# Group C A.R.I.5848 (I.F.F. Mk.10) INSTALLATION

## LIST OF CONTENTS



## LIST OF ILLUSTRATIONS



Introduction

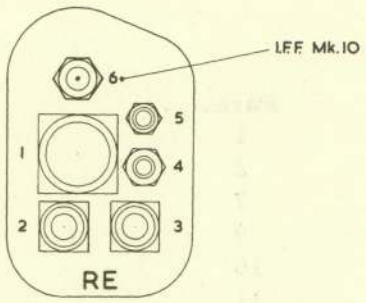
1. This group describes the AN/APX-6 (I.F.F. Mk.10) equipment installed in the aircraft, together with servicing notes and instructions concerning the removal of units for servicing. The operation of each unit is described briefly. For further information, refer to the specialist Air Publication dealing with this equipment, A.P.2887 N. Vol.1.

## DESCRIPTION

2. The purpose of the I.F.F. equipment is to enable the aircraft to identify itself to friendly forces when challenged by appropriately equipped stations.

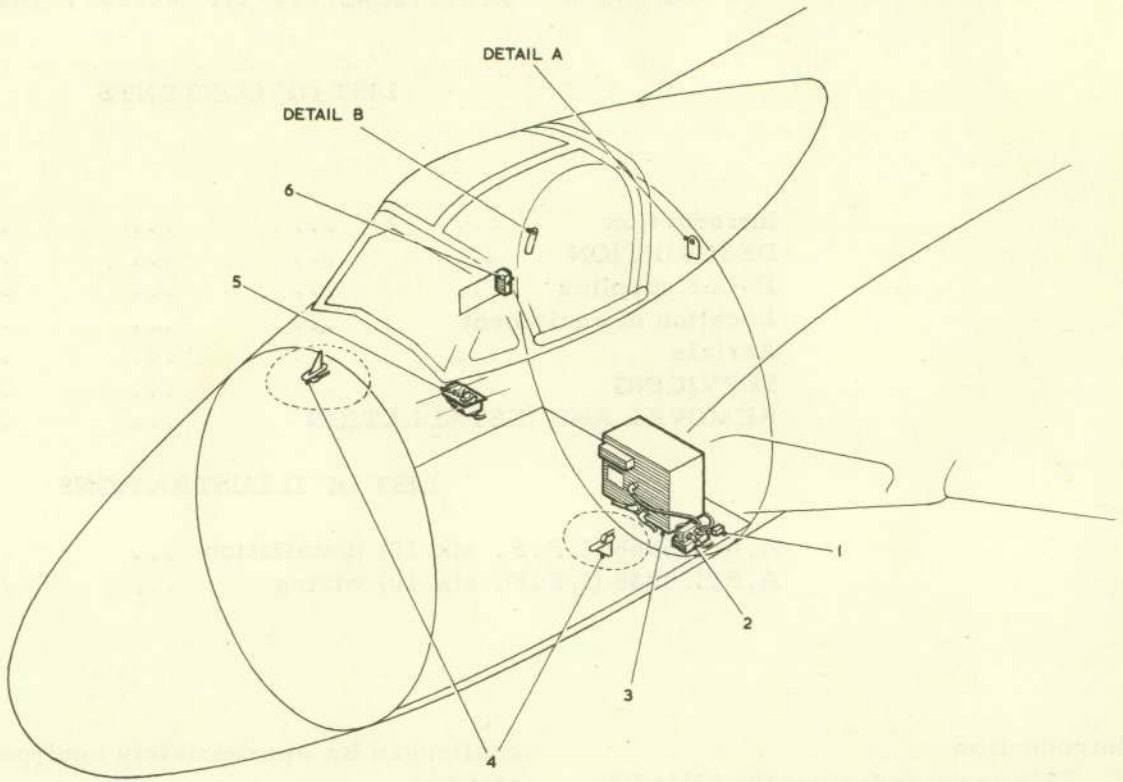
3. In operation, the equipment receives pulses of radio frequency energy transmitted by the interrograting station. These are amplified and mixed in the receiver portion of the transponder, the output being utilized to trigger off a coded response from the transmitter portion. The process of identification is as follows. The challenging station, which may be a ground radar station or a ship-borne station, or an aircraft in certain circumstances, transmits a continuous series of interrogation pulses. The aircraft receives these pulses and automatically replies with a coded response on another frequency. This coded response is received by the interrogating station and displayed on a cathode ray tube for visual identification.

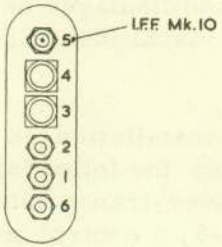
4. The installation in this aircraft comprises the following equipment:- A receiver-transponder, Type RT 82/APX-6, a control unit, Type 544/APX-6 (or control unit, Type 77PE C629/APX-6), an aerial switch unit, Type 2160, and two fin type aerials, Type 100, together with the assoc-




SEALING PLATE RE

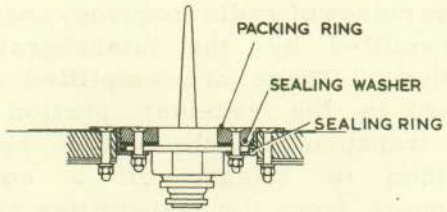
DETAIL A




SEALING PLATE RD

DETAIL B




SECTION OF AERIAL AND MOUNTING

1 T.B. RO

2 AERIAL SWITCHING UNIT, TYPE 2160

3 RECEIVER TRANSMITTER, TYPE RT82/APX-6

4 AERIAL, TYPE 100, WITH METAL 'COUNTERPOISE

5 CONTROL UNIT, TYPE C544/APX-6

6 AERIAL POSITION SWITCH

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Fig. 1. A.R.I. 5848 (I.F.F. Mk. 10) installation

iated wiring, switches and terminal blocks.

5. The control unit, Type C544/APX-6, mounted on panel A on the starboard side of the cockpit provides the necessary controls for operation of the receiver-transponder. A five-position system switch controls the operation of the set under varying conditions, including EMERGENCY. A red spring-loaded plunger-stop prevents the system switch from being inadvertently turned to the EMERGENCY position. The control unit dial has edge-lighting, the lamps for which are contained in two sockets behind two knurled bakelite covers on the front face. Two three-way switches, labelled MODE 2, OUT, I/P AND MODE 3, OUT, control the method of responding in the transponder. A further switch, protected by a red plastic spring-loaded cover, and indirectly illuminated from the front face of the control unit, completes the d.c. supply to the destruction detonators. Fig.1 shows the layout of the I.F.F. Mk.10 installation and fig.2 the wiring diagram with a reference to the supply source.

6. The two aerials are connected to the aerial switch unit, Type 2160, in the cockpit, with a further aerial feeder from the switch unit to the set. A three-way aerial position switch is mounted on the observer's switch panel on the starboard cockpit wall, which controls the operation of the switch unit, Type 2160. It has three positions, FLIGHT, UPPER and LOWER, and is normally kept in the FLIGHT position by a spring-loaded locking guard. In the FLIGHT position, the upper and lower aerials are alternately connected to the set through the operation of the switch unit mechanism. In the UPPER position of the aerial position switch, the upper aerial, Type 100, is connected to the set via the switch unit, Type 2160 contacts; with the switch at LOWER, the aerial, Type 100, under the belly of the aircraft is connected to the set.

Power supplies

7. The I.F.F.10 (APX-6) installation requires two sources of supply, one 28-v. d.c. and one 115-v. a.c. The accompanying wiring diagram (fig.2) and fig.2 of Sect.5, Chap.1, App.1, Group R and S of this publication show the power supply arrangements. Two fuses, SXC and SC, in the main electrical fuse box C are in the a.c. and d.c. supplies, respectively, to the equipment via terminal block RO. The d.c. supply is fed, via fuse SC, to the I.F.F.10 master switch on panel A, immediately below the radar switch panel RC. Closing the I.F.F. master switch completes the d.c. supply to the set, via T.B. RO/3.

8. When the I.F.F.10 equipment is switched on by means of the system switch on the control unit, Type 544/APX-6, the d.c. supply, besides being fed to the circuits in the set, is also fed out again, via T.B. RO/2, to the aerial position switch and thence to the aerial switch unit, Type 2160. A further lead from RO/2 is taken to the operating coil of a relay, Type S1 (relay F), in the main junction box B. This relay is energized and the 115v. a.c. supply from fuse SXC is now connected, via contacts 5-5A of relay F and T.B. RO/4, to the I.F.F.10 transponder.

Location of equipment

9. The receiver-transponder is contained in an anti-vibration mounting tray on the cockpit floor behind the pilot's seat. The aerial switch unit, Type 2160, is located adjacent to the forward outboard corner of the receiver transponder. It is secured to a detachable anti-vibration mounting tray which is in turn secured by means of a handle type Pip-pin to a fixed mounting tray on the floor. The control unit, Type C544/APX-6, is located on the starboard cockpit wall aft of the observer's switch panel, and the aerial position switch at the after end of the observer's switch panel itself. As previously stated, the I.F.F. Mk.10 master switch is located on panel A beneath radar switch panel RC.

Aerials

10. Two fin type aerials, Omni, Type 100, are used with the I.F.F. Mk.10 installation. One is situated in front

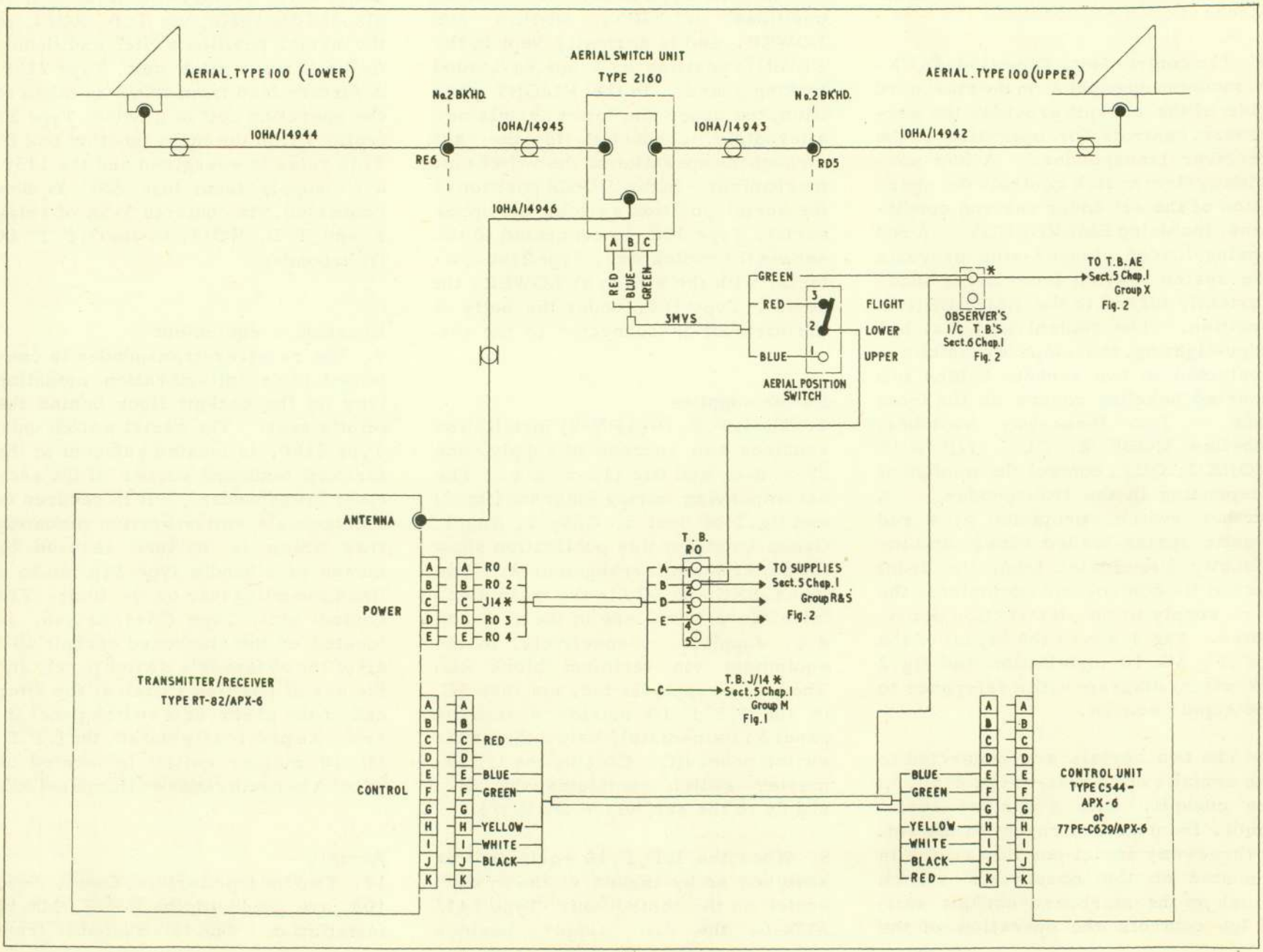


Fig. 2 A.R.I. 5848 (I.F.F. Mk.10) wiring

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of the windscreen secured to the roof of the nose compartment and the other in the belly of the aircraft beneath the cannon bay. To provide a counterpoise for these aerial systems a circular sheet of metal foil is interposed between the aircraft medapolan skin and the wooden fuselage. This is effectively bonded to the dished metal plate securing the aerial to the aircraft, and to the aircraft bonding system.

## SERVICING

11. Servicing of the I.F.F. Mk.10 is confined to in situ checks of the units and components comprising the installation. Testing and workshop servicing procedures are fully described in A.P.2887N, Vol.1. Before servicing is carried out the aircraft must be rendered electrically safe by opening the battery isolation switch.

12. To gain access to the I.F.F. Mk. 10 receiver-transponder it will be necessary to remove the pilot's ejector seat, as described in A.P. 4288N, Vol.1. When this has been done, the unit should be inspected for signs of damage or deterioration. The operation of the anti-vibration mountings should be checked to ensure that no fouls with adjacent aircraft structure exist. Plugs and sockets should be clean and free from corrosion and the knurled securing nuts on the front of the mounting tray should be check tightened. The aerial switch unit and its mounting should be checked at the same time as the receiver-transponder. The aerial connections should be checked for security and clearance from control cables, etc., and the desiccator should be checked for condition and security. The mounting tray should be checked for serviceability, ensuring that the pip pin secures the upper half of the tray securely in the fixed mounting. Inspect terminal block RO for damage and its connections for security and cleanliness. The control unit, Type C544/APX-6 (or 77PE C629/APX-6), should be inspected for security in its support bracket and condition of the switches, dial lamps and lamp holders, and the DESTRUCT switch cover. The connector plug and socket should be clean and free from damage or corrosion and securely connected.

13. The aerials, Omni, Type 100, should be inspected periodically for damage and security. The alkathene insulators should be flush with the aircraft skin and reasonably smooth to prevent dirt and moisture collecting. It is important that the resistance of the bonding of the metal foil counterpoise round both aerials is less than 0.025 ohm, and that the aerials themselves are securely fixed to the dished mounting plates. The coaxial connector plugs at the base of the aerials should be check tightened and no acute bends left in the coaxial cable adjacent to the aerial.

## REMOVAL AND INSTALLATION

14. To remove the I.F.F. Mk.10 receiver-transponder from the aircraft, it is necessary to remove the pilot's ejector seat and guide rail, as described in A.P.4288N, Vol.1. When this has been done, disconnect the three plugs on the front of the set and release the two knurled locking nuts securing the set in the mounting tray. Withdraw the unit from its mounting. Refitting is the reverse of removal. To remove the aerial switch unit, Type 2160, disconnect the three coaxial connectors and the three-pin plug at the rear. Release the handle type pip pin on the outboard side of the mounting and lift the unit and anti-vibration mounting clear. The switch unit can now be detached from the mounting by removing the three 4 B.A. nuts and bolts securing it to the three shock-mounts. Reverse the procedure when refitting, taking care to replace the bonding tag under the appropriate securing nut and washer.

15. The control unit, Type C544/APX-6 is removed from its support bracket on the starboard cockpit wall, by disconnecting the plug on the underside, and unscrewing the four mush/hd. 4 B.A. screws. The unit can then be lifted out of its mounting. In the event of a control unit, Type 77PE C 629/APX-6, being installed in place of a Type C544/APX-6, it will be necessary to remove the four Dzus fasteners on the unit, and secure it to the mounting bracket with the four mush/

hd. screws mentioned above. The mounting bracket is drilled and tapped at each end to permit either of the two control units to be fitted.

16. To remove the upper aerial, Type 100, first remove the 12 csk/hd. screws securing the aerial and packing ring to the dished mounting plate. The aerial can then be lifted sufficiently to disconnect the coaxial feeder underneath. If difficulty is experienced in disconnecting the coaxial from the outside of the aircraft, the underside of the aerial can be reached after opening the radome. Refitting is the reverse of removal, but care must be exercised in replacing the rubber sealing ring and washer to ensure a watertight fit. Ensure also that the bonding of the aerial base to the dished mounting plate is effective. Removal of the lower aerial, Type 100, is similar to the upper, except that the coaxial connector and socket are reached through the starboard cannon bay, which will entail removal of the cannon bay doors.