GROUP H1

RADIO AND RADAR SUPPLIES (CODE RT AND IF)

▶ (Includes Mods 1009, 1310, 1319, 1429 and 1480) ◀

CONTENTS

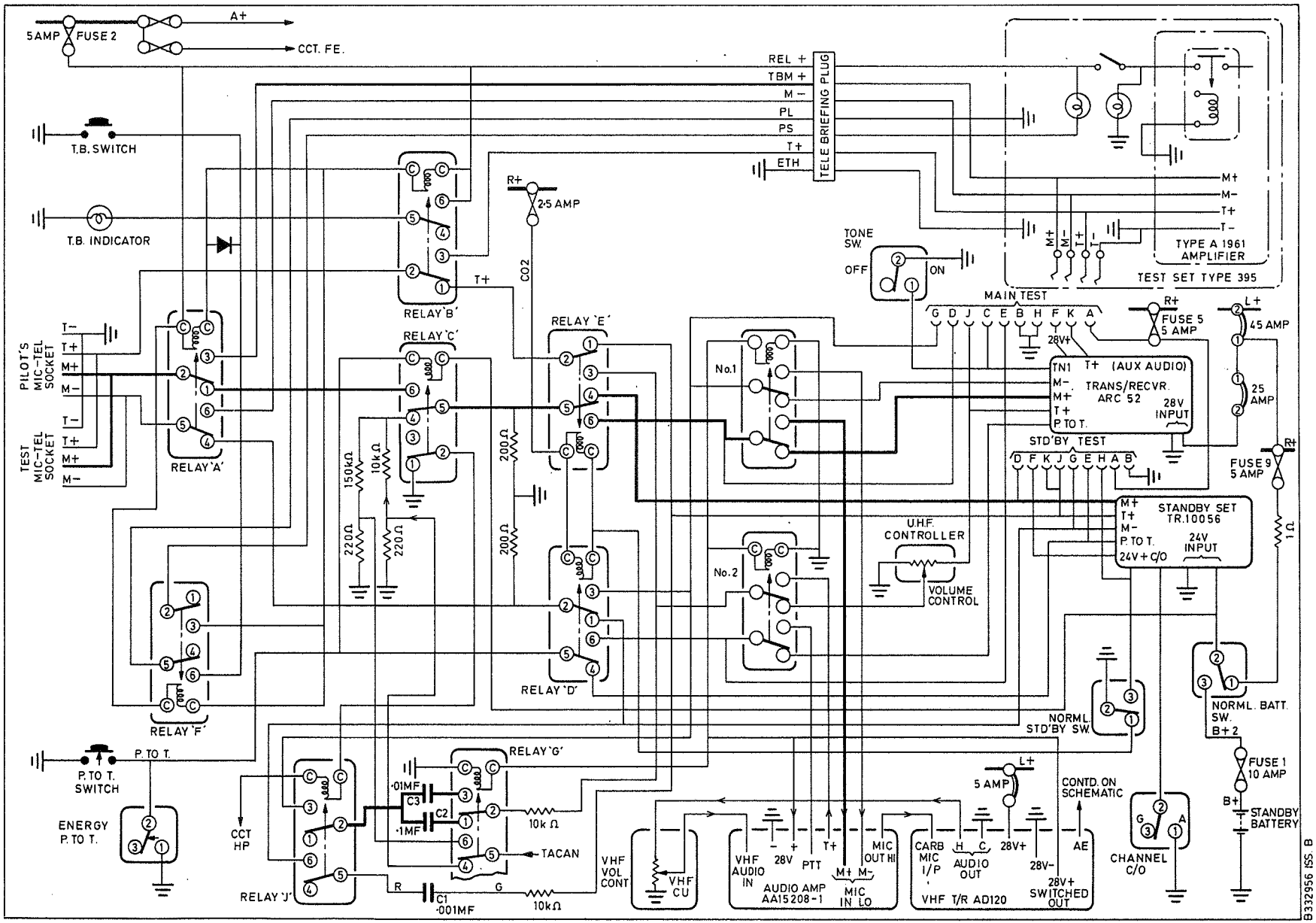


Fig. 1 Radio supplies - UHF, VHF and tele-briefing (theoretical)

▶ - pre-Mod 1480 ◀

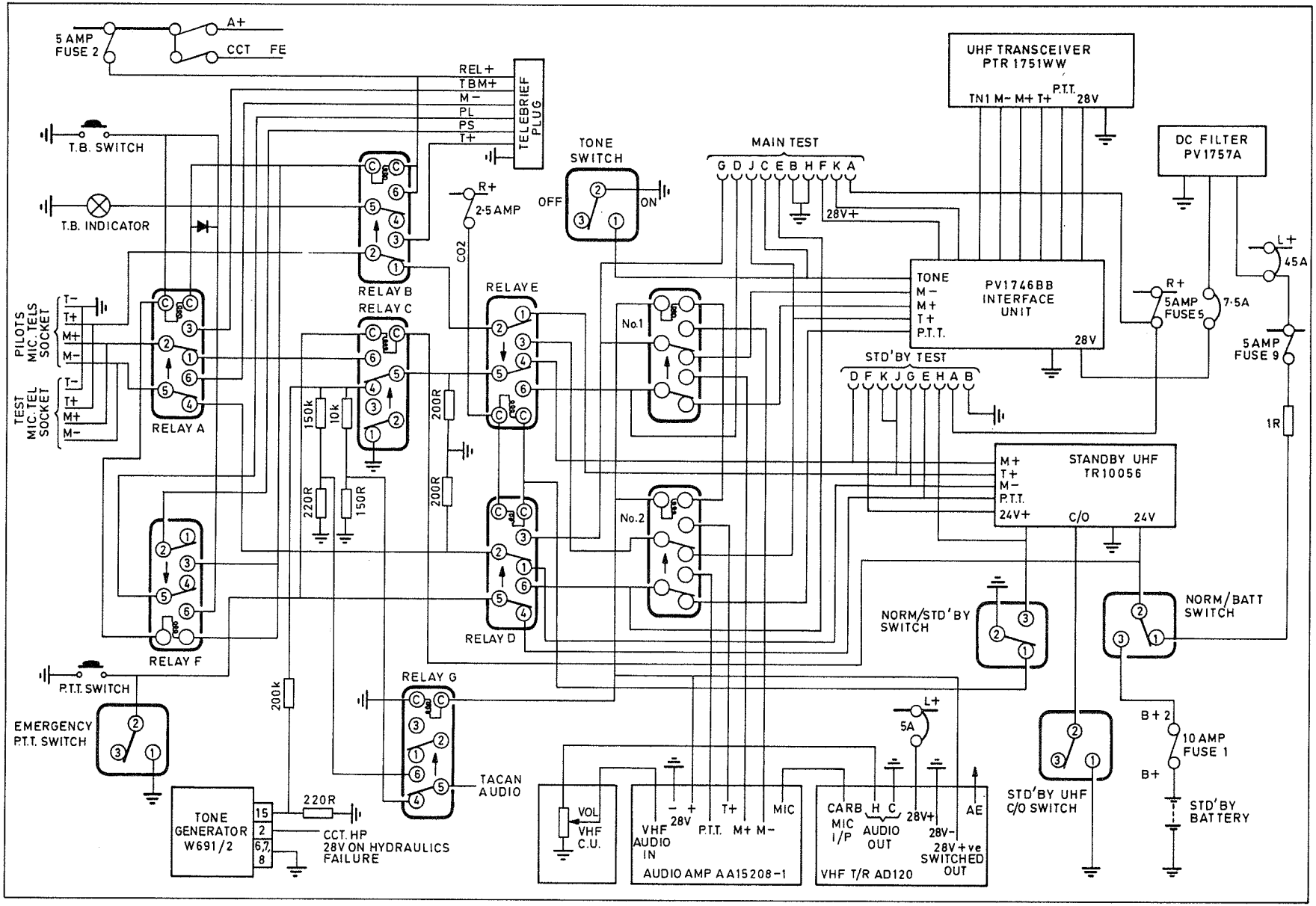


Fig. 1A Radio supplies - UHF, VHF and tele-briefing (theoretical) - post-Mod 1480

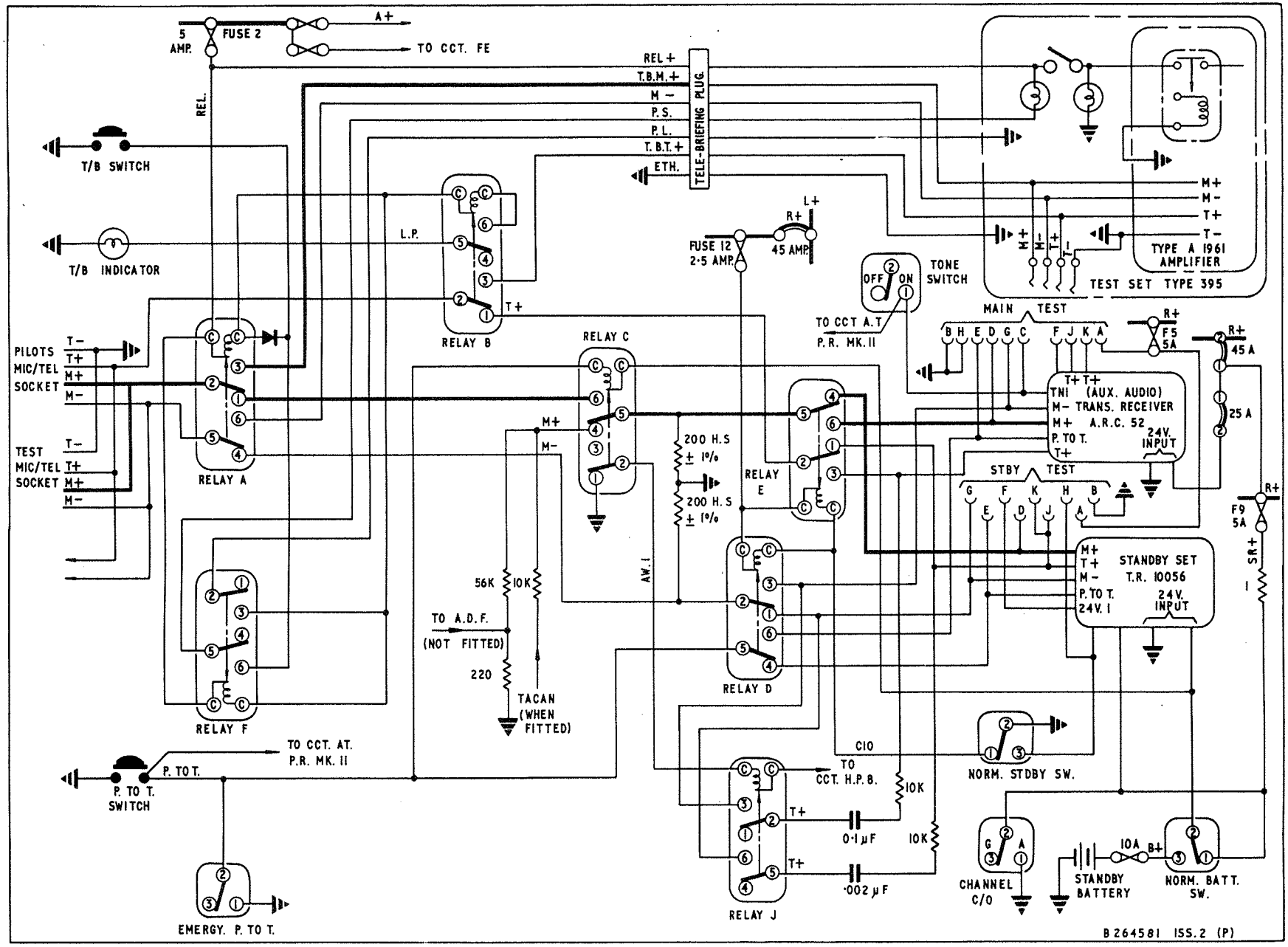


Fig. 1B Radio supplies - UHF and tele-briefing (theoretical) - pre-Mod 1429

Introduction

1. This group contains the description, and operation of the aircraft radio and radar supply circuits together with information on the servicing required to maintain the equipment in an efficient condition. Routeing and theoretical circuit diagrams are included. For a description of the aircraft electrical system reference should be made to Groups A1, A2 and A3 of this chapter. Detailed information on the standard items of equipment employed will be found in the Air Publications listed in Table 1.

DESCRIPTION

Equipment details

Radio and radar installations

2. The radio equipment includes main and standby UHF installations and, post-Mod 1429, a VHF installation. Tele-briefing equipment is incorporated which is linked with the main UHF installation. The installations are described in Sect 6, Chap 1. The main UHF set is a T/R5/ARC52 (pre-Mod 1480) or a PTR1751WW (post-Mod 1480), the standby UHF set is a T/R10056 and the VHF set is an AD1201-2. When the battery master switch is set to ON, the installations receive their d.c. supply from the supply panel (Group B1) via circuit breakers marked UHF and VHF, mounted below the supply panel in the radio bay. The standby UHF may also be operated by an auxiliary supply from a 24-volt standby battery. This battery, which may be switched into use if the main supply fails, is contained in a crate attached to the forward undersurface of the lower radio mounting structure.

3. Pre-Mod 1319, the radar installation includes an IFF Mk.10 *(described in Sect 6, Chap 2)* supplied from a circuit breaker which is marked IFF and mounted below the supply panel. This supply operates a Type 200 inverter to provide a.c. for the IFF. The main d.c. supply for the IFF is taken from a fuse mounted on the cabin starboard shelf. Mod 1319 introduces IFF/SSR, ARI 23134/3 *(described in Sect 6, Chap 2, App 2)* in lieu of IFF Mk.10.

4. The fuses and relays used in the various circuits of the main and standby UHF installations are located in the radio relay box which is attached to the underside of the top radio structure in the radio bay. All the fuses in use, except No.1 and 2, are fed from the UHF circuit breaker. Fuse No.1 is fed from the standby panel and provides the positive supply to the energizing coils of relays A, B and F; the energizing circuits of these relays are completed to earth when the tele-briefing switch is depressed.

5. Fuse No.5 provides a supply to test-sockets in the main and standby circuits. Fuse No.9 provides the normal battery supply, via a 1 ohm resistor mounted adjacent to the radio relay box, to the standby radio and fuse No.12 provides a positive energizing supply to relays D and E; the energizing circuit of these relays is completed to earth when the main UHF set is selected by setting the NORMAL/ STANDBY switch on the cabin port shelf to NORMAL with the battery master switch ON.

6. If hydraulic pressure failure occurs, relay J is energized from the hydraulic pressure warning circuit to give a pressure failure audio warning. Relay J is coupled to relay C which is energized by either of two PRESS-TO-TRANSMIT switches. When energized relay C cuts out the audio warning signal. One PRESS-TO-TRANSMIT switch is incorporated in the throttle handle assembly and the other is mounted on the windscreen platform. The NORMAL/ BATTERY switch is also mounted on the windscreen platform.

7. The radio relay box also carries several resistors and two capacitors. The capacitors C1 C2, with the resistors R6 and R7, form a feedback network switched by relay J. Mod 1429 introduces relay G and an additional capacitor, C3, in the radio relay box. Relay G is energized when the VHF control unit is switched ON, and selects C3 into the feedback network in lieu of C2. Relay G also selects the Tacan output to resistors R3 and R4 or R5 and R8. R1 and R2 form a side-tone circuit effective during transmission.

7A. When Mod 1480 is embodied, relay J and the associated resistors and capacitors forming the hydraulic pressure failure warning circuit are disconnected in the radio relay box and replaced by a tone generator, type W691/2, which is mounted on the side of the relay box. The tone generator is switched on by 28 V from the HP circuit if a hydraulic failure occurs and provides an output to relay C via resistive network R6 and R7. Relay G now provides for Tacan selection only.

8. A UHF-VHF selector relay box, introduced by Mod 1429, is mounted in the radio bay on the port side of frame 16. The box contains wiring interconnections between the radio relay box and the main UHF transmitter-receiver, and two relays (No.1 and No.2). In the de-energized position the relays connect the press-to-transmit and mic-tel circuits to the UHF system and when energized, via the transmitter-receiver switching circuits and the control unit ON switch, connect these lines to the VHF system.

9. An indicator lamp for the tele-briefing circuit is mounted on the cabin port shelf with a pushbutton switch which is used by the pilot when speaking over the tele-briefing line. An external, channel-changeover switch for use with the standby UHF set is also mounted on the windscreen platform.

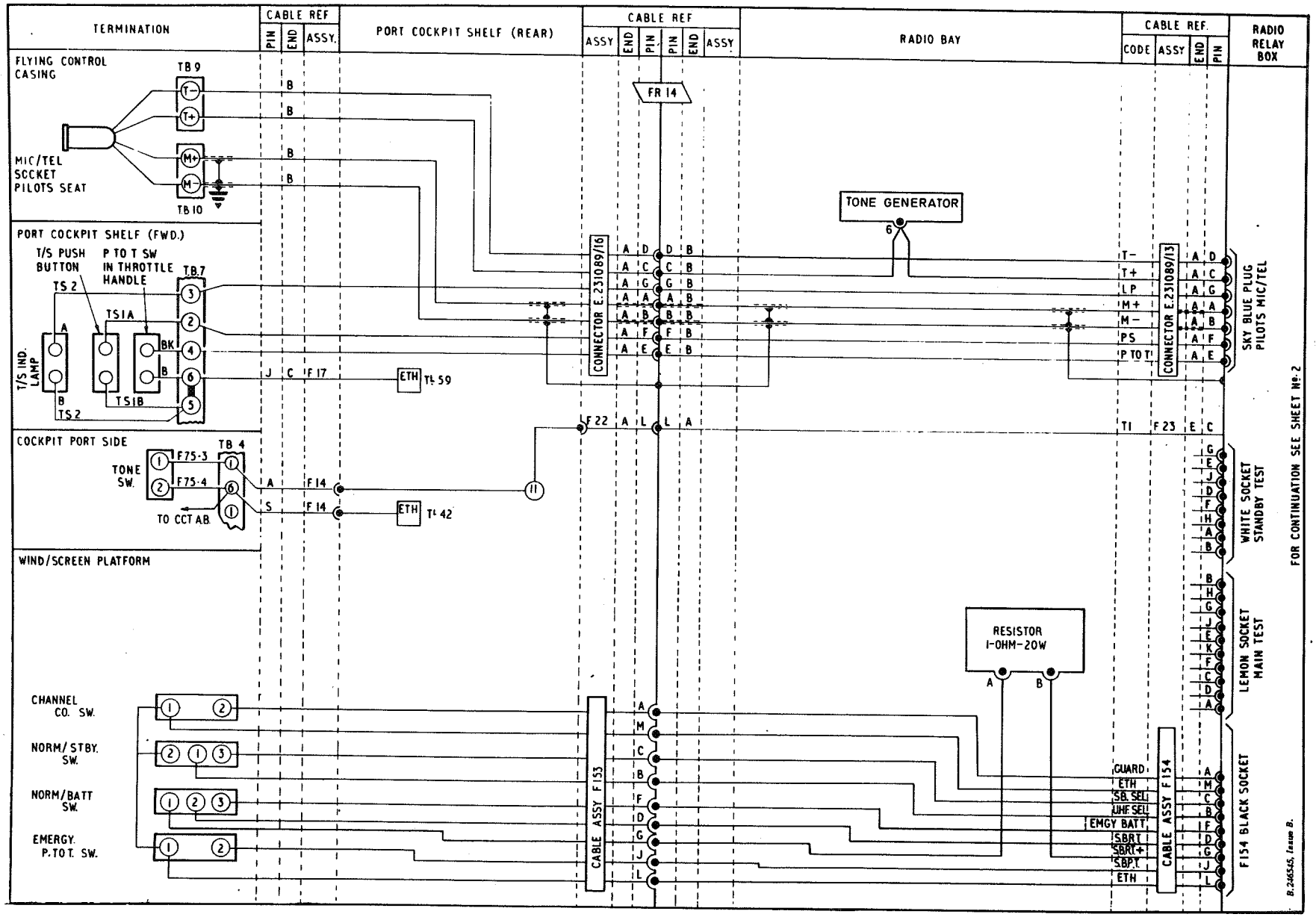


Fig. 2 Radio supplies – UHF, VHF and tele-briefing (routeing sheet 1)

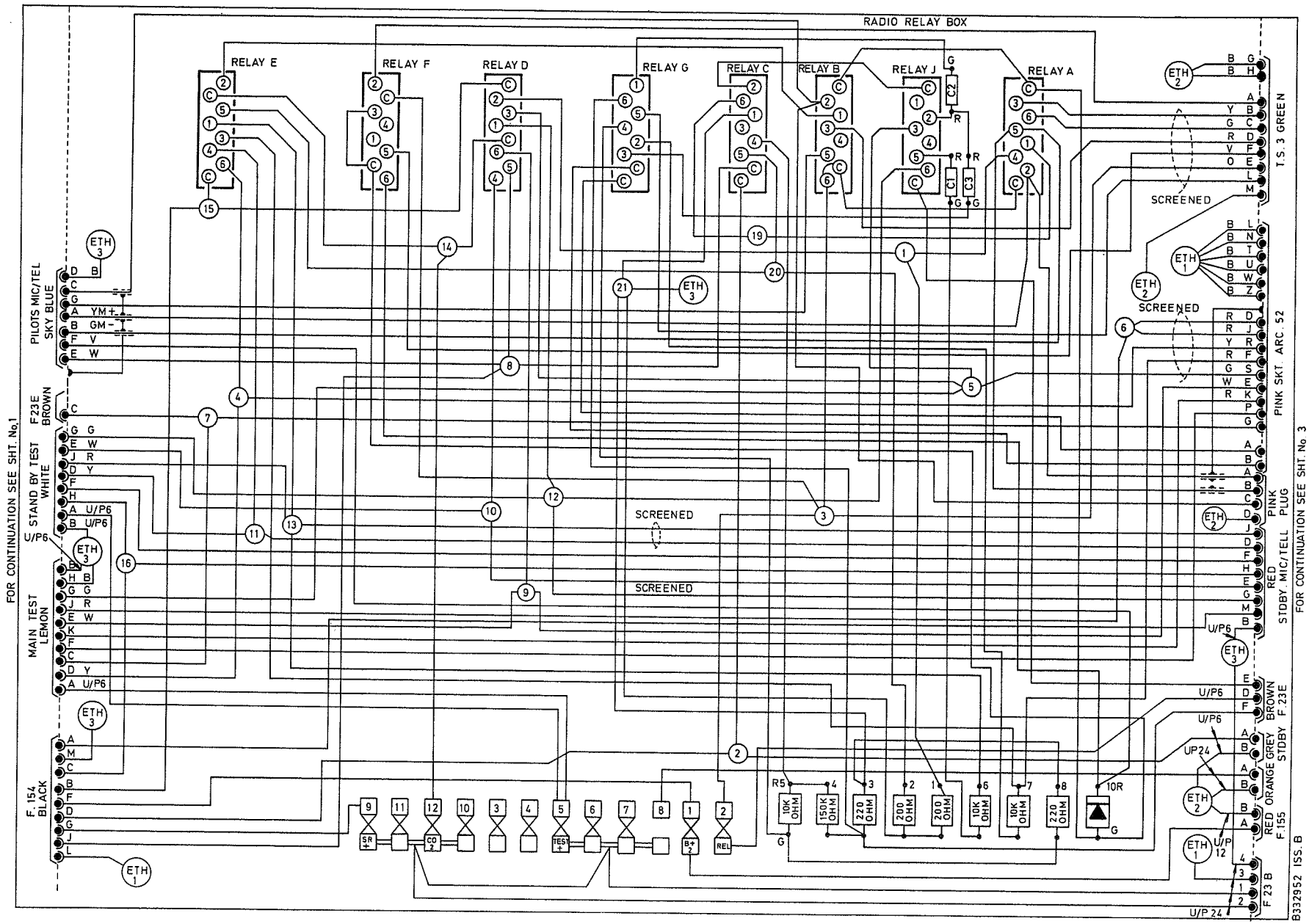


Fig. 3 Radio supplies - UHF, VHF and tele-briefing (routeing sheet 2)

▶ - pre-Mod 1480 ◀

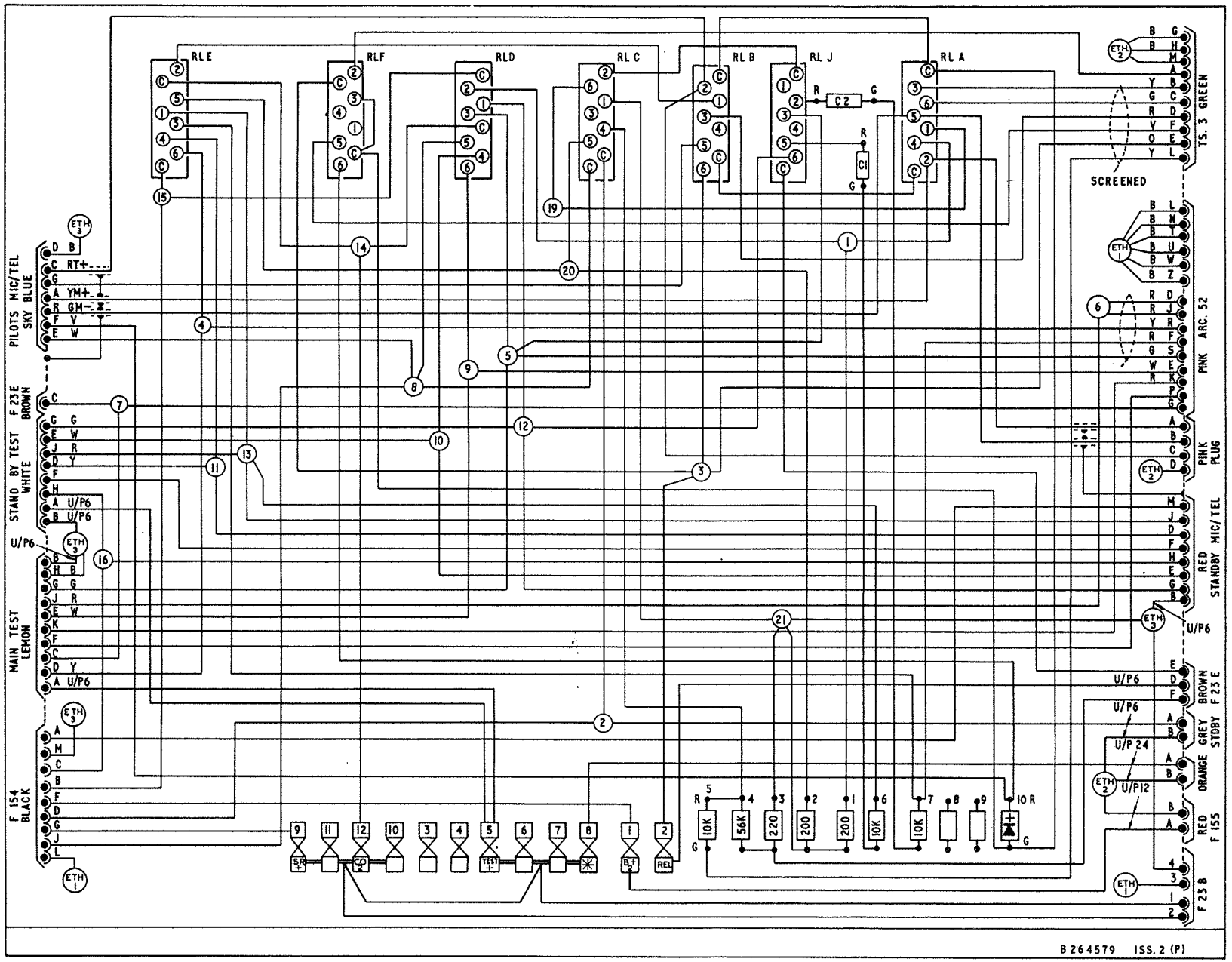


Fig.3A Radio supplies – UHF and tele-briefing (routeing sheet 2) – pre-Mod 1429

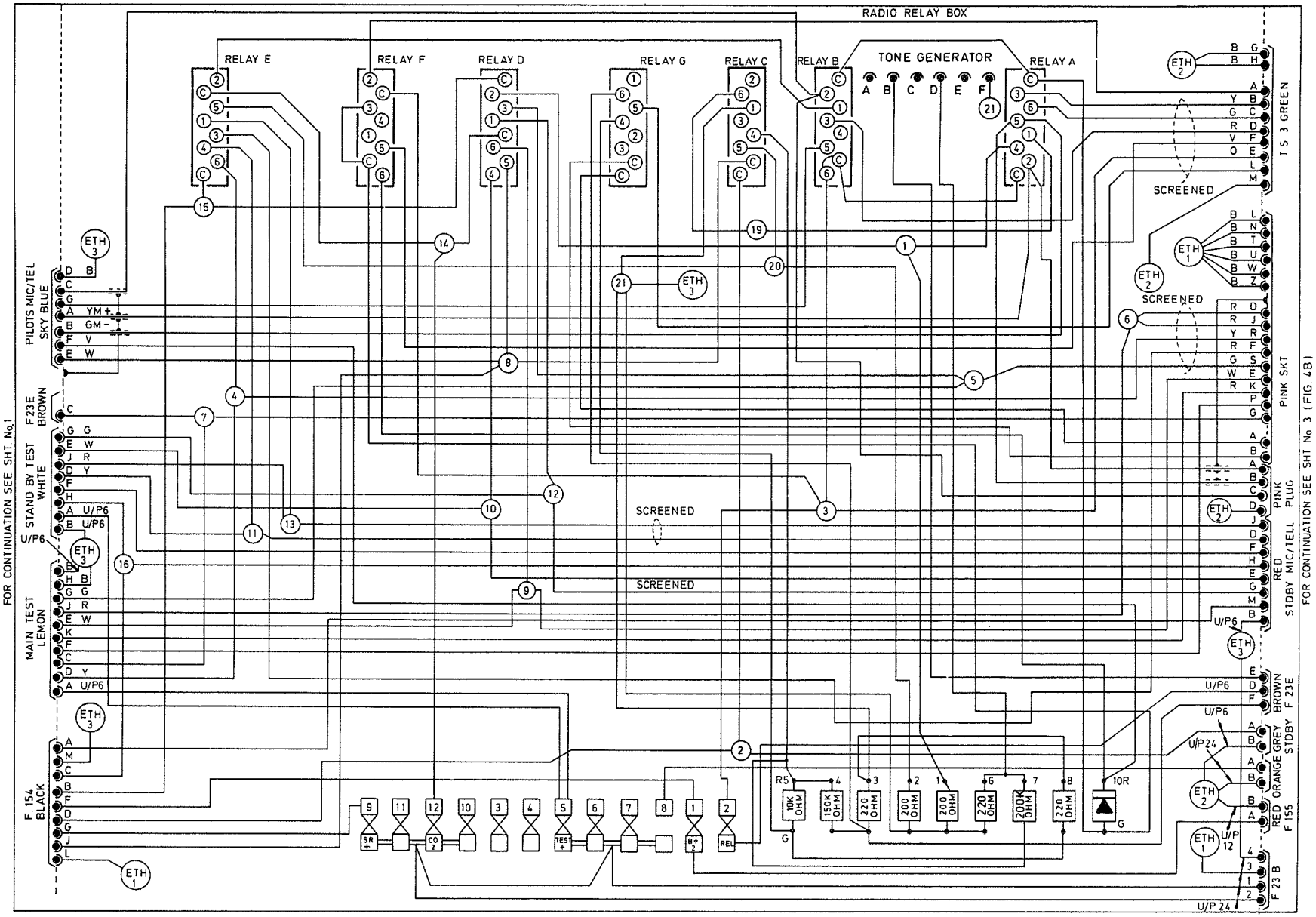


Fig. 3B Radio supplies - UHF, VHF and tele-briefing (routeing sheet 2) - post-Mod 1480

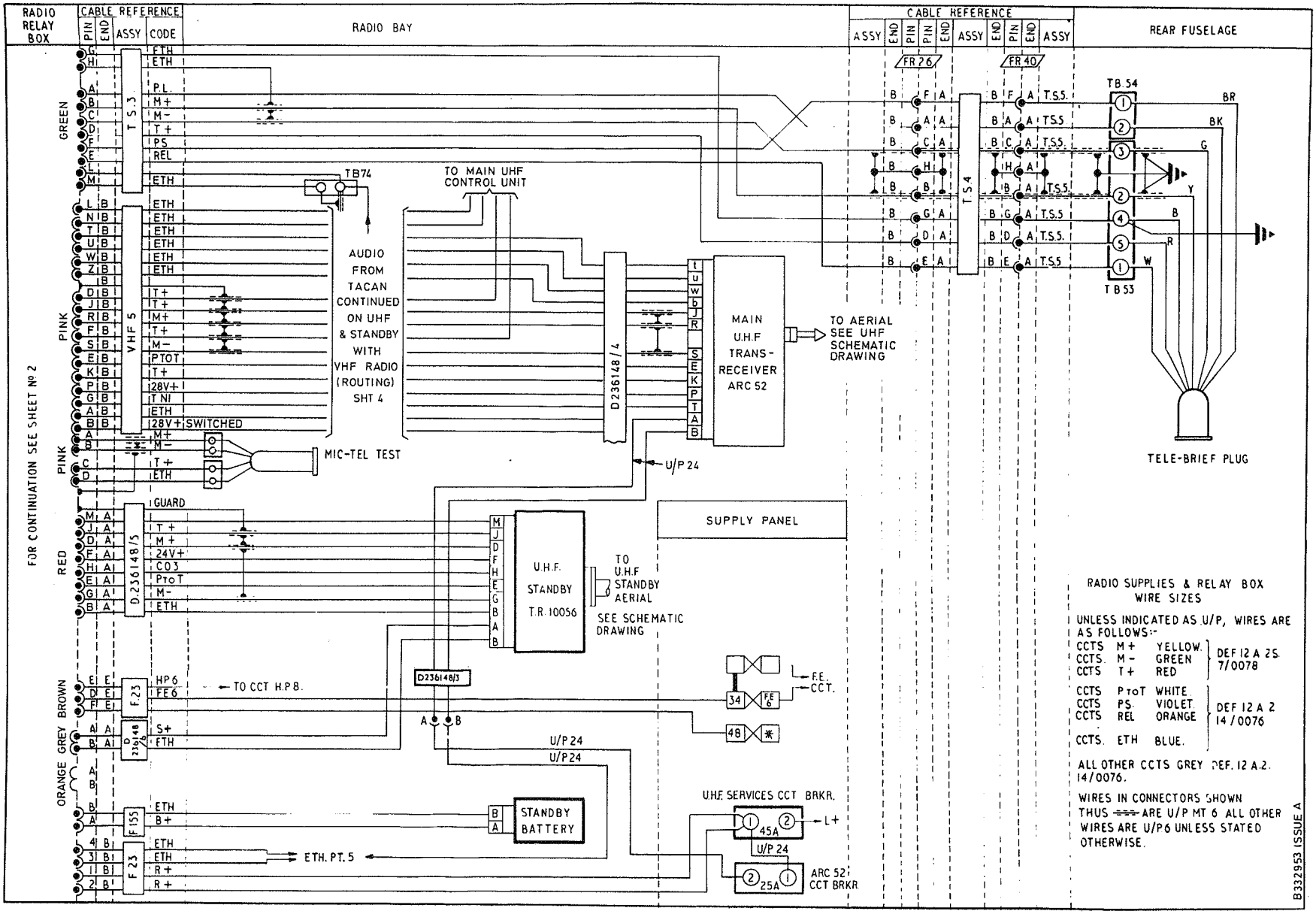


Fig. 4 Radio supplies - UHF, VHF and tele-briefing (routeing sheet 3)
▶ - pre-Mod 1480 ◀

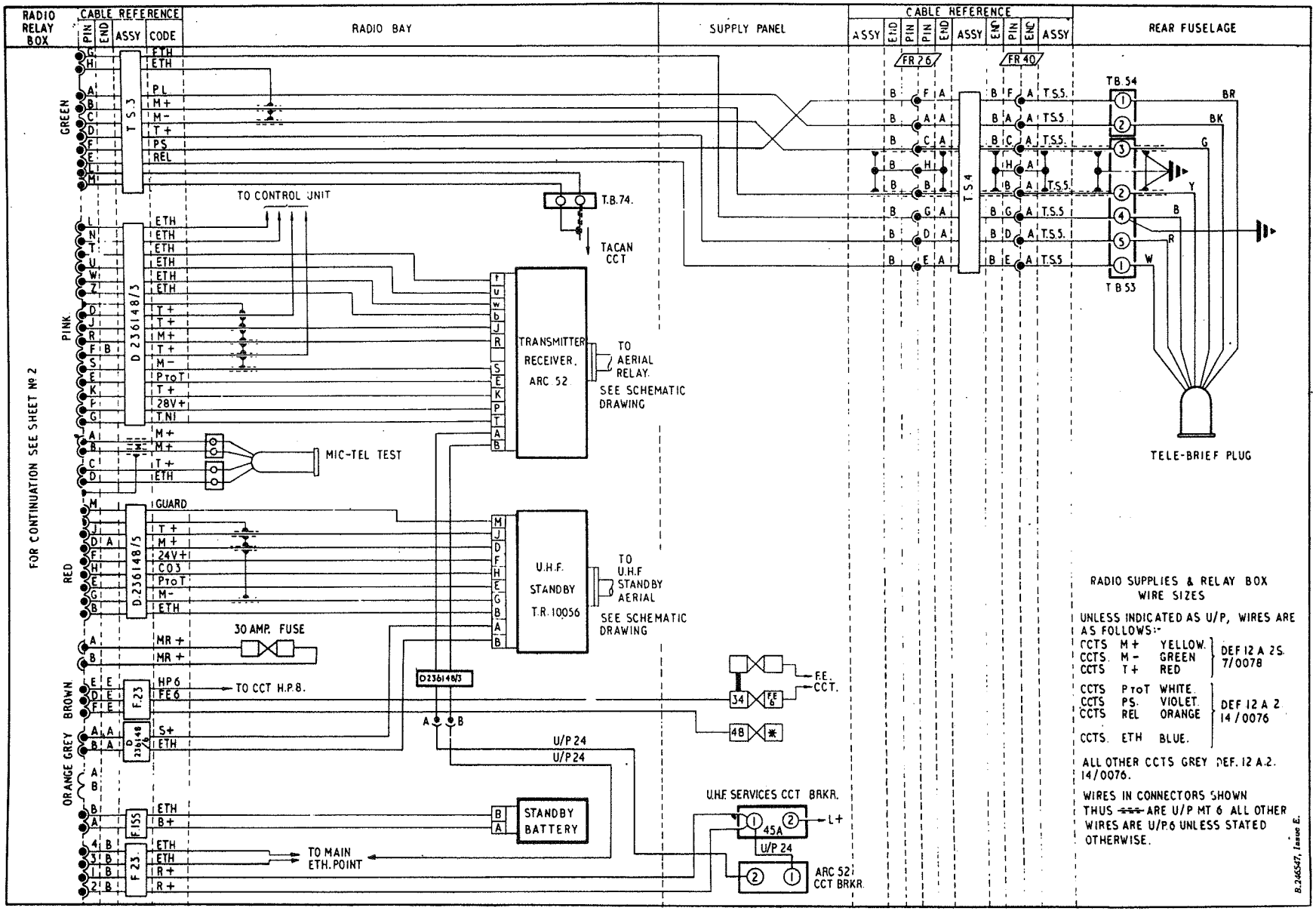


Fig.4A Radio supplies – UHF and tele-briefing (routeing sheet 3) – pre-Mod 1429

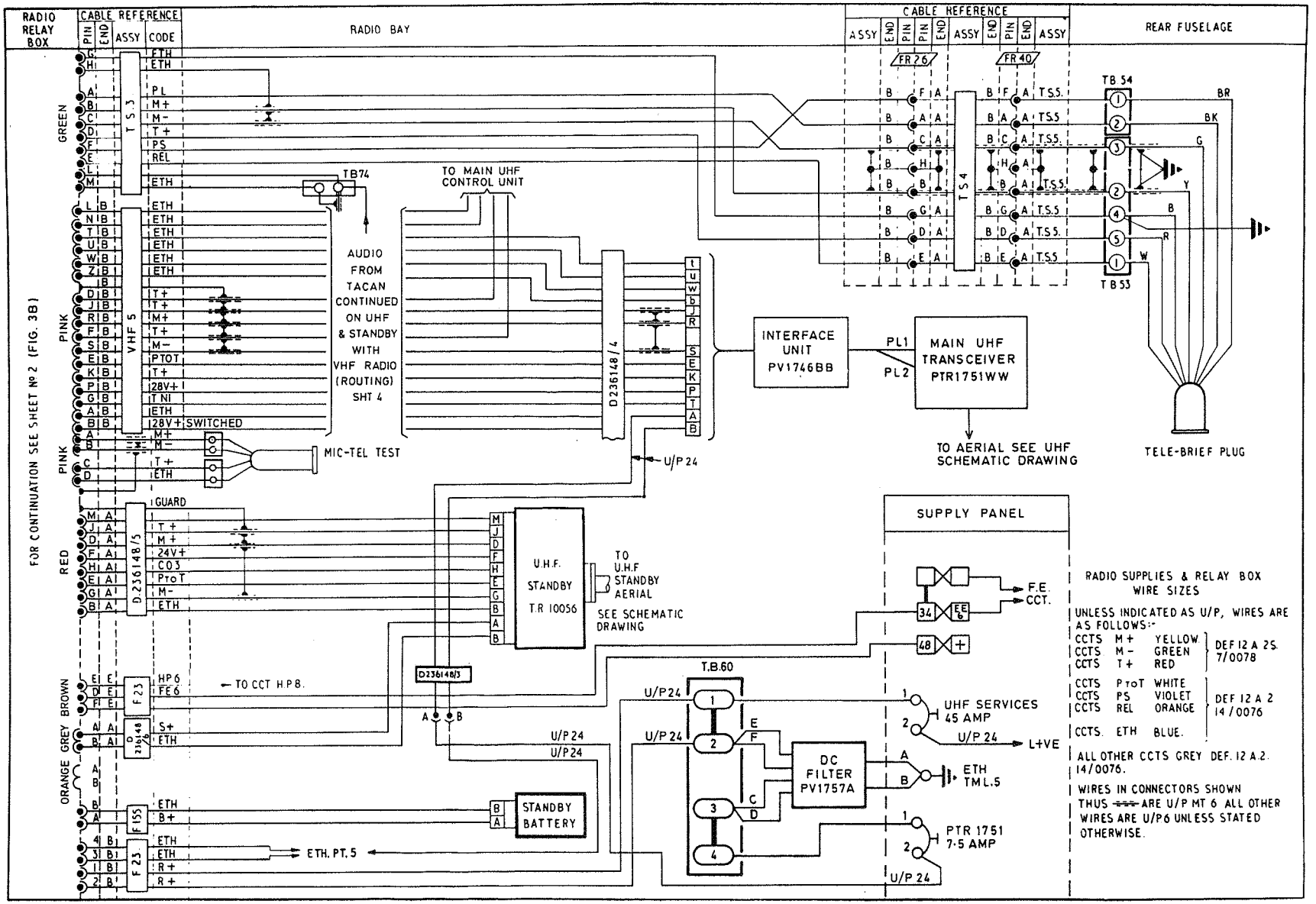


Fig. 4B Radio supplies - UHF, VHF and tele-briefing (routeing sheet 3) - post Mod 1480

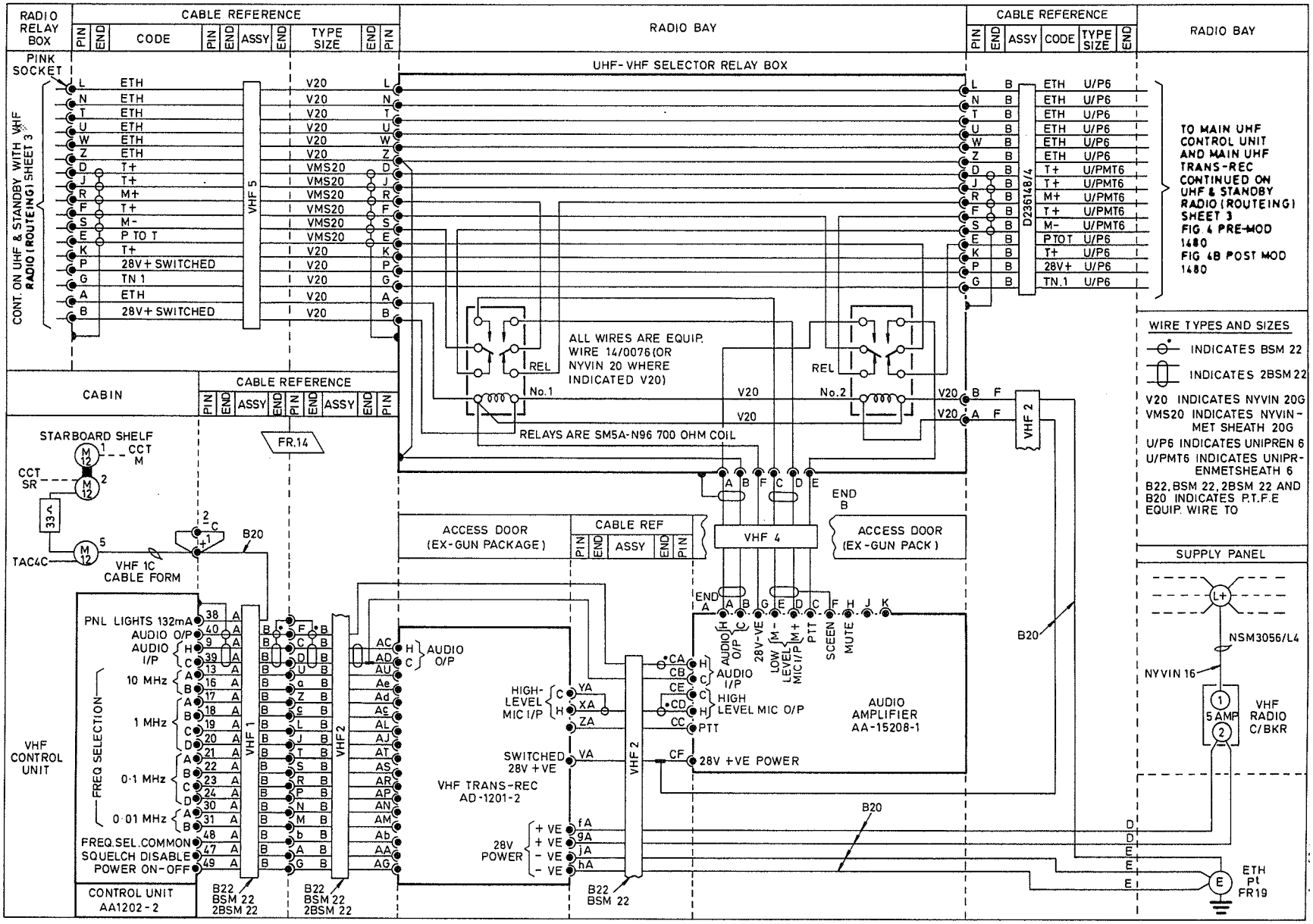


Fig. 5 Radio supplies - UHF, VHF and tele-briefing (routeing sheet 4)
▶ Mod 1480 embodied ◀

Operation

Tele-briefing

10. The tele-briefing plug in the rear of the aircraft fuselage allows the pilot's mic/tel headset to be connected to the ground tele-briefing equipment while the aircraft is at rest on the ground. The aircraft circuit is shown theoretically in fig. 1.

11. The energizing supplies to relays A, B and F are taken to the relay coils from fuse F2. To select tele-brief, the T/B push-switch is depressed and released. This completes an earth return circuit for the coil of relay F via the diode and the T/B switch. Relay F, energized, locks on through its own contacts (2 and 3) and an earth return completed through the tele-brief land line. Relays A and B are energized through the same earth return. The T/B indicator lamp in the cabin is illuminated through contacts 5-6 of relay B. Relay A, energized, routes the pilot's microphone positive and negative circuit directly to tele-brief. Relay B, energized, routes the pilot's telephone positive to the tele-brief; Tel-ve is an unswitched earth return. Call up to tele-brief ground control by the pilot is achieved by operation of the T/B push-switch which causes the tele-brief indicator lamp to illuminate. The diode prevents continuous illumination of this lamp. The system is fully described in AP116N-0301-1.

TABLE 1

Equipment type and Air Publication reference

Equipment	Air Publication
UHF	
▶ Transceiver, PTR1751WW (post-Mod 1480)	AP116D-0154-1
T/R5/ARC52 (pre-Mod 1480) ◀	AP116D-0133-1
T/R10056	AP116D-0110-16
Battery, 24 volt Voltabloc 19-VO-7	AP113C-0307-1
Circuit breaker, Type A6, 45 amp (UHF services)	AP113D-0903-1
Relays, Type SM, 5A-N.2. (In relay box)	AP113D-1309-1
Tumbler switch, SP/ON-OFF, Type XD781 No.3 (Tone; Emergency P to T)	AP113D-1100 Series
Tumbler switch, SP/ON-OFF, Type XD778 No.3 (Channel change-over; Normal/Standby; Normal/Battery)	
▶ Interface unit, PV1746BB (post-Mod 1480) ◀	AP116D-0154-1
VHF	
T/R, Type AA1201-2	AP116D-0150-1
Circuit breaker, Type 6, 5 amp	AP113D-0903-1
Relay Type SM 5, AH 96	AP113D-1300 Series
Tele-briefing	
Push switch, Type 1290	AP113D-1100 Series
Warning lamp, type A	AP113F-0600 Series
IFF Mk. 10	
T/R RT82/APX6	AP114J-0800-Series
Circuit breaker, Type A6, 45 amp	AP113D-0903-1
Tumbler switch, SP/ON-OFF, Type XD779 No.4 (ON/OFF)	AP113D-1100 Series
Tumbler switch, SP/C.O, Type XD776 No. 3 (Aerial change-over)	
Altitude switch, Type PAD/A/0.14	AP113D-1500 Series
Suppressor, Type G.2	AP113D-1902-1
Inverter, Type 200	AP113D-0113-1

12. When the tele-briefing plug is disconnected from the ground installation, relays A, B and F return to normal and connect the pilot's mic/tel headset to the aircraft UHF circuits.

UHF supplies

▶ **13.** The main UHF installation ARI 18124/1 (pre-Mod 1480) or ARI 23301/80 (post-Mod 1480) ◀ is supplied from the generator or battery positive line (L+) when the battery master switch is set to ON. The standby UHF (T/R 10056) may be similarly supplied from L+ or may be supplied ▶ from a standby battery (B+). On pre-Mod 1480 aircraft the control unit Type C.1607 of the T/R ◀ ARC 52 is used in switching the UHF installation into its various modes of operation and is described with the ARC52 equipment in AP116D-0133-1. ▶ On post-Mod 1480 aircraft, control unit C.1607 is replaced by control unit PV1754AA to operate the UHF transceiver, PTR1751WW, and is described in AP116D-0154-1. ◀

14. The equipment to be used is selected by setting the NORMAL/STANDBY switch to NORMAL for the T/R ARC 52 (pre-Mod 1480), PTR1751 (post-Mod 1480) or to STANDBY for the T/R 10056. When the standby UHF (T/R 10056) is selected it may be operated from the main or standby battery by setting NORMAL/BATTERY switch to NORMAL for L+ or to BATTERY for B+.

15. When the main UHF set is selected at the NORMAL/STANDBY switch, the relays D and E are energized. The energizing circuits, supplied from L+ via a circuit breaker and fuse 12 of the radio relay box, are completed to earth via the NORMAL/STANDBY switch. The relays A and B are de-energized when the tele-briefing plug is not connected and, when the relay E is energized, the pilot's T+ is connected to the main UHF. The pilot can then receive speech signals. Relay D, when energized, connects the PRESS-TO-TRANSMIT switches and one side of the pilot's microphone *(M-)* to the main UHF and, when either PRESS-TO-TRANSMIT switch is used, relay C is also energized. When relay C changes over, M+ from the pilot's microphone circuit is connected via relay E to the main UHF set.

16. The tone switch when set to ON switches in the 1kHz tone generator of the main UHF transceiver to modulate the RF output of the transmitter for emergency and direction finding operations.

17. When the standby UHF is selected at the NORMAL/STANDBY switch, the relays D and E are not energized and, in their normal condition, connect the pilot's T+ signal to the standby UHF. As in the operation of the main UHF, one of the PRESS-TO-TRANSMIT switches must be used to energize relay C to complete the pilot's microphone circuit when required.

18. The CHANNEL C/O switch, when set to GUARD limits the transmission to a guard frequency as explained in AP 116D–0133–1.

19. The relay J (pre-Mod 1480 aircraft only) is energized from the hydraulic pressure warning system when pressure fails. The changeover of the relay contacts connects T+ to M- via a resistance-capacitor feed-back loop to give an audio signal to the pilot. During any subsequent transmission this audio signal is cut-off when relay C is energized from either PRESS-TO-TRANSMIT switch.

VHF supplies

20. The VHF transmitter-receiver is supplied with 28 V d.c. from the positive line *(L+)* through a 5 amp circuit breaker. The associated control unit is supplied with 28 V from the cabin lighting installation to illuminate the panel and dial lamps. When the control unit is switched ON, an earth return is completed to enable the power *(28 V)* switching circuits in the VHF transmitter-receiver to operate. The switched 28 V from the transmitter-receiver supplies power to the audio amplifier, energizes relay G in the radio relay box *(para 7)* and energizes relays No.1 and No.2 in the UHF-VHF selector relay box. Relay No. 1 connects the pilots microphone lines, M+ and M-, to the audio amplifier which controls the microphone input to the transmitter-receiver. Relay No. 2 connects the press-to-transmit line to the transmitter-receiver via a through connection in the audio amplifier, and also connects the pilot's telephone T+ to the signal output of the audio amplifier.

Radar Supplies

21. The IFF Mk.10 installation is switched on and controlled by a switch and a control unit situated on the cabin starboard shelf. A description of the IFF installation including the functions of these items is given in Sect 6, Chap 2.

SERVICING

General

22. Testing and servicing of the UHF standby battery should be carried out periodically, in accordance with the instructions given in AP 113C–0200 series. All components of the installations should be kept clean, and the standard routine tests for security and serviceability as described in the appropriate Air Publications listed in Table 1, should be applied. When a fault is reported in either the radio or radar installations, the supply circuits should first be checked to ensure that the fault does not lie 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 A1.

REMOVAL AND ASSEMBLY

General

23. Once access has been obtained, the removal and assembly of the electrical components forming the radio and radar supply circuits should present no difficulty. The removal of the Type 200 inverter is described in Sect 6, Chap 2 and the removal of the UHF relay box, which carries the majority of the radio supply equipment, is covered in Sect 6, Chap 1. Removal of the UHF standby battery is also described in Sect 6, Chap 1.

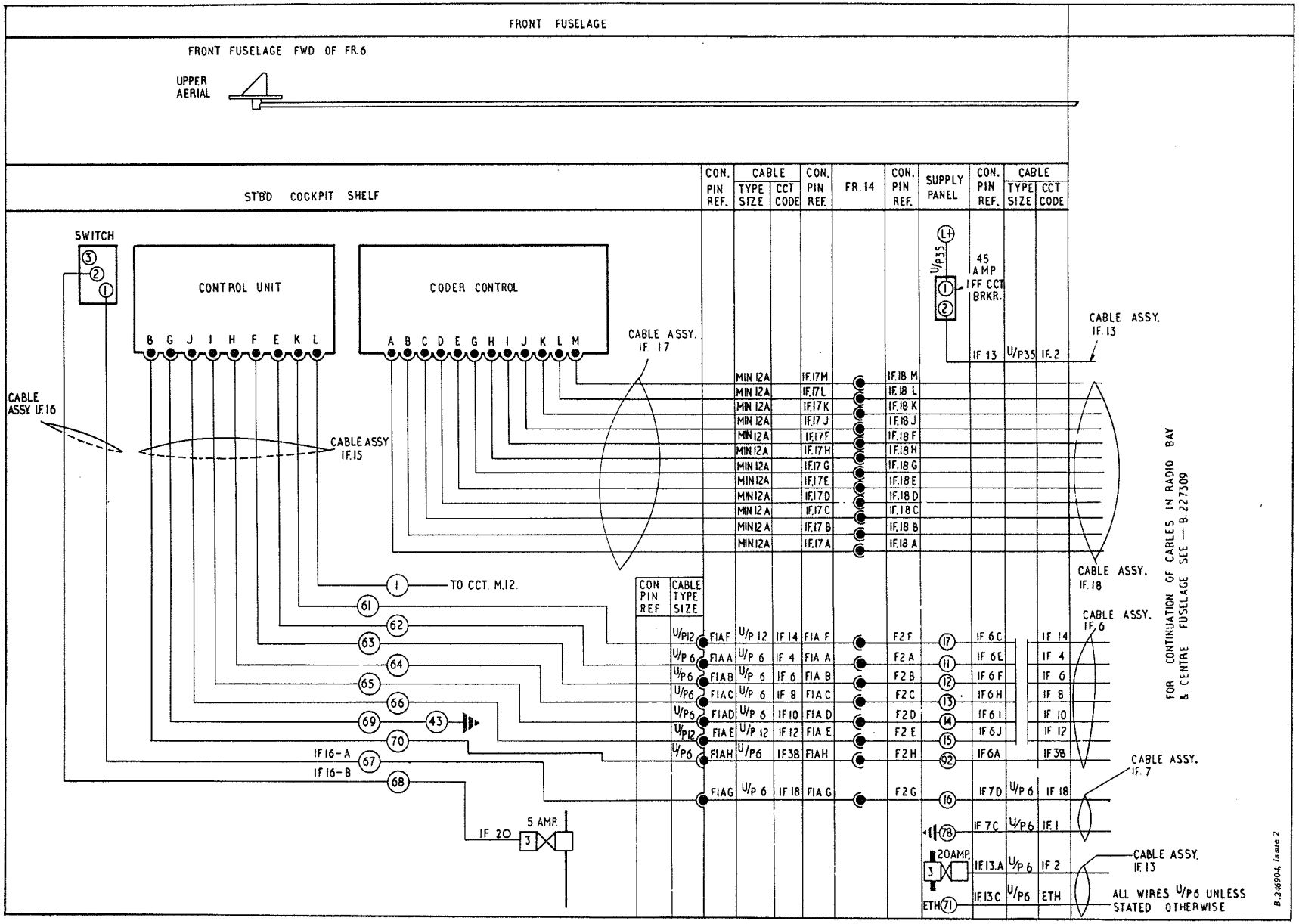


Fig.6 Radar supplies — IFF (routeing sheet 1)

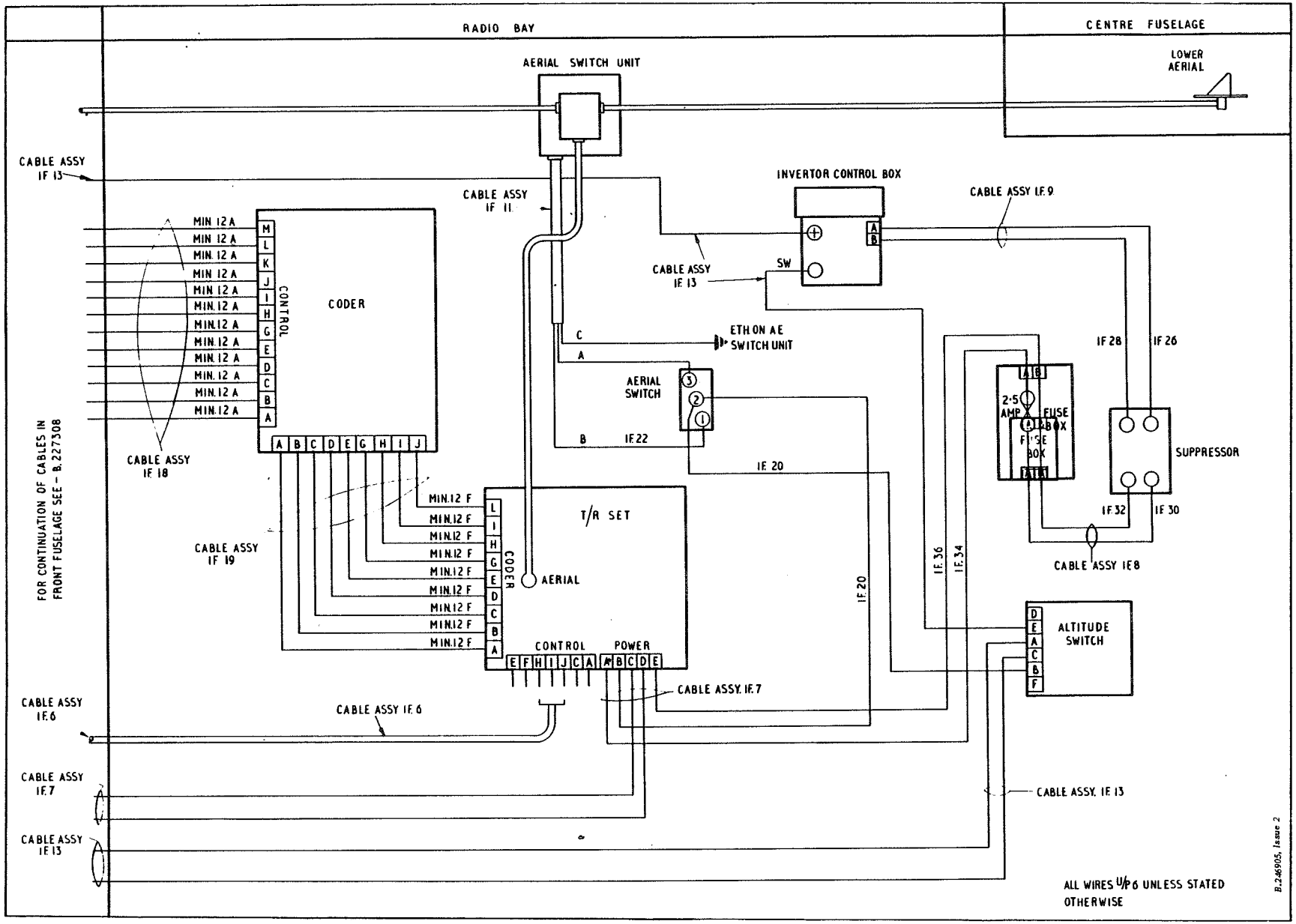


Fig.7 Radar supplies – IFF (routeing sheet 2)

APPENDIX 1 - MOD.1009

LIST OF CONTENTS

LIST OF ILLUSTRATIONS

TABLE

Mod.1009

1. This appendix contains the description, and operation of the Tacan supply circuits introduced by Mod.1009 together with information on the servicing required to maintain the equipment in an efficient condition. Routeing and theoretical circuit diagrams are included. For a description of the aircraft electrical system reference should be made to Groups A.1, A.2 and A.3. Detailed information on the standard items of equipment employed will be found in the Air Publications listed in Table 1.

DESCRIPTION

Tacan supplies

2. The Tacan inverter supply is derived from a 125 amp. fuse mounted on the forward face of frame 16 in the radio bay, and the d.c. supply to the equipment via a fuse in the Tacan a.c. junction box.

3. The a.c. supplies provided by the inverter and its control panel feed the installation via a further fuse in the Tacan a.c. junction box. The inverter is switched on and off by the use of start and stop push switches and a starter circuit, which includes a starter unit, and thermal delay unit. When the inverter is running and a.c. supplies are available at the Tacan equipment this condition is shown by a magnetic indicator on the instrument panel.

4. The inverter, control panel, starter

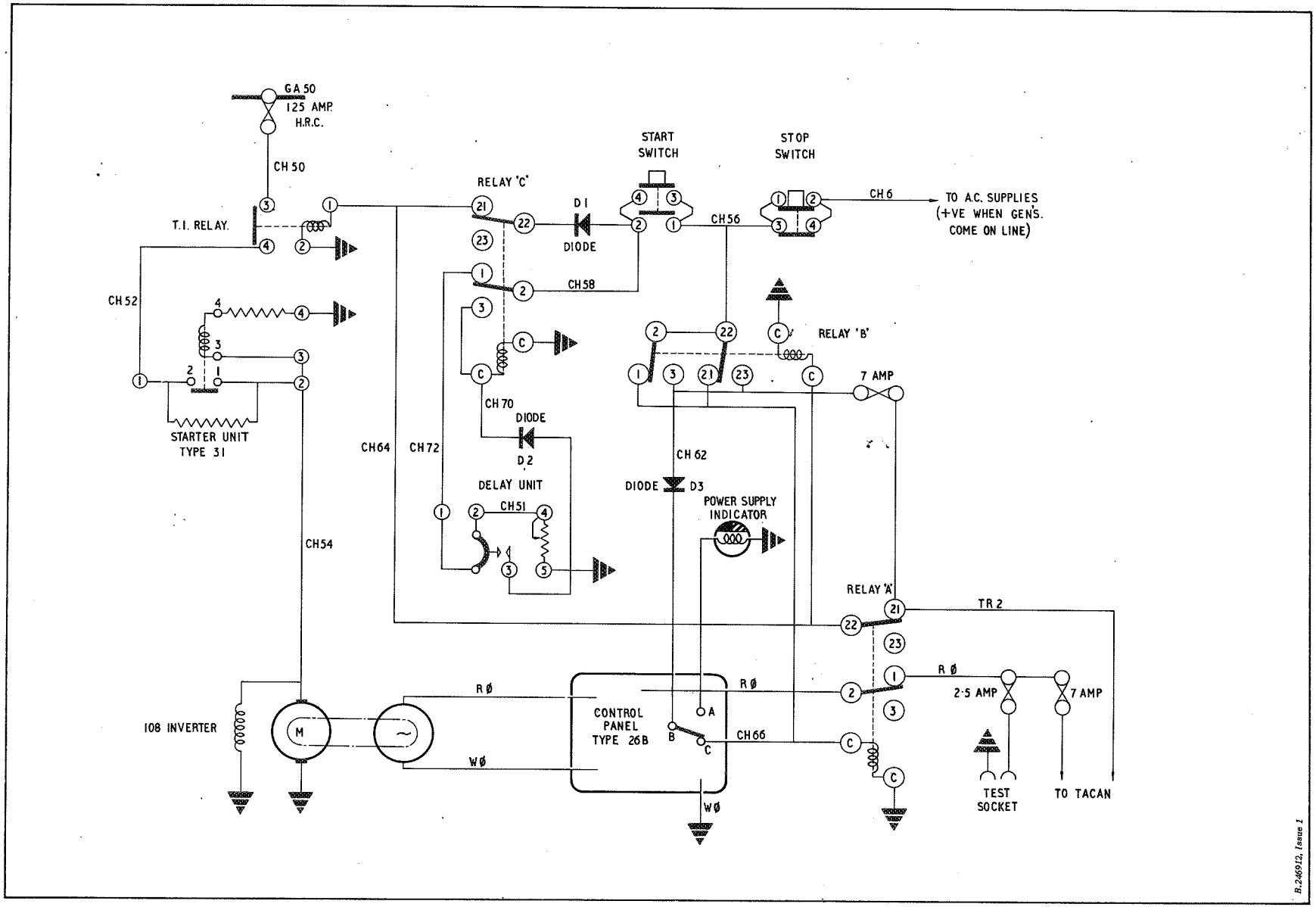


Fig.1 Tacan supplies (theoretical)

TABLE 1

Equipment type and Air Publication reference

Equipment Type	Air Publication
Inverter, Type 108, Rotax S.3303	A.P.113–0109–16
Control panel, Type 26B, Rotax U.1509	A.P.113D–0750 Series
Switch starting, Type 1A No.5, Rotax U-2005/1	A.P.113D–1300 Series
Relay switch, Type T1	A.P.113D–1327–1
Thermal delay unit, Rotax D.11201	A.P.113D–1400 Series
Push switches, Dowty D.5162	A.P.113D–1327–1
Magnetic indicator, Dowty C.5165Y Mk.62	A.P.113F–0615–1

unit, a.c. junction box, thermal delay unit and relay are all mounted on the underside of the Tacan panel. The start-stop push switches and the a.c. supplies indicator are mounted on the starboard instrument panel. Post Mods.1383 or 1387 the indicator and switches are mounted on the lower right corner of the centre instrument panel. The control relays A, B and C, diodes D1, D2 and D3 and the a.c. and d.c. fuses for the Tacan supplies and test sockets are contained in the Tacan junction box.

Operation

General

5. The Tacan supplies are switched on by pressing the start push switch, the push switch should be held for a few seconds, in order to allow the inverter output voltage to build up, after which a relay in the control panel provides a circuit to hold the inverter starting system in the running condition. Reference should be made to the theoretical and routeing diagrams fig. 1 and 2 when reading the following description to ensure a full understanding of the circuits.

Inverter control

6. When the generators come on line, a d.c. supply is available at the stop push switch, the contacts of which are normally closed, this supply passes via contacts 1-2 and 21-22 of the de-energized relay B, to the operating coil of relay A the contacts of which in its energized condition disconnect the a.c. supply line from the Tacan equipment. The d.c. supply is isolated by the normally open contacts 2-3 and 22-23 of relay B.

7. When the start push switch is pressed a supply is passed via diode D1 and contacts 21-22 of the de-energized relay C to the operating coil of relay B energizing the relay which now passes a d.c. supply via contacts 2-3 and 22-23 and a fuse to the Tacan equipment. The relay is now held in the operated position by a d.c. supply via diode D.3 and contacts B-C of the relay in the control panel, hence the a.c. line to the Tacan equipment remains isolated. Contacts 21-22 of relay C also pass a supply to the operating coil of the Type T1 relay which is then energized, a d.c. supply is now available via the 125 amp. fuse to the starting unit, energizing the unit and starting the inverter. After the start push switch has been held for a few seconds the inverter voltage builds up, the relay in the control panel operates, passing a supply via contacts A-B to the operating coil of the a.c. supplies indicator and removing the supply from the operating coil of relay A. When relay A is de-energized contacts 1 and 2 are made passing the a.c. supply to the Tacan equipment. Contacts 21-22 are also made providing a holding circuit to the operating coil of relay B and the Type T1 relay so that when the start push switch is released the inverter continues to run. When the stop push switch is pressed the d.c. supply to the Tacan equipment is disconnected, the supply to the Type T1 relay operating coil is removed and the relay is de-energized breaking the circuit to the inverter. The supply to the operating coil of relay B is also removed and the relay is de-energized, thus

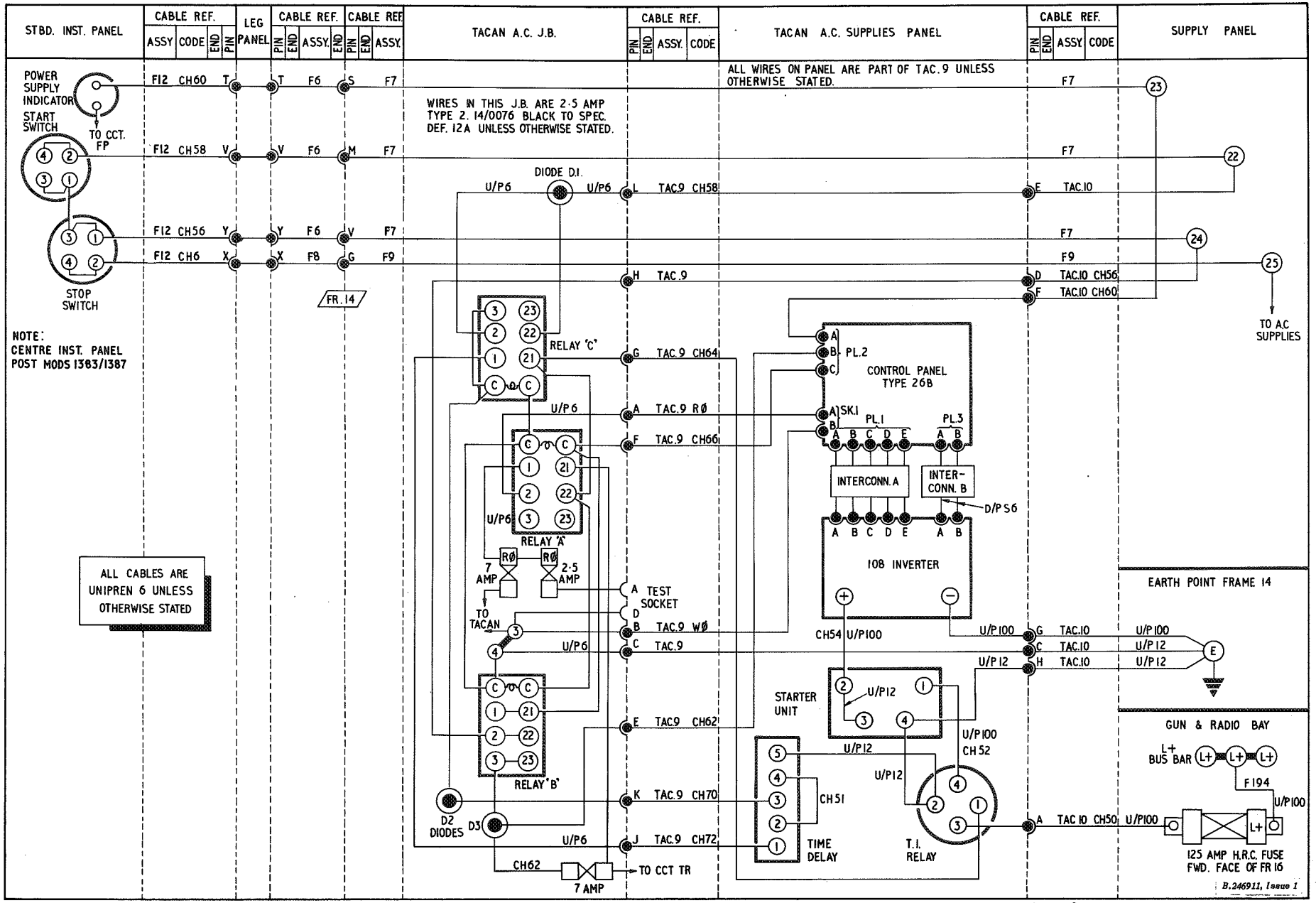


Fig.2 Tacan supplies (routeing)

(To include Mods.1383/1387)

isolating the d.c. supply line from the Tacan equipment. When the stop switch is released a supply is passed via contacts 1-2 and 21-22 of relay B to the operating coil of relay A, contacts 1-2 of relay A open, isolating the a.c. line to the Tacan equipment. As the inverter output voltage decreases the relay in the control panel is de-energized removing the supply from the a.c. supply indicator.

Power failure

8. Failure of either the a.c. or d.c. supply to the Tacan equipment will cause both a.c. and d.c. supply lines to the equipment to be isolated and the inverter to stop. In the event of a d.c. failure, the supply to the Type T1 relay hold line will be removed and the relay will be de-energized breaking the circuit to the inverter. In the event of an a.c. supply failure the relay in the control panel becomes de-energized passing a supply to the operating coil of relay A and removing the supply from the a.c. supplies indicator. When relay A is energized the a.c. line is isolated from the Tacan equipment and the supply to the operating coil of the Type T1 relay is removed and the supply to the inverter is broken. The supply to the operating coil of relay B has also been removed, the relay is de-energized and the d.c. supply line to the Tacan equipment is isolated.

Circuit protection

9. The circuit is protected by a time delay unit; if the start switch is pressed for more than three seconds and the inverter voltage does not build up a d.c. supply is passed via contacts 1-2 of relay C to the delay unit which is in series with the operating coil of relay C, after three seconds the delay unit operates passing a supply via contacts 1-2 to the operating coil of relay C via diode D2, relay C is energized and holds through its own contacts. Contacts 21-22 of relay C are then opened de-energizing the Type T1 relay and thereby ending the starting sequence. When the start switch is released the supply is removed from the operating coil of relay C, the thermal delay unit resets automatically, so that after a short interval a further attempt may be made to start the inverter.

SERVICING

General

10. 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 Tacan installation, the supply circuits 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

11. To gain access to the equipment on the Tacan panel the Tacan Bay access door must be removed as described in Book 1, Sect.3, Chap.1, also the Tacan panel must be lowered as described in Sect.6, Chap.2. Appendix 1, in order to gain access to securing bolts.

Inverter

12. The recommended method of removing the inverter is as follows:-

(1) Render the aircraft electrically safe as described in Group A.1.

(2) Remove the two connectors from the suppressor unit, fit approved caps and covers to the plugs and sockets and stow the connectors clear of the inverter.

(3) Remove the cover from the suppressor unit, disconnect the d.c. supply cables, insulate their terminals with insulating tape and stow clear of the aircraft structure. Replace the cover of the suppressor unit.

(4) The inverter may now be removed from the aircraft by unscrewing the four stiffnuts from the bolts securing it to the panel. Replace the stiffnuts to retain the eight washers.

Note . . .

When re-assembling the inverter to the panel the four washers, Part No. SP.16/G are to be fitted under the feet of the inverter, otherwise the clamp rings for the cover and outlet elbow will be jammed against the mounting plate.

Inverter control panel

13. To remove this control panel proceed as follows:-

(1) Render the aircraft electrically safe as described in Group A.1.

(2) Disconnect the four connectors from the front of the control panel, fit approved caps and covers and stow the connectors clear of the control panel.

(3) Remove the locking wire from the knurled screws on the front of the panel mounting and unscrew the screws until they clear the catches, then using the handle on the front of the panel withdraw the panel from its mounting.

Tacan a.c. junction box

14. To remove this junction box proceed as follows:-

(1) Render the aircraft electrically safe as described in Group A.1.

(2) Disconnect the three connectors from the front of the junction box, fit approved caps and covers to the plugs and sockets and stow the connectors clear of the junction box.

(3) Unscrew the stiffnuts from the bolts securing the junction box to the panel and remove the junction box from the aircraft. Replace the nuts to retain the washers.

15. Once access has been obtained the removal of the other components forming the Tacan supply circuits will present no difficulty.

APPENDIX 2 – MOD 1310

CONTENTS

Introduction

1. This modification, which is authorized by NSM 3026 in accordance with approved Command Modification procedure, is designed to remove a functional limitation inherent in the tele-brief circuit as originally installed. Mod 1310 introduces a new relay (Relay F) and a new diode into the Radio Supplies and Relay Box, and re-routes the tele-brief control circuits. After modification the relay box is identified Part No. D 294956.

2. The theoretical circuit of the radio supplies *(including Mod 1310)* is shown in fig.1, and the internal wiring of the Relay Box in fig.2. Reference must be made to Sect 6, Chap 1, – Wireless Installation, for details of the inter-connecting cable assemblies.

DESCRIPTION

Pre-Mod 1310

3. Tele-briefing is the facility which provides direct communication by cable between pilot and ground control. When the aircraft is at rest on the ground, interconnection is made at the tele-briefing plug in the rear fuselage. In the pre Mod 1310 installation the insertion of the ground line socket completes energizing circuits for relays A and B to automatically switch the pilot's mic./tel. head set to tele-brief reception. The energizing circuits are connected for supply to the aircraft essential load busbar which is effective irrespective of the position of the Battery Master Switch. Thus the two relays could remain unnecessarily energized for long periods, during which time normal radio communication ceases to be available.

Post-Mod 1310

4. The effect of this modification is to ensure that after inter-connection of the tele-brief land line the relays are not energized until selection is made by deliberate operation of the cockpit tele-brief push button switch. Until the operation is made, normal R/T communication is available.

OPERATION

General *(fig.1)*

5. The energizing supplies to relays A, B and F are taken to the relay coils from fuse F2. To select tele-brief the T/B push switch is depressed and released. This completes an earth return circuit for the coil of relay F via the diode and the T/B switch. Relay F, energized, locks on through its own contacts *(2 and 3)* and an earth return completed through the tele-

TABLE 1

Equipment type and Air Publication reference

Equipment Type	Air Publication
Relays, Type 5W SA-N.H96 (In relay box)	AP113D–1309–1
Diode. (Rectifier ZS 78, Ferranti)	

brief land line. Relays A and B are energized through the same earth return. The T/B indicator lamp in the cockpit is illuminated through contacts 5–6 of relay B.

6. Relay A, energized, routes the pilot's microphone positive and negative circuit directly to tele-brief. Relay B, energized, routes the pilot's telephone positive to tele-brief; Tel.–ve is an unswitched earth return. Call up to tele-brief ground control by pilot is by operation of pilot's T/B switch which causes the tele-brief indicator lamp to illuminate. The diode prevents continuous illumination of this lamp.

SERVICING

General

7. This modification has no effect on servicing which remains as described in Group H 1. For information relating to all circuits routed into the Radio Supplies and Relay Box refer to fig.2 & 4 of Group H 1.

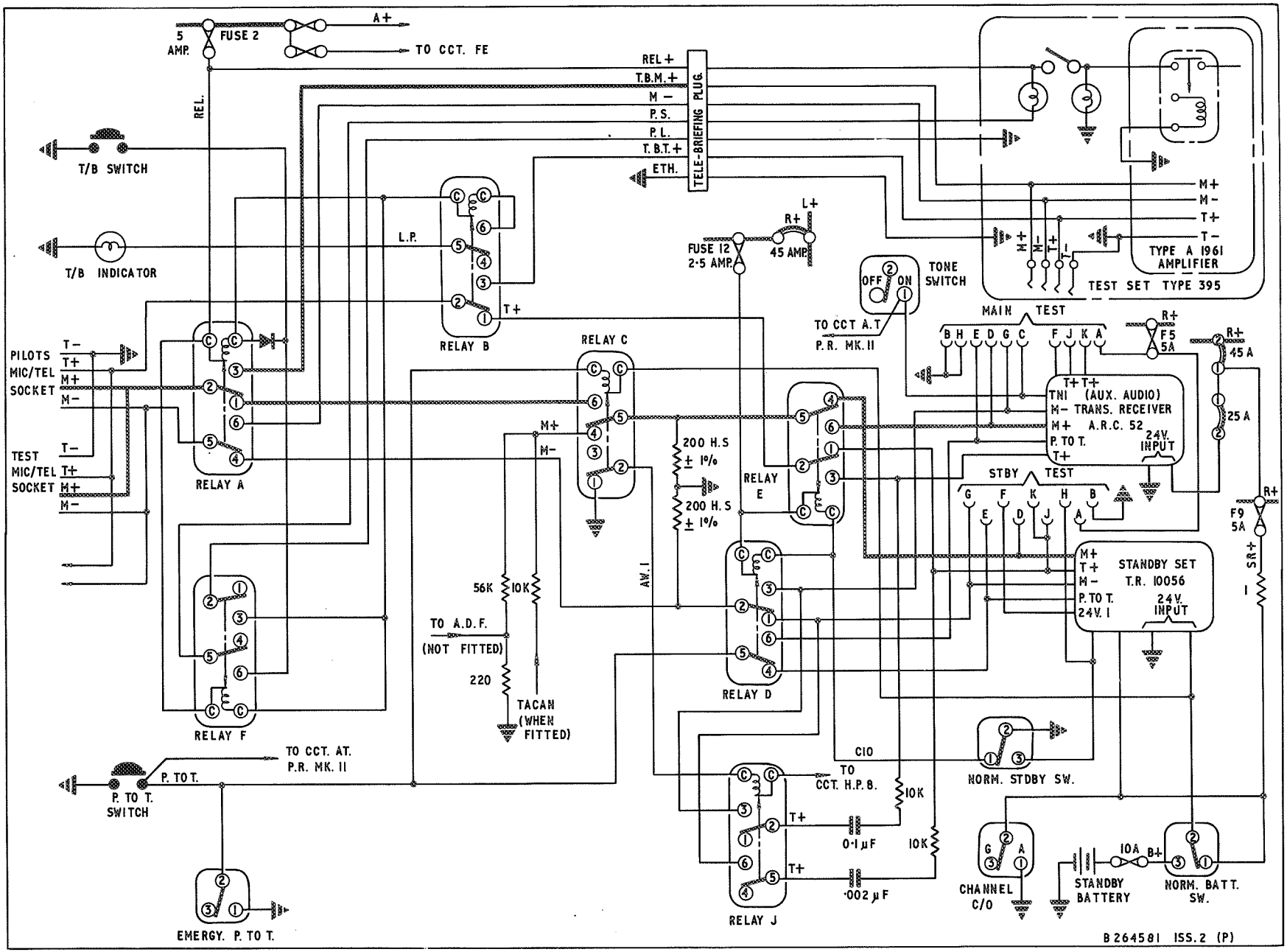


Fig. 1 Radio supplies – U.H.F. and tele-briefing (theoretical)

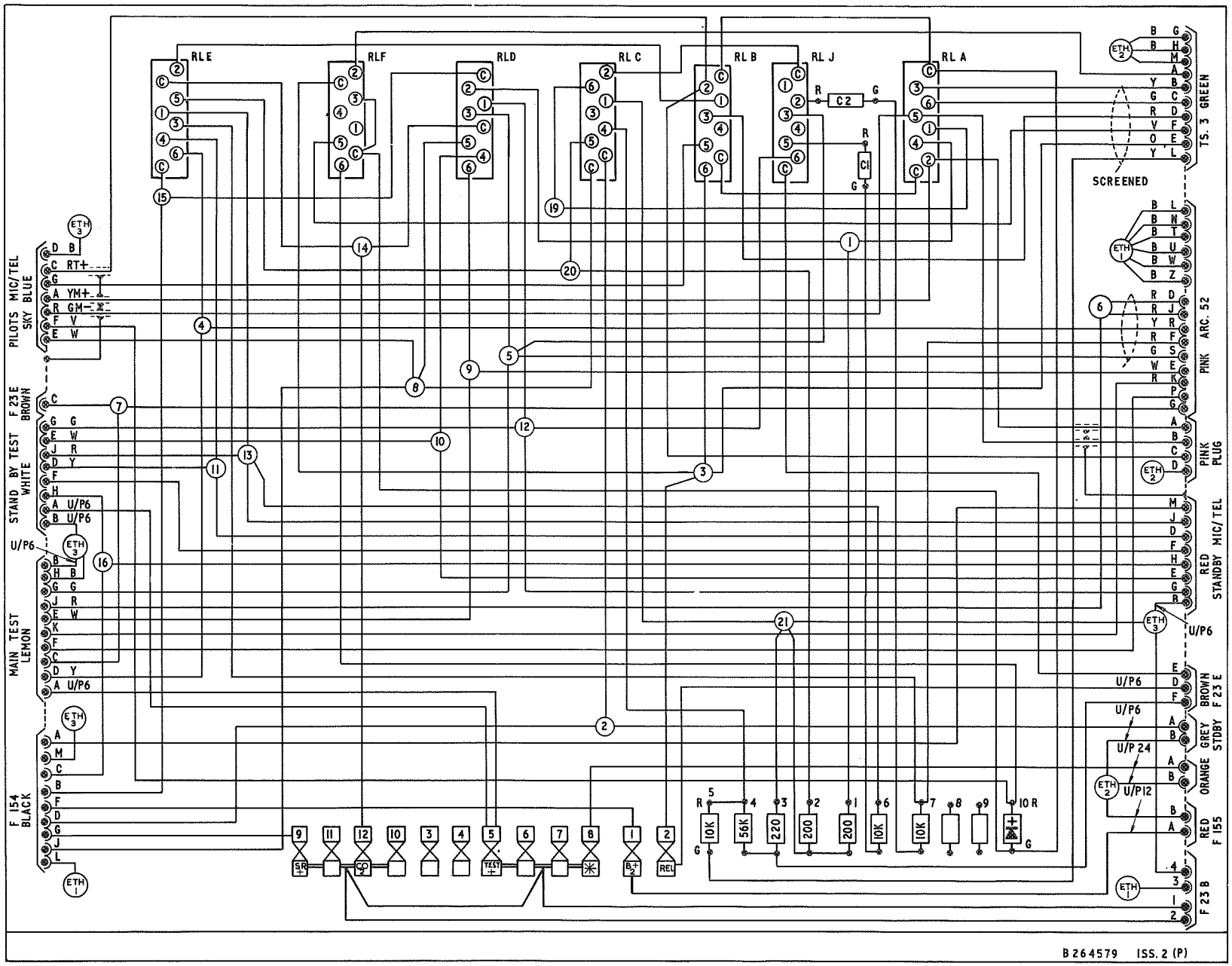


Fig. 2 Radio supplies and relay box (routeing)

Appendix 3 – MOD 1319
(A R I 23134/3)

CONTENTS

ILLUSTRATIONS

TABLE

Introduction

1. This appendix contains the description and operation of the supply circuits for the I F F /S S R *(A R I 23134/3)* introduced by Modification number 1319 to all Mk.11 aircraft, together with information on the servicing required to maintain the equipment in an efficient condition. Theoretical and routeing circuit diagrams are included. For a description of the aircraft electrical system, reference should be made to Group A 1, A 2 and A 3 of this Air Publication. Detailed information on the standard items of equipment employed in the installation will be found in the Air Publications listed in Table 1.

DESCRIPTION

General

2. The I F F /S S R *(Identification Friend or Foe/Secondary Surveillance Radar)* installation *(A R I 23134/3)* forms the airborne part of an I F F /S S R system. The purpose of this system is to

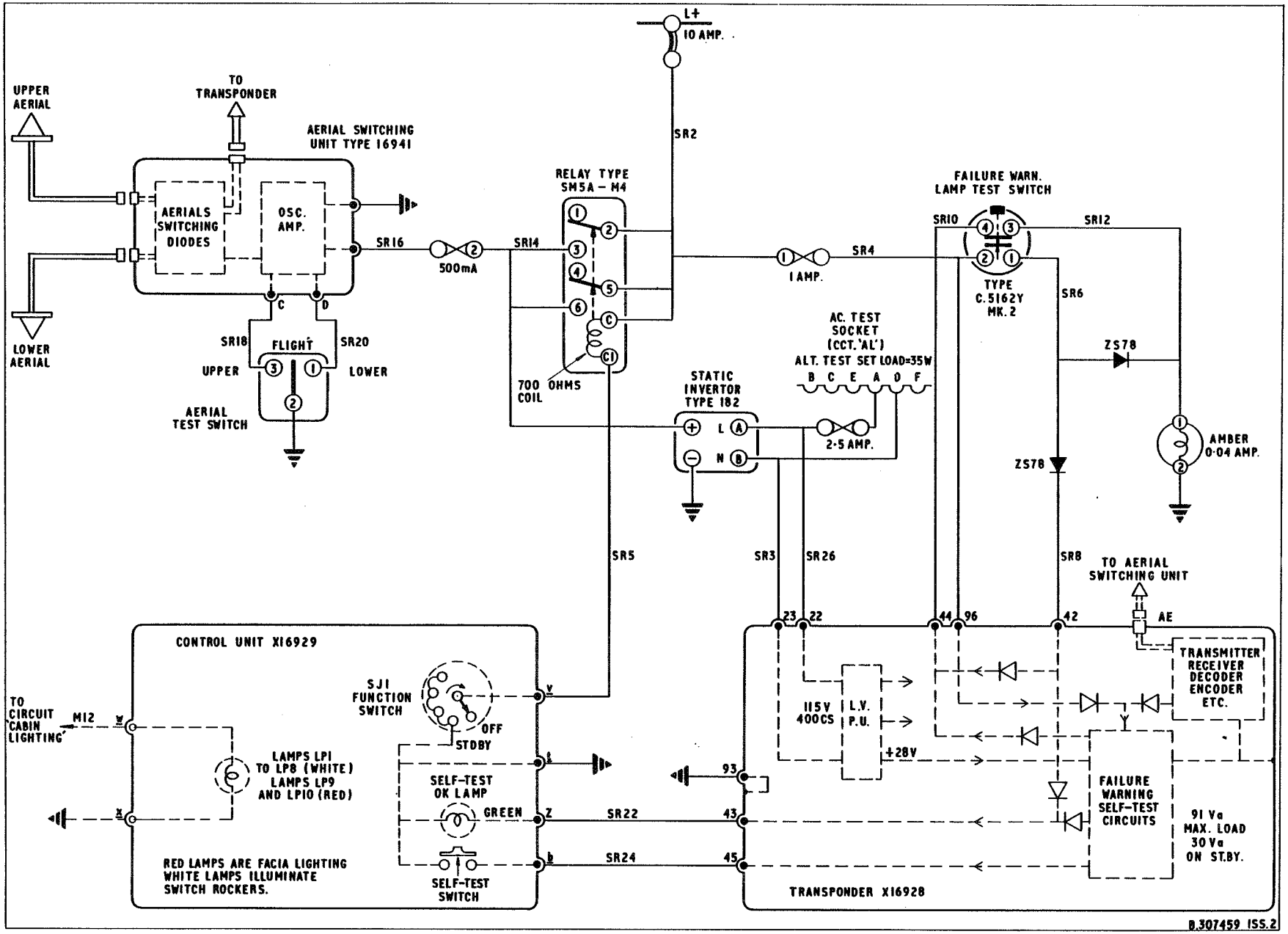


Fig.1 IFF/SSR supplies (theoretical)

enable an aircraft to identify itself rapidly and automatically when challenged by appropriately equipped ground installations. When interrogated by an I F F or S S R radar, the airborne equipment responds by transmitting the appropriate reply signal. On Mk.11 aircraft, Mode C of the system becomes operable when Mod 1383 or 1387 is embodied *(Ref. Chap.2, Group 3A, App 1)*. Mode D is not operable, and the connecting cable, *(SSR2, End F)*, is stowed at frame 19.

Electrical supplies and equipment

3. The installation receives its d.c. supply through a circuit breaker situated below the supply panel in the radio bay and labelled I F F /S S R This circuit breaker supplies all d.c. necessary for the operation of the system and also powers the Type 182 inverter which provides the single phase 115v 400 Hz a.c. required.

4. The transmitter/receiver *(transponder)* and the Type 182 inverter are mounted on shock absorber type racks and positioned adjacent to each other at the rear of the upper radio mountings in the radio bay. The transponder is designed to operate within the temperature range -55 deg. C to +125 deg. C at altitudes up to 100,000 ft. It is pressurized with nitrogen or dry air to 4lb./in.^{2} Two CHARGE/CHECK/PURGE valves on the front panel are provided for this purpose. ON and OFF switching of the Type 182 inverter is done by the control unit function switch via the control relay in the S S R junction box.

5. The I F F /S S R junction box, containing the control relay and fuses is bolted to the upper front face of frame 19. It provides the main earthing point for the installation and also forms the interconnection point between the power supply and the components of the installation. Interconnection is by multi-pin plugs and sockets.

6. The aerial test switch, labelled UPPER, FLIGHT, LOWER is positioned at the lower starboard side of the front face of frame 19. This switch is normally locked in the FLIGHT position but may be manually moved to the UPPER or LOWER position for testing or servicing purposes. The markings denote the aerial connected to the transponder. In the FLIGHT position the switching of aerials is done automatically by the aerial switching unit. This switching unit is bolted to the top rear face of frame 16.

▶ **7.** The control unit, warning lamp and lamp switch for the IFF/SSR installation are mounted in the pilot's cabin. Pre-Mod 1429, the control unit and lamp test switch are secured to a mounting on the starboard shelf immediately aft of the Tacan control unit, ◀

TABLE 1

Equipment type and Air Publication reference

Equipment Type	Air publication
Inverter, Type 182	A P 113D–0300 Series
Aerial test switch, C.W.C. Type XD 776 No.4	A P 113D–1100 Series
Failure warning lamp, Part No.232534	A P 113F–0200 Series
Circuit breaker, Type A.2	A P 113D–0900 Series
Test warning panel	
Push-button switch, Type A, C5162Y, Mk.2	A P 113D–1108–1
Diodes, Ferranti Type ZS-178 or ZS-78	A P 113D–1900 Series

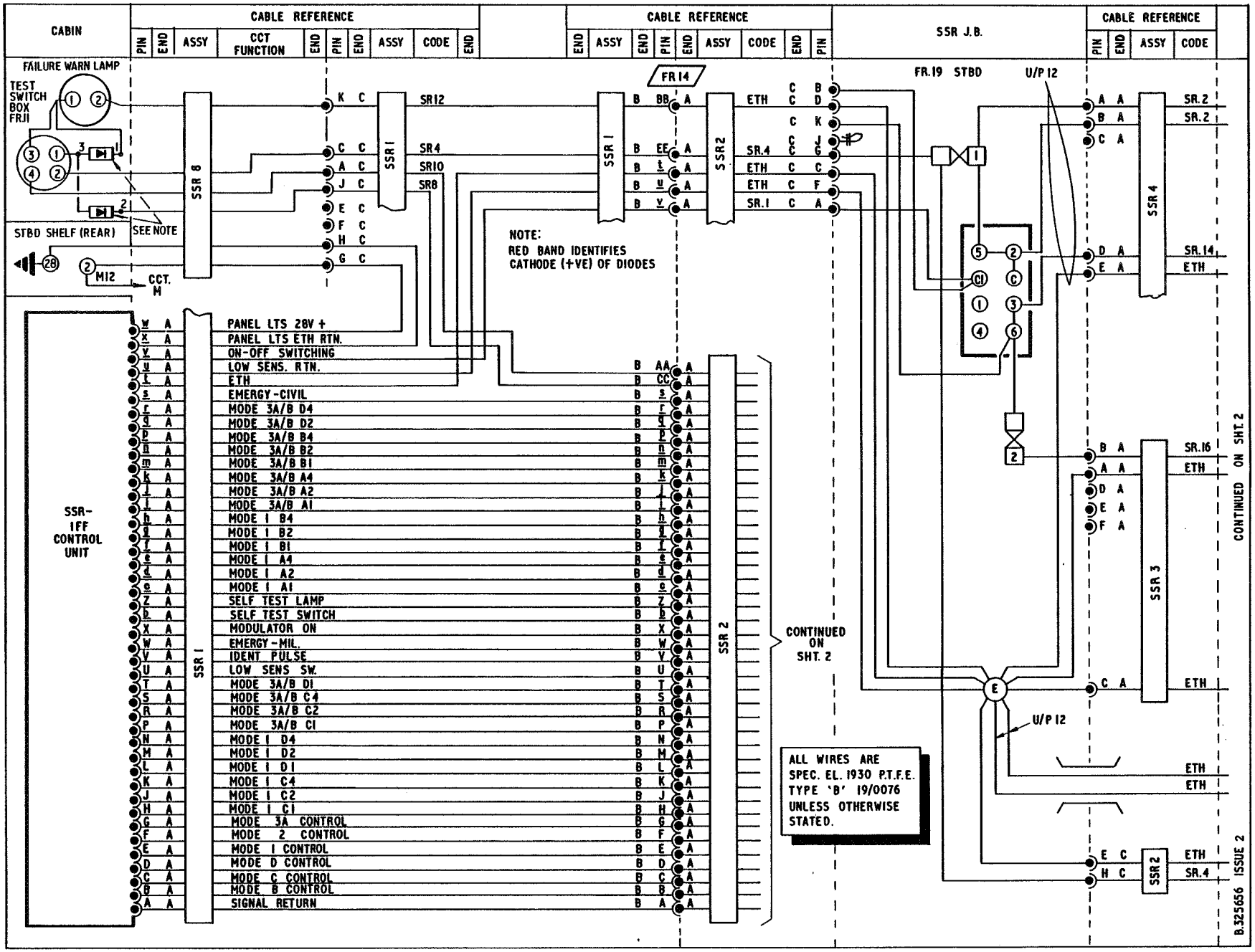
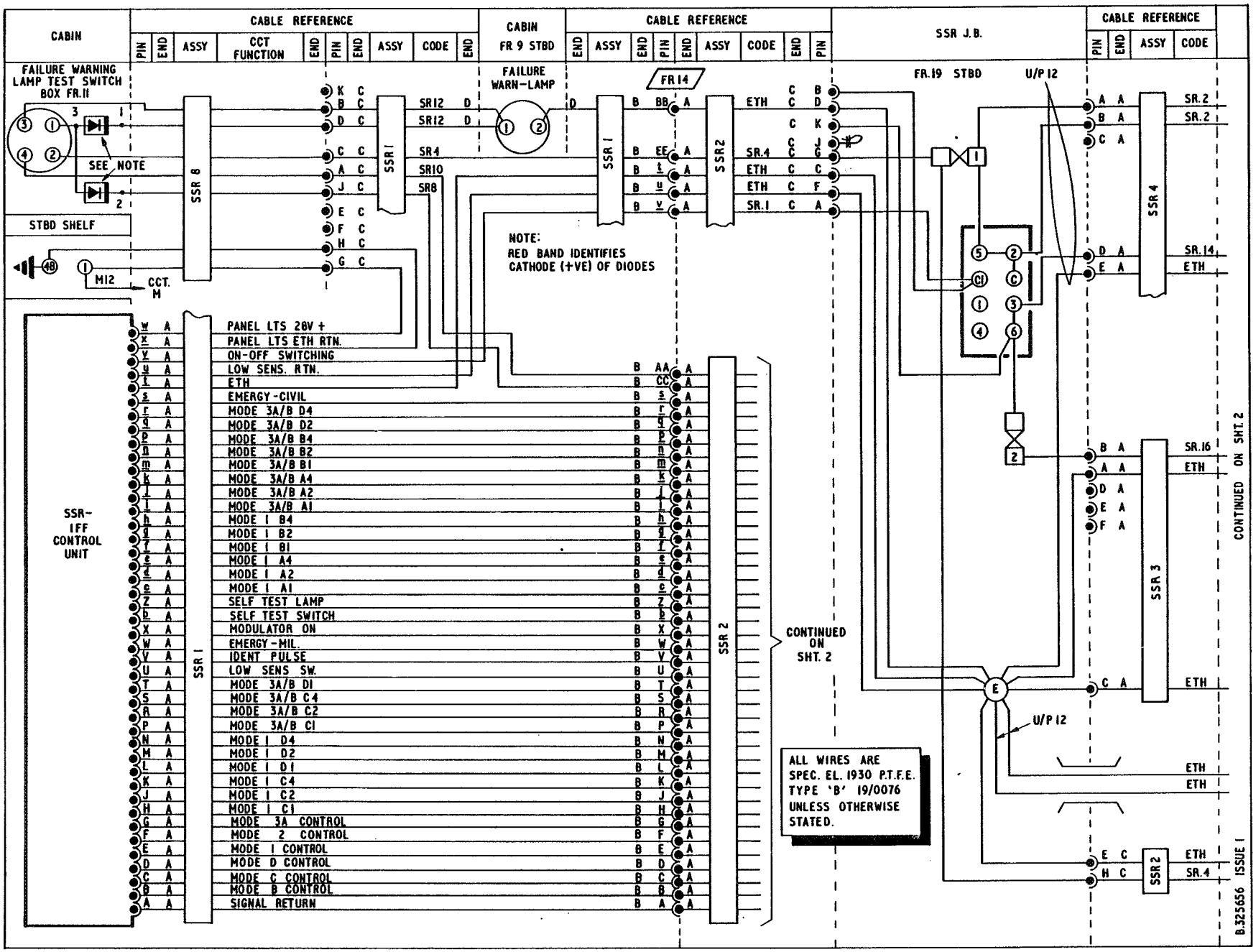


Fig.2 IFF/SSR (routeing sheet 1)

▶ (Mod 1429 added) ◀



▶ Fig.2A IFF/SSR (routeing sheet 1) – pre-Mod 1429 ◀

▶ while the failure warning lamp is held in a bracket attached to frame 9 above the forward end of the starboard shelf. When Mod 1429 is embodied, the control unit, warning lamp and lamp test switch are located on the sloping portion of the forward starboard shelf. ◀

Operation

General

8. With the I F F /S S R circuit breaker closed and d.c. power available, a supply is fed to terminal 2 of the I F F /S S R TEST panel switch and to terminal 96 of the transponder via the 1A. fuse in the I F F /S S R J.B. This supply is also available at terminals 2 and 5 of the control relay in the I F F /S S R J.B. If the push-switch on the I F F /S S R TEST panel in the cabin is pressed, supply will pass via the two diodes and illuminate the failure indicator warning filament and also the self test green lamp filament on the I F F /S S R control unit. Supply to the green self test lamp is via terminals 42 and 43 of the transponder. This operation tests the initial serviceability of these two filaments prior to further functional checks listed in Sect 6, Chap 2, App 2. The purpose of the amber failure warning lamp is to indicate failure of the I F F /S S R installation while the green self test lamp is used to indicate satisfactory operation of the equipment during the functional checks.

9. Selection of the rotary FUNCTION CONTROL switch on the I F F /S S R control unit in the cabin from OFF to any of the other four positions of the switch provides an earth return to energize the coil of the control relay in the S S R J.B. With this coil energized supply is available to bring the Type 182 inverter on line and also to power the aerial switching unit via terminal 6 of the control relay and the 500mA fuse. After a short warming up period the installation is ready for use. Sect 6, Chap 2, App 2 of this Air Publication contains details of the operating procedure and a description of all major components of the airborne I F F /S S R installation.

General

10. 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 circuits 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

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

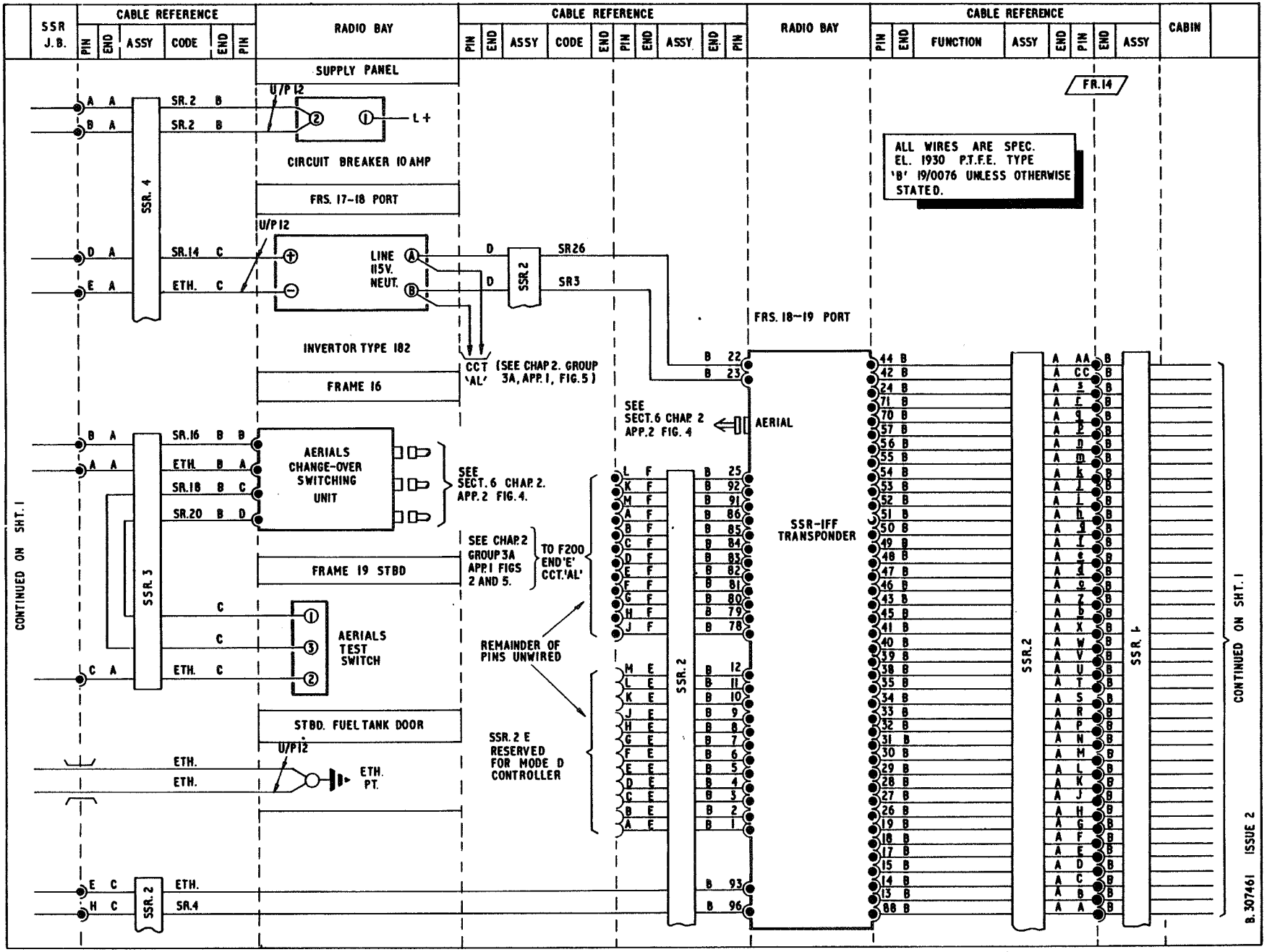


Fig.3 IFF/SSR (routeing sheet 2)