

Part I

Chapter 13—Radio and Radar

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Radio Communication

1 VHF/UHF, PTR 175 (Mod. 3815)

(a) A VHF/UHF PTR 175 set is fitted. It is possible to select 370 channels between 115 and 135.95 MC/S (VHF) and 3,500 channels between 225 and 399.95 MC/S (UHF) or 19 preset channels two of which are tuned to 243 MC/S and 121.5 MC/S respectively. In addition a separate receiver allows a pre-set guard frequency between 238 and 248 MC/S to be superimposed on any selected channel. MCW transmission is available if required.

(b) The control unit is situated on panel BQ at the AEO's position and has the following controls.

- (i) A 20-position rotary switch giving selection of 18 preset channels, the guard frequency (channel G) and MANUAL.
- (ii) Three manual control switches. The first switch selects the first two figures (hundreds and tens) of the desired frequency in

tens, the second selects the third figure (units) and the third selects the decimals. These switches are only operative when MANUAL is selected on the 20-position switch.

- (iii) A volume control.
 - (iv) A seven-position function switch giving selection of:
 - OFF
 - T/R (normal transmission and reception)
 - T/R & G (normal transmission and reception plus the guard frequency superimposed)
 - ADF (used with direction finding equipment)
 - DL
 - DL/T
 - T/R ON—DL OFF
- } inoperative

(c) It is possible to reset the preset channels in the air if necessary. To do so the cover plate on the control unit is removed by undoing the milled screws. The channel selector is then turned until the

number to be selected is indicated on the resetting panel (this will not correspond to the selector switch indicators). The resetting pins are then moved to the required positions and the cover plate replaced.

(d) *Power supplies*

◀ The 28-volt DC supplies for the installation are derived from special feeder 2P8. ▶

2 UHF ARC/52

(a) The UHF transmitter/receiver is in the floor of the fin compartment and the selector on panel AE. It is possible to select 1,750 channels at 0.1 mc/s intervals or 19 preset channels, one of which is tuned to 243 mc/s. In addition, a separate receiver allows a guard frequency of 243 mc/s to be superimposed on any selected channel. MCW transmission is available if required.

(b) The remote control unit on the port console (pre-Mod. 3882), operated by the 1st pilot, carries the following controls:

(i) A 20-position rotary switch, giving selection of 18 preset channels, the guard frequency (channel G) and MANUAL.

(ii) Four manual control switches. The first selects either 200 or 300 mc/s, the second selects 0 to 90 mc/s in tens, the third selects 0 to 9 mc/s and the fourth 0 to 0.9 mc/s. These switches are only operative when MANUAL is selected on the 20-position switch.

(iii) A volume control.

(iv) A four-position function switch, giving selection of:

OFF

T/R, normal transmission and reception

T/R + G, with the guard frequency superimposed on reception

ADF, inoperative.

(c) On panel AE is a tone switch (Pre-Mod. 3815 only).

(d) It is possible to reset the preset channels in the air, if necessary. To do so, the cover plate on the control unit is removed by undoing the milled screws. The channel selector is then turned until the number to be selected is indicated on the resetting panel (this will not correspond to the selector switch indication). The resetting pins are then moved to the required positions and the cover plate closed.

(e) Mod. 3882 repositions the control unit at the AEO's station.

(f) *Power supplies*

The UHF uses 200-volt AC, from No. 2 bus-bar, and 28-volt DC, from feeder 9P7 Post-Mod. 3815 the UHF uses DC only, supplied from No. 1 LV bus-bar (feeder 9P7).

3 Tone release

Tone release facilities are available for simulated bombing practice and may be obtained from either VHF or UHF. The controls are on panel CF and consist of a 3-position UHF—OFF—VHF switch, start switch and a light. When the start switch is pressed, the service selected radiates a continuous 1 kc/s note until the bomb is supposedly released. Tones may be obtained with the NBS isolation panel switches set at NORMAL or ISOLATE.

4 HF STR 18B2

(a) HF communication is by STR 18B2, the control unit being at the AEO's position. The control unit carries a function switch, a channel selector, volume and fine tuning controls. R/T transmission can be made on HF, if required. Also at the AEO's position are the HF SUPPLY circuit breaker and OUTPUT control switch.

(b) The STR 18B2 uses 28-volt DC.

5 Intercomm.

(a) The intercomm. system operates through an A1961 amplifier, controlled by a NORMAL—EMERGENCY—OFF switch at the AEO's position. In addition, a separate A1961 amplifier is provided

for conference intercomm. and is controlled by an ON—OFF switch at the AEO's position. If the normal intercomm. system fails, setting the control switch to EMERGENCY will provide intercomm. facilities through the amplification stage of the PTR 175.

(b) A master volume control, at the AEO's station, is in the line between the amplifier and the main distribution junction box to maintain compatibility between the volume level of VHF and intercomm.

(c) An external intercomm. point is provided on the port side of the nose, the system being controlled by two switches at the AEO's position, panel BC.

NOTE: The bomb-aimer's lead and pre-Mod. 3760 the transfer leads have their mic/tel. connections wired direct to the A1961. No other method of communication is available. (But see para. 6(c)).

6 Station boxes

(a) All crew members have identical station boxes, the controls on which allow any crew member to:

- (i) Select any one of five SPEAK-LISTEN services.
- (ii) Mix incoming radio and intercomm. signals without interfering with selections made by other crew members.
- (iii) Call all other crew members on intercomm. irrespective of the services they may have selected.

(b) The type 7681 station boxes carry the following controls:

(i) Four ON/OFF switches at the top of the box. These provide a mixer service for listening only. They consist of:

- HF
- Conference I/C
- Airborne warning
- Normal I/C

(ii) Three volume controls below the ON/OFF switches. These provide further listening services on UHF, ADF or ILS and VHF.

The VHF or UHF volume control must also be turned up when using the appropriate SPEAK-LISTEN service (see (iii) below).

(iii) A rotary SPEAK-LISTEN switch at the bottom of the box. This switch allows selection of the following five services:

- Conference I/C
- HF
- UHF
- VHF
- Normal I/C

With this switch OFF and the I/C listening switch OFF, a crew member can isolate himself from the rest of the crew when listening to incoming signals.

(iv) A spring-loaded CALL switch on the right of the SPEAK-LISTEN switch.

This switch is used, in conjunction with the I/C position of the SPEAK-LISTEN switch, to call all crew members, regardless of their selections.

(v) A NORMAL-OFF-DIRECT switch, to the left of the SPEAK-LISTEN switch.

On NORMAL, incoming signals are fed through a two-valve amplifier, powered by a fused 28-volt supply. The fuse and a spare are on the front of the box. If fuse or valve failure occurs, selection of DIRECT will by-pass the amplifier and switch it off. Only the selected SPEAK-LISTEN facility will be available (at reduced volume) and the LISTEN ONLY switches will be inoperative.

(c) Both pilots have press-to-transmit buttons on their control columns. The AEO has a press-to-transmit button and a morse key. No transmission facilities are provided for the navigators. Mod. 3883 provides full intercomm. facilities at the bomb-aimer's position in parallel with the 1st pilot's station box.

(d) *Control of services*

The control of the various services fed to the station boxes is as follows:

(i) *Pilot*

- UHF (Pre-Mod. 3882 and Post-Mod. 3815) and VHF (Pre-Mod. 3815) selection
- ILS ON/OFF switch
- ILS/ADF/TACAN audio selection
- VHF BOX selector switch (Pre-Mod. 3815)
- ILS channel selection

(ii) *AEO*

- Airborne warning
- HF
- I/C NORMAL/EMERGENCY/OFF switches
- Conference I/C ON/OFF switch
- ADF power switch
- UHF (Post-Mod. 3882 and Pre-Mod. 3815)
- VHF/UHF (Post-Mod. 3815)

(iii) *Nav./plotter*

- ADF

(iv) *Nav/radar*

- VHF-UHF tone switch

Navigation Radio and Radar

7 Radio compass (ADF)

The radio compass controller and the manual loop controller are at the nav./plotter's position, while the selection of either ILS or ADF audio signals is controlled by a switch on the 1st pilot's console. A repeater indicator is on the 2nd pilot's instrument panel. A circuit breaker on the AEO's panel BA controls the 28-volt supply.

8 ILS

The ILS channel selector is on the spine between the pilots' escape hatches, the master ON/OFF switch and the ILS/ADF/TACAN

audio selector switch are on the 1st pilot's side panel. A marker light is provided on each pilot's instrument panel. There is no separate ILS indicator the signals being fed into the MFS when the ILS is selected on and the MFS selector switches are set to LOC & GP and APPROACH. The localiser signals are then shown on the Beam Compasses and the glidepath signals on the Director Horizons. ILS signals will be fed to the auto-pilot when the TRACK and GLIDE switches are pulled out.

9 Tacan

Tacan is fitted; the controls are at the navigator's station at panel BCE. A repeater indicator is above pilots' panel AW. The equipment takes about 1½ minutes to warm up.

10 Green Satin and GPI

(a) Green Satin Mk. 2 is installed. The control unit and associated GPI Mk. 6 are at nav/plotter's position. Heading information is fed from either port or starboard compass systems, the selection being controlled by a switch on the MFS track control unit, which also carries the VSC. The Green Satin signals can be fed into the MFS when the pilots' selector is at REMOTE.

(b) The system uses 200-volt, 3-phase, 400 CPS AC from No. 1 transformer.

11 Radar altimeter Mk. 6A

The radar altimeter Mk. 6A indicator/control unit is on the nav/radar's panel CAJ and CAH. The system uses 28-volt DC from feeder 3P7 and 115-volt, single phase, 1,600 CPS AC from No. 1 or No. 2 frequency changer.

Operational Radio and Radar

12 NBC, H2S and RPU

(a) The navigational bombing system (NBS Mk. 1A or Mk. 2) is installed. The system basically consists of the H2S installation, the

NBC calculator type 7 and the bombing control unit, all of which have their controls and indicators at the nav/radar's position. The RPU is located at the rear of the nav/radar seat.

(b) The system uses 200-volt AC from No. 2 MV bus-bar, 115-volt 400 CPS AC from No. 3 or 2 transformer, 115-volt 1,600 CPS from No. 2 or 1 frequency changer and 28-volt DC. AC from No. 3 or 2 transformer is rectified within the equipment to give 112-volt DC.

(c) Signals from the NBS are fed into the MFS when BOMB is selected on the MFS navigational selector and into the auto-pilot when the BOMB switch is pulled out.

13 ECM

(a) The ECM installation is controlled by the AEO. Audio signals can be superimposed on the intercomm. by selection of the appropriate switch on the station boxes. Facilities for monitoring the ECM

warning are at the AEO's and 2nd pilot's stations by selecting MONITOR-ALARM.

(b) The power supplies required for the installation are 200-volt, 3-phase, 400 CPS from all four alternators and 28-volt DC from feeder 17P7.

(c) ECM equipment temperatures are controlled by the circulation of water-glycol. Heaters and ram air heat exchangers in the coolant circuits maintain the coolant temperatures between 6°C and 10°C. The pumps and heaters are fed from No. 1 bus-bar (aft system) and No. 4 bus-bar (forward system).

14 IFF Mk 10

IFF Mk. 10, with SIF and I/P facilities, is installed and the controls are at the AEO's position. The system uses 200-volt AC from No. 4 bus-bar and 28-volt DC from feeder 3P7.



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