GROUP H 1

RADIO SUPPLIES (CODE RT AND TK)

▶ (Includes Mods 1309, 1372, 1430 and 1481) ◀

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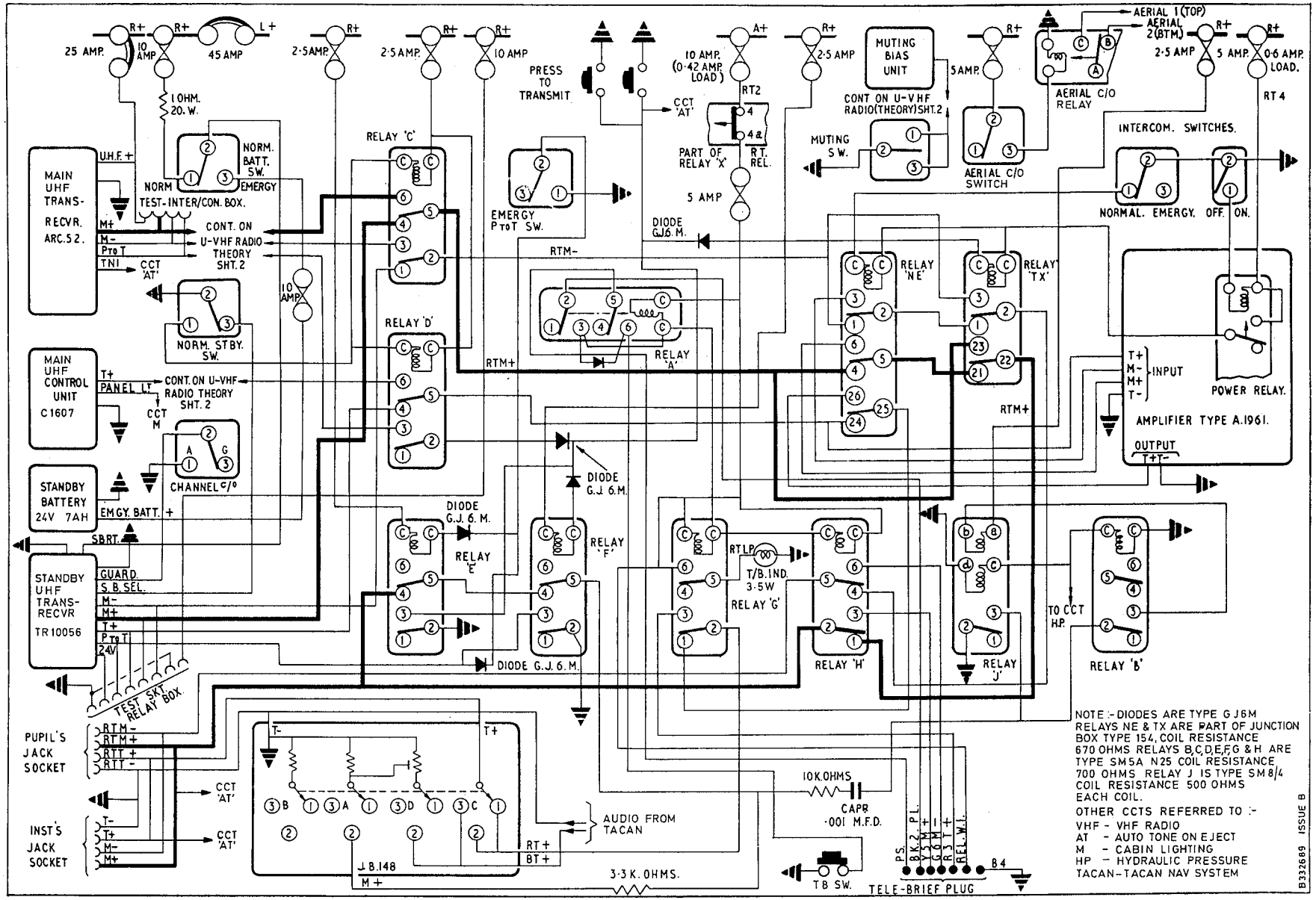
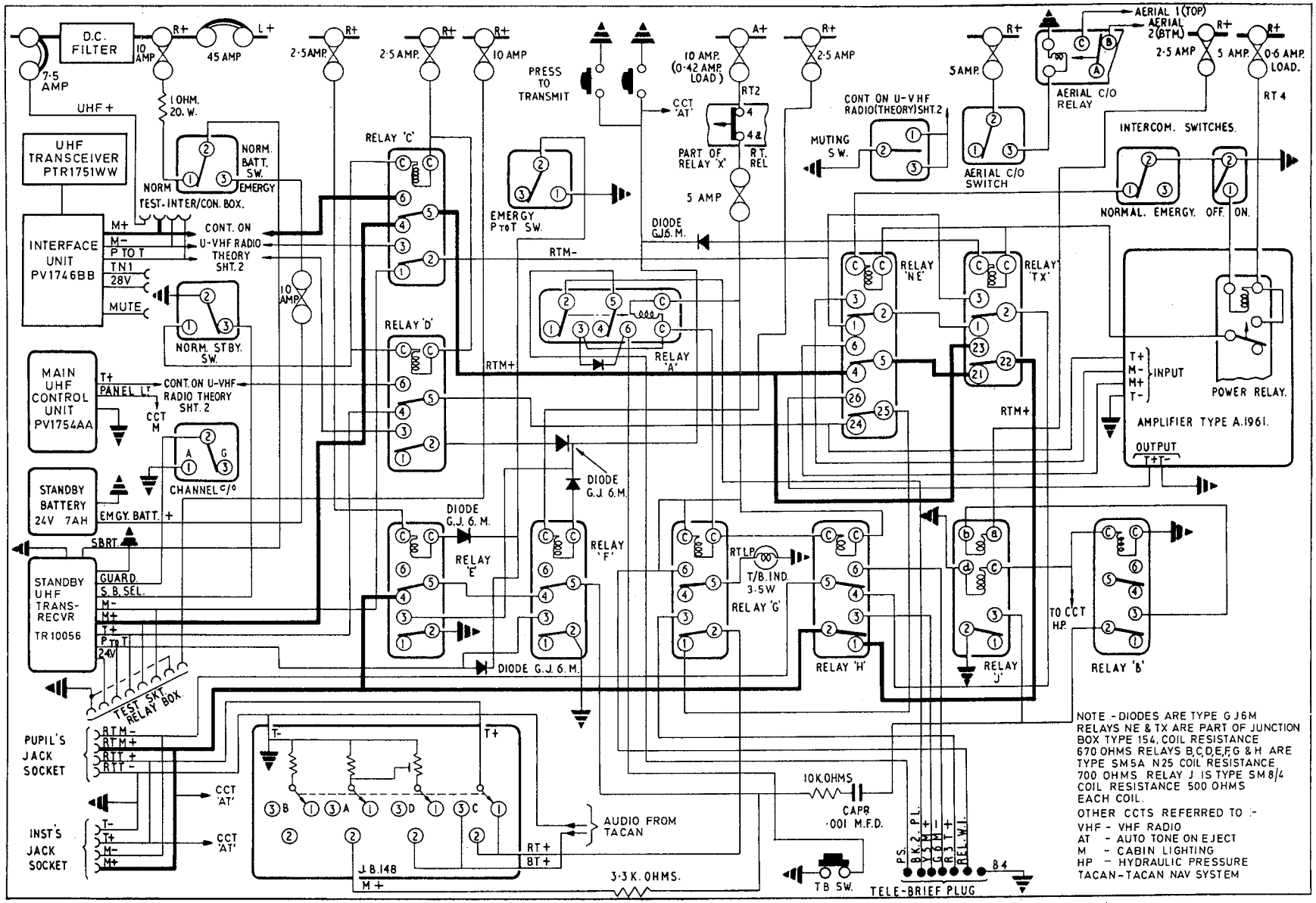
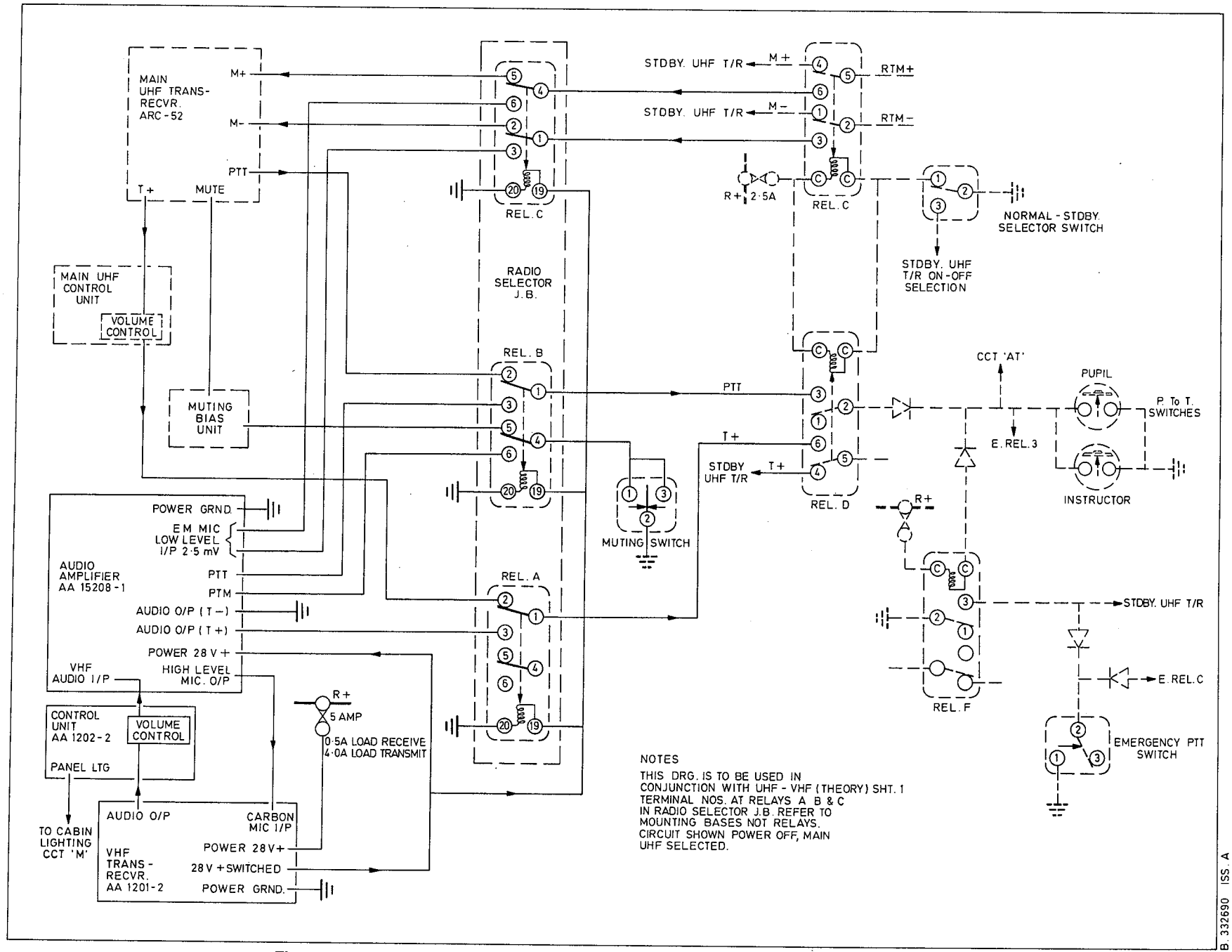


▶ Fig. 1 Radio supplies - UHF, VHF and tele-briefing (theoretical sheet 1) - pre Mod 1481 ◀



▶ **Fig. 1A Radio supplies - UHF, VHF and tele-briefing (theoretical sheet 1) - post Mod 1481** ◀



▶ **Fig. 2 Radio supplies - UHF, VHF and tele-briefing (theoretical sheet 2) - pre Mod 1481** ◀

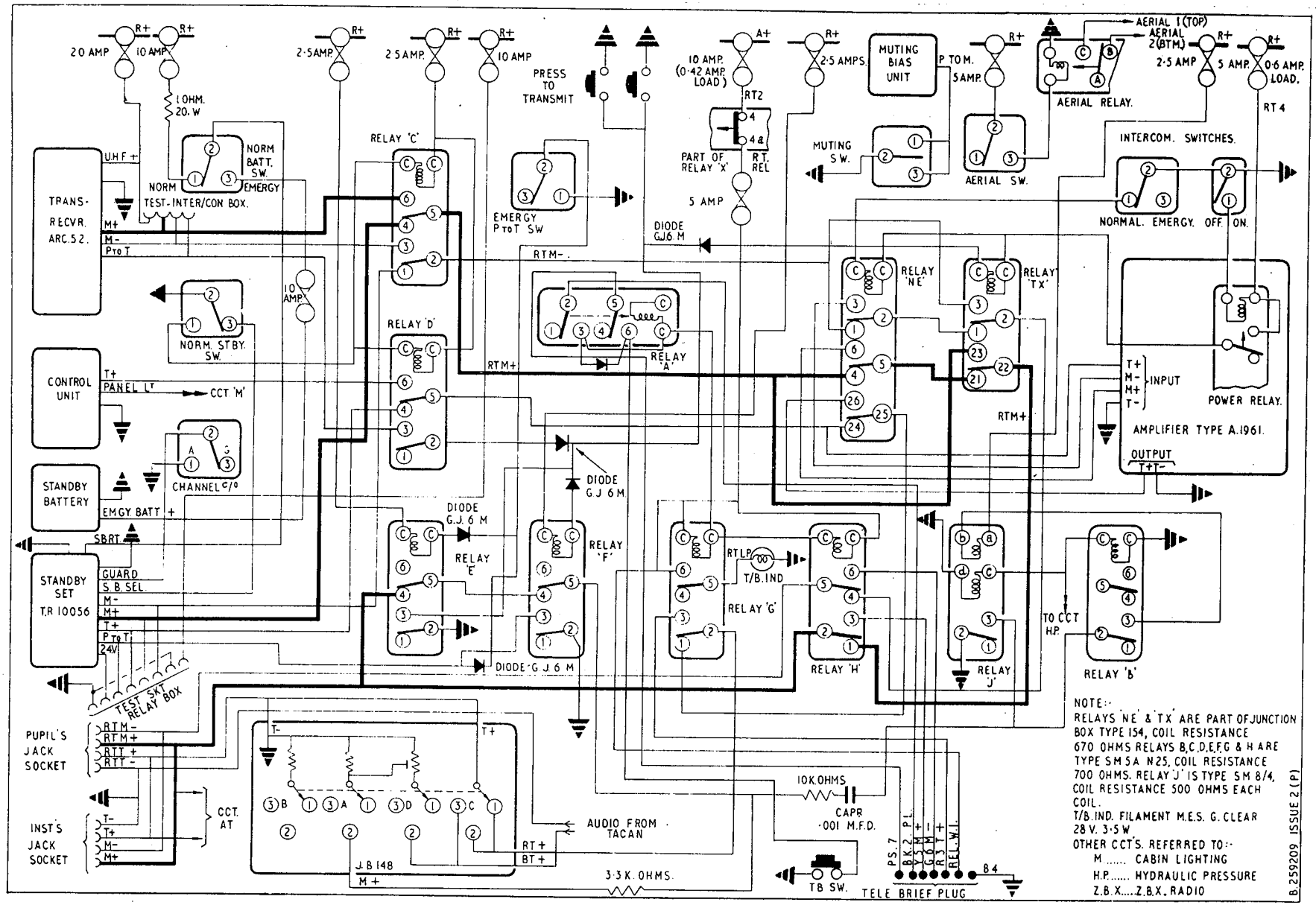
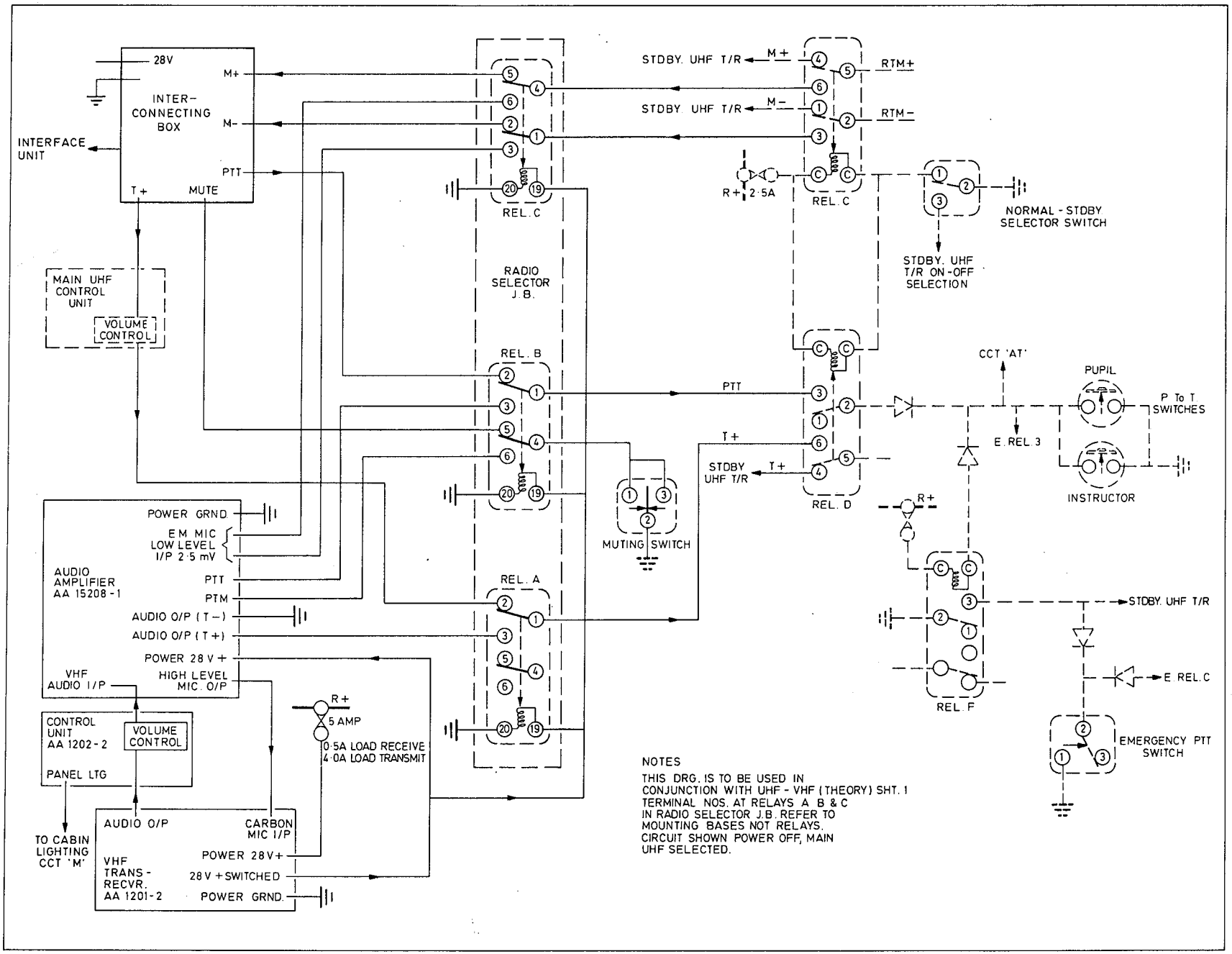


Fig.2A Radio supplies — UHF and tele-briefing (theoretical) — pre-Mod 1430



▶ **Fig. 2B Radio supplies - UHF, VHF and tele-briefing (theoretical sheet 2) - post Mod 1481** ◀

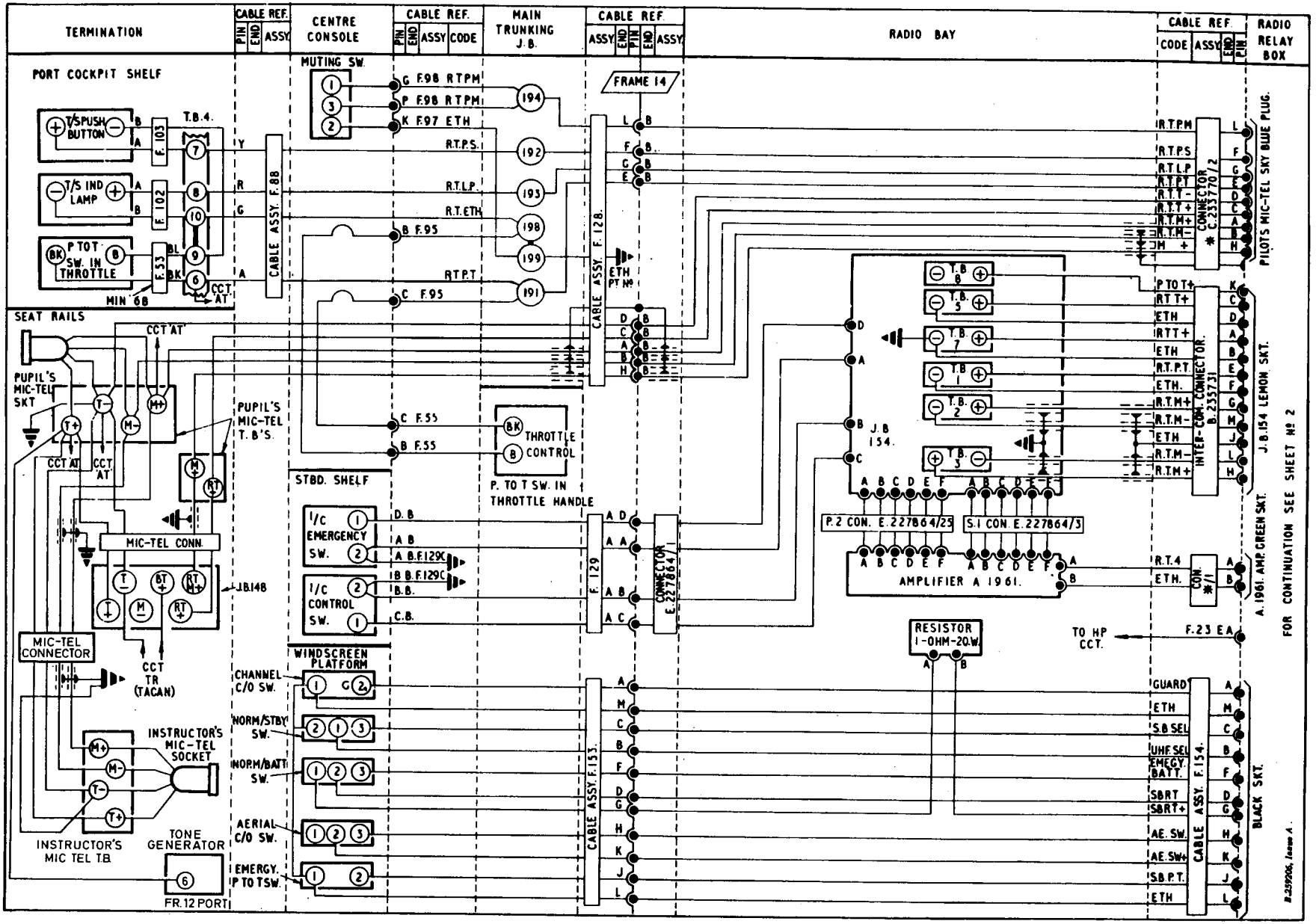


Fig. 3 Radio supplies - VHF, VHF and tele-briefing (routeing sheet 1)

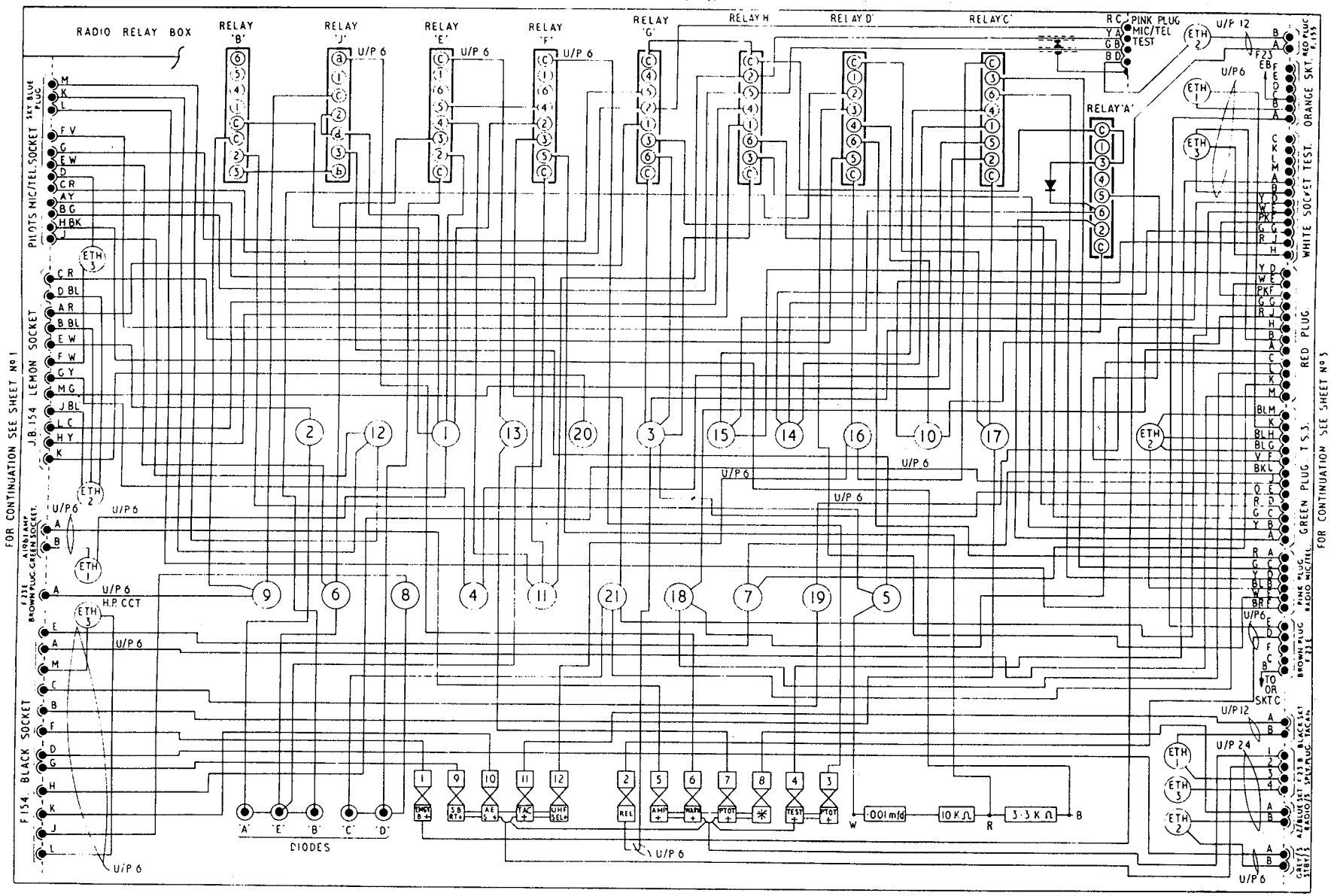
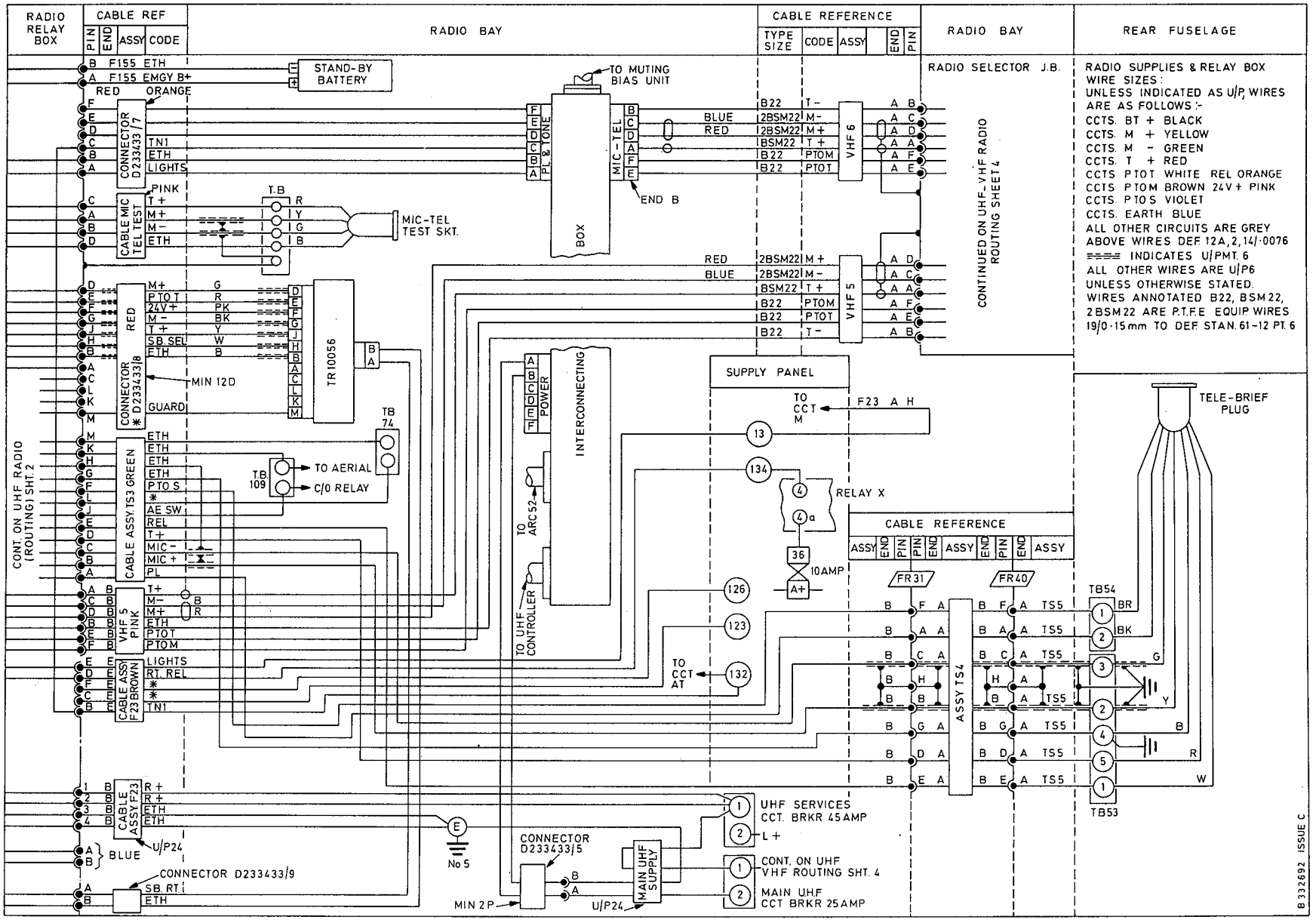


Fig. 4 Radio supplies – UHF, VHF and tele-briefing (routeing sheet 2)



▶ Fig. 5 Radio supplies - UHF, VHF and tele-briefing (routeing sheet 3) - pre Mod 1481 ◀

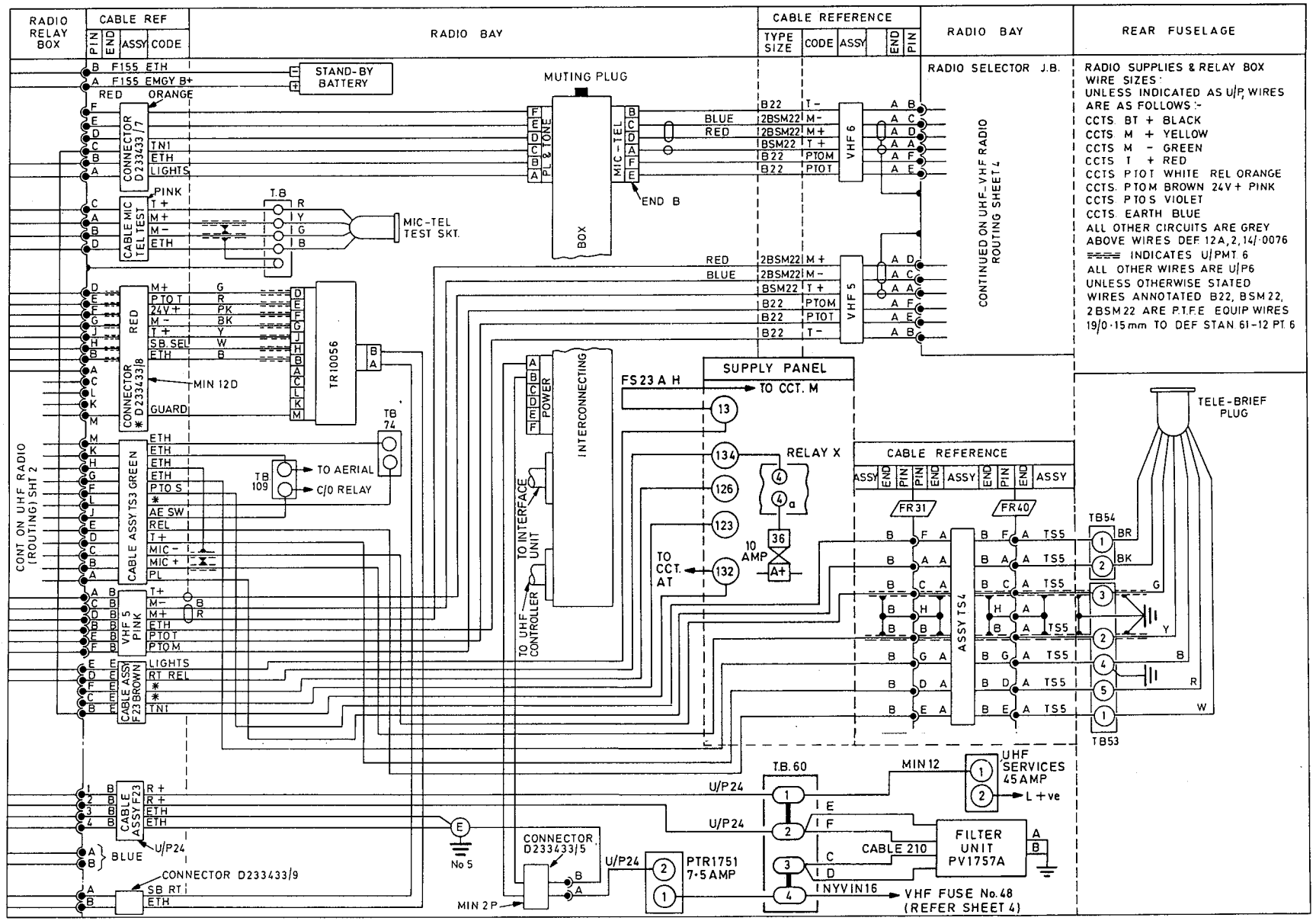


Fig. 5A Radio supplies - UHF, VHF and tele-briefing (routeing sheet 3) - post Mod 1481

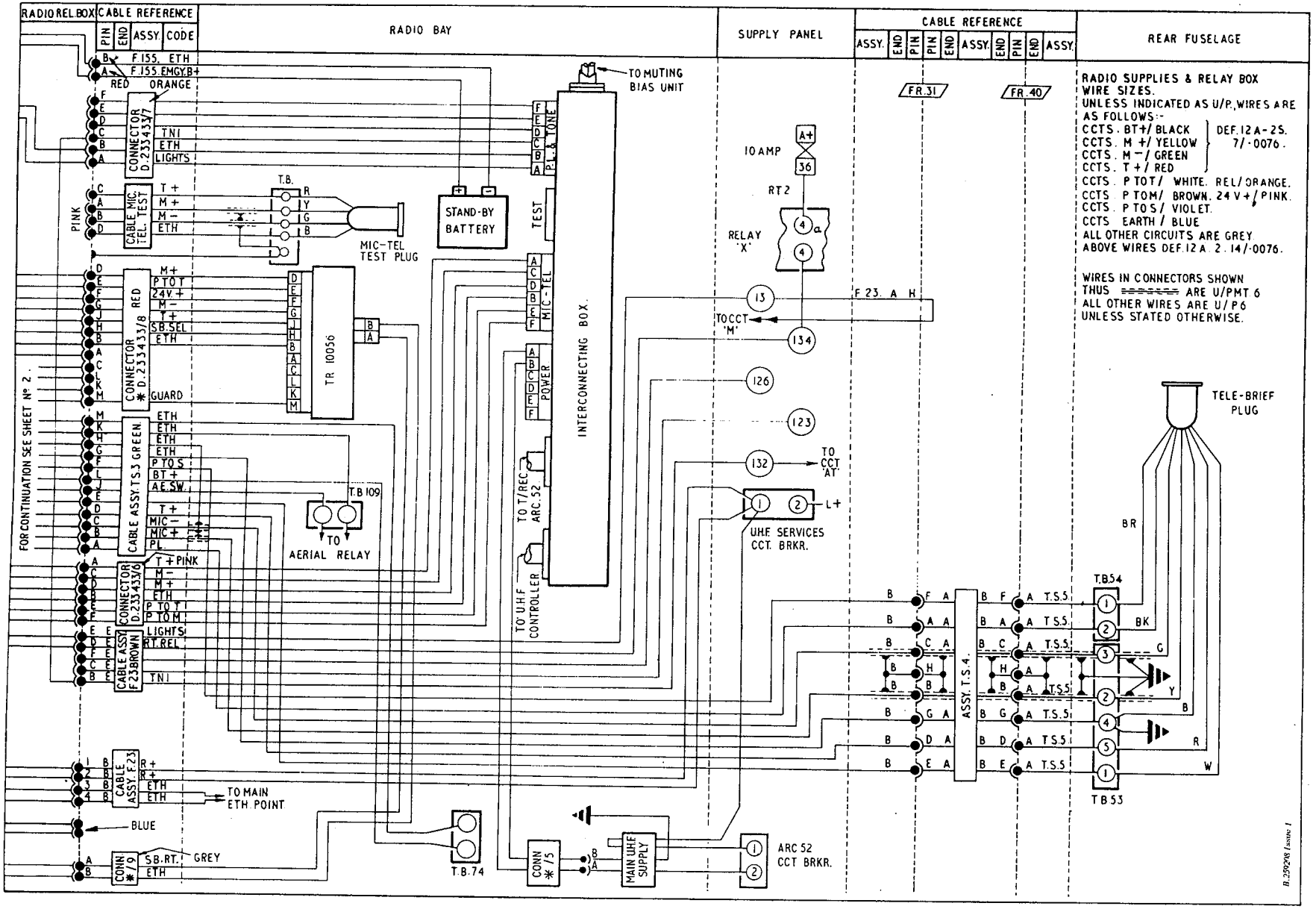


Fig. 5B Radio supplies - UHF and tele-briefing (routeing sheet 3) - pre Mod 1430

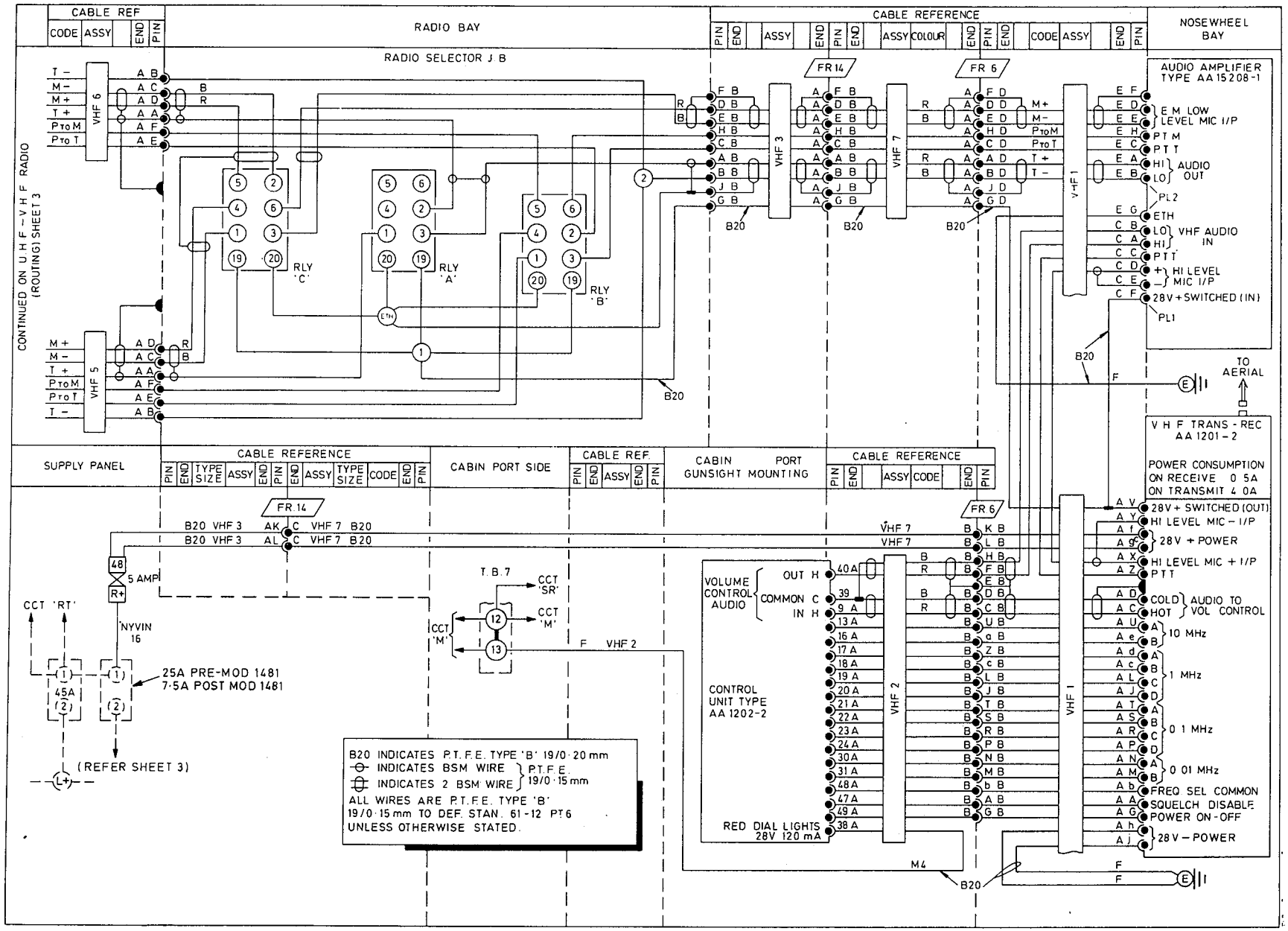


Fig.6 Radio supplies — UHF, VHF and tele-briefing (routeing sheet 4)

▶ **Mod 1481 included** ◀

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4. Relays C, D, E, F and J derive energizing supplies from the radio supply fuses in the relay box, but relay J, which has two operating coils, also derives a supply (in common with relay B) from the hydraulic pressure failure warning circuit (Sect 5, Chap 2, Group 5A) when this circuit operates. Relay J is a high speed type, whose coil a-b opposes the pull of coil c-d; in conjunction with relay B and a resistor-capacitor element, it provides an audio warning (para 20). The resistor and capacitor and also the diode rectifiers that protect the press-to transmit circuits, are all contained in the radio relay box, which is also equipped with a test socket, one pin of which is wired to fuse No. 4.

Radio selector JB - Mod 1430

5. The radio selector JB is located in the radio bay on the starboard side of the aft face of frame 15. The box contains three relays (A, B and C) which are energized from the power switching circuits in the VHF transmitter-receiver when the VHF control unit is switched ON. When relays A, B and C are energized, the press-to-transmit and mic-tel lines from relays C and D in the radio relay are selected from the main UHF transmitter-receiver to the audio amplifier which controls the VHF transmitter- receiver. Relay B also selects the muting switch line from the UHF muting bias unit to the audio amplifier.

ARI 18124/1 - UHF Main (pre Mod 1481)

6. The supply from the ARC 52 circuit breaker to the main UHF tranmitter-receiver is routed via a plug and socket connection and an interconnecting box, both located in the radio bay. In the transmitter-receiver, the power supply is connected to a power supply relay. The coil of this relay is wired to the UHF control unit on which a function switch, when placed to either of its ON positions, operates to energize the power relay, which switches the power supply to the equipment in the set. When switched ON, the equipment is in the "receive" condition. It can be switched to the "transmit" condition by use of either of the two press-to-transmit switches which are incorporated one in each of the throttle twist grips.

ARI 23301/80 - UHF main (post Mod 1481)

6A. With Mod 1481 embodied, power is supplied to the main UHF transceiver from the UHF services circuit breaker via a d.c. filter, circuit breaker PTR1751, the interconnecting box and an interface unit. The power on return line, completed by the control unit function switch, and press-to-transmit lines from the interconnecting box to the transceiver are also routed through the interface unit.

7. The main UHF installation is provided with two aerials, either of which can be connected to the set by operation of an aerial relay. The relay is mounted on a strut attached to frame 19, and is controlled by a change-over switch marked AERIAL 1 and AERIAL 2, mounted on a bracket attached to the port windscreen platform. Fuse No. 10 in the radio relay box supplies the switch, on which one contact is wired to the coil of the relay. With the switch at the AERIAL 2 position, the relay is de-energized, and its contact connects No. 2 aerial to the set. Audio signals from the Tacan installation (para 14) are fed to the crew's telephones via a Type 148 junction box; this is mounted adjacent to frame 10, on the port side of the cabin. The supply for the auto-tone facility (Sect 6) is derived from fuse No. 13 in the main fuse box.

ARI 23057 - UHF Standby

8. The standby transmitter-receiver normally operates on a supply derived from the UHF SERVICES circuit breaker via fuse No. 9 in the radio relay box. A plug-in resistor, located in the radio bay, reduces the supply to 24 volts. The supply is wired to a change-over switch marked NORMAL and EMERGENCY BATTERY, which in the NORMAL position connects the aircraft supply to the set, and in the EMERGENCY BATTERY position connects the battery supply to the set, via fuse No. 1 in the radio relay box.

9. A switch labelled NORMAL and STANDBY is used to bring the transmitter-receiver into operation. In the STANDBY position, the switch completes the earth return for the coil of a relay in the set which switches the power to the equipment. When switched on, the set is in the "receive" condition. It can be switched to the "transmit" condition by operation of either of the press-to-transmit switches in the throttle twist grips or, in the event of these proving ineffective, by use of the emergency press-to-transmit switch. Operation of these switches completes an earth return for a switching relay within the set. The NORMAL/EMERGENCY BATTERY switch, the NORMAL/STANDBY switch and the emergency press-to-transmit switch, are all mounted, together with the aerial change-over switch and channel change-over switch, on the bracket attached to the port windscreen platform.

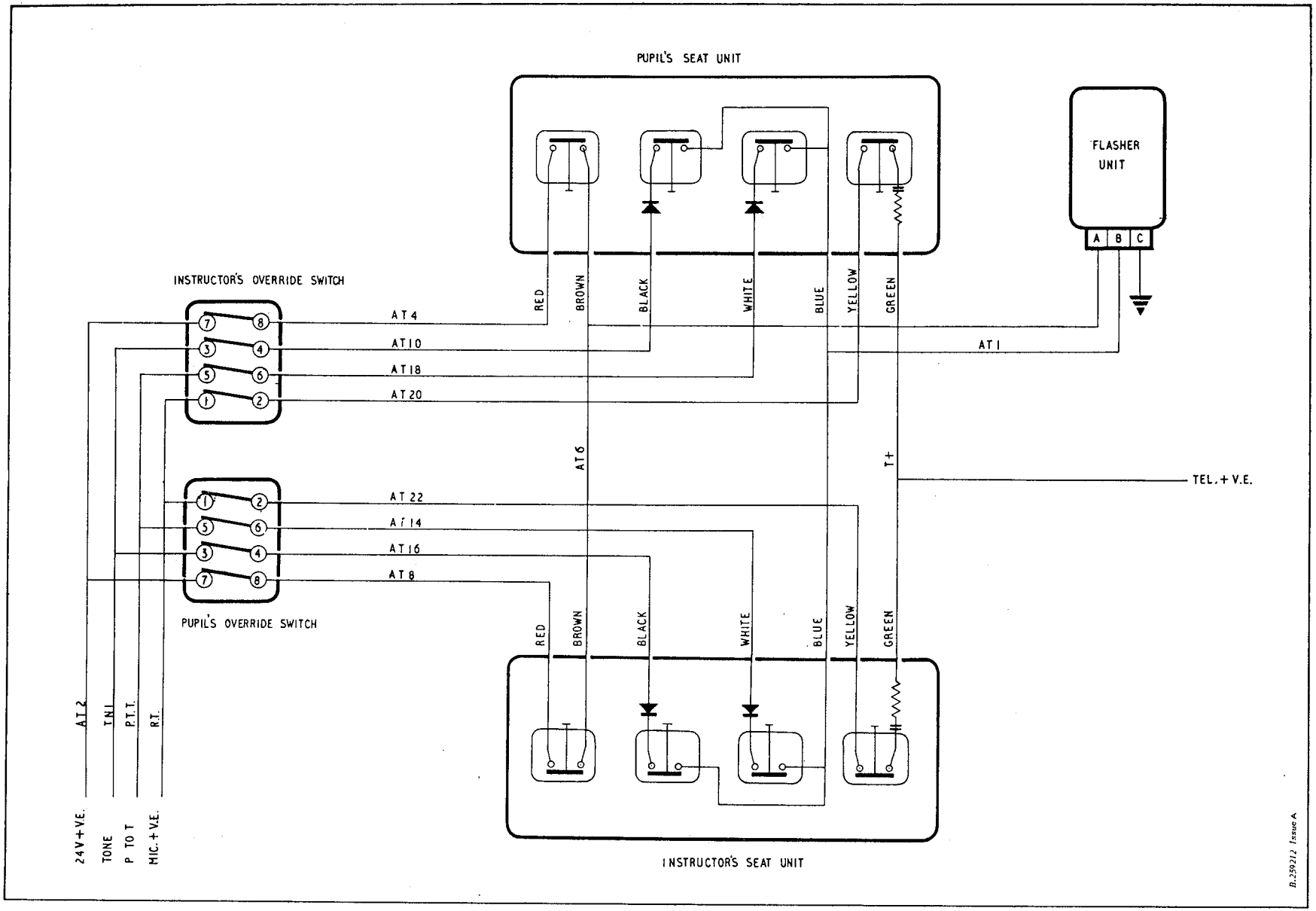

Fig.7 UHF radio auto-tone (theoretical)

ARI 23288 - VHF

10. The supply from the UHF SERVICES circuit breaker to the VHF transmitter-receiver is routed by way of a link to the ARC 52 (pre-Mod 1481) or PTR1751 (post-Mod 1481) circuit breaker via fuse No. 48 in the supply panel, and brings the transmitter-receiver to the operative state. The supply is also routed to the audio amplifier and the relays in the radio selector JB via the power switching circuits in the transmitter-receiver when the control unit is switched ON. When switched ON the equipment is in the "receive" condition. It can be switched to the "transmit" condition by use of either of the two press-to-transmit switches in the throttle twist grips.

Intercommunication amplifier

11. The A 1961 intercom amplifier is supplied from fuse No. 5 in the radio relay box, and the supply is wired to a relay within the unit, which is controlled by an ON/OFF switch and a Normal/Emergency switch, both of which are mounted on a small shelf above the cabin starboard shelf. The ON/OFF switch, in the ON position completes the earth return for the power relay, thus switching the amplifier on, and also supplying the coil of a relay, NE, and making the supply available to the coil of a second relay, TX. These relays are contained in a Type 154 junction box, which is mounted adjacent to the amplifier, in the radio bay.

12. The earth return circuit for the coil of relay NE is completed via the Normal/Emergency switch when this is to NORMAL: the earth return for the coil of relay TX is completed only when either of the press-to-transmit switches is operated. When relay NE is energized, its contacts connect the crew's microphone circuit to the amplifier input, and the telephone circuit to the amplifier output, via contacts on relay TX. When relay TX is energized, its contacts transfer the crew's microphone circuit to the transmitter-receiver in use; the telephone line remaining connected to the amplifier output.

ARI 18012 - Tele-briefing

13. A tele-briefing push-switch and an indicator lamp are mounted at the forward end of the cabin port shelf. Relays G and H (para 3) in their de-energized condition connect the crew's telephone and microphone lines with the transmitter-receiver; relay H connecting the microphone lines, and one contact on relay G connecting the telephone line, via the Type 148 junction box (para 18). Relays A, G and H derive supplies from the essential load line (para 3), and earth returns are completed when the tele-brief P to S switch is pressed. With the relays energized, relay A provides its own hold-on circuit and a hold-on circuit for relays G and H when the tele-brief switch is released. When the tele-briefing connection is made and the relays are energized, relay H connects the crew's microphone lines to the tele-briefing system, and one contact of relay G connects the telephone line, via the Type 148 junction box; the other contact passes a supply to the tele-briefing lamp. The essential load line supply is also wired to a pin of the tele-briefing plug, and, by the completion of the tele-briefing connection, this supply becomes available to the coil of the switching relay in the tele-briefing building. This relay is energized, through contacts in relay A, by operation of the tele-briefing push-switch, and connects the crew's microphone to the tele-briefing amplifier.

ARI 18107-Tacan

14. The Tacan equipment in this aircraft comprises a transmitter-receiver, a coupling unit and a control unit, and uses a Type 100B aerial. The installation is a navigation aid which, when tuned to a ground surface beacon, provides outputs of distance and bearing information; these outputs are fed to the indicator on the centre instrument panel. Identification signals transmitted from the beacon are fed via the Type 148 junction box to the telephones in the UHF radio installation.

15. The transmitter-receiver and the coupling unit are located in the nose wheel bay. They are supplied with a.c. and d.c. power via a.c. junction box No. 2 (also situated in the nose wheel bay) from fuses on the Tacan supply panel located in the radio bay. Mounted on this panel are the inverter starter unit, delay unit, Type T1 relay, a.c. control box and a.c. and d.c. fuses. The inverter fuse and the ground test switch are located on the generator control panel and the magnetic indicator and reset switch are mounted together on the centre instrument panel. On the transmitter-receiver mounting tray, power relays, controlled by a power supply switch on the control unit, are used to switch the the power supplies to the transmitter-receiver equipment.

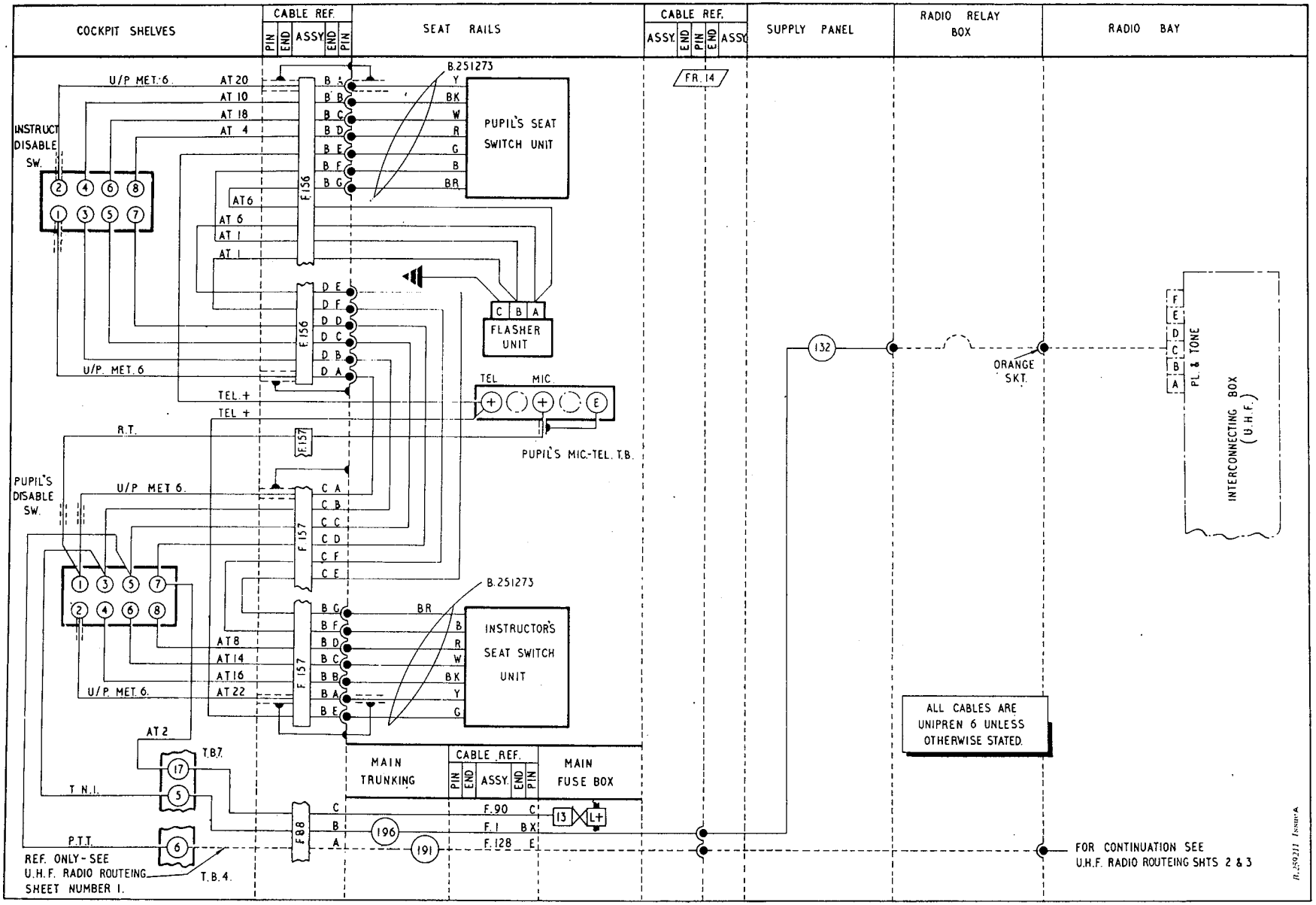

Fig.8 UHF radio auto-tone (routeing)

16. On the control unit, the power supply switch is a two-position toggle switch marked ON and OFF. A further two-position switch, marked BRG. and DIST. BRG. is used to select the mode of operation. In the position BRG. the equipment is switched to "receive" only; in the DIST. BRG. position the mode is changed to transmit and receive for distance information. Interior illumination lamps in the control unit are supplied with 28 volt d.c. from the cabin lighting circuit (Group F1).

Operation

General

17. Fig.1 and 2 (pre-Mod 1481) or Fig 1A and 2B (post-Mod 1481) illustrate the condition of the radio circuits when the battery master switch is OFF with Mod 1430 embodied. When the battery master switch is ON, the power supply is available, via the UHF SERVICES and ARC 52 (pre Mod 1481) or PTR 1751 (post Mod 1481) circuit breakers, at the power relay in the main UHF transmitter-receiver and also via the UHF SERVICES circuit breaker, at the fuses in the radio relay box. Supplies are thus available at the power relays in the UHF standby transmitter-receiver and the intercom amplifier, The VHF transmitter-receiver is supplied from the UHF SERVICES circuit breaker via fuse 48 in the supply panel. Fig.2A similarly illustrates the condition of the radio circuits when the battery master switch is OFF for pre-Mod 1430 installations.

UHF - Main

18. When the Normal/Standby set selector switch is at NORMAL, it completes the earth return for the coils of relays C and D, which energize, and their contacts connect the crew's telephone, microphone and press-to-transmit lines to the UHF transmitter-receiver; the telephone positive line being routed via the Type 148 junction box and relays G, NE, and D; the microphone lines via relays H, TX, NE and C. Relays C and D are connected to the main UHF transmitter-receiver via relays A, B and C in the radio selector JB when Mod 1430 is embodied.

19. By putting the control unit function switch to position TR, the power relay in the transmitter-receiver is energized, and the supply passes to the transmitter-receiver equipment, which then warms up ready for operation. When the control unit channel selector switch is set to a channel position, any signals on that channel will be received, and can be heard in the telephones.

20. In the event of a failure of hydraulic pressure, a supply from the hydraulic failure warning circuit energizes the coil of relay B and coil c-d of relay J *(para 4)*. Relay B's contacts connect the resistor-capacitor element in series with relay J's coil a-b and the microphone circuit; relay J's contacts *(initially closed by the pull of c-d)* are now opened by coil a-b, thereby de-energizing a-b and earthing the resistor-capacitor. This cycle of operation, repeated at high speed, produces a warning signal in the telephones until hydraulic pressure is restored, and relay B's coil and relay J's coil c-d are de-energized.

21. Operation of either of the main press-to-transmit switches completes the earth return for the switching relay in the transmitter receiver via contacts 2-3 of relay D. Thus, the switching relay is energized switching the transmitter-receiver to the "transmit" condition. At the same time, operation of the press-to-transmit switch energizes relay F, whose contacts 5-4 open, disconnecting the audio warning element from the microphone circuit. In the event of the main press-to-transmit switches proving ineffective, operation of the emergency press-to-transmit switch energizes relay E, whose contacts 2-3 complete an alternative earth return circuit for the switching relay.

UHF – Standby

22. The standby transmitter-receiver is brought into use by putting the Normal/Standby set selector switch to STANDBY, thereby disconnecting the earth return from the coils of relays C and D, and connecting it to the coil of the power relay in the standby transmitter-receiver. This relay energizes, passing a supply to the transmitter-receiver equipment, which warms up ready for operation. At the same time, the contacts of the de-energized relays C and D connect the telephone, microphone and press-to-transmit lines to the standby transmitter-receiver, these lines being routed as described in paragraph 18. With the set in the "receive" condition, signals on the guard or the alternative channel *(according to the position of the channel change-over switch)* will be received, and can be heard in the telephones.

23. Switching from the "receive" to the "transmit" condition is effected in a similar manner to that described in paragraph 21. To operate the set from the emergency battery, the radio power switch is put to the EMERGENCY BATTERY position. A supply then passes from the battery via fuse No. 1 in the radio relay box to the transmitter-receiver.

VHF

24. The VHF system is brought into operation by switching the control unit ON. This action completes an earth return to the power switching circuit, in the transmitter-receiver, which switches the 28 V supply to the audio amp-

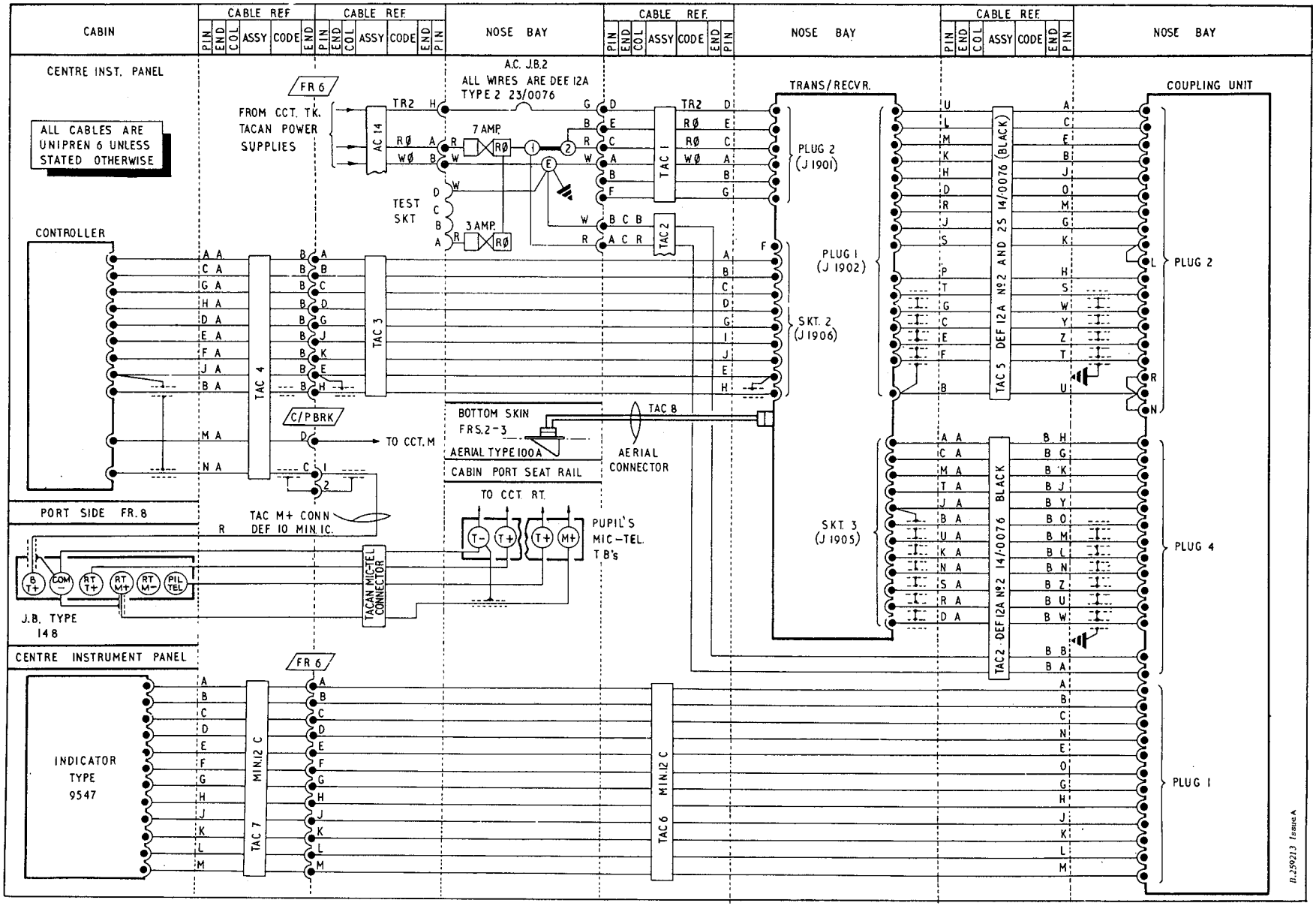

Fig.9 Tacan navigation system (routeing)

lifier and to the energizing coils of relays A, B and C in the radio selector JB. With relays A, B and C energized the telephone positive, press-to-transmit and microphone lines from relays C and D in the radio relay box are disconnected from the main UHF transmitter-receiver and connected to the VHF transmitter-receiver via the audio amplifier. The telephone positive line being selected through contacts 1-3 of relay A, the press-to-transmit through contacts 1-3 of relay B, and the microphone lines through contacts 1-3 and 4-6 of relay C.

Intercommunication amplifier

25. With the amplifier On/Off switch to ON, and the Normal/Emergency switch to NORMAL, an earth return circuit for the coil of the amplifier power relay and relay NE is complete. Thus, by a supply from fuse No. 5, the power relay is energized, supplying the amplifier equipment and also energizing relay ND, thereby connecting the crew's microphone and telephone lines to the amplifier; the telephone line being routed via the Type 148 junction box, and relays G and NE; the microphone lines via relays H, TX and NE. The telephone line from the transmitter-receiver is connected to the amplifier input, hence the crew can communicate with each other, and also hear any received signals.

26. When the amplifier is on, operation of either of the press-to-transmit switches completes the earth return for the coils of relays TX and F, and the transmitter-receiver switching relay. The contacts of relay TX transfer the crew's microphone lines from the amplifier to the transmitter-receiver, the telephone line remaining connected as before. On release of the press-to-transmit switch, relay TX is de-energized, and its contacts re-connect the crew's microphone lines to the amplifier.

27. In the event of failure of the amplifier, the Normal/Emergency switch is put to EMERGENCY, thereby de-energizing relay NE, whose contacts open, disconnecting the crew's telephone and microphone lines from the amplifier and connecting them to the transmitter-receiver. The crew can then communicate via the transmitter-receiver audio-frequency stages.

Tele-briefing

28. The tele-briefing facility becomes available when the ground installation socket is mated with the aircraft's tele-briefing plug. When the tele-brief P to S switch is pressed, earth returns are provided for relays A, G and H in the radio relay box which are supplied from the essential load line via fuse No. 2 in the relay box. When the tele-brief switch is released the relays remain in their energized position via contacts in relay A which provide an alternative earth return via the tele-brief connection to the relay coils. The supply from fuse No. 2 is also connected via a pin of the tele-briefing connection to a switching relay in the tele-briefing building.

29. With relays G and H energized, relay G's contacts 2-3 connect the crew's telephone link to the tele-briefing circuit, while contacts 5-6 connect the supply to the tele-briefing indicator lamp in the cabin; relay H's contacts 2-3 and 5-6 connect the crew's microphone lines to the tele-briefing circuit. Thus, the tele-briefing lamp is illuminated, and the crew can receive information over the system. When it is required to talk back, the aircraft's tele-briefing push-switch must be operated. Depression of this switch completes the earth return via contacts 5-6 in relay A for the switching relay, which operates, connecting the crew's microphone lines to the tele-briefing amplifier, and causing a lamp in the building to light, indicating which aircraft's microphone is connected.

Tacan

30. When the engine is running and the generator main circuit breakers are operated a supply is fed to the operating coils of relays A2 and B2 *(Group B1)*. The operation of either of these two relays passes a supply from fuse No. 30 on the supply panel through contacts 5-5a of the respective relay to contacts 2 and 5 of relay B via the normally closed contacts of the reset push switch. When the aircraft becomes airborne a supply is conducted from fuse No. 25 on the supply panel *(Group G1)* via the oleo leg microswitches and diode D3 to the operating coil of relay B.

31. When relay B operates, it holds through its own contacts 5-6 and diode D2 and passes a supply via contacts 2-3 to terminal 1 of the delay unit and via contacts 4-5 of relay C to the operating coil of the Type T1 relay. Contacts 2-3 of relay B also feed a supply via contacts B-C of the relay in the control panel to the operating coil of relay A. The operation of the Type T1 relay passes a supply from the 125 amp fuse to the starter unit operating the inverter, but since relay A is also operated the a.c. supply line to the equipment fuses remains isolated until the inverter voltage builds up and operates the relay in the control panel. The operation of the relay in the control panel disconnects the supply from the operating coil of relay A and completes the circuit to the operating coil of the Tacan a.c. supplies indicator which shows BLACK indicating that the a.c. supply is available at the equipment since with relay A de-energized its contacts 1-2 pass the a.c. supply to the equipment fuse. After an interval of 5 seconds the delay unit operates and feeds a supply via contacts 1-3 to the operating coil of relay C, relay G operates and holds on through its own contacts via diode D1

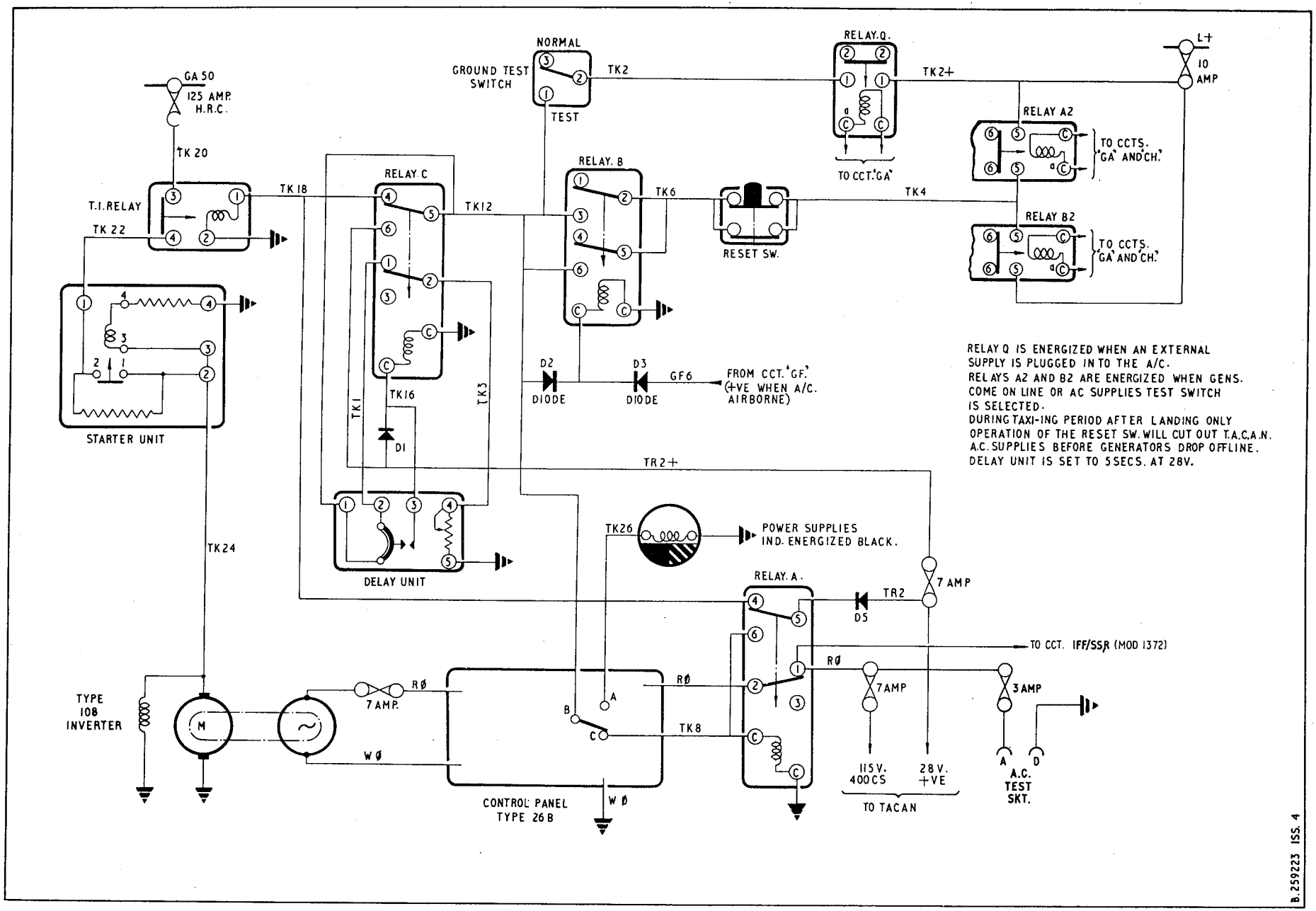

Fig.10 Tacan power supplies (theoretical)

thus breaking the circuit through the heater element of the delay unit *(which resets automatically)* and passes a supply via contacts 5-6 to the equipment d.c. fuse. The hold line to the Type T1 relay is maintained by a supply from the d.c. fuse via diode D5 and contacts 4-5 of relay A. Since the holding circuit of relay B is self maintained the supply equipment will continue to operate after the aircraft has landed and only operation of the reset switch will cut out the supplies before the generators come off line.

32. Failure of either the a.c. or d.c. supply will cause the inverter to stop operating and the a.c. supply line to be isolated from the equipment fuse. Should the output from the inverter fail or the inverter fuse blow the relay in the control unit will become de-energized, opening contacts A-B and closing contacts B-C. The opening of contacts A-B disconnects the supply from the operating coil of the Tacan supplies indicator, which shows WHITE to indicate failure. Contacts B-C of the relay in the control panel feed a supply to the operating coil of relay A, which operates and holds on through its own contacts, isolating the supply line to the equipment fuse and breaking the holding circuit of the Type T1 relay, thus stopping the inverter. In the event of a d.c. supply failure eg, blowing of the d.c. fuse, the hold on circuit to the Type T1 relay is broken thus stopping the inverter. As the inverter out-put voltage falls the relay in the control panel is de-energized, isolating the a.c. supply lines and de-energizing the Tacan supplies indicator as previously described. If the failure of the inverter output was of a temporary nature, the system can be restarted by operating and releasing the reset switch; this action de-energizes relays A, B and C and re-initiates the starting sequence.

33. To test the equipment on the ground with the engine stopped, an external supply must be connected to the aircraft; a supply is then available, via contacts 1-1a of relay Q *(Group B1)*, to terminal 2 of the ground test switch. Placing the ground test switch in the TEST position passes a supply to contacts of relay B to start the Tacan supplies system as described in *(para 30)*. After testing, the switch must be returned to the NORMAL position.

34. When the Tacan supplies system is operating, the a.c. and d.c. supplies required by the Tacan installation are available, via the fuses on the Tacan supplies panel and in a.c. junction box No. 2, at the power relays on the transmitter-receiver mounting and at the coupling unit. The equipment is switched into operation when the power switch on the control unit is put to the ON position, and will operate as determined by the position of the mode selector switch. If this switch is put to the DIST. BRG. position, the transmitter-receiver power relays will switch on the whole of the equipment, so that both bearing and distance information is indicated; if the switch is in the position BRG., the equipment is switched on so that bearing information only is indicated.

SERVICING

General

35. Information on general servicing of the aircraft electrical system is given in Group A1. Except for keeping all the components clean and carrying out the standard routine tests for security and serviceability described in the Air Publications listed in Table 1, no further servicing should be necessary. If a fault is reported in either of the radio installations, the supply circuit should first be checked, and the connectors inspected to ensure that they are correctly mated. Also, the voltage should be tested both on and off load.

REMOVAL AND ASSEMBLY

General

36. Once access has been obtained, the removal and assembly of the components of the radio installations should present no difficulties. The removal of the radio relay box, which contains most of the radio supply circuit equipment, is described in Sect 6, Chap 1.

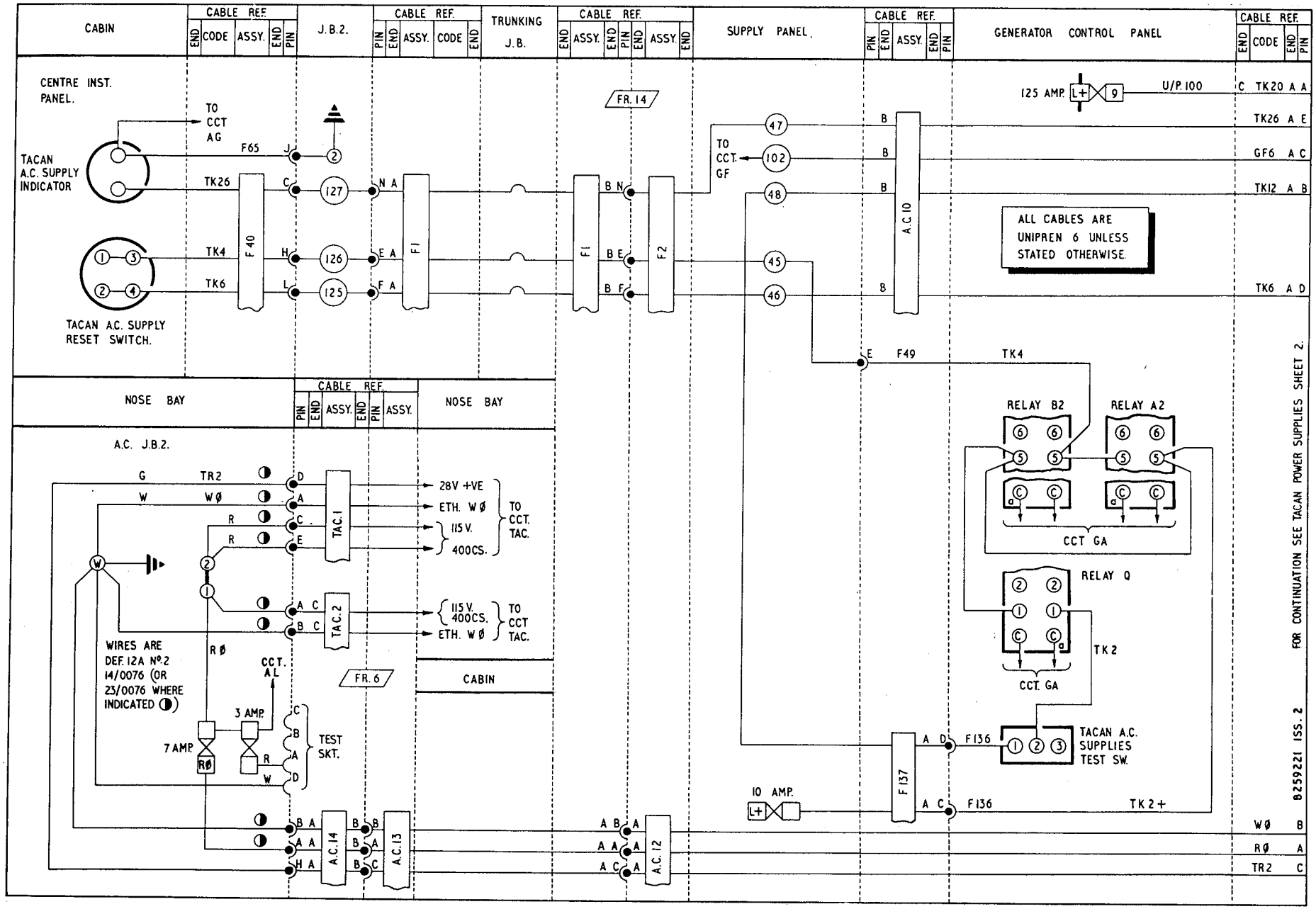

Fig.11 Tacan power supplies (routeing sheet 1)

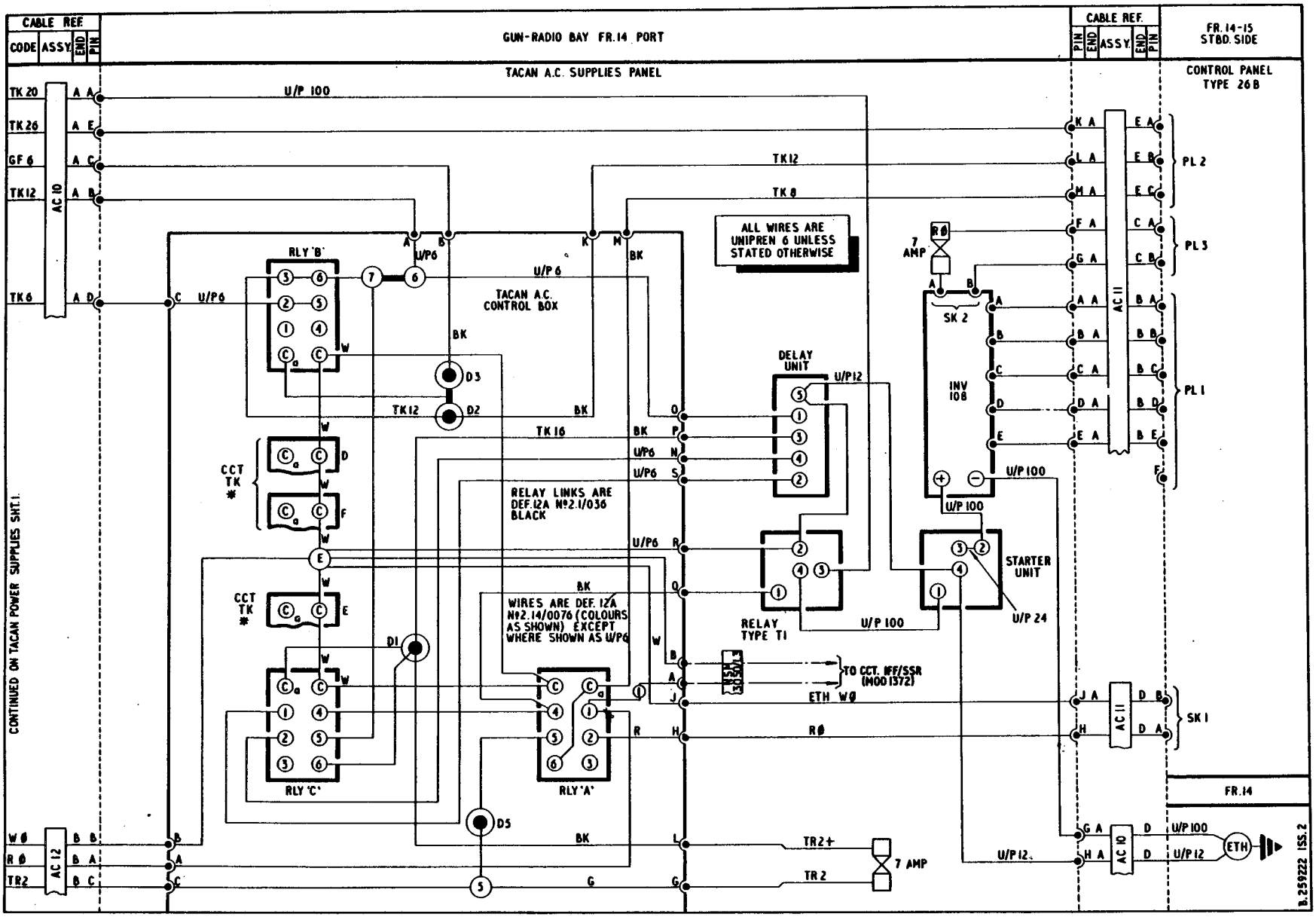

Fig.12 Tacan power supplies (routeing sheet 2)

APPENDIX 1 – MOD 1309

CONTENTS

Introduction

1. This modification, authorised by NSM 3026, is designed to remove a functional limitation inherent in the tele-briefing (ARI 18012) circuit as originally installed. The modification introduces an additional relay (relay A) and an additional diode into the radio relay box and re-routes the tele-briefing circuit within the radio relay box. A theoretical circuit of the radio supplies is shown in Fig.1 and the internal wiring of the radio relay box is shown in Fig.2. Fig.3 of this Appendix shows a simplified theoretical diagram of the modified tele-briefing circuit.

DESCRIPTION

General

2. In the pre-Mod 1309 installation, as soon as the tele-briefing land line was connected to the aircraft tele-briefing socket, the tele-briefing operating relays in the radio relay box were energized and automatically switched the pilot's head-set from normal radio communication to control tower tele-briefing reception and remained so until the telebriefing land line was disconnected. The pilot could therefore be without radio communciation for unnecessarily prolonged periods.

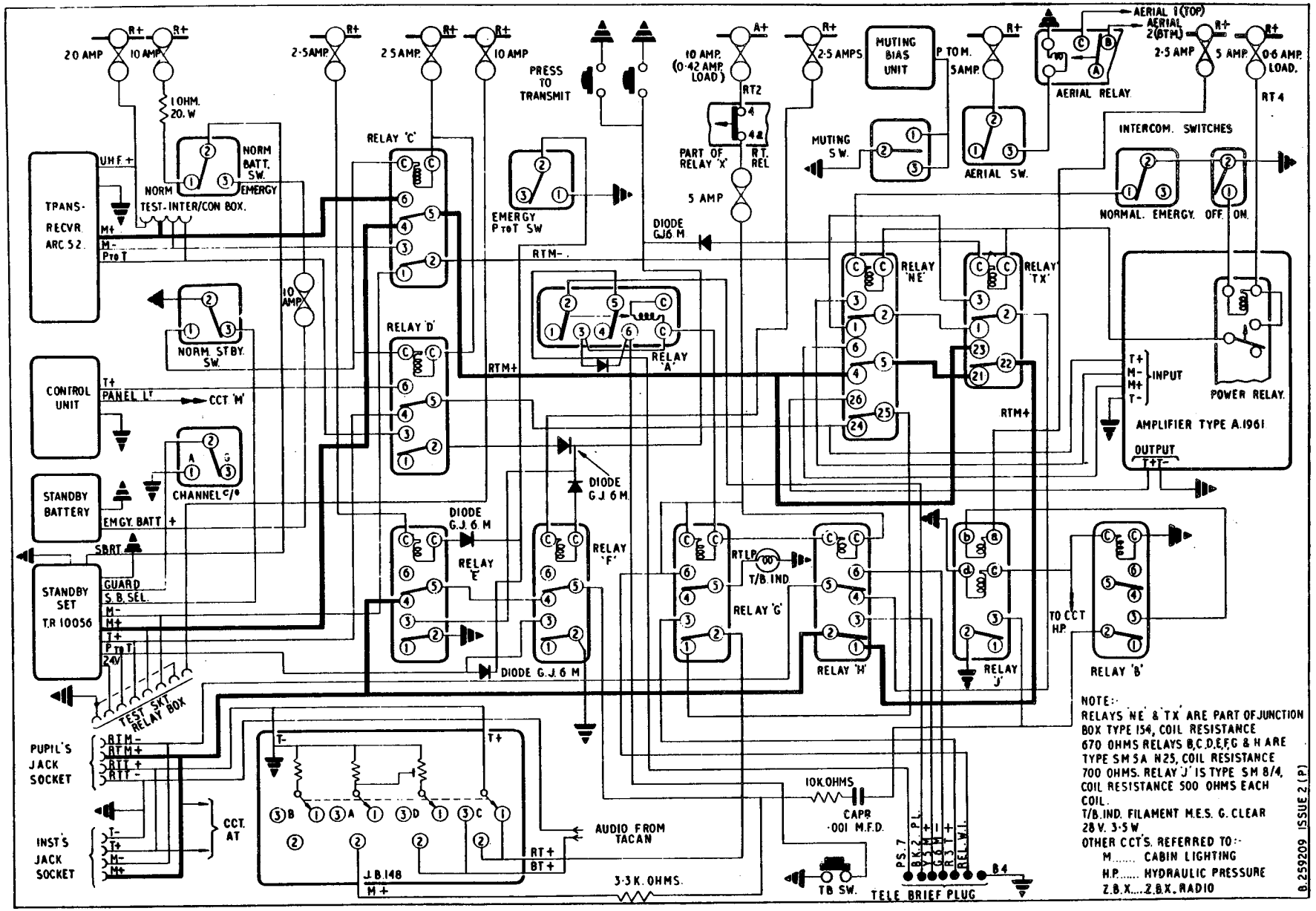

Fig.1 UHF, tele-briefing, intercommunications and Tacan (theoretical)

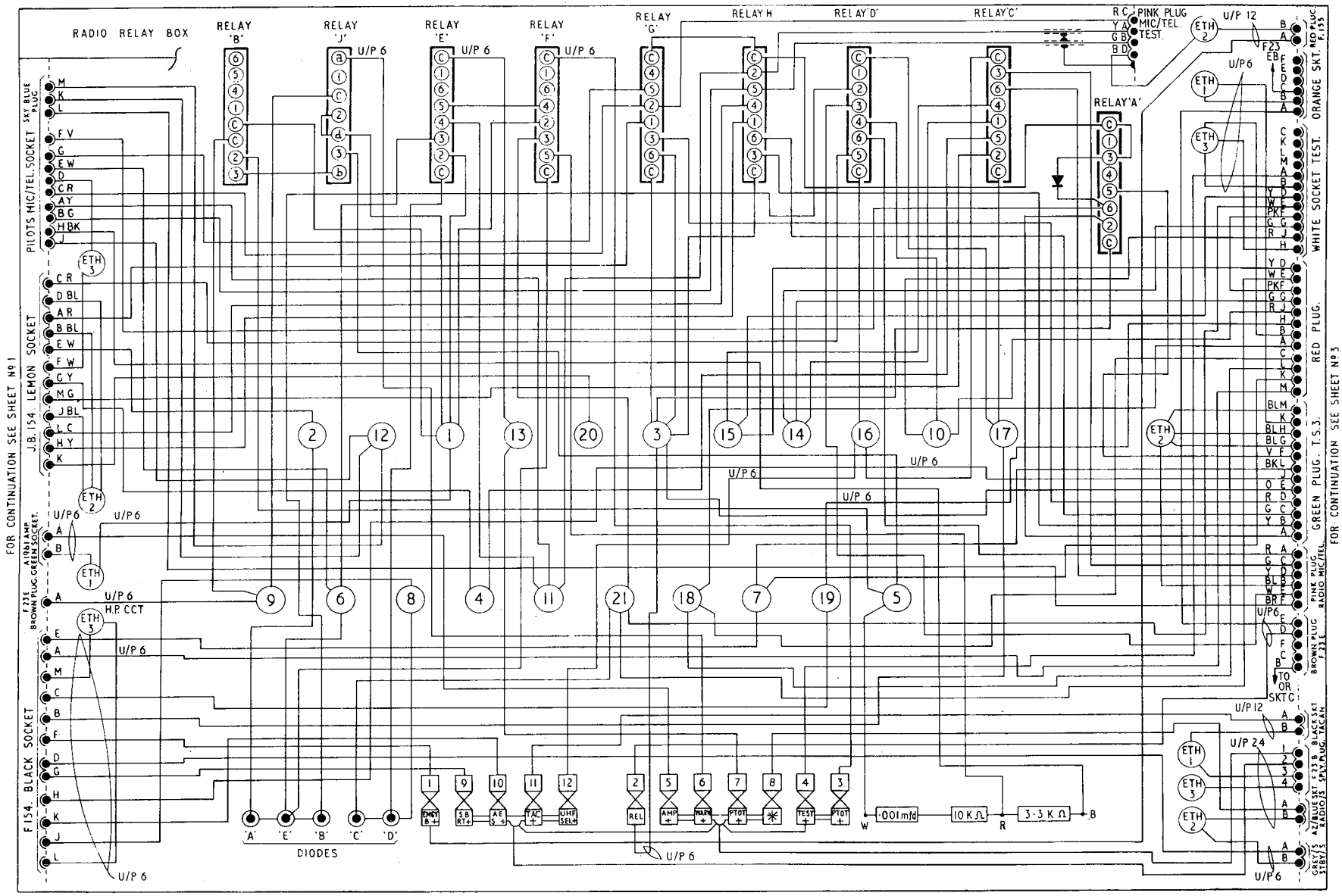

Fig.2 Radio relay box (internal - routeing)

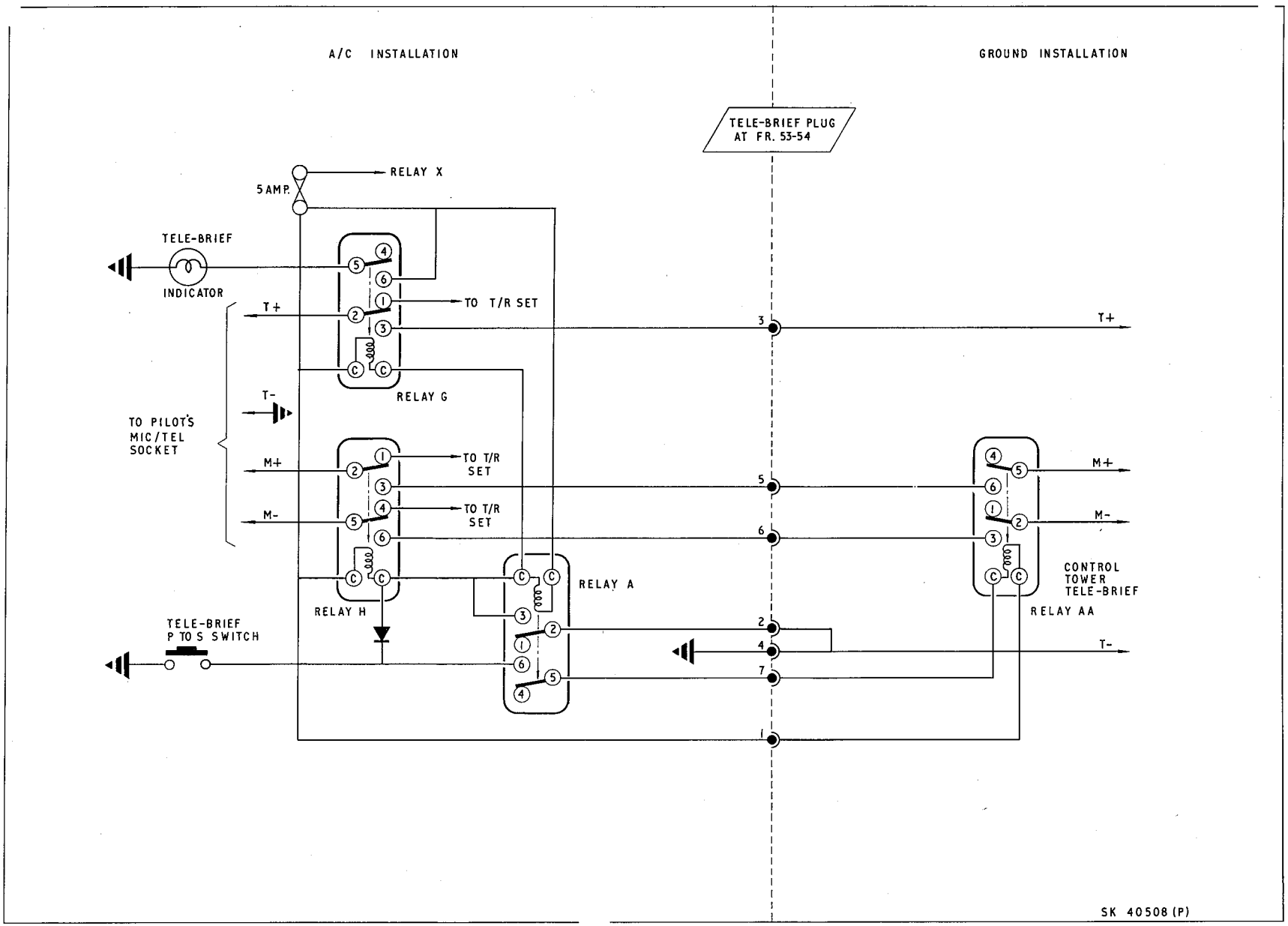

Fig.3 Simplified tele-briefing circuit (theoretical)

3. With the incorporation of Mod 1309 the tele-briefing land line can be connected to the aircraft tele-briefing socket without the automatic energizing of the tele-briefing relays and consequent loss of normal radio communication. To transfer from radio communication to tele-briefing it now requires the pilot to make a selection by depressing the tele-briefing push button switch on the port forward cabin shelf before the tele-briefing relays are energized. Once energized the relays remain locked on and the tele-briefing indicator lamp adjacent to the push button switch remains alight after release of the push button switch. Tele-briefing voice reception from control tower to pilot requires no further selection by the pilot but to talk to the control tower, he must hold the tele-briefing push button switch depressed as this energizes the microphone relay in the control tower and completes the mic. circuit.

OPERATION

General

4. Supply to energize the tele-briefing relays G, H and A is taken from fuse 2 in the radio relay box. This circuit is completed by the initial depressing of the tele-briefing P to S push button switch on the cabin port shelf after the tele-briefing land line has been plugged into the aircraft tele-briefing socket between frames 53 and 54 on the undersurface of the rear fuselage. A hold-on circuit for the relays on release of the P to S switch is provided across contacts 3–2 of energized relay A and pins 2 and 4 of the tele-briefing socket via the land line connection. This ensures the pilot's head-set microphone positive and negative remain connected to the tele-briefing land line by the closed contacts 2–3 and 5–6 of relay H, and the telephone positive by closed contacts 2–3 of relay G. Telephone negative is an unswitched earth return. A supply to the tele-briefing indicator lamp filament on the port shelf of the cabin is maintained by the closed contacts 6–5 of relay G. From the simplified tele-briefing diagram in Fig.3 it can be seen that the supply to energize relay AA in the control tower and complete the pilot's microphone circuit is from fuse 2 in the radio relay box via pin 1 of the land line to relay AA and back to earth via pin 7, the closed contacts 5–6 of energized relay A and the tele-brief P to S switch, which must be held depressed. The diode prevents the possibility of de-energizing the tele-briefing relays through feed-back when operating the P to S switch.

SERVICING

General

5. Modification 1309 does not amend the servicing of the radio equipment which remains ▶ as described in Group H1, para 35. The radio ◀ equipment also remains as listed in Table 1 of Group H1.

REMOVAL AND ASSEMBLY

General

6. Removal and assembly of the radio installation components remains as described ▶ in Group H1, para 36. ◀

Appendix 2 – MOD.1372

(IFF/SSR 1520 – ARI 23134/3)

(CODE IF)

LIST OF CONTENTS

Introduction

1. This appendix contains the description and operation of the supply circuits for the IFF/SSR installation fitted to the Mk.8C aircraft by Mod.1372 together with information on the servicing required to maintain the equipment in an efficient condition. Theoretical and routeing diagrams of the circuits are included and if further information on the installation is required, reference should be made to SRIM 3050. For a description of the aircraft electrical system, reference should be made to Groups A.1, A.2 and A.3 and further information on the standard items of equipment used on the installation will be found in the Air Publications listed in Table 1.

DESCRIPTION

General

2. The IFF/SSR (Identification Friend or Foe/Secondary Surveillance Radar) installation (ARI 23134/3) forms the airborne part of the IFF/SSR system, the purpose of which is to enable an aircraft to self identify rapidly and automatically when challenged by appropriately equipped ground installations. When interrogated by the ground station the airborne equipment responds by transmitting the appropriate reply signal.

Equipment and supply

3. When this installation is fitted the two

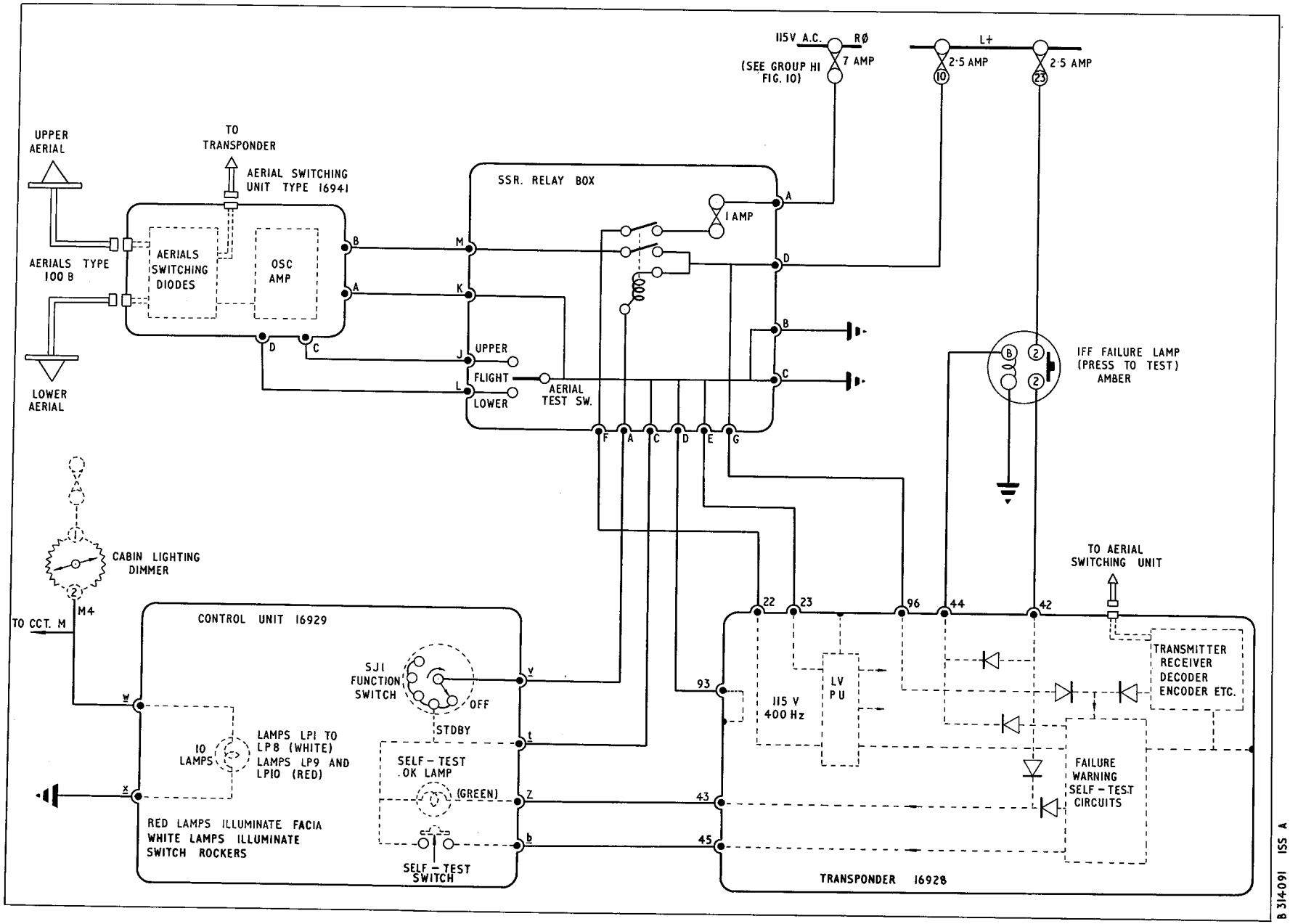

Fig. 1 IFF/SSR supplies (theoretical)

gyro gunsights are removed from their mountings in the cabin and the IFF/SSR control unit and failure warning lamp are installed in a mounting bracket in place of the port gun sight and a blanking plate is fitted in place of the starboard gun sight. When Mod 1430 is embodied, the IFF/SSR control unit is positioned to enable a VHF control unit to be fitted below it, whilst the failure warning lamp is located on the lower left hand side of the centre instrument panel. The other units of the installation are fitted in the radio bay, apart from the two aerials which are fuselage mounted. The transmitter/receiver (transponder) is at the rear end of the upper radio mountings, the aerial switching unit and the relay box are on the upper front face of frame 19.

4. Electrical supply to the IFF/SSR circuits is via two d.c. fuses in the supply panel and one a.c. fuse in the output side of the Type 108 Tacan inverter in the radio box (Group H 1). The a.c. supply is further protected by the 1 amp fuse in the IFF/SSR relay box. Interconnection of units is by multi-pin plug and socket connectors and two earthing points are provided one from the control unit to earth point 4 in the cabin and one from the relay box to earth point 5 at frame 15.

5. The transponder is mounted transversely on the upper radio mountings immediately forward of frame 19. It is slid into a tray supported on anti-vibration mountings and secured at the inboard end by two catches. Supply connection is by one 98 way pin and socket connector. In addition to providing connection for the existing IFF/SSR installation, this connector also forms one end for each of the two cables provided for the future fitment of Mode C (height encoding) and the Mode D controller. The other end of Mode C and D cables are secured to a bracket fitted below the transponder mounting at the outboard end and blanked off. Connection between transponder and aerial switching unit is by a co-axial cable.

6. The aerial switching unit and the relay box are bolted to a mounting channel assembly on the forward face of frame 19 immediately aft and inboard of the transponder. The two units are mounted one above the other, the switching unit in the upper position. The aerial switching unit has three co-axial connectors, one to each aerial and one to the transponder, plus a pin and socket supply connector. The relay box has two pin and socket connectors and contains the installation supply control relay, the aerial test switch and a 1 amp fuse in the a.c. supply circuit to the transponder. The toggle of the aerial test switch, normally locked in its central position by a spring loaded cover guard, protrudes from the bottom face of the relay box and may be selected externally. It is a three position switch, namely UPPER/FLIGHT/LOWER and only moved from the FLIGHT position during testing or servicing operations. The markings refer to the aerial which is connected to the transponder and in the FLIGHT position the aerial switching is controlled by the aerial switching unit.

7. Supply to the IFF/SSR control unit, mounted in front of the pupil pilot in the cabin is by a single multi-pin connector in the rear of the unit. The amber failure warning lamp/switch mounted adjacent to the control unit has four terminal connections. Illumination of the control unit is by ten internal lamps, two red which illuminate the facia and eight white for the switch rockers.

Operation

8. All single phase 115v, 400Hz, a.c. supply required for operation of the IFF/SSR installation is supplied by the TACAN Type 108 inverter (Group H 1). This supply is taken via the 7 amp fuse in the output line from the inverter and terminal 1 of relay A in the TACAN a.c. control box to the 1 amp fuse in the IFF/SSR relay box. It is therefore essential to have the Type 108 inverter on line before operation of the IFF/SSR equipment is possible.

9. With 28v d.c. supply to the busbar and the IFF/SSR control unit function switch OFF, both the amber IFF FAIL lamp and green TEST lamp in the cabin will glow. The circuit for the FAIL lamp is from fuse 10 in the supply panel, pins D and G of the relay box to pin 96 of the transponder through the failure circuits of the transponder to pin 44 then to earth through the FAIL lamp filament. The circuit for the green TEST lamp on the control unit is similarly from

TABLE 1

Equipment type and Air Publication reference

Equipment Type	Air Publication
Aerial test switch Ref. 5CW/1047694	
Failure warning lamp/switch, Ref. 5CW/9743	
Relay box	Naval design

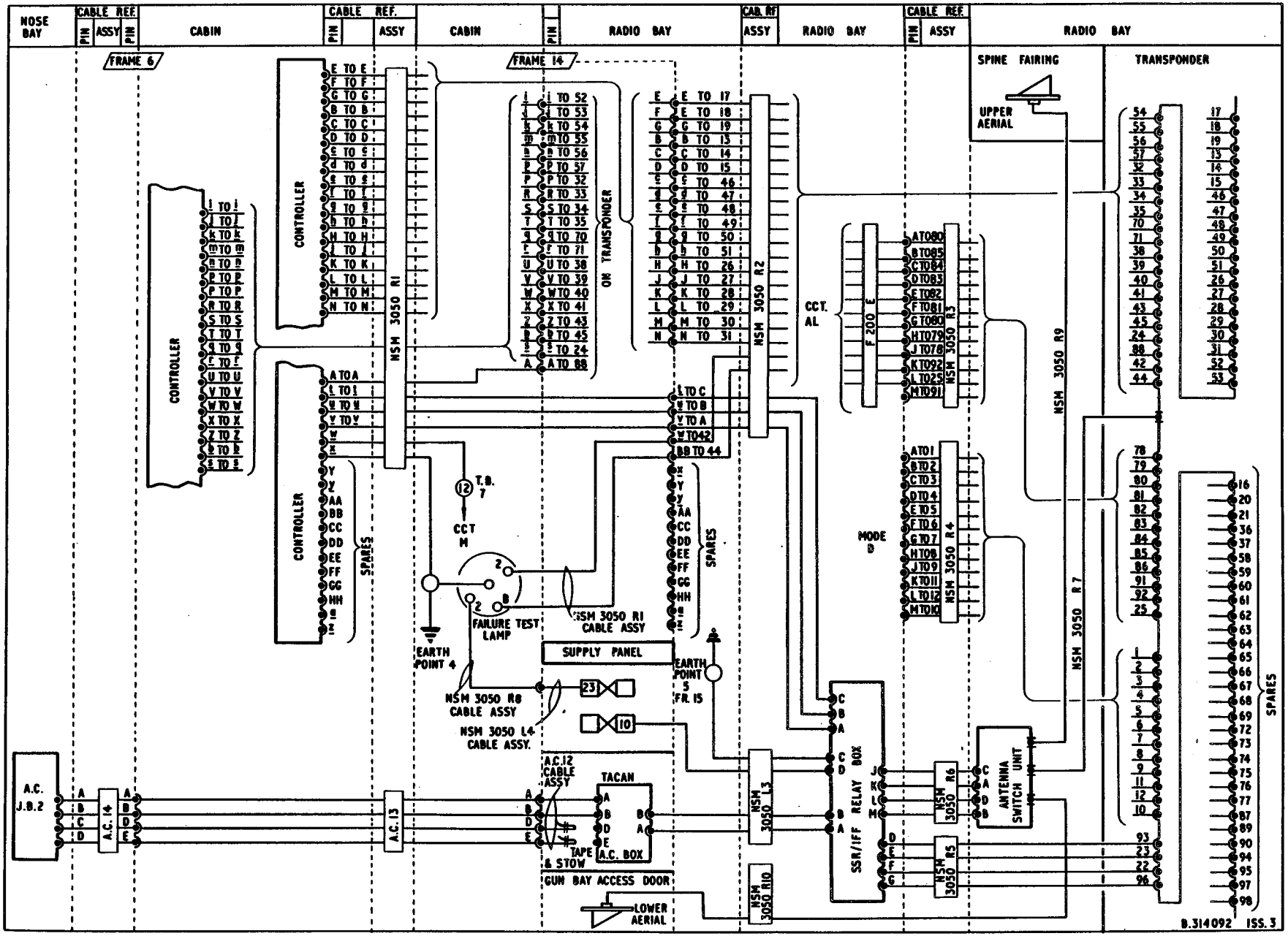

Fig.2 IFF/SSR supplies (routeing)

fuse 10 to pin 96 of the transponder, through the failure warning circuits to pin 43, then to pin z of the control unit and through the green filament to earth via pin t on the control unit and pins C-C on the relay box. Selection of the function switch to STDBY provides a circuit to energize the coil of the control relay in the relay box from fuse 10 in the supply panel via pin D, the relay coil and pin A in the relay box to pin v of the control panel and through the arm of the switch to earth via pin t and pins C-C in the relay box. With the control relay energized a circuit to operate the aerial switching unit is completed from fuse 10 across the lower pair of relay contacts and pins M and B. The circuit is completed via pin A of the aerial switching unit and pins K and C of the relay box to earth. The a.c. supply circuit for operation of the transponder is also completed via the 1 amp fuse, the upper contacts of the control relay and pin F of the relay box to transponder pin 22. This circuit is completed to earth via transponder pin 23 and pins E-C on the relay box.

10. Once the installation is switched to STDBY and warmed up the amber IFF FAIL lamp and green TEST lamp will extinguish but the filaments can be checked for serviceability by depressing the body of the IFF FAIL lamp. The test circuit for the amber filament is from fuse 23 in the supply panel across contacts 2-2 of the lamp/switch to pin 42 of the transponder returning via pin 44 and through the lamp filament to earth. For the green TEST lamp the circuit is similarly to pin 42 of the transponder then from pin 43 to pin z of the control unit and through the green filament to earth via pin t of the control unit and pins C-C of the relay box. Illumination of the IFF FAIL lamp when the installation is operating indicates failure of the installation. The green TEST lamp is used to check the self test circuits as outlined in the functional checks in Sect.6, Chap.2, App.1 and has a press to test facility for this purpose.

SERVICING

General

11. Standard routine tests for security and serviceability should be carried out as described in the appropriate Air Publications listed in Table 1. When a fault is reported in the A.R.I. 23134/3 the supply circuit should first be checked to ensure that the fault is not in these circuits. Ensure also that all connectors are correctly mated and test the voltage both on and off load. General servicing of the aircraft electrical system is described in Group A.1.

REMOVAL AND ASSEMBLY

General

12. Removal and assembly of all components of the A.R.I. 23134/3 is detailed in Sect.6, Chap.2, App.1 of this A.P.