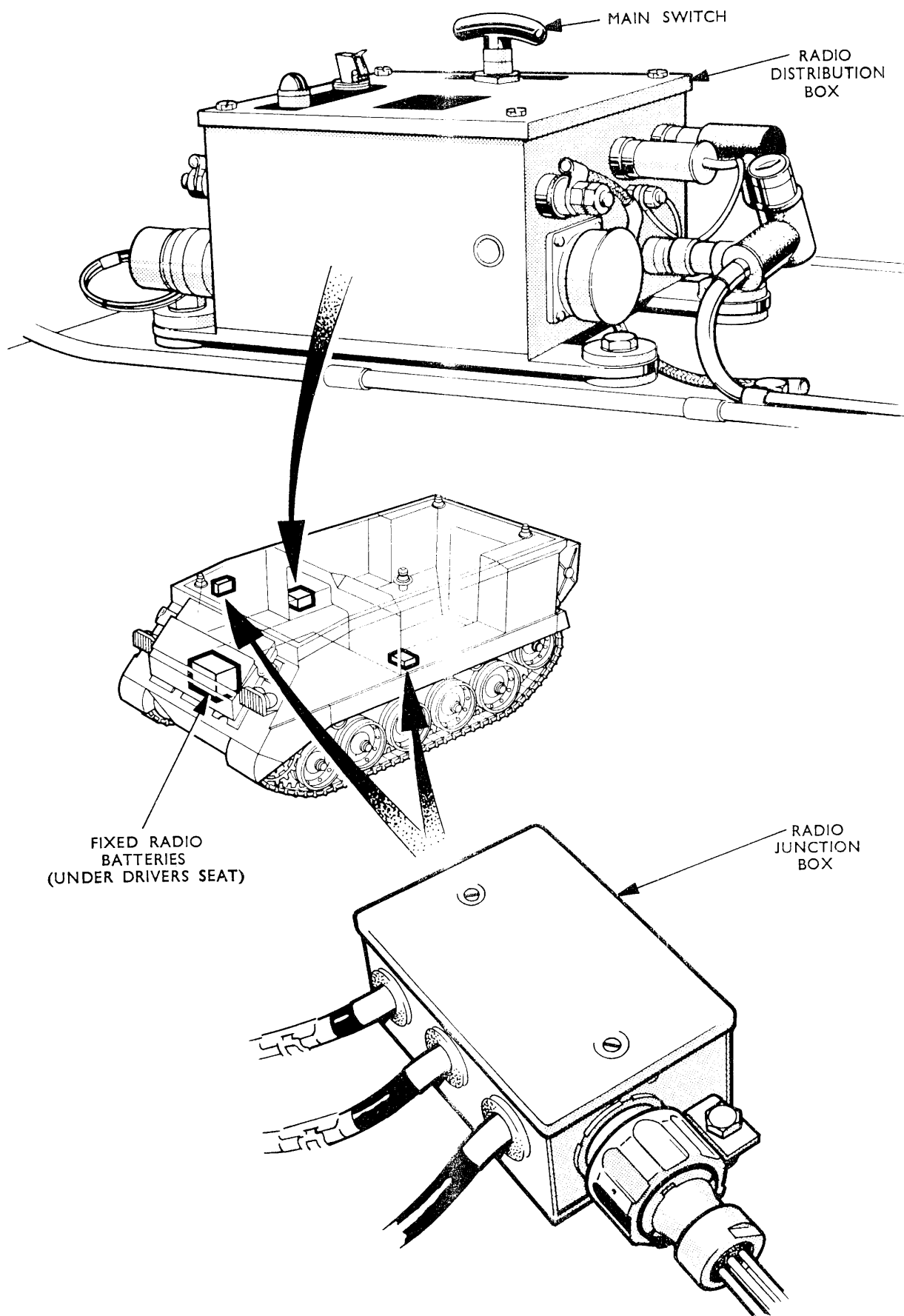


Fig 6 Communication Power Supply Items

BATTERY CHARGING

204. The facilities provided for recharging batteries are described in the User Handbook 'Carrier Full Tracked' FV 432 MK 1, Army Code No 14168 for MK 2 or 2/1, Army Code No 14693. Details for the recharging of NICAD batteries used with vehicle mounted manpack radios are given in the appropriate Set User Handbook.

REBROADCAST FACILITIES

205. This is a widely used communication facility available in FV 432 installations, whereby a signal received by one radio set can be simultaneously transmitted by another radio set, either in the same vehicle or remote from it. The rebroadcast can be:

- a. Automatic or Manual. The switching of this facility is achieved either automatically using VHF sets or manually if an HF set is employed in the system.
- b. Local or Remote. Interconnexion of the two radio sets is possible either locally by means of the harness switching or remotely by means of field cable and the terminals on the vehicles external Batten Box.

206. Parts 2 and 3 of this User Handbook detail the rebroadcast systems available in the respective harness, ie Clansman and Larkspur. All Clansman vehicle radios and some manpack sets have a rebroadcast facility accessible by means of terminals on the front panel, and this may be used to by-pass the installation harness. For further information, see the appropriate Set User Handbook.

REMOTE FACILITIES

207. Facilities are available with each type of harness for operating the installed radio sets remote from the installation and for IC between local and remote operators. In the FV 432 installation the connexion point for remote facilities is by means of terminals on the external Batten Box, and up to 3km of D10 field cable may be employed. In addition to the harness facilities, all Clansman vehicle radios and some manpack sets have a remote facility on the front panel, connexion to which by-passes the harness.

208. Details of the remote facilities provided by each harness are given in Parts 2 and 3 of this User Handbook. For information on using the front panel facility for remote working on certain Clansman sets, see the appropriate Set User Handbook.

USER SERVICING

PREVENTATIVE MAINTENANCE

301. No equipment can be expected to work indefinitely without some deterioration in performance. Preventative maintenance is therefore required to ensure that the installation retains its operational efficiency. User Servicing, the main element of preventative maintenance, has routine tasks purposely devised to be within the capability of the NCO or soldier who is in direct charge of the installation. This servicing is NOT the responsibility of workshop or repair staffs. Any faults found, whose rectification is beyond the capability of the User, should be reported for appropriate repair action.

SEALED ITEMS

302. The majority of the harness boxes are sealed to prevent ingress of moisture and therefore should not be opened by the User. Control knobs in particular should not be tampered with as this might damage the sealing glands. When adjustments or replacements are required which involve opening a sealed equipment, the task should be referred to the appropriate repair agency (R. Signals or REME) who will have the necessary drying and resealing equipment.

ROUTINE TASKS

303. These tasks are broken down into harness items, harness cable assemblies and stowed items:

a. Harness Items

- (1) Keep all items clean and dry.
- (2) Protect all plug and socket outlets not in use by fitting the protective covers provided.
- (3) Check that all switches, controls and screw terminals are mechanically functional.
- (4) If a unit is fitted with a humidity indicator (desiccator), check that it is blue. If one is pink, report the fact because the unit will need drying out in workshops.
- (5) Ensure that all earth braid connexions to harness items, radio sets and their ancillaries are clean and firmly secure.
- (6) On each antenna base, check that the slot on the top of the base is clean and undamaged, and that the clamp fitting is complete and functional.

b. Harness Cable Assemblies. Check that all assemblies:

- (1) are properly fitted in the cable runs around the walls of the vehicle.

(2) are free from damage such as fraying, cuts and breaks in the outer sheathing.

(3) have their respective connecting plugs and sockets correctly terminated and free from damage and corrosion.

(4) are connected to the correct harness items.

c. Stowed Items. These are the loose items which the User can remove and stow when not in use. These items are more prone to damage than installed items, particularly the headsets and pressel leads, and a more careful inspection is required to maintain their efficiency.

(1) Ensure that all handsets, headsets, extension cables etc are clean, free from damage and corrosion and are correctly stowed when not in use.

(2) Check that all webbing straps and quick release fittings are serviceable.

(3) Check that antenna sections are clean, undamaged and fit together and into the antenna bases.

REMOVAL AND REFITTING OF UNITS

304. If a harness item, radio set or ancillary has to be removed or refitted from or to an installation the following procedure is to be used:

a. Removal.

(1) Disconnect all leads, cable assemblies etc to the item and fit protective covers where applicable.

(2) Release securing bolts etc and withdraw the Unit. If securing bolts etc have to be removed, note the position and sequence of any spacing and securing washers and replace them all on the mounting frame for safe keeping.

b. Refitting. Carry out the removal sequence in the reverse order.

LIST OF ABBREVIATIONS

ABBREVIATION	FULL TITLE
AAFL	<u>A</u> mplifier <u>A</u> udio <u>F</u> requency <u>L</u> oudspeaker
ACCU	<u>A</u> lternating <u>C</u> urrent <u>C</u> harging <u>U</u> nit
ACTIC	<u>A</u> and <u>C</u> Radios <u>T</u> ogether with <u>I</u> C
AEL	<u>A</u> udio <u>E</u> xtension <u>L</u> ead
ARFAT	<u>A</u> daptor <u>R</u> adio <u>F</u> requency <u>A</u> ntenna <u>T</u> uning
CB-2	<u>C</u> rew <u>B</u> ox <u>2</u> -Set
CB-3	<u>C</u> rew <u>B</u> ox <u>3</u> -Set
CBF	<u>C</u> ommander's <u>B</u> ox <u>F</u> ixed
CPU	<u>C</u> ommander's <u>P</u> ersonal <u>U</u> nit
DB	<u>D</u> river's <u>B</u> ox
DCCU	<u>D</u> irect <u>C</u> urrent <u>C</u> harging <u>U</u> nit
EFW	<u>E</u> nd <u>F</u> ed <u>W</u> hip
GMM	<u>G</u> round <u>M</u> ounted <u>M</u> onopole (Antenna)
HSR	<u>H</u> andset <u>R</u> emote <u>C</u> ontrol
IBHA	<u>I</u> nterconnecting <u>B</u> ox <u>H</u> arness <u>A</u> daptor
IBRA	<u>I</u> nterconnecting <u>B</u> ox <u>R</u> adio <u>A</u> daptor
IB-2	<u>I</u> nterconnecting <u>B</u> ox <u>2</u> -Set
IB-3	<u>I</u> nterconnecting <u>B</u> ox <u>3</u> -Set
IP	<u>I</u> ndependent <u>P</u> ressel
LSVM	<u>L</u> oudspeaker <u>V</u> ehicle <u>M</u> ounting
LSF	<u>L</u> oudspeaker <u>F</u> ree <u>S</u> tanding
RAB	<u>R</u> adio <u>A</u> daptor <u>B</u> ox
RCU	<u>R</u> emote <u>C</u> ombining <u>U</u> nit

LIST OF ABBREVIATIONS (Continued)

ABBREVIATION	FULL TITLE
RJB	<u>R</u> adio <u>J</u> unction <u>B</u> ox
SCB	<u>S</u> et <u>C</u> ombining <u>B</u> ox
SURF	<u>S</u> elector <u>U</u> nit <u>R</u> adio <u>F</u> requency
TUAAM	<u>T</u> uner <u>U</u> nit <u>A</u> utomatic <u>A</u> ntenna <u>M</u> atching
TURF	<u>T</u> uning <u>U</u> nit <u>R</u> adio <u>F</u> requency
UK/PRC	Manpack Radio
UK/VRC	Vehicular Radio