

Chapter 6

A.R.I.18011

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Introduction

1. This chapter deals with the A.R.I.18011, which is an airborne instrument landing system (I.L.S.) operating in conjunction with ground transmitters. This installation provides the pilot with indications of his aircraft's position relative to the runway touch-down point, when descending to low altitude in bad visibility.

2. The signals received by the localizer and glide path receiver units, are fed via a junction box, Type 164, to the navigator's computer unit (Sect.7, Chap.5). Signals so received will be displayed on the beam compass and director horizon instruments, which are also used in conjunction with the military flight system (Sect.7, Chap.7). A location illustration of the

major components is provided in fig.1. A routing chart and a connector table will be found at the end of the text.

3. Descriptive and servicing details for the A.R.I. are given in A.P.116B-0408-1 and the military flight system in A.P.112C-0600-1A. Both should be read in conjunction with the information contained in this chapter.

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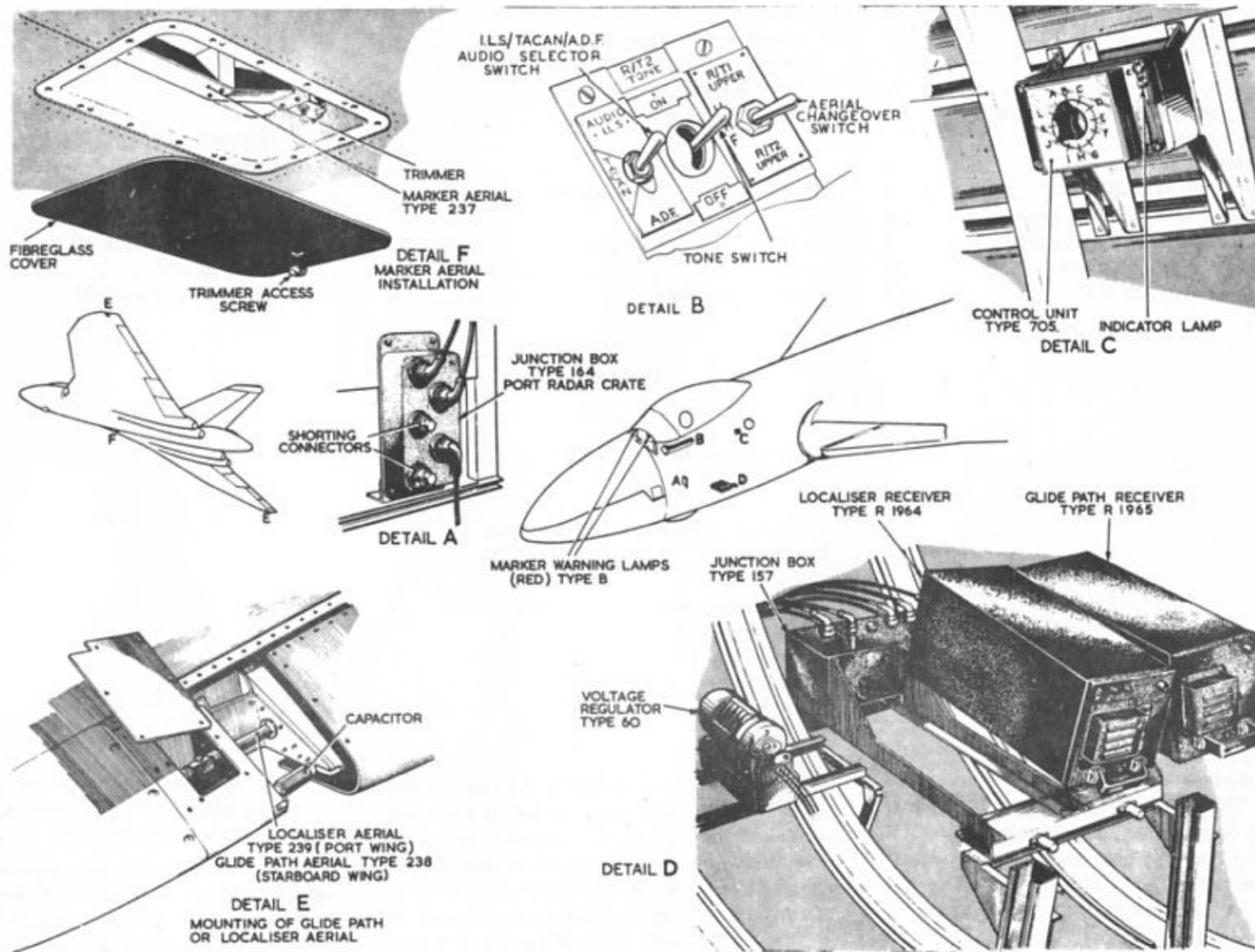


Fig.1 Component location

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CONTROLS AND UNIT LOCATION

4. The system is operated from a control unit, Type 705, located on the port side of the cabin between formers 260 and 274. The pilots' control switches are positioned on the port console and consist of a single-pole supply switch and an A.D.F./TACAN/I.L.S. change-over switch. Two red marker warning lamps are provided on the pilots' instrument panels, and the audio signal level is controlled by the A.D.F./TACAN/I.L.S. volume control on each I/C control unit, Type 7681. The junction box, Type 164, for the system is mounted below the first pilot's floor, and the following units are located below the crew's floor, port side:-

Localizer/marker receiver	Type R.1964
Glide path receiver	Type R.1965
Voltage regulator	Type 60
Junction box	Type 157

The suppressed marker aerial, Type 237, is located below the No.2 tank bay (starboard side). On the port wing tip is the localizer/aerial, Type 239, and on the starboard wing tip is the glide path aerial, Type 238.

Control unit, Type 705

5. The control unit, Type 705, consists of the following components:-

- Red indicator lamp
- 12-position rotary switch with a dial lettered A to L inclusive.
- The localizer/marker and glide path receiver oscillator circuits.

When the I.L.S. supply switch is selected to the ON position, the indicator lamp is illuminated,

DESCRIPTION AND OPERATION

indicating that the localizer/marker and glide path receivers, are switched on. The selection of any one letter on the rotary switch brings into circuit two pre-selected frequency crystals, one for each of the localizer and glide path receivers. The marker receiver is a fixed tuned receiver and is not affected by the operation of the rotary switch.

Localizer/marker receiver, Type R.1964

6. The unit consists of a front panel and main chassis. Contained on the front panel, are two aerial plugs, H.T. fuse, spare fuse holder, and the following pre-set controls, which are located behind sliding access covers:-

Marker gain
Speech volume
Marker volume
Set zero
Deflection sensitivity

Contained in the front panel is a Vokes air filter, through which air is drawn by a fan attached to the rotary transformer spindle.

7. The main chassis consists of the following units:-

L.F. unit	Type 4
Receiver unit	Type 117
Receiver unit	Type 118
Power unit	Type 797

- ▶ The L.F. unit, Type 4, carries the tone and audio stages of the localizer receiver, Type 117, and the marker receiver, Type 118. The localizer receiver operates at any one of twelve pre-selected spot frequencies in a range from 108 MHz to 112 MHz; minimum spacing between channels is 50 KHz and a total of forty channels are available (paired with the glidepath receiver). The marker receiver is fixed tuned at 75 MHz.

On reception of the ground marker beacon signals as the aircraft passes over each marker beacon, the receiver transmits a keyed coding to the marker warning lamps, which flash in synchronization with the keying. The marker lamps are located at the first and second pilots' stations. The power unit, Type 797, provides the H.T. output of 200 volts for the localizer/marker receiver, L.F. unit and the oscillator circuits in the control unit, type 705.

Glide path receiver, Type R.1965

8. This unit consists of a front panel and main chassis. Contained on the front panel is an aerial input plug, H.T. fuse, spare fuse holder and the following pre-set controls, which are located behind a sliding access cover:-

Set zero
Deflection sensitivity

Contained in the front panel is a Vokes air filter, through which air is drawn by a fan attached to the rotary transformer spindle.

9. The main chassis consists of the following units:-

L.F. unit	Type 5
Receiver unit	Type 119
R.F. unit	Type 74
Power unit	Type 797

- ▶ The L.F. unit, Type 5, carries the tone output and the main A.G.C. circuits of the glidepath receiver. The glidepath receiver operates at any one of twelve pre-selected spot frequencies in the range from 329 MHz to 335 MHz; spacing between channels is 150 KHz and a total of forty channels are available (paired with the localizer receiver). The R.F. unit, Type 74, is the frequency multiplier for the glidepath first local oscillator. The power unit, Type 797, provides the H.T. output of 200V to the glidepath receiver, L.F. unit and the R.F. unit.

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Voltage regulator, Type 60

10. The voltage regulator, Type 60, consists of a carbon pile assembly, connected in series with the normal aircraft supply of 28-volt d.c. to provide a stabilized output of 19-volt d.c.

Junction box, Type 157

11. The combined junction box, Type 157, provides for connections to both receivers, when mounted together side-by-side. The front panel consists of two 20-way sockets and two 2-way plugs. The selector panel above each 20-way socket provides for the introduction of compensating resistors into the indicator and flag output circuits. Four locating dowels project from the front panel (two to each receiver) to ensure correct alignment and to prevent inter-changing of the receiver units. The top panel face of the junction box accommodates the aircraft connector assemblies.

Junction box, Type 164

12. The junction box, Type 164, is the

distribution point for the marker lamp, localizer and glide path signals. The junction box contains five plugs, of which only three are used; the remaining two have shorting connectors fitted.

Aerial, Type 237

13. The suppressed marker aerial, Type 237, is fitted into a recess below No.2 tank bay starboard side. The aerial which is horizontally polarized, has its field of reception vertically downwards and consists of a silvered metal strip, contained in a shallow dish, with one end of the silvered strip connected to the dish, and the other end of the strip connected, via a loading capacitance, to the other side of the dish. A trimmer forms part of the loading capacitance, which allows each individual aircraft to be tuned to resonate at 75 MHz. Access to the trimmer can be gained by the removal of a plug in the outer cover of the aerial.

Aerials, Type 238 and 239

14. The localizer aerial, Type 239 and the glide path aerial, Type 238, are built into the

SERVICING

Installation

17. The setting up, operating and servicing instructions for the A.R.I.18011 and its components are contained in A.P.116B-0408-1, the military flight system in A.P.112C-0600-1A, and the voltage regulator in A.P.113D-0719-1. The security of all components should be checked regularly. All connectors, plugs, sockets and terminal blocks should be examined for damage and ingress of dirt and moisture.

port and starboard wings. The localizer aerial is tuned to resonate at a frequency of 108.1 MHz to 111.9 MHz, and the glide path aerial to resonate at 329 MHz to 335 MHz. Although termed aerials, they are in fact devices for tuning notches or apertures in the aircraft skin to resolve the current flow induced in the skin by ground transmissions.

Power supplies

15. The switch labelled, I.L.S. SUPPLY ON-OFF, located on the first pilot's console, feeds a 28-volt d.c. supply, from fuse 676 in panel 3P, to the following units:-

Voltage regulator	Type 60
Junction box	Type 157

The voltage regulator, is connected in series with the 28-volt d.c. supply to give a stabilized output of 19-volt d.c., for the valve heater circuits in the receiver units, the marker warning lamps and the indicator lamp in the control unit, Type 705. The junction box distributes the 28-volt d.c. supply to the rotary transformers in the receiver units.

Power supplies

18. In conjunction with the servicing of the system as laid down in A.P.101B-1902-4 and using a ground electrical servicing trolley, the following periodic checks should be carried out. With a suitable test meter, check that the d.c. output is 28-volt at T.B.396-A, and that the d.c. output from the voltage regulator is 19-volts \pm 0.5 volt at T.B.396-C.

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A.L.78, Jun.80**General**

19. Access to the components is straightforward, but the following point should be observed. When it is necessary to remove or replace any components, secure all loose connectors to the adjacent aircraft structure to prevent damage.

Control unit, Type 705

20. Take hold of the unit, release the four captive securing bolts, allow the unit to drop forward and then disconnect the two sockets and the plug.

Receivers, Type R.1964 and 1965

21. Disconnect the aerial feeder connectors from the front panels of the receivers and unscrew the knurled nut at the base of each receiver. Take hold of the transport handles and slide the units off their mounting trays.

Junction box, Type 157

22. To remove the combined junction box,

REMOVAL AND ASSEMBLY

first remove the two receivers and disconnect the seven connectors. Unscrew the six securing screws on the front panel which attach the junction box to the mounting tray and lift the box clear.

Junction box, Type 164

23. Disconnect the three connectors, take hold of the junction box, and remove the four securing bolts.

Voltage regulator, Type 60

24. Remove the terminal block cover, disconnect the three leads and then remove the four securing nuts and bolts.

Aerial, Type 237

25. Remove the fibre glass panel, by releasing the fourteen counter-sunk screws holding the dish container to the aircraft structure. Take hold of the dish shaped container and lower it. The aerial feeder connector can now be disconnected. On replacing, ensure that there is a good bonded

surface between the dish shaped container and the aircraft structure.

Aerials, Type 238 and 239

26. Removal of both types of aerials is similar. Remove the wing tip fibre glass panel. Disconnect the aerial feeder connector. Carefully unscrew the inner aerial lock nut and withdraw the aerial plug through the aerial diaphragm and the aerial diaphragm support plate. Then remove the aerial diaphragm securing bolts. On replacing the aerial, the reverse procedure is carried out. The following check must be made during the fitting of the aerial plug. The aerial plug is supplied with three shim washers, which are to be placed as required, between the plug and the aerial diaphragm support. This is to ensure that, when the aerial plug is secured, there is a clearance of 0.010 to 0.030 of an inch between the insulation of the plug and the face of the connector on the aerial.

TABLE 1**Connectors for A.R.I.18011**

Part No.	Cable form	Connecting between	
2/T4272	Miniature cable 2C	J.B.164	to T.B.596
3/T4272	Miniature cable 12C	J.B.164	to J.B.157 (12 P7)
8/T4272	Shorting socket 2 off	J.B.164 indicators	
9/T4272	Uniradio 67	R.P.B. plug 508	to S.R.14
10/T4272	Uniradio 67	R.P.B. plug 175	to S.R.14
11/T4272	Uniradio 67	R.P.B. plug 187	to S.R.15
12/T4272	Miniature cable 2C	J.B.157 (12 P3)	to 54P i/c J.B. inlet 6
13/T3406	Miniature cable 4R	J.B.157 (12 P1)	to supply (T.B.396)
14/T3406	Miniature cable 4R	J.B.157 (12 P8)	to supply (T.B.396)
16/T3406	Uniradio 67	R.P.B. plug 175	to marker aerial
20/T3406	Miniature cable 6C	J.B.157 (12 P5)	to control unit
21/T3406	Uniradio 43	J.B.157 (12 J2)	to control unit
22/T3406	Uniradio 43	J.B.157 (12 P6)	to control unit

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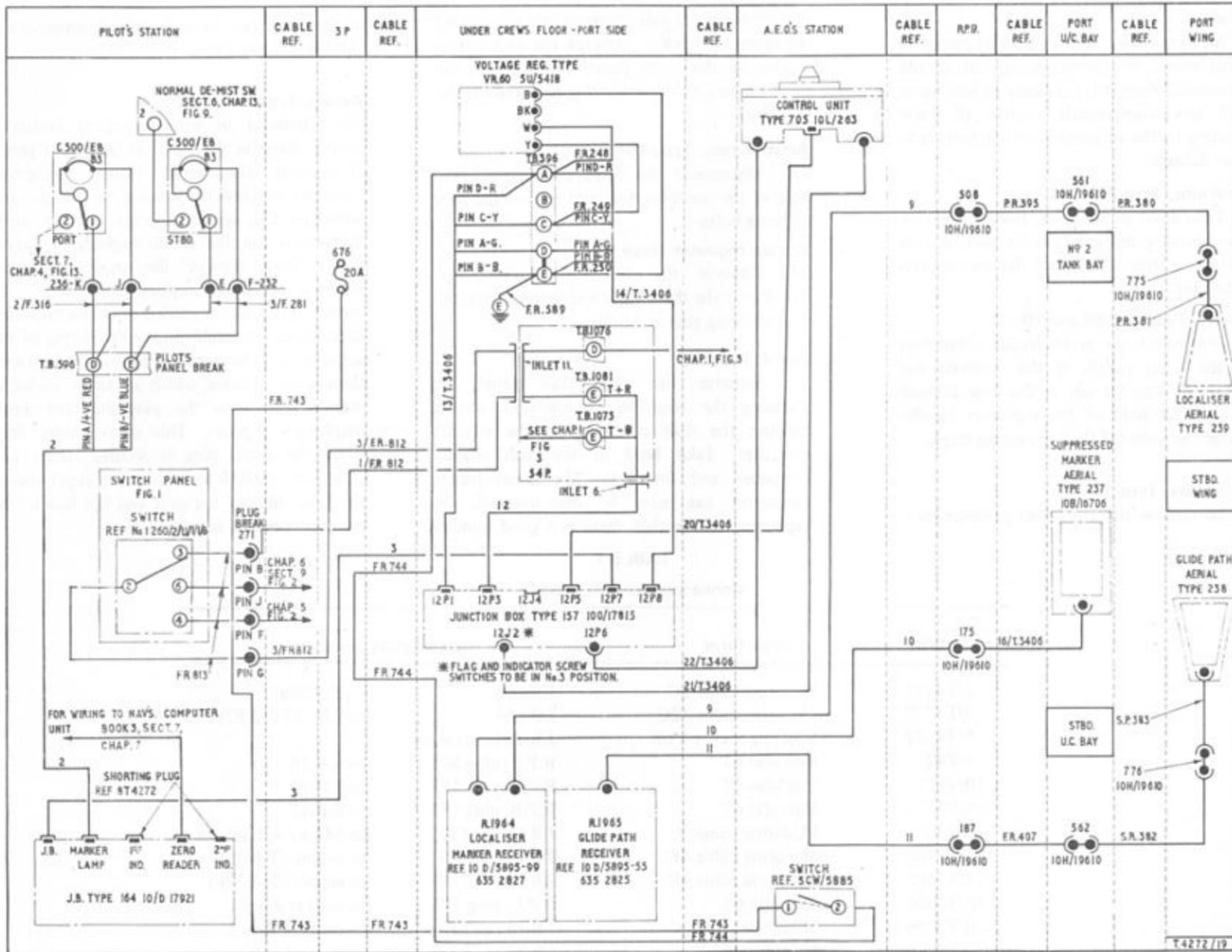


Fig. 2 A.R.I. 180II
 Mod. 2447
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