

Chapter I TACAN

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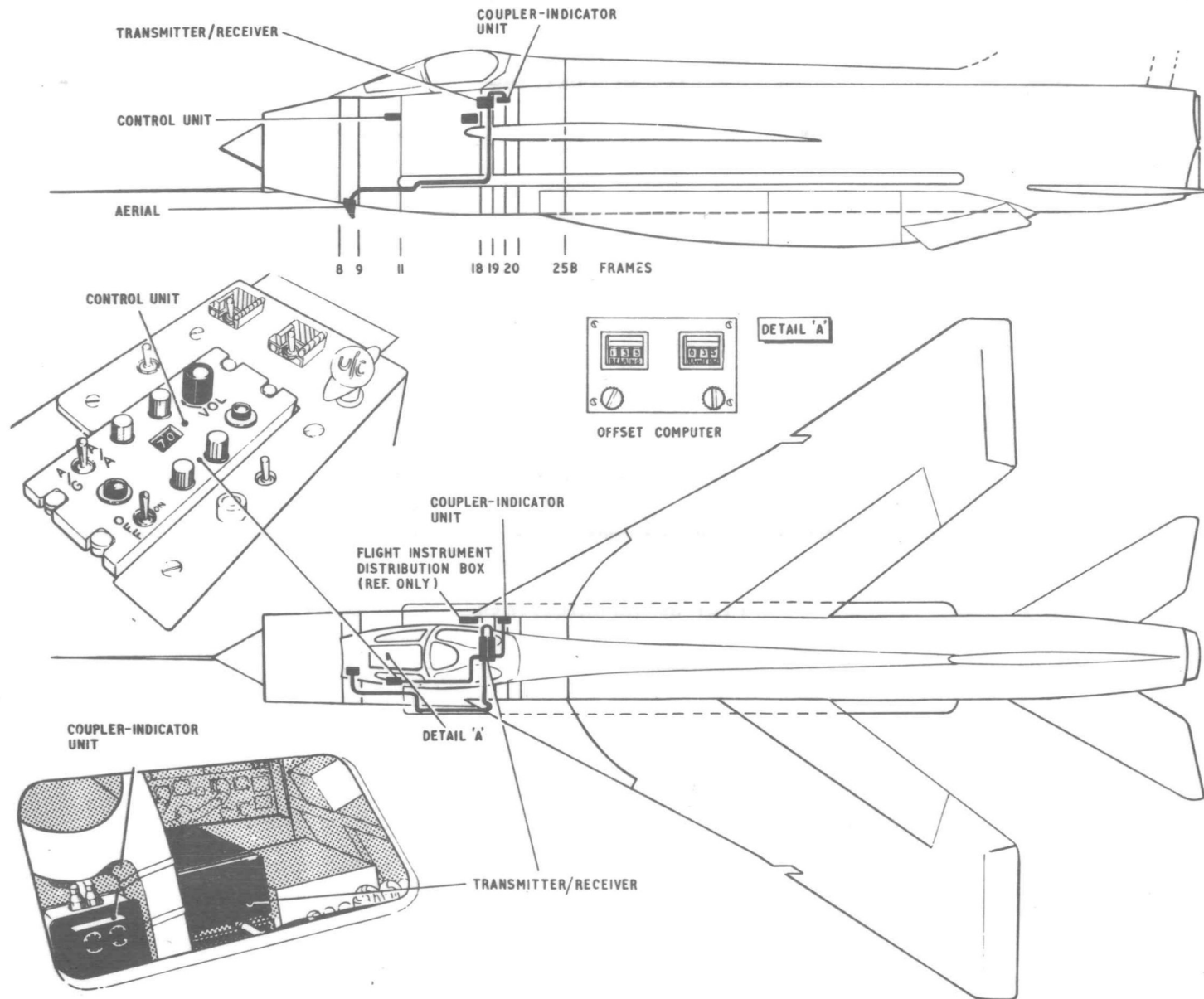


FIG. 1. TACAN INSTALLATION

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DESCRIPTION**Introduction**

1. The Tacan navigational system provides bearing and distance information to indicate the position of the aircraft with respect to a ground beacon to which the airborne equipment is tuned. The Tacan circuits are coupled to the diagnostic testing system through the integrated flight system.

2. In addition to air-to-ground mode which provides both range and bearing indications from a ground beacon, an air-to-air mode is available. In this mode the system provides a range indication only between two aircraft, e.g. when the range of a tanker aircraft is required during refuelling in the air.

General information

3. The Tacan system can be selected to operate in any one of 126 crystal-controlled channels in the 962-1214 MHz band. Each channel covers two frequencies, one for interrogation and the other for response. Each beacon radiates a recurrent 1350 Hz Morse signal which provides audible indication in the pilot's telephones that the system is tuned to that particular beacon.

4. Bearing and range information from the ground beacon and range information only from the airborne beacon is shown on the navigation display unit associated with the integrated flight instrument system. The installation includes an offset computer which can be set to modify the direct Tacan signals so that

the display unit presents range and bearing of an offset (homing) point.

5. The main components of the installation are a transmitter/receiver with its mounting tray, coupler-indicator unit, control unit, offset computer, and an aerial. A full description of the Tacan system, its equipment and functioning, is given in A.P. 116B-0304-1. The offset computer is described in A.P. 112K-1600-1 which covers the integrated flight instrument system.

Transmitter/receiver

6. The Type RT636-ARN-72-T/R is carried by a mounting tray installed between frames 18 and 19 in the main equipment compartment. With the exception of the aerial socket on the front panel all external connections to the T/R are made via a 45-way socket at the rear of the unit. The socket engages with a mating plug on the mounting tray when the T/R is secured in position. The T/R incorporates an integral motor-driven blower which cools the unit by circulating through it cold air fed from the equipment cooling system.

Mounting tray

7. The transmitter/receiver is secured to its mounting tray by two spring-loaded spigots at the rear and two screw clamps at the front. A replaceable air filter consisting of polythene cloth is fitted in the base of the mounting to protect the internals of the T/R from dust. The cold air fed from the equipment cooling system to ventilate the T/R is ducted to a point below the tray from where it is drawn through the air

filter in the mounting by the blower and then expelled through the louvres in the T/R cover. A housing at the rear of the mounting serves as a junction box for the system and carries the 45-way connector through which the T/R circuits are taken and two sockets to which are connected the cables from the other units of equipment.

Coupler-indicator unit

8. The Type 13555 unit is installed between frames 20 and 21 at the starboard side in the fuselage. The unit resolves the output signals from the transmitter/receiver into bearing and distance components before passing them to the integrated flight system.

Control unit

9. All operative controls for the system are incorporated in a Type 9273A control unit fitted in the port console. The unit provides facilities for controlling the power supplies to the equipment, channel selection, operating mode and volume level of the identity tone fed to the pilot's telephones.

10. Two miniature lamps incorporated in the control unit provide illumination of the channel indicator numbers and the lettering on the faceplate. Details of the lighting circuits are given in Sect. 6, Chap. 8.

Offset computer

11. The offset computer is fitted in the U.H.F. switch panel and provides for the modification of the direct Tacan signals into range and bearing signals of an offset point.

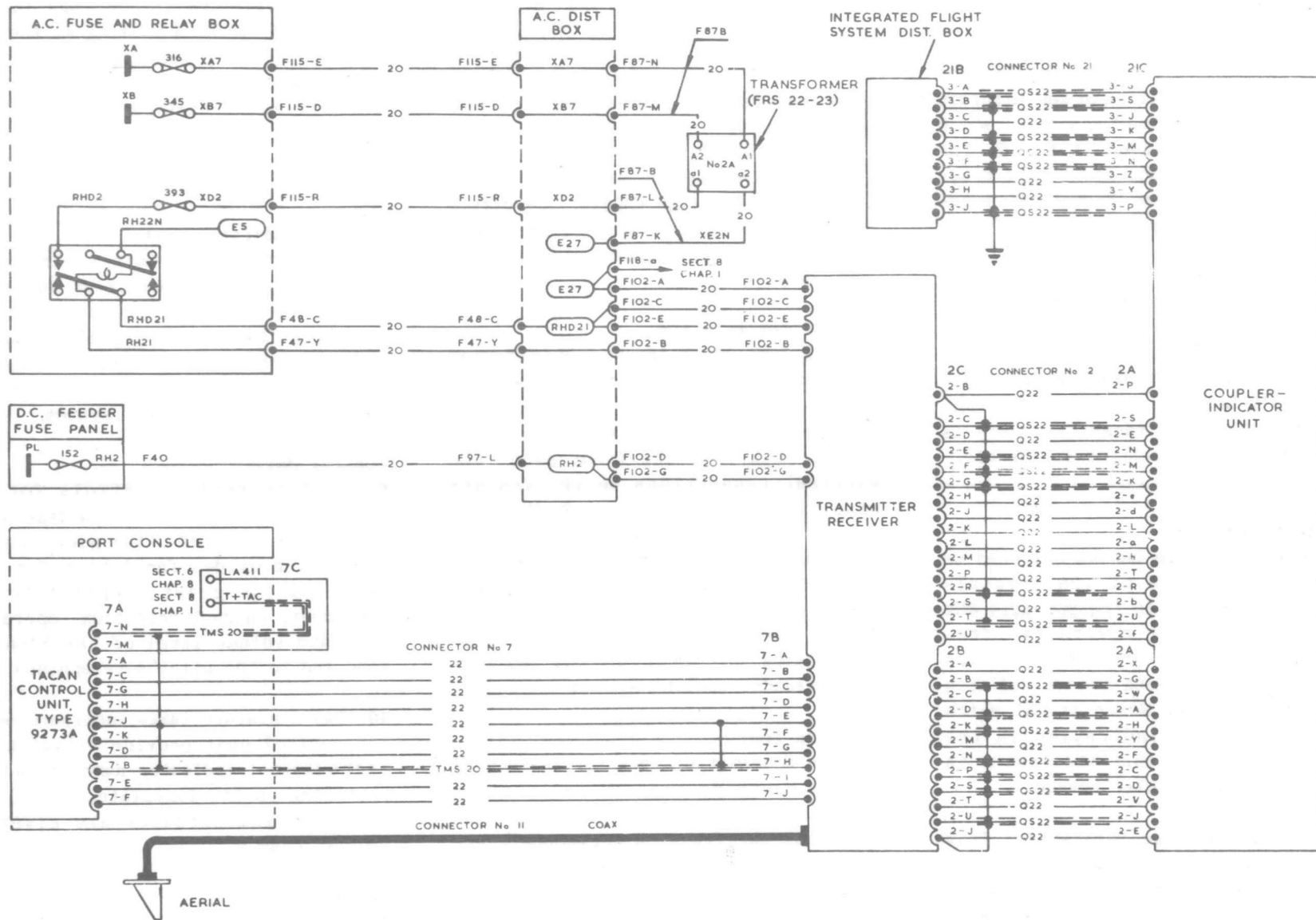


FIG. 2. TACAN SYSTEM

E	F3	B1	139	10
E	F3	B2	51	2

Aerial

12. Tacan operates with a Type 4169 omni aerial installed between frames 8 and 9 on the underside of the front fuselage.

Power supplies

13. The Tacan system requires power supplies of 28-volt d.c. and 115-volt, single-phase a.c., the main supplies being shown in fig. 2. Further information is included in Sect. 6, Chap. 11. The power supply for the offset computer is taken from the navigation display unit amplifier in the integrated flight instrument system.

SERVICING**WARNING**

The relevant safety precautions detailed on the LETHAL WARNING marker card must always be observed before entering the cockpit or performing any operations upon the aircraft.

General

14. All cables, connectors, and units of equipment should be examined periodically for security and freedom from damage. Details of the procedure for dismantling and assembling the sub-units of the transmitter/receiver and instructions for setting up and servicing the various items are given in A.P. 116B-0304-1. The test gear required during servicing is described in A.P. 116B-0303-1.

Power supplies

15. When investigating faults or making

continuity tests on the Tacan supply circuits, reference should be made to fig. 2. Further information on the power supplies will be found in Sect. 6, Chap. 11.

FUNCTIONAL TESTS**Note...**

In addition to the normal operational and continuity checks, the following tests should be made at the intervals laid down in Vol. 5 of this publication, or whenever any major component of the system has been repaired or renewed.

Preliminary tests

16. These tests are to be made before installing the transmitter/receiver and the coupler-indicator unit, and with a.c. and d.c. ground supplies connected.

(1) Disconnect cable F102A from plug PL2 on the T/R mounting (right-hand plug when viewed from rear of tray).

(2) At the cable socket, check for 28-volt d.c. between pins A and G and A and D (A is negative and earthed).

(3) Connect together pins B and D or B and G, whichever is convenient.

(4) Check that 115-volt, 400 Hz a.c. is present across pins A and C, and A and E (A is earthed).

(5) Ensure that the supply referred to in operation (4) disappears when the temporary connections made in operation (3) are removed.

Test equipment

17. The following equipment is required when making tests on the Tacan system:-

Performance tester,	
Type 10166	Ref. 10S/17501
Neon indicator	Ref. 10CV/270
Headset, Type 9	Ref. 10AH/14

Connect and set up the performance tester as follows:-

(1) Connect the test set to an external a.c. supply after ensuring that the supply connection to the test set mains transformer (T301) is on the appropriate tapping.

(2) Disconnect the aerial feeder plug from the socket on the T/R and connect the R.F. connector from the test set in its place.

(3) Switch the test set on and allow a 5-minute warming up period.

(4) Set the METER switch to TX POWER.

(5) Set the ATTENUATOR to zero.

(6) Adjust the SET ZERO control to obtain zero meter-reading.

(7) Set the METER switch to RX SENS.

(8) Adjust the SET RF LEVEL control to obtain a meter reading of 30 mA.

(9) Set the RANGE (miles) switch to 5.

(10) Set the BEARING switch to 140 deg.

Identity tone check

18. Set up the Tacan control unit as follows:-

(1) Set the ON-OFF switch to ON, the mode switch to A/G and the channel selectors to 39.

(2) Switch the cockpit lighting ON and check that the control unit front panel is illuminated. Switch the cockpit lighting OFF.

(3) Connect a headset to the pilot's mic/tel socket (refer to note para. 20).

(4) Turn the VOL. control on the Tacan control unit fully clockwise.

(5) Set the U.H.F. selector switch to NORMAL.

(6) Select T/R on the U.H.F. control unit.

(7) Turn VOL. control on U.H.F. control unit to maximum (clockwise).

(8) Allow two minutes for the equipment to warm-up.

(9) Check that a continuous note is heard in the headset.

(10) Check the operation of the Tacan control unit VOL control (i.e. clockwise for maximum volume).

Bearing and distance check

19.

(1) Adjust the SET RF LEVEL control on the test set for a meter reading of 30 mA.

(2) Check that the coupler-indicator dials indicate between 135 and 145 deg.

(3) Set the BEARING DEGREES switch to 323.

(4) Check that after a short delay the coupling unit dials rotate and then lock first time, indicating between 318 and 328 degrees.

(5) Adjust the SET.RF LEVEL control on the test set for a meter reading of 30 mA.

(6) Set the mode switch on the Tacan control unit to A/G.

(7) Set the ATTENUATOR to GREEN 4.

(8) Ensure that the coupler-indicator unit dials indicate between 4.5 and 5.5 nm.

(9) Set the RANGE MILES switch to 105.

(10) Check that after a short delay the

coupler-indicator unit distance dials begin to increase and lock first time, indicating between 102 and 108 nm.

Transmitter power output check

20.

(1) Set the METER to TX POWER.

(2) Adjust the ATTENUATOR for a meter reading of 30 mA and check that GREEN is indicated under the cursor.

(3) Check that the coupler-indicator unit dials rotate smoothly.

(4) Repeat operations (1), (2) and (3) on channels 10, 60 and 120, allowing 30 seconds after each channel selection.

Note...

The calibration of the test set may not be accurate on channels other than 39.

(5) Set the mode switch on the Tacan control unit to A/A.

TABLE 1

Equipment, location, and access

Equipment	Location	Access
Transmitter/receiver	Frames 18-19	Panel 21C
Mounting tray (Mod.RMC.4932 & 6794)	Frames 18-19	Panel 21C
Coupler-indicator unit	Frames 20-21(S)	Panel 21C
Control unit	Port console	Cockpit
Aerial	Frames 8-9 (EX)	-

(6) Remove the test set RF cable from T/R aerial socket and reconnect the aircraft aerial cable to the T/R.

(7) Set the mode switch on the Tacan control unit to A/G.

(8) Check that the neon lamp glows when held near the Tacan aerial.

(9) Set the ON-OFF switch on the Tacan control unit to OFF and switch off the U.H.F. equipment.

(10) Disconnect the headset from the mic/tel socket.

(11) Switch off and disconnect the test set from the a.c. supply.

Note...

The mic/tel plug on the headset will not mate with the P.E.C. on the pilot's seat. The P.E.C. Ref.No. 6D/2073 should be used together with an adapter, if necessary, to enable a large Type 119 plug, Ref.No. 10H/10991, to connect to the small type mic/tel socket, Ref. No. 10H/18574.

