Chap 3 :- Obsolete.
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Chapter 3

A.R.I.18064

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Introduction

1. This chapter deals with the installation and general functioning of the A.R.I.18064 which incorporates a simulated bombing tone for tactical training in Vulcan aircraft. The A.R.I.18064 is an airborne V.H.F. installation consisting of two transmitter-receivers (1985 and 1986), operating on C.W. and M.C.W. on ten spot crystal-controlled frequencies; covering a range band of 100 Mc/s to 156 Mc/s with its associated control unit, voltage regulators, relays, external trimmer resistances and aerial. A location illustration of the major components is provided in fig.1, routing charts and a connector table will be found at the end of the text.

2. Descriptive and servicing details for the A.R.I.18064 are given in A.P.2528P, Vol.1, which should be read in conjunction with the information contained in this chapter.

CONTROL AND UNIT LOCATION

3. The installation is controlled from a control unit, Avro Part No.1/T4488, fitted on the first pilot's console. The No.1 transmitter-receiver, Type 1985, is located below and to the rear of the navigator's table, and the following associated units are fitted below the crew's floor in the V.H.F. crate on the starboard side:-

Transmitter-receiver No.2	Type 1986
Voltage regulator (2)	Type 60
Relay	Type 125
Relay	Type 102A
Trimmer resistances	Type 3
Mic-tel. sockets (2)	Type 359

An aerial 140-L.R.U.-67C is fitted to the aircraft, above No.2 tank bay. The simulated bombing tone control panel is attached to panel 9P in the navigator bomber's position. A plug and relay box, Avro Part No.1/T4607, is located below the crew's floor on the port side

Transmitter-receiver units, 1985 and 1986

4. Each of the transmitter-receiver units are similar in design and appearance, the difference being basically in the values of the R.F. inductors and trimmer capacitors and in the crystal frequency used. The selection of any one channel within the frequency range of the particular T.R. unit is by means of an automatic channel-change mechanism, manually controlled by a rotary switch in the control unit. The frequency range covered by the two transmitter-receivers is as follows:-

T.R.1985 100 Mc/s. to 125 Mc/s.
T.R.1986 124.5 Mc/s. to 156 Mc/s.

Control unit, 1/T4488

5. The control unit, 1/T4488, consists of a control unit, Type 9116, with the volume control removed and a suitable blanking plate fitted. The unit carries two rotary switches, No.1 and No.2, for channel selection, a set selector switch, labelled SET 1 - SET 2, and a dimmer switch for dial illumination. The No.1 and No.2 rotary switches carry the channel letters A to J, and K to T respectively. Volume controls for the V.H.F. sets are provided on the associated intercomm. control units, Type 7681, at each crew position.

Voltage regulator, Type 60

6. The voltage regulator, Type 60, has been adjusted from its nominal output of 19 volts d.c., with its associated external trimmer resistance set to a mid-position, to give an output of 24 volts on a 7 amp. load.

Relay units, Type 125 and 102A

7. The two relays Type 125 and 102A, are the aerial and wiring change-over switch units, which operate in conjunction with the set selector switch in the control unit.

Aerial 140 - L.R.U. - 67C

8. The vent sleeve aerial, 140 - L.R.U. - 67C, is of shark fin design, with a short rod projecting horizontally at the rear of the blade; it is mounted on the aircraft top skin (fig.1).

POWER SUPPLIES

9. With the set selector switch selected to No.2 on the control unit, relays 125 and 102A are energised from fuse 608 in panel 3P. The selection of any channel on the control unit energises relay 5/1 in the V.H.F. sets via fuse 695 for set No.1 (T.R.1985) and fuse 696 for set No.2 (T.R.1986). The simulated bombing tone relays 647 and 648 are energised from fuses 546 and 545 respectively in panel 4P. Reference should be made to Book 2, Sect.6, Chap.6 for a full description of the 28-volt d.c. power supplies.

SIMULATED BOMBING TONE

10. Incorporated into the audio stages of the V.H.F. system is a controlled tone network for simulated bombing. The system is operated from panel 9P at the navigator's bomb station. When the bomb firing switches in the prone bomb aimer's station and the bomb aimer's panel 9P, are depressed, the tone circuit is cancelled.

Circuit operation

11. With the V.H.F. system switched ON, a simulated bombing tone is transmitted in the following manner (refer to fig.2). The change-over switch labelled SIM. BOMB is selected to V.H.F. and the start switch momentarily depressed, a 28-volt d.c. supply from fuse 555 will be fed through the sim. bomb and start switches to the energising coil of relay 648 via a 680 ohm resistor, and earthed via relay contacts 647/1. The relay 648 is held in by its own contacts 648/1 and the lamp will now light.

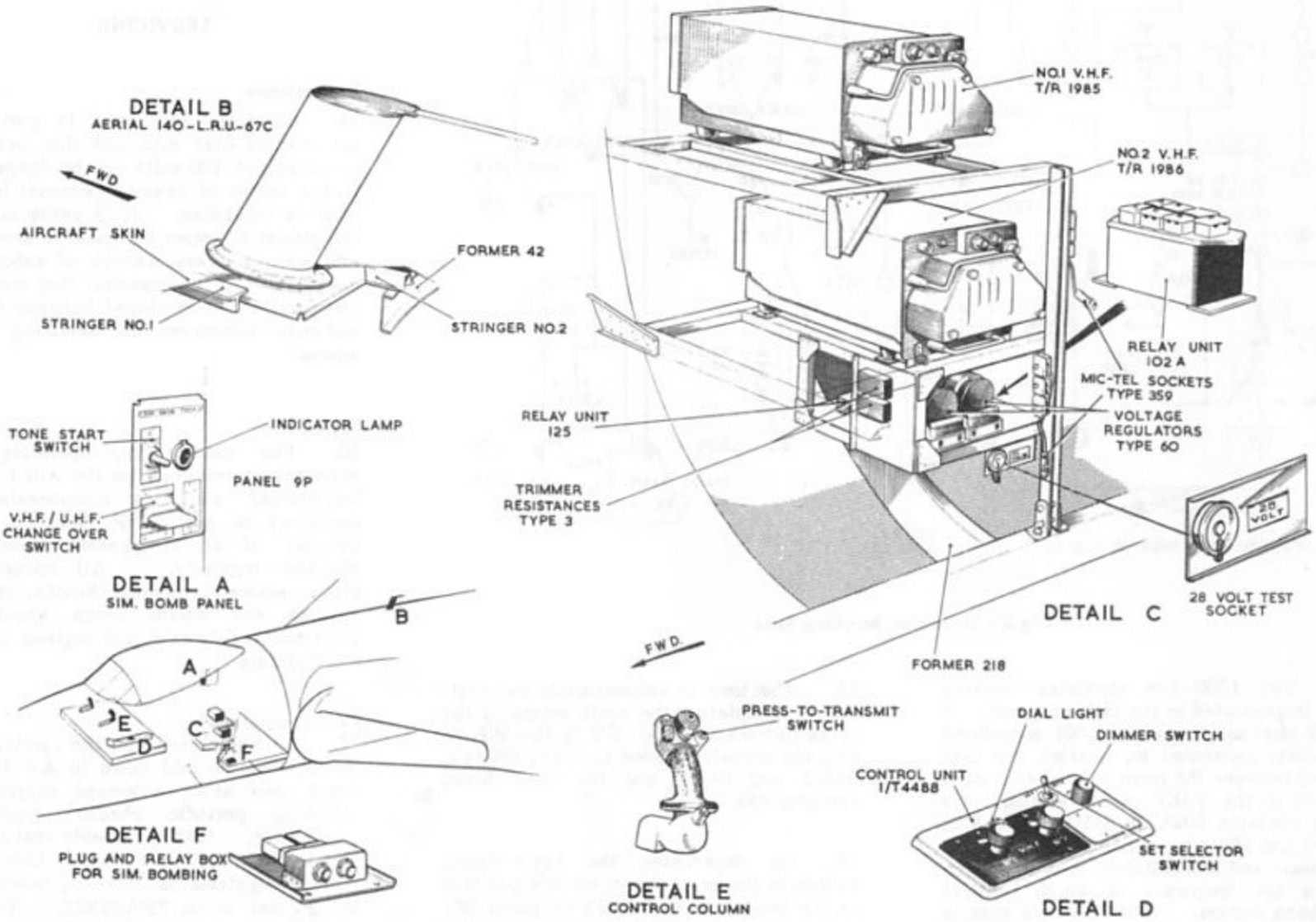

Fig. 1 Component location

Test socket panel added on detail C

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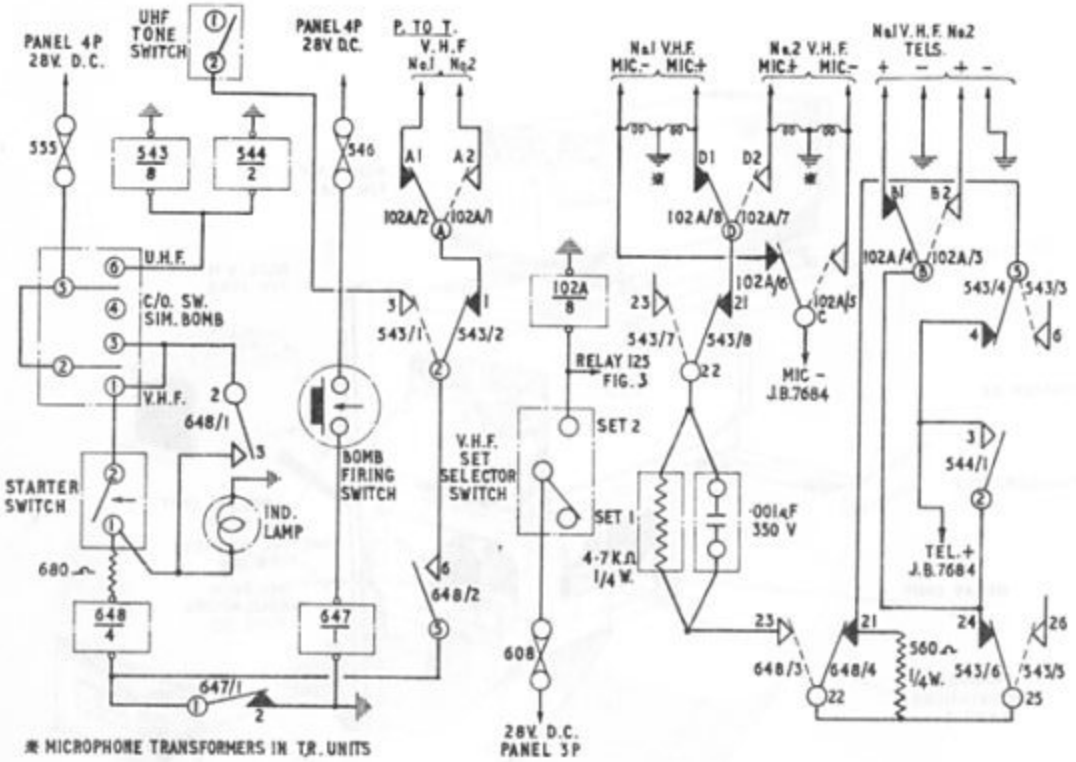

Fig.2 - Simulated bombing tone

12. The 1000 c/s simulated bombing tone is generated in the following way. A 4,700 ohm resistor and a .001 microfarad capacitor connected in parallel, are connected between the input (mic +) and output (tel +) of the V.H.F. audio amplifier via relay contacts 102A/8, 543/8 and 648/3, 543/6 and 102A/4. The values of the resistance and capacitance network determines the frequency at which positive feedback occurs. The 1000 c/s tone is injected into the crews intercomm. system via a 560 ohm resistor and relay contacts 543/4.

13. The tone is automatically transmitted by completing the earth return of the press-to-transmit relay 3/2 in the V.H.F. set, via normally closed contacts 102A/2, 543/2 and 647/1 and the now closed contacts 648/2.

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 energising 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.

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 employed between trades mutually concerned in servicing operations.

Installation

16. The setting up, operating and servicing instructions for the A.R.I.18064 installation and its components are contained in A.P.2528P, Vol.1. The security of all components should be checked regularly. All connectors, plugs, sockets, terminal blocks, mic-tel sockets and strain cords should be examined for damage and ingress of dirt and moisture.

Power supplies

17. In conjunction with the servicing of the system as laid down in A.P.4505B, Vol.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 from each voltage regulator is 24 volts, when each V.H.F. set is on TRANSMIT. Voltage adjustment is controlled from a remote trimmer resistor, Type 3. Disconnect the supply socket 874, from plug 874 in

the plug and relay box, 1/T4607 With the appropriate switches selected to on, a 28-volt d.c. supply will now be available at pins B and C in the supply socket 874. A 28-volt test socket connected to fuse 695 and fitted just below the voltage regulators, Type 60, is used for supplying the test-set, Type 740, when testing the V.H.F. equipment in situ.

Voltage regulator, Type 60

18. Before the installation of the voltage regulator, Type 60, for the V.H.F. installation, it is necessary to re-set the ballast resistor to raise the output from its initial 19 volts to 24 volts for a 7 amp. load. The remote trimmer resistor, Type 3, is to be set to mid-point during this operation. Mod.688 must be painted on the regulator adjacent to the label, after this adjustment has been made. Using the revised values, carry out normal voltage regulator checks in accordance with A.P.4343B, Vol.1, Chap.22.

TABLE 1

CONNECTORS FOR A.R.I.18064

A.V.Roe Item No.	Cableform	Connecting between
2/T4775	Miniature 6D	T.R. unit 1985 to T.B.'s 1047, 1048, 1049
3/T4775	Miniature 6D	T.R. unit 1986 to T.B.'s 1050, 1051, 1052
7/T4775	Uniradio 67	R.P.B. plug 179 to V.H.F. aerial
8/T4775	Miniature 12A	T.R. unit 1985 to control unit plug No.3
9/T4775	Miniature 12A	T.R. unit 1986 to control unit plug No.2
10/T4775	Unipren 12 - 2 off	T.R. unit 1985 to T.B.1046
11/T4775	Unipren 12 - 2 off	T.R. unit 1986 to T.B.1046
12/T4775	Uniradio 67	T.R. unit 1985 to aerial relay unit 125 No.1
13/T4775	Uniradio 67	T.R. unit 1986 to aerial relay unit 125 No.2
14/T4775	Uniradio 67	Aerial relay unit 125 to R.P.B. plug 179

REMOVAL AND INSTALLATION

General

19. 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 units

20. On both transmitter-receiver units, disconnect the four sockets and unscrew the two knurled nuts at the base of the T.R. unit, take hold of the transport handle and slide the unit off its anti-vibration mounting tray. On replacing the unit, ensure that the locating dowels engage properly at the rear of the tray.

Voltage regulators, Type 60

21. The two voltage regulators, Type 60, are mounted side by side below No.2 V.H.F. set. Ensure before disconnecting, that the channel selector switches on the pilot's control unit are in the OFF position. Remove the terminal block cover, disconnect the three cables and unscrew the four retaining nuts and bolts.

Relay units, Type 125 and 102A

22. These units are mounted behind the voltage regulators, Type 60. Remove either No.2 V.H.F. set or the voltage regulators, Type 60. For relay unit 125, disconnect the leads in the terminal block, unscrew the three aerial connectors, and then remove the four securing nuts and bolts. For relay 102A, disconnect the leads in the seven terminal blocks, and then remove the four securing nuts and bolts.

Trimmer resistances, Type 3

23. The two trimmer resistances (mounted on a plate adjacent to the voltage regulators) can be removed, by releasing the cover, disconnecting the two leads, and then removing the two securing screws.

Control unit

24. On the pilot's control unit, 1/T4488,

remove the 4 retaining screws and withdraw the unit from the port console panel. Sufficient cable length has been allowed to enable the plug to be disconnected.

Aerial 140 - L.R.U. - 67C

25. The aerial feeder lead is located just forward and above the front spar, and should not be difficult to disconnect. In order to gain access to the aerial, a servicing ladder giraffe, Type D4, may be used. Remove the ten counter-sunk securing bolts at the base of the aerial and lift off the aerial. On replacing, ensure that there is good bonded surface between the base of the aerial and the aircraft structure.

Plug and relay box

26. The plug and relay box,1/T4607, (mounted on an anti-vibration plate), can be removed, by disconnecting the plug and socket connectors, and then removing the 2 securing nuts and bolts.

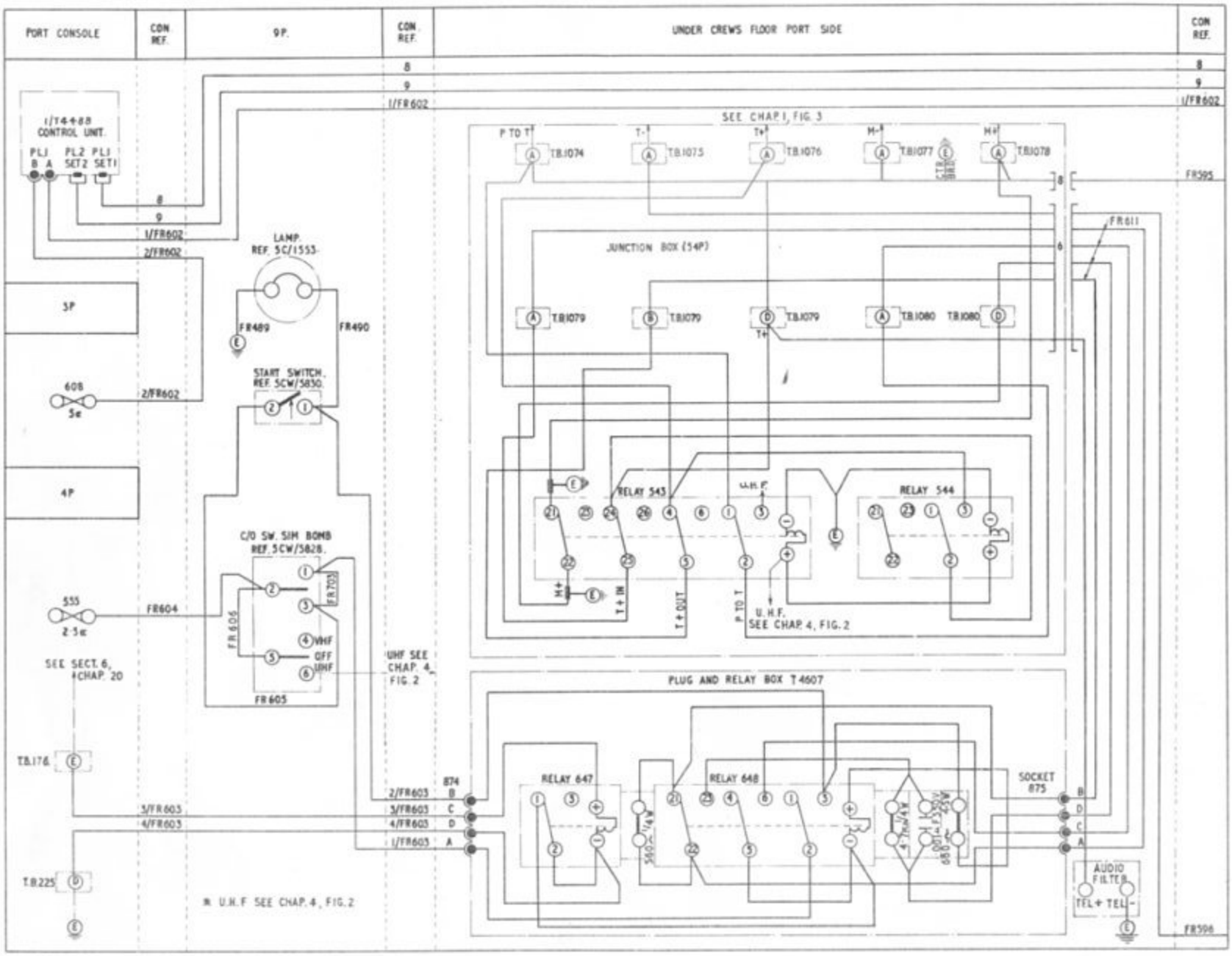

Fig. 3 (I). A.R.I. 18064
(Mod 1427 and 939 embodied)

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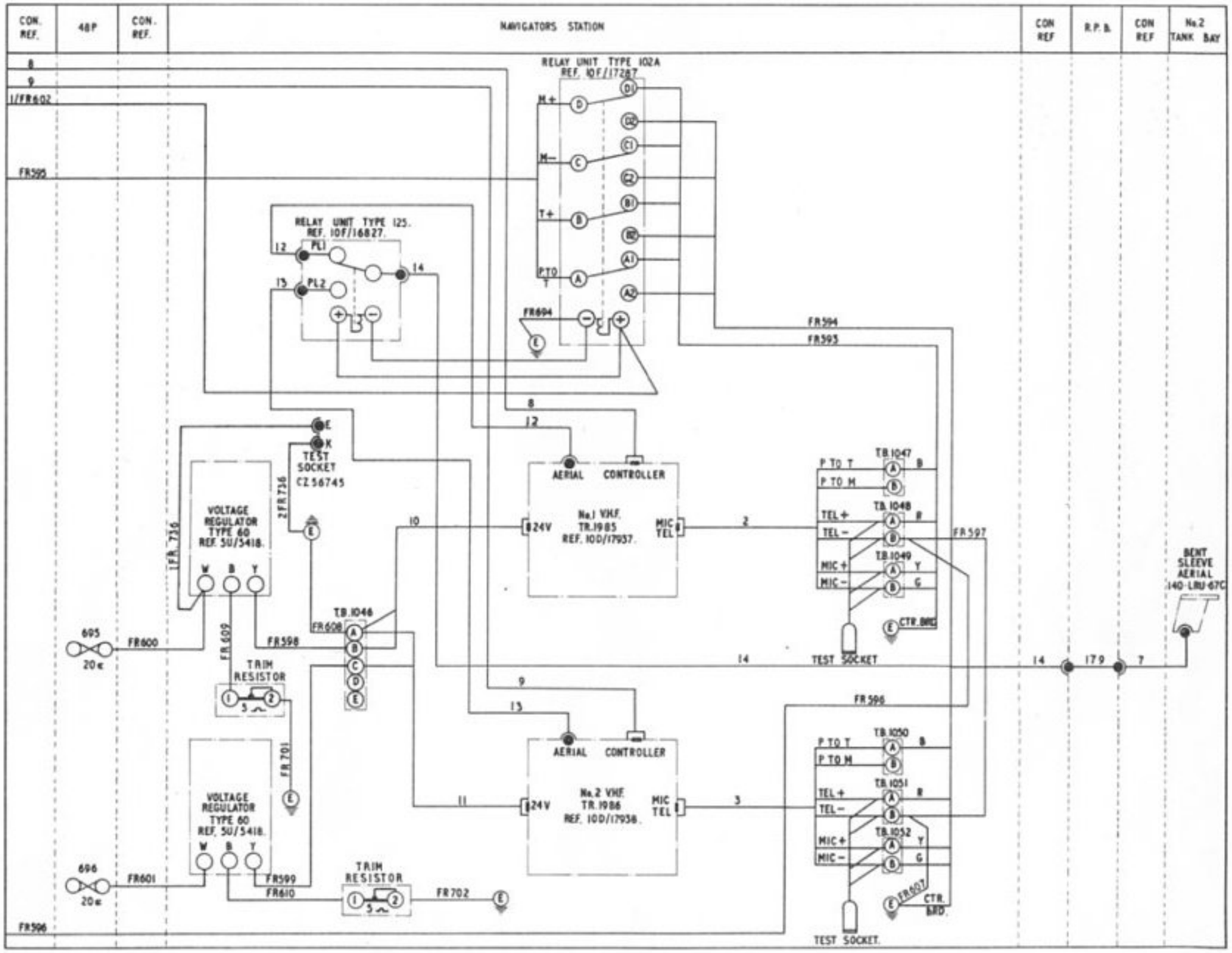

Fig. 3 (2) A.R.I. 18064
(Test socket added)

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