

## Chapter 2

## U.H.F. AND TELEBRIEFING

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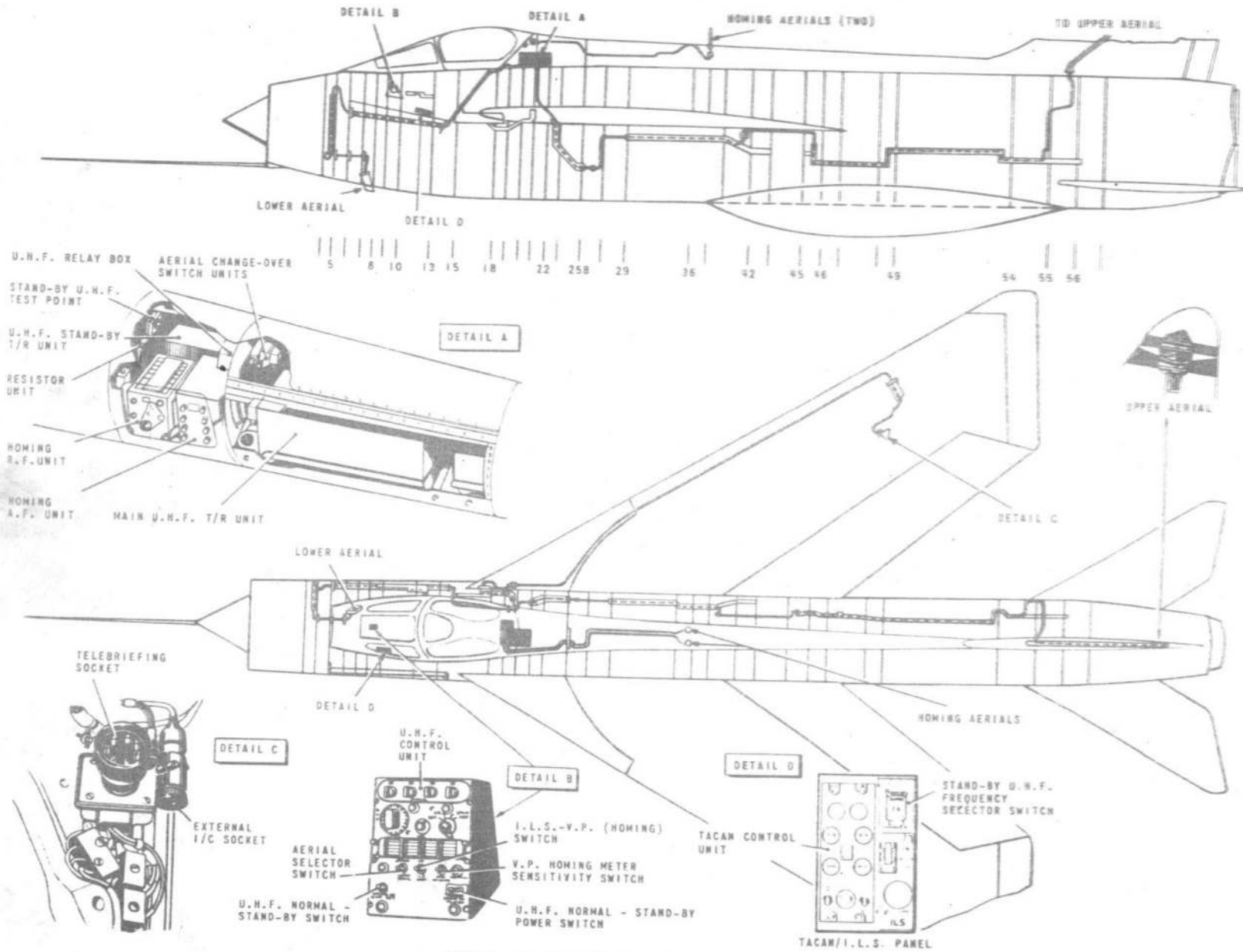


FIG. I. U.H.F. AND TELEBRIEFING

DETAIL D ADDED MOD. 2125

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**DESCRIPTION****General**

1. This chapter now includes the following modification:-

◀ Mod. 1545 Introduction of aerial Type AT-840-ARC. ▶

Radio communication is normally provided by a Type ARC/52 U.H.F. transmitter/receiver whilst a Type 10056 transmitter/receiver is held for stand-by use. The main T/R unit operates in conjunction with a Type C1607 control unit, Type 11037 R.F. unit and Type 9635 A.F. unit. The latter two units form part of a homing system operating with the I.L.S. indicator. Four aerials are installed for communication and homing purposes. External telebriefing and I/C sockets are provided to maintain communication with the pilot whilst the aircraft is on the ground. Provision is made for feeding audio signals from the I.L.S., Tacan and Standard Warnings system into the pilot's telephones.

**Main transmitter/receiver, Type ARC/52**

2. The main T/R unit is carried by a mounting tray in the front fuselage spine, aft of the cockpit pressure bulkhead. The unit provides for the automatic selection of 19 preset frequencies and manual selection of 1750 frequency channels spaced 100 kc/s apart. The unit operates at an internal pressure between 4 and 5 lb/in<sup>2</sup>, air being introduced through a Schrader valve. To assist servicing, the Schrader valve is fitted at the port side of the

aircraft behind access panel 30P and is connected to the T/R unit case by a length of rubber tubing.

**Stand-by transmitter/receiver**

3. The Type 10056 stand-by T/R installed forward of the main T/R provides emergency communication on a single frequency channel of 243 MHz.

4. A frequency of 243.8 MHz is made available for test purposes. Selection of the test frequency is made by a switch on the Tacan/I.L.S. panel on the port console. The switch has two positions, GUARD and CHANNEL A and is normally retained in the GUARD position by a safety flap.

5. In addition to the selector switch the modification introduces cable RT25 between the Tacan/I.L.S. panel and the U.H.F. switch panel, circuit RP26 links in the latter panel and the U.H.F. relay panel, and a new connector No. 16 incorporating a lead from pin M at the U.H.F. relay panel.

**Homing facility**

6. The Type 11037 R.F. unit and the Type 9635 A.F. unit are located forward of the main T/R unit in the spine. The R.F. unit operates with two aerials and the I.L.S. indicator.

**Control unit, Type C1607**

7. Selection of the U.H.F. channel for use is made through the Type C1607 control unit installed below the main instrument panel. The unit incorporates

a selector switch which covers 19 automatically preset frequencies, four selector switches which can be set to any one of 1750 frequencies, a volume control, and a function switch. A frequency record card is carried on the lower panel of the unit.

**U.H.F. switch panel**

8. Positioned immediately below the Type C1607 control unit is the U.H.F. switch panel which carries the switches controlling the stand-by U.H.F. power supply, meter sensitivity, indicator change-over, aerial selection, and normal/stand-by U.H.F. selection.

**U.H.F. relay box**

9. This box, installed near the stand-by U.H.F. T/R unit in the spine, contains relays numbered 1 to 4, two resistors of 200 ohms each and one resistor of 33,000 ohms.

**Press-to-transmit switches**

10. U.H.F. transmission is initially controlled by two press-to-transmit push switches, one of which is fitted in the No. 1 throttle lever and the other in the control column handgrip. As the switches are connected in parallel either may be used when transmitting.

**Telebriefing and I/C sockets**

11. The U.H.F., telebriefing and associated audio circuits connect to the pilot's microphone and telephones through his personal services connector. Two external sockets, one for telebriefing

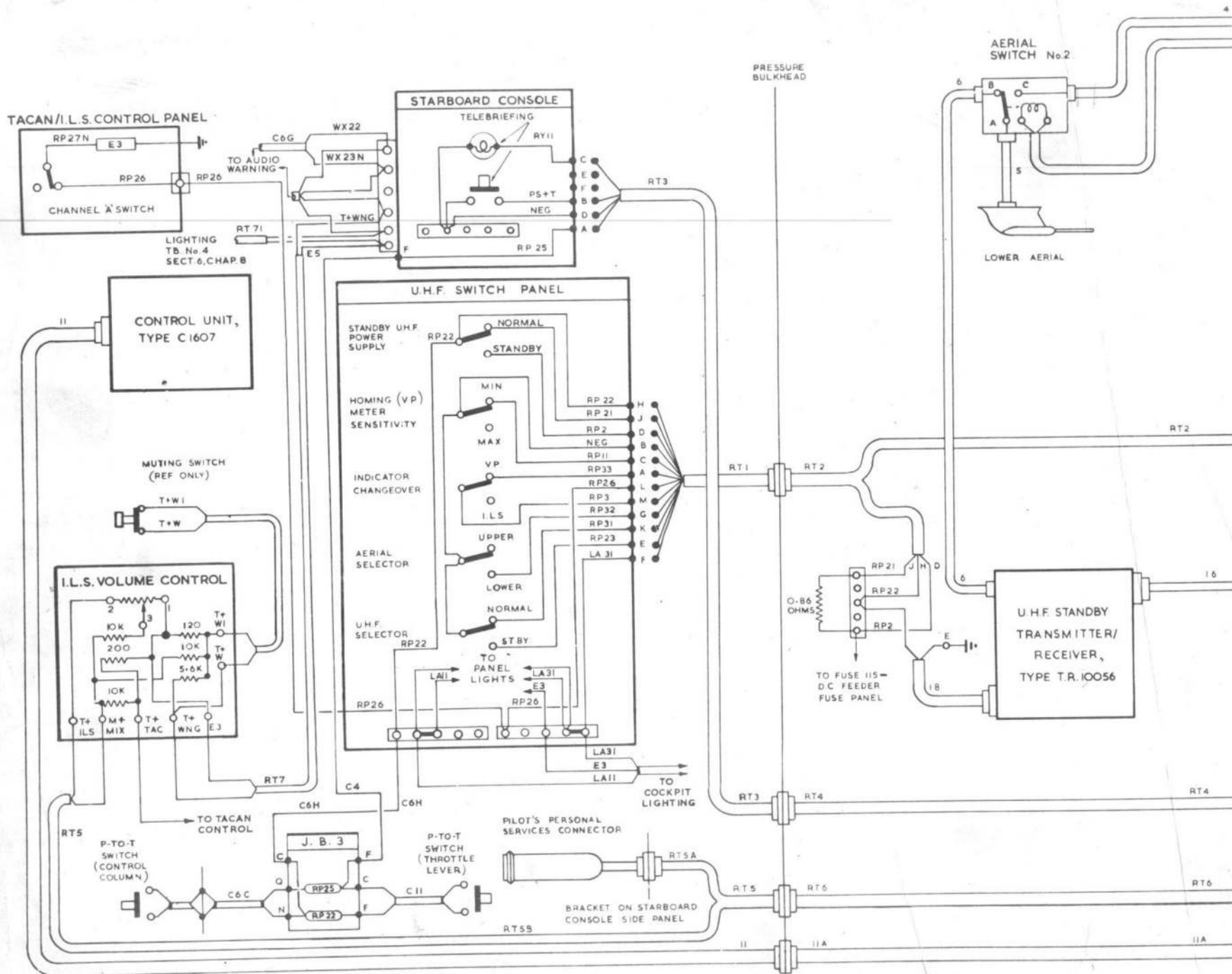


FIG. 2. U.H.F AND TELEBRIEFING

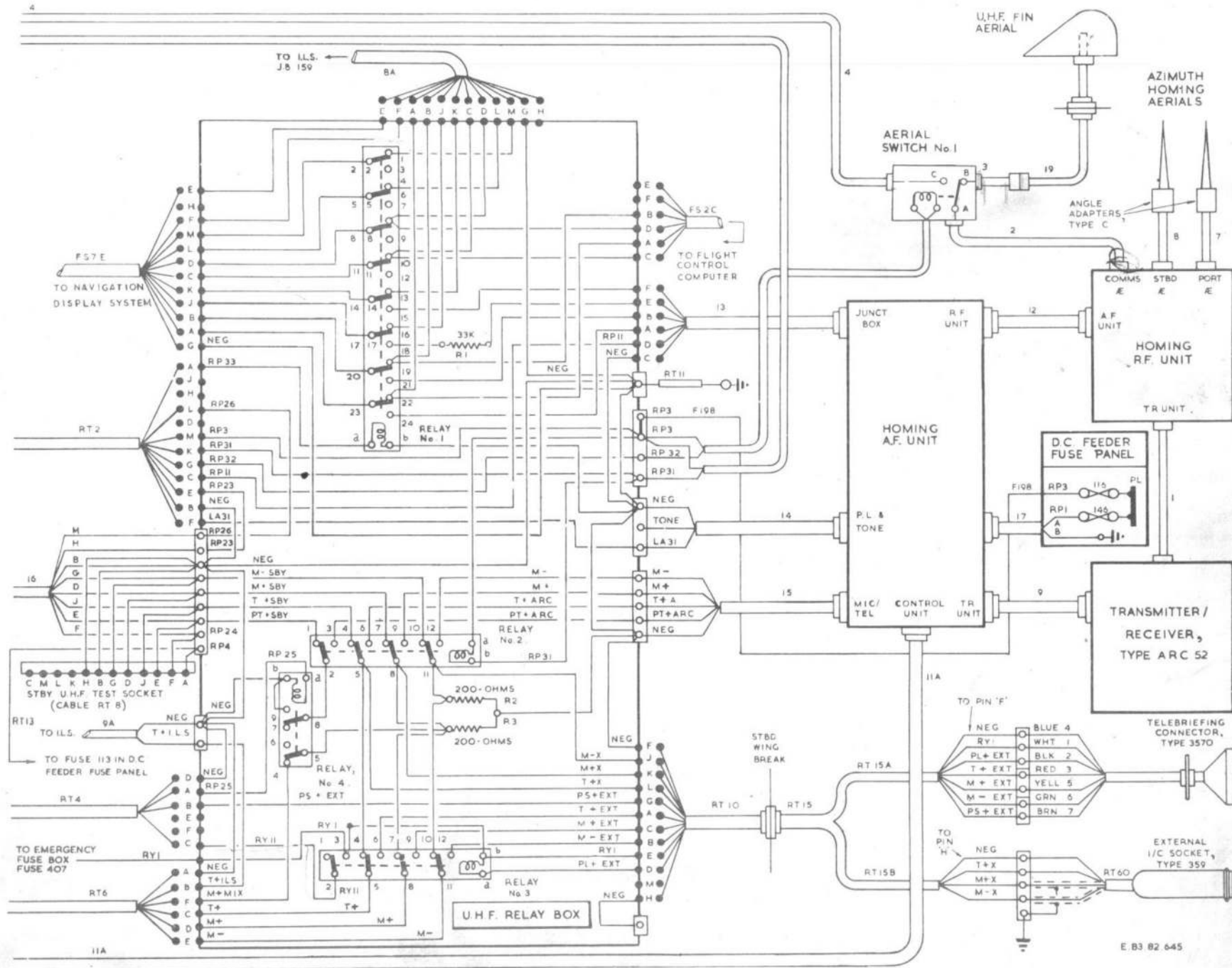


FIG. 2A. U.H.F. AND TELEBRIEFING

and the other for intercom, are fitted on rib 11 in the starboard wheel bay.

#### Stand-by U.H.F. test socket

12. A test socket for checking the operation of the stand-by U.H.F. T/R unit is fitted on the spine diaphragm aft of frame 19. The socket is connected by cable RT8 to the U.H.F. relay box.

#### Power supplies

13. The main U.H.F. T/R unit operates from the normal 28 volts (nominal) d.c. power supply. The stand-by T/R unit operates at 24 volts fed from the 28 volt supply via a 0.68 resistor installed in the spine. If the generator supply should fail, the stand-by set can be operated from the battery busbar after changing over the stand-by power switch from NORMAL to STBY, thus cutting out the 0.68 ohm resistor. Further information on the power supplies will be found in Sect.6, Chap.11.

#### Operation

14. The operation of either press-to-transmit switch energizes No.4 relay in the U.H.F. relay box. Closing of the relay completes circuit PT+ A to either the main or the stand-by set, depending on which is selected for use and whether No.2 relay is energized or de-energized. No.2 relay is energized when the U.H.F. selector switch is set to NORMAL and de-energized when the switch is at STBY. With the relay energized the main T/R unit is connected, via the homing A.F. unit, to the external I/C socket and the contacts of No.3 relay. When the relay is de-energized, the stand-by T/R unit is connected to

the external I/C socket and the contacts of No.3 relay. The operation of No.3 relay is described in para.22.

#### Homing indication

15. The I.L.S. indicator is operated from either the I.L.S. or the U.H.F. homing system. Change-over from one to the other is controlled by the I.L.S.-V.P. switch on the U.H.F. switch panel and No.1 relay in the U.H.F. relay box. With the switch set to I.L.S. the relay is de-energized and the I.L.S. output is fed to the I.L.S. indicator and also linked with the autopilot system. When the switch is selected to V.P., No.1 relay is energized and the U.H.F. homing information is fed to the I.L.S. indicator.

#### Aerials

##### General

16. A total of four aerials is installed, an upper and a lower aerial for U.H.F. communication and two whip aerials for homing.

##### Upper aerial

17. The upper aerial constitutes part of the fin and comprises the topmost tip with, below this, alternate sections of fibre glass, metal and fibre glass which form a complete unit attached to the main fin assembly. The top section of fibre glass insulates the tip from the lower metal section whilst the lower section of fibre glass insulates the whole of the upper assembly from the fin structure proper. The insulated tip and lower section form the aerial which is energized by an internal probe.

The probe is connected by coaxial cable to the No.1 aerial change-over unit in the spine. It should be noted that there is no electrical connection between the probe and the insulated sections of the aerial. The vicinity of the joints between the fibre glass and metal sections is treated with anti-static compound. Access to the probe is gained after removing a detachable panel at the port side of the fin.

##### Lower aerial

18. This aerial, Type AT/840/ARC is installed starboard of the centre line between frames 7 and 8, below the nose.

##### Homing aerials

19. The homing facility utilizes two Type 11421 whip aerials installed near each other in the spine. In the vicinity of the aerials the spine is recessed and the aerials are each secured by five bolts in the base of the recess. Connections to the aerials are made inside the spine assembly. The fuselage contour over the recess is continued by a fibreglass panel through which the aerials protrude after passing through rubber grommets. The removal of the aerials entails first removing the fibreglass panel which is secured by countersunk screws to the spine assembly.

##### Aerial switching

##### Main U.H.F. T/R unit

20. The selection of the aerial for use is made by the aerial selector switch and the U.H.F. normal/stand-by switch on the U.H.F. switch panel. With the

aerial selector switch at its UPPER position the solenoid of the No. 1 aerial change-over switch is de-energized and the main U.H.F. T/R unit is connected to the upper aerial. Whilst the U.H.F. selector switch is at NORMAL, No. 2 aerial change-over switch is energized and the lower aerial is connected to the No. 1 aerial change-over switch so that the operation of the aerial selector switch then controls whichever aerial is connected to the main T/R unit.

#### *Stand-by U.H.F. T/R unit*

21. When the U.H.F. selector switch is set to STBY. No. 2 aerial change-over switch is de-energized and the lower aerial is connected to the stand-by T/R unit. No provision is made for operating the stand-by T/R unit from the upper aerial.

#### **Telebriefing**

22. Connecting the ground communication system to the telebriefing socket provides an external link between PL+T and NEG. This permits a supply from RY1 to energize No. 3 relay which transfers the pilot's TEL/MIC circuits from the T/R unit to the telebriefing system and completes a circuit through contacts 2 and 3 of the relay to light the telebriefing ON indicator lamp on the starboard console. Under these conditions the pilot can receive messages from the central control point or from other

aircraft connected to the same ground installation; he may also transmit messages to the telebriefing network by depressing a push switch adjacent to the indicator lamp. Operation of this switch connects the pilot's microphone to the ground system amplifier. Mod. 1831 makes circuit changes, introducing a facility which allows the telebriefing system to operate irrespective of the battery master switch selection. Further information on telebriefing can be found in A.P. 2876G.

#### **SERVICING**

##### **WARNING**

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

##### **General**

23. Components and cables should be checked periodically for damage. General servicing is straightforward and removal and assembly of components should not present undue difficulties. Connectors No. 7 and No. 8 are matched phasing components and their electrical length is shown on each. Should a replacement be required for either connector both must be replaced by a matching pair or the new connector must be a match for the replaced item. Angle adapters must not be removed except for installation

reasons when the painted end can be disconnected temporarily.

##### **Main U.H.F. T/R unit**

24. A full description of this unit will be found in Part 1 of A.P. 2531J, Vol. 1, Part 2 of the Volume deals with servicing, and Part 3 with fault diagnosis. The internal air pressure of the unit should be checked periodically. If found to be below 3 lb/in<sup>2</sup>, the pressure should be raised to 4 or 5 lb/in<sup>2</sup>, using a pressurizing pump, Type 4G/5435. After pressurizing, ensure that the Schrader valve cap is replaced.

##### **Stand-by U.H.F. T/R unit**

25. This T/R unit is covered in A.P. 2531N, Vol. 1, a general description being given in Part 1, servicing in Part 2, and fault diagnosis in Part 3.

26. Functional tests of both U.H.F. T/R units are made with the test set, Type 15056 (6625-99-943-4149). This set includes the test set, Type 15077 (6625-99-943-3488) and connector set, Type 15057 (6625-99-943-4146).

##### **Homing system**

27. The homing system units are described in Part 1 of A.P. 2531L, Vol. 1, Part 2 of the Volume covers servicing and includes a description of the test oscillator, Type 9784, and test set, Type 9969, used when making functional checks on the installation. Fault finding information is contained in Part 3.

TABLE 1

Connectors and cable assemblies

Cable symbols:- Unifersil = T, Unifersilmetsheath = TMS

TERMINATION CABLE TERMINATION

CONNECTOR NO.1 - 10HB/8876

homing { coaxial } T/R unit  
R.F. unit { } ARC 52

CONNECTOR NO.2 - 10HB/8877

homing { coaxial } aerial  
R.F. unit { } switch No.2

CONNECTOR NO.3 - 10HB/8878

aerial { coaxial } fin aerial  
switch No.1 { } break

CONNECTOR NO.4 - 10HB/8879

aerial { coaxial } aerial  
switch No.1 { } switch No.2

CONNECTOR NO.5 - 10HB/8880

aerial { coaxial } lower  
switch No.2 { } aerial

CONNECTOR NO.6 - 10HB/8881

aerial { coaxial } stand-by  
switch No.2 { } U.H.F. T/R

CONNECTOR NO.7 - EB2.82.353

homing { coaxial } port  
R.F. unit { } azimuth AE. } paired  
connectors

CONNECTOR NO.8 - EB2.82.355

homing { coaxial } starboard  
R.F. unit { } azimuth AE. } EB3.82.857

CONNECTOR NO.9 - 10HB/8994

TERMINATION PIN CABLE PIN TERMINATION

	A	T16	A	
	B	T16	B	
	C	T22	C	
	D	T22	D	
	E	T22	E	
	F	T22	F	
	H	T22	H	
	J	T22	J	
	K	T22	K	
	L	T22	L	
	M	TMS22	M	
	N	TMS22	N	
	P	T22	P	
	R	TMS22	R	
	S	TMS22	S	
	T	T22	T	
	U	T22	U	
	V	T22	V	
	W	T22	W	
homing	X	not wired	X	T/R ARC 52
A.F. unit	Y	not wired	Y	
	Z	not wired	Z	
	a	T22	a	
	b	T22	b	
	c	T22	c	
	d	T22	d	
	e	T22	e	
	f	T22	f	
	g	T22	g	
	h	T22	h	
	i	T22	i	
	j	T22	j	
	k	T22	k	
	m	T22	m	
	n	T22	n	
	p	T22	p	
	q	T22	q	
	r	T22	r	
	s	T22	s	
	t	T22	t	
	u	T22	u	
	w	T22	w	

CONNECTOR NO.11 - EB3.82.913

CONNECTOR NO.11A - EB3.82.915

TERMINATION PIN CABLE PIN TERMINATION

	A	P.T.F.E	A	
	B	equipt.	B	
	C	wire	C	
	D	Type B	D	
	E	19/.0076	E	
	F	19/.0076	F	
	H	19/.0076	H	
	J	19/.0076	J	
	K	19/.0076	K	
	L	19/.0076	L	
	M	19/.0076	M	
	N	19/.0076	N	
	P	19/.0076	P	
	R	19/.0076	R	
	S	19/.0076	S	
control	T	19/.0076	T	homing A.F. unit
unit C1607	U	19/.0076	U	
	V	19/.0076	V	
	W	19/.0076	W	
	X	19/.0076	X	
	Y	19/.0076	Y	
	Z	19/.0076	Z	
	a	19/.0076	a	
	b	19/.0076	b	
	c	19/.0076	c	
	d	19/.0076	d	
	f	19/.0076	f	
	g	19/.0076	g	
	h	19/.0076	h	
	i	19/.0076	i	

Pins e, j, k, m, n, p, q, r, s, t, u and w are not connected,

TABLE 1 Connector and cable assemblies - continued

Cable symbols:- Unifersil = T, Unifersilmetsheath = TMS

CONNECTOR NO.12 - EB3.82.917

TERMINATION	PIN	CABLE	PIN	TERMINATION
homing A.F. unit	A	P.T.F.E.	A	homing R.F. unit
	B	equipt.	B	
	C	wire	C	
	D	Type B	D	
	E	19/.0076	E	
	F	19/.0076	F	
	H	19/.0076	H	
	J	19/.0076	J	
	K	19/.0076	K	
	L	19/.0076	L	
	M	19/.0076	M	
	N	19/.0076	N	
	P	19/.0076	P	
	R	19/.0076	R	
	S	19/.0076	S	
	T	19/.0076	T	
	U	19/.0076	U	
	V	19/.0076	V	
	W	19/.0076	W	
	X	19/.0076	X	
Y	19/.0076	Y		
Z	19/.0076	Z		
a	19/.0076	a		
b	19/.0076	b		
c	19/.0076	c		
d	19/.0076	d		
f	19/.0076	f		
g	19/.0076	g		
h	19/.0076	h		
i	19/.0076	i		

CONNECTOR NO.13 - 10HB/8888

TERMINATION	PIN	CABLE	PIN	TERMINATION
homing A.F. unit	A	T22	A	U.H.F. relay box
	D	T22	D	
	E	T22	E	
	G	T22	C	
	J	T22	B	
K	T22	F		
other pins not used				

CONNECTOR NO.14 - 10HB/8889

TERMINATION	PIN	CABLE	TAIL	TERMINATION
homing A.F. unit	A	T22	LA31	U.H.F. relay box
	B	T22	neg	
	C	T22	tone	
	D	-	-	
	E	-	-	

CONNECTOR NO.15 - 10HB/8890

TERMINATION	PIN	CABLE	TAIL	TERMINATION
stand-by T/R unit	A	T22	T-ARC	U.H.F. relay box
	B	T22	neg	
	E	T22	PT-ARC	
	C	TMS22	M-ARC	
	D	TMS22	M-ARC	

CONNECTOR NO.16 - EB2.82.967

TERMINATION	PIN	CABLE	TAIL	TERMINATION
stand-by T/R unit	B	T22	neg	U.H.F. relay box
	E	T22	PT-SBY	
	F	T22	RP24	
	H	T22	RP23	
	J	T22	T-SBY	
	D	TMS22	M-SBY	
	G	TMS22	M-SBY	
	M	T22	RP26	

Pins A, C, K & L not used

CONNECTOR NO.17 - 10HB/8892

TERMINATION	PIN	CABLE	TAIL	TERMINATION
homing A.F. unit	A	T12	RP1	D.C. feed fuse panel
	B	T12	neg	
	C	-	-	
	D	-	-	
	E	-	-	
	F	-	-	

CONNECTOR NO.18 - 10HB/8893

TERMINATION	PIN	CABLE	TAIL	TERMINATION
stand-by T/R unit	A	T12	RP22	resistor unit
	B	T12	neg	

CONNECTOR NO.19 - 10HB/8884

TERMINATION	CABLE	TERMINATION
fin aerial break	coaxial	fin aerial break

CABLE ASSEMBLY - RT1

TERMINATION	PIN	CABLE	PIN	TERMINATION
U.H.F. switch panel	A	T22	A	pressure bulkhead
	B	T22	B	
	C	T22	C	
	D	T20	D	
	E	T22	E	
	F	T22	F	
	G	T22	G	
	H	T20	H	
	J	T20	J	
	K	T22	K	
L	T22	L		
M	T22	M		

CABLE ASSEMBLY - RT2

TERMINATION	PIN	CABLE	PIN	TERMINATION
(RT2) aft pressure bulkhead	A	T22	A	(RT2A) U.H.F. relay box
	B	T22	B	
	C	T22	C	
	E	T22	E	
	F	T22	F	
	G	T22	G	
	K	T22	K	
	M	T22	M	
	L	T22	L	
	D	T20	D	
TAIL	RP2		RP2	(RT2B) resist. unit
	RP22		RP22	
	RP21		RP21	

TABLE 1 Connector and cable assemblies - continued

Cable symbols:- Unifersil = T, Unifersilmetsheath = TMS

CABLE ASSEMBLY - RT3

TERMINATION	PIN	CABLE	PIN	TERMINATION
starboard console plug panel	A	T22	A	aft pressure bulkhead
	B	T22	B	
	C	T22	C	
	D	T22	D	
	E	T22	E	
	F	T22	F	

CABLE ASSEMBLY - RT7

TERMINATION	TAIL	CABLE	TAIL	TERMINATION
port console	T-WNG	T22	T-WNG	starboard console
	E5	T22	E5	

CABLE ASSEMBLY - RT11

TERMINATION	TAIL	CABLE	TAIL	TERMINATION
U.H.F. relay box	neg	T20	neg	earth F20A
	neg	T20	neg	

CABLE ASSEMBLY - RT4

TERMINATION	PIN	CABLE	PIN	TERMINATION
aft pressure bulkhead	A	T22	A	U.H.F. relay box
	B	T22	B	
	C	T22	C	
	D	T22	D	
	E	T22	E	
	F	T22	F	

CABLE ASSEMBLY - RT8

TERMINATION	PIN	CABLE	TAIL	TERMINATION
stand-by U.H.F. test point	A	T22	RY1	U.H.F. relay box
	B	T22	neg	
	C			
	D	T22	M-SBY	
	E	T22	PT-SBY	
	F	T22	RP24	
	G	T22	M-SBY	
	H	T22	neg	
	J	T22	T-SBY	
	K			
	L			
	M			

CABLE ASSEMBLY - RT15

TERMINATION	PIN	CABLE	TAIL	TERMINATION
(RT15) starboard wing break	A	T20	T-T	(RT15A) starboard wheel bay
	B	TMS20	M-T	
	C	TMS20	M-T	
	D	T20	PL-T	
	E	T20	RY1	
	F	T20	neg	
	G	T20	PS-T	(RT15B) starboard wheel bay
	H	T20	neg	
	J	TMS20	M-X	
	K	TMS20	M-X	
	L	T20	T-X	
	M			

CABLE ASSEMBLY - RT5

TERMINATION	PIN	CABLE	PIN	TERMINATION
RT5 aft pressure bulkhead	A	T22	E	(RT5A) starboard console
	C	T22	F	
	D	TMS22	D	
	E	TMS22	C	
			B	
			A	
		TAIL	(RT5B)	
		T-ILS	I.L.S.	
		M-MIX	T/B	

CABLE ASSEMBLY - RT25

TERMINATION	TAG	CABLE	TAG	TERMINATION
Channel A switch	RP26	T22	RP26	T.B. on U.H.F. pedestal

CABLE ASSEMBLY - RT10

TERMINATION	PIN	CABLE	PIN	TERMINATION
U.H.F. relay	A	T22	A	starboard wing break
	B	TMS22	B	
	C	TMS22	C	
	D	T22	D	
	E	T22	E	
	F	T22	F	
	G	T22	G	
	H	T22	H	
	J	TMS22	J	
	K	TMS22	K	
	L	T22	L	
	M		M	

CABLE ASSEMBLY - RT6

TERMINATION	PIN	CABLE	PIN	TERMINATION
aft pressure bulkhead	A	T22	A	U.H.F. relay box
	B	T22	B	
	C	T22	C	
	D	TMS22	D	
	E	TMS22	E	
	F	TMS22	F	

CABLE ASSEMBLY - RT60

TERMINATION	TAG	CABLE	TAG	TERMINATION
ext. i/c socket	T-	T20	T-X	starboard wheel well cable sheath earth
	tel	T20	neg	
	mic	TMS20	M-X	
	M	TMS20	M-X	
		E-		

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