

## CHAPTER 2

### RADAR INSTALLATION

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#### **WARNING**

An aircrew ejection seat is fitted to this aircraft. Before attempting to enter the cabin, therefore, ensure that the instructions given in the Lethal Warning Marker Card at the beginning of this volume, have been carried out. In the interests of safety, this is very important.

#### **Introduction**

1. This chapter describes the radar equipment installed in this aircraft and includes information on the servicing required to maintain the installation in an

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efficient condition. Information on the removal of the various components, with illustrations showing the location and interconnection of the equipment, is also included. A detailed description, and technical information on the equipment used, is given in A.P.2887N, Vol.1.

#### **DESCRIPTION**

##### **General**

2. The radar equipment in this aircraft consists of an A.R.I.5848 (*I.F.F.*) installation, the basic purpose of which is to enable the aircraft to automatically identify

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itself as friendly when challenged by appropriately equipped air, sea or ground forces. The system also provides:-

- (1) Identification of one specific friendly aircraft among many.
- (2) Transmission of a specially coded reply (*emergency signal*) which indicates that the aircraft is in distress.

Operation of the system is effected by control units situated in the cabin. The location of the equipment is illustrated in fig.1 and 2.

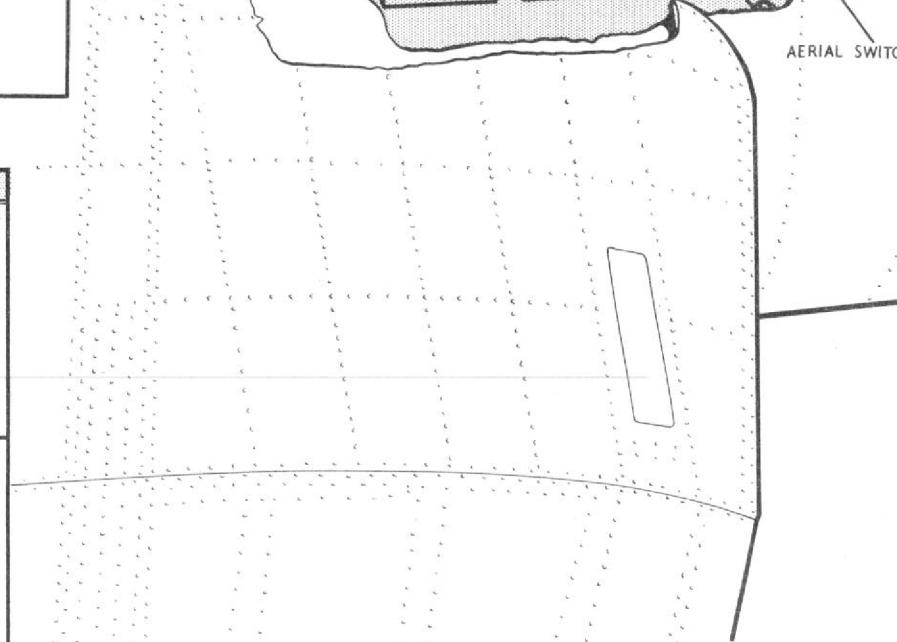
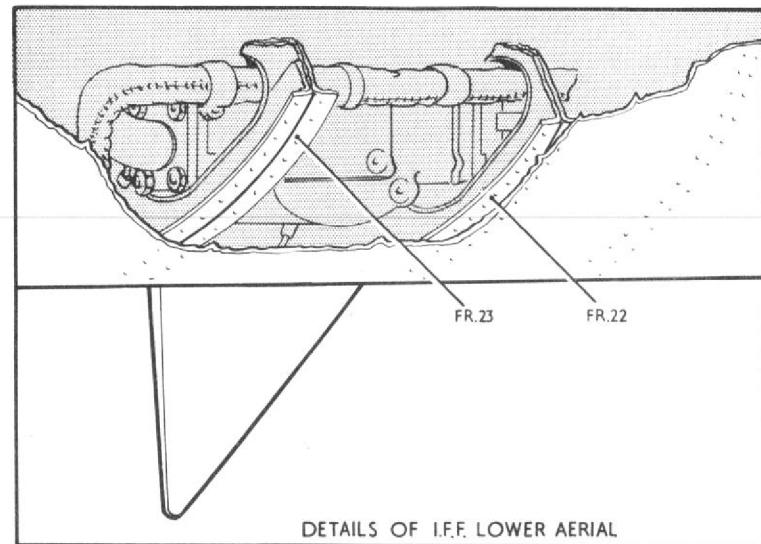
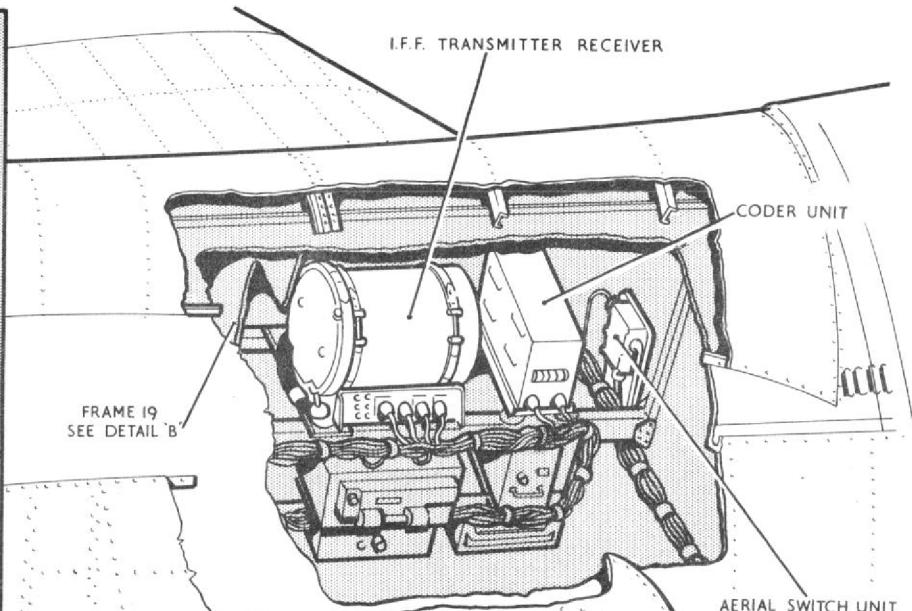
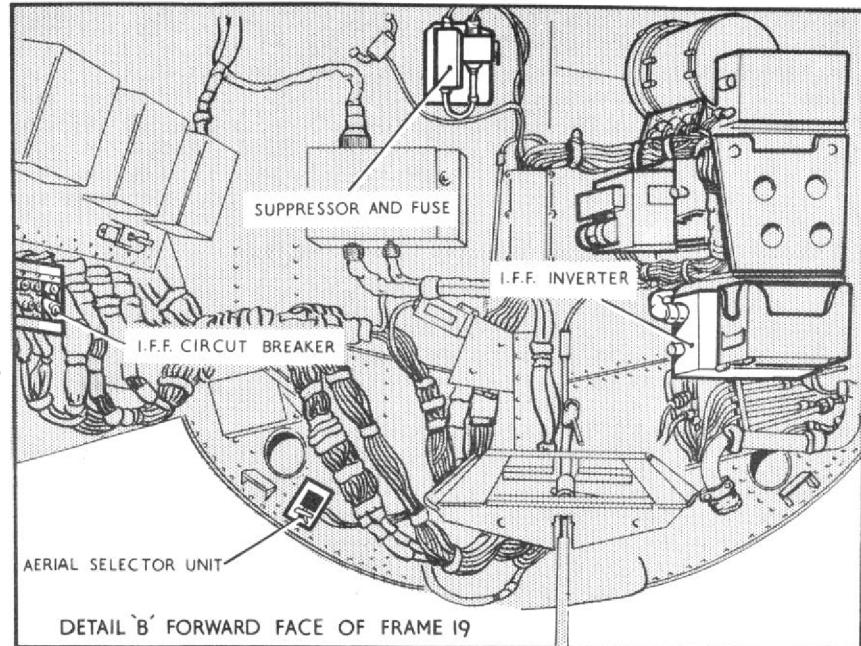


Fig. 1 Radar installation - location (1)

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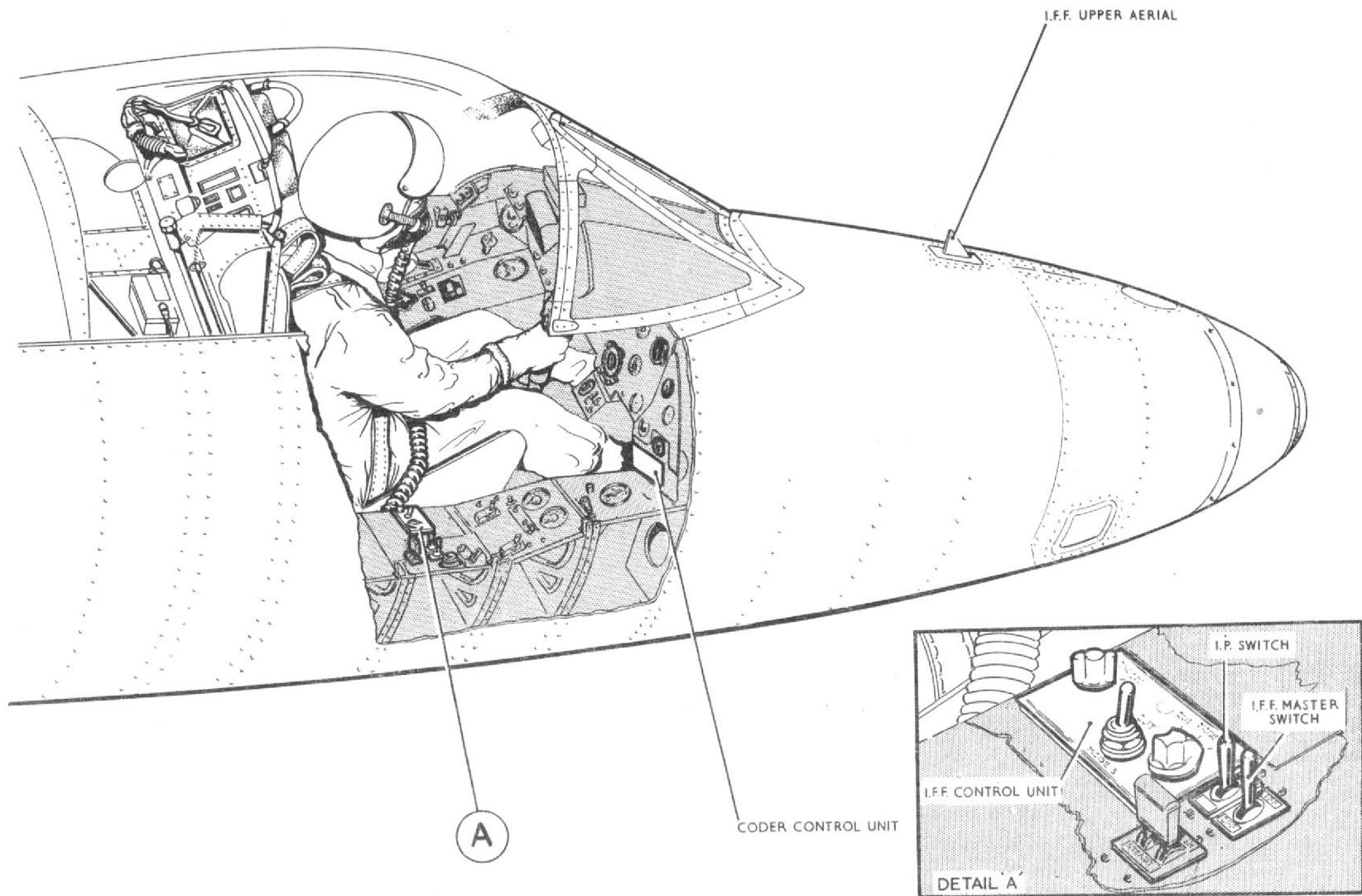


Fig. 2 Radar installation - location (2)

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3. The installation is designed for spot frequency operation on two separate channels within the 950 to 1,150 Mc/s band. One channel is employed for reception of interrogation signals, and the other for transmission of replies. The main item of the aircraft installation is a transmitter-receiver contained in one unit and known as a transponder. An interrogating pulse from a ground station is fed to the transponder receiver which produces a pulse to modulate the transponder transmitter. The resultant transmission or reply pulse is received by the ground station and displayed with the radar echo, but it appears at slightly greater range, due to delay introduced by both the interrogating equipment and the transponder. Selective coding of the interrogating pulses is used; the transponder decodes these pulses, and replies only to those interrogators transmitting the appropriate code.

#### A.R.I.5848 installation

4. This is a Mk.10 I.F.F. installation embodying a Type 4585 transmitter-receiver which is carried on a shock-absorber type mounting rack located at the aft end of the top platform of the radio mounting structure in the radio bay. The installation uses either two Type 100A or 100B aerials ► each of which is automatically connected, in turn, to the transmitter-receiver by a Type 6850 aerial switch unit. One aerial is situated on the top of the front fuselage just forward of the windscreen, and the other is mounted between frames 22 and 23 on the underside of the centre fuselage.

The aerial switch is mounted on a plate attached to the aft face of frame 16 on the port side, in the radio bay.

5. Remote operation of the installation is by a single-pole ON - OFF I.F.F. master switch, a single-pole ON - OFF I.P. switch and a Type 927 control unit. These are mounted together on the cabin starboard shelf. The installation includes a Type KY-95A/APX.25 coder unit; this is mounted on a Type X.6475 mounting tray fitted with anti-vibration mountings to a carrier attached to frame 16 in the radio bay. The coder is operated by a Type C.1128/APX.25 control unit situated above the cabin starboard shelf, adjacent to the starboard instrument panel.

6. The power supply for the installation is obtained from a Type 200 inverter which is mounted on the underside of the radio mounting structure in the radio bay. The inverter obtains its d.c. supply from a circuit breaker mounted below the aircraft's electrical supply panel on the starboard side of the radio bay. The power supplies are described in Sect.5, Chap.1, Group H.1. The inverter is switched on by the I.F.F. master switch and its output is taken to the transmitter-receiver via a Type G.2 suppressor and fuse. The suppressor and fuse are mounted together on the forward face of the starboard fuel tank access door on frame 19.

7. To enable the upper or lower aerial to be selected for test purposes, a single-pole changeover switch in the radio bay, marked UPPER, LOWER and FLIGHT, is mounted on a bracket attached to the forward face of frame 19, below the starboard fuel tank access door. The switch is fitted with a spring-loaded safety cover to retain the switch toggle in the FLIGHT position on the completion of testing or servicing.

#### Interconnection

8. The various components of the radar installation are interconnected as shown in fig.3 by connectors strapped and clipped to the aircraft structure. These connectors are of the metal-braided and non-braided type fitted with standard and miniature plug and socket type breakdown points.

## OPERATION

#### A.R.I. 5848

9. Setting-up and operational instructions for this installation are given in detail in A.P.2887N, which should be referred to when this information is required.

## SERVICING

#### General

10. Servicing of the radar installation is fully covered in A.P.2887N. Any units suspected of being unserviceable should first be carefully checked in-situ and if found to be faulty, removed from the aircraft

and taken into the workshop for rectification action as necessary. The location of the radar equipment is illustrated in fig.1 and 2, and the interconnection in fig.3. Wiring diagrams of the power supplies will be found in Group H.1 of Sect.5, Chap.1.

#### Power supply

11. If a fault is reported in the radar installations, the power supply should first be checked, in conjunction with the routeing and theoretical diagrams given in Group H.1 of Sect.5, Chap.1, to ensure that the trouble is not located in the aircraft's electrical system. The voltage, both on and off load, must be tested and a check made to ensure that the connectors carrying the supply to the equipment are correctly assembled.

#### Cables and connectors

12. Servicing of cables and connectors consists of the standard continuity and insulation resistance tests and of periodical examinations throughout their entire length for signs of damage or deterioration of the insulation. If any signs of these defects are found, the complete cable or connector must be replaced. All the clips and straps securing the connectors to the structure must also be examined for signs of looseness and rectified as necessary to prevent chafing. All the plug and socket connections must be checked to ensure that they are fitted properly and that the fixings are tightened securely.

#### Final check

13. After servicing the radar installations, ensure that the equipment is left switched OFF and that all access doors, and panels, removed to gain access, are correctly replaced and secured.

## REMOVAL AND ASSEMBLY

#### General

14. The recommended procedure for removing the majority of the components comprising the radar installation is given in the following paragraphs. The method of assembly is, in general, the reverse of the removal sequence, but when there is any special assembly feature it is covered by a note in the appropriate paragraph. Before removing or replacing any components, the aircraft's electrical system must be rendered safe, as described in Group A.1 of Section 5, Chapter 1.

#### Transmitter-receiver

15. To remove this transmitter-receiver proceed as follows:-

- (1) Render the aircraft electrically safe (Sect.5, Chap.1, Group A.1).
- (2) Disconnect the connectors from the transmitter-receiver and fit approved caps and covers to the plugs and sockets. Stow the connectors clear of the set.
- (3) Unscrew and disengage the two knurled catches securing the transmitter-receiver to the mounting rack and

pull the unit inboard to release the two retaining spigots at the rear.

- (4) Remove the transmitter-receiver from the aircraft.

#### Inverter

16. The recommended method of removing this component is covered in the removal of the gun firing panel as described in Section 5, Chapter 1, Group A.2.

#### Aerials

17. The recommended method of removing the aerials is as follows:-

- (1) Render the aircraft electrically safe (Sect.5, Chap.1, Group A.1).
- (2) Gain access to the aerial and disconnect the aerial connector from the socket at the base of the aerial unit.
- (3) Remove the nuts and washers from the screws securing the aerial to the fuselage structure and withdraw the aerial into the fuselage taking care to retain the sealing washer and bonding strips.
- (4) Remove the aerial from the aircraft.

#### Note . . .

When assembling the aerial, ensure that the bonding strips are replaced on the attachment screws before the sealing washer is fitted. When the aerial is in position, bend the bonding strips around

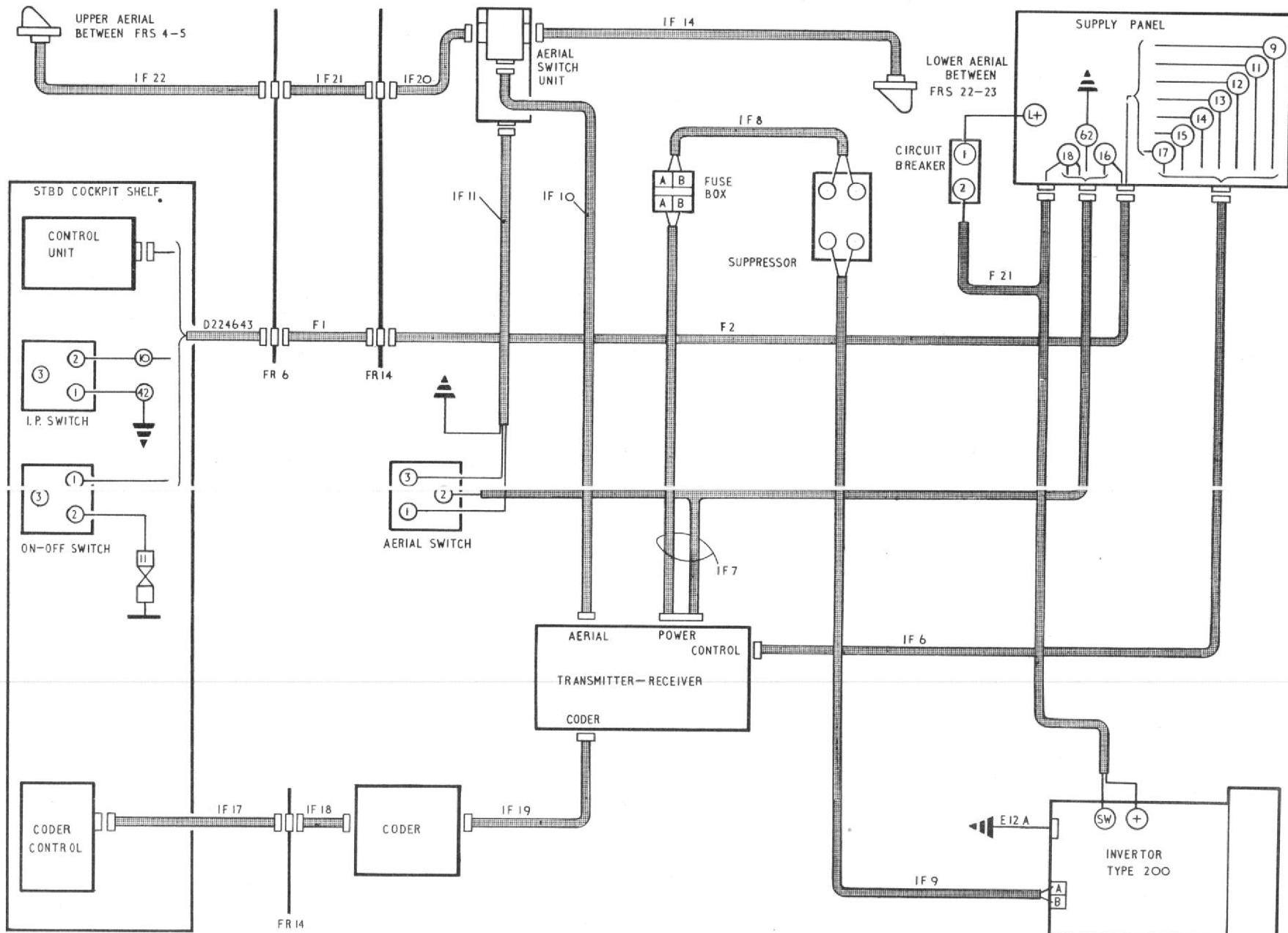


Fig.3 Radar installation - interconnection

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*the aerial and place them under the nuts and washers on the screws securing the aerial in position.*

#### **Aerial switch unit**

18. To remove the switch unit, first render the aircraft electrically safe, and then remove all the connectors from the unit. Fit approved caps and covers to the plugs and sockets and stow the connectors clear of the unit. The unit may now be removed by unscrewing the three bolts securing it to the mounting plate.

#### **Coder unit**

19. The recommended procedure for removing this unit is as follows:-

- (1) Render the aircraft electrically safe (Sect.5, Chap.1, Group A.1).
- (2) Disconnect the cables from the unit and fit approved caps and covers to the plugs and sockets. Stow the connectors clear of the unit.
- (3) Unscrew the knurled screw and dis-

engage the clamping plate holding the unit to the mounting rack and remove the unit from the mounting tray.

#### **I.F.F. master switch, I/P switch and coder control unit**

20. When it is required to remove either of these units from the cabin starboard shelf, the shelf should first be removed, as described in Section 5, Chapter 1, Group A.2. The method of removing the units will then be self-evident.





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