Chapter 6

A.R.I.18124/1 AND A.R.I.18120/4

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Introduction

1. The two installations A.R.I.18124/1 and 18120/4 are fitted in the aircraft (fig.1). The A.R.I.18120/4 is homing equipment used in conjunction with the A.R.I.18124/1 (U.H.F. RT.).

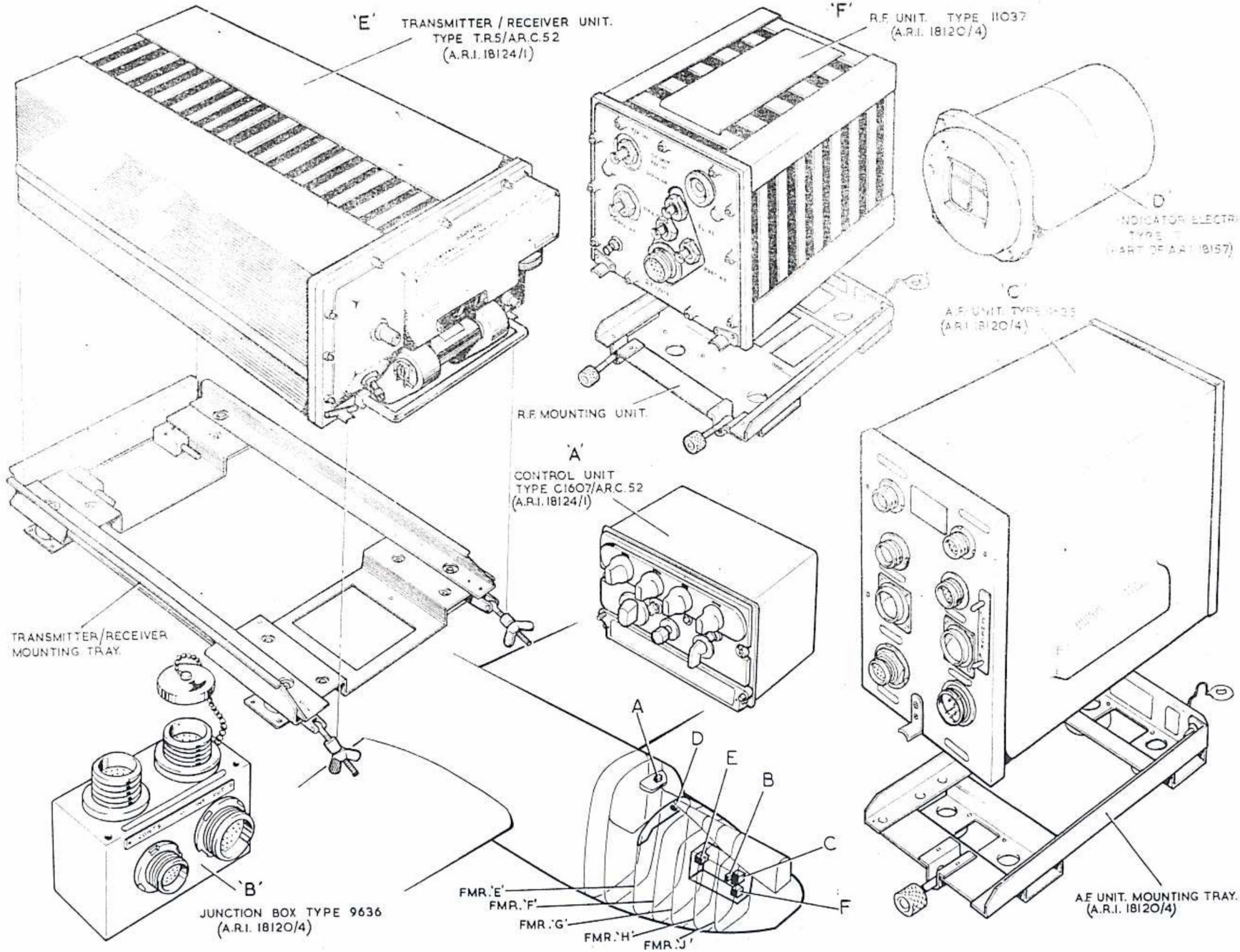

Fig. 1. Location of equipment

DESCRIPTION AND OPERATION

A.R.I.18124/1

General

2. The A.R.I.18124/1 is pressurised multi-channel U.H.F. transmitter-receiver equipment operating over the frequency range of 225.0 Mc/s. to 399.9 Mc/s. The equipment is primarily intended to provide communication between aircraft and ground, aircraft and ships and also between aircraft in flight. Facilities are also available to radiate M.C.W. for direction finding and emergency purposes. The installation comprises the following items of equipment.

Transmitter-receiver	Type TR5/ARC52
Tray mounting	Type MT1477/ARC52
Control unit	Type C1607/ARC52
Aerials	Type 140/LRU/101B
Aerial relay	Type 1741

A.R.I.18120/4

General

3. The A.R.I.18120/4 is designed to give homing indications from C.W., M.C.W. or R.T. transmissions in the 225 Mc/s. to 400 Mc/s. band. Facilities are provided to enable the A.R.I.18124/1 receiver to be used with the A.R.I.18120/4 for homing or for normal communication. The equipment can also be used for search and rescue operations at 234 Mc/s. The installation comprises the following items of equipment.

R.F. unit	Type 11037
Mounting assembly	Type 11502
A.F. unit	Type 9635
Mounting assembly	Type 11053
Indicators (2)	Type 7 (also used in A.R.I.18157/1)
Aerials (2)	Type 11421
Junction box	Type 9636

A.R.I.18124/1

Transmitter-receiver, Type TR5/ARC52

4. This unit, together with its mounting tray is fitted in a rack assembly in the port nose section of the aircraft (fig.1). The transmitter-receiver is enclosed in a double walled pressurised cover. This cover functions as a heat exchanger between the outside air and the air inside the case. A dual blower motor mounted on the front of the transmitter-receiver forces air between the walls of the cover. Air circulation inside the unit is assisted by means of two fans fitted to an integral dynamotor.

Front panel assembly

5. The front panel assembly forms part of the chassis and incorporates the following:-

Pressurising valve
External dual air blowers
Aerial socket
Multi-pole connector plug
Co-axial aerial relay
Main filter assembly

By removing the panel assembly, access is gained to a number of preset controls, microphone-headphone jack and a power supply jack, all of which are used during setting up.

Mounting tray, Type MT1477/ARC52

6. This mounting tray is fitted with an anti-vibration attachment and the transmitter-receiver is secured to it by means of two locking screws and wing nuts, a bonding strap is also provided.

Control unit, Type C1607/ARC52

7. The control unit fitted on the pilot's canopy panel provides the following controls:-

(1) Function switch. This has four positions to permit the selection of one of the following services:-

OFF. In this position the power supply relay is not energised and the equipment is switched off.

T/R. In this position the power supply relay is energised and the equipment is switched on.

T/R + G. In this position the guard receiver is available for direction finding in conjunction with the A.R.I.18120/4 (homing).

(2) Channel selector switch. This has 20 positions. Those numbered 1 to 18 provide facilities for selecting the desired preset frequency channel. The two remaining positions are annotated M and G.

M position is used to switch the selection of frequency to manual control.

G position is normally set up to the guard frequency and thus enables the transmitter-receiver to be used on guard frequency.

(3) MANUAL. The manual control incorporates four controls, each of which is associated with a series

of numbers appearing in an aperture adjacent to the appropriate controls. The four controls are operated to set the numbers to correspond with the desired frequency channel, thus any one of 1,750 channels can be selected.

(4) VOL. This control is used to set the level of the audio signals in the telephones.

8. Access to the controls for setting up the preset frequency channels is obtained by releasing the cover at the bottom of the front panel. Two dial lamps are also fitted to the front panel.

Pressurising

9. Provision is made to pressurise the transmitter-receiver by means of a Schraeder valve. Pressure should be maintained at approximately 4 p.s.i. above atmospheric pressure.

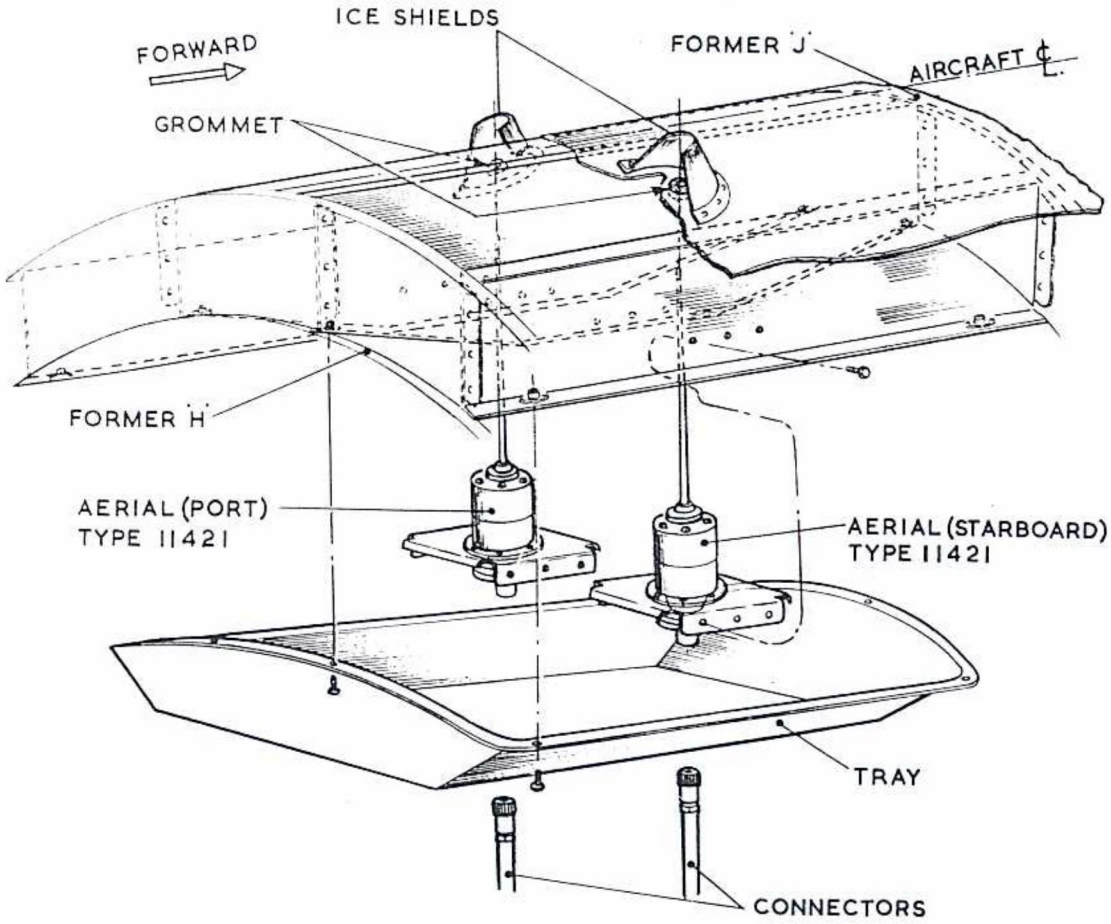

Fig.2 Assembly of A.R.I.18120/4 aerials

Press-to-mute switch

10. Fitted to the 2nd pilot's hand wheel is a switch labelled PRESS-TO-MUTE. This switch is used to mute the receiver when its audio circuit is being used for intercommunication.

11. A common audio output is provided for crew members intercomm. via the A.F. unit used in the A.R.I.18120/4.

A.D.F. operation

12. To operate the transmitter-receiver together with its associated direction finding equipment (A.R.I.18120/4), the function switch on the control unit is set to A.D.F. When used for this purpose the transmitter-receiver will receive the R.F. signals from the direction finding aerial, amplify and demodulate them and then feed A.F. output to the A.R.I.18120/4 which incorporates a relay system which permits the equipment to be used for transmission.

Aerials, Type 140-LRU-101B

13. The two aerials fitted, are of triangular construction with a short rod projecting horizontally at the back (fig.3) One aerial is mounted on top of the aircraft between formers 17 and 18 whilst the other is mounted below the aircraft between formers 31 and 32.

Aerial switch unit, Type 1741

14. The aerial switch unit is used to change-over the aerials to the A.R.I. It contains a coaxial switch operated by a relay which is wired in series with a single-pole, two-way switch, fitted on the pilot's canopy panel. Normally the upper aerial is in use (relay unenergised). Operation of the switch to LOWER energises the relay to connect the lower aerial to the equipment.

Power supplies

15. The power supplies for the A.R.I. are from the aircraft 28-volt, d.c. supply via fuse BT2 at the signallers station. When the selector switch on the control unit, Type C1607/ARC52, is set to any one of the three functional positions an auxiliary H.T. supply will be made available from a dynamotor unit which operates from the aircraft 28-volt system. The valve heaters, relays, tuning unit motor and blower are supplied direct with 28-volts.

A.R.I.18120/4

R.F. unit, Type 11037

16. This unit contains a phase measuring device which converts the phase difference between the signals from the port and starboard aerials into amplitude modulation of the carrier. The modulated carrier is then amplified and demodulated in the receiver section of the ARC.52. The demodulated signal is then fed back into the A.F. unit where it is converted into a form suitable to operate the pointer in the indicator, Type 7. The phase difference between the port and starboard aerials is used for indication in azimuth. The appropriate aerials are selected in the R.F. unit by a coaxial relay which is remotely operated by a switch labelled U.H.F. - UPPER - LOWER fitted on the pilot's canopy control panel.

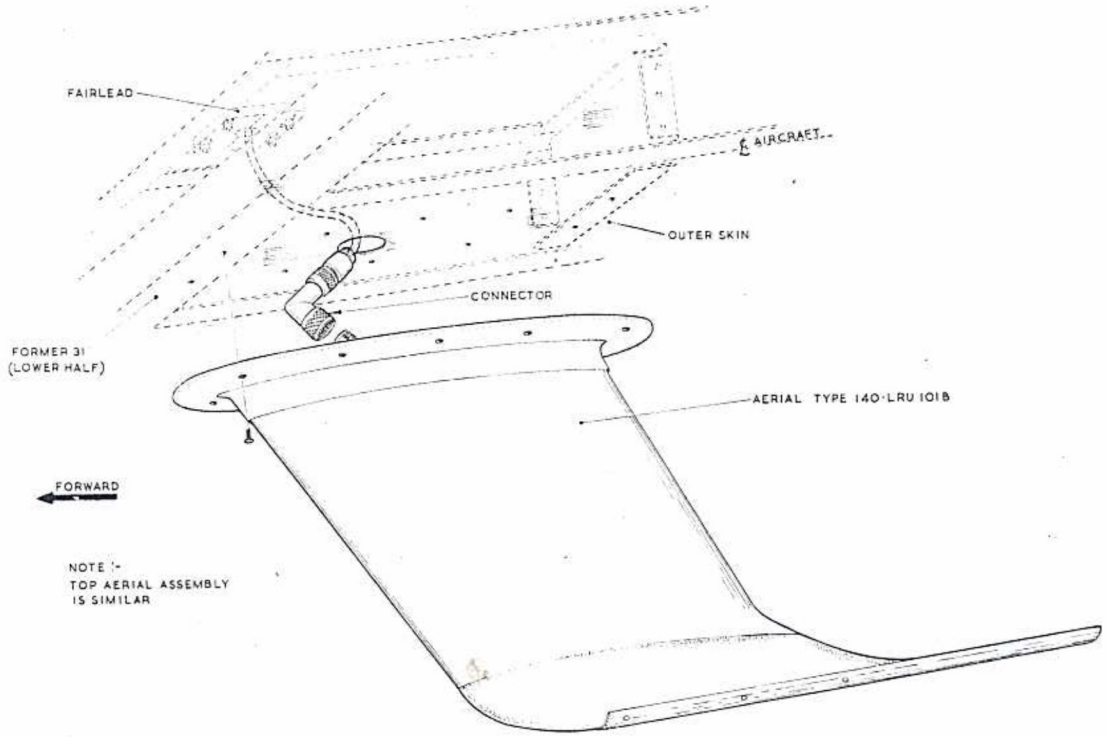

Fig.3 Assembly of A.R.I.18124/1 aerial

A.F. unit, Type 9635

17. This unit acts as a junction box for the control unit, Type C1607/ARC52 and the transmitter-receiver, Type TRS/ARC52 It also contains an amplifier which amplifies the demodulated carrier from the U.H.F. receiver. A test point is also provided.

Junction box, Type 9636

18. This junction box provides the interconnection points between the A.F. unit, meter sensitivity switch and the A.R.I.18157 (Chap.13A).

Aerials, Type 11421

19. The two vertical whip aerials are fitted in the top of the fuselage at formers J and H.

Indicators, Type 7

20. The two indicators fitted are of the crossed pointer design. One indicator is fitted to the pilot's panel, the other at the routine attack navigator's panel. The two indicators are also used in the A.R.I. 18157 (Chap.13A). Control is by means of a switch unit, Type 11145, fitted on the pilot's panel.

Power supplies

21. The power supplies for the installation are derived from the associated A.R.I.18124/1 (transmitter-receiver TR5/ARC52) and the aircraft's 28-volt d.c. supplies (para.15).

A.R.I.18124/1

22. The equipment should be examined at regular intervals for security of attachment. The connectors and cables should also be examined for security, cleanliness and any signs of damage. Mounting trays should be examined for flexibility, all bonding should be secure and free from damage. Operate all controls and verify that they are undamaged and serviceable.

Pressure check

23. At each inspection check the air pressure in the transmitter-receiver. It should not be less than 3 p.s.i. If below this figure the pressure should be raised to 4 or 5 p.s.i. using the pressurising pump Ref.No.4G/5435. On completion ensure that the cap of the Schrader valve is screwed back into position.

24. In the event of a defect either a part or the whole of the equipment must be removed from the aircraft and serviceable items substituted. The procedure for subsequent servicing is described in A.P.1160D-0105-1.

A.R.I.18120/4

25. The connectors and cables should be checked at regular intervals for security, cleanliness and any signs of damage, The equipment should be examined for security of attachment.

Pressure test

26. The air pressure should be checked at the Schrader valve on the front panel of the R.F. unit. It should not be less than 3 p.s.i. Pressure should be raised as detailed in para.23.

27. The operation of the installation is entirely dependent on the full serviceability of the A.R.I.18124/1. Before commencing fault finding on the A.R.I. 18120/4 therefore, the A.R.I.18124/1 should be functionally tested as described in A.P.116D-0105-1.

28. It should be noted that the communications aerial for the TR5/ARC52 is routed via the R.F. unit, Type 11037, also that the A.F. unit, Type 9635 acts as a junction box for the A.R.I.18124/1. A faulty A.R.I.18124/1 may therefore be traced to a unit of the A.R.I.18120/4.

29. General fault finding information will be found in A.P.116B-030-1, Part 3.

REMOVAL AND INSTALLATION

A.R.I.18120/4

30 No difficulty should be encountered when removing the A.R.I.18120/4 equipment. Slackening of the knurled nuts at the front of the trays housing the A.F. and R.F. units will enable these units to be drawn clear.

A.R.I.18124/1

31 The transmitter-receiver is removed from its mounting tray by releasing the two locking screws and wing nuts. Use the transport handle to ease the set forward and out of its mounting tray.

32. Removal of the control unit from the pilot's canopy panel is by releasing the quick-release fasteners securing the panel and unbolting the unit.

TABLE 1

Major items of equipment for A.R.I.18124/1

Item	Type	Ref. No.	A.P. Reference
Transmitter-receiver	TR5/ARC52	10D/9428542	◀ A.P.116D-0105-1 ▶
Tray mounting	MT1477/ARC52	-	
Control unit	C1607/ARC52	10L/9428543	
Aerials (2)	140/LRU/101B	10B/9326363	
Aerial relay	1741	10F/18374	

TABLE 2

Major items of equipment for A.R.I.18120/4

Item	Type	Ref. No.	A.P. Reference
R.F. unit	11037	10D/20571	◀ A.P.116B-030-1 ▶
A.F. unit	9635	10D/20572	
Junction box	9636	10D/20573	
Mounting assembly (A.F. unit)	11502	-	
Mounting assembly (R.F. unit)	11503	-	
Indicator electrical (A.R.I.18157)	7	10Q/61	
Aerials (2)	11421	10B/16907	

TABLE 3

Connectors for A.R.I.18120/4 and 18124/1

Item	Cable-form	Connecting
2/T5669	Equipment wire, Type 2 (Spec.D.E.F.12B)	A.F.unit, Type 9635 to control unit, Type C1607
3/T5669	Miniature 6D (Spec.D.E.F.10)	A.F.unit, Type 9635 to T.B.700 (A to E) and T.B.701 (A and E)
4/T5669	Miniature 4A	A.F.unit, Type 9635 to T.B.702 (C,D,E)
5/T5669	Equipment wire, Type 2 (Spec.D.E.F.12B)	A.F.unit, Type 9635 to junction box, Type 9636
6/T5669	Equipment wire, Type 2 (Spec.D.E.F.12B)	A.F.unit, Type 9635 to R.F. unit, Type 11037
7/T5669	Miniature 2P	A.F.unit, Type 9635 to T.B.703 (A and B)
8/T5669	Equipment wire (Spec.D.E.F.12B)	Junction box, Type 9636 to T.B.702 (A and B)
9/T5669	Uniradio 67	Transmitter-receiver, Type ARC 52 (P1402) to R.F.unit, Type 11037
10/T5669	Uniradio 67	R.F.unit, Type 11037 to aerial relay, Type 174 (A)
11/T4792	Uniradio 81	Aerial, Type 11421 (Stbd.) to R.F. unit, Type 11037
12/T4792	Uniradio 81	Aerial, Type 11421 (Port) to R.F.unit, Type 11037
13/T5669	Uniradio 67	Aerial, Type LRU-140-1015 (top) to aerial relay, Type 1741 (B)
14/T5669	Uniradio 67	Aerial, Type LRU-140-1015 (lower) to aerial relay, Type 1741(C)
15/T5669	Unitersil 22 (33 cores) Unitersil 14 (2 cores). Uninyvinmetsheath 22 (4 cores)	Transmitter-receiver, Type ARC52 to A.F. unit, Type 9635

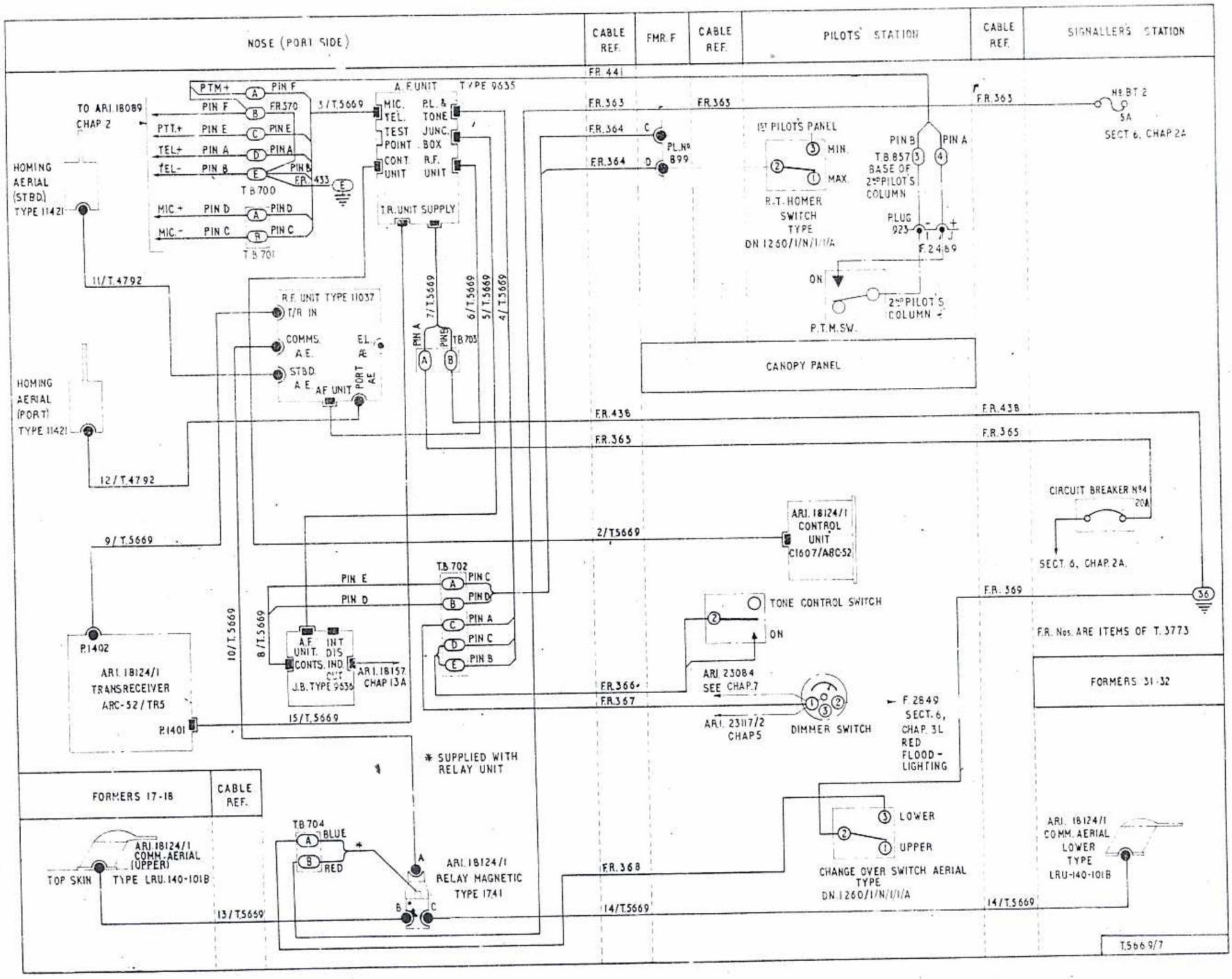

Fig. 4. A.R.I. 18120/4 and 18124/1