

# The VMARS Archive

VMARS is a not-for-profit organisation specialising in all types of vintage communications electronics. We maintain an archive of documentation to help our members understand, research, repair and enjoy their vintage radio equipment. Access by non-members is extended as a gesture of goodwill, but not as a right.

Rare documents are frequently provided free of charge by VMARS members, and all scanning and document processing is carried out on a voluntary basis. Accordingly, we do not expect others to profit from the hard work of volunteers, who give their time freely without charge.

**This is a gentle reminder that the document attached to this notice is provided to you for your personal use only. This edition remains copyright of VMARS, and while you may sell or give your copy to someone else, this right does not extend to making further copies of this information, either to give or sell to others. This includes a prohibition on placing it on websites, or printing it for sale at rallies, boot fairs or similar public events. If our goodwill is abused, then withdrawal of public access to our archive will be the result.**

Please refer anyone else wanting a copy back to VMARS – either to our website at <http://www.vmars.org.uk/> or by email to the Archivist at [archivist@vmarsmanuals.co.uk](mailto:archivist@vmarsmanuals.co.uk). If you want to know more about our copyright, please see the FAQ below.

## FAQ on copyright of VMARS documents

- Q** How can you copyright a document that is already in the public domain?
- A.** *Plainly the original copyright of the content has expired, or we have obtained permission to copy them. What we copyright is our own edition of the document.*
- Q.** Surely your “own edition” is identical to the original document, so cannot be copyrighted?
- A.** *Our editions are **not** identical to the original document. You will find that full advantage has been taken of electronic publishing facilities, so pages are cleaned up where possible (rendering them better than originals in some cases!), and large diagrams are prepared for both on-screen viewing and for easy printing at A4 format.*
- Q.** Why do you not just give your manuals away, as so many do via the internet these days?
- A.** *We do make all our manuals available free of charge (in soft copy) to VMARS members. These members have already covered the costs of running the archive via their subscriptions. The only time members are charged for copies is when they request them on paper, in which case charges are restricted to the cost of paper, ink and postage.*

*The VMARS archive is not a “shoe-string” operation. Money is spent on computing facilities to make copies available, and on shipping original documents securely (usually costing several pounds per shipment) to carry out the scanning. As members have already contributed to these costs, it is only reasonable that non-members should do likewise – and thus a very moderate charge is levied for copies provided to non-members. With typical commercial photocopying charges starting at 5 pence per A4 side, it will be evident that paying 4 pence for our equivalent on paper is excellent value (amounts current at Spring 2004). We also think “you get what you pay for” – we invite you to make the comparison and draw your own conclusions!*

*Despite the above, we will be making copies of essential technical information (circuit diagram, parts list, layout) freely available to all via our website from late 2004 onwards. This will be done to try and encourage and enable the maintenance of our remaining stock of vintage electronic equipment.*

## ***Guidance on using this electronic document***

### **Acrobat Reader version**

You need to view this document with Acrobat Reader **version 5.0** or later. It is possible that the document might open with an earlier version of the Acrobat Reader (thus allowing you to get this far!), but is also likely that some pages will not be shown correctly. You can upgrade your Acrobat Reader by direct download from the internet at <http://www.adobe.com/products/acrobat/readermain.html> or going to <http://www.adobe.com/> and navigating from there.

### **Don't miss the index!**

This document has had “bookmarks” added – which provide you with an “on-screen index”. These allow you to quickly move to particular parts of the document, a numbered section or maybe the circuit diagrams for instance, merely by clicking on the page title. Click on the “Bookmarks” tab on the left hand side of the Acrobat Viewer window to access this feature – move the cursor over these titles and notice it change shape as you do so. Click on any of these titles to move to that page.

### **Large diagrams**

The large diagrams are given in two formats – in A4 size sheets to allow easy printing, and complete as originally published to allow easy on-screen viewing. These versions are in different sections of the document, which can be found within the bookmarks.

### **Printing the document on an A4 format printer**

The document has been optimised for printing on A4 size paper (this is the common size available in UK and Europe, which measures 29.7cm by 21.0cm). Please follow these steps (these are based on Acrobat Reader version 6.0 – other versions may differ in detail):

1. Work out the page numbers you want to print. If you want to print the whole document, then within “Bookmarks” (see above), first click on “**Front**”, and note the page number given at the bottom of the Acrobat window – this will give you the page number of the first page to be printed. Similarly click on “**End of A4 printable copy**”, to determine the last page to be printed.
2. Select “File – Print” or click on the printer icon. This will bring up the print dialog box.
3. Select the correct printer if necessary.
4. In the area marked “Print Range” click on the radio button marked “Pages from..”, then enter the first and last page numbers worked out in step 1 into the “from” and “to” boxes.
5. In the “Page Handling” area, next to “Page Scaling”, select “Fit to paper”. Then press “OK”

Note that the document is set up for double-sided printing – if you print it out single-sided then you will find a number of blank pages present, which may be removed and reused.

### **Printing the document on an US Letter format printer**

Since A4 and US Letter sizes are similar, it is expected that this document should print satisfactorily on the latter format paper. This has not been tested however, and is not guaranteed. Follow the steps as for A4 printing, and make doubly sure that “Fit to paper” is selected (step 5).

### **Any other problems?**

Please get in touch with me at [archivist@vmarsmanuals.co.uk](mailto:archivist@vmarsmanuals.co.uk).

Richard Hankins, VMARS Archivist, Summer 2004

Crown Copyright Reserved

Army Code No.

14961

26/Manuals/4336

**USER HANDBOOK  
FOR  
UK/PRC-316  
LIGHTWEIGHT HF RADIO A.16**

Published under the Authority of  
The Signal Officer-in-Chief (Army), Ministry of Defence, Whitehall, S.W.1.

**NOVEMBER 1968**



Crown Copyright Reserved

Army Code No.

14961

26/Manuals/4336

**USER HANDBOOK  
FOR  
UK/PRC-316  
LIGHTWEIGHT HF RADIO A.16**

Published under the Authority of  
The Signal Officer-in-Chief (Army), Ministry of Defence, Whitehall, S.W.1.

**NOVEMBER 1968**

ASSOCIATED PUBLICATIONS

User Handbook for Station Radio A13    Army Code No. 13120

User Handbook for Station Radio A14    Army Code No. 13119

## SYNOPSIS

The Lightweight HF Patrol Radio PRC-316 is a compact, simple-to-operate transmitter/receiver developed primarily for use at the halt. It provides 45 crystal-controlled communication channels in the band 2 - 7 MHz. The transmitter/receiver is sealed.

The radio is intended to operate at ranges up to about 800 km using CW. Voice can also be used but with less chance of success at these ranges. Voice is primarily provided for operation over a few kilometres, for instance to support aircraft.

A simple dipole antenna is provided; alternatively, items of the SR. A13 or SR. A14 antennas may be used.

Two types of headgear are supplied; a conventional headgear with twin receivers and a boom microphone, and a single unit receiver/microphone. A morse key is built into the radio.

The radio operates from a plug-in 12 volt primary battery, but alternative supplies may be used, including all those developed for SR. A13.

The basic station weighs under 4kg.

The equipment is not intended for use in very cold conditions, at temperatures lower than minus 10°C.

## C O N T E N T S

	<u>Page</u>
 <b>PART I. OPERATING INSTRUCTIONS FOR PATROL STATION</b>	
Lightweight HF Patrol Radio PRC-316 used as a Patrol Station	2-3
Setting up and Operating .....	4-5
Dipole Antenna .....	6-9
Battery and Replacement .....	10-11
Headgear .....	12
Throwing Weight and Cord .....	13
 <b>PART II. OPERATING INSTRUCTIONS FOR BASE STATION</b>	
Lightweight HF Patrol Radio PRC-316 used as a Base Station	16
Ancillary Items used at the Base Station .....	17
Base Station Batteries .....	18-19
Base Station Antenna .....	20
Alternative Antennas .....	21
The Morse Code .....	22
 <b>PART III. TECHNICAL DETAILS</b>	
General Description .....	24-25
Controls .....	26-29
Battery Life .....	30
Exposure to High Temperature and Sunlight .....	31
The Relationship of Basic Channel and Offset .....	32
Antenna Length .....	33
The Functional Test Lamp and its uses .....	34
Servicing .....	35
Functional Tests .....	36-40



PART I

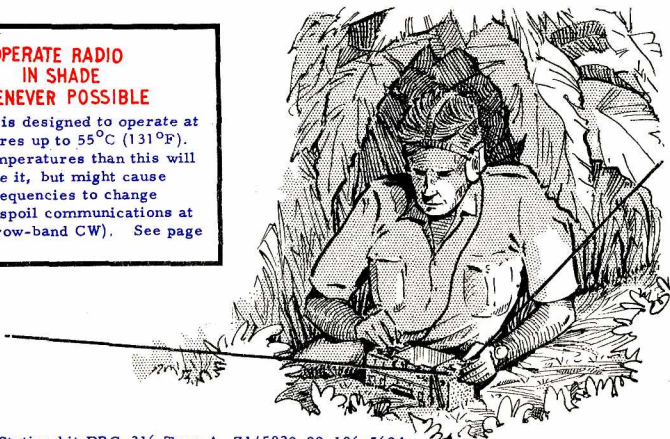
OPERATING INSTRUCTIONS

FOR

PATROL STATION

**OPERATE RADIO  
IN SHADE  
WHENEVER POSSIBLE**

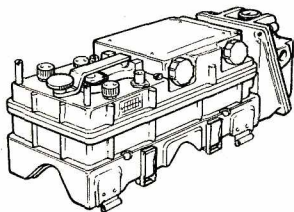
The radio is designed to operate at temperatures up to 55°C (131°F). Higher temperatures than this will not damage it, but might cause channel frequencies to change enough to spoil communications at KEY (narrow-band CW). See page 31.



Radio Station kit PRC-316 Type A Z1/5820-99-106-5694

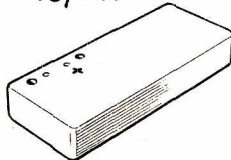
Radio Station kit PRC-316 Type B Z1/5820-99-106-5696

Battery Dry 12V 1.6A (Leclanché)  
Y3/6135-99-106-3304

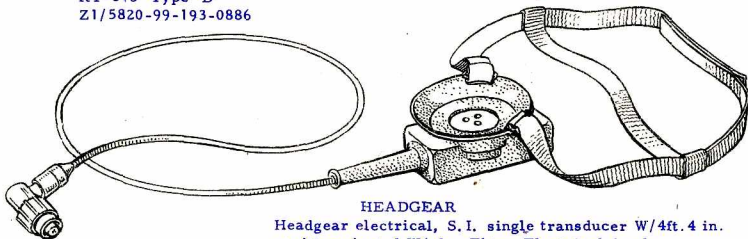


**RADIO**

RT-316 Type 'A'  
Z1/5820-99-106-2486  
RT-316 Type 'B'  
Z1/5820-99-193-0886



**BATTERY**, Battery, dry 12V, 1.6A,  
Y3/6135-99-106-1769

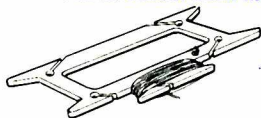


**HEADGEAR**

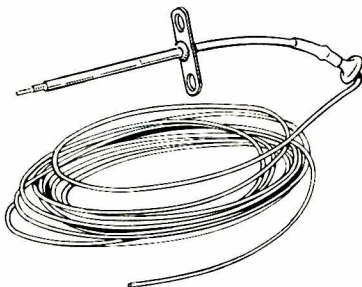
Headgear electrical, S.I. single transducer W/4ft. 4 in. cord terminated W/plug Thorn Electrical 4 pole.  
Y1/5965-99-106-1770

**LIGHTWEIGHT HF RADIO PRC-316.....**

THE DIPOLE ANTENNA COMPRISING:-



Reel and throwing cord assy.  
Z1/5820-99-193-032 - 2 off

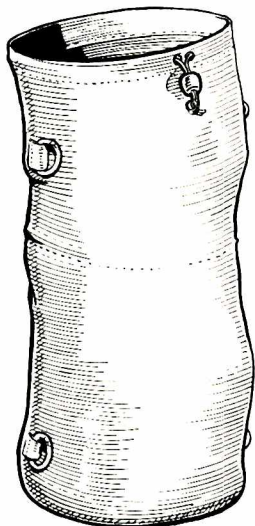


AND

Antenna single conductor type moveable 120 ft.  
Type 'A' Z1/5820-99-193-033 - 2 OFF

OR

Antenna single conductor type moveable 120 ft.  
Type 'B' Z1/5820-99-193-034 - 2 OFF



STORAGE BAG

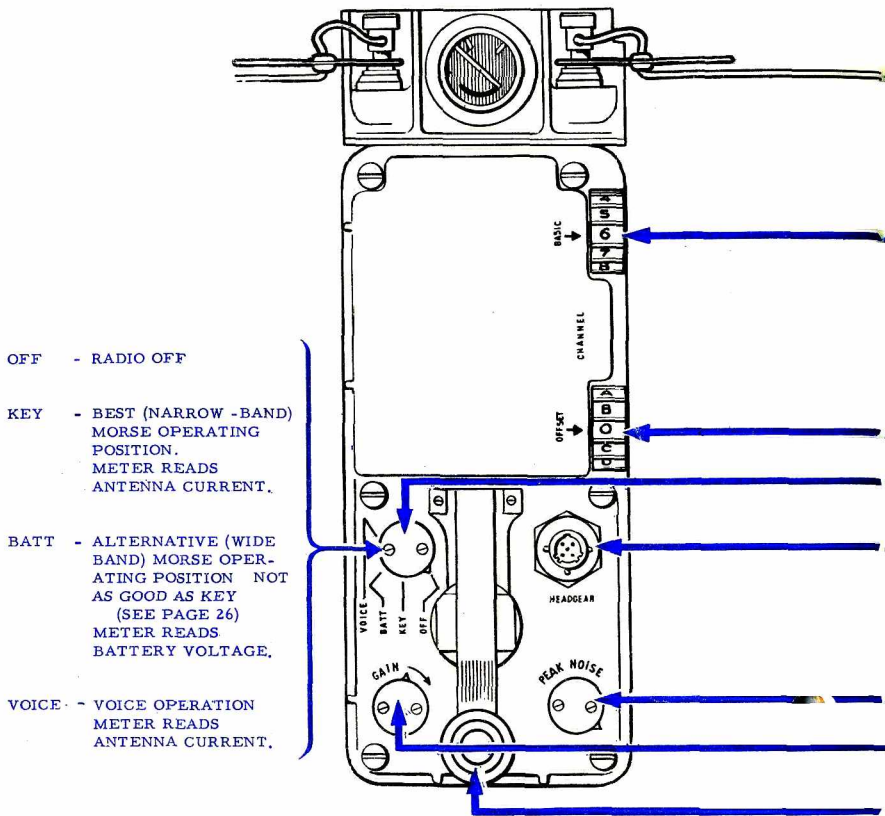
Bag transmitter/receiver radio  
Z1/5820-99-193-~~1054~~  
**3504**

When you have unpacked the items of the antenna, thread the end of the conductor without the ferrule, through the hole in the reel and knot it. Then wind the rest of the antenna on the reel.

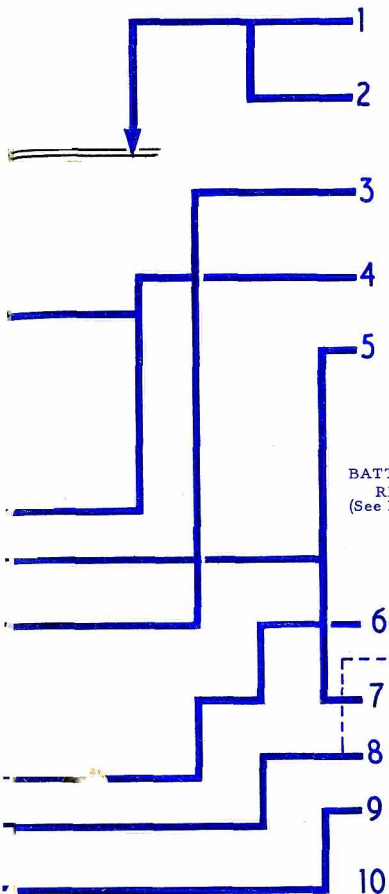
Spare throwing cord is available. Twine polyester ~~Z1/5820-99-193-1060~~

**H2/4020-99-193-1060**

.....USED AS A PATROL STATION



## SETTING UP AND OPERATING THE DRILL APPLIES TO PATROL & BASE STATIONS



1 UNWIND ANTENNA TO GIVEN CHANNEL  
(See Page 6)

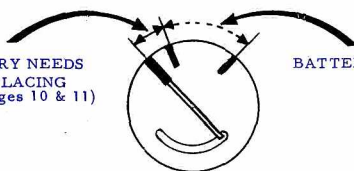
2 ERECT AND CONNECT ANTENNA  
(See Pages 7, 8 and 9 for Patrol Station  
and Pages 20 and 21 for Base Station)

3 PLUG IN HEADGEAR  
(See Page 12 for Patrol Station  
and pages 16 and 17 for Base Station)

4 SET CHANNEL TO GIVEN NUMBER AND  
LETTER

5 SET SWITCH TO 'BATT' - NOTE METER

BATTERY NEEDS  
REPLACING  
(See Pages 10 & 11)



BATTERY GOOD

6 ADJUST FOR MAXIMUM NOISE IN HEADGEAR  
AT RECEIVE (GAIN CONTROL SHOULD BE SET  
SO THAT NOISE IS JUST AUDIBLE). IF NO NOISE PEAK IS

OBTAINED, SWITCH OFF THEN ON AGAIN, RE-ADJUST.  
7 GET MODE SWITCH AS REQUIRED, DEPRESS WITH SW AT BATT.  
DEPRESS KEY, CHECK BATTERY ON TRANSMIT. REPLACE BATTERY  
IF NEC.

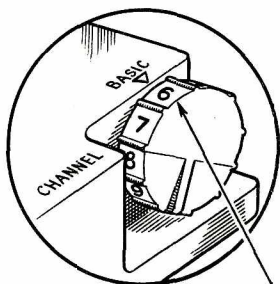
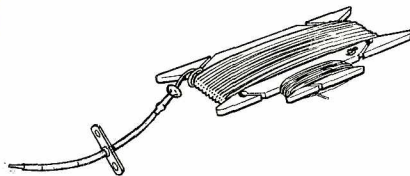
8 ADJUST FOR WANTED LOUDNESS AND  
CLARITY OF RECEIVED SIGNAL

SET SW TO 'KEY' OR  
'VOICE', KEY AND  
CHECK ANT  
CURRENT.

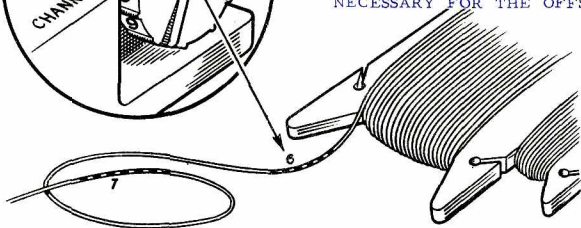
9 OPERATE KEY FOR CW TRANSMISSION.  
TO SPEAK, USE PRESSEL ON HEADGEAR (See  
Page 12) CHECK THAT METER DEFLECTS

10 TO CLOSE DOWN, SWITCH 'OFF', DISMANTLE  
STATION AND STOW

- 1 THE ANTENNA WIRE AND THROWING CORD FOR EACH LEG OF THE DIPOLE ANTENNA ARE WOUND ON A REEL.

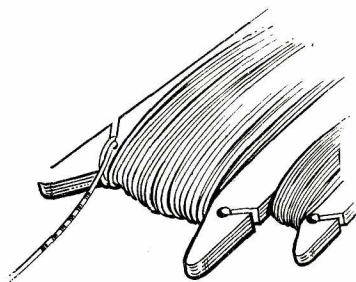


2. THE ANTENNA WIRE IS MARKED WITH GROUPS OF COLOURED SLEEVES. UNWIND THE WIRE UNTIL YOU REACH THE GROUP WITH THE SAME NUMBER OF SLEEVES AS THE CHANNEL NUMBER ON WHICH YOU WANT TO OPERATE. NO FURTHER ADJUSTMENT OF LENGTH IS NECESSARY FOR THE OFFSET CHANNELS.

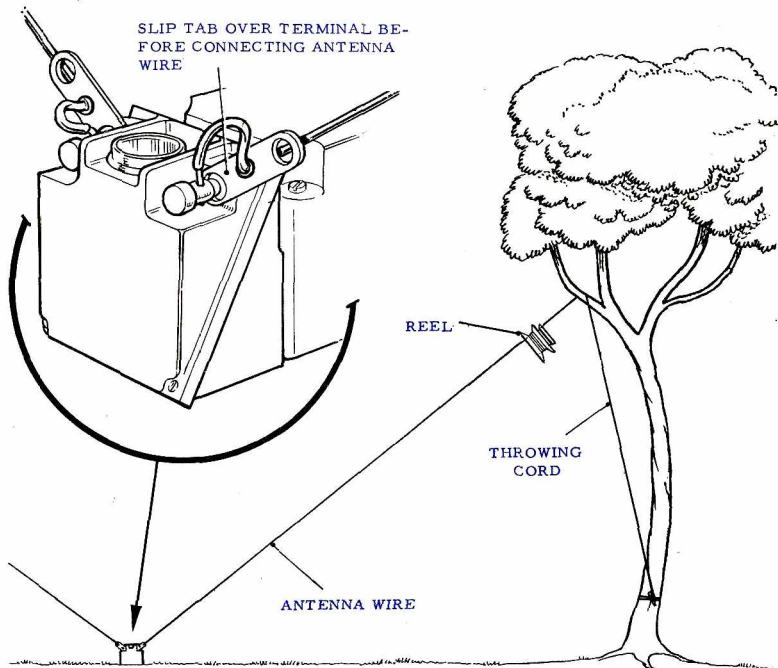


3. TIE-OFF THE ANTENNA WIRE USING A DOUBLE LOOP OR CLOVE HITCH SO THAT THE REQUIRED GROUP OF SLEEVES IS VISIBLE ON THE FREE END.

- 4 REPEAT 2 AND 3 ABOVE FOR THE SECOND LEG OF THE DIPOLE ANTENNA.



## DIPOLE ANTENNA ADJUSTMENT OF LENGTH TO SUIT CHANNEL

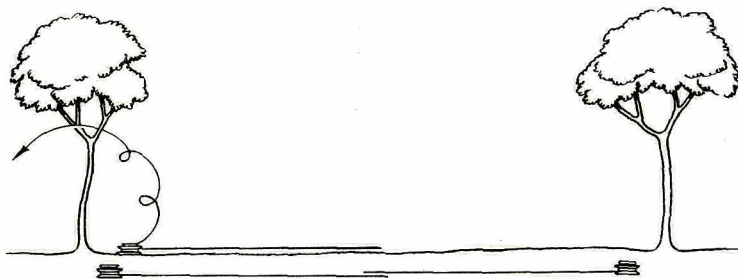


FOR COMMUNICATIONS OVER DISTANCES LESS THAN 300 km (200 miles) ANTENNA DIRECTION IS NOT CRITICAL. BUT IN TROPICAL AREAS ANTENNAS SHOULD RUN NORTH-SOUTH FOR LOWEST UNWANTED NOISE LEVEL.

FOR COMMUNICATIONS OVER DISTANCES GREATER THAN 300 km ANTENNAS SHOULD BE ERECTED BROADSIDE-ON TO THE DIRECTION OF COMMUNICATION.

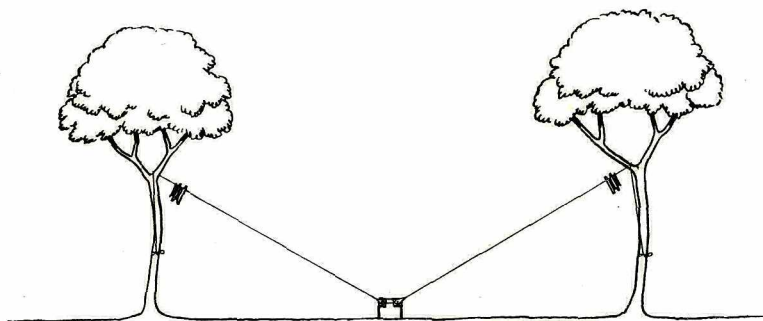
## DIPOLE ANTENNA - ERECTION





1 ROUGHLY CHECK THE TOTAL ANTENNA LENGTH AGAINST THE TREE SPACING

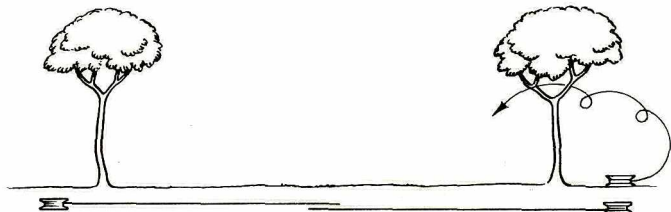
2 IF THE TREE SPACING IS GREATER, UNWIND THE THROWING CORDS, AND WITH A SUITABLE WEIGHT AT THE FREE END, THROW THE CORD OVER A BRANCH ABOUT 10 M (30FT.) ABOVE THE GROUND AND -



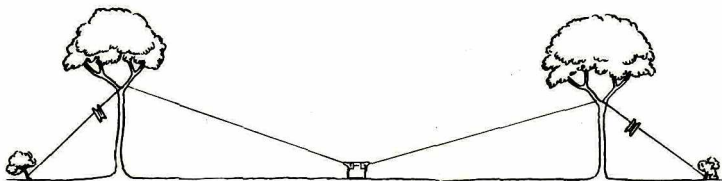
3 ERECT THE ANTENNA LIKE THIS

**DIPOLE ANTENNA — ERECTION (CONTINUED)**

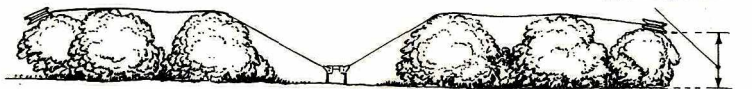




- 4 IF THE TREE SPACING IS LESS THAN THE TOTAL LENGTH OF THE ANTENNA, TIE THE WEIGHT TO THE FREE END OF THE ANTENNA AND THROW THE WIRE OVER A SUITABLE BRANCH AND-

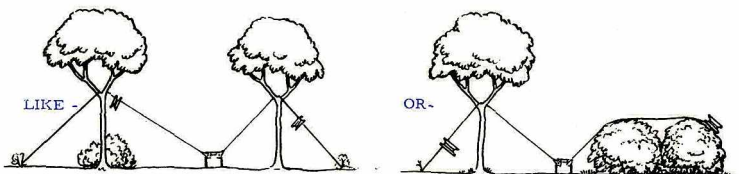


- 5 ERECT THE ANTENNA LIKE THIS



- 6 IF TREES OR OTHER SUPPORTS ARE NOT AVAILABLE THE ANTENNA WIRES MAY BE DRAPED OVER BUSHES, KEEPING WIRES AND REELS AS HIGH AS POSSIBLE.

- 7 OR IT MAY BE NECESSARY TO USE A COMBINATION OF THE FOREGOING-



## DIPOLE ANTENNA - ERECTION (CONTINUED)

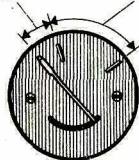
THE SUPPLY FOR THIS RADIO IS NOMINALLY 12 VOLTS DC

THE LIFE OF A MALLORY ALKALINE BATTERY, FOR A 1:9 TRANSMIT/RECEIVE RATIO IS APPROXIMATELY 20 HOURS. A LONGER LIFE WILL BE OBTAINED FOR SHORTER TRANSMISSION PERIODS

DATE	TOTAL TIME 'ON' -NEAREST $\frac{1}{4}$ HOUR
2/7/69	$\frac{1}{4}$
"	$\frac{1}{4}$
"	1
3/7/69	$1\frac{1}{2}$
"	2
"	$2\frac{1}{2}$
4/7/69	
"	

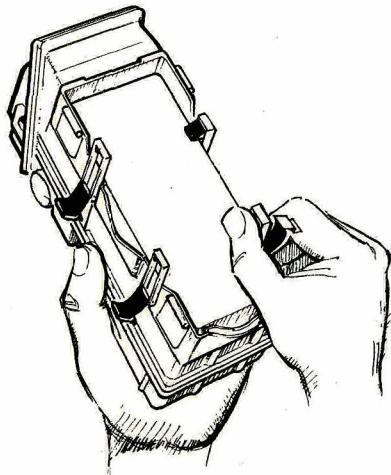
BATTERY  
DISCHARGED  
- REPLACE

BATTERY  
GOOD



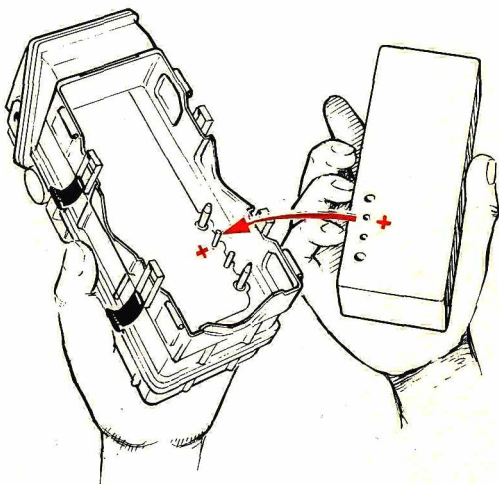
RECORD THE TOTAL TIME  
THE BATTERY IS IN USE ON  
THE LABEL ON THE BATTERY

TO TEST THE BATTERY - SET  
SWITCH ON THE RADIO TO  
'BATT' NOTE THE METER  
WITH THE KEY DEPRESSED



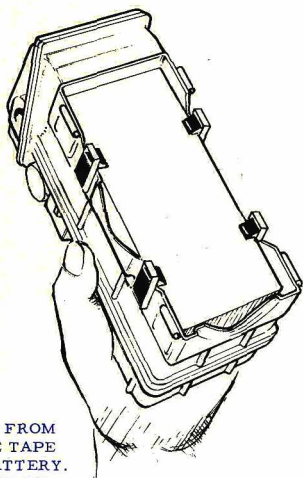
- 1 UNCLIP THE SPRINGS AND  
REMOVE THE BATTERY

## BATTERY AND REPLACEMENT



**2** REMOVE THE TAPE FROM THE SOCKET ON THE NEW BATTERY THEN MATCH THE SOCKET TO THE PLUG ON THE RADIO. (STICK THE TAPE TO THE SIDE OF THE BATTERY FOR USE WHEN WADING - SEE BELOW).

**3** FIT THE NEW BATTERY AND SECURE THE CLIPS.



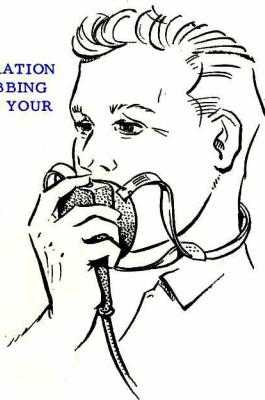
### WADING

BEFORE WADING, REMOVE THE BATTERY FROM THE RADIO AND REPLACE THE ADHESIVE TAPE TO COVER THE SOCKET HOLES IN THE BATTERY. AFTER WADING, DRY THE BATTERY PLUG ON THE RADIO AND REPEAT 2 AND 3 ABOVE.



WHEN USING MORSE YOU CAN WEAR THE HEADGEAR AS SHOWN. THE HEADBAND IS ADJUSTABLE.

FOR VOICE OPERATION LOOP THE WEBBING LOOSELY AROUND YOUR NECK.



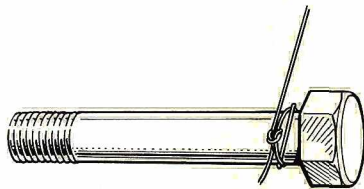
TO TRANSMIT, DEPRESS THE PRESSEL AND SPEAK.



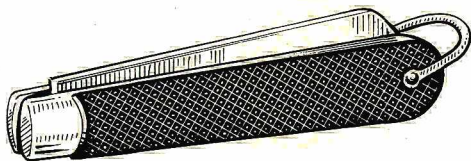
TO RECEIVE, RELEASE THE PRESSEL AND PUT THE UNIT TO YOUR EAR.

## HEADGEAR

ANY PIECE OF FAIRLY COMPACT ELONGATED METAL WEIGHING ABOUT  $\frac{1}{4}$  LB, TO WHICH YOU CAN SECURELY TIE THE CORD, WILL MAKE A SATISFACTORY THROWING WEIGHT.



A  $\frac{1}{2}$  IN. DIA. BOLT ABOUT  $3\frac{1}{2}$  IN. LONG OVERALL, IS SUITABLE



- AND SO IS A LARGE JACK-KNIFE

THROWING WEIGHT FOR ANTENNA CORD



PART II

OPERATING INSTRUCTIONS

FOR

BASE STATION

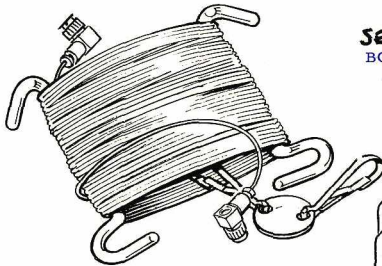


SEE PAGE 20  
FOR  
BASE STATION ANTENNA

SEE PAGES 18 AND 19 FOR  
BASE STATION BATTERIES  
AND BATTERY  
REPLACEMENT

LIGHTWEIGHT HF RADIO PRC-316  
USED AS A BASE STATION

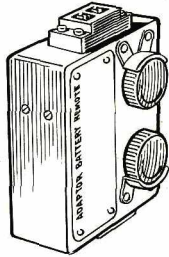
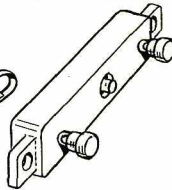




CABLE ASSY. RF 50 FT  
Z1/5995 - 99 - 101 - 9805

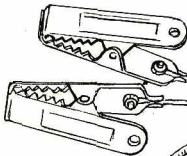
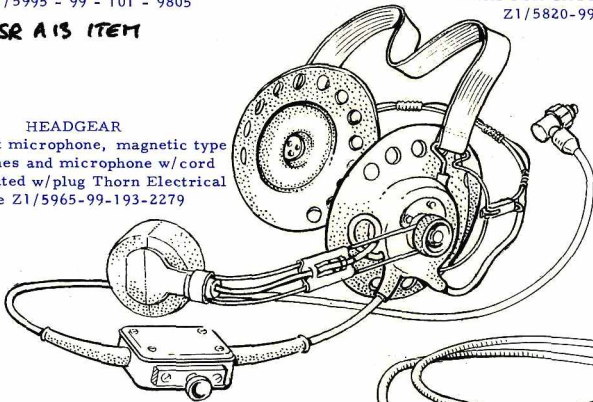
**SR A13 ITEM**

**SR A13 ITEM**  
BOARD ANTENNA JUNCTION  
Z1/5820 - 99 - 949 - 6883

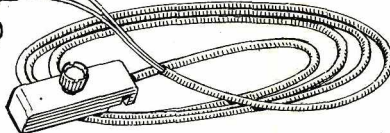


ADAPTOR BATTERY REMOTE  
Z1/5820-99-106-2476

**HEADGEAR**  
Headset microphone, magnetic type  
earphones and microphone w/cord  
terminated w/plug Thorn Electrical  
4 pole Z1/5965-99-193-2279



**SR A13 ITEM**



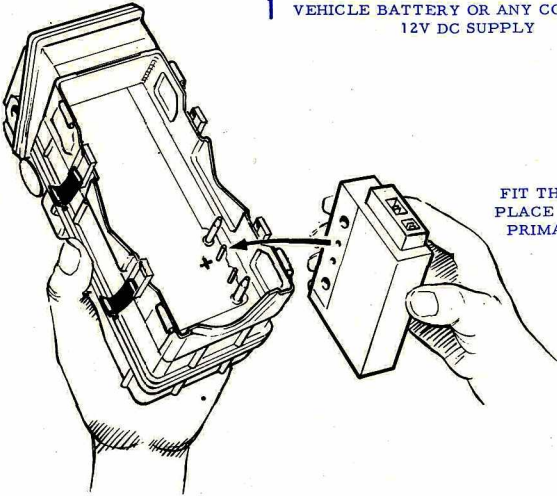
CABLE ASSY. SPECIAL PURPOSE ELECTRICAL  
2-CONDUCTOR 6 FT  
Z1/5995-99-949-7148

CABLE ASSY. SPECIAL PURPOSE ELECTRICAL  
2-CONDUCTOR **6 FT**  
Z1/5995-99-949-6859  
This is an SR A13 item  
and allows the SR A13  
battery to be used

## ANCILLARY ITEMS USED AT THE BASE STATION

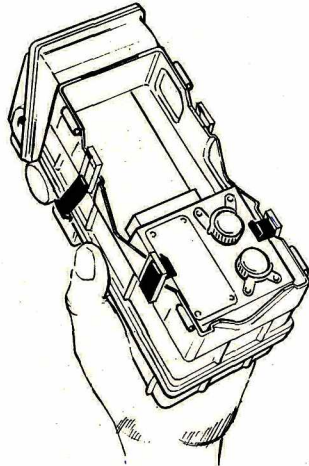
[RADIO STATION, KIT (A AND B) ANCILLARIES Z1/5820-99-106-5695]

1 VEHICLE BATTERY OR ANY CONVENIENT  
12V DC SUPPLY

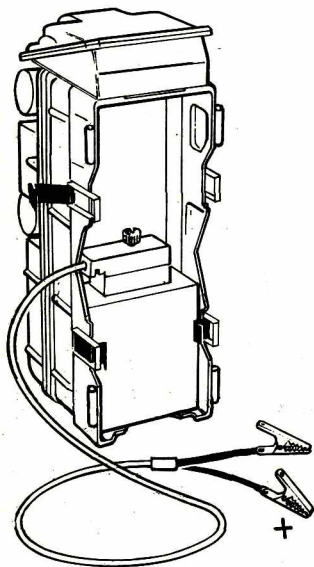


FIT THE ADAPTOR IN  
PLACE OF THE NORMAL  
PRIMARY BATTERY

AND CLIP IT IN POSITION



## BASE STATION BATTERIES

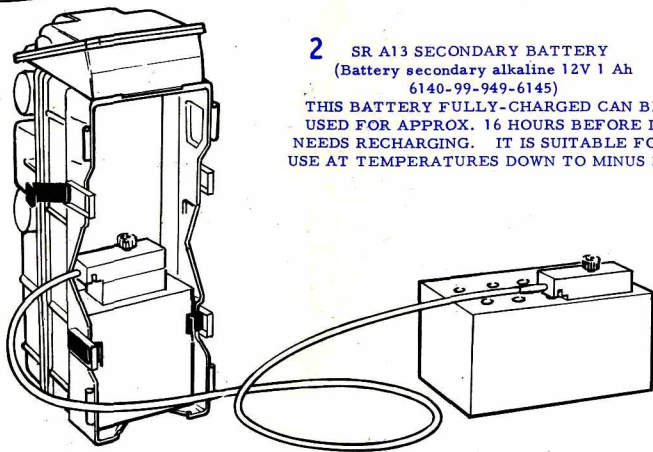


THEN CONNECT THE ADAPTOR TO THE BATTERY USING THE SR A13 CONNECTOR (Cable assy. special purpose 2-conductor 6 ft Z1/5955-99-949-7148)

THE SUPPLY MUST BE BETWEEN 10 AND 16 VOLTS DC. THE RADIO WILL NOT OPERATE IF THE SUPPLY CONNECTIONS ARE REVERSED OR HAVE BEEN CONNECTED TO A SUPPLY HIGHER THAN 17 VOLTS.

IF THE 12 VOLTS SUPPLY IS OBTAINED BY TAPPING ACROSS A 24 VOLT NEGATIVE EARTH VEHICLE SUPPLY, THE NEGATIVE LEAD FROM THE RADIO MUST BE CONNECTED TO THE EARTHED BATTERY CONNECTOR.

WHEN CONNECTED TO A SUPPLY FROM A VEHICLE WITH A POSITIVE EARTH, THE RADIO MUST NOT TOUCH THE METAL PARTS OF THE VEHICLE. IF IT DOES, THE FUSE (FS1. 2. 5A) WILL BLOW. REPLACE IT BY THE SPARE.



**2** SR A13 SECONDARY BATTERY (Battery secondary alkaline 12V 1 Ah 6140-99-949-6145)

THIS BATTERY FULLY-CHARGED CAN BE USED FOR APPROX. 16 HOURS BEFORE IT NEEDS RECHARGING. IT IS SUITABLE FOR USE AT TEMPERATURES DOWN TO MINUS 20C

UNPLUG THE BATTERY WHEN THE RADIO IS SWITCHED OFF (See Page 30)

THE BASE STATION ANTENNA MAY BE MADE UP USING THE FOLLOWING SR A13 OR SR A14 ITEMS:

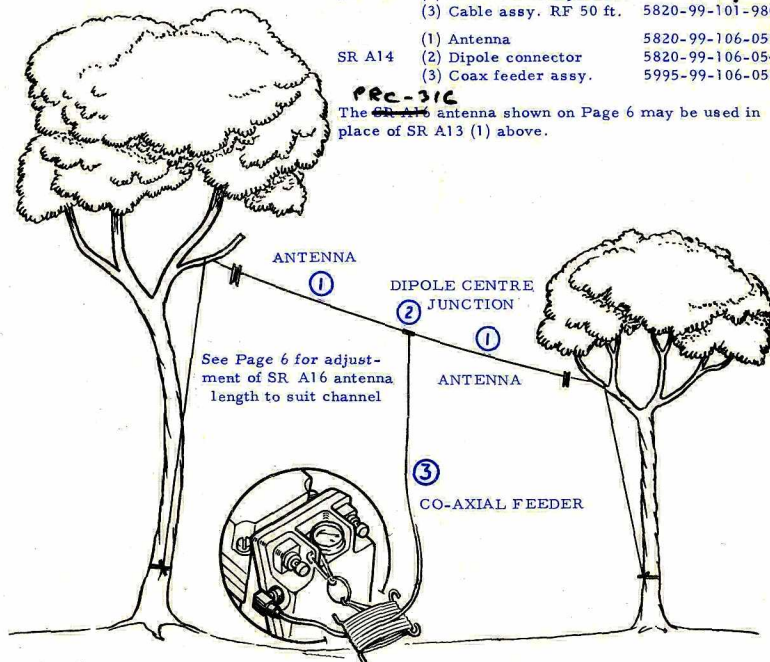
ALL ITEMS 21/...

SR A13 (1) Antenna and frame assy 5820-99-101-9312  
 (2) Board antenna junction 5820-99-947-6833  
 (3) Cable assy. RF 50 ft. 5820-99-101-9805

SR A14 (1) Antenna 5820-99-106-0518  
 (2) Dipole connector 5820-99-106-0548  
 (3) Coax feeder assy. 5995-99-106-0563

**PRC-316**

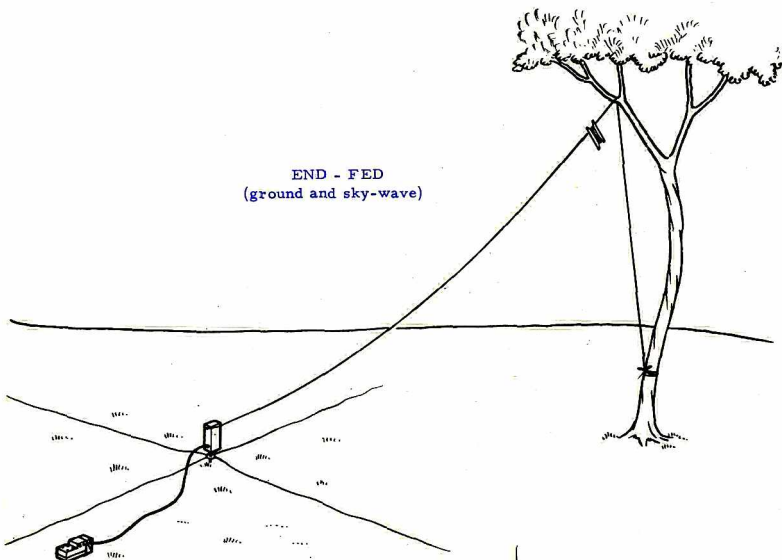
The ~~SR A14~~ antenna shown on Page 6 may be used in place of SR A13 (1) above.



YOU CAN USE THE PATROL TYPE ANTENNA AT A BASE STATION, BUT YOU WILL GET BETTER RESULTS USING AN ELEVATED DIPOLE ANTENNA LIKE THIS

## BASE STATION ANTENNA

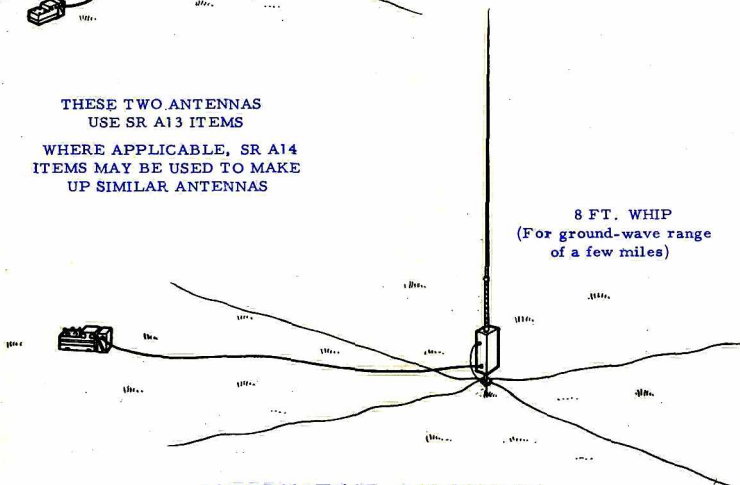
END - FED  
(ground and sky-wave)



THESE TWO ANTENNAS  
USE SR A13 ITEMS

WHERE APPLICABLE, SR A14  
ITEMS MAY BE USED TO MAKE  
UP SIMILAR ANTENNAS

8 FT. WHIP  
(For ground-wave range  
of a few miles)



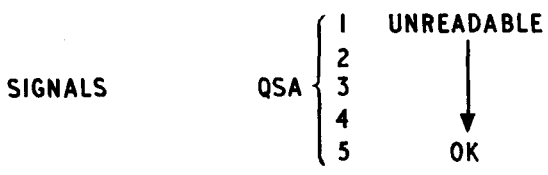
**ALTERNATIVE ANTENNAS  
MADE UP WITH ITEMS FROM OTHER STATION KITS**

A .-  
 B -...  
 C -.-.  
 D -..  
 E .  
 F ..-.  
 G -.-.  
 H ....  
 I ..  
 J .-.-.-  
 K -.-  
 L .-..  
 M --  
 1 .-.-.-.-  
 2 ..-.-.-  
 3 ...-.-  
 4 ....-  
 5 .....

N --.  
 O ---  
 P .-.-.  
 Q -.-.-  
 R .-..  
 S ...  
 T -  
 U ..-  
 V ...-  
 W .-.-  
 X -.-.-  
 Y -.-.-.-  
 Z --.-.  
 6 -.....  
 7 -.-.-.-  
 8 -.-.-.-.  
 9 -.-.-.-.  
 0 -.-.-.-.-

MESSAGE RECEIVED  
 OVER  
 OUT  
 QUERY  
 SAY AGAIN  
 ERASE

R .-..  
 K -.-  
 AR .-.-.-  
 INT ..-.-  
 IMI ..-.-.-  
 .....



CHANGE FREQUENCY TO    QSY

### THE MORSE CODE

PART III

TECHNICAL DETAILS

## GENERAL DESCRIPTION

### (1) Purpose

This radio station meets the need for a compact simple-to-operate transmitter/receiver capable of providing CW communications between distant locations and voice communications over shorter distances.

### (2) Facilities

The radio provides CW and double sideband AM voice communication.

### (3) Frequency

Nine, switched, crystal-controlled basic frequencies are provided in the band 2 - 7 MHz. Each of these frequencies can be offset by small preset amounts by a second switch to give five frequencies giving a total of  $9 \times 5 = 45$  channels.

### (4) Power Output

4 watts peak on both key and voice.

### (5) Range

On key operation, with the correct choice of frequency, a range of hundreds of miles may be achieved day or night. A similar range may be achieved with voice operation under favourable conditions, but voice is intended primarily for short range communication, as for example, to support aircraft.

### (6) Construction

The radio consists of three units:-

- (a) A moulded thermoplastic resin case which houses the controls, receiver circuits and circuits common to the receiver and transmitter.
- (b) a cast light-alloy case housing the transmitter and antenna connections, and
- (c) a fabricated light-alloy battery housing to which (a) and (b) are secured so as to form a rigid assembly.

The radio is sealed and with its ancillaries can be used over the temperature range  $-10^{\circ}\text{C}$  to  $+55^{\circ}\text{C}$ . It can be transported in unpressurised aircraft at altitudes up to 10,000 ft.



(7) Power Supplies

The radio operates from a 12 volt battery plugged into the underside of the set or from any convenient 12 volt DC supply through an adaptor unit and external lead.

(8) Antenna

A dipole antenna is provided which is adjustable in length to suit the frequency of the channel in use. The halves of the dipole are secured direct to terminals on the radio and the use of insulated wire allows the antenna to function when draped over wet vegetation.

A throwing cord is provided with each half of the antenna so that they can be raised in trees.

Each half of the antenna and its throwing cord are wound on a reel.

The radio is also provided with a 50 ohm coaxial socket to allow its use with SR.A13 and SR.A14 antenna items.

(9) Headgear

Two types of headgear are provided:-

- (a) A single unit microphone/receiver with pressel switch, which may be worn as a receiver for key operation or slung around the neck for voice operation, and
- (b) a conventional double receiver/boom microphone assembly with a pressel switch in the lead.

(10) Dimensions and Weights

Radio	260mm x 117mm x 95mm ( $10\frac{1}{8}$ " x $4\frac{5}{8}$ " x $3\frac{3}{4}$ " )	2.2kg (4lb. 12oz.)
Battery	185mm x 79mm x 32mm ( $7\frac{1}{4}$ " x $3\frac{1}{8}$ " x $1\frac{1}{4}$ " )	.9kg (1lb. 14oz.)
Antenna	241mm x 102mm x 51mm ( $9\frac{1}{2}$ " x 4" x 2" )	.4kg (each half) (14oz.) ( " " )
Headgear	See description above.	
	Type (a)	.3kg ( $9\frac{1}{2}$ oz.)
	Type (b)	.6kg (1lb. 4oz.)

## CONTROLS

WHEN POSSIBLE, WORK  
TO ANOTHER PRC-316

### THE SYSTEM SWITCH

OFF                      Radio switched OFF.

KEY                      This position provides CW operation with narrow band (300 Hz ) reception and it is used when communicating with another PRC-316 or with radios of high frequency stability such as SR. C14, SR. C15 or SR. D11.

A beat frequency oscillator gives a note of  $1000 + 150$  Hz on an accurate received signal. Sidetone of about 1kHz is provided by an audio frequency oscillator which operates when the key is depressed.

The meter reads antenna current when the key is depressed. The correct antenna must be connected to obtain this reading. *Use of coax feeder with wrong ant length can give false meter readings.*

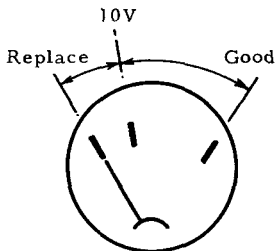
BATT                      This position is used for testing the battery and the meter indicates voltage on a non-linear scale.

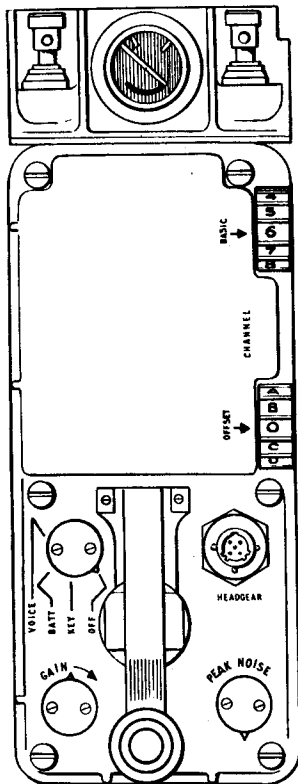
The position also provides CW operation with wide-band (6 kc/s) reception and may be used for communicating with radios of frequency stability similar to SR. A13, SR. C11, SR. C13 or SR. A510, should it be impossible to receive signals from these sets within the narrow pass-band available in the KEY position. Communications will be inferior to those obtained at KEY.

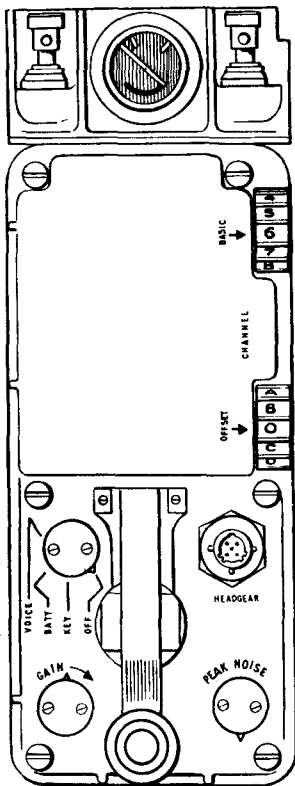
The BFO gives a 0 - 4 kHz note on the received signal depending on its position in the pass-band. A 1kHz tone will be heard if the signal is in the centre of the pass-band. A sidetone of about 1kHz is heard when the key is depressed.

The meter continuously indicates battery voltage on transmit or receive and does not read antenna current.

To check the antenna current, switch to KEY; the meter should deflect when the key is depressed. Return the switch to BATT before receiving again.







BATT            Some of the older sets such as the WS. 19 and WS. 62  
(cont'd) have such poor frequency stability that it may be difficult to receive a reasonable CW note on the PRC-316 even when the older set is properly netted to it.

You can sometimes get a better note by changing the OFFSET knob; but remember you are then transmitting on another frequency and if there is a PRC-316 also on the net, he will not hear you.

### BEWARE MIXED NETS

VOICE            This position provides double sideband AM voice operation and a 6 kHz transmitted and received bandwidth. Communication may be made with ground radios such as PRC-316, SR. A13, SR. A14, SR. A510, SR. C11, SR. C13, SR. C14, SRC15 or SR. D11; or with certain airborne radios such as SUNAIR SA-14-R or T-10-R or Collins 618/T.

Transmission is made by either depressing the key or the pressel ~~where it exists~~ on the headgear. Speech sidetone is provided on the double receiver/boom microphone headgear only.

PEAK            This control tunes circuits which are common both to  
NOISE            the transmitter and receiver. The correct tuning is indicated on the receiver by maximum noise in the headgear when the correct antenna is connected. While operating this control, the GAIN control should be set so that the noise is just audible.

WARNING. Although a peak can be found on the meter by tuning at transmit for maximum antenna current, this method must not be used as it can lead to incorrect tuning.

GAIN            This control enables the loudness and clarity of the received signal to be adjusted. It varies the overall gain of the receiver and needs careful setting as automatic gain control is not provided in the receiver.

## BATTERY LIFE

Battery life in hours, on the basis of a 1:9 transmit/receive ratio, may be reckoned as:-

Battery Capacity (ampere hours) x 8

(Providing the battery is capable of supplying 1.5 amps peak current)

Life of batteries used with PRC-316:-

Mallory alkaline primary battery	20 hours
SR. A13 secondary battery	16 hours
<b>LECLANCHE PRIMARY BATTERY</b>	<b>10 hours</b>

So that a rough check may be kept on the life of primary batteries, operators should record the date and duration of each operating period, to the nearest  $\frac{1}{4}$  hour, on a label on the battery.

The primary batteries may have little life left at temperatures below freezing point (0°C). So if the weather is cold, keep the battery in a warm place, say inside clothing until it is required for use, and also, if possible, in a warm place when operating.

The SR. A13 nickel cadmium secondary battery is suitable for use at temperatures down to minus 20°C.

### Battery Adaptor Unit

See pages 18 - 19 for method of use.

The SR. A13 connector, Cable Assy Special Purpose 2-Conductor 6 ft. (5955-99-949-7148), which is terminated in crocodile clips, permits possible errors when connecting to a supply source.

The Battery Adaptor Unit gives reversed polarity protection and over-voltage protection up to 32 volts.

IT DOES NOT GIVE PROTECTION AGAINST CONNECTION TO AN AC SUPPLY OR TO AN UNSMOOTHED BATTERY CHARGER.

The Battery Adaptor Unit consumes about 3.5 mA from a 12 volt supply, so in order not to discharge the supply, it is advisable to disconnect the unit from the supply when the radio is not in use.

The adaptor is fitted with a 2.5 A fuse to protect the radio when it is connected to a positive earthed supply. The metal parts of the radio case are connected internally to the negative battery lead, and should any

of these parts touch the metal parts of the vehicle, the fuse will blow. A spare fuse is carried in a second fuse holder in the adaptor.

This fuse will also protect the radio if the 12V supply leads are incorrectly tapped across a negative earth 24V vehicle supply. The negative lead from the radio must connect to the earthed connector on the vehicle battery, or when the metal parts of the radio and vehicle touch, the fuse will blow.

#### EXPOSURE TO HIGH TEMPERATURE AND SUNLIGHT

The PRC-316 is designed to function at temperatures up to 55°C (131°F).

In hot climates and in direct sunlight where metal objects can become too hot to touch. The temperature of the radio can rise well above 55°C.

If this happens to the PRC-316, no damage should result to the radio, but the channel frequencies may change enough to spoil communications at KEY (narrow band CW).

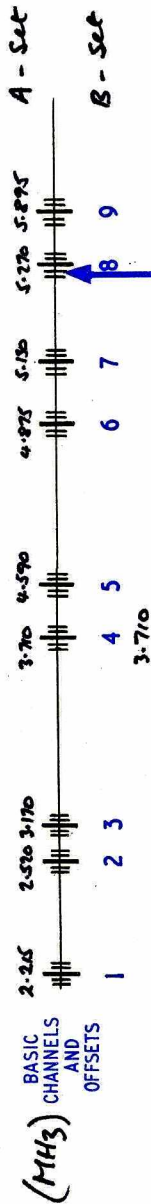
For this reason the warning is given to keep the radio out of direct sunlight in very hot conditions.

A temperature high enough to affect the radio would cause the operator considerable discomfort, and shade would be beneficial to both.

If it is impossible to find shade, drape the carrying bag loosely over the radio.

If you have reason to believe that your PRC-316 has become extremely hot in the sun, and communications are not satisfactory at KEY (narrow band CW), try the BATT (wide band CW) position.

Communications up to several hundred kilometres can be achieved at BATT by day, although results will not be so good as at KEY. The main advantage of the KEY position will be noticed between mid-afternoon and dawn.



Ch 4 (kHz)

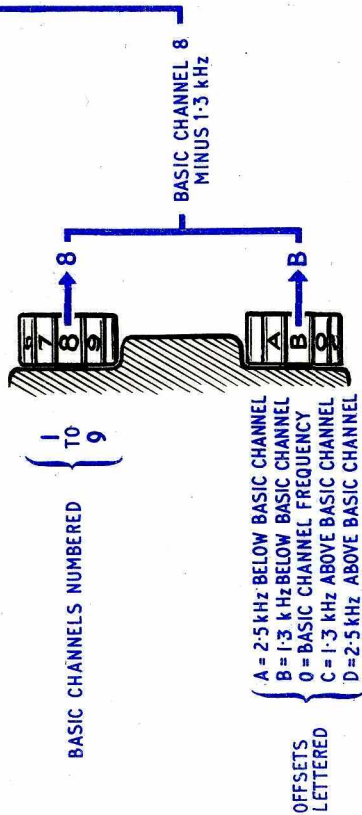
A. 3707.5

B. 3708.7

O. 3710.0

C. 3711.3

D. 3712.5

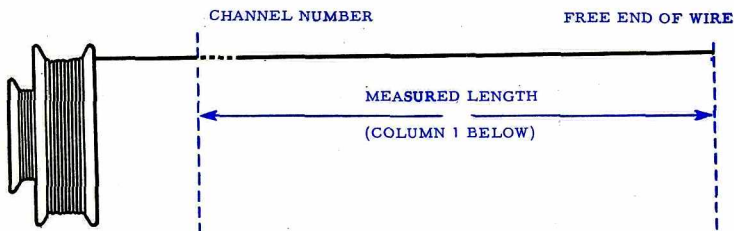


THE RELATIONSHIP OF BASIC CHANNEL & OFFSET  
 FOR EXAMPLE 8B



- IF YOU NEED TO RENEW THE WIRE ON AN ANTENNA REEL AND A REPLACEMENT IS NOT AVAILABLE, TAKE 37m (120 ft) OF SUITABLE WIRE, TIE ONE END TO THE REEL, THEN MEASURE THE LENGTHS GIVEN BELOW IN COLUMN 1 OF THE TABLE FROM THE FREE END OF THE WIRE AND MARK THE POSITIONS WITH ADHESIVE TAPE.

THESE LENGTHS ARE CORRECT ONLY WHEN AN ANTENNA IS ERECTED WITH THE UNUSED PART OF THE ANTENNA WIRE WOUND ON THE REEL.



TYPE 'A' SET

Channel	PRC-316 Half Ant. Length m		SR A13 SR A14 Antenna
	1	2	
1	30.0	30.8	
2	26.7	27.2	
3	21.4	21.7	
4	18.1	18.6	
5	14.7	15.0	
6	13.8	14.2	
7	13.0	13.4	
8	12.6	13.0	
9	11.3	11.7	

Use PRC-316  
Column 1 lengths

TYPE 'B' SET

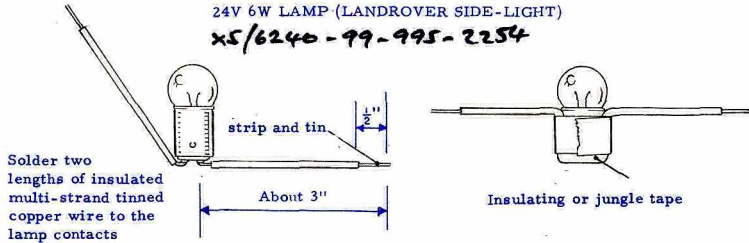
Channel	PRC-316 Half Ant. Length m		SR A13 SR A14 Antenna
	1	2	
1	29.0	29.8	
2	25.0	25.4	
3	20.6	21.0	
4	18.1	18.6	
5	14.9	15.3	
6	13.8	14.2	
7	12.6	13.0	
8	10.5	10.9	
9	9.6	10.0	

Use PRC-316  
Column 1 lengths

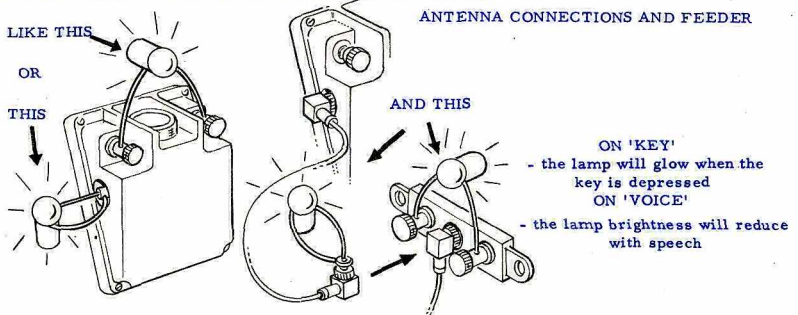
- IF YOU INTEND TO CUT AN ANTENNA TO SUIT A PARTICULAR CHANNEL, USE THE LENGTHS GIVEN IN COLUMN 2 OF THE TABLE.

## ANTENNA LENGTH

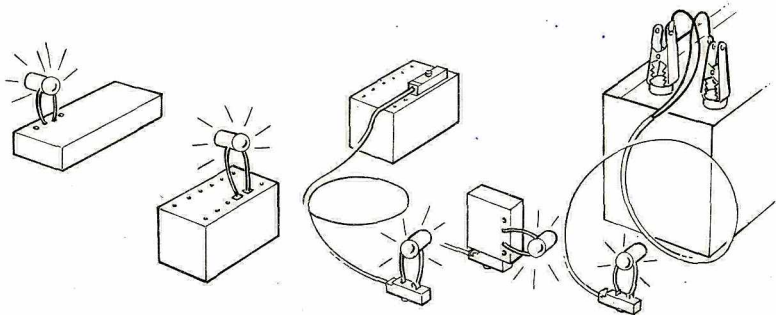
24V 6W LAMP (LANDROVER SIDE-LIGHT)  
 X5/6240-99-995-2254



USE THE LAMP TO CHECK THE TRANSMITTER OUTPUT,



USE THE LAMP TO CHECK BATTERIES, BATTERY CONNECTORS AND ADAPTOR



THE FUNCTIONAL TEST LAMP & ITS USES

## SERVICING

### General

No equipment can be expected to work properly unless it is kept in first class condition by regular servicing conscientiously carried out. This is the responsibility of the NCO or man who is in direct charge of the equipment and NOT of workshop or repair staff, though workshop personnel may be called upon to carry out certain servicing tasks.

To guide the NCO or man responsible for servicing, and to ensure that it is carried out regularly, signal equipment is serviced on a task system.

The tasks in the case of the PRC-316 are very simple and few in number and are detailed below.

Instructions regarding supervision of servicing, frequency of carrying out each task and recording of completion of tasks will be issued by unit commanders. Army Form B2661 can be used for recording purposes.

The RT-316 is contained in fully sealed cases which must not be opened except in workshops.

### Operator's Servicing

- (1) Keep the equipment clean and dry, particularly the area around the battery plug on the underside of the radio. Remove any dirt from plugs, sockets, control knobs and terminals.
- (2) Check switches and controls to ensure that they are functioning correctly.
- (3) Examine connectors for frayed ends or damaged insulation. Pay particular attention to coaxial connectors if the radio is used with SR. A13 or SR. A14 antenna systems.
- (4) Check that the dipole antenna connections are clean and in good condition. If an antenna wire breaks, as a temporary measure, strip back the insulation on each side of the break and tie the exposed ends together using a reef knot. If the ferrule breaks off the end of the antenna wire, as a temporary measure, strip back the insulation for a short distance at the end of the wire and connect the exposed end directly to the terminal on the radio.

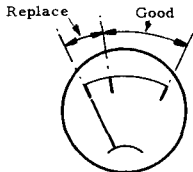
### Functional Tests

The following tests are for use by the operator or technician as a means of quickly testing a station for correct working before or during a patrol.

## FUNCTIONAL TESTS

### 1. TO TEST A BATTERY

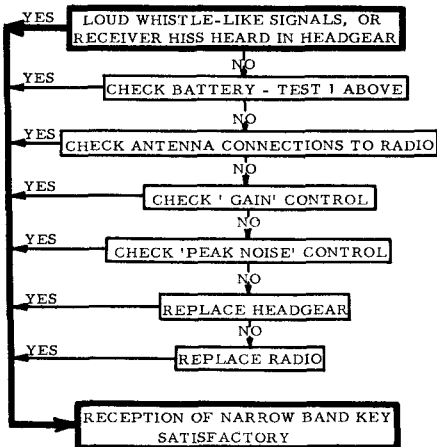
The station need not be set up for operating. Set the switch to BATT and briefly depress the key. The battery will be on load with the key depressed and PEAK NOISE control correctly set. The meter will indicate if the battery needs replacing



### 2. TO TEST OPERATION OF STATION ON KEY - NARROW BANDWIDTH RECEPTION

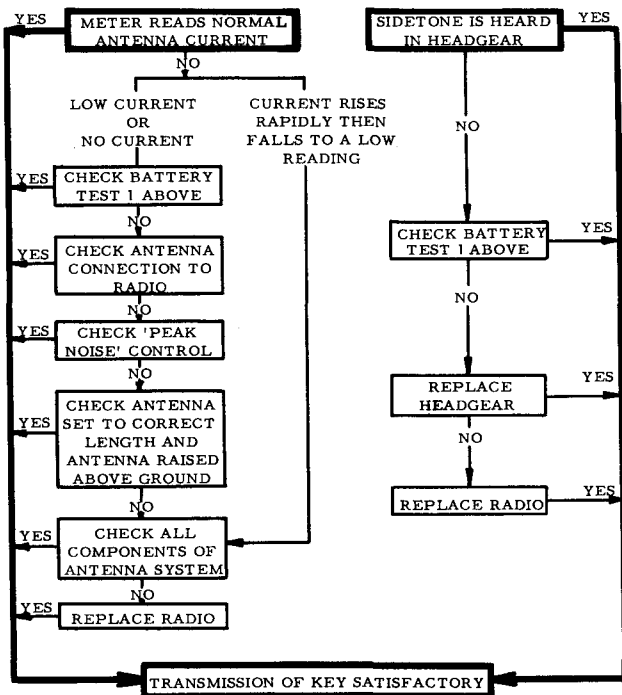
Set up the station according to instructions on Pages 4 and 5 and set switch to KEY.

#### (a) Receive



NOTE: The noise in the headgear at receive KEY, will normally be much lower than at BATT or VOICE.

(b) Transmit Depress Key



OPERATION OF STATION ON KEY WITH NARROW BAND  
RECEPTION SATISFACTORY

3. To Test Operation of Station on Key - Wide-band Reception

Set up station according to instructions on pages 4 and 5 and set switch to BATT.

(a) Receive

Test as for narrow-band reception at 2(a) above.

(b) Transmit

Note that with the switch at BATT, meter reads battery volts only, on transmit and receive.

Therefore to check antenna current, switch to KEY and repeat test 2(b) above.

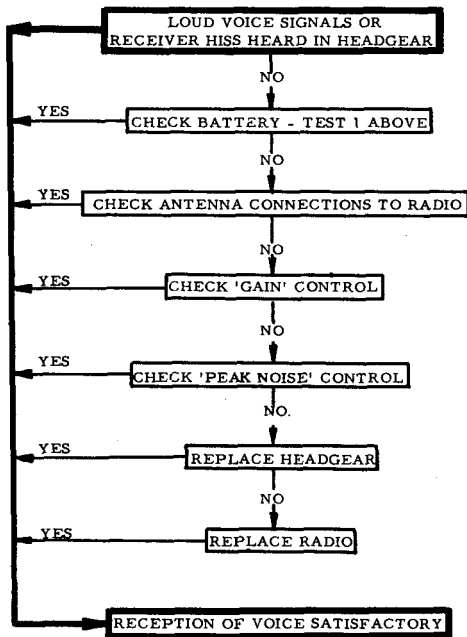
Return switch to BATT for wide-band reception.

OPERATION OF STATION ON KEY, WIDE-BAND RECEPTION  
SATISFACTORY

4. TO TEST OPERATION OF STATION ON VOICE

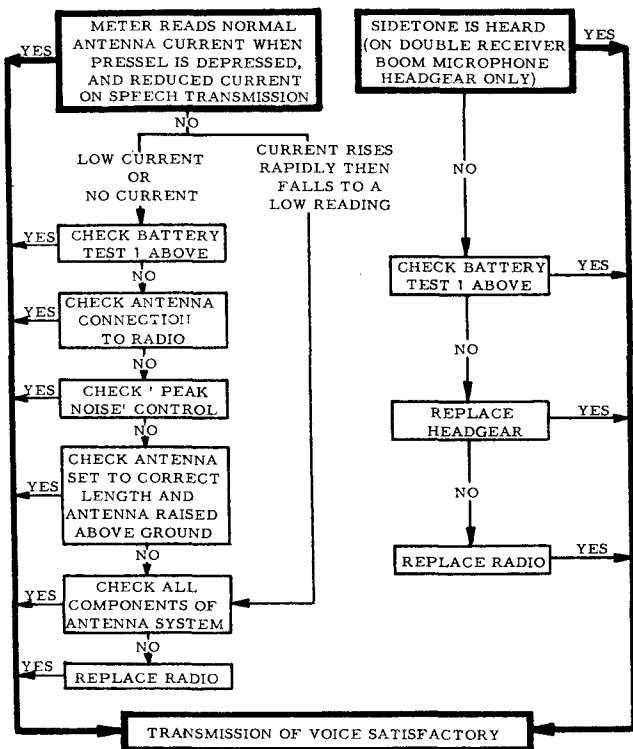
Set up station according to instructions on Pages 4 and 5 and set switch to VOICE.

(a) Receive



(b) Transmit

Depress pressel on headgear and speak into microphone.



OPERATION OF STATION ON VOICE SATISFACTORY





Printed at the  
Signals Research and Development Establishment, Christchurch, Hants.