



**USER HANDBOOK  
FOR  
PRC 320/1 & PRC 320/1 - 100W  
H.F. SSB RADIO STATIONS**

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## FIRST AID IN CASE OF ELECTRIC SHOCK

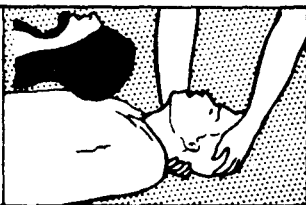
### EXHALED AIR METHOD

1. SWITCH OFF. If this is not possible, PROTECT YOURSELF with dry insulating material and pull the victim clear of the conductor.

DON'T TOUCH THE VICTIM WITH YOUR BARE HANDS until he is clear of the conductor, but DON'T WASTE TIME.

2. (a) Lay the patient on his back. Quickly loosen waist band and clothing round neck. If his mouth is open, sweep a finger through his mouth to clear obstruction and remove loose dentures.

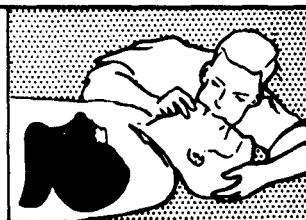
(b) Lift the head and tilt the head backwards by putting one hand underneath the neck and the other on the crown of the head.



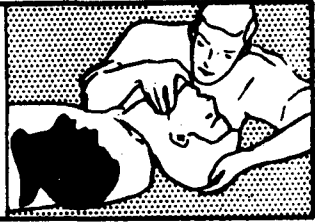
(c) Hold the head tilted as far back as possible and lift up the jaw firmly, closing the lips. This keeps the victim's airway clear by straightening the breathing passage.



(d) Take a deep breath. Open your mouth as wide as you can. Seal your lips on the victim's cheeks around his nose. Blow air into his nose until you see the chest rise (inspiration).



(e) Remove your mouth to let him breathe out; his chest will fall (expiration).



(f) Take another deep breath and blow again as soon as he has exhaled, and continue inflations 10 to 15 times a minute. (This is a little slower than the normal rate of 18).

The movement of the victim's chest provides visual confirmation of the success of your efforts.

3. If you fail with the nasal route, try the mouth as follows:-

Lift the jaw and hold his mouth open slightly as you blow, keeping the head tilted well back with the other hand.

Seal your lips around his opened mouth and press your cheek against his nostrils to stop air leakage, and blow until you see the chest rise.

Continue as described in (e) and (f) above until normal breathing returns or medical assistance becomes available.

DO NOT GIVE LIQUIDS UNTIL VICTIM IS CONSCIOUS

NOTE:

If after 5 or 6 effective inflations of the patient's lungs there is:-

(i) no improvement in the colour of the face and lips

(ii) no constriction of the dilated pupils

(iii) no pulse to be felt in the neck or elsewhere, this means that the heart is not beating.

Carry out EXTERNAL CARDIAC MASSAGE (see page v)

## EXTERNAL CARDIAC MASAGE

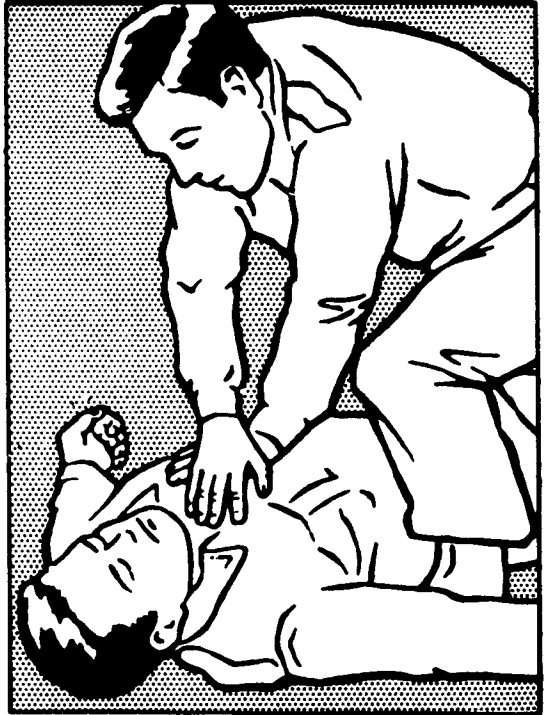
1. (a) Lay the victim on his back on the ground or on some other firm surface.

(b) Place the heel of one hand, with the other on top of it, on the lower part of the sternum (breast bone) in the mid line of the chest: see Note 1 on following page.

(c) Apply firm pressure vertically downwards, aided by the weight of the body, about 60 times a minute.

(d) At the end of each pressure stroke lift the hands slightly to allow full recoil of the victim's chest.

(e) Use sufficient pressure to depress the sternum an inch or so, towards the vertebral column (spine).



2. Artificial respiration must continue simultaneously with external cardiac massage at the rate of about 5 compressions of the heart to one inflation of the lungs.

3. Massage should continue until the victim's pulse is clearly felt and the colour returns to normal, or until medical assistance arrives.

- Notes:
1. Do not attempt cardiac massage if there is obvious damage to the victim's chest wall.
  2. There is a real danger of damage to internal organs by the improper use of external cardiac massage.
  3. Particular care must be taken with infants and small children, with whom much less pressure is required to depress the sternum than in the case of adults. In these cases the fingers should be used in preference to the palms of the hands.

## FOREWORD

This User Handbook is designed for use by the non-technical operator and contains operating instructions and simple field maintenance and fault-finding procedures for radio stations based on the PRC320/1. The Handbook is in two parts, Part 1 containing information on the basic PRC320/1 (30W output), which can be used as a manpack, vehicle or ground station, and Part 2 containing information on the PRC320/1-100W derivative (100W output), which can be used as a vehicle or ground station.

### LIST OF ASSOCIATED PUBLICATIONS

	Army Code
Radio Station UK/VRC321	61253
Radio Station UK/VRC322	61255
Radio Station UK/PRC350	61124
Radio Station UK/PRC351 and UK/PRC352	61128
Radio Station UK/VRC353	61393
Radio Station UK/PRC344	61351
Clansman Radio Control Harness )	61172
Clansman Audio Accessories )	
Clansman Secondary Batteries and Battery Charging	61394
Adaptor, Telegraph, Radio low/high level	61466
Clansman VHF Antennas	61388
Test Set, Audio, Radio Audio Accessories	NYA
Test set, Condition 'Clansman Radio'	NYA
Test Set, Harness Connectors Clansman	NYA

# PART 1

## PRC320/1 H.F. SSB 30W RADIO STATIONS

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Fig. 1 The PRC320/1 Manpack

PURPOSE AND PLANNING INFORMATION

INTRODUCTION

1.1 The Radio Station PRC320/1 is based on the RT320/1, a simple to operate lightweight transmitter/receiver operating in the 2 to 30 MHz range with operating frequency selection at 1 kHz intervals. The PRC320/1 operates in the SSB, AM or CW modes and can be used as a manpack, ground station or vehicle radio.

The RT320/1 is fully sealed and operates from a clip-on 24V secondary battery. A headset assembly, handset and morse key are provided as basic items. A hand generator, a.c. and d.c. charging units are also available as ancillaries. The PRC320/1 and its ancillaries are suitable for use in combat conditions anywhere in the world.

PURPOSE

1.2 Although it can be used as a ground station or vehicle radio, the PRC320/1 is primarily a manpack radio operating in the SSB mode.

DESCRIPTION

1.3 As a manpack radio with a whip antenna, the PRC320/1 provides reliable ground wave SSB communication for distances of up to 35km, day or night, over the kind of country found in Western Europe. The basic manpack weighs about 11kg, including its carrier.

As a ground station with a 7.9m vertical antenna, it provides ground wave communication for distances up to 50km. As a ground station using an end-fed or dipole antenna with optimum choice of frequency, the sky wave range is several thousand kilometres. These ranges are dependent on the choice of frequency.

As a vehicle radio, the PRC320/1 can be operated independently or through the vehicle control harness. Its operating characteristics are similar to those of the manpack. The manpack carrier is used to mount the radio in a vehicle. The radio must be run from its own battery and not directly from the vehicle supply. However, the radio battery can be float charged by means of a d.c. charging unit.

Remote control, including intercommunication and call facilities, is available in conjunction with the Control Radio Set, Local/Remote and various alternative remote units. Manual rebroadcast facilities can be obtained in conjunction with units of the Clansman radio control harness.

A solar shield is available to protect the radio from direction radiation by the sun. No harm is done if the shield is left fitted to the radio when it is not needed.

## TECHNICAL DATA

1.4	Frequency Range	2 to 30 MHz
	Frequency Control	From built-in frequency synthesizer and reference oscillator.
	Frequency Indication	The frequency indicated by the decade switches is: <ul style="list-style-type: none"><li>a. The suppressed carrier frequency on LSB and USB.</li><li>b. The carrier frequency on AM.</li><li>c. The radiated frequency on CW.</li></ul>
	Frequency Selection	In increments of 1 kHz by means of five decade switches.
	Frequency Stability	1 ppm
	Operating Modes and Bandwidth	Voice: LSB (lower sideband) 2.7 kHz  USB (upper sideband) 2.7 kHz  AM (double sideband) 6 kHz
		Key : CW 2.7 kHz
	Operating Temperature	-37°C to +52°C

Environmental  
Protection

Fully sealed

Receiver Sensitivity      LSB :      0.8uV for 10dB (S+N)/N  
                                  USB :      0.8uV for 10dB (S+N)/N  
                                  AM :      3.3uV at 30% mod  
  for 10dB (S+N)/N  
                                  CW :      0.8uV for 10dB (S+N)/N

Audio Output

7mW into 100 ohms (less  
than 10% distortion)

Transmitter Power

High Power : 30W p.e.p.  
                                  10W mean  
Low Power : 3W p.e.p.  
                                  1W mean

Power Consumption  
(Average)

Receive : 3.6W  
Transmit : 40W

Power Supplies

24V d.c. 3.3Ah secondary  
battery which provides 12  
hours of operation on a 1:9  
transmit/receive ratio.  
24V d.c. 1Ah secondary  
battery normally used with  
hand generator which can  
power the radio for long  
periods.

24V d.c. signal batteries  
when used with a special  
cable assembly fitted with  
non-reversible polarity  
connector.



## BATTERY CHARGING FACILITIES

1.5 The 14V or 28V D.C. Charging Units can charge one Clansman 3.3Ah or 1Ah battery. They operate from a nominal 14V or 28V d.c. source and provide a constant current charge output. The units are intended primarily to float charge the radio battery in vehicle installations.

The A.C. Charging Unit will recharge up to 16 Clansman 3.3Ah or 1Ah batteries simultaneously. It operates from a 100-125V or 200-250V 50-60 Hz a.c. supply.

The approximate times for charging batteries from flat, using either a d.c. or an a.c. charging unit, are:-

3.3Ah	4 hours
1Ah	1 $\frac{1}{4}$ hours

Charging control is automatic and overcharging or battery damage cannot occur.

The Hand Generator, which clips on to the RT320/1 and battery, will maintain the charge state of the battery for an indefinite period with a normal transmit/receive ratio of 1:9.

## VEHICLE INSTALLATION

1.6 When the PRC320/1 is installed in a vehicle, its carrier frame is clipped to a mounting rack.

The battery may be float charged by the d.c. charging unit from the vehicle supply. The radio must not be powered directly from the vehicle supply since this could cause damage.

The radio can be operated with a headset, handset or morse key plugged in direct, or connected via a harness adaptor into the vehicle harness and operated through a control, radio set, local/remote (see Chapter 3). In both cases the radio is connected to the vehicle whip antenna.

## CONSTRUCTION

1.7 The transmitter/receiver (RT320/1) is contained in a sealed light alloy case. All controls are mounted on the front panel and external connectors on the top and rear panel. Projections around the front and rear panels protect the controls and connectors. The RT320/1 is mounted on a lightweight carrier and the battery is clipped to the bottom of the case of the transmitter/receiver.

The manpack whip antenna comprises eight sections of tubing threaded on a cord to facilitate assembly. When assembled, it has an overall length of 2.4m and is fitted to the RT320/1 using the antenna adaptor. The whip antenna can also be used with a 5.4m mast and adaptor to provide a 7.9m vertical antenna for ground station use. The 5.4m mast consists of six tubular fibreglass sections (approximately 1m in length) together with supporting guys and other accessories. When dismantled, it can be packed into a reinforced fabric case for ease of transportation. Assembly details are shown in Fig.8 (page 27).

The vehicle whip antenna comprises four sections of spring steel tubing which screw together. When assembled, the antenna has an overall length of 4m and is fitted, via an adaptor, to a sprung base mounted on the vehicle. A 3m antenna can be obtained by omission of the top section of the tubing.

The wire antenna consists of 47m of insulated braid wound on a bobbin. The braid has coloured markers at one, five and ten metre intervals to facilitate measurement of the required antenna length; a 40m throwing cord is attached to the bobbin. Two wire antennas can be used as a dipole, in conjunction with a dipole centre junction and antenna feeder cable.

The antenna counterpoise comprises four 9m lengths of insulated wire attached to a bobbin on which they are wound when not in use. A short lead joined to the wires on the bobbin provides an external connection.

TABLE 1

## RADIO STATION PRC320/1 ITEMS

ITEM NAME (COMMON NAME)	REF. NO.	NOMINAL DIMENSIONS	NOMINAL WEIGHT	FIG. NO.
Transmitter receiver, radio RT320/1 (RT320/1)	630/1/37530	390 x 250 x 120mm	5.0kg	2a
Battery, secondary, 24V 3.3Ah (3.3Ah battery)	640/4/14688 (6140-99-620-8057)	180 x 130 x 70mm	3.4kg	2a
Carrying frame (manpack carrier)	630/1/37501	430 x 190 x 100mm	1.2kg	2a
Adaptor, antenna (whip adaptor)	640/1/14557 (5820-99-621-9025)	220 x 40 x 30mm	400g	2a
Antenna assembly 2.4m long (whip antenna)	640/4/15030 (5820-99-621-9029)	2.4m x 9mm dia. (8 sections, 350mm long)	140g	2a
Headset, microphone assembly and cable assembly, switch, electrical, pressel (headset)	640/4/15063 (5965-99-620-8320) 640/4/15064 (5965-99-620-5667)	- -	500g	2a

ITEM NAME (COMMON NAME)	REF. NO.	NOMINAL DIMENSIONS	NOMINAL WEIGHT	FIG. No.
Handset, general application (handset)	640/4/15062 (5965-99-620-5669)	200 x 80 x 50mm	200g	2b
Key, telegraph, manual, manpack (morse key)	640/1/14527 (5805-99-117-7542)	270 x 110 x 100mm	170g	2b
Solar shield (solar shield)	640/1/14712 (5820-99-620-2088)	430 x 270mm	100g	2b
Bag, ancillaries (ancillaries bag)	640/4/15029 (5820-99-621-9028)	310 x 230 x 100mm	110g	2b
Cable assembly, power, electrical, 2 conductors, 3m long (battery extension cable)	640/1/14567 (5995-99-620-2113)	3m long	120g	2b
Generator, electrical, hand operated (hand generator)	503/1/02050 (5820-99-114-3390)	210 x 130 x 80mm (210 x 150 x 80mm with handle in operating position)	2.5kg	2b

ITEM NAME (COMMON NAME)	REF. NO.	NOMINAL DIMENSIONS	NOMINAL WEIGHT	FIG. No.
Battery, secondary, 24V, 1Ah (1Ah battery)	640/4/14689 (6140-99-620-8058)	180 x 70 x 50mm	1.1kg	2b
Antenna, wire type, c/w reel (wire antenna)	640/1/14575 (5820-99-117-7440)	140 x 120mm (47m extended)	650g	2c
Centre junction, dipole (dipole centre junction)	640/1/14578 (5820-99-117-7439)	140 x 50 x 30mm	150g	2c
Cable assembly, r.f. UR76, 20m long (antenna feeder cable)	686/1/00504/ 002 (5995-99-620-5803)	20m long	680g	2c
Antenna counterpoise (counterpoise)	640/1/14515 (5820-99-117-7438)	110 x 80mm (9x9m extended)	140g	2c
Mast, antenna support, fibreglass, 5.4m (5.4m mast)	640/1/14979 (5820-99-621-9027)	5.4m high (990 x 150 x 100mm in carrying case)	4.3kg	2c

ITEM NAME (COMMON NAME)	REF. NO.	NOMINAL DIMENSIONS	NOMINAL WEIGHT	FIG. No.
Control, radio set, local/ remote (CRL/R)	640/1/14583 (5820-99- 117-0449)	130 x 120 x 80mm	680g	14
Cable, electric, D10, c/w reel (D10 cable)	-	330 x 146mm (805m extended)	10.5kg	14
Cable assembly, electrical, 6 conductor, 500m long (CRL/R cable)	640/1/14511 (5995-99- 620-2352)	500mm long	70g	14
Handset, remote control (remote control handset)	630/9/37624 (5965-99- 620-5670)	200 x 80 x 50mm	200g	14
Cable assembly, power, electrical, 2 conductor, 2.23m long (external supply cable)	640/1/14500 (5995-99- 117-7435)	2.23m long	140g	4b
Charger, battery, d.c. input, 14V (14V d.c. charging unit)	640/1/14873 (6130-99- 620-2114)	210 x 140 x 120mm	2.3kg	18
Charger, battery, d.c. input, 28V (28V d.c. charging unit)	640/1/14605 (6130-99- 117-0450)	210 x 140 x 120mm	2.3kg	18

ITEM NAME (COMMON NAME)	REF. NO.	NOMINAL DIMENSIONS	NOMINAL WEIGHT	FIG. No.
Wiring harness, 2 conductor, 2m long (d.c. charging unit supply cable)	640/1/14512 (5995-99-117-7437)	2m long	130g	18
Cable assembly, power, electrical, 4 conductor, 1m long (battery charging cable)	705/9/11447 (5995-99-117-7436)	1m long	100g	17 18
Charger, battery, a.c. (a.c. charging unit)	640/1/14628 (6130-99-117-0451)	440 x 350 x 310mm	29.0kg	17
Rack, electrical equipment (vehicle rack)	630/1/37611	410 x 270 x 90mm	2.2kg	22
Vehicular h.f. antenna PV1316 (vehicle whip antenna) comprising:-	686/1/01445		2.2kg	21
Base assembly (sprung base)	686/1/01446	236 x 236 x 128mm		
Whip adaptor assembly (whip adaptor)	686/1/01109	161 x 84 x 84mm		
Adaptor, antenna base (antenna base adaptor)	686/4/01102	83 x 44 x 26mm		
Cable assembly, r.f. (antenna feeder)	702/1/09823	521 x 29 x 29mm		
Antenna, whip (sections 1 & 2)	686/4/01386	1m long		
Antenna, whip (section 3)	686/4/01387	1m long		
Antenna, whip (section 4)	686/4/01388	1m long		



OPERATING INFORMATION

BASIC STATION AND ANCILLARY EQUIPMENT

2.1 The items comprising the basic station and its ancillary equipment are illustrated in Fig.2a,b,c in which they are referred to by their common names.

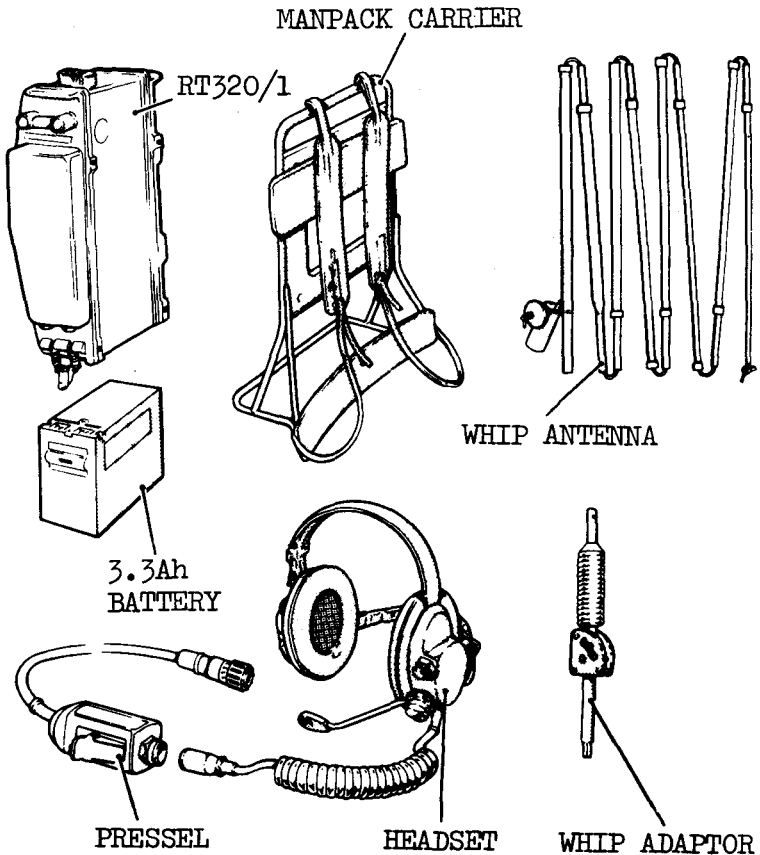


Fig.2a Basic Station and Ancillary Equipment

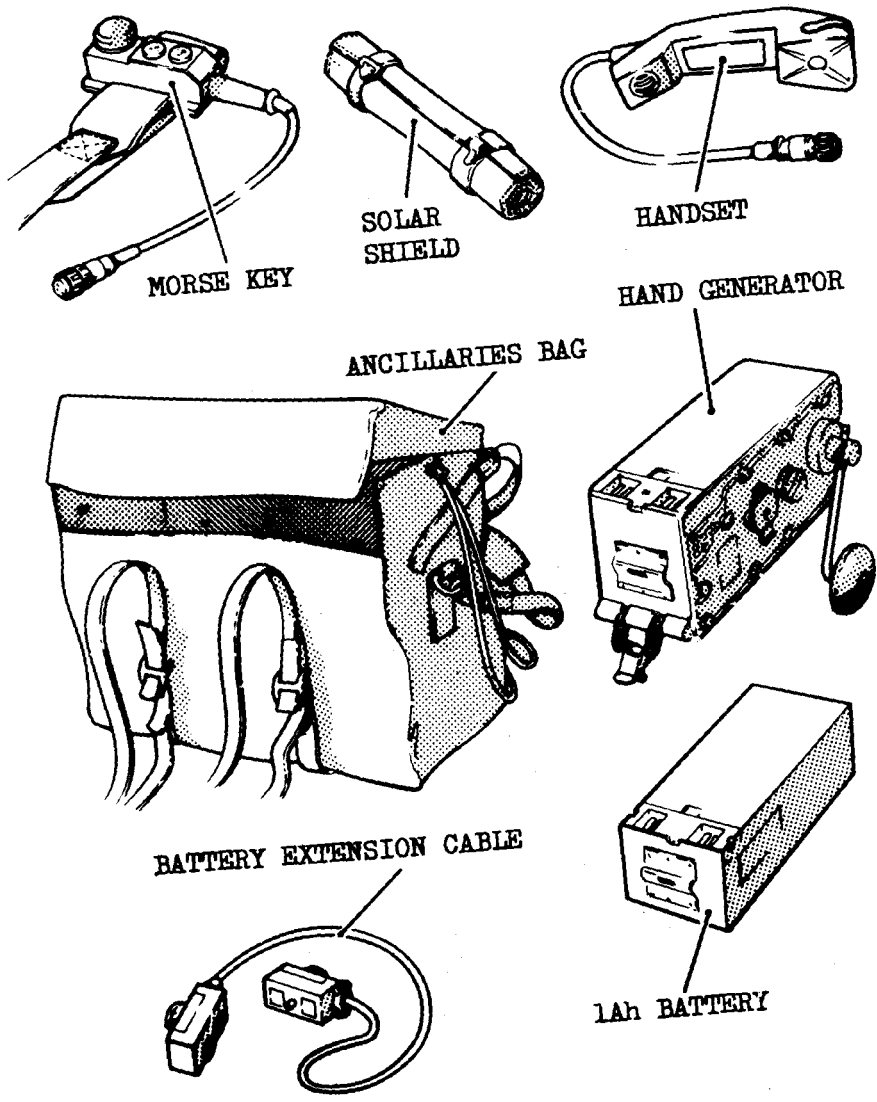


Fig.2b Basic Station and Ancillary Equipment

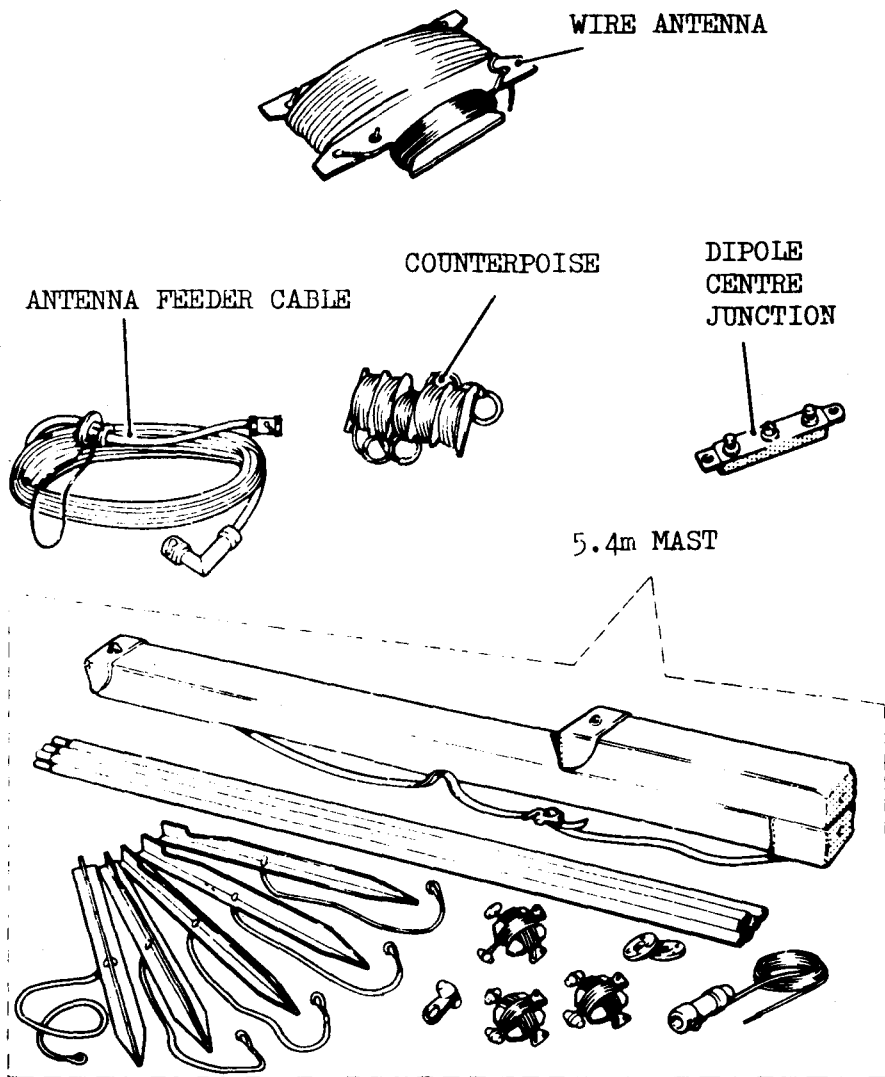


Fig.2c Basic Station and Ancillary Equipment

## ASSEMBLY OF STATION

2.2 Fitting RT320/1 to carrier (Fig.3). Proceed as follows:-

2.2.1 Secure the RT320/1 to the carrier by means of the four captive screws.

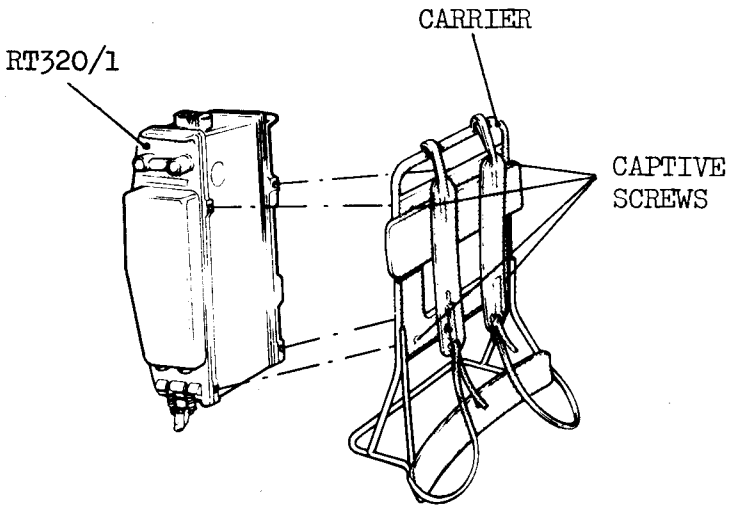


Fig.3 Fitting RT320/1 to Carrier

2.3 Connecting battery to RT320/1 (Fig.4a & b). Proceed as follows:-

2.3.1 At the RT320/1, turn the transmitter power switch to OFF.

2.3.2 Lift the battery retaining latches of the RT320/1, fit the battery to the RT320/1 so that the contacts of both engage and then secure the retaining latches.

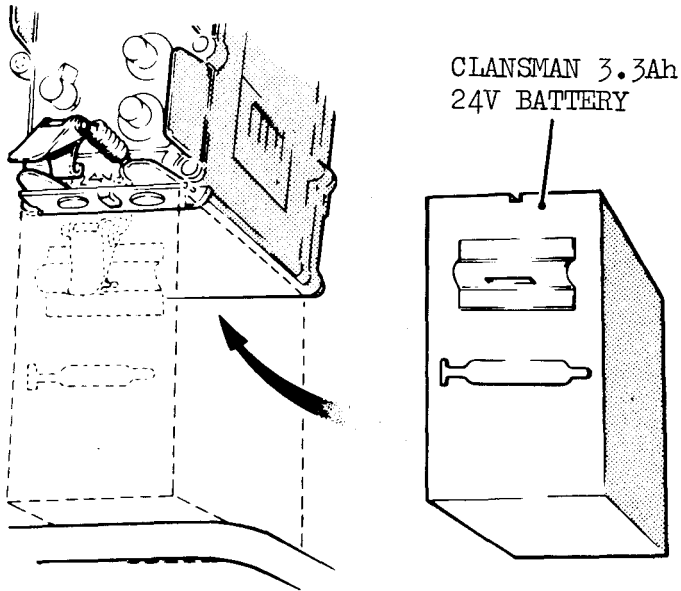


Fig.4a Fitting Battery

2.3.3 If it is required to operate the RT320/1 with the battery separated, connect the battery with the battery extension cable, ensuring that the plug and socket are correctly orientated on the battery and RT320/1 respectively by means of the locating studs and that the plug and socket securing screws are tightened.

2.3.4 If it is required to operate the RT320/1 with a 24V signal battery, connect the battery with the external supply cable, ensuring that the socket is correctly orientated on the RT320/1, the socket securing screw is tightened and the red and black leads are connected to the battery positive and negative terminals respectively.

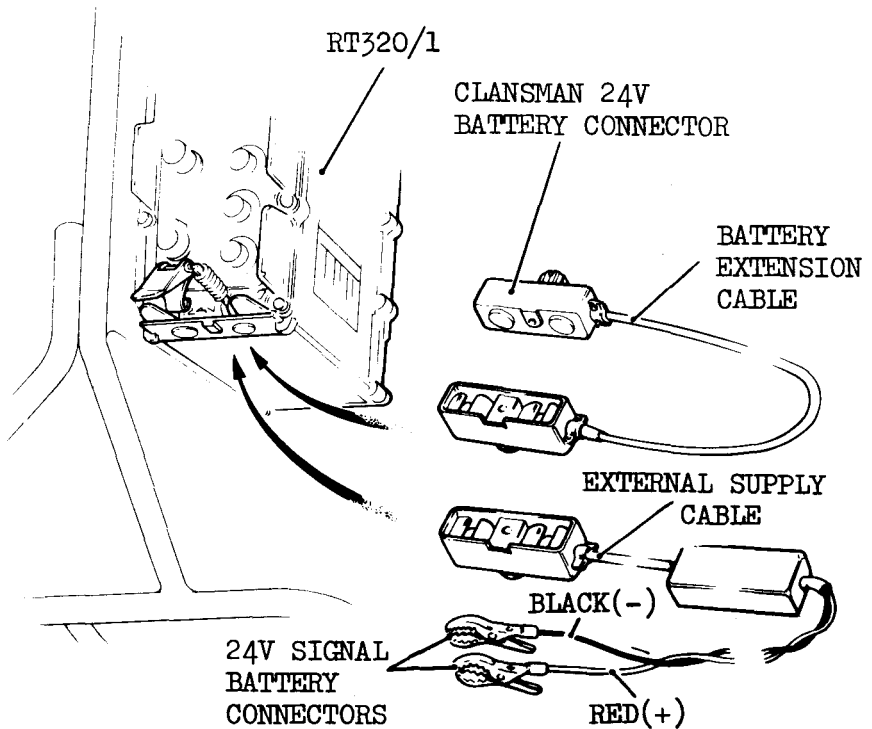


Fig.4b Fitting Battery Cables

2.4 Assembling manpack. Proceed as shown in Fig.5

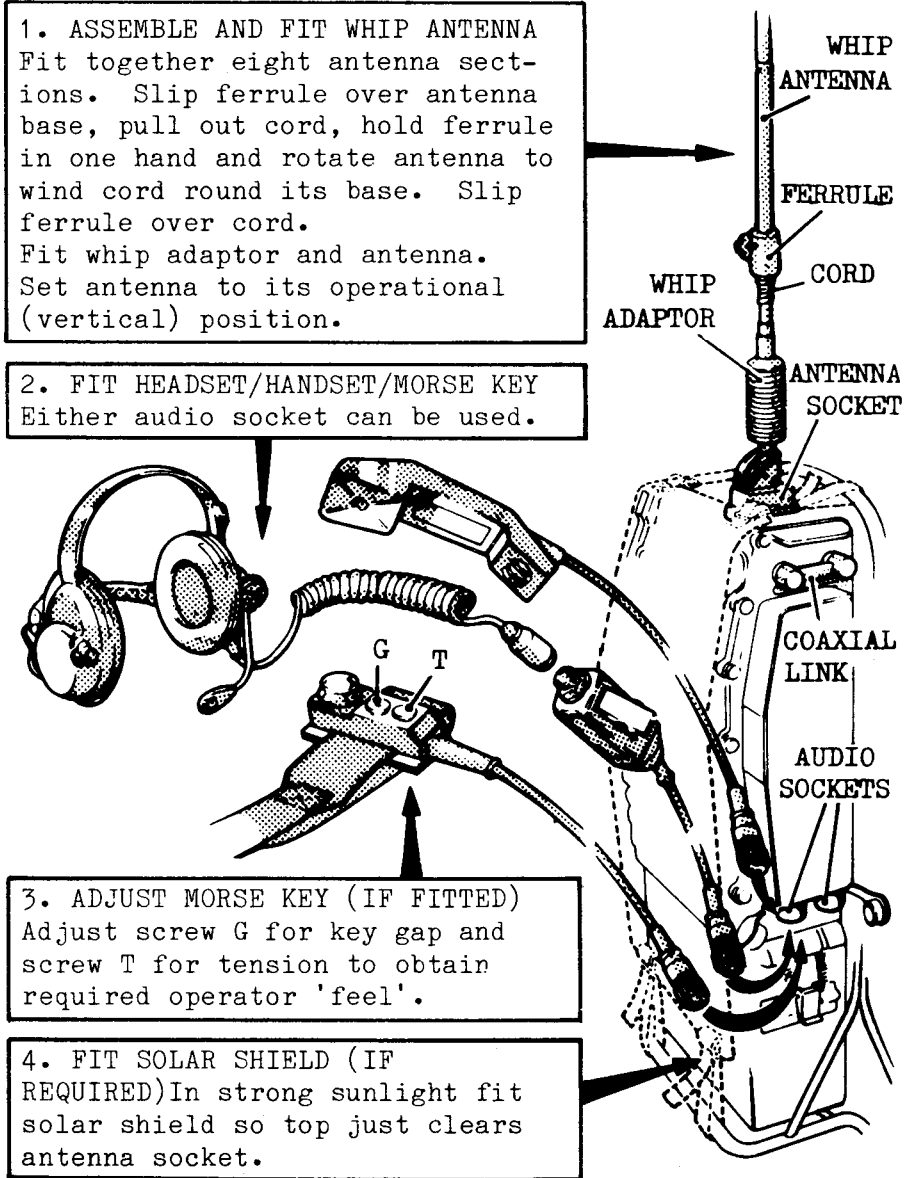


Fig.5 Assembling Manpack

## CARRYING POSITION

2.5 The correction carrying position for the manpack is as shown in Fig.1 (page xii).

## OPERATING INFORMATION

2.6 Set up and tune the PRC320/1 as shown in Fig.6.

## ANTENNA TUNING

2.7 The settings of the RANGE AND LOAD SWITCHES on the RT320/1 antenna tuning unit (ATU) are determined by the operating frequency and the type of antenna (various configurations are described in para.2.12 to 2.17), as shown in the ATU RANGE AND LOADING TABLE (Fig.7, page 24) on the equipment case. Switch settings for V dipole and vehicle 4m whip antennas are not given in this table and form the subject of a separate table, also illustrated in Fig.7. The method of using the tables is as follows:-

2.7.1 Determine which block in the appropriate ANTENNA column corresponds with the selected operating frequency in the FREQ MHz column and initially set the RANGE and LOAD switches respectively to the letter and number given in the block, e.g. if the operating frequency is 5.763 MHz, commence tuning with the switches set to B and 3 respectively when using the manpack whip antenna, B and 6 with the 5.5m vertical antenna and B and 2 with the vehicle 3m and 4m whip antennas. When using the 7.9m vertical antenna, set the switches to B and the position between 6 and 9 inclusive which enables the highest meter reading to be achieved when adjusting the TUNE control. Complete the tuning procedure as indicated in Fig.6.



2.7.2 In the case of an end-fed antenna, set the antenna length and the switches according to the table, e.g. for a frequency of 5.763 MHz set the antenna to a length of 32 metres and the switches to C and 7. Complete the tuning procedure as indicated in Fig.6.

2.7.3 In the case of a dipole antenna using a dipole centre junction and antenna feeder cable, antenna tuning is performed solely by adjusting the length of each dipole element to the nearest frequency listed in the table, e.g. for a frequency of 5.763 MHz, set the length of each element to 11.5 metres.

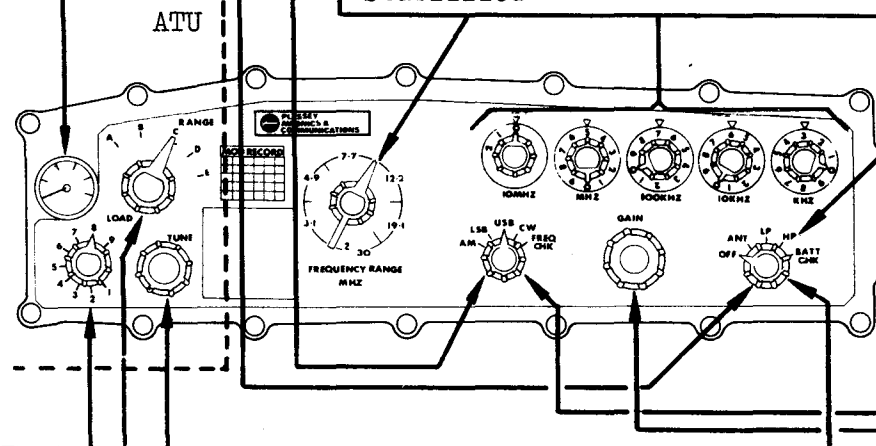
2.7.4 In the case of a dipole antenna in which the elements are connected directly to the RT320/1 (V dipole), the switches are set as shown in addition to adjusting the element lengths, e.g. for a frequency of 5.763 MHz, set each dipole element to a length of 11.5 metres. Set the switches to C and the position between 5 and 7 inclusive which enables the highest meter reading to be achieved when adjusting the TUNE control. Complete the tuning procedure as indicated in Fig.6.

### 1. CHECK BATTERY

Set to BATT CHK and CW. Depress pressel/morse key. Check meter needle registers on or above second mark. (The first mark is zero). Release pressel. If needle was below second mark, replace battery.

### 2. SELECT FREQUENCY

Set switches (shown set to 5.763 MHz) to required frequency (stop at zero positions enables frequency to be set by touch in dark). Set FREQUENCY RANGE switch (no stop fitted) to corresponding frequency band. Tone heard in headset/handset ceases when correct band selected and frequency stabilized.



### 3. TUNE ANTENNA TUNING UNIT (ATU)

Set to ANT. Set RANGE and LOAD switches to suit antenna and frequency (see para.2.7). Depress pressel/morse key and adjust TUNE control for maximum reading. Adjust LOAD switch for maximum reading. selecting lower number position if two give same reading. Re-adjust TUNE control for maximum reading and release pressel.

4. RECHECK BATTERY  
Repeat operation 1.

5. SELECT TRANSMITTER POWER  
Set to LP (low power) or HP (high power)  
as required.

6. SELECT MODE  
Set to LSB, USB or AM for speech and CW  
for morse.

7. COMMUNICATE  
To transmit, depress pressel and speak  
into microphone when in speech mode, or  
operate morse key when in CW mode.  
Sidetone heard in every mode. To receive,  
release pressel/morse key.

8. ADJUST VOLUME  
Adjust GAIN control for required volume  
of received signal.

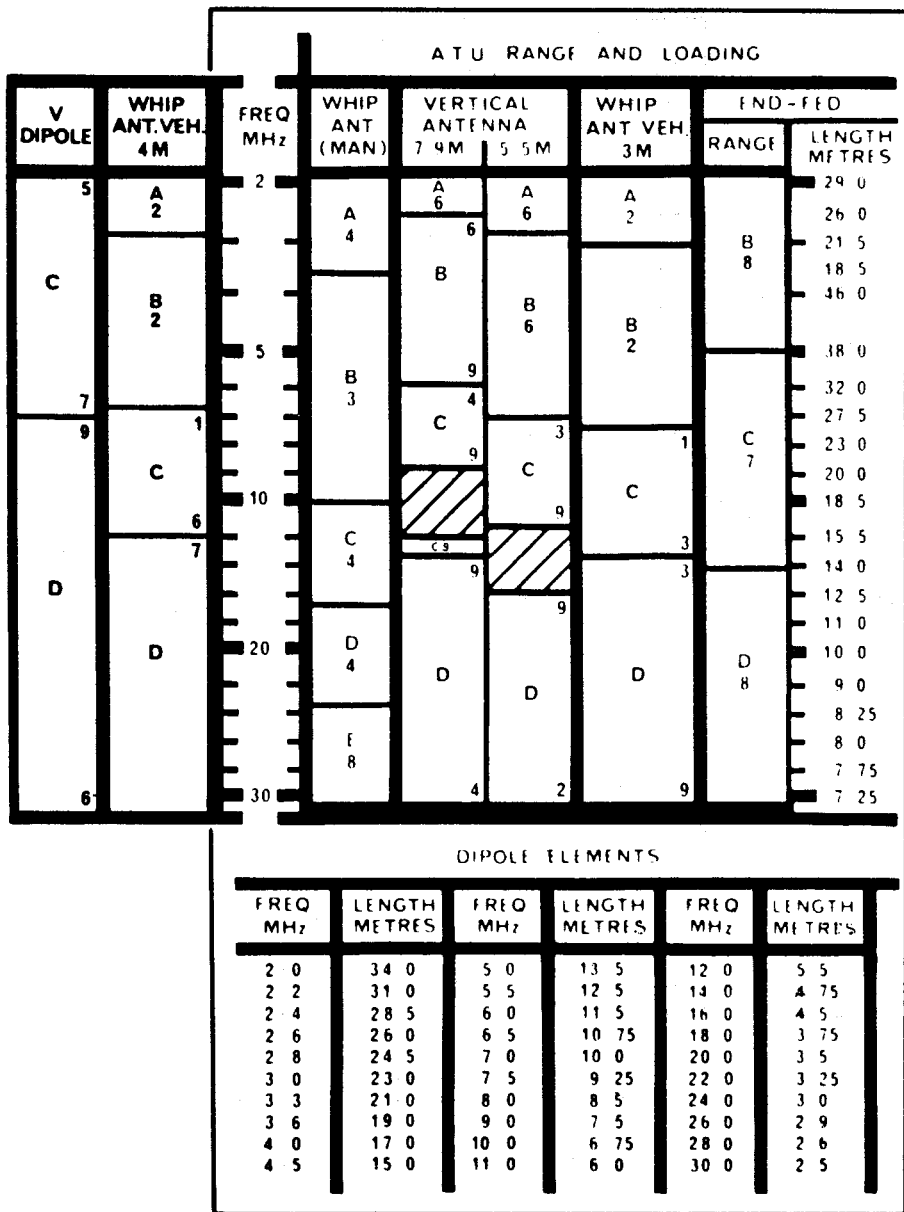


Fig.7 ATU Range and Loading and Dipole Elements Tables

## 5.4M MAST (Fig.8 page 27, Fig.10 page 31)

2.8 The 5.4m mast forms the basis of the 7.9m and 5.5m vertical antennas used for ground wave operation and can also be used as a support for various dipole and end-fed antenna configurations. It comprises six tubular sections which, when fitted together, are supported by three pairs of guys. For ease of transport, the mast is supplied as a kit, 640/1/14979 (5820-99-621-9027) containing the following items:-

Mast section assembly (section) 640/1/14980 (5820-99-621-9017)	-	6 off
Guy assembly (guy) 640/1/14983 (5820-99-621-9018)	-	6 off
Stake, peg assembly (stake) 640/1/14986 (4030-99-621-9019)	-	5 off
Adaptor, mast assembly (adaptor) 640/1/14989 (5820-99-621-9020)	-	1 off
Plate, guy (guy plate) 640/2/14993 (5820-99-621-9021)	-	2 off
Former 640/2/14994 (5820-99-621-9022)	-	3 off
Plate, tie (tie plate) 640/2/14995 (5820-99-621-9023)	-	1 off
Case, mast (case) 640/4/14996 (5820-99-621-9024)	-	1 off

2.9 To assemble and erect the mast, proceed as follows:-

2.9.1 Remove all items from the case and fit together the six sections, interposing a guy

plate between the third and fourth and the tie plate between the two lowermost sections.

2.9.2 Fit to the top of the mast the second guy plate and:

a. If the mast is to be used for a 5.5m vertical antenna add the adaptor complete with down lead.

b. If the mast is to be used for a 7.9m vertical antenna add the adaptor complete with down lead and then fit the 2.4m whip antenna into the adaptor.

2.9.3 Remove the guys from the formers on which they are wound and feed the guy toggles through the underside of the elongated holes in the guy plates. Locate the toggles so that they will not pull through the holes when the guys are under tension.

2.9.4. If the mast is to support a wire dipole or end-fed antenna, feed the throwing cord of the wire antenna (para.2.13) through the top of the circular holes in the upper and lower guy plates. If the mast is to be used as a vertical antenna, feed the adaptor down lead through the guy plates.

2.9.5. Drive into the ground three of the stakes, equally spaced in a circle of 6m diameter. In soft ground, dig holes for the stakes and embed them to a depth sufficient to withstand the tension of the guys.

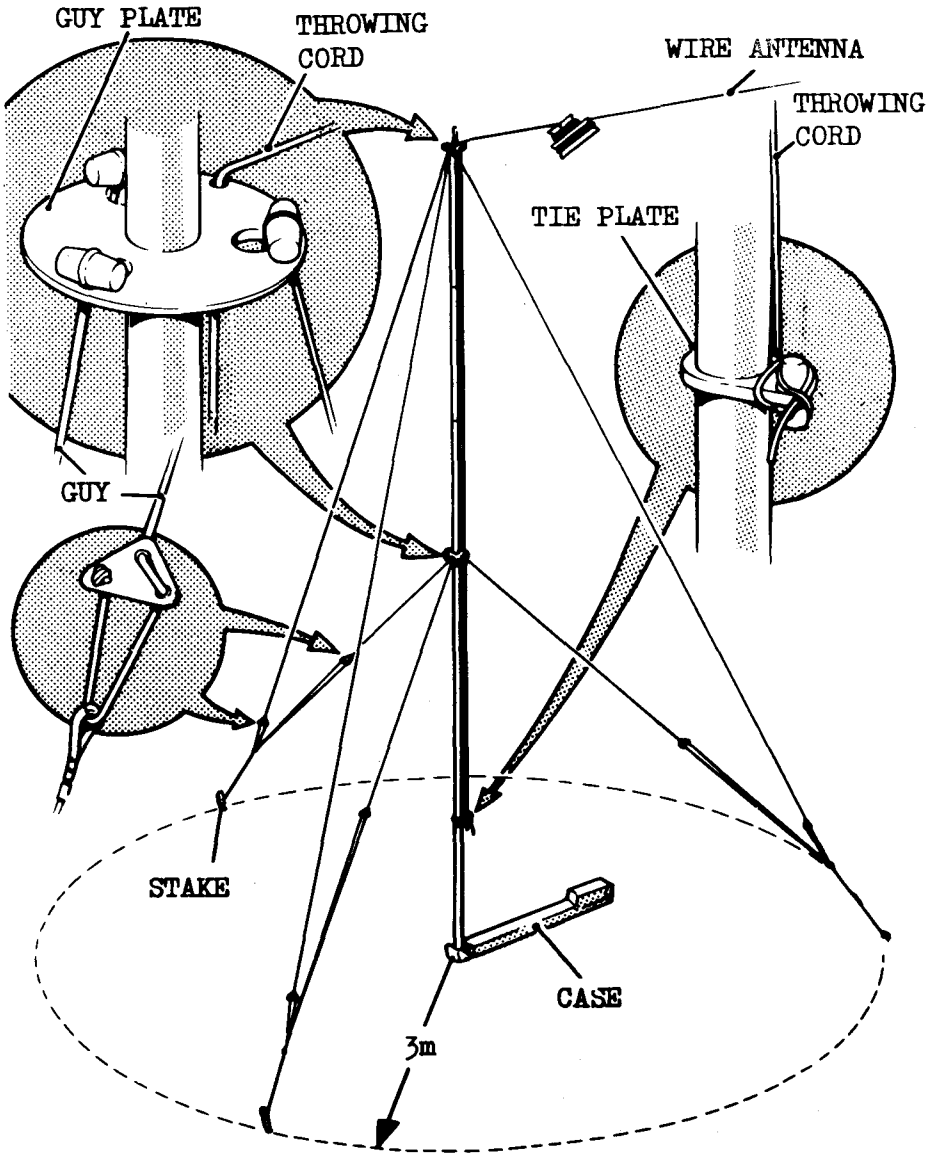


Fig.8 Erection of 5.4m Mast with Wire Antenna

2.9.6. Stand the base of the mast on the reinforced lid of the case in the centre of the circle and attach the loop at the end of the upper and lower guy of each pair to a stake by means of its hook. Tighten the guys to maintain the mast in a vertical position.

2.9.7. If the mast is to support a wire dipole or end-fed antenna, pull the throwing cord of the wire antenna tight and tie off round the tie plate.

#### ANTENNA COUNTERPOISE (Fig.9, page 29)

2.10 The antenna counterpoise provides an artificial earth for all antennas when used on ground of poor conductivity such as desert or frozen snow and ice and should always be used with the ground wave vertical and end-fed antennas. In use, the four wires are spread radially around the RT320/1 and the short lead is connected to the earth terminal of the RT320/1. The counterpoise should always be used if doubtful about the ground conditions, because its use will never reduce performance and will often improve it.



2.11 The setting up procedure for the RT320/1 when used in conjunction with the counterpoise is as shown in Fig.6 but if the counterpoise is added after setting up, the equipment should be retuned.

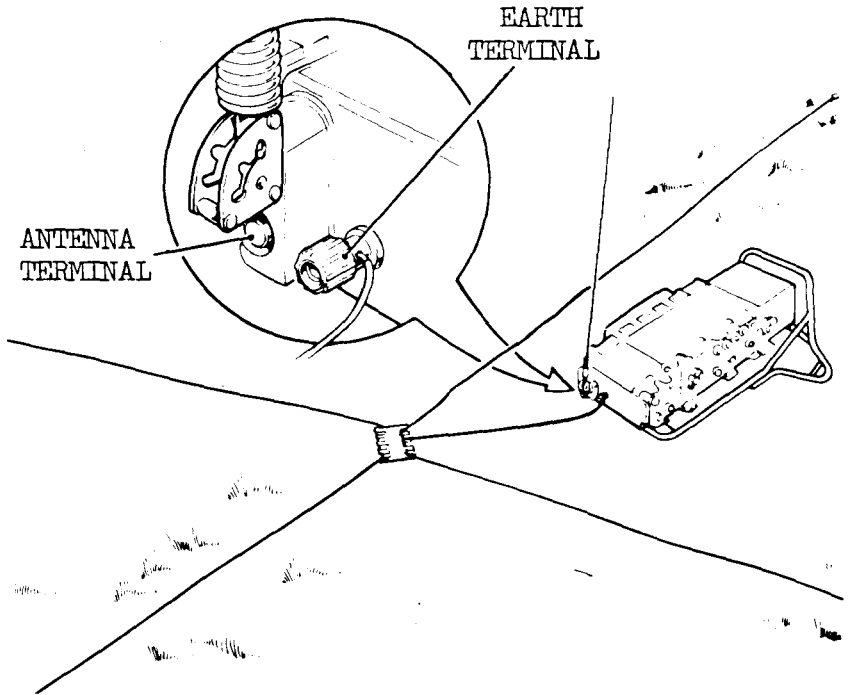


Fig.9 Antenna Counterpoise

## GROUND WAVE VERTICAL ANTENNAS (Fig.10)

2.12 For ground wave operation the RT320/1 uses vertical antennas based on the 5.4m mast (see para.2.9 on page 25). In both the 5.5m and the 7.9m antennas the down lead is connected to the RT320/1 antenna terminal, as shown, and the setting up procedure is as shown in Fig.6. Both antennas can be used throughout the frequency range of the equipment, except within the dead spots shown hatched in the ATU RANGE AND LOADING table. In these cases, an end-fed antenna should be used, as described in para.2.17. The antenna counterpoise must be used with these antennas (see para.2.10).

## SKY WAVE DIPOLE AND END-FED ANTENNAS (Fig.11,12,13 Pages 33,35,36)

2.13 For sky wave operation the RT320/1 can use either a dipole or an end-fed antenna, both based on the wire antenna. This comprises 47m of insulated braid, marked at one metre intervals with one green marker, at five metre intervals with two yellow markers and at ten metre intervals with three blue markers; it is wound on a bobbin equipped with a throwing cord.

2.14 Various dipole configurations, each using two wire antennas, are possible. In each case the direction of the antenna is not critical for communication over distances up to 300km, but in tropical areas the antenna should run N - S for the lowest unwanted noise level. For distances greater than 300km the antenna should be erected broadside on to the direction of communication.

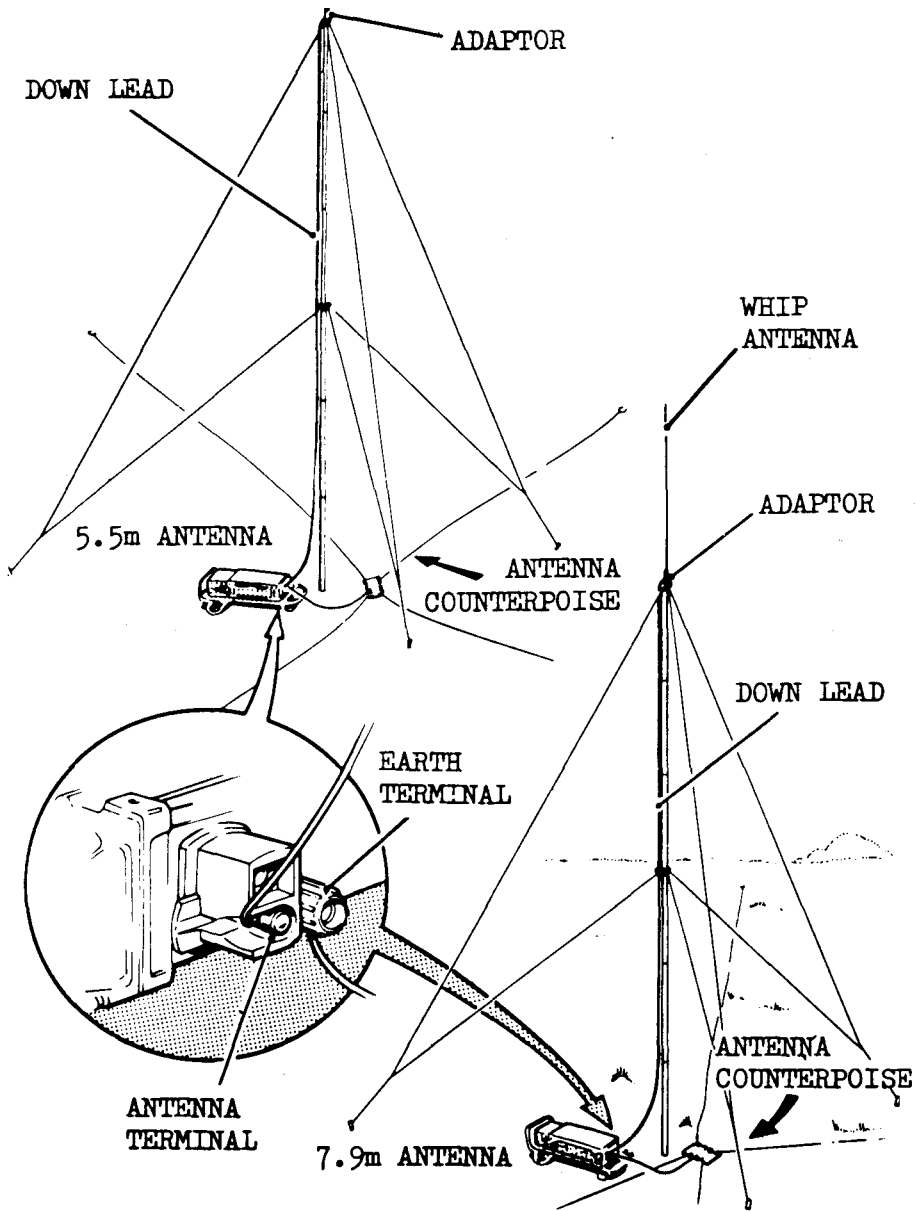


Fig.10 5.4 Mast with Ground Wave Vertical Antennas

2.15 The dipole configurations which give best results at maximum range are shown in Fig.11. The setting up procedure for these configurations is as follows:-

2.15.1 Establish the required length of each dipole element from the table on the case of the RT320/1.

2.15.2 Unwind the required lengths of antenna wire from each bobbin and tie off with a double loop or clove hitch so that the coloured length marked is just free of the knot.

2.15.3 Erect the horizontal dipole as shown in Fig.11 (the side of a house or wall could be used instead of a tree), using a suitable weight, such as a jack knife, on the throwing cord to get the wire or cord through the branches of the tree. Tie off the cord in the same way as the antenna wire.

2.15.4 When only a 5.4m mast is available to support the antenna, a centre supported dipole can be used. This dipole is erected as shown in Fig.11 and the dipole centre junction is secured to the top of the mast with a length of cord. The bobbins of the wire antennas are supported by securing the throwing cords to the spare stakes included in the mast kit.

2.15.5 Remove the coaxial link between the RT320/1 INT TUNER and T/R sockets and connect the latter to the dipole centre junction by means of the antenna feeder cable. Ensure that no strain is applied to the terminals and

WIRE ANTENNA

DIPOLE  
CENTRE JUNCTION

ANTENNA  
FEEDER  
CABLE

ANTENNA  
FEEDER  
CABLE

DIPOLE CENTRE  
JUNCTION

WIRE  
ANTENNA

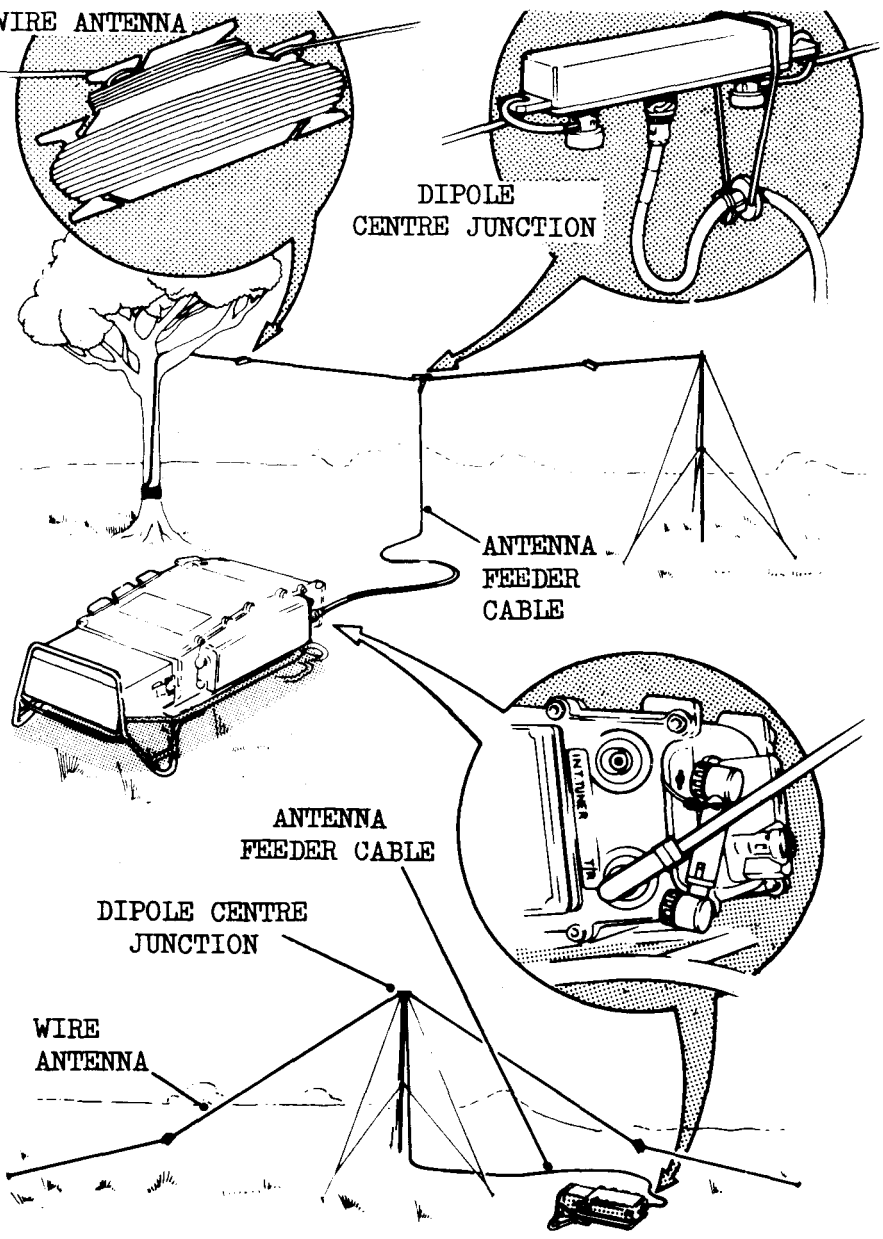


Fig.11 Dipole Configurations  
using Antenna Feeder Cable

coaxial socket of the dipole centre junction by looping the antenna wires through its lugs and suspending the antenna feeder cable from it by means of the loop of cord attached to the cable, as shown.

2.15.6 Set up the equipment as shown in Fig.6 (pages 22 and 23), but do not tune the ATU (operation 3) as, in this configuration, antenna matching is provided solely by the lengths of the dipole elements.

2.16 Examples of other dipole configurations are given in Fig.12. In these examples the dipole centre junction and antenna feeder cable are not used, the coaxial link between the INT TUNER and T/R sockets remains fitted and the wire antenna ends are connected directly to the RT320/1 antenna and earth terminals as shown. The lengths of the dipole elements are specified in the table on the radio set (also shown in Fig.7, page 24). The equipment is set up as shown in Fig.6 (pages 22 and 23), using the RANGE and LOAD switch settings given for the V dipole in Fig.7 (page 24).

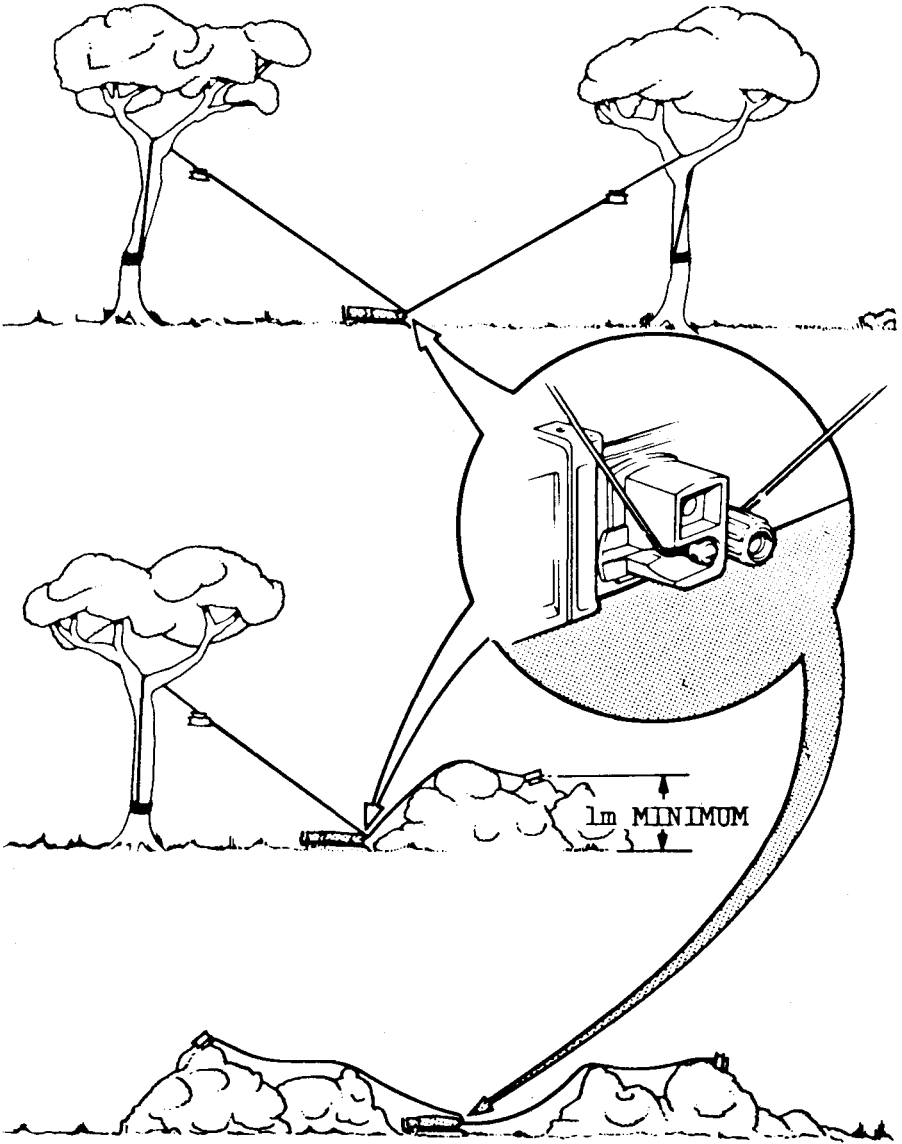


Fig.12 Examples of other Dipole Configurations

2.17 The end-fed antenna, an example of which is shown in Fig.13, uses one antenna wire connected to the RT320/1 antenna terminal and can be supported by a mast or a wall, instead of a tree. After setting the antenna length, as specified in the END-FED column of the ATU RANGE AND LOADING table (Fig.7, page 24), the equipment is set up as shown in Fig.6 (pages 22 and 23) using the RANGE and LOAD switch settings given in the table. The antenna counterpoise must be used with this antenna (see para.2.10).

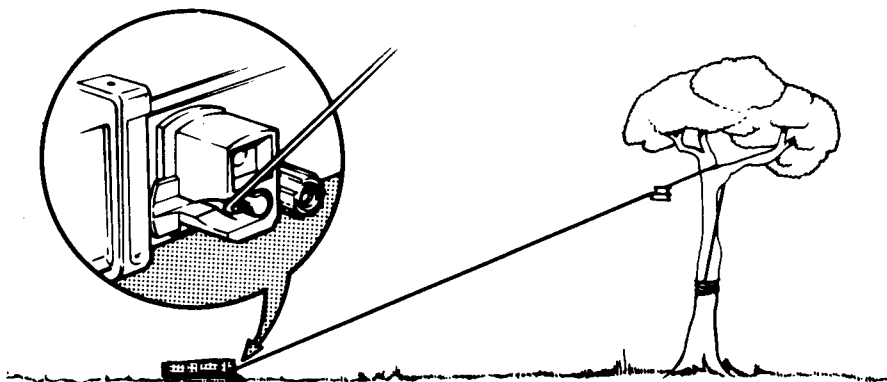


Fig.13 Example of End-Fed Antenna

#### REMOTE OPERATION (Fig.14, page 37)

2.18 The PRC320/1 can be operated remotely from a distance of up to 3km by the use of other items from the Clansman range of equipment.

2.19 Speech operation. For operation in a speech mode (AM, LSB or USB), the PRC320/1 is used in conjunction with a control, radio set, local/remote (CRL/R) at the local position, connected to audio



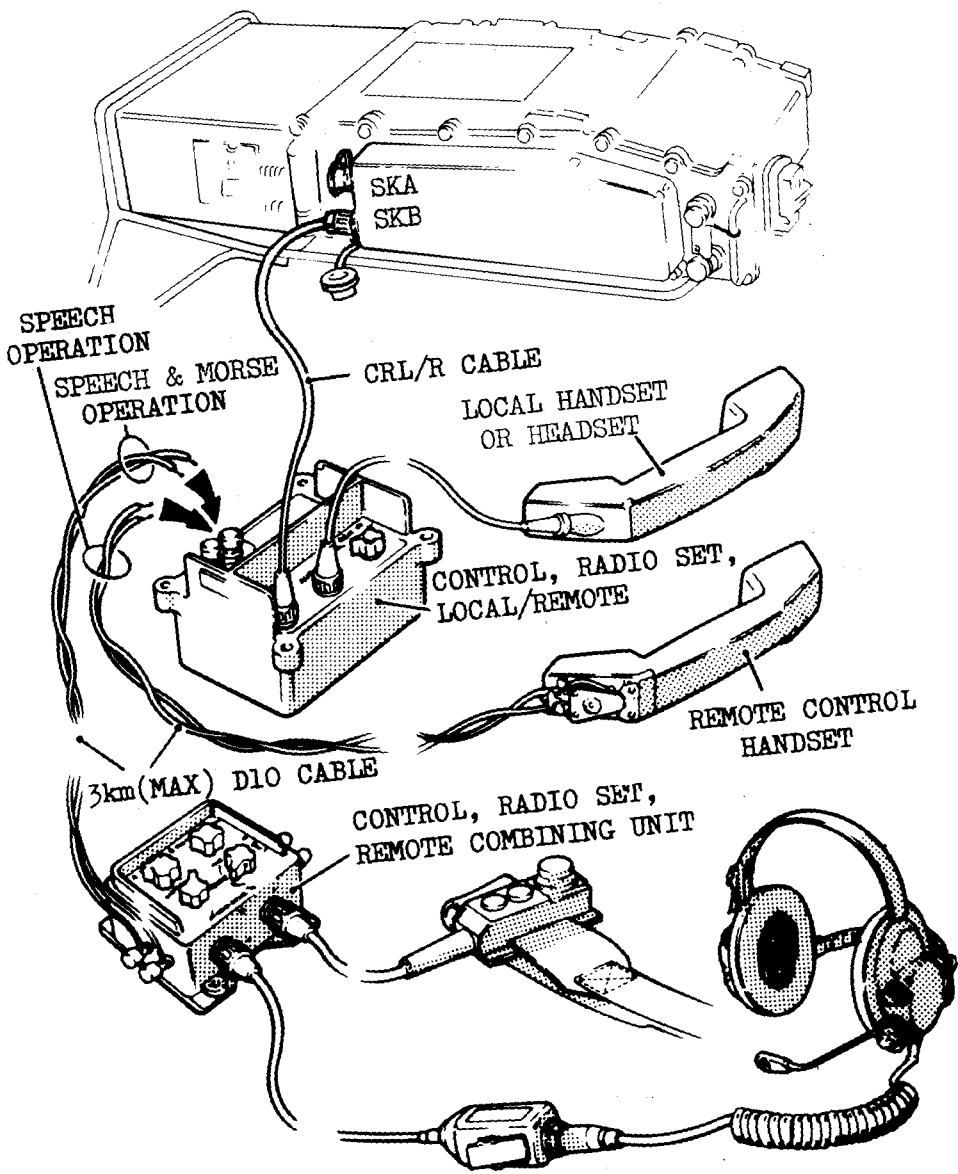


Fig.14 Remote Operation

socket SKB of the RT320/1 and by up to 3km of D10 cable to a remote control handset at the remote position, as shown. (Details of the method of connecting D10 cable to the handset are given in the User Handbook for Clansman Radio Control Harness, Army Code No. 61172). The setting up and operating procedure is as follows:-

2.19.1 Set the CRL/R function switch to LOCAL and set up the RT320/1 as shown in Fig.6 (pages 22 and 23).

2.19.2 At the RT320/1, select the required speech mode (AM, LSB or USB). The equipment is now ready for operation from either the local or the remote position, depending on the setting of the CRL/R function switch, the facilities provided in each position of which are as follows:-

- a. LOCAL - RT320/1 controlled by local operator's pressel. Both operators hear received signal and transmitter sidetone.
- b. REM - RT320/1 controlled by remote operator's pressel, but local operator can override remote operator by operating his pressel. Both operators hear received signal and transmitter sidetone.
- c. I/C - Intercommunication between both operators on operation of their respective pressels. Both operators hear received signal superimposed on their inter-communication.
- d. CALL - Local operator calls remote by a tone. Switch spring loaded to return to I/C position. (Remote operator can call

local in any position of CRL/R function switch by depressing call button on handset).

2.20 Morse operation. For morse operation (CW), a morse key and/or headset/handset at the remote position is connected via a control, radio set, remote combining unit (RCU) to the D10 cable in place of the remote control handset, as shown. The setting up and operating procedure is as described for speech operation in para. 2.19, except that the CW mode is selected at the RT320/1. The setting up and operating procedure for the RCU, details of which are given in the User Handbook for Clansman Radio Control Harness, Army Code No. 61172, is as follows:-

2.20.1 If the D10 cable has been connected to the LINE A terminals, set the selector switch to A. If the cable has been connected to the LINE B terminals, set the switch to B.

2.20.2 Set the function switch to MORSE. The equipment is now ready for operation in the CW mode and can be controlled from either the local or the remote position by means of the CRL/R function switch, as previously described. When the equipment is operating, set the WORKING control to obtain the required volume in the remote headset or handset. To call the local operator, turn the function switch to the spring loaded CALL position.

2.20.3 If required, the RCU can be operated in the speech mode by setting the function switch to VOICE and the RT320/1 to AM, LSB or USB.

REBROADCASTING (Fig.15)

2.21 The PRC320/1 can be operated as a manual rebroadcast station in conjunction with a control, radio set, local/remote (CRL/R), an interconnecting box, harness adaptor (IBHA) and an interconnecting box, 2 radio (IB2). Interconnections between the units are shown in block diagram form in Fig.15, but reference should be made to the User Handbook for Clansman Radio Control Harness, Army Code No. 61172.

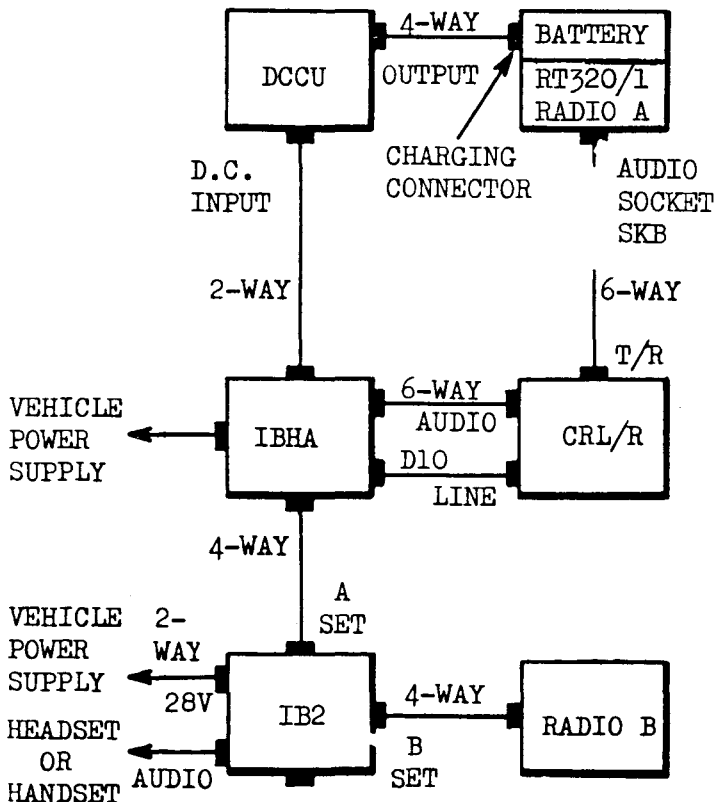


Fig.15 Local Rebroadcast Interconnections

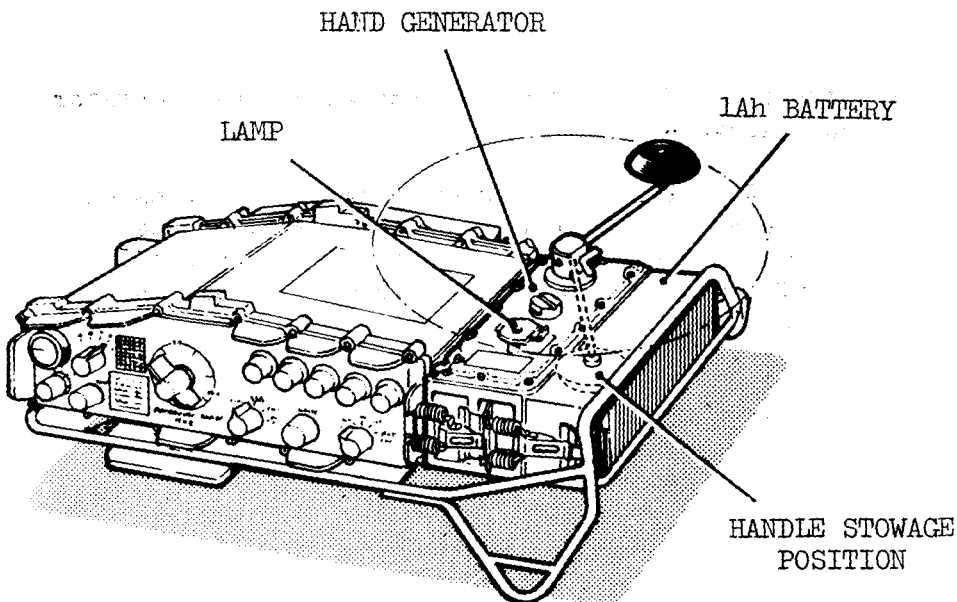


Fig.16 PRC320/1 with Hand Generator

#### BATTERY CHARGING UNITS

##### HAND GENERATOR (Fig.16)

2.22 The hand generator enables a PRC320/1 to be operated for an indefinite period without changing the battery and, complete with a 1Ah secondary battery, is latched to the RT320/1 in place of a 3.3Ah battery. In an emergency, the generator alone (without the battery) can be used to power the RT320/1 when in the receive condition. The generator can be used with the equipment in any position, but it will be found easiest to operate with the equipment on the ground. If required, a 3.3Ah battery may be used instead of the 1Ah, but in this case the equipment must be removed from the carrier.

The procedure for fitting and operating the generator is as follows:-

2.22.1 Lift the battery retaining latches on the RT320/1, fit the generator so that its spring contacts engage with the contact studs of the RT320/1 and then close the retaining latches.

2.22.2 Lift the battery retaining latches on the generator, fit the battery so that its spring contacts engage with the contact studs of the generator and then close the retaining latches.

2.22.3 Loosen the generator handle retaining wing nut, set the handle to the winding position and tighten the wing nut.

2.22.4 Turn the handle. As the turning speed is increased, the generator indicator lamp (provided with a sliding shutter for night operation) will light until a speed is reached at which the lamp extinguishes. Continue to turn the handle at this speed to keep the lamp extinguished.

2.22.5 When using the RT320/1 at a normal transmit:receive ratio of 1:9, the battery should remain charged by continuous operation of the generator. If the normal ratio is exceeded, it will be necessary to operate the generator after the radio is switched off in order to fully charge the battery.

2.22.6 On completion of an operating period, return the generator handle to its stowage position, as shown.

W A R N I N G

The voltages used in this equipment are high enough to endanger life.

CARELESSNESS COULD BE FATAL

See First Aid instructions on pages (ii) to (vi).

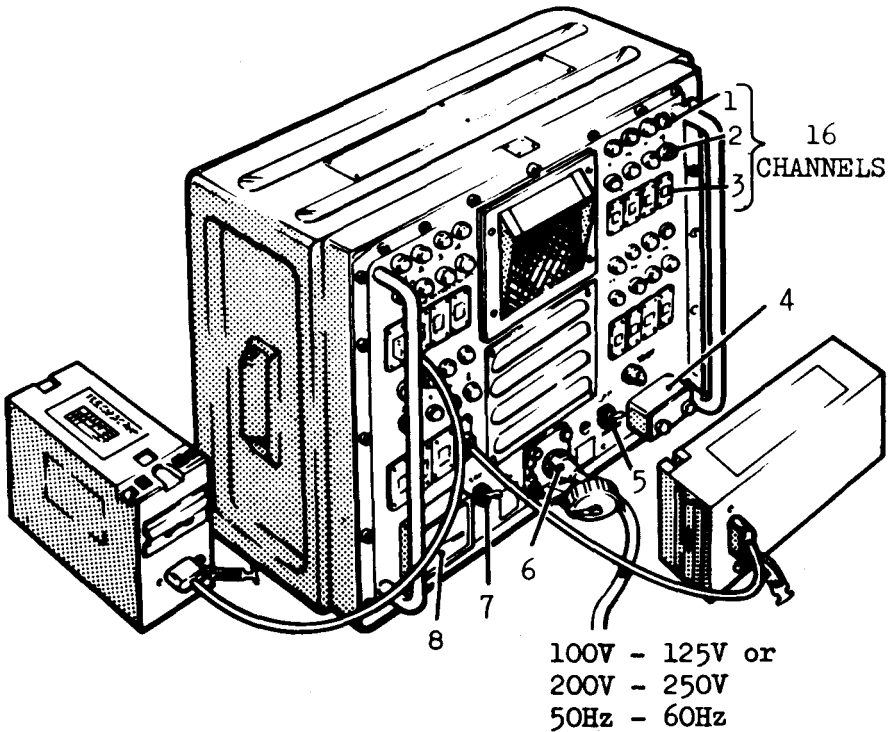


Fig.17 A.C. Charging Unit

## A.C. CHARGING UNIT (Fig.17)

2.23 The a.c. charging unit enables up to 16 Clansman 3.3Ah and 1Ah secondary batteries to be recharged simultaneously, regardless of their state of discharge. The charging procedure is as follows:-

2.23.1 Remove the cover from the charging unit.

2.23.2 Adjust the voltage selector panel (8) to correspond with the voltage of the 50 - 60 Hz a.c. mains supply

**WARNING:** Ensure that the unit is disconnected from the supply whilst making adjustments.

2.23.3 Remove the cover from the a.c. mains fuse (4) and ensure that it is of the correct rating, i.e. 20A for a 100 - 125V supply and 10A for a 200 - 250V supply.

2.23.4 .Open the sliding vent at the rear of the charging unit.

2.23.5 Using the a.c. charging unit supply cable, connect the INPUT plug (6) to the a.c. mains supply.

2.23.6 Set the LAMPS switch (7) down (on).

2.23.7 Using the battery charging cables, connect the charging connector of each battery to be charged to an outlet connector (3) and set the MAINS switch (5) down (on). Each outlet has an associated yellow lamp (1), which will light to indicate that the battery is properly connected and is being charged. When the battery is fully charged this lamp will extinguish and an associated green lamp (2) will light.



2.23.8 The approximate charging times from flat are:-

- a. 1Ah battery 1 $\frac{1}{4}$  hours
- b. 3.3Ah battery 4 hours

2.23.9 Except when connecting, or inspecting the charge state of batteries, set the LAMPS switch (7) to OFF.

2.23.10 Replace charged batteries with discharged ones (there is no need to switch off when doing so). No damage to the battery or the charging unit will occur if a fully charged battery is left connected.

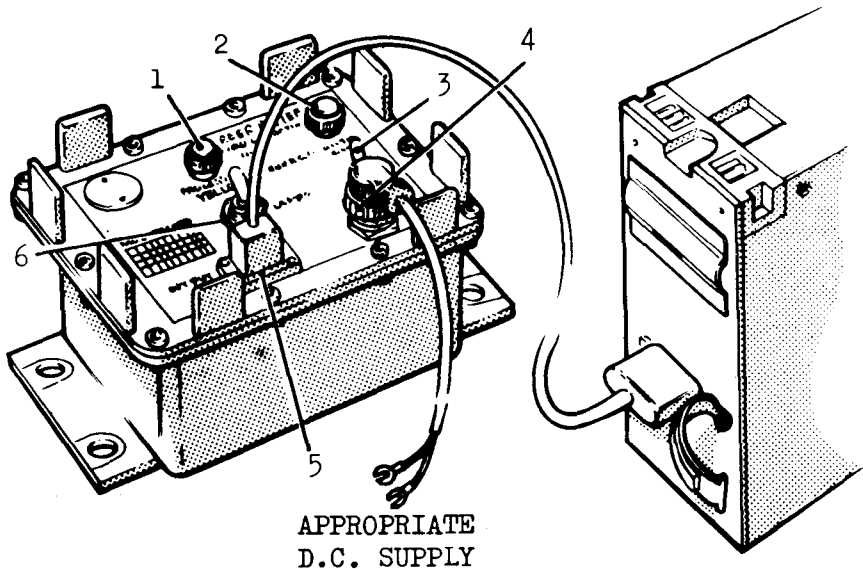


Fig.18 D.C. Charging Unit

## D.C. CHARGING UNITS (Fig.18)

2.24 The d.c. charging units (14V and 28V d.c. input) are primarily designed to float charge a Clansman manpack secondary battery used with a vehicle radio. The charging period is as follows:-

2.24.1 Using the d.c. charging unit supply cable, connect the D.C.INPUT plug (4) to the appropriate d.c. supply (14V or 28V), ensuring correct polarity.

2.24.2 Using the battery charging cable, connect the charging connector on the battery to the OUTPUT connector (5).

2.24.3 Set the INPUT switch (3) to ON.

2.24.4 Set the LAMPS switch (6) down (on). The CHARGE PROCEEDING YELLOW lamp (1) will light to indicate that the battery is properly connected and is being charged. When the battery is fully charged this lamp will extinguish and the CHARGE COMPLETE GREEN lamp (2) will light. The approximate charging times from flat are:-

- |                  |                       |
|------------------|-----------------------|
| a. 1Ah battery   | 1 $\frac{1}{4}$ hours |
| b. 3.3Ah battery | 4 hours               |

2.24.5 Except when connecting the battery, or inspecting its charge state, set the LAMPS switch to OFF. No damage to the battery or the charging unit will occur if a fully charged battery is left connected.

WORKING TO OTHER RADIOS (Fig.19)

2.25 The PRC320/1 will work to another PRC320/1 and to Clansman radios VRC321 and VRC322 in any transmission mode and on any selected 1 kHz channel in the frequency range 2 MHz to 30 MHz. It will also work in limited modes of transmission and on limited frequencies to the other radios, as in the examples shown below.

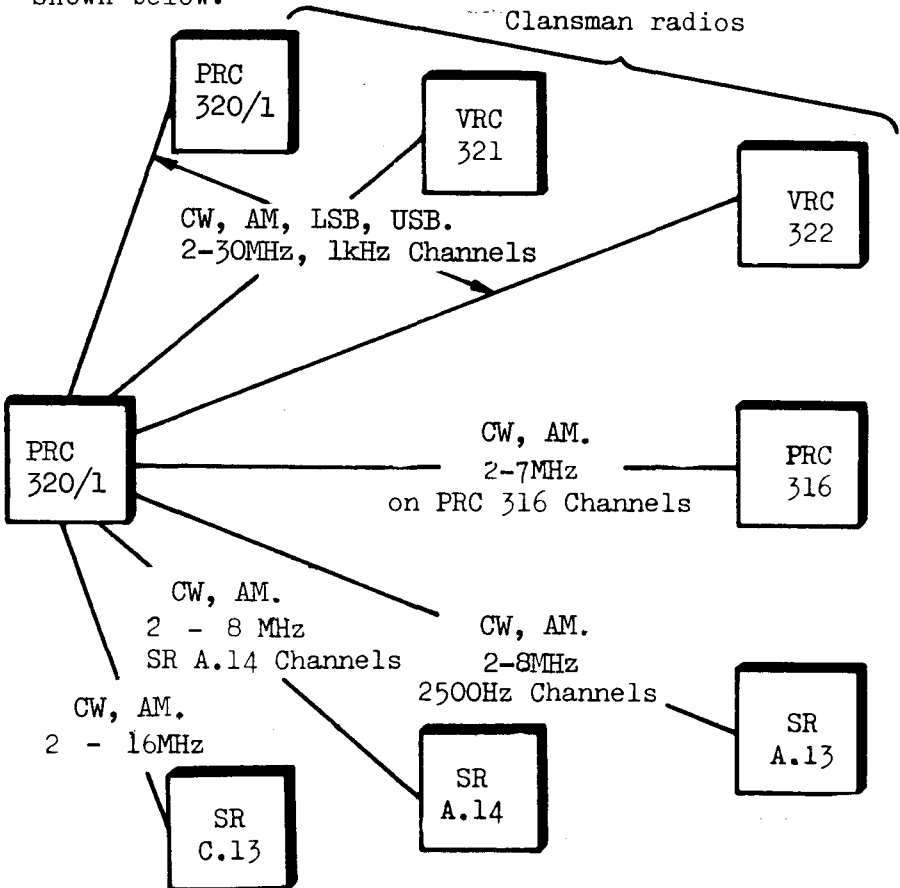


Fig.19 Working to other Radios

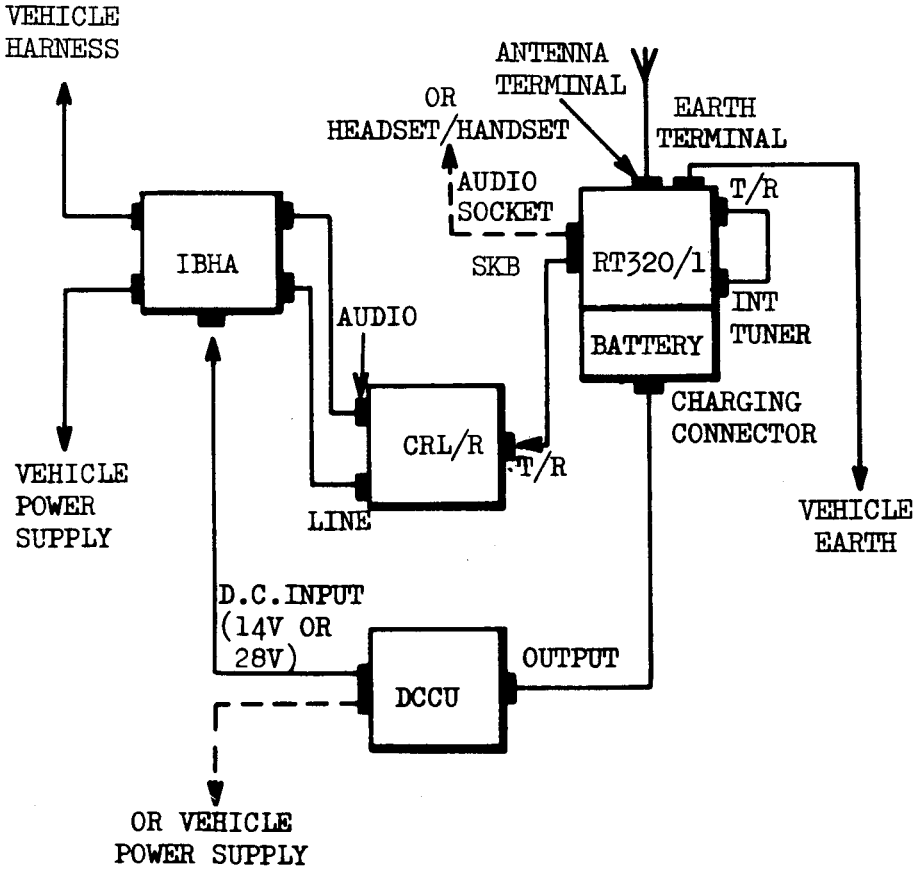


Fig.20 Vehicle Harness Interface

## USE OF RADIO IN A VEHICLE

## INTRODUCTION

3.1 When used in a vehicle, the RT320/1 is secured by its carrier to a bench or wall-mounted rack and connected via its antenna terminal to the vehicle whip antenna. The equipment can be connected directly to a headset, handset or morse key, as in the manpack role, or into the vehicle harness via a control, radio set, local/remote (CRL/R) and interconnecting box, harness adaptor (IBHA), as shown in block diagram form in Fig.20. If a loudspeaker output is required, the PV2324 amplifier-loudspeaker can be connected to one of the RT320/1 audio sockets. The battery is normally float-charged by either a 14V or 28V input d.c. charging unit (DCCU), depending on the vehicle electrical supply. Under no circumstances is the RT320/1 to be powered directly by the vehicle electrical supply as damage could result from so doing.

## INSTALLATION

3.2 Fitting PV1316 vehicle whip antenna (Fig.21). Proceed as follows:-

3.2.1 Determine the required location of the antenna, which must be sited clear of all obstructions to prevent a short-circuit to the vehicle frame, and in the selected position cut a hole of approximately 25mm diameter to accommodate the seal on the antenna feeder.

3.2.2 Pass through the hole the free end of the antenna feeder and the cord attached to the seal, and bolt the sprung base to the vehicle over the centre of the hole.

3.2.3 Pull the seal into the hole by means of the cord, ensuring that the hole is now watertight, and connect the antenna feeder to the RT320/1 antenna terminal.

3.2.4 Screw together the whip antenna sections (three for a 3m antenna or four for a 4m antenna), slacken the wing nut on the antenna base adaptor, insert the antenna into the adaptor, set the antenna to a vertical position and tighten the wing nut.

3.3 Fitting RT320/1 (Fig.22). Proceed as follows:-

3.3.1 Using the holes appropriate to the mounting position, bolt the vehicle rack in such a position that the RT320/1 antenna terminal is as close as possible to the antenna.

3.3.2 Fit the carrier, complete with RT320/1 and battery, on the vehicle rack mounting blocks and tighten the associated clamps. (It is not necessary to remove the webbing straps from the carrier in order to install the equipment).

## OPERATION

3.4 Connect the RT320/1 as required (as in Chapter 2 or in Fig.20 of this Chapter) and tune and operate the equipment as described in Chapter 2.

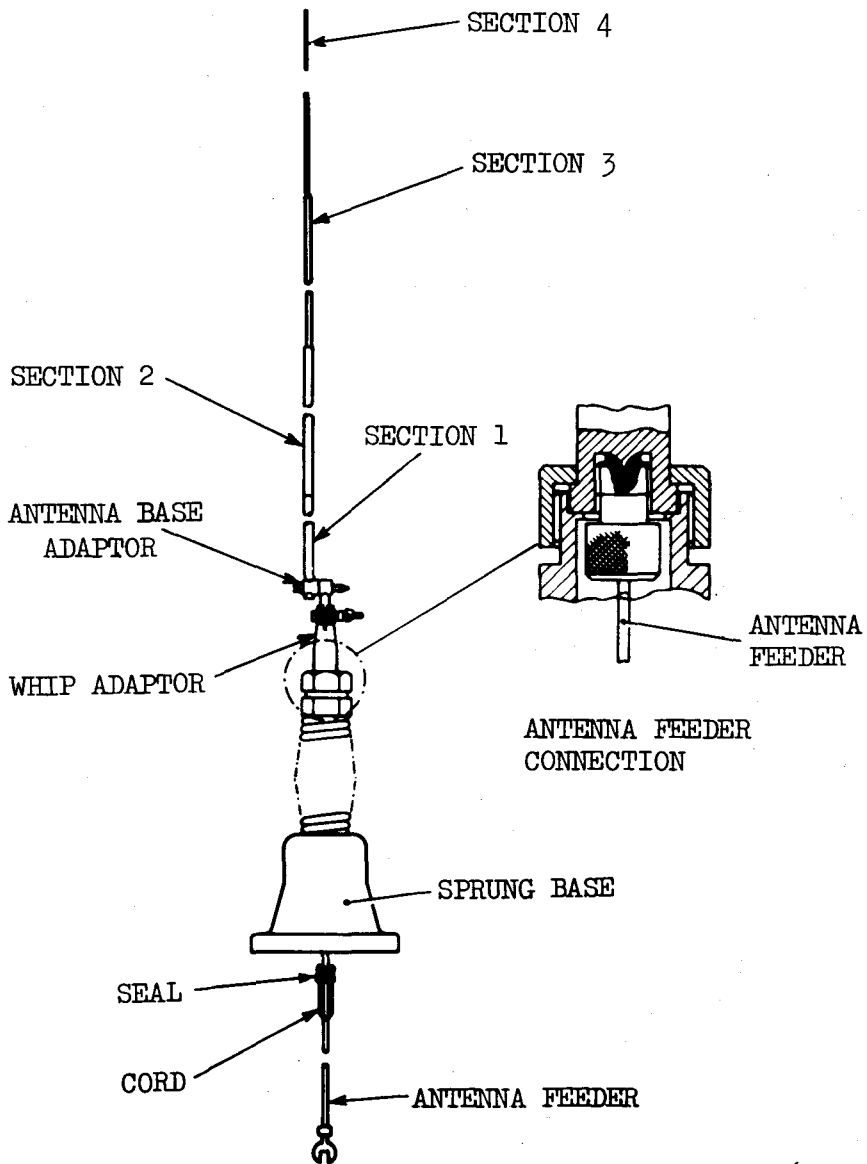
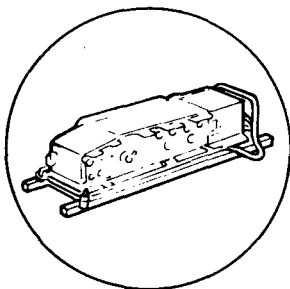
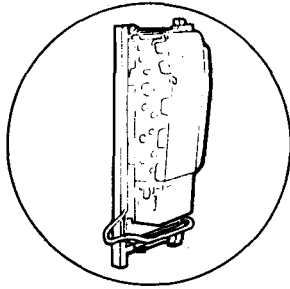


Fig.21 PV1316 Vehicle Whip Antenna



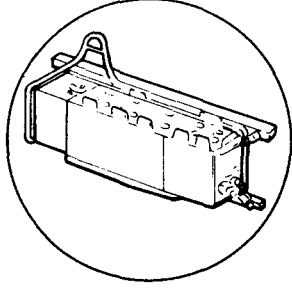
BENCH MOUNTING  
USE HOLES

(A)



VERTICAL MOUNTING  
(CONTROLS AT SIDE)  
USE HOLES

(B)



HORIZONTAL  
MOUNTING  
(CONTROLS  
UPPERMOST)  
USE HOLES

(C)

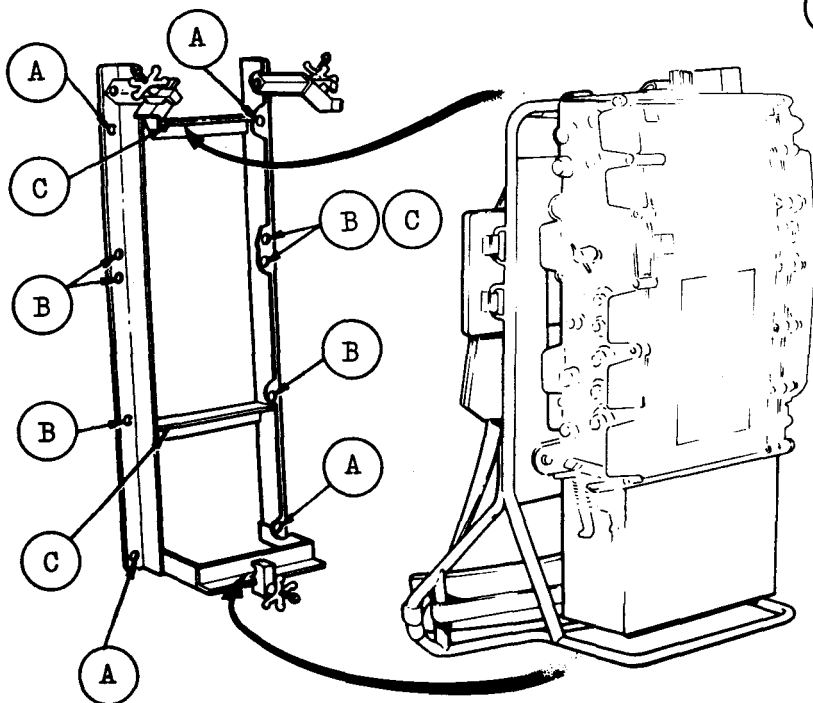


Fig.22 Installation in a Vehicle



PREVENTIVE MAINTENANCE

GENERAL

4.1 To obtain maximum performance from the equipment it must be ensured that it is kept in good condition by regular maintenance. This is normally the responsibility of the operator, NOT of the workshop or repair staff, and is as described below.

4.2 The RT320/1 is a fully sealed radio and must NOT be opened by the operator under any circumstances.

MAINTENANCE INSTRUCTIONS

4.3 The following maintenance tasks should be carried out by the operator at specified times or as required:-

4.3.1 Keep the equipment clean and dry. Remove any dust or dirt from the connectors, control knobs and terminals. If the equipment has been subjected to immersion, remove loose water from all connectors. Dry the headset or handset by shaking. Remove water from inside the morse key by shaking and from the contacts by blowing through the hole below the knob.

4.3.2 Check switches and controls to ensure that they are functioning correctly and are securely mounted on the case.

4.3.3 Inspect the case for damage and corrosion.

4.3.4 Check that battery connections are clean and undamaged.

4.3.5 Check the battery fixing clamps and latches for security. Report any weak or broken springs.

4.3.6 Check the security of the RT320/1 on its carrier.

4.3.7 Examine cable assemblies for frayed ends or damaged insulation. Pay particular attention to coaxial connectors used on antenna feeders.

4.3.8 Check that wire antenna connections are clean and in good condition. If an antenna wire breaks, strip back the insulation on each side of the break and, as a temporary measure, tie the bared ends together. If the ferrule breaks off from the end of an antenna wire, strip back the insulation and, again as a temporary measure, connect the bared end to the appropriate terminal on the RT320/1.

4.3.9 Carry out the functional tests described in Chapter 5.

CORRECTIVE MAINTENANCE AND FUNCTIONAL CHECKS

GENERAL

5.1 The procedures outlined in this chapter are to be followed when checking the RT320/1 and its ancillary equipment. These checks are to be carried out as part of the preventive maintenance given in Chapter Four or in the event of equipment failure. They are designed to enable an operator to prove quickly that the equipment is functioning correctly or to localise the fault if it is not. The following points are to be observed at all times:-

5.1.1 The operator is not to open sealed equipment under any circumstances.

5.1.2 The equipment is not normally to be removed from its parent installation in order to perform maintenance.

5.1.3 The user is only to take remedial action where this is stated to be specifically within his capability.

5.1.4 The user is not to make adjustments or replace items unless he can make a confirmatory test.

FUNCTIONAL CHECKS

5.2 When carrying out the functional checks following, it is to be ensured that the equipment has been correctly set up and is being operated in accordance with the operating information given in Chapter Two (page 20).

## BATTERY CHECK

5.3 Check the charge state of the battery as follows:-

5.3.1 Set the transmitter power switch to BATT CHK and the mode selector switch to the CW position.

5.3.2 Depress the pressel or the morse key and check that the meter needle registers on or above the second mark on the scale (the first mark is zero). Release the pressel. If the needle was below the second mark, replace the battery.

5.3.3 Tune the antenna as described in Chapter Two (Page 20) and recheck the battery as described above.

## FREQUENCY CHECK

5.4 The operator can check the frequency accuracy of the RT320/1 by comparing its frequency with that of either a laboratory frequency standard or a standard frequency broadcast. The check procedure is as follows:-

5.4.1 Set the mode selector switch to the CW position. Set the frequency of the RT320/1 to that of the check station, ensuring that the latter is transmitting CW only so that a pure tone is heard in the headset. (Any other mode of transmission from the check station might

cause a warbling tone that could be mistaken for frequency instability in the RT320/1.

5.4.2 Set the mode selector switch to FREQ CHK and listen to the two tones now present, adjusting the GAIN control as necessary.

a. If the tones fluctuate slowly, the RT320/1 frequency accuracy is satisfactory, the rate of fluctuation indicating the amount by which the frequency is off tune. If speech is badly distorted at the higher frequencies in the LSB or USB modes, the equipment should be sent to workshops for recalibration as soon as possible.

b. If a rapid warble is heard, the frequency is well off tune and the equipment should be sent to workshops for recalibration. Even with the frequency well off tune, in an emergency it might be possible to communicate with another PRC320/1 in the AM or CW modes.

#### OPERATING MODE CHECKS

5.5 Check the PRC320/1 for correct operation in each position of the mode selector switch as described below. When checking reception in each mode, another PRC320/1 can be used as a transmission source by transmitting (on the same frequency as the equipment being checked) speech in the voice modes and keyed CW in the CW mode. The check procedure is as follows:-

5.5.1 AM reception. Set the mode selector switch to AM and the GAIN control as required.

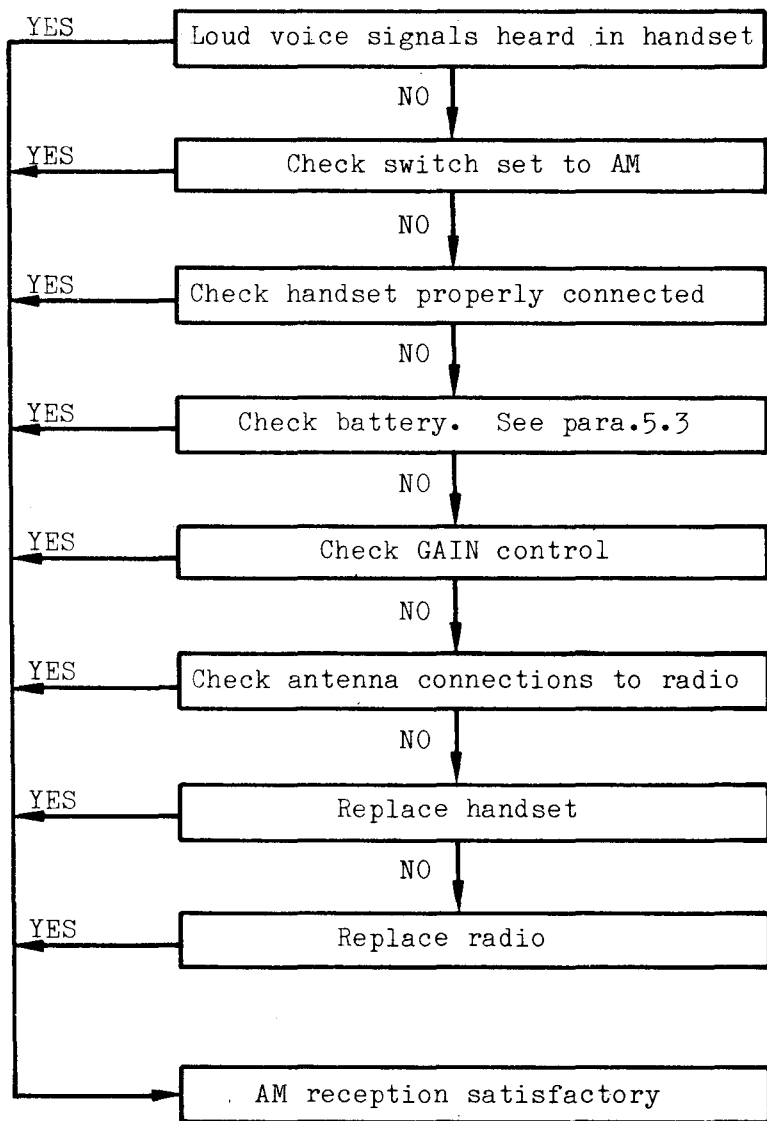


Fig.23 AM Reception Check

5.5.2 AM Transmission. Set the mode selector switch to AM, the GAIN control as required, depress the pressel and speak into the microphone.

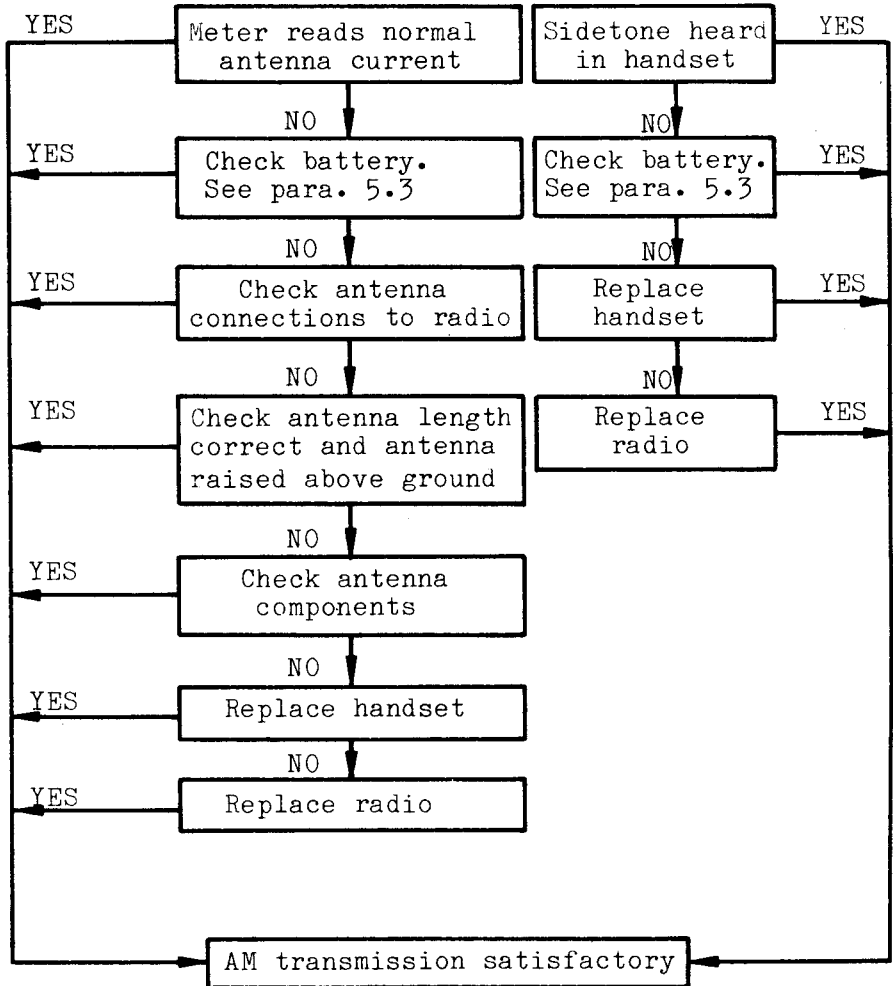


Fig.24 AM Transmission Check

5.5.3 SSB reception. Set the mode selector switch to LSB and the GAIN control as required.

On completion of the check below, repeat it with the mode selector switch set to USB.

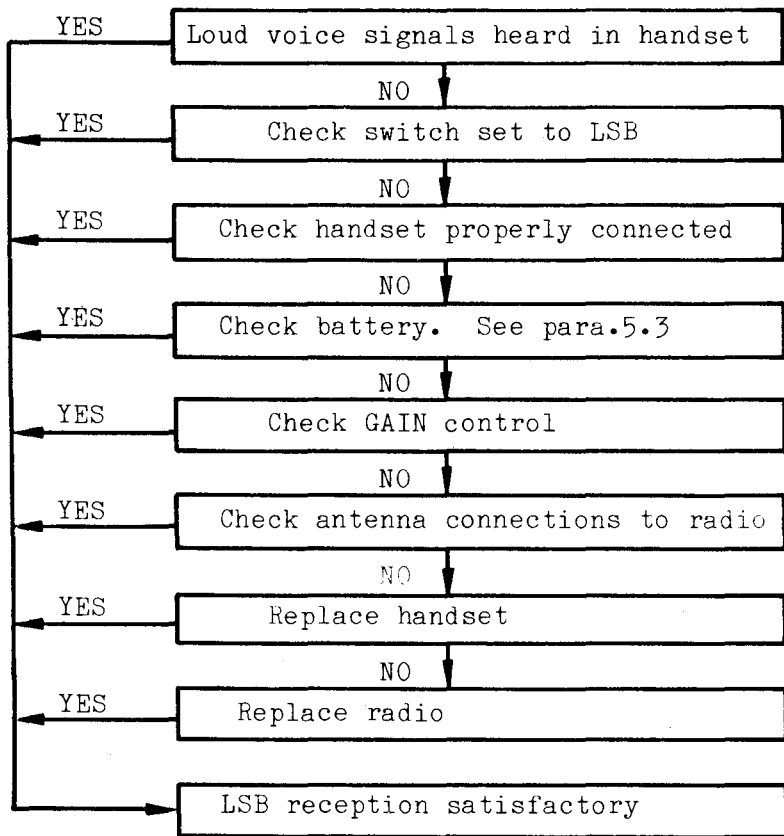


Fig.25 SSB Reception Check



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

On completion of the check below, repeat it with the mode selector switch set to USB.

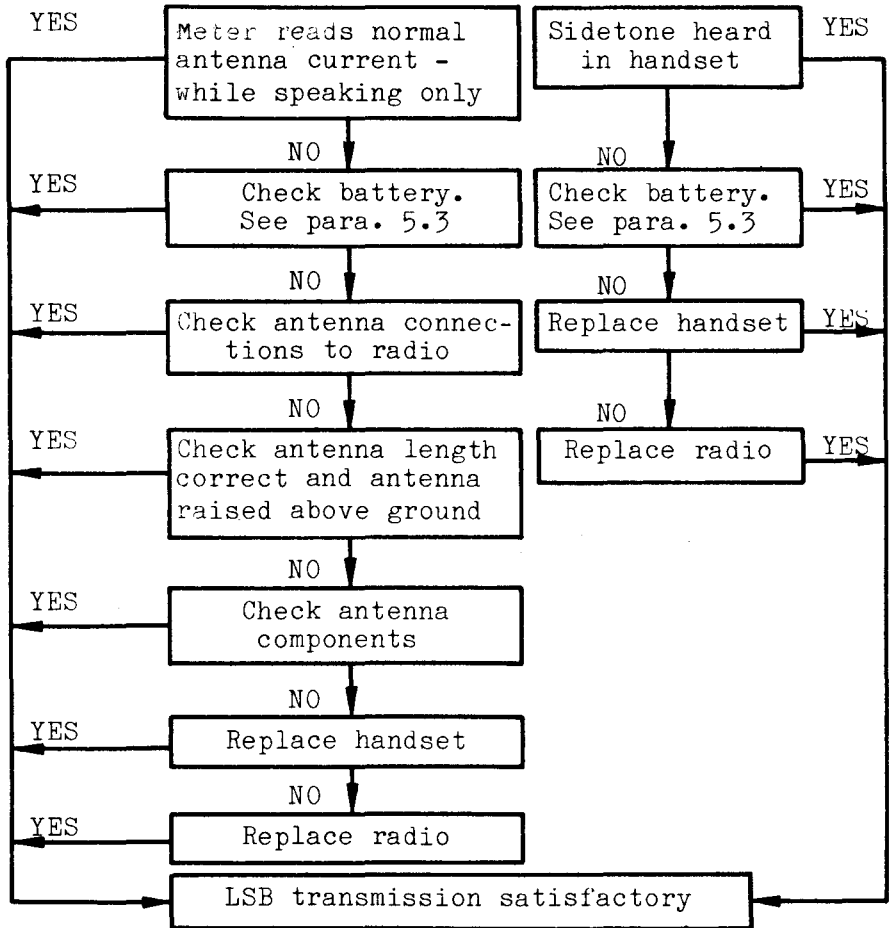


Fig.26 SSB Transmission Check

5.5.5 CW reception. Set the mode selector switch to CW and the GAIN control as required.

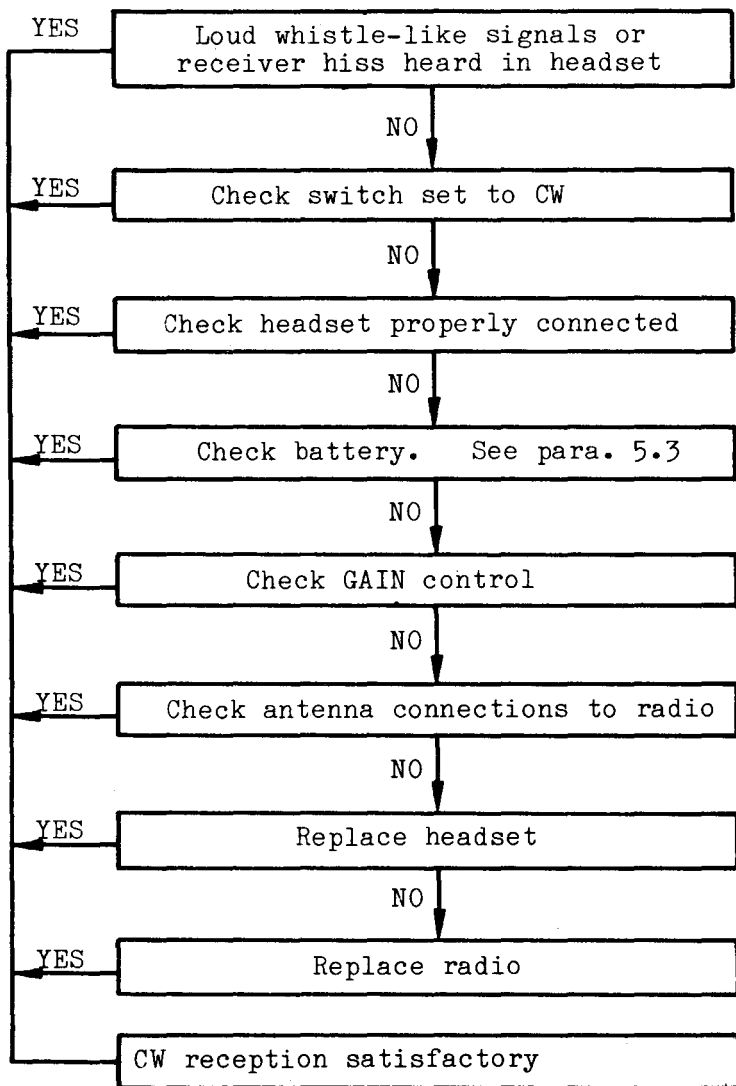


Fig.27 CW Reception Check

5.5.6 CW transmission. Set the mode selector switch to CW, the GAIN control as required and depress the morse key.

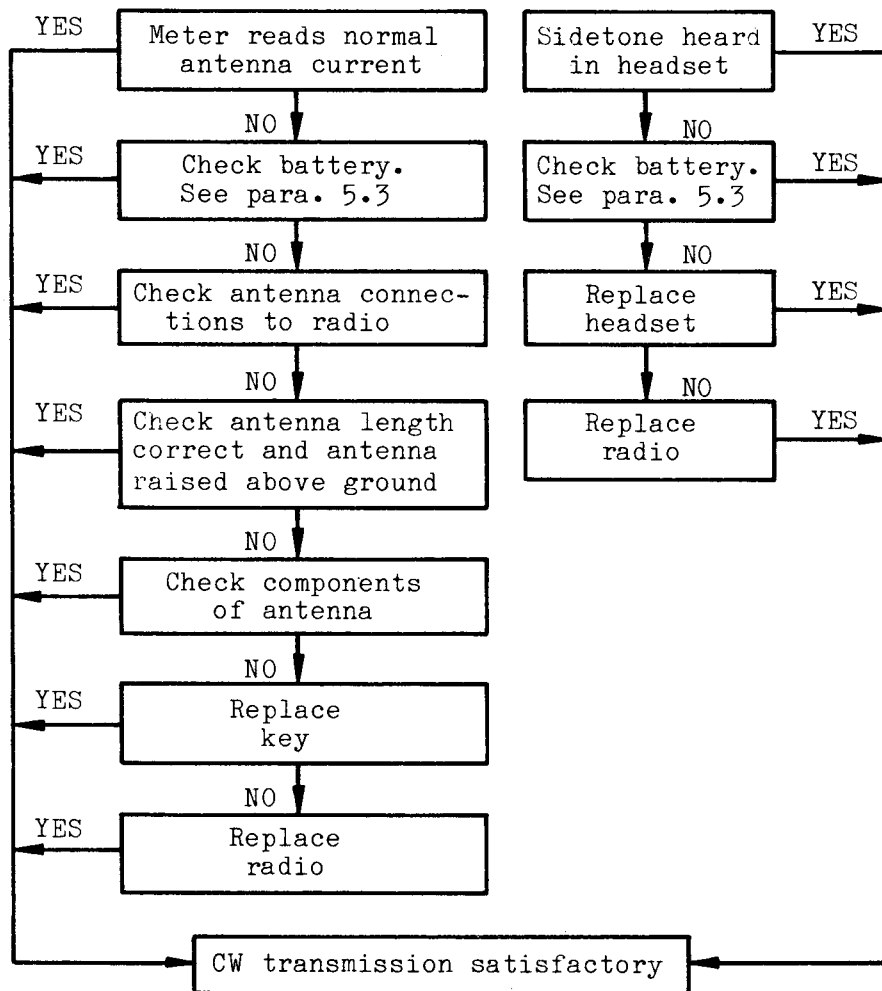


Fig.28 CW Transmission Check

## **PART 2**

PART 2

PRC320/1-100W H.F. SSB 100W RADIO STATIONS

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## PURPOSE AND PLANNING INFORMATION

## INTRODUCTION

1.1 The Radio Station PRC320/1-100W is a 100W derivative of the 30W PRC320/1 station described in Part 1 of this Handbook and can be used as either a vehicle radio or a ground station. It comprises the basic RT320/1 transmitter/receiver, together with a PV1311 100W amplifier, PV1313 automatic antenna tuning unit and its associated control/mounting tray PV1318, and for vehicular use, a PV1317 mounting tray and the RT320/1 vehicle rack described in Part 1. Interconnections between the units are provided by cable assemblies, which can be supplied in lengths suitable for any installation. This part of the Handbook contains information only on the 100W station equipment which is additional to that used in the 30W station. Thus reference should be made to Part 1 for details of the RT320/1 and the common ancillary equipment.

## PURPOSE

1.2 Although it can be used as a ground station, the PRC320/1-100W is primarily a vehicle radio operating in the SSB mode over the frequency range 2 to 30 MHz.

## DESCRIPTION

1.3 In the 100W role the RT320/1 operates as a driver for the 100W amplifier, the output of which feeds the antenna via the automatic antenna tuning unit (ATU). This takes the place of the RT320/1 integral antenna tuning unit, which in this application is not used. The PV1318 operates as a control unit and mounting tray for the ATU and also accepts the 100W amplifier or the RT320/1. In vehicle installations the ATU is normally stacked on top of the 100W amplifier and together mounted on the PV1318, which in turn is mounted on the shock absorbing mounting tray PV1317. The RT320/1, complete with manpack carrier, is mounted on the vehicle rack, which enables the RT320/1 to be quickly removed for reversion to the 30W manpack role.

1.4 Operating into the vehicle whip antenna (see Part 1, Chapter Three) the equipment provides reliable ground wave SSB communication at distances of up to 100km over average rolling terrain. Using sky wave antennas in ground station applications, as described in Part 1, the range is several thousand kilometres. As in the 30W station, matching of resonant dipole configurations is provided solely by the lengths of the dipole elements. The antenna may then be connected directly to the output of the 100W amplifier and the ATU is not necessary.

1.5 The PRC320/1-100W requires a nominal 28V d.c. supply and operates satisfactorily from a supply in the range 20V to 32V. The RT320/1 itself can be



powered from the PV1311 or by its own battery float-charged by a d.c. charging unit. When used in a vehicle with a nominal 12V d.c. supply, a separate converter is required.

#### TECHNICAL DATA

1.6 Transmitter Power output	3W, 30W or 100W p.e.p.
Typical Range (Ground Wave)	Up to 100km
(Sky Wave)	600km plus
Antenna Tuning Time	10s maximum 4s average
Temperature Range	-37°C to +52°C (operational) -40°C to +75°C (storage)
Maximum Altitude	2,400m (operational) 7,600m (transport)
Environmental Protection	Fully sealed (withstands immersion to a depth of 1m for 2 hours)
Power Supply	20V to 32V d.c. (reverse polarity and over-voltage protected)
Current Consumption (Average)	Receive: 150mA Transmit: SSB Speech 6A CW 12A

## CONSTRUCTION

1.7 The ATU is contained in a sealed, cast case, which is finned to provide efficient convection cooling. Connectors for the r.f. input from the 100W amplifier and signals from the PV1318 control unit are mounted on the front panel, and antenna and earth terminals are mounted on the rear panel.

1.8 The 100W amplifier is of similar appearance and construction, with one audio and one supply connector on the rear panel, and all controls, indicators and remaining connectors on the front panel. Lugs on the bottom and threaded bosses on the top of both this unit and the ATU provide for mounting one on top of the other and for securing to the PV1317 or PV1318 mounting trays by means of M5 screws.

1.9 The PV1317 provides a shock absorbing mounting for the PV1318, the 100W amplifier or the ATU, or a stacked combination of them. It comprises a flanged tray of aluminium alloy supported on four resilient mounts. A second tray, similar to that of the PV1318 (para.1.10), may also provide a mounting for the RT320/1. Fixing for the PV1318 or second tray is provided by two dowels on the rear flange, which engage with corresponding holes at the rear of the PV1318 (or second tray), and two clinch nuts on the front flange, which accept corresponding screws in the front of the PV1318 (or second tray). Fixing for the 100W amplifier or the ATU is provided by four clinch nuts on the base of the tray, which accept the M5 screws by which these two units are secured. Earth connections are made by two captive screws on the front flange.

1.10 The PV1318 provides a mounting for the 100W amplifier and the ATU and it also incorporates the

control unit for the latter, The PV1318 tray and PV1317 second tray each comprise a flanged tray of aluminium alloy with holes in the front and rear flanges to provide fixings for the PV1317, as already described. Threaded holes in the tray accept the 100W amplifier or ATU securing screws, and plain holes accommodate the RT320/1 securing screws. Mounted on the front of the PV1318 tray is a sealed, cast case containing the ATU control unit, the front panel of which carries three indicator lamps, a reset switch and three connectors.

TABLE 1

## RADIO STATION PRC320/1-100W EQUIPMENT

ITEM NAME (COMMON NAME)	REF.NO.	NOMINAL DIMENSIONS	NOMINAL WEIGHT	FIG. No.
Transmitter receiver, radio RT320/1 (RT320/1)	630/1/37530	390 x 250 x 120mm	5.0kg	2
PV1311 amplifier r.f. (PV1311)	640/1/01285	275 x 250 x 140mm	4.5kg	1
PV1313 h.f. antenna tuning unit (PV1313)	686/1/01176	275 x 250 x 140mm	6kg	1
PV1318 control, electrical/electronic (PV1318)	700/1/17530	315 x 291 x 68mm	1.3kg	1
PV1317 tray, mounting, electronic equipment (PV1317)	675/1/27796	306 x 264 x 58mm	1.3kg	1

ITEM NAME (COMMON NAME)	REF. NO.	NOMINAL DIMENSIONS	NOMINAL WEIGHT	FIG. No.
Cable assembly, r.f. (RT320/1-PV1311 r.f. cable)	705/1/12163 etc.	125 to 2000mm	-	3
Cable assembly, power, electrical (PV1318-RT320/1 d.c. supply cable)	705/1/12174/etc.	125 to 2000mm	-	3
Cable assembly, special purpose (RT320/1-PV1311 audio cable)	705/1/12162/etc.	125 to 2000mm	-	3
Cable assembly, r.f. (PV1311-PV1313 r.f. cable)	705/1/12166/etc.	125 to 2000mm	-	3
Cable assembly, special purpose (28V-PV1311 supply cable)	705/1/12157/etc.	125 to 2000mm	-	3

ITEM NAME (COMMON NAME)	REF. NO.	NOMINAL DIMENSIONS	NOMINAL WEIGHT	FIG. No.
Cable assembly, special purpose (PV1311-PV1318 supply cable)	705/1/12161/etc.	125 to 2000mm	-	3
Cable assembly, special purpose (PV1318-PV1313 control cable)	705/1/12368/etc.	125 to 2000mm	-	3
Lead, electrical, earth (Earthing braid)	705/1/12171/etc.	125 to 2000mm	-	3

OPERATING INFORMATION

100W EQUIPMENT

2.1 The main items additional to the basic PRC320/1 30W station which are required to make up the 100W PRC320/1-100W station are illustrated in Fig.1.

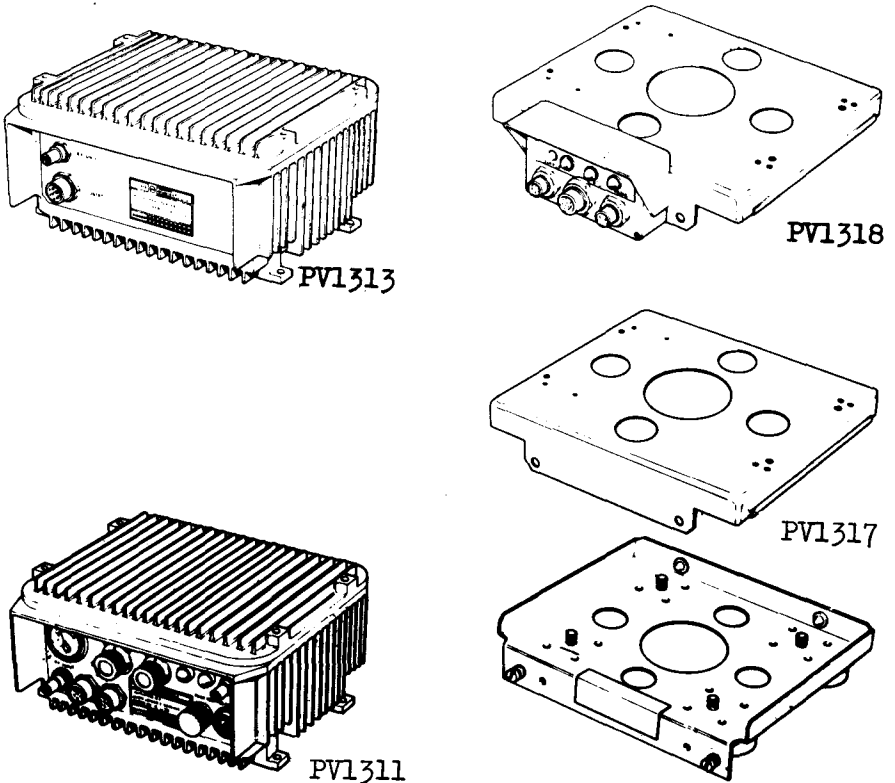


Fig.1 100W Equipment

## INSTALLATION

2.2 The PRC320/1-100W is designed for a wide variety of installations, but whatever arrangement of the equipments is adopted, they must be sited for ease of access by the operator and, in a vehicle installation, the PV1313 antenna tuning unit must be located as close as possible to the vehicle whip antenna base. (The length of the PV1316 vehicle whip antenna feeder cable is 1m and this length should not be exceeded if other types of vehicle whip antenna are used).

2.3 The normal disposition of the equipments in a vehicle installation is illustrated in Fig.2, which shown the PV1313 and PV1311 stacked on the PV1318 and together mounted on the PV1317. The RT320/1, complete with carrier and webbing, is mounted alongside on the vehicle rack which, if required, allows for instant removal of the RT320/1 and its redeployment as a manpack.

2.4 The installation procedure for the arrangement shown in Fig.2 is as follows:-

2.4.1 Secure the PV1317 to the vehicle framework (or radio mounting table, if fitted) by means of the resilient mounts.

2.4.2 Locate the dowels on the rear flange of the PV1317 in the holes in the rear flange of the PV1318 and lock the two front panels together by means of M8 screws.

2.4.3 Using M5 screws, secure the PV1311 to the PV1318 and the PV1313 to the PV1311 by means of the lugs on the underside of the two latter equipments.



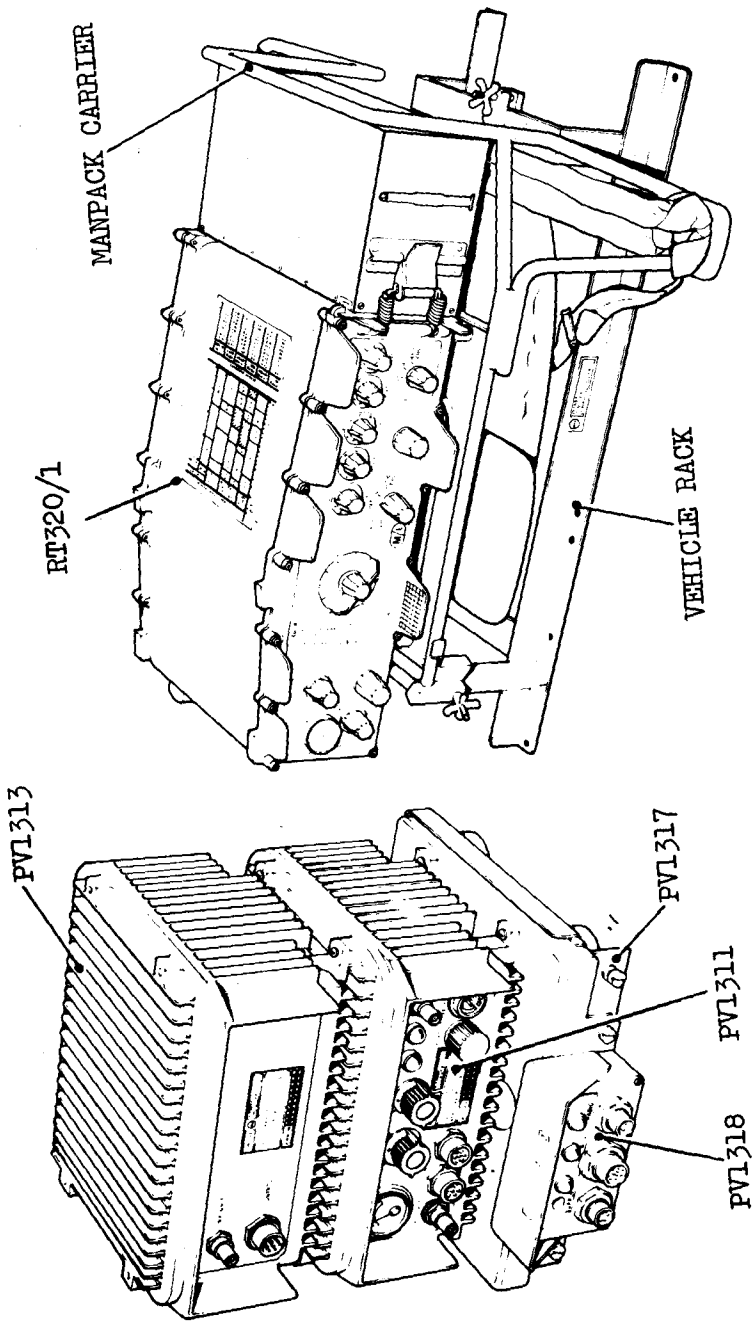


Fig.2 Typical Vehicle Installation

2.4.4 Secure the vehicle rack, as described in Part 1, Chapter Three, and fit the RT320/1 and its carrier.

2.4.5 Remove the coaxial link from the rear of the RT320/1 and interconnect the equipments as shown in Fig.3, using the RT320/1 coaxial socket labelled T/R and the audio socket labelled SKA for connection to the PV1311 R.F. INPUT and rear panel AUDIO connectors respectively. The interconnecting cables can be supplied in lengths to suit any installation and those with a minimum surplus length should be used. Note that there are very high r.f. voltages present at the antenna base and that if an antenna other than the PV1316 is used, a well-insulated heavy duty cable must be used to connect the PV1313 antenna terminal to the antenna. The RT320/1 can be powered by its own battery, as shown in Fig.2, or by the regulated power supply from the PV1318, as shown in Fig.3. In the former case the battery should be float-charged by a 28V d.c. charging unit (DCCU) supplied from the vehicle 28V supply.

2.4.6 Complete the installation by using the earthing braid to connect the earth terminal on the rear of the PV1313 and one of the two earthing screws on the front of the PV1317 to the vehicle framework.

2.5 For installation other than that shown in Fig.2, the PV1311 and PV1313 can be mounted directly on the PV1317 and the RT320/1 can be mounted on a combination of the PV1317 and PV1318. In the latter case the M5 securing screws are inserted from the underside of the PV1318 to engage with the threaded bosses on the underside of the RT320/1 normally used for attachment to the manpack carrier.

#### OPERATING INFORMATION

2.6 Set up and tune the equipment as shown in Fig.4.

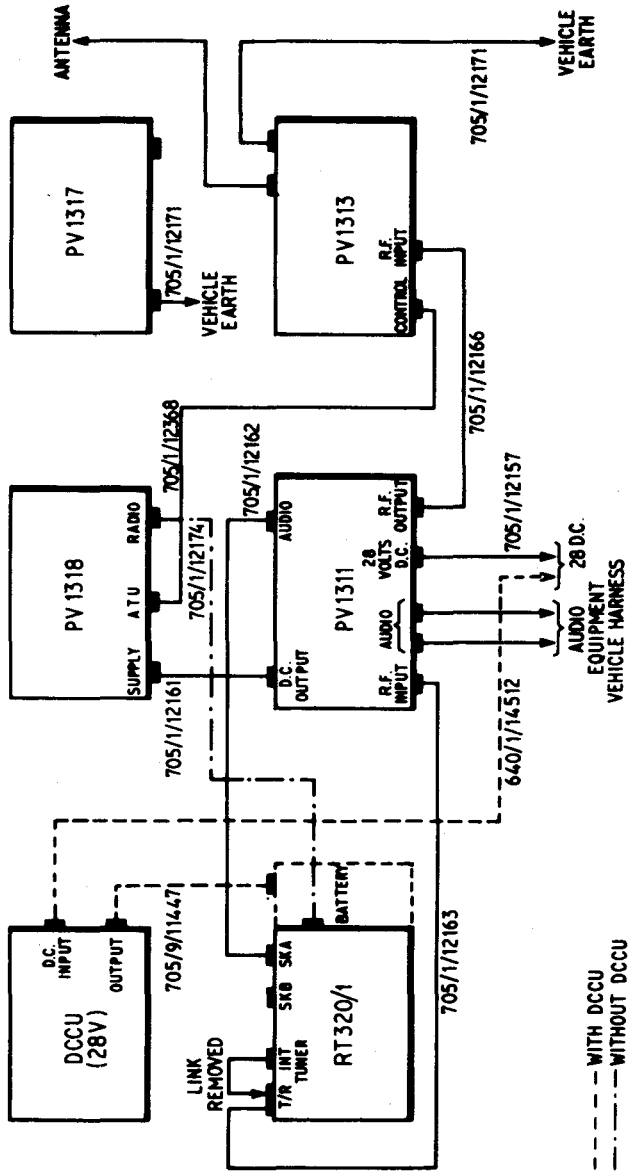


Fig. 3 Typical Interconnection Diagram



3. CHECK RT320/1 SUPPLY AND SELECT FREQUENCY

Carry out operations 1 and 2 in Fig.6 of Part 1, Chapter Two. If RT320/1 supplied from PV1318 and needle below second mark in operation 1, SUPPLY VOLTS too low.

4. TUNE ANTENNA TUNING UNIT (ATU)

Press and release. Depress and release pressel. Amber TUNING lamp lights. Extinguished when green READY lamp lights to indicate completion of tuning. Repeat tune sequence only when switching on, when different frequency selected or when antenna changed. If red fault lamp lights, fault in antenna system indicated. Refer to Chapter Three.

5. SELECT MODE AND ADJUST VOLUME

Set RT320/1 mode switch to LSB, USB or AM for speech and CW for morse. Adjust GAIN control for required volume of received signal.

6. OPERATE

To select transmit, depress pressel, when green ACTIVE LAMP will light. To receive, release pressel (ACTIVE lamp extinguished).

## ANTENNAS

2.7 The various types of antenna described in Part 1, Chapter Two, can equally be used with the PRC320/1-100W, substituting the PV1313 antenna and earth terminals for those of the RT320/1. Where a dipole wire antenna is used in conjunction with a dipole centre junction, antenna matching is provided solely by the lengths of the dipole elements, as specified on the case of the RT320/1. The PV1313 is then not used and the antenna feeder cable must be connected to the PV1311 R.F. OUTPUT coaxial socket direct.

## REMOTE OPERATION AND REBROADCASTING

2.8 The PRC320/1-100W can be operated remotely or used as a manual rebroadcast station, as described in Part 1, Chapter Two; substituting a PV1311 AUDIO socket for that of the RT320/1.

## CHAPTER THREE

### PREVENTIVE AND CORRECTIVE MAINTENANCE AND FUNCTIONAL CHECKS

#### GENERAL

3.1 The procedure given in Part 1, Chapters Four and Five are generally applicable to the PRC320/1-100W, with the exception that the RT320/1 antenna tuning unit is inoperative and thus its meter does not indicate antenna current. This function is performed by the PV1311 meter when the OUTPUT POWER switch is set to FWD. and the function switch to DRIVER. The RT320/1 is still operative when BATT CHK is selected, however, and can be used to check the RT320/1 supply voltage, regardless of whether this is derived from a battery or the PV1318.

#### FUNCTIONAL CHECK

3.2 Before checking the operation of the additional PRC320/1-100W equipment, carry out the procedures given in Part 1, Chapters Four and Five, to ensure satisfactory operation of the RT320/1. Monitoring of the 100W equipment performance is provided by the PV1311 meter and its associated OUTPUT POWER switch, the four positions of which provide meter indications as follows:-

3.2.1 R.F. INPUT - the drive level from the RT320/1, which should be approximately 30W peak.

3.2.2 FWD. - the forward output power into the antenna, which should be between 80W and 140W, depending on the supply voltage, when the antenna is accurately matched.

3.2.3 REF. - the reflected power in the antenna. For an acceptable matching accuracy the ratio of reflected to forward power should be better than 1:8. (A ratio of 1:2.5 or worse causes the PV1318 red FAULT lamp to light, indicating that the antenna system may have been damaged or its impedance altered by the proximity of conducting structures. The fault should be rectified and, if the antenna is fed via the ATU, the system should be re-tuned as shown in Fig.4).

3.2.4 SUPPLY VOLTS - the d.c. supply voltage to the equipment, which should be within the range 20V to 32V for satisfactory operation.

3.3 Set the PV1311 function switch to AMPLIFIER, depress the pressel switch and check the equipment as shown in Fig.5



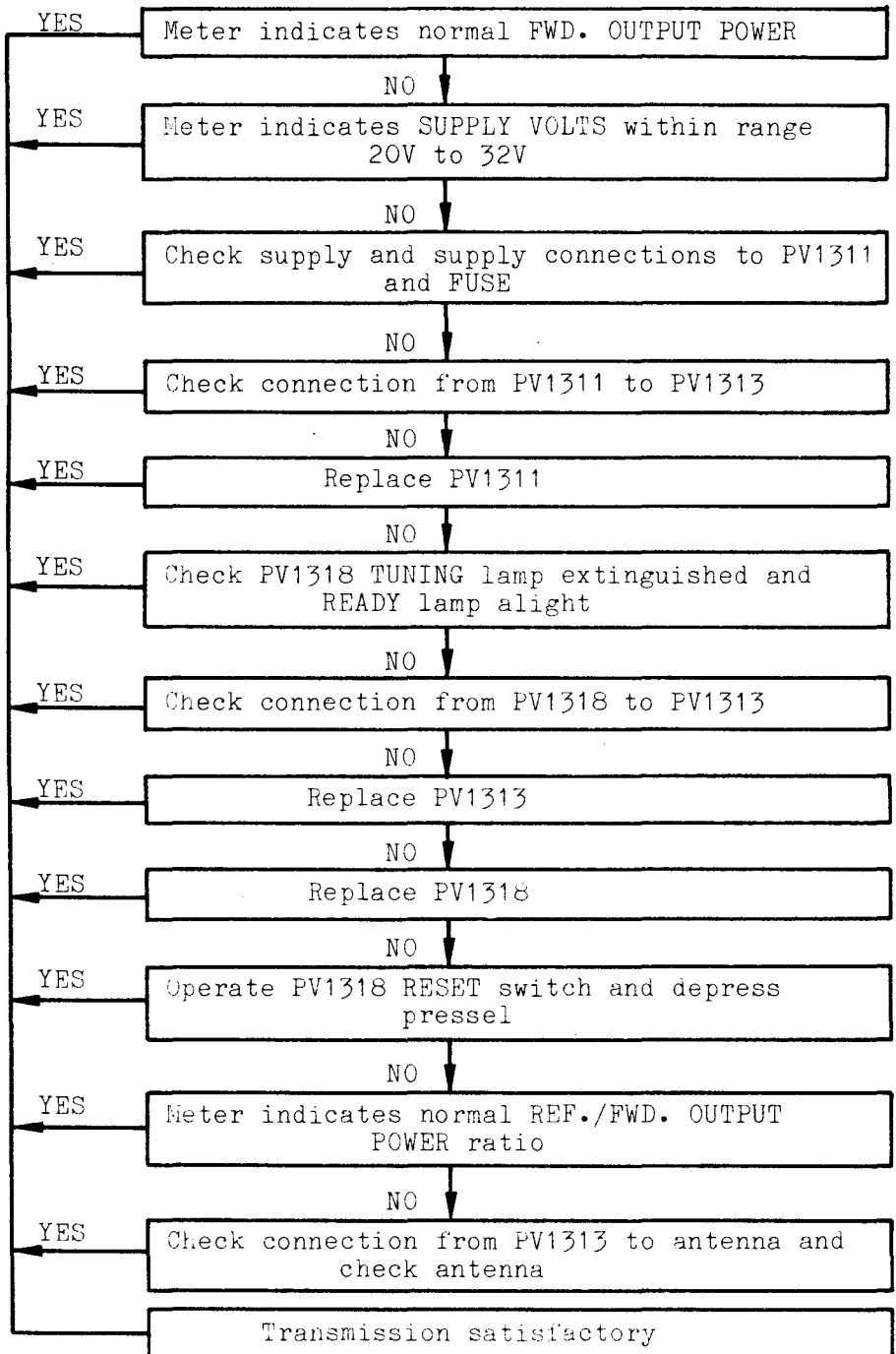
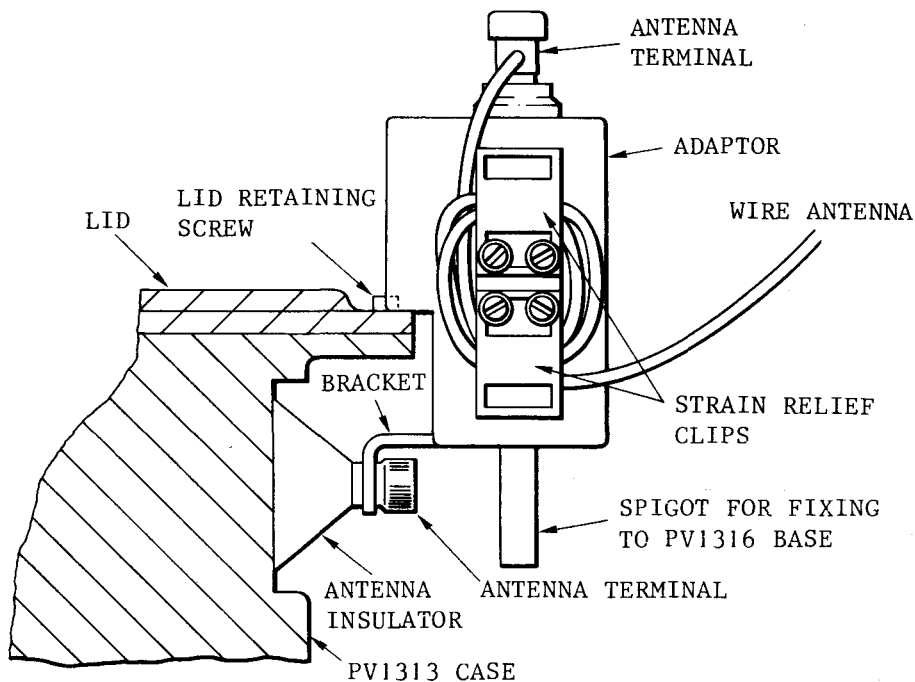


Fig.5 100W Transmission Check

SUPPLEMENT

LONG WIRE ANTENNA ADAPTOR



1. The long wire antenna adaptor facilitates secure connection of a long wire antenna to the PV1313 antenna terminal or to the PV1316 vehicle antenna base. It comprises an isolating capacitor, enclosed in a rigid box of low loss compound. A slotted bracket for connection to the PV1313 antenna terminal and a spigot for insertion into

the PV1316 base are connected to the lower end of the capacitor. A spring loaded antenna terminal is connected to the upper end. Two strain relief clips are mounted on one side.

2. To fit the adaptor to the PV1313, slacken the PV1313 antenna terminal and fit the adaptor as shown in the diagram with its shoulder in firm contact with the PV1313 and the recess in this shoulder clearing the lid securing screws. Tighten the antenna terminal. It is possible to fit the adaptor so that it covers the PV1313 earth terminal, but this should be avoided as connection is more difficult.

3. To fit the adaptor to the PV1316 base, slacken the PV1316 wing nut, insert the adaptor spigot fully into the base and tighten the wing nut.

4. To connect the wire antenna to the adaptor, depress the antenna terminal cap, feed the bared end of the antenna through the terminal hole and release the cap. Pass two or three turns of the wire antenna around the strain relief clips.

5. Recommended wire antenna lengths when using the PV1313 are:-

- 2 to 4MHz : 15 metres
- 4 to 8MHz : 25 metres
- 8 to 16MHz: 15 metres
- 16 to 30MHz: 10 metres

**WARNING: VERY HIGH R.F. VOLTAGES ARE PRESENT AT THE ANTENNA TERMINALS WHILST TRANSMITTING. SWITCH OFF THE EQUIPMENT BEFORE HANDLING AND AVOID CONTACT DURING OPERATION.**