

Fig. 1 Location of A.R.I. 18089 equipment

◀ (Change to detail A) ▶

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**A.R.I.18089**

2. The A.R.I.18089 is a development of the earlier intercomm. system described in Chap.1. The system offers increased service selecting facilities, a means of mixing the receiver services without one adversely affecting the others, and two intercomm. channels. At the five main crew stations a control box is fitted for selection of the available facilities. Other intercomm. points have no provision made for selection of services.

3. With Mods.555 and 657 embodied, a total of nine intercomm. points are provided in the aircraft, including two external points for the use of ground servicing personnel. Interconnection between the control circuits and the various wireless services is provided by junction box 54P and a main junction box Type 7684. Distribution to the crew positions is via subsidiary junction boxes Type 7682 and Type 7683. Amplifiers Type A1961 are used for the normal and conference intercomm. channels together with Type 7681 control units. Press-to-transmit switches are fitted for three crew members; 1st pilot, 2nd pilot and A.E.O. In addition the A.E.O. is provided with a Type 51 morse key. Call switches are fitted at all positions except the ground servicing i/c points.

**Equipment at crew stations**

4. A control unit Type 7681, a junction box Type 7682 and a junction box Type 7683 are fitted at the following stations:-

1st pilot  
2nd pilot  
A.E.O.  
Nav. plotter  
Nav. bomber

At the air bomber, port peri-sextant and starboard peri-sextant positions, only call

**DESCRIPTION AND OPERATION**

switches and mic/tel connectors are fitted. Although individual call switches are provided for the air bomber and starboard peri-sextant positions, both these positions are served by a single mic/tel connector, fitted on the starboard radar crate.

**Supplies and control**

5. The system operates on 28-volts d.c. and is fed with five separate d.c. supplies. The supplies may be listed as follows:-

Fuse No.67, supplies conference i/c panel 3P - amplifier via switch on A.E.O.'s panel.

Fuse No.96, supplies normal i/c amplifier via switch on A.E.O.'s panel.

Fuse No.98, panel 3P - supplies JB7684.

CB/9, panel 3P - supplies 1st pilot's, nav. bomber's, and nav. plotter's JB's Type 7683.

Fuse 16, panel 4P - supplies A.E.O.'s and 2nd pilot's JB's Type 7683.

6. The supply to the normal i/c amplifier is controlled by a 3-position switch on the R/T panel at the A.E.O.'s station, marked NORMAL-EMERGENCY-OFF. Switching to NORMAL completes the circuit for a power relay within the amplifier, thus preparing the amplifier for normal operation. A single-pole ON-OFF switch controls the supply to the conference intercomm. amplifier in a similar manner. A routing chart of the circuit is given in fig.7 and para.19 gives a description of the circuit operation.

**Amplifiers, Type A1961**

7. A Type A1961 amplifier, Ref.No. 10U/16596, is provided for each of the two intercomm. services; normal and conference. The normal I/C amplifier is

mounted adjacent to junction box 54P under the port side of the crew's floor between formers 260 and 274. The amplifier connects into the system at inlet 13 of JB.54P and its circuit operation is described in para.19.

8. The conference i/c amplifier is mounted on the shelf behind the navigator's panel as shown in fig.1. This amplifier connects into the system at plug B on the JB Type 7684 and its circuit operation is given in para.25. Further information on Type A1961 amplifiers will be found in Chap.1.

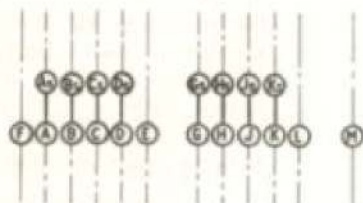
**Control units**

9. The control units Type 7681 fitted at the crew stations listed in para.4 enable the user to select three transmitter-receiver services, three receiver services, and two i/c services. In addition each unit is fitted with a call switch which, when selected, permits the caller's voice to be superimposed on other services.

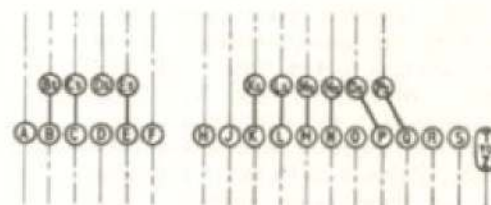
10. A rotary speak-listen switch is used to select the transmitter-receiver services, while four toggle switches and three potentiometers control the listen-only services. The services available are as follows:-

Conference i/c	}	Speak-listen switch
H.F.		
U.H.F.		
V.H.F.		
Normal i/c	}	Listen-only toggle switches
H.F.		
Conference i/c		
Warning receiver		
Normal i/c	}	Listen-only potentiometers
U.H.F.		
A.D.F./I.L.S.		
V.H.F.		

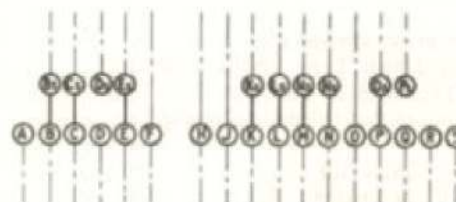
SWITCH POSITION CODE NUMBER	WHETHER POSITION IS ON ROTARY (MIC/TEL) SW. OR IS TELS. ONLY.	SERVICE	MIC. CIRCUIT IDENTIFICATION LETTERS FROM CONTROL UNIT, INSIDE J.B. TYPE 7682	MIC. CIRCUIT (PRECEDING COLUMN)	TRANSMITTER RECEIVER OUTLET (SIX WAY MIC. TELS & PTOT) ON J.B. TYPE 7684.	IDENTIFICATION LETTERS (PTOT) CIRCUIT FROM CONTROL UNIT INSIDE J.B. TYPE 7683	MATING LETTERS (IN J.B. TYPE 7683) FOR PTOT CIRCUIT	IDENTIFICATION LETTERS OF TEL. +VE CIRCUIT FROM CONTROL UNIT, INSIDE J.B. TYPE 7683	MATING LETTERS (IN J.B. TYPE 7683) FOR TEL. +VE CIRCUIT
1	MIC. / TEL.	OFF	—	—	—	—	—	—	—
2	MIC. / TEL.	CON I/C ARL 18089	B <sub>6</sub> H <sub>6</sub>	B - H	PLUG 2 'B'	—	—	L <sub>6</sub>	L
3	MIC. / TEL.	HF ARL 5874	C <sub>6</sub> J <sub>6</sub>	C - J	PLUG 3 'C'	C <sub>6</sub>	C	H <sub>6</sub>	M
4	MIC. / TEL.	UHF ARL 18049	D <sub>6</sub> K <sub>6</sub>	D - K	PLUG 4 'D'	D <sub>6</sub>	B	N <sub>6</sub>	N
5	MIC. / TEL.	VHF ARL 18064	A <sub>6</sub> G <sub>6</sub>	A - G	PLUG 1 'A'	E <sub>6</sub>	E	K <sub>6</sub>	K
6	MIC. / TEL.	I/C ARL 18089	E - L	E - L	PLUG 7 'K'	—	—	J	J
7	TELS. ONLY.	AMBORN WARNING ARL 18105	—	—	—	—	—	P <sub>6</sub>	Q
8	TELS. ONLY.	U.S. ARL 18011 ADF ARL 23023	—	—	—	—	—	O <sub>6</sub>	P



SPILL CONNECTIONS FOR J.B. TYPE 7682  
REF. 10D/19820 FOR ALL CREW MEMBERS.



SPILL CONNECTIONS FOR J.B. TYPE 7683 REF. 10D/19821  
FOR ALL CREW MEMBERS EXCEPT A.E.O. & 2<sup>nd</sup> PILOT.



SPILL CONNECTIONS FOR A.E.O. & 2<sup>nd</sup>  
PILOT'S J.B. TYPE 7683 10D/19821.

NOTE :

SPILL CONNECTIONS FOR INDIVIDUAL  
JUNCTION BOXES ARE RECORDED ON  
A LABEL FITTED INSIDE THE JUNCTION  
BOX COVER

Fig.2 Jumper connection diagram

RESTRICTED

**NOTE...**

*The warning receiver service is not available at the A.E.O.'s and second pilot's positions.*

An anti-crosstalk network is incorporated in the units to prevent re-radiation of signals between the services. An integral amplifier is then employed to restore the signals to their normal level.

11. A three-position switch labelled NORMAL-OFF-DIRECT is fitted on the front face of each control unit. This switch controls the 28-volt supply and telephone connections, as described in para.20. It should be noted that in the DIRECT position no mixing facilities are available. Further details of the control unit will be found in A.P.2876B, Vol.1, Part 2, Chap.3.

**Junction boxes****Main junction box**

12. The main junction box, Type 7684, is located under the navigator's table and is the central connecting point for the i/c system and the associated wireless services. Two relays, NE/4 and 0/2, are mounted on the upper face of the box, encircled by the multi-pin plug and socket connectors. Relay NE/4 is energised when the normal/emergency switch is at NORMAL. Relay 0/2 is energised when any call switch is pressed.

**Sub junction boxes**

13. As stated in para.3 a junction box Type 7682 and a junction box Type 7683 are fitted at each station equipped with a control unit Type 7681. Each junction box has four multi-pin plugs, three for inter-circuit connections and the fourth for connection to the control unit. The Type 7682 junction boxes carry the main microphone cables while the Type 7683 junction boxes carry the main telephone cables. Internal connections are made by

soldered spills on a tagboard. The spill arrangement determines which services are available at the various switch positions in the control unit. A diagram showing the spill connections for both junction boxes is provided in fig.2.

**Junction box 54P**

14. This junction box is mounted adjacent to the normal i/c amplifier, under the port side of the crews' floor between formers 260 and 274. The junction box contains two relays, No.543 and 544, and T.B.'s 1074 to 1083 inclusive. The junction box in addition to interconnecting the various services is also associated with the circuit of the simulated bombing tone produced by either the V.H.F. or U.H.F. installations. Relays 543 and 544 are change-over relays energised by the simulated bombing change-over switch. Further details will be found in paragraph 39.

**Press-to-transmit switches**

15. Three press-to-transmit switches are fitted in the aircraft, one on each pilot's control column, and the other on the table top at the A.E.O.'s station. The closing of any of these switches will energise the transmit relay in the transmitter of any transmitter-receiver service selected on the user's control unit Type 7681. At the A.E.O.'s station a morse key is connected in parallel across the press-to-transmit switch, thus providing keying facilities on the H.F. equipment.

16. The first and second pilots' press-to-transmit switches energise the transmit relay via two relays, 687 and 688, on the relay box at the starboard side of the pilots' floor. The transmitter relay circuit from each control unit is normally broken by the open contacts of the associated relay. Relay 687 controls the first pilot's circuit and relay 688 controls the second pilot's circuit. The relays will be

energised, thus completing the circuit for the transmitter relay, when the appropriate press-to-transmit switch is made. The first pilot's switch is fed with a 28-volt supply from fuse 34, panel 3P. The second pilot's switch receives a similar supply from fuse 35, panel 3P.

**External i/c points**

17. External intercomm. connecting points are provided for use during ground servicing periods. A ground i/c panel in the rear warning bay carries a mic/tel socket, Type 359 and a mic/tel plug Type 3570, together with an extension lead which is stowed on the panel. A second mic/tel plug Type 3570 is fitted on the lower part of the nose wheel assembly. Three toggle switches marked EXTERNAL I/C ON-OFF are fitted on the R/T panel at the A.E.O.'s station for control of these circuits.

**Monitor-alarm switches**

18. These two switches, fitted one at the A.E.O.'s station and one at the 2nd pilot's station, enable the 2nd pilot and A.E.O. to select monitor or alarm from the aural warning circuits of the E.C.M. equipment.

**Circuit operation****Normal i/c operation**

19. The normal i/c system is prepared for operation by selecting NORMAL on the NORMAL-OFF-EMERGENCY switch at the A.E.O.'s station. This will complete the earth circuit for relay P2 inside the normal i/c amplifier. The relay is fed with a 28-volt d.c. supply from fuse 96 in panel 3P, via JB.54P. Energising relay P2 will connect the amplifier's rotary transformer and voltage regulator to the d.c. supply, thus providing H.T. and L.T. for the amplifier circuits. At the same time an earth will be provided, via contacts 1-2 of the NORMAL-EMERGENCY-OFF switch, for relay NS/4 in the junction box Type



7684. Energising this relay will disconnect the microphones from the audio stages of the V.H.F. transmitter and connect them to the normal i/c amplifier. Relay NE/4 is fed with a 28-volt d.c. supply from fuse 98, via 54P and plug H of the JB type 7684.

20. The integral amplifiers in the control units are provided with a 28-volt d.c. supply from their associated JB's Type 7683. The supplies to these JB's are detailed in para. 5. When the normal-off-direct switch on the front of the control unit is placed to NORMAL the supply to the integral amplifier is made and, at the same time, the user's telephone is connected to the amplifier via the switch and pin R, plug B. The microphone is connected, through the speak-listen switch, from pins F and M, plug A, to pins A and C, plug A before connecting to the JB Type 7682. Thus when the speak-listen switch is selected to i/c, mic/tel communication will be available.

#### *Emergency operation*

21. Provision is made for emergency operation of the normal i/c system in the event of failure of the Type A1961 amplifier in the individual control units. Failure of the Type A1961 amplifier is counteracted by selecting EMERGENCY on the normal-emergency-off switch. This action will de-energise the power relay in the amplifier and relay NE/4 in the JB Type 7684, thus cutting off the d.c. supply from the amplifier and connecting the i/c circuits to the audio stages of the V.H.F. receiver via the contacts of the de-energised relay NE/4.

22. If a control unit amplifier should fail the normal-off-direct switch on the front of the control unit should be placed to DIRECT. This action disconnects the supply from the amplifier and at the same time connects the user's telephone direct to the normal i/c amplifier, via the speak-listen switch.

#### *Press-to-call*

23. When the call switch on any control unit Type 7681 is pressed, relay 0/2 in the junction box Type 7684 will be energised. The change-over contacts of the now energised relay will allow the output from the user's microphone to be superimposed on all other services thus permitting the user to call crew members switched to services other than intercomm.

#### *Press-to-transmit*

24. Circuit operation for the press-to-transmit switches is as detailed in para.15.

#### *Conference i/c operation*

25. Conference intercomm. provides an additional intercomm. channel for use between crew members when isolation from the normal intercomm. is desired. An additional Type A1961 amplifier is provided which is fed with 28-volt d.c. from fuse 67 via a switch labelled CONFERENCE I/C, ON-OFF, mounted on the A.E.O.'s panel. When the switch is selected to ON, relay P2 in the amplifier will be energised, thus connecting the voltage regulator and rotary transformer to the 28-volt d.c. supply. The additional channel is then made available by selecting CON/I/C on the user's control unit Type 7681.

#### **A.R.I.18124/1**

26. A.R.I.18124/1 is a pressurised multi-channel U.H.F. R/T transmitter-receiver primarily intended to provide communication between aircraft and ground, aircraft and ships, and also between aircraft in flight. The equipment operates over the frequency range of 225.0 Mc/s to 399.9 Mc/s and in addition to R/T transmission, facilities are available to radiate M.C.W. for direction finding and emergency purposes. Provision is

also made for transmission of a simulated bombing tone during tactical training exercises.

27. The major units and their controls are briefly described in the paragraphs that follow, and are shown in fig.4. A routing chart of the installation is provided in fig.8. For a more detailed description of the installation reference should be made to A.P.2531J, Vol.1.

#### **Supplies and control**

28. The installation operates from the aircraft 28-volts d.c. system and reference to the routing chart fig.8 will show that two d.c. supplies are provided; one from fuse 63 in panel 3P, to the aerial change-over switch; the other from CB.95, adjacent to 15P in the nose wheel bay, to the JB Type AN/ARC-52.

29. The main controls of the installation consist of a control unit Type C1607/ARC-52, an aerial change-over switch and a tone switch. These items are all mounted on the port console as shown in fig.4.

#### **Control unit Type C1607/ARC-52**

30. This unit provides the first pilot with remote control of the installation. A function switch, channel selection switch, manual switch and volume control are mounted on the front face of the unit.

#### **Aerial change-over switch**

31. This single-pole toggle switch permits selection of either of the two aeriels. The switch controls a d.c. supply to an aerial switch unit Type 1741 which contains a relay operated co-axial switch. With the toggle switch selected to No.1, the relay is de-energised and the installation is connected to the No.1 aerial. Selecting the toggle switch to No.2 will energise the relay, operate the co-axial switch, and thus switch the installation to the No.2 aerial.

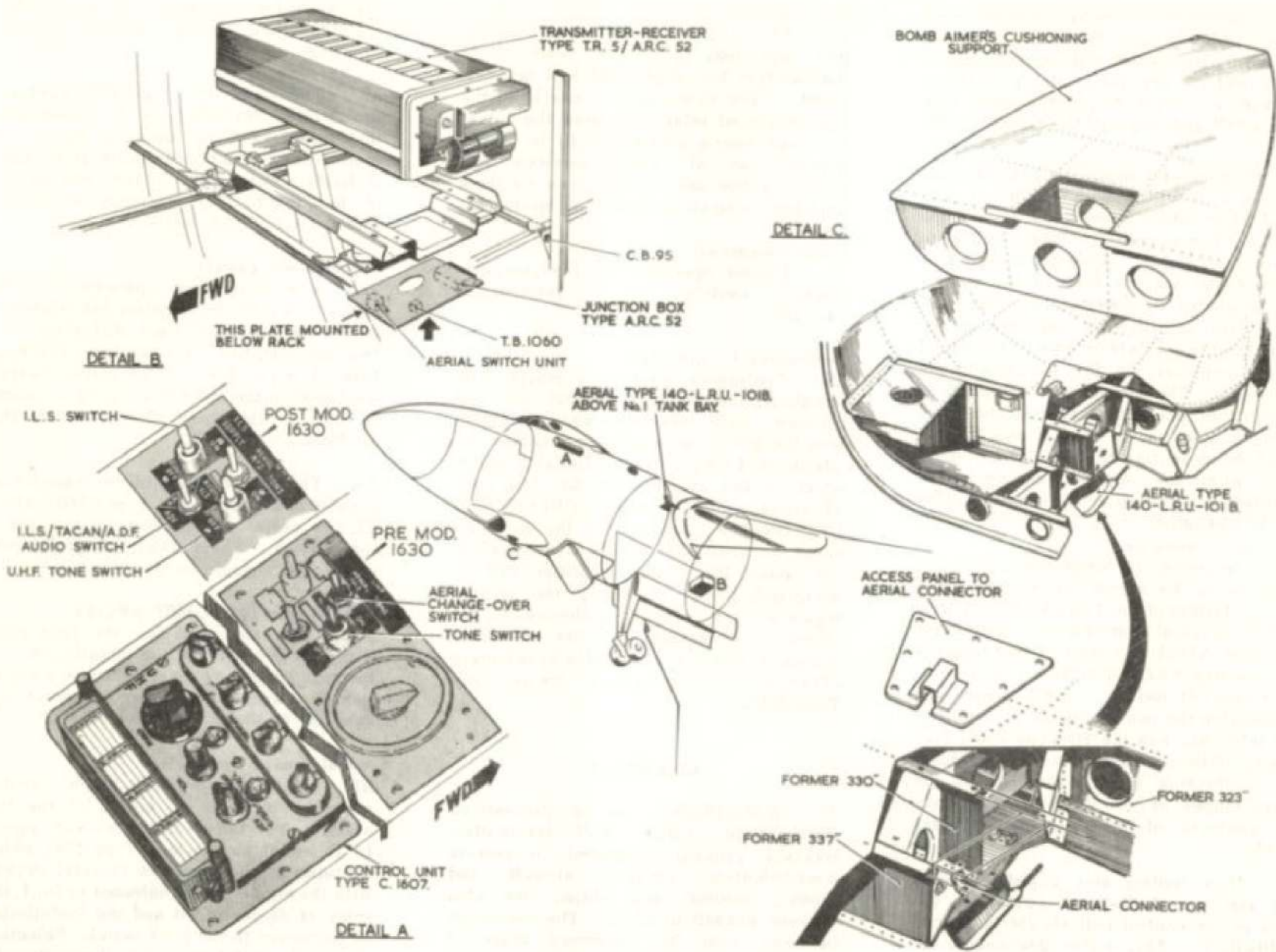


Fig. 4. Location of A.R.I. 18124/1 equipment.

(Change to detail A)  
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**Tone switch**

32. The tone switch is located on the port console, and when depressed completes the earth return to relay K904 whose contacts switch on the U.H.F. 1000 c/s tone generator and also energise the transmit relay K901, thus transmitting the 1000 c/s tone. Relays K904 and K901 are part of the U.H.F. set assembly. This facility is intended for emergency or A.D.F. purposes, and is also used for providing a simulated bombing tone.

**Transmitter-receiver**

33. The transmitter-receiver is enclosed in a double-walled pressurised cover which acts as a heat exchanger between the outside air and the air inside the cover. Air forced between the walls by a dual blower, mounted on the front of the transmitter-receiver, dissipates the heat absorbed by the inner wall and is then exhausted through two vents on top of the outer cover. Air circulation within the power unit is provided by two fans mounted one on each end of the dynamotor.

34. The main chassis of the transmitter-receiver carries the various sub-units and is fitted with a front panel assembly. The panel forms part of the chassis and has the following items mounted on its front face:-

- Pressurising valve
- External dual air blowers
- Aerial plug
- Multi-pole connector plug

The complete unit is secured to a mounting tray Type MT1477/ARC52 which provides the necessary anti-vibration and bonding requirements.

**Junction box**

35. The junction box Type AN/ARC52 is the main distribution box for the U.H.F. installation and provides the following distribution facilities:-

- Connection of the aircraft i/c system to the transmitter-receiver.
- Connection of the tone output and

panel lamp circuits to the associated switches and controls.

Connection of the power supplies to the control unit and transmitter-receiver.

Connection of the control unit to the transmitter-receiver.

**Aerial switch unit Type 1741**

36. This unit is mounted below the shelf supporting the transmitter-receiver and, as stated in para.31, is used for switching the transmitter-receiver to either of the two aerial systems. The unit contains a co-axial switch operated by a relay which is controlled by a single-pole toggle switch on the port console.

**Aerial systems**

37. Two aeriels Type 140-LRU-101B are fitted in the aircraft to form two separate aerial systems. Both aeriels are of shark fin design with a straight rod projecting horizontally at the rear. The aeriels are mounted externally on the aircraft skin. The No.1 aerial is mounted below the air bomber's blister whilst the No.2 aerial is fitted above the No.1 tank bay.

**SIMULATED BOMBING CIRCUIT**

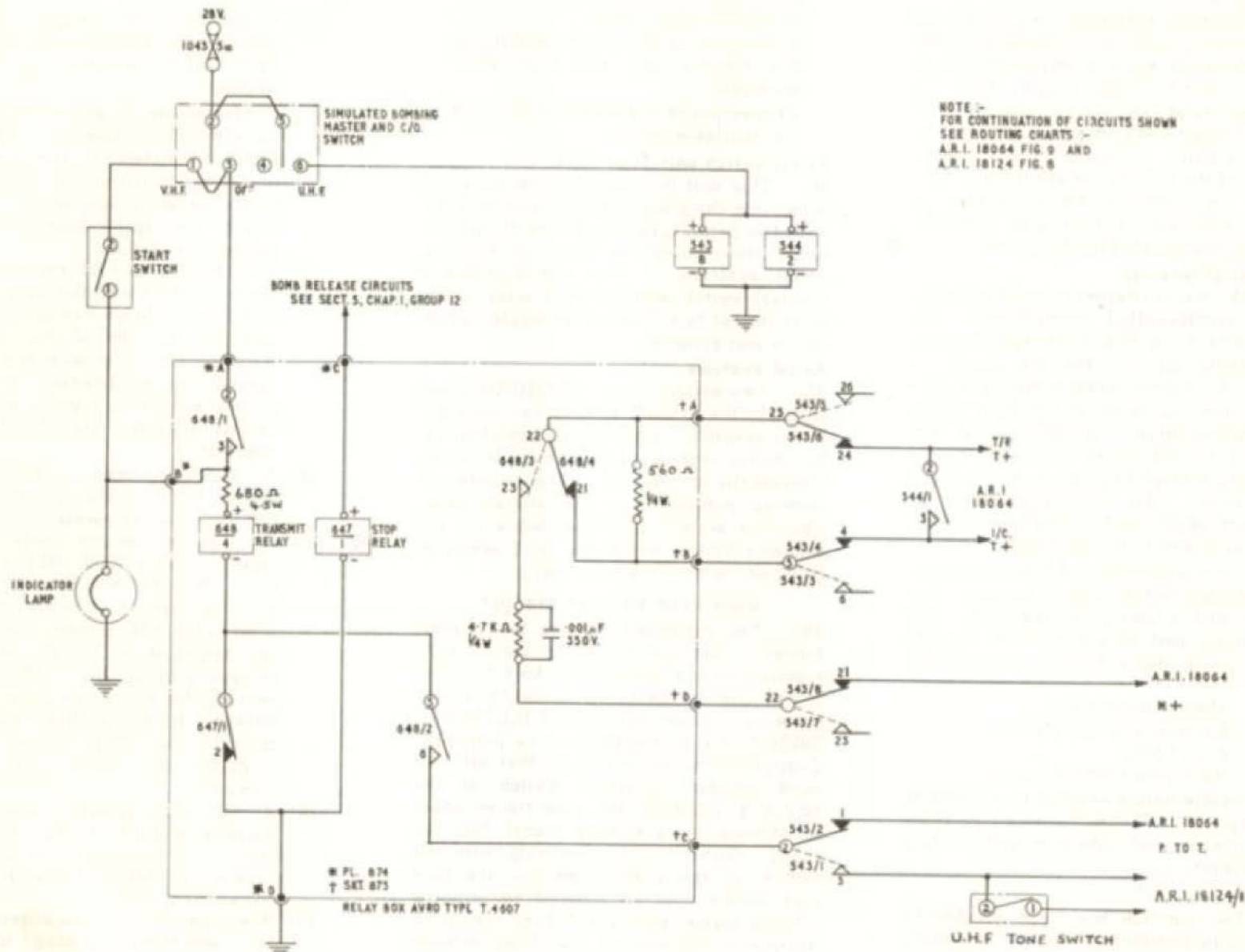
38. The simulated bombing tone circuit formerly associated with the V.H.F. installation and described in Sect.6, Chap. 1 can now be switched to cause a tone transmission from either the A.R.I.18064 or 18124/1, for simulated bombing purposes. Control of the circuit is such that with the bomb release isolation switch at the ISOLATE position, the tone transmission is stopped by a release signal from the N.B.S. circuit. Alternatively with the switch at the normal position the tone transmission can be stopped by either a release signal from the N.B.S. circuit or depression of any of the bomb release switches. The circuit is shown on the A.R.I.18064 routing chart, fig.9, and also in theoretical form, at fig.5.

**Components**

39. The circuit consists of the following

components:-

- (1) A double-pole toggle switch, Ref.No.5CW/5828 labelled V.H.F. - OFF - U.H.F., employed as a master switch.
- (2) A single-pole toggle switch, Ref. No.5CW/5830 labelled START, which completes the initial supply to a relay, which in turn causes the transmission to commence. The switch is spring-loaded to the centre off position.
- (3) Four relays, two of which operate in conjunction with the start switch and bomb release circuits; one to start and the other to stop the tone transmission. The other two relays operate in conjunction with the master switch to transfer the tone circuit between the A.R.I.'s as required.
- (4) An indicating lamp 5G/1553 which shows, when lit, that the coil of the transmit relay is energised.
- (5) A 4.7K ohm resistor connected in parallel with a 0.001 MFD capacitor. When the V.H.F. is selected this network is inserted by the start relay 648 between the input and output of the V.H.F. set audio frequency amplifier. When connected, the resistance capacitance network allows positive feedback to occur at 1000 c/s and thus modulate the V.H.F. transmitter carrier.
- (6) A 560 ohm resistor provides a suitable control of the side tone level, which is injected into the crew's i/c whilst the tone is being transmitted.
- (7) When the U.H.F. transmission of the simulated bombing tone is required, the U.H.F. set internal 1000 c/s tone generator is employed. The necessary change-over from V.H.F. to U.H.F. tone transmission is accomplished by the



NOTE :-  
FOR CONTINUATION OF CIRCUITS SHOWN  
SEE ROUTING CHARTS :-  
A.R.I. 18064 FIG. 9 AND  
A.R.I. 18124 FIG. 8

Fig.5 Simulated bombing tone circuit

(4 Mod 1427 embodied)

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change-over relays 543 and 544, circuit details of which will be found in para.46.

40. The two resistors, the capacitor and the transmit and stop relays, are contained in a relay box Avro Type T4607 which is mounted near JB.54P. The master and start switches, and the indicator lamp, are mounted on a small panel affixed to the upper forward edge of the nav.bomber's control panel 9P at the navigator's station. The panel is shown in fig.6.

#### Supplies

41. Two 28-volt d.c. supplies are required for the circuit. One is fed from fuse 1043 on panel 4P, via the master and start switches, to energise the coil of the transmit relay, light the indicator lamp and, when U.H.F. is selected, also to energise the coils of the change-over relays. The other supply is fed from fuse 165, also on 4P, via the bomb release switches, to energise the coil of the stop relay.

#### Circuit description V.H.F.

42. Referring to fig.5, it will be seen that with the master switch in the centre off position, the V.H.F. telephone circuit is completed for normal operation via normally closed relay contacts 543/6, 648/4 and 543/4.

43. Starting with a supply available at fuse 1043, selection of V.H.F. at the master switch and momentary depression of the start switch will cause a supply to be fed to light the indicator lamp and to the coil of relay 648. The earth circuit of relay 648 will be completed via normally closed relay contacts 647/1 and the relay will be energised resulting in the following circuit action:-

- (1) Closing of relay contacts 648/1 will connect a supply from fuse 1043, via terminals 2-1-3 of the master

switch, to relay 648 and to the lamp which will now light.

- (2) Closing of relay contacts 648/2 will complete the earth return of the A.R.I.18064 press-to-talk circuit, via normally closed relay contacts 543/2 and 647/1, and the set in use will start transmitting.

- (3) Change-over of relay contacts 648/4 to 648/3 will:-

- (a) Connect the 4.7K ohm resistor, also connected in parallel with a 0.001 MFD capacitor, between the input and output of the V.H.F. audio frequency amplifier thus causing positive feedback at a frequency of 1000c/s. This in turn will modulate the transmitter carrier.

- (b) Inject a side tone of 1000 c/s via a 560 ohm resistor into the crew's i/c system.

#### V.H.F. tone cancelling

44. The tone transmission will continue until operation of one of the bomb release circuits causes a supply to be fed to energise the coil of relay 647. When this occurs the following circuit action will result:-

- (1) Opening of relay contacts 647/1 will:-

- (a) Interrupt the earth return of the press-to-talk circuit and the transmission will cease.

- (b) Interrupt the earth circuit of relay 648 which will be de-energised.

- (2) Opening of relay contacts 648/1, will disconnect the hold-in supply to the coil of relay 648 and the supply to the indicator lamp which will go out.

- (3) Opening of relay contacts 648/2 will isolate the press-to-talk circuit.

- (4) Change-over of relay contacts 648/3 to 648/4 will prepare the A.R.I.18064 telephone and microphone circuits for normal operation.

45. When the bomb release circuit supply is removed from the coil of relay 647, relay contacts 647/1 will close to make the tone circuit ready for further use.

#### Circuit description U.H.F.

46. Selection of the U.H.F. position at the master switch will connect a supply from fuse 1043, via terminals 5-6, to energise the coils of relays 543 and 544. The U.H.F. set internal 1000 c/s tone generator is utilised in providing a simulated bombing tone. Normally the tone generator is switched on via the tone switch, and as previously stated in para.32 completes the earth return to relay K904, with relay K904 energised the U.H.F. set will commence to transmit the tone. For simulated bombing purposes the earth return to relay K904 is completed via pin 2 of the tone switch, and relay contacts 543/1, 648/2 and 647/1 as shown in fig.5. Relay contacts 544/1 will close to complete the telephone circuit of A.R.I.18064 (V.H.F.) for normal operation.

#### U.H.F. tone cancelling

47. The U.H.F. tone transmission will continue to operate until relay 647 is energised via the bomb release switches. This will de-energise relay 648, and contacts 648/2 and 647/1 will isolate the earth return to relay K904 thus switching off the U.H.F. tone and carrier. Momentary depression of the start switch will cause the U.H.F. tone transmission to occur again, and cancellation will take place when the bomb release switch is operated. At the conclusion of simulated bombing operations the master switch

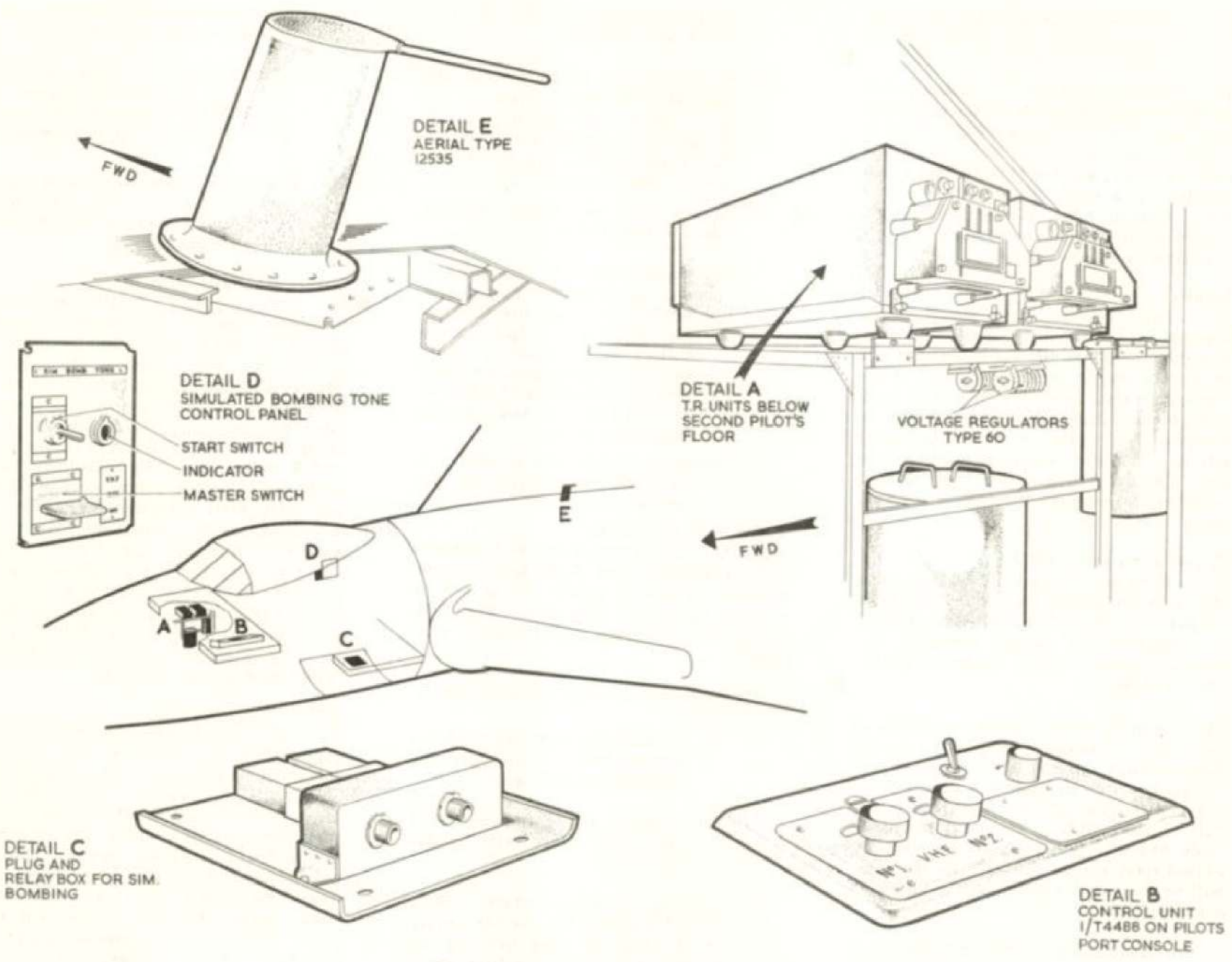


Fig.6 Location of A.R.I.18064 equipment

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should be returned to the off position in order to de-energise relays 543, 544 and 648. Relay contacts 543/4, 543/6 and 648/4 will then connect the V.H.F. inter-comm. circuit back to normal operation.

#### A.R.I.18064

48. On aircraft with S.R.I.M.2291 embodied, the A.R.I.18064 equipment has been moved from the compartment aft of the power compartment to a position below the second pilot's floor. The Type 7121 aerial has also been replaced by an aerial Type 12535 and moved to a new position above the No.2 tank.

49. In addition, the 28-volt d.c. power supplies to the two T.R. units are now fed from new fuses, via two Type 60 voltage regulators. The Type 60 voltage regulators are introduced to reduce the 28-volt supply to 24 volts. The No.1 T.R. unit is fed, via its associated regulator, from fuse No.1 on the V.H.F. fuse block in panel 4P. The No.2 T.R. unit is fed, via its associated regulator, from fuse No.4 on the V.H.F. fuse block in panel 3P. The control unit on the port console is fed from fuse 108 in panel 3P. A routing chart of the installation, post S.R.I.M.2291, is given in fig.9, while fig.6 shows the T.R. units and Type 12535 aerial in their new positions.

50. With the introduction of A.R.I.18089 the remote control unit Type 9116 for the

#### General precautions

57. The general precautions preceding the servicing information in Chap.1 should be followed prior to any tests and adjustments outlined in this appendix.

#### A.R.I.18089

58. The control units Type 7681 and their associated JB's should be checked

V.H.F. installation has been replaced by an AVRO Type I/T4488 control unit. This unit is a modified Type 9116 control unit which has had the volume control removed and a suitable blanking plate fitted. Control of volume is now effected by the volume control on the i/c control units.

#### A.R.I.5874

51. The H.F. installation remains basically unchanged. However it will be seen from the routing chart fig.10, that cables formerly routed via junction box 5J are now routed via JB.54P.

#### A.R.I.5378

52. The radio altimeter circuit is unchanged except for a minor alteration in cable reference number between TB.777 and plug 170. A new routing chart is provided in order that any subsequent alterations to this installation, on Mk.1A aircraft, may be recorded.

#### A.R.I.23023

53. The sense aerial which was formerly connected direct to the A.D.F. installation is now connected via a co-axial switch unit. When the switch is in the normal, de-energised, position the sense aerial is connected to the A.D.F. installation, but when the switch is energised the aerial is connected to the A.R.I.18074 installation.

### SERVICING

periodically for ingress of moisture and for security of attachment and connections. All mic/tel connectors should be inspected for signs of damage and for freedom of movement without strain on the connections. The main junction boxes of the system and their associated plugs and sockets should also be checked for security and freedom from corrosion. Further servicing information on the above components will

The aerial thus serves either installation depending upon the position of the switch. The switch is controlled by the A.R.I.18074 installation and the aerial used is a wide-band aerial, Type 10228, which is mounted in the upper forward edge of the fin structure.

54. The only other change to the installation is the introduction of an A.D.F./I.L.S. selector switch. On aircraft with TACAN (Mod.1630) embodied, the selector switch is changed to a 3-way type and is labelled A.D.F./TACAN/I.L.S. This switch mounted on the port console, enables the first pilot to select which service (A.D.F. or I.L.S. or TACAN when fitted) shall be available at the crew members i/c control units.

#### A.R.I.18011

55. As the I.L.S. signals are now routed via JB.54P and the individual crew member's i/c control units, the I.L.S. volume control and resistor network panel have been deleted from the port console. This arrangement enables each crew member receiving I.L.S. signals to adjust the volume to his personal requirements by means of the volume control on his i/c control unit.

56. As stated in para.54 an I.L.S. - A.D.F. selector switch has been introduced at the port console.

be found in A.P.2876E, Vol.1, Part 2, Chap.3.

#### Amplifiers Type A1961

59. The two amplifiers should be checked at intervals for security of attachment and for tightness of plug and socket connections. Instructions for opening up the amplifier for bench testing purposes will be found in A.P.2876E, Vol.1, Part 2, Chap.1.

### Functional check

60. The following functional check of the system should be carried out at the appropriate periods.

- (1) Ensure that the necessary ground power supplies are connected.
- (2) At the A.E.O.'s station switch the normal-emergency-off switch to NORMAL and the CON. I/C switch to ON. At the same time switch the three external I/C switches to ON.
- (3) Select the speak-listen switch to I/C and the normal-direct switch to NORMAL on each control unit Type 7681.
- (4) Check for communications facilities between all mic/tel connectors.
- (5) Check for communications facilities with each normal-direct switch selected in turn to DIRECT, on the control units Type 7681. Return each switch to NORMAL.
- (6) Select the speak-listen switch to CON. I/C on each control unit Type 7681.
- (7) Check for communications facilities between all mic/tel connectors, then return the speak-listen switches to the I/C position.
- (8) Check for telephone only facilities with the listen-only I/C switch at ON, and the speak-listen switch selected to any other position on the control units Type 7681. Return

66. The instructions given in the following paragraphs apply only to the two new installations A.R.I.18089 and A.R.I.

the switches to their previous position.

- (9) Repeat (8) with the listen-only CON. I/C switch at ON. Return the switches to their previous position.
- (10) Press all call switches in turn, checking that the signal from the user's microphone is superimposed on whatever service is selected at the other stations.
- (11) When testing the transmitter-receiver services check the operation of each press-to-transmit switch. Check the mixing facilities of the receiver services using the appropriate controls on the control units Type 7681.
- (12) Check for emergency operation by selecting the normal-emergency switch to EMERGENCY and using the No.1 V.H.F. for intercomm.
- (13) Put all switches to OFF and remove the ground supplies.

### A.R.I.18124/1

61. The equipment should be examined at regular intervals for security of attachment. Cables and connections should be examined for signs of damage. Ensure that all plugs and sockets are correctly mated and that the bonding is secure and free from damage.

### Servicing limitations

62. Servicing of the transmitter-receiver in the aircraft is limited to a series of

### REMOVAL AND ASSEMBLY

18124/1. Removal instructions for other installations are given in Chap.1.

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functional checks made periodically to ensure that the equipment is in satisfactory working condition. A test set, U.H.F. equipment, Type 15056 is available for testing the aircraft installation and is described in A.P.2531J, Vol.1, Part 2, Chap.6. Instructions for using the test set will be found in Vol.1, Part 2, Chap.3, of the same publication. Any defective units should be removed from the aircraft to be bench tested in accordance with the instructions given in A.P.2531J, Vol.1, Part 2, Chap.4.

### Pressure check

63. At each inspection check the case pressure of the transmitter. It should not be less than 3 lb. per sq.in. If below this figure the pressure should be raised to 4 or 5 lb. per sq.in. using the pressurising pump Ref.No.4G/5435. On completion ensure that the cap of the Schrader valve is screwed back in position.

### A.R.I.18064

64. General servicing instructions for the installations are as given in Chap.1. However, the Type 60 voltage regulators introduced by S.R.I.M.2291 are initially set to give a voltage output of 19 volts and should be adjusted to give an output of 24 volts. This is achieved by means of the ballast resistor with the remote trimmer Type 3 set to the mid position. Further details will be found in S.R.I.M. 2291.

### OTHER INSTALLATIONS

65. The servicing instructions for A.R.I.'s 5874, 5378, 2302<sup>3</sup> and 18011 are unchanged and remain as given in Chap.1.

### A.R.I.18089

67. The control units Type 7681, are

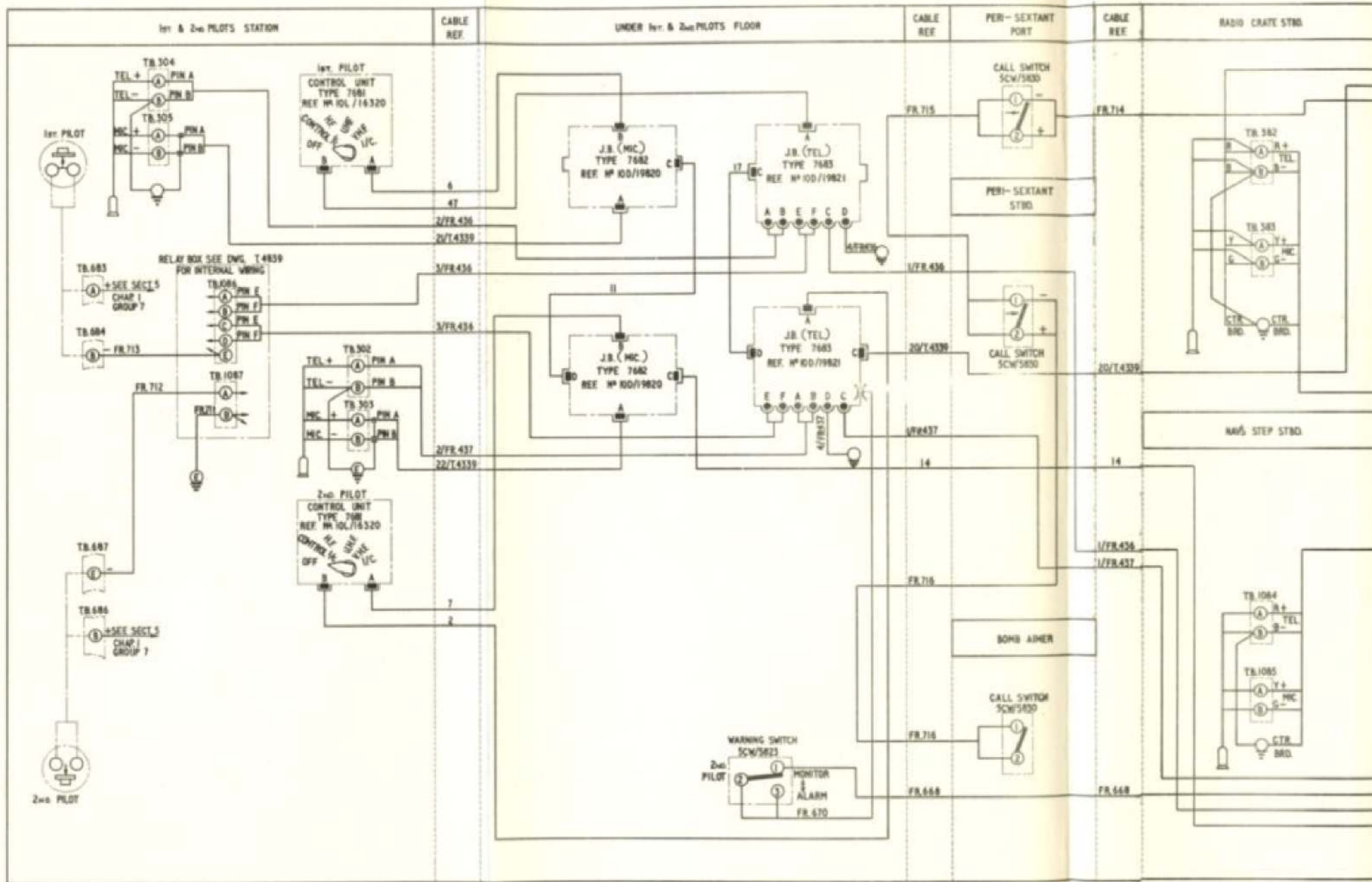


Fig.7(1) A.R.I. 18089 (pre Mod.1630)

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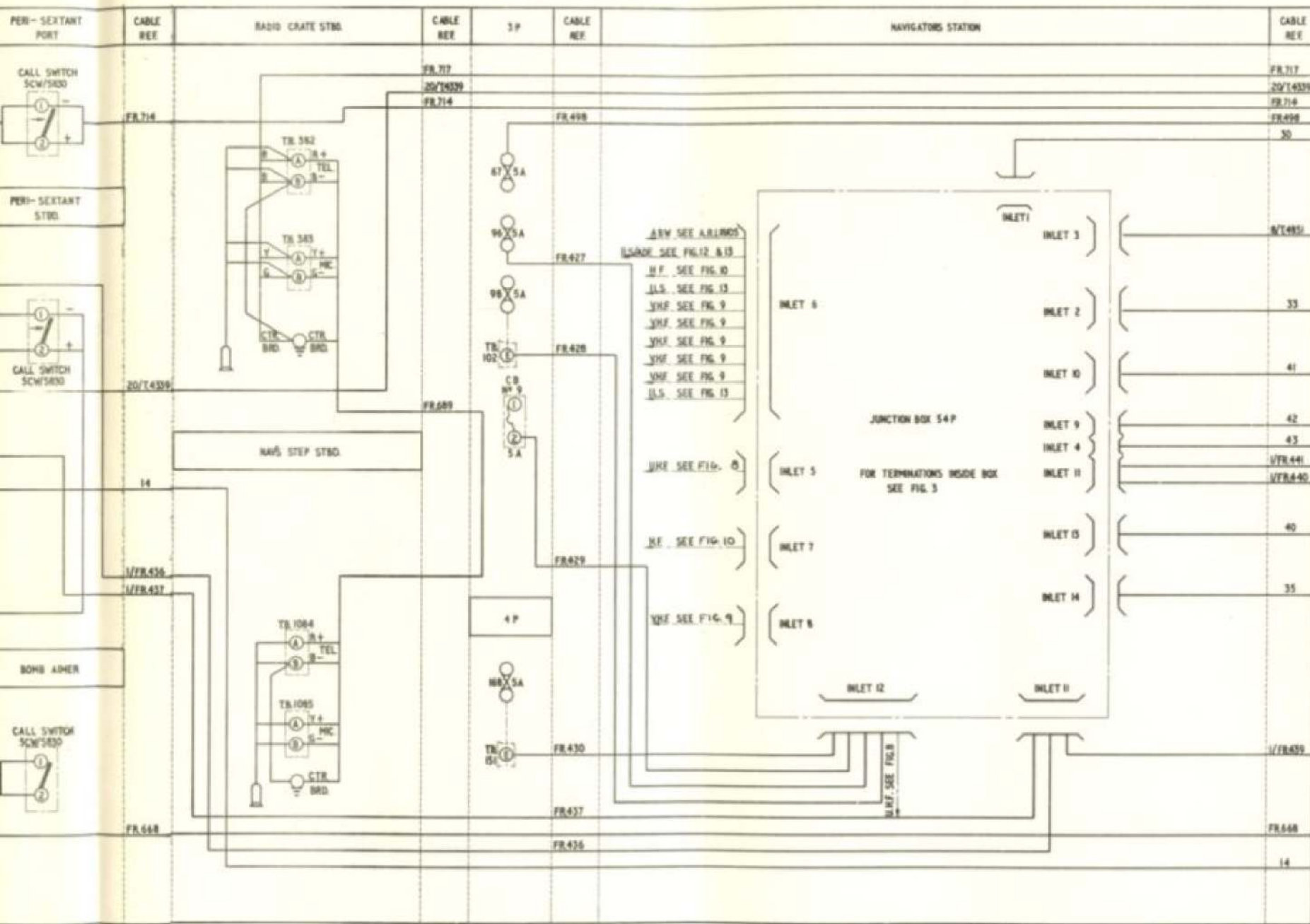


Fig. 7(1) A.R.I. 18089 (pre Mod. 1630)

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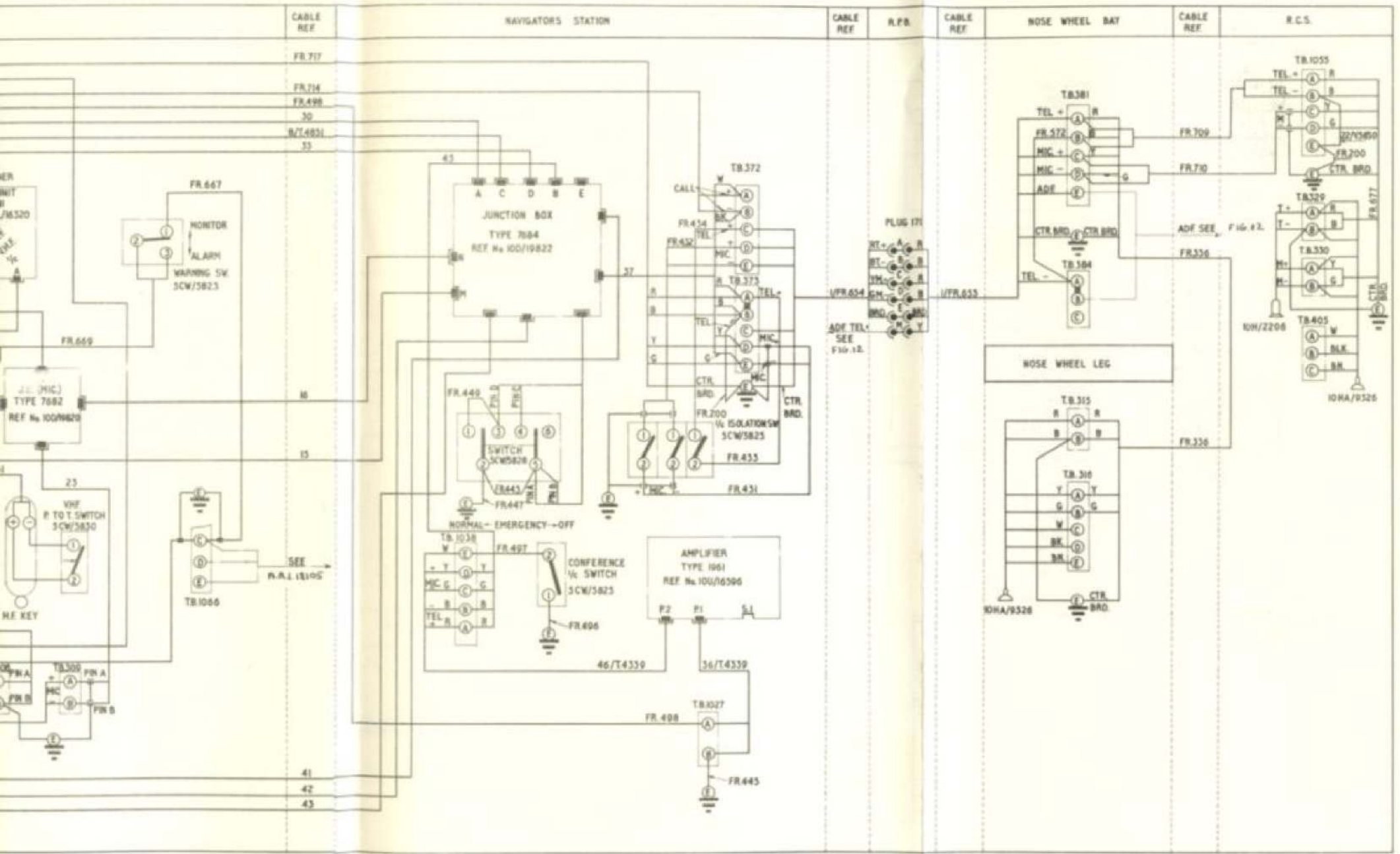


Fig.7(2) A.R.I. 18089 (pre Mod.1630)

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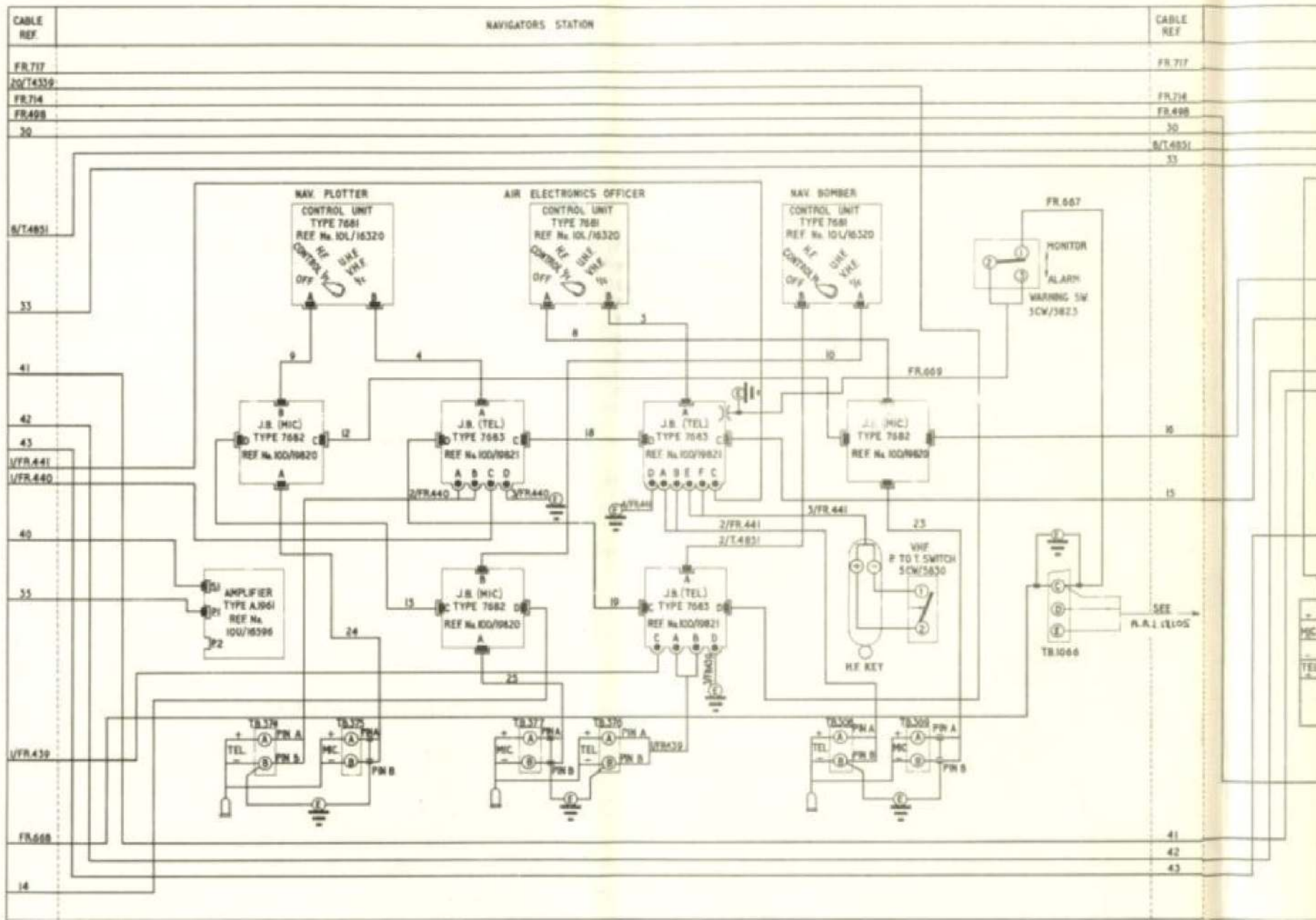


Fig.7(2) A.R.I. 18089 (pre Mod.)

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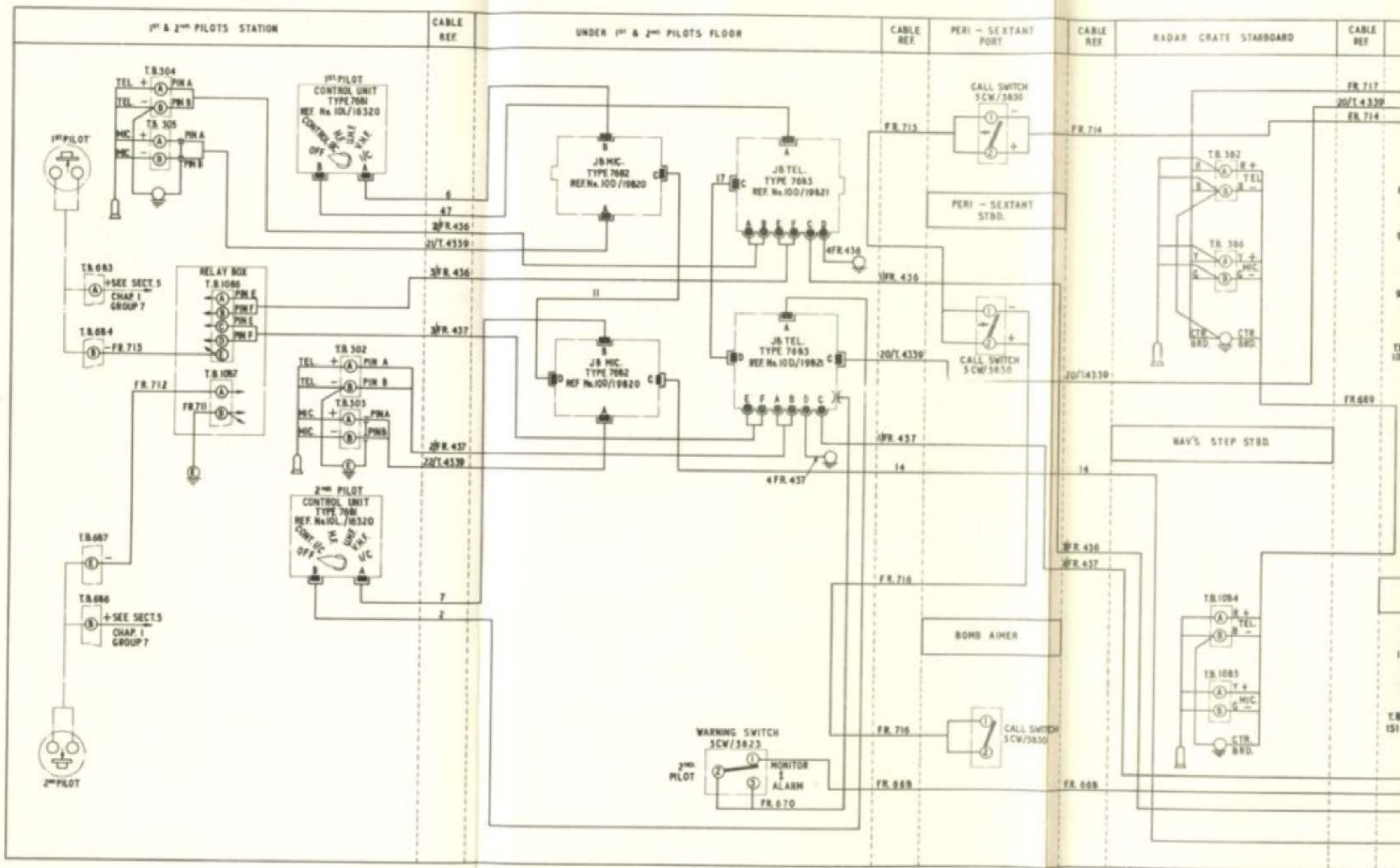


Fig.7A(1) A.R.I. 18089 (post Mod.1630)

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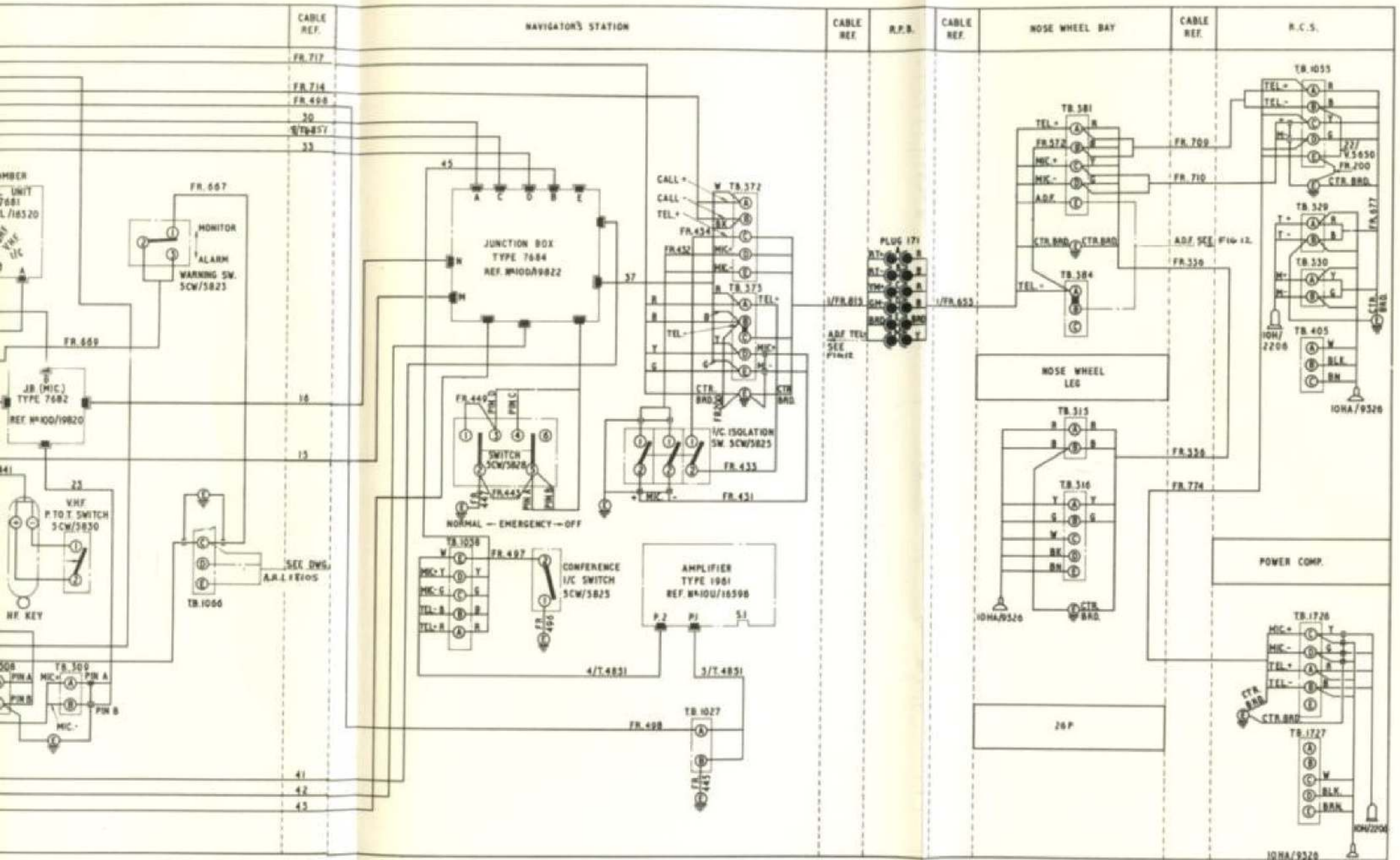


Fig.7A(2) A.R.I. 18089 (post Mod.1630)

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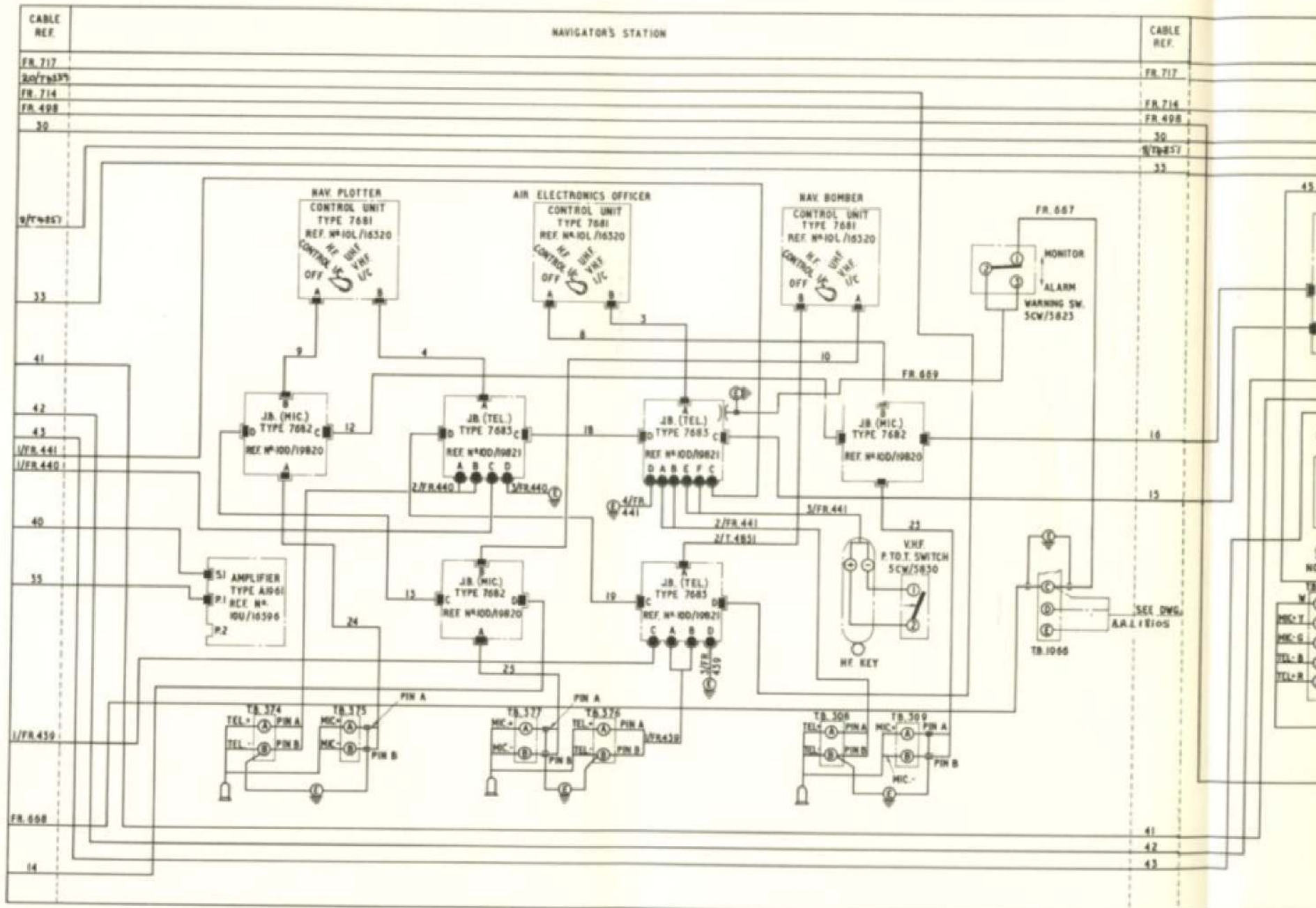


Fig.7A(2) A.R.I. 18089 (post Mod. 1)

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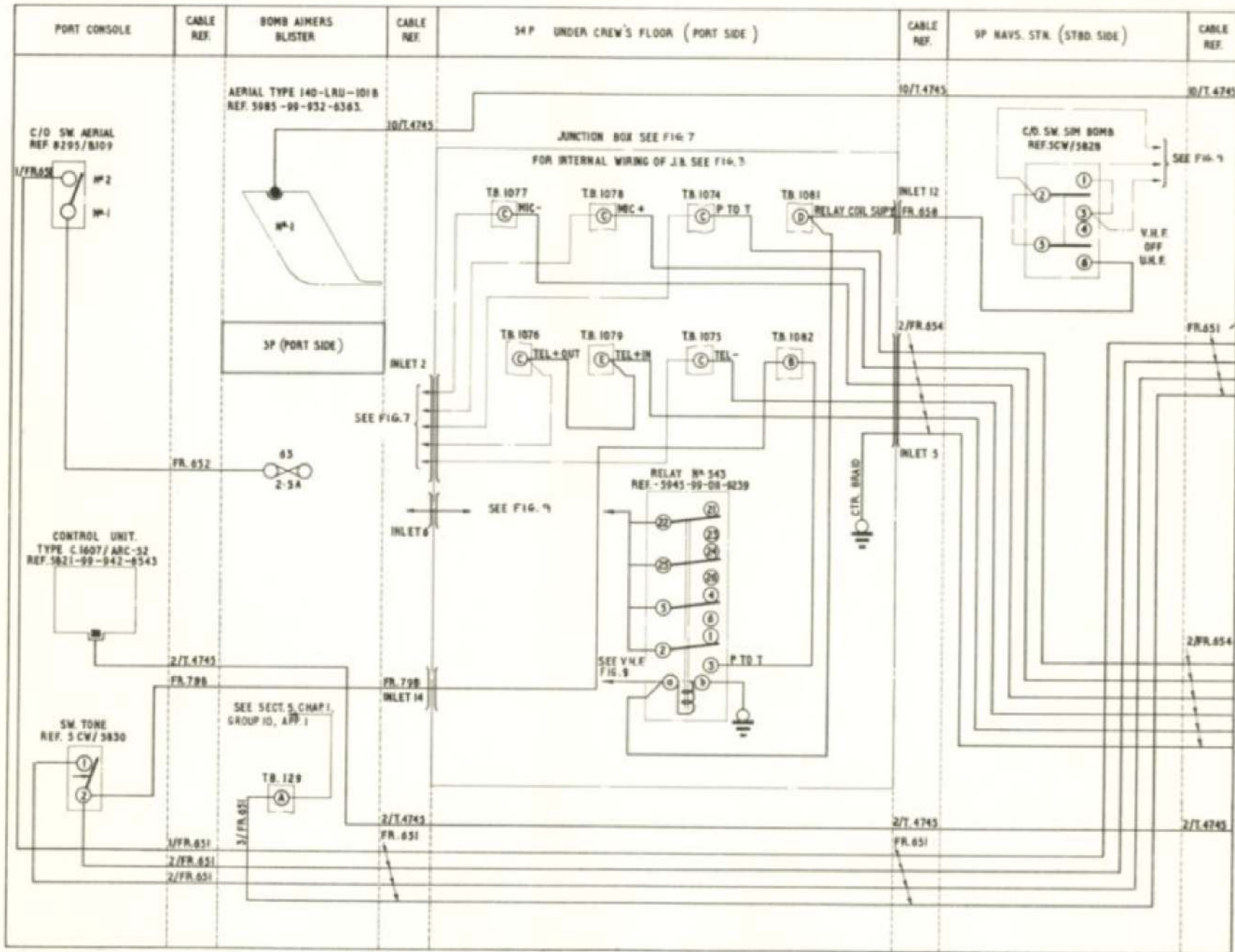


Fig. 8 (1) A.R.I. 18124/1 (pre Mod. 1630)  
 (Mod. 1627 embodied)

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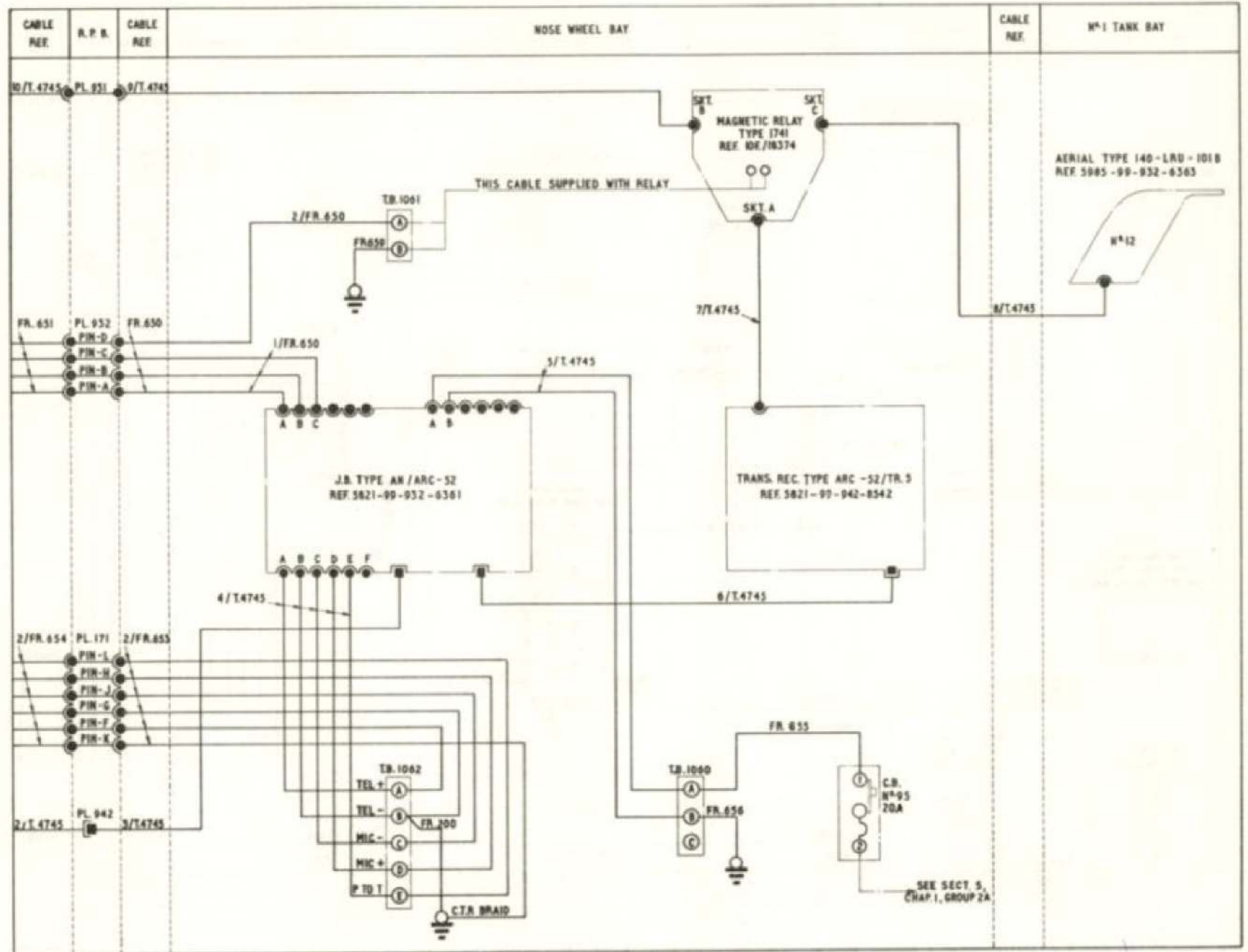


Fig. 8 (2) A.R.I. 18124/1 (pre. Mod. 1630)

( \* Mod. 1707 embodied \* )

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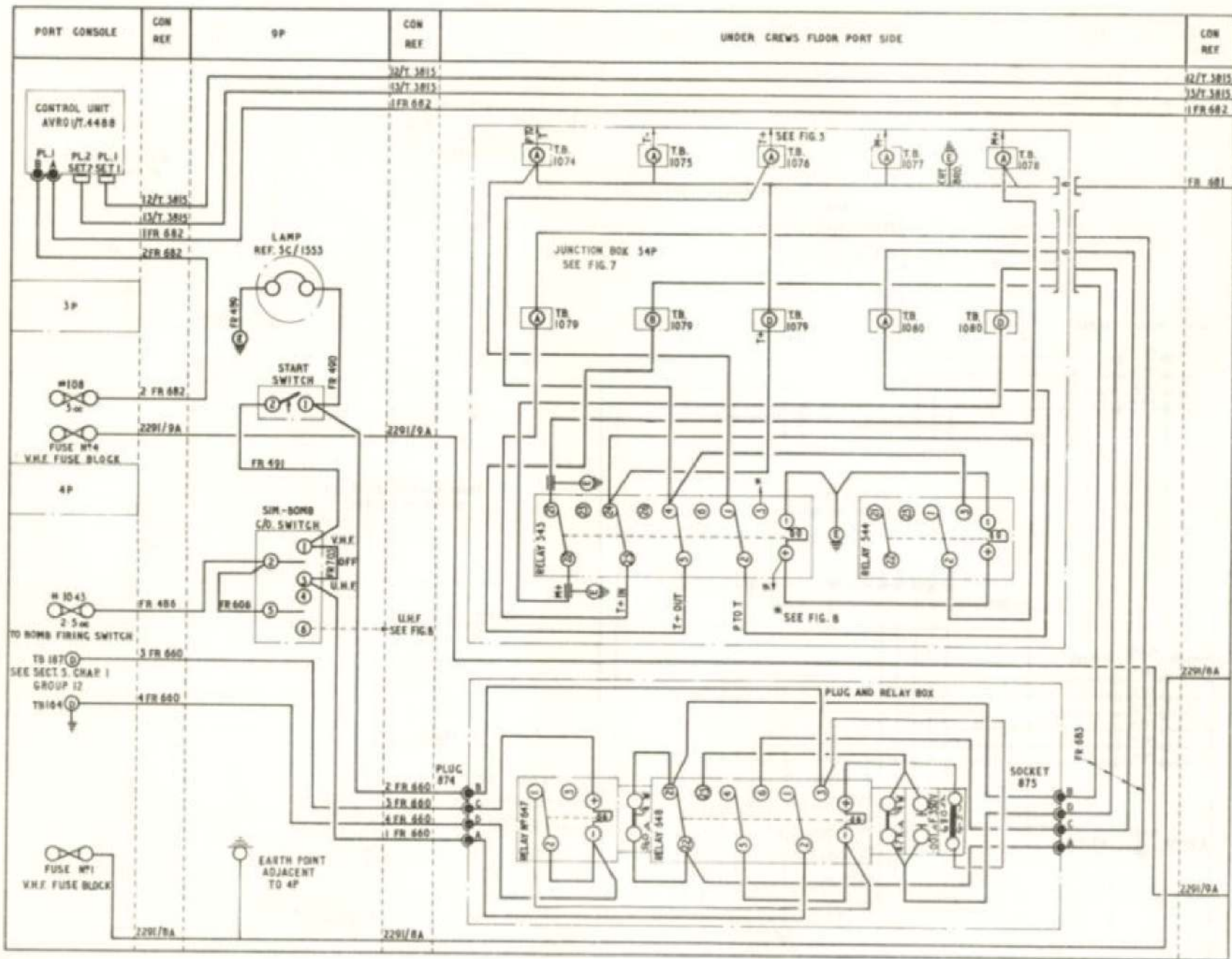


Fig. 9 (I). A.R.I 18064.

( \* Mod. 1427 embodied \* )

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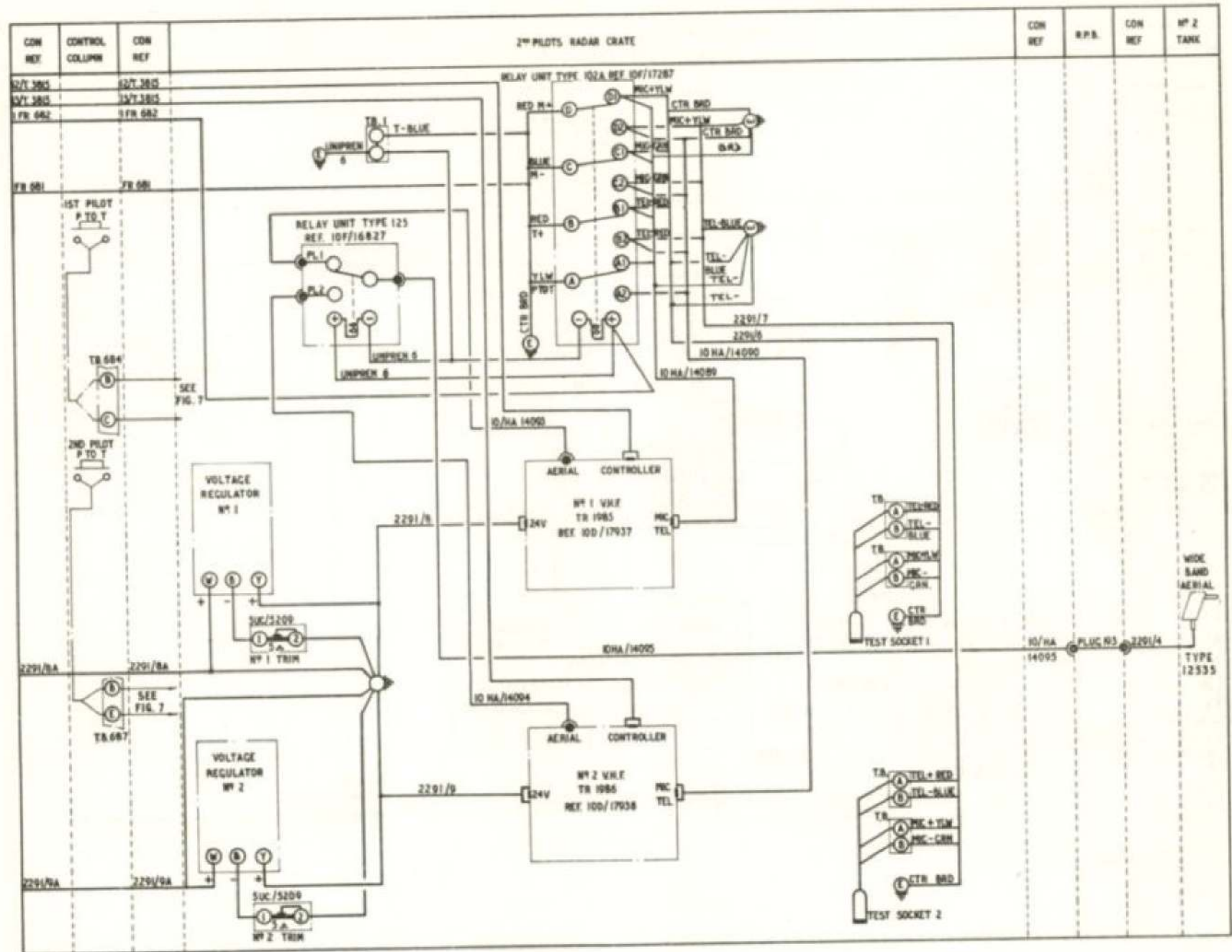


Fig. 9 (2) A.R.1 18064.

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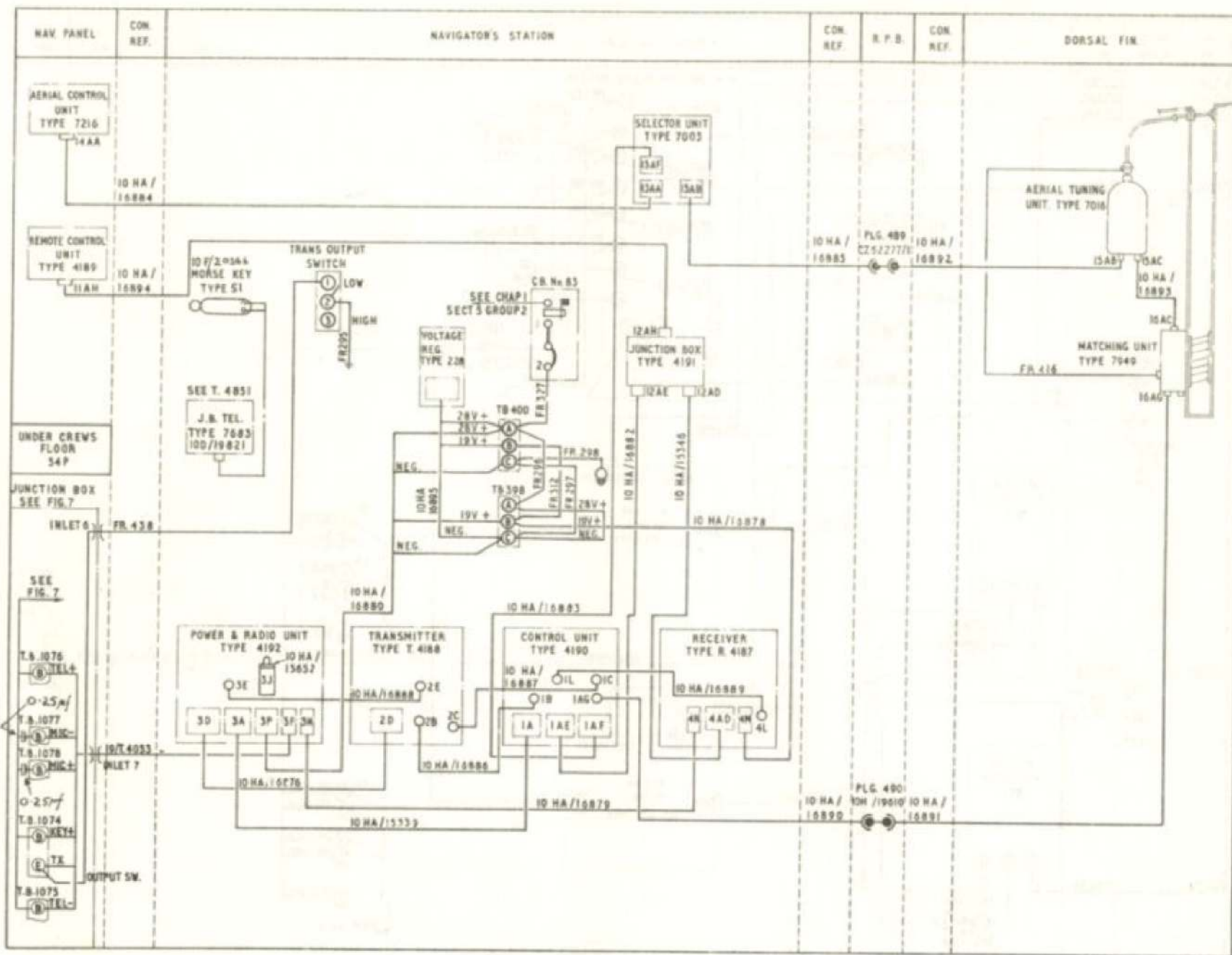


Fig. 10. A.R.I 5874.

( Mod. 1779 embodied )

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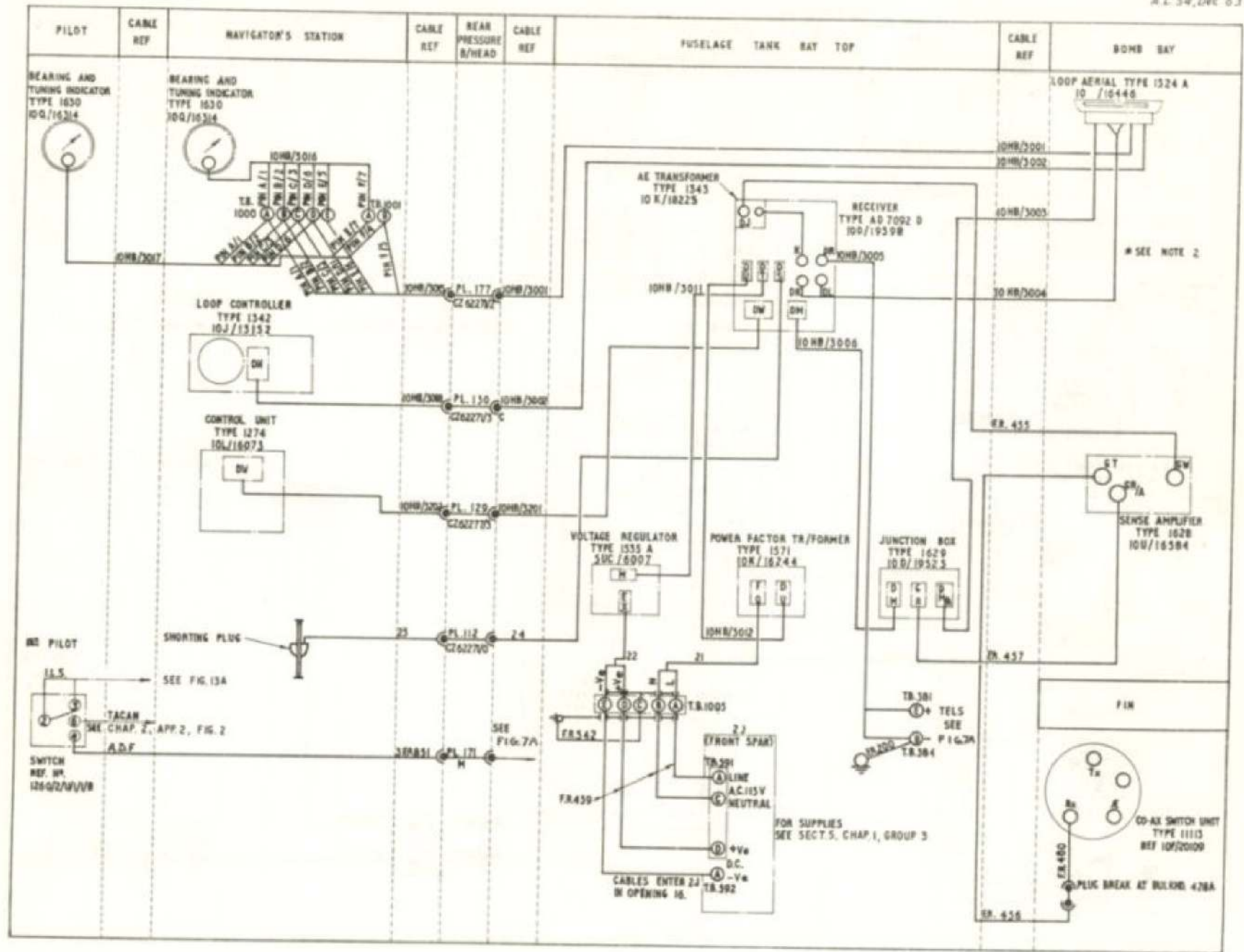


Fig. 12A A.R.I. 23023 (Post Mod 1630)

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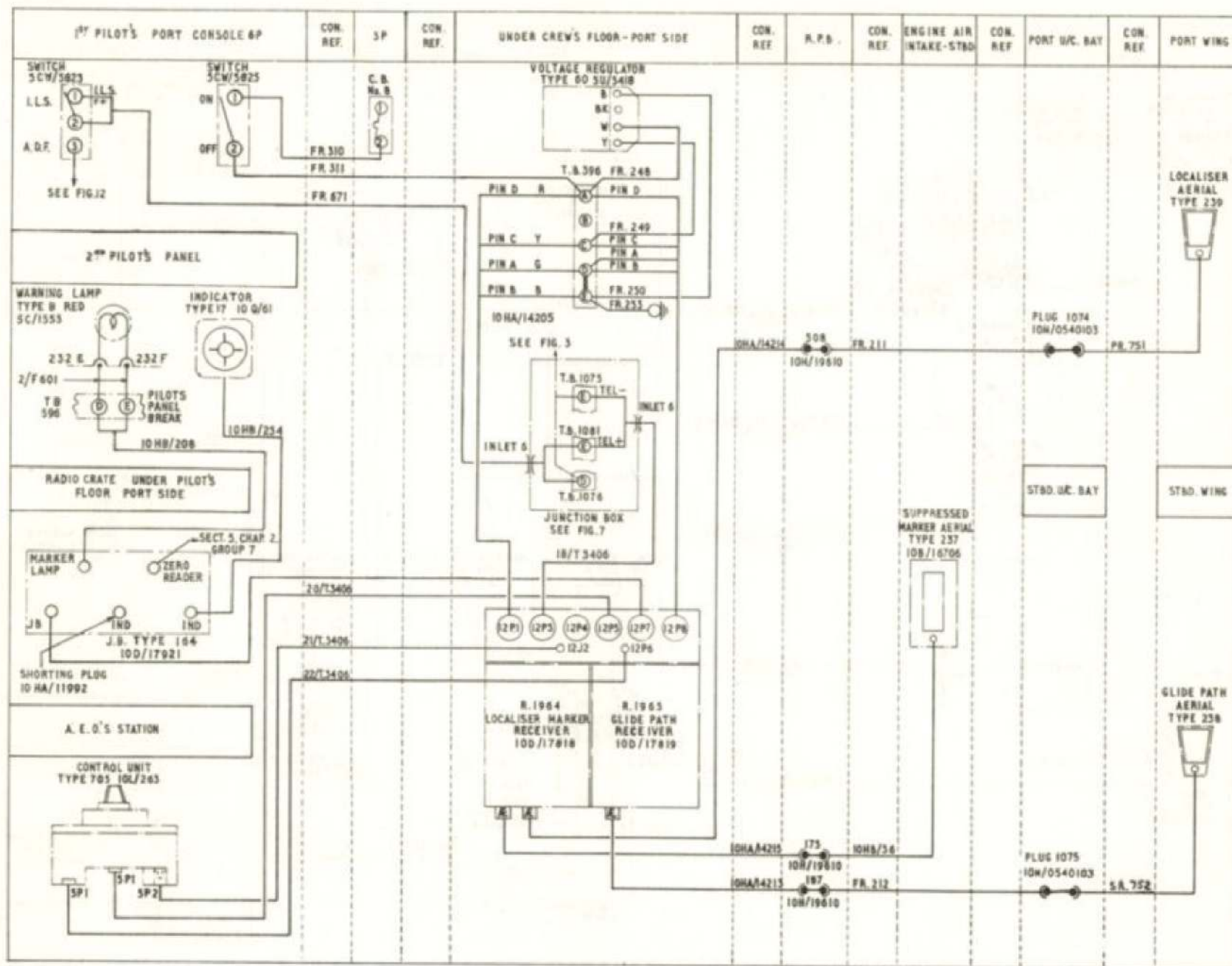


Fig. 13. A.R.I. 18011 (Pre Mod. 1630)

(Mod. 1123 embodied)

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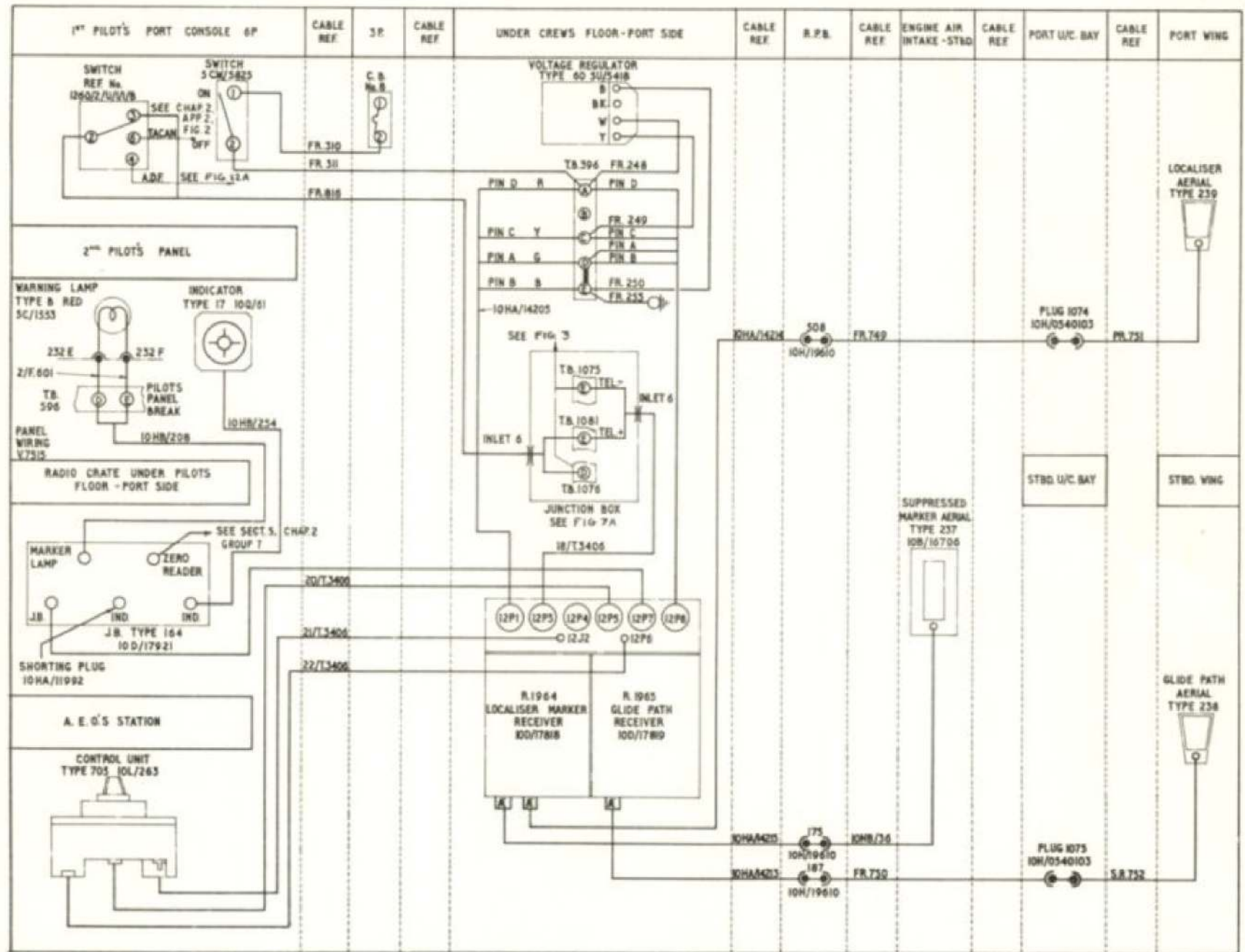


Fig.13A A.R.I 18011 (Post Mod. 1630)  
**RESTRICTED**

bomb release circuits to the coil of relay 647 will produce the stop cycle described above. At the conclusion of simulated bombing operations the master switch should be returned to the centre off position.

#### A.R.I.18064

48. On aircraft with S.R.I.M.2291 embodied, the A.R.I.18064 equipment has been moved from the compartment aft of the power compartment to a position below the second pilot's floor. The Type 7121 aerial has also been replaced by an aerial Type 12535 and moved to a new position above the No.2 tank.

49. In addition, the 28-volt d.c. power supplies to the two T.R. units are now fed from new fuses, via two Type 60 voltage regulators. The Type 60 voltage regulators are introduced to reduce the 28-volt supply to 24 volts. The No.1 T.R. unit is fed, via its associated regulator, from fuse No.1 on the V.H.F. fuse block in panel 4P. The No.2 T.R. unit is fed, via its associated regulator, from fuse No.4 on the V.H.F. fuse block in panel 3P. The control unit on the port console is fed from fuse 108 in panel 3P. A routing chart of the installation, post S.R.I.M.2291, is given in fig.9, while fig.6 shows the T.R. units and Type 12535 aerial in their new positions.

#### General precautions

57. The general precautions preceding the servicing information in Chap.1 should be followed prior to any tests and adjustments outlined in this appendix.

#### A.R.I.18089

58. The control units Type 7681 and their associated JB's should be checked

50. With the introduction of A.R.I.18089 the remote control unit Type 9116 for the V.H.F. installation has been replaced by an AVRO Type 1/T4488 control unit. This unit is a modified Type 9116 control unit which has had the volume control removed and a suitable blanking plate fitted. Control of volume is now effected by the volume control on the i/c control units.

#### A.R.I.5874

51. The H.F. installation remains basically unchanged. However it will be seen from the routing chart fig.10, that cables formerly routed via junction box 5J are now routed via JB.54P.

#### A.R.I.5378

52. The radio altimeter circuit is unchanged except for a minor alteration in cable reference number between TB.777 and plug 170. A new routing chart is provided in order that any subsequent alterations to this installation, on Mk.1A aircraft, may be recorded.

#### A.R.I.23023

53. The sense aerial which was formerly connected direct to the A.D.F. installation is now connected via a co-axial switch unit. When the switch is in the normal, de-energised, position the sense aerial is

connected to the A.D.F. installation, but when the switch is energised the aerial is connected to the A.R.I.18074 installation. The aerial thus serves either installation depending upon the position of the switch. The switch is controlled by the A.R.I.18074 installation and the aerial used is a wide-band aerial, Type 10228, which is mounted in the upper forward edge of the fin structure.

54. The only other change to the installation is the introduction of an I.L.S.-A.D.F. selector switch. This switch, mounted on the port console, enables the first pilot to select which service (ADF or ILS) shall be available at the crew members i/c control units.

#### A.R.I.18011

55. As the I.L.S. signals are now routed via JB.54P and the individual crew member's i/c control units, the I.L.S. volume control and resistor network panel have been deleted from the port console. This arrangement enables each crew member receiving I.L.S. signals to adjust the volume to his personal requirements by means of the volume control on his i/c control unit.

56. As stated in para.54 an I.L.S. - A.D.F. selector switch has been introduced at the port console.

### SERVICING

periodically for ingress of moisture and for security of attachment and connections. All mic/tel connectors should be inspected for signs of damage and for freedom of movement without strain on the connections. The main junction boxes of the system and their associated plugs and sockets should also be checked for security and freedom from corrosion. Further servicing information on the above components will

be found in A.P.2876E, Vol.1, Part 2, Chap.3.

#### Amplifiers Type A1961

59. The two amplifiers should be checked at intervals for security of attachment and for tightness of plug and socket connections. Instructions for opening up the amplifier for bench testing purposes will be found in A.P.2876E, Vol.1, Part 2, Chap.1.

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#### Functional check

60. The following functional check of the system should be carried out at the appropriate periods.

- (1) Ensure that the necessary ground power supplies are connected.
- (2) At the A.E.O.'s station switch the normal-emergency-off switch to NORMAL and the CON. I/C switch to ON. At the same time switch the three external I/C switches to ON.
- (3) Select the speak-listen switch to I/C and the normal-direct switch to NORMAL on each control unit Type 7681.
- (4) Check for communications facilities between all mic/tel connectors.
- (5) Check for communications facilities with each normal-direct switch selected in turn to DIRECT, on the control units Type 7681. Return each switch to NORMAL.
- (6) Select the speak-listen switch to CON. I/C on each control unit Type 7681.
- (7) Check for communications facilities between all mic/tel connectors, then return the speak-listen switches to the I/C position.
- (8) Check for telephone only facilities with the listen-only I/C switch at ON, and the speak-listen switch selected to any other position on the control units Type 7681. Return

the switches to their previous position.

- (9) Repeat (8) with the listen-only CON. I/C switch at ON. Return the switches to their previous position.
- (10) Press all call switches in turn, checking that the signal from the user's microphone is superimposed on whatever service is selected at the other stations.
- (11) When testing the transmitter-receiver services check the operation of each press-to-transmit switch. Check the mixing facilities of the receiver services using the appropriate controls on the control units Type 7681.
- (12) Check for emergency operation by selecting the normal-emergency switch to EMERGENCY and using the No.1 V.H.F. for intercomm.
- (13) Put all switches to OFF and remove the ground supplies.

#### A.R.I.18124/1

61. The equipment should be examined at regular intervals for security of attachment. Cables and connections should be examined for signs of damage. Ensure that all plugs and sockets are correctly mated and that the bonding is secure and free from damage.

#### Servicing limitations

62. Servicing of the transmitter-receiver in the aircraft is limited to a series of

#### REMOVAL AND ASSEMBLY

18124/1. Removal instructions for other installations are given in Chap.1.

functional checks made periodically to ensure that the equipment is in satisfactory working condition. A test set, U.H.F. equipment, Type 15056 is available for testing the aircraft installation and is described in A.P.2531J, Vol.1, Part 2, Chap.6. Instructions for using the test set will be found in Vol.1, Part 2, Chap.3, of the same publication. Any defective units should be removed from the aircraft to be bench tested in accordance with the instructions given in A.P.2531J, Vol.1, Part 2, Chap.4.

#### Pressure check

63. At each inspection check the case pressure of the transmitter. It should not be less than 3 lb. per sq.in. If below this figure the pressure should be raised to 4 or 5 lb. per sq.in. using the pressurising pump Ref.No.4G/5435. On completion ensure that the cap of the Schrader valve is screwed back in position.

#### A.R.I.18064

64. General servicing instructions for the installations are as given in Chap.1. However, the Type 60 voltage regulators introduced by S.R.I.M.2291 are initially set to give a voltage output of 19 volts and should be adjusted to give an output of 24 volts. This is achieved by means of the ballast resistor with the remote trimmer Type 3 set to the mid position. Further details will be found in S.R.I.M. 2291.

#### OTHER INSTALLATIONS

65. The servicing instructions for A.R.I.'s 5874, 5378, 2302<sup>3</sup> and 18011 are unchanged and remain as given in Chap.1.

#### A.R.I.18089

67. The control units Type 7681, are

66. The instructions given in the following paragraphs apply only to the two new installations A.R.I.18089 and A.R.I.

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secured by four screws and are easily removed. Where applicable the associated panel structure should be released and the cable sockets disconnected prior to the unit being unscrewed from its mounting. The main junction box and sub junction boxes are each secured by four bolts and require no special removal instructions. The removal of the amplifiers Type A1961 is similarly straightforward.

#### A.R.I.18124/1

##### Nose wheel bay units

68. The transmitter-receiver unit is

easily removed from its mounting tray by first disconnecting the electrical connections then unscrewing the knurled nuts at the base of the unit. The unit can then be slid from its mounting tray.

69. The other units at this station are mounted below the transmitter-receiver and are readily accessible and easily removed.

##### Control unit C.1607

70. Removal of this unit is straightforward and no special instructions are required.

##### Aerials

71. Although these units are not readily accessible no difficulty should be experienced should it be necessary to remove them. Access to the No.1 aerial feeder cable is gained by first removing the air bomber's cushioning and then the floor panels supporting the cushioning. Once this is done the aerial is easily removed by unscrewing the securing bolts from the aerial base.

72. A servicing ladder Type D4 will be required to reach the No.2 aerial. Once the aerial securing bolts have been removed the aerial may be lifted to disconnect the feeder cable.

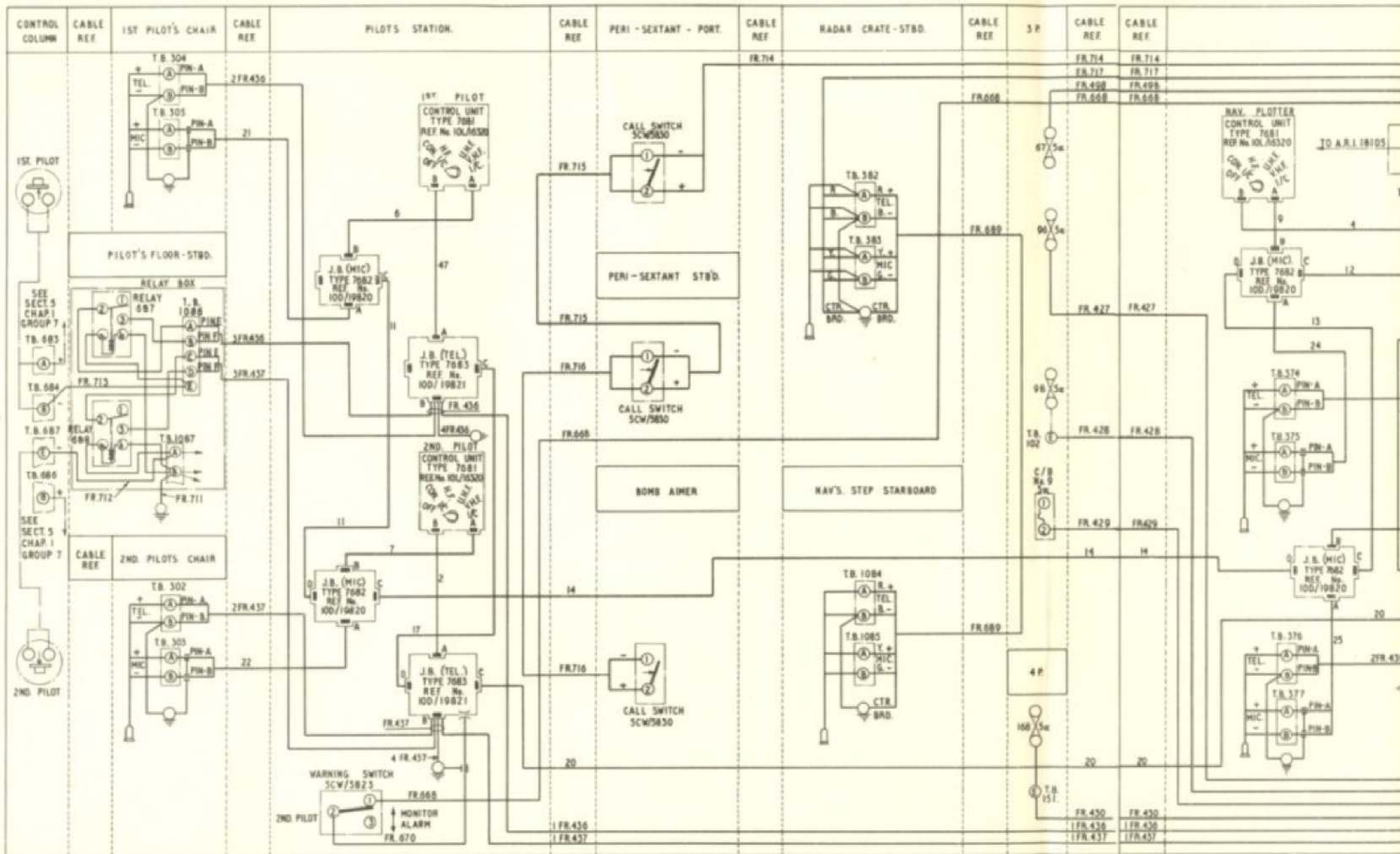


Fig.7(1) A.R.I.18089  
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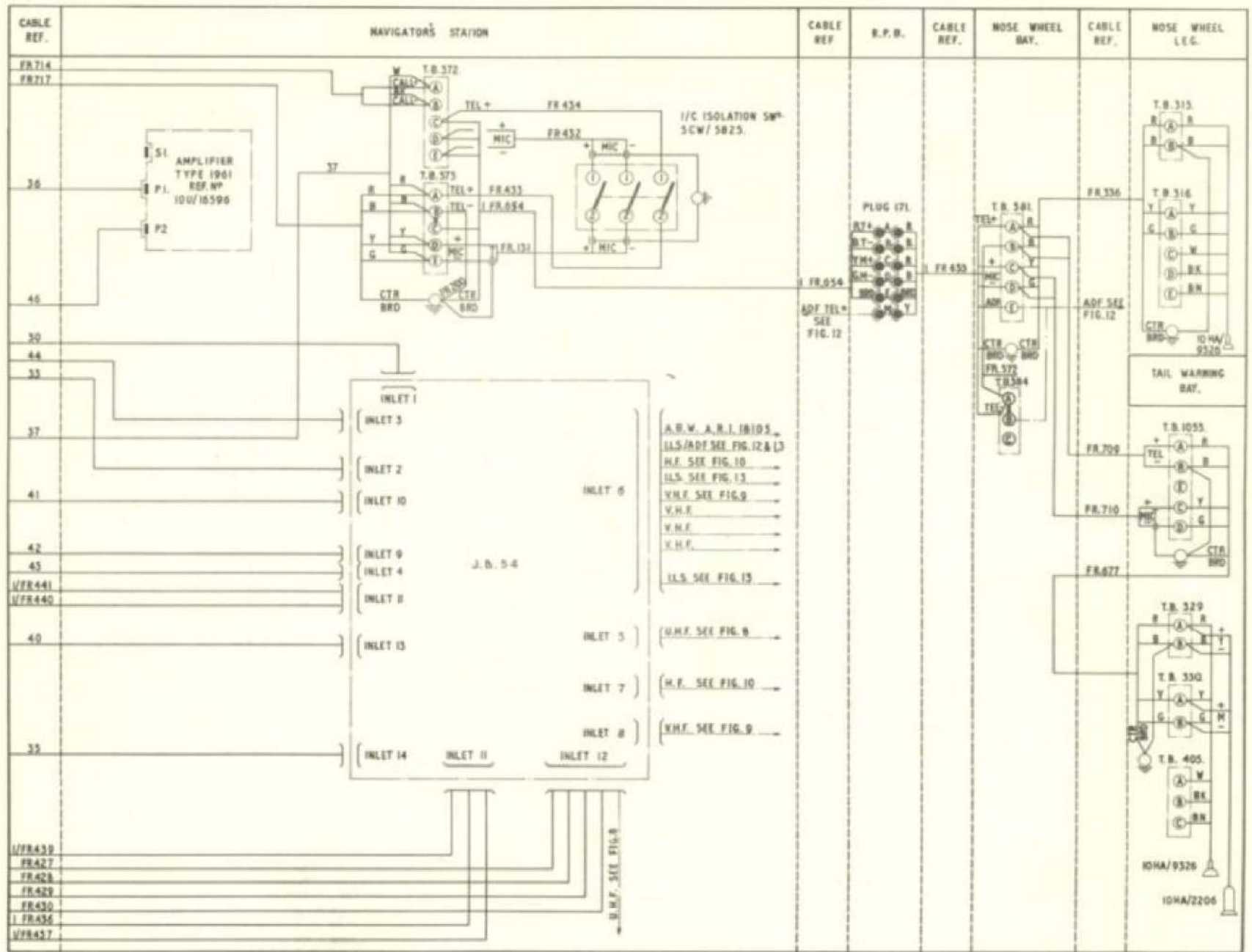


Fig.7(2) A.R.I.18089

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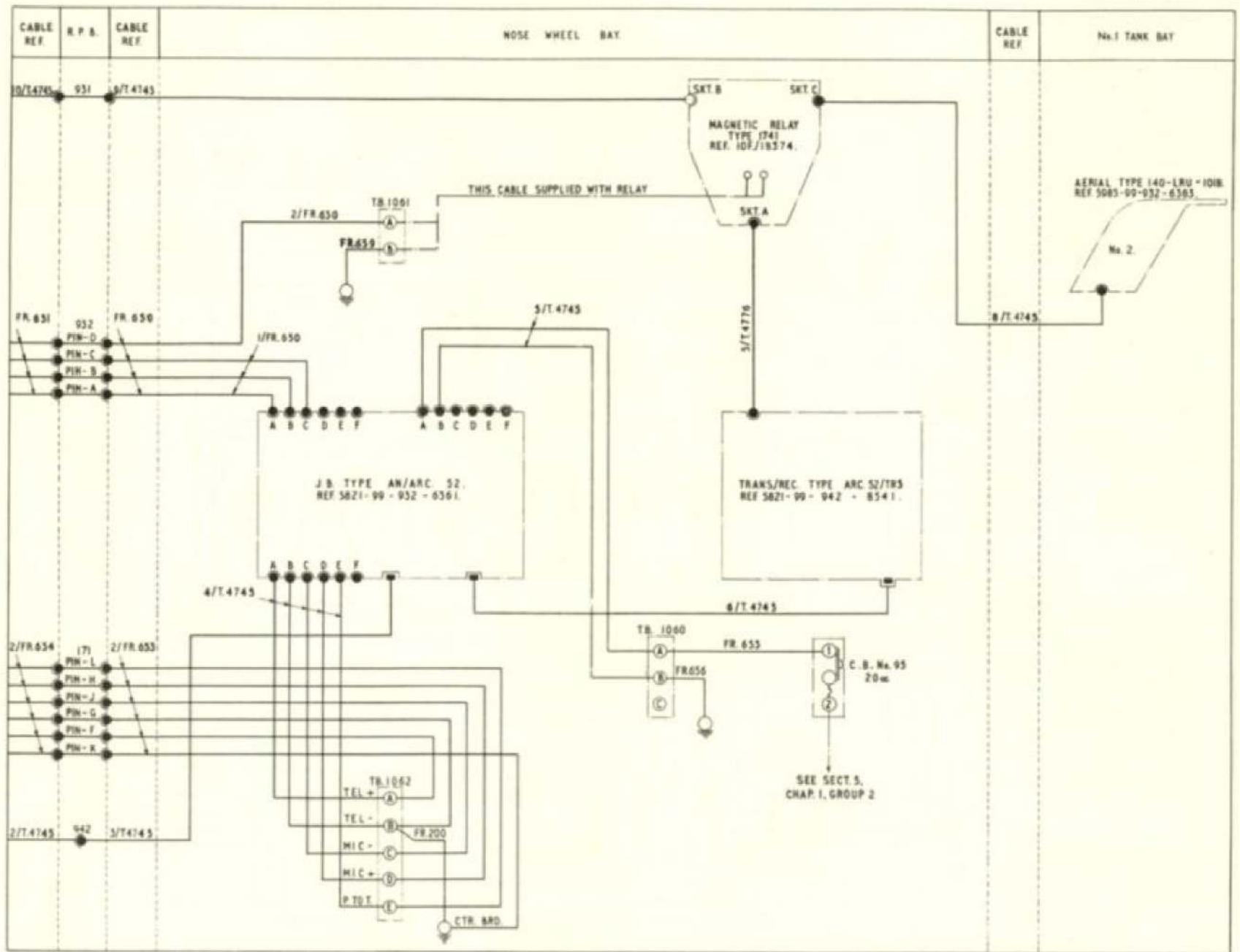


Fig.8(2) A.R.I.18124/1

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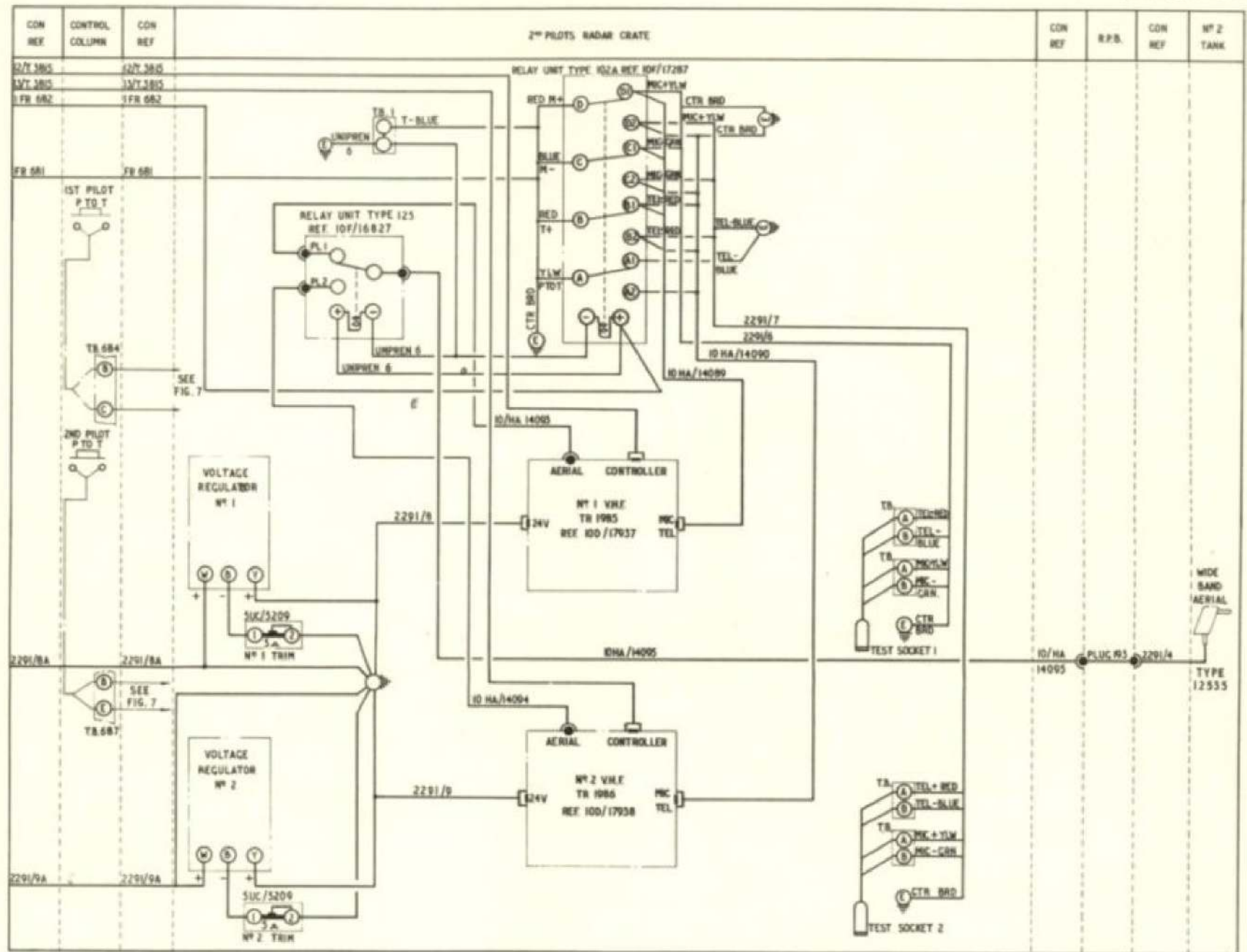


Fig.9(2) A.R.I.18064

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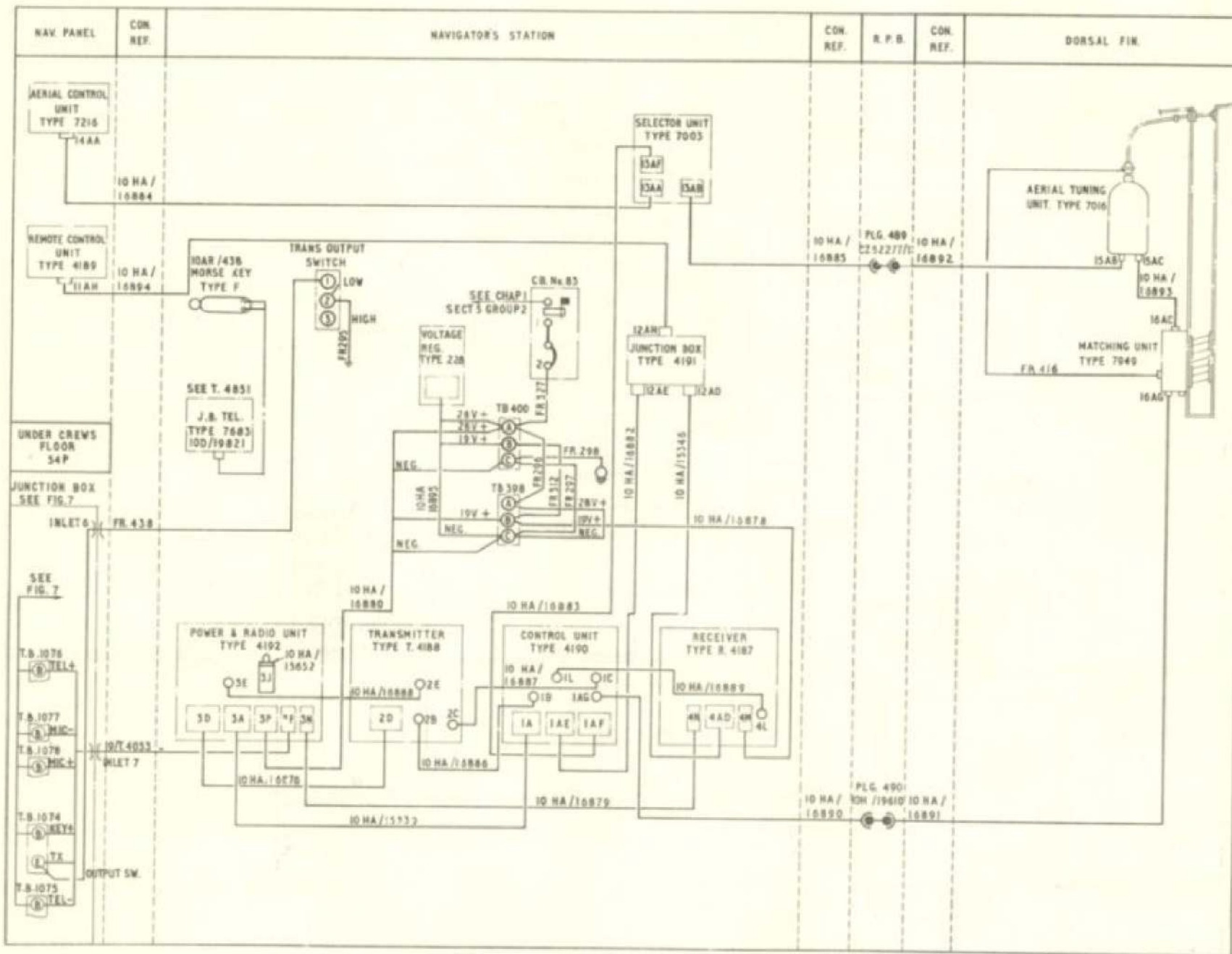


Fig.10 A.R.I.5874

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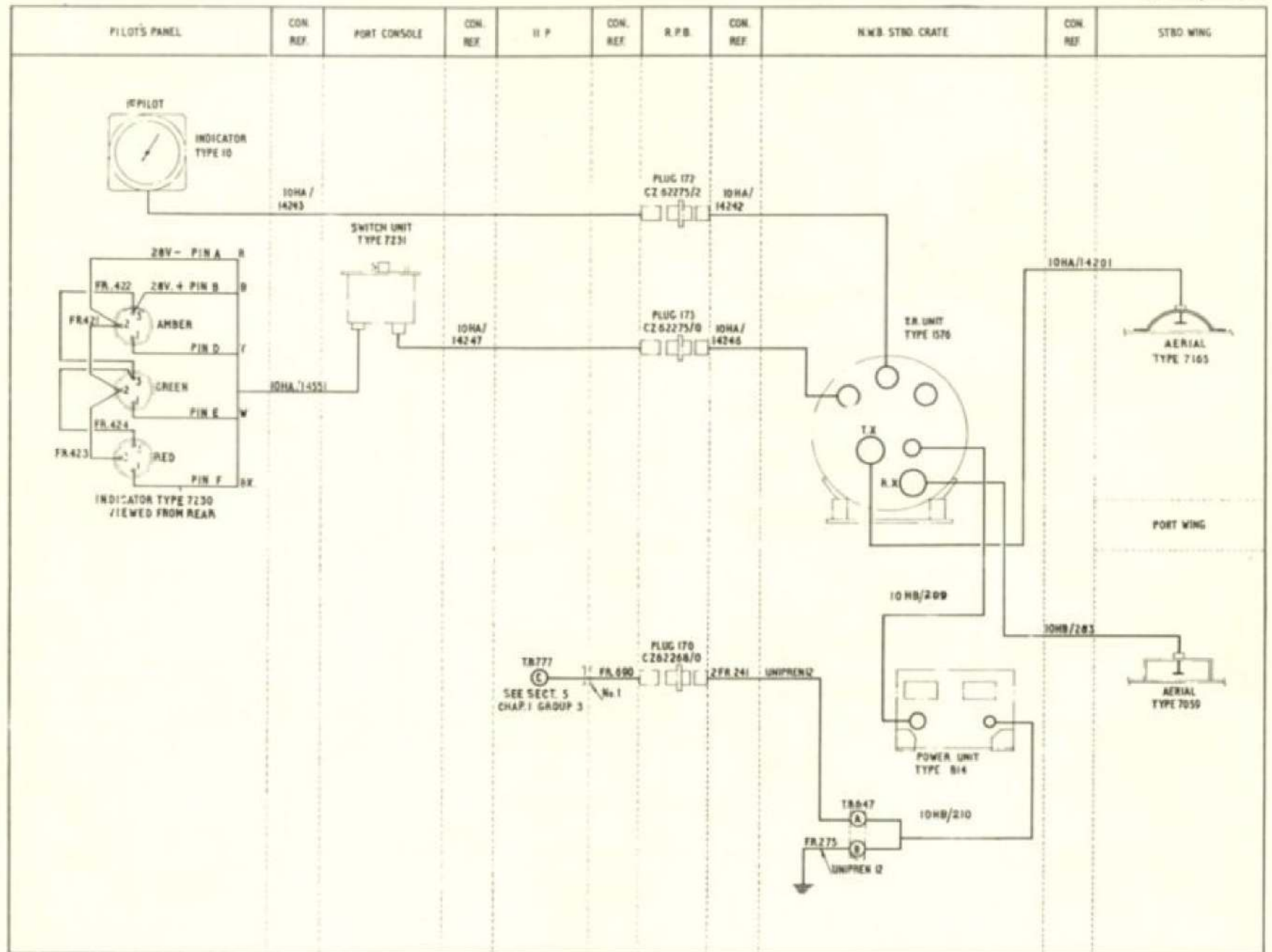


Fig.11 A.R.I.5378

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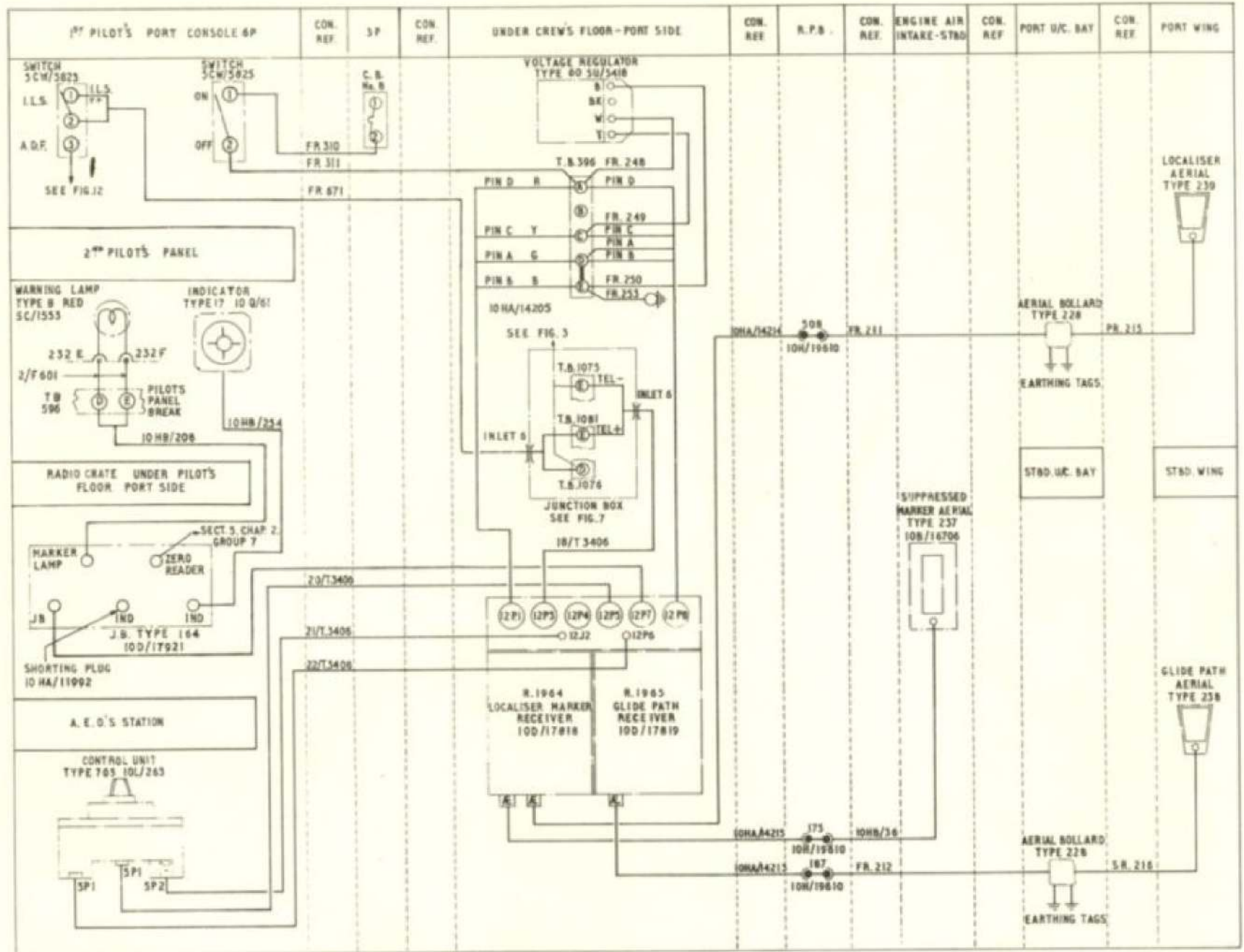


Fig.13 A.R.I.18011

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