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. 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 it 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](http://www.adobe.com/products/acrobat/readermain.html) or going to [http://www.adobe.com/](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”. The 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.

**Richard Hankins, VMARS Archivist, Summer 2004**
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
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.
## CONTENTS

### PART I. OPERATING INSTRUCTIONS FOR PATROL STATION

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lightweight HF Patrol Radio PRC-316 used as a Patrol Station</td>
<td>2-3</td>
</tr>
<tr>
<td>Setting up and Operating</td>
<td>4-5</td>
</tr>
<tr>
<td>Dipole Antenna</td>
<td>6-9</td>
</tr>
<tr>
<td>Battery and Replacement</td>
<td>10-11</td>
</tr>
<tr>
<td>Headgear</td>
<td>12</td>
</tr>
<tr>
<td>Throwing Weight and Cord</td>
<td>13</td>
</tr>
</tbody>
</table>

### PART II. OPERATING INSTRUCTIONS FOR BASE STATION

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lightweight HF Patrol Radio PRC-316 used as a Base Station</td>
<td>16</td>
</tr>
<tr>
<td>Ancillary Items used at the Base Station</td>
<td>17</td>
</tr>
<tr>
<td>Base Station Batteries</td>
<td>18-19</td>
</tr>
<tr>
<td>Base Station Antenna</td>
<td>20</td>
</tr>
<tr>
<td>Alternative Antennas</td>
<td>21</td>
</tr>
<tr>
<td>The Morse Code</td>
<td>22</td>
</tr>
</tbody>
</table>

### PART III. TECHNICAL DETAILS

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Description</td>
<td>24-25</td>
</tr>
<tr>
<td>Controls</td>
<td>26-29</td>
</tr>
<tr>
<td>Battery Life</td>
<td>30</td>
</tr>
<tr>
<td>Exposure to High Temperature and Sunlight</td>
<td>31</td>
</tr>
<tr>
<td>The Relationship of Basic Channel and Offset</td>
<td>32</td>
</tr>
<tr>
<td>Antenna Length</td>
<td>33</td>
</tr>
<tr>
<td>The Functional Test Lamp and its uses</td>
<td>34</td>
</tr>
<tr>
<td>Servicing</td>
<td>35</td>
</tr>
<tr>
<td>Functional Tests</td>
<td>36-40</td>
</tr>
</tbody>
</table>
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 (Learns) 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.
21/5820-99-193-032 - 2 off

AND

Antenna single conductor type moveable 120 ft.
Type 'A' 21/5820-99-193-033 - 2 OFF

OR

Antenna single conductor type moveable 120 ft.
Type 'B' 21/5820-99-193-034 - 2 OFF

STOWAGE BAG

Bag transmitter/receiver radio
21/5820-99-193-1000

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 21/5820-99-193-1060

...USED AS A PATROL STATION
OFF - RADIO OFF

KEY - BEST (NARROW-BAND) MORSE OPERATING POSITION.
      METER READS ANTENNA CURRENT.

BATT - ALTERNATIVE (WIDE BAND) MORSE OPERATING POSITION NOT
      AS GOOD AS KEY (SEE PAGE 26)
      METER READS BATTERY VOLTAGE.

VOICE - VOICE OPERATION METER READS ANTENNA CURRENT.

SETTING UP AND OPERATING
THE DRILL APPLIES TO PATROL & BASE STATIONS
UNWIND ANTENNA TO GIVEN CHANNEL  
(See Page 6)

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

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

SET CHANNEL TO GIVEN NUMBER AND LETTER

SET SWITCH TO 'BATT' - NOTE METER

BATTERY NEEDS REPLACING  
(See Pages 10 & 11)

BATTERY GOOD

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.  
SET MODE SWITCH AS REQUIRED, DEPRESS KEY AND CHECK ANTEANNA CURRENT  
DEPRESS KEY, CHECK BATTERY ON TRANSMIT, REPLACE BATTERY IF NEC.  
ADJUST FOR WANTED LOUDNESS AND  
CLARITY OF RECEIVED SIGNAL  
OPERATE KEY FOR CW TRANSMISSION.  
TO SPEAK, USE PRESSER ON HEADGEAR (See  
Page 12) CHECK THAT METER DEFFLECTS  
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.
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 (30 ft.) 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 DRAPE OVER BUSHES, KEEPING WIRES AND REELS AS HIGH AS POSSIBLE.

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

LIKE -

OR-

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.

<table>
<thead>
<tr>
<th>DATE</th>
<th>TOTAL TIME 'ON' - NEAREST ½ HOUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>2/7/69</td>
<td>¾</td>
</tr>
<tr>
<td>3/7/69</td>
<td>½</td>
</tr>
<tr>
<td>4/7/69</td>
<td>2½</td>
</tr>
</tbody>
</table>

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 \( \frac{1}{2} \) LB. TO WHICH YOU CAN SECURELY TIE THE CORD, WILL MAKE A SATISFACTORY THROWING WEIGHT.

A \( \frac{1}{2} \) IN. DIA. BOLT ABOUT 3\( \frac{3}{4} \) 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
ANCILLARY ITEMS USED AT THE BASE STATION

[Radio Station, Kit (A and B) Ancillaries Z1/5820-99-106-5695]
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 ZI/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 20°C

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 5820-99-997-6833
(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

The SR A16 antenna shown on Page 6 may be used in place of SR A13 (1) above.

See Page 6 for adjustment of SR A16 antenna length to suit channel

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
<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>N</th>
<th>O</th>
<th>P</th>
<th>Q</th>
<th>R</th>
<th>S</th>
<th>T</th>
<th>U</th>
<th>V</th>
<th>W</th>
<th>X</th>
<th>Y</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
</tr>
</tbody>
</table>

MESSAGE RECEIVED
OVER
OUT
QUERY
SAY AGAIN
ERASE

\[\begin{array}{c}
R \\
K \\
AR \\
INT \\
IMI \\
\end{array}\]

\[\begin{array}{c}
1 \quad \text{UNREADABLE} \\
2 \\
3 \\
4 \quad \text{OK} \\
5 \\
\end{array}\]

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 $-10^\circ C$ to $+55^\circ C$. 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**

<table>
<thead>
<tr>
<th></th>
<th>Dimensions</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio</td>
<td>260mm x 117mm x 95mm (10 1/8&quot; x 4 3/8&quot; x 3 3/4&quot;)</td>
<td>2.2kg (4lb. 12oz.)</td>
</tr>
<tr>
<td>Battery</td>
<td>185mm x 79mm x 32mm (7 3/4&quot; x 3.3/32&quot; x 1 3/4&quot;)</td>
<td>0.9kg (1lb. 14oz.)</td>
</tr>
<tr>
<td>Antenna</td>
<td>241mm x 102mm x 51mm (9 3/8&quot; x 4&quot; x 2&quot;)</td>
<td>0.4kg (each half) (14oz.)</td>
</tr>
<tr>
<td>Headgear</td>
<td>See description above.</td>
<td>Type (a) 0.3kg (9 1/2oz.) Type (b) 0.6kg (1lb. 4oz.)</td>
</tr>
</tbody>
</table>
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. The geese tester with wrong raft 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 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 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.

NOISE

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:

<table>
<thead>
<tr>
<th>Battery Type</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mallory alkaline primary battery</td>
<td>20</td>
</tr>
<tr>
<td>SR. A13 secondary battery</td>
<td>16</td>
</tr>
<tr>
<td>Leclanché primary battery</td>
<td>10</td>
</tr>
</tbody>
</table>

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 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 $55^\circ$C ($131^\circ$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 $55^\circ$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.
THE RELATIONSHIP OF BASIC CHANNEL & OFFSET FOR EXAMPLE 8B
1. 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.

<table>
<thead>
<tr>
<th>CHANNEL NUMBER</th>
<th>FREE END OF WIRE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MEASURED LENGTH</td>
</tr>
<tr>
<td></td>
<td>(COLUMN 1 BELOW)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TYPE 'A' SET</th>
<th>TYPE 'B' SET</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channel</td>
<td>Channel</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>9</td>
<td>9</td>
</tr>
</tbody>
</table>

2. IF YOU INTEND TO CUT AN ANTENNA TO SUIT A PARTICULAR CHANNEL, USE THE LENGTHS GIVEN IN COLUMN 2 OF THE TABLE.
24V 6W LAMP (LANDROVER SIDE-LIGHT)

USE THE LAMP TO CHECK THE TRANSMITTER OUTPUT,

LIKE THIS
OR
THIS

ANTENNA CONNECTIONS AND FEEDER

ON 'KEY'
- the lamp will glow when the key is depressed
ON 'VOICE'
- the lamp brightness will reduce with speech

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.

-35-
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**

   ![Flowchart](image)

   **NOTE:** The noise in the headgear at receive KEY, will normally be much lower than at BATT or VOICE.
(b) Transmit Depress Key

TRANSMISSION OF KEY SATISFACTORY

OPERATION OF STATION ON KEY WITH NARROW BAND RECEPTION SATISFACTORY

SIDETONE IS HEARD IN HEADGEAR

CURRENT RISES RAPIDLY THEN FALLS TO A LOW READING

YES

CHECK BATTERY TEST 1 ABOVE

NO

REPLACE HEADGEAR

YES

REPLACE RADIO

NO

REPLACE RADIO

YES

CHECK BATTERY TEST 1 ABOVE

NO

YES

CHECK 'PEAK NOISE' CONTROL

NO

YES

CHECK ANTENNA CONNECTION TO RADIO

NO

YES

CHECK ANTENNA SET TO CORRECT LENGTH AND ANTENNA RAISED ABOVE GROUND

NO

YES

CHECK ALL COMPONENTS OF ANTENNA SYSTEM

NO

YES

CHECK BATTERY TEST 1 ABOVE

NO

LOW CURRENT OR NO CURRENT

YES

CHECK BATTERY TEST 1 ABOVE

NO

YES

METER READS NORMAL ANTENNA CURRENT

NO

YES

METER READS NORMAL ANTENNA CURRENT

NO
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

LOUD VOICE SIGNALS OR RECEIVED HISS HEARD IN HEADGEAR

YES

CHECK BATTERY - TEST 1 ABOVE

NO

YES

CHECK ANTENNA CONNECTIONS TO RADIO

NO

YES

CHECK 'GAIN' CONTROL

NO

YES

CHECK 'PEAK NOISE' CONTROL

REPLACE HEADGEAR

NO

YES

REPLACE RADIO

RECEPTION OF VOICE SATISFACTORY
(b) Transmit

Depress pressel on headgear and speak into microphone.

- **Meter reads normal antenna current when pressel is depressed, and reduced current on speech transmission**
  - **No**
    - **Low current or no current**
      - **Yes**
        - Check battery
        - Test 1 above
      - **No**
        - Check antenna connection to radio
        - **No**
          - **Yes**
            - Check "peak noise" control
            - **No**
              - Check antenna set to correct length and antenna raised above ground
              - **No**
                - Check all components of antenna system
                - **Yes**
                  - Replace radio
                - **No**
                  - Replace radio
          - **Yes**
            - Replace headgear
        - **Yes**
          - Replace radio
        - **No**
          - Replace radio
  - **Yes**
    - Check battery
    - Test 1 above

- **Sidetone is heard (on double receiver boom microphone headgear only)**
  - **No**
    - Current rises rapidly then falls to a low reading
    - **Yes**
      - Check battery
      - Test 1 above
      - **No**
        - Replace headgear
        - **Yes**
          - Replace radio

**Operation of station on voice satisfactory**