

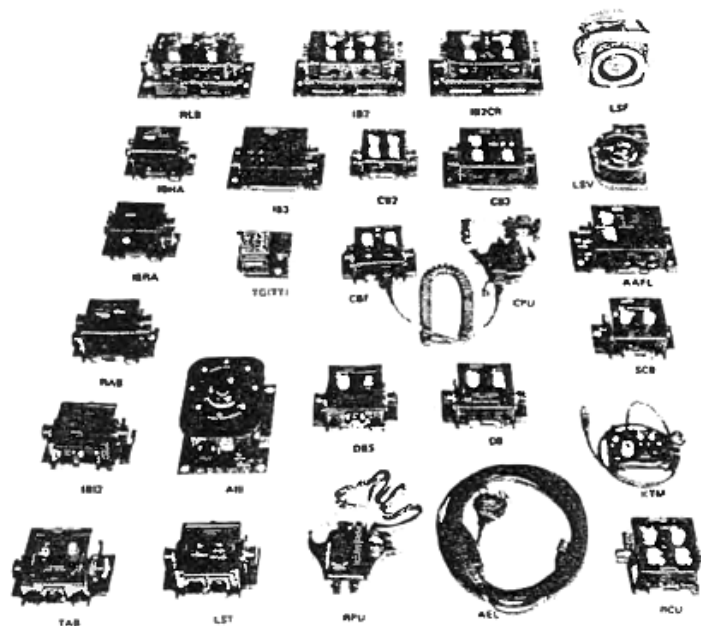
Introduction

The advanced Clansman Radio Control Harness (CRCH) has been developed and manufactured by the Ministry of Defence at the Royal Ordnance Factory, Blackburn, and is designed to provide the crew of an armoured fighting vehicle (AFV) or a remote operator, with positive intercommunication and access to the installed radios.

Of superior design, the Clansman harness supersedes the quite different Larkspur system and lends itself to an almost universal application to many different roles, and may be fitted to any vehicle in a one, two or three radio installation.

Clansman reflects a new design philosophy by recognising the needs of users who may not require the total inventory available. Flexibility in application is a keynote of the CRCH system which embodies nine control or inter-connecting units with twelve ancillary items; many different installation requirements can be met. Superior performance capability in limited space has been achieved in producing a highly effective system.

The range of units represents approximately one quarter of the number of units required for the previous harness range and increased protection against connection failure is achieved by linking the harness items in a ring.



CLANSMAN

Design

The Clansman Radio Control Harness is designed to meet the requirements of DEF 133 Table L3 and is classified as Ground Equipment, Exposed and Immersable (unpacked).

Clansman harness is supplied from a 21V to 33V (28V nominal) vehicle battery supply and the system will withstand the switching surges and pulses present in an armoured fighting vehicle supply. Elimination of excessive interference noise (a limitation on previous systems) ensures that harmful levels of signal are not fed to the ear.

An important characteristic of CRCH design is its simplicity of operation under difficult conditions and the harness is capable of continuous operations over the ambient temperature range of -40°C to 75°C under conditions of driving rain, salt spray, driving sand and dust. In addition, the CRCH can operate at 95 - 100% relative humidity at a temperature of 30°C .

The Clansman harness system has been carefully designed to ensure that only a brief period of instruction is necessary to enable the equipment to be used effectively in darkness, under conditions of high ambient noise or when the vehicle is crossing open country.

Summary of terms used

Clansman Radios

2 HF Radios – UK/PRC 320 — UK/VRC 321/322
and
4 VHF Radios – UK/PRC 350 — UK/PRC 351/352
UK/VRC 353 — UK/PRC 349

IC

Normal voice intercommunication between crew members with 'Press to Talk' facilities.

Live IC

Voice intercommunication between crew members with 'Hands Free' operation.

Override (O/R)

Voice override of a crew member that will be heard by all crew members in their right ear, irrespective of the switch settings.

Rebroadcast (LRB or RRB)

Signals received by one radio can be re-transmitted by the other, i.e., these can be either two installed radios (LRB) or one installed radio and one remote radio (RRB).

Working Signal

Signal of selected working channel, heard in the left ear.

Remote Control (REM)

To perform the same function as a person able to 'use' the harness, from a remote point.

Monitor (M)

To receive signal on a selected channel without the ability to transmit, heard in the right ear.

Systems

Two basic systems are available, two radio and three radio, but the actual installation depends on the type and role of the vehicle.

Two Radios

This is the most common configuration in use and the system provides normal and live IC, override and monitor, with or without auto or manual rebroadcast (both local and remote).

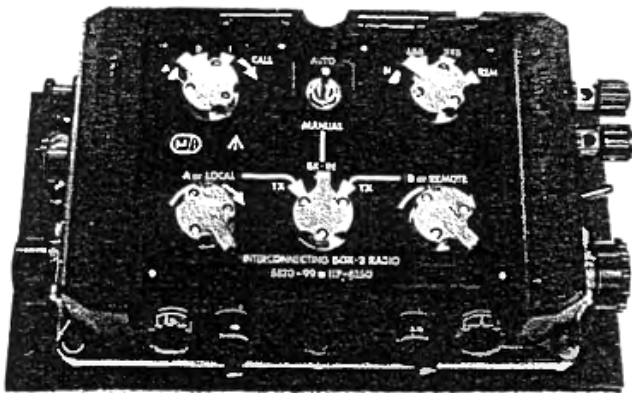
Three Radios

This system is normally used in a command vehicle role, where rebroadcast facilities are not required. It provides control of three radios, normal and live IC, override and monitor. Communal IC is provided so that two or more vehicle harnesses can be linked together for voice intercommunication while the vehicles are stationary.

Units for two radio installation

There is a combination of seven units normally considered for a two radio installation.

Interconnecting Box 2 Radio (IB2)



The Interconnecting Box 2 Radio (IB2) is the main unit in a 2 radio installation and is a combined control, junction and power supply unit for the harness. The IB2 provides the IC amplifier and acts as an outlet and inlet to the main harness for radios and remote users. It enables two installed radios, or one installed radio and one remote radio, to operate in auto or manual rebroadcast. This is controlled by the local operator at the IB2.

The IB2 is supplied from the 28V d.c. vehicle power supply. Switching, fusing, and feeding to the harness is accommodated through the IB2.

Interconnecting Box 2 Radio, Crew and Remote (IB2 CR)

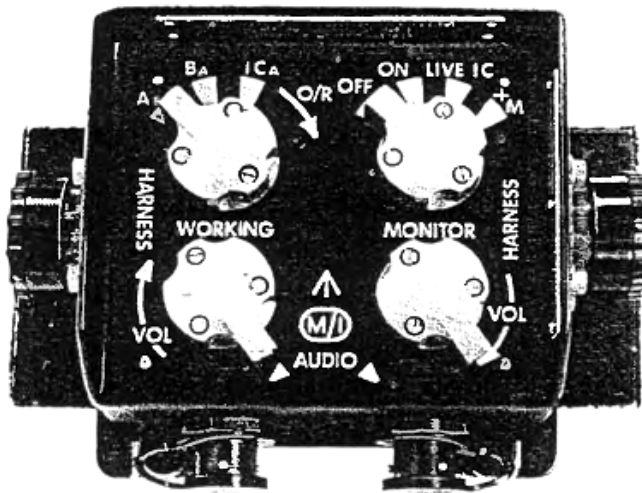


As an alternative to IB2 where rebroadcast is not required, the IB2 CR may be used. Its main advantage over more conventional alternatives is cost reduction since only one box is required and it allows a virtually universal application.

The IB2 CR is supplied from a 28V d.c. vehicle power supply. Switching, fusing, and feeding to the harness is accommodated through the IB2/CR. Its principal user facilities include positive access to A and B radio with monitor, normal and live IC and override, and access to harness and radios by a remote operator.

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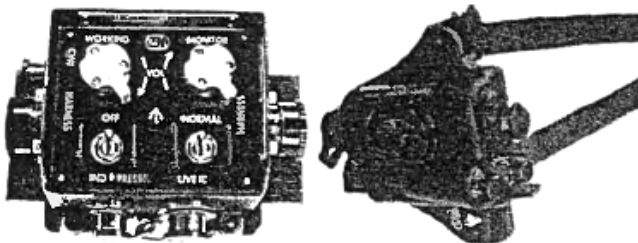
Crew Box 2 Set (CB2)



The Crew Box 2 Set (CB2) is the general purpose selection and control box for crew members. It provides access through the harness to the installed radios and IC channel. Live IC is provided to enable 'hands free' operation of the IC to be worked. With live IC + Monitor (M) selected, the crew member receives the working channel in his left ear with IC and monitor channel at reduced level in his right ear. On operation of his pressel, the working set switches to 'transmit'. Override (O/R) is provided so that during operation the crew member will be heard by all other crew positions, irrespective of their switch settings without the use of pressel.

Separate volume controls are provided for both working and monitor signals.

Commanders Box Fixed (CBF) and Commanders Personal Unit (CPU)

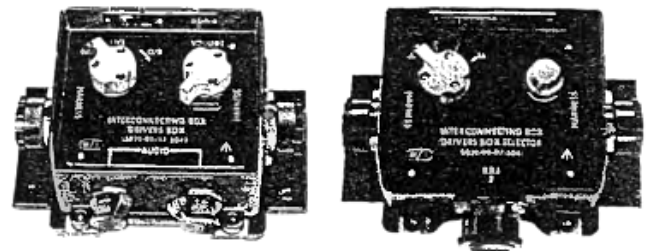


The Commander's Box Fixed (CBF) and Commander's Personal Unit (CPU) are always used together and connected by a Commander's lead or a curly cord providing a two metre (approximate) extension. Together the two units provide the same facilities as the CB2, but the imperative controls are carried on the CPU. This is held by a webbing strap carried around the Commander's neck. Both the headgear and webbing strap are fitted with snatch release devices.

Audio warning signals can be fed into the CBF which will also accept an independent pressel unit.

Separate volume controls are provided on the CBF for working and monitor signals.

Drivers Box (DB) and Drivers Box Set Selector (DBS)



The Driver's Box (DB) and Driver's Box Set Selector (DBS) provide similar facilities to the CB2, but are used where the number of lines through the turret sliprings are limited. This combination requires a minimum of five lines instead of the normal twelve.

The DB is normally located in the driver's compartment and the DBS in the turret. The DBS is operated by a crew member in the turret who selects the channel required.

At the DB, the driver has full intercom facilities, but is able to work only one channel at a time; override is provided. The DB can be used in a normal harness ring without the DBS at a crew position where intercom only is required. A single volume control is provided on the DB.

Additional units for three radio installation

Two more units are added to the previous seven to provide a three radio installation. These are the Interconnecting Box 3 Radio (IB3) and the Crew Box 3 Set (CB3).

Interconnecting Box 3 Radio (IB3)



The Interconnecting Box 3 Radio replaces the IB2/IB2 CR and provides access through the harness to all three radios; rebroadcast and remote control facilities are not provided. Communal IC facilities are provided enabling several harness installations to be linked together for intercom purposes; full IC and override (O/R) facilities are provided. The IB3 is supplied from the 28V d.c. vehicle power supply. Switching, fusing and feeding to the harness is accommodated through the IB3.

Crew Box 3 Set (CB3)



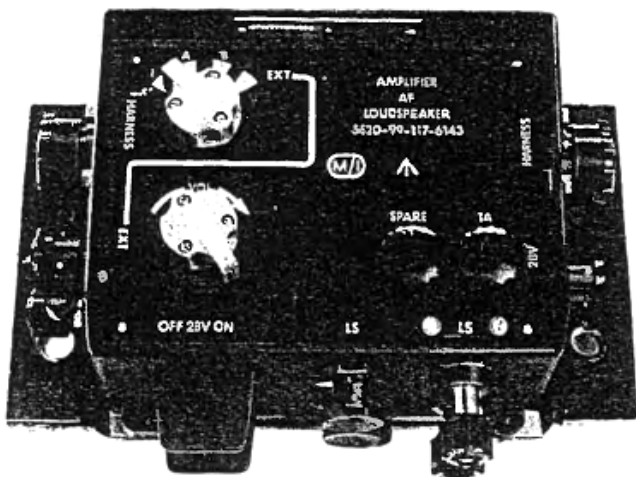
The Crew Box 3 Set is used where access to all three radios is required at one crew position. IC O/R and monitor facilities similar to CB2 are provided but live IC is not available. Separate volume controls are provided for both working and monitor signals.

Two-radio installation crew boxes may be used in a three radio installation so that, for example, a CB2 can control either A and B or A and C radios with full IC, O/R and monitor facilities.

Ancillary Items

The following ancillary items can be used to extend the range of facilities.

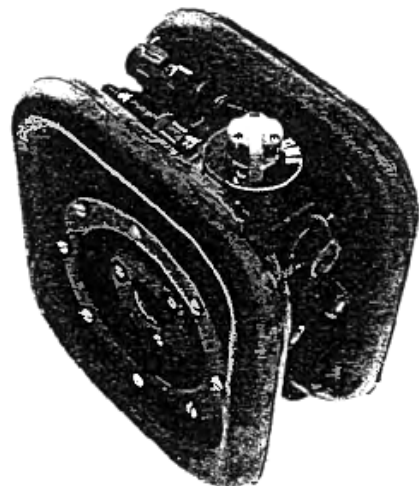
Amplifier AF Loudspeaker (A AF L)



Amplifier AF Loudspeaker (A AF L) is a 4 watt audio amplifier that can be connected in a harness ring. It amplifies the selected radio or IC signal to drive up to four Loudspeakers Free Standing or Loudspeakers Vehicle Mounting. The A AF L can be used outside a harness installation and be fed direct with signals from a radio or audio-gear.

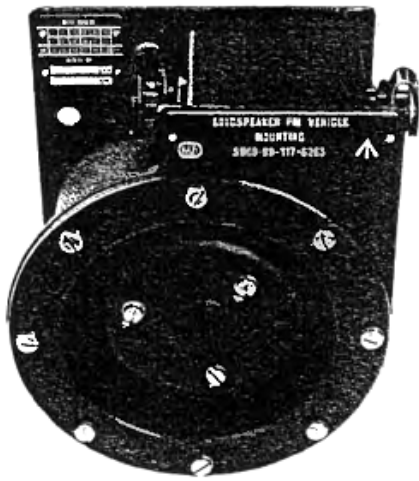
28V d.c. is supplied to the A AF L either from a battery or a vehicle power supply.

Loudspeaker Free Standing (LFS)

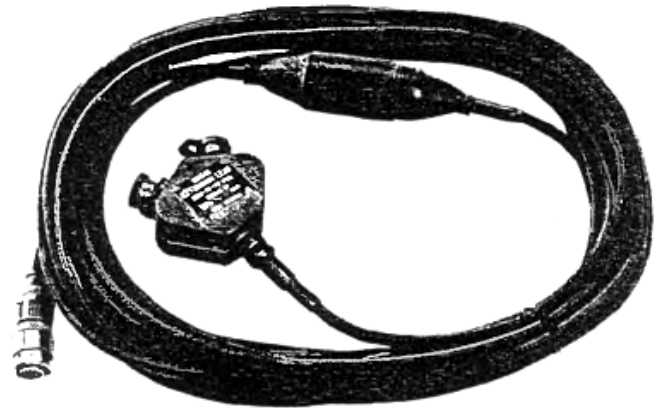


The Loudspeaker Free Standing is a portable unit with its own volume control. It can be used under quiet conditions in or near the vehicle with its own short jumper lead or extended up to 10 metres by using the Audio Extension Lead from any audio socket in harness. Used in either of these modes, a hand-set can be plugged into the socket on the unit to give talk-back facilities. A total of up to four additional speakers can be added, when used with the A AF L. The LSF is fitted with line terminals so that it can be driven by the A AF L over telephone lines up to 50 metres away without talk-back.

Loudspeaker Vehicle Mounting (LSV) Audio Extension Lead (AEL)

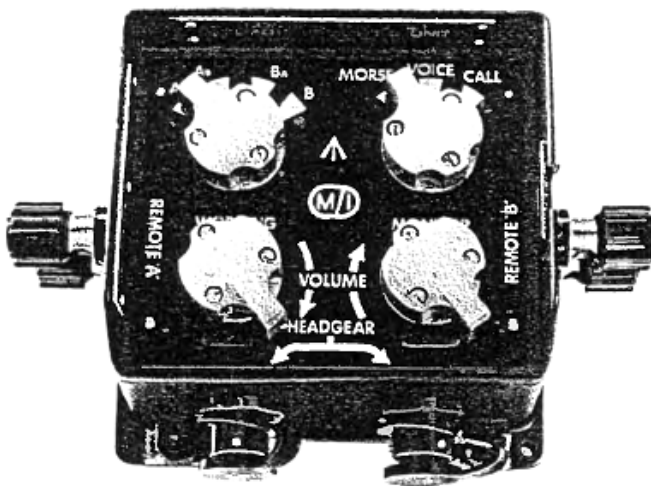


The Loudspeaker Vehicle Mounting is an installed unit and is normally driven from the A AF L; a total of up to four can be connected together using standard cables.



The Audio Extension Lead provides short range (up to 10 metres) remote audio facilities from any radio or harness unit audio socket and provision is made for access by two sets of headgear/headsets.

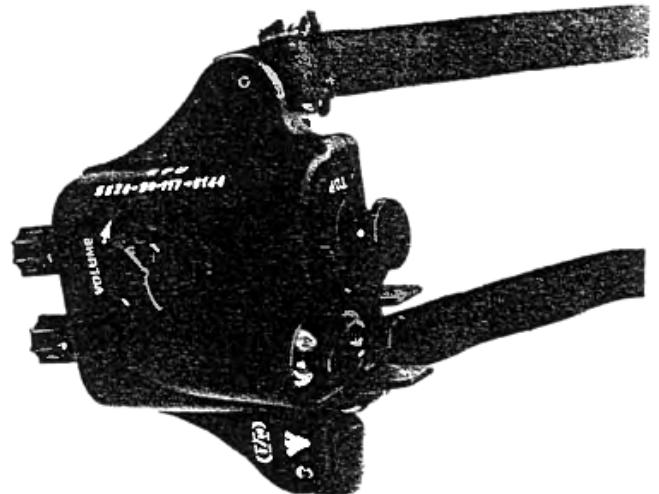
Remote Combining Unit (RCU)



The Remote Combining Unit permits one of two remote Clansman radios or harness installations to be selected and used on voice or morse as selected. It allows monitoring of the other set at distances of 3km using D10 cable or 5km using CT10 to each installation or radio from the RCU.

Call and IC are available to the local operator of the harness (IB2) or radio. The d.c. supply to the unit is taken from the IB2/IB2 CR or radio along the line.

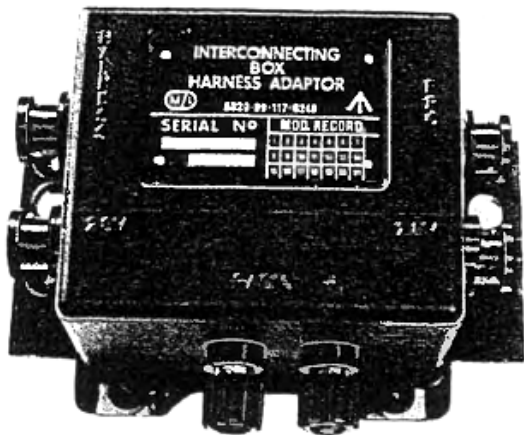
Remote Personal Unit (RPU)



The Remote Personal Unit is carried around the neck of the user by a webbing strap and provides access to the installation via the remote terminals of an IB2 or direct to radio remote terminals over a distance of up to 3km using D10 cables, or 5km using a pair of CT10 cables. It is used with ear-defending headgear. The headgear and the webbing strap are both fitted with snatch release devices. The d.c. supply to the unit is taken from the IB2/IB2 CR or radio along the line.

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Interconnecting Box Harness Adaptor (IBHA)



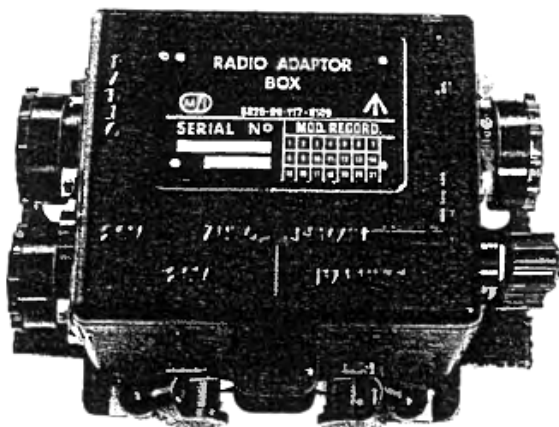
The Interconnecting Box Harness Adaptor (IBHA) enables Clansman Manpack radios UK/PRC 320 and UK/PRC 351/352 to be interfaced with the same control as the vehicle radios UK/VCR 321/322 and UK/VRC 353.

Set Combining Box (SCB)



The Set Combining Box is used when two Clansman radios are to be worked outside an installation where IC is not required. It enables an operator to work one radio and monitor the other. A dummy socket is provided so that the cable to the third can be plugged in, in readiness for selection.

Radio Adaptor Box (RAB)

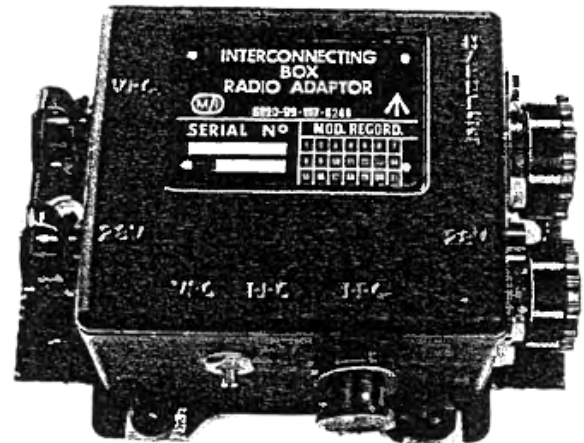


The radio Adaptor Box (RAB) enables the Larkspur generation of radios to be used to their full potential when controlled from the Clansman Radio Control Harness.

Key Telegraph Manual (KTM)

The Key Telegraph Manual can either be used free or clipped into a mounting tray in its vehicle role. It is connected into any audio socket in the harness or radio by a short jumper lead that is permanently plugged into one of its two sockets. A Clansman headset or handset can be plugged into the second socket to monitor the key operation. In this mode, normal audio facilities are available when the key is not being operated.

Interconnecting Box Radio Adaptor (IBRA)



The Interconnecting Box Radio Adaptor (IBRA) enables Clansman Vehicle and Manpack radios to be used to their full potential with the Larkspur generation of harness.

Remote Rebroadcast Box (RRB)

The Remote Rebroadcast Box (RRB) enables CLANSMAN HF radios to be used in the rebroadcast function. This box may be used with IB2CR or IB3 in harness installations, and SCB or RCU in non-harness installations.

Self-Propelled Artillery Communication Harness

Introduction

An example of the application of this harness can be seen in the British version of the Anglo-German-Italian SP70 self-propelled gun. In common with standard armoured fighting vehicle practice the harness has a central feature of a harness ring with interconnecting boxes, including as the main unit the Radio Lines Box (RLB).

Two features are included to meet the special requirements of self-propelled artillery:

- (i) Automatic communication of gun laying data, in digital form, from the battery command post over existing voice channels. This communication is effected by land line, or in exceptional circumstances via the installed radio.
- (ii) Two-way cordless communication with ammunition numbers working outside the vehicle under non-silent conditions. This is achieved by use of rugged amplifier/loudspeaker units mounted on the turret bustle. Either loudspeaker can be used as a microphone by the operation of a press-to-talk button. The use of two speakers ensures that at least one is accessible at all practical turret positions.

A typical system includes seven types of installed box, of which the Interconnecting Box Harness Adaptor (IBHA) and the Drivers Box (DB) are taken from the existing

Clansman range (the DB is utilised as a general crew box), the remainder being specific to SP artillery. The five new boxes are listed below and described on the following pages.

Radio Lines Box (RLB)

Amplifier Intercom Box (AIB)

Loudspeaker Tee Box (LST)

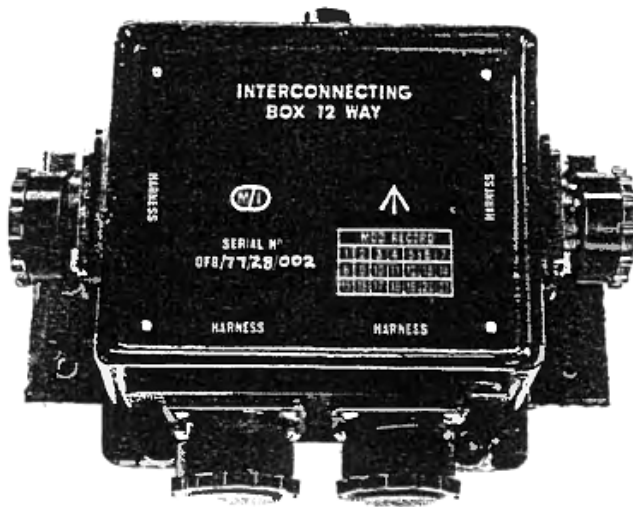
Interconnecting Box 12-way (IB12)

Telephone Adaptor Box (TAB)

The personal communication gear, including the Commander's Personal Unit (CPU), is standard, except that the CPU switch has a slightly different function from standard Clansman practice.

The radio equipment may be based on either a PRC351 VHF Manpack adapted to the vehicle role by use of the Interconnecting Box Harness Adaptor, or a Clansman vehicle radio, interfacing directly with the RLB. Signals received over the radio or lines, or both, can be superimposed on the harness intercommunication channel at the discretion of the commander.

Interconnecting Box 12-Way (IB12)



The Interconnecting Box 12-way is a junction box connection into the harness ring to provide one spur outlet to the Emergency Crew Control equipment (ECC) and another, via the sliprings to boxes installed in the hull.

There are no operator controls on the box, and it has a wide field of potential application.

Telephone Adaptor Box (TAB)



A tank telephone position, incorporating a handset, is mounted on the vehicle exterior. This is also the normal connection point for line connection to the battery command post. The Telephone Adaptor Box (TAB) is the first interior box to which the tank telephone box connects. The lines connections are linked through the TAB, and terminate at the Radio Lines Box. The signals to and from the tank telephone handset are adjusted within the TAB to levels compatible with the harness. The TAB also incorporates an indicator lamp visible to the driver, who may respond to a call from the tank telephone handset by operating a switch on the TAB, thereby connecting the handset to the harness intercom ring.

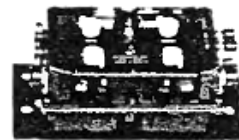
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RLB



IB2



IB2CR



LSF



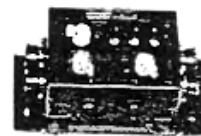
IBHA



IB3



CB2



CB3



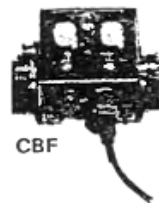
LSV



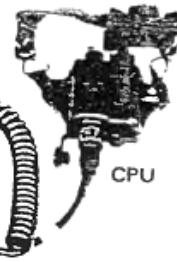
IBRA



TG(TT)



CBF



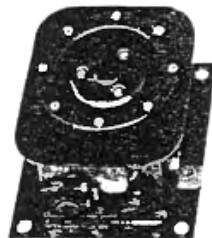
CPU



AAFL



RAB



AIB



D&S



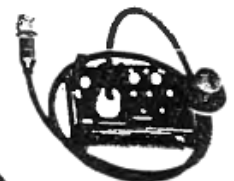
DB



SCB



IBI2



KTM



TAB



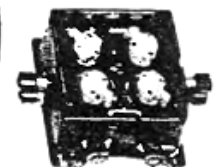
LST



RPU



AEL



RCU

2 and 3 Radio Harness Items

EQUIPMENT	DESIGNATION	NATO NO.
IB2	Interconnecting Box 2 Radio	5820-99-117-6250
IB2CR	Interconnecting Box 2 Radio Crew and Remote	5821-99-718-4304
IB3	Interconnecting Box 3 Radio	5820-99-117-6110
CB2	Crew Box 2 Set	5895-99-117-4911
CB3	Crew Box 3 Set	5895-99-117-4910
DB	Drivers Box	5820-99-117-5042
DBS	Drivers Box Selector	5820-99-117-5041
CBF	Commanders Box Fixed	5895-99-117-4909
CPU	Commanders Personal Unit	5820-99-117-5043

Ancillary Items

EQUIPMENT	DESIGNATION	NATO NO.
AAFL	Amplifier AF Loudspeaker (Lab)	5820-99-117-6143
LSF	Loudspeaker Free Standing	5965-99-117-6264
LSV	Loudspeaker Vehicle Mounting	5965-99-117-6263
AEL	Audio Extension Lead	5820-99-117-6142
RCU	Remove Combining Unit	5820-99-117-6111
RPU	Remove Personal Unit	5820-99-117-6144
IBHA	Interconnecting Box Harness Adaptor	5820-99-117-6249
SCB	Set Combining Box	5895-99-117-6108
RAB	Radio Adaptor Box (Larch)	5820-99-117-6109
IBRA	Interconnecting Box Radio Adaptor (Crab)	5820-99-117-6248
TG(TT)	Tone Generator Converts Tank Telephone	5965-99-117-5044
KTM	Key Telegraph Manual	5805-99-652-6872
RRB	*Remote Rebroadcast Box	
HRB	*Harness Rebroadcast Box	

Self Propelled Artillery Items

EQUIPMENT	DESIGNATION
RLB	Radio Lines Box
AIB	Amplifier Intercom Box
LST	Loudspeaker Tee Box
TAB	Telephone Adaptor Box
IB12	Interconnecting Box 12 Way

*Not illustrated

CLANSMAN IB2 CR CIRCUIT

STANDARD STOWED ITEMS

1. REMOTE PERSONAL UNIT (RPU)
Used with standard clansman headgear it provides voice communication and call (see page 9).
2. AUDIO EXTENSION LEAD (AEL)
Extends audio socket facilities up to 10 metres.
(see page 9).
3. REMOTE HANDSET
Provides voice communication and call

ANCILLARY ITEMS

1. REMOTE COMBINING UNIT (RCU)
Provides CALL & INTERCOMM access to 2 radios via remote lines (see page 9).
2. KEY TELEGRAPH MANUAL (KTM)
Morse key for vehicle installations (see page 10).
3. LOUDSPEAKER - FREE STANDING (LSF)
Delivers up to 1 watt of audio output (see page 8).
4. SET COMBINING BOX (SCB)
Gives access to 2 radios not in harness (see page 10).

INTERFACE ITEMS

1. RADIO ADAPTOR BOX (RAB)
Provides an interface between Clansman harness and Larkspur radio (see page 10).
2. INTERCONNECTING BOX HARNESS ADAPTOR (IBHA)
Provides an interface between Clansman harness and Clansman Manpack radios PRC 351/352 and PRC 320 (see page 10).