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AUSTRALIAN MILITARY FORCES



USER HANDBOOK
on
INSTALLATION OF WIRELESS STATIONS
IN B VEHICLES

1960

AMENDMENT RECORD

Serial No.	AAO's	Initials

INTRODUCTION

This loose-leaf User Handbook is published in two parts.

The first part contains information that is common to all wireless stations installed in B vehicles, and consists of the following chapters:-

- Chapter One - General information.
- Chapter Two - Wireless control harness Type B, in which individual items of the harness and associated headsets and handsets are described.
- Chapter Three - Operation of the wireless control harness in conjunction with the wireless sets.
- Chapter Four - User Servicing. This chapter includes a number of operator's functioning tests.
- Chapter Five - Aerials.

The second part consists of ANNEXES, identified alphabetically, which will be added to the handbook as information becomes available on the different types of installation introduced into Service use. Each Annex will contain specific information on one particular type of wireless station mounted in a vehicle in regard to its use and installation. Normally, information on operation of the various installations will be covered by the examples given in Chapter Three of the main handbook. Should it be necessary to augment this information the Annexes will be used for the purpose.

The information contained in this User Handbook and its Annexes will be supplementary to that contained in the User Handbooks on individual wireless sets. Reference numbers of these associated handbooks will be quoted on the cover of each Annex.

An Index of Annexes is included at the end of Chapter Five. Recipients of this User Handbook should keep this index up-to-date as each Annex is issued.

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CHAPTER ONE

GENERAL INFORMATION

SECTION 1 - USER RESPONSIBILITIES

General

1. User units are responsible for the installation of wireless equipment and associated items of control harness in vehicles already modified to enable this to be done. These modifications are normally carried out in workshops in accordance with Electrical and Mechanical Engineering Instructions.
2. User units will receive installation kits containing all items necessary for installation of wireless stations in vehicles. Instructions for each type of installation will be contained in separate Annexes to this User Handbook. For example, ANNEX A details the installation of Wireless Station C42/B47 in TRUCK, UTILITY, 3/4 ton, CS, FFW, Land Rover Series 2, 109-in WB.

Recovery of installation kits from vehicles to be evacuated

3. When a vehicle is to be evacuated as "beyond local repair", or if for any other reason it is removed from the charge of the unit holding the wireless equipment, all items of installation kit must be dismantled. This includes all equipment detailed in the Annexes to this handbook for particular installations, and all stowed equipment. These items will be retained by the unit to await installation in a replacement vehicle. It does not include basic equipment provided in a "fitted for wireless" (FFW) vehicle, (see Section 2) nor those items added as vehicle modifications. Equipment in these two categories will be provided in the replacement vehicle.
4. Failure to remove installation kit items from an evacuated vehicle will cause considerable delay in installing the wireless equipment in a replacement vehicle.

Testing installations

5. 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.
6. After completing the installation, inspect all fittings, ensuring that bolts and nuts are securely tightened.

7. Check that the terminations of all connectors are firmly attached to the appropriate points.
8. Ensure that the installation is complete, and that all items of equipment are clean and dry.
9. Examine the level of the electrolyte in the batteries and, if necessary, top up with distilled water.
10. When necessary, fit the canvas hood on the rear of the vehicle, and secure all the retaining devices.
11. 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.
12. Conduct normal routine tests on the wireless equipment in accordance with the user handbooks.

SECTION 2 - LWB LAND ROVER INSTALLATIONS

13. All modifications made to long wheel-base Land Rovers to convert them to FFW vehicles are the same irrespective of the type of installation. It is therefore possible to supply a list of items used in this conversion, and this is done in Table 1.



TABLE 1

ITEMS USED IN CONVERTING LWB LAND ROVERS TO FEW

Items	Remarks
Plate and screw assembly 9-11/16-in x 9-1/2-in No 1 (ZE14979) 1	Strengthening plate for near side front wing
Plate and screw assembly 9-11/16-in x 9-1/2-in No 2 (ZE14978) 1	Strengthening plate for off side front wing
Socket, co-axial, dummy 2	For both front wings
Plate cover and clamping 2	Fitted on front wings
Plate stiffening assembly wheel arches 4	Fitted on rear wheel arches
Runner assemblies 19-in x 5-in x 3-1/2-in pairs (ZE14898) 1	Mountings for table
Container, cable ends, assembly 1	To contain loose plugs and cable
Connector, 12-pt No 85, 12-ft Type C/E (ZA46878) 1	To Control unit 'C' mounted on passenger's dashboard
Connector co-axial No 123, 14-ft (ZA46980)	To ATU's on both wings (includes cable clips, nuts, and screws)
Clamps cable fixing No 55, Sets 1 (ZE19872)	For fixing connector 12-pt No 85, 12-ft
Control unit operator's 'C' (ZA46192) 1	Mounted on passenger's dashboard
Baseboard, battery, assembly 1	On floor of vehicle
Carrier battery 17-1/2-in x 16-in (ZE14743) 2	Mounted on battery baseboard
Grommet strip 3/16-in (PVC) 6-in 1	For 1-11/16-in hole in rear bulk-head
Bolts 5/16-in UNF x 3/4-in cad plated 2) For attaching 'C' unit to dashboard
Nuts 5/16-in UNF "NYLOC" cad plated 2	
Screws 1/4-in UNF x 1-1/4-in hex hd cad plated 1) For earthing table to vehicle
Nuts wing 1/4-in UNF cad plated 1	
Washers, flat 1/4-in cad plated 1	

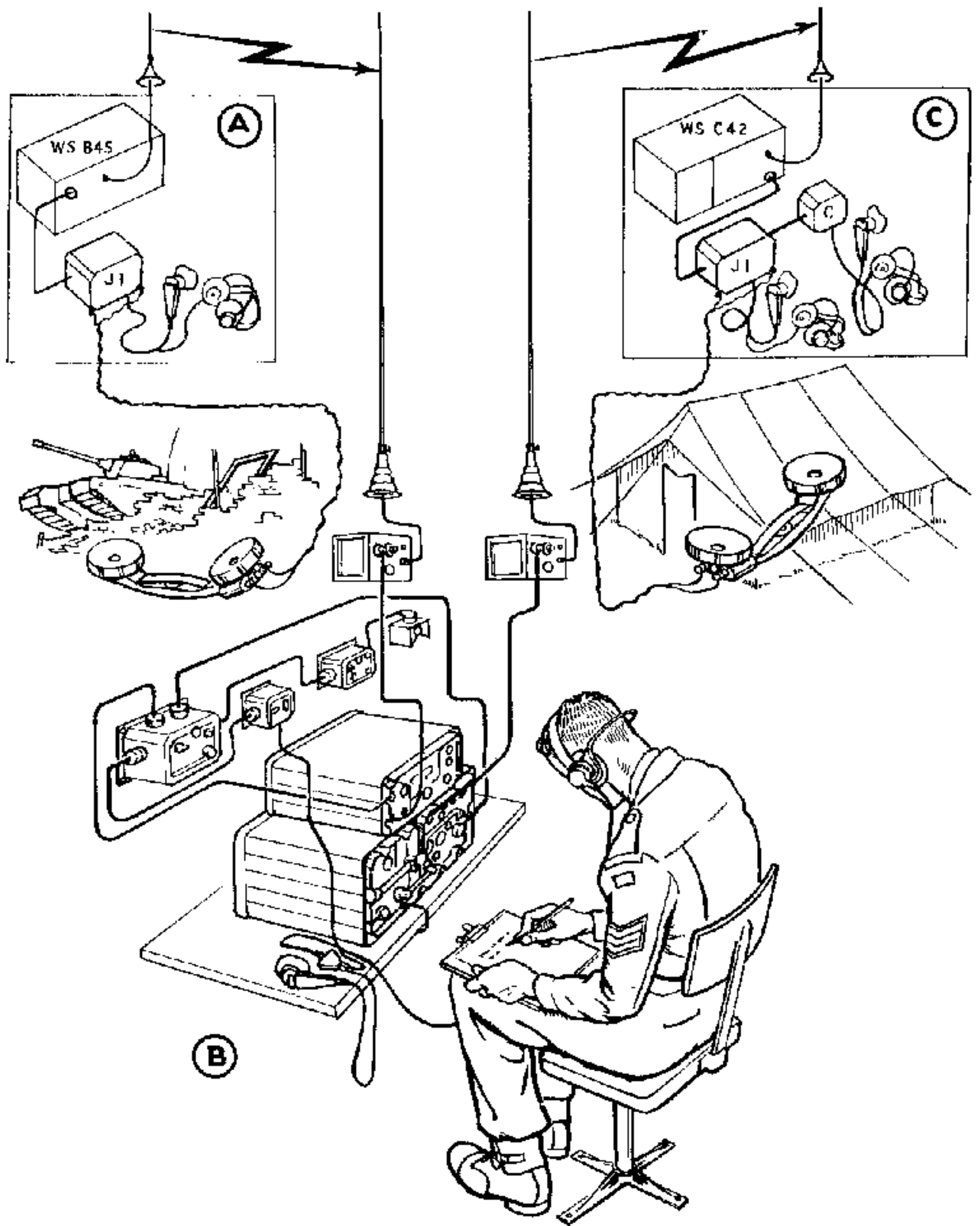


FIG I
 TYPICAL VHF INSTALLATIONS USING REBROADCASTING FACILITIES

CHAPTER TWO

WIRELESS CONTROL HARNESS TYPE B

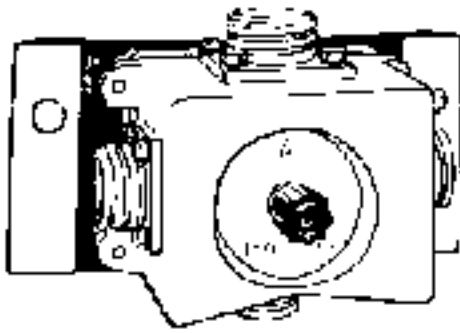
SECTION 3 - PURPOSE AND FACILITIES

14. This wireless control harness, comprising a system of control units and junction boxes, has been designed mainly for use with the new range of HF and VHF wireless sets. Existing types of wireless sets can also be controlled, but for these sets special connectors are necessary. While the harness is intended primarily for use in vehicles, it can be used in installations which have been dismantled and set up in ground stations. It provides a means of controlling one or two wireless sets from various positions in a vehicle or other location, including intercommunication between these positions in conjunction with an audio amplifier incorporated in one of the wireless sets.

15. In addition it can provide automatic rebroadcast facilities in two-set installations incorporating VHF wireless sets, and manually controlled rebroadcast switching if one or more of the sets is in the HF range. Remote rebroadcasting can be arranged, on both one-set and two-set installations, with "break-in" facilities for operators at either end of the link.

16. Fig 1 illustrates three typical installations, and shows the manner in which they can inter-work to pass information between two points. At station 'A' is a one-set installation connected by remote control cable to an observer who can speak on the remote handset. Transmissions from station 'A' are received by station 'B', which is a two-set installation with rebroadcasting facilities. At station 'B' signals from the observer can be heard by operators connected to the harness, and they can be simultaneously retransmitted on the second wireless set for reception at station 'C'. The one-set installation with remote control at 'C' enables the original signals to be heard by operators there, and by the control point served by the remote handset. Thus a message from the observer at 'A' is received instantly at the control point 'C'. Similarly the remote operator at 'C' can speak to the observer at 'A'. Conversation can proceed in either direction, rebroadcasting by station 'B' being fully automatic provided VHF sets are used. Operators at 'A', 'B', and 'C' can break in on this conversation if they wish. For full descriptions of the installations at points 'A', 'B', and 'C' see pages 39, 33, and 39 respectively.

17. Units comprising the control harness are described in detail in this chapter and examples of operation of a number of typical installations are given in Chapter Three.

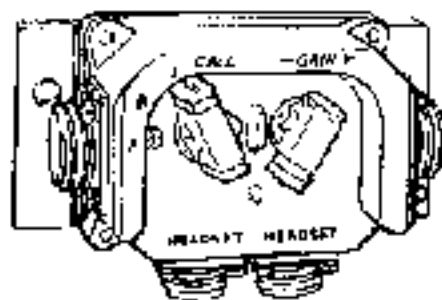
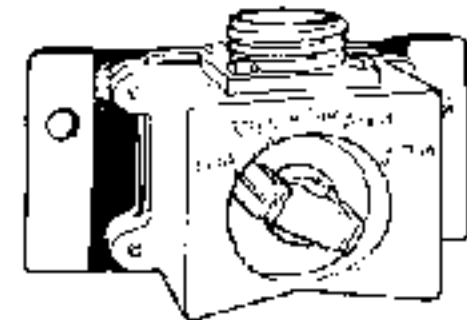


ADAPTER UNIT 'A' RECEPTION SET (ZA46196)

Enables Reception set R210 to be operated without Wireless Sender C11. Connections for two headsets, 24V supply for the receiver and 12-way lead from the receiver.

REBROADCAST UNIT 'B' (ZA46193)

Local rebroadcast control unit. Has switch positions for automatic or manual rebroadcast, and break-in.

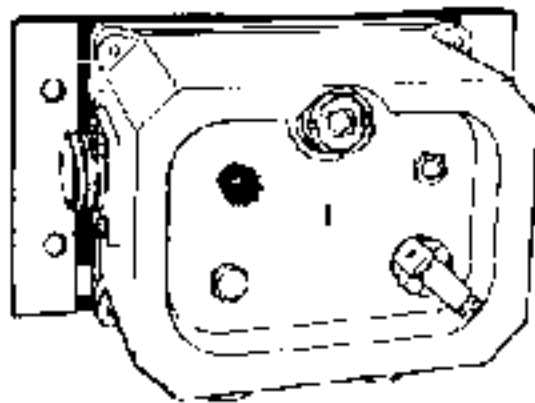
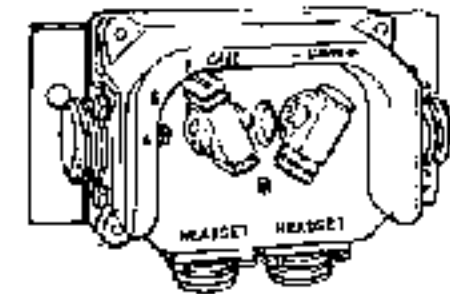


CONTROL UNIT OPERATORS 'C' (ZA46192)

Operator's control unit for controlling one or two wireless sets through junction box, and intercom. Two headset sockets and connections to other control units.

CONTROL UNIT DRIVERS 'D' (ZA46191)

Driver's control unit in one and two-set installations. Provides listening facilities only on wireless sets, otherwise similar to unit 'C'.

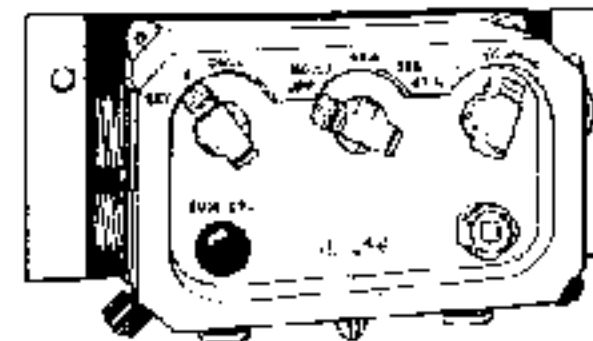


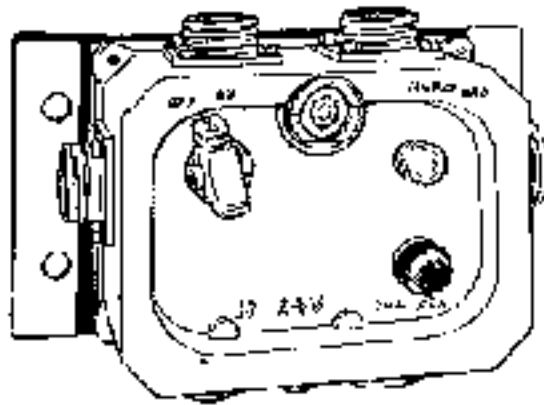
IC AMPLIFIER 'I'

For installations using a wireless set which does not contain an audio amplifier, and where intercom facilities are required, for example, Wireless Set B47. The amplifier is 24 volt.

JUNCTION BOX ONE-SET 'J1' (24V-ZA46288)

Junction box for a one-set installation. Fitted between wireless set and harness, with set or IC, on-off, remote control and rebroadcast switching. Two headset sockets, cable terminals, LT input. Voltage control circuit.



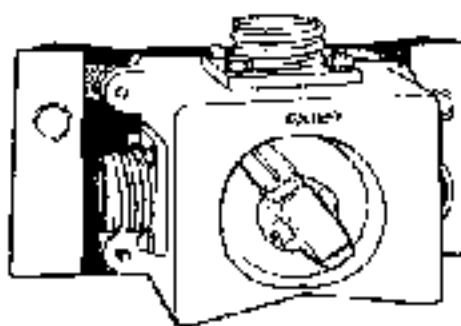
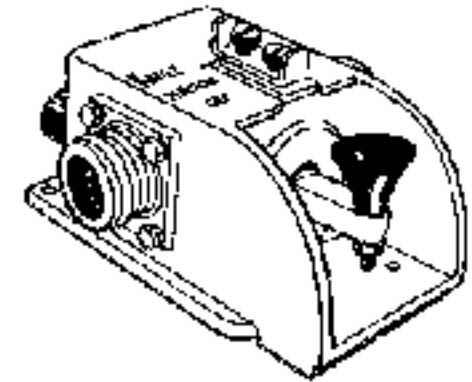


JUNCTION BOX TWO-SET 'J2' (24V-ZA46286)

Junction box for a two-set installation. Fitted between wireless sets and harness, with on-off and rebroadcast switching and voltage control circuit. Connections for two wireless sets, two control units, unit 'R' and LT.

REMOTE CONTROL UNIT 'K' MK2 (ZA51445)

Provides facilities for hand speed morse signalling and remote control of HF sets. Used in conjunction with remote control telephone.

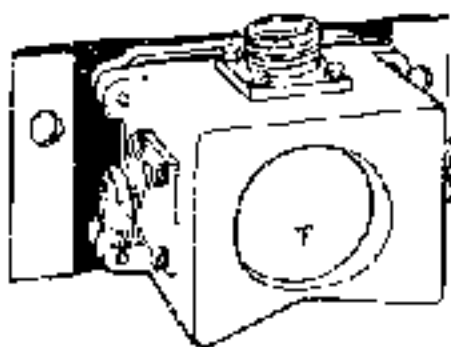
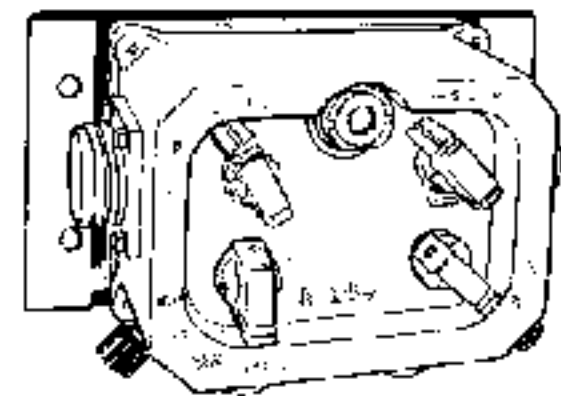


ADAPTER UNIT ONE-SET 'O' (ZA46194)

One-set adapter connects two headsets direct to a wireless set output. Fitted with a gain control, 12-way input and two 6-way headset sockets.

REMOTE CONTROL UNIT 'R' (ZA46292)

Combined local remote control unit and operator's unit for two-set installations. Wireless set, IC, remote control and break-in switching. Two headset sockets, cable terminals, and connections for junction box and rebroadcast unit.



ADAPTER UNIT HEADSET 'T' (ZA46195)

Headset adapter enabling two headsets to be connected to one standard 6-way Mk. 4 headset outlet socket through an extension lead.

18. Remote control of all wireless sets connected to the harness can be arranged, and may take various forms according to requirements at the remote point.

19. Certain installations may include a separate amplifier unit which is used in intercommunication when the wireless set as fitted does not contain a built-in IC amplifier. Another amplifier may be installed complete with loudspeaker units to provide additional listening facilities for crew members who have difficulty in wearing a headset owing to the nature of their duties.

20. Fourteen different types of unit are described in this handbook, and certain of these units, with the necessary connectors and headsets, are used to construct the particular type of harness required in any particular instance. The units in use depend upon whether one or two wireless sets are included in the installation, and upon the facilities required. The diagrams in this handbook depict typical arrangements, and show how installations can be built up.

SECTION 4 - POWER SUPPLIES

21. Wireless control harness type 'B' requires a direct current power supply of 24 volts for its own operation, in addition to the power supply required by the wireless sets which form the basis of the installation. The batteries from which the wireless sets are supplied will provide this additional power.

22. The wireless control harness takes a current of between a half and one ampere, according to the installation. The current required by the harness is additional to that required by the wireless set or sets, but this extra current drain is not great enough to make any appreciable difference to the total rate of battery discharge.

23. Power supply connections are made to the two-set junction box 'J2' or to the one-set junction box 'J1' using the same source of power supply as the wireless equipment in the vehicle. This power is normally supplied through a junction box which forms part of the vehicle installation. The power supply must also be connected to the IC amplifier when this unit is included in the installation. "Power on" lamps are fitted on Junction boxes 'J1' and 'J2' to ensure that wireless sets operate satisfactorily on battery voltages which may vary between 20.7 and 29 volts. A voltage control relay selects a low voltage transformer tapping in the wireless set supply unit when the battery voltage is between 20.7 and 25.5 volts, and a high voltage tapping when this voltage is between 23.5 and 29 volts. If the junction box is disconnected the supply unit is restored to the high voltage tapping regardless of the actual battery voltage and the wireless set does not perform with maximum efficiency on low battery voltages. This can also happen if certain faults develop in the voltage control circuit.

24. When a Reception set R21C and a Reception set adapter unit 'A' are being used, a 24-volt DC supply must be connected to the 2-pin plug on the adapter unit 'A'. This 24-volt supply is required by the reception set to provide the power supplies normally obtained from the sender associated with this receiver. The orientation of the 12-way connection is not standard; the connector which is normally fitted between the receiver and the sender and the sender power supply unit should be in this case fitted between the receiver and the Reception set adapter unit 'A'.

SECTION 5 - CONSTRUCTION

25. Each control unit and junction box is of similar cast aluminium construction, although the sizes and shapes vary according to the function of the unit. Each box is hermetically sealed to render it moisture and dust proof, and is mounted on a flexible base by means of which it is secured in a convenient position in the vehicle. Desiccators are fitted in Junction boxes 'J1' and 'J2' and in Control units 'E' to absorb residual moisture. They can be changed when necessary by the user. Each control unit and junction box is clearly marked with the designation by which it is identified.

26. All controls and switches are fitted to the fronts of the units. Knobs and panels are designed to enable switches to be manipulated by operators even when wearing heavy arctic protective gloves.

SECTION 6 - CONNECTIONS

27. All connections between units are made by means of special cables terminated in Mk 4 multi-point plugs and sockets. The only exception is the remote control cable which consists of a twisted pair of D10 cables attached to terminals on the appropriate units. Leads from standard headsets are terminated in 6-way Mk 4 plugs. The remote control handset has a pair of terminals to which the remote control cable is connected. The commander's headset has a 12-way Mk 4 connector, and can be attached to the right hand socket on a control unit 'C' or 'D'. All Mk 4 plugs and sockets are protected by plastic covers which screw on when the connection is not in use, and which are held captive by a short length of wire.

28. If HF wireless sets such as Wireless Set No 19 are incorporated in Type 'E' control harness, a special adapter lead must be fitted to the wireless set output to connect the set to the Mk 4 type plugs and sockets used on the control harness.

SECTION 7 - 'B' HARNESS UNITS

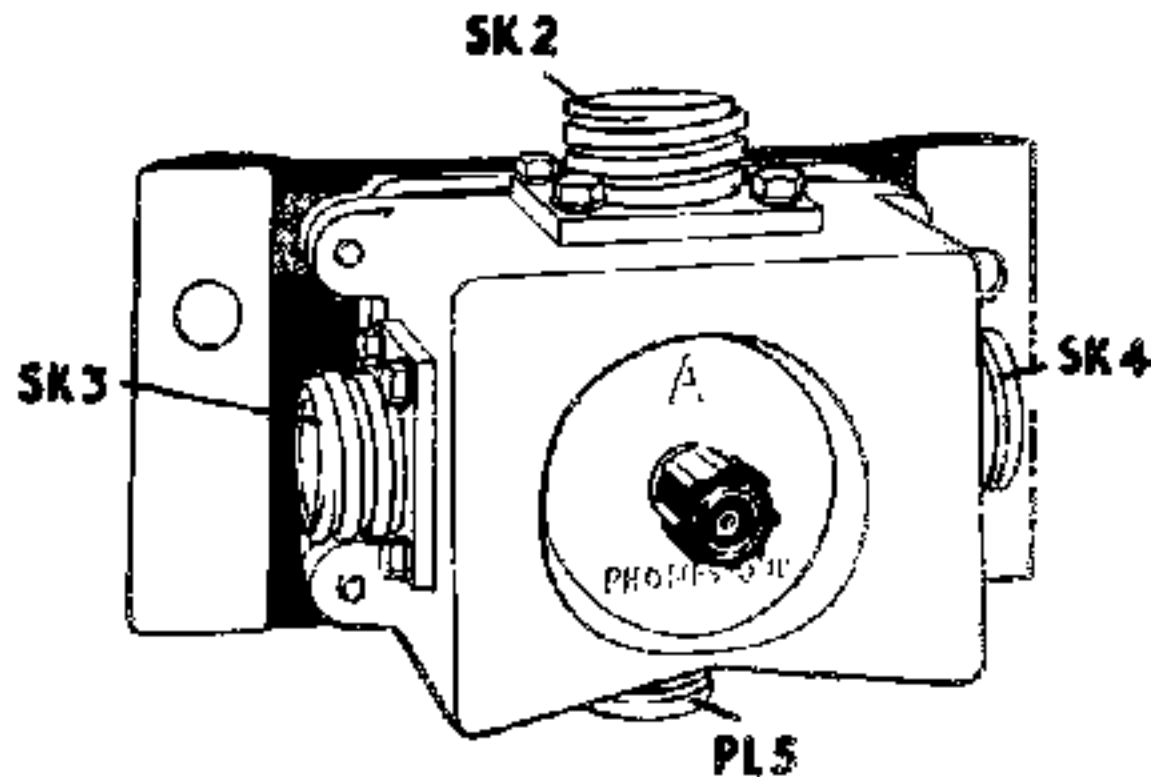


FIG 2

ADAPTER UNIT, 'A' reception set (Fig 2)

29. A 4-way adapter unit designed to enable one or two headsets and a 24 volt power supply to be connected to a Reception Set R210 when this receiver is operated without its associated Wireless sender C11. This arrangement provides reception only. Operation of the pressel switches on the headset microphones has no effect upon this reception.

30. The unit is connected to the R210 set through a 12-way socket SK2. Two 6-way sockets SK3 and SK4 provide for attachment of the headsets or one headset and an adapter unit 'T' carrying two headsets. A cable terminal enables attachment of a remote control handset with earth return. A 2-pin plug PL5 is necessary for connection of a 24 volt DC power supply. This 24 volt supply operates the Reception set R210, which has a built-in power supply unit, and it replaces the power supply which the receiver normally obtains from its associated sender. The orientation of the 12-way connection is not standard; the connector which is normally fitted between receiver and sender power supply unit should be fitted between the receiver and the Adapter unit 'A' reception set when this adapter is used.

31. A diagram showing typical use of the 'A' unit is given in Fig 26 .

REBROADCAST UNIT 'B' (Fig 3)

32. Used for local rebroadcasting in 2-set installations. A 25-way connector attaches it to a Remote control unit 'R', or to a Junction box 'J2'. Rebroadcast unit 'B' is not needed for remote rebroadcasting (RRB).

33. A five-position switch selects the system required: these positions are:-

- (a) NORM: Operators' send-receive pressel switches are connected ready for operating the sets. No rebroadcasting facilities are available.
- (b) AUTO: Rebroadcasting is automatic between two VHF sets, on which the squelch controls must be correctly adjusted. Operators' S/R pressels are disconnected.
- (c) BK.IN: An operator at Control unit 'C' or Remote control unit 'R' can break in on rebroadcasting.
- (d) A-B: Reception on wireless set 'A' is rebroadcast on wireless set 'B'.
- (e) B-A: Reception on wireless set 'B' is rebroadcast on wireless set 'A'.

34. Manual control positions A-B and B-A are used for HF wireless sets, or for a mixture of HF and VHF sets.

35. Typical use of the 'B' unit is shown in Fig 19 .

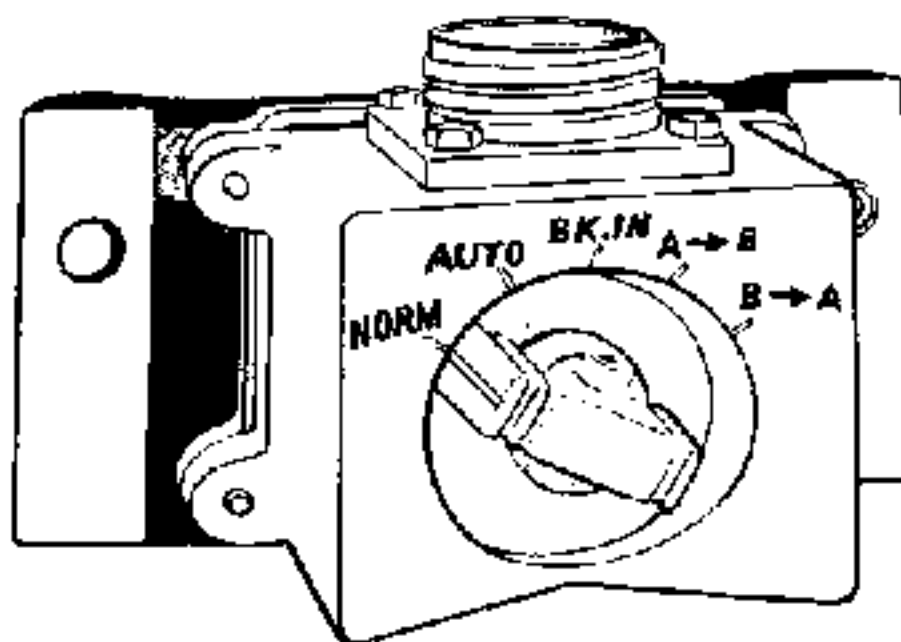


FIG 3

CONTROL UNIT, operator's 'C' (Fig. 4)

36. This is the operator's control box in either 1-set or 2-set installations. It is fitted with a 12-pin plug, PL6, through which it is connected to other types of control unit. A 12-way socket SK7, enables the box to be connected to an additional control unit 'C' or to a driver's control unit 'D'. Two 6-way sockets are used for the attachment of headsets.

37. Switch SWA selects wireless set or intercommunication, and can be pressed against a spring to give a calling buzz. In a 1-set installation a stop screw is fitted to prevent the switch being turned to 'A'. In a 2-set installation this switch must be set to select 'A' or 'B' set as required. It then enables an operator to send or receive on the selected wireless set, or permits intercommunication between the various headsets attached to the harness.

38. Gain control RV1 adjusts the level in the headsets attached to this unit.

39. Fig 22 shows a Control unit, operator's 'C' being used in a typical two-set installation.

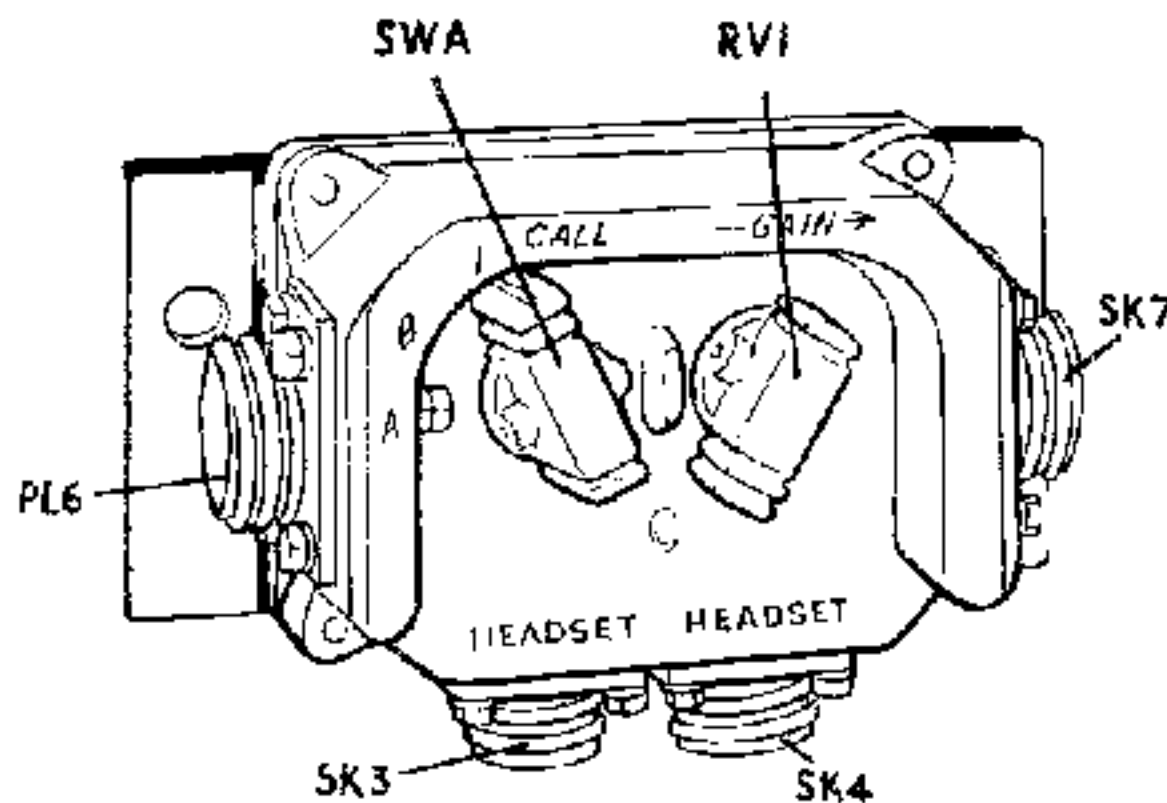


FIG 4

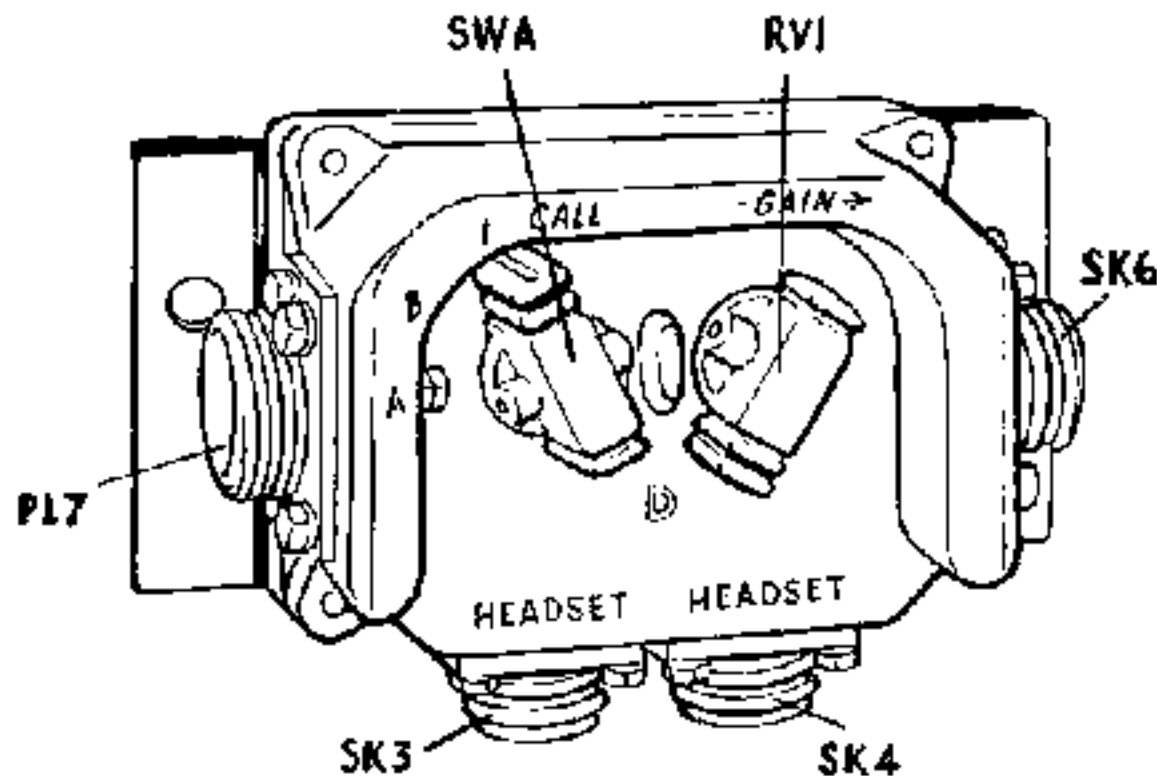


FIG 5

CONTRCL UNIT, driver's 'D' (Fig 5)

40. This unit is provided for driver and co-driver's use in 1-set or 2-set installations. Its use is illustrated in Fig 22. It is basically the same as an operator's control unit 'C' except that operator's control facilities are not provided.

41. Switch SWA can select the wireless set to be heard in a 2-set installation, or can be turned to 'I' for intercom. When pressed against a spring to CALL it sends a calling buzz on the IC circuit. In a 1-set installation a stop screw is fitted to prevent the switch being turned to 'A'.

42. Driver and co-driver can overhear conversation on the wireless set, or in a two-set installation on the wireless set which is selected by switch SWA, but cannot transmit on either set. When listening the driver can hear the intercom call, and speech superimposed on this reception, but cannot speak on 'I' until switch SWA has been moved. To talk on 'I' the driver or co-driver must turn switch SWA to the 'I' position, and operate his microphone pressel switch in the normal way.

43. The driver's control unit is fitted with a 12-pin plug PL7 on the left hand side which enables the unit to be connected to other types of control unit. Socket SK7 provides for the connection of additional operator's control units, other driver's units, or a commander's microphone. Two 6-way Mk 4 sockets are provided for the attachment of standard type operator's headsets.

44. RV1 is a gain control.

45. Fig 22 shows a Control unit driver's 'D', together with a Control unit, operator's 'C' in a one-set installation.

JUNCTION BOX, one-set 'J1' (Fig 6)

46. This junction box is used to connect one wireless set to the control harness. It is provided with a 12-pin plug PL1 for connection to the wireless set, a 12-way socket SK6 for connection to the adjacent operator's or driver's control units, and a 2-pin plug PL5 for the LT supply. Beneath the box are two six-way sockets, SK3 and SK4, for headsets, and two terminals for the attachment of a remote control cable. A red indicator lamp, mounted on the underside of the box, glows when the installation is switched on. Its brightness can be varied by turning the lamp cover.

47. A voltage control relay is incorporated in junction box 'J1'.

48. There are three switches on the front of the box -

(a) SWA has 3 positions -

- (i) SET to connect the headsets to the phone, microphone, and pressel circuits of the wireless set, thus enabling an operator to send and receive on the set.
- (ii) 'I'. To connect headsets to the IC amplifier in the wireless set, and enable intercom between all headset positions attached to the harness. This intercom is not transmitted.
- (iii) CALL. In this position the switch is spring-loaded, and will return to 'I' unless held at CALL. When pressed against the spring it causes a buzzer to send a calling signal over the intercom circuit.

(b) SWC has five positions -

- (i) OFF. In this position the voltage control circuit, the IC buzzing relay, and the red indicator lamp are switched off. The remote control terminals are disconnected.
- (ii) NORMAL. The voltage control relay is switched on and the buzzing relay is in circuit. The indicator lamp is switched on. The remote control terminals remain disconnected.
- (iii) REMOTE. The remote control cable terminals are brought into circuit, and the remote handset can then be used.
- (iv) RRR. Used when rebroadcasting is required between two single set installations. An operator at 'J1' can monitor remote re-broadcast working.
- (v) BK.IN. Used when a local operator, whose headset is attached to 'J1', wishes to break in on rebroadcasting on the installation. He must wait till the set at the remote end stops receiving a signal before switching to BK.IN. He can then transmit at both ends of the link.

(c) The right hand knob RV1 is a gain control, which regulates the level in the headsets connected to SK3 and SK4.

49. A 2-amp fuse and dessicator are fitted to the front of the unit.
50. Typical use of the 'J1' junction box is illustrated in Fig 22.

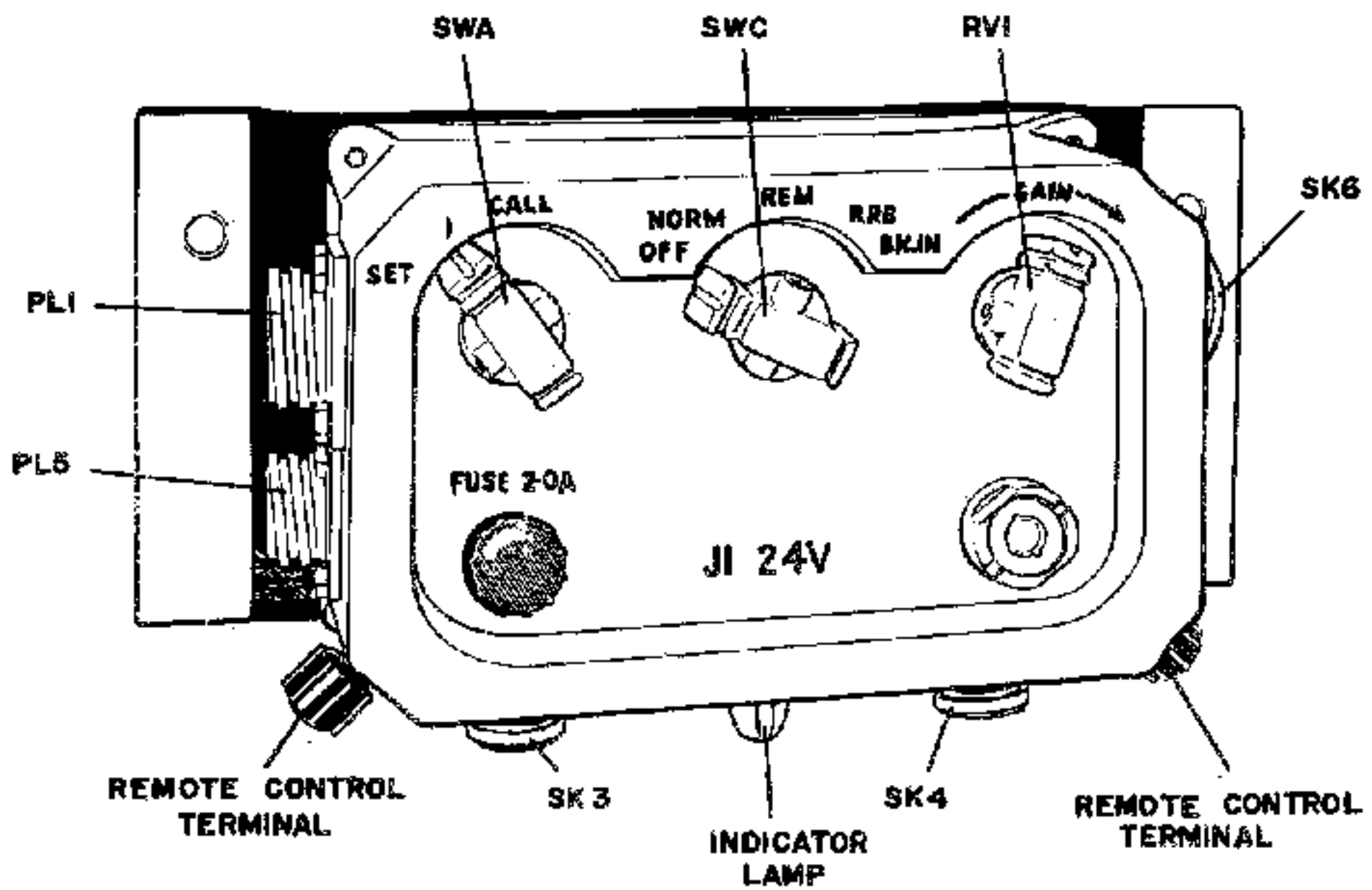


FIG 6

JUNCTION BOX, 2-set, 'J2' (Fig 7)

51. This junction box is for the connection of two wireless sets into an installation.

52. Junction box 'J2' has two 12-pin plugs, PL1 and PL2, for the connectors to the two wireless sets, a 25-way socket, SK8, for connection to a Remote control unit 'R' or a Re-broadcast unit 'B', and a 2-pin plug, PL5, for the LT supply. If Wireless set 19 is used, a special adapter lead must be fitted between this set and the Mk 4 plug on 'J2'. Two 12-way sockets SK6 and SK7, are provided for the connection of operator's control unit 'C' or driver's control unit 'D'. A voltage control relay is incorporated in junction box 'J2'.

53. Two switches are mounted on the front of the unit. Switch SWD is a two-position OFF-ON switch, and when it is at ON the voltage control and IC buzzing relays are in circuit, and the red indicator lamp glows. Switch SWB, which is enclosed by a transparent cover, is screwdriver operated, and selects 'NORM' or 'REF' (rebroadcast) working, but must remain at 'NORM' when 'B' box is not fitted. When a 'B' box is fitted and 'REF' facilities are required, the switch is set to 'REF'.

54. A 2-amp fuse and desiccator are fitted.

55. Examples of the use of the 'J2' junction box are shown in Fig 19 .

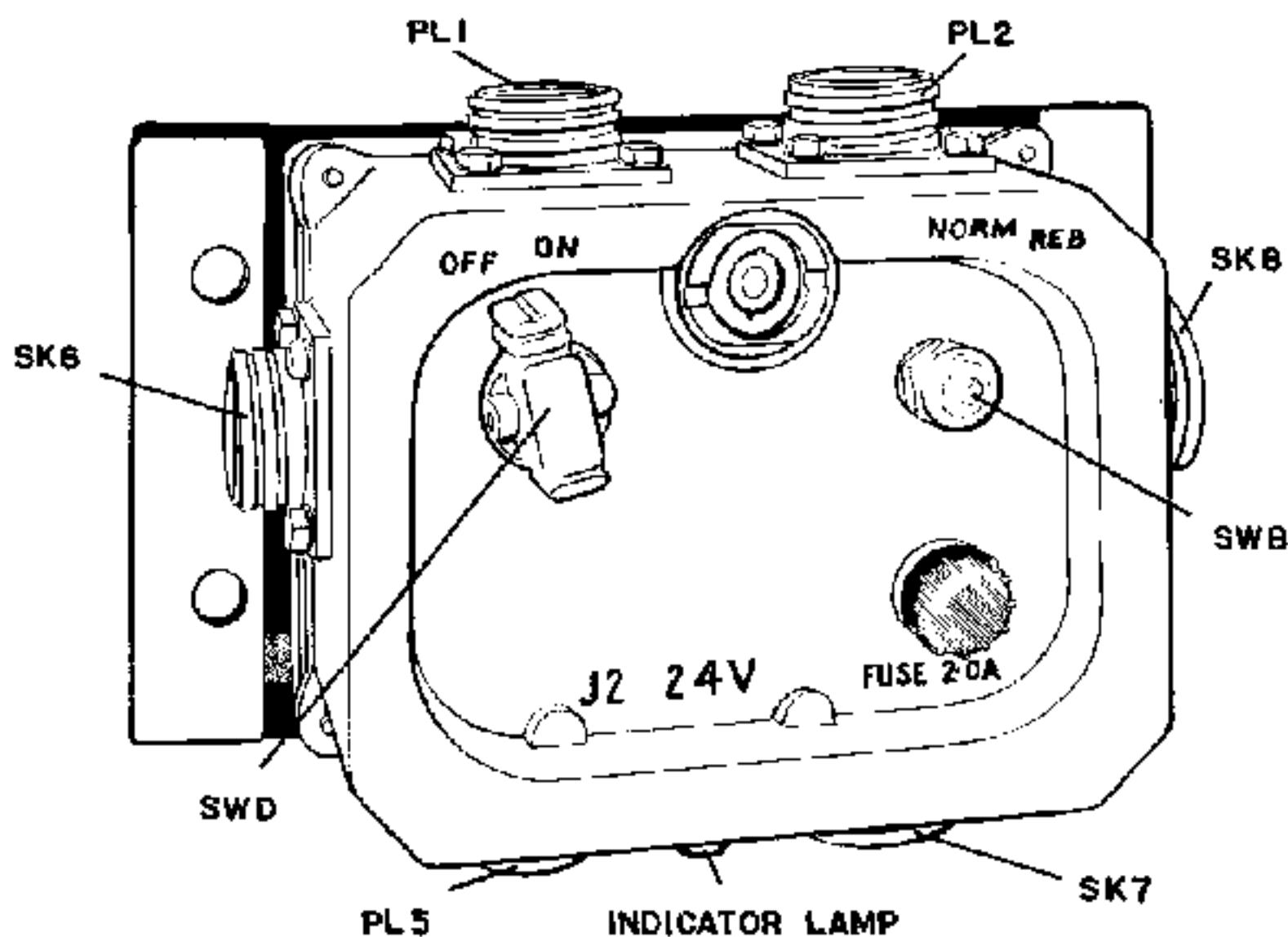


FIG 7

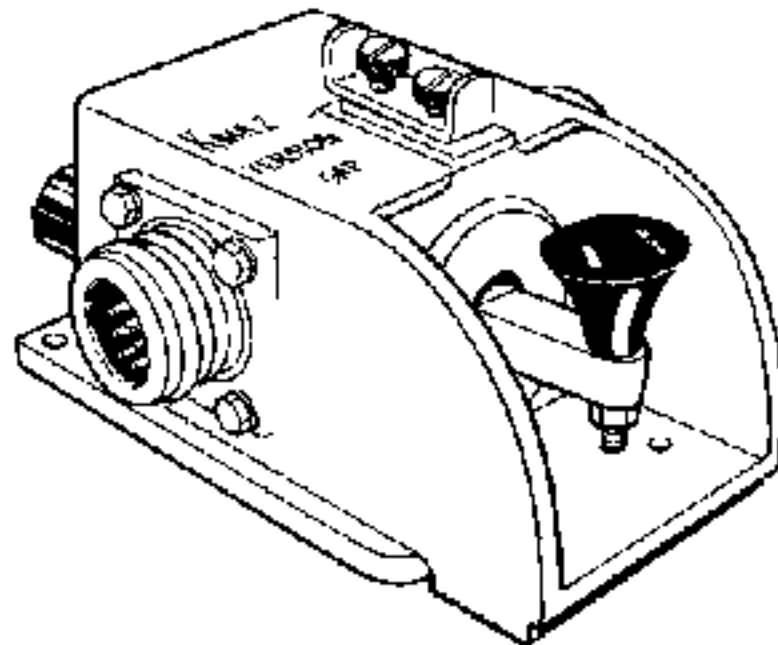


FIG 8

REMOTE CONTROL UNIT, 'K', Mk 2 (Fig 8)

56. This keying unit provides facilities for hand speed morse signalling on HF sets. It is fitted with a key for CW operation. Two screw adjusters enable adjustment of key tension and gap.

57. On the right side of the 'K' unit a Mk 4 socket enables connection of a microphone and headgear assembly. On the left side a Mk 4 plug is fitted to enable connection to any headset outlet in the vehicle harness when hand speed morse signalling is required in circumstances other than remote control.

58. The normal use of the 'K' unit is for remote control of a HF wireless set when keying facilities are required. It is connected to the remote control terminals of the 'J1' or 'R' unit by up to 1/2 mile of twisted pair D10 cable. Correct polarity is not essential in remote control connections to the 'K' unit; each cable may be terminated to either terminal.

59. The kit includes a fixed carrier for mounting the 'K' unit on the table in the vehicle and a free carrier with two web straps by which the keying unit may be strapped to the remote operator's knee.

60. When the 'K' unit is used remotely, and the remote operator wishes to call the local operator, he must use a telephone, hand SI, remote control No 1 (see paras 85 and Fig 17) connected in parallel with the 'K' unit as shown in Fig 23. To do this, thread the cable through the terminals on the 'K' unit, pull through approximately six feet, and tighten the terminals to pierce the insulation. Connect the cable ends to the remote control telephone. Pressing the handset CALL button then causes a calling buzz.

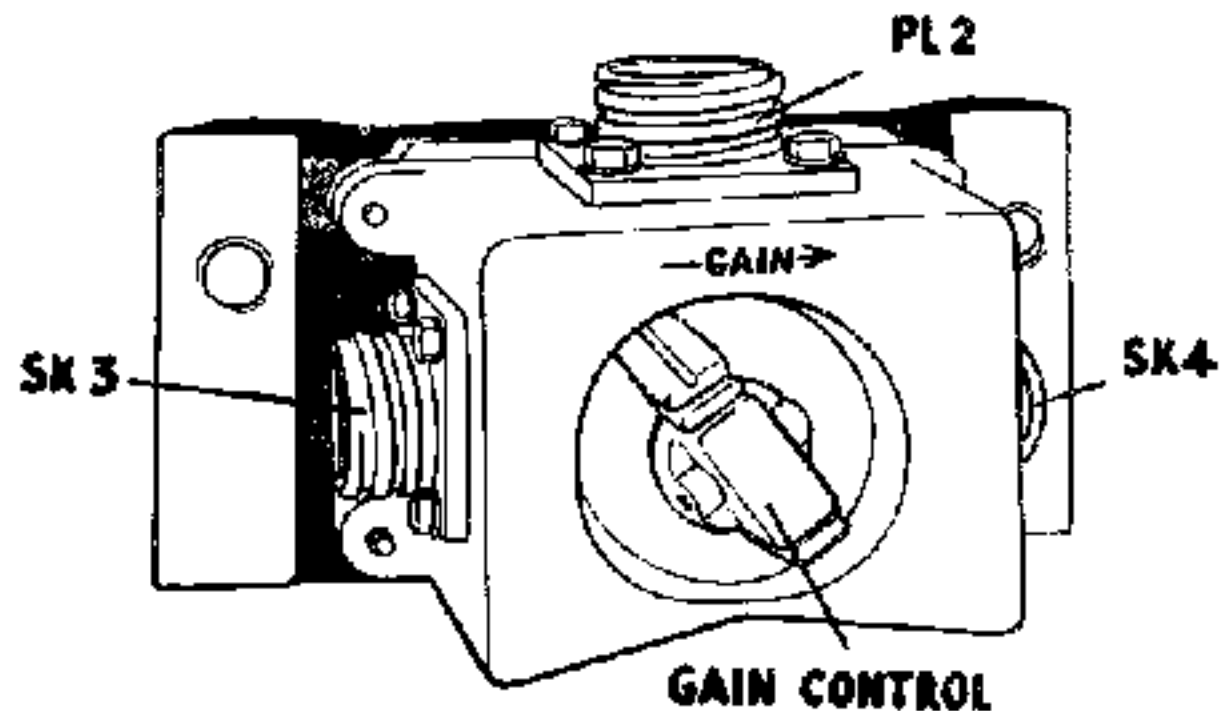


FIG 9

ADAPTER UNIT, one-set 'O' (Fig 9)

61. This unit is intended for emergency use in the event of failure occurring in the more complicated units of the wireless control harness. It enables headsets to be connected directly to the output of a wireless set. The arrangement provides send-receive facilities, and is used in installations where requirements can be met by the use of two or more headsets in parallel without any control switching. The unit provides no facilities for intercommunication, remote control, or rebroadcasting.

62. Installations using unit 'O' instead of a normal control harness with a 'J' unit do not have the advantage of a voltage control circuit, and the "slave" relay in the set power supply unit will be in the non-operated or high voltage position.

63. 'O' is fitted with a 12-pin plug PL2 through which it is connected to the wireless set output, and two 6-way sockets SK3 and SK4 for the attachment of two headsets with microphones, or keys for CW operation. Adapter units headset 'T' can be connected to the headset sockets to enable additional parallel headsets to be attached, but the number of these extensions must be kept to a minimum.

64. A gain control on the front of the adapter unit 'O' adjusts the gain level in the headsets attached to this unit.

65. Use of the 'O' adapter unit is illustrated in Fig 25.

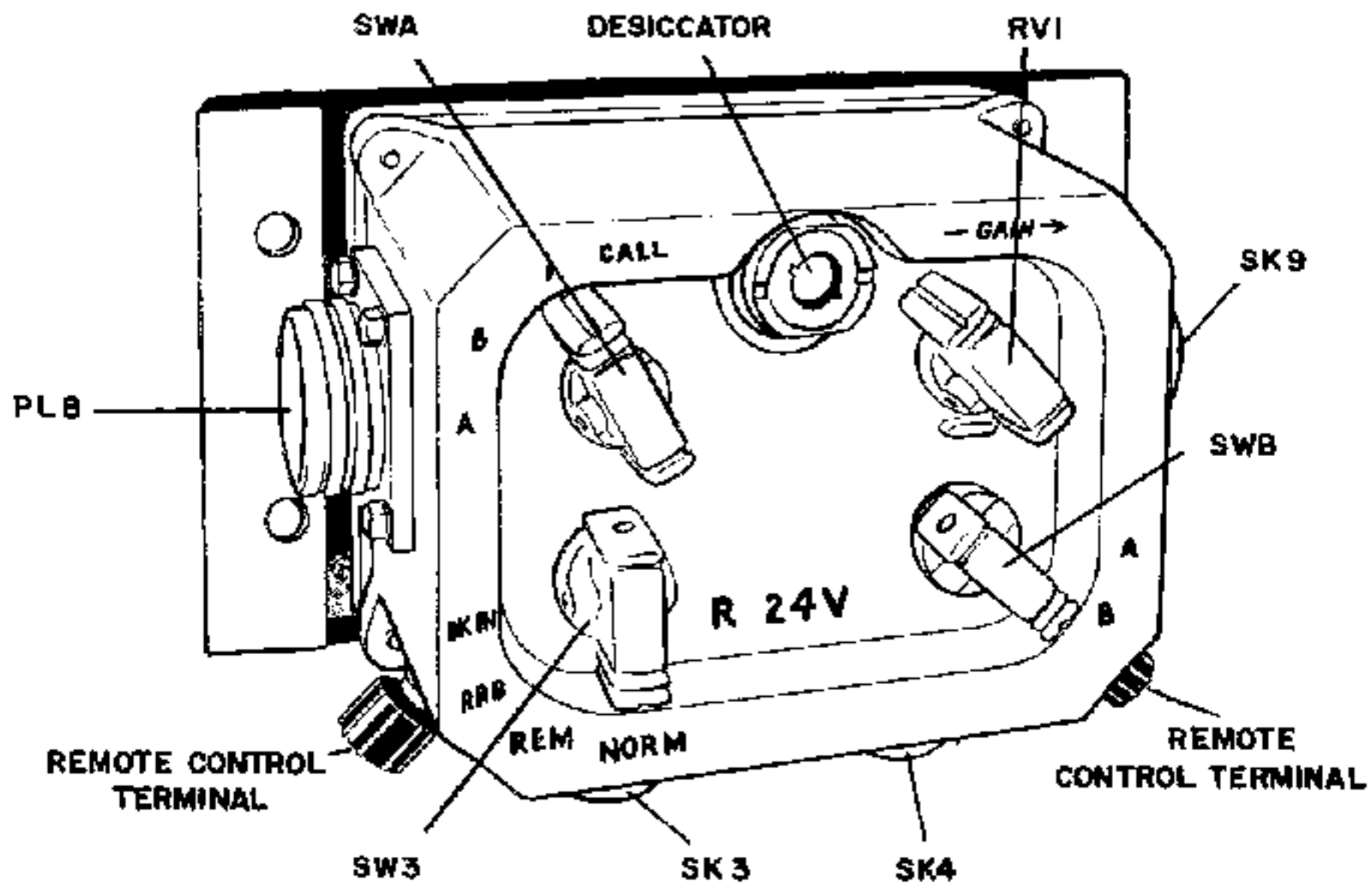


FIG 10

REMOTE CONTROL UNIT 'R' (Fig. 10)

66. This unit is used in two-set installations. With switch SWC at NORMAL the unit has all the facilities of an operator's control unit 'C'. Different methods of using this unit are shown in Chapter Three.

67. Unit 'R' is fitted with a 25-pin plug, PLB, for the connector to Junction box 'J2', and a 25-way socket, SK9 for connection to a rebroadcast unit 'B', or another Remote Control unit 'R'. Two 6-way sockets SK3 and SK4 are provided for the attachment of headsets. Two screw terminals, one marked + (pos) and the other - (neg) are fitted for the attachment of a remote control cable. This cable can connect the control unit to a similar control unit 'R' in another installation, or it can be connected between Remote control unit 'R' and a Junction box 'J1' when remote rebroadcasting is required. In both these cases correct polarity of remote control cable connections is essential. If wrong terminals are connected, polarity is reversed and both wireless sets are switched to send. Alternatively, the remote control cable can be inserted between the local control unit 'R' and a handset at a remote point in order to remotely control the wireless sets attached to the Junction box 'J2'.

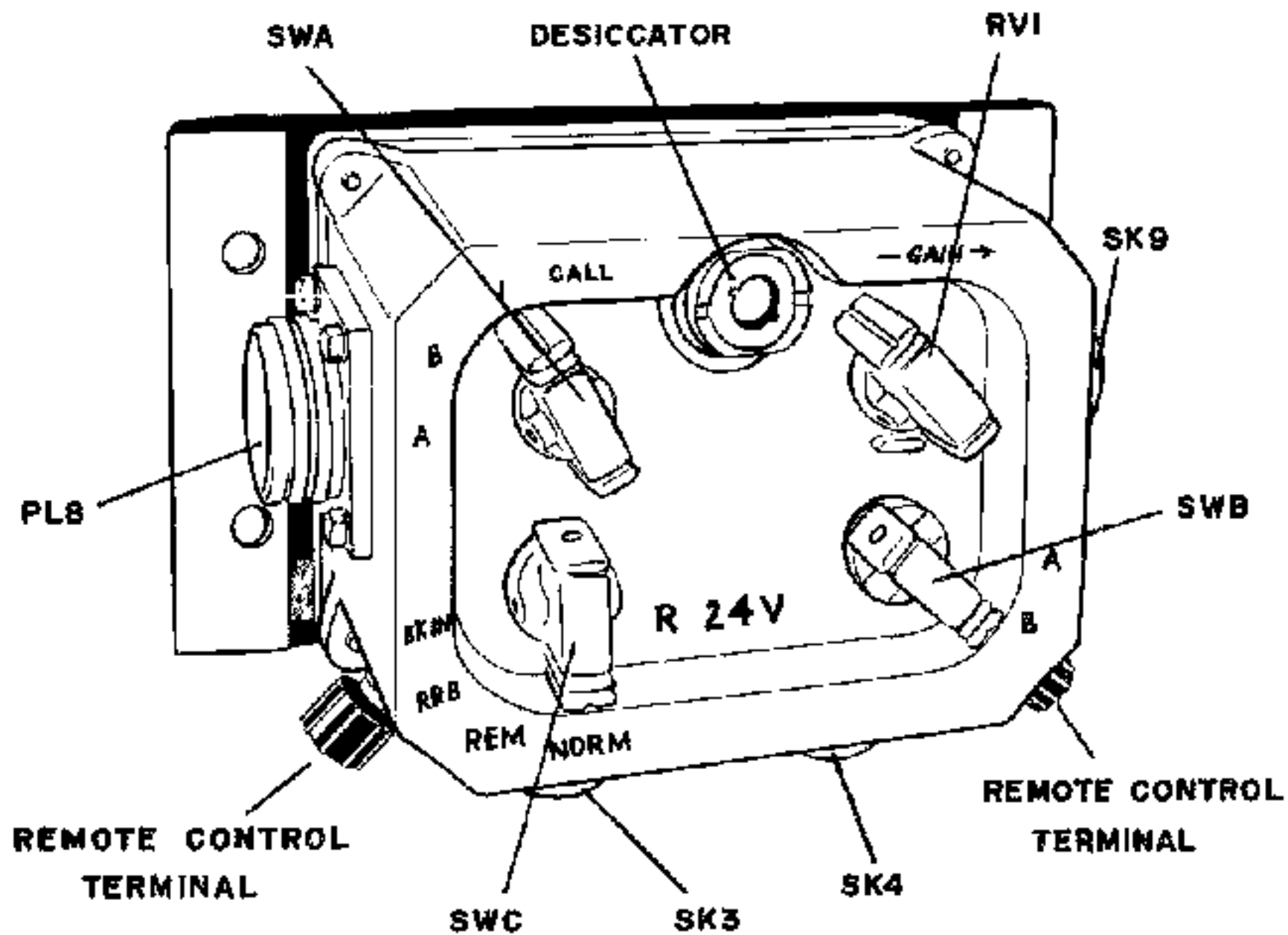


FIG 10

68. Three switches are mounted on the unit. Switch SWA has the following four positions:-

- A: Connects headsets to phone, microphone, and preselect circuits of the wireless set 'A', and thus enables an operator to send or receive on this set.
- B: Similarly connects headsets to W/S 'B'.
- I: Connects headsets to the phone and microphone circuits of the IC amplifier, and remote IC, and permits intercom between all headset positions attached to the harness.

CALL:When pressed against the spring-loaded CALL position the switch sends a calling buzz over the intercom circuit, and returns to the 'I' position when released.

69. Switch SWB has two positions, 'A' and 'B', and selects the wireless set which is to be remotely controlled.

70. Switch SWC has four positions as follows:-

NORMAL: In this position the remote control cable terminals are disconnected. Operators connected to Remote control unit 'R' can operate the wireless sets normally by means of switch SWA, as with a control unit 'C'.

REMOTE: In this position the wireless set selected by switch SWB can be operated remotely from a handset connected to the remote control terminals on control unit 'R'. For an HF set a keying unit 'K' could also be used. If necessary, the local operator can still use either set or CALL by operating switch SWA.

RRB: In this position automatic remote rebroadcasting can take place if two installations equipped with VHF wireless sets have the remote control terminals of their control units 'R' connected by D10 cable. Switch SWB selects the set to be used in each station.

BK.IN: Used when an operator whose headset is attached to Remote control unit 'R' wishes to break in on rebroadcasting. Either operator can speak on either set.

71. RV1 is a gain control which regulates the level in the headsets.

ADAPTER UNIT, headset, 'T' (Fig 11)

72. This 3-way adapter enables two headsets to be connected to one of the standard 6-way Mk 4 headset sockets on a junction box. It can also be used to attach two headsets to one 6-way headset socket on any operator's control unit.

73. It has two 6-way output sockets, SK3 and SK4, connected in parallel with a 6-way input plug, PL4, at the top. It has no switching facilities or gain control.

74. It can be incorporated in one-set or two-set installations.

75. Fig 26 shows one method of putting this unit to use.

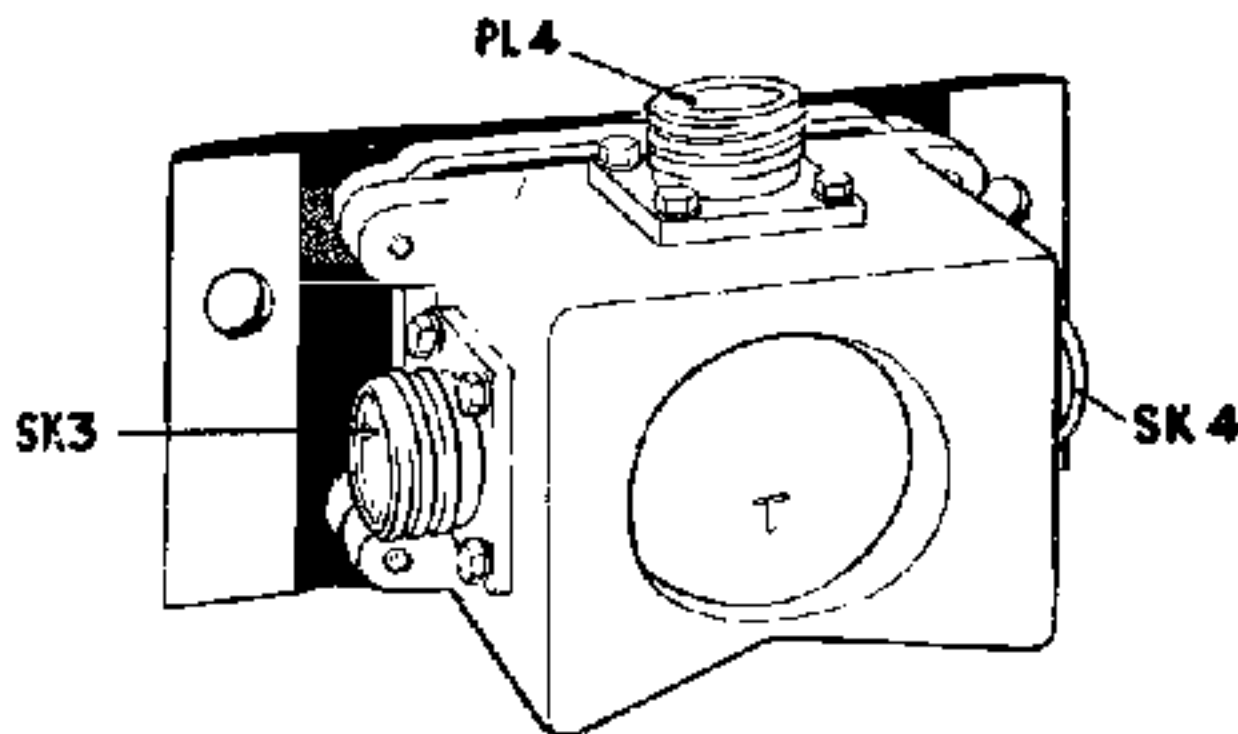


FIG 11

INTERCOMMUNICATION AMPLIFIER UNIT, 'T' (Fig 12)

76. This unit is used in installations in which an intercom amplifier is required, but is not provided by the wireless set. This requirement may be found in certain installations using wireless set B47, B48, etc, which do not contain IC amplifiers.

77. Twelve-point connectors are fitted from the amplifier to the wireless set and to the junction box set input. The amplifier is for use on 24-volt systems only, and has a 2-point plug to which this supply is connected. An on-off switch and an indicator lamp are fitted and a gain control for use with the headset which can be attached to the amplifier.

78. The use of this amplifier unit is illustrated in Fig 24 .

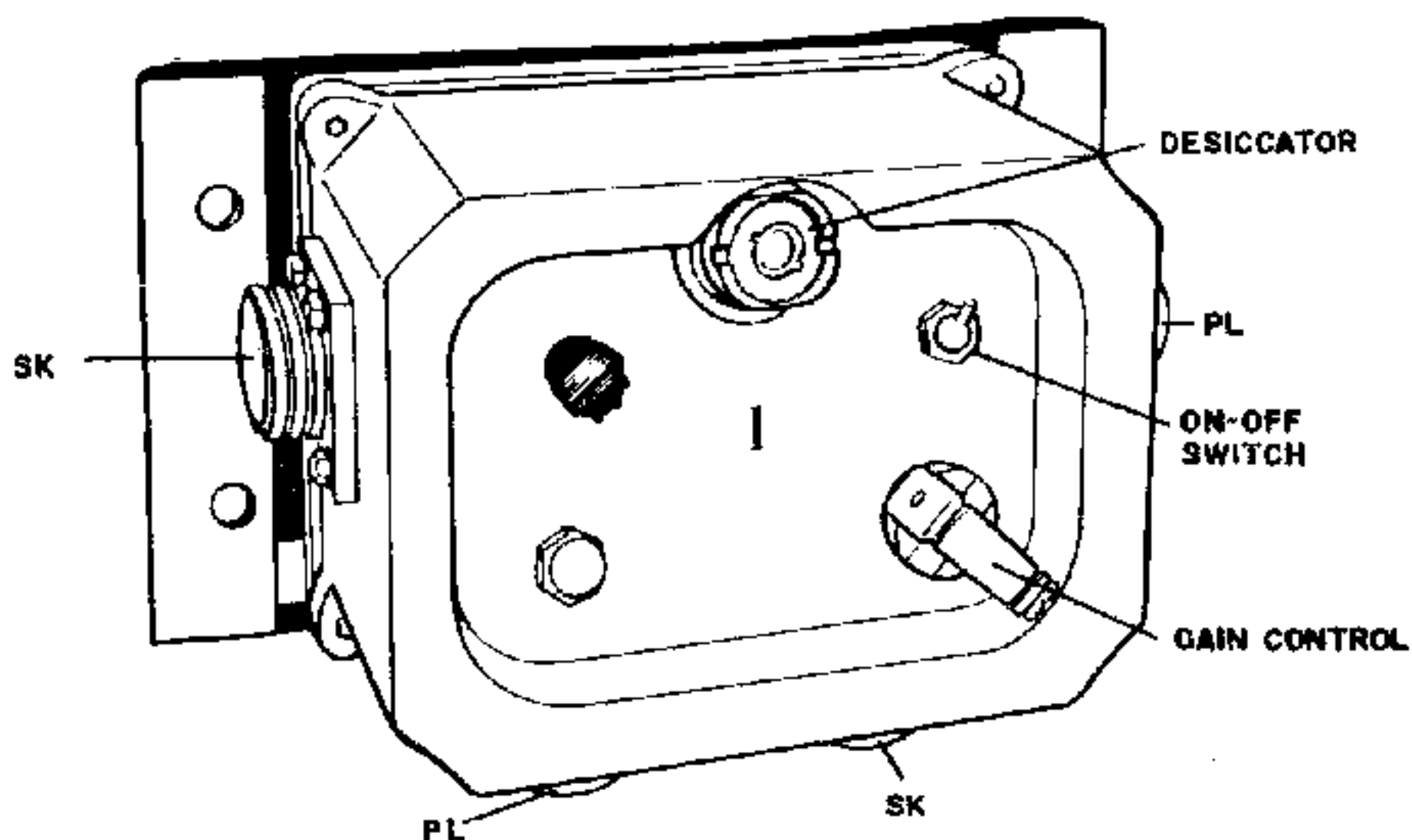


FIG 12

SECTION 8 - POWER DISTRIBUTION BOXES

Box, junction, I.T., 4-way No 1 (Fig 13)

79. This unit is a distribution box for the LT supply. A 2-pin plug is provided for LT input and three 2-pin sockets for LT outlet to wireless sets and control harness. Each position is indicated on the box.

Box, junction, 4-way No 4 (Fig 14)

80. A 2-pin plug is provided for LT input from the signals batteries and two 2-pin sockets for LT outlet to the wireless sets or harness. The fourth connection is a 4-pin plug to enable connection to be made to a battery charger. Each position is marked.

Box, interconnecting, 4-way, No 1 (Fig 15)

81. This box is used in installations (such as the WS C11) with a greater current drain. A 2-pin socket is provided for connection to the control harness, a 4-pin socket for the wireless set connection, and two 4-pin plugs for the vehicle batteries and signals batteries. The last three positions are clearly marked on the box.

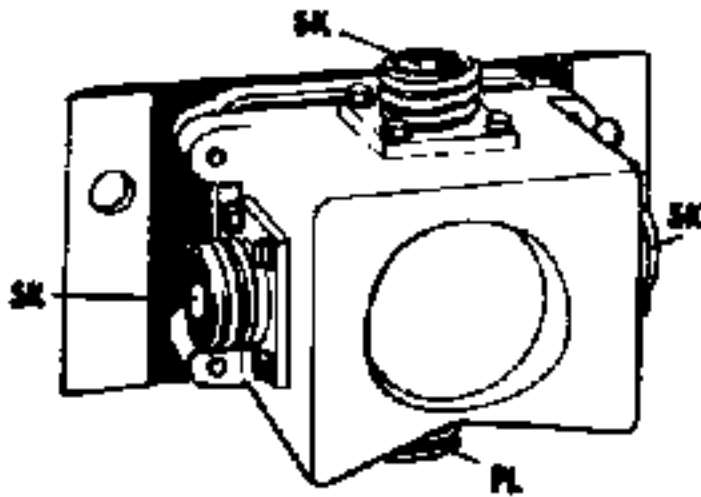


FIG 14

FIG 13

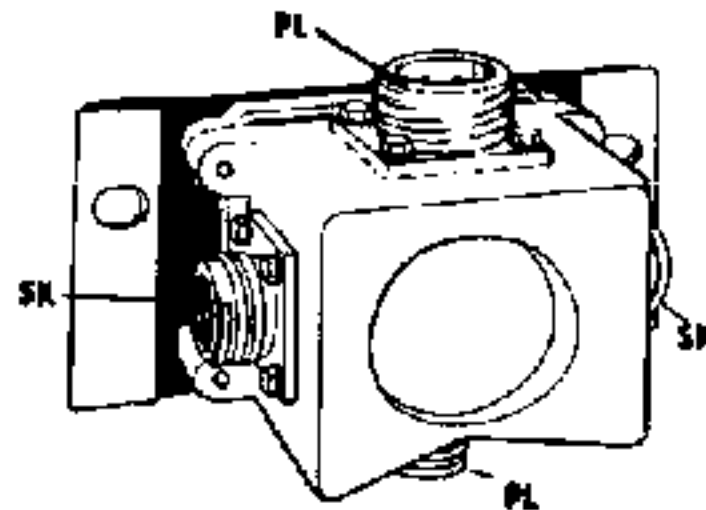
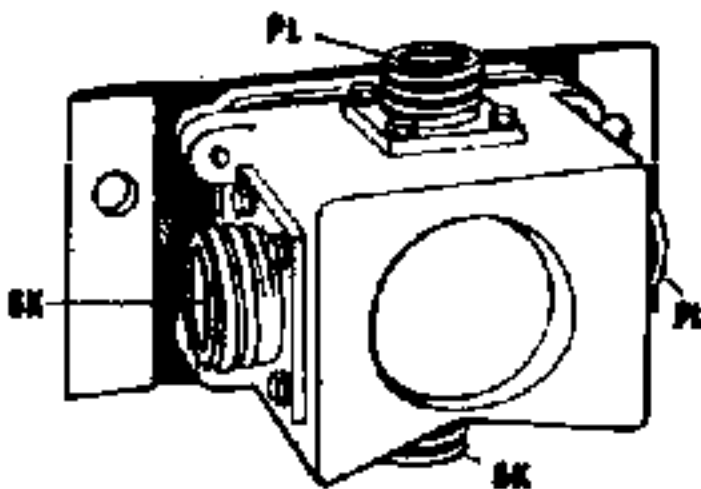


FIG 15



SECTION 9 - HANDSET AND HEADSET ASSEMBLIES

Operator's microphone and headgear assembly (Fig 16)

82. This is the microphone and receiver headgear assembly used by all personnel except the commander and distant users in a remotely controlled system. It is designated Microphone hand SI No 6 and neckband snatch harness, and Receivers headgear SI double No 1A.

83. Separate connectors from the microphone and receivers are joined at a small junction box which normally hangs from the user's neck on a web strap. The junction box can be attached to any Mk 4 HEADSET socket by means of a suitable 6-pin Mk 4 plug. A snatch plug connects the receiver phones to the junction box, which is itself attached to the webbing neckband harness by means of stud fasteners. Snatch plug and stud fasteners will easily part if given a sharp pull, and thus in an emergency the wearer can quickly free himself from the assembly, except for the headphones which remain on his head. A pressel switch on the microphone performs send-receive switching, this switch being readily manipulated with either hand.

84. Fig 22 shows this assembly in use on different units of an installation.

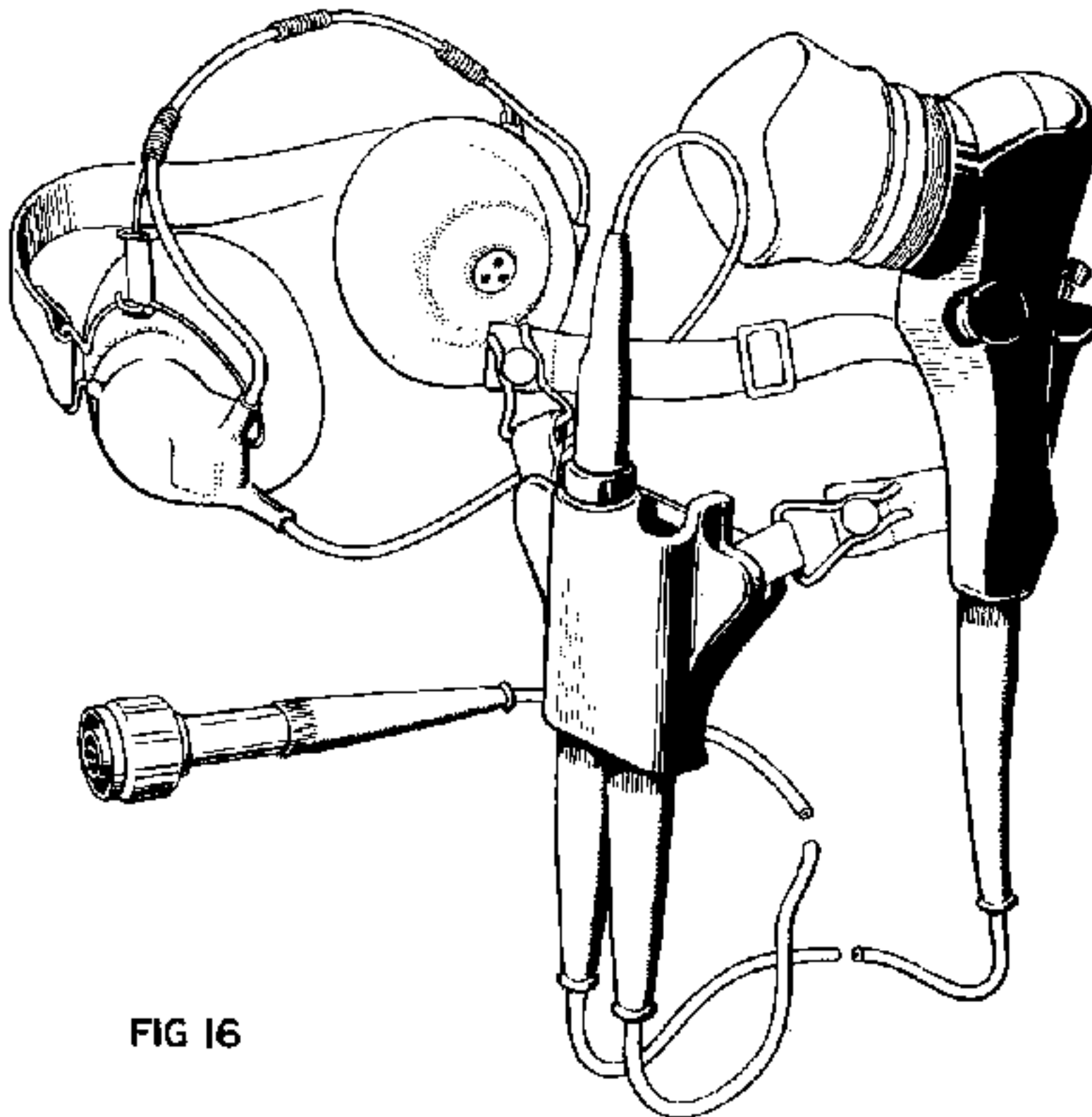


FIG 16

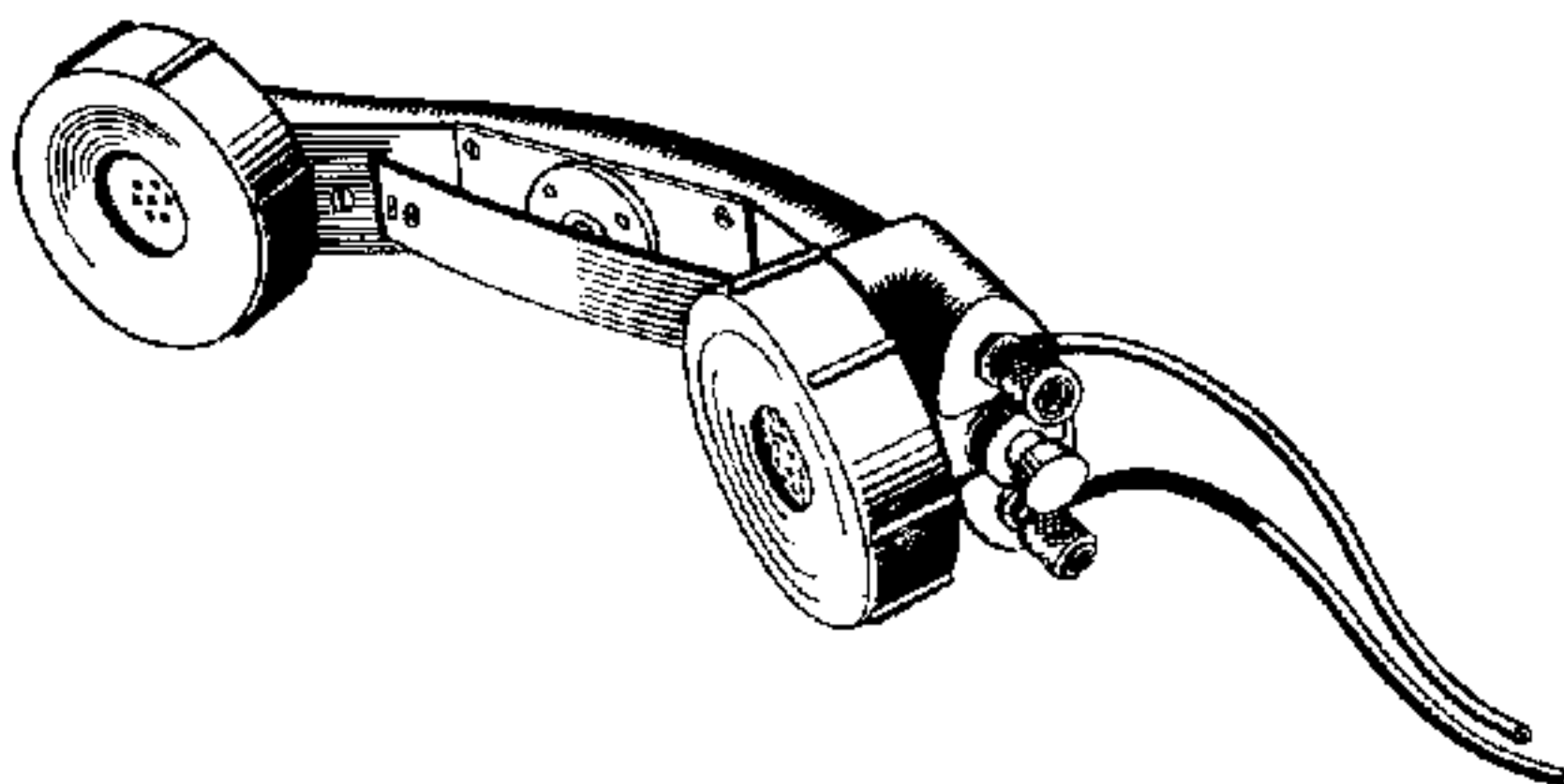


FIG 17

TELEPHONE, hand, SI remote control No 1 (Fig 17)

85. The handset is used by an operator at the distant end of the remote control cable. The manner in which it can be connected to a junction box by means of a remote control cable is indicated in Fig 22.

86. The handset is fitted with two cable terminals for connection to the remote control cable, which consists of a twisted pair of D10 cables. Correct polarity is not essential on the cable to the remote control handset, and each termination of D10 cable may be attached to either terminal.

87. A call button on the handset operates a buzzer in the junction box, and is pressed by the distant user when he wishes to call the local operator. When the handset pressel switch is operated by the distant user, the pre-selected wireless set is automatically switched from receive to send.

88. A local operator can call the distant user by turning switch SWA on his junction box to CALL. This causes a buzzer to function and be fed into the phone of the remote handset through the IC amplifier, producing a signal loud enough to be heard at a range of several feet. Then with this switch SWA at position 'I', intercommunication is possible between local and distant operators. Any other extensions switched to 'I' can join in this IC. Similarly, when a wireless set is being controlled from a remote point, and other extensions can overhear by switching to the same set.

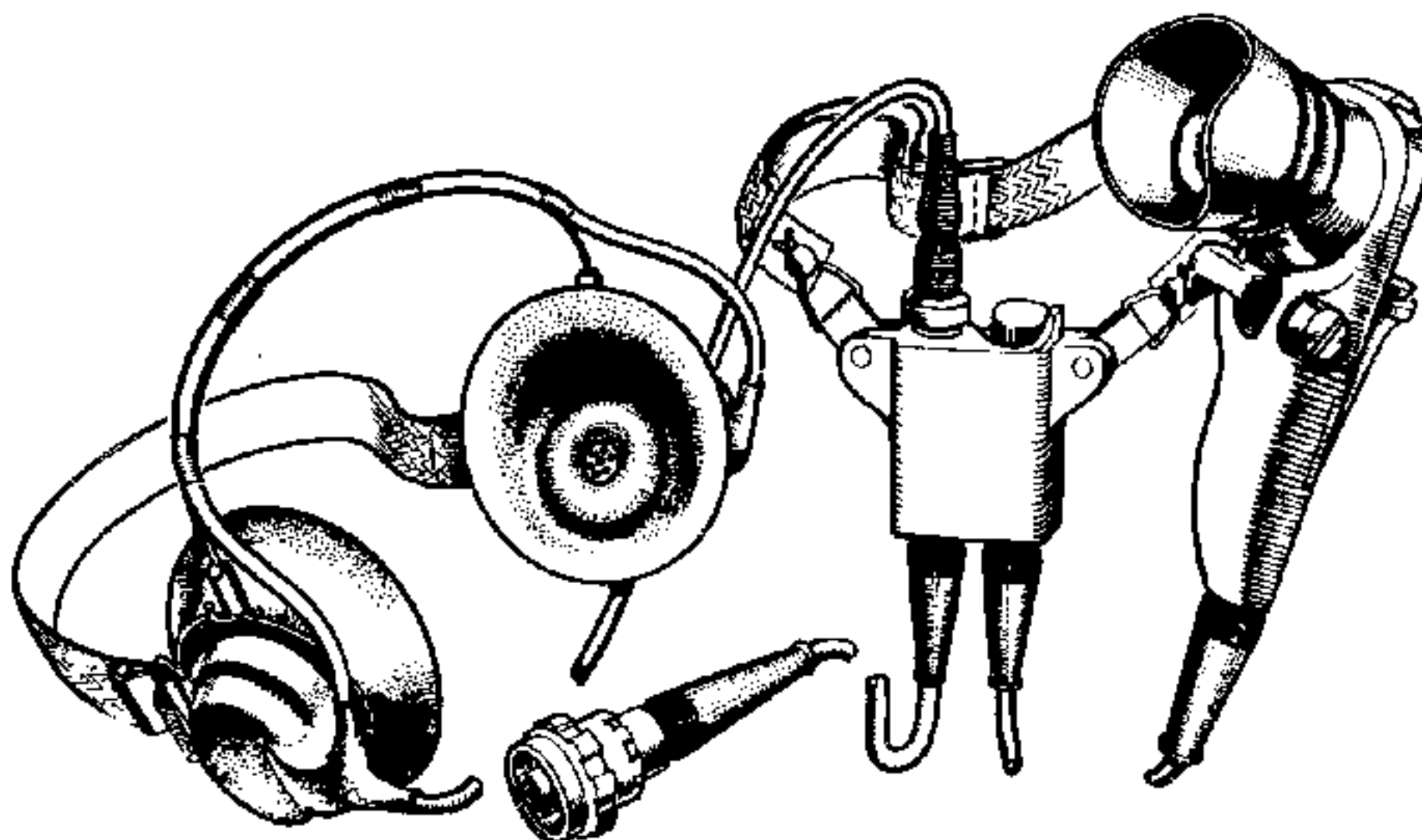


FIG 18

Commander's headset (Fig 18)

89. A commander's headset may be attached to a control unit 'C', as in Fig 27, or it may be found more convenient to attach it to the unit 'D'. It can also be attached direct to the 12-point control unit socket on a Junction box 'J2'.

90. A complete headset consists of a Microphone hand SI No 7 and neck-band snatch harness, and a Receiver headgear SI double No 1A. The microphone is fitted with a set selector switch and a send-receive pressel switch.

91. A webbing neckband supports a small junction box incorporating a gain control and a snatch plug.

92. An extension lead 30 feet in length enables the commander's headset to be operated at a distance, for example outside the vehicle containing the installation.

CHAPTER THREE

OPERATION OF WIRELESS CONTROL HARNESS TYPE B

SECTION 10 - ALTERNATIVE INSTALLATIONS

93. The operating instructions which follow describe ten typical arrangements of the control harness, designed for the installations indicated, but many other combinations of units may be encountered. Users may find that the particular installation with which they are concerned does not conform in detail with any of those shown in this chapter. Fundamentally it should be similar to one of them, however, and the functions and method of operating the individual control units can be ascertained by finding the typical arrangement which most nearly resembles the actual installation in use, and using that as a basis for a new operating instruction.

SECTION 11 - PREPARATION

94. Check that control harness units and adapters are firmly mounted in the vehicle. Ensure that connector terminations are properly screwed down, and that all cables are securely cleated to the interior of the vehicle.

95. Ensure that all remote control equipment, provided for use at a remote point when this is eventually set up, is stored in a safe place in the vehicle. See that a drum of D10 cable is available if it is likely to be required.

96. Do not attach headsets to control units or adapters until they are required for use. Headsets, handsets, and microphones should remain stowed in signal satchels provided for the purpose until they are required, in order to protect them from damage.

97. Ensure that the control harness ON-OFF switches are at ON before commencing to tune wireless sets. These switches are fitted on the one-set junction box 'J1' and the two-set junction box 'J2'.

98. Red indicator lamps fitted on junction boxes 'J1' and 'J2' glow when the harness is switched on. The brightness of these lamps can be varied by turning the lamp cover.

SECTION 12 - A TWO-SET INSTALLATION WITH LOCAL REBROADCASTING

(Fig 19)

Facilities provided in this installation

99. (a) Two headset assemblies, giving send and receive facilities on either of the two wireless sets at two positions in the vehicle. Additional headsets can be attached if required.

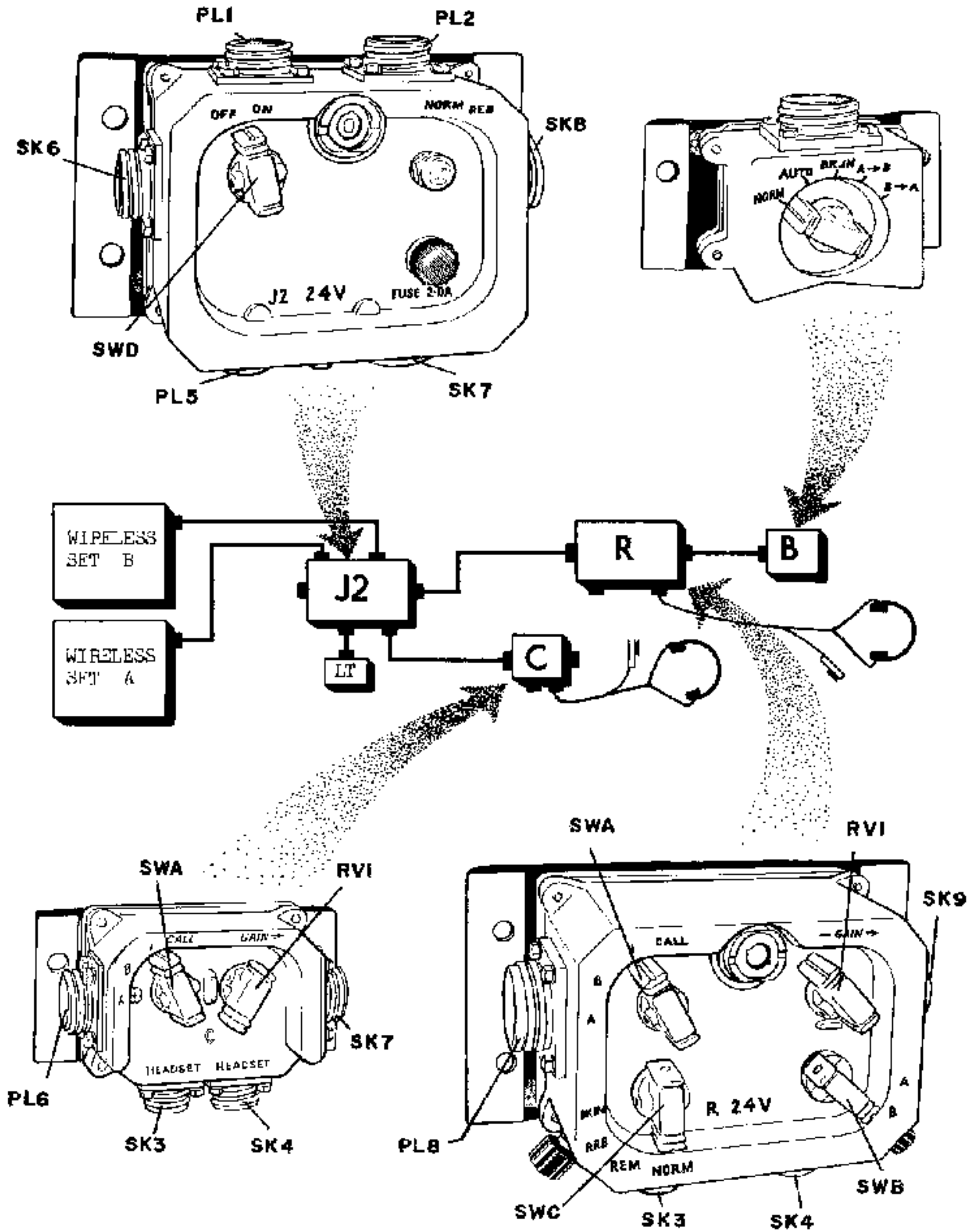


FIG 19-LOCAL REBROADCAST WITH A TWO SET INSTALLATION

- (b) Intercommunication between the headsets in the vehicle.
- (c) Rebroadcast switching, by which reception on one wireless set can be transmitted on the other. Rebroadcasting is automatic if the wireless sets are in the VHF range with squelch relays, or manual for HF sets.
- (d) Remote control of either wireless set through a remote control unit 'R'. This arrangement is not shown in Fig. 19.

Intercommunication

100. (a) Switch the harness on by turning switch SWB on box 'J2' to ON. Tune the wireless sets as instructed in the separate handbooks. Ascertain which wireless set is to be considered 'A' and which 'B'. This is determined by the method of connecting, set 'A' being that attached to the top left hand plug on junction box 'J2', and set 'B' the top right hand plug.
- (b) Turn switch SWA on unit 'C' to 'I'. On unit 'R' turn switch SWA to 'I' and switch SWC to NORMAL. On box 'J2' switch SWB is pre-set to REB. On unit 'B' set the switch to 'NORM'. Intercommunication is now possible between the operators at Control units 'C' and 'R'.
 - (c) To call operators on the harness, turn switch SWA on control unit 'C' or 'R' to CALL, then let it return to 'I'.
 - (d) Adjust the GAIN controls on Control units 'C' and 'R'.

To send or receive

101. (a) See that switch SWB on box 'J2' is at ON. Tune the wireless sets as instructed in the separate handbooks.
- (b) Turn switch SWA on unit 'C' to position 'A' or 'B' according to which wireless set is to be used. On control unit 'R' turn switch SWA to the same set position, turn switch SWC to NORMAL, and disregard switch SWE. On junction box 'J2' switch SWB is pre-set to REB. See that unit 'B' is switched to 'NORM'.
 - (c) Use headsets and microphones attached to units 'C' and 'R'. Adjust gain controls on units 'C' and 'R' to give a comfortable level.

Rebroadcasting (automatic)

102. (a) Ensure that both wireless sets to be used in the automatic rebroadcasting link are VHF types, and check that connections are correct with a rebroadcast unit 'B' attached to remote control unit 'R'. Squelch relays of the VHF wireless sets must be correctly set up and operated, for which instructions are given in the separate user handbooks issued with wireless sets or squelch units.
- (b) Turn the switch on rebroadcast unit 'B' to position AUTO.
 - (c) Disregard switches SWA, SWE, and SWC on Remote control unit 'R'.

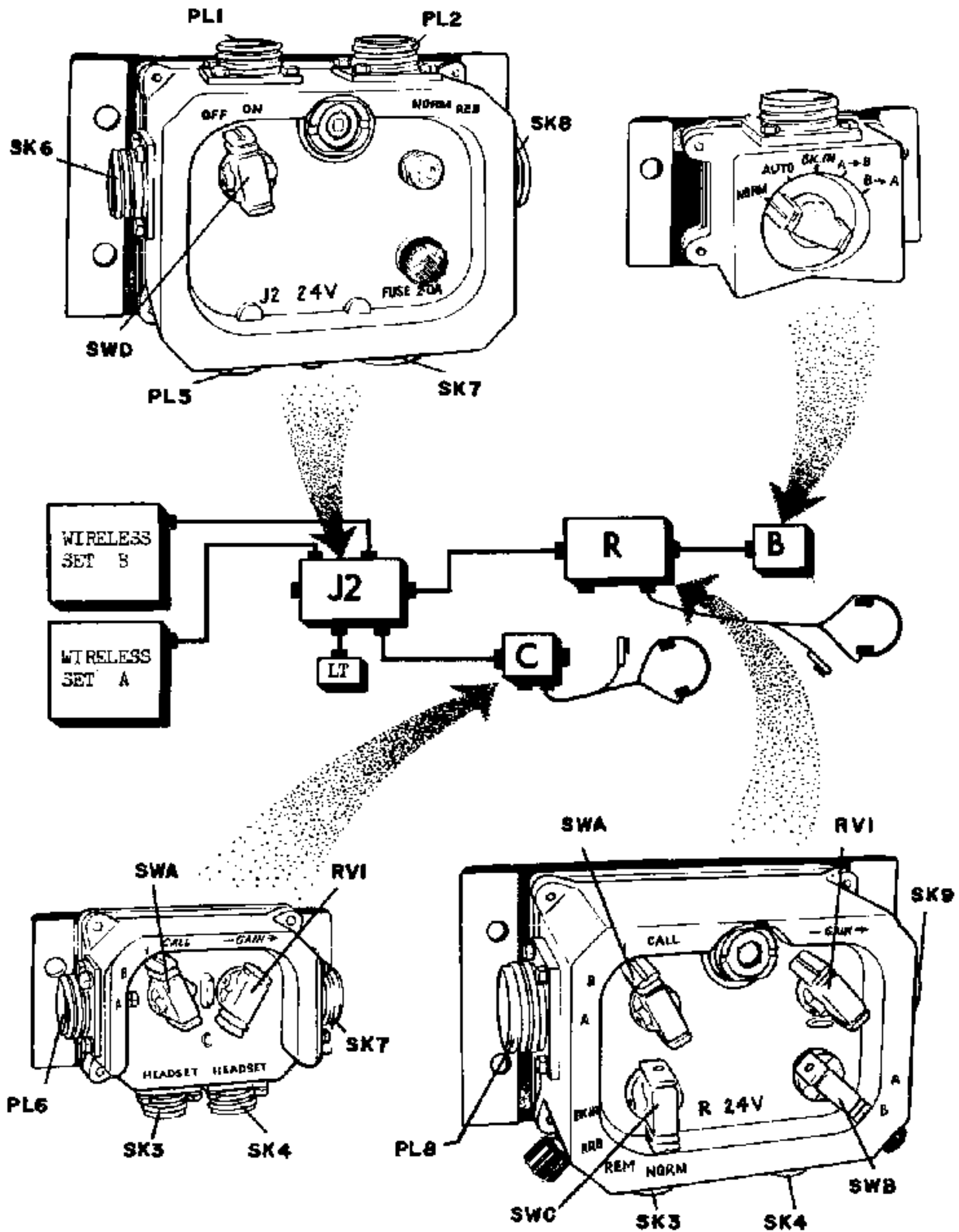


FIG 19 - LOCAL REBROADCAST WITH A TWO SET INSTALLATION

- (d) On Junction box 'J2' turn switch SWD to ON. Switch SWB is pre-set to REB.
- (e) Disregard switch SWA on control unit 'C'.
- (f) Set up and tune the two wireless sets as instructed in the separate handbooks.
- (g) A two-way rebroadcast link is now established. This link is entirely automatic, messages received on the 'A' set being transmitted on the 'B' set, and messages received on the 'B' set transmitted by set 'A'. While no signals are being received, both wireless sets remain in the 'receive' condition, but upon the arrival of a message at one set, the other set is automatically switched to the "send" condition and the arriving message is simultaneously retransmitted.

To break in on automatic rebroadcasting

103. (a) Turn the switch on unit 'B' to position BK.IN. All other switches remain as set in paragraph 102 (c), (d), and (e) above.
- (b) Operate the pressel switch on the headset microphone attached to control unit 'C' or 'R'. The operator can then transmit simultaneously on both wireless sets, and send-receive switching of both wireless sets is controlled by the operator's pressel switch.

Rebroadcasting (manual)

104. (a) If one or both wireless sets in an installation are HF types and have no squelch relays, switching from receive to send for rebroadcasting will not take place automatically. In this case rebroadcasting is in one direction only, as selected by the operator adjusting unit 'B' as follows:-
- (b) To receive on set 'A' and send on set 'B' turn the switch on unit 'B' to position 'A-B'. All messages arriving at wireless set 'A' are then simultaneously re-transmitted by set 'B', but set 'B' cannot receive signals, neither can set 'A' transmit.
- (c) The operator must listen continuously to the transmission, and when it becomes necessary to reverse the direction of rebroadcasting by receiving on set 'B' and sending on set 'A', turn unit 'B' to 'B-A'.
- (d) Ensure that all other control switches remain in the positions necessary for automatic rebroadcasting. See paragraphs 102 (c) to (e) above.

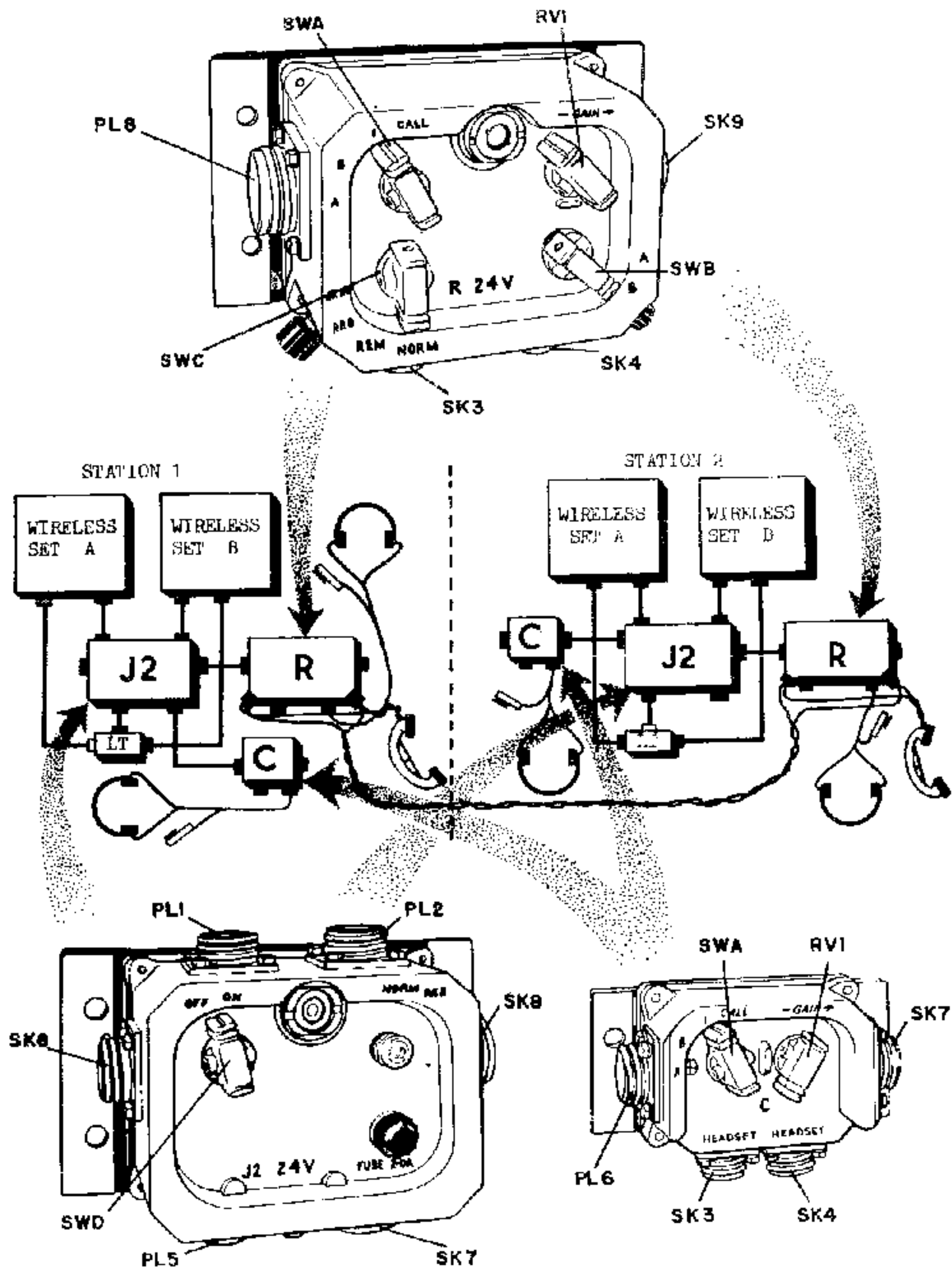


FIG 20- A TWO SET INSTALLATION WITH REMOTE REBROADCASTING

SECTION 13 - A TWO-SET INSTALLATION WITH REMOTE REBROADCASTING

(Fig 20)

Facilities provided in this installation

105. (a) Two separate stations, each similarly equipped as shown in Fig 20, and joined by not more than 1,000 yards of D1C twisted pair cable. In each station, two or more headset assemblies, one of which can be in the driving cab, giving send and receive facilities on either of the two wireless sets at two or more positions in the truck.
- (b) Intercommunication between station 1 and station 2, and between individual operators in each station.
- (c) Rebroadcast switching, by which reception on either wireless set in station 1 is automatically retransmitted on either wireless set in station 2, assuming that all wireless sets are VEF types.
- (d) As an alternative, one of the stations could be a one-set arrangement as shown on page 37. In this case the remote control cable would be fitted between control unit 'R' and junction box 'J1'.

Connections

106. Check that connectors are correctly positioned. Note that the remote control cable between the two stations should be kept as short as possible. It must not be more than 1,000 yards in length. Ensure that the polarity of the remote control cable is correct by attaching one wire between the two positive (+) terminals, and the other wire between the two negative (-) terminals.

Intercommunication

107. (a) Switch the harness on by turning switch SWD on box 'J2' to ON. Tune and operate the wireless sets as instructed in the separate handbooks. Remember that wireless set 'A' is connected to the left hand plug on the top of junction box 'J2' and wireless set 'B' is connected to the right hand plug.
- (b) Referring to Fig 20 turn switches SWA on control units 'C' and 'R' to 'I'. Turn switch SWC on unit 'R' to NORMAL. On junction box 'J2' the screwdriver operated switch SWB is pre-set to 'NORM'. Disregard switch SWE on both control units 'R'. Intercommunication is now possible between operators at units 'C' and 'R', but the remote control cable is disconnected at each end.
- (c) To enable operators at station 1 to communicate with those at station 2, turn switch SWC on both control units 'R' to REMOTE. To call operators on the harness turn switch SWA on control unit 'C' or 'R' to CALL, then let it return to 'I'. Adjust the GAIN CONTROLS.

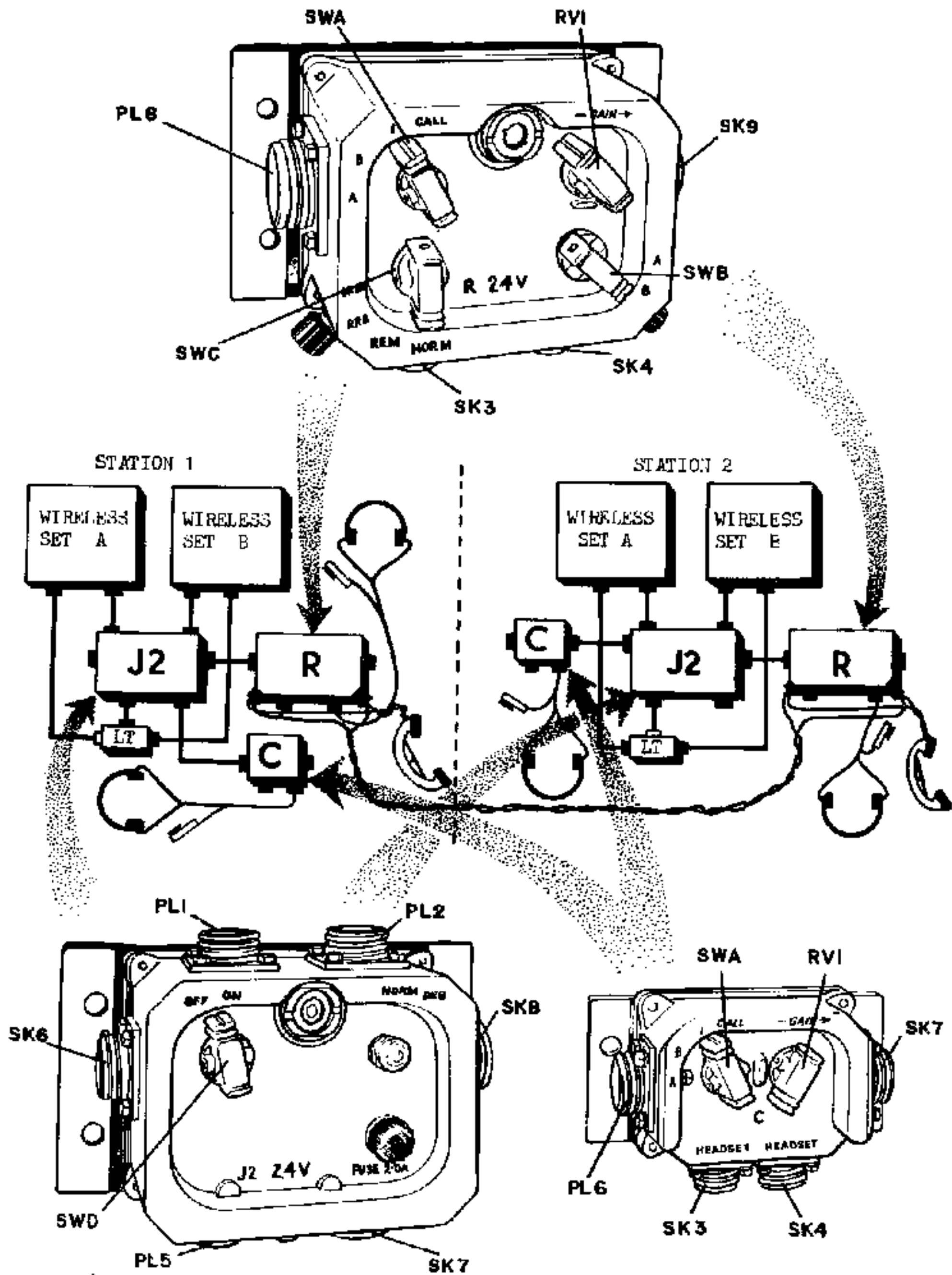


FIG 20-A TWO SET INSTALLATION WITH REMOTE REBROADCASTING

- (d) When setting up for remote rebroadcasting an alternative method of intercommunication between the two stations can be provided by the use of two remote handsets. Having attached the remote control cable to the terminals on each unit 'R', connect a remote handset to the same terminals on each unit 'R' as shown in Fig 20. At station 1 turn switch SWA on unit 'R' to 'I' and SWC to remote. At station 2 turn switch SWC on unit 'R' to NORMAL and disregard switch SWA. This avoids the use of an IC amplifier at station 2. Station 1 can use a standard headset if required. Do not speak on the remote handsets with the switches at RRB or the conversation will be radiated.

To send or receive in station 1 and station 2

108. (a) Referring to Fig 20 turn switch SWC on both remote control units 'R' to NORMAL to disconnect the remote control cable terminals. Turn switches SWA on control units 'C' and 'R' to position 'A' or 'B' according to which wireless set is to be used. On Junction box 'J2' turn switch SWD to ON, and ensure that the screwdriver-operated switch SWB is at 'NORM.' Disregard switch SWB on both Control units 'R'.
- (b) Use the headsets and microphones attached to Control units 'C' and 'R'. Adjust gain controls if necessary.

To rebroadcast between the two stations

109. (a) Ensure that both wireless sets to be used in the rebroadcasting link are VEF types with squelch units correctly adjusted. Set up both wireless sets and squelch units as instructed in the separate handbooks issued with those equipments. Note that automatic remote rebroadcasting is not possible with HF wireless sets.
- (b) Refer to Fig 20. In station 1, turn switch SWB on remote control unit 'R' to position 'A' or 'B' according to which wireless set is to be used in the rebroadcasting link. Similarly select the wireless set to be used in station 2 by means of switch SWB on remote control unit 'R' in that station.
- (c) In both stations, turn switch SWC on Control unit 'R' to RRB.
- (d) Switches SWA on control units 'C' and 'R' may be disregarded.
- (e) When the selected wireless sets are switched on a two-way automatic rebroadcast link is established, and signals received by station 1 are rebroadcast by station 2. When no signals are being received both sets remain in the receive condition, but upon the arrival of a signal at one set the other set is automatically switched to send.
- (f) Do not operate pressel switches attached to a control unit switched to a set position or rebroadcasting may be interrupted. By turning switches SWA to 'I', intercommunication is possible between operators within a station, but not between stations.

To break in on remote rebroadcasting

110. (a) To enable an operator at station 1 to interrupt rebroadcasting and to speak over the link, turn switch SWC on control unit 'R' in this station to BK.IN. By operating the pressel switch on his microphone the operator can then speak simultaneously over both radio nets.
- (b) When the pressel switch is released both sets go to "receive", but before automatic rebroadcasting can re-commence switch SWC on control unit 'R' in station 1 must be restored to position PRB.
- (c) An operator at station 2 can break in on rebroadcasting in a similar manner by turning switch SWC on his Control unit 'R' to BK.IN and operating his pressel switch. Restore this switch to PRB to resume rebroadcasting.

SECTION 14 - TWO ONE-SET INSTALLATIONS CONNECTED FOR REMOTE BROADCASTING (Fig 21)

Facilities provided in this installation

111. (a) In each station, two or more headset assemblies, giving send and receive facilities on the wireless set at two or more positions.
- (b) Intercommunication between station 1 and station 2, and between individual operators in each station.
- (c) Rebroadcast switching, by which messages received on the wireless set in station 1 can be retransmitted on the set on station 2, or vice versa, assuming that both wireless sets are of VHF types with squelch relays.

Connections

112. Check that connectors are correctly positioned. Note that the remote control cable between the two stations should be kept as short as possible. It must not be more than 1,000 yards in length. Ensure that the polarity of the remote control cable is correct by attaching one wire between the two positive (+) terminals, and the other wire between the two negative (-) terminals.

Intercommunication

113. (a) Switch the harness on by turning switch SWC on box 'J1' to NORMAL. Tune the wireless sets as instructed in the separate handbooks. This is necessary in order to provide an IC amplifier.
- (b) In both stations turn switch SWA on unit 'C' to 'T'. Turn switch SWA on box 'J1' to '1' and switch SWC to REMOTE. Intercommunication is now possible between operating positions in each station.
- (c) To call any operating position on the intercommunication system, turn switch SWA on unit 'C' or 'J1' to the CALL position, then let it return to '1'. Adjust gain controls RV1.

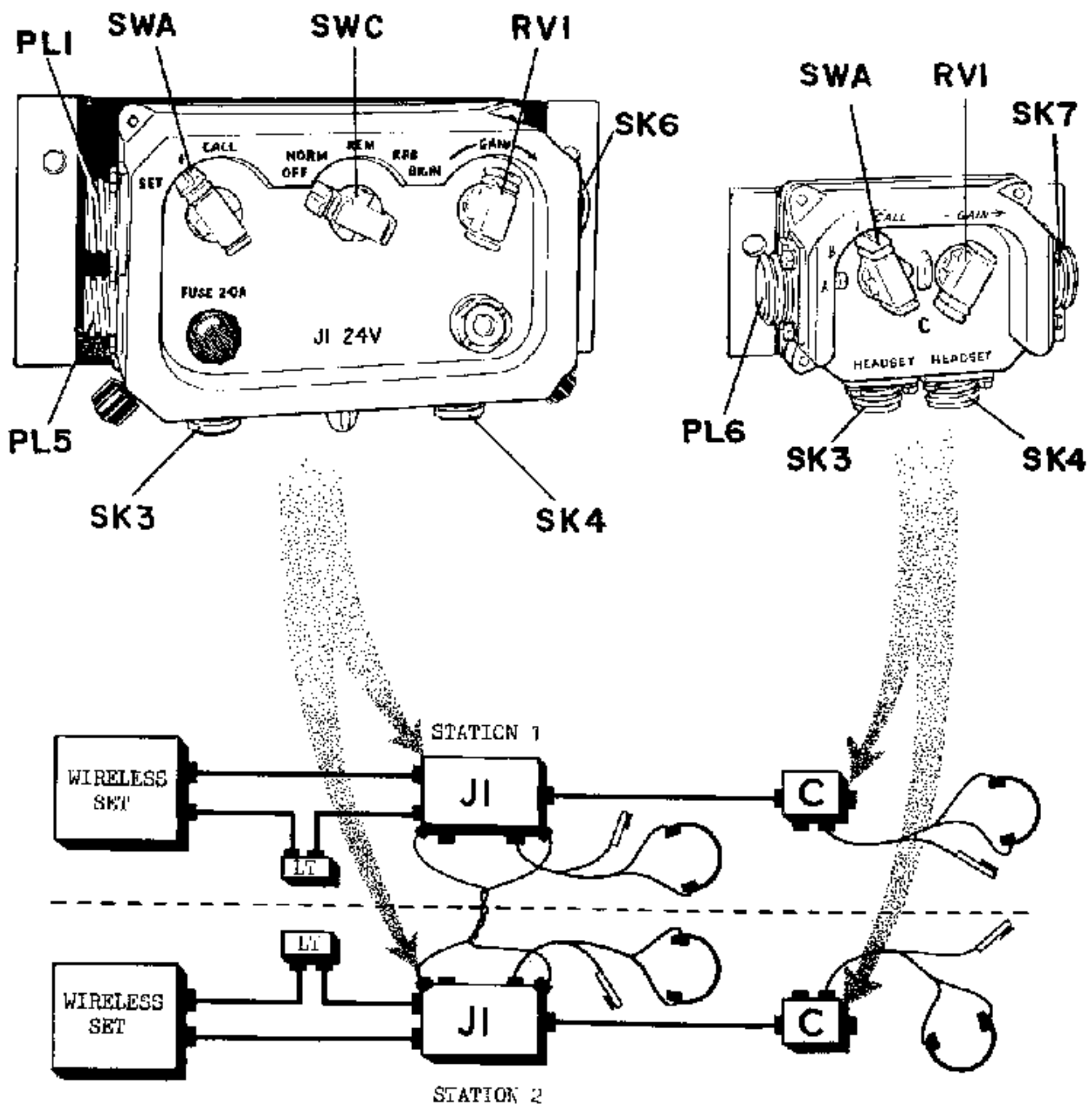


FIG 21

- (d) If switch SWC on Junction box 'J1' is turned to NORMAL the remote control terminals are disconnected.

To send or receive

114. (a) In both stations turn switch SWA on Junction box 'J1' to SET, and switch SWC to NORMAL. The remote control cable is now disconnected at each end. On control unit 'C' turn switch SWA to position 'B'. Note that in a one-set installation a stop is fitted to this switch to prevent it being turned to position 'A'.
- (b) Use headsets and microphones attached to Control units 'C' and box 'J1'. Operate the pressel switch on the microphone when speaking, and release it to receive. Adjust gain controls RV1 on both units to give a comfortable level in the headsets.

Remote rebroadcasting

115. (a) Set up the wireless set in each station as instructed in the separate handbooks. Ensure that squelch relays are correctly adjusted.
- (b) On box 'J1' in both stations, turn switch SWC to RRB and switch SWA to SET. Ensure that both units 'C' remain switched to 'B'. An automatic two-way rebroadcast link is now established between the two stations, and messages received on either wireless set are simultaneously retransmitted on the other set.

To break in on remote rebroadcasting

116. (a) In the station whose operator wishes to break in on remote rebroadcasting, turn switch SWC on box 'J1' to position BK.IN. Other switches remain as for remote rebroadcasting.
- (b) By operating his pressel switch, this operator can then transmit simultaneously on both wireless sets.



SECTION 15 - A ONE-SET INSTALLATION WITH REMOTE CONTROL HANDSET

(Fig 22)

Facilities provided in this installation

- 117. (a) Five headset assemblies, two of which are in the driving cab, giving intercommunication between the five positions in the truck with send and receive facilities at three positions. Note that control unit 'D' provides IC and listening only.
- (b) Additional handset for use at a remote point, with remote control of the wireless set, and intercommunication facilities.

Connections

- 118. (a) Check that connectors are correctly positioned.
- (b) If the remote control handset is to be used connect it to Junction box 'J1' by D10 twisted pair cable not more than 1,000 yards in length.

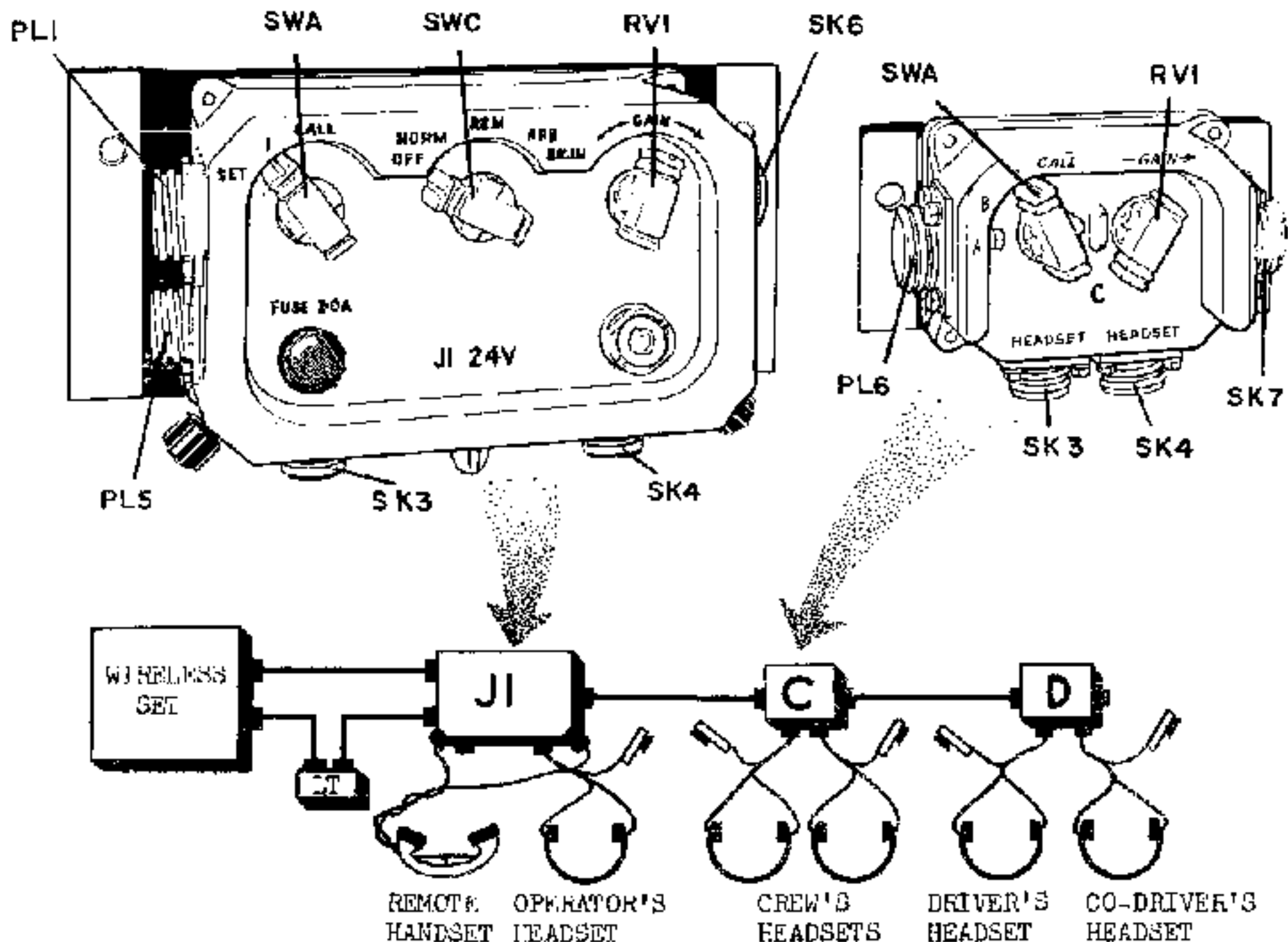


FIG 22

Intercommunication

119. (a) Switch the harness on by turning switch SWC on box J1 to NORMAL. Tune the wireless set as instructed in the separate handbook. Although the intercommunication is not radiated, the wireless set must be switched on to provide an IC amplifier.
- (b) Referring to Fig 22 turn switch SWA on Junction box 'J1' to 'I'. Turn the left hand switch SWA on operator's control unit 'C' and driver's control unit 'D' to 'I'.
- (c) Intercommunication is now possible between operators at units 'C', 'D' and 'J1', but the remote control cable terminals are disconnected. If the remote handset is to be included in the IC conversation, turn switch SWC on box 'J1' to REMOTE.
- (d) To call operators on the harness, including the remote user, turn switch SWA on units 'C', 'D', or 'J1' to CALL, then let it return to 'I'.
- (e) To call operators on the harness from the remote point, press the button on the remote control handset.
- (f) Adjust GAIN controls RV1 on units 'C', 'D' and 'J1'.

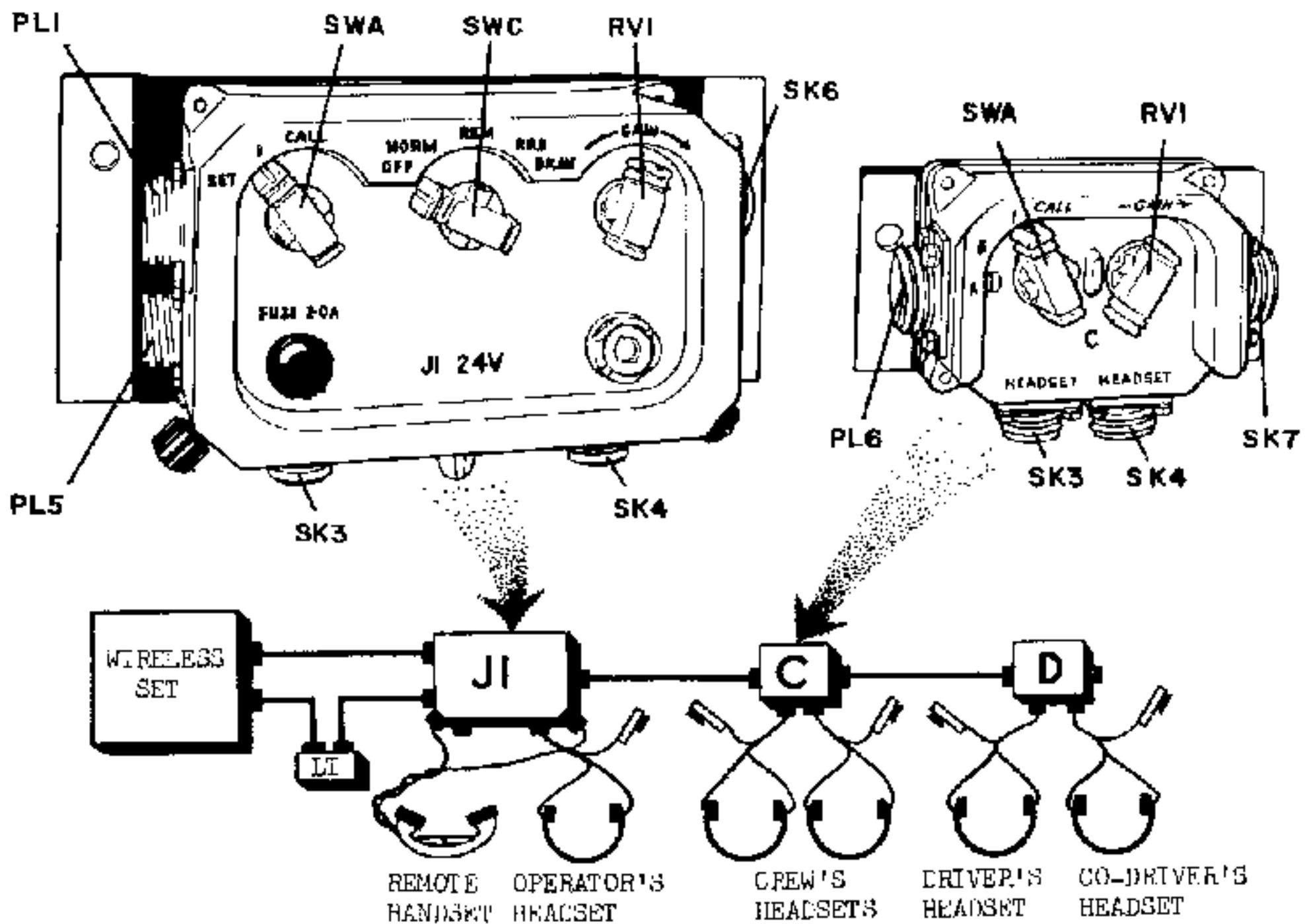


FIG 22

To send or receive from within the truck

120. (a) Switch the harness on by turning switch SWC on box 'J1' to NORMAL. Tune the wireless set as instructed in the separate handbook.
- (b) Referring to Fig 22, turn switch SWA on Junction box 'J1' to SET. Turn switch SWA on control unit 'C' to position 'B'; this position for set 'B' is always used when the operator's control unit 'C' is fitted in a one-set installation.
- (c) Use the headsets and microphones attached to units 'C' and 'J1'. Press the pressel switch on the microphone when speaking, and release it to receive.
- (d) Adjust the gain controls on both units to give a comfortable level in the headsets.

To send or receive at the remote control point

121. (a) Tune the wireless set as instructed in the separate handbook.
- (b) Referring to Fig 22, check that switch SWA on Junction box 'J1' is at SET, and turn switch SWC to REMOTE. On the operator's control unit 'C', selector switch SWA can remain at position 'B'.
- (c) The remote control handset incorporates a send-receive pressel switch. This handset is connected direct to the wireless set, which is now controlled from the remote position.
- (d) In this condition operators at units 'C' and 'J1' can listen on the harness. If they wish to speak they can break in on remote operation by pressing their pressel switches.



SECTION 16 - A ONE-SET INSTALLATION WITH REMOTE CONTROL

AND KEYING FACILITIES

(Fig 23)

Facilities provided in this installation

122. (a) One headset assembly giving send and receive facilities in the truck. Additional headsets can be attached.
- (b) Remote control of the wireless set, with remote keying for an HF type set.
- (c) Intercommunication between the local operator in the truck and the distant user at the remote point.

Connections

123. Check that connectors are correctly positioned. If Control unit 'K' Mk 2 is to be used, connect it to Junction box 'J1' by D10 twisted pair cable not more than 1,000 yards in length. In this case polarity of the remote control cable is not important, and each termination of the D10 cable may be attached to either terminal.

Intercommunication

124. (a) Switch on the harness by turning switch SWC on box 'J1' to REMOTE. Tune the wireless set as instructed in the separate handbook.
- (b) Referring to Fig 23, turn switch SWA on junction box 'J1' to 'I'.
- (c) Intercommunication is now possible between the local operator at junction box 'J1' and the distant operator at the remote control point with remote control unit 'K' and a Telephone, hand SI, remote control, No 1.
- (d) Adjust GAIN control RV1 on box 'J1'.
- (e) To call the user at the remote point, turn switch SWA on junction box 'J1' to the CALL position. To call an operator in the truck from the remote point, press the CALL button on the remote handset.

To send or receive in the truck

125. (a) Tune the wireless set as instructed in the separate handbook.
- (b) Referring to Fig 23, turn switch SWA on box 'J1' to SET, and switch SWC to NORMAL. The remote control cable terminals are now disconnected.
- (c) Listen on the headset attached to box 'J1'. To send, speak into the microphone, at the same time pressing the pressel switch on this microphone. Release the pressel switch to receive.

To send or receive at the remote control point

126. (a) Set up the wireless set as instructed in the separate handbook.
- (b) Referring to Fig 23, turn switch SWA on junction box 'J1' to SET, and switch SWC to REMOTE. The remote handset is connected direct to the wireless set, which is now controlled from the remote point. The headset attached to box 'J1' is still connected, and can overhear the conversation. If switch SWA on junction box 'J1' is turned to '1' the remote operator is disconnected from the set and placed on IC.

To break in on remote operation

127. (a) The headset attached to junction box 'J1' is connected in parallel with the handset on control unit 'K', and can break in on remote operation by pressing the pressel switch on the microphone.
- (b) Wait until the remote operator stops speaking before breaking in.

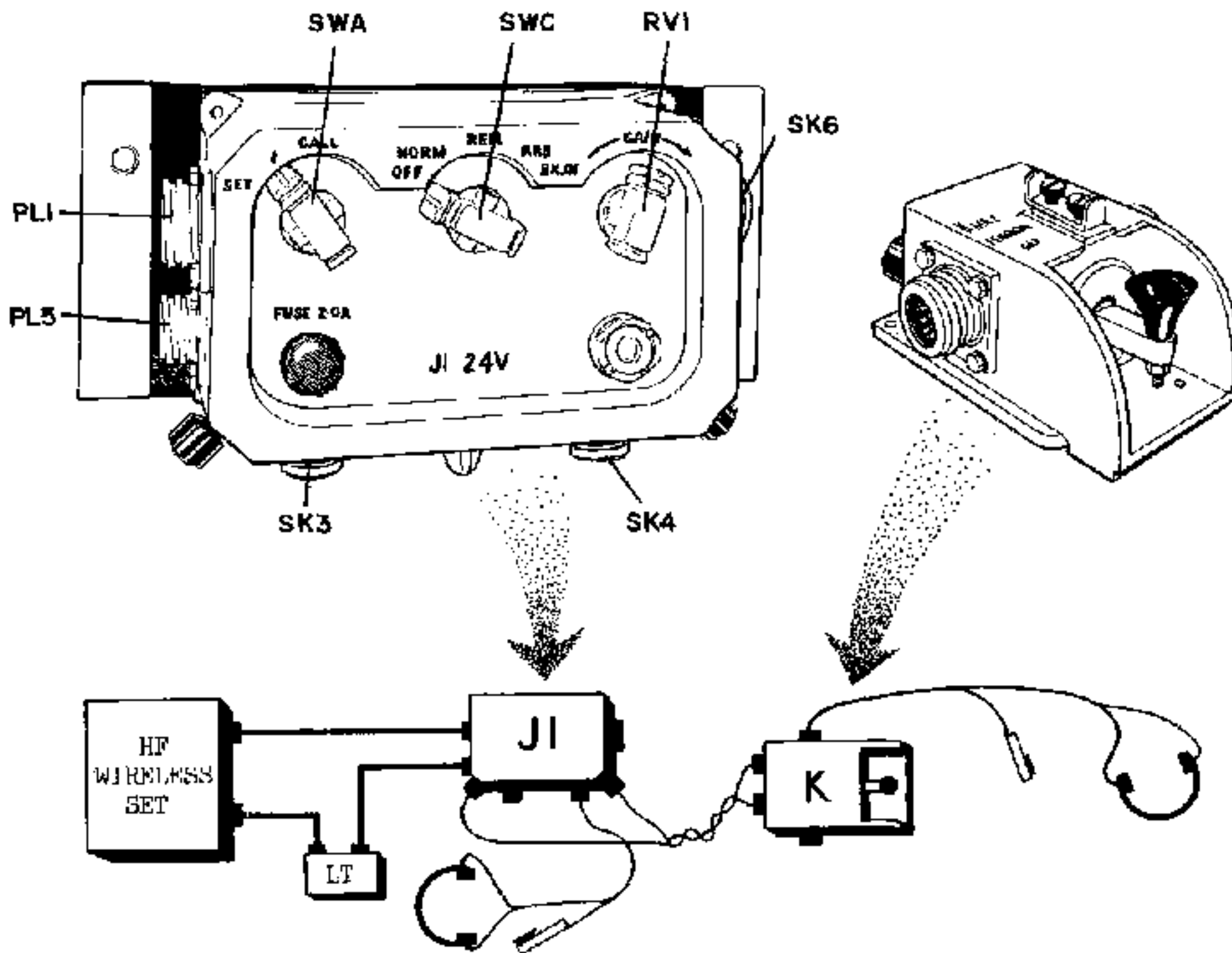


FIG 23

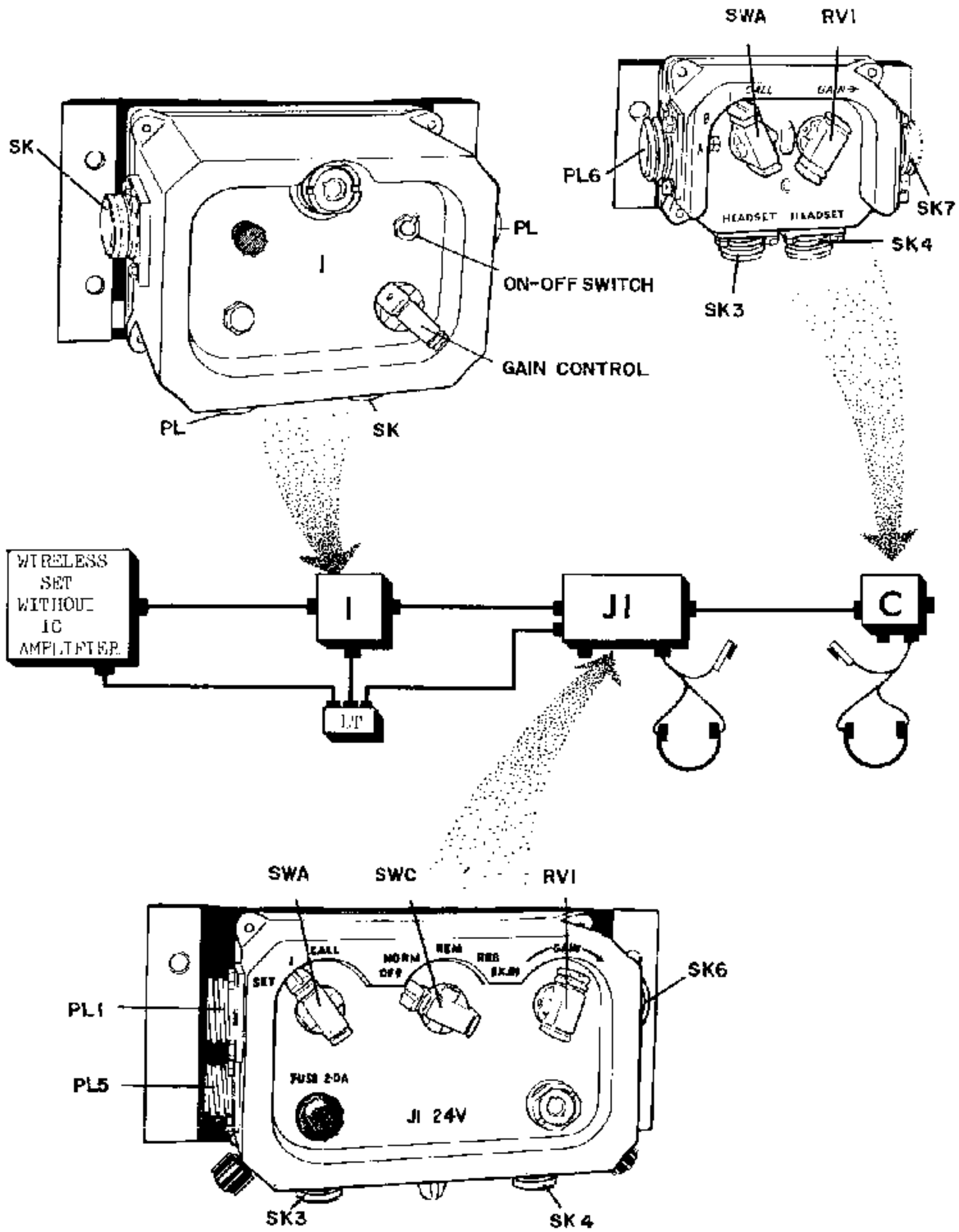


FIG 24

SECTION 17 - A ONE-SET INSTALLATION USING A WIRELESS

SET WITHOUT AN IC AMPLIFIER

(Fig 24)

Facilities provided by this installation

128. (a) Certain wireless sets, for example Wireless set E47, do not contain an IC amplifier circuit. The inclusion of an independent amplifier unit in the harness enables an intercommunication system to be operated in an installation based on such a wireless set.
- (b) In addition to the IC system, normal send-receive facilities are available in the vehicle. Two headsets are shown attached in Fig 24 but this number can be increased if necessary.

Connections

129. Ensure that connections are correctly made, with an LT supply of 24 volts to the wireless set, the amplifier, and junction box 'J1'.

Intercommunication

130. (a) Refer to Fig 24. On control unit 'C' turn switch SWA to 'I'. On junction box 'J1' turn switch SWA to 'I' and switch SWC to NORMAL. On the amplifier unit set the ON-OFF switch to ON and observe that the warning lamp glows.
- (b) Intercommunication is now possible between the operators whose headsets are connected to unit 'C', box 'J1', and the amplifier.

To send or receive

131. (a) Set up and operate the wireless set as instructed in the separate user handbook.
- (b) On control unit 'C' turn switch SWA to position 'R'. On junction box 'J1' turn switch SWA to position SET and let switch SWC remain at NORMAL.
- (c) Use headsets and microphones attached to control unit 'C' and junction box 'J1'. Send-receive switching is achieved with the pressel switches on the microphones, and gain control RV1 can be adjusted to give a comfortable level in the headsets.

Remote operation

132. A remote control cable with handset or keying unit can be connected to junction box 'J1', and the installation would then resemble that shown on page 39 or page 42 .

SECTION 18 - A ONE-SET INSTALLATION HAVING NO IC.

REMOTE CONTROL OR REBROADCASTING FACILITIES

(Fig 25)

Facilities provided in this installation

133. (a) A one-set installation can be operated by means of an adapter unit one-set 'O' without any other control units. This may be a useful facility if a fault occurs in the control harness. The wireless set output is available at two sockets on adapter unit 'O' as shown in Fig 25.
- (b) No IC, remote control or rebroadcast facilities are available with adapter unit 'O'. Neither does the unit contain any voltage control equipment, consequently the wireless set will operate with reduced efficiency on batteries in a low state of charge.

Connections

134. These are shown in Fig 25. A 12-way connector links the adapter unit to the wireless set, and two 6-way sockets are provided for parallel headsets.

To send or receive

135. No switching is provided on adapter 'O'. Send-receive switching is accomplished by means of the pressel switches on the attached microphones. A gain control enables the levels in the headsets attached to the adapter unit to be adjusted as required.

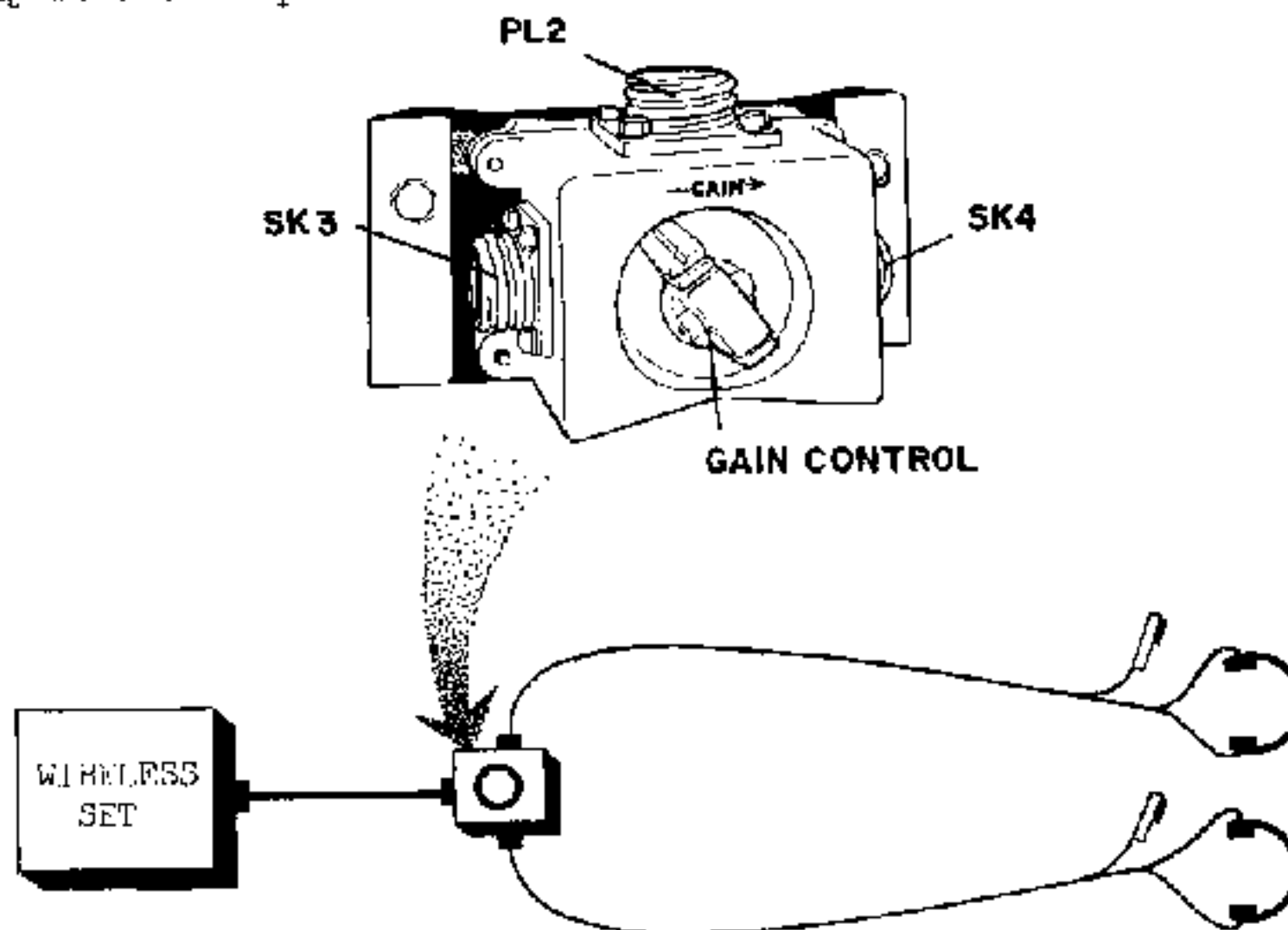


FIG 25

SECTION 19 - RECEPTION ONLY, USING RECEPTION SET R210

(Fig 26)

Facilities provided by this installation

136. (a) Reception only, using an Adapter unit 'A' reception set on the output from the receiver as shown in Fig 26.
- (b) Additional headsets fitted to a standard Mk 4 headset socket by means of an adapter 'T'. The diagram shows standard headsets with microphones fitted to this installation, but the microphones cannot be used. Manipulation of pressel switches will in this instance have no effect upon reception.

Connections

137. (a) The 12-way Mk 4 connector normally fitted between Reception set R210 and the power supply unit for Wireless sender C11 is, in this installation, fitted between the reception set and SK2 on the 4-way junction box. Fit this connector as shown in Fig 26 .
- (b) Obtain a battery power supply of 24 volts and connect it to PL5 on the adapter unit 'A'.
- (c) Attach headsets to adapter 'A' or, if required, attach an adapter 'T' to form a 'T' junction accommodating additional headsets as shown in Fig 26 .

Reception

138. Having checked the connections, operate the receiver as instructed in the separate handbook. Remember that the installation provides reception only, and the manipulation of microphone pressel switches has no effect.

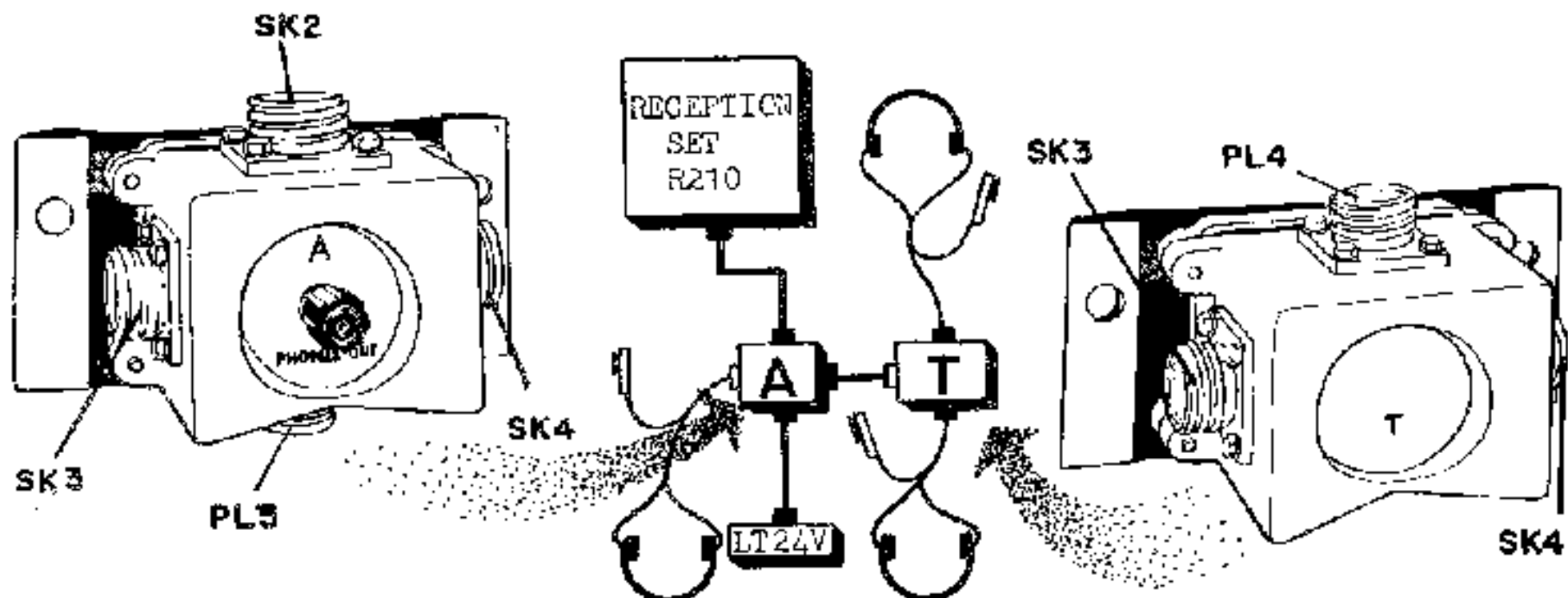
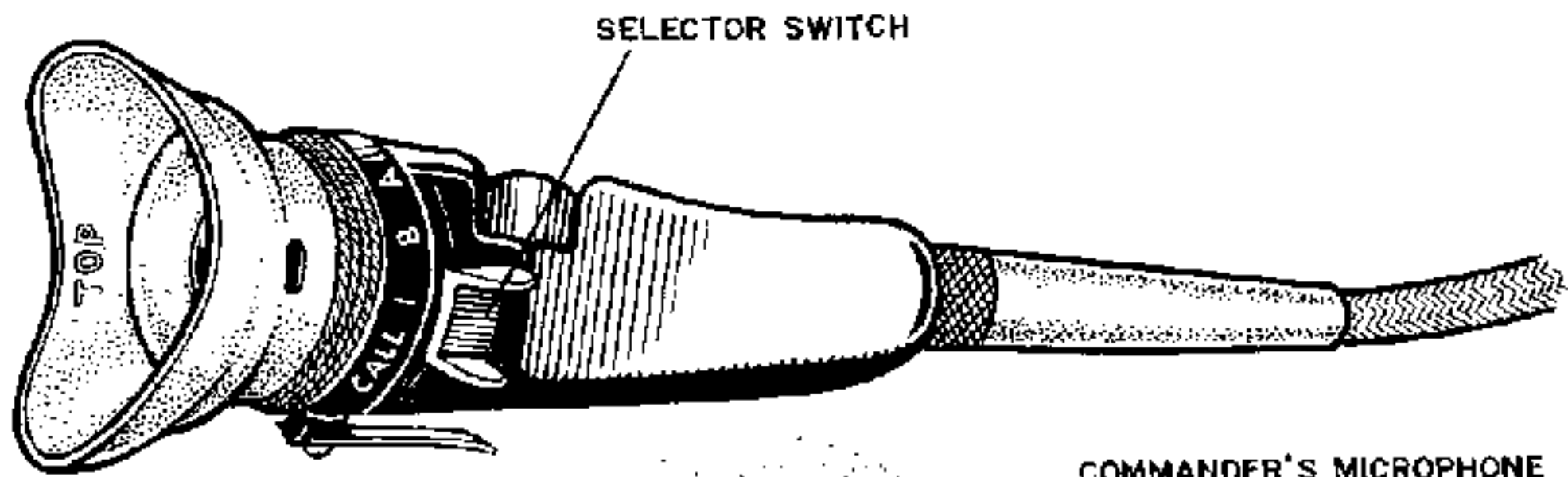


FIG 26



SELECTOR SWITCH

COMMANDER'S MICROPHONE

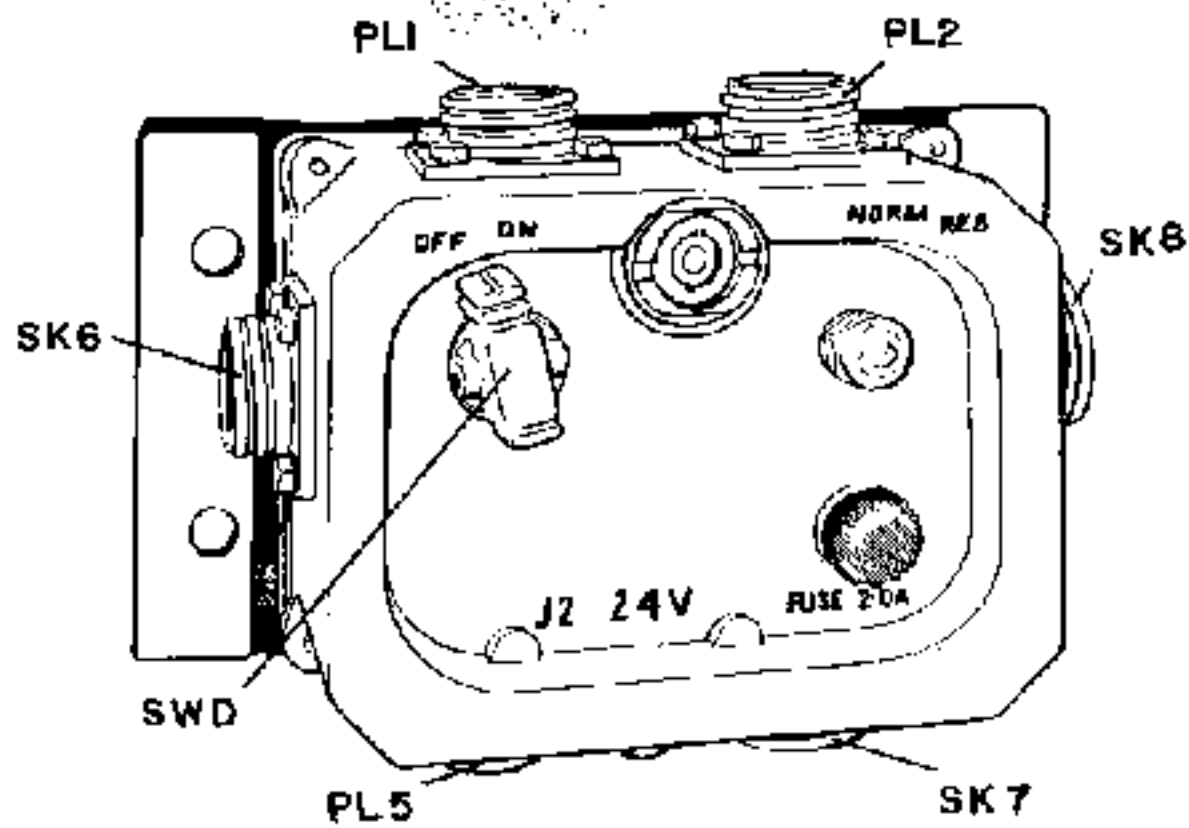
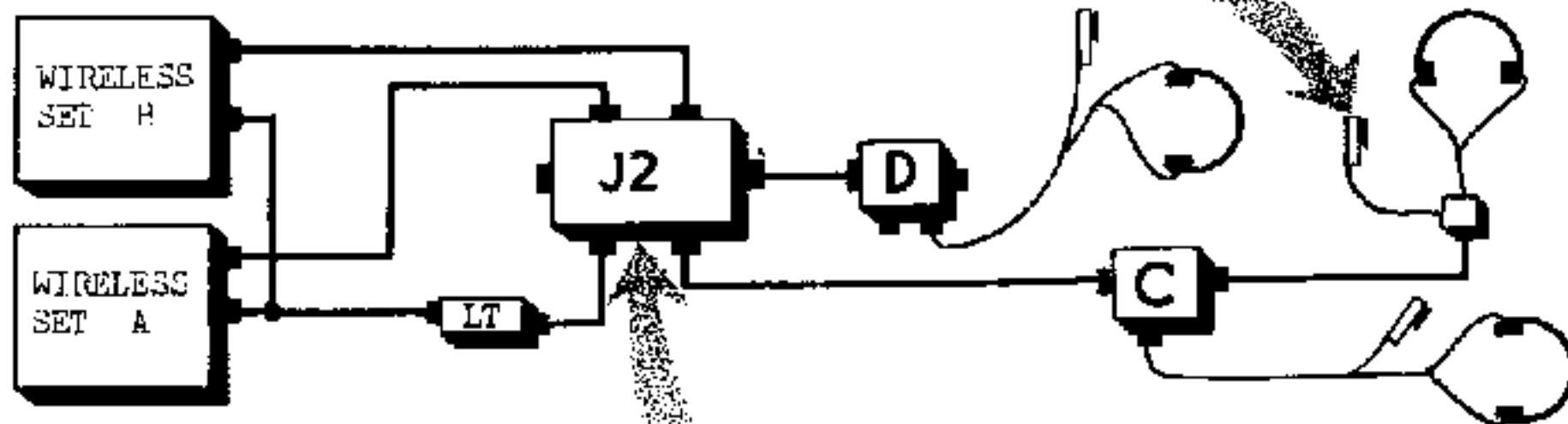


FIG 27

SECTION 20 - COMMANDER'S HEADSET IN A TWO-SET INSTALLATION

(Fig 27)

Facilities provided by the commander's headset

139. (a) Send and receive facilities on both wireless sets, either one of which can be selected from the microphone.
- (b) Intercommunication with other operators. The selector switch has a spring loaded CALL position as shown in Fig 27 .

Connections

140. The 12-way plug from the commander's headset can be attached direct to a Junction box 'J1' or 'J2', to an operator's control unit 'C' as shown in Fig 27 , or to the similar socket on a driver's control unit 'D'. All other units are connected in the normal way for a two-set installation.

To send and receive on either wireless set

141. (a) Switch on the harness by turning switch SWD on box 'J2' to ON.
- (b) Set the selector switch on the microphone to position 'A' or 'E' according to which wireless set is to be used.
- (c) Press the send-receive pressel switch when speaking, and release it when listening. The commander's headset can then be operated in the same way as a standard operator's headset. Use the microphone selector switch to change over from set to set; this switch selects the set to be used regardless of the position of the selector switch on the control unit.

To call all operators

142. Hold the microphone selector switch in the CALL position. A calling buzz is then superimposed over the reception of all other signals on the harness. The position of all set and IC selector switches on microphones and control units is immaterial. Allow the switch to return to the 'J' position.

To talk to other operators

143. (a) Set the selector switch on the microphone to 'I'. The commander can then talk to all other operators whose junction box or control units are switched to IC.
- (b) Press the send-receive pressel switch when speaking, and release it when listening.

SECTION 21 - WHEN THE INSTALLATION IS NOT IN USE

Switch off

144. Move the on-off switches on the control harness to OFF positions, in addition to switching off the wireless set or sets. If the harness is not switched off there will be a gradual drain on battery supplies by indicator lamps. On-off switches are shown in Fig 28 and situated as follows:-

- (a) On Junction box 'J1', move switch SWC to OFF.
- (b) On Junction box 'J2', move switch SWD to OFF.
- (c) On the amplifier move the ON-OFF switch to OFF.

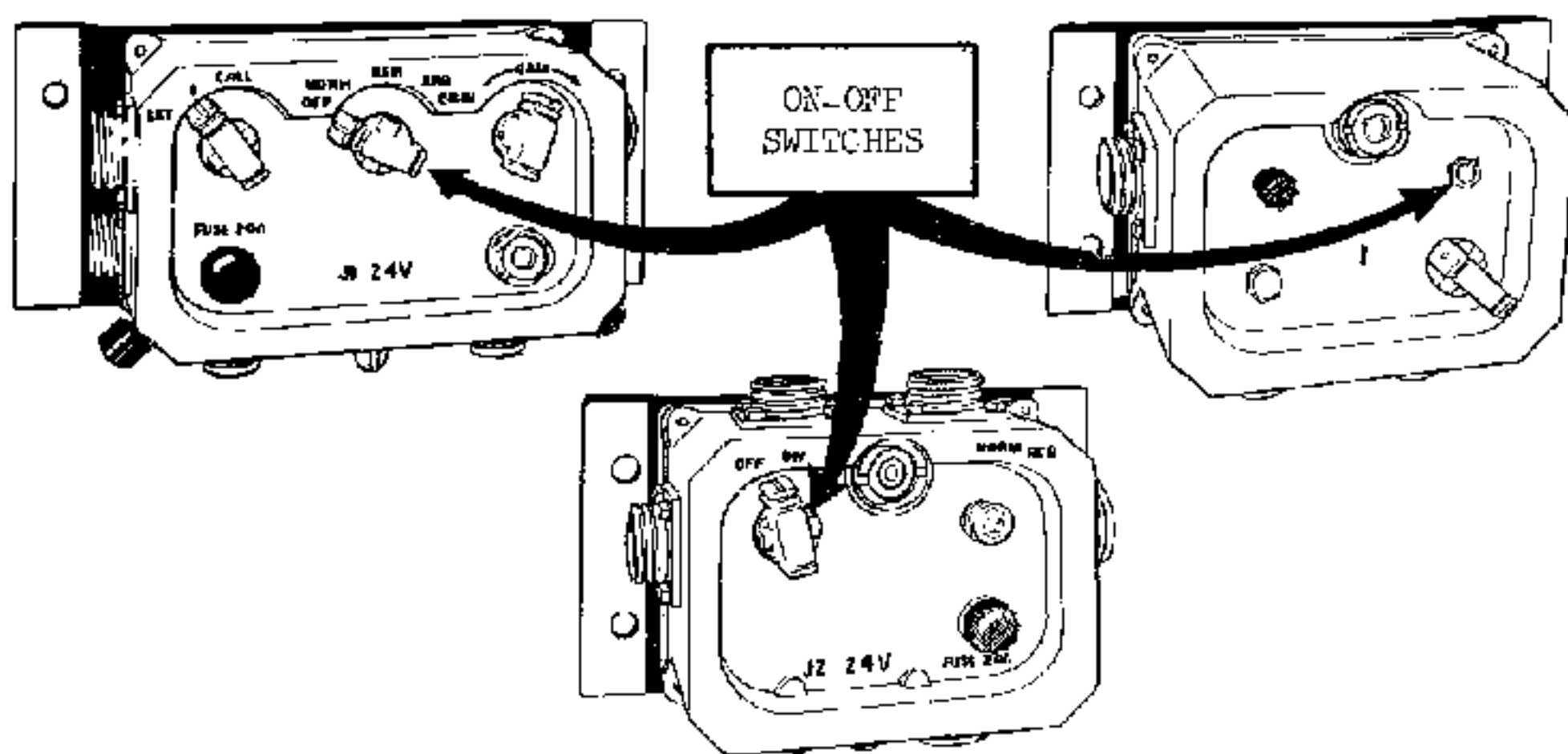


FIG 28

Remote control equipment

145. Dismantle and stow remote control units and equipment when these are no longer required for use. In addition to increasing its liability to damage by leaving remote control equipment installed in its operating position, the presence of a long remote control cable tends to impose a drain on the harness which may reduce the efficiency of the installation as a whole.

Headsets, handsets, and microphones

146. These items are extremely vulnerable to damage, and must not be left plugged into control units when they are not required for use, nor left lying about in vehicles. Handle with care all headsets, handsets, and microphones, and their associated cables and plugs. Stow them in haversacks provided for the purpose when they are not actually in use, and keep the haversacks in a safe place.

CHAPTER FOUR

USER SERVICING

SECTION 22 - SERVICING ON THE TASK SYSTEM

General

147. No equipment 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.

148. 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. 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.

149. The following additional servicing tasks are applicable to this installation and should be carried out as indicated.

SECTION 23 - BATTERY SERVICING

General

150. Battery servicing should be carried out daily on the installation in constant use and weekly if the batteries are not being used continuously. 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 22V, replace the batteries at once and 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.

Connections

151. 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.

Panel, power distribution No 8 (Fig 29)

152. Wireless batteries can be charged by means of Panel, power distribution No 8 and the vehicle power take-off. To use the Panel refer to the instruction card supplied with it. Before charging batteries check the following points:

- (a) With both switches at OFF, check that the 12-24 volt link on Panel power distribution No 8 is the 24 volt position.
- (b) See that connectors are fitted as shown in the relevant Annex to this handbook. Ensure correct polarity, noting that the positive (+) lead is red and the negative lead (-) blue.

Battery switching

153. Three different arrangements of battery connections can be selected by the left hand switch on the panel.

- (a) At DISCH. 1 - CH. 2 power is supplied by one pair of 12V batteries (BATTERY 1). The other pair of batteries (BATTERY 2), now connected to the generator, are on charge when the generator is running.
- (b) At DISCH. 2 - CH. 1 power is supplied by BATTERY 2 and BATTERY 1 is on charge.
- (c) At FLOAT CHG both 24V banks of batteries are connected in parallel to supply the equipment and to be float charged when the generator is running.

Battery charging

154. Three different arrangements of battery charging can be selected by the right hand switch on the panel. Charging rates are shown on the meter when the meter switch is depressed.

- (a) VEH GENER LOW, used when a low rate of charge is required for the vehicle generator.
- (b) VEH GENER HIGH, used when maximum output is required for the vehicle generator. The choice between HIGH or LOW depends upon

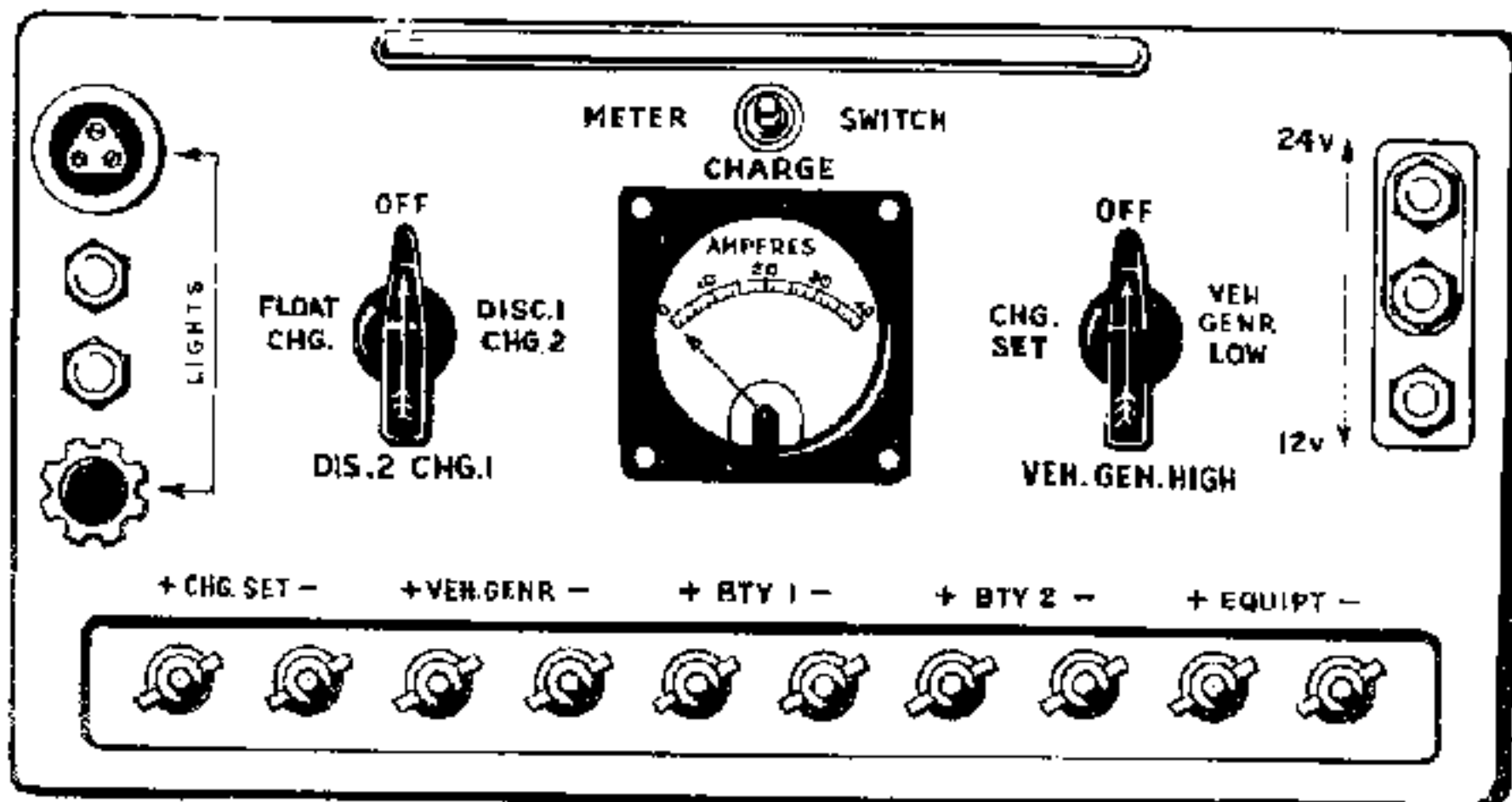


FIG 29

the state of the batteries on charge.

- (c) CHG SET, used when a separate 24V charging set is connected to Panel power distribution No 8.

Charging set

155. When instead of the vehicle generator a separate 24V charging set is to be used, connect it to the CHG set terminals on Panel, power distribution No 8. A Connector twin No 53 is supplied for this purpose.

IMPORTANT If a 12V charging set is supplied do not connect it to Panel, power distribution No 8. Disconnect the 12V batteries from the installation, connect them in parallel, and charge at 12V.

WARNING

Do not attempt to charge one bank of batteries when the other bank is disconnected. If the engine is started with Panel power distribution No 8 switched on and the loose positive lead is in contact with the metal body work a short circuit would cause serious damage to the generator.

Take these precautions:

- (1) Always put both switches on Panel power distribution No 8 to OFF before disconnecting battery leads.
- (2) See that both banks of batteries are correctly connected before switching the panel ON.
- (3) If any battery leads have to be left disconnected, see that the terminations are well taped up to prevent accidental contacts.

SECTION 24 - ROUTINE SERVICING

DAILY

156. Keep the wireless equipment and all associated units clean, dry, and free from dust.
157. Keep headsets in the Signal satchels provided for the purpose when they are not in use, to protect them from damage.
158. Check the clamping screws securing the VHF ATUs to the front wings, and tighten if necessary.

WEEKLY

159. 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.
160. Check that good connections exist between the earth terminal on the wireless set and the vehicle chassis, and between the negative (-) side of the wireless battery supply and the vehicle chassis. See that all earth bonding strips are in order.

MONTHLY

161. 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.
162. Inspect all mounting frames, carriers, etc., particularly the aerial mountings, and ensure that all screws, nuts, etc., are secure.
163. On 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 are in position.
164. Inspect the desiccator in the panel of the junction box and observe the colour of the indicator in the centre of the small circular window. If the indicator is bright blue in colour, similar to the surrounding blue ring, then 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.
165. Report all units on which the indicator appears pink, in order that they can be sent as soon as possible to workshops 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 through the orifice. Therefore desiccators should only be changed under suitable dry conditions.

166. 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 25 - FAULT FINDING

General

167. Simple external faults are much more common than internal trouble. If the wireless station does not operate satisfactorily in the vehicle, first carefully check all connections and ensure that all terminations are correctly fitted.

168. Then see that all switches and controls on wireless equipment and control harness units are adjusted as instructed.

169. If the red indicator lamp on junction box 'J1,' 'J2' or the amplifier unit does not glow when the unit is switched ON, and all power supply connections are in order, the lamp or the fuse may be faulty. If this fuse blows, the automatic voltage control relay in the junction box will no longer assist the wireless set power supply unit to operate on batteries in a low state of charge. Fit a new fuse of the same type and rating as the original. If the insertion of a new fuse does not restore the unit to working order, report the fault. If the new fuse blows, report the fault. Do not keep on inserting new fuses.

170. Section 29 goes into greater detail on fault finding and provides the operator with typical tests for isolating faults in one-set and two-set installations.

171. Radio technicians should also refer to the fault finding tables in the separate user handbooks for wireless sets. The test procedure, for which a special kit of test apparatus and spares is essential, enables the faulty unit or connector to be identified by a process of elimination. The faulty component is then exchanged by the technician for a serviceable replacement.

172. If a wireless installation functional tester FT1 is available it can be used by the radio technician to locate a faulty unit or connector. Working instructions for the FT1 are supplied with it.



SECTION 26 - OPENING A SEALED UNIT

General

173. In these installations all wireless equipment and control harness units are hermetically sealed. 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.

174. When adjustments or replacements are required which involve opening a sealed unit, the unit should be sent to workshops.

175. R Aust Sigs radio technicians may open a 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 radio technician, when absolutely necessary to restore essential communications, or
- (b) On the authority of the Officer Commanding.

176. These are the only occasions when R Aust Sigs radio technicians may open a sealed unit.

177. 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.

178. 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 27 - LOOSE CONTROL AND SWITCH KNOBS

179. If the Allen set screw in the knob of a switch or control becomes loose, the knob will no longer turn the spindle, and 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.

180. Appropriate wrenches are supplied in the spare parts case issued with the control harness.

SECTION 28 - MICROPHONE AND RECEIVER INSETS

Standard microphone and receiver insets

181. 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.

Microphone hand SI No 6

182. 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.

Receiver headgear SI double No 1A

183. 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.

Telephone hand SI remote control No 1

184. To remove the inset from the handset, unscrew the cap retaining each one in position and detach it from its pair of terminals. Insets used in the handset 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 EM No 1, colour coded green with white band and having a resistance of approximately 40 ohms.

Interchangeability

185. A headset assembly functions when similar insets are used for earpiece and mouthpiece, but the performance may 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 only.

Pressel switches

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

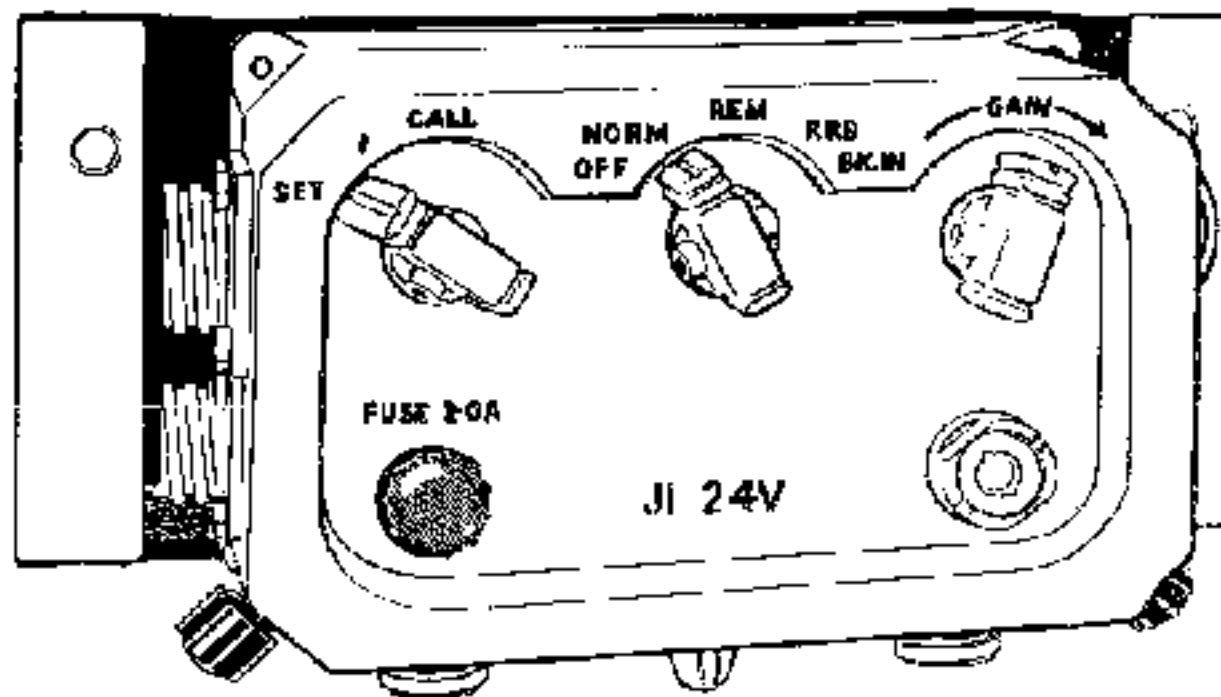


FIG 30
JUNCTION BOX J1

SECTION 29 - OPERATOR'S FUNCTIONING TESTS

187. This section contains a series of typical tests to check the functioning of wireless installations using control harness. The operator will find them useful as a preliminary check before commencing operation, or as a means of isolating faults when they occur.

188. The equipment gives visible or audible indications that it is operating satisfactorily. If it does not give the correct indication that it is operating satisfactorily, or if the operator is unable to obtain the correct indications by using the resources at his disposal and from the suggestions contained in the following paragraphs, the fact should be reported in the normal way.

189. Wireless sets should be switched on and allowed to warm up for at least five minutes, or fifteen if possible, before commencing the tests.

190. If the tests are to be carried out during periods of wireless silence, ensure that the wireless set POWER switch is at LOW. Ensure that the co-axial connector is fitted between the wireless set and the ATU. Then temporarily disconnect the lead from the ATU to the aerial base before switching the set to "send". Reconnect it immediately after the tests.

191. A wireless set 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.

192. Testing the one-set installation WS C11-R210

Test 1. Check power supply to 'J1'

(a) Switch positions

Left hand switch on 'J1'	:	SET
Centre switch on 'J1'	:	NORMAL

(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) Connections Check battery connections.

(ii) Fuse 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) Lamp Fit a new 28V 0.04A lamp of the same pattern as the original.

(iv) Report 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 intercom if the fuse on 'J1' has blown, or even with the 'J1' switched OFF, but this should not be done as there will be no calling buzz on the intercomm circuit.

Test 2. Check power supply to WS C11-R210

(a) Switch positions

'J1' centre switch	:	NORMAL
WS C11 power high-low switch	:	LOW
WS C11 meter switch	:	LTx5
Supply unit OFF-ON switch	:	ON
R210 OFF-ON switch	:	ON & LIGHTS

(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 lamp or the FSC does not light

- (i) Connections Check battery connections
- (ii) Fuse Fit a new 5A 250V 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.

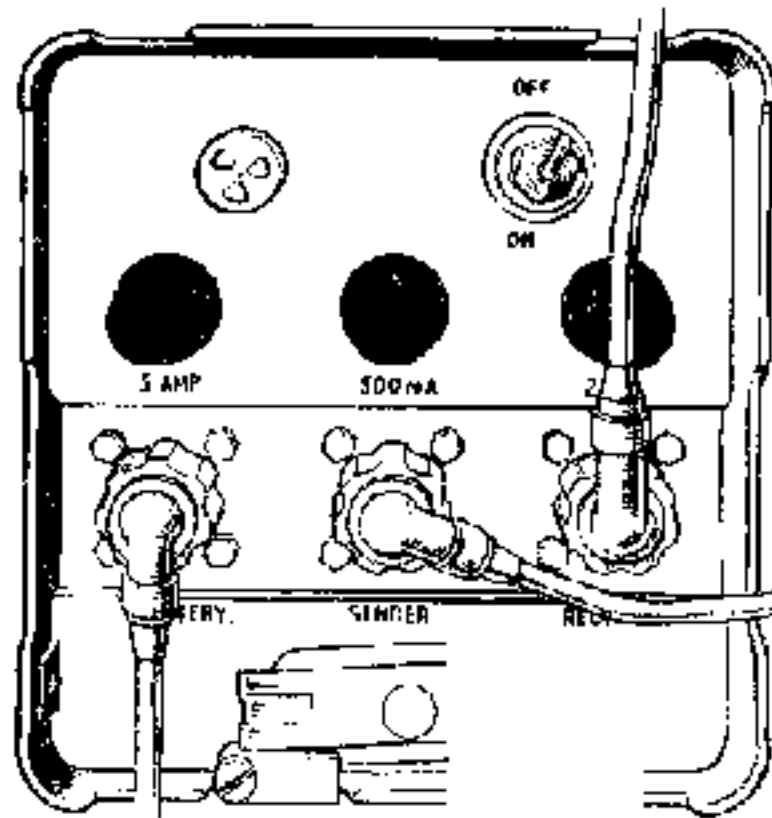


FIG 31
SUPPLY UNIT

Test 3. Check dial lamps

(a) Switch positions

WS C11 tuning LOCK control	:	anti-clockwise
AIU tuning LOCK control	:	anti-clockwise

(b) Correct indications

Scale window illuminated, tune control free.

(c) If the scale windows are not illuminated

- (i) WS C11 Fit a new 12V lamp of the same type as the original, or report an internal fault in the unit.
- (ii) AIU Report an internal fault. The lamp cannot be changed without opening the sealed unit.
- (iii) Note The lamps are switched OFF when the lock control is turned clockwise.

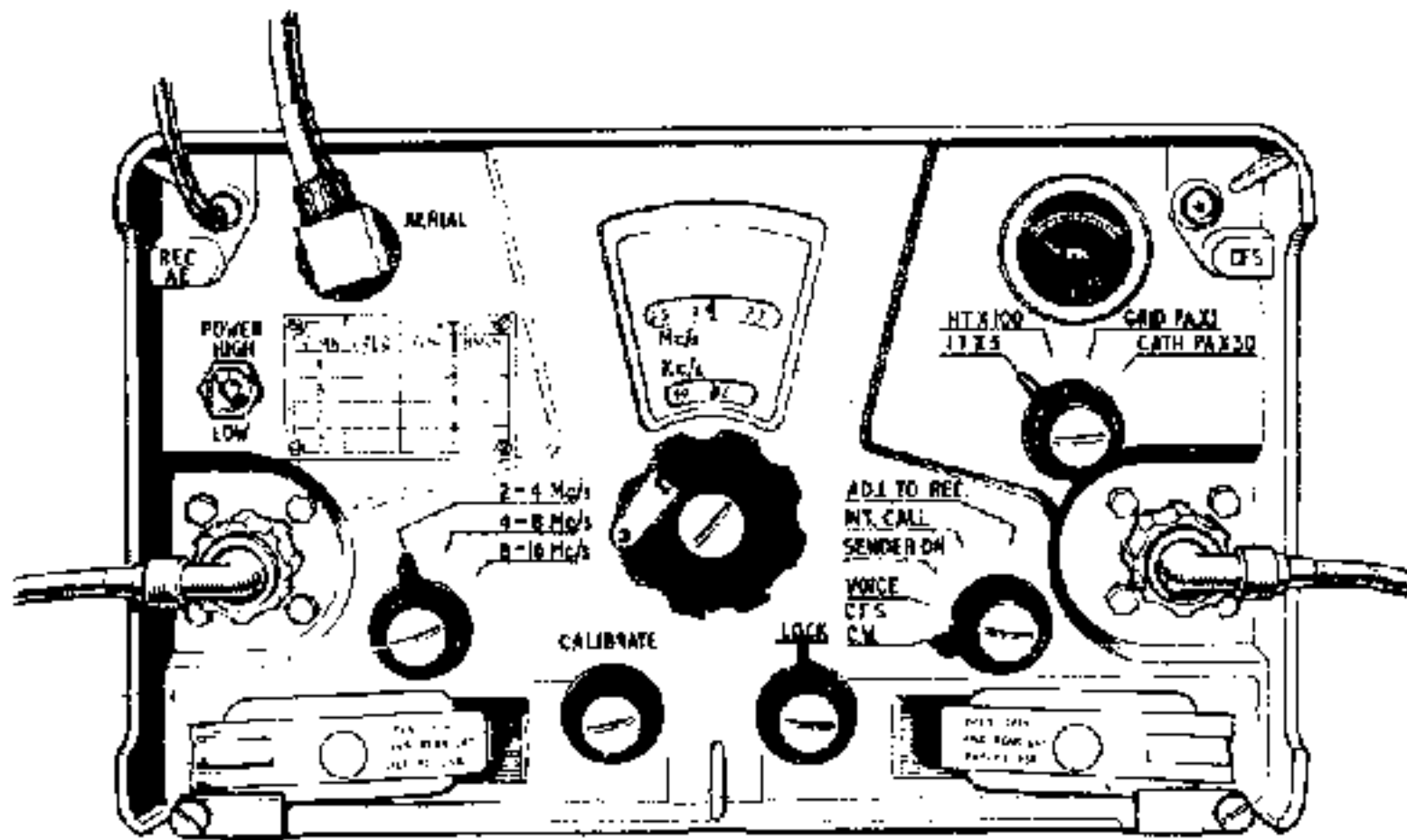


FIG 32
WS C11

Test 4. Tune sender and receiver

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

Test 5. Check WS C11 system switch

(a) Switch positions

C11 system switch : Turn to SENDER ON,
then to CW
and finally to VOICE CFS.

(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 PSU or ATU

- (i) Connections Check connections to PSU and ATU.
- (ii) Internal fault Report.

Test 6. Check WS C11 on "send"

(a) Switch positions

'J1' left hand switch	:	SET
'J1' centre switch	:	NORMAL
WS C11 system switch	:	VOICE-CFS
WS 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) WS 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.

(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.

Test 7. Check R210

(a) Switch positions

'J1' centre switch	:	NORMAL
R210 GAIN control	:	Fully clockwise
R210 ON & LIGHTS switch	:	ON
R210 NOISE LIMITER switch	:	OFF
R210 system switch	:	AGC
R210 BAND switch	:	Turn through positions 1 to 7
Junction box 'J1' GAIN control	:	Adjust as necessary

(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 3A 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.

Test 8. Check remote control

(a) Connect the telephone hand set to the 'J1'.

(b) Switch positions

Supply unit power switch	:	OK
'J1' left hand switch	:	SET
'J1' centre switch	:	REMOTE
Telephone pressel	:	Press and release slowly

(c) Correct indications

When it is tuned, the ATJ meter needle is deflected while the telephone pressel is pressed.

(d) If the ATJ meter needle is not deflected

- (i) Connections Check that the D10 cable is correctly fitted between the 'J1' and the telephone hand set.
- (ii) Telephone If possible, change the telephone hand set for a serviceable replacement.
- (iii) Internal fault Report.

Test 9. Check call circuit on remote telephone

(a) Switch positions

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

(b) Correct indications

A calling buzz is audible in all earphones while the button is pressed.

(c) If there is no calling buzz

(i) Telephone If possible, change the telephone hand set.

(ii) Internal fault Report.

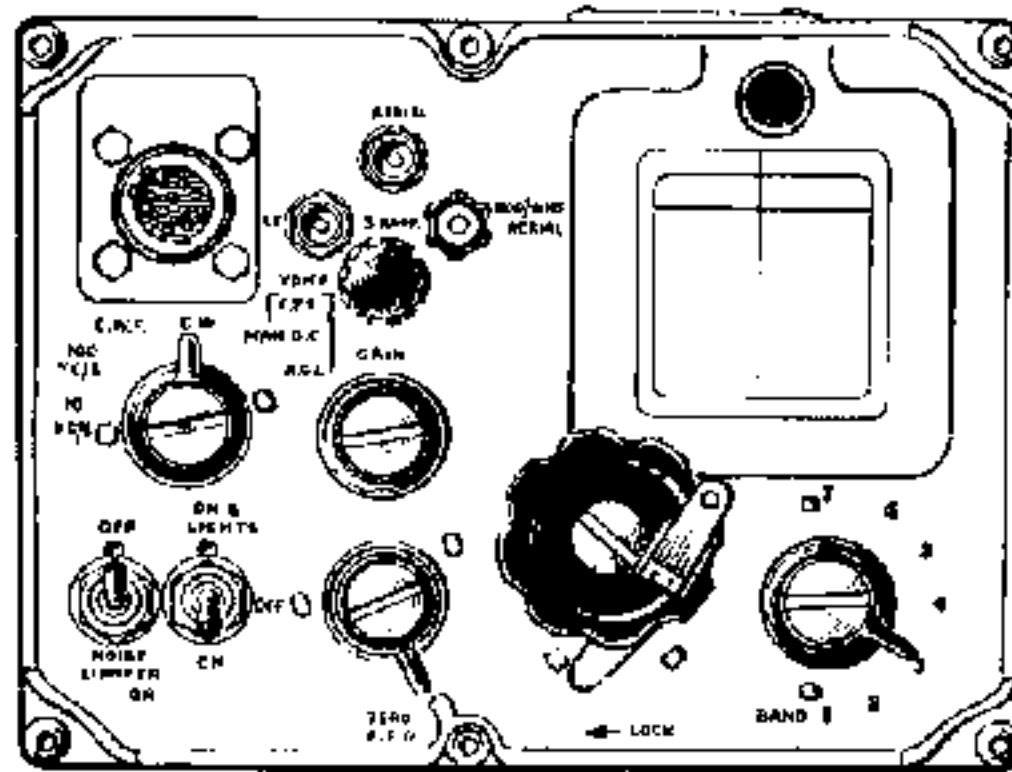


FIG 33- R210

Test 10. Check CW keying

(a) Connect the 'K' box to the 'J1' by means of D10 cable.

(b) Switch positions

'J1' set selector switch	:	SET
'J1' centre switch	:	REMOTE
R210 system switch	:	CW
R210 BFO pitch control	:	ZERO
WS C11 system switch	:	CW
WS C11 meter switch	:	HT x 100
'K' box	:	Press the key

(c) Correct indications

(i) As WS C11 is switched to CW:

Rotary transformer in the supply unit starts running.
WS C11 meter needle is deflected.

(ii) As key is pressed:

ATU meter needle is deflected.
Side tone is audible in earphones.

(iii) As key is released:

ATU meter needle returns to zero.
Side tone stops.

(d) If there is no side tone or meter deflection when the key is pressed

(i) Connections Check that the D10 cable is correctly fitted between the 'J1' and the 'K' box.

(ii) Key Check the key.

(iii) Internal fault Report.

(e) Note

After the test turn the WS C11 system switch to VOICE-CFS to stop the rotary transformer. The WS C11 meter then returns to zero.

Test 11. Switch OFF

(a) Switch positions

'J1' centre switch : OFF
PSU POWER switch : OFF

(b) Indications

'J1' red indicator lamp goes OFF
PSU POWER ON lamp goes OFF

(c) If the lamps do not go off

Disconnect the batteries and report an internal fault in the unit concerned.

193. Testing the two-set installation WS C11-R210/C45

Test 1. Check power supply and fuse in 'J2'

(a) Switch positions

Panel power distribution No 8 : ON
'J2' left hand switch : ON
'J2' right hand switch : REE (This switch is screw-driver operated and in this installation it must remain at REE).

(b) Correct indications

Red indicator lamp on 'J2' 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 'J2' off before fitting replacements.

- (i) Connections Check battery connections.
- (ii) Fuse Fit a new 2A 250V cartridge type fuse in 'J2'. Suitable spares are supplied in Case spare parts No 49. Replace the cap and screw on firmly.
- (iii) Lamp Fit a new 28V lamp of the same pattern as the original.
- (iv) Internal fault If connections, fuse and lamp are serviceable and the lamp does not light, report an internal fault.

(d) Note

It is possible to work the send-receive circuits and intercom if the fuse in 'J2' has blown, or even with the 'J2' switched OFF, but this should not be done as the WS C45 is then deprived of the assistance of the VCR and there will be no calling buzz on the intercom circuit.

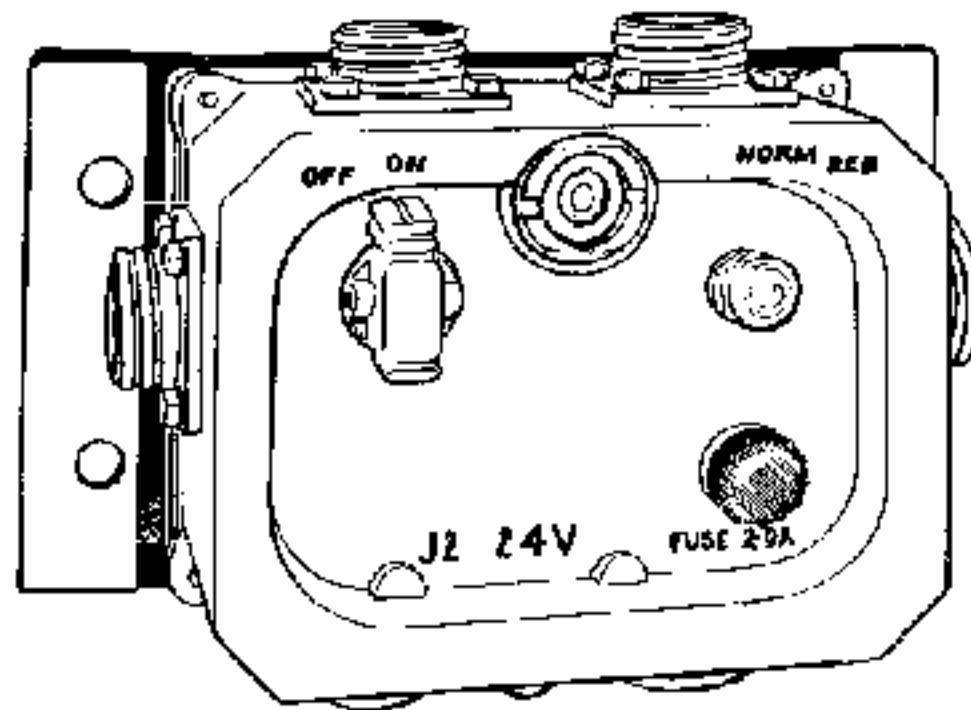


FIG 34
JUNCTION BOX J2

Test 2. Check power supply to WS C45

(a) Switch positions

WS C45 High-low power switch : LOW
Supply unit TRAFFIC-STANDBY switch : TRAFFIC
Supply unit POWER switch : ON
Supply unit WIRELESS SET switch : ON

(b) Correct indications

Supply unit voltmeter shows 20.7-29V
Supply unit POWER ON lamp lights.

(c) Note

The voltmeter will indicate the battery voltage immediately the Panel power distribution No 8 is switched on regardless of switch positions on set or harness.

(d) If the meter does not indicate the required battery voltage

(i) Batteries Fit fully charged batteries if those in the installation are discharged.

(ii) Connections Check battery connections.

(iii) Internal fault Report.

(e) If the POWER ON lamp does not light

(i) Fuse Fit a new fuse of the same rating as the original. These are 2A 440V for Mk 2 supply unit and suitable spares are provided in the unit.

(ii) Lamp Fit a new 12V lamp of the same type as the original. Suitable 12V 2.2W lamps are supplied in the spare case.

(iii) Internal fault Report.

Test 3. Check dial lamp on WS C45

(a) Switch positions

WS C45 calibrate switch to CURSOR ADJ, CHANNEL ADJ and TUNE RP in turn, and finally to OPERATE.

(b) Correct indications

Dial lamps light at first three switch positions and go out with switch at OPERATE.

(c) If dial lamp does not light

Report internal fault.

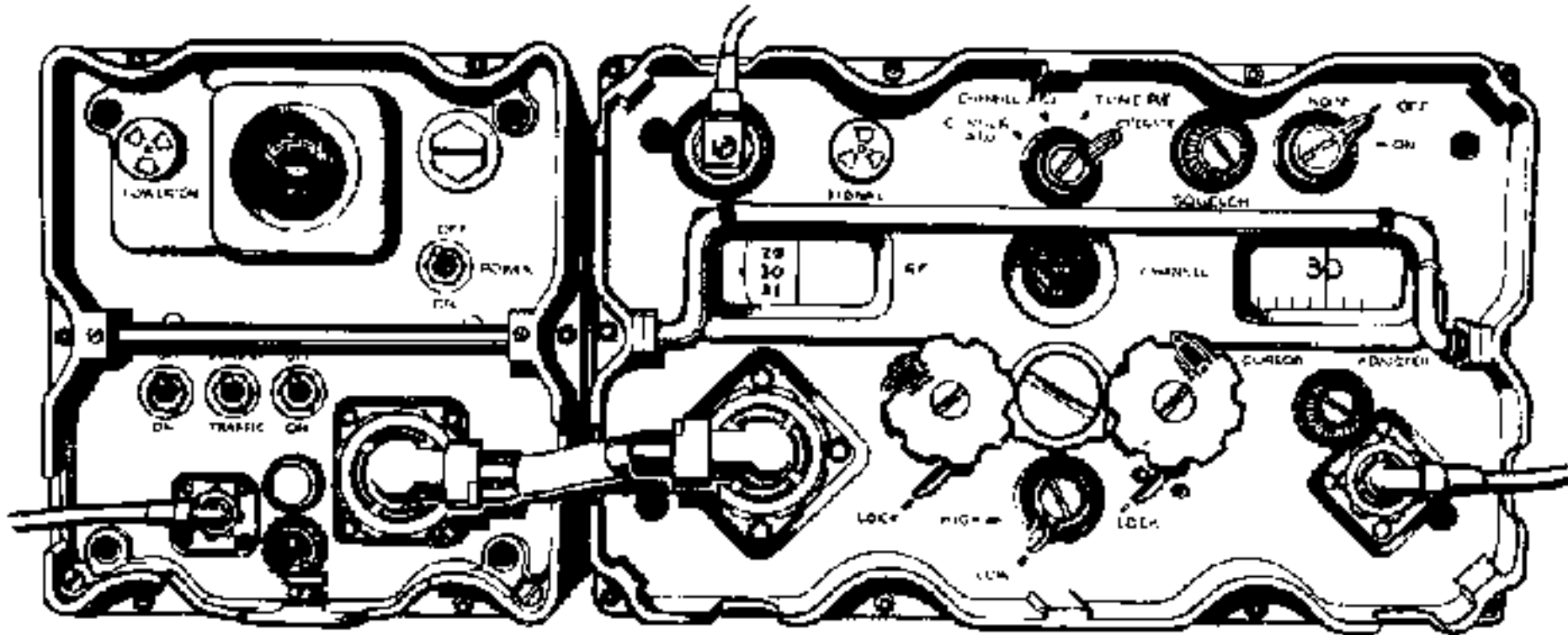


FIG 35- WS C45 AND SUPPLY UNIT

Test 4. Tune WS C45

- (a) Attach the required number of headsets to the Mx 4 headset sockets on Control units 'C' and 'R'. 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 WS C45 as instructed in the separate user handbook. See that the ATU is correctly adjusted. If correct results cannot be obtained, check the following operations.

Test 5. Check SIGNAL lamp on WS C45

(a) Switch positions

WS C45 NOISE switch	:	OFF
WS C45 SQUELCH control	:	Turn clockwise, then anti-clockwise.

(b) Correct indications

SIGNAL lamp lights as control is turned clockwise and should go OFF when it is turned back.

(c) If the SIGNAL lamp does not light

(i) Lamp Unscrew the metal cover and fit a new 12V 2.2W lamp.

(ii) Internal fault Report.

Test 6. Check WS C45 on "receive"

(a) Switch positions

'R' box set selector switch	:	Position 'A'
'R' box system selector switch	:	NORMAL
'R' box GAIN control	:	Adjust as necessary
'B' box switch	:	NORMAL
WS C45 NOISE switch	:	ON

(b) Correct indications

Receiver background noise is audible in earphones as set warms up. Identify this as coming from WS C45 by putting the supply unit POWER switch to OFF and then to ON again and noting that the background noise stops while this switch is at OFF.

(c) If there is no audible background noise

- (i) Headset Change the headset assembly for a replacement known to be serviceable.
- (ii) Internal fault Report.

(d) If the gain level does not vary

Report internal fault.

Test 7. Check WS C45 on "send"

(a) Switch positions

WS C45 NOISE switch	:	OFF
'R' box system selection switch	:	NORMAL
'R' box set selector switch	:	Position 'A'
'B' box switch	:	NORMAL
Microphone pressel switch	:	Slowly press and release

(b) Correct indications

WS C45 signal lamp lights while the pressel switch is pressed. ATU No 9 meter needle deflected while switch is pressed. Speech in microphone audible as sidetone in earphones

(c) If the signal lamp does not light

Report internal fault.

(d) If the ATU meter needle is not deflected

- (i) Connections Check that the co-axial connector is correctly fitted between the WS C45 and the ATU No 9.
- (ii) Microphone Change the headset assembly.
- (iii) Internal fault Report.

- (e) If there is no side tone when the pressal is pressed
- (i) Headset Change the headset assembly.
 - (ii) Internal fault Report.

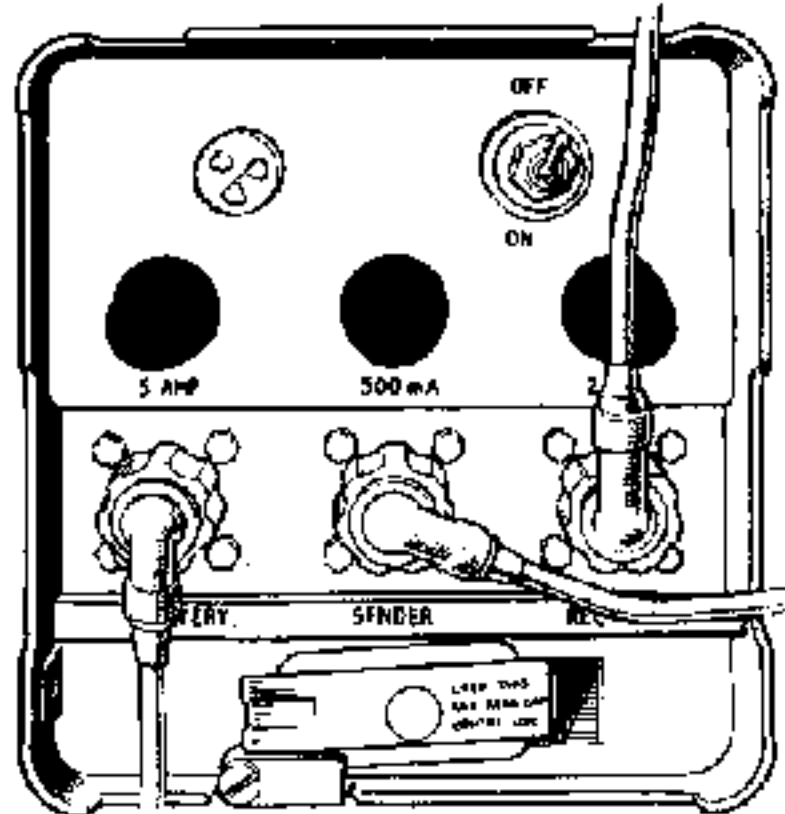


FIG 36 - SUPPLY UNIT

Test 8. Check power supply to WS C11-R210

(a) Switch positions

'J2' left hand switch	: ON
WS C11 Power high-low switch	: LOW
WS C11 meter switch	: LTx5
Supply unit OFF-ON switch	: ON
R21C OFF-ON switch	: ON & LIGHTS

(b) Correct indications

Supply unit red indicator lamp lights.
 WS C11 meter shows battery voltage (multiply reading by 5).
 R21C scale window illuminated.

(c) If the red indicator lamp on the supply unit does not light

- (i) Connections Check battery connections.
- (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 3A 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.

Test 9. Check dial lamps

(a) Switch positions

WS C11 tuning LOCK control : anti-clockwise
 ATU No 7 tuning LOCK control : anti-clockwise

(b) Correct indications

Scale window illuminated, tune control free.

(c) If the scale windows are not illuminated

- (i) WS 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.
- (iii) Note The lamps are switched OFF when the LOCK control is turned clockwise.

Test 10. Tune WS C11-R210

- (a) Attach the required number of headsets to the Mk 4 headset sockets on Control unit 'R'. Screw the locking rings down firmly by hand. Check that the snatch release plug and stud fasteners are correctly fitted. The 'J1' on the R210 is used only when WS C11-R210 is to be separately remotely controlled.
- (b) With the 'J2' switched on, tune the 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.

Test 11. Check WS C11 system switch

(a) Switch positions

WS C11 system switch : Turn to SENDER ON, then to CW and finally to VOICE CFS.

(b) Correct indications

At SENDER ON the rotary transformer in the supply unit starts running and the ATU meter needle is deflected. At CW the rotary transformer runs and the WS 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.

Test 12. Check WS C11 on "send"

(a) Switch positions

'R' box set selection switch : Position 'B'
'R' box system selection switch : NORMAL
WS C11 system switch : VOICE-CFS
WS C11 meter switch : INT x 100
Microphone pressel : Press

(b) Correct indications

As the pressel is pressed:

(i) Rotary transformer in supply unit starts running.

(ii) WS C11 meter deflected.

(iii) ATU No 7 meter deflected.

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

(c) If all the above indications are not obtained

(i) Microphone Change the headset assembly.

(ii) Internal fault Report.

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

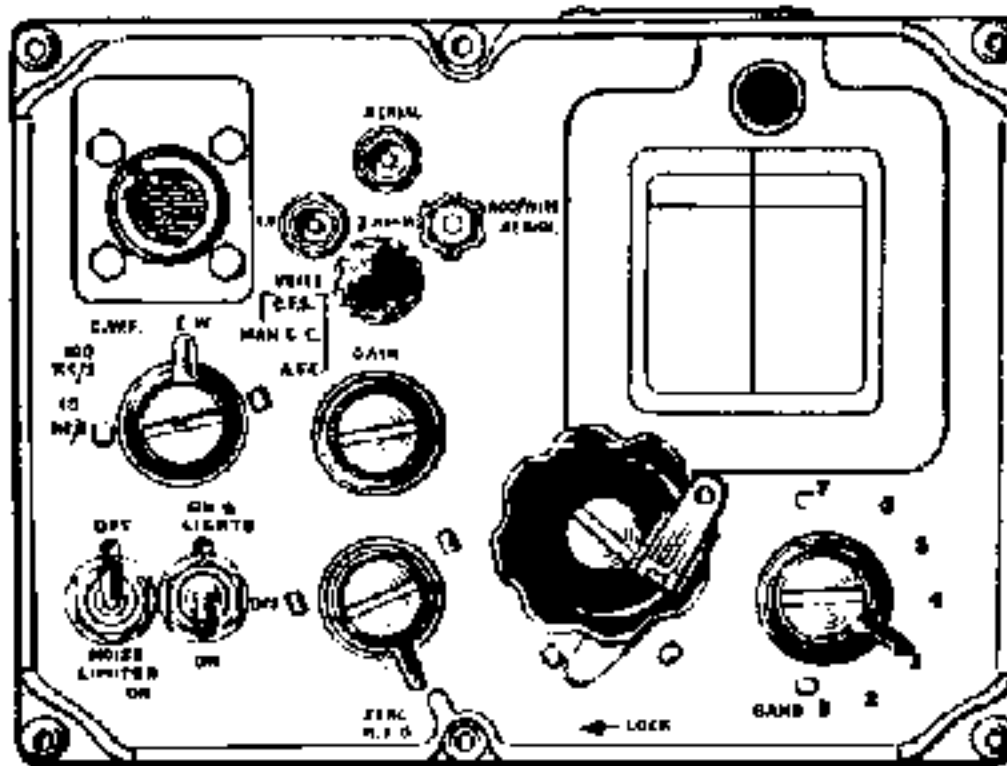


FIG 37- R 210

Test 13. Check R210

(a) Switch positions

- | | | |
|--------------------------------|---|--------------------------------|
| 'R' box system selector switch | : | NORMAL |
| 'R' box set selector switch | : | Position 'B' |
| 'R' box GAIN control | : | Adjust as necessary |
| R210 GAIN control | : | Fully clockwise |
| R210 OK & 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) <u>Fuse</u> | Check the fuse in the R210 and fit a replacement of the same type as the original. |
| (ii) <u>Headset</u> | Change the headset assembly. |
| (iii) <u>Internal fault</u> | Report. |

Test 14. Check manual rebroadcasting on WS C11-R210/G45

(a) Switch positions

Adjust WS C11-R210 and WS C45 for operation.

- | | | |
|---------------------------------|---|---------------|
| 'R' box system selection switch | : | NORMAL |
| 'E' box switch | : | B-A, then A-B |

(b) Correct indications with 'B' box at B-A

WS C11-R210 at receive and WS C45 at "send".

Receiver noise is audible in earphones. Check that the noise heard is from the R210 by momentarily switching WS C11-R210 supply unit OFF and ON again.

(c) Correct indications with 'B' box at A-E

WS C45 at receive and WS C11 at "send".

WS C45 noise is audible in earphones. Check that the noise heard is from WS C45 by momentarily switching the supply unit OFF and ON again.

(d) If the two sets do not show this response

- (i) Connectors Check the 25-pt. connector between 'R' and 'B' boxes.
- (ii) Internal fault Report.

Test 15. Check remote control of WS C11-R210/C45

(a) Connect the telephone to the remote control terminals on the 'R' box.

(b) Switch positions

'J2'	:	ON
WS C45 PSU power switch	:	ON
WS C11 power switch	:	ON
'R' box lower right hand switch	:	First A, then B
'R' box lower left hand switch	:	REMOTE
'B' box switch	:	NORMAL
Telephone pressel	:	Press and release slowly

(c) Correct indications

At 'A' the ATU No 9 meter needle is deflected while telephone pressel is pressed.

At 'B' the ATU No 7 shows similar deflection.

(d) If the ATUs do not show this response

- (i) Connections Check that the D10 cable is correctly fitted between the 'R' box and the telephone handset.
- (ii) Telephone If possible, change the telephone handset.
- (iii) Internal fault Report.

Test 16. Check call circuit on remote telephone

(a) Switch positions

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 hand set.

(ii) Internal fault Report.

Test 17. Check CW keying

(a) Connect the 'K' box to the remote control terminals on the 'E' box.

(b) Switch positions

'E' box system selection switch	:	REMOTE
'R' box set selector switch	:	Position 'B'
'K' box	:	Press the key
R21C system switch	:	CW
R210 EFO pitch control	:	ZPRC
C11 system switch	:	CW

(c) Correct indications

(i) As WS C11 is switched to CW:

Rotary transformer in PSU starts running.
WS C11 meter needle is deflected.

(ii) As key is pressed:

ATU No 7 meter needle is deflected.
Side tone is audible in earphones.

(iii) As key is released:

ATU meter needle returns to zero.
Side tone stops.

(d) If there is no side tone or meter deflection when the key is pressed

(i) Key Check the key.

(ii) Internal fault Report.

(e) Note After the test, turn the WS C11 system switch to VCICE-CFS to stop the rotary transformer. The WS C11 meter then returns to zero.

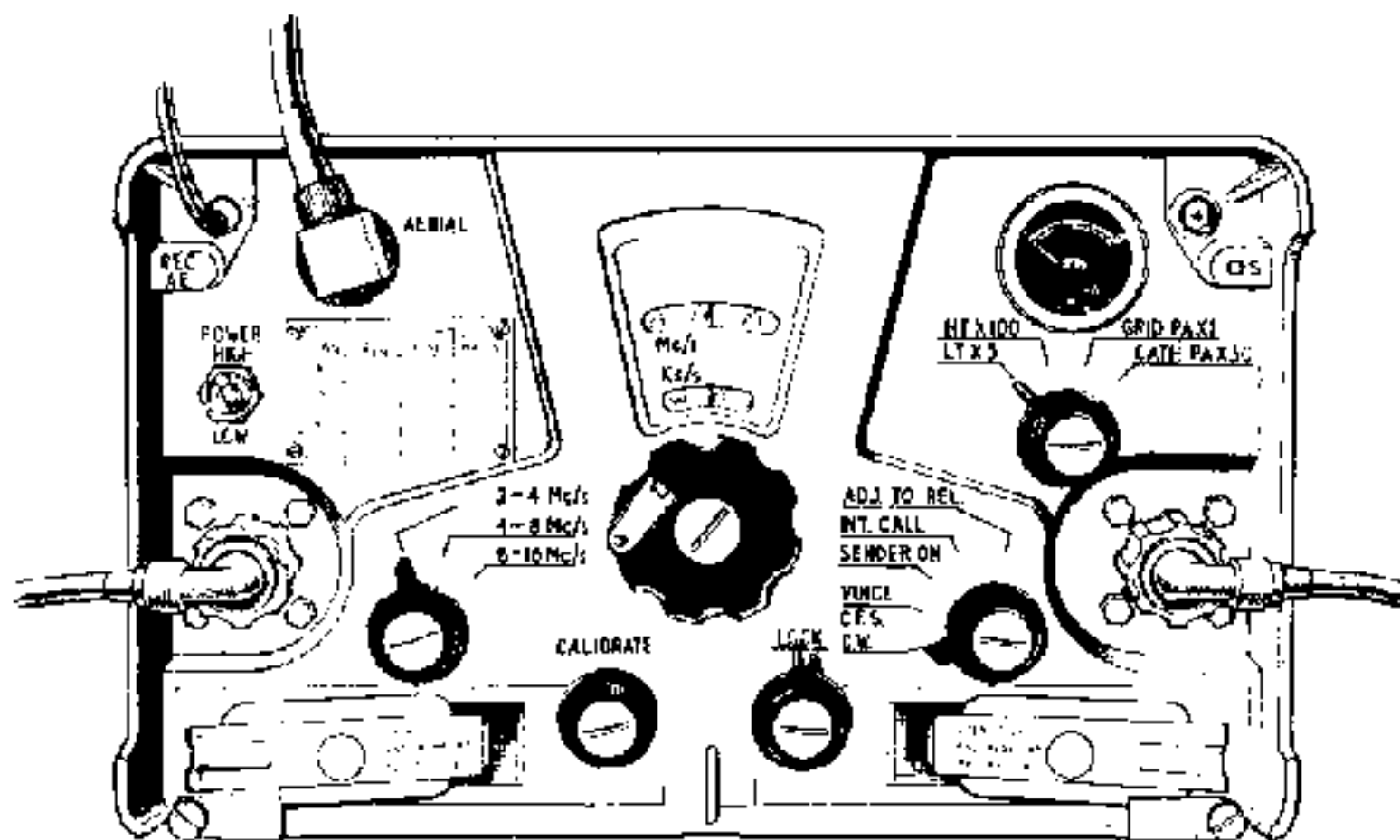


FIG 38-WS C II

Test 18. Check intercom circuit

(a) Switch positions

WS C45 FSW POWER switch	:	CN
WS C45 IC switch	:	CN
'R' box set selector switch	:	Position '1'
'R' box GAIN control.	:	Adjust as necessary
Microphone pressel	:	Press

(b) Correct indications

Speech in microphone attached to 'R' box audible in all ear-phones, including remote telephone and in loudspeaker when connected.

(c) If there is no sidetone

(i) Headset Change the headset assembly.

(ii) Internal fault Report.

Test 19. Check intercom call circuit.

(a) Switch positions

'R' box set selector switch : Turn to CALL, pause and release.

(b) Correct indications

Calling buzz audible in all earphones while switch is at CALL.

(c) If there is no calling buzz

Report internal fault.

Test 20. Check Control unit 'C'

Attach a headset to the Control unit 'C' and repeat tests 5 to 11 using the switch on this unit. Only those portions of the tests necessary to prove the efficiency of the control unit need be performed.

Test 21. Check the headset extension connector

Attach a headset to the extension and repeat tests 18 and 19 to check the connector.

Test 22. Switch OFF the two-set installation after testing

(a) Switch positions

Panel power distribution No 8	:	OFF
Supply unit ON-OFF switches	:	OFF
'J2' left hand switch	:	OFF

(b) Correct indications

'J2' red indicator lamp goes OFF
Both PSU lamps go OFF

(c) If the lamps do not go OFF

Disconnect the batteries and report an internal fault in the unit concerned.

CHAPTER FIVE

AERIALS

SECTION 30 - VERTICAL AERIAL

(as used with WS C11 installations)

Kit aerial 34-ft or 16-ft twin No 2 Mk 1/1

194. This aerial has a maximum height of 34-ft. It can be erected on the truck roof or remotely within 150 feet of the truck. When the aerial is erected remotely the ATU No 7, dismounted from its position in the vehicle, is placed at the side of the insulator which forms the base of the aerial. As it is scaled, ATU No 7 will not be harmed by exposure but long grass etc., must be kept away from the terminals. It is essential that not more than six 3-ft 'D' sections are used to construct the vertical aerial and that the aerial is supported by two sets of four correctly adjusted stay ropes. The 'D' sections bend very easily if an assembled aerial is strained.

195. A mast 18-ft in height can be constructed from the 'D' sections in the aerial kit. This mast, erected on a Spike Mk 1/1 antennae rod 'D' instead of on the insulated aerial base, can be used to support a wire aerial.

Frequency coverage

196. The height of the vertical aerial should be selected to suit the operating frequency. The following table shows the number of 'D' and 'F' sections, and the height in feet, of the various different arrangements necessary to cover the WS C11-R210 frequency range.

Operating Frequency in Mc/s	No. of 3-ft. 'D' sections	No. of 4-ft. 'F' sections	Total height in feet
2 to 5	6	4	34
6	6	3	30
7	6	1	22
8 and above	4	1	16

Component parts

197. The vertical aerial, illustrated on page 81, consists of the component parts listed in the following table.

Part	Quantities per mast
* Sections No. 1, 2, 3 and 4, antennae rods 'F'	4 (maximum)
* Adapter No. 1 Mk. 1/1 antennae rod 'F' (ZA29554)	1
* Sections 3-ft antennae rod 'D'	6 (maximum)
Insulator WT aerial load-in No 25 Mk 1/1 (ZA29675)	1
* Pegs anchoring No. 4 Mk. 1/1 (ZA29571)	4
* Stayplate and stay assembly No. 2 Mk. 1/1	2
* Stayplate and stay assembly No. 2A	1
Base plate	1
Pegs Mk. 1/1 antennae rod 'A'	4

Items marked * in the above table form part of the aerial kit. Items not so marked are provided in the installation kit. A complete list of component parts of the aerial kit which includes carrying case and ancillary equipment, is given in the CES.

Lead counterpoise 25-ft.

198. A separate counterpoise earth should always form part of the remote vertical aerial arrangement. Instructions for spreading the wire counterpoise and connecting it to the equipment are given on page 83.

SECTION 31 - ERECTING THE VERTICAL AERIAL ON THE GROUND

(Fig 39)

Site

199. Select a suitable site on which the vertical aerial can be erected. The site must be reasonably accessible as the vehicle must be brought to within 150-ft of the aerial base, this distance of 150-ft being determined by the combined length of the three 50-ft co-axial aerial feeder cables. The ground must be clear of obstructions over a radius of some 25-ft in order that the counterpoise earth leads can be laid out. Having chosen the site, level a space in the centre for the insulator and the dismantled ATC No 7. Clear away long grass, etc., which might interfere with aerial terminals and connections.

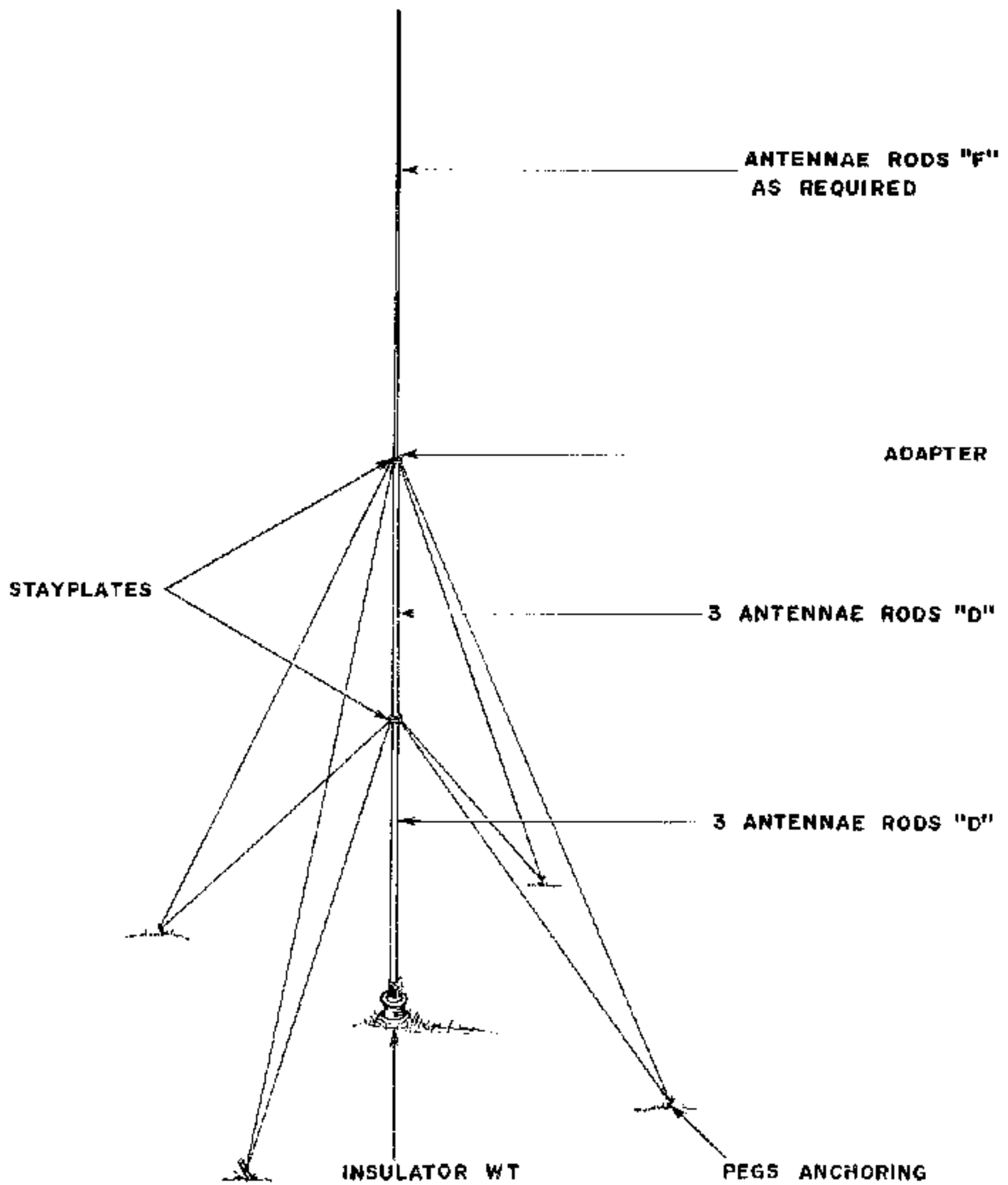


FIG. 39-AERIAL VERTICAL 34 FT.

Insulator base plate

200. The base plate is shaped like a tray to hold the insulator. Place it on level ground in the position chosen for the aerial. Ensure that it is horizontal.

Pegs Mk 1/1 antennae rods 'A'

201. Before fitting the insulator, drive the four Pegs antennae rod 'A' through holes in the base plate to ensure that it does not move. The corner holes are off-set to enable these pegs to be inserted at an angle.

Pipe earth Mk 3

202. Drive this earth pipe firmly into the ground within a few inches of the insulator base plate, where it will form an earth connection for the dismounted ATU and the counterpoise. If the top of the earth pipe is left approximately four inches above ground, it can be used to support the front of the ATU at a convenient angle for operating.

Insulator WT aerial lead-in No 25 Mk 1/1

203. After anchoring the base plate and driving the earth pipe into the ground, place the insulator in the base plate and secure it by means of the four captive wing bolts on the insulator. Note that a Spike antennae rod 'D' must not be used as a base support for 'D' sections when the mast is employed as a vertical aerial.

Pegs anchoring No 4 Mk 1/1

204. Space the four angle iron stay rope pegs equally round the insulator, each approximately 18 feet from the centre, and drive them into the ground at an angle of 45 degrees.

Sections antennae rod 'D' and 'F'

205. Assemble the antennae rod sections as shown in Fig 39, fitting 'D' and 'F' sections according to the requirements of the operating frequency. Ensure that all screw-type 'D' sections and plug-in 'F' sections fit correctly. Over the threaded end of the third 'D' section from the bottom, fit the first stayplate with four stays attached. Fit the remaining 'D' sections. On the top 'D' section fit the second stayplate with stays, and then the 'F' section adapter. Finally fit the required number of 'F' sections and tighten the wingnut on the adapter. The aerial is now ready for erection.

Raising the vertical aerial

206. Lift the aerial into a vertical position, fit the bottom end into the insulator and tighten the clamp. Support the assembly until the two sets of stays are adjusted.

Stay ropes

207. Adjust the eight stays evenly to hold the aerial vertical. In high winds or with an aerial at maximum height the two sets of stay ropes are

essential. Do not strain the 'D' sections by failing to use stays, nor by having the stays tightened unevenly. Check and adjust the stays frequently, especially in damp weather, and ensure that the pegs remain firmly anchored in the ground.

Lead, counterpoise 25-ft effective length

208. This counterpoise must always form a part of the remote vertical aerial assembly. See Fig 40. Spread the eight leads out, equally spaced and flat on the ground so that they radiate from the base of the vertical aerial like spokes from the hub of a wheel. Extend each lead to its full length and tread the end cap into the ground. Note that when the counterpoise is being taken up each lead should be coiled separately. Start winding from the centre, otherwise the wire will curl and twist. Tie each coiled lead separately and then tie the group of coils together.

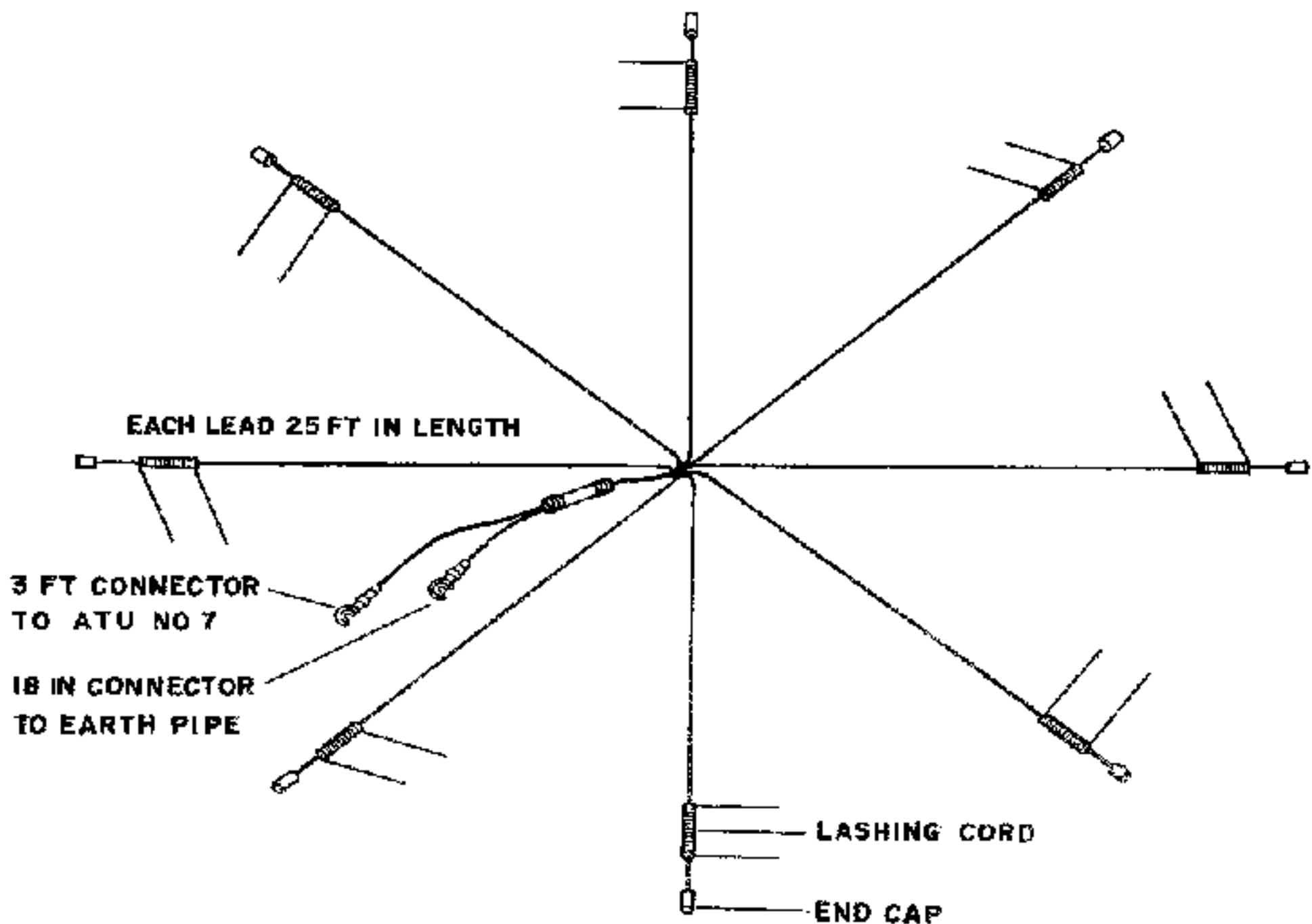


FIG 40 - COUNTERPOISE EARTH

Aerial tuning unit No 7 assembly

209. Dismount the APU No. 7 from the frame which secures it to the tray on the top of WS C11. It is held by a screw and clamp fitted over the panel flange. Place it at the foot of the vertical aerial.

Connections

210. Fit the following connectors to the remote APU and the counterpoise.

- (a) Connector single No 228, 1-ft 3-in (ZA51454)

Terminal on insulator WT to aerial terminal on APU No 7. This connector, which has a slotted lug at each end, must be kept well clear of the ground and all metal parts.

- (b) Aerial feeder No 5, 50-ft

Co-axial plug on APU No 7 to WS C11. If necessary join two or three to make a maximum length of 150-ft.

- (c) Connector single 3-ft (part of counterpoise)

Counterpoise to earth terminal on APU No. 7.

- (d) Connector single 18-in (part of counterpoise)

Counterpoise to terminal on Pipe earth Mk 3.

Adjusting the remote APU No 7

211. After tuning the WS C11, adjust the remote APU for maximum meter deflection. If it is necessary to establish communication between the truck and the remote APU, use the telephone handset and D10 cable.

NOTE TO READERS

Additions will be made to this Chapter as information on aeri-als now under development becomes available, or instructions are required on other aeri-als which are not at present envisaged for use with vehicle installations.

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ANNEX	INSTALLATION
A	Wireless Station C42/B47 in LWB Land Rover
B	Wireless Station C45/B48 in LWB Land Rover
C	Wireless Station C45 in LWB Land Rover
D	Wireless Station C42 in LWB Land Rover
E	Wireless Station C11/R210 in LWB Land Rover
F	Wireless Station C11-R210/C11-R210 in LWB Land Rover
G	Wireless Station C42/C42 and C45/C45 in LWB Land Rover
H	Wireless Station C42/C45 in LWB Land Rover
J	Wireless Station C42/C11-R210 in LWB Land Rover

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10/7/61.

Issued by Command of the Military Board

A handwritten signature in cursive script, appearing to read 'A. W. ...', is written below the printed text.

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