Chapter 4
A.R.I.18124/2

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Introduction

1. This chapter deals with the installation and general functioning of the A.R.I.18124/2 (a.c. version) which incorporates a simulated bombing tone for tactical training on Vulcan aircraft. The A.R.I. is an airborne U.H.F. installation, designated R/T2, consisting of a multi-channel transmitter-receiver, operating on a crystal-controlled frequency range of 225.0 MHz to 399.9 MHz with facilities available to radiate M.C.W. for emergency or direction finding purposes. A location illustration of the major components is provided in fig.1. A routing chart and a connector table will be found at the end of the text.

2. Descriptive and servicing details for the A.R.I. are given in A.P.116D-0105-1.

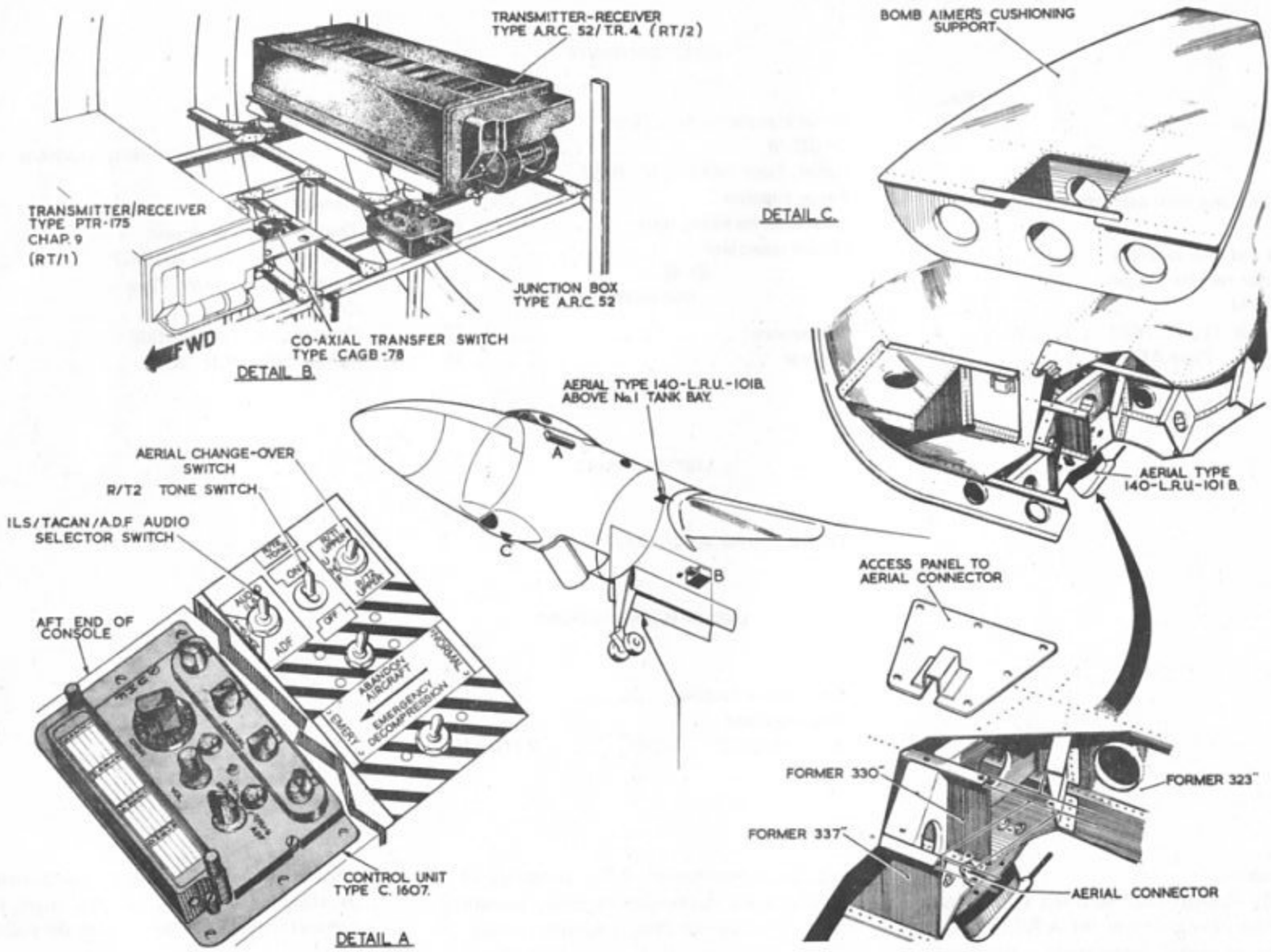

Fig. 1 Component location

DESCRIPTION AND OPERATION

CONTROLS AND UNIT LOCATION

3. The installation is remotely controlled from a control unit, Type C1607, in conjunction with an aerial change-over switch and a tone switch. These controls are located on the port console. The following associated units are fitted on a shelf on the starboard side of the nose-wheel bay:-

Transmitter-receiver	Type ARC52/TR4
Junction box	Type AN/ARC52
Aerial transfer switch	Type CAGB-78

Two U.H.F. aerials, Type 140-L.R.U.-101B are located as follows:-

Lower aerial - below the bomb aimer's blister

Upper aerial - above the No.1 tank bay

Both aerials are shared with the R/T1 installation (Chap.9) and are fitted externally on the aircraft skin.

Transmitter-receiver, Type ARC52/TR4

4. The transmitter-receiver unit comprises a front panel and a main chassis, the unit being mounted on an anti-vibration tray. The front panel contains:-

Pressure air valve (Schrader)
External dual air blower
Multi-pole plug
Aerial plug

The main chassis has all the sub-assemblies mounted on it and the whole assembly is enclosed in a double walled aluminium case (pressurized to 18 p.s.i.g.) which functions as a heat exchanger between the outside air and the air inside the case. Air forced between the walls by the dual blower, dissipates the heat absorbed by the inner wall and is exhausted out through the vents on the top of the outer case. The T.R. unit has sufficient crystals fitted in the unit to provide 1 750 frequency channels spaced at 100 KHz apart. A pre-determined guard frequency is constantly monitored, by a fixed tuned receiver (fitted in the unit), operating on a frequency range of 238 MHz to 248 MHz. An M.C.W. tone of 1 000 Hz (approx.) is transmitted, (when the tone switch is depressed) from a tone generator incorporated in the modulator unit for emergency or direction finding purposes. The tone generator is also employed to provide a simulated bombing tone.

Control unit, Type C.1607

5. The control unit, Type C.1607, provides remote control of the installation by operation of the following switches, mounted on the front panel. The function switch has four positions:-

OFF	In this position the power relay K1101 remains de-energized.
T.R.	In this position the power relay K1101 is energized and makes the installation ready for use.
T.R.+G	The guard receiver is now available in addition to the T.R.
A.D.F.	The T.R. is switched to A.D.F. with the appropriate airborne equipment.

The volume controller (VOL) is used to adjust the level of the audio signal in the telephones. The channel selector switch (CHAN) is a 20-position rotary switch, labelled 1 to 18 inclusive and G and M. Each numeral position has a pre-set frequency, which on selection, selects the frequency automatically. In position G, and with the function switch selected to T.R., the guard receiver output is cut-off, and the main receiver can now receive or transmit at this guard frequency. In position M, the selection of automatic frequency is cut off and allows manual control to take place. Selection of any one of the 1 750 channels can be obtained by rotating the manual control switches to the required frequency, which then actuates the automatic tuning mechanism. Frequency adjustments for pre-selected channels are made by releasing a small panel at the bottom of the control unit front panel, which has an ivorine tablet on which the frequencies selected may be marked. Two lamps are arranged to provide diffused illumination of the controls.

Junction box, Type ARC/52

6. The junction box, Type ARC/52, is the main distribution point for the R/T2 system. The junction box is equipped with seven multi-pole sockets, which provide the following facilities:-

(1) Connects the microphone input and audio output circuits from the T.R. unit to the I/C system.

(2) Links the control unit to the T.R. unit.

(3) Connects the power supplies to the T.R. unit.

(4) Connects the tone output and panel light to the appropriate control and dimmer switches.

Aerial transfer switch, Type CAGB-78

7. The aerial transfer switch is operated by a 28-volt d.c. supply and is only energized when the aerial selector switch on the port console 6P is set to R/T1 UPPER. With the aerial selector switch set to R/T1 UPPER the U.H.F. lower aerial is connected to the transmitter-receiver belonging to this installation (R/T2) and the U.H.F. upper aerial is connected to the transmitter-receiver, Type PTR.175, (R/T1 Chap.9). With the aerial selector switch set to R/T2 UPPER the aerial transfer switch is de-energized and the switch contacts transfer the lower aerial to the R/T1 transmitter-receiver and the upper aerial to the R/T2 transmitter-receiver.

Aerial, Type 140 - L.U.R. - 101B

8. The aerial, Type 140 - L.R.U. - 101B is of shark fin design, with a short rod projecting horizontally at the rear of the blade.

POWER SUPPLIES

9. When the function switch, on control unit, Type C1607 (located on the port console) is rotated from the OFF position to either T.R., T.R. + G or A.D.F., a power relay K1101, in the power unit is energized by a 28-volt d.c. supply from fuse 822 in panel 19P. With relay K1101 energized, a 200-volt 400 Hz a.c. supply is fed from fuses 230 (R.Y.B.) in panel 28P to the T.R. unit. When the console red flood dimmer (located on the port side, below the cockpit rail) is operated, a 28-volt d.c. supply from fuse 629 in panel 3P, is fed to the lamp which illuminates the dials and switches on control unit, Type C.1607. Power supplies for the radio installation are fully described in Sect.6, Chap.6 and 7 of this publication.

SIMULATED BOMBING TONE

10. As previously mentioned (para.4) the tone generator in the U.H.F. R/T2 set is used for simulated bombing. The system is operated from panel 9P at the navigator's station. When the bomb firing switches at the prone bomb aimer's station or the bomb aimer's panel 9P are depressed, the tone circuit is cancelled.

Circuit operation

11. With the R/T2 system switched to ON and with reference to fig.2 in Sect.8, Chap.9, a simulated bombing tone is transmitted in the following manner. The change-over switch labelled SIM BOMB, is selected to R/T2 and the start switch momentarily depressed. A 28-volt d.c. supply from fuse 555 in panel 4P, will be fed through the bomb and start switches to the energizing coils of relays 543 and 544 to earth, also to the energizing coil of relay 648 via a 680 ohm resistor, earth and relay contacts 647/1. Relay 648 is held on by relay contacts 648/1 and the indicator lamp will now light.

12. The earth return to relay K904 in the U.H.F. set is normally earthed via a tone switch situated on the port console 6P. When relay K904 is energized in this way, switching on the tone generator, the press-to-transmit relay K901 is also energized and thus transmits the R/T2 tone signal automatically.

13. For simulated bombing purposes the earth return for relay K904 is completed via terminal 2 of the tone switch, and relay contacts 543/1, 648/2 and 647/1. The tone will therefore be automatically transmitted when R/T2 is selected on the simulated bombing change-over switch and the start switch operated. The side tone to the crew's I/C system is routed via the normal R/T2 set J.B. Type AN/ARC.52.

14. On depressing the bomb firing switch in the prone bomb aimer's position or the bomb aimer's switch, on panel 9P, the tone is cancelled by energizing relay 647 from fuse 546 in panel 4P. Relay contacts 647/1 open, to break the earth to the coil of relay 648, and the indicator lamp goes out. Relays 543 and 544 remain energized, until the change-over switch sim bomb is selected to OFF.

SERVICING

Precautions

15. Servicing personnel in particular are warned that a.c. and d.c. voltages in excess of 100-volts can be dangerous, to the extent of causing personal injury, fatal or otherwise. It is essential that the utmost attention be given to servicing instructions where matters of safety are concerned. It is essential that maximum co-operation be maintained between trades mutually concerned in servicing operations.

General

16. The setting up, operating and servicing instructions for the installation and its components are contained in A.P.116D-0105-1. The security of all

components should be checked regularly. All connectors, plugs, sockets and terminal blocks should be examined for damage and ingress of dirt and moisture.

General

18. Access to the components is straightforward, but the following points should be observed. When it is necessary to remove or replace any components, secure all loose connectors to the adjacent aircraft structure to prevent damage.

Transmitter-receiver unit

19. On the front panel of the unit disconnect the two connector sockets, unscrew the two knurled nuts at the base of the unit, take hold of the transport handle and slide the unit off its anti-vibration mounting tray.

Junction box, Type ARC/52

20. Disconnect the five connector plugs from the sockets attached to the lid of the unit. The lid of the unit can now be removed by releasing the three securing screws. The remainder of the unit may be removed after taking out the four securing screws.

Aerial transfer switch, Type CAGB-78

21. For ease of accessibility, remove amplifier unit, Type 16089 (see Chap.7 for removal instructions). On the aerial transfer switch, disconnect the four aerial plugs, remove the securing screws and nuts and lift off.

Control unit, Type C.1607

22. On the control unit, Type C.1607, release the four quick release fasteners, raise and withdraw the unit from the console panel.

Power supplies

17. In conjunction with the servicing of the system as laid down in A.P.101B-1902-4, and using a ground supply, the following periodic checks should be carried out. With a suitable test meter, check that the d.c. output is 28-volts at T.B.1060-A and that the a.c. output is 200-volt 400 Hz, at T.B.1054-A.B. and C.

REMOVAL AND INSTALLATION

Sufficient cable length has been allowed to enable the plug to be disconnected.

Aerials 140 - L.R.U. - 101B

23. The lower aerial feeder can be disconnected by removing the prone bomb aimer's cushions, and unscrewing the four floor securing bolts. Lift and remove the floor panel, release the seven quick release fasteners on the U.H.F. aerial access panel, and disconnect the feeder lead. The aerial fitted to the external surface of the bomb bay blister, can now be removed by unscrewing the ten countersunk securing bolts at the aerial base. Access to the upper aerial (on top of No.1 tank bay) is gained by the use of a servicing ladder Giraffe, Type D4. Remove the ten countersunk securing bolts at the base of the aerial, lift the aerial and disconnect the feeder lead.

TABLE 1

Connectors for A.R.I.18124/2

Part No.	Cableform	Connecting
2/T4776	Equip. wire 14/.0076	R.P.B. plug 942 to control unit, Type C.1607
3/T4776	Equip. wire 14/.0076	R.P.B. plug 942 to junction box, Type ARC/52
8/T4776	Uniradio 67	R.P.B. plug 931 to aerial No.1
9/T4776	Miniature 2P) Miniature 3D)	Junction box, Type ARC/52 to T.B.'s 1054, 1060
10/T4776	Miniature 6D	Junction box, Type ARC/52 to T.B.1062
15/T4776	Uniradio 73	T.R. unit to aerial relay, Type CAGB-78
16/T4776	Uniradio 73	Aerial No.2 to aerial relay, Type CAGB-78
17/T4776	Uniradio 73	R.P.B. plug 931 to aerial relay, Type CAGB-78
18/T4776	Unitersil 14) Unitersil 22) Unitersilmet 22)	T.R. unit to junction box, Type ARC/52

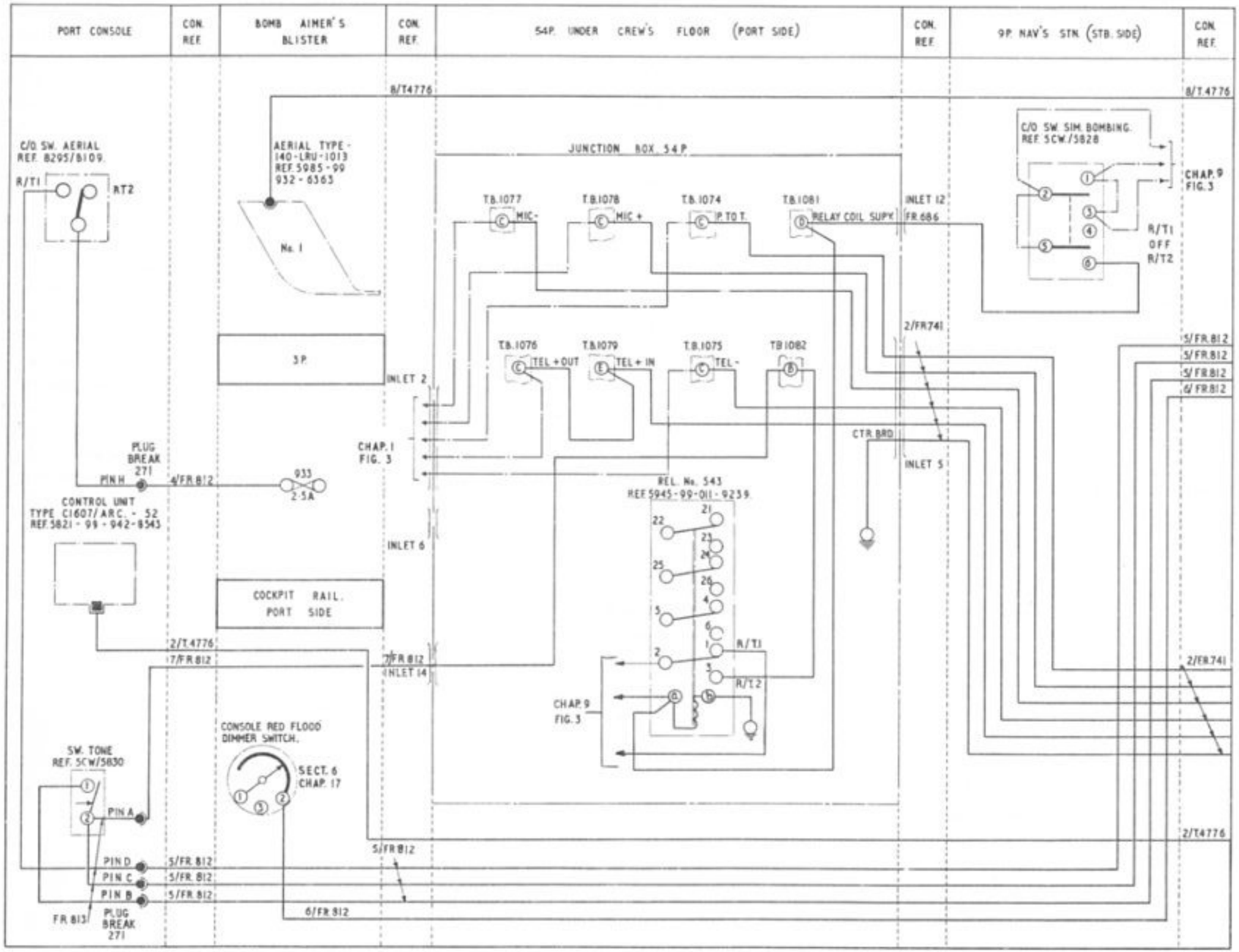

Fig. 2 (1) A.R.I. 18124/2

Cross reference amended

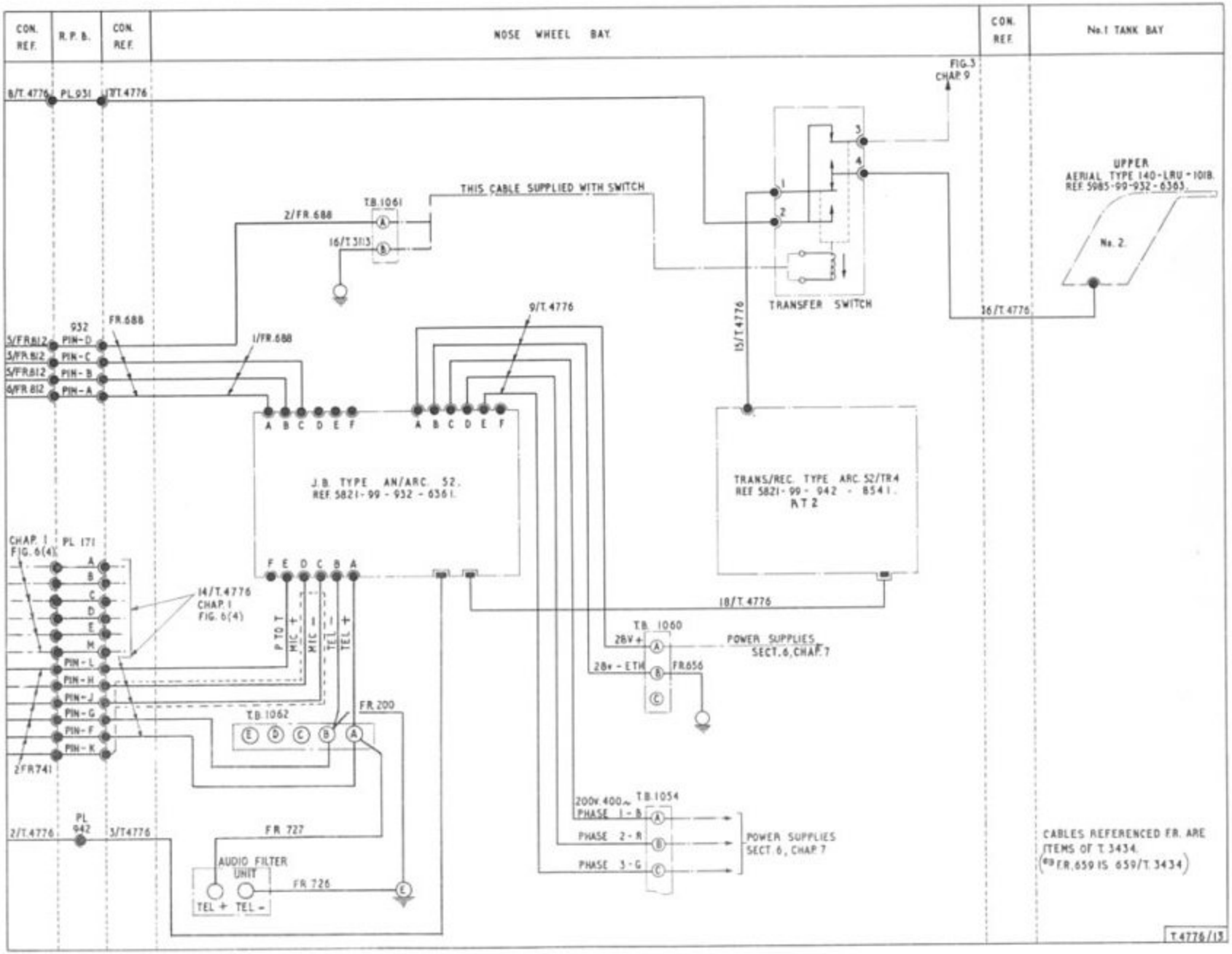

Fig 2.(2)A R I. 18124/2

▶ *Cross references amended* ◀

RESTRICTED