Chapter 1

WIRELESS INSTALLATIONS

(Completely revised)

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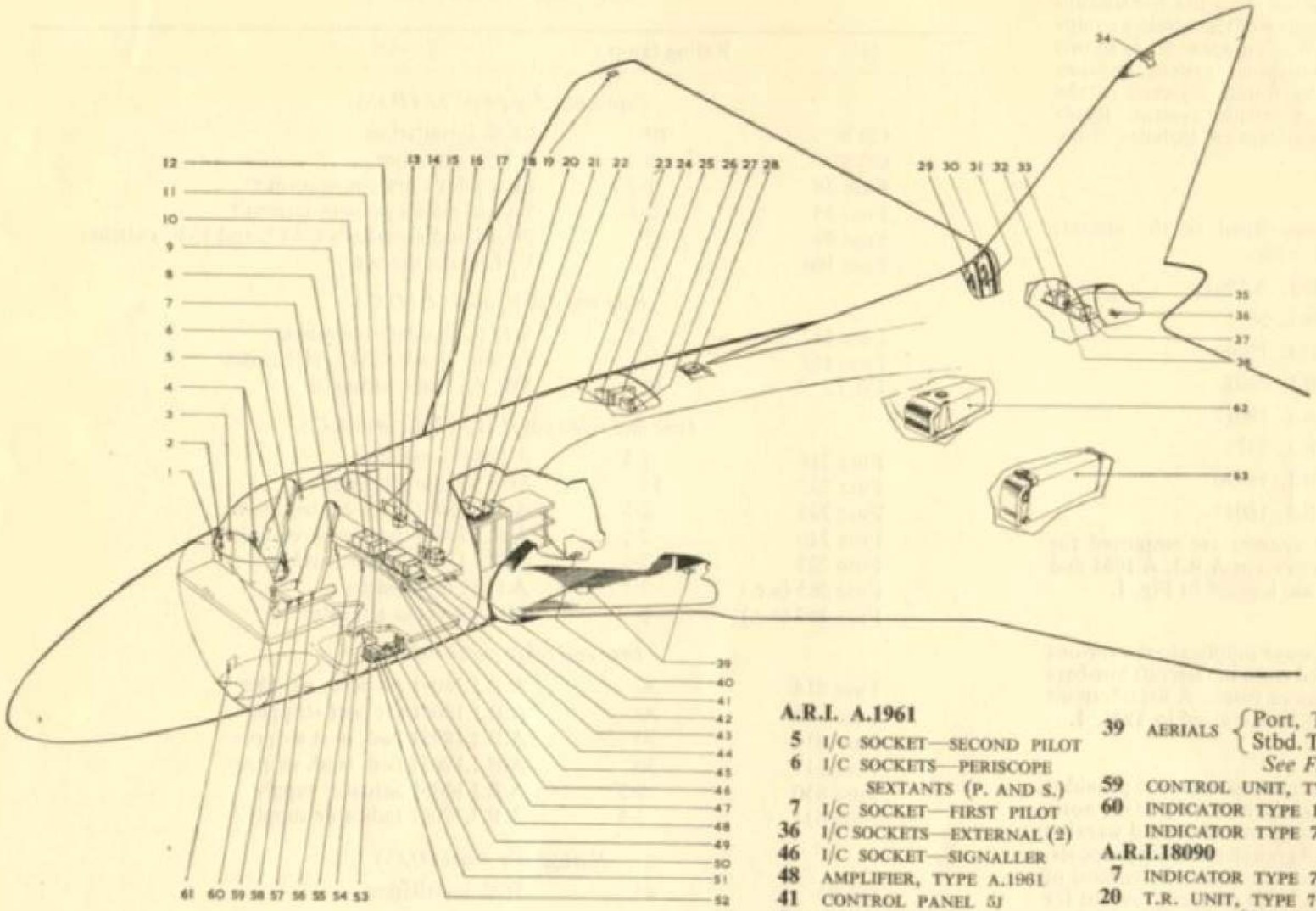

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A.R.I.18051

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Fig. 1. Location of wireless equipment

Introduction

1. This chapter deals with the installation and general functioning of the wireless equipment. The location of components is shown in fig. 1, and individual system location illustrations will be found adjacent to the text describing the particular system. Routing charts for each system are included at the end of the text.

2. The installations fitted to the aircraft consist of the following:—

A.R.I. A.1961
A.R.I. 5874
A.R.I. 18064
A.R.I. 23023
A.R.I. 18011
A.R.I. 5378
A.R.I. 18090
A.R.I. 18051

Suppressed aerial systems are employed for all the installations except A.R.I. A.1961 and A.R.I.18051 and are located in Fig. 1.

3. A.C. and d.c. power supplies to the various installations are fed from the aircraft bus-bars via circuit breakers or fuses. A list of circuit breakers and fuses is contained in Table 1.

4. Intercomm. mic/tel facilities are provided at all crew stations, and externally at the nose-wheel bay for towing and at the tail warning bay for towing and ground servicing purposes. The H.F. equipment is under the control of the signaller, with R/T facilities provided for the pilots. V.H.F. radio and telephony is controlled by the first pilot. An A.D.F. installation under the control of the plotter navigator, enables loop orientation and aerial sensing to be carried out. The I.L.S. installation is under the control of the first pilot, with the indicator at the second pilot's station.

4A. Two radio altimeter systems provide the first pilot with a low range facility and the navigator with a high range facility. Each crew member operates his respective installation. On aircraft with S.T.I.30 embodied the aerials of these two systems are re-arranged in order to overcome defects of the original A.R.I.5738, low level system. This results in the high level aerials (Type 7165) being used for transmission on both systems and the low level aerials (Type 7059) being used for reception on both systems. This re-arrangement however introduces certain limitations in the operation of the A.R.I.5378, these are listed in para. 93. The A.R.I.18051 is operated from the rear crew station.

TABLE 1
Fuses and circuit breakers

No.	Rating (amp.)	Service
		Fuse and relay panel 3P (D.C.)
CB 8	10	I.L.S. installation
CB 9	5	A.1961 amplifier
Fuse 34	2·5	First pilot's press-to-transmit
Fuse 35	2·5	Second pilot's press-to-transmit
Fuse 98	5	Pilot's and signaller's CALL and H.F. switches
Fuse 108	5	V.H.F. change-over
		Fuse and relay panel 4P (D.C.)
Fuse 162	2·5	V.H.F. simulated bombing
Fuse 168	5	Second pilot's CALL/HF switch
CB 73	10	Mk. 6A radio altimeter
		Fuse and relay panel 11P (D.C. and A.C.)
Fuse 216	7·5	A.D.F. installation
Fuse 222	15	Mk. 5 radio altimeter
Fuse 225	2·5	A.R.I.18051 stbd. control unit
Fuse 226	2·5	A.R.I.18051 port control unit
Fuse 227	2·5	A.R.I.18051 actuator relay
Fuse 265 (a.c.)	2·5	A.D.F. installation
Fuse 269 (a.c.)	5	Mk. 6A radio altimeter
		Fuse and relay panel 26P(D.C.)
Fuse 614	30	A.R.I.18051 aft stbd. stripper
Fuse 615	30	A.R.I.18051 aft port stripper
Fuse 616	30	A.R.I.18051 fwd. port stripper
Fuse 617	30	A.R.I.18051 fwd. stbd. stripper
Fuse 630	7·5	A.R.I.18051 actuator supply
Fuse 631	2·5	A.R.I.18051 indicator supply
		Navigator's panel (D.C.)
CB 83	45	H.F. installation

DESCRIPTION AND OPERATION

5. The following modifications are included in this group:—

Mod. 10	Fuselage—To introduce A.R.I. 18051—fixed fittings.
Mod. 11	Fuselage—To introduce A.R.I. 18051—removable fittings.
Mod. 66	Radio—Introduction of A.R.I. 5800 less "B" scope.
Mod. 123	Radio—Introduction of radio compass A.D.7092D—less sense aerial.
Mod. 143	Centre section wing. Modification of front spar and No. 2 tank for carriage of new store.
Mod. 150	Miscellaneous minor alterations resulting from the final conference.
Mod. 256	Radio — To introduce I.L.S. audio output in the intercomm. system.
Mod. 285	Radio altimeter Mk. 5 and 6. To cater for changes called for at final conference.
Mod. 334	Instruments — Introduction of radio altimeter Mk. 6A in lieu of Mk. 6.
Mod. 353	Instruments — Introduction of zero reader flight director.
Mod. 428	Pt.A. Radio compass—provision for fitting of voice range filter. Pt.B. Radio compass—provision of switched audio output to intercomm.
Mod. 436	Radio, to enable V.H.F. aerial to provide sensing facilities for radio compass A.D.7092D.
Mod. 463	Radio altimeter Mk. 5—to introduce connectors 10HB/283 and 10HB/284 in lieu of 10HA/14248/Z and 10HA/1429/Z respectively.
Mod. 510	Radio—To make provision for V.H.F. tones for simulated bombing.
Mod. 555	Radio—to reposition starboard sextant intercomm. socket.
Mod. 638	Electrical. To change the frequency of V.H.F. tones for simulated bombing.

A.R.I. A.1961

6. The installation is a combination of the orthodox intercommunication system, and a control system for radio services known as A.R.I. A1961. It consists of the following major components.

Amplifier	Type A1961
Junction box	Type 154
Relay box 5J	Avro Type T3836
Mic-tel. sockets (9)	Type 359
External i/c plugs (2)	Type 3570

On aircraft with Mod. 428 Pt.B embodied, the following item is added:—

Switches (2)	Ref. No. 5C/5823

7. The sockets and plugs are located in the following positions:—

First pilot's seat
Second pilot's seat
Bomb aimer's position
Port periscopic sextant station
Starboard periscopic sextant station
Signaller's station
Plotter navigator's station
Radar navigator's station
Nose wheel leg—towing plug
Tail warning bay—ground servicing socket and towing plug.

On aircraft with Mod. 555 embodied the stbd. sextant socket is moved to a location under the second pilot's floor. A component location diagram is given in fig. 4 and a routing chart at figs. 12 and 12A.

Amplifier

8. The intercomm. amplifier, Type A1961, is fitted to a shelf under the crew's port floor. The amplifier is secured to a suitable mounting tray which is fitted with anti-vibration mountings.

9. The unit is a three-stage audio-frequency amplifier, operating from the aircraft 28-volt supply. A rotary transformer is incorporated within the unit to supply H.T. at 260 volts for the anodes of the valves. The valve heaters are fed from a stabilized supply at 19 volts, this is also obtained from the aircraft supply, voltage stabilisation being effected by the inclusion of a carbon pile voltage regulator in the circuits. Two fuses are provided for L.T. and H.T., access to the fuses being made from the amplifier front panel. Descriptive and servicing information for the amplifier, Type A1961 will be found in A.P.2876E, Vol. 1, Part 2, Chap. 1.

Junction box, Type 154

10. Installed adjacent to the amplifier, Type A1961, is a junction box, Type 154. This unit serves to provide emergency intercomm. switching, and includes terminations for the aircrew microphone and telephone wiring. The junction box, Type 154, is described in A.P.2867E, Vol. 1, Part 2, Chap. 2.

TABLE 2

Connectors for A.R.I. A.1961

Ref. No.	Cableform	Connecting between
10HA/14096	Quadrametvinsmall 2·5	JB.154(P1) and switch panel
10HA/14097	Dumetvinsmall 16	Amplifier Type A.1961 (P1) & TB.396 (A & B)
10HA/14098	Sexometvinsmall 2·5	,, ,, ,, (S1) & JB.154 (S.1)
10HA/14099	Sextocorevinsmall No. 1	,, ,, ,, (P2) & JB.154 (P.2)

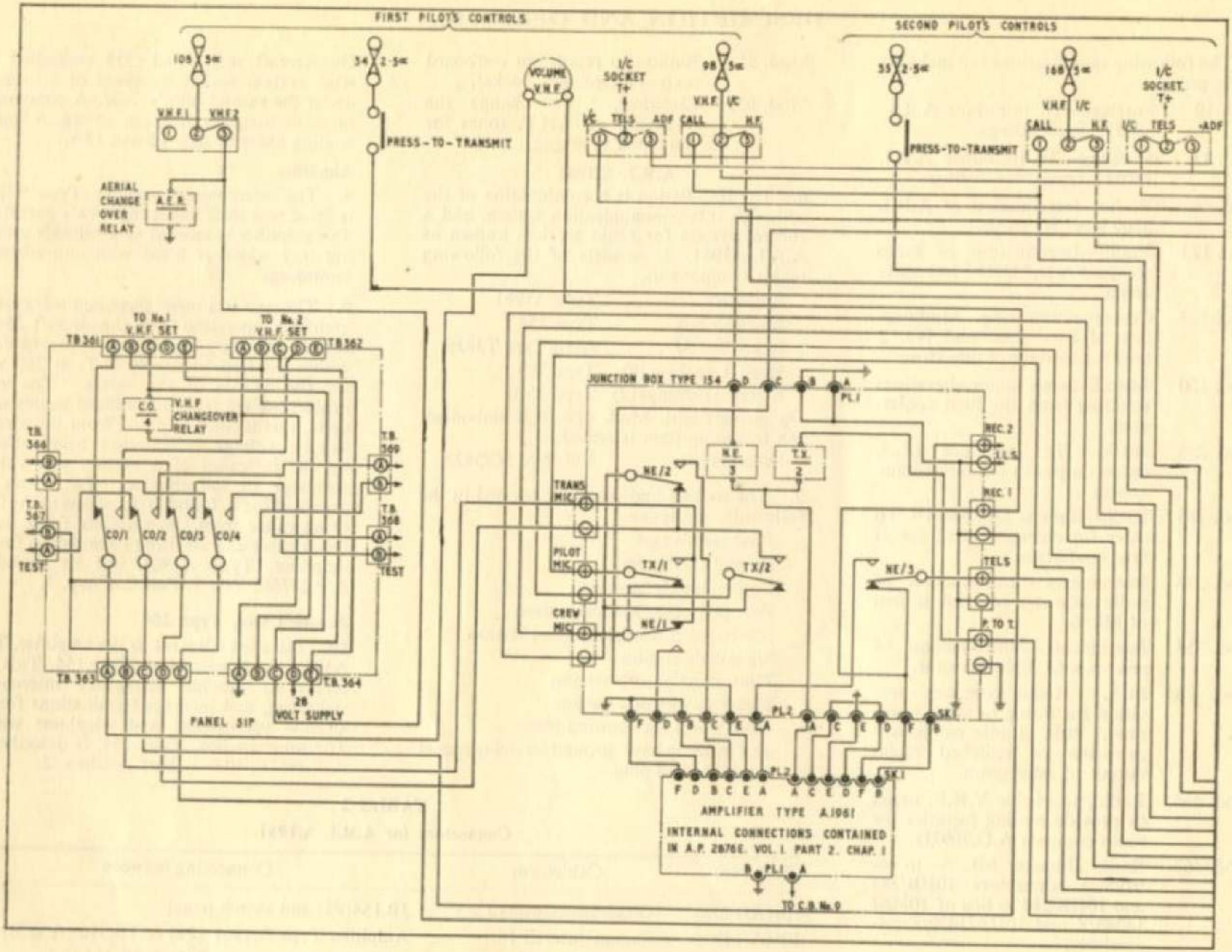


Fig. 2 (1). Intercomm. switching system

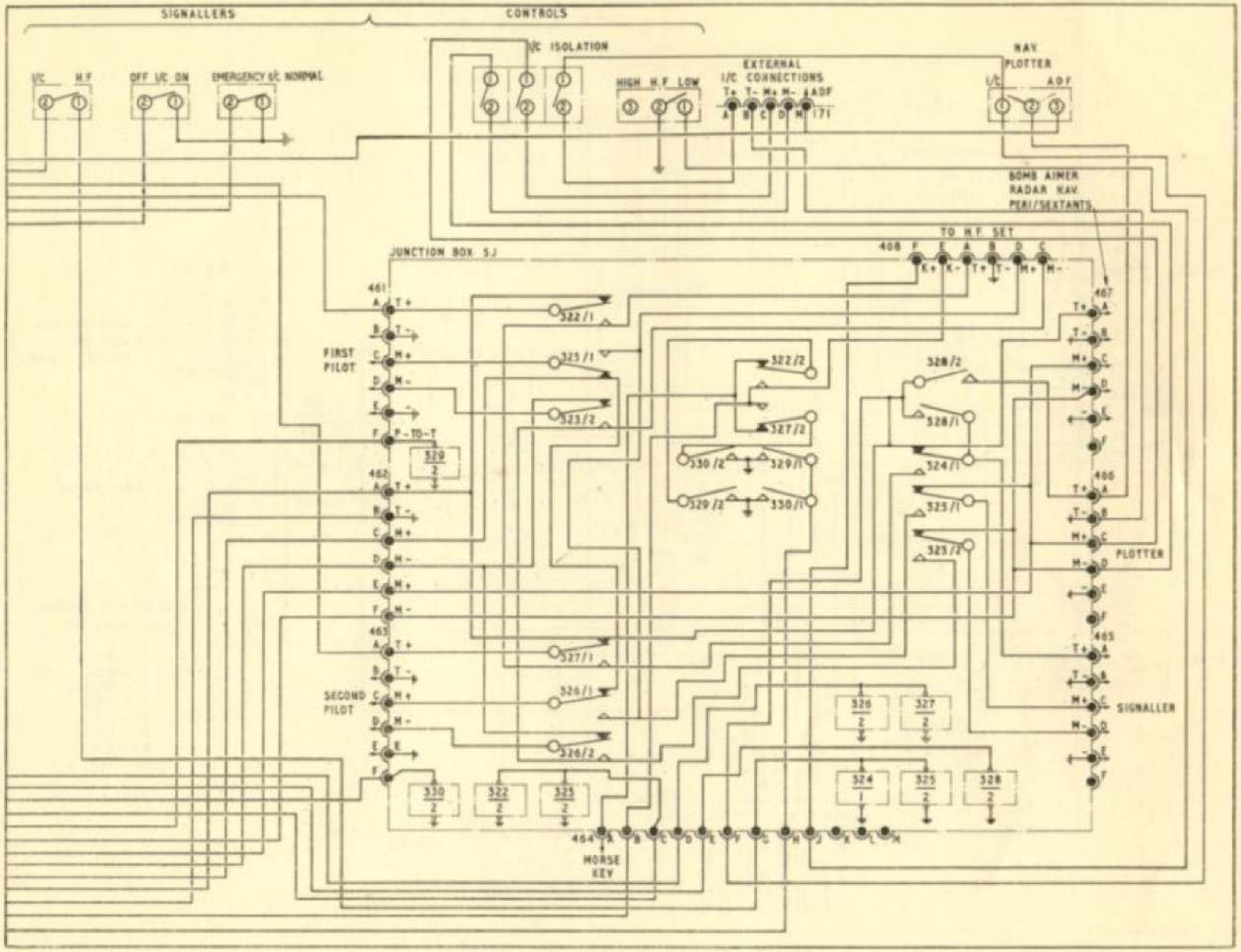


Fig. 2 (2). Intercomm. switching system

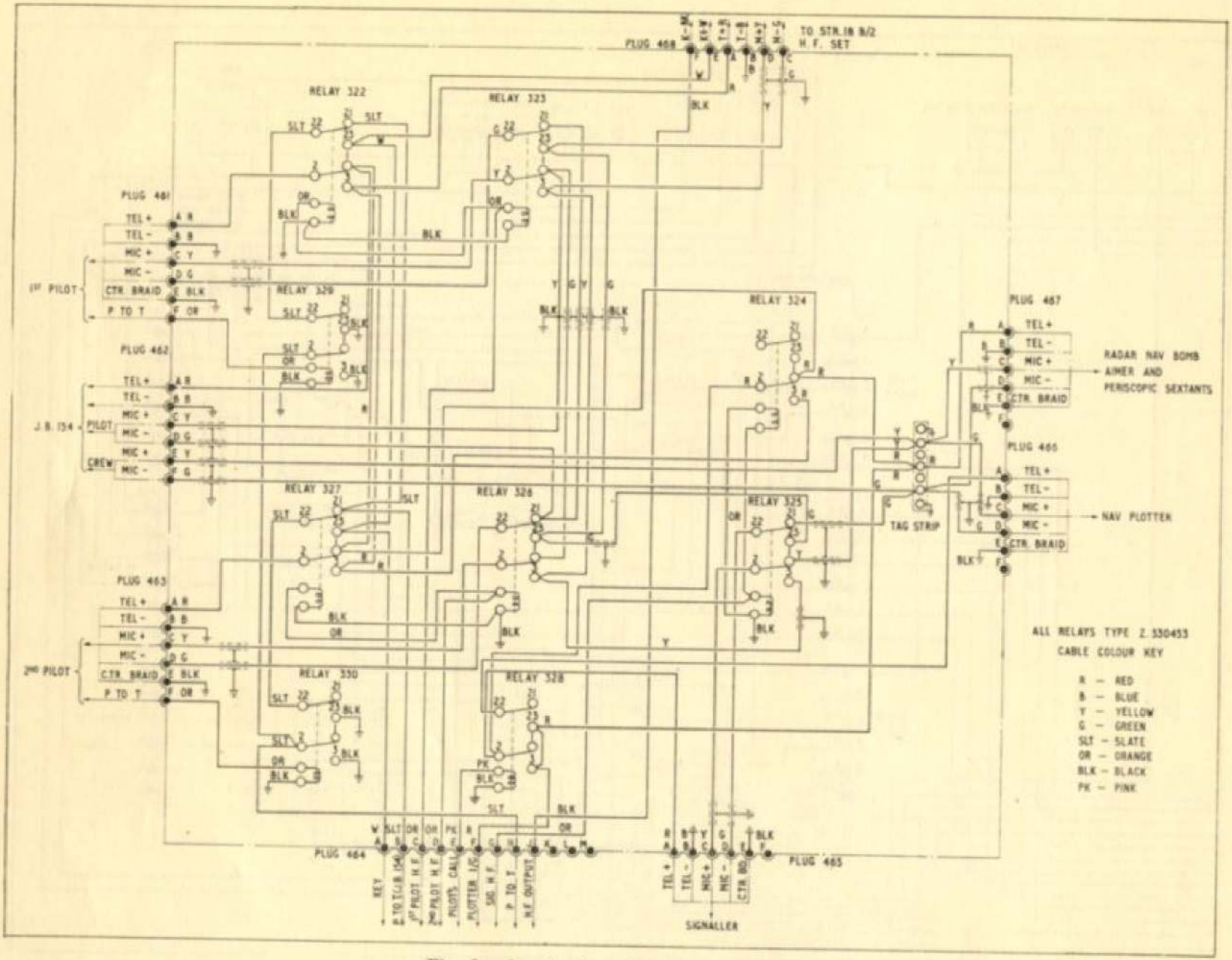


Fig. 3. Junction box 5J wiring diagram

Relay box 5J

11. A relay box, Avro Type T3836, designated 5J in the aircraft system, is fitted behind the table at the navigation station. This unit forms the central connecting point for all the radio intercomm. services. The box contains nine relays, and a wiring diagram is provided in fig. 3. From the relay box, multi-core connectors carrying the radio and intercomm. services are linked to each crew radio switching position.

Supplies

12. Power supply to the intercomm. amplifier, Type A1961, is obtained from the aircraft 28 volt bus-bars via circuit breaker No. 9 on 3P and is fed from the amplifier to the junction box, Type 154.

13. The supply to the amplifier and junction box is controlled by a switch labelled I/C ON-OFF on the R/T panel at the signaller's station. Adjacent to the control switch, is the intercomm. emergency switch, labelled NOR-EMER.

Intercomm. switching system

14. Referring to fig. 2 it will be seen that certain crew members have facilities for H.F., CALL and V.H.F; the plotter navigator also has an A.D.F. telephone switch. Crew facilities and circuit operation are contained in the following paragraphs. On aircraft with Mod. 428 Pt. B embodied the first and second pilot are also provided with A.D.F. telephone switches.

Normal/emergency intercomm.

15. The action of the normal-emergency intercomm. switch on the R/T panel at the signaller's station is as follows.

16. Assuming the intercomm. control switch to be in the ON position with the NOR-EMER. switch in the NOR. position, relay NE/3 in the junction box, Type 154 will be energised. All microphones will be connected to the mic. termination of the A1961 amplifier, but the pilot's microphone can be isolated from this circuit line by operating either press-to-transmit switch (relays 329 and 330). All the telephone circuits, including those of the pilot's, are connected to the amplifier output line.

17. With the intercomm. switch in the EMER. position however, relay NE/3 is not energised. This will result in the CREW/MIC and PILOT/MIC terminals being connected to the TRANS/MIC terminals and the V.H.F. set A.F. output line will provide emergency intercomm. It should be noted that all intercomm. traffic will be transmitted if the press-to-transmit switches are operated under these conditions.

Pilots' call

18. Each pilot is provided with a control switch, labelled CALL-V.H.F. I/C-H.F. The first pilot's switch is fitted to the call switch panel on 6P, the second pilot's switch is fitted on the forward end of the starboard console 7P. Both switch toggles are spring-loaded to the central (V.H.F. I/C) position.

19. When either pilots' call switch is held to the CALL position, relay 328 in 5J will be energised, thus closing contacts 328/1 and 328/2. Closure of these contacts will superimpose the pilots' speech on all other crew members telephone circuits. If the plotter navigator is connected to the A.D.F. installation, contacts 328/2 will connect the pilots' call to his telephone circuit. Should the signaller be switched to H.F., contacts 328/1 will connect the pilots' call to his telephone circuit.

20. When the first pilot's call switch is held to the H.F. position, relays 322 and 323 in 5J will be energised, causing contacts 322/1, 322/2, 323/1 and 323/2 to change-over. This action will thus connect the first pilot's mic. and tel. lines to the H.F. installation. Similarly, when the second pilot's call switch is held to the H.F. position, relays 326 and 327 will be energised, causing the second pilot's mic. and tel. lines to be connected to the H.F. installation. On aircraft with Mod. 428 Pt. B embodied the first and second pilot are provided with an ADF/i/c selector switch in their telephone circuits. These switches are located on the respective consoles and enable independent selection to be made.

Signaller's H.F. switch

21. Situated on the R/T control panel, this switch, labelled I/C-H.F., enables the signaller's head set to be isolated from the normal intercomm. system, and connected to the H.F. set. This is effected by operation of the I/C-H.F. switch to the H.F. position. This action will energise relays 324 and 325 in the relay panel 5J, causing change-over of relay contacts 324/1, 325/1 and 325/2. Should either pilot operate his call switch while the signaller is connected to the H.F. installation, the signaller can only talk back by placing his I/C-H.F. switch to the I/C position.

Intercomm. isolation

22. Three mechanically-linked single-pole switches, labelled INTERCOMM. ISOLATION, are fitted to the R/T control panel at the signaller's station. These switches are provided to isolate the external intercomm. points during flight.

External intercomm. Points

23. Three external intercomm. points are provided. Two in the tail warning bay, and one on the nosewheel leg. The intercomm. point in the tail warning bay which terminates in a socket, Type 359 is provided for ground servicing intercomm. facilities. The remaining two points which terminate in plugs, Type 3570, are provided for forward and rearwards towing intercomm. facilities.

A.R.I.5874

24. The H.F. communications equipment, A.R.I.5874, is under the control of the signaller at the navigation station. The equipment consists of the following major components:—

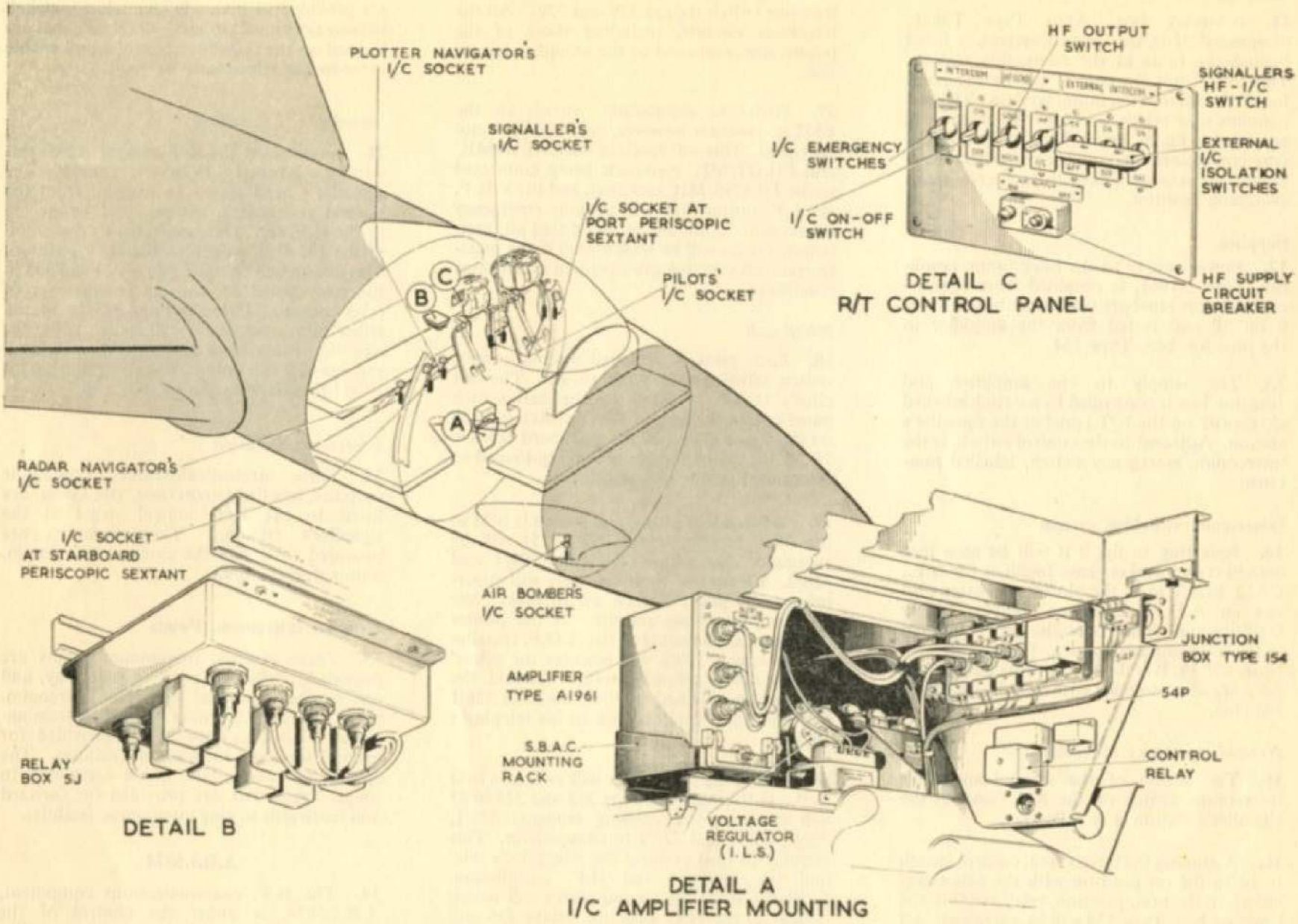


Fig. 4. A.R.I. A.1961 and R/T panel

Transmitter	T4188
Receiver	R4187
Power and radio unit	Type 4192
Control unit	Type 4190
Selector unit	Type 7003
Remote control unit	Type 4189
Aerial control unit	Type 7216
Junction box	Type 4191
Aerial tuning unit	Type 7016
Matching unit	Type 7949
Morse key	Type F
Aerial	Dorsal fin type
Voltage regulator	Type 228

25. The basic equipment of A.R.I.5874 includes a 24-channel crystal-controlled transmitter and receiver, operating in the H.F. band 2·8 to 18·1 mc/s. Operation may be on CW, MCW, or R/T with a transmitter carrier output of approx. 100 watts. The complete installation forms a general purpose airborne H.F. communications system, and is used in conjunction with a suppressed dorsal fin aerial installation.

26. The bulk of the equipment is fitted to suitable mounting trays on the H.F. shelf, which is situated below and behind the navigator's table at the crews' station. The equipment is operated from a remote control unit installed on the navigator's panel at the signaller's station. R/T facilities are available for both pilots by the operation of their respective call switches to the H.F. position. A location illustration of the system is contained in fig. 5.

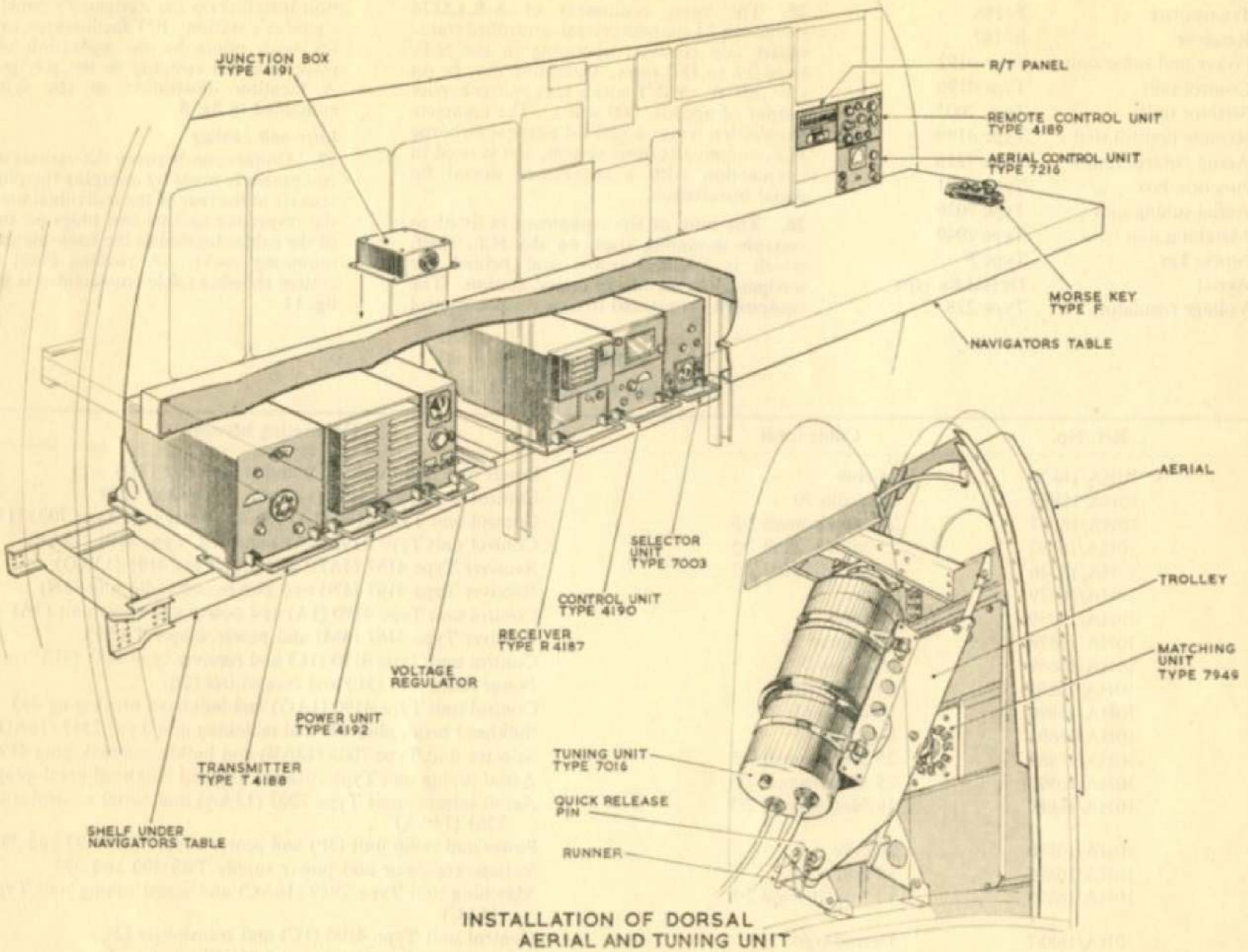
Inter-unit cabling

27. Connection between the various units of equipment is made by engaging the plugs and sockets at the rear of the individual units with the respective sockets and plugs on the ends of the cables located in the back-plates of the mounting racks. A routing chart of the system showing cable connections is given in fig. 11.

TABLE 3

Connectors for A.R.I.5874

Ref. No.	Cable form	Connecting between
10HA/16876	24 core	Power and radio unit (3D) and transmitter (2D)
10HA/16886	Uniradio 70	Control Unit Type 4190 (1B) and transmitter (2B)
10HA/16883	25 Metvinsmall 2·5	Control unit Type 4190 (1AF) and selector unit Type 7003 (13AF)
10HA/16882	25 Metvinsmall 2·5	Control unit Type 4190 (1AE) and J.B. Type 4191 (12AE)
10HA/15346	25 Metvinsmall 2·5	Receiver Type 4187 (4AD) and J.B. Type 4191 (12AD)
10HA/16879	4 core	Receiver Type 4187 (4N) and power and radio unit (3N)
10HA/15339	20 core	Control unit Type 4190 (1A) and power and radio unit (3A)
10HA/16878	3-Unipren 12	Receiver Type 4187 (4M) and power supply TB.398
10HA/16889	Uniradio 70	Control unit Type 4190 (1L) and receiver type 4187 (4L)
10HA/16888	Uniradio 65	Power radio unit (3E) and transmitter (2E)
10HA/16890	Uniradio 65	Control unit Type 4190 (1AG) and bulkhead break plug 490
10HA/16891	Uniradio 65	Bulkhead break plug 490 and matching unit Type 7217 (16AG)
10HA/16885	25 Metvinsmall 2·5	Selector unit Type 7003 (13AB) and bulkhead break plug 489
10HA/16892	25 Metvinsmall 2·5	Aerial tuning unit Type 7016 (15AB) and bulkhead break plug 489
10HA/16884	18 Metvinsmall 2·5	Aerial selector unit Type 7003 (13AA) and aerial control unit Type 7261 (14AA)
10HA/16880	20 core	Power and radio unit (3P) and power supply TBS 400 and 398
10HA/16895	15 core	Voltage regulator and power supply TBS 400 and 398
10HA/16893	12 Metvinsmall 2·5	Matching unit Type 7949 (16AC) and aerial tuning unit Type 7016 (15AC)
10HA/16887	Uniradio 65	Control unit Type 4190 (1C) and transmitter (2C)
10HA/16877	Septocorevinsmall No. 1	Power and radio unit (3F) and 5J/468 tel-mic
10HA/15652	Unipren 4	TX. shorting plug (3J)
10HA/16894	25 Metvinsmall 2·5	J.B. Type 4191 (12 AH) and remote control unit Type 4189 (11 HA)



INSTALLATION OF DORSAL
AERIAL AND TUNING UNIT

Fig. 5. A.R.I.5874

Power supplies

28. D.C. power supply at 28 volts is fed from the aircraft system via circuit breaker No. 83 on the R.T. control panel at the signaller's station. This panel also forms the main control panel for the signaller's wireless and intercomm. control.

29. The 28 volts d.c. supply is fed from circuit breaker 83 to the power and radio unit and the voltage regulator via terminal blocks 398 and 400. The power and radio unit supplies H.T. for the transmitter. The receiver unit incorporates its own rotary transformer which supplies 220 volts H.T. for the receiver circuits. The voltage regulator provides a 19 volt stabilised supply for certain L.T. portions of the installation.

Controls

30. Full descriptive and operation information for the A.R.I.5874 installation is contained in A.P.2535E, Vol. 1. The following paragraphs contain a brief outline of the controls and units in regard to Vulcan aircraft.

*Receiver, Type R*4187

31. The receiver, Type R4187, is virtually a self-contained unit within the installation, since it incorporates its own power unit operating from the aircraft 28 volt system, and all those circuits necessary for the reception of signals from the aerial input.

32. The receiver tuning range is divided into three frequency bands with the following coverage:—

Band 1	2·8 to 5·2 Mc/s
Band 2	5·2 to 9·7 Mc/s
Band 3	9·7 to 18·1 Mc/s

Control unit, Type 4190

33. This unit forms the control or drive unit for the transmitter and includes all the control circuits necessary to operate the transmitter, together with the pre-set potentiometers for setting up the channels. The control unit is fitted with 24 crystals which are heated in a thermostatically-controlled enclosure, giving a temperature control which does not allow the temperature to fall below 10 deg. C.

*Transmitter, Type T*4188

34. The transmitter consists mainly of three tuned amplifiers, a mechanical drive unit which includes a tuning motor, and a blower motor for air cooling the P.A. stage. All the components are mounted on a cast aluminium chassis and sub-chassis attached thereto.

The frequency range of the transmitter is provided in two bands viz:—

Band 1—2·8 and 7·0 Mc/s
Band 2—7·0 and 18·1 Mc/s

35. Referring to the front panel of the transmitter (*fig.* 5) a TUNE KEY is provided to facilitate the checking of the valve currents with the aid of the meter switch. The change-over from automatic to manual control is possible using the AUTO/MAN. switch. In the manual condition the transmitter coils can be rotated by means of the TRANS/TUNE knob to enable a mechanical check to be made during inspection of the equipment. The transmitter H.T. is not available in this condition.

Power and radio unit, Type 4192

36. The chassis of the power and radio unit carries the following main items:—

Rotary transformer
Amplifying unit
Transformer

The unit provides H.T. power for the transmitter circuits, the power output being 300 volts and 600 volts respectively. A sliding cover beside the air filter on the front panel provides access to three pre-set adjustments on the audio amplier, these are:—

DELAY (in the V.O.G.A.D. circuit)
SIDETONE
M.C.W.

Remote control unit, Type 4189

37. The remote control unit is located at the signalling station and provides the following controls and indications:—

Power supply switching.
Selection of type of transmission.
Selection of frequency with fine tuning and lamp indication.
RF. Gain control.
Aerial excitation meter.
Dimmer switch for the dial light of the frequency selector switches.

The unit controls the A.R.I.5874 throughout, including automatic aerial selection via, the selector unit, Type 7003, except for the following operations:—

(1) Fine tuning of the aerial circuit when under automatic selection is effected by the control on the aerial control unit, Type 7216.
(2) Manual selection and tuning of the aerial circuit when necessary, is effected overall by the control unit, Type 7216.

Junction box, Type 4191

38. The junction box connects the remote control unit to the receiver and transmitter circuit. Other than the interconnection wiring there are no electrical components in the junction box.

Voltage regulator—Type 228

39. Input d.c. power supply to the A.R.I.5874 installation is required at 28 volts and 19 volts. The latter is derived from the 28 volts supply by use of the voltage regulator.

40. The regulator is of the carbon type designed to give a constant output of 19 volts from an input which may vary between 22 and 29 volts. On the front panel of the voltage regulator are mounted a voltmeter and the following controls and switches:—

ADJUST VOLTS—A manual control of the volts potentiometer which is calibrated with an arbitrary scale and can be locked after adjustment.
CHECK—A press-release switch for output level tests.
SET—A press-release switch for output level adjustments.
LIGHT—A push-pull switch controlling the illumination of the voltmeter.

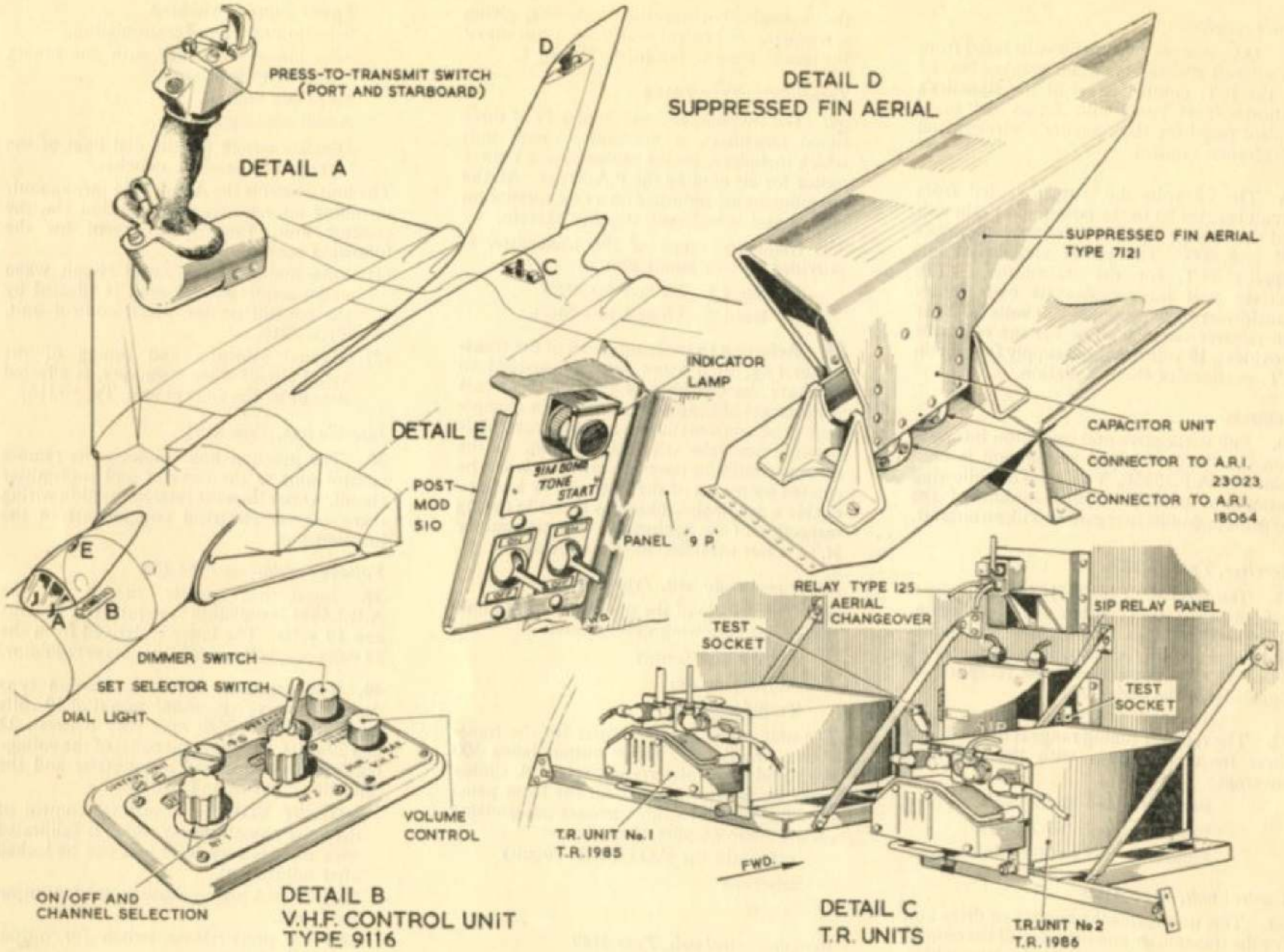


Fig. 6. A.R.I.18064

41. Although the potential level of the output is 19 volts, arrangements are made for this to be varied between 18 and 20 volts by means of variable wire-wound resistive elements.

42. An illuminated voltmeter mounted on the front panel indicates the level of the output voltage, the limits of 18-20 volts being clearly defined. A sealed control on the front panel is provided for adjustment of the stabilized potential level.

43. The regulator is capable of supplying 2 to 10 amps. or 5 to 15 amps. The change-over from one range to the other is effected by replacing one plug-in resistor by another, the unused component being stowed inside the dust cover.

Channel selection and tuning

44. The remote control system used to tune the equipment includes selector circuits and tuning circuits. The system employs the self-balancing resistance bridge or Wheatstone servo.

Suppressed aerial system—Type 9502

45. A suppressed aerial installation is fitted to the aircraft for the A.R.I.5874 installation. This takes the form of a notched excitation aerial in the lower part of the dorsal fin. The notch is cut to provide a cavity in the aircraft structure which is tunable to resonance through a frequency range of 2·8 Mc/s to 18·1 Mc/s. The aircraft structure, when connected via an impedance matching device to the transmitter receiver, then functions as a dual purpose aerial element. Tuning of the system is effected automatically or manually. Automatically, in conjunction with selection on the T.R. control unit of frequencies for which pre-flight adjustment of the aerial tuning devices is made. Manually, in the event of failure of the automatic preselector system, or of frequencies other than those available by pre-selection. The controls and tuning devices are described briefly hereunder.

Aerial control unit, Type 7216

46. This unit is mounted adjacent to the remote control unit at the signaller's station. It provides for the selection of automatic tuning of the aerial system by the selector unit Type 7003 or manual tuning by the following controls and indications mounted on the front panel:—

(1) Selection of Automatic or manual tuning.

*(2) Selection of the appropriate capacitance range with coarse and fine tuning to the required frequency.

(3) Limit indicator lamp which lights when the tuning capacitor rotor reaches either end of its travel.

(4) Tuning meter for R.F. output or servo check.

(5) Servo check switch.

(6) Safe warning lamp which lights in conjunction with a pressure switch in the aerial tuning unit.

The unit is used in conjunction with the selector unit Type 7003 during pre-flight adjustment of the aerial tuning devices to the preselected frequencies.

** The aerial fine tuning control is available also under automatic selection.*

Selector unit, Type 7003

47. This unit is located under the navigators table adjacent to the Signallers station. It contains the master elements for all the servo channel selection and tuning in the suppressed aerial system. The following pre-setting controls and indications are provided on the front panel:—

(1) Selected channel indicator. This operates in conjunction with the selection of the required channel on the remote control unit, Type 4189.

(2) Selection of tune, operate and test conditions effecting the transmitter power output with lamp indication of tune conditions.

(3) Frequency range setting and capacitor tuning.

(4) R.F. output and servo check meter.

(5) Servo check switch.

Aerial tuning unit—Type 7016

48. This unit is mounted adjacent to the cavity in the fin and provides the means of varying the capacitance value in the tuned circuit. It consists of an electro-mechanical unit which drives a 3 section variable capacitor in association with a fixed capacitor switched in 3 sections by the same device. The unit is contained in a canister which is pressurized to 20 lb/in² absolute. Two pressure switches in the circuit function as follows. One to light the SAFE lamp on the aerial control unit at pressures down to 16 lb/in² absolute. The other function to reduce the transmitter output to low power if the pressure should fall below 14 lb/in² absolute. The latter operation is to prevent R.F. breakdown of the capacitance.

Matching unit, Type 7949

49. This unit is also mounted adjacent to the cavity in the fin and provides the means of varying the inductive value in the tuned circuit. It is designed to maintain a reasonable match between the input impedance of the aicraft exciting system and the output impedance of the transmitter at all frequencies within the band.

A.R.I. 18064

50. The equipment installed to meet the requirements of V.H.F. communication consists of the following major components:—

Transmitter/receiver No. 1	Type TR.1985
Transmitter/receiver No. 2	Type TR.1986
Control unit	Type 9116
Wide band fin aerial	Type 7121
Aerial relay unit	Type 125

On aircraft with Mod. 510 embodied, provision is made for a V.H.F. tone to be used as a simulated bombing signal, Mod. 638 intruduces items to improve the tone.

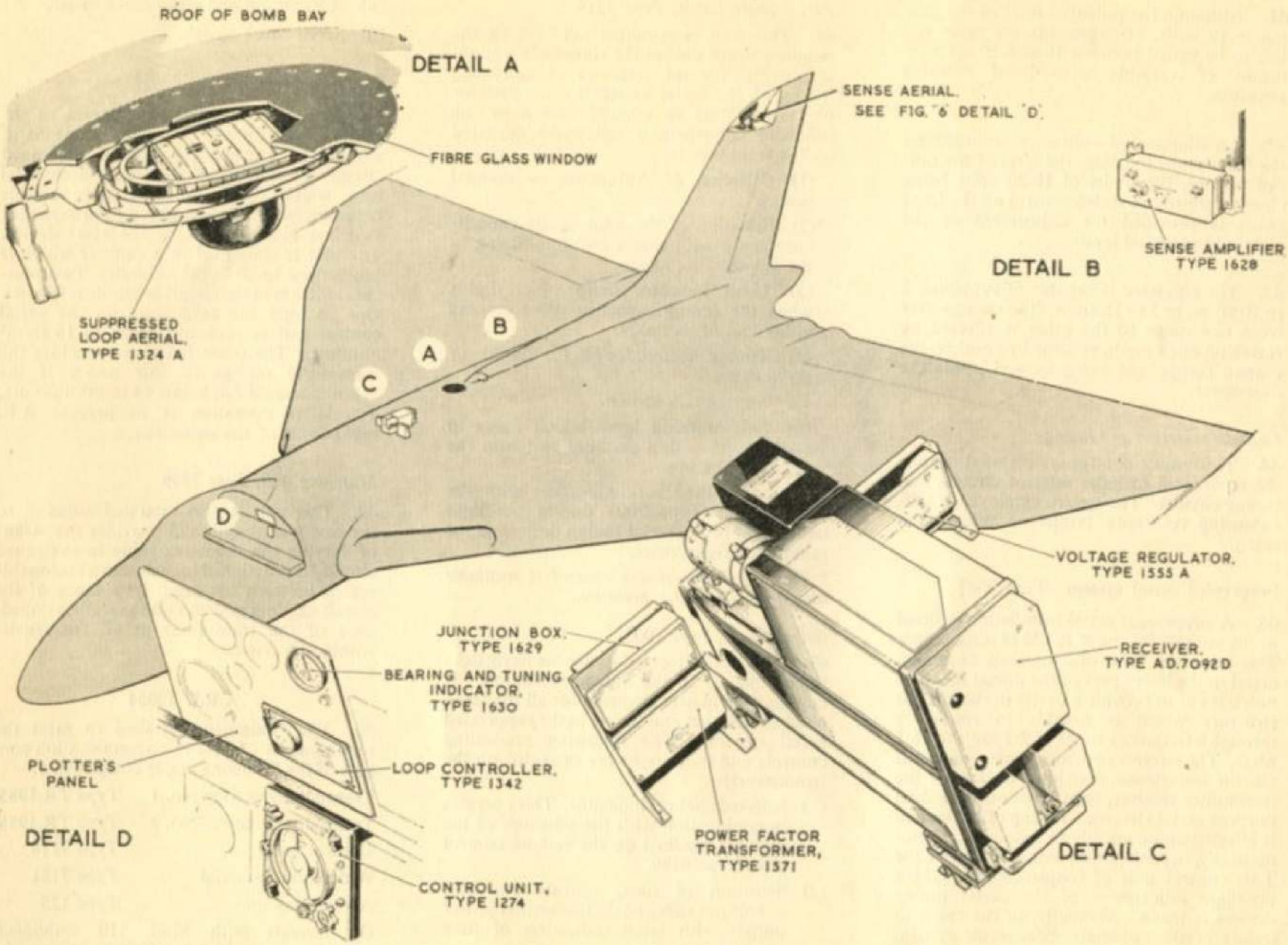


Fig. 7. A.R.I. 23023

The following are then added:—

Lamp (red)	Ref. No. 5C/1553
Switch	Ref. No. 5CW/5825
Switch	Ref. No. 5CW/5830
Relay box	Avro Type T4607

51. The No. 1 and No. 2 transmitter/receiver units are 10-channel sets, which cover the following frequency ranges:—

TR.1985—100 Mc/s to 125 Mc/s

TR.1986—124·5 Mc/s to 156 Mc/s

Each equipment has provision for the selection of any one of ten crystal controlled frequencies within its own particular range.

52. Selection of any one channel within the frequency range of the particular T.R. unit is effected by means of an automatic channel-change mechanism manually controlled by a rotary switch in an associated control unit, Type 9116. The channel change mechanism is mounted on the front panel of the T.R. unit.

Controls

53. The remote control unit Type 9116 is mounted on a panel designated V.H.F. control panel and located on the first pilot's console 6P. It provides the following controls:—

(1) A two position toggle switch labelled SET 1 and SET 2 which selects the set appropriate to the required frequency.

(2) Two multi position rotary selector switches labelled NO. 1 and NO. 2. Each has an illuminated dial and provides ON/OFF switching and channel selection on its respective set as follows:—

NO. 1 switch on the TR.1985 with dial markings A to J.

NO. 2 switch on the TR.1986 with dial markings K to T.

(3) A rotary switch labelled with an arrow marked DIM which controls the illumination of the channel selector dials.

(4) A volume control for the V.H.F. signal.

F.S./9

TABLE 4

Connectors for A.R.I.18064

Ref. No.	Cable form	Connecting between
10HA/14085	Miniature cable 12A	T.R. unit No. 1 and plug 176
12/T3815	Miniature cable 12A	No. 1 control unit and plug 176
10HA/14087	Miniature cable 12A	T.R. unit No. 2 and plug 178
13/T3815	Miniature cable 12A	No. 2 control unit and plug 178
10HA/14089	1 Duprenmet 6 1 Dupren 6 1 Uniprenmet 6 1 Unipren 6	T.R. unit No. 1 and 51P
10HA/14090	1 Duprenmet 6 1 Dupren 6 1 Uniprenmet 6 1 Unipren 6	T.R. unit No. 2 and 51P
10HA/14091	2 Unipren 12	T.R. unit No. 1 and 51P inlet 1
10HA/14092	2 Unipren 12	T.R. unit No. 2 and 51P inlet 2
10HA/14093	Uniradio 67	T.R. unit No. 1 and aerial relay
10HA/14094	Uniradio 67	T.R. unit No. 2 and aerial relay
10HA/14095	Uniradio 67	Aerial relay and fin aerial

54. Two press-to-transmit switches are fitted, one to each pilot's control column handle. Operation of either press-to-transmit switch will energize one of two control relays (No. 329 and 300) in 5J, causing the selected transmitter to be switched to transmit.

55. Two toggle switches and an indicator lamp are mounted on the forward edge of bombing panel 9P at the navigator's station. The switches control an energising supply to the coil of the transmit relay in the simulated bombing circuit. The lamp lights to indicate when the supply is on.

T.R. units

56. The No. 1 and 2 transmitter receiver units are each contained in a unit assembly secured to a rack and mounted on the port and starboard sides of the compartment aft of the main power compartment in the rear fuselage. A small panel (51P) between the sets contain the test mic/tel sockets and the change-over relay, 28 volt d.c. supplies to the V.H.F. sets are obtained from fuses 488 and 487 in 26P. Descriptive and servicing information for the A.R.I.18064 installation is contained in A.P.2528P, Vol. 1.

Change-over circuit

57. The V.H.F. change-over switch on 6P controls the power supply, aerial, and mic/tel change-over relays. These circuits are normally connected to the No. 1 set (TR.1985), but when the change-over switch is moved to the No. 2 position, the change-over relays will be energised. The aerial relay, Type 125, will disconnect the aerial from the No. 1 set and connect it to the No. 2 set. The relay in 51P will switch the microphone, telephone, and press-to-transmit feeds from the No. 1 to the No. 2 set.

Aerial system

58. A suppressed axe-type aerial, Type 7121, is installed in the fibreglass fin cap. This unit has been specially developed to meet the

requirements for a wide-band suppressed V.H.F. aerial. Constructional details of the aerial are given in fig. 6. The aerial element is mounted on an insulated base frame. A capacity is mounted inside the aerial element and is connected to the moulded termination unit.

Simulated bombing circuit

59. The circuit which provides the V.H.F. tone transmission for simulated bombing consists of the following items:—

(1) A 4·7 kilohm resistor connected in parallel with a ·001 microfarad capacitor. This network is inserted by a relay, when required, in the audio frequency amplifier/modulator stage of the set in use. In circuit, the network causes the generation of 1000 C.P.S. oscillation which is passed to the subsequent stages and modulates the transmitted signal to the required tone.

(2) A 27 kilohm resistor is inserted in series with the V.H.F. volume control by the same relay action as above. It is employed to provide a more effective control of the side tone level whilst the tone signal is being transmitted.

(3) A S.P. tumbler switch (*Ref. No.* 5CW/5825) labelled ON/OFF is employed as a master switch.

(4) A S.P. tumbler switch (*Ref. No.* 5CW/5830) also labelled ON/OFF but additionally START is employed to complete an initial energising supply to the transmit relay. It is spring return to OFF.

(5) A relay (*Ref. No.* 10F/Z.530434) is employed in conjunction with the START switch to insert the parallel network and commence the tone transmission.

(6) A relay (*Ref. No.* 10F/Z.530423) is employed in conjunction with the bomb firing switch to stop the tone transmission.

(7) An indicating lamp (*Ref. No.* 5C/1553) is employed to show, when illuminated, that the coil of the transmit relay is energised.

60. The two resistors, the capacitor and two relays, are contained in a relay box Avro Type T.4607 which is mounted near panel 54P. The switches and the indicating lamp are mounted on a small panel affixed to the forward edge of the bombing panel 9P at the navigator's station. The master switch is the forward one of the two. Two 28 volt d.c. supplies are employed in the circuit. One is fed from fuse 162 on panel 4P to energise the coil of the transmit relay. The other is fed from fuse 165 also on 4P via the bomb firing switch to energise the coil of the stop relay. A circuit description follows and should be read in conjunction with the routing chart at Fig. 13.

Circuit description

61. A 28 volt d.c. supply is fed from fuse 162 on panel 4P to contact No. 2 of the master switch. When this switch is placed in the ON position the supply is connected as follows:—

(1) To terminal 2 of the transmit relay No. 646.

(2) To contact 2 of the START switch.

62. When the START switch is operated momentarily to the ON position the following action occurs:—

(1) The indicator lamp will light to show that a supply is connected via terminal 1 of relay 646 to energise its operating coil.

(2) Closing of relay contacts 646-1 will complete the holding in supply at terminal 2.

(3) Closing of relay contacts 646-2 will complete an earth return to the press-to-talk circuit and the set in use will start transmitting.

(4) Closing of relay contacts 646-3 inserts:—

(*a*) The tone network in the circuit of the modulator stage thus causing tone modulation of the transmitted signal.

(*b*) The 27 kilohm resistor in series with the V.H.F. volume control.

63. When the START switch is released to the OFF position the following conditions will result:—

(1) The operating coil of the transmit relay No. 646 will continue to be energised by the holding in supply across its No. 1 contacts.

(2) The lamp will continue to be illuminated also by this supply.

(3) The tone transmission will continue until the bomb firing switch is operated.

64. When the bomb firing switch is operated the following action will take place:—

(1) A supply will be fed from fuse 165 on panel 4P via the bomb firing switch and TB 161 (C), also on 4P, to energise the coil of the stop relay No. 647.

(2) Opening of relay Contacts 647-1 will disconnect the earth return of the press-to-talk circuit and the tone transmission will stop. At the same time the earth return of the supply to the coil of relay No. 646 will be disconnected and the coil de-energised.

(3) Opening of relay contacts 646-1 will disconnect the holding in supply to the coil.

(4) Opening of relay contacts 646-2 will disconnect the press-to-talk circuit from the earth terminal of the relay.

(5) Opening of relay contacts 646-3 withdraws the tone network from the modulator stage. At the same time the 27 kilohm resistor is "shorted out" of the V.H.F. volume control circuit.

The V.H.F. facilities will then have reverted to normal.

65. When the bomb firing switch is released relay contacts 647-1 will close and reconnect the earth terminal of relay 646 to earth. This action puts the circuits ready for further use. Operation of the START switch to ON will cause the cycle to be repeated as required. On completion of operations the master switch should be placed in the OFF position.

A.R.I. 23023

66. The equipment installed to meet the requirements for automatic direction finding is known as A.R.I.23023. The system is controlled from the plotter navigator's station, and consists of the following major components:—

Receiver	Type AD7092D
Sense amplifier	Type 1628
Loop controller	Type 1342
Control unit	Type 1274
Bearing and turning indicators (2)	Type 1630
Aerial transformer	Type 1343
Power factor transformer	Type 1571
Junction box	Type 1629
Voltage regulator	Type 1555A
Loop aerial	Type 1324A

67. The installation provides the following facilities:—

(1) Automatic relative bearing indication from the source of radio signals.

(2) Aerial relative bearing determination by null signal method, the loop aerial being remotely controlled.

(3) Aural reception of modulated or unmodulated radio signals, either by loop or sense aerial.

(4) Radio range reception.

68. The receiver and the loop aerial are both remotely controlled from the plotter's station, the control system being entirely electrical. Descriptive and servicing details for the complete installation are contained in A.P. 2883K.D, Vol. 1.

Controls

69. The bulk of the A.D.F. equipment is installed in suitable mounting trays in a compartment above the fuselage tank bay. This equipment includes the receiver, junction box, power factor and aerial transformers, and the voltage regulator. The loop controller and receiver controller are installed on the navigation panel at the plotter's station. A bearing indicator is fitted to the plotter's panel and a repeater indicator is fitted to the second pilot's panel. The suppressed loop aerial is installed in the bomb bay and the sense amplifier at the aft end of the bomb bay. A component location illustration is contained in fig. 7.

Plotter's controls

70. The receiver control unit, Type 1274, is mounted on the navigator's panel just below the plotter's panel. This unit permits full remote control of the receiver, and incorporates an illuminated tuning scale calibrated in frequency. The following controls are provided:—

System switch
Frequency range switch
RT C/W selectivity switch
Tuning control
Gain control
Light switch

Two spare dial lamps are included on the unit.

71. The loop controller, Type 1342, is fitted to the plotter's panel at the navigation station and provides for remote rotation of the loop aerial when aerial D.F. is employed.

Receiver equipment

72. The equipment installed in the fuselage tank bay consists of the receiver, aerial and power factor transformers, voltage regulator and junction box. The units are attached to suitable mounting trays fitted with quick release fasteners. Cable connections to the units are made by engaging the plugs and sockets at the rear of the individual units with the respective backplate plugs and sockets attached to the mounting trays. All the mounting trays are equipped with anti-vibration mountings.

Receiver unit

73. The receiver, Type AD7092D, is a complete unit, fitted in a light alloy case. A

TABLE 5
Connectors for A.R.I.23023

Ref. No.	Connecting between
10HB/3001	Loop aerial Type 1324A and RPB plug 177
3002	" " " " " " " 130
3003	" " " " " JB. Type 1629 (DM/A)
3004	" " " " " Recvr. Type AD.7092D (DK/DL)
3005	Recvr. Type AD.7092D (DR) and TB 381 (E)—TB 384 (B)
3006	" " " (DM) and JB Type 1629 (DM)
3011	" " " (DT) and Volt reg. Type 1555A (M)
3012	" " " (DU) and PF Transformer Type 1571 (DU)
3015	RPB plug 177 and TB 1000 (A.B.C.D & E)—TB.1001 (B)
3016	Navs. Ind. Type 1630 & T.B.1000 (A.B.C.D.&E)—TB.1001 (A)
3017	Pilot's Ind. Type 1630 and TB.1000 (A.B.C.&D.)—TB.1001 (A & B)
3018	Loop Controller Type 1342 (DN) and RPB plug 130
3201	Receiver Type AD.7092B (DW) and RPB plug 129
3202	Control unit Type 1274 (DW) and RPB plug 129
21/T.4096	P.F. Transformer Type 1571 (FQ) and TB.1005 (A&B)
22/T.4096	Volt Reg. Type 1555A (EX) and TB.1005 (E&D)
*23/T.4096	RPB plug 112 and Voice range filter
*24/T.4096	Receiver Type AD.7092D (DS) and RPB plug 112

* Post Mod. 428

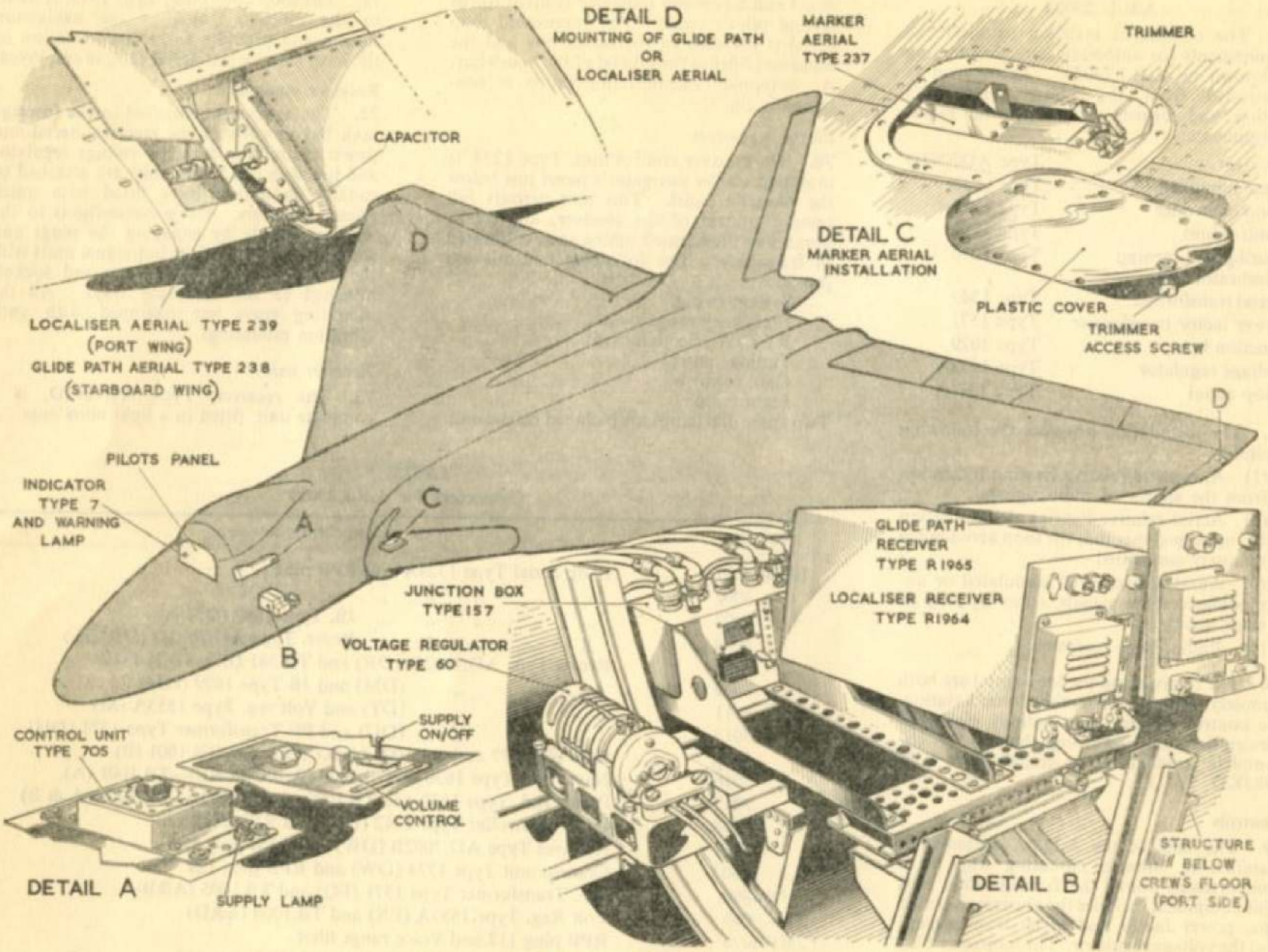


Fig. 8. A.R.I. 18011

small rotary transformer is fitted to the rear of the receiver case for H.T. supply. Motors for driving the tuning condensers and control switches are mounted on the front of the unit, and are accessible by removing the covers on the front panel. The aerial transformer, Type 1343, is secured to the back plate of the receiver, and serves to match the impedance of the co-axial aerial cable to the input circuits of the receiver.

Power factor transformer

74. This unit, Type 1571, is installed adjacent to the receiver unit, and is provided to improve the power factor of the load on the a.c. supply to the receiver. The junction box, Type 1629, serves to form a connection point between the sense amplifier, Type 1628, and the receiver installation. A voltage regulator, Type 1555A, is provided to ensure a regulated d.c. supply of 19 volts to the receiver unit.

Aerial system

Loop aerial

75. A suppressed, remotely controlled loop aerial, Type 1324, is fitted amidships in the roof of the bomb bay. The loop is wound on a former around an iron core, the complete assembly is contained in a shallow tray which is recessed into the roof of the aircraft bomb bay.

76. The loop shaft is supported in suitable bearings on a chassis beneath the loop baseplate, electrical connection to the loop being by means of slip rings on the shaft and silver-faced brushes in holders attached to the chassis. A 2-phase a.c. motor drives the loop through a suitable reduction gear train.

Sense aerial and amplifier

77. The installation utilizes a Type 7121 wide band aerial which is installed and used primarily for the A.R.I.18064 (V.H.F.) purposes. The aerial is located in the upper leading edge structure of the fin and is connected to the sense amplifier via a filter. This filter prevents the V.H.F. signal voltages from reaching the A.D.F. circuit. The sense amplifier Type 1628 is located on the forward face of the bomb bay rear bulkhead.

Power supplies

78. A.C. and d.c. power supplies to the installation are obtained from fuses in 11P at the navigation station, via terminal blocks 591 and 592 in 2J on the front spar.

79. The a.c. supply at 115 volts 400 cycles is obtained from the blue phase of inverter No. 3, via fuse No. 265 in 11P. Further details of the No. 3 inverter supplies are contained in Sect. 5, Chap. 1, Group 3, of this publication. D.C. supply is obtained from the 28 volt aft bus-bars via fuse 216 in 11P.

A.R.I.18011

80. An installation known as A.R.I.18011 (I.L.S.), is provided as a landing approach aid. The system is under the control of the first pilot, the following major components are employed in the system:—

Localiser marker receiver	Type R1964
Glide path receiver	Type R1965
Control unit	Type 705
Junction box	Type 164
Junction box	Type 157
Indicator	Type 7
Warning lamp	Type B
Marker aerial	Type 237
Aerial bollards (2)	Type 228
Localiser aerial	Type 239
Glide path aerial	Type 238
Voltage regulator	Type 60
Switch	Ref. No. 5C/4184
Volume control	Type 11

81. The Instrument Landing System (I.L.S.) provides a radio guide along a prescribed path to a runway, and enables the aircraft to descend to a low altitude without sight of the ground. Thus, in conditions of bad visibility, a successful approach can be made to a point at which sight of the ground, or landing lights, will permit a landing to be made.

82. The signals produced by the localiser and glide path receivers are particularly suited for the operation of automatic following devices, and these signals are fed to the automatic pilot installation via a suitable coupling unit. This permits automatic let-down to be carried out to within about 15 ft. of the ground. Descriptive and servicing

TABLE 6

Connectors for A.R.I.18011

Ref. No.	Cableform	Connecting between
10HB/208	Dumetvinsmall 2·5	J.B. Type 164 (M.L.) and TB596 (D&E)
10HA/14208	12 Metvinsmall 2·5	J.B. Type 164 (J.B.) and JB Type 157 (12P7)
10HB/254	12 Metvinsmall 2·5	J.B. Type 164 (IND.) and Indicator Type 7
10HA/14207	Sextometvinsmall 2·5	Control unit 705 & JB Type (12P5)
10HA/14216	Uniradio 43	Control unit 705 & JB Type 157 (12J2)
10HA/14217	Uniradio 43	Control unit 705 & JB Type 157 (12P6)
10HA/14205	Quadrametvinsmall 16	JB Type 157 (12P1) and TB 396 (A,C,D,&E)
10HA/14206	Quadrametvinsmall 16	JB Type 157 (12P8) and TB 396 (A,C,&D)
10HB/207	Dumetvinsmall 2·5	JB Type 157 (12P3) and TB 1006 (A & B)
10HA/14213	Uniradio 67	Receiver Type 1965 and RPB plug 187
10HA/14214	Uniradio 67	Receiver Type 1964 and RPB plug 508
10HA/14215	Uniradio 67	Receiver Type 1964 and RPB plug 175
10HB/36	Uniradio 67	RPB plug 175 and S.M. aerial Type 237

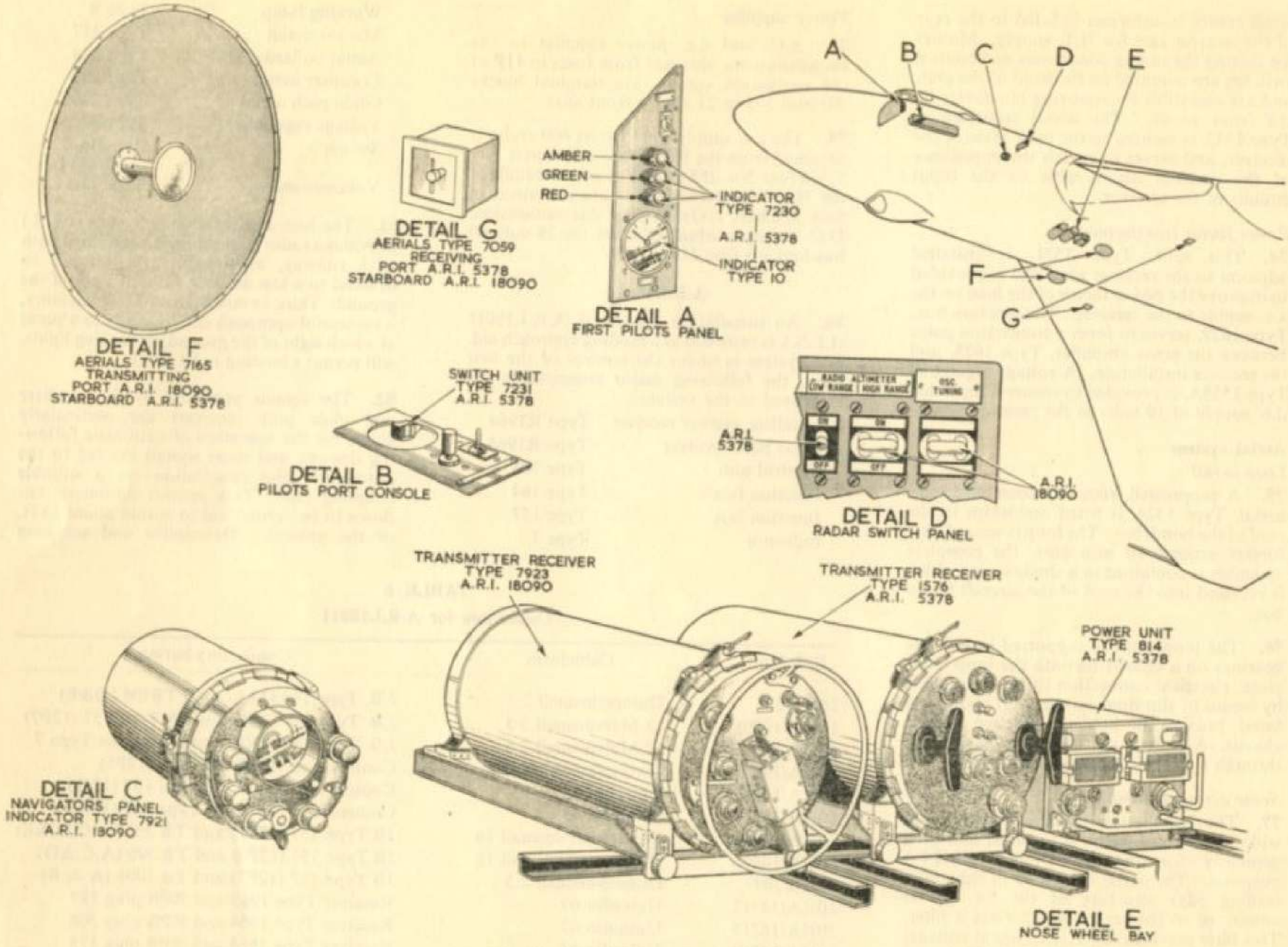


Fig. 9. A.R.I.5378 and A.R.I.18090

information for the I.L.S. installation is contained in A.P.2534E, Vol. 1, and a brief description of the installation as fitted to the Vulcan aircraft are contained in the following paragraphs.

Controls

83. The localiser and glide path receivers along with the junction box are located beneath the crew's floor on the port side of the cabin. The receivers are fitted side by side in a twin mounting tray, the back plate of the tray housing the junction box, Type 157. Four locating pins project from the front of the junction box to ensure that the receivers fit exactly to the box, and the plugs and the sockets align with their counterparts on the receivers.

Pilots' station

84. The control unit, Type 705, is located on the port console, and is used by the first pilot. The unit contains the localiser and glide path receiver local oscillator circuits, and the channel selector switch. A red lamp is mounted on the front panel of the unit and indicates when the supply to the installation is on.

85. 24 crystals are fitted on a socket panel on the front face of the control unit. The crystal selector switch is fitted behind the panel. A cover, Type 924, fits over the crystals in normal use; the switch control knob, together with a coupling shaft, are integral with the cover. The switch positions are identified by the letters A to L engraved on the front of the cover.

86. A volume control Type 11 is located on the port console forward of the control unit Type 705. This control in conjunction with a resistor network mounted underneath the console, regulates the strength of the I.L.S. signals passed to the I/C amplifier.

87. The system provides two visual indications both located on the second pilot's instrument panel. One is a Type 7 indicator which displays the I.L.S. signals deriving from the glidepath and localizer receivers by means of two pointers and two flags. The other is a warning lamp Type B which displays the signals deriving from the marker receiver. Location of all the components employed in A.R.I.18011 is given at fig. 8.

Power supply

88. 28 volt d.c. power supply to the I.L.S. installation is obtained from the aircraft busbar circuit breaker No. 8 on 3P. The supply is controlled by a single-pole ON-OFF switch situated on the port console. After the switch the supply is fed to the receiver units at 28 volts for rotary transformer operation giving 200 volts for H.T. The 28 volt supply is also fed to a voltage regulator Type 13 fitted adjacent to the receivers. The voltage regulator serves to maintain the L.T. supply to the receivers at constant potential of 19 volts.

Aerial system

89. Three aerials are fitted for the I.L.S. installation. These aerials are all of the suppressed type and consist of:—

Marker aerial	Type 237
Glide path aerial	Type 238
Localiser aerial	Type 239

Marker aerial

90. The marker aerial, Type 237, consists of a shaped strip of silvered metal, nine inches long, fitted in a shallow dish. One end of the metal strip is connected physically to one side of the dish, the other end of the strip is connected, via a loading capacitance, to the other side of the dish. The unit is installed on the lower surface of the fuselage aft of the nose wheel bays. A plastic cover is fitted over the aperture, and a screwed plug is fitted in the cover to provide access to the loading capacitance for adjustment purposes.

91. The marker aerial is horizontally polarised and its field of reception is mainly vertically downwards as is required for the reception of marker beacons. The aerial can be tuned by means of the preset trimmer to resonate at a frequency of 75 Mc/s. Descriptive details of the marker aerial, Type 237 are contained in A.P.2543E, Vol. 1, Part 1, Chap. 5.

Localiser and glide path aerials

92. The localiser and glide path aerials are built into the port and starboard wing tips. The localiser aerial, Type 239, is tuned to resonate at a frequency of 108 to 112 Mc/s, and the glide path aerial, Type 238, at 329-335 Mc/s. Whilst termed "aerials", they are in fact devices for tuning "notches" or apertures in the skin of the aircraft to resolve the current flow induced in the skin by ground transmission. The aerial feeders are connected to bollards, Type 228, located one in each main wheel bay. A location of the I.L.S. aerials is contained in fig. 8.

A.R.I.5378

93. This installation employs a frequency modulated reflected wave technique to provide the 1st Pilot with two height indications. One is the measured height of the aeroplane above the terrain immediately beneath through a range of 50-5000 ft. The other is a comparison of the measured height with a pre-selected height through a limited range of 50-1000 ft. The preselection of the limit height is made by the pilot and the on/off switch for the installation is operated by the navigator. A component location diagram is given at Fig. 9 and a routing chart at Fig. 16. This description and the illustrations refer to aircraft where the aerials have been rearranged in accordance with S.T.I.30, the following limitations are therefore to be observed:—

(1) *No reliance can be placed on the readings when the angle of bank of the aircraft is greater than* 20°.

(2) *No reliance can be placed on the readings obtained when the A.R.I.*18090 *is switched on.*

(A.L.34, Jan. 59)

94. The equipment consists of the following items:—

Power unit	Type 814
Transmitter receiver unit	Type 1576
Mounting assembly	Type 1033/1
Aerial unit	Type 7059
Aerial unit	Type 7165
Switch unit	Type 7231
Indicator electrical	Type 7230
Indicator electrical	Type 10

Inter-unit connection

95. Connection between the various units of the installation is made by fitting the connectors listed at Table 7 in accordance with the routing chart. On aircraft where Mods. 463 is embodied some connector references change as shown.

Power supply

96. A 28-volt d.c. supply is fed to the power unit from fuse 22 on panel 11P via contacts 1 and 2 of the ON-OFF switch labelled RADIO ALTIMETER-LOW RANGE on panel 12P and terminal A of TB.647. This TB is fitted at the forward end of a radio crate located on the starboard side of the nose wheel bay.

Power unit Type 814

97. The power unit Type 814 is installed on the aft end of the radio crate. It produces a low value stabilised D.C. voltage and H.T. voltage for the circuits of the T.R. unit. On aircraft where Mod. 285 is embodied the power unit is moved from a position immediately forward of the T.R. unit to a position immediately aft.

Transmitter/receiver unit Type 1576

98. A transmitter receiver unit Type 1576 is installed in a mounting assembly Type 1033/1, on the radio crate adjacent to the power unit. The unit is built into a pressurized container as a protection against conditions at higher altitudes. It consists of the various circuits necessary to produce, receive and compare the measuring wave. The unit also produces the reference voltages which are necessary to operate the limit height indicator. The measured height output is applied to a height indicating meter, the reference voltage is applied to the limit height selector switch.

Aerials

99. The system employs two aerials, one for transmitting and the other for receiving the measuring wave. The transmit aerial is a Type 7165 installed on the starboard underside of the aeroplane. The receive aerial is a Type 7059 installed on the port underside of the aeroplane.

Indicator electrical, Type 10

100. An indicator electrical, Type 10, is installed on the port outer instrument panel at the 1st pilot's station. It is a sealed unit and indicates the measured height in multiples of 1000 on a counter mechanism and subdivisions of 1000 by means of a pointer and circular scale. The scale is indexed every 100 ft. and graduated at 20 ft. intervals. The operational range of the system is 50-5000 ft. At altitudes in excess of 5,000 ft. the counter mechanism will read OFF and the pointer will steady at a scale reading of approximately 400.

Switch unit, Type 7231

101. A switch unit, Type 7231 is installed on the port console at the 1st pilot's station. It is a sealed unit rotary selector switch and is graduated at 50 ft. and then at intervals of 100 from 100 to 1000 ft. inclusive. Operation of this switch to the required setting selects the height in relation to which the measured height is compared. The difference is applied to the limit height indicator and displayed as follows.

Indicator electrical, Type 7230

102. An electrical indicator, Type 7230, is installed on the port outer instrument panel at the 1st pilot's station. It is located immediately above the measured height indicator. It consists of three lamps coloured amber, green and red which are mounted vertically in that order from the top.
The lamps are illuminated in conjunction with height setting on the selector switch and indicate that the measured height relative to the limit height is as follows:—

Amber—"Above limit height" (more than 15 ft.)
Green —"On limit height" (± 15 ft.)
Red —"Below limit height" (more than 15 ft.)

TABLE 7
Connectors for A.R.I.5378

Ref. No.	Cableform	Connecting between
10HA/14551	Sextometvinsmall 2·5	Indicator Type 7230 and Switch Unit Type 7231
10HA/14247	12 Metvinsmall 2·5	Switch unit Type 7231 & RPB plug 173
10HA/14246	12 Metvinsmall 2·5	RPB plug 173 and Trans. Receiver Type 1576
10HA/14243	12 Metvinsmall 2·5	Indicator Type 10 & RPB plug 172
10HA/14242	12 Metvinsmall 2·5	RPB plug 172 & Trans. Receiver Type 1576
10HA/14201	Uniradio 65	Trans. Receiver Type 1576 (TX) & (RX) Stbd. Ac. Type 7165
*10HB/283	Uniradio 21	Trans. Receiver Type 1576 (RX) & Port Ar. Type 7059
*10HB/1209	Quadrometvinsmall 16	Trans. Receiver Type 1576 & P.U. Type 814
*10HB/210	Dumetvinsmall 16	P.U. Type 814 and TB 647 (A) & (B)

* Pre Mod. 463 Con. Ref. { 10HB/283 was 10HA/14248; 10HB/209 was 14/T3407; 10HB/210 was 15/T3407

By suitable arrangement of a relay circuit the occurrence of a failure in the supply to the power unit will cause the red and amber lamps to show simultaneously. A full description of the components, circuit, operation and servicing of the installation is contained in A.P.2533H, Vol. 1, Parts 1 & 2.

A.R.I.18090

103. This installation employs a pulsed radar technique to provide the navigator with a height indication. This consists of the measured height of the aeroplane above the terrain, immediately beneath, through a range of 500 to 50,000 ft. The on/off and remote tuning switches are operated from the rear crew station. A routing chart of the aircraft installation is given at Fig. 17 and should be used in conjunction with the following paragraphs. A component location diagram is given in fig. 9.

104. The equipment consists of the following items:—

Transmitter receiver unit	Type 7923
Mounting assembly CRT.	Type 1032
Aerial unit	Type 7165
Aerial unit	Type 7059
Indicating unit	Type 7921

Inter unit connection

105. Connection between the various units of the installation is made by fitting the connectors listed at Table 8 in conjunction with the routing chart.

Power supplies

106. Power supplies are fed to the installation as follows:—

28 *volt D.C.*

(1) Oscillator tuning unit from C.B.73 on panel 4P via contacts 6-3 or 4-1 of the change over switch 5CW/5832 labelled OCS.—TUNING on panel 12P and terminals A and B of TB.1205. The tuning unit is attached to the front of the transmitter receiver, TB.1205 is located at the forward end of radio crate in the nose-wheel bay.

(2) Transmitter receiver unit from CB.73 on panel 4P via. contacts 5-4 of the ON-OFF switch 5C/4198 labelled RADIO ALTIMETER-HIGH RANGE on panel 12P and terminal D of TB.676, adjacent to TB.1205.

115 *volt* 1600 *c/s A.C.*

Transmitter receiver unit from fuse 269 on panel 11P via contacts 2-1 of the ON-OFF switch 5C/4198 labelled RADIO ALTIMETER-HIGH RANGE on panel 12P and terminal A of TB.676.

Transmitter/receiver unit, Type 7923

107. A transmitter/receiver unit Type 7923 is installed in a mounting Type 1032 on the radio crate, in the nose-wheel bay. On aircraft where Mod. No. 258 is embodied the T.R. unit is moved from a position immediately forward of the power unit for the Mk. 5 radio altimeter to a position immediately forward of the T.R. unit for the Mk. 5 installation. The unit is built into a pressurized container as a protection against conditions at higher altitudes. It consists of the various circuits required to produce and receive the measuring pulse. The resulting height information is applied to a C.R.T. indicating unit and displayed as a distance between two deflections of the oscilloscope trace.

Aerials

108. The system employs two aerials, one for transmitting and the other for receiving the measuring pulse. The transmit aerial is a Type 7165 installed on the port underside of the aeroplane. The receiving aerial is a Type 7059 installed on the starboard underside of the aeroplane.

Indicating unit, Type 7921

109. An indicating unit Type 7921 is installed on the navigator's radar panel. A selector switch mounted on the front of the unit permits the scale markings on the tube to be used over ranges of 0-5,000 ft. or 0-50,000 ft. whichever is required. A full description of the components circuit, operation and servicing of the installation is given in A.P.2533G, Vol. 1, Chap. 5.

A.R.I. 18051

110. Twin installations are employed to provide an airborne radio counter-measure. They are operated from the rear crew station.

Mod. 10 introduces the fixed fittings and

TABLE 8

Connectors for A.R.I.18090

Ref. No.	Cableform	Connecting between
10HA/17667	12 Metvinsmall 2·5	Indicating unit Type 7921 & RPB plug 201
10HA/17666	12 Metvinsmall 2·5	RPB plug 201 & Trans. Receiver unit Type 7923
10HA/14204	Uniradio 70	Indicator unit Type 7921 and RPB plug 183
10HA/14203	Uniradio 70	RPB plug 183 & Trans. Receiver Type 7923
10HA/14202	Uniradio 65	Trans. Receiver Type 7923 (TX) & Port Aerial Type 7165
*10HB/284	Uniradio 21	Trans. Receiver Type 7923 (RX) & Stbd. Aerial Type 7059
10HB/14200	Quadrometvinsmall 2·5	Trans. Receiver Type 7923 & TB 676
10HB/98	Unipren 6 (2 off)	Trans. Receiver Type 7923 & TB 1205

* Pre. Mod. 463 Con. Ref. 10HB/284 was 10HA/14249

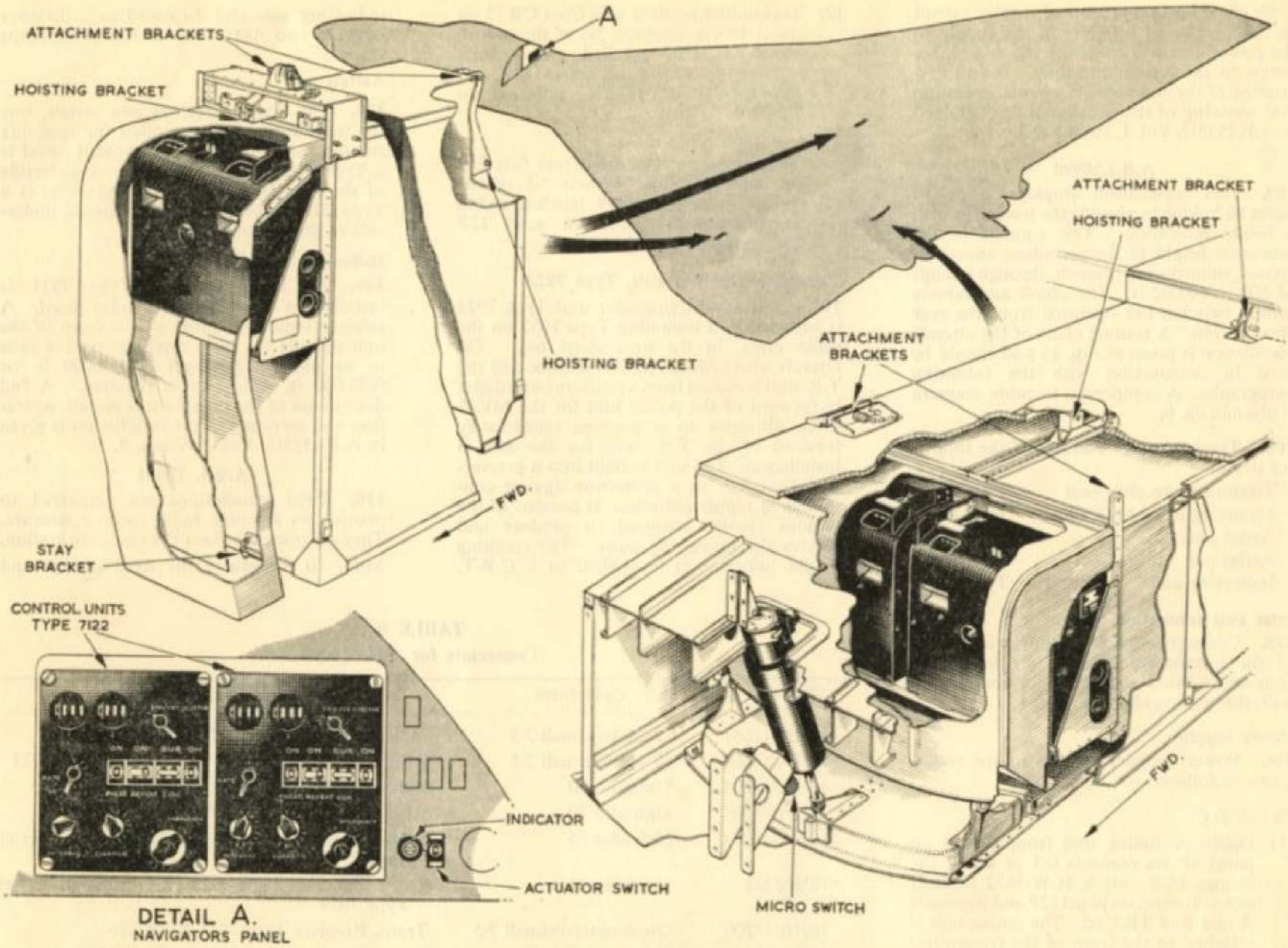


Fig. 10. A.R.I.18051

Mod. 11 introduces the removable fittings which under normal use conditions consist of:—

(1) The forward port and starboard container magazines with their associated stripper units attached, and the two detachable chutes.

(2) The aft combined port and starboard container magazine with the two stripper units and the common chute attached.

A routing chart of the aircraft installation is given at Fig. 18 and should be used in conjunction with the following paragraphs. A component location diagram is given in fig. 10.

111. The equipment consists of the following items:—

Control units (2)	Type 7122
Stripper units (4)	Ref. No. 10AS/460
Suppressors (2)	Type B4
Suppressors (4)	Type O2
Relays (2)	Type S1
Switch single pole	Ref. No. 5C/4184
Acutator	Type AO113L
Micro switch	Type C1831Y Mk. 1
E.M. indicator	Type A2 (28 volt)

Power supplies

112. 28 volt D.C. supplies are fed to the installation from fuse 225, 226 and 227 on panel 11P and fuses 615, 616, 617, 630 and 631 on panel 29P, details of the services supplied are given in Table 1.

Control units, Type 7122

113. The two control units, Type 7122, are mounted on the navigation plotters panel at the rear crew station. Each unit provides the selection, on/off switching and variable control of two stripper units. The control unit on the left facing the panel operates the starboard forward and aft units, that on the right operates the port forward and aft units.

Stripper units

114. The four stripper units are located as follows. The two forward units in compartments immediately aft of the port and starboard u/c bays, each has a separate container magazine and ejects through a separate outlet. The two aft units are in a compartment below the electrical power compartment, they are attached to a double container magazine and eject through a common outlet. A door is fitted to this outlet, it is operated by a separately controlled actuator Type AO1132 and when opened projects into the slipstream to assist ejection of the material.

Suppressors, Type B4 and O2

115. Two radio interference suppressors Type B4 are fitted, one to the input circuit of each control unit, they are located on the forward face of the R.P.B. at the port side. Four suppressors Type O2 are fitted, one to the input circuit of each stripper unit. Those serving the forward units are adjacent to them, those serving the aft units are installed on the forward outboard face of the port and starboard sides of the dispensing compartment.

Relays, Type S1

116. Two relays Type S1 are installed on panel 29P, one serves to switch a supply to the open or closed coils of the actuator for the aft outlet door. The other relay, when energised, connects the operating supplies to the two aft stripper units.

Actuator control switch

117. A single pole switch Ref. No. 5C/4184 is mounted on the navigators panel adjacent to the control units and labelled OPEN-CLOSE.

Micro switch, Type C1831Y

118. A micro switch Type C1831Y Mk. 1 is installed adjacent to the actuator and operated by the outlet door when it reaches the fully open position. When operated the micro switch connects an energising supply to the stripper unit supplies relay and also to a magnetic indicator. This circuit arrangement prevents material being produced by either of the aft stripper units before the outlet door is fully open.

Magnetic indicator Type A2

119. A magnetic indicator Type A2 (28 volt) is fitted on the navigators panel immediately adjacent to the actuator control switch. It serves to indicate when the door is open and supply available at either aft stripper unit. The indicator will remain energised until the micro switch functions when the door commences to close.

Circuit description

120. The controlling supplies for both installations are fed from fuses 226 and 225, on panel 11P, via suppressors, Type B4, to the port and starboard control units, Type 7122, respectively on the navigators panel. The operating supplies for the two forward stripper units are fed from fuses 616 and 617 on panel 29P via suppressors, Type O2, to the port and starboard units. Selection on the appropriate control unit of the No. 1 stripper, and switching ON will start ejection from the required forward port or starboard outlet.

121. The operating supplies for the two aft stripper units are not completed until the outlet door is in the fully open position, this is accomplished in the following manner:—

(1) On placing the CLOSE-OPEN switch on the navigators panel to the OPEN position a supply is fed from fuse 227 on panel 11P via the switch contacts 1 and 2 to the coil of relay 388 on panel 29P. The closing of contacts 388-3-3a connects a supply from fuse 630 on panel 29P to the "open" winding of the actuator Type AO113 and the door will commence to open.

(2) On reaching the fully open position the door operates a micro switch. This action causes a supply to be fed from fuse 631 on panel 29P via the micro switch contacts 5-6 to the coil of relay 387 on 29P and also to the magnetic indicator on the navigators panel.

(3) The closing of relay contacts 387-3-3a connects the operating supply from fuse 615, via a suppressor, Type O2, to the aft port stripper unit. The closing of

contacts 388-1-1a connects the operating supply from fuse 614 via a suppressor Type O2 to the aft starboard stripper unit.

122. As the energised magnetic indicator will show to this effect, selection on the appropriate control unit of No. 2 stripper and switching on will then cause ejection from the required aft port or starboard unit through the common outlet.

123. On completing the launching operation the ejection of material can be stopped by placing the ON-OFF switch on the appropriate stripper control unit to the OFF position. The magnetic indicator will remain energised however to show the door open until the actuator control switch is placed to the CLOSE position.

124. The following action then occurs:—

(1) Relay 388 becomes de-energised and the opening of contacts 388-3-3a disconnects the supply to the OPEN winding of the actuator. A supply is fed instead from fuse 630 via the normally closed contacts 388-2-2a to the close winding of the actuator and the door will commence to close.

(2) As the door moves from the fully open position the micro switch will function to disconnect the energising supply to the magnetic indicator and Relay 387.

(3) The opening of relay contacts 387-1-1a and 387-3-3a will disconnect the operating supply from the input terminals of the two aft stripper units. The magnetic indicator will become de-energised.

A full description of the components, circuit, operating, loading and servicing of the basic installation is contained in A.P.4343X, Vol. 1, Sect. 22, Chap. 1.

SERVICING

Precautions

125. Servicing personnel in particular are warned that A.C. or D.C. voltages in excess of 100 can become dangerous under certain conditions, to the extent of causing personal injury, fatal or otherwise and/or damage to equipment. It is essential therefore that the utmost attention be given to servicing instructions concerning safety of either a general or particular application. It is equally essential that the maximum co-operation be employed between trades mutually concerned in servicing operations whether of an installed or removable nature.

General

126. In addition to the detailed setting-up, operating and servicing instructions for the various installations and their components promulgated in the relevant A.P.'s or elsewhere the following periodic checks should be made:—

(1) Security of components and their mountings.

(2) Security of all plug and socket, terminal block, fuse holder and bonding point connections.

(3) Insulation and continuity resistance checks throughout the permanent wiring and fixed connectors.

Aerials

127. The Vulcan Mk. 1 aeroplane is equipped throughout with suppressed aerials. Servicing of these aerials consists of the following periodic checks:—

(1) Security of attachment to the aeroplane structure.

(2) Security of attachment of connectors.

(3) Freedom from corrosion.

A.R.I. A.1961

128. Periodic aural checks should be made for correct functioning of the various selector switches and overall freedom from extraneous noise. Component servicing instructions are contained in A.P.2876E, Vol. 1, Part 2. A check should also be made periodically that the D.C. input at P.L.1 on the amplifier is not less than 24 volts.

Sockets Type 359

129. In addition to periodic checks for security of connections at the terminal blocks the strain cords should be examined for security, correct operation and freedom from wear. Where operating conditions tend to cause ingress of moisture this should be safeguarded against.

A.R.I.5874

130. Setting up, operating and servicing instructions for the installation and its components including the pressurized aerial system are contained in A.P.2535E, Vol. 1, Parts 1, 2 and 3. A periodic check should be made that the d.c. input to the installation at CB.83 is 28 volt. The C.B. is located on the right hand panel at the signallers station.

A.R.I.18064

131. Servicing instructions for the installation and its components are contained in A.P.2528P, Vol. 1, Parts 1, 2 and 3. A periodic check should be made that the D.C. input to the installation is 28 volts at the following points:—

Pin B of P.L.1 on the control unit Type 9166.

TB.683(A) on the 1st Pilot's control column.

TB.686(B) on the 2nd Pilot's control column.

TB.363(D) on panel 51P.

TB.364(E) on panel 51P.

No. 2 contact on the forward ON/OFF simulator tone switch adjacent to 9P.

TB.161(C) on panel 4P with the bomb firing switch depressed.

A.R.I.23023

132. Servicing instructions for the installation and its components are contained in A.P.2883D, Vol. 1. A check should be made periodically to ensure that the input supplies are as follows:—

A.C. 115 volts between TB.591(A) and (C).

D.C. 28 volts between TB.591(D) and TB.592(A).

both TB.'s are positioned in junction box 2J on the front spar.

A.R.I.18011

133. The servicing instructions for the components of this installation are contained in A.P.2534E, Vol. 1. The d.c. input to the system should be checked to ensure that 28 volt is being fed to contact No. 1 of the ON/OFF switch on the port console 6P.

A.R.I.5378

134. Servicing instructions are contained in A.P.2533H, Vol. 1. The d.c. input to the system should be checked periodically at TB.647(A) in the nose wheel bay to ensure that it is 28 volt.

A.R.I.18090

135. Servicing instructions for this installation are contained in A.P.2533G, Vol. 1. The power supplies to the installation can be checked periodically as follows:—

28 volt d.c.
Between TB.676(D) and (E).
TB.1205(A) and (B).

115 volt a.c.
Between TB.676(A) and (C).

both TB's are located in the nose wheel bay.

A.R.I.18051

136. Servicing instructions on the basic installation are contained in A.P.4343X, Vol. 1, Sect. 22. The 28 volt d.c. inputs to the system should be checked periodically as follows:—

Pin A of the input socket on both Control units Type 7122 mounted on the navigator's panel.

Contact No. 2 on the actuator control switch also on the navigator's panel.

Pin A of the input socket of both the forward stripper units.

Terminal 2 of relay No. 388 on panel 29P.

Terminals 1 and 3 of relay No. 387 also on 29P.

Terminal 5 of the micro switch mounted near the actuator door.

Actuator Type AO.113

137. Servicing instruction for the actuator are contained in A.P.4343D, Vol. 1, Book 3.

Micro switch setting

138. The position of the micro switch relative to the actuator door when fully open is adjusted on initial installation. This adjustment provides ·125 in. minimum movement and should not require further attention.

REMOVAL AND ASSEMBLY

General

139. Access to the majority of components is straightforward. The following points however, should be observed when it is necessary to remove and replace equipment. Loose connectors should be stowed safely to prevent damage or electrical faults. Unless otherwise stated the replacement procedure is the reverse of that for removal. When replacing equipment care should be taken that the connectors are replaced in accordance with the appropriate routing chart.

A.R.I. A.1961

Amplifier, Type A.1961

140. The amplifier is installed in a standard S.B.A.C. rack. It is removed by disconnecting socket S.1 and Plugs P1 and P2 from the front panel, unscrewing the knurled nut securing the handle and the unit to the rack and withdrawing the unit. On replacing the unit care should be taken to ensure that the locating dowels at the rear are properly engaged.

A.R.I.5874

Equipment under navigator's table

141. The following items are installed in standard S.B.A.C. racking:—

Selector Unit Type 7003

Control Unit Type 4190

Receiver Unit Type 4187

Voltage regulator Type 228

Power and Radio Unit Type 4192

Transmitter Unit Type 4188

They are removed by unscrewing the knurled nut securing the unit and the handle to the rack and withdrawing the unit. On replacing the units, care should be taken that the locating dowels engage properly in order to align the Jones type plugs and sockets at the rear of the units with those on the rack.

Equipment on navigator's panel

142. The following items are flush mounted on the panel:—

Aerial Control Unit Type 7216

Remote Control Unit Type 4189

They are removed by reaching upwards behind the panel to unscrew the connectors at the rear, removing the four corner securing screws will then allow the units to be withdrawn.

Aerial tuning unit Type 7016

143. Access to the tuning unit is obtained through an aperture at the aft end of the bomb bay roof. The removal procedure is as follows:—

(1) Disconnect the two plugs and sockets 15AB and 15AC and the two bonding strips at the base of the unit. The bonding strips securing nut should be replaced in order to prevent the weight of the end cover being taken by the pins of the connectors.

(2) Disconnect the two bonding strips from the aft terminals at the top of the unit.

(3) Remove the ¼ B.S.F. securing nut at the base of the carriage and allow the unit to slide down approx. nine inches to rest on the stops.

(4) Break the locking wire of the four quick release clamps which secure the unit to the carriage.

(5) Holding the unit firmly with one hand unfasten the quick release clamps and remove the unit.

When replacing the unit care should be taken to slide it into the carriage so that the aerial coupling at the top of the unit engages correctly.

Matching unit Type 7949

144. Access to the Matching Unit is obtained by removing the dielectric cover of the H.F. aerial cavity at the base of the fin. Then proceed as follows:—

(1) Disconnect the five tuning connections from the matching unit.

(2) Through the same access aperture as for the tuning unit above, disconnect the three plug and socket connections from the matching unit and unscrew the four 2BA nuts securing the Unit mounting plate to the structure. The Unit can then be withdrawn through the fin aperture.

A.R.I.18064

Control unit Type 9116

145. To remove the control unit from the port console unscrew the four 4BA securing screws and withdraw the unit sufficiently to release the connectors at the rear.

Transmitter/receivers, Type 1985 and 1986

146. Access to the two transmitter-receivers is obtained through the rudder motor compartment and the removal procedure is as follows:—

(1) Remove the waterproof covers.

(2) Disconnect all plugs and sockets from the front of each set.

(3) Unscrew the knurled retaining screws and remove the T.R. from its crate.

A.R.I.23023

Equipment at navigators' station

147. The following items are installed on the navigator plotters' panel:—

Relative bearing indicator Type 1630
Loop controller Type 1432

Removal is as follows:—

(1) Unscrew the four securing screws at the top edge of the panel and lower it to the extent of the check straps.

(2) Release the connectors at the rear of the unit and return the panel to its normal position.

(3) Remove the perspex front of the panel.

(4) Remove the four securing screws and withdraw the unit from the panel.

148. The control unit Type 1274 is positioned immediately below the plotters' panel. To remove the unit unscrew the four securing bolts and withdraw it sufficiently to release the connector at the rear.

2nd pilot's indicator Type 1630

149. Access to release the connector at the rear of the indicator is obtained by lowering the pilots' centre panel. Removing the four securing screws will then allow the unit to be withdrawn.

Equipment above No. 2 tank

150. Access to the following components is obtained through an aperture at the forward end of the bomb bay roof:—

Receiver, Type AD.7092D
Voltage regulator, Type 155A
Power factor transformer
Junction box

To remove the receiver unscrew the knurled nut securing the handle and the unit to the crate and withdraw the unit. To remove the remaining three items unscrew the Jones type connectors at the rear and the two diagonally displaced 2BA securing screws at the front. The units can then be taken from their mountings.

Loop aerial

151. The loop aerial is removed by unscrewing the five Jones type connectors at the unit and the twelve 2BA bolts securing the mounting plate to the aeroplane structure.

A.R.I.18011

Equipment at pilots' station

152. To remove the control unit, Type 705, from the port console unscrew the four securing screws and withdraw the unit sufficiently to free it by removing the connector at the rear.

153. Access to disconnect the 2nd pilot's indicator, Type 7, is obtained by reaching upwards behind the lower edge of the panel on which it is mounted. Unscrewing the four retaining screws then allow the unit to be withdrawn.

Equipment under crews floor — port side

154. To remove the receivers, Type 1964 and 1965, disconnect the aerials from the front of the set, unscrew the wing nut securing the handle and the set to the crate and withdraw the set.

A.R.I.5378

Equipment at pilot's station

155. To disconnect the 1st pilot's indicator, Type 10, access is obtained by reaching upwards behind the instrument panel. Removal of the four retaining screws then allows the unit to be withdrawn.

156. The limit height switch, Type 7231, is removed by unscrewing the screws securing it to the port console. The unit should then be withdrawn sufficiently to allow the connectors at the rear to be removed.

Equipment in the nose wheel bay

157. The components located in this bay consist of:—

Transmitter-receiver Type 1576
Power unit Type 814

They are removed by unscrewing all connectors from the front panel in each case and the retaining nuts or bolts as applicable. On replacing the equipment care should be taken that in the case of the T.R. the locating dowels engage properly. In the case of the P.U. a locating lip is provided at the rear of the chassis and it is equally essential that this should be properly entered.

A.R.I.18090

Transmitter/receiver, Type 7923

158. Removal of the T.R.7923 located adjacent to the T.R.1576 is as for the T.R.1576 (*para.* 157).

Indicator, Type 7921

159. Removal of this unit from the navigators panel consists of detaching the connectors from the front cover of the unit and undoing the knurled nuts, securing the mounting to the panel.

A.R.I.18051

Forward dispensing units (Port and Starboard)

160. When the magazine containers, the stripper units and the appropriate chutes are assembled they can more readily be referred to as dispensing units. The following procedure details the operations for installing the loaded dispensing units in the aircraft:—

(1) Release the fasteners securing the access door which is hinged to the rear u/c bulkhead.

(2) Remove completely the detachable skin panel which lies immediately aft of the access door. From this panel remove the blanking cover of the chute outlet.

(3) Position the dispensing unit, less chute, stripper unit forward and uppermost, immediately below the aperture which is exposed by the removed skin panel.

(4) Obtain two 500 lb. minihoists and attach as follows:—

(*a*) At forward end hook the hoist over the distance tube and the bolt which is fitted in the top skin structure just outboard of the transport rib, and approximately in line with the centre beam.

(*b*) Take the ball end of the cable on the hoist and thread this over the pulley which lies immediately aft of the hook, and extend the cable down to the dispensing unit.

(*c*) Attach the cable to the dispenser by fitting the ball end in the forward recessed bracket on the centre line of the container and finally secure by means of the quick release pin attached by a chain to the bracket.

(*d*) At the aft end hook the minihoist over the bolt fastener in the top skin structure about 20 in. forward of the wing rear spar.

(*e*) Extend the cable down to the dispenser unit and fit the ball end into the aft recessed bracket on the centre line of the container.

(*f*) Secure the cable by means of the quick release pin attached to the bracket.

(5) With an operator at each minihoist hoist the dispenser into the compartment.

(6) Secure the dispenser to the top skin structure by means of the two quick release pins provided. The attachment at the forward end is to the bracket just aft of the pulley and at the aft end to the swinging link just forward of the hook attachment.

(7) Remove the minihoists.

(8) Secure the dispenser to the side of transport rib by means of the two stays provided. One stay is attached to the forward panel of the dispenser container and the other to the aft panel. Both stays are attached to the container by means of quick release pins chained to the bracket and to the transport rib by means of bolts. The bolts are fastened through brackets already attached to the transport rib for this purpose.

(9) Attach the chute to line up with fixture points and secure with Dzus fasteners.

Note . . .

Forward chutes should be identified to particular aircraft port or starboard.

(10) Connect the plugs clipped on the top skin structure to the sockets on the outboard side of the stripper.

(11) Replace the access door and panel.

Aft dispensing unit

161. (1) Remove the access panel under the skin just aft of the rear spar.

(2) Position the aft dispensing unit immediately below the aperture with the stripper units forward.

(3) Obtain access into the power compartment through the door in the under surface skin and proceed as follows from inside the compartment.

(*a*) Remove the cover plate in the floor of the compartment.

(*b*) Take one 500 lb. minihoist and attach the hoisting block to the hoisting point in the roof structure approximately above the cover plate.

(*c*) Lower the ball end of the cable through the hole in the floor of the power compartment and attach to the lifting point on the centre line of the container. Secure with the quick release pins.

(*d*) Proceed to hoist dispenser unit into aircraft, chute end first and guiding the three securing points on the container through the holes in the power compartment floor.

(*e*) Line up holes in fixing points fore and aft and secure with quick release pins provided.

(4) Unhook minihoist from structure and replace cover plate in floor of power compartment.

(5) Connect plugs clipped on fuselage structure to sockets on stripper unit.

(6) Replace access panel.

(*A.L.34, Jan. 59*)

P29225 355680/8618 3/59 500 C & P Gp 375

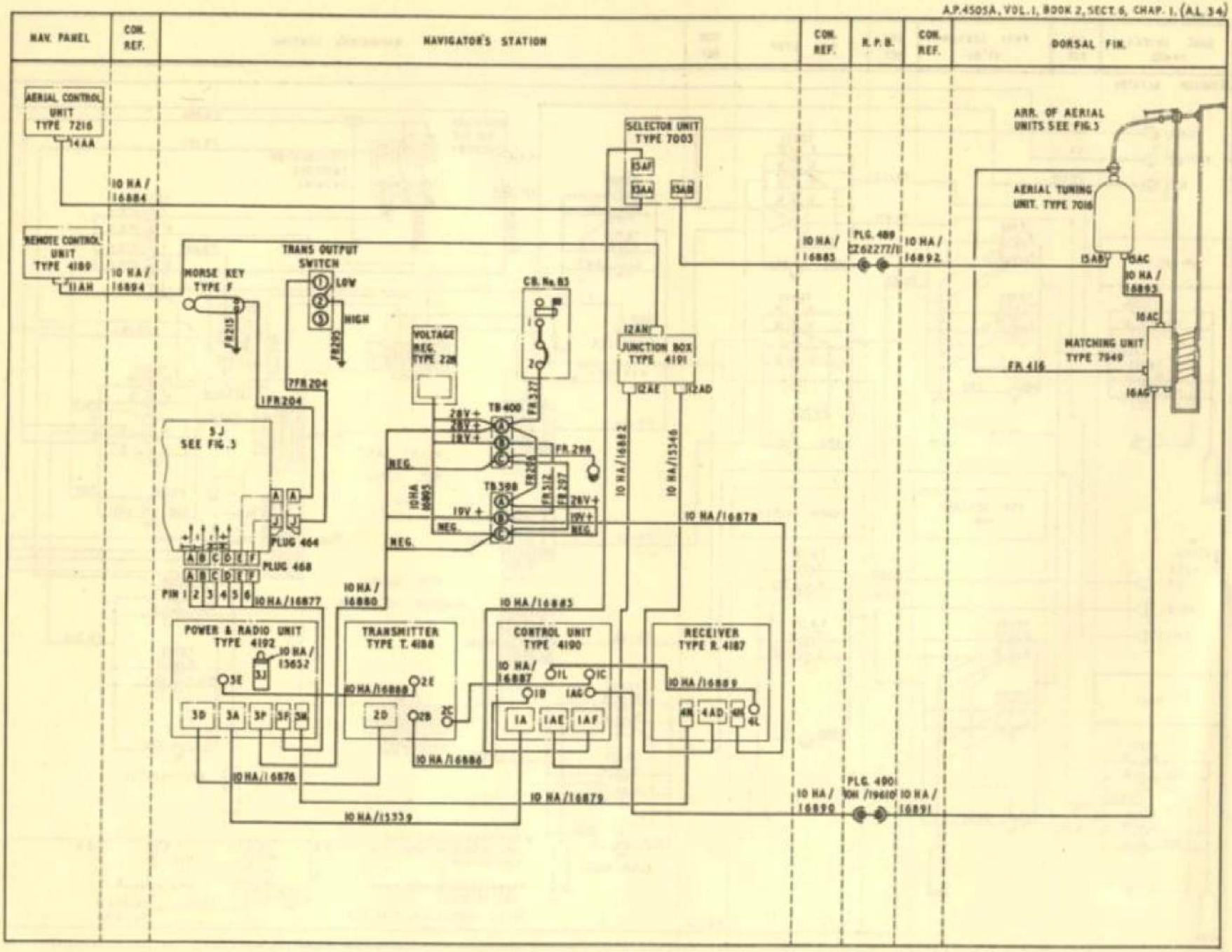


FIG. 11 A.R.I. 5874.

PP8498 335681/8619 2.59 506 C&P Gp. 924 (4)

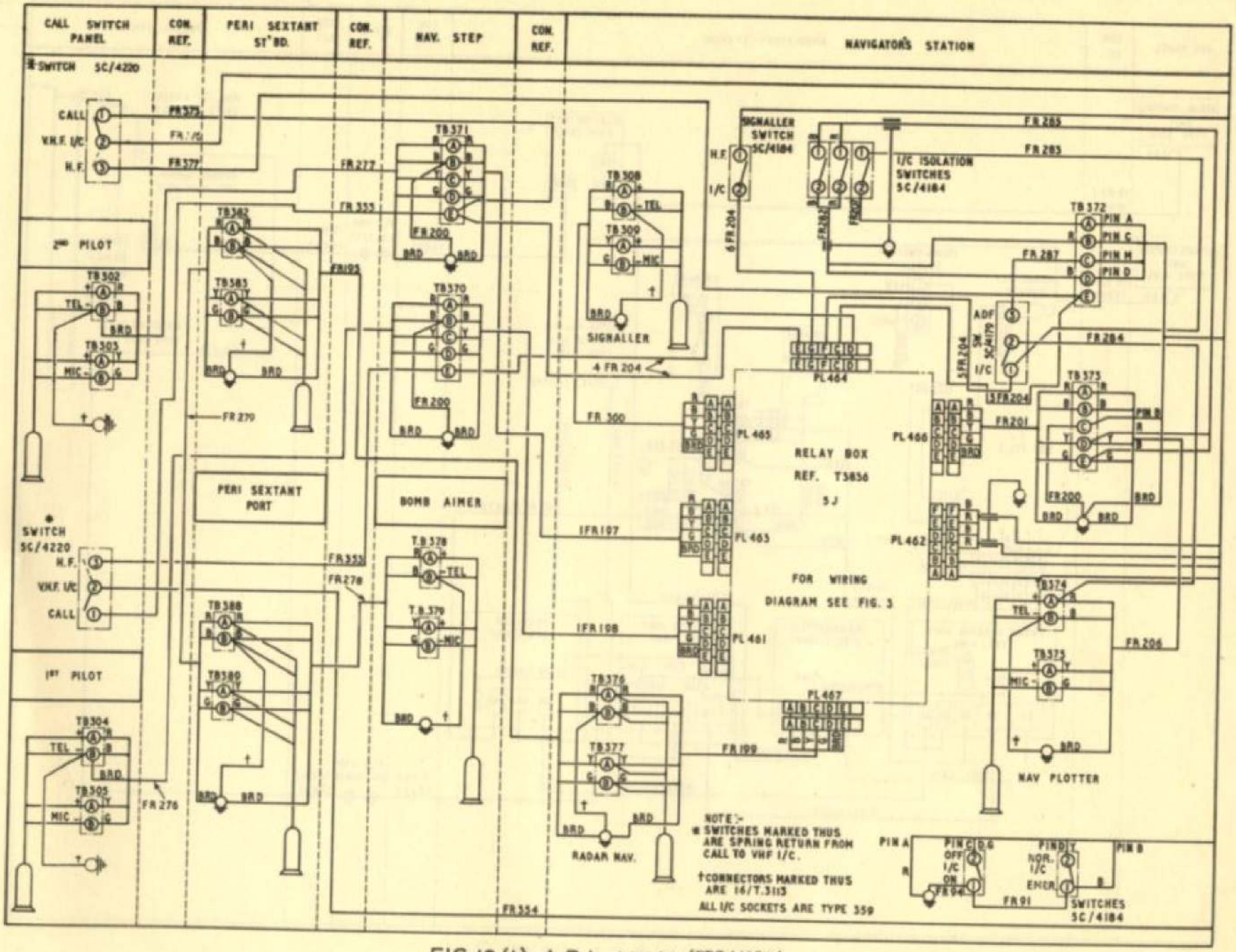


FIG 12 (1) A.R.I. A1961 (PRE. MODS. 555 & 428)

RESTRICTED

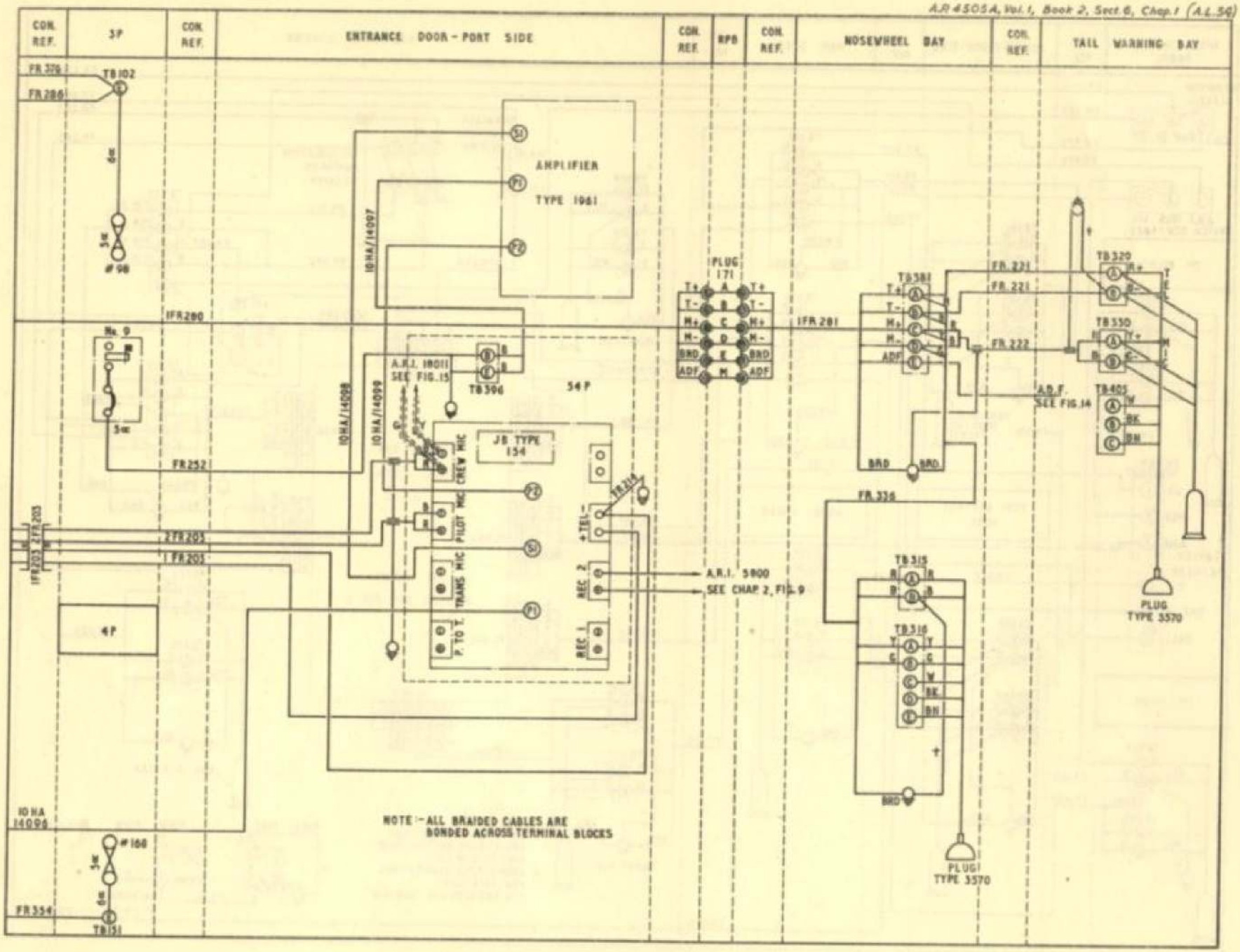


FIG. 12(2) A.R.I. A1961 (PRE. MODS. 555 & 428)

FPB498 355681/8619 2.59 506 C&P Gp. 926 (4)

RESTRICTED

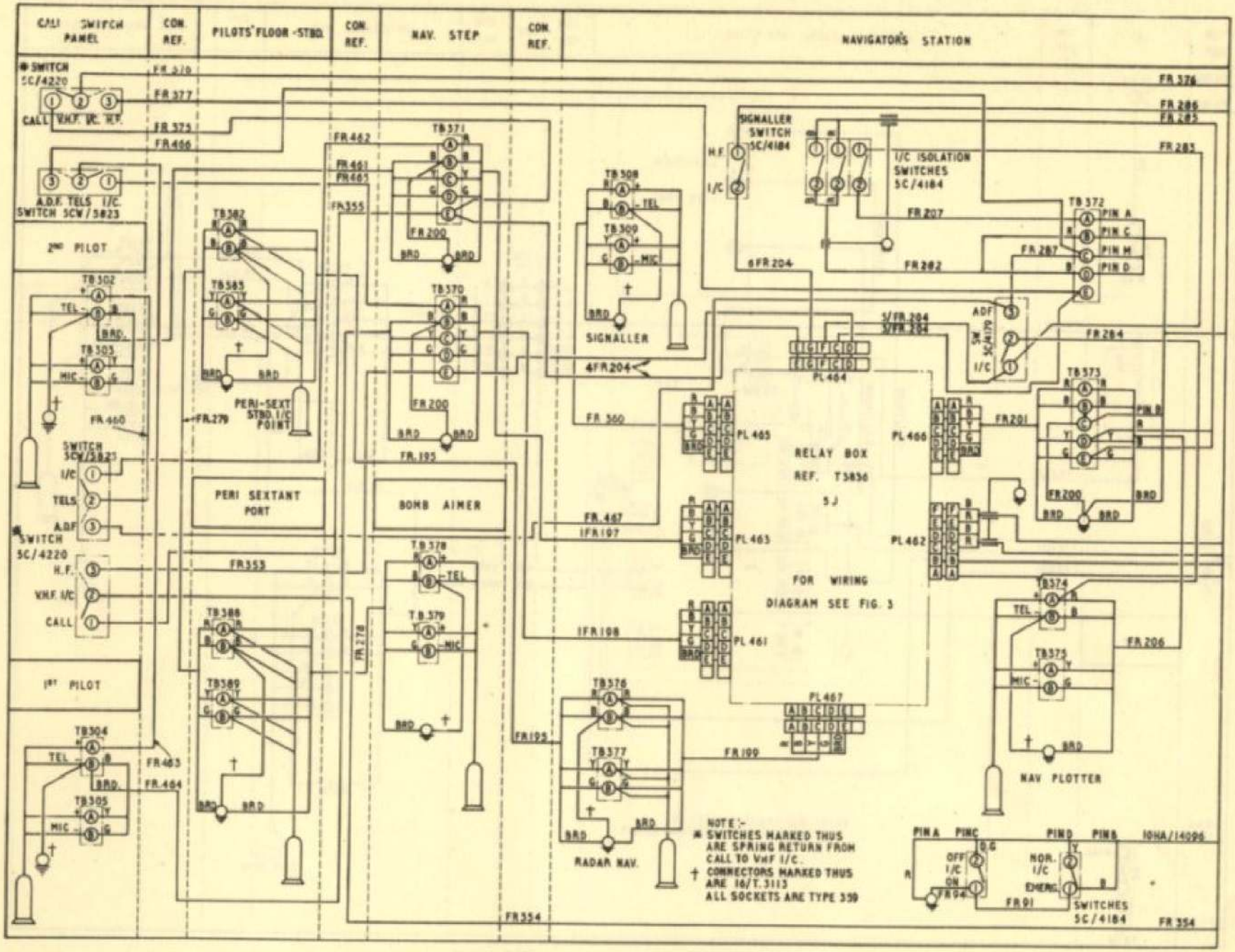


FIG. 12 A.(I) A.R.I. A.1961 (POST MODS. 555 & 428)

RESTRICTED

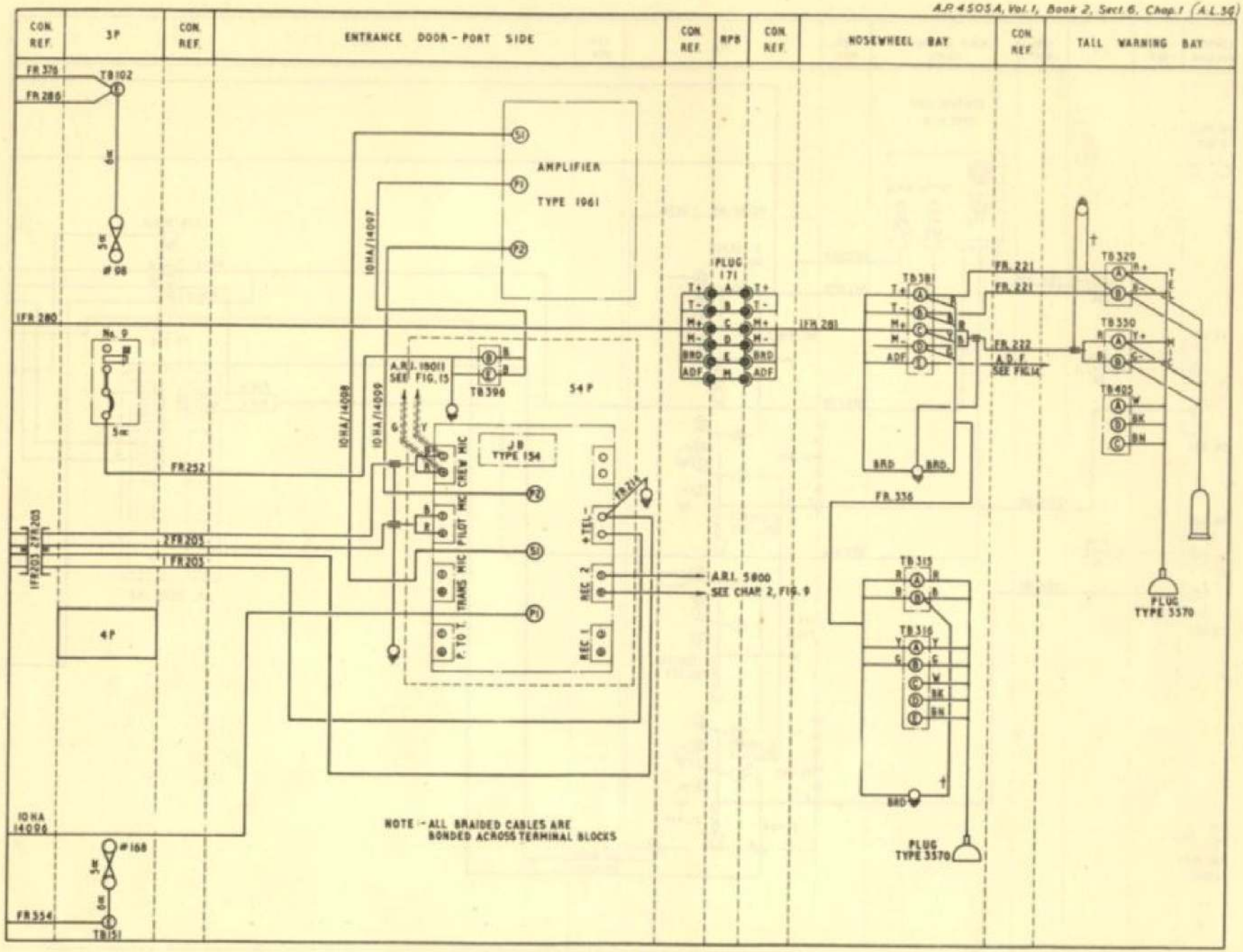


FIG. 12A. (2) A.R.I. A.1961 (POST MODS. 555 & 428)

PP8498 355681/8619 2.59 506 C&P Gp. 924 (4)

RESTRICTED

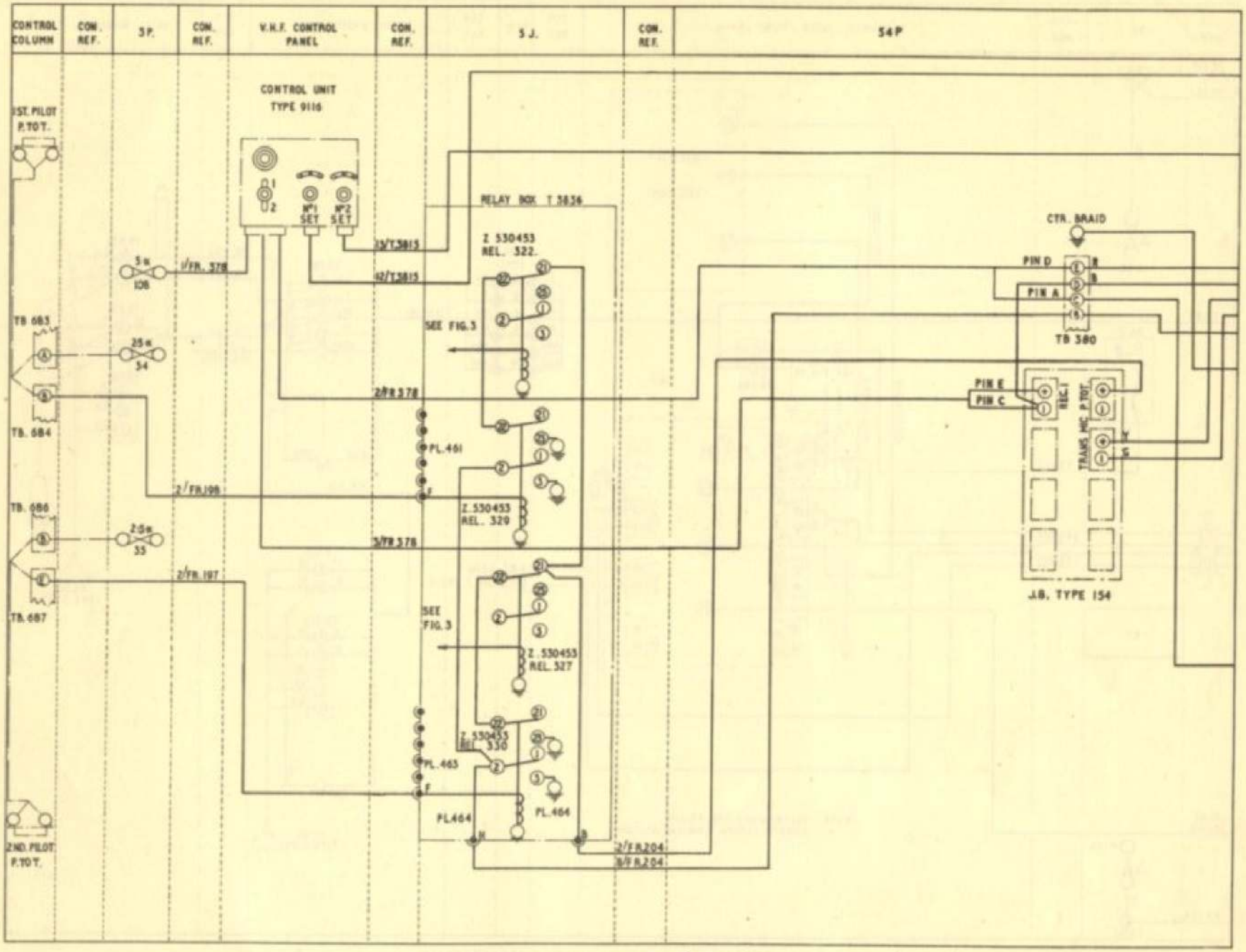
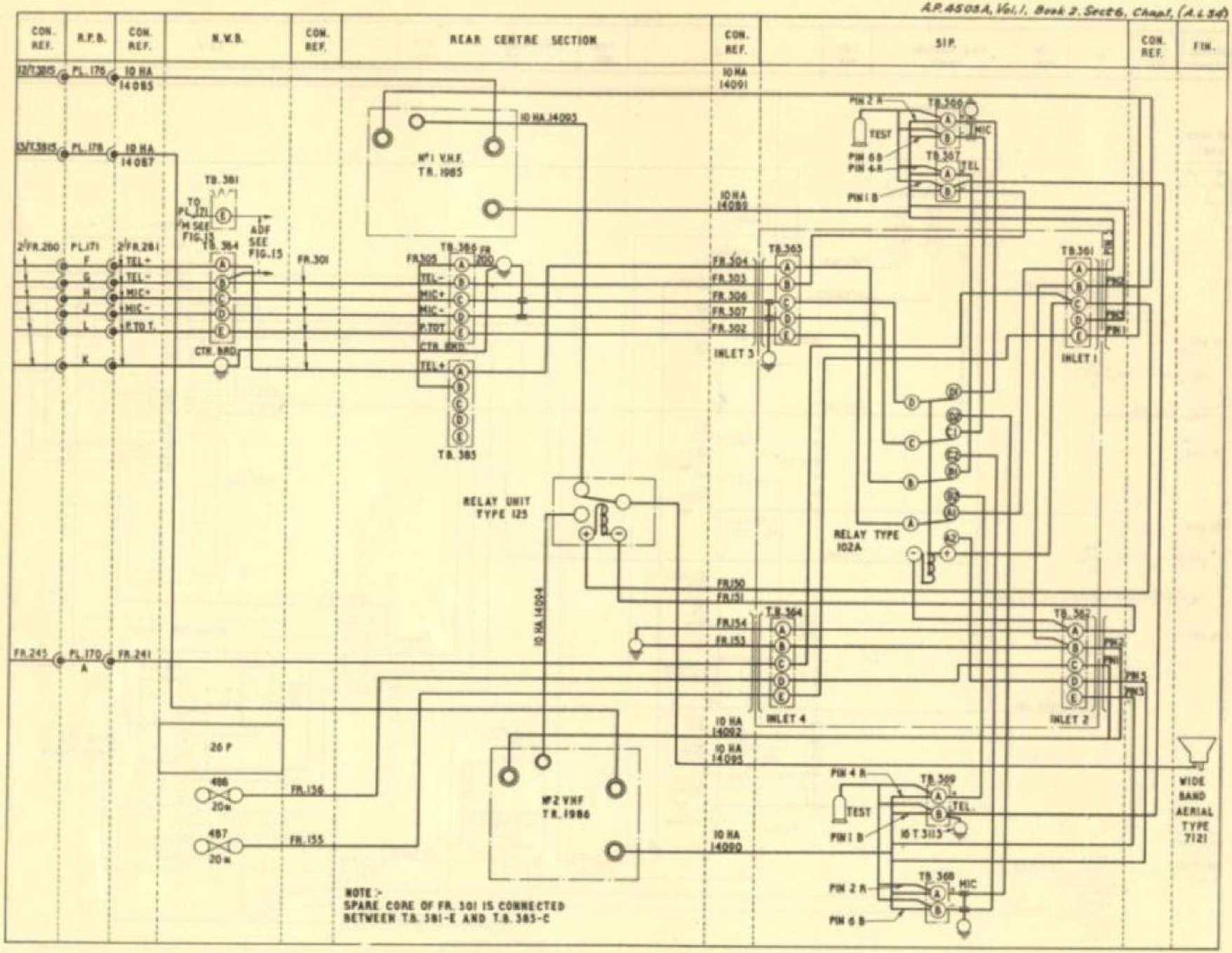


FIG. 13(1) A.R.I. 18064 (PRE MODS. 510 & 638)

RESTRICTED



NOTE :-
SPARE CORE OF FR. 301 IS CONNECTED BETWEEN T.B. 381-E AND T.B. 385-C

FIG. 13(2) A.R.I. 18064 (PRE MODS. 510 & 638)

PP6498 355681 8619 2.59 506 C&P Gp. 924 (4)

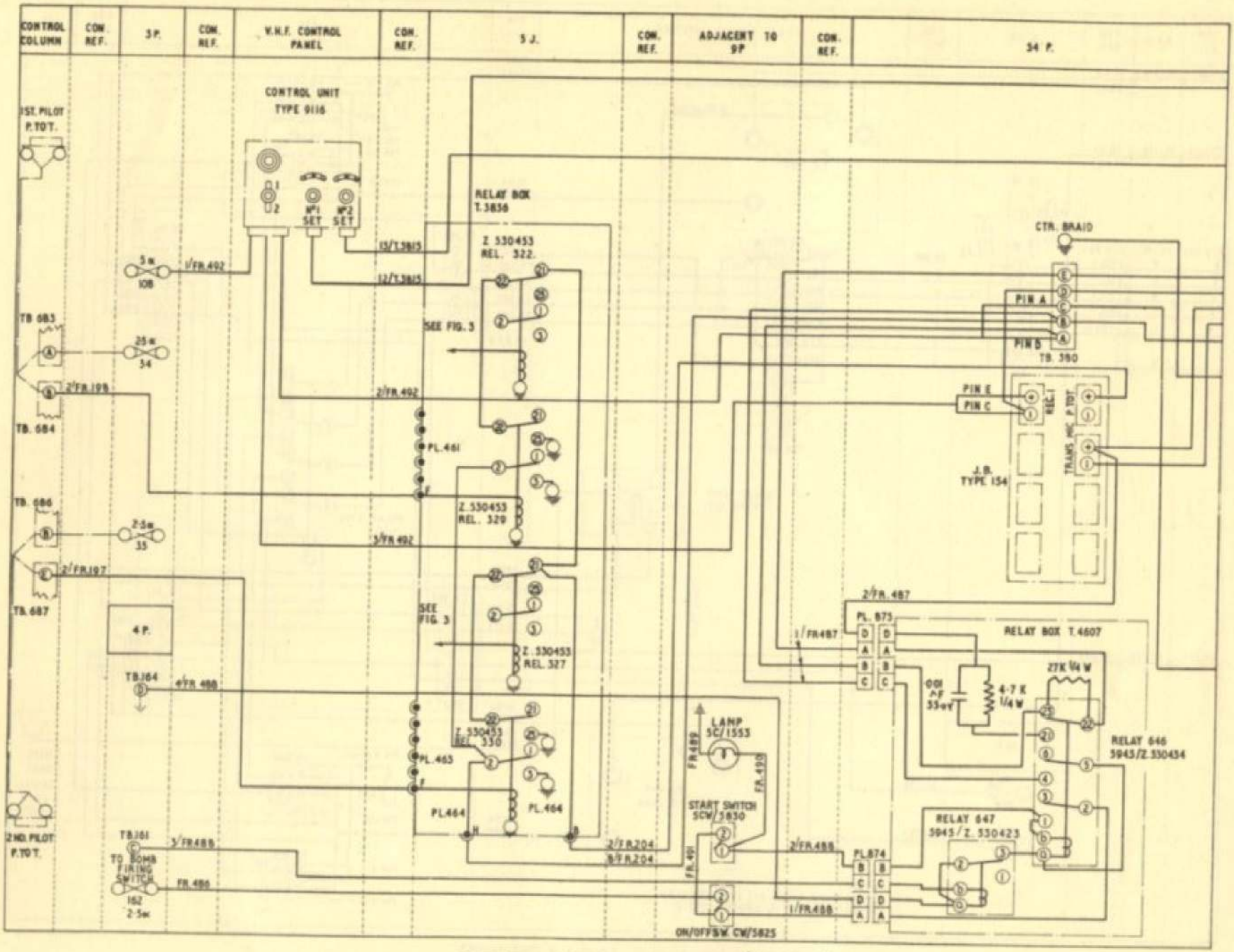


FIG 13 A (1) A.R.I. 18064 (POST MODS. 510 & 638)

RESTRICTED

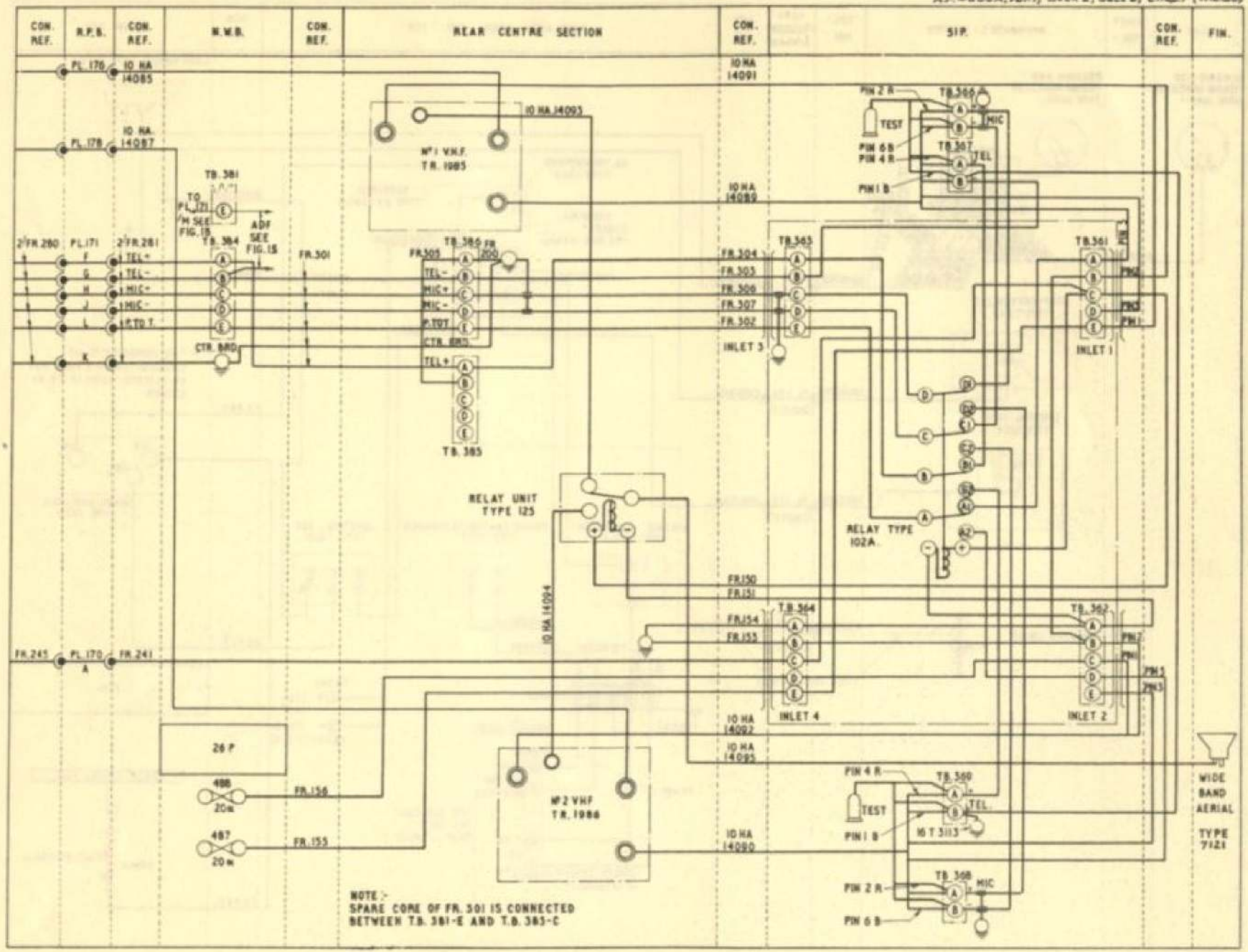


FIG. 13 A (2) A.R.I. 18064 (POST MODS. 510 & 638)

PP6498 355681/8619 2/59 506 C&P Gp.924 (4)

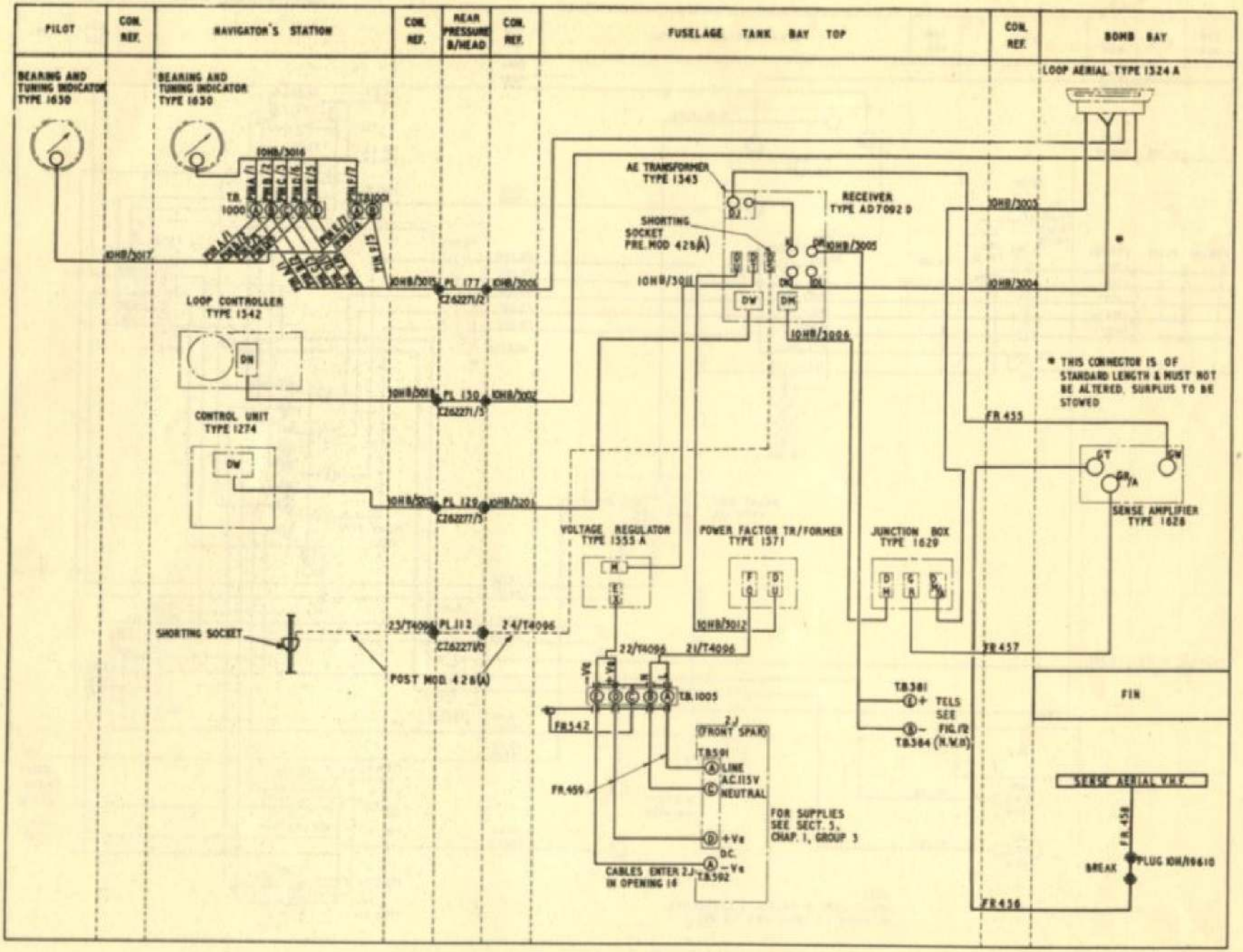


FIG. 14 - A.R.I. 23023 (PRE & POST MOD. 428)

RESTRICTED

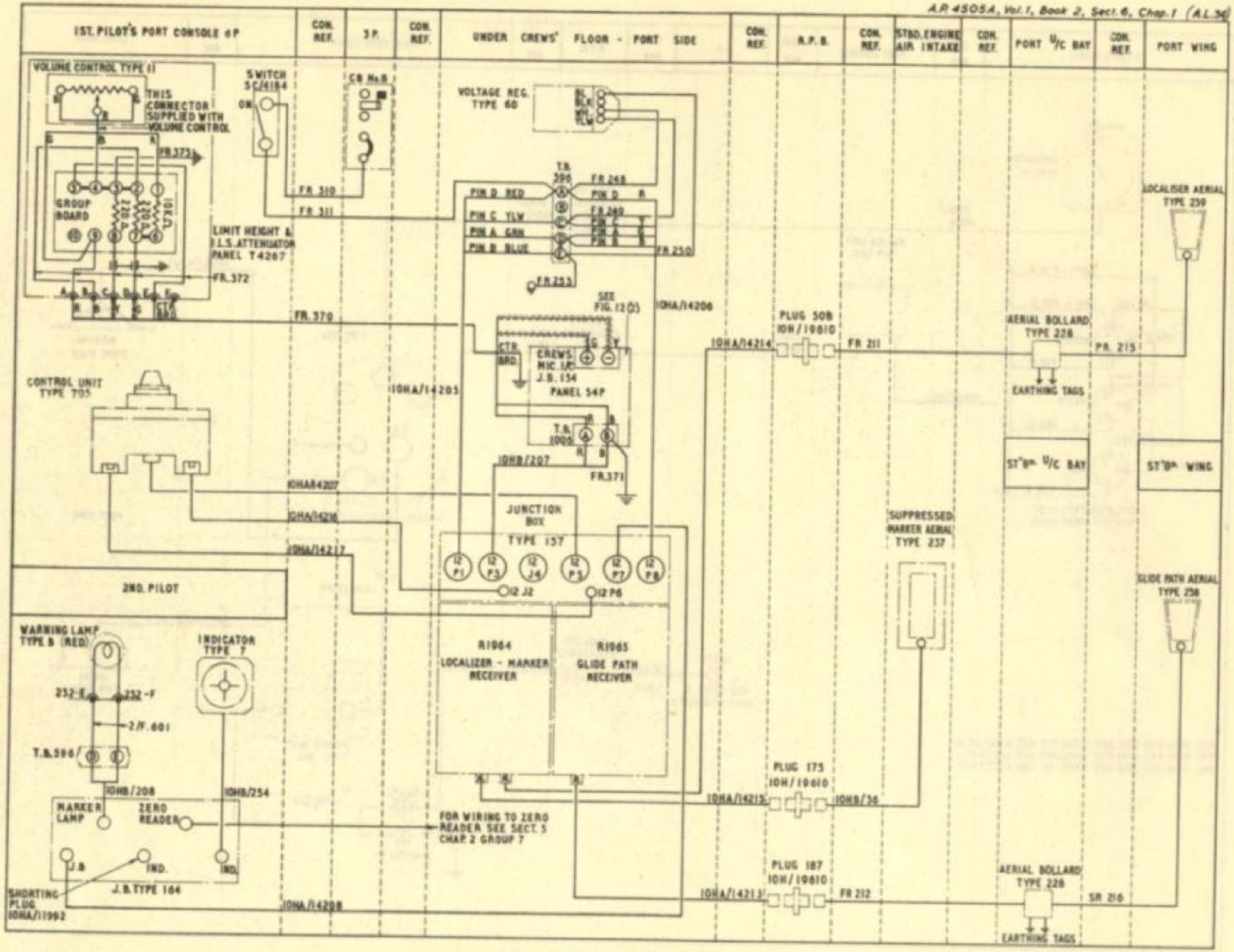


FIG. 15 - A.R.I. 18011

PP8498 355681/8619 2.59 506 C&P Gp. 924 (4)

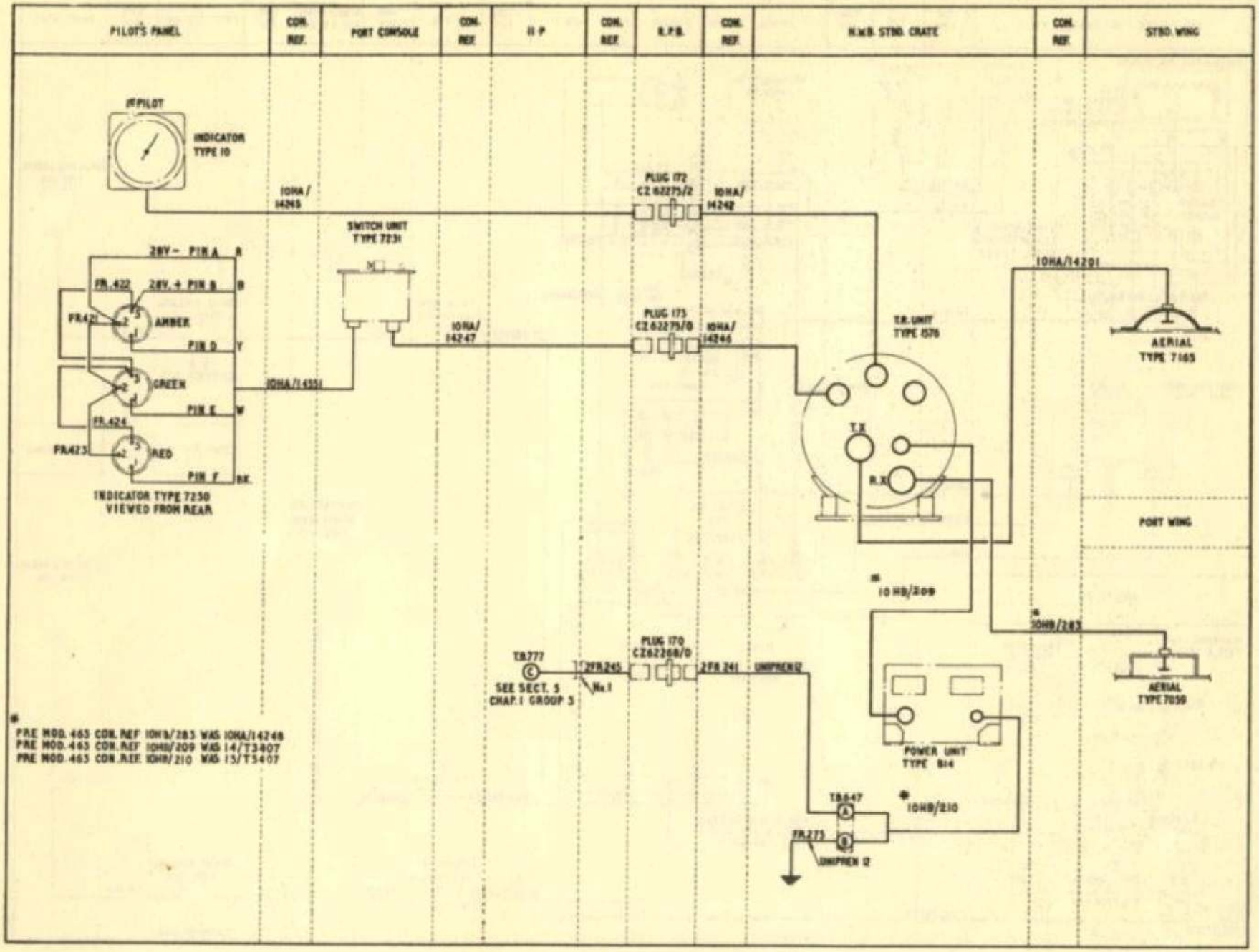
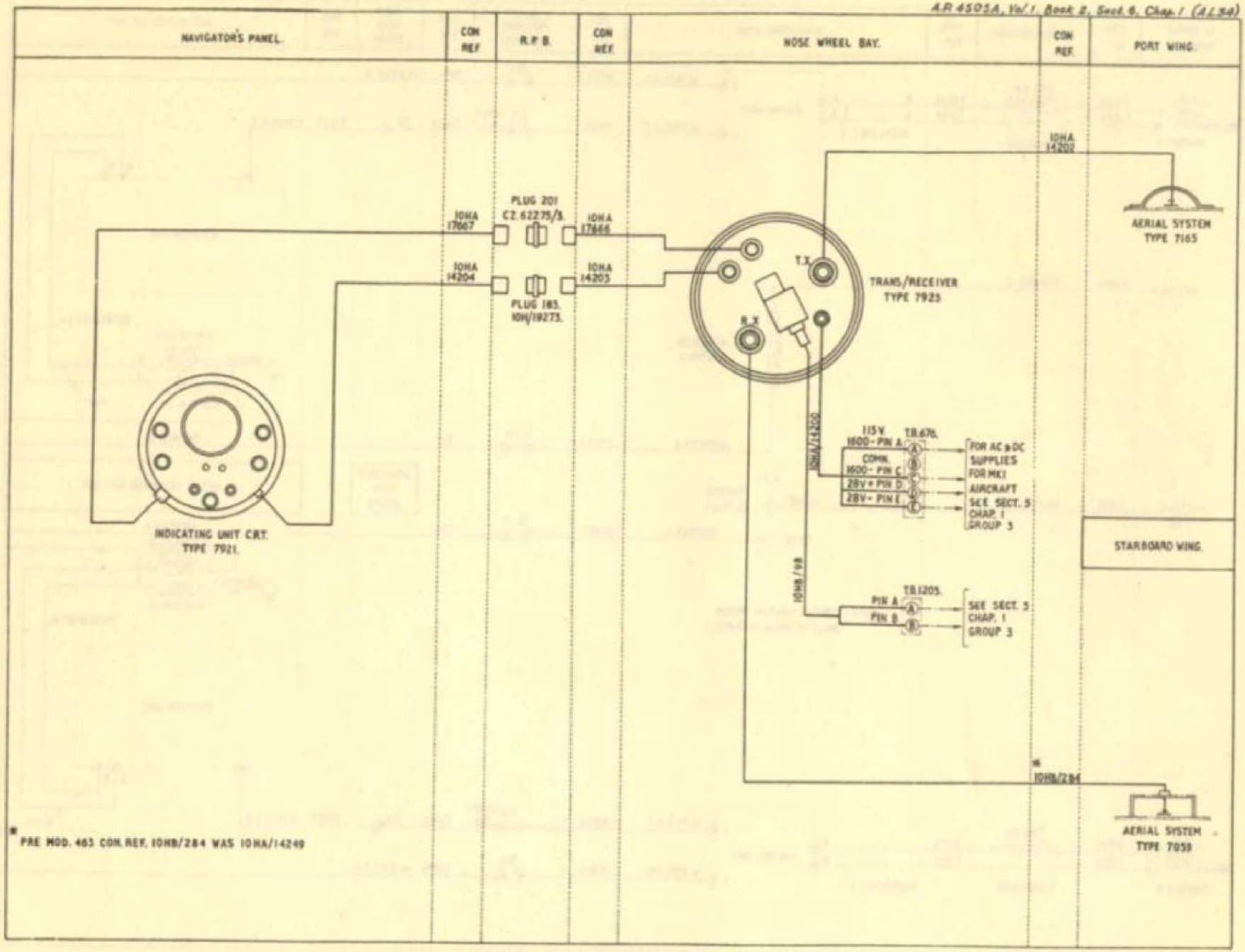


FIG. 16 - A.R.I. 5378 (PRE & POST MOD. 463)

RESTRICTED



* PRE MOD. 465 CON. REF. 10HB/284 WAS 10HA/14249

FIG. 17 - A.R.I. 18090

PP8498 355681 8619 2.59 504 C&P Gp. 924 (4)

RESTRICTED

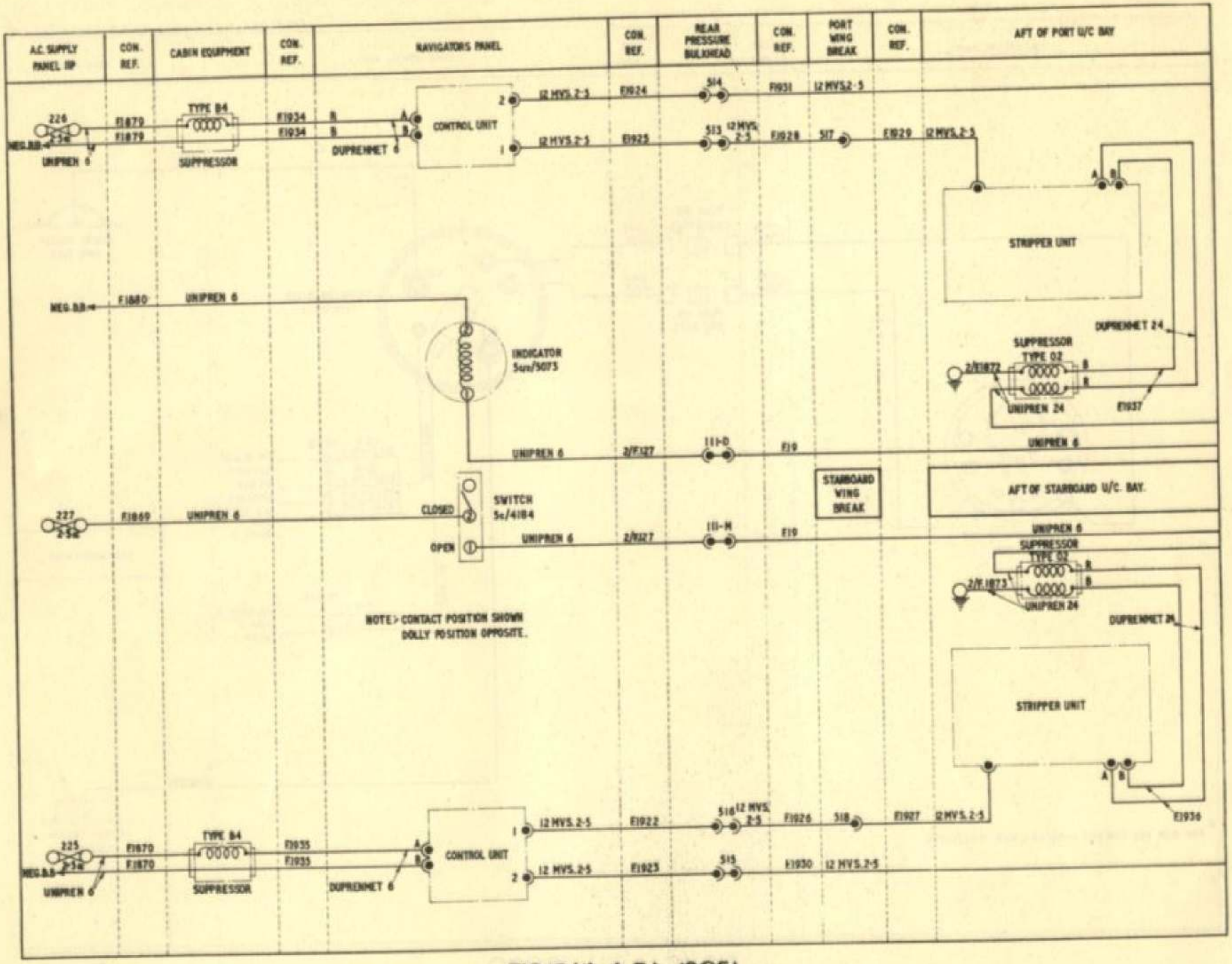


FIG.18(1) A.R.I. 18051

RESTRICTED

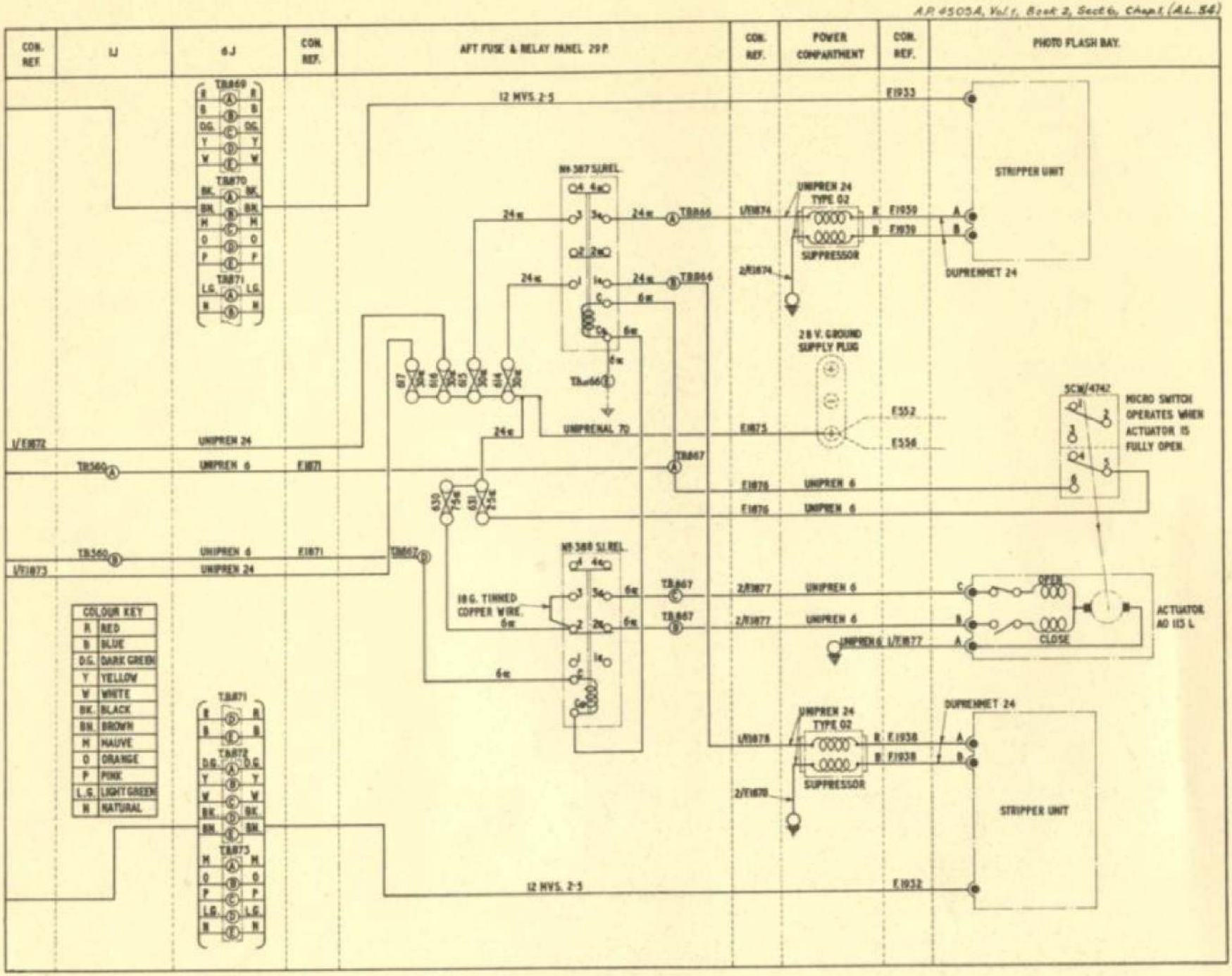


FIG. 18 (2) A.R.I. 18051

PPB498 355681 8619 2:59 506 C&P Gp. 924 (4)

RESTRICTED