

Wireless Set No 19 Mk.3 (Canadian)

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**USER HANDBOOK**  
**for**  
**RADIO INSTALLATION A.S.S.U. TENTACLE**  
**(C48 / BCC. LL 46 U / A 41 and C 11-R 210 / R 209)**  
**in**  
**TRUCK  $\frac{1}{4}$ - TON GS 4x4 ROVER Mk. 3**  
**and**  
**TRAILER  $\frac{1}{2}$  - TON GS CARGO 2- WHEELED Mk. 2**

**PUBLISHED UNDER THE AUTHORITY OF  
THE SIGNAL OFFICER-IN-CHIEF  
THE WAR OFFICE  
WHITEHALL S.W.1.**

**AUGUST 1963**

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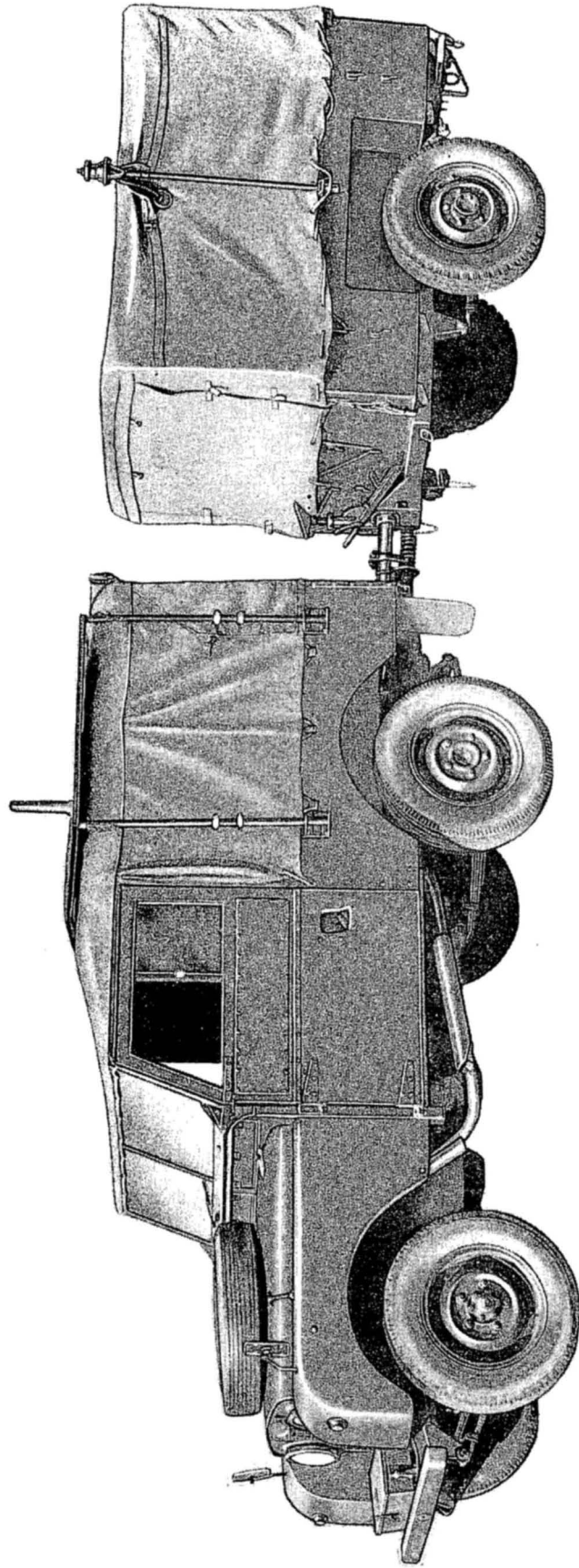
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ASSOCIATED PUBLICATIONS

Reception Set R209 Mk. 2	...	...	...	...	W.O. Code No. 10710
Reception Set R210	...	...	...	...	W.O. Code No. 12051
Wireless Sender C11	...	...	...	...	W.O. Code No. 12052
Wireless Control Harness type B	...	...	...	...	W.O. Code No. 11195
Wireless Set A41	...	...	...	...	W.O. Code No. 12336
Wireless Set C48 (VHF Multi-Channel Transmitter/Receiver ARC/52	...	...	...	...	Air Publication 2531J
Wireless Set BCC46U	...	...	...	...	Manufacturers manual
Charging Set 1260 watt	...	...	...	...	Manufacturers manual



**FIG. 1 GENERAL VIEW OF INSTALLATION VEHICLES**

# CHAPTER I

## GENERAL DESCRIPTION

### Section 1. Purpose and facilities

This handbook contains a general description of the radio equipment for an ASSU Tentacle in a Truck 1/4 ton G.S. 4 x 4 Landrover Mk. 3 and Mk. 4 and a Trailer 1/2-ton Cargo 2 Wheeled Mk. 2.

Instructions on preparing the installed vehicles for parachute dropping are not included in this publication.

Facilities for communication on the UHF band between aircraft, air support formation and ground forces are provided by a C48.

The C11/R210 is used for the air formation net, re-transmitting information to other radio stations working in the 2 to 16 Mc/s frequency band. (HF).

A BCC 46.U provides facilities for ground to air communication in the VHF band.

A Reception set R209 Mk. 2 is provided for the reception of meteorological information when required.

A manpack SR A41 is stowed in the 1/4-ton truck for communication with infantry when necessary.

The radio equipment can be dismantled from the vehicles and set up as a ground station in a short time. Connections for a ground station would, in general, be the same as those for the vehicle station described in this handbook. Information on dismantability is given in Chapter 5 page 63.

For R.T. operation, send-receive switching is achieved by means of microphone pressel switches in headgear connected through a Junction box J1 24 Volts, to the C48.

The radio station is completely self contained and can be operated on the move if required.

If either vehicle is evacuated, all the installation kit items must be removed and held ready for installation in a replacement vehicle.

General views of the installation in the truck and trailer are shown on pages 2, 3 and 5.



Section 2. Radio Sets

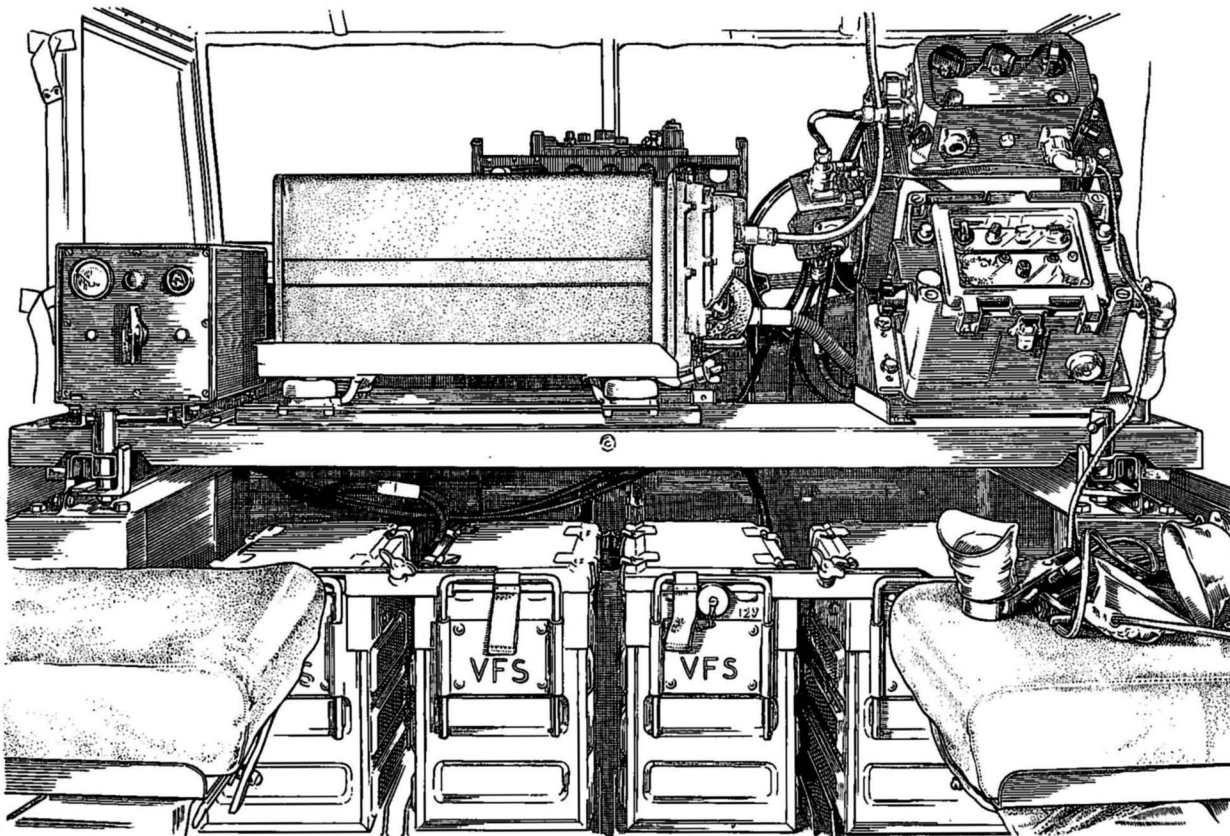
Full descriptions of the radio sets are contained in the user handbooks issued with the sets. A list of the relevant handbooks for this installation is shown at page V of this publication.

The sets forming the installation and their respective roles are as follows. Note that mileage ranges quoted here are arbitrary figures and may vary considerably according to operating conditions and environment.

(1) SR C48

This sender/receiver, installed in the 1/4-ton truck, is for ground to air voice communication in the UHF band 225 to 399.9 Mc/s.

The set has a range of approximately 100 miles to an aircraft flying at 20,000 feet. This range increases as the height of the aircraft increases and vice versa.



**FIG. 2 VIEW OF RADIO EQUIPMENT IN 1/4 TON TRUCK**

(2) SR BCC 46.U

This manpack AM sender/receiver, carried in the 1/4-ton truck, is for ground to air voice communication in the VHF band 110 to 140 Mc/s.

It is a single channel fixed frequency crystal controlled transmitter/receiver powered by dry batteries and operated by an ON/OFF switch on the front of the microphone attachment. At the ON position the set is in the 'receive' condition. Transmission is simply achieved by pressing the pressel switch on the top of the microphone and speaking into the mouthpiece.

(3) SR A41

This VHF FM infantry man-pack sender/receiver is included for communication with infantry. The set is not fitted in the installation but is stowed in the truck by the user. The frequency band coverage is 38 to 55 Mc/s and the maximum working range, between two A41's with 10-ft. rod aerials, should be approximately five miles. Using 4-ft. rod aerials the range should be approximately three miles.

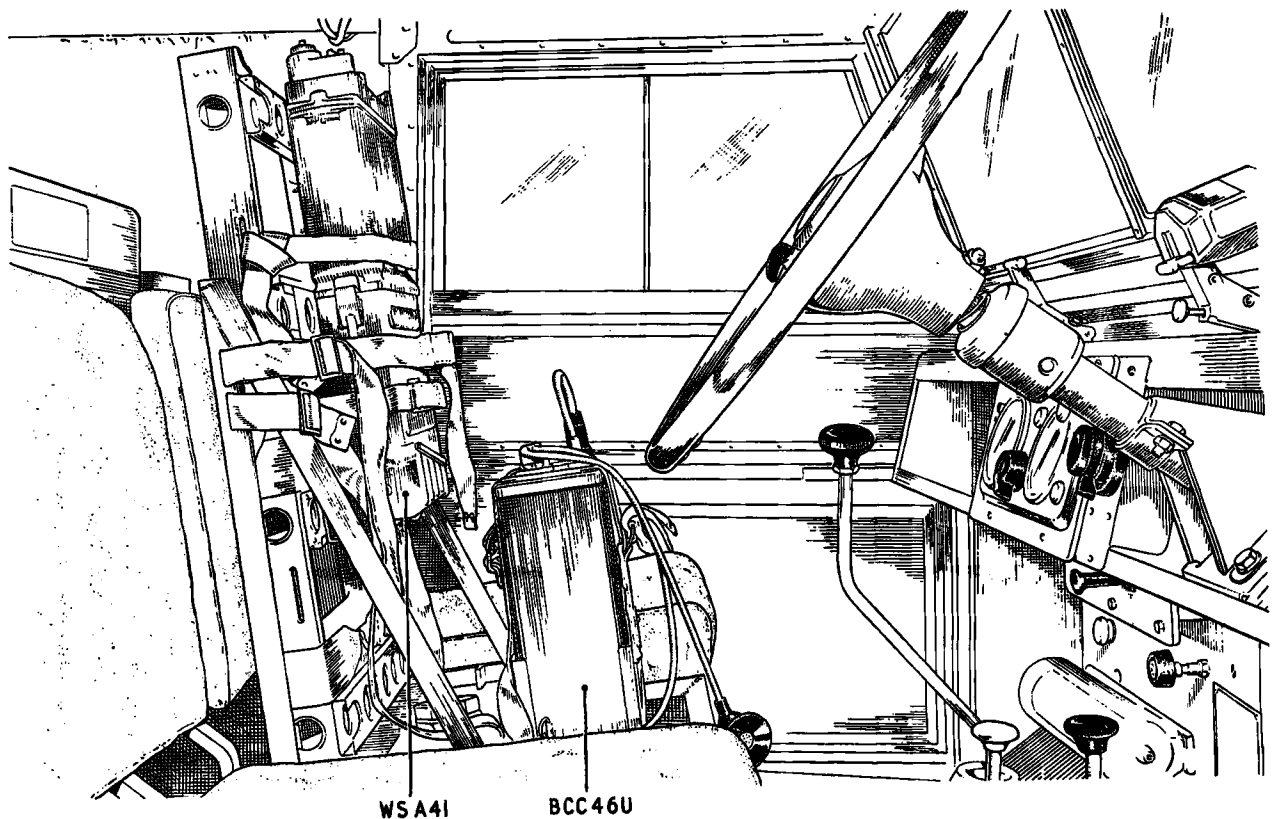


FIG. 3 VIEW OF A 41 AND BCC 46U IN STOWED POSITION

(4) SR C11/R210

The wireless sender C11 and its associated reception set R210 is installed in the  $\frac{1}{2}$ -ton trailer and is used for the air support formation net. Full descriptions of the sender and the reception set are contained in the user handbooks issued with the Sets. (See table of associated publications on page V.) The sets have the following facilities, plus additional features not required in this station.

(a) Transmitter C11

The C11 is an HF AM transmitter for voice or CW hand speed keying operation with a frequency coverage of from 2 to 16 Mc/s. On high power its output is 40-50W and on low power 3-10 W.

Over average terrain, between moving vehicles with 12 ft. rod aerials, a WS C11 working on high power to a Reception Set R210 can be expected to cover a range of approximately 25 miles (voice) or 50 miles (CW keying).

Working on low power these ranges are halved. At night they are also approximately halved.

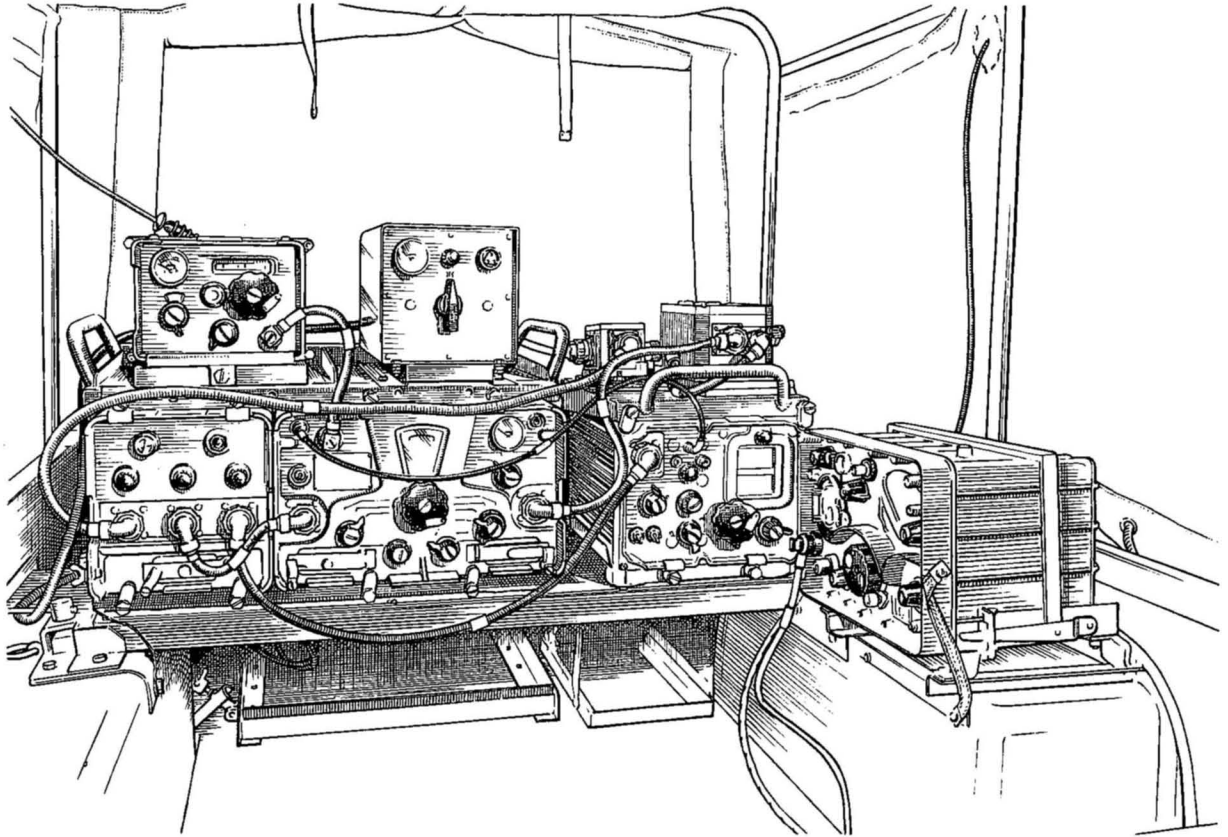
(b) Reception Set R210

The R210 receives AM, CW or MCW signals in the frequency range of from 2 to 16 Mc/s. It is connected to the same aerial and power supply as the WS C11 with which it is associated although provision is made for separate connections if required. Its audio output is connected to the control harness via the W.S. C11.

(5) Reception Set R209 Mk. 2

This reception set is installed in the trailer and is used primarily for the reception of 'TAC R' meteorological broadcasts on a fixed wavelength. This reception set is not connected to the wireless control harness, headgear being attached direct to it. It has an independent 12 volt power supply and aerial.

The frequency range of the R209 Mk. 2 extends from 1 to 20 Mc/s.



**FIG. 4 VIEW OF RADIO EQUIPMENT IN TRAILER**

### Section 3. Aerials

For normal operation of the wireless sets in a mobile role the following rod aerials would be used:-

- |                                     |  |
|-------------------------------------|--|
| (1) <u>C48</u>                      | Wide band UHF Derveaux type aerial mounted on an aluminium plate fitted on top of the canvas hood and superstructure of the 1/4-ton truck (see Fig. 5 on page 10). |
| (2) <u>BCC.46.U</u>                 | Special rod aerial fitted with plug base and threaded collar for attachment to aerial termination on set. This aerial is supplied with the set.                    |
| (3) <u>C11/R210</u>                 | 12-ft. rod aerial (three 4 ft. antennae rod 'F' sections). The sender and receiver use the same aerial.  |
| (4) <u>Reception Set R209 Mk. 2</u> | 12-ft. rod aerial (as above)   |
| (5) <u>A41</u>                      | 4-ft. rod aerial.  |

Section 4. Power Supplies

(1) In the truck

Four 12V/75 Ah batteries are carried, one pair being connected in series to form Battery No. 1 and the other pair being similarly connected to form Battery No. 2.

The two pairs of batteries are connected to a power distribution unit which in turn is connected to the vehicle power take off.

A 27.5 volt DC output from the power take-off is obtained from an alternator and rectifier unit which forms part of the vehicle.

Dependent on the switching of the power distribution unit, either pair of batteries may be switched for operation whilst the other pair is being charged. Alternatively both pairs may be simultaneously float-charged.

These batteries provide the power supply for the operation of W.S. C48 only.

(2) In the trailer

Five 12V/75 Ah batteries are carried in the trailer, two being connected in series to form the operational battery for the C11/R210 and two being similarly connected to form a stand-by supply source.

The two pairs of batteries are connected to a power distribution unit similar to that installed in the truck. This panel provides battery switching facilities for the installed trailer equipment.

A 1260 Watt charging set (Onan) is carried in the trailer and is connected to the power distribution unit for battery charging.

The remaining 12V/75 Ah battery is solely for power supply to the reception set R209 Mk. 2. This battery is connected direct to the reception set and not via the distribution unit. When necessary this battery must be replaced with a fully charged one and recharged under unit arrangements.

Power supplies for the operation of W.S. BCC.46.U are obtained from two 1.5 volt LT batteries and two 45 volt HT batteries contained in the set case.

The current drain on transmission is 0.6A for LT and 26 mA for HT.

On reception the current drain is 0.75A for LT and 24 mA for HT.

The approximate continuous working time is twelve hours, assuming transmission time at 10%.

Power supply for the operation of the A41 is obtained from a dry battery contained in the set case. The battery provides HT at 137 and 67 volts and LT at 1.4 volts. The working life of the battery is between 15 and 20 hours depending on use.

Section 5. Layout of Equipment

A complete station, installed in the truck and trailer is distributed as detailed in the following paragraphs. This ensures that both the truck and trailer are self contained units and can be operated independently when necessary.

Although the process of packing the wireless equipment for dropping by parachute would involve repositioning many items, the distribution between the vehicles would remain unchanged.

(1) In the truck

A table mounted across the body of the truck carries the C48 and its associated control unit, the power distribution unit and the harness boxes J1 and LT distribution 4 way No. 4. Beneath the table are four batteries, connected in pairs for 24 volt power supplies. The wide band Dervaux type aerial is mounted on a metal plate over the canvas top of the truck and is supported by four insulated pillars mounted on four posts which are clamped into tubular sockets fitted to the sides of the vehicle. The central passenger seat, next to the driver's seat, has been removed and a two-set stowage frame has been installed in its place, this frame provides a mounting position for the A41 complete on its manpack carrier, and also stowage for the BCC.46.U. The general arrangement is shown at Fig. 2.

For parachute dropping the aerial assembly is unclamped and removed from its sockets and stowed with the canvas tilt and support hoops whilst the units on the table are removed and stowed on the floor to reduce the overall height to below that of the vehicle body.

In the trailer

The C11/R210 equipment, together with its associated aerial tuning unit and harness boxes are mounted on a table fitted across the wheel arches of the trailer. A power distribution unit similar to that installed in the truck, is also mounted on the table.

The reception set R209 Mk. 2 is housed in a carrier set No. 48 fitted on the right hand wheel arch towards the rear of the trailer.

A double battery carrier is fitted in each of the rear corners of the trailer and the operator's seat, mounted on top of a small locker is secured in position between the two battery carriers. A single battery carrier is installed in the right hand forward corner of the trailer and a carrier to hold one jerrican is fitted against the forward right hand wall immediately behind the single battery carrier position. Another jerrican carrier is fitted in the forward left hand corner of the trailer, this carrier also provides a stowage position for a one-gallon oil container. The 1260 watt Charging set is secured on the floor space between the jerrican carriers. An aerial base No. 31 mounted on a metal support fitted to the left hand side of the trailer is provided for, the C11/R210 equipment. A similar assembly is fitted on the right hand side of the trailer for the reception set R209 Mk. 2.

Section 6. Main items of Equipment

The main items of fitted equipment, less the inter-unit connectors, are shown in Tables 1 and 2. Screws and nuts as required are provided in linen bags attached to the various Carriers, mounting plates etc.

Certain additional packaging materials are required when the station is prepared for parachute dropping, these should be obtained on indent in the normal way.

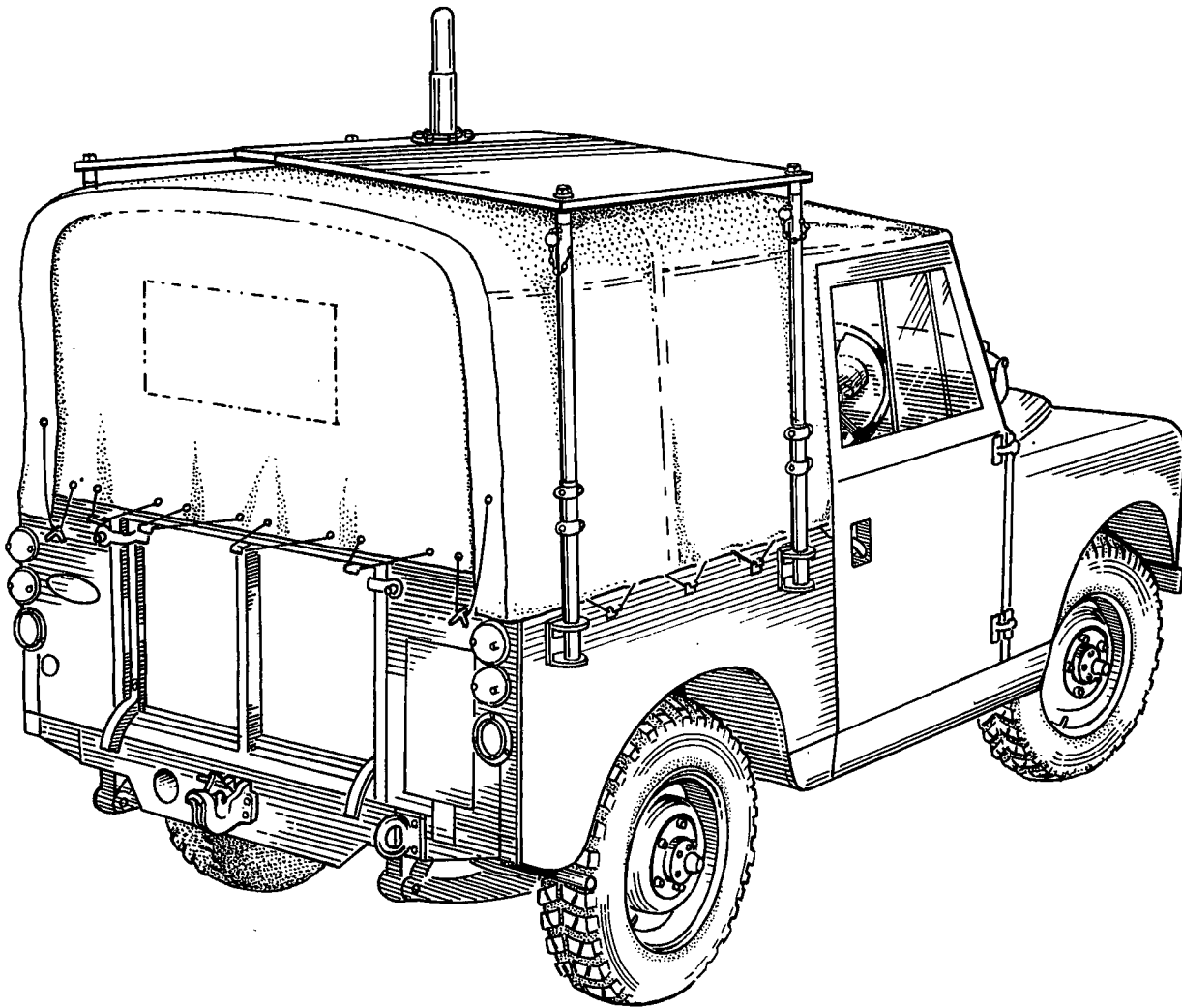
Table 1 - The Truck

Item	No. off per kit
Aerial, wide band UHF Derveaux type	1
Aerial mounting plate	1
Aerial mounting plate support and bracket assy.	4
Battery secy port 12V 75 Ah	4
Box Junction 4-Way No. 4 (ZA 46982)	1
Carrier battery 17 $\frac{1}{2}$ -in. (ZB14743)	2
Floor plate	1
Frame, mounting power distribution unit	1
Frame, mounting W.Set C48	1
Frame, mounting W. Set C48 Control Unit, J1 Box and Junction dist box	1
Frame Battery Carrier	2
Junction Box 1 set J1-24V (ZA 46288)	1
Locker, metal	1
Plate assembly stiffening 12-in. x 3-in. (ZB 14916)	4
Runner assembly 19-in. x 5-in. 3 $\frac{1}{2}$ -in. pairs	1
Seat assemblies, folding	2
Support Electronic Equipment	1
Table top 4'2-in. x 16 $\frac{1}{2}$ -in x 3.1/8-in.	1
Units, power distribution	1
A41	1
BCC.46.U	1
C48, including control unit	1

TABLE 2 - TRAILER  $\frac{1}{2}$ -TON

Item	No. off per kit
Aerial Base No. 28 R209 (ZA 41843)	1
Aerial Base No. 31 (C11) (ZA49827)	1
Aerial Base and Bracket Assembly No. 3 (ZA 53000)	1
Aerial Tuning Unit No. 7 (C11) (ZA 46321)	1
Baseboard, plywood	1
Batteries, secy. port. 12V 75 Ah	5
Brackets, Mounting Aerial Base 37 $\frac{1}{2}$ -in.	2
Cans, jerrican	2
Carrier, jerrican	2
Carrier, power distribution unit	1
Carrier set No. 48 (ZA 30242)	1
Carrier set No. 81	1
Carrier set No. 82 Mk. 1	1
Carrier, Battery secy. port. No. 33 (ZB 14923)	1
Carrier, Battery 17 $\frac{1}{2}$ -in. x 16-in. (ZB 14743)	2
Chair, tubular frame 20-in. x 17-in.	1
Charging Set 1260 Watt	1
Clamps MS 1-in. x 1-in. x 1.1/4-in. x 11/32-in. grip (ZB 14904)	10
Clamp support assembly	2
Cover, Canvas SD/C 187974	2
Frames, securing Charging Set 1260 Watt	1
Interconnecting box 4-way No. 1 (ZA 51311)	1
Junction box 1-set J1 (ZA 46288)	1
Locker, metal (seat mounting)	1
Mountings, aerial base 37 $\frac{1}{2}$ -in. (ZA 54532)	2
Plate assemblies 17 $\frac{1}{2}$ -in. x 5.3/4-in. pairs	1
Reception Set R209 Mk. 2	1
Reception Set R210	1
Supply metal hoopstick (ZA 39685)	3
Supply Unit Transformer Rotary Input 24V (ZA 46320)	1
Table	1
Tiebar metal 35.1/8 x 5/8-in. (ZA 39686)	4
Transmitter C11	1
Tray assembly MS 13-in. x 10.5/8-in. x 1.15/16-in. (ZB 14927)	1
Tray metal 22.3/4-in. x 13.1/8-in. x 5.1/8-in.	1
Units, power distribution control	1





**FIG. 5 C48 AERIAL ASSEMBLY ON ROOF OF TRUCK**

# CHAPTER 2

## OPERATION

### Section 7. General

The A41 and the BCC 46.U, installed in the truck, have their respective microphone and headgear assemblies connected directly to the sets and full instructions for the operation of these two sets are contained in the relevant user handbooks issued with the equipment. Reference numbers of the user handbooks are shown on page V of this publication.

In the case of the C48 the output of the set is connected to the associated microphone and headgear assembly via a 'B' type harness junction box J1 - 24 volt and a box junction 4-way No. 4 and certain additional instructions for checking the equipment together with preliminary setting up and operating instructions are given in the following sections.

### Section 8. Controls of C48

Normally all the controls of the C48 are those on the front panel of the C48 Control unit. In this installation the control unit is fitted inside an hermetically sealed case and ON/OFF switching and terminations are mounted on the right hand side of the outer case and the panel controls are preset before closing the outer case.

The panel controls are as follows:-

(1) Channel selector switch CHAN

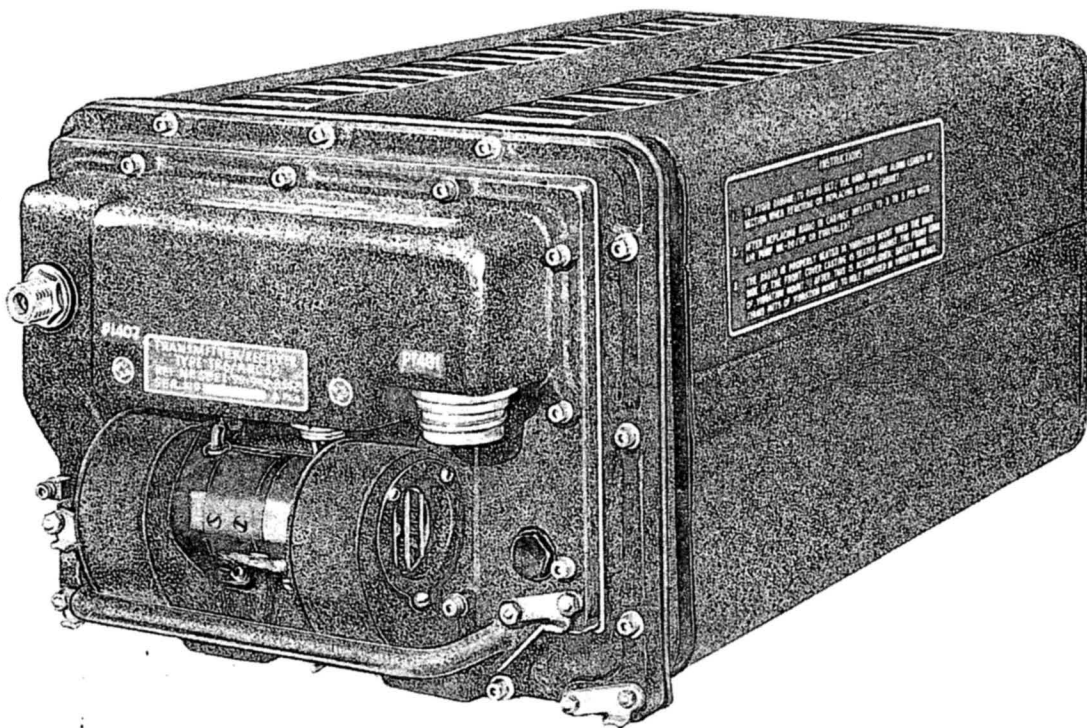
This is a 20-position rotary type switch, positions number 1 to 18 being for the preset channels of operation, position M being for manual control and position 'G' being for a guard frequency normally set at 243.0 Mc/s.

(2) Manual frequency controls

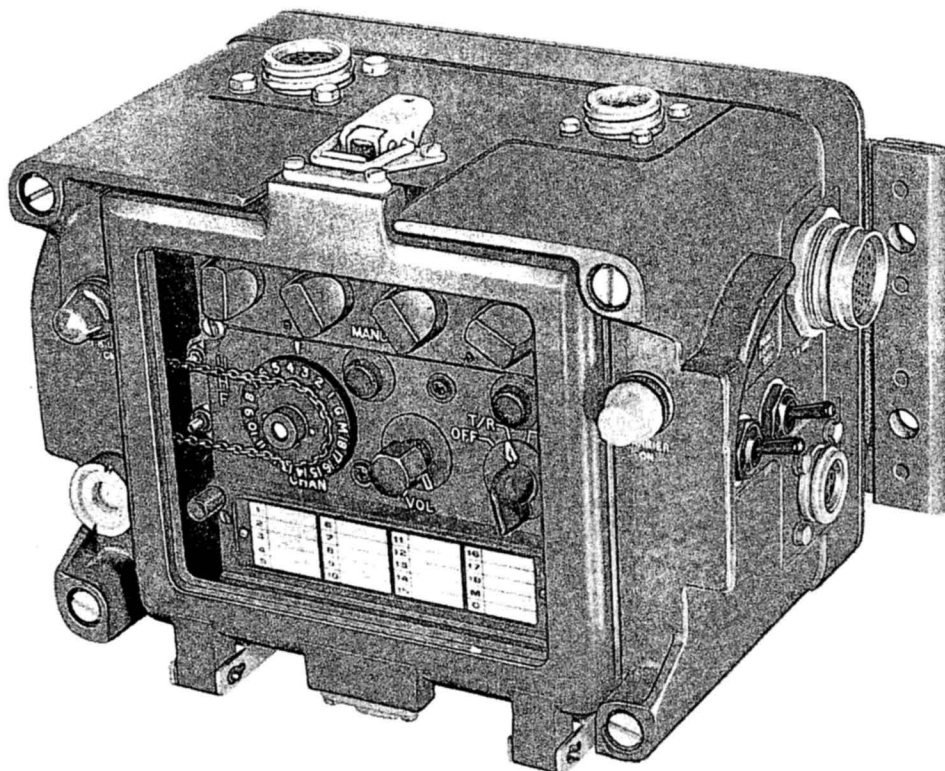
The four control knobs and indicators at the top of the front panel can be used to manually select the operating frequency when the channel selector switch CHAN is at the M position. When the switch is not in the M position the manual selectors do not affect the operating frequency.

(3) Volume control VOL

This normally permits the level of the audio signal in the telephones to be set at the required level. In this installation the control can be set at maximum i.e. fully clockwise and the level is adjusted by the GAIN



**FIG. 6 C48 TRANSMITTER/RECEIVER**



**FIG. 7 C48 CHANNEL SELECTOR AND CONTROL UNIT**

control of the junction box J1 which is mounted on the carrier frame above the control unit assembly.

(4) System switch OFF-T/R-T/R+G-ADF

The four facilities controlled by this switch are as follows:-

(a) OFF

In this position the power supplies are switched off.

(b) T/R

In this position the power supply is switched on and the equipment is automatically set for reception purposes. When it is required to transmit the pressel switch of the microphone must be operated.

(c) T/R+G

The guard frequency receiver is switched on in addition to the facilities given by (b) above.

(d) ADF

This position is used in conjunction with DF equipment.

As previously stated the above controls have to be preset before the outer case is closed, therefore the channel frequencies are preset as described in Section 9 below, the volume control is turned to maximum and the system switch is set at the T/R position, the other operational positions not being required for use with this installation.

(5) Controls on the outside of the case

The controls and terminations on the outer case are as follows:-

(a) Channel Change

On the left hand side of the case is a large knob linked by chain to the channel selector switch. This enables the channel to be changed without opening the sealed case.

(b) Inter-connector termination

A 42 point multi-socket termination is fitted on the right hand side of the sealed case for connecting supplies and outputs from the C48.

(c) Headset

A 6-point socket termination fitted below the multi socket ((b) above) provides a means of attaching a microphone and headset assembly to the unit when required. For the purpose of this installation the normal connection of the microphone and headset assembly will be via the junction

box J1 mounted on the framework above the control unit.

(d) Panel Light ON/OFF switch

This switch, mounted on the right hand side of the sealed case, controls the panel lights on the front panel of the control unit.

(e) T/R ON/OFF Switch

This switch, mounted by the side of the panel light switch, (4) above, controls the power supplies to the set. With this switch at the ON position the set is operational for reception.

The pressel switch of the microphone controls the transmitter.

(f) Indicator Lamps

A red indicator lamp T/R ON fitted on the front left hand side of the case gives visual indication of the set being switched on.

A green indicator lamp, CARRIER ON, fitted on the front right hand side of the case gives indication of received carrier.

(g) Humidity Indicator

This indicator is fitted on the left hand front of the outer case, and is provided to give indication of excessive moisture inside the case.

Section 9. Setting up pre-set channels of C48

For the purpose of this installation the C48 control unit is contained in a hermetically sealed outer case with the two main ON/OFF switches mounted on the right hand side of the case. The normal controls of the unit are mounted on the front panel and are visible through the glass front of the outer case. The pre-set selector controls are behind the hinged cover plate on the lower part of the front panel.

To obtain access to the setting up scale release the two spring catches of the outer case and open the glass front to expose the hinged cover plate and unscrew the two milled-headed screws securing the cover plate. Fig. 8 shows the control unit with cover plate open.

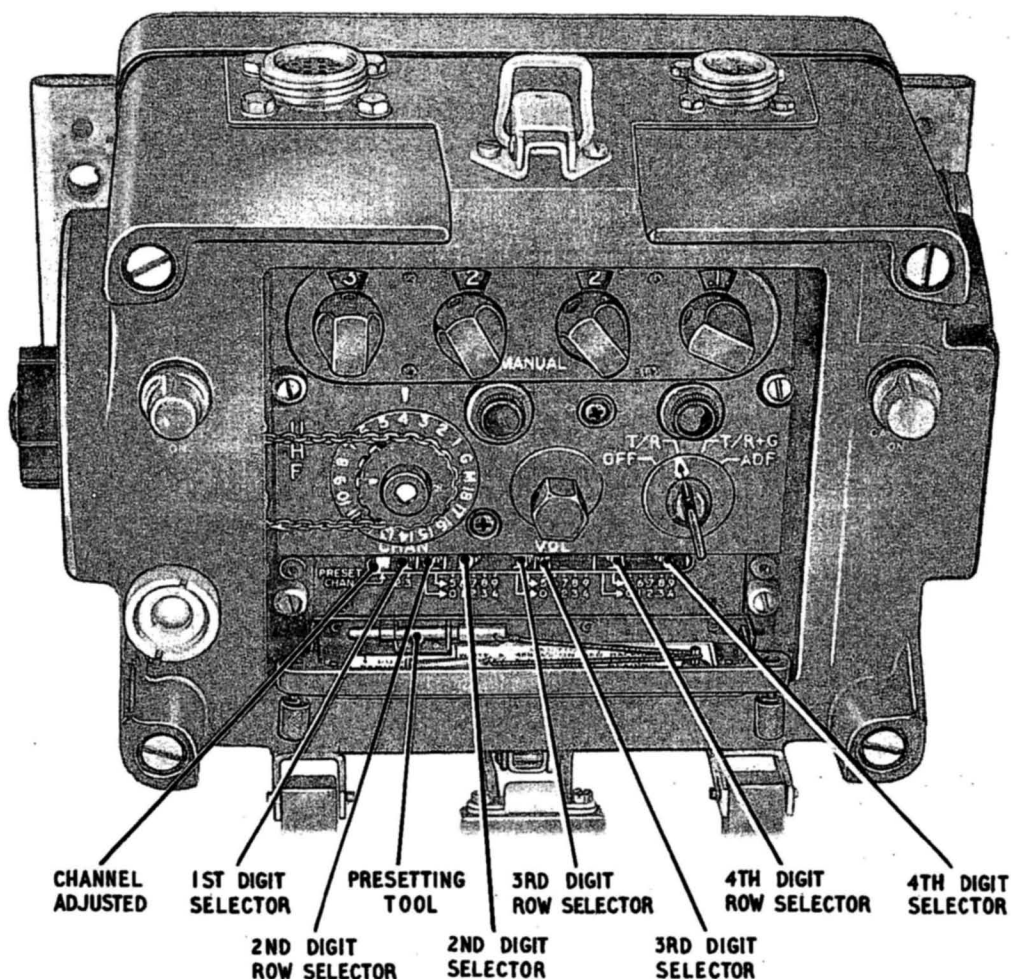
The channel to be set up is indicated by a white number on a red background at the extreme left hand end of the scale. Ignoring the numbers engraved on the channel selector switch, rotate the switch until the figure of the required channel appears on the adjusting scale. Because of the method used for setting up purposes the number appearing on the scale will not correspond with the switch position during this procedure.

Setting up is done by means of switch actuators mounted on a drum, there being one bank of actuators for each channel. A special pre-setting tool (See Fig. 8) is provided for sliding the actuators to the required positions. The actuators operate switches inside the control unit.

The adjusting scale has four groups of digits and, reading from the left hand to the right hand side, they represent the frequency in Mc/s as follows:-

The first group consists of digits 2 and 3, these represent the hundreds of Mc/s within the frequency range of 225.0 Mc/s and 399.9 Mc/s. One actuator is used to select either the 2 or 3 as required.

The second group consists of two rows of five digits which represent the tens of Mc/s within the frequency range. Two actuators are used with these digits, one to select the row in which the required digit lies and the other to select the actual digit.



**FIG. 8 C48 CHANNEL SELECTOR SYSTEM**

The third group is similar to the second group but represents units of Mc/s.

The fourth group is also similar to the second group but represents the tenths of Mc/s.

The actual setting up procedure is as follows assuming that Channel 7 is to be set up to a frequency of 351.5 Mc/s:-

- (1) Power supplies need not be switched off during the setting up.
- (2) Rotate the channel switch until channel number 7 appears in the aperture at the extreme left of the adjusting scale i.e. opposite the arrow pointing to PRESET CHAN.
- (3) Remove the pre-setting tool from its stowage and set up the actuators in sequence, commencing from the left hand side of the scale as follows:-
  - (a) Hundreds, Mc/s, digit 3 first group. Set the first actuator over the digit 3.
  - (b) Tens Mc/s digit 5, second group. Set the second actuator over the arrow pointing to the upper row which includes digit 5, and set the third actuator over digit 5.
  - (c) Units Mc/s digit 1, third group. Set the fourth actuator over the arrow pointing to the lower row of figures which includes digit 1 and set the fifth actuator over digit 1.
  - (d) Tenths Mc/s digit 5, fourth group. Set the sixth actuator over the arrow pointing to the upper row of figures containing digit 5 and set the seventh actuator over the digit 5.
  - (e) The frequency of each channel, as it is set up, should be recorded on the front of the hinged cover plate.
  - (f) The remaining channels can be set up to required frequencies by first setting the PRESET CHAN so that the required channel number appears in the PRESET CHAN position and repeating the instructions (3) (a) to (e) above.

#### Section 10. Aerial Erection

##### (1) C48 Vehicle Aerial

The aerial for use with the vehicle mounted WS C48 is the UHF wide band stub aerial already mounted on a large metal base plate and fitted over the roof of the vehicle on four insulated pillars. A coaxial lead in with a right angle adapter from the underside of the dipole should be connected to the aerial input socket in the top left hand corner of the front of the WS C48 transmitter/receiver unit.

##### (2) C48 Elevated Aerial

A separate aerial assembly, contained in a transit case and stowed in the vehicle has been designed for use with the WS C48 when it is required to operate as a ground station.

(3) C11/R210 Rod Aerial

Aerial rod sections are contained in a carrying case stowed as a loose item in the vehicle.

- (a) Assemble an aerial of the required length using Antennae rod 'F' sections. Tables showing the frequency coverage of the various lengths are given in the user handbook for WS C11.
- (b) Fit the completed aerial length into the Aerial base No. 31. This aerial base is situated on the left hand side of the trailer.

NOTE: A 16 ft. rod aerial can be used when the station is operating from a static position but the rod aerial should never exceed 12 ft. when the station is mobile.

(4) Reception Set R209 Rod Aerial

- (a) Assemble a rod aerial 12 ft. in length using three antennae rod 'F' sections.
- (b) Fit the aerial into the Aerial base No. 28 mounted on the right hand side of the trailer.

(5) A41 Rod Aerials

Aerial rod sections for this wireless set are carried stowed in the canvas carrying case strapped to the side of the set carrier. Two aerial lengths are supplied, a 4 ft. for mobile operation and a 10 ft. for ground station operation.

Both aerials are made up of tapered tubular sections with a flexible retaining wire running through the inside.

Separate aerial input terminations are provided on the wireless set.

Detailed instructions for the selection and erection of the aerials are contained in the user handbook issued with the wireless set.

(6) BCC 46 U

The aerial supplied with this wireless set is a flexible stranded wire aerial, 30 inches in length, fitted at one end with an insulated coaxial socket which fits the aerial input termination of the set.

Section 11. Preliminary Check of Installed Equipment

These preliminary checks should be made by an operator to ensure that the installation is in working order. The equipment gives visible or audible indications that it is operating satisfactorily. If it does not give the correct indication, or if the operator is unable to obtain the correct indications by using the resources at his disposal and from the suggestions given in the text, the fact should be reported in the normal way.



The radio sets should be allowed to warm up for at least five minutes, or fifteen if possible.

If the tests are to be carried out during periods of wireless silence, make sure that the C11 POWER switch is at LOW. Ensure that the coaxial connector is fitted between the C11 and ATU No. 7. Then temporarily disconnect the lead from the ATU to the aerial base before switching the set to 'Send'. Reconnect it immediately after the tests.

The C11 should never be switched to 'Send' when it is not connected to the ATU. It must not be switched to high power 'Send' when the ATU is not connected to the aerial.

(1) Test No. 1. Check Power Distribution Unit Output (in 1/4 Ton Truck and Trailer)

(a) Switch Position

Set ON/OFF switch of power distribution unit (See Fig. 10) to the required supply source, i.e. BTY No. 1, BTY No. 2 or FLOAT CHARGE.

(b) Correct Indication

Output voltage should be indicated on the meter of the unit.

(c) If Meter Does Not Read

(i) Check connections from power source to unit.

(ii) Check unit fuse and replace if necessary.

(iii) If (i) and (ii) satisfactory, probable internal fault which should be reported in the usual way.

(2) Test No. 2. Check Power Supply to J1 (In 1/4 Ton Truck and Trailer)

(a) Switch positions (See Fig. 9)

J1 centre switch	:	NORMAL
J1 left hand switch	:	SET

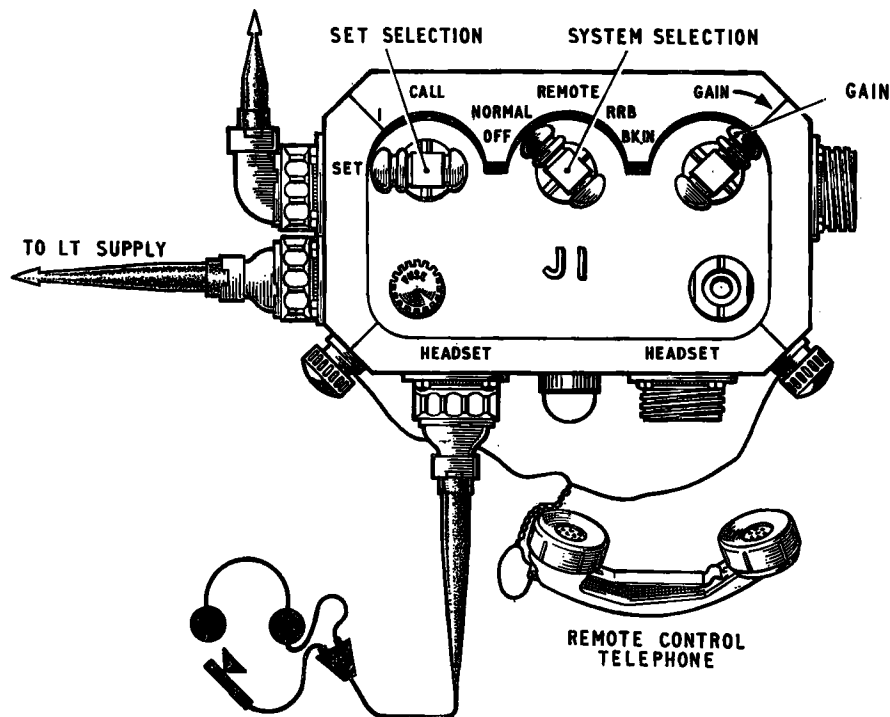


FIG. 9 J1 BOX CONTROLS AND TERMINATIONS

(b) Correct Indications

Red indicator lamp on J1 lights. If necessary rotate the red lamp cover as this forms a dimming device.

(c) If the Indicator Lamp Does Not Light

Check the following details, switching the J1 off before fitting replacements.

- |                             |  |
|-----------------------------|--|
| (i) <u>Connections:</u>     | Check battery connections referring to the table on pages 30 and 35.   |
| (ii) <u>Fuse:</u>           | Fit a new 2A 250V cartridge type fuse in J1. Suitable spares are supplied in Case spare parts No. 49. Replace the cap and screw on firmly. |
| (iii) <u>Lamp:</u>          | Fit a new 28V lamp of the same pattern as the original.  |
| (iv) <u>Internal Fault:</u> | If connections, fuse and lamp are serviceable and the lamp does not light, an internal fault is indicated. Report this in the normal way.  |

(d) Note

It is possible to work the send-receive circuits and intercomm if the fuse on J<sub>1</sub> has blown, or even with the J<sub>1</sub> switched OFF, but this should not be done as there will be no calling buzz on the intercomm circuit.

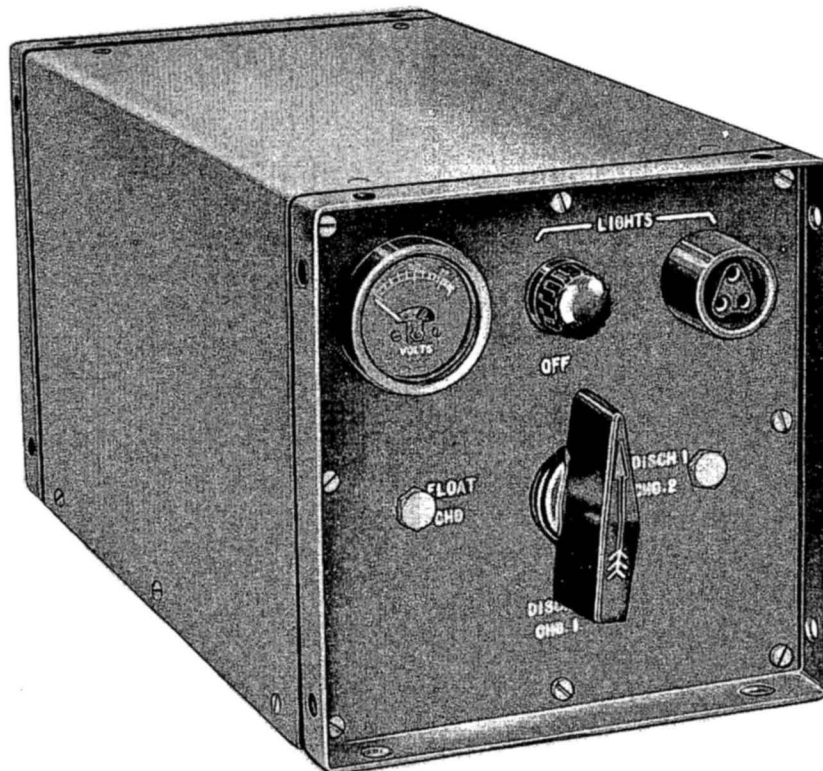
(3) Test No. 3. Check Power Supply to WS C48 in 1/4 Ton Truck

(a) Switch positions

- (i) ON/OFF switch of power distribution unit (see Fig.10) set to required supply.
- (ii) TR/ON switch, on right hand side of control unit to ON.
- (iii) PANEL LIGHT switch to ON.

(b) Correct Indications

- (i) Red Indicator lamp on front of control unit lights.
- (ii) The generator of the set can be heard running.
- (iii) Front panel controls of the control unit should be illuminated.



**FIG. 10 POWER DISTRIBUTION UNIT**

- (c) If the Indicator Lamp Does Not Light
- (i) Check power supply connector between interconnecting box 4-way No. 1 and control unit.
  - (ii) Suspect faulty indicator lamp. Fit new lamp of same type.
- (d) If Indicator Lamp Lights but Set Generator Fails to Run
- (i) Check connection between control unit and transmitter/receiver.
  - (ii) Suspect internal fault and report in normal way.
- (e) If Tests (c) and (d) above are Satisfactory but Panel Controls are not illuminated
- (i) Faulty lamps or lamp circuit. As the unit must not be opened by other than authorised personnel the fault must be reported in the normal way.

(4) Test No. 4. Check Power Supply to C11/R210 (in Trailer)

(a) Switch positions

J1 centre switch	: NORMAL
C11 Power high-low switch	: LOW
C11 meter switch	: LT x 5
Supply unit OFF/ON switch	: ON
R210 OFF/ON switch	: ON and LIGHTS

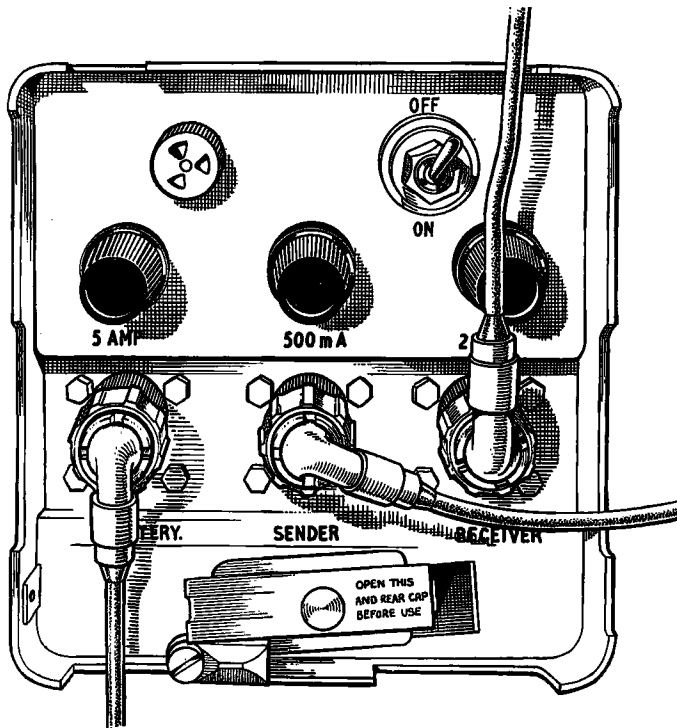


FIG. 11 C11 SUPPLY UNIT TRANSFORMER ROTARY

(b) Correct Indications

Supply unit red indicator lamp lights  
WS C11 meter shows battery voltage (multiply reading by 5)  
R210 scale window illuminated.

(c) If the Red Indicator Lamp on the PSU does not Light

- (i) Connections: Check battery connections referring to page
- (ii) Fuse: Fit a new 5A fuse in the supply unit BATTERY circuit.
- (iii) Lamp: Fit a new 12V 3.6W lamp of the same type as the original.
- (iv) Internal Fault: Report.

(d) If the Meter does not Indicate the Required Battery Voltage

- (i) Fuse: Fit a new 500 mA fuse in the supply unit SENDER circuit
- (ii) Batteries: Fit fully charged batteries if those in the installation are discharged.
- (iii) Internal Fault; Report

(e) If the R210 Scale Window is not Illuminated

- (i) Fuse: Fit a new 2A fuse in the supply unit RECEIVER circuit.
- (ii) Internal Fault: Report
- (iii) Note: The scale window is not illuminated when the R210 ON-OFF switch is at ON.

(5) Test 5. Check Dial Lamps

(a) Switch positions

C11 tuning LOCK control : anti-clockwise  
ATU tuning LOCK control : anti-clockwise

(b) Correct Indications:

Scale window illuminated, tune control free.

(c) If the Scale Windows are not Illuminated(i) C11

Fit a new 12V lamp of the same type as the original, or report an internal fault in the unit.

(ii) ATU No. 7

Report an internal fault. The lamp cannot be changed without opening the sealed unit.

(d) Note

The lamps are switched OFF when the LOCK control is turned clockwise.

(6) Test 6. Tune C11-R210

- (a) Attach the required number of headsets to the Mk. 4 headset sockets on the J1 and on Adapter unit 'T'. Screw the locking rings down firmly by hand. Check that the snatch release plug and stud fasteners are correctly fitted.
- (b) With the J2 switched on, tune sender and receiver as instructed in the separate user handbooks. See that the ATU is correctly adjusted. If correct results cannot be obtained, check the following operations.

(7) Test 7. Check C11 System Switch(a) Switch positions

C11 system switch (see Fig. 12). : Turn to SENDER ON, then to CW and finally to VOICE CFS.

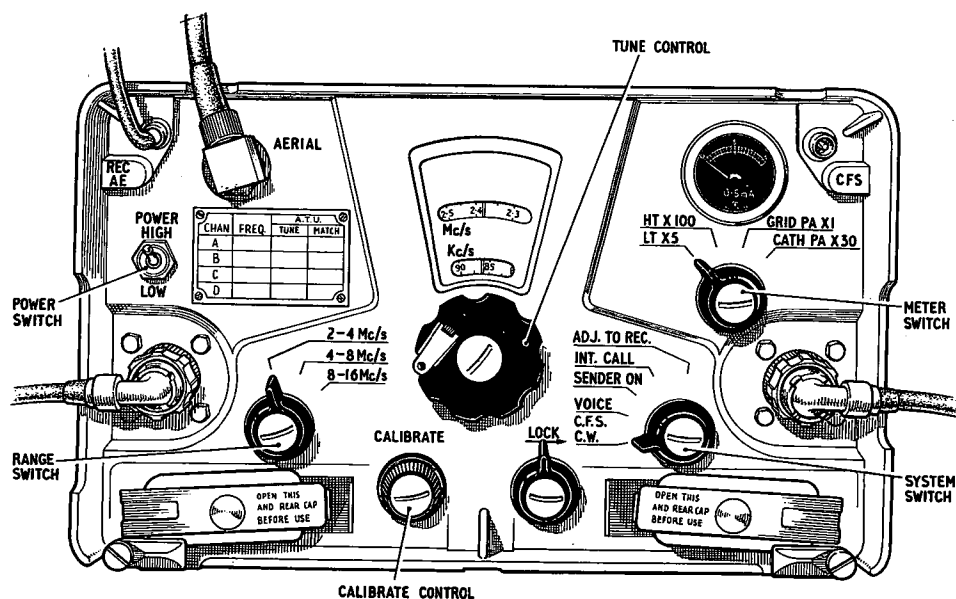


FIG. 12

C11

(b) Correct Indications

At SENDER ON the rotary transformer in the PSU starts running and the ATU meter needle is deflected. At CW the rotary transformer runs and the C11 meter needle is deflected. At VOICE CFS the transformer does not run and the meter needles are at zero.

(c) If No Response in Supply Unit or ATU No. 7

- (i) Connections: Check connections to supply unit and ATU  
(ii) Internal Fault: Report.

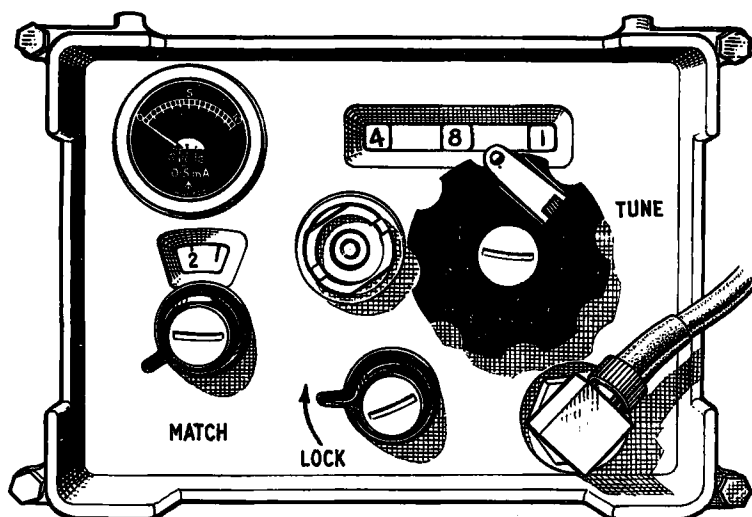


FIG. 13 AERIAL TUNING UNIT No. 7

(8) Test 8. Check WS C11 on 'Send'(a) Switch positions

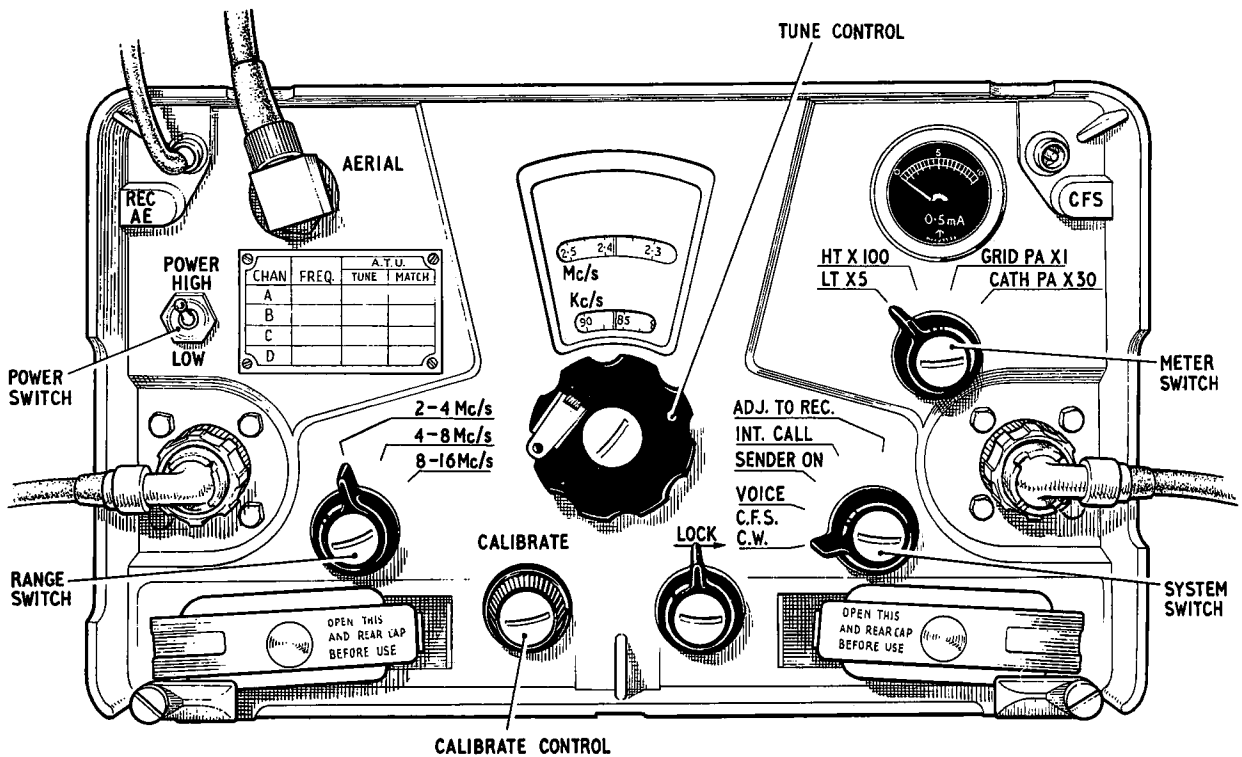
J1 left hand switch	:	SET
J1 centre switch	:	NORMAL
C11 system switch	:	VOICE-CFS
C11 meter switch	:	HT x 100
Microphone pressel	:	Press

(b) Correct Indications

As the pressel is pressed:

- (i) Rotary transformer in PSU starts running
- (ii) C11 meter deflected.
- (iii) ATU meter deflected.

Speech or whistling in the microphone, audible as side-tone in earphones, causes ATU meter needle to fluctuate slightly.



**FIG. 14 C11 CONTROLS**

(c) If All the above Indications are not obtained

- (i) Microphone: Change the headset assembly for a replacement known to be serviceable.
- (ii) Internal Fault: Report

(d) Note

On releasing the pressel switch both meters return to zero and the rotary transformer stops running.



(9) Test 9. Check R210(a) Switch positions

J1 centre switch	:	NORMAL
J1 set selector switch	:	SET
J2 GAIN control	:	Adjust as necessary
R210 GAIN control	:	Fully clockwise
R210 ON and LIGHTS switch	:	ON
R210 NOISE LIMITER switch	:	OFF
R210 SYSTEM switch	:	AGC
R210 BAND switch	:	Turn through positions 1 to 7

(b) Correct Indications

Set receive noise audible in earphones as set warms up. As the BAND switch is turned a white background strip moves into position behind the scale for the selected band.

(c) If there is No Set Receive Noise

- (i) Fuse: Check the fuse in the R210 and fit a replacement of the same type as the original.
- (ii) Headset: Change the headset assembly for a serviceable replacement.
- (iii) Internal Fault: Report

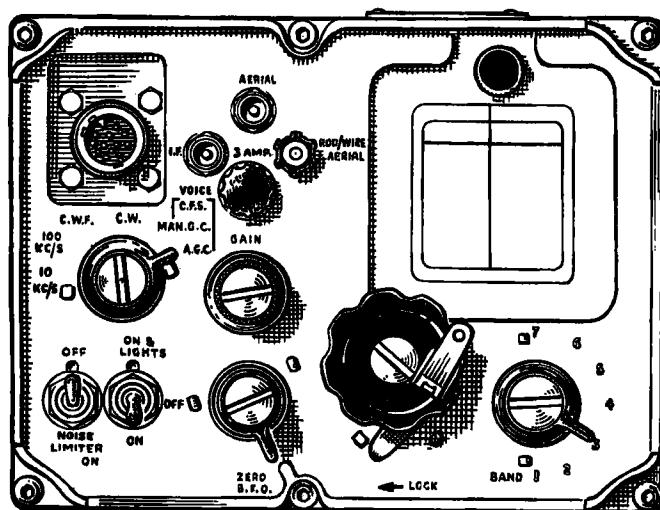
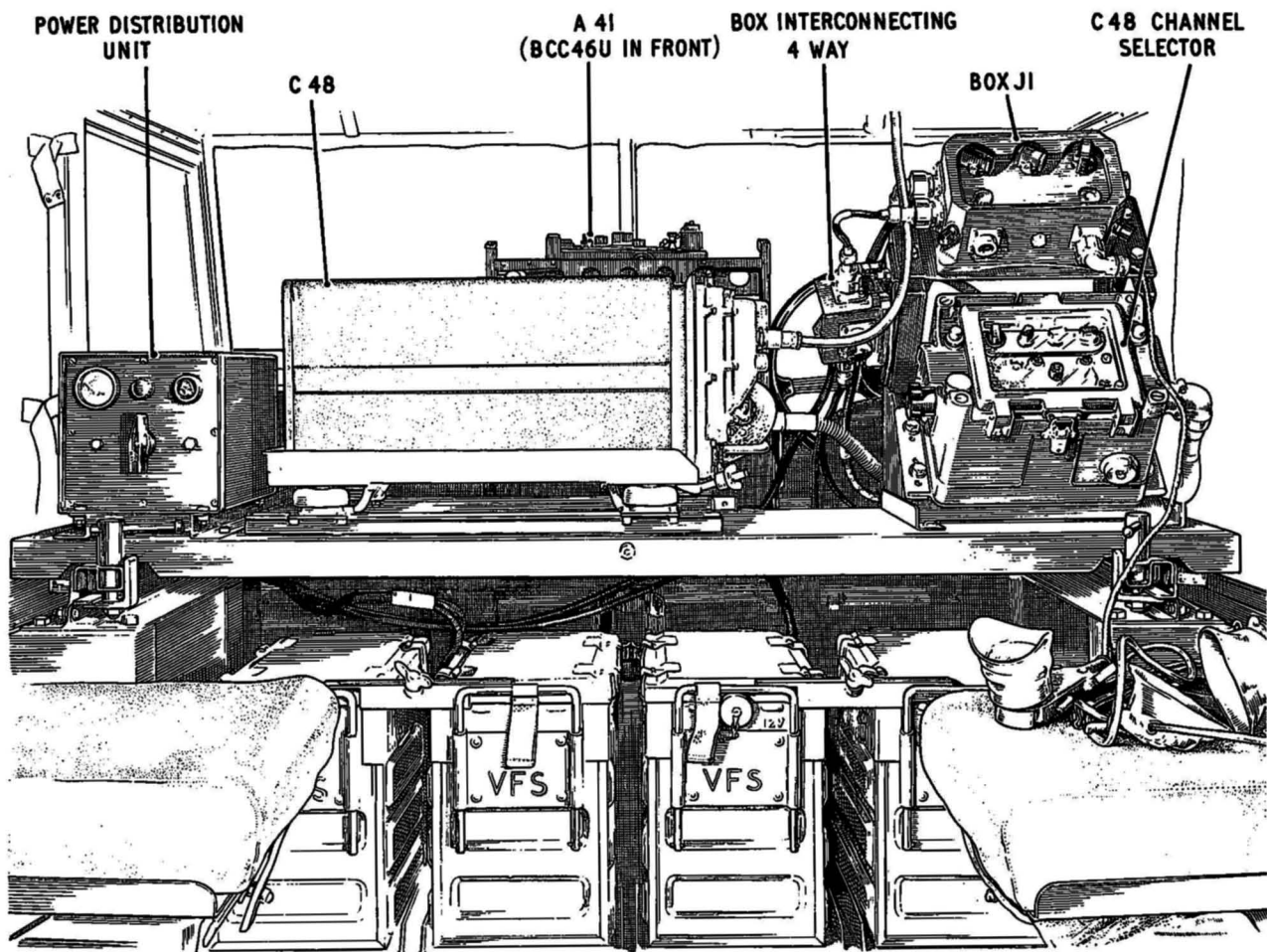


FIG. 15 RECEPTION SET R210-CONTROLS

(10) Test 10.    Check Remote Control  
                           (Truck and Trailer)

(a) In Truck

- (i) Connect the remote control handset to the remote control terminals on J1.
- (ii) Switch on power to the C48 via the power distribution unit.
- (iii) Operate left hand switch of J1 to SET and centre switch to REMOTE.
- (iv) Set TR/ON switch of the C48 control unit to the ON position.
- (v) Operate pressel switch of the handset. The transmitter should be heard to operate and sidetone should be heard in phone when speaking or blowing into microphone.
- (vi) If operation is unsatisfactory, check connection between J1 box and the remote handset and check for faulty handset.



**FIG. 16 RADIO EQUIPMENT IN ¼ TON TRUCK**

(b) In Trailer

- (i) Connect the remote control handset to the remote control terminals of the J1.
- (ii) Switch on power to the C11/R210 equipment via the power distribution unit.
- (iii) Operate left hand switch of J1 to SET and the centre switch to REMOTE.
- (iv) Check that system switch of the C11 is at VOICE/CFS.
- (v) Switch C11 PSU to the ON position.
- (vi) Operate pressel switch of the remote handset. The transmitter will be heard to start and the needle of the ATU No. 7 will be deflected.
- (vii) If no satisfaction is obtained check connection between the J1 box and the remote handset and check for fault in the handset.

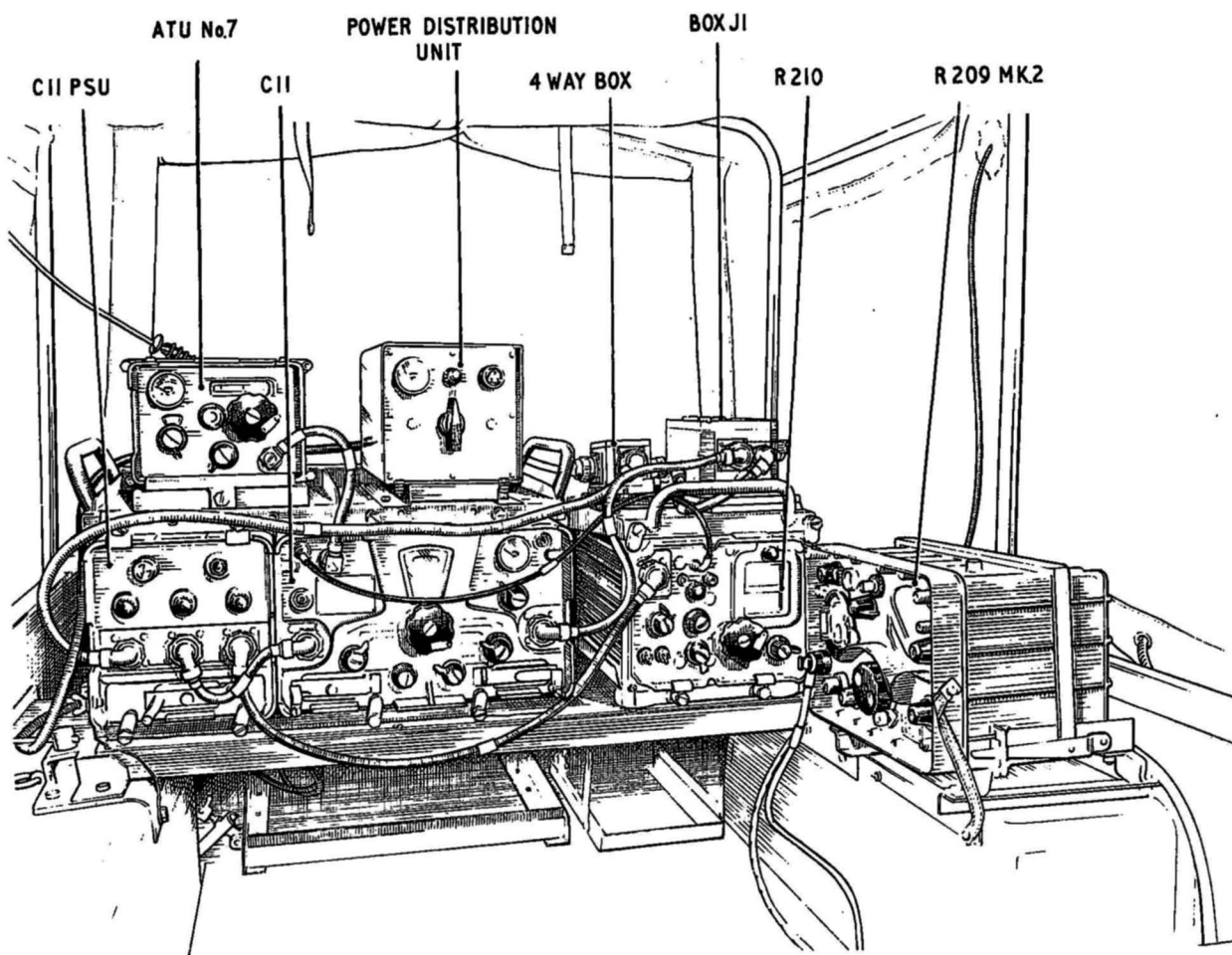


FIG. 17 RADIO EQUIPMENT IN  $\frac{1}{2}$  TON TRAILER

(11) Test 11. Check Call Circuit on Remote Telephone

(a) Switch positions

J1 centre switch	REMOTE
Remote telephone CALL button	: Press, pause and release

(b) Correct Indications

Calling buzz audible in all earphones while button is pressed.

(c) If there is no calling buzz

- (i) Telephone: If possible, change the telephone handset.
- (ii) Internal fault: Report

(12) Test 12. Checking Reception Set R209

The R209 in this installation is not connected to any control harness and is operated from an independent 12 volt DC battery.

Routine check of this set should be carried out in accordance with the instructions contained in the relevant user handbook.

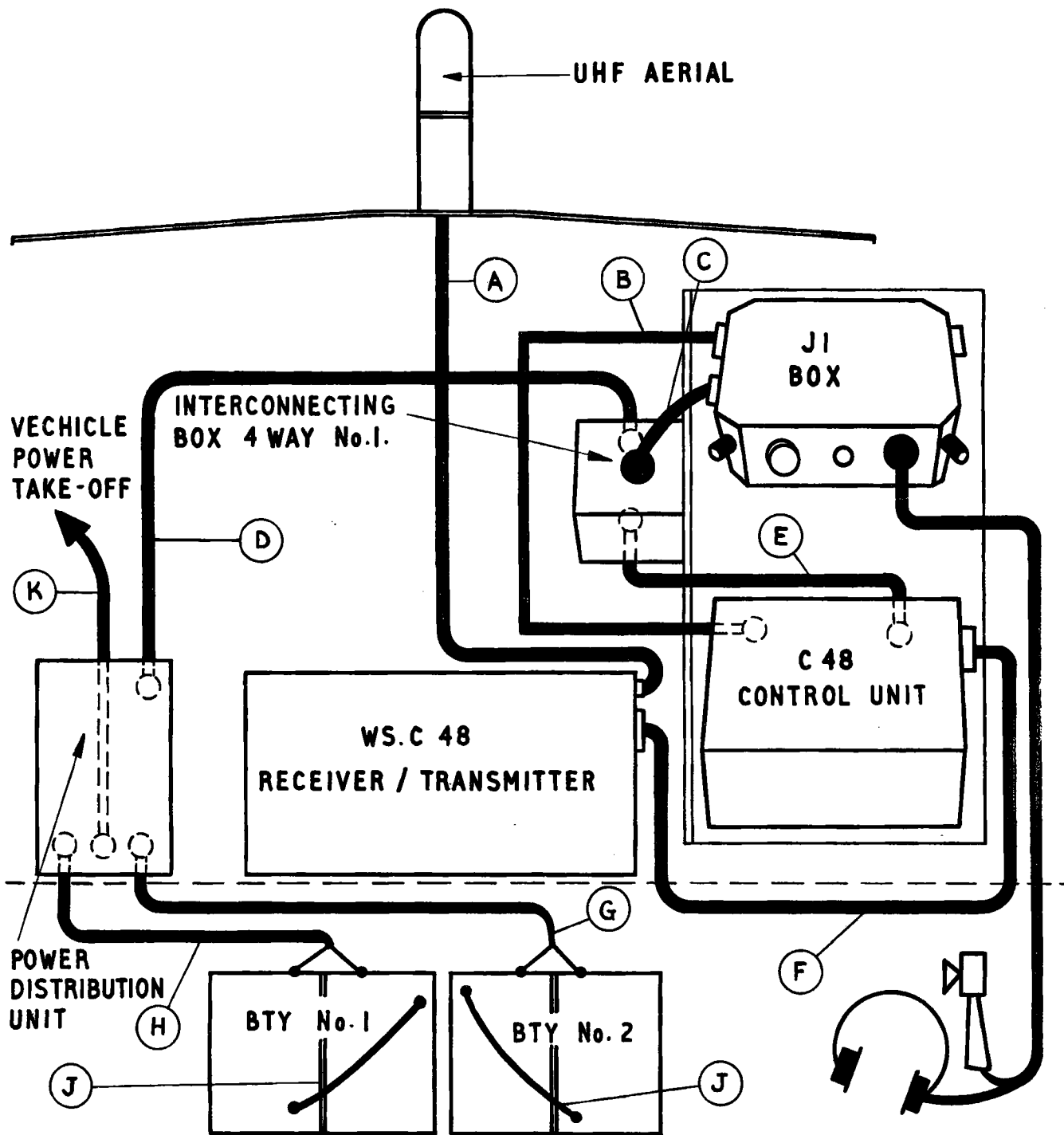
(13) Test 13. Checking the A41

The A41 is self-contained and is carried in the vehicle in a stowed position. Routine checks and operation of this set should be carried out in accordance with the instructions contained in the relevant user handbook supplied with the set.

(14) Test 14. Checking the BCC 46 U

This set is self-contained and is carried in a stowed position in front of the A41 on the front seat next to the driver's position. Check its operation in the following manner.

- (a) Operate the ON/OFF switch on the front of the microphone to ON. Set noise should be heard in the attached phones.
- (b) With the ON/OFF switch at the ON position press the pressel switch on the top edge of the microphone and speak into the mouthpiece. Side tone should be heard in the phones.
- (c) If no results are obtained check battery voltages and replace batteries if necessary. If no results are obtained with renewed batteries an internal fault exists and should be reported immediately.



A	CONNECTOR COAXIAL.	F	CONNECTOR MULTI 41 PT.
B	CONNECTOR 12 PT.	G	CONNECTOR 4/2 PT.
C	CONNECTOR 2 PT.	H	CONNECTOR 4/2 PT.
D	CONNECTOR 2 PT.	J	CONNECTOR SINGLE (2 OFF).
E	CONNECTOR 2 PT.	K	CONNECTOR 4/2 PT.

FIG. 18. INTERCONNECTION OF WS.C 48 EQUIPMENT IN TRUCK.

### Section 12. Operation of the C48 Equipment

With the units inter-connected as shown in the diagram at Fig. 18 proceed as follows:-

- (1) Set the rotary switch of the power distribution unit to the required position, i.e. DISCHARGE 1 or DISCHARGE 2. The meter will indicate battery volts.
- (2) Operate the T/R ON-OFF switch, on the right hand side of the control unit case, to ON. The red indicator lamp on the front of the control unit should light. Allow 30 seconds for the valves of the set to warm up.
- (3) Set the channel selector switch to the required channel.
- (4) Operate the right hand switch, on the front of the associated J1 box to the 'SET' position and set the centre switch on the box to NORMAL. The red indicator lamp on the lower edge of the box should light.
- (5) Set the GAIN control of the J1 box at a midway position. This control may have to be adjusted to give the required level of sound when the first received signal is heard in the headphones. The CARRIER ON (green) indicating lamp will light when carrier is being received.
- (6) Transmission is effected on the same channel by operating the pressel switch of the microphone.

### Section 13. Operation of C11/R210 Equipment

Full operating instructions for the C11, the Reception Set R210 and the Reception Set R209 Mk. 2 are contained in the user handbooks issued with each set. Reference numbers of all associated user handbooks are shown on page v of this publication.

Make sure that the air inlets and outlets on the C11 and its associated PSU are open before switching on. In addition to the inlets on the front panels each unit has an air outlet at the rear of the case.

WARNING

THERE IS A VERY HIGH VOLTAGE ON THE AERIAL SYSTEM WHEN THE WS C11 IS IN OPERATION. PAY ATTENTION TO THE FOLLOWING PRECAUTIONS:-

DO NOT touch the antennae rod, the aerial base No. 31 nor the insulated aerial terminal of the associated ATU No. 7 whilst the Sender is switched on, or you will receive a severe RF burn.

DO NOT allow the connector from the Aerial base No. 31 to the ATU No. 7 to touch any metal parts or it may be burnt. This connector is protected by plastic insulators to keep it clear from metal parts.

If the rod aerial is touching a power wire, DO NOT reach up to free the aerial. Just tow the trailer clear of the wires.

NEVER change aerials near overhead wires.

#### Section 14. Voice Send-Receive Working

- (1) Turn the left hand switch on Junction box J1 to SET and the centre switch to NORMAL. The indicator lamp on J1 should glow.
- (2) With the required number of headsets attached to the harness, switch on and tune the wireless set for operation as instructed in the separate user handbooks. Send-receive facilities are now available at the headset positions on the harness, all headsets being connected in parallel.
- (3) Adjust the gain control on Junction box J1 as necessary to raise or lower the level in the earphones.

NOTE: The above instructions apply to both the C48 and the C11/R210 equipment.

#### Section 15. Intercommunication

- (1) The intercomm facility may be found useful when a remote control handset or a headset extension lead is fitted.
- (2) Put the Power distribution unit switch to an ON position. The C11 PSU must be switched on to provide an intercomm amplifier in the trailer installation and the C48 set must be on to provide an intercomm amplifier for the truck.
- (3) On J1 turn the left hand switch from SET to 'I'. If the remote operator is to be included in the intercomm circuit, turn the centre switch on J1 to REMOTE.
- (4) To call operators, turn and hold the set selector switch on J1 to position CALL. This causes an audible buzz in all headsets attached to the harness. An operator hearing the calling buzz then answers the call. The original caller, having allowed the call switch to return to 'I', speaks on the intercomm circuit.
- (5) The remote operator can call on the intercomm circuit by pressing his handset call button. This causes a buzz in all headsets, including those on send-receive working.

#### Section 16. Remote Control

- (1) Additional connections for remote control consist of D10 twisted pair field cable fitted between the terminals on the J1 and the remote control telephone handset. Screw the terminals down firmly by hand. For remote control, correct polarity is not essential and either wire can be attached to either terminal. At the wireless set end, do not allow the free ends of the cable

to protrude from the terminals, or bare strands of wire may come into contact with the metal case or with connector terminations.

- (2) On the Junction box J1 turn the centre switch to REMOTE and the left hand switch to SET. The operator at the remote control point can then listen to normal operation of the radio set by the local operator and can break in and transmit at any time merely by pressing the pressel switch on the telephone handset.
- (3) Switch positions RRB and BK IN on the J1 are for remote rebroadcasting and are not used in this installation.



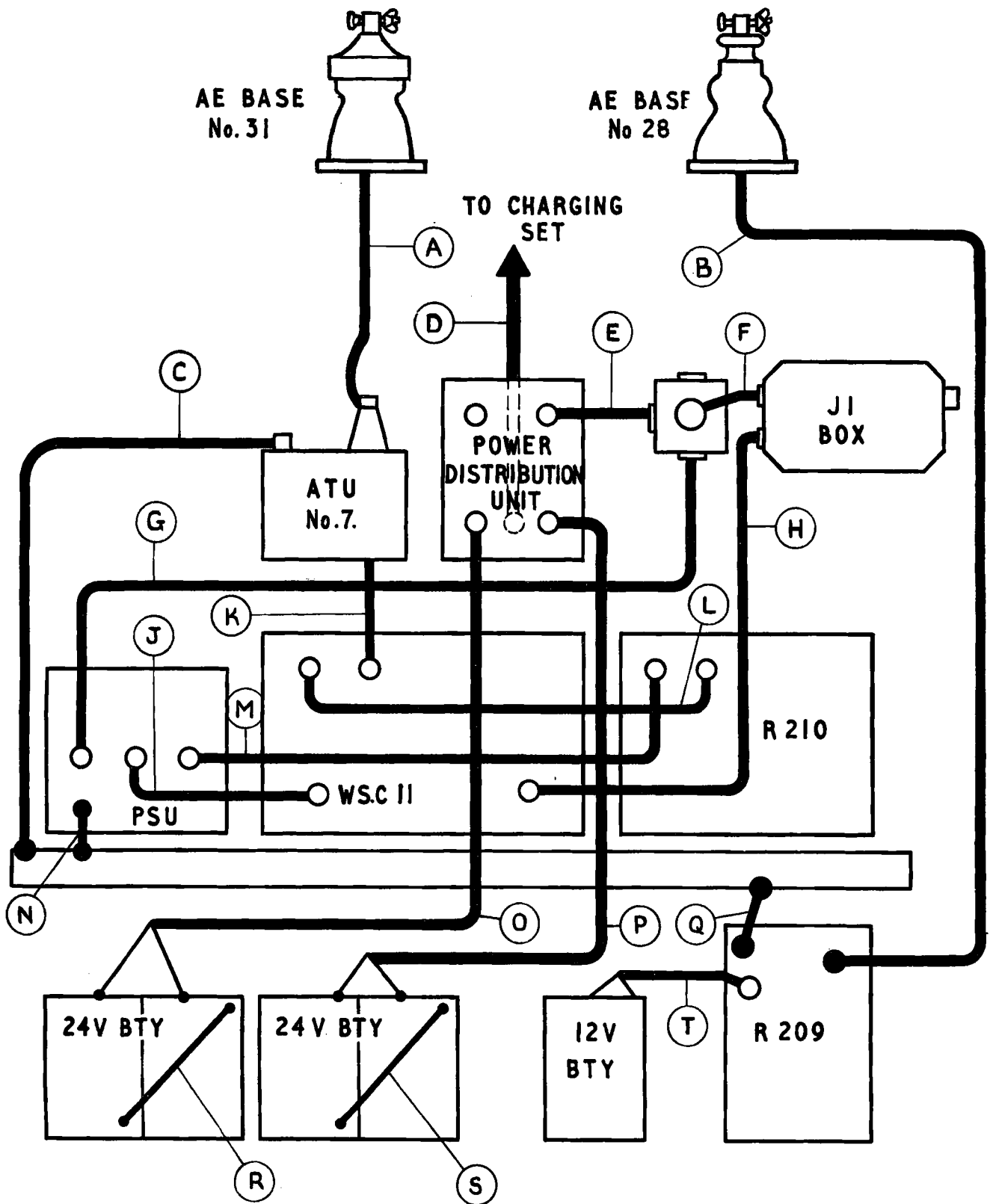


FIG. 19. INTERCONNECTION OF WS. CII/R 210 - R 209 IN TRAILER.

Section 17. Connectors in Trailer

Table 3 is a list of connectors used with the installed wireless equipment in the trailer and should be read in conjunction with Fig. 19 opposite. The connectors used in the truck are shown at Fig. 18 ( page 30).

Table 3 - Interconnection of Equipment in Trailer

Fig. 19 Ref.	Connector	Position
A	Connector Single No.226 3-ft. (ZA 51691)	Aerial Base No. 31 to ATU No. 7
B	Connector Single No. 31	Aerial Base No. 28 to R209
C	Connector Copper Braid	ATU No. 7 earth terminal to table
D	Connector 4/2 Pt. 30' long	Power distribution unit to Charging Set
E	Connector 1'9" Type c/c	Power distribution unit to Inter-connecting box 4 way No. 1
F	Connector twin No. 400, 1 ft. type F/F (ZA49894)	Interconnecting box 4 way No. 1 to J1 Box
G	Connector 4 pt. No. 99, 3'3" type F/C (ZA51168)	Interconnecting box 4 way No. 1 to C11 PSU
H	Connector 12 pt. No. 85, 1'6" (ZA51170)	C11 output to J1 Box
J	Connector 12 pt. No. 90 - 7 in. type H/B (ZA46824)	C11 PSU to power input of C11
K	Connector Coaxial No. 120, 8-in. (ZA51323)	ATU No. 7 to C11
L	Connector Coaxial 2'3" (ZA55289)	C11 to Reception Set R210
M	Connector 12 pt. No. 100 2'3" type A/B (ZA51134)	C11 PSU to Reception Set R210
N	Connector Copper braid 8"	C11 PSU to screw on table
O	Connector 4/2 pt. 9-ft.	24 volt battery to Power distribution input No. 1
P	Connector 4/2 pt. 9-ft.	24 volt battery to Power distribution unit input No. 2
Q	Connector copper braid No.23 8-in. ZA 46985	Reception Set R209 earth terminal to screw on base frame.
R	Connector Single No.	Connects two 12V batteries in series to form 24 volt battery No. 1
S	Connector Single No.	Connects two 12V batteries in series to form 24 volt battery No. 2
T	Connector twin No. 282 (ZA 29060)	12 volt battery to Reception Set R209
U	Connector Copper Braid No.23 10-in. ZA 46904	Connector R210 to earthing point

Section 18. Stowage of Loose Items

Five haversacks are included in the station kit for the stowage of loose items such as spare connectors, remote handset microphone and headsets, etc. In addition a small locker forms the base of the operators seat in the trailer and small items can be stowed there.

When not in use the aerial rod sections should be stowed in their carrying cases.

# CHAPTER 3

## SERVICING

### Section 19. Servicing on the Task System

- (1) No installation can be expected to work properly unless it is kept in first class condition by regular servicing, conscientiously carried out. This servicing is the responsibility of the NCO or man who is in direct charge of the equipment and responsible for its operation, NOT of workshop or repair staffs, though workshop personnel may be called upon to carry out certain servicing tasks.
- (2) To guide the NCO or man responsible for servicing, and to ensure that it is done, it has been laid down that signal equipment will be serviced on the task system and that completion of each task will be recorded on Army Form B2664 - Operator servicing log.
- (3) A facsimile of this log is reproduced at the end of this handbook. Completion of servicing tasks will be recorded by initialling in the spaces provided on the front of the form; all repairs and replacements will be recorded on the reverse. The form lasts 24 weeks and replacements should be obtained on indent in the normal way. Current and completed forms should be kept in the pocket in the back cover of this handbook.
- (4) Servicing tasks to be carried out daily, weekly and monthly by the user are listed in the servicing chapters of the relevant user handbooks, which show the full servicing required for an installation in continuous use. In conditions where this does not apply, the frequency with which each task is carried out will be detailed by the Commander concerned.
- (5) The following additional servicing tasks are applicable to this installation and should be carried out as indicated.

### Section 20. Battery Servicing

#### (1) Servicing

Battery servicing should be carried out daily on an installation in constant use and weekly if the batteries are not being used continuously.

In the 1/4 ton truck four 12V 75 Ah batteries are carried connected together in pairs to provide two alternative 24 volt power supply sources.

In the trailer five 12V 75 Ah batteries are carried, four being connected in two pairs to give two alternative 24 volt power supply sources for the WS C11 equipment, the remaining one providing a separate 12 volt power source for the reception set R209.

Attend to battery servicing as follows:-

- (a) Ensure that battery connectors are firmly attached. Remove any corrosion from terminals, connecting plugs, sockets, etc. Examine battery leads and ensure that they are not frayed or chafed.
- (b) See that vent holes in filling plugs are clear.
- (c) Check the level of the electrolyte in each cell and add distilled water as necessary according to the instructions on the lids of the batteries. Dry off any spilt water.
- (d) Test the battery voltage with the junction box and the wireless set power supply unit switched ON, using the meter on the unit. If the voltage is below 22 volts, have them recharged. A battery should be recharged when the specific gravity of the electrolyte in any cell, read with a hydrometer, falls below approximately 1.18.
- (e) Do not allow batteries to stand in a discharged condition.

## (2) Connections

When making battery connections always fit the series connector first, and then complete positive and negative connections. The reason for this is that if the negative connection is made first and the series link is then connected to the positive terminal of the same battery, the other end of the series link can, by touching any surrounding metal, cause a heavy short circuit on this battery. The chances of such short circuits occurring are increased by the use of metal cased batteries.

## (3) Battery Charging

### (a) In the 1/4 ton Truck

The two pairs of batteries are connected to the vehicle power take-off via the FLOAT CHARGE position of the switch of the power distribution unit.

The engine of the vehicle must be running to give this charging facility.

### (b) In the Trailer

Charging facilities for the two banks of 24 volt batteries are provided by the 1260 watt charging set carried in the trailer. The single 12 volt battery is not connected in the charging circuit and must be charged under unit arrangements when necessary.

The two banks of 24 volt batteries must not be float charged, i.e. the wireless equipment must not be used whilst charging is being carried out.

A 4/2 pt. charging connector, 30 feet in length, is carried stowed in the trailer; when commencing charging operations the 1260 watt charging set must be taken from its stowage position in

the trailer and placed in a convenient position on the ground within the limits of the charging connector length, the Mk. 4 socket of the connector must be attached to the 4-pin plug marked CHARGING SET on the back of the power distribution unit and the two lugs on the other end of the connector must be attached securely to the charging set output terminals. Care should be taken to ensure that correct polarity is maintained, i.e. that the red lead of the connector is attached to the positive (+) terminal and the black lead is attached to the negative (-) terminal.

Detailed instructions for the operation of the 1260 watt Charging Set are contained in the user handbook issued with the set.

### Section 21. Routine Servicing

#### DAILY

- (1) Keep the radio equipment and all associated units clean, dry and free from dust.
- (2) Keep headsets in the haversacks provided for the purpose when they are not in use, to protect them from damage.

#### WEEKLY

- (3) See that the ends of the rod aerial sections are clean and straight and that they fit together. Inspect the aerial base and leads for damage.
- (4) Check that good connections exist between the earth terminal on the wireless set and the vehicle chassis, and between the negative (-) side of the battery and the vehicle chassis. See that all earth bonding strips are in order.

#### MONTHLY

- (5) Inspect all detachable leads and connectors on the installation and ensure that they are correctly fitted and that insulation and terminations are in good order. Make sure that connectors have not become trapped or chafed by equipment in the vehicle.
- (6) Inspect all mounting frames, carriers, etc., particularly the aerial mountings and ensure that all screws and nuts are secure.
- (7) On the control harness boxes and units, all Mk. 4 plug and socket outlets not in use in this installation should be protected by screw-on plastic covers. See that these covers, which are held captive to the units, are in position.
- (8) Inspect the humidity indicator in the panel of the junction box J1 and observe its colour. If the indicator is bright blue, similar to the surrounding blue ring, the desiccator remains serviceable and the interior of the unit is dry. If the indicator has turned pink then the desiccator is exhausted and must be changed, for moisture inside the unit has been absorbed by the drying agent.

- (9) Report all units on which the indicator appears pink, in order that they can be sent to workshops as soon as possible, where drying apparatus is available and where a replacement desiccator of the correct type can be fitted. It is important to remember that when a desiccator is removed from a panel the interior of the unit is exposed and moisture and dust can enter. Therefore desiccators should only be changed under suitable dry conditions.
- (10) A replacement desiccator must be properly screwed in immediately an exhausted one is withdrawn and the rubber sealing ring must be correctly positioned to ensure that the sealing is effective. A replacement desiccator should not be taken from its sealed package until the moment it is to be inserted into a unit, or the atmosphere will affect its condition.

#### Section 22. Fault finding

- (1) External faults are much more common than internal trouble. If the radio station does not operate satisfactorily in the vehicle, first carefully check all connections in accordance with the diagram on page 54 and ensure that all terminations are correctly fitted.
- (2) Then see that all switches and controls on the equipment and control harness units are adjusted as instructed.
- (3) Radio technicians should refer also to the fault finding tables and test procedure given in the C11 or R210 user handbooks.
- (4) If a radio installation functional test set FT1 is available it can be used by the radio technician to locate a faulty unit or connector. Working instructions for the test set FT1 are supplied with it.

#### Section 23. Opening a sealed unit

- (1) Control harness boxes and wireless units are sealed and operators must not loosen any fixing screws or in any way attempt to remove cover plates from boxes or control units. Furthermore, none of the control knobs may be tampered with as the spindle sealing glands might become damaged thereby.
- (2) When adjustments or replacements are required which involve opening a sealed unit, the unit should be sent to workshops.
- (3) Royal Signals radio technicians may open a sealed unit for servicing, so far as their technical ability and the equipment and spares in their possession allows, subject to the following conditions:
  - (a) On the initiative of the technician, when absolutely necessary to restore essential communications, or
  - (b) On the authority of the Officer Commanding.

These are the only occasions when Royal Signals radio technicians may open a sealed unit.

- (4) If a sealed unit is opened in accordance with the above conditions, it should be done only in a clean and dry situation. Ensure that the risk of dust or dampness getting into the equipment is as small as possible.
- (5) The equipment must be sent to workshops for testing of the seals, and drying out if necessary, as soon as possible after an emergency opening.

Section 24. Case spare parts No. 49

- (1) This spares case forms part of the installation kit. It contains the following items, with quantities as shown.

Fuse link cartridge ceramic 500 mA 440V AC (X2/5920-99-059-0108)	- Qty	4
Fuse link cartridge ceramic 2-A 250V AC (X2/5920-99-059-0139)	"	4
Fuse link cartridge ceramic 2-A 440V AC (X2/5920-99-059-0110)	"	6
Fuse link cartridge ceramic 3-A 440V AC (X2/5920-99-059-0111)	"	4
Fuse link cartridge ceramic 5-A 440V AC (X2/5920-99-059-0112)	"	4
Lamp electric filament, 8V 1.2W MES tubular clear (X2/6240-99-995-1148)	"	3
Lamp electric filament, 12V 3.6W MES clear (Y3/6240-99-995-1246)	"	3
Lamp electric filament, 28V 0.04-A, midjet flange clear (X2/5920-99-995-9118)	"	3
Wrench key for internal hex 1/16-in.	- Qty.	1
Wrench key for internal hex 5/64-in.	- Qty.	1

- (2) As spares are used, replacements should be obtained through normal channels to maintain a complete spares kit. Do not put defective components back in the spares box.

Section 25. Control and switch knobs

- (1) If the Allen set screw in the knob of a switch or control becomes loose the knob will no longer turn the spindle and it may fall off. Tighten loose set screws by means of the appropriate wrench, making sure that the wrench fits exactly in the hexagon socket before applying pressure. If the wrong size wrench is used the wrench or the screw head may be damaged.
- (2) Two small wrenches are supplied in the Case spare parts No. 49, and the following table shows the correct size wrench for all knobs secured by Allen set screws.

Knob	Wrench size
Control harness knobs, two side set screws	1/16-in.
Control harness knobs, end set screw	5/64-in.

Section 26. Microphone and receiver headgear

- (1) Standard microphone and receiver insets

If a microphone, receiver or handset is suspected of being faulty it is possible that one or both diaphragm units have been damaged. These standard insets can be changed if suitable replacements are available. An inset suspected of being faulty should have its resistance checked with a suitable meter and it should be renewed if it does not conform to the requirements shown.



(2) Microphone hand SI No. 6

The Inset standard microphone E/M No. 1 fitted in this microphone is colour coded red with white band and its resistance should be approximately 40 ohms. To remove a microphone inset, undo the binding or clip so that the rubber mouthpiece can be pulled off to reveal the inset contained in a broad metal clip. The clip opens when the securing bolt is released, thus freeing the inset, which only needs detaching from the terminals.

(3) Receiver headgear SI double No. 1A

Insets standard receiver E/M No. 1 colour coded green with white band and having a resistance of approximately 40 ohms are fitted in the headgear assembly. To remove an inset from an earpad, detach the wire frame, then stretch the rubber until the aperture is large enough for the inset to pass through and finally release the inset from the terminals.

(4) Telephone hand SI remote control No. 1

To remove the insets from the handset, unscrew the cap retaining each one in position and detach it from its pair of terminals. Insets used in the hand set are as follows:-

(a) Microphone

Inset standard microphone carbon No. 1, colour coded red with black band and having a resistance varying between 100 ohms and 200 ohms when gently shaken.

(b) Receiver

Inset standard receiver E/M No. 1, colour coded green with white band and having a resistance of approximately 40 ohms.

(5) Interchangeability

A headset assembly will function when similar insets are used for earpiece and mouthpiece, but the performance will not be up to normal standard. Consequently, if the correct replacement inset is not available, either type can be used in lieu of the other as a temporary measure.

(6) Pressel switches

If a microphone or handset pressel switch is found to be faulty the complete assembly should be changed for a serviceable replacement.

# CHAPTER 4

## INSTALLATION

NOTE:- The left and right hand sides of the vehicle are those which would be assumed by a person sitting normally in the driver's seat.

### Section 27. Procedure

#### (1) Action by REME Workshops

Before the equipment can be installed in the truck and trailer the vehicles must be modified in accordance with the EMER modification instruction.

If REME assistance is obtained for carrying out the complete modification and equipment installation this user handbook and the complete installation kit should be sent to REME workshops.

If the vehicle modifications only are being undertaken by REME workshops the table tops and certain additional items of the installation kit should be sent with the vehicles for drilling and fitting in workshops prior to the user installing the equipment.

#### (2) Installation

After the vehicle modifications have been completed the kit should be installed in accordance with the instructions given in this chapter.

The instructions have been divided into two parts. Section 28 below covers the 1/4 ton truck installation and Section 29 page 50 covers the trailer.

### Section 28. The 1/4 ton Truck Installation

#### (1) Vehicle Modifications

These entail changing the existing springs and shock absorbers of the truck for a heavier type and carrying out certain drilling modifications on the body. The set of heavy duty springs and shock absorbers are issued with the installation kit, these should be extracted from the kit and sent with the vehicle to workshops to be fitted under the authorised instruction detailed by EMER Wheeled Vehicle No. Q029, Miscellaneous Instruction No.12.

The drilling modifications are authorised under EMER Wheeled Vehicle No. Q027 Modification Instruction No. 13.

The following is a summary of the various drillings and is not a detailed instruction as contained in the relevant EMER.

- (a) Two pairs of holes are drilled in each side of the vehicle walls and two pairs are drilled in the wall flange, immediately over those drilled in the wall, for fixing the aerial ground plane supports. In addition another hole is drilled towards the rear of each side wall in line with the rear pair of support holes and, together with one hole of the rear pair, provide a fixing position for the seat brackets fitted over the wheel arches.
- (b) Eight holes are drilled in each wheel arch for bolts securing the stiffening plates and table mountings.
- (c) Ten holes are drilled in the floor of the vehicle, the rear six being for tread plate fixing and the forward four for battery carrier baseplate fixing.
- (d) Three holes are drilled in the inner face of the rear cross member of the vehicle in line with the rear wheel for fixing the mudguard assemblies.

## (2) Preparing the Truck

It may be found convenient to remove the canvas hood from the rear position of the truck in order to improve accessibility to the interior during fitting operations. Release the straps and retaining cords and roll the canvas hood forward to open up the rear of the truck. Note that the hood must be replaced before the aerial plate assembly is positioned on its four supports.

The following items, fitted in the Rover truck when it is first issued, are not required in this installation and must be removed from the vehicle. Together with all fixing screws, etc. they should be adequately packed and labelled and should bear the number of the truck from which they were removed. They should be deposited in unit stores ready for replacement if the truck should revert to a normal role.

- (a) If not already taken out, remove the two complete seat and backrest assemblies from the rear wheel arches leaving the wheel arches clear.
- (b) Detach the chain and clamp by which the spare wheel may be secured to the cross member behind the centre seat.
- (c) If the spare wheel is fitted inside the truck remove the wheel and attach it to the alternative mounting on top of the vehicle bonnet. Secure it firmly in position.
- (d) Remove the cushion from the front centre seat. This will be re-positioned at a later stage of the installation fitting.

## (3) Installing the Equipment in the Truck

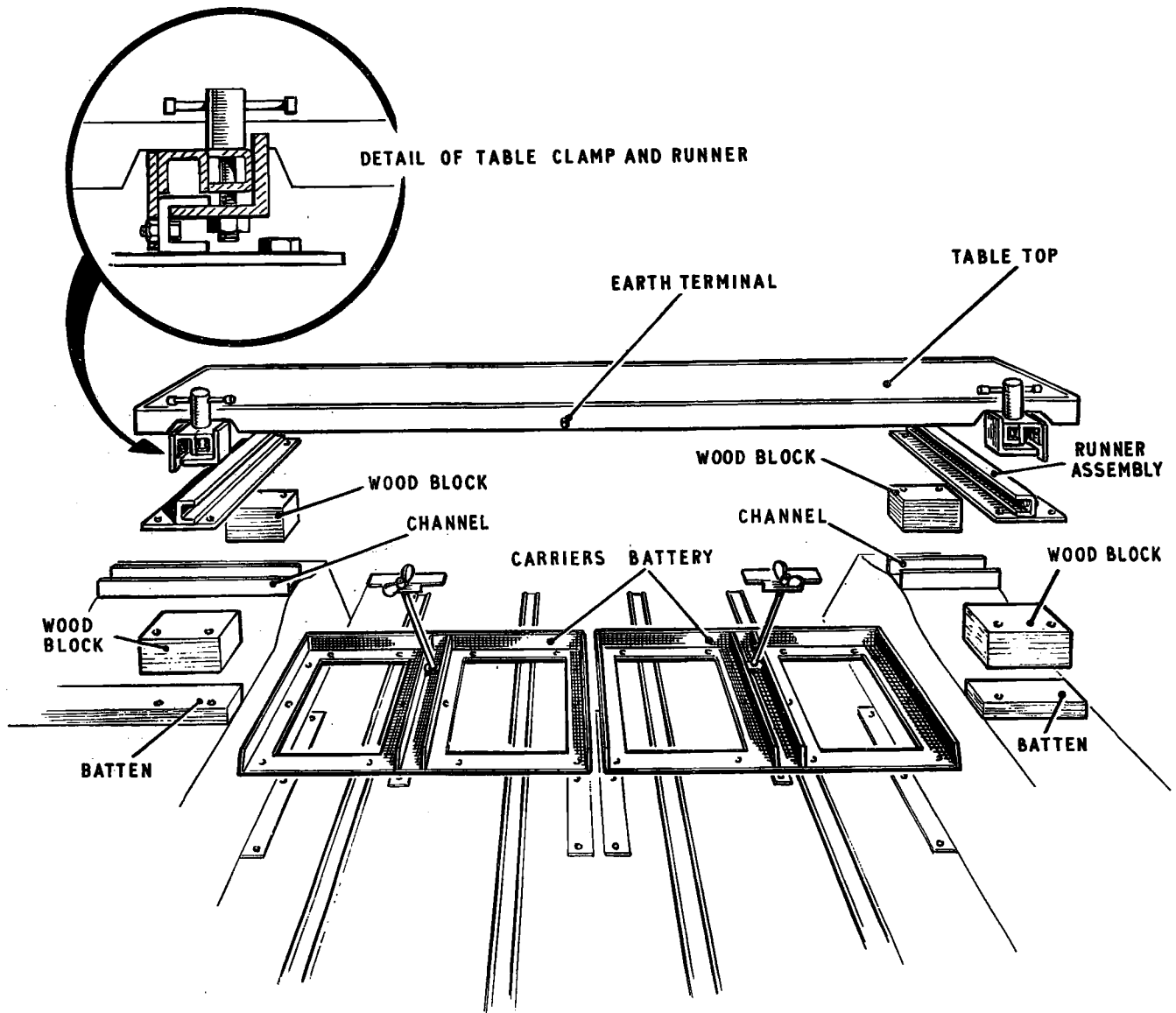
### (a) Frame, battery carrier

Place this metal baseplate on the floor of the truck. Secure by

means of countersunk screws 1 inch in length, fitting backing plates, nuts and lock nuts beneath the floor. If it is found that any backing plate fouls an angle bearer under the floor cut a strip from one side of the plate so that it may be fitted correctly. All four backing plates must be fitted against the underside of the floor to strengthen it.

(b) Carriers, battery 17 $\frac{1}{2}$  x 16-in.

Attach the two battery carriers to the metal baseplate as shown at Fig. 20, using countersunk screws 3/8 inch in length.



**FIG. 20 BATTERY CARRIER LAYOUT IN TRUCK**

(c) Plate assemblies stiffening 12-in. x 3-in.

Place four plain top plates on the top surfaces of the wheel arches and align the fixing holes with the holes drilled in the wheel arches as shown in Fig. 21.

The backing plates for the undersides of the wheel arches have a flat surface on one side and a narrow strip welded to the other side. For Mk. 3 bodies position the backing plates with the flat surface downwards and bolt top plates and backing plates together. For Mk. 1 bodies the backing plates are reversed, i.e. the flat surfaces uppermost. The top plates extend beyond the edges of the wheel arch. File off protruding corners to a radius of approximately 1/8-in. if this has not already been done.

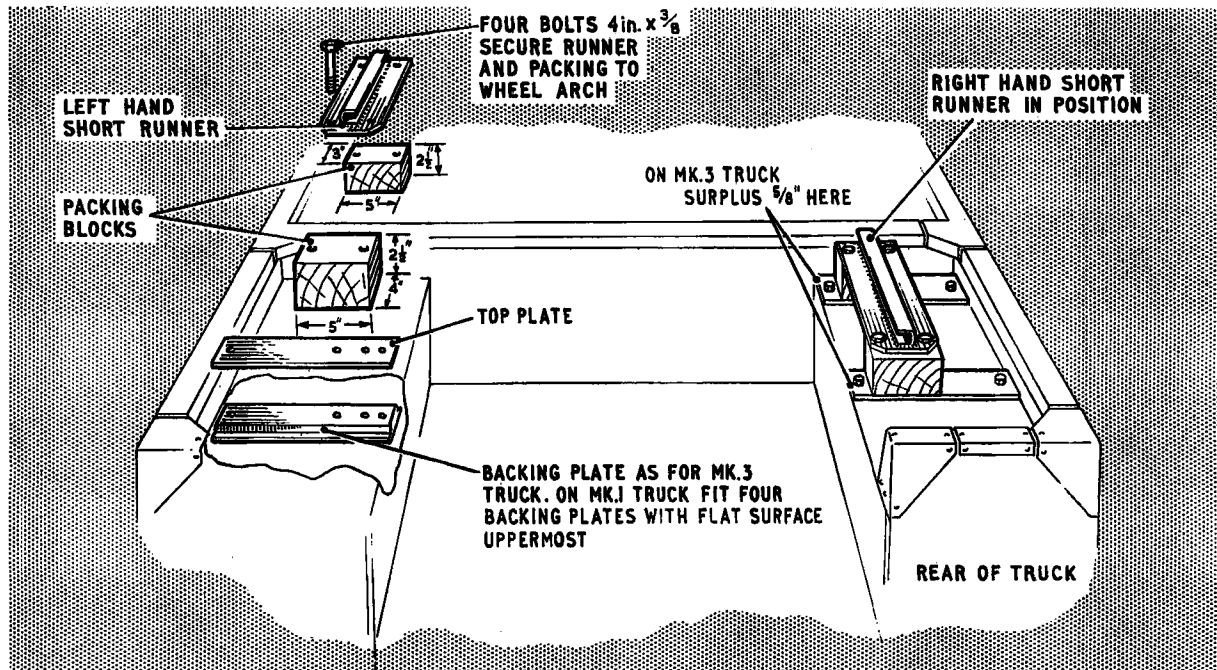


FIG. 21. TABLE RUNNERS IN LAND ROVER

(d) Runner Assemblies

Position the four wooden blocks as shown in Fig. 21 to provide horizontal bases for the table runners. Assemble a runner assembly on each pair of blocks with the mitred corners towards the rear of the vehicle. Secure in position, using the eight long bolts supplied with each runner but do not tighten these bolts until after the table top has been fitted in the runners. To fit the table, unscrew the four clamps completely and remove them with the angle brackets, lift the table on to the runners and re-assemble the clamps in their original positions.

Fit the free end of the copper braid earthing connector under the head of adjacent bolt of the table runner assembly, tighten the eight bolts of the runners and finally tighten the four thumbscrews of the clamps.

(e) Table top  $4\frac{1}{2}$ -in. x  $16\frac{1}{2}$ -in. x  $3\frac{1}{8}$ -in.

The table top is made of wood  $3$ -inch thick, bolted into a steel frame, to the ends of which are welded the two channel section runners carrying the clamps.

The table top must be drilled to the dimensions shown at fig. 22. This may be done under unit arrangements or may be sent to REME workshops with the truck for drilling when the vehicle modifications are carried out. All the holes are  $\frac{5}{16}$ -in. diameter.

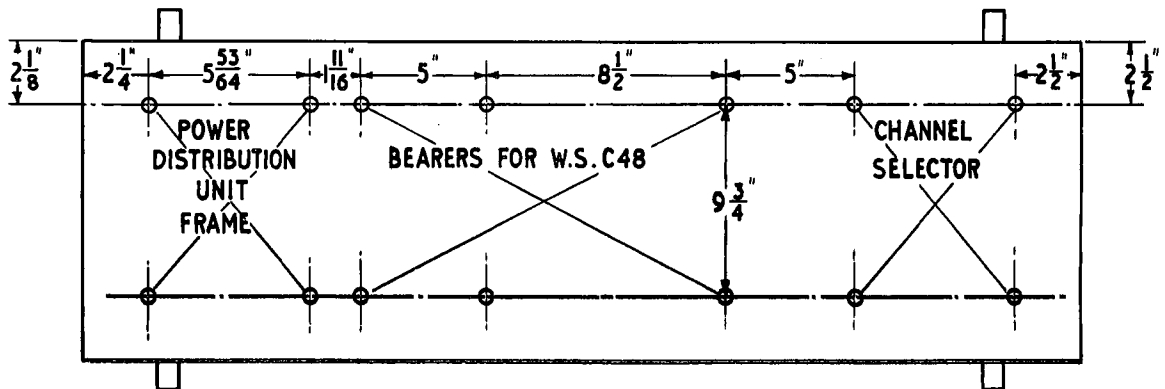


FIG. 22 TABLE TOP DRILLINGS - TRUCK

(f) Aerial ground plane supports

Four upright supports are provided to carry the aerial ground plane assembly over the roof of the vehicle. Commencing at the left hand forward position align the holes in the bracket of one support with the set of four holes drilled in the vehicle wall (two on the flange and two in the side wall) and secure with the bolts and nuts supplied. Repeat the operation at the other forward position. Carry out the same operations at the two rear positions but leave the rear fixing hole of each rear support temporarily vacant. The two bolts at these positions are utilised for the seat bracket fixing detailed at (g) below.

(g) Operators' seats

Two seat brackets and one seat cushion are provided for installation over the rear wheel arches. The seat cushion previously removed from the front centre seat will be utilised for attachment to the second seat bracket. Over the left hand wheel arch position a seat bracket against the inside wall of the vehicle so that the right hand fixing hole of the bracket is in line with the rear hole of the aerial ground plane support bracket (see (f) above) and the left hand hole is in line with the other hole drilled in the vehicle wall, secure by passing one bolt through the vacant hole of the aerial ground plane support, through the vehicle body and the seat bracket and secure with the nuts. Secure the other end of the seat bracket to the wall with the bolt and nut provided with the bracket. Position the two seat cushions in the retaining sockets of the seat brackets.

(h) Lockers Metal

A metal stowage locker is provided in the kit and must be fitted in front of the radiator grill on the bumper bar. Remove the inner bolt of each pair of bolts securing the bumper to the chassis members. Position the metal locker on the bumper so that the holes in the side brackets of the locker are located over the holes vacated by the two bolts. Replace the bolts through the locker brackets and the bumper to secure the locker.

(4) Installing the Operational Equipment(a) Mounting the Power Distribution Unit

Locate the four holes in the lower flange of the frame, over the corresponding four holes drilled in the left hand side of the table top. Secure with the bolts and nuts provided. Place the power distribution unit on the frame so that the holes in the forward and rear lower flange of the unit are aligned with the four holes, in the upper flanges of the frame. Secure with bolts and nuts provided.

(b) Mounting the C48

Position the bearers on the table top to the right of the power distribution unit assembly so that the flanges are uppermost and the holes in the trough of the bearer channels are located over

corresponding holes drilled in the table. Secure in position with bolts and nuts provided with the bearers. Remove the WS C48 from its anti-vibration tray. Place the tray on the bearers so that the fasteners of the tray are towards the right hand side of the vehicle and the holes of the shock mountings are located over the fixing holes on the bearer flanges. Secure with the bolts and nuts provided. Replace the set and secure the clamps.

(c) Frame, mounting, Channel Selector, J1 etc.

Position this mounting frame on the table top to the right of the WS C48 assembly so that the set mounting positions of the frame slope backwards and the four holes in the base of the frame are located over corresponding holes drilled in the table top. Secure with the bolts and nuts provided with the frame. Position the fixing holes of the interconnecting box 4-way No. 1 against the corresponding holes on the left hand side of the frame so that the notched edge on the blank face of the unit is uppermost. Secure with the bolts and nuts provided with the frame. On the lower front face of the frame, position the WS C48 channel selector, with the channel change control on the left and secure to the frame with the bolts and nuts provided. On the top face of the frame, locate the four fixing holes of the Junction Box J1 against the four corresponding holes of the frame and secure with the bolts and nuts of the frame. (See Fig. 16 page 27).

(d) A41 and BCC46U Carrier Assembly

This assembly consists of three parts (i) an adaptor frame, (ii) a carrier frame for the WS BCC 46U and a carrier frame for the WS A41 and its associated man-pack carrier. Locate the four holes in the base of the WS A41 carrier over the four corresponding holes of the adaptor frame so that the adaptor protrudes forward from the WS A41 frame and secure with the screws provided.

Remove the two lowest hexagon headed bolts from the backrest supports of the centre passenger seat and remove the three hexagon headed screws from the seat platform. Locate the holes in the frame-work of the carrier assembly over the holes vacated by the removed bolts and screws and secure the assembly by replacing the bolts and screws. Position the wireless set A41, complete with its manpack carrier in the mounting frame at the front centre seat position and secure with the webbing straps provided. Position the wireless set BCC46U in the adaptor frame attached to the WS A41 mounting frame and secure with the webbing strap of the frame. (See Fig. 3 page 3).

(e) Aerial and Ground Plane Assembly

The short UHF aerial stub must be fitted to the ground plate before the assembly is mounted on the vehicle. Align the six holes in the flange of the aerial with the six fixing holes in the centre of the plate



and bolt together, using the bolts and nuts supplied. Connect the coaxial aerial lead to the coaxial termination on the underside of the aerial, using the right angle adaptor provided in the kit.

If the canvas hood of the vehicle has been removed or rolled back, replace it on the superstructure before lifting the aerial and plane assembly into position. Remove the captive pins from their fixing holes in the top of the aerial plate supports, lift the aerial and plate assembly over the roof of the vehicle and locate the insulated spigots at the four corners of the plate into the tops of the four supports. Replace the captive pins through the holes in the supports and insulators.

(f) Batteries

Four Batteries secondary lead acid 12V 75 Ah are provided for installation in the battery carriers beneath the table. The battery connectors must be attached to the batteries before they are installed in their carriers. Connect each pair of batteries in series by means of the Connectors single 1 ft. 6 inches, provided in the kit and attach the lugs of a Connector 4/2 Pt. to the positive and negative terminals of each pair. The connectors 4/2 pt. are supplied in two sizes, i.e. 4 ft. long and 6 ft. long. The 4 ft. connector should be connected to the left hand pair and the 6 ft. connector to the right hand pair of batteries. Place the two pairs of batteries in their respective carriers and secure them with the diagonal clamp of the carrier.

(4) Inter-connection of Units

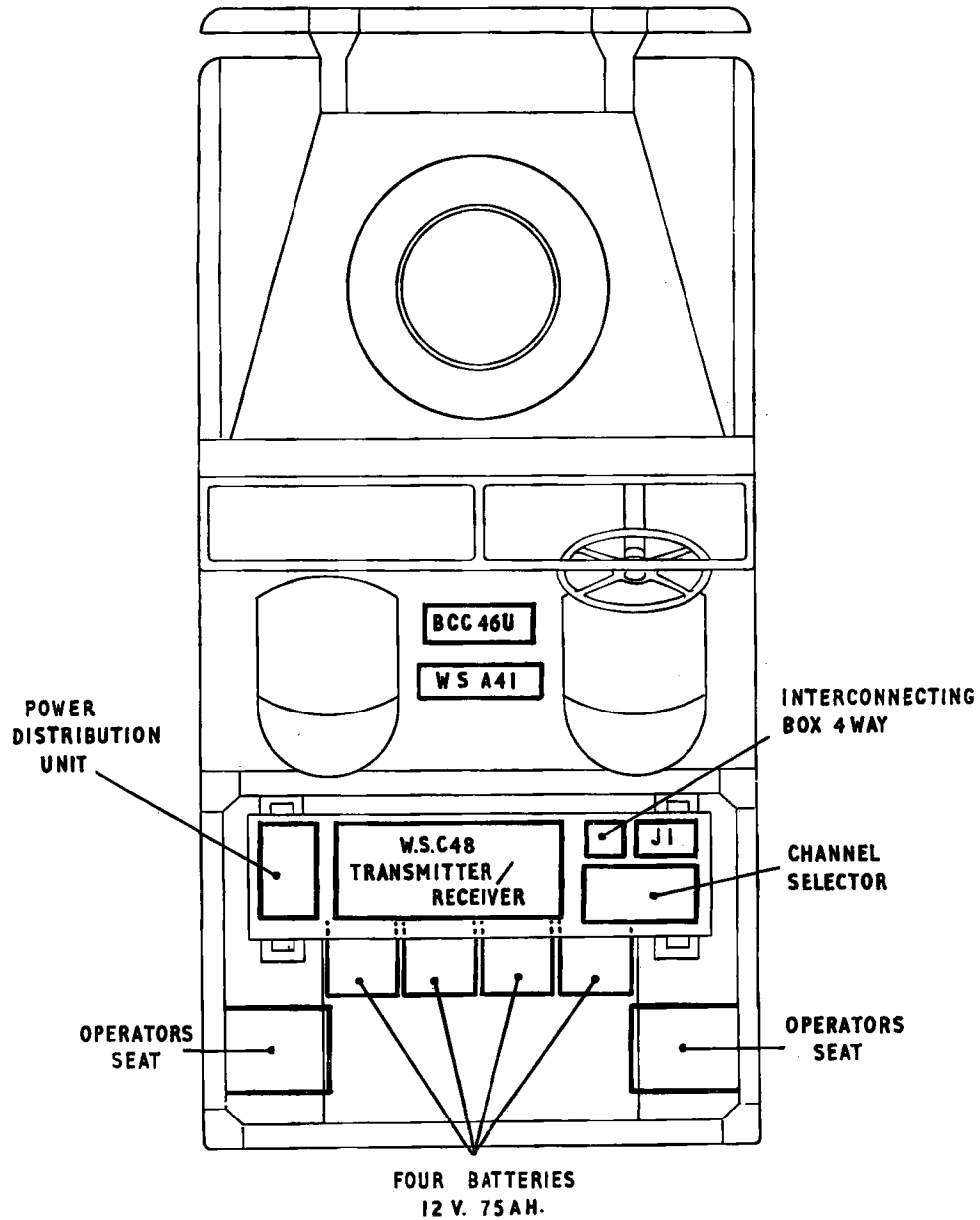
The equipment is inter-connected as shown in the diagram at Fig. 18 page 30 using the connectors listed in the associated table.

Section 29. Trailer Installation

(1) Vehicle Modifications

The following paragraphs give a summary of the necessary drillings required in the trailer body before installing the equipment. Authorization and detailed instructions are given in EMER Wheeled Vehicle No. Modification Instruction No. 2.

- (a) Twelve holes are drilled in the floor for the six 'U' bolts which secure the wooden baseboard to the trailer chassis.
- (b) Ten holes are drilled in each wheel arch for screws which secure plates and clamps to hold the table top carrying the WS C11/R210.
- (c) Four holes are drilled in the right hand wheel arch for screws which secure the adaptor frame for the R209 carrier.



**FIG. 23 PLAN VIEW OF TRUCK LAYOUT**

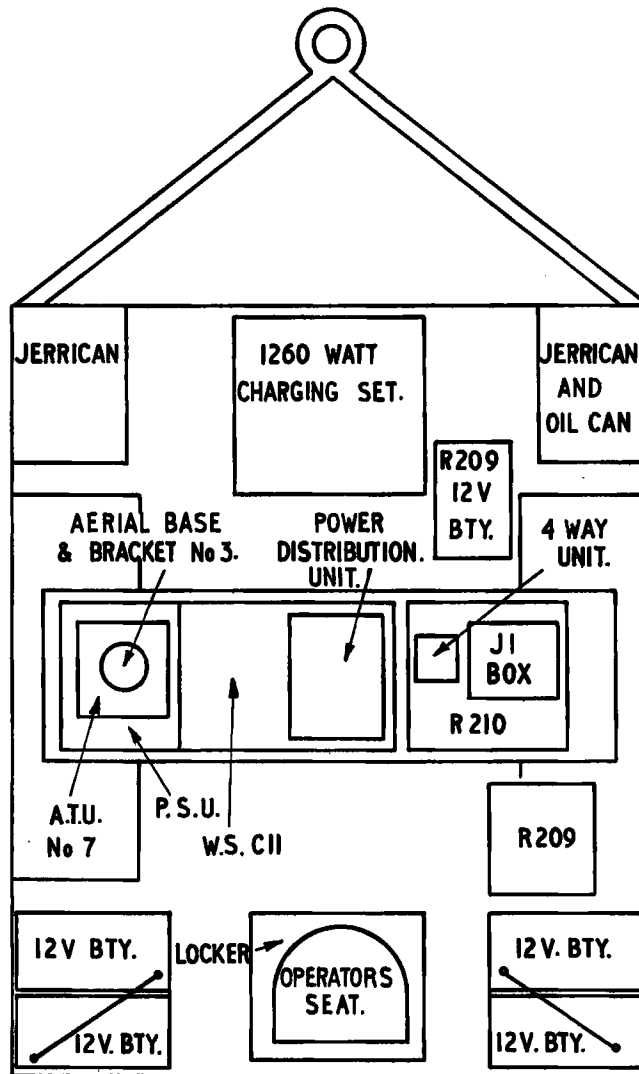


FIG. 24 PLAN VIEW OF TRAILER LAYOUT

- (d) Two aerial inlets with protecting flaps are fitted in the canvas hood, one on each side.
- (e) Six locating marks are scored on the side wall top flanges to mark the fitting positions for hoop stick and aerial mounting clamps.

The wooden baseboard assembly can be used as a template by workshops personnel when the modifications are carried out. Extract it from the kit complete with all its fixings and send it to workshops with the trailer. The fixing holes in the trailer floor can then be marked off with the baseboard in position.

## (2) Preparing the Trailer

After the drilling modifications have been completed and before commencing installation work ensure that the hand brake is applied and that the three supporting legs are correctly adjusted to take the weight of the trailer. Firmly tighten the clamps on these legs in order to prevent tipping when personnel climb into the trailer.

If it is fitted, remove the canvas hood from the trailer to improve accessibility during the fitting operations. See that the interior of the trailer is clean and dry.

Check the position of the towing eye of the tow-bar assembly. This can be positioned to suit the height of the hook of the towing vehicle. In this installation the towing eye must be in the low position.

## (3) Installing the Mounting Frames, etc.

### (a) Baseboard Assembly

A wooden baseboard is to be fitted to the floor of the trailer if this has not already been done by workshops (see (1) above). The baseboard is secured to the floor and chassis by means of six 'U' clamps, washer plates and nuts. It is already drilled where necessary and is fitted with 'T' nuts by which the various mounting frames are secured in the installation. A 'T' nut is a metal insert which is driven into the drilled hole from the underside of the baseboard where it is retained by a flange. In this way it forms a tapped hole in the board.

### (b) Carriers, Jerricans

Two jerrican stowage frames are provided in the kit, a single compartment frame and a double compartment frame. Position the single compartment frame in the left hand corner of the trailer so that the fixing holes of the frame are aligned with corresponding holes in the baseboard. Secure with the screws provided with the frame. Position the double compartment frame in the right hand corner of the trailer so that the smaller compartment of the frame is towards the rear of the trailer. Secure in position with the screws provided.

Place the jerricans and oil containers in the stowage carriers at the forward corners of the trailer and secure with the clamps and thumbscrews of the carriers.

(c) Carrier, Charging Set 1260 Watt

Place this carrier at the near centre forward position on the baseboard so that the fixing holes of the carrier line up with corresponding tapped holes in the baseboard. Secure in this position with the set screws supplied with the carrier.

Release the clamps of the carrier, lift the charging set into the carrier and secure by means of the carrier clamps.

(d) Carrier, Single Battery for R209 Mk. 2

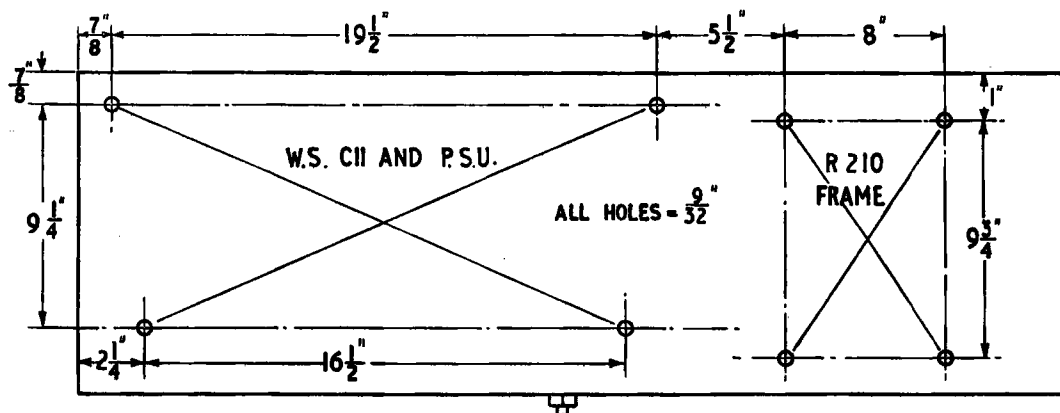
Place this carrier on the baseboard in a position between the charging set carrier and the right hand wheel arch so that the fixing holes of the battery carrier are located over corresponding tapped holes in the baseboard. Secure in position with screws provided. Connect the spade terminals of a Connector Twin No. 282 (ZA29060) to the terminals of a Battery secy port 12V 75 Ah, close the lid and position the battery in the single battery carrier. Secure with the clamp of the carrier. The other end of this battery connector will be connected to the power input plug of the R209 Mk. 2 when it is installed.

(e) Clamp Support Assembly, Table Top

The table top carrying the WS C11/R210 is supported across the wheel arches and is held in position by two clamp assemblies mounted on the wheel arches. The clamp assembly consists of a clamp screwed to an angled mounting plate, and an angled strengthening plate which is fitted against the underside of the wheel arch. The whole assembly is secured by ten bolts, six on the top of the wheel arch and four on the side wall of the arch. Locate the ten holes of a mounting plate over the holes drilled in the wheel arch, position the angled strengthening plates on the underside of the arch and line up the fixing holes with those of the arch and mounting plate and secure together with four bolts, washers and nuts through the holes in the side wall. Locate the fixing holes of a clamp over corresponding holes on the top side of the mounting plate and secure the assembly together with the remaining bolts, washers and nuts. Repeat the operation on the other wheel arch.

(f) Table Top

The table top used in the trailer is supplied already drilled to accept the WS C11/R210. Release the screws of the table clamps previously installed (see (e) above). Place the table across the wheel arches with the earth terminal on the table edge towards the rear and with the table ends resting in the clamp assemble. Secure by tightening screw clamps against the flange at the table ends.



**FIG. 25 TABLE DRILLING FOR TRAILER**

(g) Carrier Set No. 82 (WS C11)

Position the four fixing holes in the shock mountings of the carrier over four corresponding holes on the left hand side of the table top and secure with the four bolts and nuts supplied with the carrier. This carrier provides a mounting position for the WS C11 and its associated P.S.U.

Place the wireless sender in the carrier engaging two studs on the rear frame of the carrier with two corresponding sockets in the rear of the sender and secure with two Clamps M.S. 1" x 1" x 1.1/4" which must be fitted to the front of the carrier. These clamps are supplied in the kit.

Place the Supply unit transformer rotary, in the carrier to the left of the wireless sender and secure with two clamps M.S. 1" x 1" x 1.1/4" which must be fitted to the front of the carrier in a similar fashion to that used for the sender.

(h) Carrier Set No. 81 (R210)

Position the four shock mountings of this carrier over the four corresponding holes on the right hand side of the table top and secure by means of the bolts and nuts supplied with the carrier.

Place the reception set R210 in the carrier engaging two studs on the carrier frame with two corresponding sockets on the rear of the set. Fit two clamps M.S. 1" x 1" x 1.1/4" x 11/32" grip, over

the lower flange of the set and tighten the clamp screws into the two holes along the front edge of the carrier to secure the set.

(j) Trays metal 22.3/4" x 13.1/8" x 5.1/8"

Position a Trays, metal 22.3/4" x 13.1/8" x 5.1/8" on the top of the sender and supply unit, engaging studs in the tray with corresponding sockets in the rear of the units. Secure the tray by means of four clamps M.S. hooked over the top flanges of the sender and supply unit. Screw down firmly without over-tightening. Make sure the tray is firmly attached as the handles of the tray are provided to enable the complete sender to be lifted and carried completely assembled.

Attach a Frames, metal 13.7/16" x 7.13/16" x 1.7/16" to the left hand compartment of the tray engaging the two studs at the rear of the tray with two sockets in the rear of the frame. Secure the frame to the tray with four screws 1/4" UNF 2A 1/2" long inserted into tapped holes in the tray.

Place the ATU No. 7 on the frame with the rear panel flange engaging in the projecting flap on the frame. Secure by hooking the clamp of the frame over the front flange of the ATU and tightening the screw of the clamp. Aerial Base and Bracket Assembly No. 3 is provided for use as a remote aerial. Mount it on top of the ATU No. 7 by hooking it to the front upper flange of the ATU No. 7 and securing it with the clamp hooked over the rear upper flange and screwed down.

Locate the four holes in the lower flange of this mounting frame for the Power distribution unit over four corresponding holes in the Tray, metal 22.3/4" x 13.1/8" x 5.1/8" to the right of the ATU position. Secure by the bolts and nuts provided.

Place the Power distribution unit on its frame and secure with the bolts and nuts provided with the frame.

(k) Junction box one-set J1, 24V

Before mounting the Tray Assembly M.S. 13" x 10.5/8" x 1.15/16" on the top of the reception set, attach the Junction box to the tray by the four screws, nuts and washers, placing two rubber pads, supplied with the tray, between the box and the tray,

(l) Interconnecting Box 4-way No. 1

Attach this box to the tray by means of two screws, nuts and washers, with two rubber pads between the box and the tray. Note that the cut-away side of the box must be towards the J1 box.

(m) Tray assembly MS 13" x 10.5/8" x 1.15/16"

After attaching the above two boxes to the tray place the tray assembly on top of the reception set R210 so that the two studs on the rear edge of the tray engage in two corresponding sockets on the rear of the set. Secure the set by tightening the screws of the two

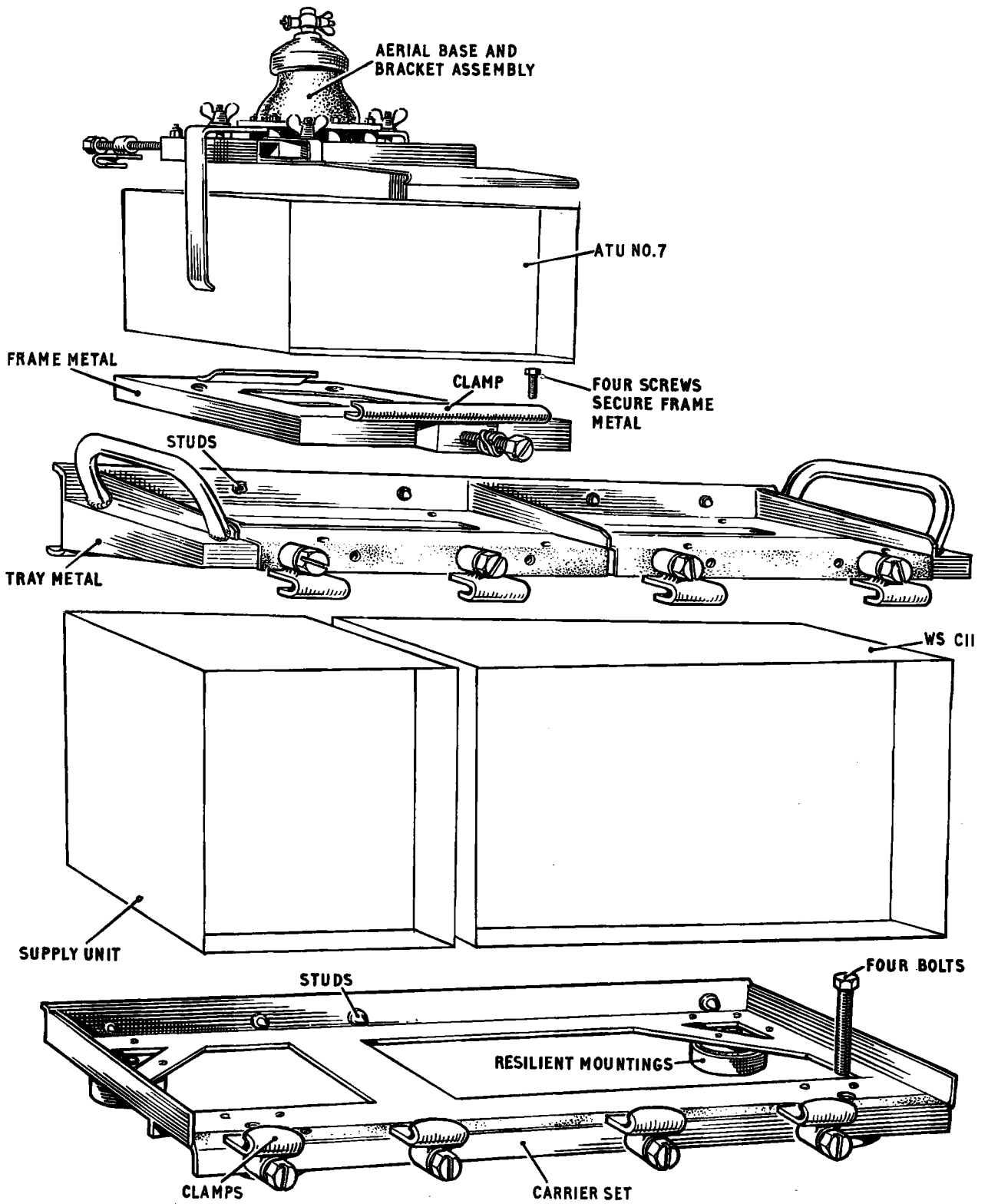


FIG. 26 METHOD OF FITTING CII ASSEMBLY



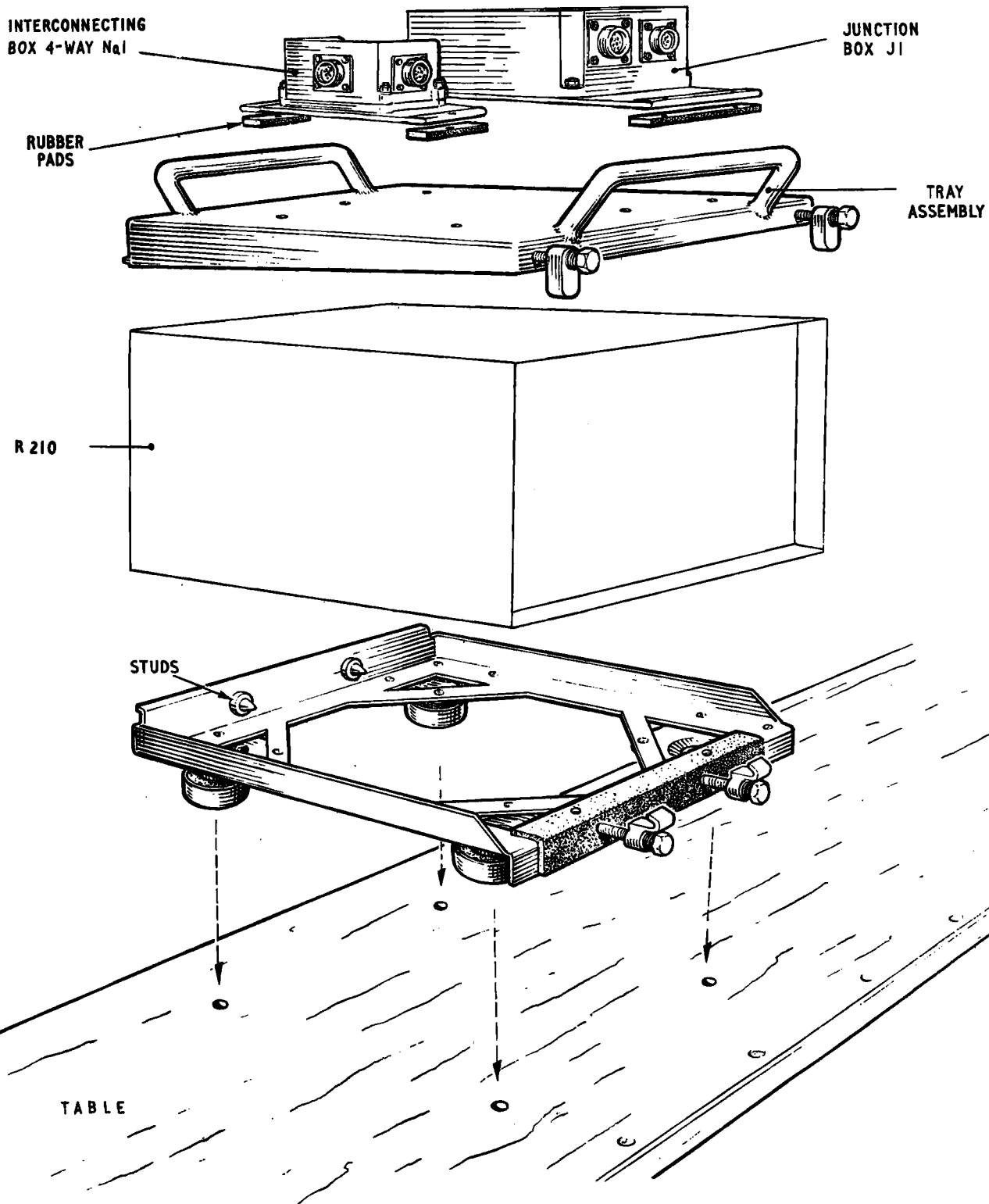


FIG. 27 METHOD OF FITTING RECEPTION SET R210

clamps, attached to the tray against heads of the two Allen screws in the upper corners of the set.

(n) Frame Assembly 11.1/4" x 10.3/8"

Position this adaptor frame over the fixing holes drilled in the right hand wheel arch (two on the top face and two on the side). Locate the two holes of the backing plate, supplied with the frame, against the underside of the two holes in the top face of the wheel arch and secure with two bolts and nuts. Fit two similar bolts and nuts through the side wall of the wheel arch and flange of the frame and secure.

(o) Carrier Set No. 48

Mount this carrier on the frame mentioned at (n) above, with the open side of the carrier towards the centre of the trailer. Secure it by means of four 1/4-in x 1-in. screws passed through the resilient mountings and inserted into tapped holes of the frame.

Place the Reception Set R209 Mk. 2 in the carrier set No. 48 with the control panel facing towards the centre of the trailer. Arrange the clamping device of the carrier and tighten it down on each side to retain the set.

(p) Carriers Battery Secy. Port. 17 1/2" x 16"

Two of these twin battery carriers are included in the kit for installation in the two rear corners of the trailer. Position them in their respective corners so that the open edges in both cases face inwards towards the centre of the trailer and the fixing holes in the carriers are located over corresponding fixing holes in the baseboard. Secure with the screws provided.

Place a pair of 12 volt batteries in each of the twin battery carriers, so that the lids of each pair open outwards from the centre of the carrier. Using Connectors Single No. supplied in the kit, connect each pair in series. Connect the spade terminals of a Connector 4/2 Pt. - 9 ft. across each pair of batteries, RED to the positive terminal and BLUE to the negative terminal. Close the lids and secure each pair of batteries in their respective carriers by tightening the diagonal clamps against the upper edges of the batteries.

(q) Operator's Chair and Locker Assembly

In this installation the operator's chair is mounted on top of the hinged stowage locker and the assembly is secured to the baseboard in a central position towards the rear. Remove the four wing nuts and screws from the seat base frame. These are not required and should be returned to stores. Locate the four holes of the seat frame over four corresponding holes drilled in the top of the locker. Secure with bolts and nuts supplied. Position the fixing holes of the hinge on the lower front edge of the locker over the forward pair of a set of four holes at a central position towards the rear of the baseboard, so that the assembly can be tilted forward on its hinge. Secure the hinge to the baseboard with two screws. Tilt the seat

back to the normal upright position and secure by inserting the two thumbscrews, fitted to the rear of the locker, into the other pair of holes in the baseboard.

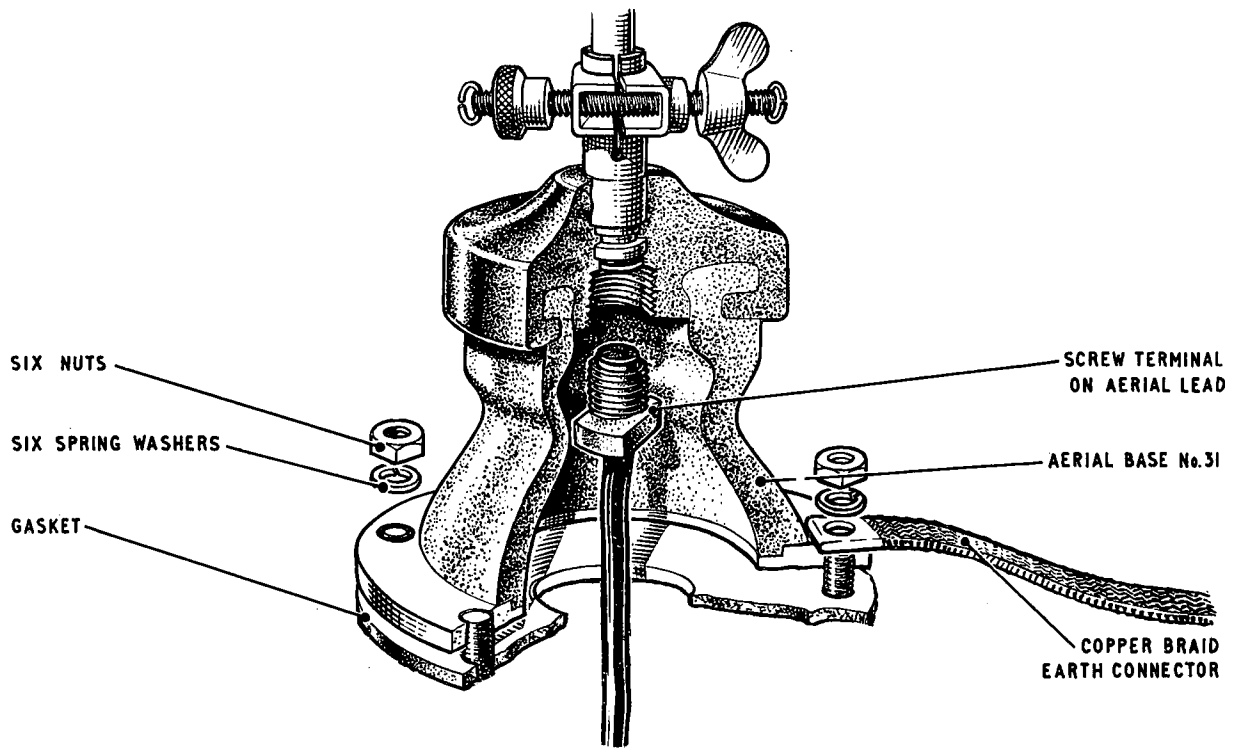
(r) Hoopstick Assembly

This assembly consists of three 'Supports metal hoopstick No. 1', four 'Tiebars, metal 35.1/8-in x 5/8-in.', four single socket clamps and two double socket clamps. When assembled these components support the canvas hood and the two aerial mountings. Fit the four single socket clamps on the flange of the trailer wall at the four corner positions identified by the locating marks on the flange. Tighten each clamp with the tommy bar. Fit the two double socket clamps at the two centre positions identified by the locating marks on the trailer wall flange, and tighten in a similar manner to the other four clamps. Fit the three tubular hoopsticks to the clamps and secure with the wing screws of the clamps. Fit the tiebars to the inner side of the hoopsticks and secure with the screws and wing nuts.

(s) Aerial Base Mountings

An Aerial base No. 28 is supplied for use with the reception set R209 Mk. 2 and an Aerial base No. 31 is supplied for use with the C11/R210.

These aerial bases are mounted on support mountings which fit into the second socket of the double socket clamps fitted at a central position on the sides of the trailer wall (see (r) above). Bolt the Aerial base No. 28 to the top of a Mounting aerial base 37 $\frac{1}{2}$ -in. using six 1-inch screws, nuts, lock nuts and washers. The copper braid connector which forms part of the aerial base should be secured externally under one of the six screwheads. If a pigtail is supplied inside the Aerial base No. 28 it must be removed. Mount the complete assembly in the second socket of the double socket clamp on the right hand side of the trailer. The assembling of the Aerial base No. 31 on its mounting support is slightly more complicated, (see Fig. 28) a plastic gasket must be fitted between the aerial base and the mounting and the aerial connector must be connected at the same time. The aerial connector is provided with a detachable slotted terminal, a screw terminal and a number of plastic insulating beads and rubber end stops. In order to fit the connector to the aerial base all these items except the screw terminal must be removed from the cable, take them off carefully and keep them in the same order ready for replacing. Thread the free end of the connector down through the centre hole of the "Plate plastic 1/4" ID x 5" OD x 1/8" thick", then replace the insulating beads, rubber end stops and identification sleeve in exactly the same order as originally. At the free end of the cable twist the wire strands firmly together, slip the threaded bush on to the cable and bend the twisted strands round the slots in the side of the terminal. Screw the bush firmly on to the terminal to grip the wire. At the other end see that the wire ends are splayed out evenly over the washer at the top of the screw terminal. Fit the screw terminal into the Aerial base No. 31 and tighten it with the "Tool, adjusting" supplied in the kit for this purpose. Pass the connector end through the centre of the mounting plate at the top of a "Mounting, aerial base 37 $\frac{1}{2}$ -in." and



**FIG. 28 AERIAL BASE No. 31 SHOWING CONNECTION OF AERIAL LEAD**

bolt the aerial base and gasket to the top of the mounting using six 1/4-inch screws, nuts, lock nuts and washers. Mount the complete assembly in the second socket of the double socket clamp at the centre of the left hand wall. Leave the connector end free temporarily.

(t) Canvas Hood

Replace the canvas hood over the hoopsticks fitted to the trailer, attaching the side ropes to the hooks along the side walls of the trailer. Roll back the ends to allow accessibility to the interior of the trailer. Two rubber discs are fitted, one in the left hand side and one in the right hand side walls of the canvas. Each disc has a centre hole cut to allow the aerial leads to be fed direct from the set to its respective aerial base. When the canvas has been fitted to the trailer the strengthening clamp supplied with the aerial base mountings must be secured from the upright pillar of each mounting to the adjacent hoop-stick, via a hole cut in the canvas near the bend of the centre hoopstick one on the left and one on the right hand side.

(4) Inter-connecting the Equipment in Trailer

The operational equipment in the trailer must be connected together in accordance with the diagram at Fig.19 page 34 using the connectors as listed in Table 3 page 35.

Section 30. Testing the installation

- (1) After completing the installation inspect all fittings, ensuring that bolts and nuts are securely tightened. Check that the terminations of all connectors are firmly attached to the appropriate points. Ensure that the installation is complete and that all items of equipment are clean and dry.
- (2) Examine the level of the electrolyte in the batteries and, if necessary, top up with distilled water.
- (3) Carry out a thorough mechanical test on the installation. This can best be achieved by driving the vehicle for a few miles over moderately uneven road surfaces. Check any brackets or other fittings which show defects, and repeat the test.
- (4) Although the wireless equipment should have been inspected when it was issued from stores, it is advisable to ensure that its serviceability has not since been impaired. Conduct normal routine tests on the wireless equipment in accordance with the user handbooks and with the checking procedure given in chapter 2 of this handbook.

# CHAPTER 5

## DISMANTLING THE INSTALLATION

### Section 31. Conversion from Vehicle to Ground Station

If the wireless equipment is dismantled from the vehicle for use as a ground station the general lay-out of units must remain unchanged in order to use the existing inter-unit connectors. Operating procedure is the same whether the sets are in the vehicle or on the ground but the user should note the variations between vehicle station and ground station arrangements.

The Reception Set R210, the ATU No. 7 and Control harness boxes are sealed to withstand exposure. The WS C48 equipment, the WS C11 and its associated PSU are not sealed. These units have air inlets and outlets for cooling and therefore must be kept clear of the ground and protection must be given in inclement weather.

### Section 32. Dismounting the Wireless Equipment

#### (1) The C48 Equipment

Disconnect the aerial connector from the aerial input of the set, disconnect the two battery connectors from the rear of the power distribution unit, release the table clamps and remove the complete table assembly from the vehicle.

Release the clamps of the battery carriers, disconnect the series connectors between each pair of batteries and remove the batteries from the vehicle.

#### (2) The A41

This set can be quickly removed from its mounting frame on the front seat by releasing the webbing straps holding the set and manpack carrier on the frame. Operational instructions are given in the user handbook supplied with the set

#### (3) The BCC46U

This set may be removed complete from the mounting frame on the front seat by releasing the securing strap of the frame. Operational instructions are issued with the set.

#### (4) The C11 assembly

Release all the connectors except those between units forming part

of the assembly. Along the lower edge of the front panel release the four clamps which retain the sender and supply unit in the Carrier Set No. 82. Ensure that the clamps holding the top tray to the unit are secure. Lift the complete assembly of sender, ATU No. 7 and supply unit from the carrier by means of the handles of the tray and remove from the trailer.

(5) Reception Set R210 assembly

Release the two clamps which retain the R210 in the Carrier Set No. 81. Ensure that the clamps holding the top tray to the set are secure. Lift the complete assembly of R210, and top tray from the vehicle and re-assemble with the WS C11 in the ground station position. Disconnect the series connectors of each pair of batteries, lift the batteries from the trailer and position them in the ground station position.

(6) Reception Set R209

Disconnect the aerial lead from the R209, disconnect the battery connector, release the set from the Carrier Set No. 48 and remove to a convenient position in the ground station. Release the single battery from its carrier and remove to a position near the set.

(7) Connecting the Sets for Ground Station Operation

Connection between the various units is as shown in the diagrams at Figs. 18 and 19 on pages 30 and 34, respectively, the only difference being the types of connectors used between aerial bases and the wireless sets.

(8) Ground Station Aerials

(a) C48

A ground station aerial kit is being developed and will be supplied with the complete station kit. It will consist of a stub aerial, spreaders and a modified vertical mast. No other details are available at the time of publishing this handbook.

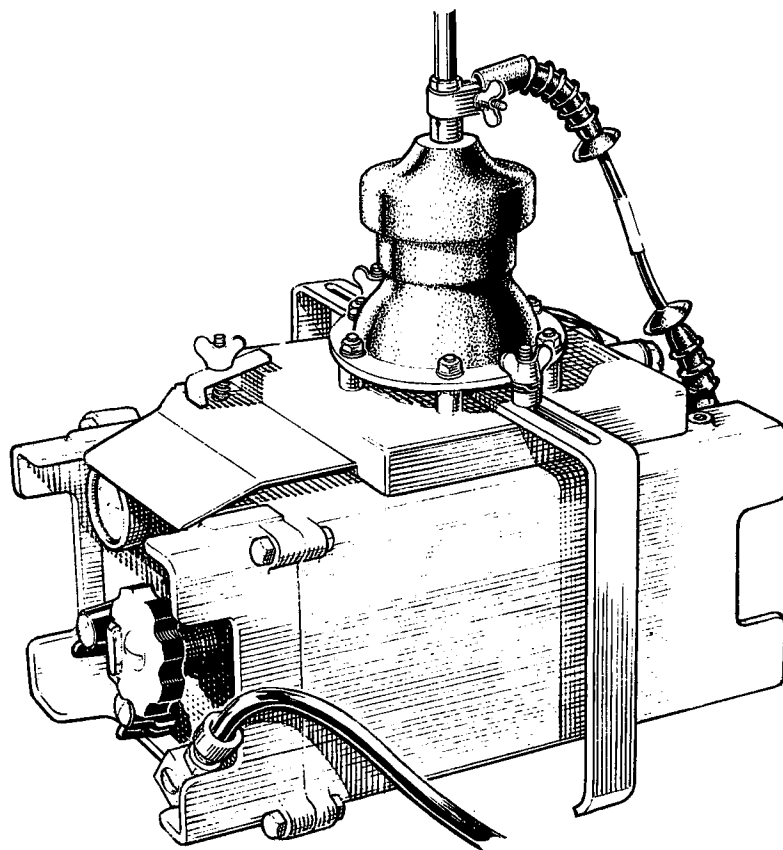
(b) R209 Mk. 2

A length of Wire, electric R4 Mk. 1 is provided in the complete station kit for use as a wire aerial for R209 Mk. 2 ground station operation.

(c) C11/R210

(i) Aerial Adjacent to Set

Normally the antennae rods 'F' sections are used in the aerial base and bracket assembly No. 3. Care must be taken to ensure that the short aerial lead (Connector single No. 229 - 1'9") is connected between the external terminal of the aerial base and the aerial terminal on the rear of the ATU No. 7.



**FIG. 29 REMOTE AERIAL FOR C11/R210**

(ii) Remote Aerial

If necessary the aerial can be set up remote from the set. When this is required proceed as follows:-

Disconnect and remove the dismantable ATU No. 7 assembly from its carrier on the top tray of the wireless set. The assembly which is illustrated at Fig. 29 is secured by a single clamp on the lower flange of the ATU.

Slacken the two wing nuts on the aerial base and bracket assembly and slide the two side supports out to their fullest extent as shown in Fig. 29.

Place the ATU assembly on the ground at the site chosen for the erection of the remote aerial. This site must be within 150 feet of the wireless set. See that the assembly is firmly positioned or it may heel over in a high wind.

Connection between the ATU No. 7 and the wireless set may be made with up to three Aerial feeders No. 5, 50-ft. (ZA47041) connected together in series. The aerial feeders 50 ft. may be



joined together by means of couplers, plug and chain assembly. These are provided in the kit.

(9) Ground Station Connectors

The following items, not shown in Figs. 18 or 19, are supplied with the complete station for ground station use.

Wire electric R4 Mk. 1 44 yards (R209 Mk. 2)

Wireless Set No. 52, Remote Control and ground station  
Kit No. 3 (C11/R210)

Connector Single No. 229, 1'9"

Connector 6 Pt No. 35 (microphone extension lead)

Connector 6 Pt No. 76 (loudspeaker connector)

Section 33. Recover the Installation Kit from  
a Vehicle to be Evacuated

If the vehicle is evacuated as "beyond local repair" or if for any other reason it is removed from the charge of the unit holding the equipment on charge, all items of the installation kit must be dismantled.

This includes all equipment for which fitting instructions are given in this handbook. This does not include items added as vehicle modifications.

Failure to remove installation kit items will cause considerable delay and difficulty when re-installing the radio station in a replacement vehicle, therefore care should be taken to check items against the complete station list.

When all installation items have been removed the following original items should be refitted:

The original seats on the wheel arches  
Clamps which secure spare wheel to rear of front seats.