

SECTION 8

◀ RADIO INSTALLATION ▶

LIST OF CHAPTERS OVERLEAF

LIST OF CHAPTERS

Note.- A list of contents appears at the beginning of each chapter

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- 2 U/V.H.F. and stand-by U.H.F.
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**SECT.
8**

Chapter I INTERCOMMUNICATION

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DESCRIPTION

General

1. The A.R.I. 18089 intercomm. installation provides facilities for distributing I/C signals between crew positions, independent selection of any combination of the available transmitter or receiver services and the mixing of received signals without introducing any adverse effects. Only the pilot and navigator are provided with press-to-transmit switches, otherwise, the same intercomm. associated services are available for each crew member; these are I/C, U/V.H.F., Stand-by U.H.F., Radio Compass, Tacan, V.O.R./LOC. and I.L.S. Marker, of these

the last four permit receive only. A full description of the A.R.I. 18089 I/C system is given in A.P.116N-0105-1; for information relating to the services interconnected with I/C reference should be made to the appropriate chapters in this Section or in Section 9.

Power supplies

2. The intercomm. system operates on power supplies of 28-volt d.c. obtained from the E.C.P. For further information refer to Sect.6, Chap.11.

Control units, Type 7681

3. A control unit is mounted at each

crew station, the pilot's on his miscellaneous instrument panel, the navigator's on his instrument panel and the passenger's on the starboard cabin wall.

4. Four toggle switches and three potentiometer-type volume controls, labelled LISTEN ONLY and fitted on the face of the control unit, allow the user to independently select, for receive only, any combination of the seven services interconnected with the intercomm. A rotary switch, labelled SPEAK-LISTEN and also fitted on the face of the control unit, transfers the user's microphone, telephone and press-to-transmit circuits to the I/C amplifier

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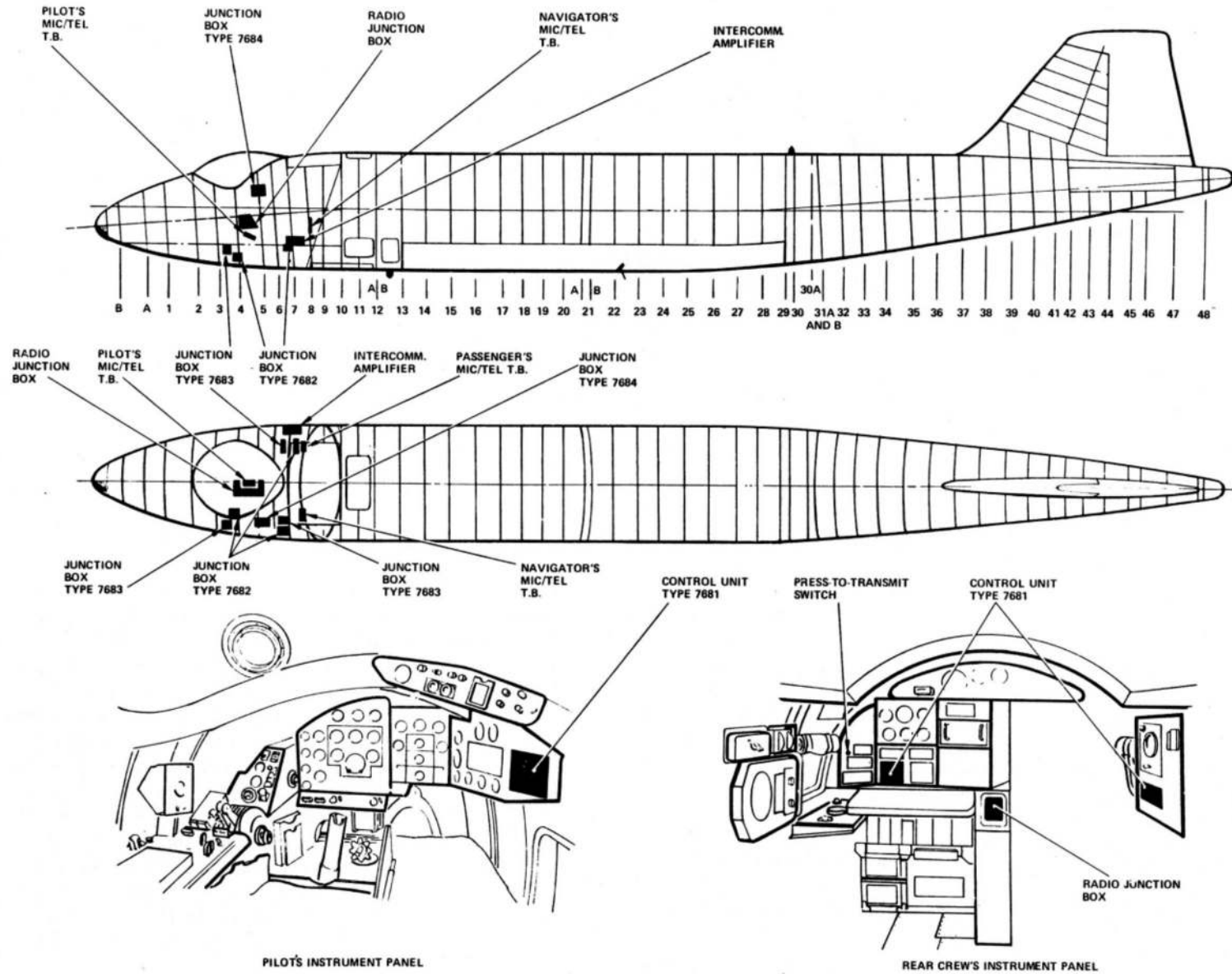


FIG. 1. INTERCOMM - LOCATION DIAGRAM

PILOT'S JUNCTION BOX TYPE 7682 REPOSITIONED

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or the transmitter/receiver of his choice.

Note...

A variation exists between the labeling of the pilot's control unit and that of the rear crew's control units; this is because of the difference in priorities at these stations. The wiring changes necessary to bring about these variations are effected by the jumpered connections in J.B. 7683.

5. Input signals are normally fed into the control unit, mixed and fed via an anticross-talk network to a push-pull amplifier, the output of which is passed to the users telephones. In the event of the push-pull amplifier failing, the incoming signals from the equipment selected by the SPEAK-LISTEN switch can be passed direct to the telephones by selecting DIRECT on a three position switch to the left of the rotary switch. In this mode however, only the one signal can be received since the anti-cross-talk network attenuates the 'listen only' signals to an inaudible level.

6. If on a particular control unit the SPEAK-LISTEN switch is not in the I/C position or the I/C toggle switch is at the OFF position, the user of that control unit is isolated from the other crew members. To overcome this, a call switch is mounted on each control unit to enable its operator to speak to another crew member who would be otherwise isolated. When a call switch is operated, it completes the earth return

from the solenoid of the relay in J.B. 7684 which connects the output of the I/C amplifier to a core in the main telephone lines; this core is permanently connected to the input side of each control unit amplifier.

Junction boxes, Type 7682 and 7683

7. One each of these junction boxes is fitted beneath the floor at each crew position. Both types of unit are T-junction devices and connect the control unit to the main microphone and telephone cables, respectively. Although the same two types of units are fitted at each crew position there are differences in the way that they have been adapted to suit the aircraft installation. These adaptations each take the form of links which are jumpered across certain pairs of soldering spills. The spills are mounted inside each junction box and form two rows on a terminal block which interrupt the circuit between the junction of the 'T' and the control unit. The spills that are linked and the types of wire used for the linkages in each junction box are given in Table 2.

Junction box, Type 7684

8. This unit which is the I/C system main junction box, is mounted high on the wall to port of the navigator and provides interconnection between the junction boxes, Type 7682 and 7683, and the I/C amplifier and other transmitter/receiver services. The box also contains the call relay (*para.6*) and the emergency I/C relay (*para.9*).

Radio junction box

9. This unit is mounted on top of the

E.C.P. and carries three terminal blocks, an I/C master switch and certain power supply components. The terminal blocks provide interconnection between the radio systems and the I/C switch controls the I/C relay in the junction box, Type 7684. When the switch is set to normal the relay is energized and the contacts on that relay make the necessary mic/tel connections to the I/C amplifier. When the switch is set to EMERGENCY, the mic/tel circuits are transferred to the U/V.H.F. transmitter/receiver by the now de-energized relay, and when set to OFF, it disconnects the earth return from the solenoid of the intercomm. amplifier's internal power supply relay, and renders the amplifier inoperative.

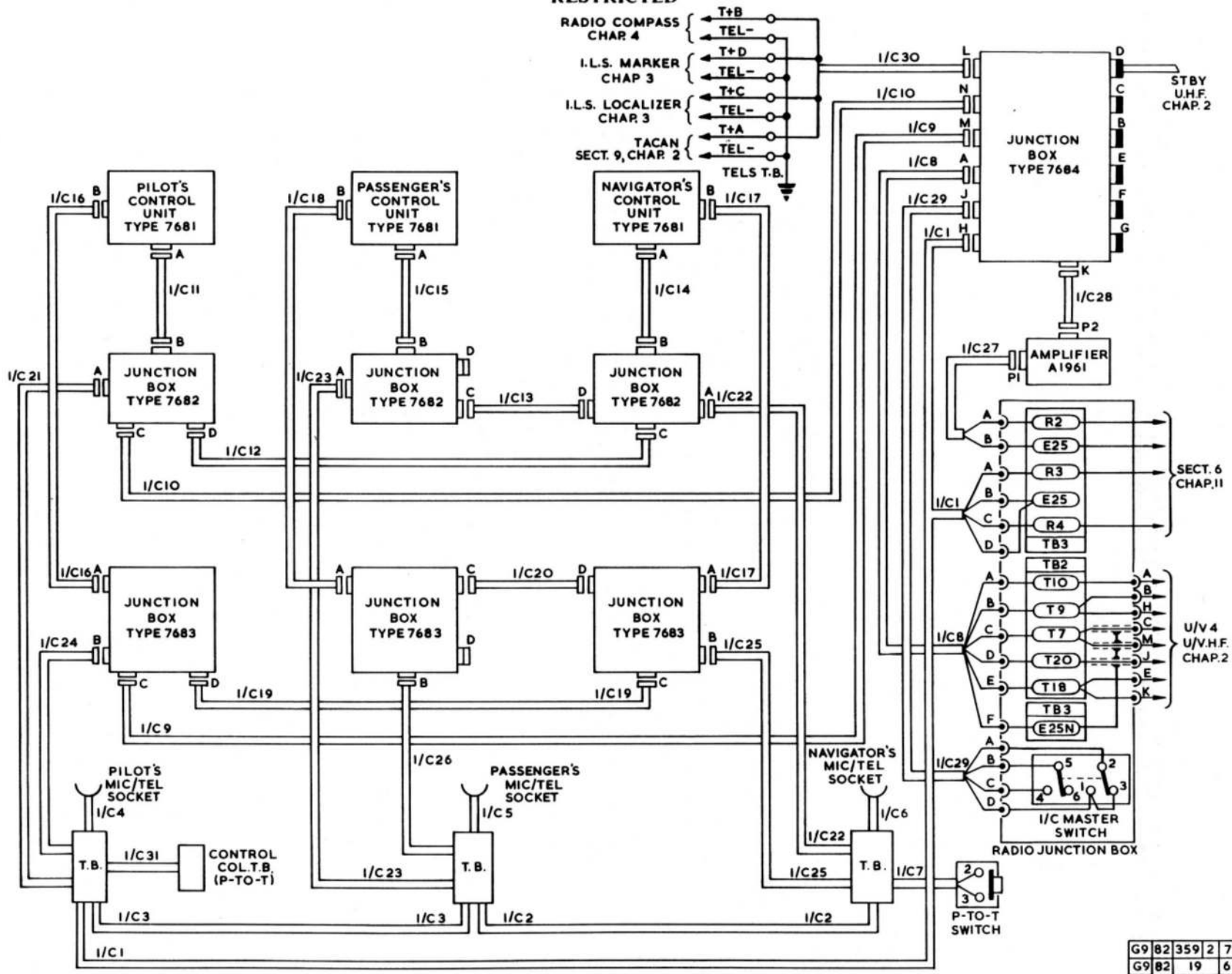
Amplifier

10. This unit is carried by a tray equipped with antivibration mountings and situated on the starboard cabin wall at the passenger's station. The unit is a three-stage audio amplifier which operates from the aircraft's 28-volt d.c. supply. A Type 103 rotary transformer is incorporated in the unit to supply the H.T. to the valve anodes and a Type 40 carbon pile regulator provides the valve heaters with a stabilized voltage of 19 volts.

Mic/tel sockets

11. Type 359 I/C sockets are fitted at the side of each ejection seat and are connected into the I/C system by terminal blocks. The pilot's I/C terminal block is fitted inside the navigator's crate, the navigator's is positioned above his port panel and the passenger's is mounted on the aft vertical face of the

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G9	82	359	2	7
G9	82	19		6

FIG. 2 INTERCOMM-INTERCONNECTION DIAGRAM

◀ MOD 5102 EMBODIED ▶

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starboard rear cabin floor. From each Type 359 socket a lead is routed up the seat structure and extended to a quick-release socket into which the headset is connected.

Press-to-transmit (P-to-T) switches

12. The pilot's P-to-T switch is situated in the crook of the right hand grip of the control column and the navigator's at the port edge of the instrument panel. Operation of either switch effects

transmission by either the U/V.H.F. or stand-by U.H.F. T/R units, depending on the position of the rotary switch on the I/C control unit.

SERVICING

WARNING

The relevant safety precautions detailed on the LETHAL WARNING marker card must always be observed before entering the cabin or performing any operations upon the aircraft.

General

13. Components and cables should be checked periodically for damage and security, otherwise servicing consists of verifying that all controls and switches function correctly and produce the desired effects.

Note...

During replacement of the pilot's press-to-transmit switch, great care must be taken to avoid trapping of the tailplane trim control cables by the shoulder of the press-to-transmit switch. ▶◀

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TABLE 1
Equipment, locations and A.P. references

Equipment	Type	Location	A.P. reference
Junction box	7684	Navigator's station	116N-0105-1
Junction box	7683	Beneath cabin floor at pilot's station	
Junction box	7682		
Junction box	7683	Beneath cabin floor at navigator's station	
Junction box	7682		
Junction box	7683	Beneath cabin floor at passenger's station	
Junction box	7682		
Control unit	7681	One fitted at each crew position	
Amplifier	A1961	Passenger's station	
Mounting tray	936		

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TABLE 2

Jumpered connections

J.B.7683 (PILOT'S STATION)			J.B.7683 (NAV'S AND PASSENGER'S STATIONS)			J.B.7682 (ALL STATIONS)		
SPILL	TO	SPILL	SPILL	TO	SPILL	SPILL	TO	SPILL
B		BS	B		BS	A		AS
N		NS	N		NS	D		DS
P		LS	P		LS	G		GS
Q		OS	Q		MS	K		KS
R		MS	R		PS			
S		PS	S		OS			
E		ES	E		ES			
K		KS	K		KS			

Note...
Equipment wire (Q22) to be used for links in J.B.'s.7683 and 20 S.W.G.
tinned-copper wire to be used for links in J.B.'s.7682.

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TABLE 3

Cable assembly details

Note: - Screens from cores are earthed at plug or socket unless otherwise stated

CABLE ASSEMBLY 1/C1 (EG9.82.293-2)

Mk.7 plug Radio junction box	}	A	1/C1A	N20	1/C1B	A	Mk.7 socket J.B.7684 Pilot's T.B.
		B	1/C1A	N20	1/C1B	B	
		C	1/C1A	N20	1/C1C	+	
		D	1/C1A	N20	1/C1C	-	

CABLE ASSEMBLY 1/C8 (EG9.82.307-3)

Mk.7 free plug Radio junction box	}	A	Red	MIN.6D	Red	A	Mk.7 free socket J.B.7684(A)
		B	Blue	MIN.6D	Blue	B	
		C	Black	MIN.6D	Black	C	
		D	Green	MIN.6D	Green	D	
		E	White	MIN.6D	White	E	
		F	Yellow	MIN.6D	Yellow	F	

CABLE ASSEMBLY 1/C2 (EG9.82.295-2)

Passenger's T.B.	}	28V +	1/C2	N20	1/C2	28V +	Navigator's T.B.
		28V -	1/C2	N20	1/C2	28V -	

CABLE ASSEMBLY 1/C3 (EG9.82.297-2)

Pilot's T.B.	}	28V +	1/C3	N20	1/C3	28V +	Passenger's T.B.
		28V -	1/C3	N20	1/C3	28V -	

CABLE ASSEMBLY 1/C4 (EG9.82.299-3)

Pilot's T.B.	}	MIC +	1/C4	NMS20	1/C4	MIC +	Pilot's mic/tel socket, Type 359
		MIC -	1/C4	NMS20	1/C4	MIC -	
		TEL +	1/C4	N20	1/C4	TEL +	
		TEL -	1/C4	N20	1/C4	TEL -	

* Screens from cores linked to earth at pilot's T.B.

CABLE ASSEMBLY 1/C5 (EG9.82.301-1)

Passenger's T.B.	}	MIC +	1/C5	NMS20	1/C5	MIC +	Passenger's mic/tel socket, Type 359
		MIC -	1/C5	NMS20	1/C5	MIC -	
		TEL +	1/C5	N20	1/C5	TEL +	
		TEL -	1/C5	N20	1/C5	TEL -	

CABLE ASSEMBLY 1/C9 (EG9.82.309-3)

Mk.7 free plug J.B.7684(M)	}	A	Grey	MIN.25C	Grey	A	Mk.7 free socket J.B.7683(C) (Pilot's)
		B	Green/White	MIN.25C	Green/White	B	
		C	Green/Orange	MIN.25C	Green/Orange	C	
		D	Yellow	MIN.25C	Yellow	D	
		E	Light Green	MIN.25C	Light Green	E	
		F	Red/Blue	MIN.25C	Red/Blue	F	
		G	Red	MIN.25C	Red	G	
		H	Green/Yellow	MIN.25C	Green/Yellow	H	
		J	White	MIN.25C	White	J	
		K	Pink	MIN.25C	Pink	K	
		L	Red/Green	MIN.25C	Red/Green	L	
		M	Blue	MIN.25C	Blue	M	
		N	Blue/Orange	MIN.25C	Blue/Orange	N	
		O	Black	MIN.25C	Black	O	
		P	Orange	MIN.25C	Orange	P	
		Q	Red/Yellow	MIN.25C	Red/Yellow	Q	
		R	Green	MIN.25C	Green	R	
		S	Blue/Black	MIN.25C	Blue/Black	S	
		T	Brown	MIN.25C	Brown	T	
		U	Violet	MIN.25C	Violet	U	
		V	Red/White	MIN.25C	Red/White	V	
		W	Red/Brown	MIN.25C	Red/Brown	W	
		X	Blue/White	MIN.25C	Blue/White	X	
		Y	Red/Black	MIN.25C	Red/Black	Y	
		Z	Blue/Yellow	MIN.25C	Blue/Yellow	Z	

CABLE ASSEMBLY 1/C6 (EG9.82.303-1)

Navigator's T.B.	}	MIC +	1/C6	NMS20	1/C6	MIC +	Navigator's mic/tel socket, Type 359
		MIC -	1/C6	NMS20	1/C6	MIC -	
		TEL +	1/C6	N20	1/C6	TEL +	
		TEL -	1/C6	N20	1/C6	TEL -	

CABLE ASSEMBLY 1/C7 (EG9.82.779-1)

Navigator's T.B.	}	P-to-T +	1/C7	N20	1/C7	2	P-to-T switch (Nav's)
		P-to-T -	1/C7	N20	1/C7	3	

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TABLE 3 Cable assembly details - continued

CABLE ASSEMBLY I/C15 (EG9.82.321-4)				CABLE ASSEMBLY I/C17 (EG9.82.325-3) - continued					
Mk.7 free socket Control unit, Type 7681(A) (Passenger's)	A White	MIN.12C White	A	Mk.7 free plug J.B.7682(B) (Passenger's)	Mk.7 free socket Control unit, Type 7681(B) (Nav's)	F Blue	MIN.18C Blue	F	Mk.7 free plug J.B.7683(A) (Nav's)
	B Black	MIN.12C Black	B			G Green	MIN.18C Green	G	
	C Yellow	MIN.12C Yellow	C			H Light Green	MIN.18C Light Green	H	
	D Red	MIN.12C Red	D			J Red/Brown	MIN.18C Red/Brown	J	
	E Blue	MIN.12C Blue	E			K Red/Black	MIN.18C Red/Black	K	
	F Brown	MIN.12C Brown	F			L Black	MIN.18C Black	L	
	G Grey	MIN.12C Grey	G			M White	MIN.18C White	M	
	H Light Green	MIN.12C Light Green	H			N Yellow	MIN.18C Yellow	N	
	J Green	MIN.12C Green	J			O Red/Blue	MIN.18C Red/Blue	O	
	K Violet	MIN.12C Violet	K			P Grey	MIN.18C Grey	P	
L Pink	MIN.12C Pink	L	Q Red/White	MIN.18C Red/White	Q				
M Orange	MIN.12C Orange	M	R Red/Yellow	MIN.18C Red/Yellow	R				
			S Red/Dark Green	MIN.18C Red/Dark Green	S				
CABLE ASSEMBLY I/C16 (EG9.82.323-3)				CABLE ASSEMBLY I/C18 (EG9.82.327-3)					
Mk.7 free socket Control unit, Type 7681(B) (Pilot's)	A Violet	MIN.18C Violet	A	Mk.7 free plug J.B.7683(A) (Pilot's)	Mk.7 free socket Control unit, Type 7681(B) (Passenger's)	A Violet	MIN.18C Violet	A	Mk.7 free plug J.B.7683(A) (Passenger's)
	B Orange	MIN.18C Orange	B			B Orange	MIN.18C Orange	B	
	C Pink	MIN.18C Pink	C			C Pink	MIN.18C Pink	C	
	D Brown	MIN.18C Brown	D			D Brown	MIN.18C Brown	D	
	E Red	MIN.18C Red	E			E Red	MIN.18C Red	E	
	F Blue	MIN.18C Blue	F			F Blue	MIN.18C Blue	F	
	G Green	MIN.18C Green	G			G Green	MIN.18C Green	G	
	H Light Green	MIN.18C Light Green	H			H Light Green	MIN.18C Light Green	H	
	J Red/Brown	MIN.18C Red/Brown	J			J Red/Brown	MIN.18C Red/Brown	J	
	K Red/Black	MIN.18C Red/Black	K			K Red/Black	MIN.18C Red/Black	K	
L Black	MIN.18C Black	L	L Black	MIN.18C Black	L				
M White	MIN.18C White	M	M White	MIN.18C White	M				
N Yellow	MIN.18C Yellow	N	N Yellow	MIN.18C Yellow	N				
O Red/Blue	MIN.18C Red/Blue	O	O Red/Blue	MIN.18C Red/Blue	O				
P Grey	MIN.18C Grey	P	P Grey	MIN.18C Grey	P				
Q Red/White	MIN.18C Red/White	Q	Q Red/White	MIN.18C Red/White	Q				
R Red/Yellow	MIN.18C Red/Yellow	R	R Red/Yellow	MIN.18C Red/Yellow	R				
S Red/Dark Green	MIN.18C Red/Dark Green	S	S Red/Dark Green	MIN.18C Red/Dark Green	S				
CABLE ASSEMBLY I/C17 (EG9.82.325-3)				CABLE ASSEMBLY I/C19 (EG9.82.329-3)					
Mk.7 free socket Control unit, Type 7681(B) (Nav's)	A Violet	MIN.18C Violet	A	Mk.7 free plug J.B.7683(A) (Nav's)	Mk.7 free socket J.B.7683(D) (Pilot's)	A Grey	MIN.25C Grey	A	Mk.7 free socket J.B.7683(C) (Nav's)
	B Orange	MIN.18C Orange	B			B Green/White	MIN.25C Green/White	B	
	C Pink	MIN.18C Pink	C			C Green/Orange	MIN.25C Green/Orange	C	
	D Brown	MIN.18C Brown	D			D Yellow	MIN.25C Yellow	D	
	E Red	MIN.18C Red	E						

continued...

TABLE 3 Cable assembly details - continued

CABLE ASSEMBLY 1/C19 (EG9.82.329-3) - continued

Mk.7 free socket J.B.7683(D) (Pilot's)	E	Light Green	MIN.25C	Light Green	E	Mk.7 free socket J.B.7683(C) (Nav's)
	F	Red/Blue	MIN.25C	Red/Blue	F	
	G	Red	MIN.25C	Red	G	
	H	Green/Yellow	MIN.25C	Green/Yellow	H	
	J	White	MIN.25C	White	J	
	K	Pink	MIN.25C	Pink	K	
	L	Red/Green	MIN.25C	Red/Green	L	
	M	Blue	MIN.25C	Blue	M	
	N	Blue/Orange	MIN.25C	Blue/Orange	N	
	O	Black	MIN.25C	Black	O	
	P	Orange	MIN.25C	Orange	P	
	Q	Red/Yellow	MIN.25C	Red/Yellow	Q	
	R	Green	MIN.25C	Green	R	
	S	Blue/Black	MIN.25C	Blue/Black	S	
	T	Brown	MIN.25C	Brown	T	
	U	Violet	MIN.25C	Violet	U	
	V	Red/White	MIN.25C	Red/White	V	
	W	Red/Brown	MIN.25C	Red/Brown	W	
X	Blue/White	MIN.25C	Blue/White	X		
Y	Red/Black	MIN.25C	Red/Black	Y		
Z	Blue/Yellow	MIN.25C	Blue/Yellow	Z		

CABLE ASSEMBLY 1/C20 (EG9.82.331-3)

Mk.7 free socket J.B.7683(D) (Nav's)	A	Grey	MIN.25C	Grey	A	Mk.7 free socket J.B.7683(C) (Passenger's)
	B	Green/White	MIN.25C	Green/White	B	
	C	Green/Orange	MIN.25C	Green/Orange	C	
	D	Yellow	MIN.25C	Yellow	D	
	E	Light Green	MIN.25C	Light Green	E	
	F	Red/Blue	MIN.25C	Red/Blue	F	
	G	Red	MIN.25C	Red	G	
	H	Green/Yellow	MIN.25C	Green/Yellow	H	
	J	White	MIN.25C	White	J	
	K	Pink	MIN.25C	Pink	K	
	L	Red/Green	MIN.25C	Red/Green	L	
	M	Blue	MIN.25C	Blue	M	
	N	Blue/Orange	MIN.25C	Blue/Orange	N	
	O	Black	MIN.25C	Black	O	

CABLE ASSEMBLY 1/C20 (EG9.82.331-3) - continued

Mk.7 free socket J.B.7683(D) (Nav's)	P	Orange	MIN.25C	Orange	P	Mk.7 free socket J.B.7683(C) (Passenger's)
	Q	Red/Yellow	MIN.25C	Red/Yellow	Q	
	R	Green	MIN.25C	Green	R	
	S	Blue/Black	MIN.25C	Blue/Black	S	
	T	Brown	MIN.25C	Brown	T	
	U	Violet	MIN.25C	Violet	U	
	V	Red/White	MIN.25C	Red/White	V	
	W	Red/Brown	MIN.25C	Red/Brown	W	
	X	Blue/White	MIN.25C	Blue/White	X	
	Y	Red/Black	MIN.25C	Red/Black	Y	
Z	Blue/Yellow	MIN.25C	Blue/Yellow	Z		

CABLE ASSEMBLY 1/C21 (EG9.82.333-6)

Mk.7 free socket J.B.7682(A) (Pilot's)	A	Red	MIN.2D	Red	M +	Pilot's T.B.
	B	Blue	MIN.2D	Blue	M -	

CABLE ASSEMBLY 1/C22 (EG9.82.335-3)

Mk.7 free socket J.B.7682(A) (Nav's)	A	Red	MIN.2D	Red	M +	Nav's. T.B.
	B	Blue	MIN.2D	Blue	M -	

CABLE ASSEMBLY 1/C23 (EG9.82.337-3)

Mk.7 free socket J.B.7682(A) (Passenger's)	A	Red	MIN.2D	Red	M +	Passenger's T.B.
	B	Blue	MIN.2D	Blue	M -	

CABLE ASSEMBLY 1/C24 (EG9.82.339-2)

Mk.7 free socket J.B.7683(B) (Pilot's)	A	1/C24	N20	1/C24	T +	Pilot's T.B.
	B	1/C24	N20	1/C24	T -	
	C	1/C24	N20	1/C24	28V +	
	D	1/C24	N20	1/C24	28V -	
	E	1/C24	N20	1/C24	P-to-T +	
	F	1/C24	N20	1/C24	P-to-T -	

continued...

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TABLE 3 Cable assembly details - continued

		CABLE ASSEMBLY 1/C25 (EG9.82.341-2)					
Mk.7 free socket J.B.7683(B) (Nav's)	}	A	1/C25	N20	1/C25	T +	Nav's. T.B.
		B	1/C25	N20	1/C25	T -	
		C	1/C25	N20	1/C25	28V +	
		D	1/C25	N20	1/C25	28V -	
		E	1/C25	N20	1/C25	P-to-T +	
		F	1/C25	N20	1/C25	P-to-T -	
		CABLE ASSEMBLY 1/C26 (EG9.82.343-2)					
Mk.7 free socket J.B.7683(B) (Passenger's)	}	A	1/C26	N20	1/C26	T +	Passenger's T.B.
		B	1/C26	N20	1/C26	T -	
		C	1/C26	N20	1/C26	28V +	
		D	1/C26	N20	1/C26	28V -	
		E	1/C26	N20	1/C26	P-to-T +	
		F	1/C26	N20	1/C26	P-to-T -	
		CABLE ASSEMBLY 1/C27 (EG9.82.345-2)					
Mk.7 free socket Amplifier A1961 P1	}	A	1/C27	N16	1/C27	A	Mk.7 free plug. Radio J.B.
		B	1/C27	N16	1/C27	B	
		CABLE ASSEMBLY 1/C28 (EG9.82.347-5)					
Mk.7 free socket J.B.7684(K)	}	A	Red	MIN.6D	Red	A	Mk.7 free socket. 1/C Amplifier P2
		B	Blue	MIN.6D	Blue	B	
		C	Black	MIN.6D	Black	C	

		CABLE ASSEMBLY 1/C28 (EG9.82.347-5) - continued					
Mk.7 free socket J.B.7684(K)	}	D	Green	MIN.6D	Green	D	Mk.7 free socket. 1/C Amplifier P2
		E	White	MIN.6D	White	E	
		F	Yellow	MIN.6D	Yellow	F	
		* Screen from core locally earthed through socket to J.B.7684(K) ▶					
		CABLE ASSEMBLY 1/C29 (EG9.82.349-2)					
Mk.7 free plug J.B.7684(J)	}	A	1/C29	N20	1/C29	A	Mk.7 free socket Radio J.B.
		B	1/C29	N20	1/C29	B	
		C	1/C29	N20	1/C29	C	
		D	1/C29	N20	1/C29	D	
		CABLE ASSEMBLY 1/C30 (EG9.82.351-2)					
Mk.7 free plug J.B.7684(L)	}	A	1/C30	N20	1/C30	T + A	Tels. T.B (Nav's. table)
		B	1/C30	N20	1/C30	T + B	
		C	1/C30	N20	1/C30	T + C	
		D	1/C30	N20	1/C30	T + D	
		E	1/C30	N20	1/C30	T + E	
		F	1/C30	N20	1/C30	T + F	
		G	1/C30	N20	1/C30	T + G	
		H	1/C30	N20	1/C30	T + H	
		J	1/C30	N20	1/C30	T + J	
		K	1/C30	N20	1/C30	T + K	
		L	1/C30	N20	1/C30	T + L	
		M	1/C30	N20	1/C30	T + M	
		CABLE ASSEMBLY 1/C31 (EG9.82.353-2)					
T.B. Control column break	}	P-to-T +	1/C31	N20	1/C31	P-to-T +	Pilot's T.B.
		NEG	1/C31	N20	1/C31	NEG	

Chapter 2 U/V.H.F. AND STAND-BY U.H.F.

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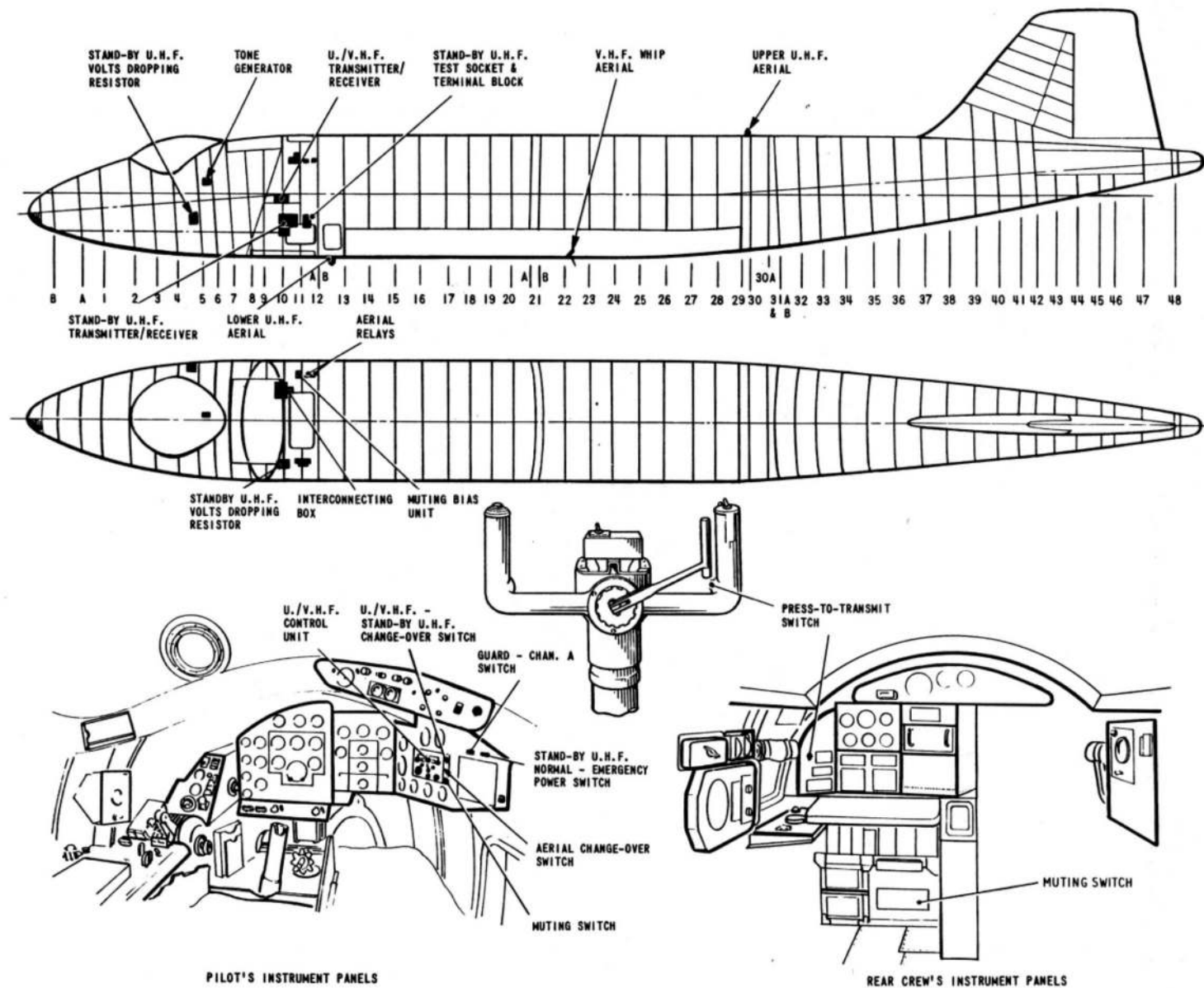


FIG. 1. U./V.H.F. AND STAND-BY U.H.F. - LOCATION DIAGRAM

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DESCRIPTION**General information**

1. The aircraft is equipped with two means of radio communication namely U/V.H.F. and stand-by U.H.F. The U/V.H.F., also known as P.T.R. 175, is capable of operating on both the U.H.F. and V.H.F. frequency ranges and for this purpose has two separate aerial installations. A choice of two aeri-als (upper and lower) is provided for the transmission and reception of U.H.F. signals and a single whip aerial provides similarly for V.H.F. signals. The stand-by U.H.F. T/R unit is used as an alternative method of radio communication if the U/V.H.F. equipment becomes unserviceable. The unit operates on a 24-volt d.c. supply which is normally obtained, via a dropping resistor, from the E.C.P.; if this supply is not available the equipment can be supplied direct from an emergency battery.

2. Transfer from normal U/V.H.F. to stand-by U.H.F. is effected by a switch mounted on the miscellaneous instrument panel which, when in the stand-by position, energizes the T/R unit and, by interrupting the U.H.F. aerial selector feed, makes available for stand-by use the lower U.H.F. aerial.

3. The U/V.H.F. and stand-by U.H.F. services are delivered to the crew member's headsets by the I/C system (*Chap. 1*). Table 1 lists the components included in the radio communications installation together with the means of access to them and the A.P.'s in which they appear.

U/V.H.F. INSTALLATION (A.R.1.23143/1)**Transmitter/receiver**

4. This unit is pressurized, contains its own cooling system and is mounted on an aluminium carrier which is supported by four air-damped, shock-absorber, mounts and located at the starboard side of the upper equipment bay floor. The unit can operate on any one of 3500 frequency channels encompassed by the U.H.F. and V.H.F. frequency bands (225.0 to 399.9 MHz and 117.5 to 135.9 MHz, respectively), both bands being split into channels spaced 50 KHz apart and any 19 of which can be preset and are available for immediate use by the operation of a rotary switch on the control unit. The remaining frequency channels are manually selected by five knobs also situated on the face of the control unit.

Control unit

5. The transmitter/receiver is controlled by a unit fitted on the miscellaneous instrument panel. The unit's controls comprise four manual frequency selectors (MANUAL), a rotary channel selector switch (CHAN), a volume controller (VOL) and a rotary mode selector switch. The manual controls are used to select any one of 3500 frequencies.

Muting bias unit

6. A muting bias unit is fitted at the starboard side of the upper equipment bay and provides a negative bias supply for receiver muting. The unit is controlled by switches mounted on the miscellaneous instrument panel and the sloping footrest below the table at the rear crew's station. The operation of either switch energizes a relay inside the

muting unit and causes the bias to be applied, via the interconnecting box, to the a.g.c. line of the U/V.H.F. receiver.

Interconnecting box

7. Mounted adjacent to the transmitter/receiver in the upper equipment bay, this unit is the main distribution point for the U/V.H.F. installation.

Aerials

8. Three radio communication aerials are fitted to the aircraft, two being for use when the equipment is operating in the U.H.F. range and the third, a whip aerial, for use over the V.H.F. range. The U.H.F. aerials are located above and below the fuselage between frames 29 and 30 and 12 and 13, respectively, and the V.H.F. aerial is located below the fuselage between frames 22 and 23.

U.H.F. aerial switching

9. The choice of upper and lower U.H.F. aerials is provided so that maximum signal cover can be obtained at any altitude. Change-over is effected by a switch mounted on the miscellaneous instrument panel which controls the 28-volt supply to the solenoid of the two relay armatures. When the relays are energized the upper aerial is not used and the lower aerial is connected to the U/V.H.F. T/R unit; when the relays are de-energized the upper aerial is connected to the U/V.H.F. T/R unit and the lower aerial to the stand-by T/R unit. Since the energizing line to the aerial relay solenoids is disconnected when the U/V.H.F. - U.H.F. STD' BY switch is selected to stand-by, the relay units

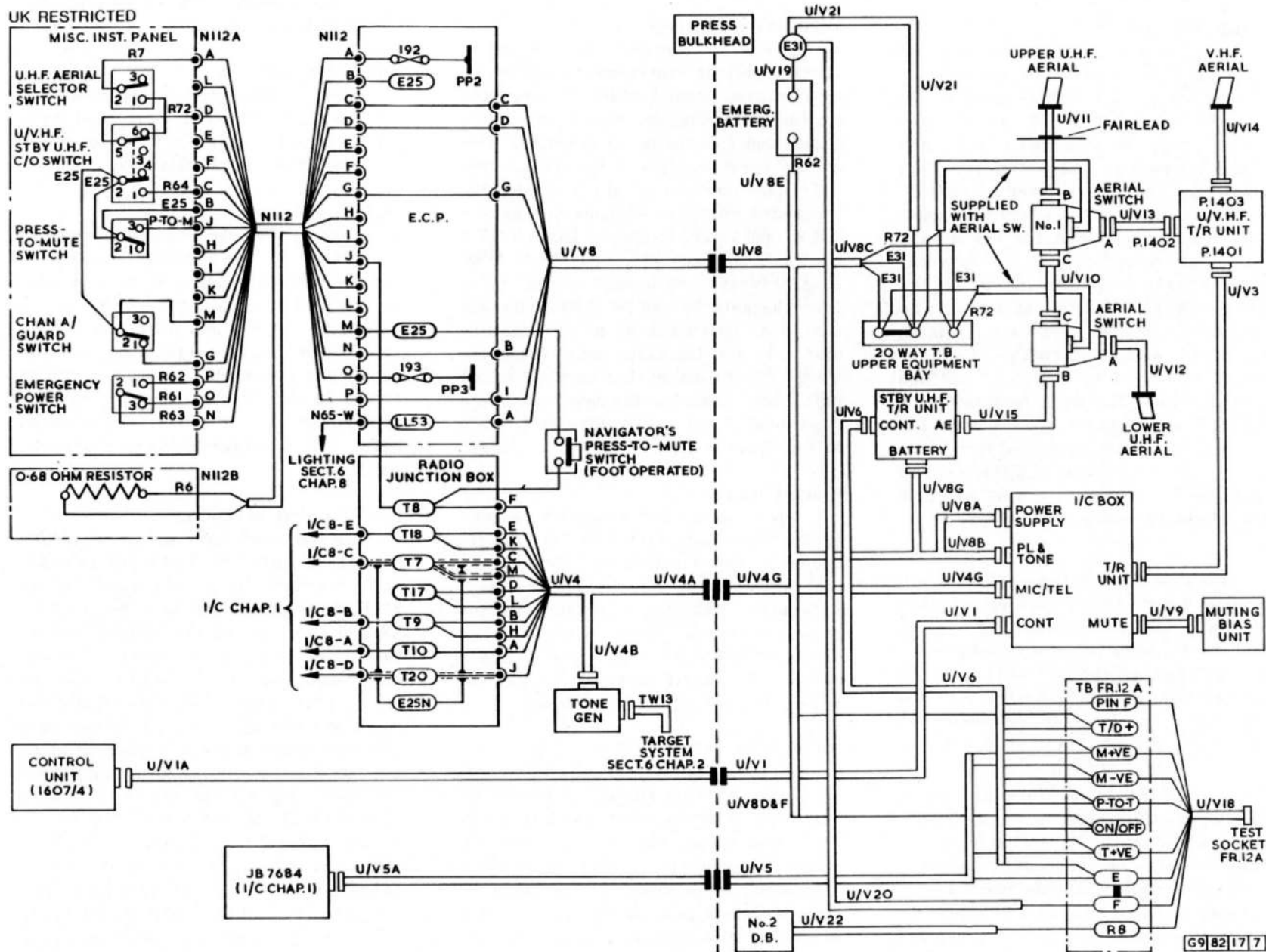


FIG.2 U./V.H.F. AND STANDBY U.H.F. - INTERCONNECTION DIAGRAM

◀U/V14 AMENDED TO U/V18 AT FR.12A▶

are therefore not energized and ensure that the lower aerial is made available for stand-by use.

Press-to-transmit switches

10. Refer to Chap.1.

Tone generator

11. Refer to Sect.6, Chap.2.

STAND-BY U.H.F. (A.R.1.23057)

Transmitter/receiver

12. The transmitter/receiver is mounted on a Type 1031 carrying tray and is located in the port equipment bay. The unit can operate on the guard frequency channel and another frequency known as channel A. Both of these frequencies are in the range of between 238 to 248 MHz and are spaced at not more than 1 MHz apart. A switch marked GUARD - CHAN A and situated on the miscellaneous instrument panel effects selection of the chosen frequency by energizing a relay within the T/R unit.

13. The unit requires a power supply of 24 volts d.c. and this is normally

obtained from the aircraft's 28-volt d.c. supply at the E.C.P., the reduction in voltage being obtained by an 0.68 ohm series resistor mounted between frames 4 and 5 at the starboard side of the cabin. Also fitted is a filter unit which plugs into the front of the T/R unit to protect it against transient supply conditions. In order to maintain radio communications after a failure in the normal d.c. supplies, the stand-by T/R unit can be operated from a 24-volt battery situated in the port equipment bay; the change-over being effected by a toggle switch situated on the miscellaneous instrument panel and labelled U.H.F. STANDBY, NORMAL - EMERGENCY, POWER.

Test socket

14. A test socket, for use when servicing the stand-by U.H.F. equipment, is provided at frame 12A starboard, and is connected into the system at a terminal block also mounted at frame 12A.

Aerial

15. The lower U.H.F. aerial is used for stand-by U.H.F. communication purposes.

The aerial's location and circuit switching are described in para.8 and 9.

SERVICING

WARNING

The relevant safety precautions detailed on the LETHAL WARNING marker card must always be observed before entering the cabin or performing any operations upon the aircraft.

General

16. Refer to A.P.116D-0105-1 and A.P.116D-0110-16 for servicing information concerning the individual units of the radio communication system, the only other checks necessary are a periodic examination for component damage and security. It is also necessary to periodically check the air pressure inside the U/V.H.F. transmitter/receiver which must be maintained at between 4 and 5 lb/in². For this purpose the Schrader valve has been extended, by a length of rubber tube, from the face of the T/R unit to the top of the upper equipment bay in line with the forward edge of the hatch.

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TABLE 1

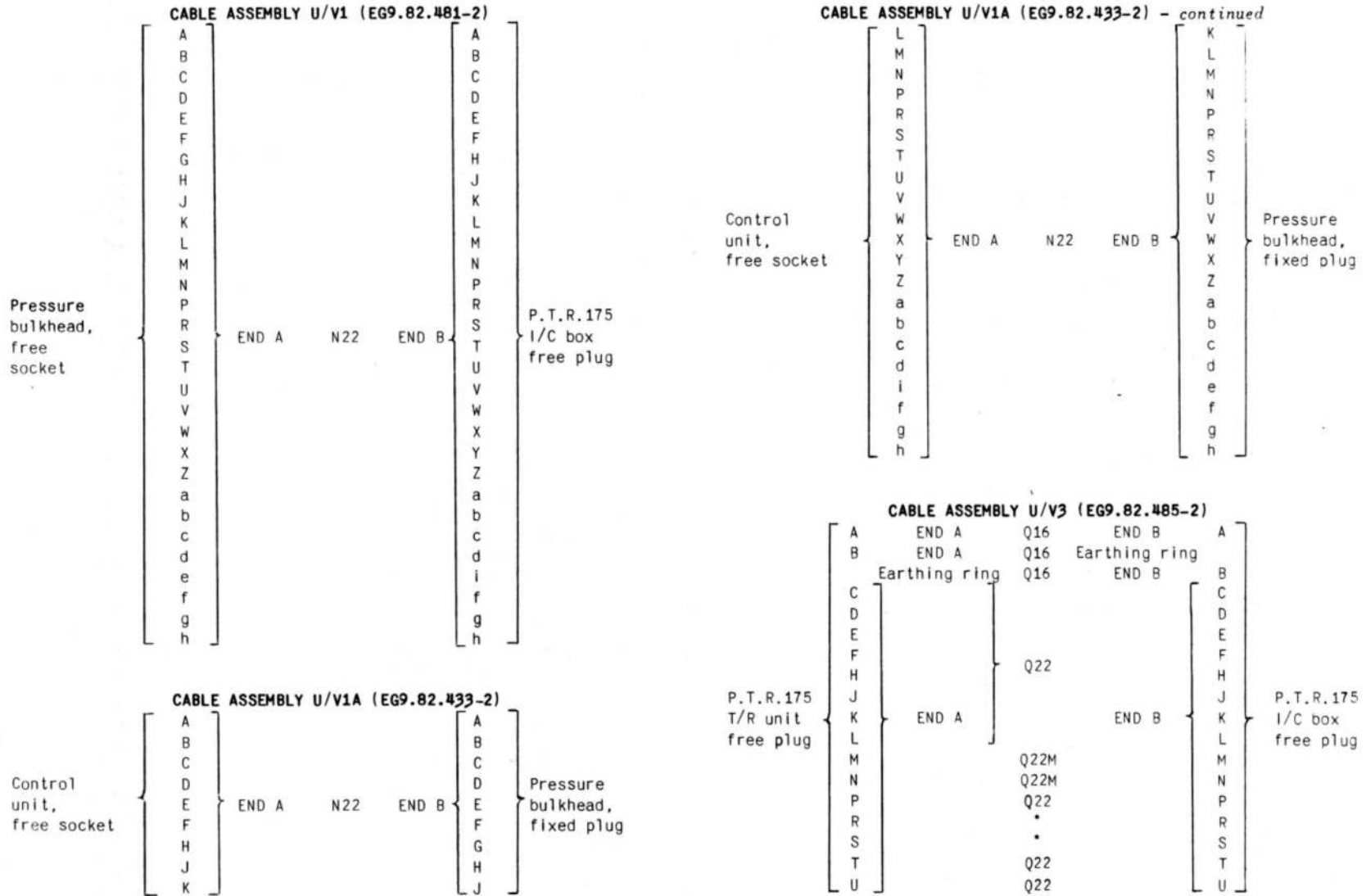
Equipment, locations and A.P. references

Equipment	Type	Location	A.P. reference
U/V. H. F. Transmitter/receiver	PTR 175	Upper equipment bay	} 116D-0105-1 (2nd.Edn.)
Mounting tray	1477	Upper equipment bay	
Tone generator	IRX 168	Cabin	
Interconnecting box (Ref.No.5821-99-9326361)		Upper equipment bay	
Muting bias unit (Ref.No.5821-99-9433247)		Upper equipment bay	
Control unit	C1607/4	Cabin - miscellaneous instrument panel	
Aerial relay armatures	1741	Upper equipment bay	
U.H.F. upper aerial	16-1	Frames 29-30	
U.H.F. lower aerial	16-1	Frames 12-13	
V.H.F. whip aerial	WT 44025/E	Frames 22-23	
Stand-by U.H.F. Transmitter/receiver	M6	Port equipment bay	116D-0110-1
Mounting tray	1031	Port equipment bay	
Resistor (voltage dropping)	VS/K3 0.68 ohm	Cabin	
Stand-by U.H.F. test socket	Mk. 4	Frame 12A	
Battery, 24-volt	19/VO/7	Port equipment compartment	116D-0110-1

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TABLE 2

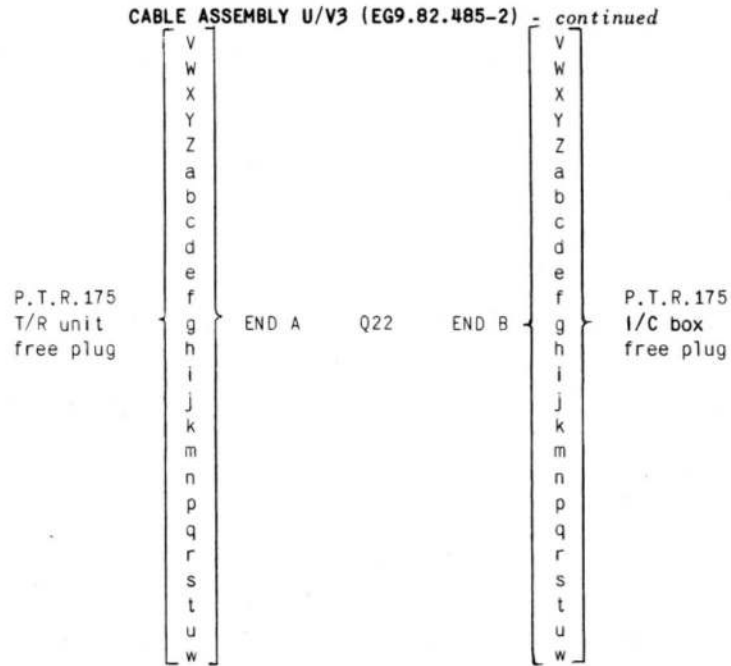
Cable assembly details



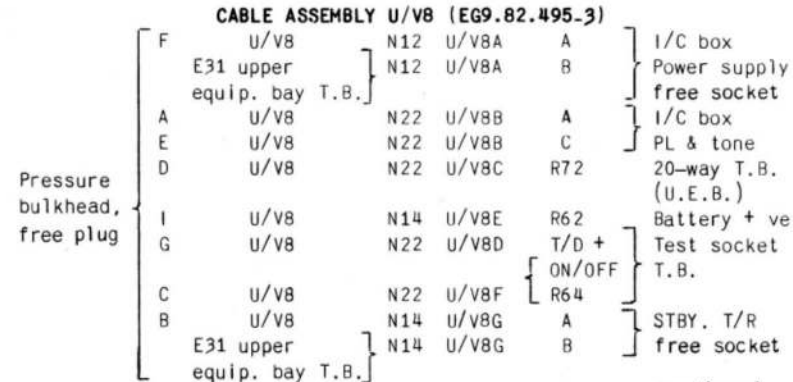
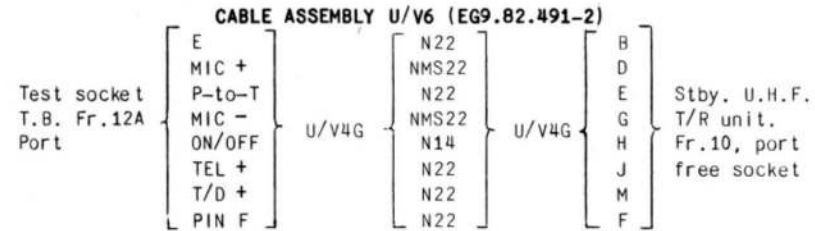
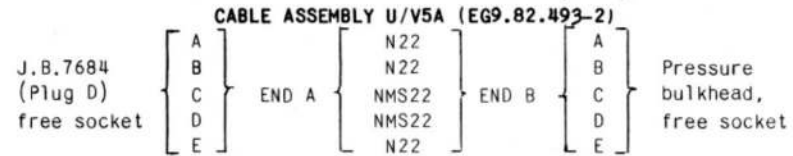
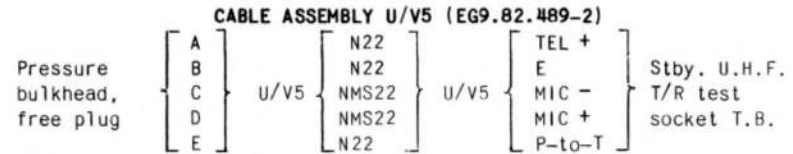
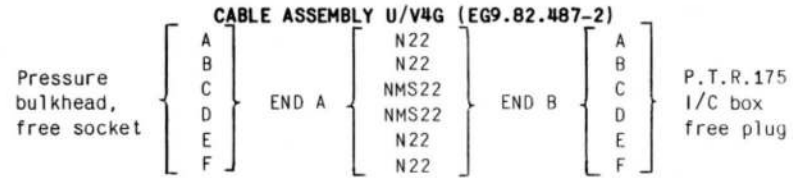
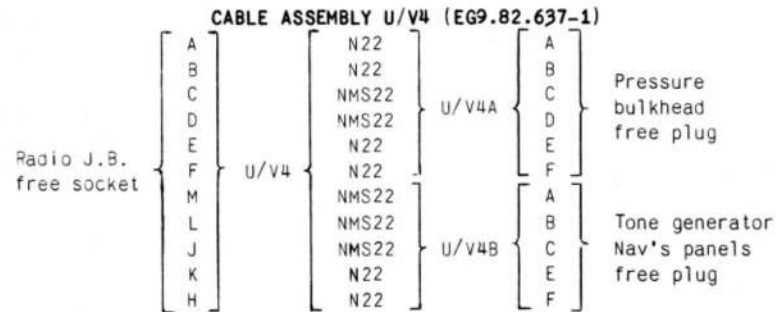
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TABLE 2 Cable assembly details - continued



Cables, Type 103/202/1, cores twisted together and screened.
Pin connections at each end are yellow core to pin R and green core to pin S.



continued...

TABLE 2 Cable assembly details - continued

<p>CABLE ASSEMBLY U/V8A (EG9.82.513-2)</p>		<p>CABLE ASSEMBLY U/V18 (EG9.82.515-1) - continued</p>	
E.C.P. free plug	<p> { A } { B } { C } { D } { E } { F } { G } { I } </p>	<p> { N22 } { N14 } { N14 } { N14 } { N22 } { N12 } { N22 } { N14 } </p>	<p> { A } { B } { C } { D } { E } { F } { G } { I } </p>
	<p>END A</p>	<p>END B</p>	<p>Pressure bulkhead, fixed socket</p>
			<p> Test socket Fr.12A { E } Q23 { F } Q23 { G } Q22M { H } Q23 { J } Q22M { K } </p>
			<p> END B { P-to-T } { Pin F } { MIC-VE } { E } { TEL+VE } </p>
			<p>Test socket T.B. Fr.12A</p>
<p>CABLE ASSEMBLY U/V9 (EG9.82.497-2)</p>		<p>CABLE ASSEMBLY U/V19 (EG9.82.537-2)</p>	
P.T.R.175 I/C box free plug	<p> { A } { B } { C } { D } { E } </p>	<p> { NMS22 } { N22 } { N22 } </p>	<p> { A } { B } { C } { D } { E } </p>
	<p>END A</p>	<p>END B</p>	<p>Muting bias unit free socket</p>
			<p>Battery negative -VE U/V19 N22 U/V19 E31 Earth</p>
<p>CABLE ASSEMBLY U/V10 (EG9.82.499-2)</p>		<p>CABLE ASSEMBLY U/V20 (EG9.82.539-2)</p>	
No.1 U.H.F. aerial relay	C	U/V10 UR67	U/V10 C
			No.2 U.H.F. aerial relay
<p>CABLE ASSEMBLY U/V11 (EG9.82.501-2)</p>		<p>CABLE ASSEMBLY U/V21 (EG9.82.541-2)</p>	
No.1 U.H.F. aerial relay	B	U/V11 UR67	U/V11 AE
			Upper U.H.F. aerial
<p>CABLE ASSEMBLY U/V12 (EG9.82.503-2)</p>		<p>CABLE ASSEMBLY U/V22 (EG9.82.569-2)</p>	
No.2 U.H.F. aerial relay	A	U/V12 UR67	U/V12 AE
			Lower U.H.F. aerial Fr.12-13
<p>CABLE ASSEMBLY U/V13 (EG9.82.505-2)</p>		<p>CABLE ASSEMBLY U/V14 (EG9.82.507-3)</p>	
P.T.R.175 T/R unit	P14U2	U/V13 UR67	U/V13 A
			No.1 U.H.F. aerial relay
<p>CABLE ASSEMBLY U/V15 (EG9.82.509-2)</p>		<p>CABLE ASSEMBLY N112 (EG9.82.309-3)</p>	
P.T.R.175 T/R unit	P1403	U/V14 UR67	U/V14 AE
			V.H.F. aerial port bomb door Fr.22-23
<p>CABLE ASSEMBLY U/V18 (EG9.82.515-1)</p>		<p>Starboard instrument panel fixed socket</p>	
Stand-by T/R unit	AE	U/V15 UR67	U/V15 B
			No.2 U.H.F. aerial relay
Test socket, Fr.12A	<p> { A } { B } { D } </p>	<p> { N16 } { N16 } { Q22M } </p>	<p> { R8 } { E } { MIC+VE } </p>
	<p>END A</p>	<p>END B</p>	<p>Test socket, T.B. Fr.12A</p>
			<p> { A } { B } { C } { D } { E } { F } { G } { H } { I } { J } { K } { L } { M } { N } { P } </p>
			<p> { N22 } { N112 } { N20 } { N14 } { N16 } { N14 } { N16 } { N14 } </p>
			<p> { N112 } { N112B-R61 } { N112 } { N112 } { N112-0 } </p>
			<p> { A } { B } { C } { D } { E } { F } { G } { H } { I } { J } { K } { L } { M } { N } { P } { O } </p>
			<p>E.C.P. free plug</p>
			<p>Dropping resistor</p>

Chapter 3 V.O.R./I.L.S.

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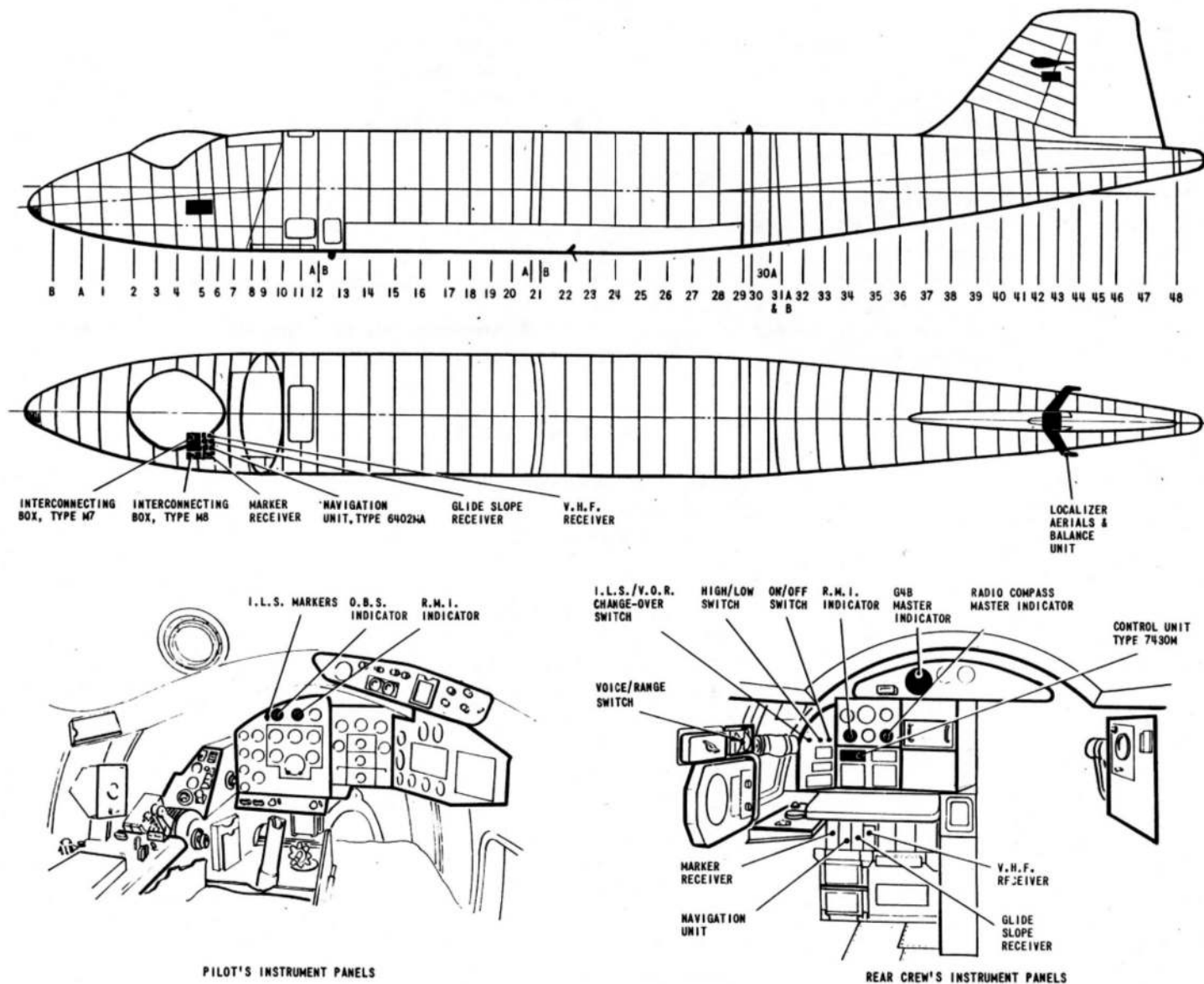


FIG. 1. V.O.R./I.L.S. — LOCATION DIAGRAM

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DESCRIPTION**General information**

1. A V.O.R./I.L.S. (A.R.I. 23118) installation is fitted to serve as a navigation and landing aid. The equipment function is to interpret air navigation information from V.O.R. (V.H.F. Omnidirectional radio Range) beacon transmissions and runway approach information from I.L.S. (Instrument Landing System) signals. Information is presented to the pilot and navigator by indicators and instruments mounted on their respective panels and by audio signals channelled via the I/C system (Chap.1). Three coloured lamps mounted on the pilot's flying panel comprise the indicators and these flash when the aircraft passes over an I.L.S. marker beacon. The blue light indicates the outer marker, the amber light the middle marker, and the white light the inner or airways marker. The instruments include an omni-bearing selector (O.B.S.) and two radio magnetic indicators (R.M.I.). The O.B.S. indicator and an R.M.I. are mounted on the pilot's flying panel and the second R.M.I. is mounted on the navigator's instrument panel.

Interconnecting box, Type M7A

2. This is a back-plate type junction box through which are routed the power supplies, control circuits and similar services to the navigation unit, V.H.F. receiver and glide slope receiver. The box also contains an R.M.I. card amplifier, a voice-range filter unit and a transformer for matching the system audio output to the I/C system. The

unit is mounted together with the navigation unit, V.H.F. and glide slope receivers beneath the navigator's table.

Navigation unit

3. This unit receives navigational data from the V.H.F. receiver and processes it in different ways according to the mode of operation selected. In the V.O.R. mode, the unit receives data from the GM4B compass system (Sect.7, Chap.4) and provides a reference output to the pilot's and navigator's R.M.I's. In the I.L.S. mode, the unit supplies an output to the deviation indicator to give left and right indications and to actuate the OFF flag when these indications become unreliable.

V.H.F. receiver

4. The V.H.F. receiver has an overall frequency range of between 108 and 135.95 MHz thus covering the V.O.R., I.L.S. and V.H.F. communication channels. The receiver is tuned by an automatic timing mechanism and controlled from the Type 7430M control unit.

Glide-slope receiver

5. This is a crystal-controlled U.H.F. receiver which provides 40 channels with 150 KHz intervals over the frequency range 329.15 to 335 MHz. Signals within this frequency range cover the glide-slope channels associated with I.L.S. and after amplification drive the horizontal (high/low) pointer and warning flag of the O.B.S. indicator.

Interconnecting box, Type M8

6. This unit is a back-plate junction box through which the power supplies

and control circuits are routed to the marker receiver. The box and receiver are both situated beneath the navigator's table.

Marker receiver

7. The marker receiver operates on a fixed frequency of 75 MHz and receives signals which are derived from marker beacons positioned on the landing approach. The receiver processes the signals received from the beacons and, by initiating the sequential flashing of coloured indicator lights, informs the pilot of the positions reached in the landing approach. Audio warning is also given to all crew members by keyed tones fed via the I/C system.

8. The d.c. power supplies required to operate the receiver are taken from fuse 194 in the E.C.P. and are fed via a single-pole switch mounted on the navigator's control panel and marked I.L.S. MARKER ON-OFF. A second switch, mounted adjacent to the ON-OFF switch, is marked SENS, HIGH-LOW and gives two stage sensitivity control for the receiver.

Frequency selection

9. Selection of the frequency of operation of the V.O.R./I.L.S. installation is made on the Type 7430M control unit mounted beneath the navigator's instrument panel. The front panel of the unit is marked NAV and carries a combined volume control and on-off switch together with whole and fractional megahertz selection switches. The frequency selected is indicated by a digital display.

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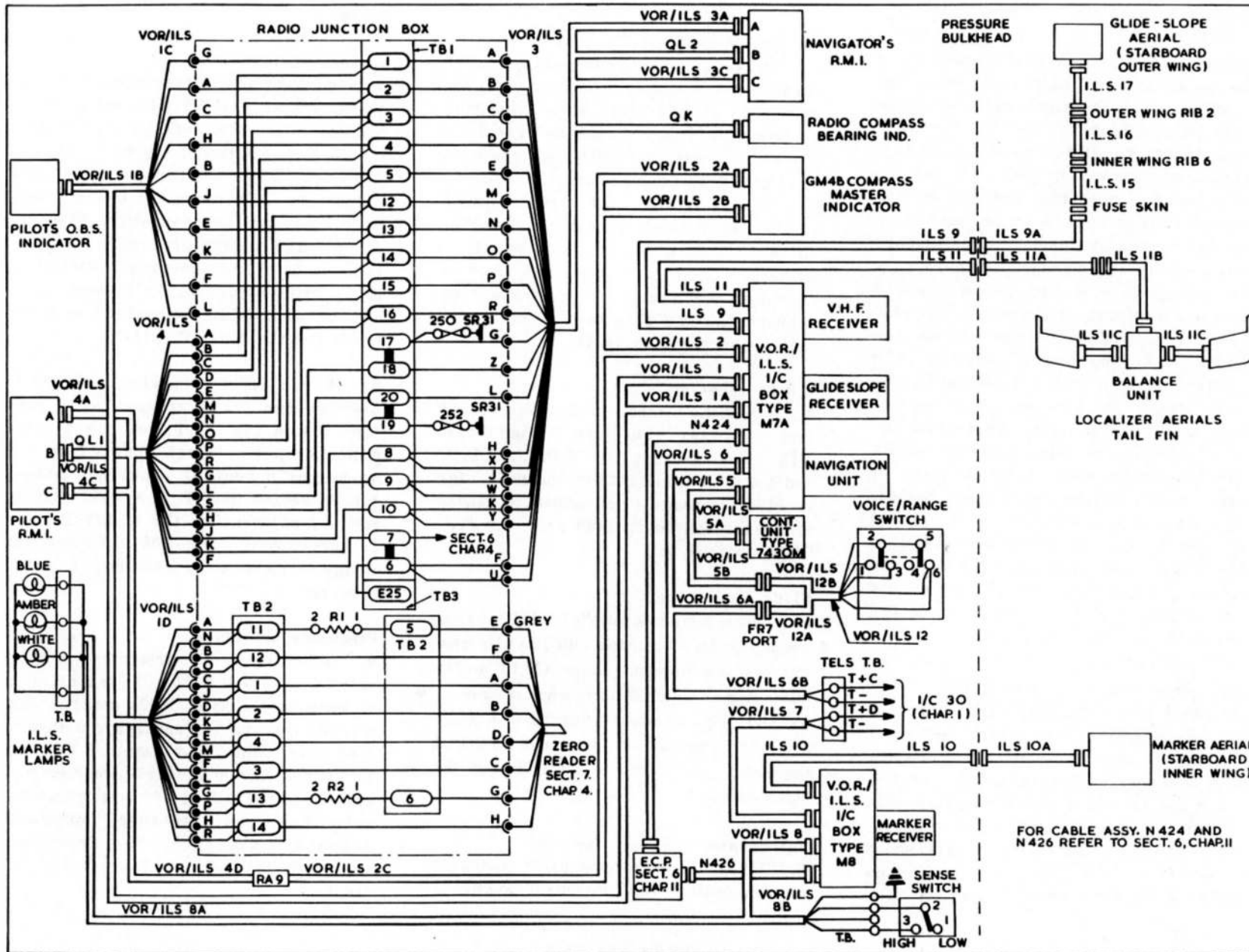


FIG. 2. V.O.R./I.L.S. - INTERCONNECTION DIAGRAM

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