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USER HANDBOOK

for

CLANSMAN RADIO CONTROL HARNESS

Published under the authority of

The Signal Officer in Chief (Army), Ministry of Defence, Whitehall, SW1.

APRIL 1976

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Published Under the Authority Of:-
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ASSOCIATED PUBLICATIONS

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	Army Code Number
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PRC-350	61124
PRC-351/352	61128
VRC-321	61253
VRC-322	61255
VRC-353	61393
Adaptor Telegraph Radio, Low/High Level	61466
Clansman VHF Antennas	61388
Radio Audio Accessories	
Clansman Secondary Batteries, Battery Charging and Testing	61394
Condition Test Set for 'Clansman' Radio	
Test Set Harness Connectors 'Clansman'	
SR-A13	13120
SR-A14	13119
SR-A40	12045
SR-A41	12336
SR-B47	11791
SR-B48	12275
SR-C11	12052
SR-R210	12051
SR-C13	12289
SR-C42	11197
SR-C45	11792
Harness 'A' (Modified for Chieftain)	60968
Radio Installations in FFR 'B' Vehicles	12798

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GLOSSARY OF TERMS

The following terms are used in conjunction with Clansman Radio Control Harness:-

1. Clansman The name given to the range of HF and VHF manpack and vehicle radios and control harness developed to replace Larkspur equipment.

The radios are:- PRC-320, PRC-350, PRC-351/352, VRC-321/322 and VRC-353.
2. Larkspur The name given to the range of radios and control harness replaced by Clansman.

The radios are:- SR.A13, SR.A14, SR.A40, SR.A41, SR.B47, SR.B48, SR.C11/R210, SR.C13, SR.C42 and SR.C45.
3. Signal A voice, tone or DC condition used to communicate information.
4. Operate To perform the functions of switching on and off; selecting modes of operation, frequency of transmission and tuning for maximum power (of radios); sending and receiving traffic appropriate to the mode selected; selection of the radios to be used or monitored, or control of the remote and rebroadcast facilities.
5. Use Sending and receiving traffic appropriate to the mode and connections selected by the operator.
6. Monitor To receive traffic on a selected channel but without the ability to send traffic. This signal is connected to the right earphone of the associated headset.
7. Working Set The set selected for use by the crew member. The audio output from this set is connected to the left earphone of the headset.
8. I or IC The common voice intercommunication channel inside the vehicle, or external to it via remote terminals, by which crew members can pass information.
9. Communal IC The common voice intercommunication channel between vehicles, connected by line via the remote terminals, by which crews can pass information.
10. O/R An over-ride facility allowing a user to make his voice heard by all crew members irrespective of the selection made on their control boxes. It interferes in their use of the control harness, only by replacing the signal in their right ear by the voice call.

11. Call A tone initiated by a remote user or station indicating the wish to communicate into the vehicle harness. The tone replaces the selected monitor channel, and is heard on the remote controlled channel only.
12. Live IC This allows a crew member to use the IC system without operating a pressel. His microphone is 'live'.
13. Remote Control To perform the same function as a person able to 'use' the harness, but from a remote point.
14. Rebroadcast To interconnect two radio stations in such a manner that traffic received on one is transmitted by the other and vice-versa. If both radios are VHF, the facility can be automatic and no operator intervention is necessary once rebroadcast has been established. If one or both radios is HF, manual control by an operator is necessary.
15. Local Rebroadcast Rebroadcast carried out between two radios in the same control harness system.
16. Remote Rebroadcast Rebroadcast carried out between two radio harness systems connected by line.
17. Audio Connector This connector will accept any Clansman audio gear, morse key or independent pressel, directly or via audio extension lead. It provides a nominal 18V supply of limited current capability.
18. Headgear Connector As for audio connector but with no 18V supply.
19. Harness Connector This is the main harness ring connector and carries 'A' and 'B' radio, I/C, O/R and supply connections to the crew boxes.
20. Actic Connector As for harness connector except that 'B' radio is replaced by 'C' radio. Normally used with the harness ring in a 3 radio installation.
21. Radio Junction Box (RJB) The 28V power distribution point.
22. Rotary Base Junction (RBJ) The slip ring connector between the hull and turret of a fighting vehicle.

2. GENERAL DESCRIPTION

The Clansman Radio Control Harness is an interconnected system of operating, junction and adaptor boxes, and audio gear, which permits the use of up to three Clansman radios of the VRC-321, VRC-353 type, from various positions in a vehicle, and which also provides intercommunication between these positions which is independent of the radios. These facilities are also available in part to a remote user via a 2 wire line up to 3 km (2 miles) long using D10 cable, and up to 5 km (3½ miles) long using one pair of CT10 cable.

The harness can also be used to provide rebroadcast facilities, which may be automatic or manually controlled, between two of the installed radios, or between any installed radio and a remote radio connected into the harness system by a 2 wire line as described above.

The basic control harness is intended for use with a one or two radio installation, which form the majority of vehicle radio installations. It is a single system suitable for all such vehicle installations, the varying requirements being met by different arrangements of the standard range. The boxes are connected in series and the free ends may be joined by a standard cable, to give a measure of protection against cable failure.

Three-radio installations are built up from the basic two radio harness by adding boxes which provide the extra channel and control functions required.

By using a Harness Adaptor Box, Clansman manpack radios may be connected into the harness as if they were vehicle radios, and full facilities, including manual and automatic rebroadcast, where appropriate, are available.

When using radio or IC, the operator hears transmit side tone in his headset. The side tone is heard in both ears if he is working radio or IC only. When working radio or IC and monitoring another radio or IC, the working signal is heard in the left ear and the monitored signal in the right ear. This can be remembered by looking at the Crew Box volume controls, WORKING - left hand, MONITOR - right hand. An exception to this side tone rule is the rebroadcast operation from the interconnecting Box 2 Radio.

In addition to the standard range of harness boxes, a Radio Adaptor Box (RAB) is provided, which enables a Larkspur radio to be installed and used to its full potential in Clansman harness.

If, in certain armoured vehicles, a Centralised Warning Indicator (CWI) is fitted to give audible warning of certain incidents or failures, this warning can be fed into the harness system.

The harness system operates from a nominal 28 volt DC supply derived from the vehicle electrical supply, or from a separate radio supply if it is fitted.

The harness boxes are of cast light-alloy construction. Plug and socket connections are made at the sides, top or bottom of the boxes, and with minor exceptions, the controls are on the front face. Control boxes are flanged so as to protect knobs and switches. Boxes are fitted with flexible belting which retains the same stud fixing as the earlier Larkspur harness.

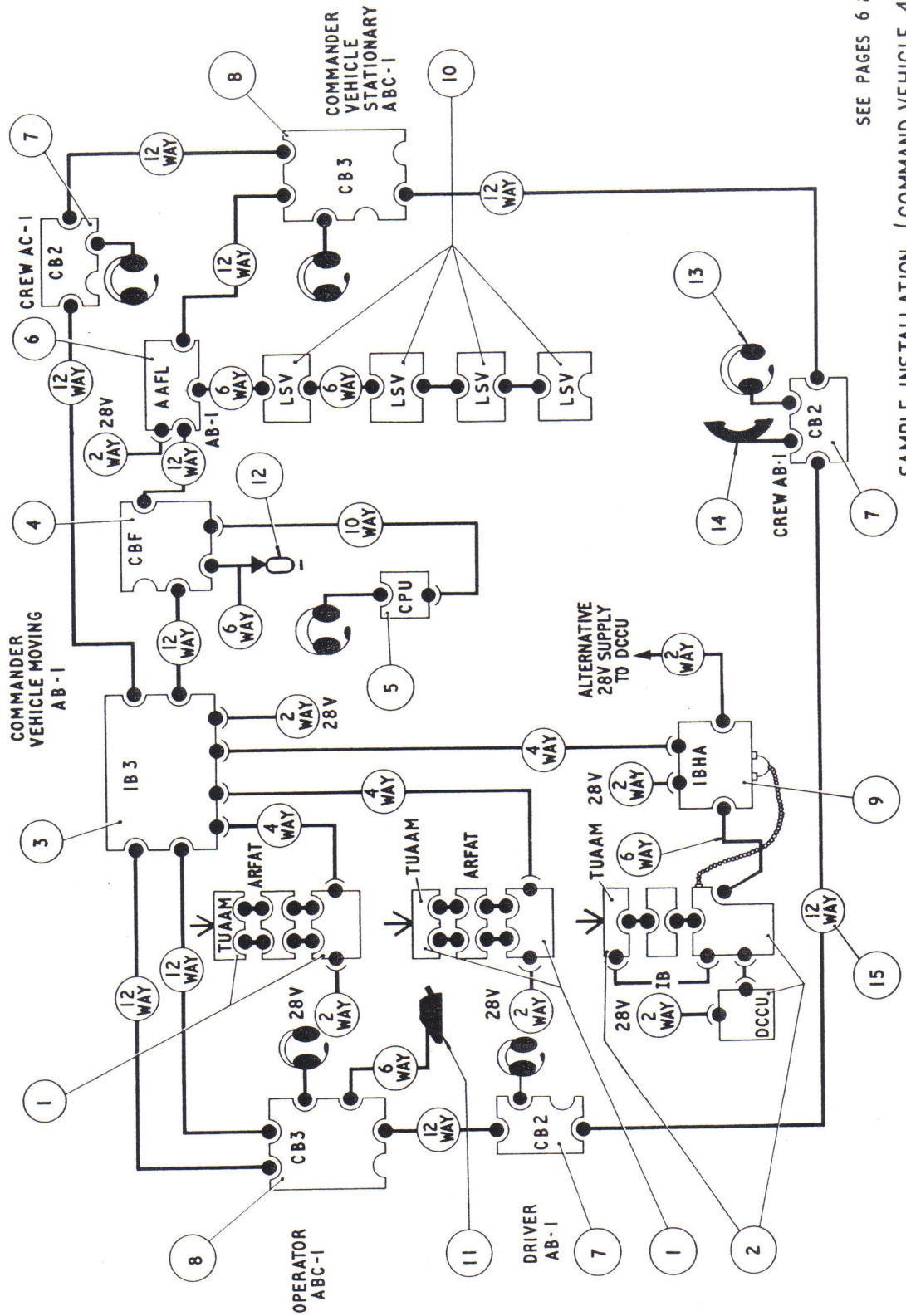
3. ITEMS OF THE HARNESS

In the following pages an illustration and a brief written description of each item is given, and where appropriate, as in the case of an operating box, there is a diagram giving switch positions and related facilities.

Cable assemblies are dealt with, and are referred to by the number of conductors in the cable and its application.

Clansman radio sets and Clansman vehicle installations using the control harness are dealt with in separate handbooks (See associated publications). The actual arrangement of radio sets and harness will be shown in the relevant installation handbook. The drawings on pages 6 to 11, show only one possible arrangement of a 3 radio installation in FV432 and a 2 radio installation in a Chieftain tank.

This handbook does not go into any detail regarding the operation of Clansman radios, but it does refer to the switching of radios in connection with the re-broadcast and remote control facilities that can be provided by the control harness.



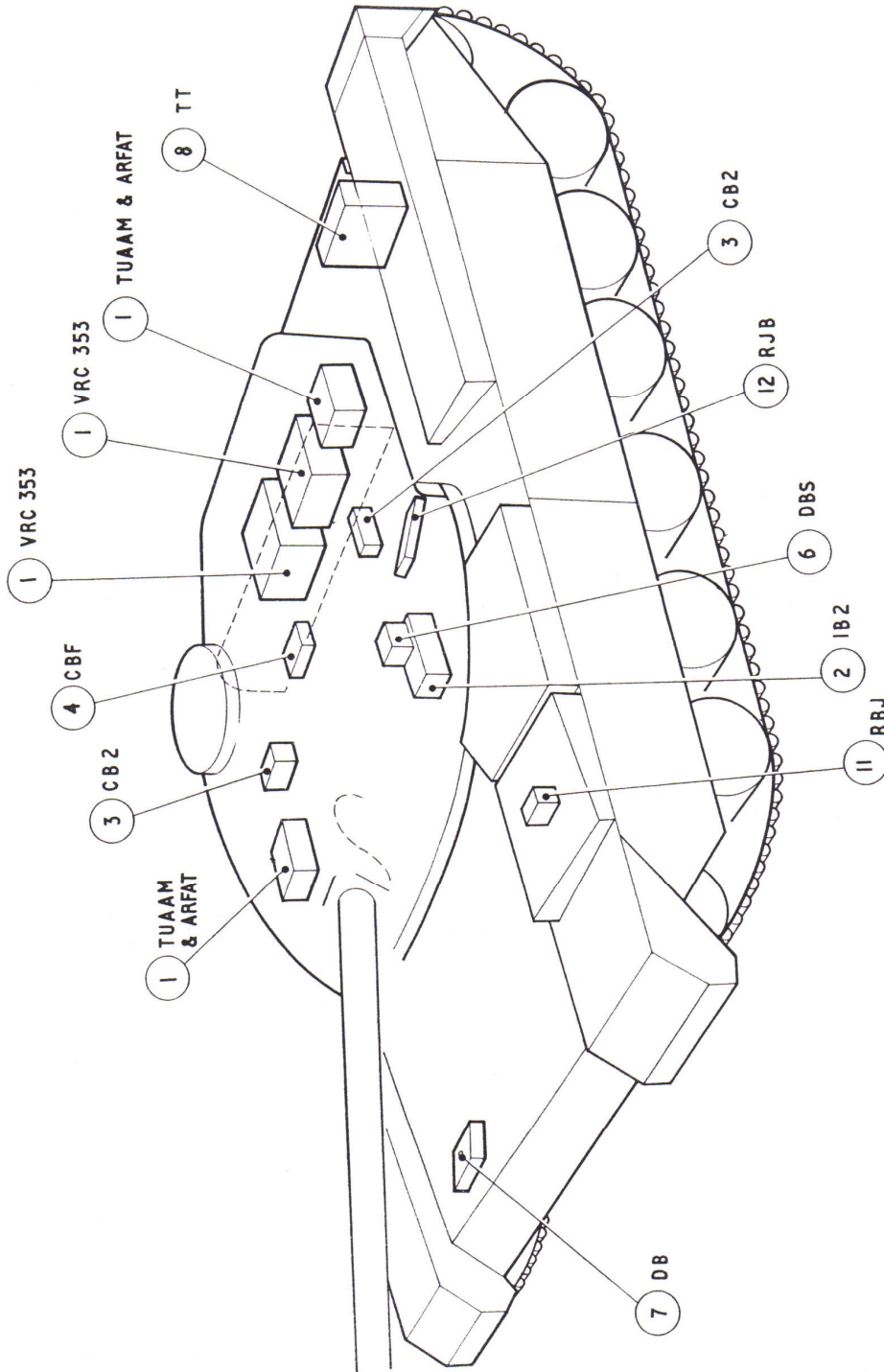
SEE PAGES 6 & 8

SAMPLE INSTALLATION (COMMAND VEHICLE 432)

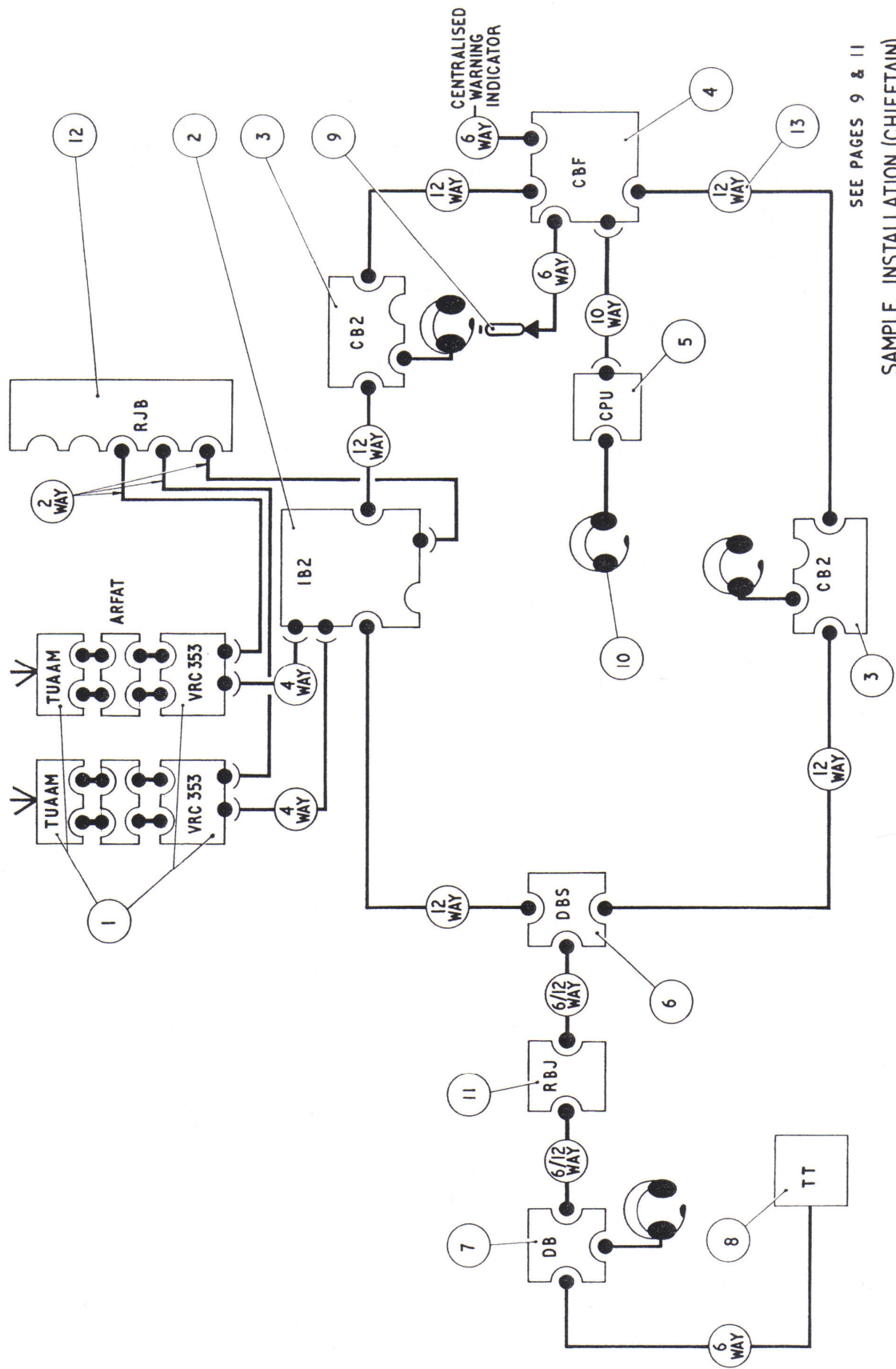
SAMPLE INSTALLATION (COMMAND VEHICLE 432)

ITEM NO	ITEM	
1	VRC 353	Vehicle Radio 353 with Aerial Tuning Unit, and attenuator RF aerial tuning. See User Handbook 61393
2	PRC 351/352	Manpack Radio 351/352 with Aerial Tuning Unit initiator box and DC Charging Unit. See User Handbook 61128
3	IB3	Interconnecting Box 3 Radio Page 29
4	CBF	Commanders Box Fixed Page 16
5	CPU	Commanders Personal Unit Page 16
6	AAFL	Amplifier AF Loudspeaker Page 35
7	CB2	Crew Box 2 Set Page 12
8	CB3	Crew Box 3 Set Page 14
9	IBHA	Interconnecting Box Harness Adaptor Page 32
10	LSV	Loudspeaker PM Vehicle Mounting Page 38
11	KTM	Key Telegraph Manual Page 39
12		Independent Pressel Unit. (This is a foot operated switch, used in parallel with the Headgear Pressel Unit, plugged into a Headgear or Audio Socket).
13		Headgear Page 43
14		Handset Page 45
15		Connector Cables Page 49

Note: For particular installation details see relevant Installation Handbook



SEE PAGES 10 & 11
 SAMPLE INSTALLATION (CHIEFTAIN)



SEE PAGES 9 & 11
 SAMPLE INSTALLATION (CHIEFTAIN)

SAMPLE INSTALLATION (CHIEFTAIN)

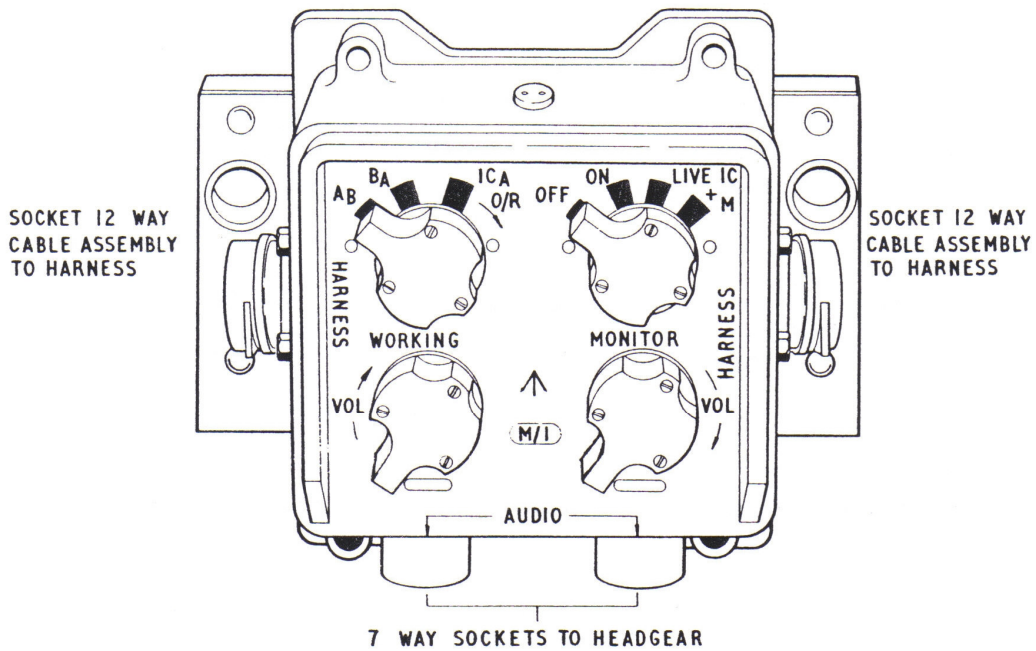
ITEM NO	ITEM	
1	VRC 353	Vehicle Radio 353 with Aerial Tuning Unit, and attenuator RF aerial tuning. See User Handbook 61393.
2	IB2	Interconnecting Box 2 Radio Page 30
3	CB2	Crew Box 2 Set Page 12
4	CBF	Commanders Box Fixed Page 16
5	CPU	Commanders Personal Unit Page 16
6	DBS	Driver's Box Selector Page 20
7	DB	Driver's Box Page 20
8	TT	Tank Telephone Page 40
9		Independent Pressel Unit. (This is a foot operated switch, used in parallel with the Headgear Pressel Unit, plugged into a Headgear or Audio Socket).
10		Headgear Page 43
11	RBJ	Rotary Base Junction. Glossary Item 22
12	RJB	Radio Junction Box Glossary Item 21
13		Connector Cables Page 49

Note: For particular installation details see relevant Installation Handbook.

CONTROL COMMUNICATION SYSTEM

CREW BOX 2 SET

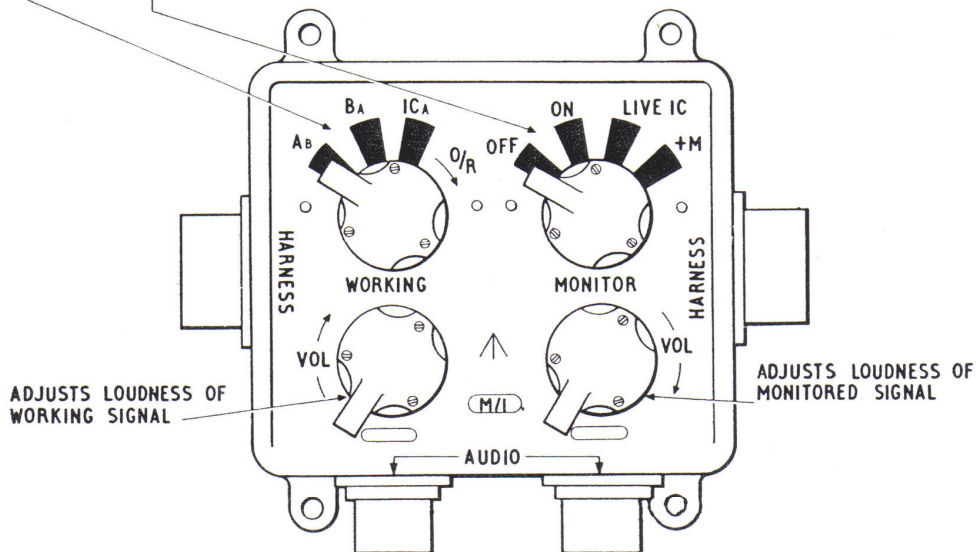
The Crew Box 2 Set (CB2) is the general purpose selection and control box. It enables the user to select and operate one of the two installed Clansman radios and monitor the other and have intercommunication and O/R facilities.



CREW BOX 2 SET

The CB2 provides the following facilities:-

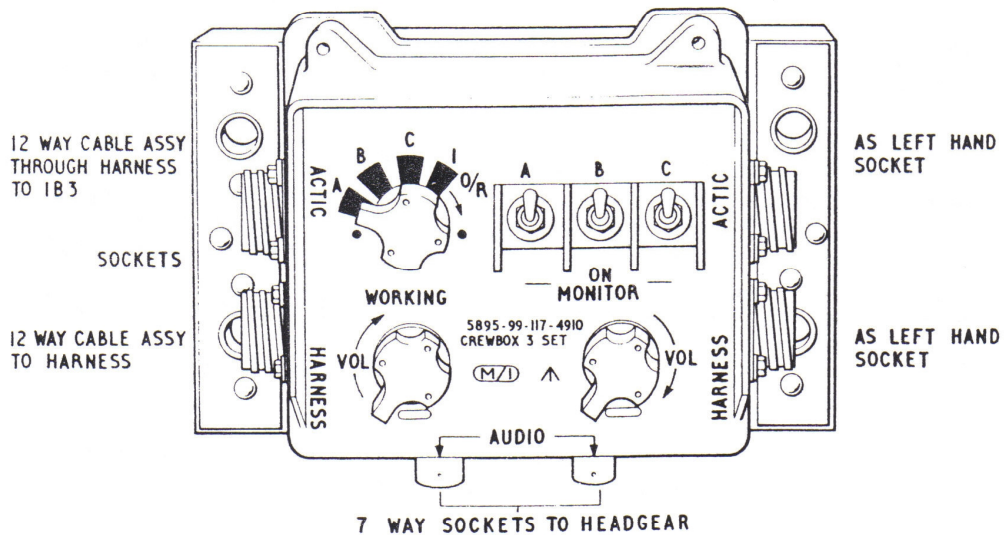
SWITCH POSITION	Facility
A B OFF	Work 'A' set: press to talk: signal in both ears.
A B ON	Work 'A' set: press to talk: signal in left ear. Monitor 'B' set: signal in right ear.
B A OFF	Work 'B' set: press to talk: signal in both ears.
B A ON	Work 'B' set: press to talk: signal in left ear. Monitor 'A' set: signal in right ear.
ICA OFF	Intercomm: press to talk: signal in both ears.
ICA ON	Intercomm: press to talk: signal in left ear. Monitor 'A' set: signal in right ear.
O/R (OVER-RIDE SPRING LOADED)	Voice call without use of pressel: heard by all crew members. Revert to IC _A for subsequent communication.
A B OR B A LIVE IC	O/R from any other control box in the harness replaces the signal in the CB2 operator's right ear, irrespective of any switch settings. The loudness of the O/R will depend on the MONITOR - VOL setting.
A B OR B A +M	Microphone live with reduced output - talk on IC: monitor IC in right ear. Press to transmit on selected 'A' or 'B' set, signal in left ear. As above with addition of monitored set at reduced level also in right ear.



CONTROL COMMUNICATION SYSTEM

CREW BOX 3 SET

The Crew Box 3 Set (CB3) is used in the special case of a 3 radio installation (Page 7) and is used in conjunction with the interconnecting Box 3 Radio (IB3, Page 29). It enables the user to select and operate one of three installed Clansman radios, to have intercommunication and O/R facilities, with the ability to simultaneously monitor one, two or all three of the installed radios.

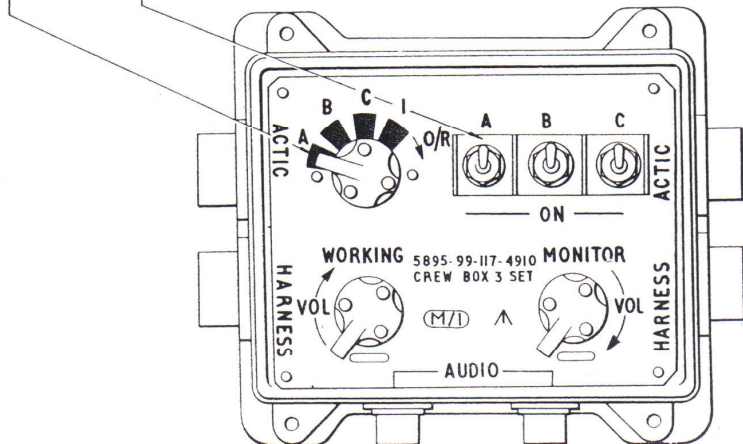


CREW BOX 3 SET

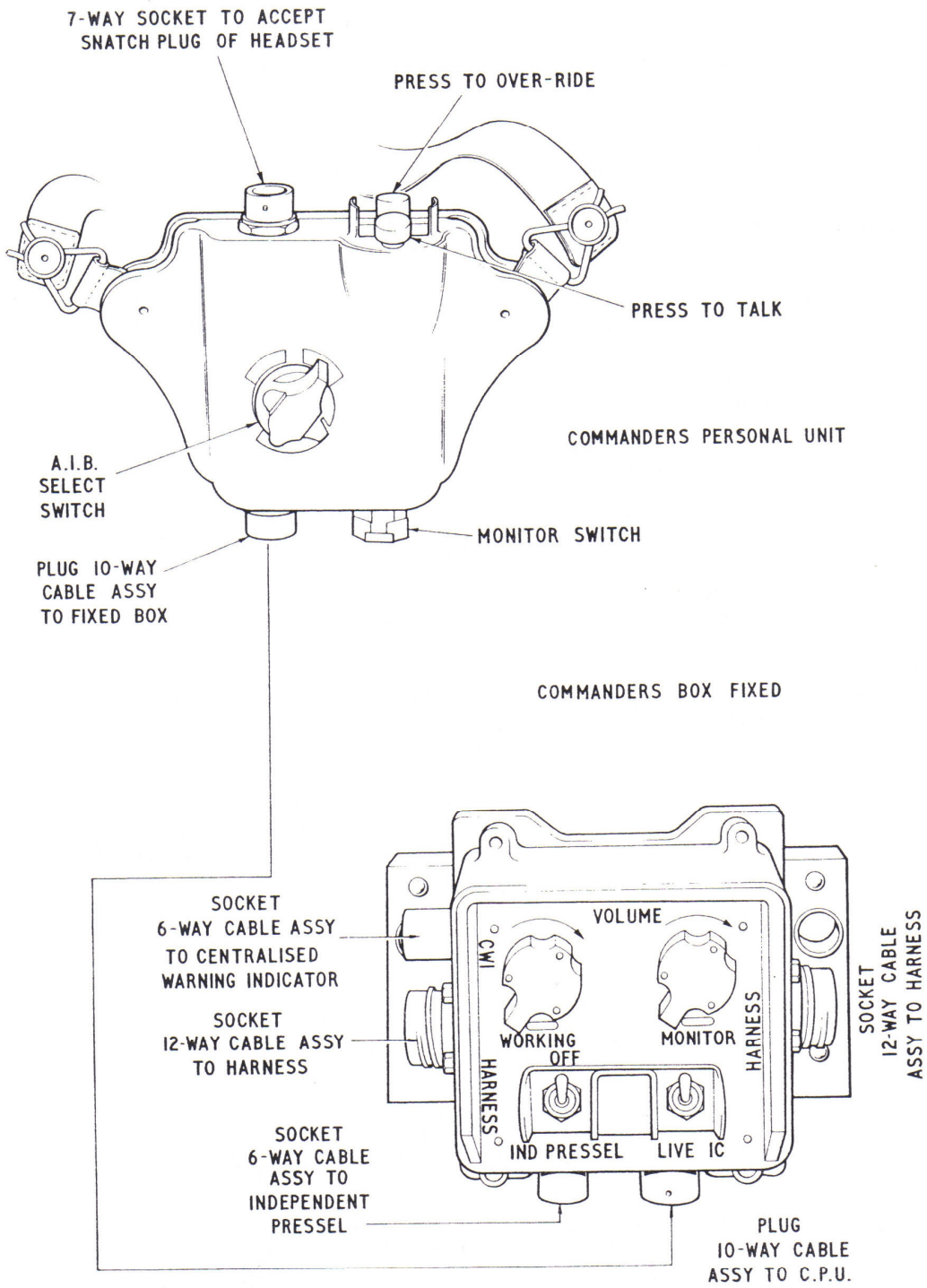
The CB3 provides the following facilities:-

SWITCH POSITION	Facility
A, B OR C - OFF	Work selected A, B or C set: press to talk: signal in both ears.
A OR B - C ON	Work selected A or B set: press to talk: signal in left ear. Monitor C set: signal in right ear.
B OR C - A ON	Work selected B or C set: press to talk: signal in left ear. Monitor A set: signal in right ear.
A OR C - B ON	Work selected A or C set: press to talk: signal in left ear. Monitor B set: signal in right ear.
A OR B - A AND B ON	Work selected A or B set: press to talk: signal in left ear. Monitor other set: signal in right ear.
A - B AND C ON	Work selected 'A' set: press to talk: signal in left ear. Monitor B and C signal in right ear.
I - OFF	Intercomm: press to talk: signal in both ears.
I - A, B OR C ON	Intercomm: press to talk: signal in left ear. Monitor A, B or C set: signal in right ear.
I - A, B AND C ON	Intercomm: press to talk: signal in left ear. Monitor A, B and C sets: signal in right ear.
O/R (OVER-RIDE SPRING LOADED) - OFF/A B OR C	O/R to all crew members without use of pressel. Microphone automatically made live. Revert to I for subsequent communication.

O/R from any other control box in the harness replaces the signal in the CB3 operator's right ear, irrespective of any switch settings. The loudness of the O/R will depend on the MONITOR - VOL setting.



CONTROL COMMUNICATION SYSTEM



CONTROL COMMUNICATION SYSTEM

COMMANDER'S BOX FIXED AND PERSONAL UNIT

The Commander's Boxes comprise a Fixed Box installed in the vehicle and a Personal Unit carried by the commander. These boxes are always used together and are connected by a 2m or 10m flexible lead. They are intended for use in a 2-radio installation.

The Fixed Box is mounted on flexible belting which fits standard two-stud fixing.

The Personal Unit is carried by webbing around the commander's neck. A standard Clansman headset is used. Webbing and headset cable are fitted with snatch release devices.

The boxes together provide facilities similar to those of the Crew Box 2 Set. The imperative controls, such as radio selection, press to talk and over-ride are carried in the Personal Unit.

An independent pressel may be plugged into the Fixed Box and it is in parallel with the press to talk button on the Personal Unit. When not in use, the IND PRESSEL switch should be off, to prevent accidental operation.

In certain armoured vehicles, a Centralised Warning Indicator (CWI) at the commanders position gives visual warning of failures and incidents. It is connected into the harness at the Commander's Fixed Box, and in parallel with the warning light, operates the over-ride and feeds a high-pitched bleeping note to the right ear of harness users. The warning note is fed to all crew members.

COMMANDER'S FIXED BOX AND PERSONAL UNIT

The Commander's Boxes provide the following facilities:-

SWITCH POSITIONS			
PERSONAL UNIT		FIXED BOX	
A	OFF	NORMAL	OFF
B	OFF	NORMAL	OFF
I	OFF	NORMAL	OFF
A	MON	NORMAL	OFF
B	MON	NORMAL	OFF
I	MON	NORMAL	OFF

Facility

Work 'A' set: press to talk: signal in both ears.

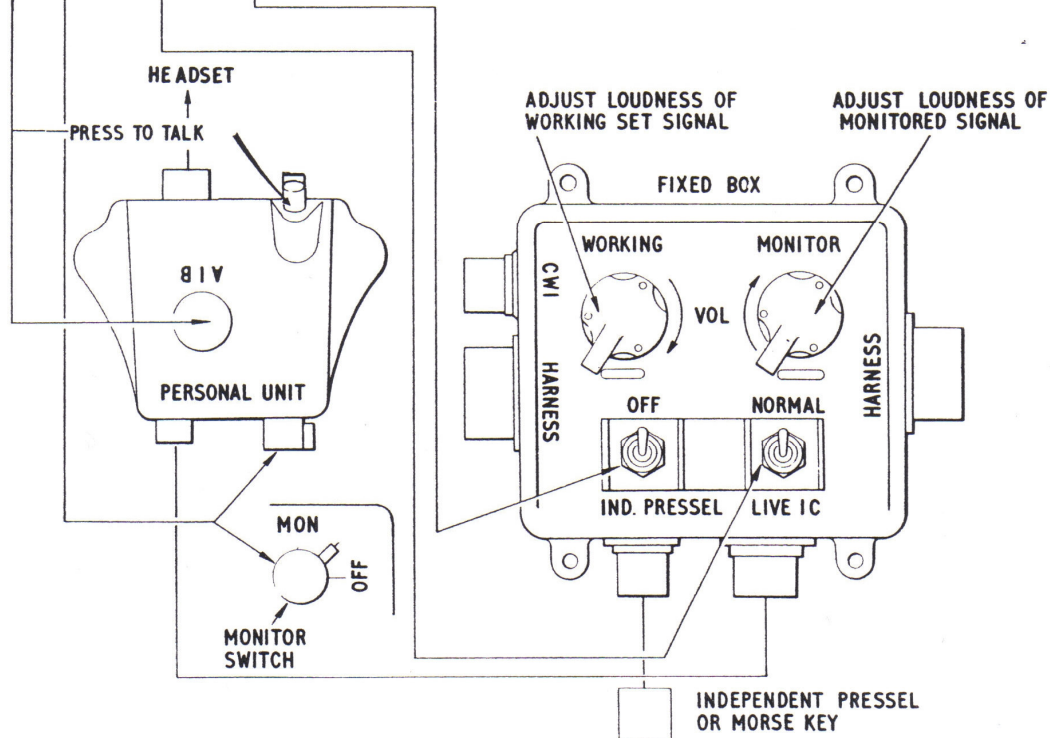
Work 'B' set: press to talk: signal in both ears.

IC: press to talk: signal in both ears.

Work 'A' set: press to talk: signal in left ear. Monitor 'B' set: signal in right ear.

Work 'B' set: press to talk: signal in left ear. Monitor 'A' set: signal in right ear.

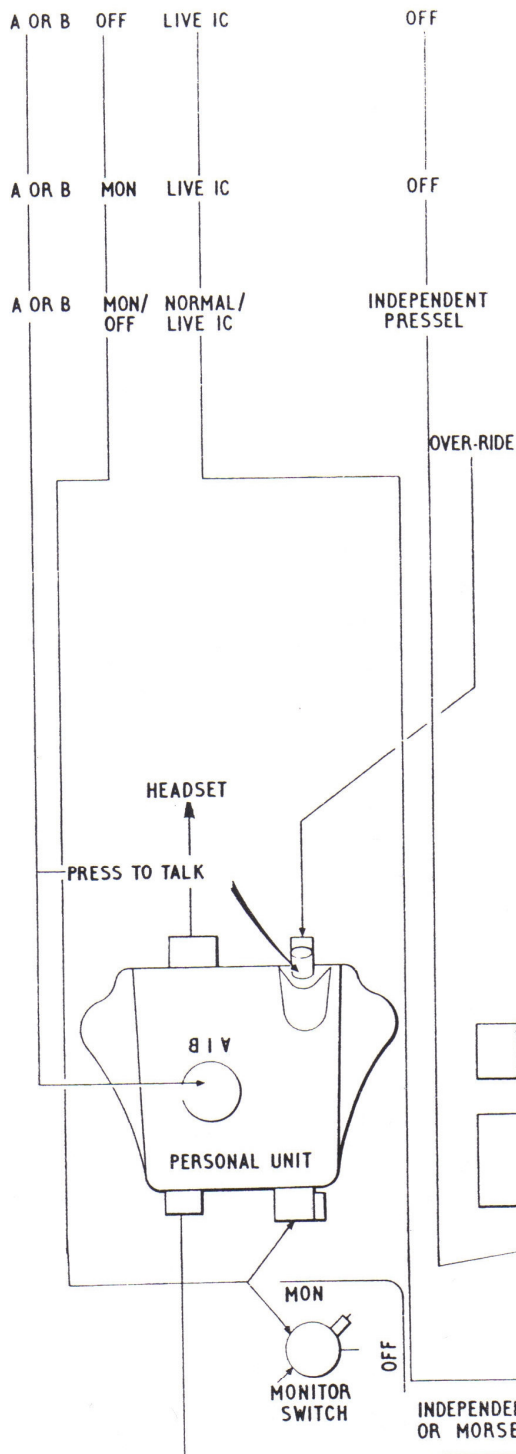
IC: press to talk: signal in left ear. Monitor 'A' set: signal in right ear.



COMMANDER'S FIXED BOX AND PERSONAL UNIT continued

SWITCH POSITION

Facility



IC without use of pressel:
Monitor IC in right ear. Press
to talk on selected A or B set:
Signal in left ear: Monitored
IC remains in right ear.

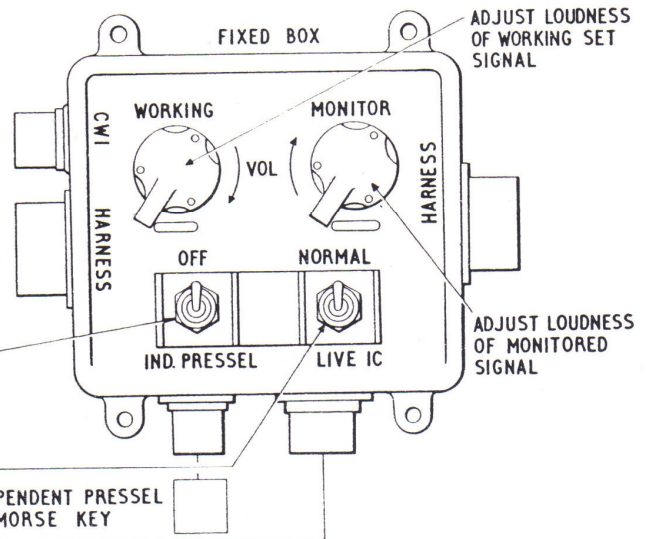
As above with the addition of
monitored set at reduced level
also in right ear.

Separate pressel or morse key,
in parallel with press to talk
button on Personal Unit. Switch
OFF when not used.

IC: breaks in on all crew
members. Microphone automatically
made live.

O/R from any other control box
in the harness replaces the signal
in the commander's right ear,
irrespective of any switch settings.
The loudness of the O/R will
depend on the MONITOR - VOLUME
setting on the Fixed Box.

Alarm Audible alarm from Centralised
Warning Indicator heard in right
ear irrespective of any switch
positions.



INTERCONNECTING BOX DRIVER'S BOX AND DRIVER'S BOX SELECTOR

In installation where intercommunication facilities only are required, the Driver's Box (DB) is used by itself.

The IC facilities provided by the Driver's Box are given on Page 21.

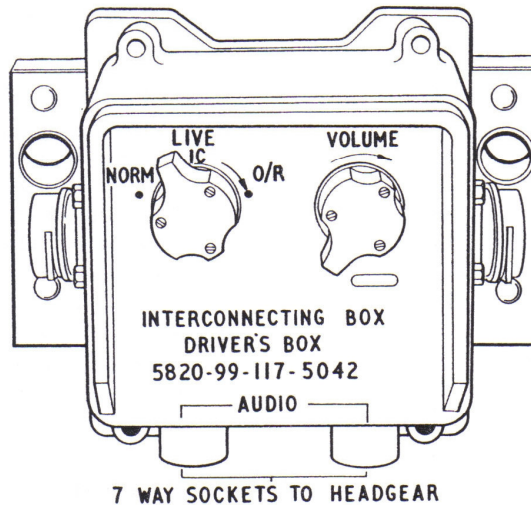
In a turreted vehicle with a minimum of 5 connections available via the Rotary Base Junction (RBJ), and where the driver requires radio selection and monitoring facilities in addition to IC, the Drivers Box (DB) is connected through the RBJ to a Driver Box Selector (DBS).

The Driver's plus Driver's Selector Boxes jointly provide the facilities of a Crew Box 2 Set (Page 12). The switching and facilities provided are given on Page 22.

The Driver's Selector Box is fitted with a lamp, which lights when the selector is switched to I or I_A.

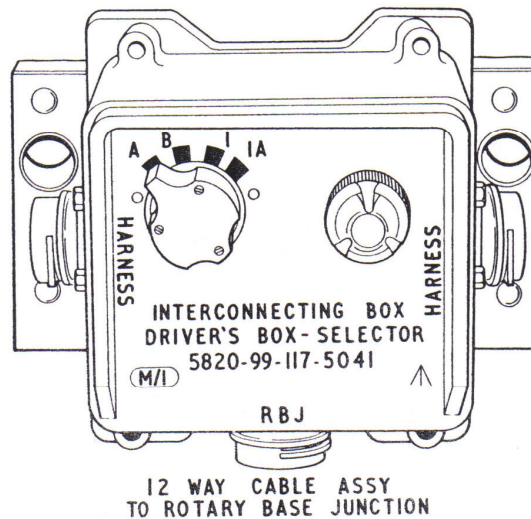
The Tank Telephone (Page 40), when installed, normally connects into the Driver's Box.

SOCKET
12 WAY CABLE ASSY
TO HARNESS
ROTARY BASE JUNCTION
OR TANK TELEPHONE



SOCKET
12 WAY CABLE ASSY
TO HARNESS
ROTARY BASE JUNCTION
OR TANK TELEPHONE

SOCKET
12 WAY CABLE ASSY
TO HARNESS

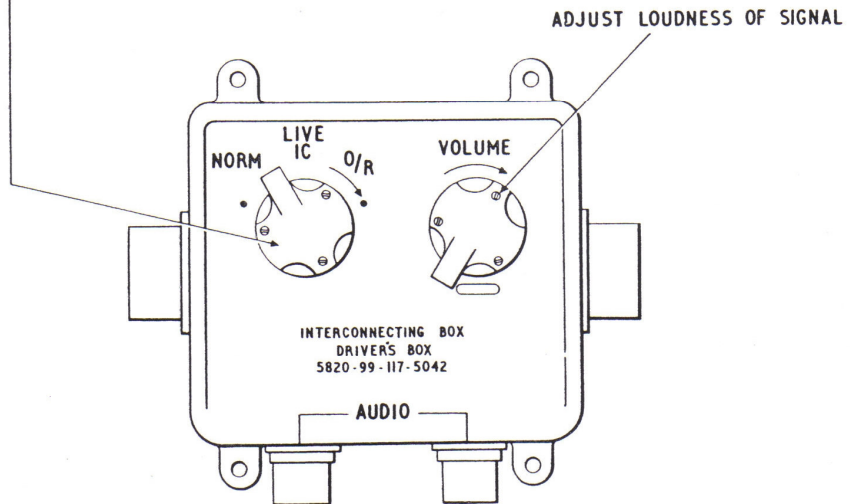


SOCKET
12 WAY CABLE ASSY
TO HARNESS

DRIVER'S BOX

The Driver's Box provides the following IC facilities:

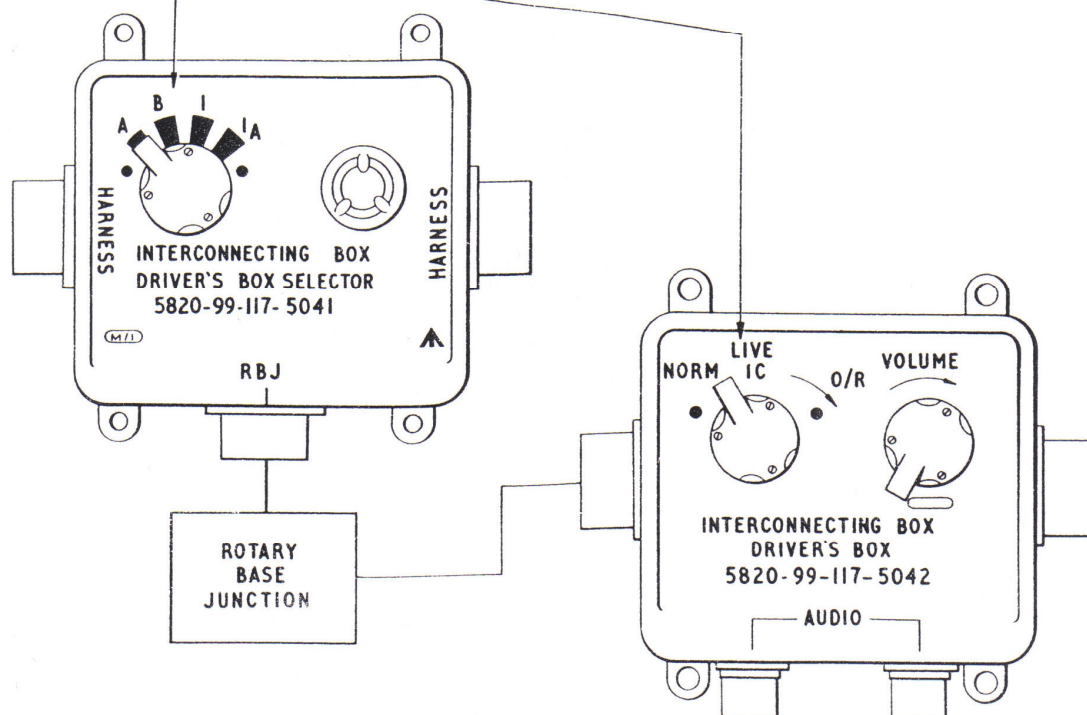
SWITCH POSITION	Facility
NORM	Intercomm: press to talk: signal in both ears.
LIVE IC	Intercomm: microphone live: signal in both ears.
O/R (OVER-RIDE SPRING LOADED)	O/R to all crew members without pressel: signal in both ears. Switch to LIVE IC or NORM for subsequent communication. O/R from any other control box in the harness, or a call from the Tank Telephone, replaces the intercomm signal in both ears. The loudness of the O/R will depend on the VOLUME setting.



DRIVER'S BOX AND DRIVER'S BOX SELECTOR

The Driver's Box Selector can be used only in conjunction with a Driver's Box. The boxes together provide the following facilities:-

SWITCH POSITION	Facility
A	NORM Work 'A' set: press to talk: signal in both ears.
B	NORM Work 'B' set: press to talk: signal in both ears.
I	NORM OR LIVE IC IC FACILITIES AS FOR DRIVER'S BOX) I and I _A Page 21: signal in both ears.) switch
I _A	NORM OR LIVE IC IC FACILITIES AS FOR DRIVER'S BOX) positions Page 21: signal in both ears.) cause Monitor 'A' set: signal in both) warning lamp ears at reduced level.) to light.
A OR B	LIVE IC As A or B - NORM above. The microphone is not live when radio working is selected.
ANY	O/R O/R to all crew members without use of pressel. Switch Driver's Box Selector to I or I _A for subsequent communication. O/R from any other control box in the harness, or a call tone from the Tank Telephone, replaces the signal in both ears. On receipt of a call tone from the Tank Telephone, the DBS must be set to I or I _A before <u>any</u> crew box in harness can communicate with the Tank Telephone.



REMOTE PERSONAL UNIT

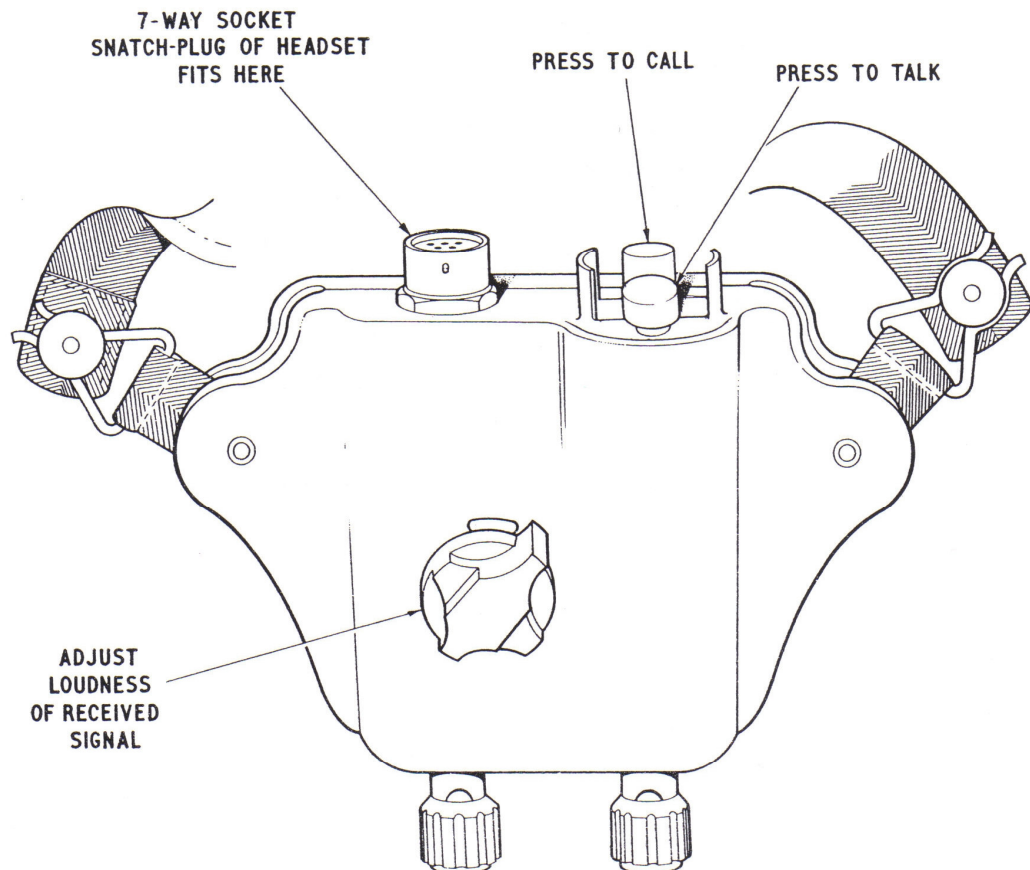
The Remote Personal Unit permits the operation of Clansman radios, and call and IC with an operator at the radio, at distances of up to 3 km (2 miles) over D10 cables or 5 km (3½ miles) over one pair of CT10 cable. It is intended primarily for use with ear defending or head protecting headgear so that the user need not remove his headgear when remote use is required.

The cable is connected between the terminals on the unit and the REMOTE terminals on the radio, or the REMOTE terminals on the Interconnecting Box 2 Radio in an Installation.

The unit is carried by webbing around the neck of the user and the headset plugs into it. Both webbing and headset cable are fitted with snatch release devices.

The unit contains a transistor amplifier to increase the signal power to the line and to provide a locally generated side tone. The amplifier obtains its DC supply along the cable from the radio or IB2.

When the CALL button is pressed, a tone is generated within the connected working radio, which is heard by the local operator and, if the radio is in harness, by any crew member who has selected that radio as the Working or Monitor Set. Similarly, if connected to the line terminals of an IB2 switched to I REM a tone will be heard by all crew members who have selected I.



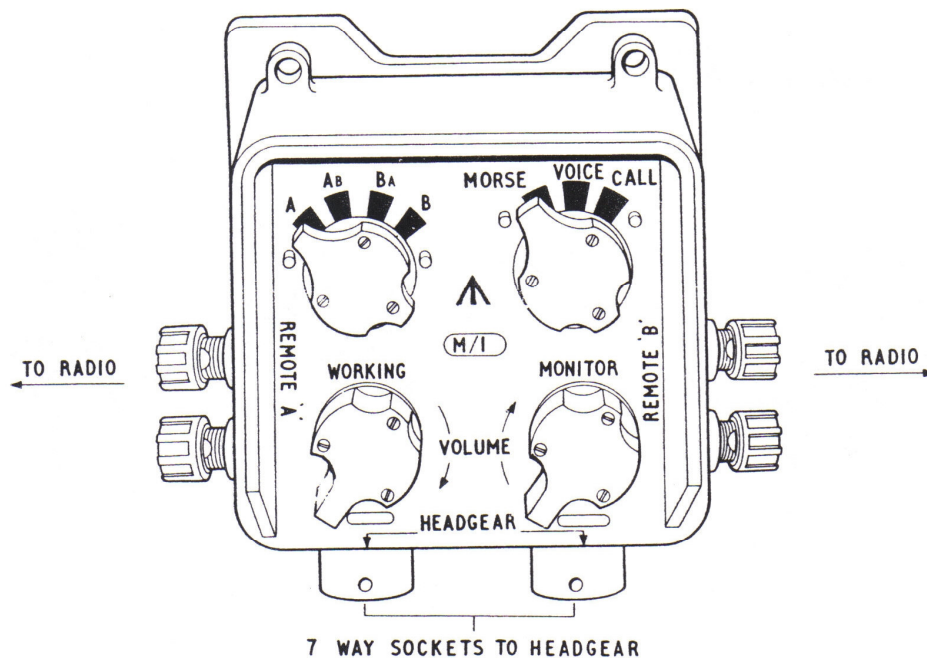
CONTROL RADIO SET

REMOTE COMBINING UNIT

The Remote Combining Unit (RCU) permits one of two remote Clansman radios to be selected and used on voice or morse as appropriate; and a second radio to be monitored, at distances of up to 3 km (2 miles) over D10 cable, or 5 km (3½ miles) over one pair of CT10 cable.

The RCU contains a transistor amplifier to increase the signal power to the line and to provide a locally generated side tone. The amplifier obtains its DC supply along the line from the radio or harness.

When switched to CALL, a tone is generated within the connected working radio, which is heard by the local operator, and if the radio is in harness, by any crew member who has selected that radio as the Working or Monitor Set.



REMOTE COMBINING UNIT

The RCU is used as follows:-

To a 2 radio Installation

The line is connected to the Interconnecting Box 2 Radio (IB2) (See Appendix A).

Morse or voice as appropriate, are available on either installed radio, together with IC and CALL within the harness, as determined by the IB2 switch positions.

To any Clansman Radio (Except PRC-320) - No Harness

The line is connected direct to terminals on the radio.

Morse or voice as appropriate are available on radio; and IC and CALL with the local operator.

To PRC-320, No Harness

The line is connected to the radio through the Remote Control Local Unit (RCLU). The RCLU is part of the PRC-320 system.

Morse or voice are available on radio, and IC and CALL with the local operator.

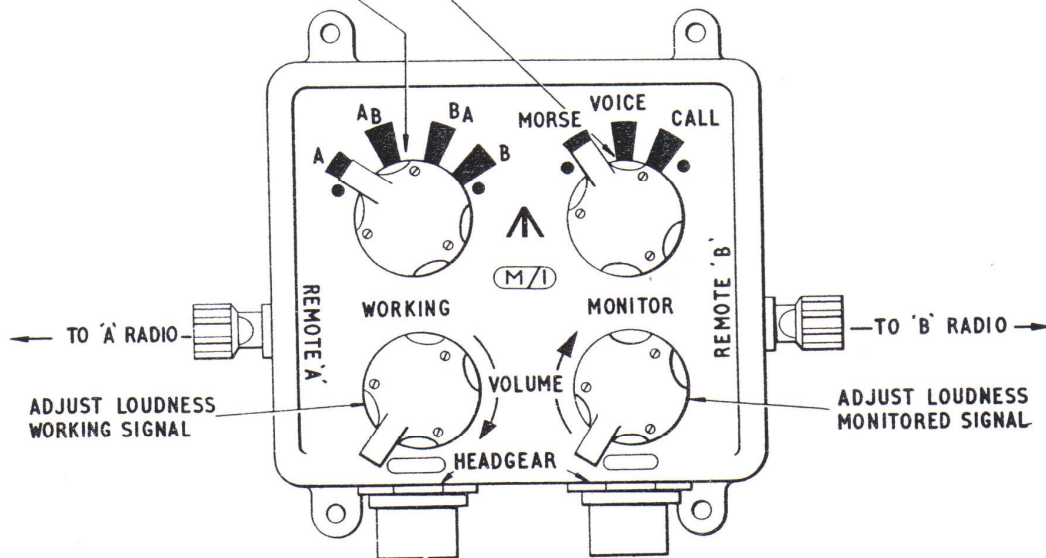
REMOTE COMBINING UNIT

The Remote Combining Unit provides the following facilities:-

SWITCH POSITION	Facility
A *MORSE/VOICE	Work 'A' set: signal in both ears.
AB MORSE/VOICE	Work 'A' set: signal in left ear: Monitor 'B' set: signal in right ear.
BA MORSE/VOICE	Work 'B' set: signal in left ear: Monitor 'A' set: signal in right ear.
B MORSE/VOICE	Work 'B' set: signal in both ears.
ANY CALL (SPRING-LOADED)	CALL tone heard by local operator of selected working set, who will switch to IC to reply. Remote operator then switches to VOICE for subsequent communication.

*MORSE. HF radio only. Press key to send
Release key to receive.

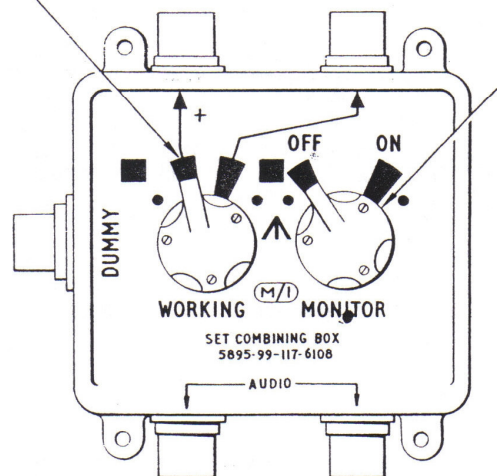
VOICE. Press pressel to send; release to receive.



SET COMBINING BOX

The Set Combining Box provides the following facilities:-

SWITCH POSITION	Facility
VRC/PRC OFF	Work selected set: press to talk: signal in both ears.
VRC/PRC ON	Work selected set: press to talk: signal in left ear. Monitor other set: signal in right ear.



INTERCONNECTING BOX 3 RADIO

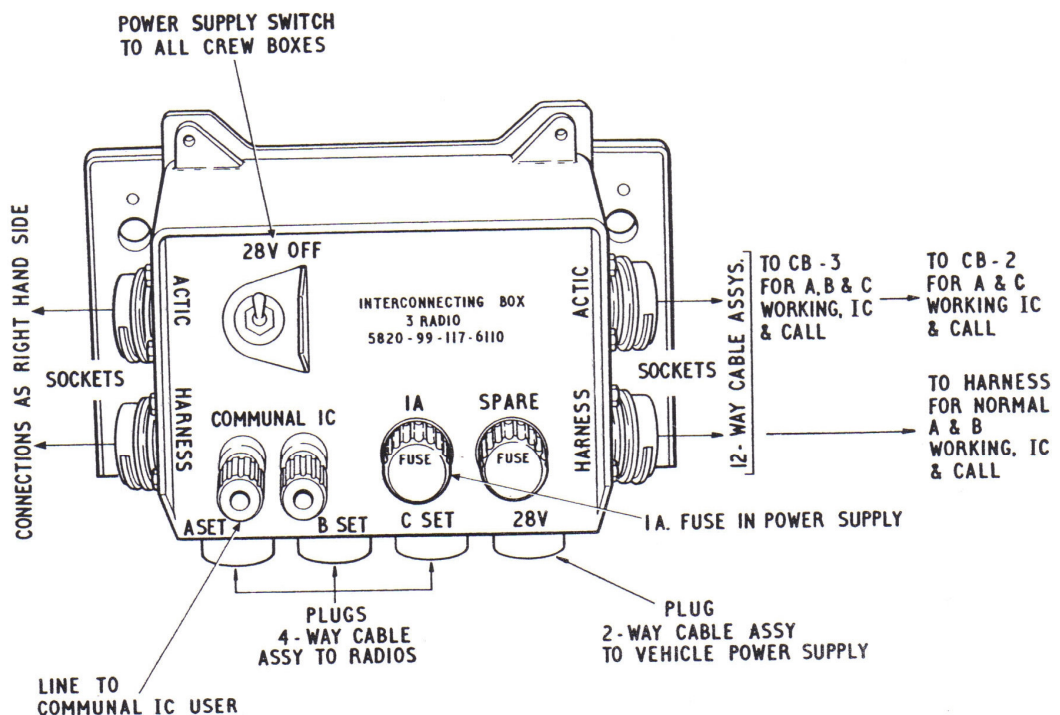
The Interconnecting Box 3 Radio (IB3) is a junction and power supply unit for harness items in installations of up to 3 radios, where rebroadcast facilities are not important.

The IB3 connects the radios into the harness so that:-

1. A, B or C radio, IC or O/R may be selected and operated from a Crew Box 3 Set connected to the Harness and ACTIC sockets on the IB3.
2. Normal A or B radio, IC or O/R may be selected and operated from any 2 radio control box connected to the HARNESS socket on the IB3.
3. A or C radio, IC or O/R (A, C, together with IC - ACTIC) may be selected and operated from a 2 radio control box connected to the ACTIC socket on the IB3. The operator will read C for B on the control box selector switch.

The IB3 does not provide remote control or rebroadcast facilities. These must be met by connections outside the harness to the remote terminals on the radios. However, line terminals are provided for communal IC purposes.

28 volts DC is fed from the vehicle supply into the box where it is switched and fused and fed out to the harness items. The IB3 does not supply power to the radios, Amplifier A.F. Loudspeaker, Emergency Crew Control boxes or to the Centralised Warning Indicator system.



INTERCONNECTING BOX 2 RADIO

The Interconnecting Box 2 Radio (IB2) is used in 2 radio installations and is a combined control, junction and power supply unit for harness items.

It contains an IC amplifier and acts as the inlet and outlet to the main harness for radios, remote users and communal IC users.

It enables the two installed radios, or one installed radio and a remote radio to be connected for manual or auto rebroadcast, as appropriate; or a remote user to be connected into the harness to use an installed radio or talk to the crew using IC. These facilities are controlled by an operator whose headset is plugged into the IB2.

28 volts DC is fed into the box from the vehicle supply, and a regulated 18 volts is distributed to all crew boxes. The harness is protected by a 1 amp fuse in the IB2. The IB2 does not supply power to the radios, Amplifier A.F. Loudspeaker or Emergency Crew Control boxes, or the Centralised Warning Indicator system.

The IB2 and its connections are shown opposite.

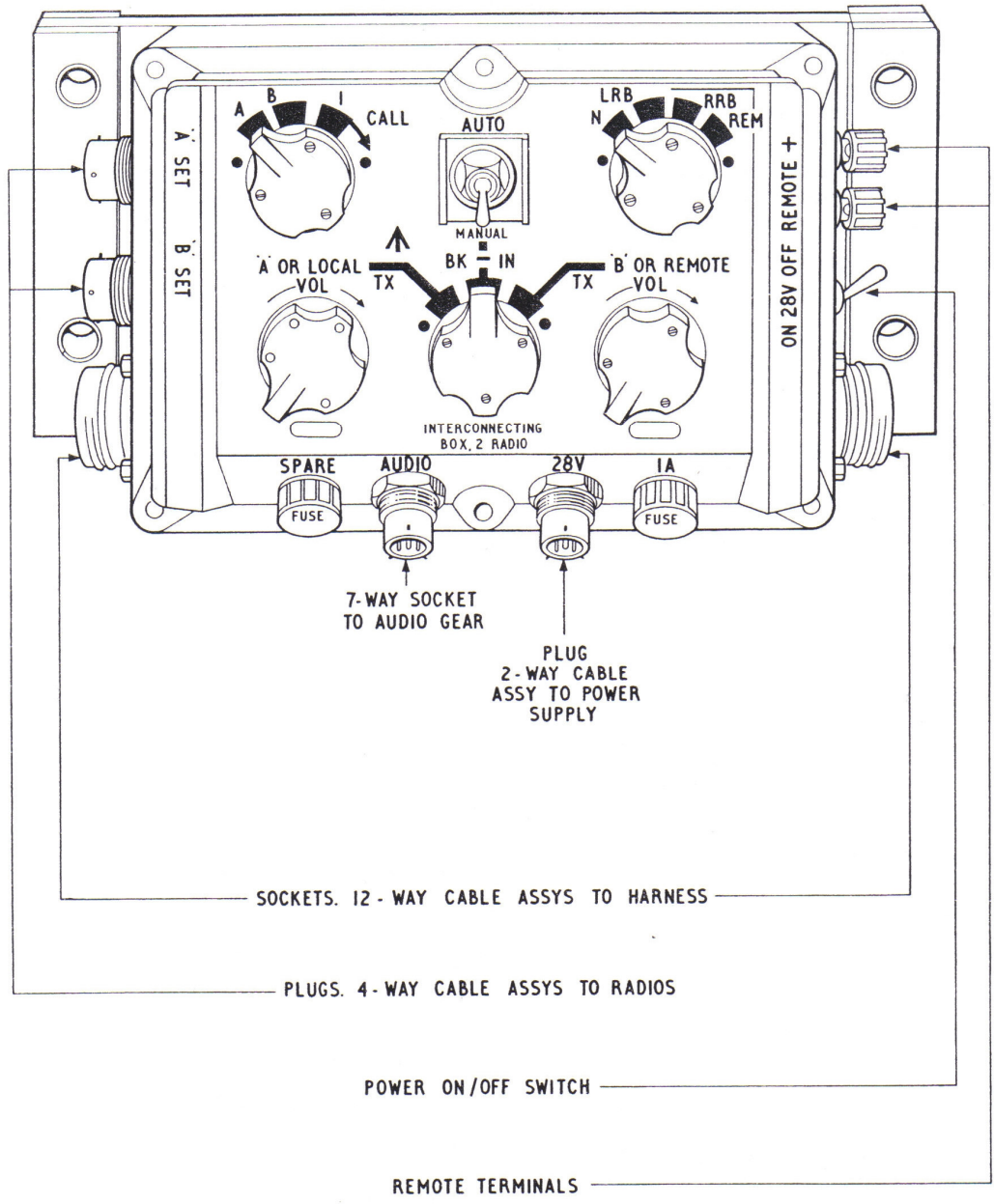
OPERATING NOTE

For normal harness use, switch 28V ON, and right hand switch to N (Normal), and switch the radios as follows:-

HF radios (RAB or Clansman) to REM
VHF radios (RAB or Clansman) to AUTO

If an interfering signal is received by a VHF radio switched to AUTO, it will not be possible for that radio to transmit without first switching it to REM.

See Appendix A for the details of the controls and complete facilities provided by the IB2.



INTERCONNECTING BOX HARNESS ADAPTOR

The Harness Adaptor Box (HAB) adapts the Clansman manpack radio PRC-320 or PRC-351/352 for connection into the harness system, and provides control and rebroadcast through the harness, as if the manpack radio was a vehicle radio. The unit also contains an amplifier which raises the audio output level of the manpack radio to that of a vehicle radio harness output.

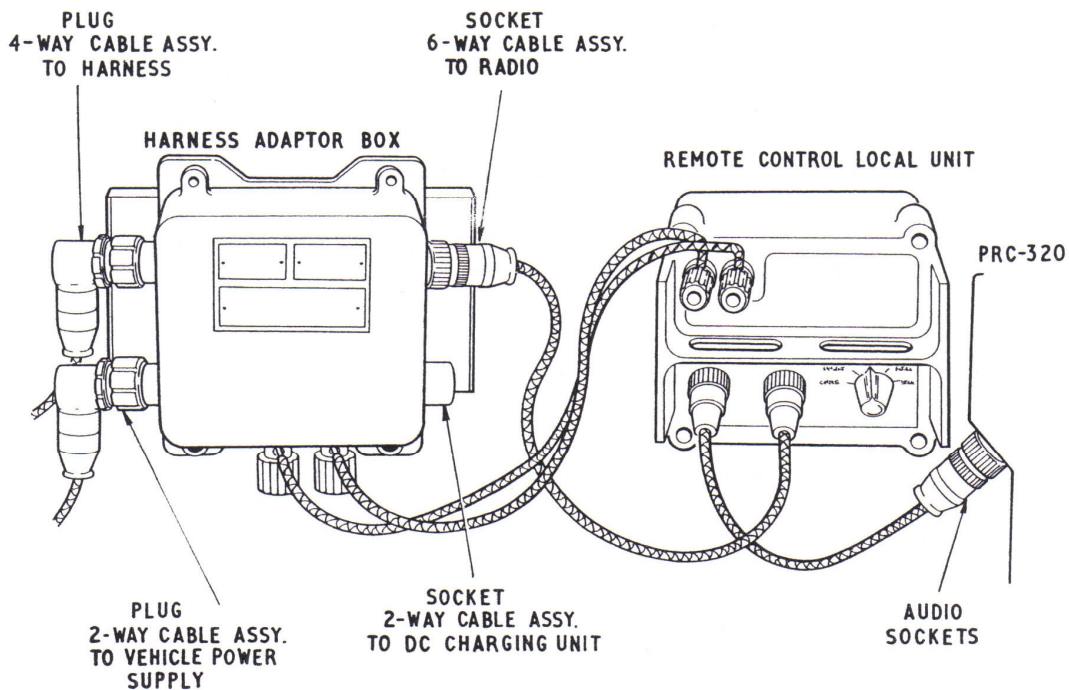
The radio is powered from its own battery, which may be float charged from a DC Charging Unit. The DC Charging Unit can obtain its 28V supply through the Harness Adaptor.

PRC-320

The Harness adaptor is used in conjunction with the Remote Control Local Unit of the PRC-320, and is connected as shown below. The Remote Control Local Unit will be switched to REM.

The normal selection and operation of the radio is available from control boxes in the harness.

Manual, local or remote rebroadcast, is possible through the Interconnecting Box 2 Radio.



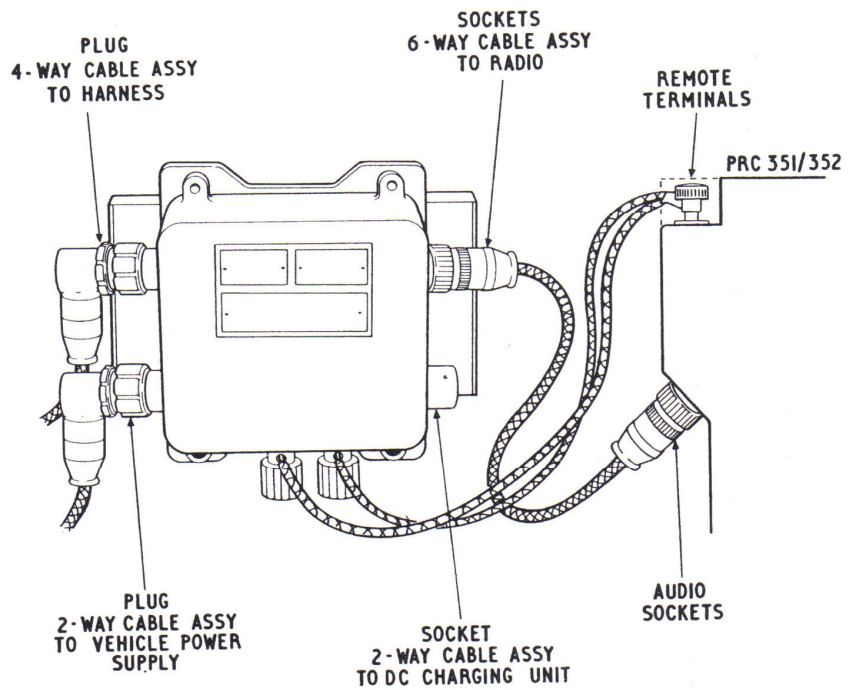
INTERCONNECTING BOX HARNESS ADAPTOR continued

PRC-351/352

The normal selection and operation of the radio is available from control boxes in the harness. The radio will be switched to REM.

Manual or auto, local or remote rebroadcast is possible through the interconnecting Box 2 Radio. The radio will be switched to REM for manual rebroadcast and to AUTO for auto rebroadcast, as for any other VHF radio.

The PRC-351/352 to Harness Adaptor connections are shown below.



RADIO ADAPTOR BOX (LARCH)

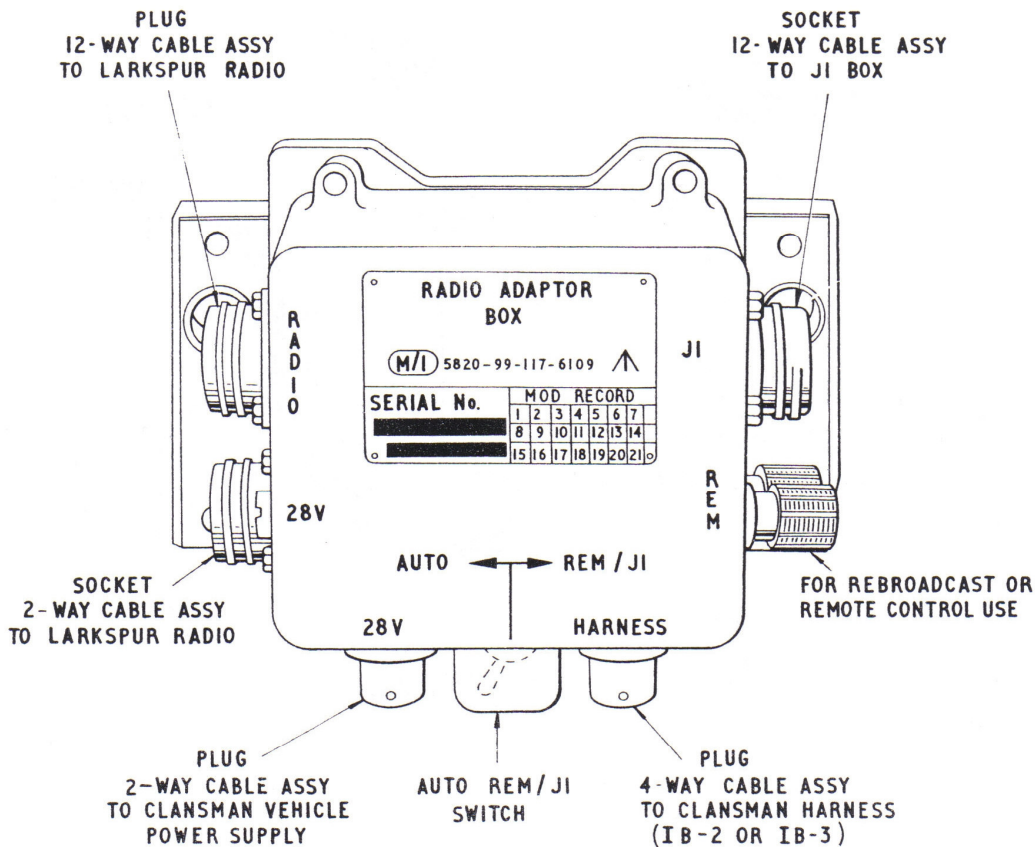
The Radio Adaptor Box (Larkspur to Clansman Harness Adaptor Box - LARCH) is not a true item of Clansman harness, but permits Larkspur radios (SR.C11, C13; SR.B47, B48; SR.C42, C45) to be used to their full potential in Clansman harness.

The toggle switch marked AUTO REM/J1 is used as follows:

AUTO For normal harness use or when carrying out rebroadcast from the harness or the REMOTE terminals.

REM/J1 For when the J1 box is connected or when an interfering signal received by a VHF radio prevents transmission in the AUTO position.

NOTE:- If the REMOTE terminals are used for carrying out local rebroadcast with a VRC-353 in an installation which includes a Crew Box 3 Set, an undesirable audio tone will be produced if the monitor switches of the CB3 appropriate to the sets in use for rebroadcast are operated when the VRC-353 is switched for 'Break-In' operation. To prevent this malfunction do not monitor either set at a CB3 when the VRC-353 is switched for 'Break-In'.



AMPLIFIER AF LOUDSPEAKER

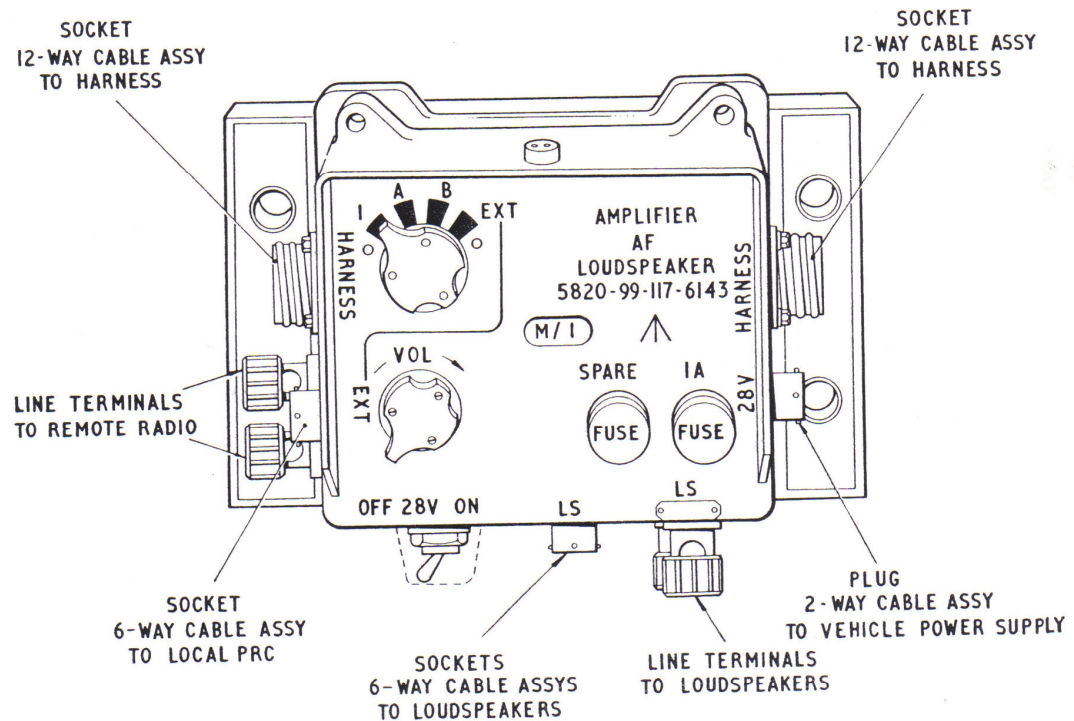
The Amplifier AF Loudspeaker (AAFL) connects into the main harness distribution ring and amplifies the selected A, B radio or IC signal sufficiently to drive four loudspeakers (Vehicle Mounting or Free Standing).

A radio may be connected into the system at EXT INPUT; a local radio into the PRC socket, or a remote radio into the terminals; and its output broadcast by switching to EXT.

An over-ride signal from any harness box replaces the selected signal.

By modifying the circuit in the box, the AAFL can be made suitable for use with an induction loop. The loop is used inside or outside the vehicle and it permits crew members working near it, carrying an existing induction receiver and wearing headphones, to receive signals without being connected to the harness by cable. When the AAFL is used this way, the LS label is changed to read OP.

The 28V DC power supply to the AAFL is obtained direct from the vehicle supply.



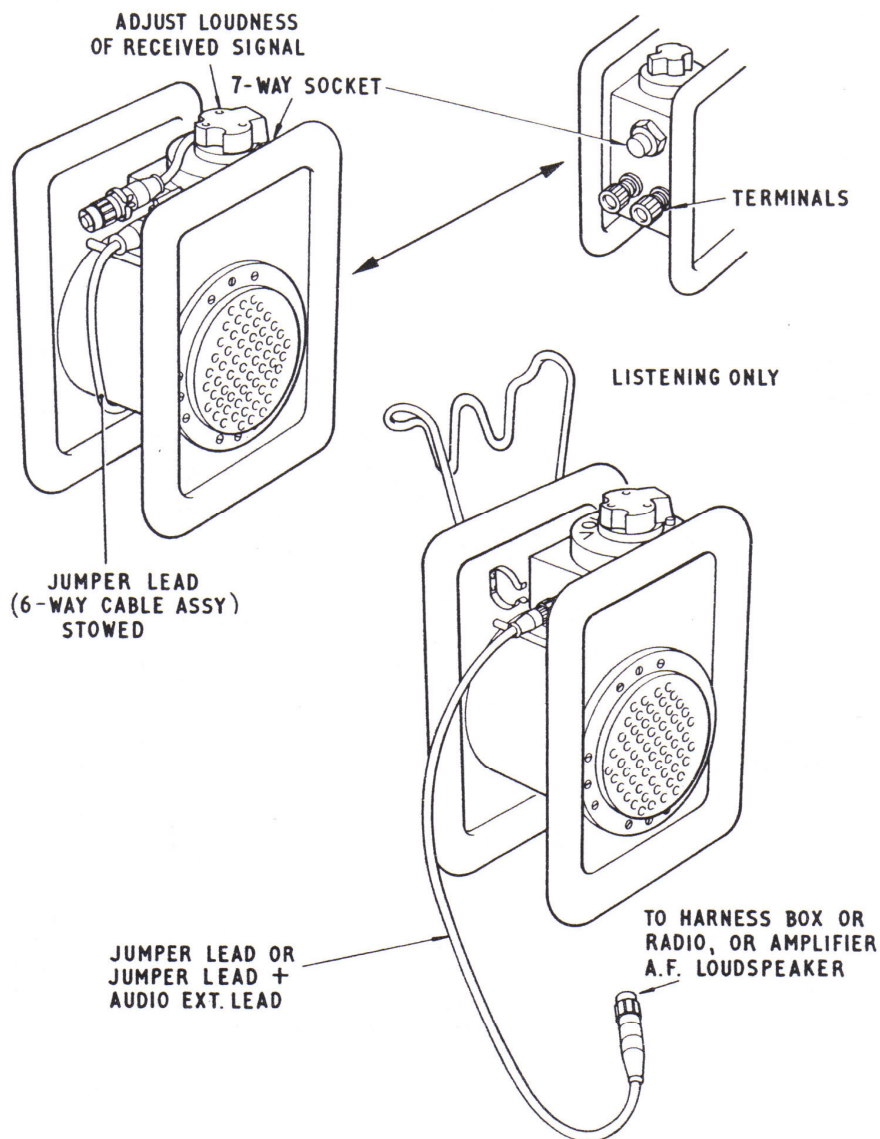
LOUDSPEAKER PM FREE STANDING

This is a portable loudspeaker fitted with a volume control and supplied with a 0.5m jumper lead, necessary when using the Audio Extension Lead.

The Loudspeaker is used as follows:-

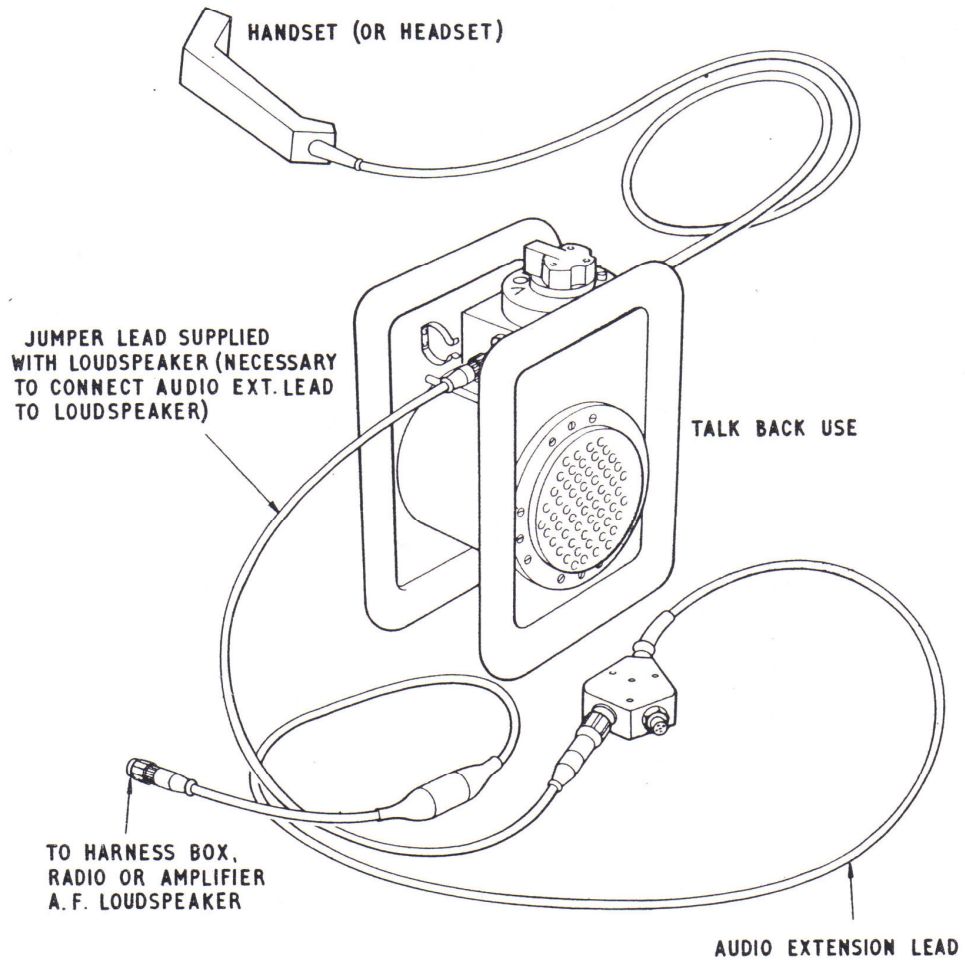
For monitoring -

- in or near vehicle - Connect by 6 way cable assy to AUDIO socket on radio or harness control box; or to LS socket on Vehicle Mounted Loudspeaker.
- up to 50m remote - Connect twin cable between terminals on loudspeaker and Amplifier AF Loudspeaker.



LOUDSPEAKER PM FREE STANDING continued

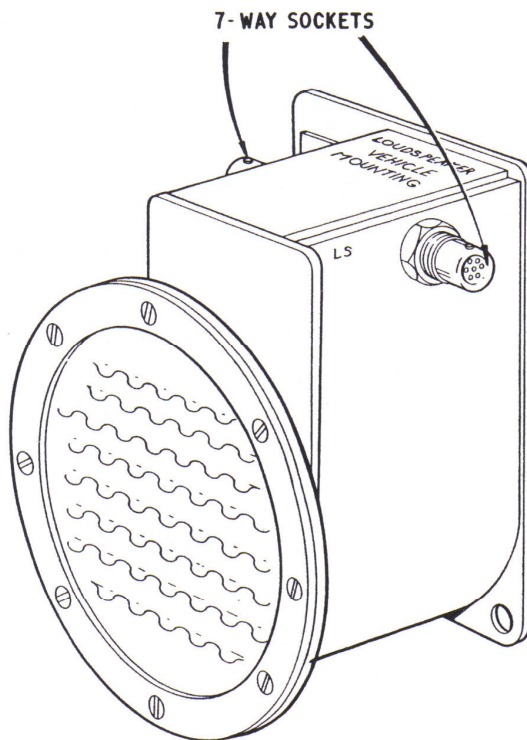
For radio and 'talk-back' - Connect by jumper lead and Audio Extension Lead to AUDIO socket on radio or harness control box. In this role, the monitoring of an alternative signal is not possible.



LOUDSPEAKER PM VEHICLE MOUNTING

This is a vehicle installed loudspeaker that may be connected to the AUDIO socket on any harness box or vehicle radio for use in quiet conditions, or connected to the Amplifier AF Loudspeaker when a greater output is required in noisier conditions.

Up to four loudspeakers, including the Loudspeaker Free Standing, connected series or parallel, by standard cables, may be driven from the Amplifier AF Loudspeaker.



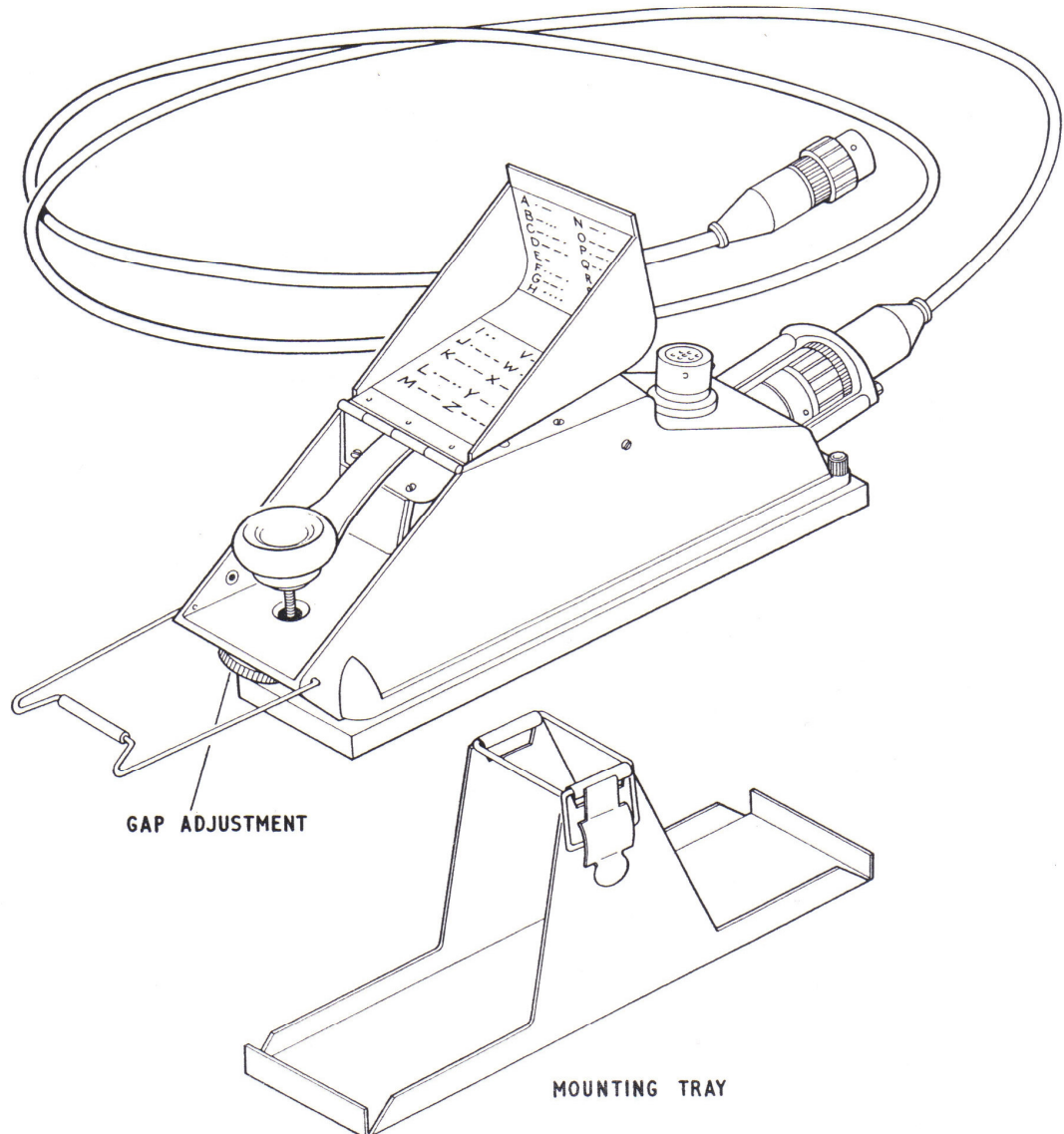
KEY TELEGRAPH MANUAL

This key is for use with Clansman radios installed in vehicles.

It connects by means of a permanently connected 1m long 6 way cable assembly to the AUDIO socket on any Clansman radio or harness box, or to the AUDIO socket on the Remote Combining Unit, or to the INDEPENDENT PRESSEL socket on the Commander's Fixed Box. A Clansman handset, or any headgear, can be plugged into the second socket on the key.

The morse key fits into a mounting screwed to the vehicle. It can be used loose.

The morse key supplied with Clansman manpack radios can be used in place of the vehicle key, but it will not fit into the mounting.



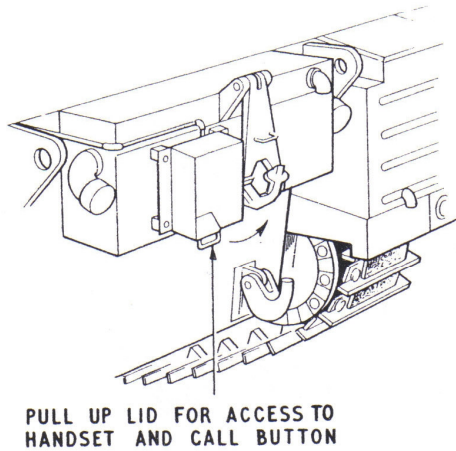
TANK TELEPHONE

The Tank telephone is fitted in an armoured box on the outside of the vehicle. It connects into the vehicle harness and provides IC only with the crew.

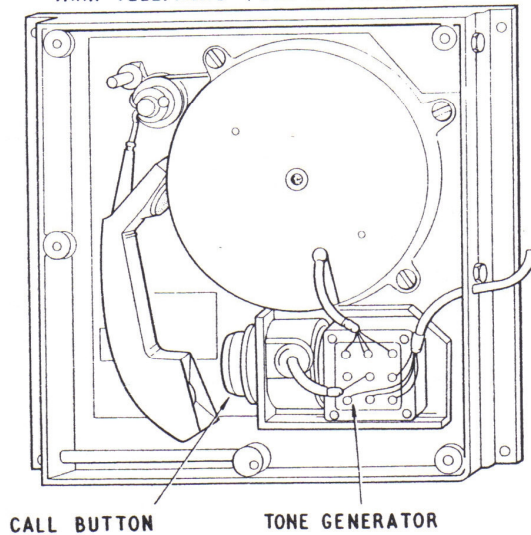
A special handset, containing a transistor amplifier, is used with a 3m (10 ft) lead which is wound on a spring loaded drum. The handset is pulled out for use and automatically rewinds to the stowed position when released.

A call button and tone generator are fitted in the box.

TELEPHONE IN ARMOURD BOX AT REAR OF CHIEFTAIN



TANK TELEPHONE (BOX LID REMOVED)



In the Chieftain layout shown as an example the tank telephone connects into the HARNESS socket on the Driver's Box (Page 20) inside the vehicle.

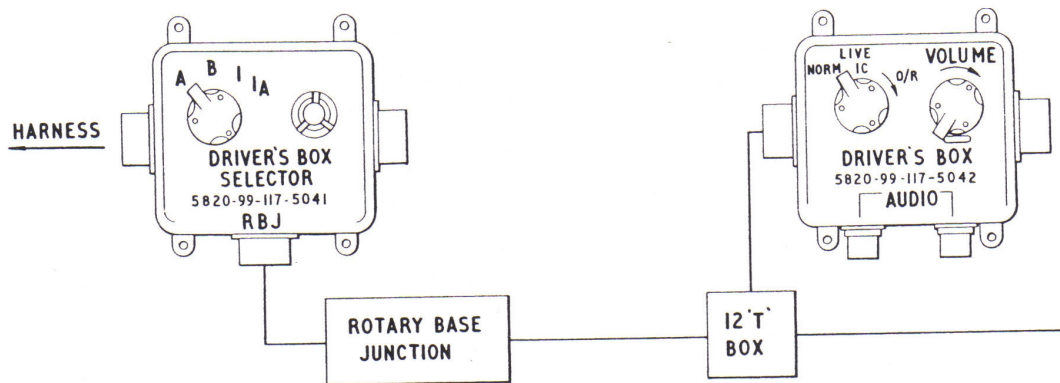
For operation of the tank telephone the Harness normally includes a Driver's Box Selector even though connection may not be made directly to it. If an installation is required employing a tank telephone and does not include a Driver's Box Selector, then a Tank Telephone Interface Box, FV818540, must be inserted into the Harness Ring.

TANK TELEPHONE

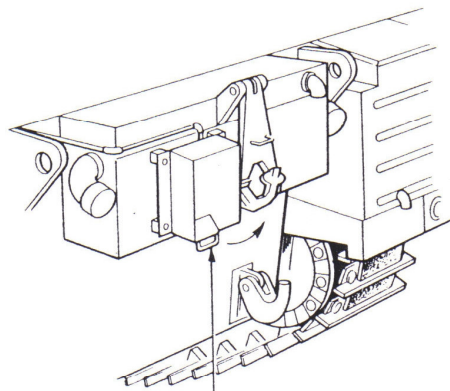
To use the Tank Telephone:-

1. Open the lid of the armoured box.
2. Pull out the handset.
3. Press the call button (The call tone will be heard throughout the harness irrespective of the switch settings at the control box).
4. At the Driver's Box Selector set the switch to I or I_A. If required other Harness control boxes should be set to I.
5. Communicate: press to talk and listen.

If the Driver's Box Selector is switched to radio A or B, no communication between Tank Telephone and crew is possible, unless the driver operates O/R, but the call tone will still be heard.

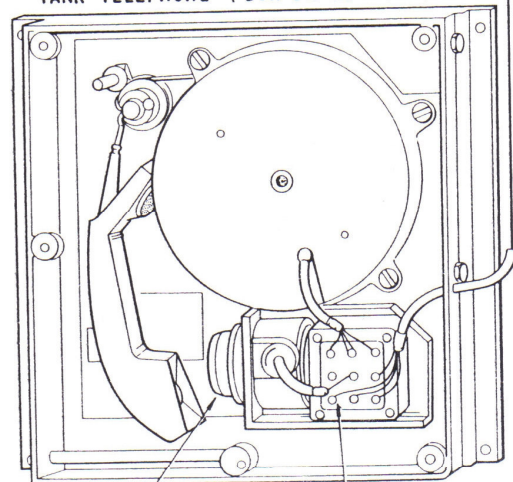


TELEPHONE IN ARMoured BOX AT REAR OF CHIEFTAIN



PULL UP LID FOR ACCESS TO HANDSET AND CALL BUTTON

TANK TELEPHONE (BOX LID REMOVED)



CALL BUTTON

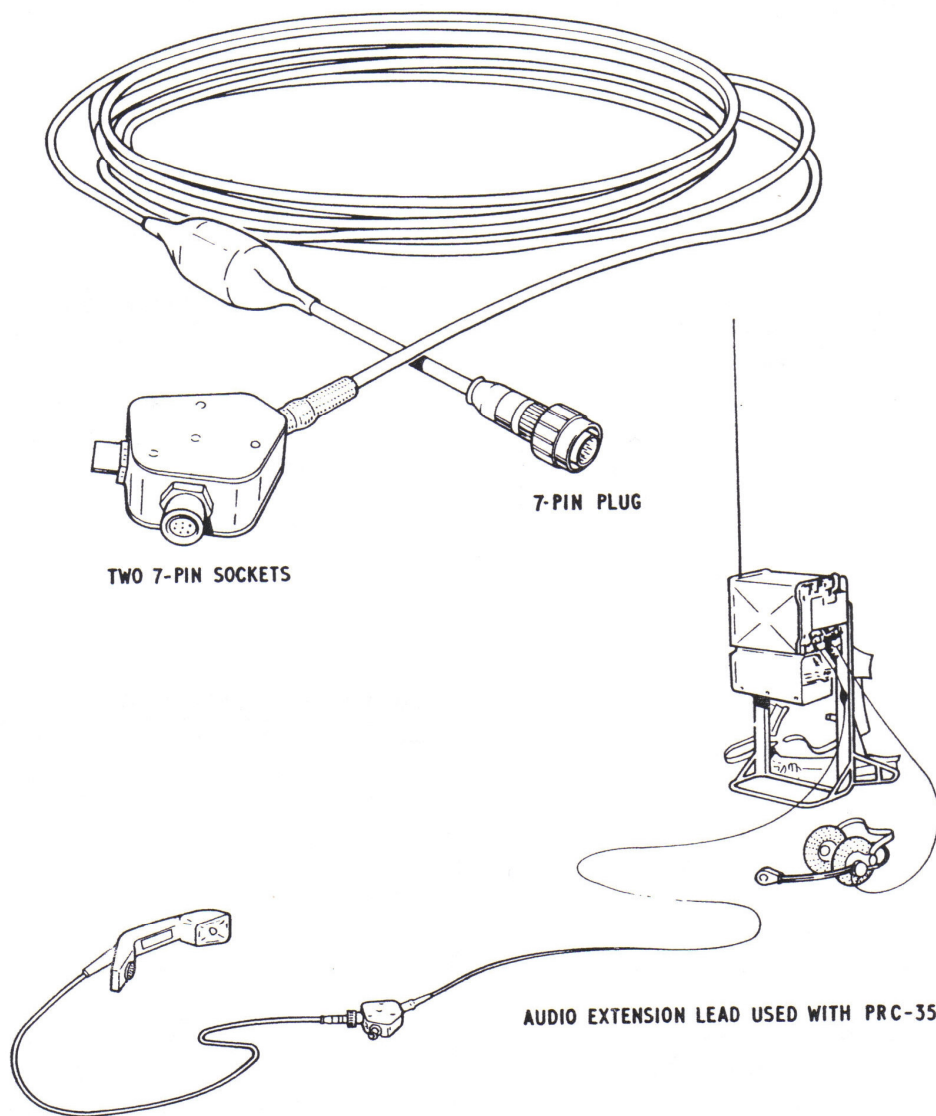
TONE GENERATOR

AUDIO EXTENSION LEAD

The Audio Extension Lead is 10 m (33 ft) long and permits short range remote use of Clansman radios or harness control boxes using the standard range of audio gear.

The monitoring facility is available.

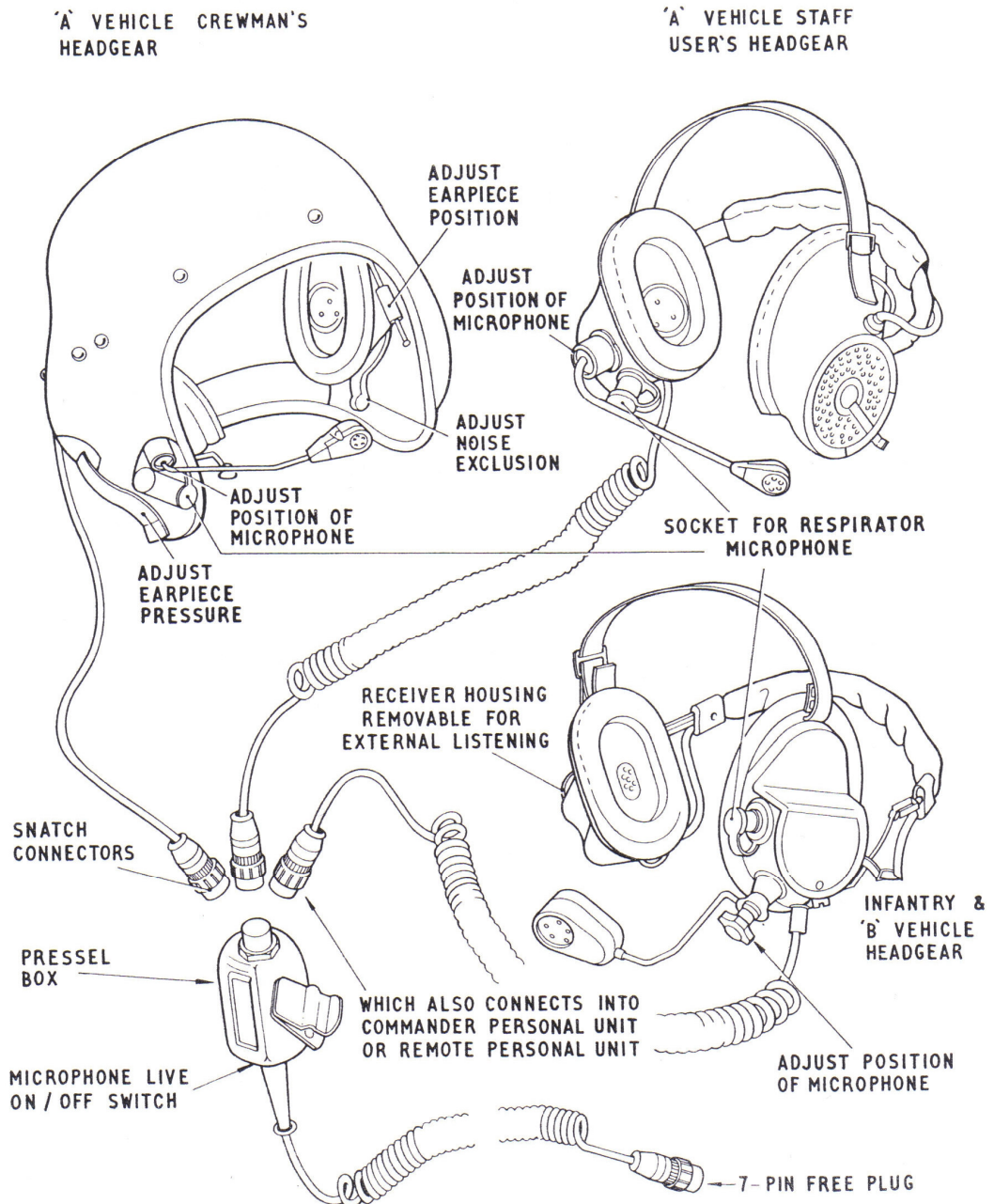
The lead may also be used with the Loudspeaker Free Standing in the 'talk-back' role as shown on Page 37.



HEADGEAR ASSEMBLIES

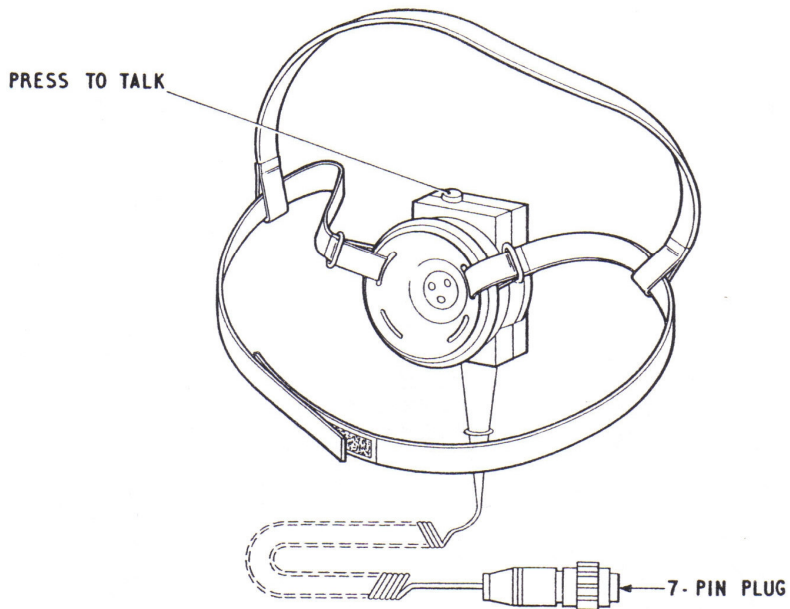
Three types of headgear shown below are provided for use with Clansman radios and/or harness. They plug direct into the radio, or into the harness control box sockets marked AUDIO or HEADGEAR, via pressel Box.

The headgear shown use rocking-armature receivers in noise-excluding ear pads, and a boom mounted pressure gradient (noise cancelling) microphone. There is a noise exclusion adjustment on vehicle headgear.



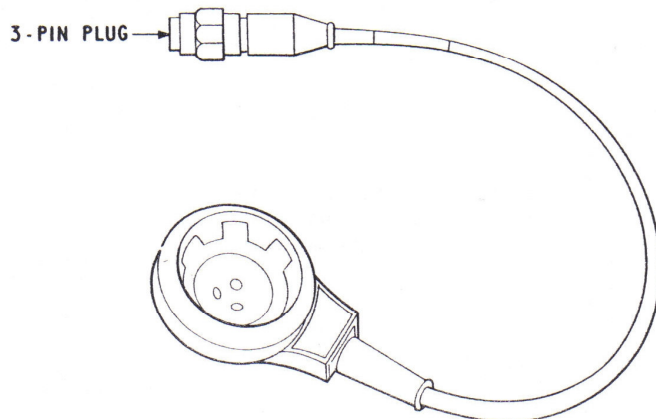
SINGLE TRANSDUCER HEADSET

The headset is a lightweight alternative to the handset. The single transducer is used alternatively as a microphone or receiver. A pressel Switch is provided in the housing. The headgear can be plugged directly into the AUDIO or HEADGEAR sockets of either radios or harness control boxes.



RESPIRATOR MICROPHONE

The microphone is used with Respirator Anti-Gas No S6 and one of the 'A' or 'B' vehicle headsets. The three pin connector is plugged into the socket provided in the moulded housing of the headgear. The housing of the microphone clips over the outlet of the voice tube of the respirator.



PRESSEL BOX

The purpose of the pressel box is to provide a pressel switch for headset users (P.43). In addition to the pressel bar on the side of the box there is a small pre-set switch at the bottom. Slackening the fixing screw allows the slider of this pre-set switch to be placed in either the live microphone or the microphone on/off position. After the slider is put in the desired position it is locked by tightening the fixing screw.

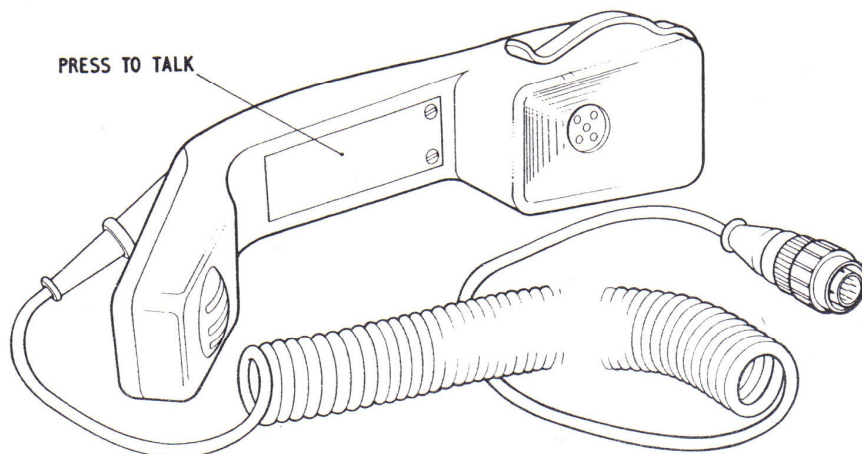
For live IC in harness the pre-set switch must be in the live mic position. The microphone is then live all the time without the use of the pressel switch which in this condition is used to activate the working transmitter.

With mic on/off selected on the pre-set switch the pressel operates normally as a press to talk switch.

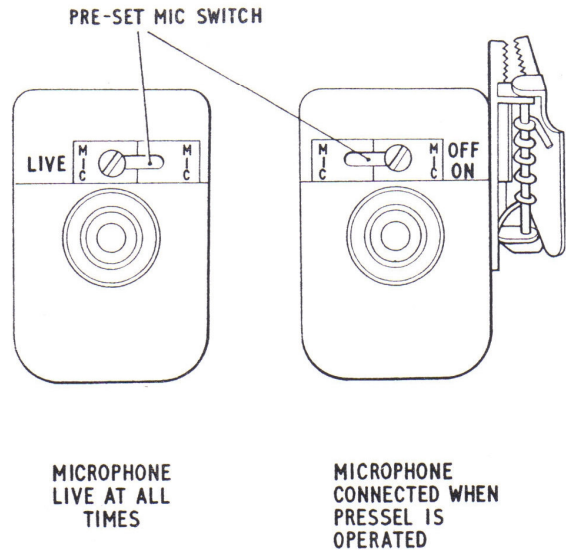
The box is fitted with a swivel mounted clothing clip and it is connected between the headset cable and the appropriate harness connection.

HANDSET G.P.

The handset is used with any Clansman radio, direct or through a Clansman harness control box and plugs into AUDIO or HEADGEAR sockets. A pressel switch operates the radio transmit/receive or intercomm switching.



ALTERNATIVE POSITIONS OF THE PRE-SET SLIDER



MICROPHONE
LIVE AT ALL
TIMES

MICROPHONE
CONNECTED WHEN
PRESSEL IS
OPERATED

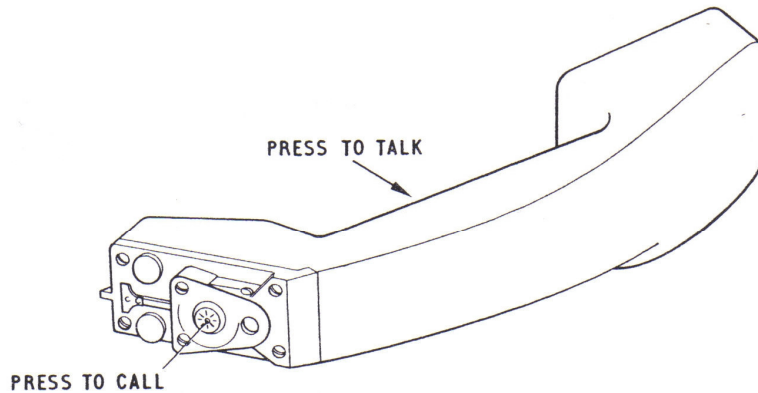
HANDSET - REMOTE CONTROL

This handset is used to remote control any Clansman radio by connecting either direct to the REMOTE terminals on the radio, or through Clansman control harness by connecting to the terminals on the Interconnecting Box 2 radio.

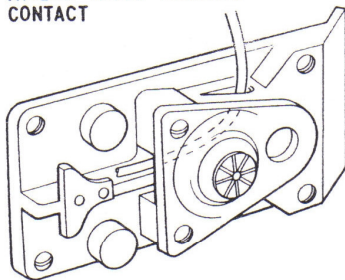
The handset is fitted with insulation piercing cable contacts and can be connected and used at distances up to 3 km (2 miles) over D10 cable, or 5 km (3½ miles) over one pair of CT10 cable.

It contains a transistor amplifier to increase the signal power to the line and to provide a locally generated side tone. The amplifier obtains its DC supply along the cable from the radio or harness.

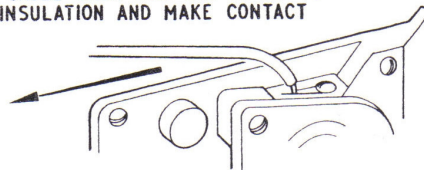
A pressel switch operates the radio transmit/receive or intercomm switching, and a call button switches the call tone, which is generated in the connected radio or IC channel and is heard by everyone in the harness.



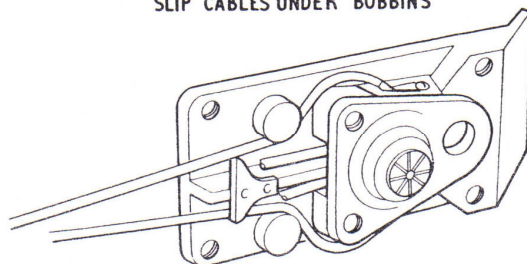
1. THREAD CABLE THROUGH CONTACT



2. PULL CABLE BACK THIS WAY SO AS TO CUT INSULATION AND MAKE CONTACT



3. SLIP CABLES UNDER BOBBINS



USE AND CARE OF AUDIO EQUIPMENT

Helmet Fitting Instructions

Putting On

1. Ensure valve levers are in line with Velcro strips.
2. Pull drawtapes to separate earshells and secure.
3. Park the boom microphone.
4. Put on helmet and release the drawtapes.
5. Adjust vertical position of earshells for maximum comfort.
6. Secure the drawtapes.
7. Position microphone close to lips at right hand corner of mouth.

Taking Off

1. Park the boom microphone.
2. Separate earshells using the drawtapes and lift the helmet off the head.

Fitting

1. Remove front and back pads. Turn over the crown pad to reveal the cat's cradle and adjust drawstring so that the helmet takes up a comfortable position with the inner lining clear of the head and the earshells positioned correctly over the ears.
2. Remove helmet from head and fit appropriate size front and back pads to maintain the comfort and stability of the helmet on the head. (2 front and 3 back pad sizes are available).

Care of Helmet

Cleaning

1. Clean all surfaces with a weak solution of mild detergent, taking care that no liquid enters the apertures of the microphone or receivers. (Do not use solvents.) Rinse with clean water and wipe dry with clean cloth.
2. If the grey foam pads in the earshells are badly ingrained with oil or dirt they should be cleaned in mild soapy water, rinsed out and dried.

WARNING

If the helmet shell is damaged due to accident or neglect it must be examined to ensure the protection is not impaired. If in doubt seek advice.

Treatment After Immersion

1. These notes refer to all items of audio gear except the Pressel Assembly, which is fully sealed.

USE AND CARE OF AUDIO EQUIPMENT continued

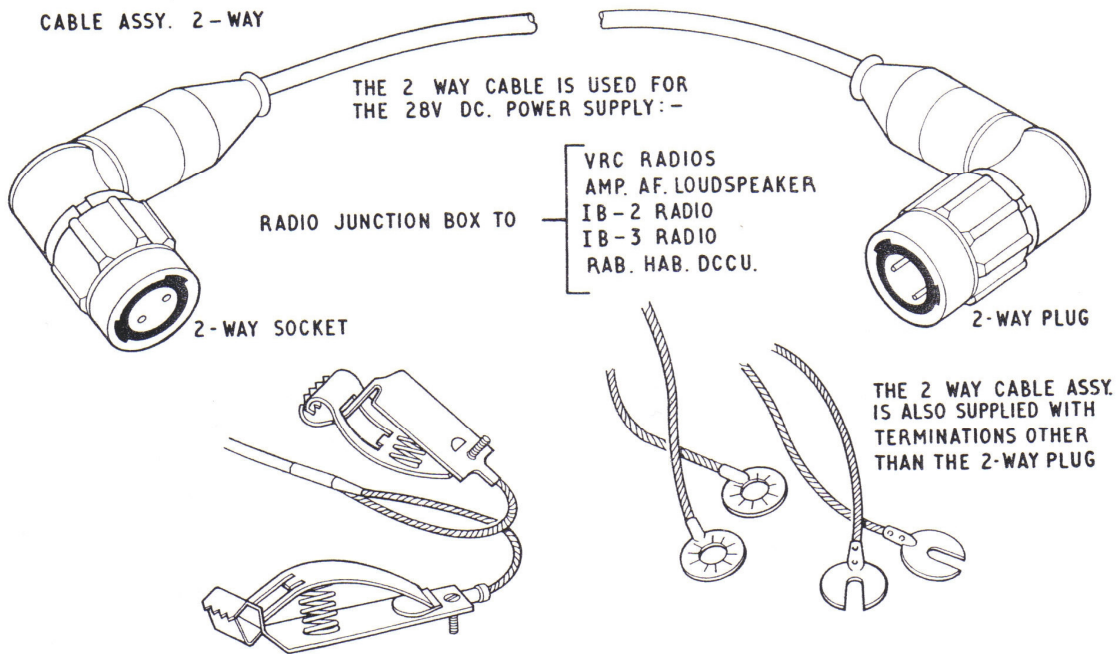
2. After immersion, operation, though possibly at reduced efficiency, may be expected provided the following actions are taken immediately:-
 - a. Drain away surplus water, opening the assembly if necessary. (This applies particularly to handsets.)
 - b. Shake out any water trapped in the faces of the microphone and receiver.
 - c. Squeeze out water from the foam acoustic pads in assemblies with acoustic valves.
 - d. Thoroughly dry the interiors of the assemblies.

3. Where there is a possibility of water penetrating to the interior of the microphone or receiver, the affected item should be replaced at the earliest opportunity.

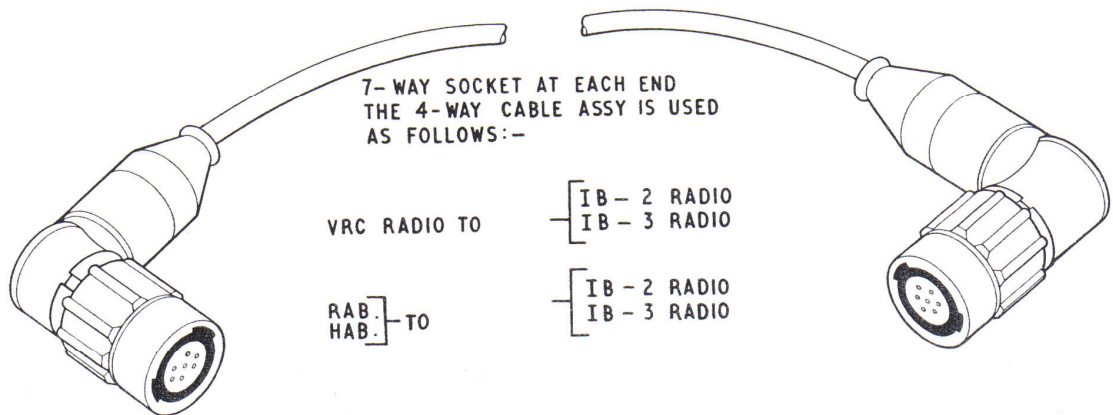
CABLE ASSEMBLIES

Items of Clansman Control Harness are interconnected by standard cable assemblies, 2-way, 4-way plus screen, 6-way, 10-way and 12-way plus screen. They are designated by the number of conductors in the cable, not by the number of pins or sockets in the connector.

Each of the cable assemblies is illustrated and its use is listed but lengths are not quoted.

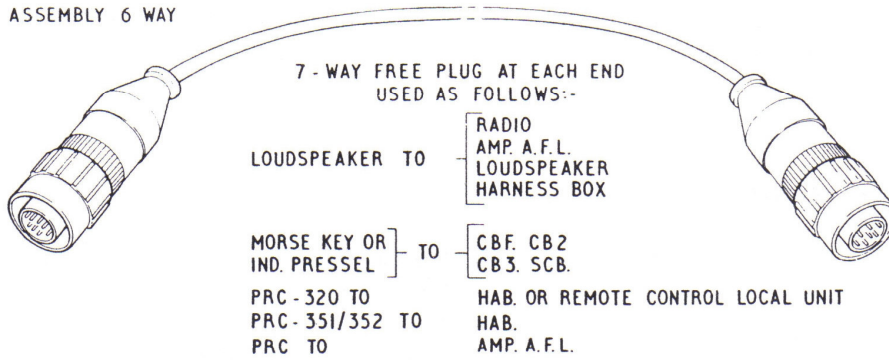


CABLE ASSY. 4-WAY PLUS SCREEN

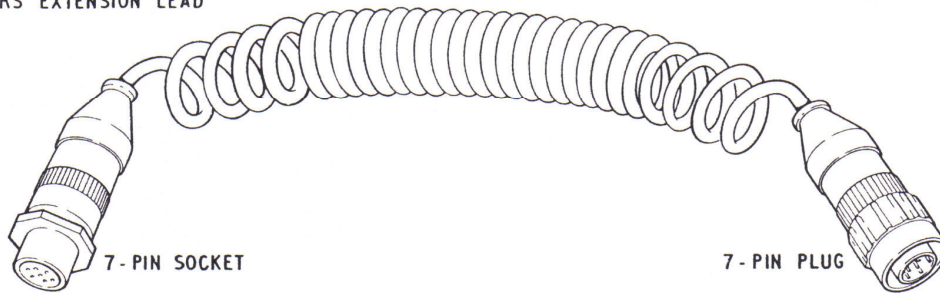


CABLE ASSEMBLIES continued

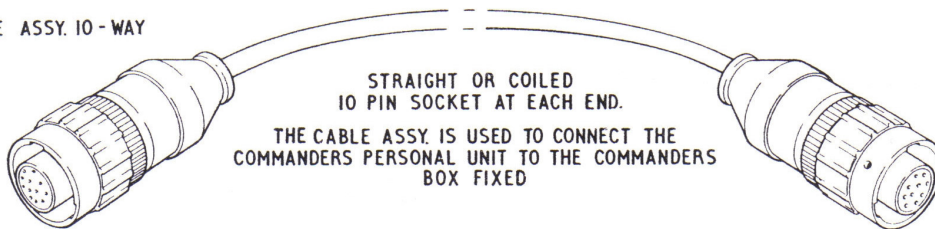
CABLE ASSEMBLY 6 WAY



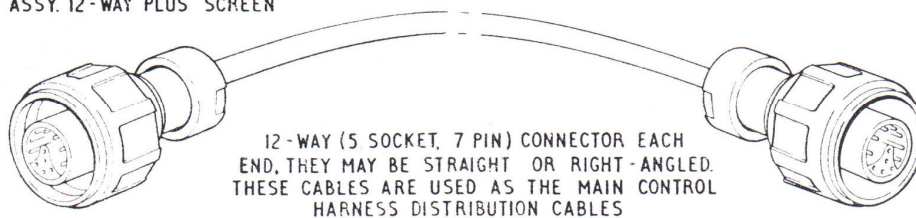
LOADERS EXTENSION LEAD



CABLE ASSY. 10 - WAY



CABLE ASSY. 12-WAY PLUS SCREEN



DIMENSIONS AND WEIGHTS

Dimensions are overall, and rounded off to the nearest mm.

The dimensions and weights of harness boxes include flexible mounting belting.

In the case of items such as headgear which have a cable attached, it is reckoned that the cable is coiled up and included in the overall dimensions.

ITEM	DIMENSIONS		WEIGHTS	
	mm	in	kg	lb oz
Crew Box 2 Set	165 x 124 x 89	6.5 x 4.9 x 3.5	1.16	2 10
Crew Box 3 Set	224 x 150 x 99	8.6 x 5.9 x 3.9	1.7	3 12
Commander's Box - Fixed	165 x 124 x 89	6.5 x 4.9 x 3.5	1.25	2 12
Commander's Personal Unit	137 x 124 x 56	5.4 x 4.9 x 2.2	0.45	1 0
Driver's Box	165 x 124 x 89	6.5 x 4.9 x 3.5	1.1	2 7
Driver's Box Selector	165 x 124 x 89	6.5 x 4.9 x 3.5	1.16	2 9
Remote Combining Unit	168 x 123 x 82	6.6 x 4.8 x 3.2	0.91	2 0
Remote Personal Unit	137 x 140 x 55	5.4 x 5.5 x 2.2	0.45	1 0
Set Combining Box	165 x 128 x 89	6.5 x 5.0 x 3.5	0.68	1 8
Interconnecting Box - 2 radio	290 x 165 x 120	11.5 x 6.5 x 4.7	3.9	8 10
Interconnecting Box - 3 radio	224 x 150 x 104	8.8 x 5.9 x 4.1	2.04	4 8
Harness Adaptor Box	165 x 135 x 97	6.5 x 5.3 x 3.8	1.16	2 9
Radio Adaptor Box (LARCH)	168 x 124 x 97	6.6 x 4.9 x 3.8	1.36	3 0
Amplifier AF Loudspeaker	224 x 161 x 103	8.8 x 6.3 x 4.1	2.27	5 0
Loudspeaker PM Free Standing	217 x 186 x 115	8.5 x 7.3 x 4.5	3.18	7 0
Loudspeaker PM Vehicle Mounting	157 x 142 x 92	6.2 x 5.6 x 3.6	2.04	4 8
Audio Extension Lead	10m long	394 long	0.8	1 12
Key Telegraph Manual	230 x 70 x 80	9.1 x 2.8 x 3.1	0.45	1 0
Tone Generator (TT)	122 x 79 x 98	4.8 x 3.1 x 3.9	0.45	1 0

DIMENSIONS AND WEIGHTS continued

ITEM	DIMENSIONS		WEIGHTS	
	mm	in	kg	lb oz
'A' Vehicle Crewman's Headgear	280 x 250 x 240	11.0 x 9.8 x 9.4	1.7	3 12
'A' Vehicle Users Headgear	180 x 180 x 120	7.1 x 7.1 x 4.7	0.8	1 12
Infantry and 'B' Vehicle Headgear	180 x 180 x 120	7.1 x 7.1 x 4.7	0.5	1 2
Handset	200 x 50 x 80	7.9 x 2.0 x 3.1	0.2	0 7
Handset Remote Control	200 x 50 x 80	7.9 x 2.0 x 3.1	0.2	0 7
Commander's Lead	2 m long	78.8 long	0.29	0 10
Commander's Extension Lead	10 m long	394 long	0.74	1 10

4. USER PREVENTIVE MAINTENANCE

4.1 No equipment can be expected to work indefinitely without some deterioration in performance. Preventive maintenance is required to ensure that it retains its operational efficiency. To this end, positive action by the user is necessary to reduce the probability of failure due to:-

- a. Gradual deterioration in performance not normally detectable during operation (ie parametric failure).
- b. Non-catastrophic failure (eg badly frayed lead, broken bulb failure of a mode not actually in use).

4.2 The responsibility for performing user preventive maintenance is that of the NCO or man who operates the equipment or who has the equipment on charge. It should not normally be necessary to remove the equipment from its parent installation to perform preventive maintenance.

4.3 All units are sealed. Operators must not loosen any fixing screws or in any way attempt to open sealed equipment. In particular control knobs should not be tampered with as this might damage the spindle sealing glands. When adjustments or replacements are required which involve opening a sealed equipment, the equipment should be sent to workshops. Royal Signals radio technicians may open a sealed equipment for maintenance so far as their technical ability and the equipment and spares in their possession allows, either on the initiative of the technician, when absolutely necessary to restore essential communications, or on the authority of the Officer Commanding. These are the only occasions when Royal Signals radio technicians may open a sealed equipment. If a sealed equipment is opened in accordance with these conditions, it should be done only in a clean and dry situation. Ensure that the risk of dust or moisture getting into the equipment is as small as possible. 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.

4.4 Routine Tasks

1. Keep all units clean and dry by wiping with a dry cloth.
2. Ensure that all headsets, handsets, free standing loudspeakers, extension leads and morse keys are correctly stored when not in use.
3. Check that all cable assemblies and connectors are in good order and correctly fitted.

USER PREVENTIVE MAINTENANCE continued

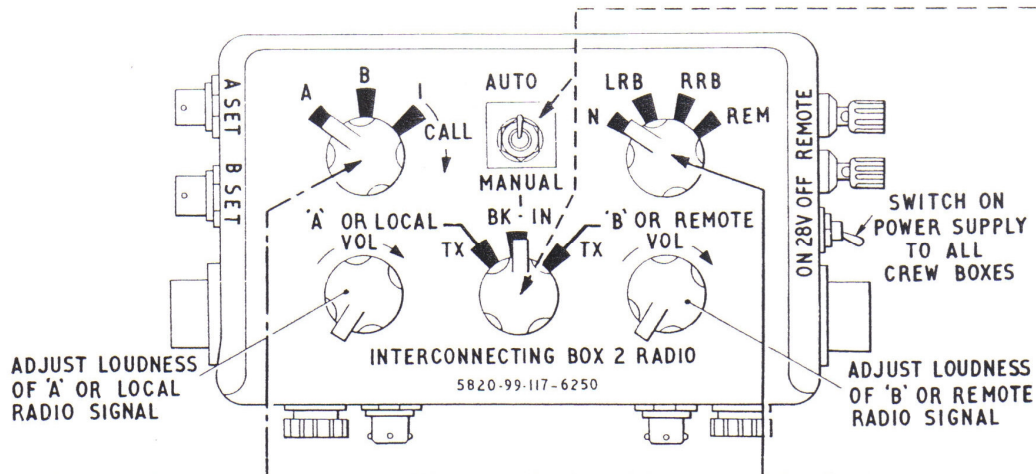
4. Protect all plug socket outlets not in use by fitting the captive covers provided.
5. Check that switches and controls function correctly.
6. Check that webbing straps and quick release fittings on personal units are serviceable.
7. If a Driver's Box Selector is installed check that the lamp lights when the unit is switched to intercomm. Replace the bulb if it is faulty.
8. Check the fuse in Interconnecting Box 2 Radio by seeing that the system works when switched on. Check the spare fuse by substituting it into the working position. Replace any faulty fuses.

Similarly check both fuses in Amplifier AF Loudspeaker when this is installed.
9. Check that all screw terminals function correctly and are not damaged.

APPENDIX 'A'

INTERCONNECTING BOX 2 RADIO

OPERATION

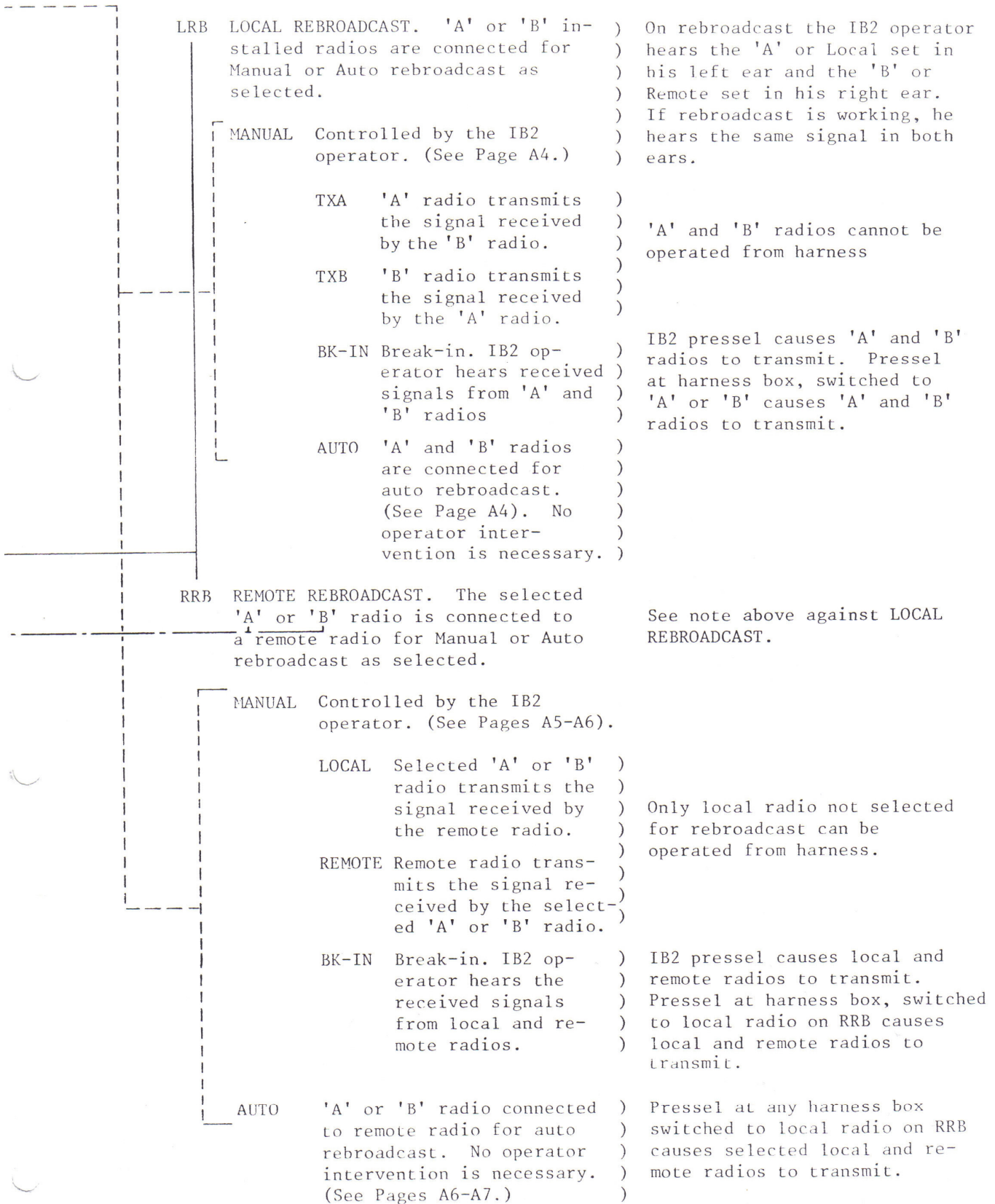


- N NORMAL use of 'A' or 'B' installed radios from IB2, or from any harness box. All other controls and the REMOTE terminals are inoperative.
- REM REMOTE CONTROL. A remote user can control the selected 'A' or 'B' radio and can call any operator monitoring these radios from a harness box. He also has full IC facilities to any crew member when IC is selected. (See Page A7.)
- I INTERCOM. The following IC facilities are available to the IB2 operator, according to the switch positions.
 - I + N IC within vehicle: no connection to remote user.
 - I + REM IC within vehicle: to remote user and for communal IC.
 - I + RRB IC to remote user: no connection to vehicle.
- CALL Call the remote user. The outgoing call tone is heard by the IB2 operator, but is not heard in the harness.
 -) The IB2 operator can be
 -) called by a remote operator
 -) or station. (Except from
 -) the PRC-351/352 which has
 -) IC but no call facility).

Revert to I for subsequent communication.

The IB2 operator will hear O/R (Override) from any harness box, in his right ear, at all times.

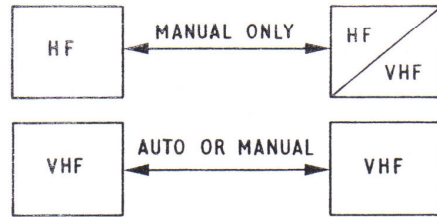
INTERCONNECTING BOX 2 RADIO



1. MANUAL/AUTO rebroadcast facilities with Clansman and Larkspur radios.

HF radios - Clansman PRC-320, VRC-321/322, Larkspur SR.C11, SR.C13.

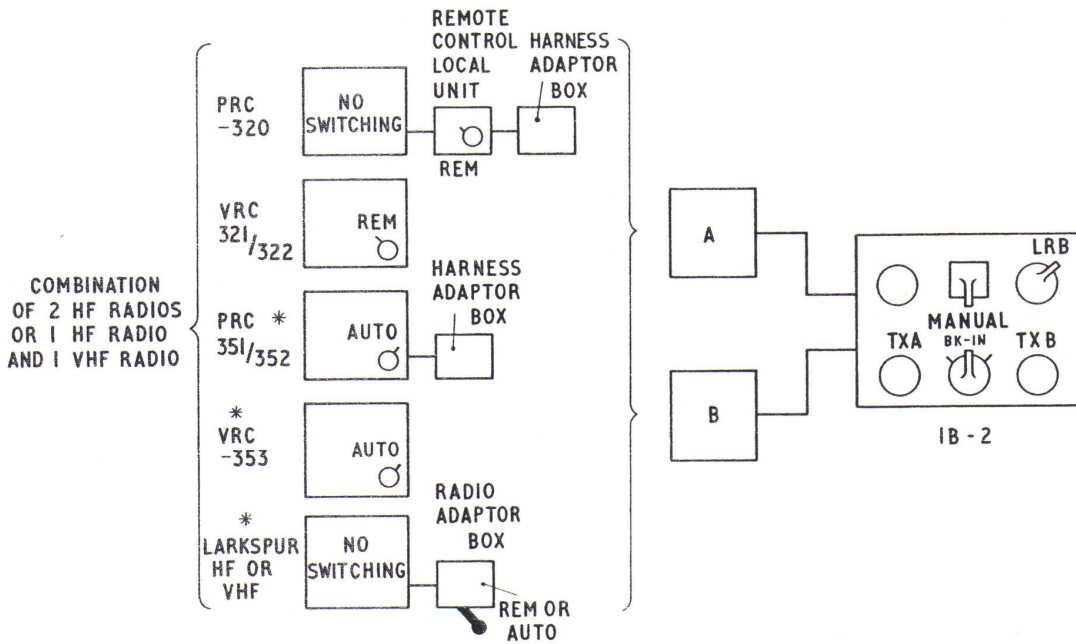
VHF radios - Clansman PRC-351/352, VRC-353, Larkspur SR.C42, C45, B47.



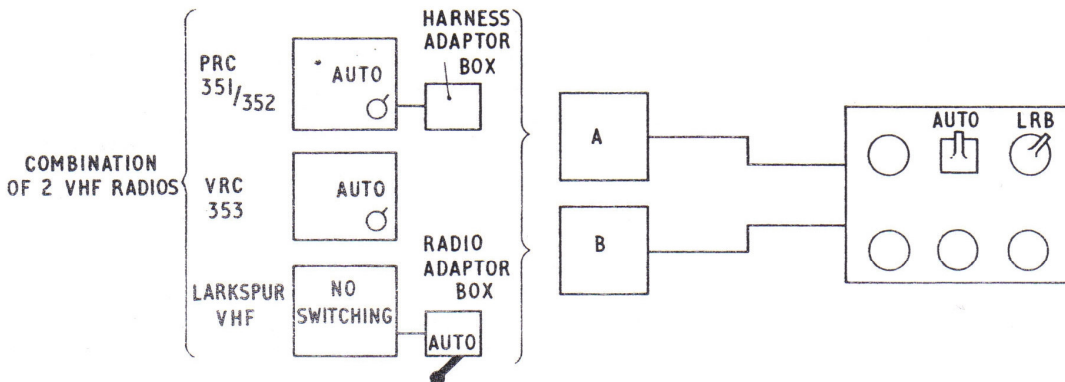
2. LOCAL REBROADCAST

- a. MANUAL - usually HF

SWITCH POSITION ON RADIO ETC.



- b. AUTO - VHF only

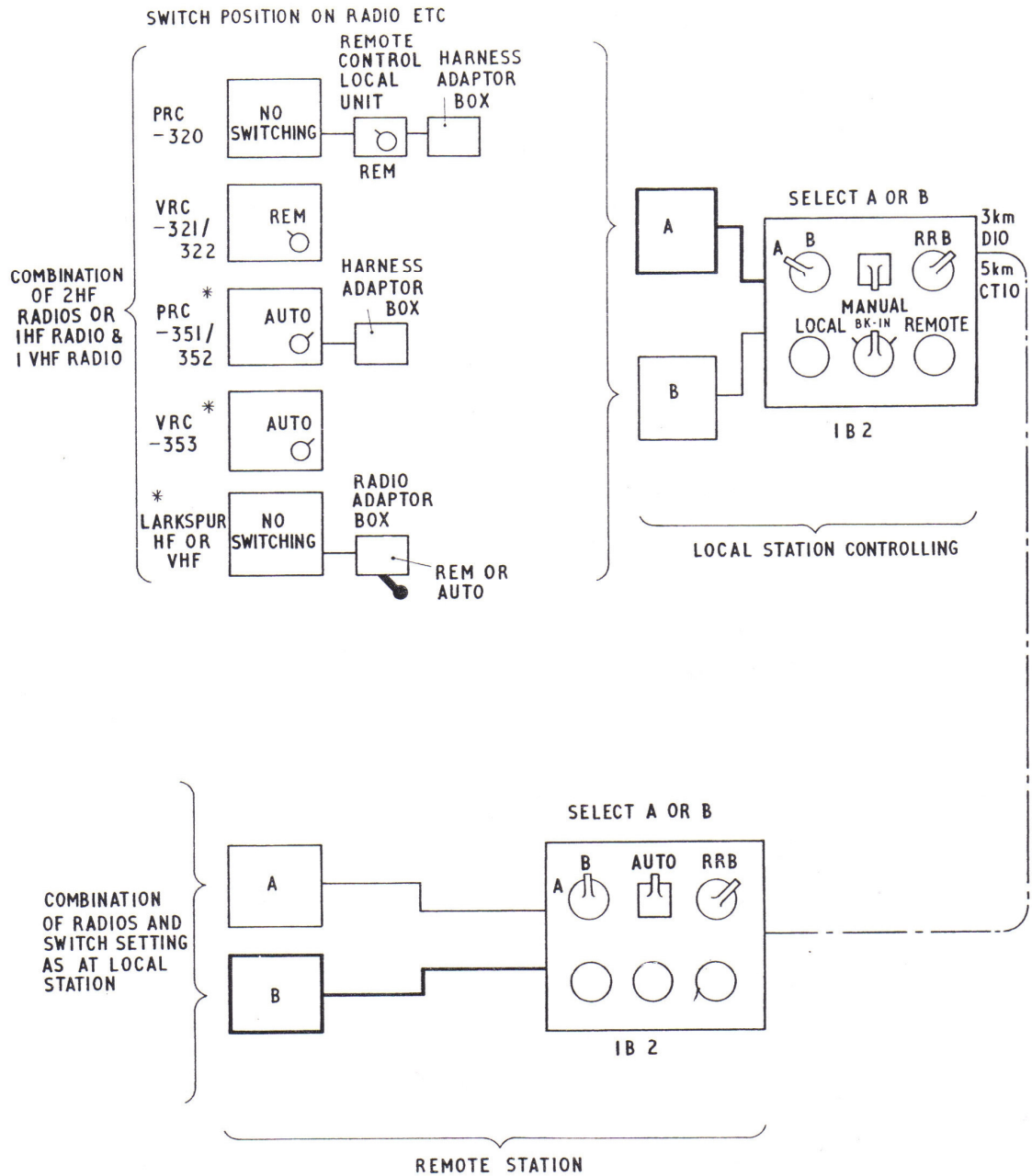


* If interference on VHF receiver is experienced, switch to REM to make Radio transmit.

3. REMOTE REBROADCAST - REMOTE STATION IN HARNESS

a. MANUAL either local or remote station may control rebroadcast.

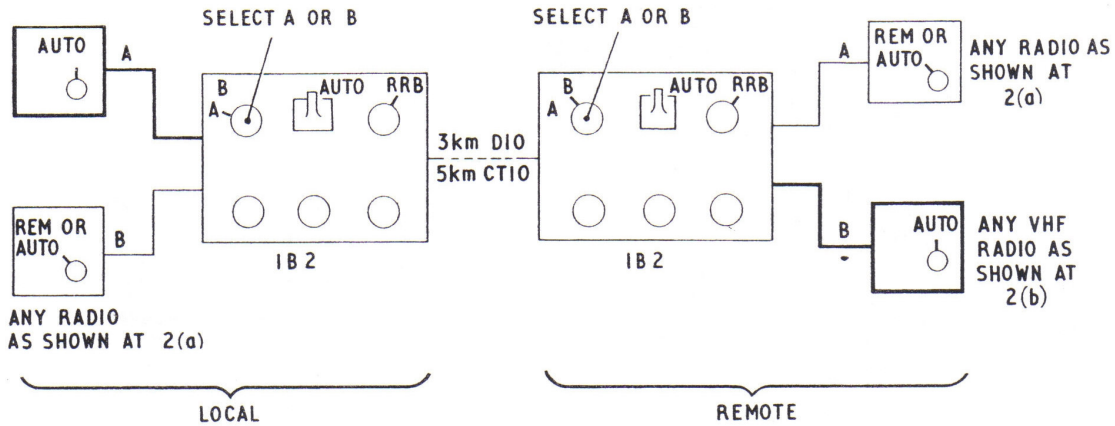
The IB2 at the controlling station is set to 'Manual'.
The IB2 at the other station is set to 'Auto'.



* NOTE: If interference is experienced on VHF receiver, switch to REM to make radio transmit.

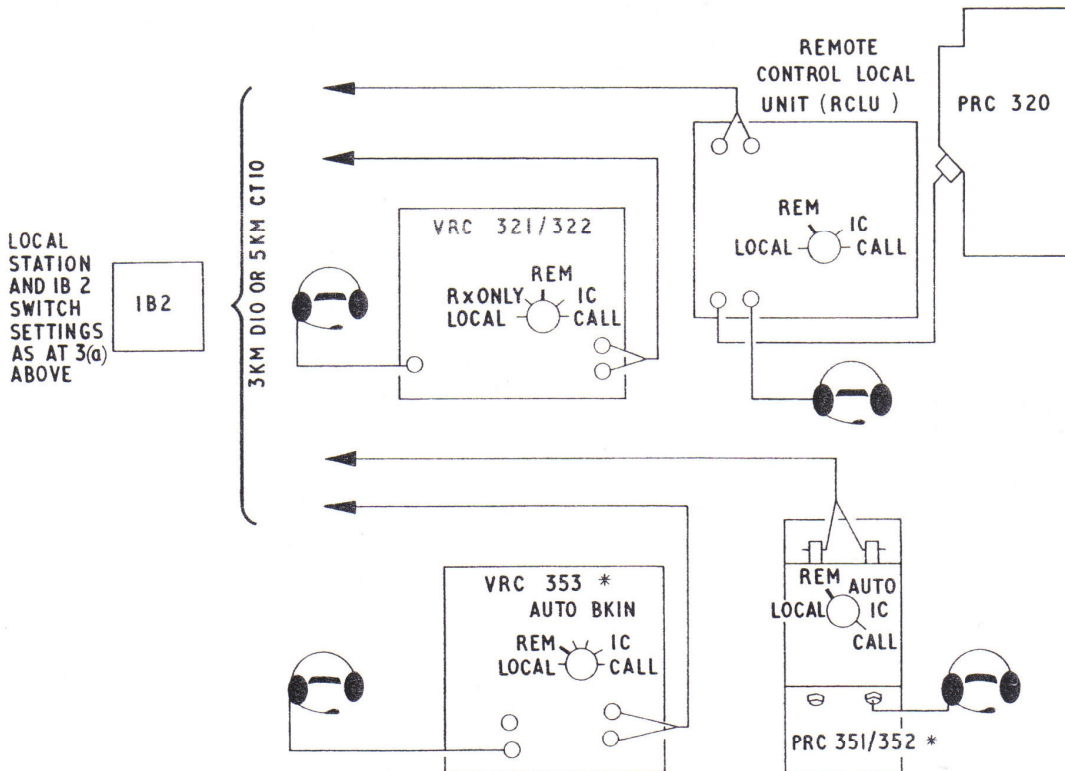
3. b. AUTO

In this example the LOCAL 'A' radio is working auto-rebroadcast with the REMOTE 'B' radio. The radios must be switched to AUTO. The other radios may be switched to REM or AUTO as normal.



4. REMOTE REBROADCAST - REMOTE STATION NOT IN HARNESS

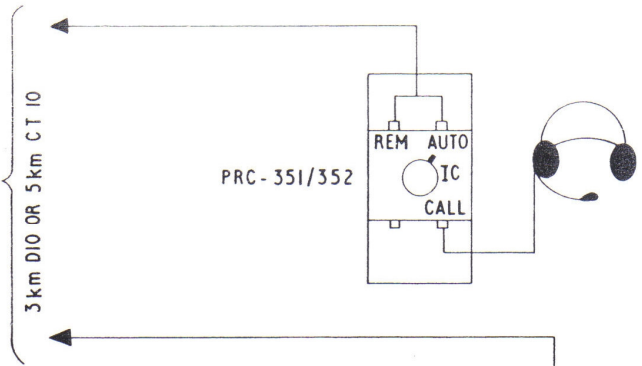
a. MANUAL



* For PRC-351/352 and VRC-353, the switch may be left at AUTO for all conditions of use from the Harness.

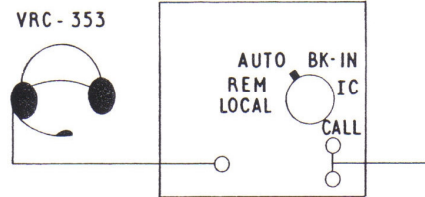
4. b AUTO

LOCAL STATION & IB2 SWITCH
SETTINGS AS AT 3 (b) ABOVE



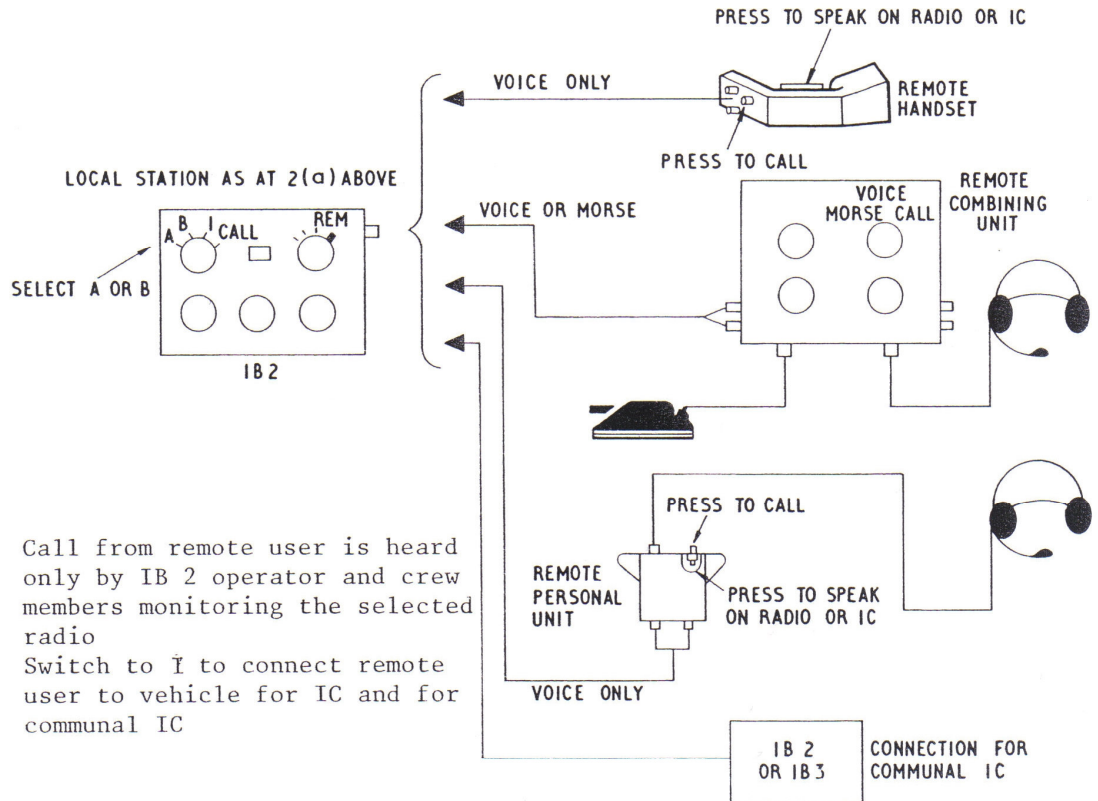
ONE-WAY AUTO-REBROADCAST

As 2(b) or 3 (b) above, except the transmitting station is switched to REM.



REMOTE CONTROL OF RADIO AND REMOTE IC

A remote user may be connected to the IB2 line terminals by up to 3km of D10 cable or 5km of CT-10 pair cable, and control the selected A or B radio.



Call from remote user is heard only by IB 2 operator and crew members monitoring the selected radio
Switch to I to connect remote user to vehicle for IC and for communal IC

RESTRICTED

IDEAS

SUGGESTIONS

DEFECTS

YOU are the user of this equipment,
can it be improved?

If you have any good suggestions
about this or ANY Signals equipment,
The Ministry of Defence Army
Department are interested

IDEAS AND SUGGESTIONS

If you can suggest:

- a. an improvement in design or
shape,
- b. a better method of installation,
operating, or servicing
- c. other equipments which might do
the job better,

the procedure is quite simple - pass it
to your OC or Adjutant for transmission
to the local Chief Signal Officer.

It will remain YOUR idea.

DEFECTS

If there is something wrong with the
equipment AS IT STANDS, other than a fair
wear and tear fault, it is a defect.

Again, don't keep it to yourself, pass it
to your OC. The procedure for him to follow
is given in EMER Management N200. (AFG3660
is the form to use).

