

APPENDIX 5
USER INSTRUCTIONS

FOUR (4) PAGE USER INSTRUCTIONS
FOLLOWS THIS SHEET

USER INSTRUCTIONS
FCC ID: BT9BME25

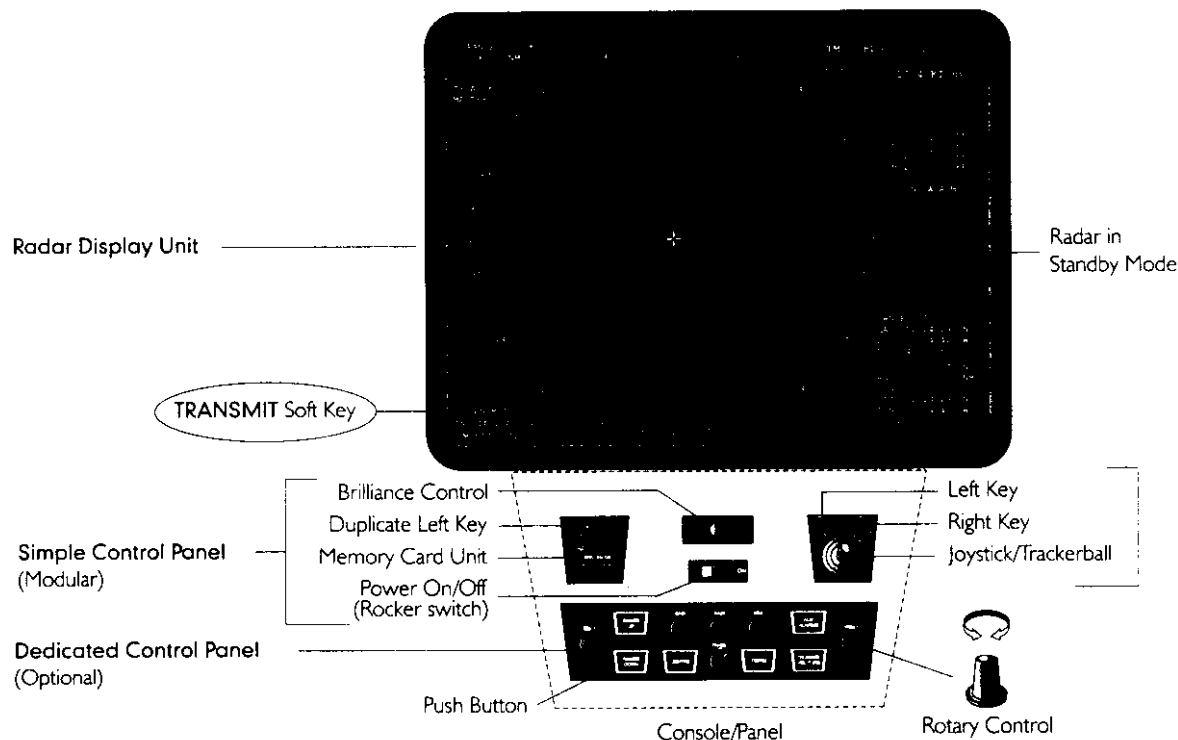
APPENDIX 5

Bridge Quick Reference

Control panels

The radar Display Unit is always fitted with a **Simple Control Panel** (see diagram below). This panel contains a simple pointing device (a joystick or trackerball referred to as the cursor control) with two associated keys (left and right) which are used to control the radar and its display. A duplicate left key is available when a 2-card memory card unit is fitted at the left hand side of the panel, thus enabling two-handed operation. Memory cards are used for storing and retrieving information such as maps and ship's track histories.

An optional **Dedicated Control Panel** may also be fitted. This dedicated panel contains individual controls for specific functions which would normally be accessed and adjusted using the cursor control and associated left/right keys of the Simple Control Panel (see diagram below).



Getting started

If the radar is already operating in the **TRANSMIT** mode (i.e. the display looks similar to that depicted in the centre pages of this card), and the compass has been initialised, then the abbreviated operating instructions given in the centre pages can be used to operate the display.

However, if the radar is in **STANDBY** mode, as depicted in the diagram above, the following operations should be carried out to select **TRANSMIT** mode. **Note** - If a *Scanner Control Unit* is fitted, and it is set to **OFF**, ensure that it is safe to switch it **ON** (i.e. that no one is working on, or is in the vicinity of, the scanner).

1. If fitted, ensure that the *Scanner Control Unit* is switched **ON** (refer to Note above).
2. Using the joystick/trackerball, position the screen cursor over the **TRANSMIT** soft key (see diagram above).
3. Left click to select (press and release the left key associated with the joystick/trackerball).

BridgeMaster Radar Bridge Quick Reference

Motion Mode

Left click on the motion mode caption to toggle between RM(T) and TM. A right click will reveal a list of options; left click on the option required, or right click again to exit. Refer to Chapter 5 of User Guide.

RM(R) - Relative Motion, Relative Trails. Own ship displayed at fixed point and all target trails relative to own ship. Stationary targets have trails if own ship is moving.

RM(T) - Relative Motion, True Trails. Own ship displayed at fixed point and all target trails show their true direction. Stationary targets do not produce trails.

TM - True Motion, Own ship moves across the video circle. Stationary targets do not produce trails.

Presentation Mode

Left click on the presentation mode caption to toggle between N Up and C Up. A right click will reveal a list of options; left click on the option required, or right click again to hide the list.



H Up (Head Up): Unstabilised, ship's heading marker vertical.

N Up (North Up): Stabilised, true north 000° at top of video circle.

C Up (Course Up): Stabilised, ship's heading at time of selection, at top of video circle. Must be reset after a change of course.

Screen Cursor

Start Here

The position of the on-screen cursor ( or  is controlled by the Joystick/Trackerball. When the cursor is outside the video circle it is displayed as a small white arrow. As the arrow moves over a caption which can be selected, the box around that caption is highlighted in white and two small boxes (representing the left and right keys) appear next to the arrowhead cursor. One or both of these boxes is filled in white to indicate which key(s) are active. When the cursor is positioned over a highlighted caption, a single click with the left key will normally select or deselect that function. A single click with the right key will normally show additional options (if available).













Range Scale

Left click on the plus (+) or minus (-) sign to increase or decrease the range selected. A left click below the RANGE caption will reveal a list of the ranges available; left click on the range required, or right click to exit.

Range Rings

A set of fixed range rings, displayed as a number of equally spaced concentric circles (normally six) can be switched ON or OFF. Left click on the **RR** caption box to toggle Range Rings ON or OFF. When switched-ON, the distance between consecutive range rings is displayed.

Radar Symbols

-  Target vector.
-  Target.
-  Target trail.
-  Lost target.
-  Target has infringed bow crossing limits.
-  Target has infringed CPA and TCPA limits.
-  Target has entered auto-acquisition zone.
-  Initial target tracking symbol.
-  Selected target.
-  Reference target (Echo Reference Mode).

Selected Transceiver

The currently selected Transceiver (TX A or B) via the Interswitch. X-Band or S-Band (X) or (S); Master or Slave selection; the return to Standby key (STBY) and Transmitter Pulse Length selection (SP, MP or LP). Refer to Chapter 3 of User Guide.

Annular
Auto-acquisition or Guard Zone

Radar Tuning & Performance

Performance Monitoring (PM): Ship's Heading Line (HL) or Stern Line (SL) can be hidden, together with all of the synthetics within the video circle, by a left press and hold on caption. Line and synthetics restored when key released. Event marking: Video Processing and Transceiver Tuning. Refer to Chapter 3 of User Guide.

Centre Key

Left click to place own ship at the centre of video circle. To off-centre own ship, position cursor over own ship's position, press and hold down left key, place cursor at required position, release the key. A right click on soft key will reveal **MAX VIEW** ahead option, left click on option to select, or right click again to remove option without further action. Refer to Chapter 3 of User Guide.

Video Circle

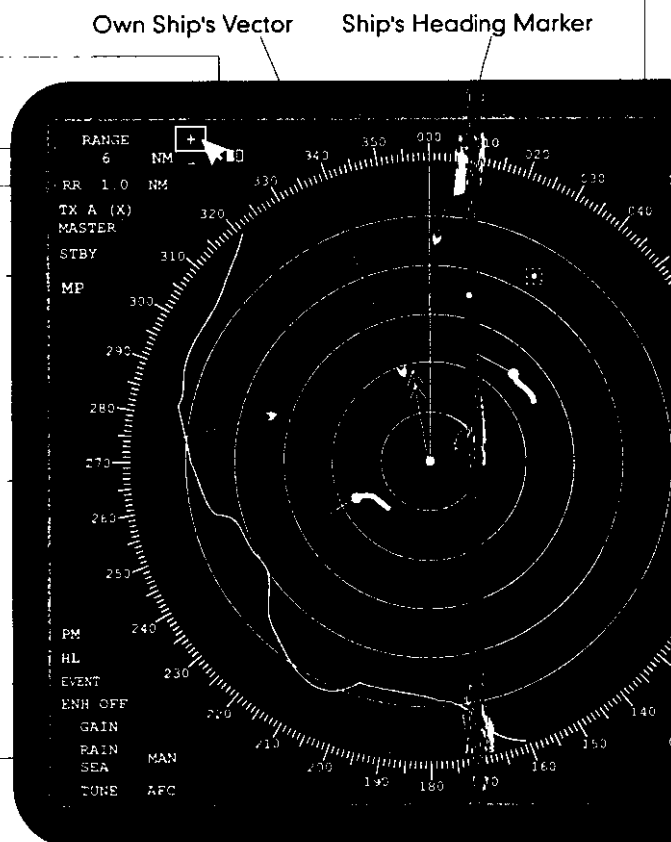
(Within the video circle, left click to acquire target, right click to cancel.)

Help Area

This area is used to provide 'prompt' information is trying to make a selection which conflicts with prompts, when they exist, are displayed on the top line. Refer to Chapter 3 of User Guide.

Soft Key Functions

Key	Function	User Guide
AZ	Acquisition Zones, or	Chapter 7
GZ	Guard Zones	
PI	Parallel Indexing	Chapter 11
TOOLS	Tools: (Rotating cursor etc.)	Chapter 12
ARPA	Automatic Radar Plotting Aid	Chapter 8
ATA	Automatic Tracking Aid, or	
EPA	Electronic Plotting Aid	
SYSTEM	System: (Memory cards etc.)	Chapter 14
NAV	Navigation: (Routes, Tracks)	Chapter 9
TRIAL	Trial Manoeuvre	Chapter 7
MAPS	Maps: (Creating, Editing etc.)	Chapter 10
BRILL	Brilliance: (Day/Night etc.)	Chapter 3



caption to toggle between RM(T) and TM. options; left click on the option required, or to Chapter 5 of User Guide.

Active Trails. Own ship displayed at fixed point own ship. Stationary targets have trails if own

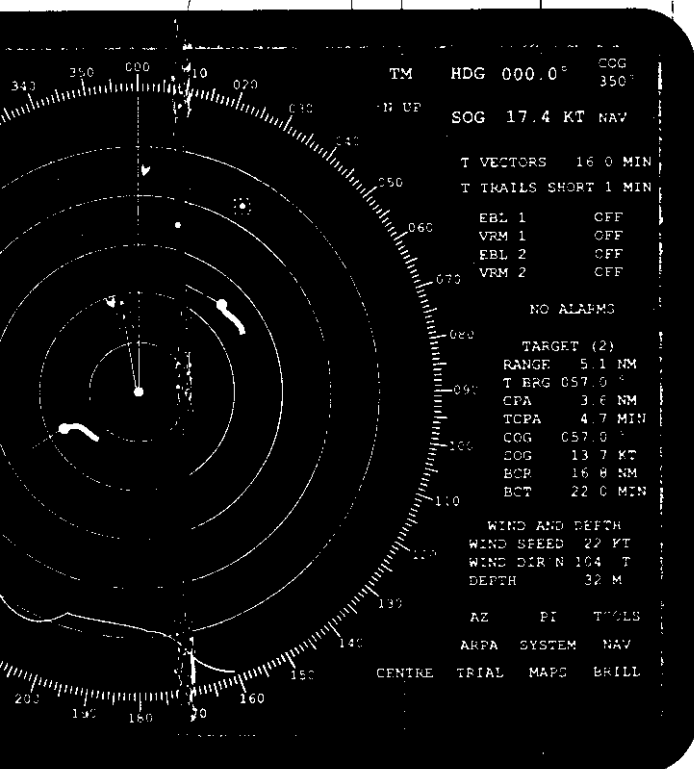
Trails. Own ship displayed at fixed point true direction. Stationary targets do not

moves across the video circle. Stationary

de

mode caption to toggle between will reveal a list of options; left click click again to hide the list. ship's heading marker vertical. true north 000° at top of video circle. ship's heading at time of selection. reset after a change of course.

Ship's Heading Marker



eo Circle

in the video circle, left click to fire target, right click to cancel.)

Help Area

area is used to provide 'prompt' information when, for instance, the user is trying to make a selection which conflicts with the existing set up. Permanent prompts, when they exist, are displayed on the top line. Temporary prompts are displayed on the bottom line. Refer to Chapters 2 and 15 of User Guide.

Ship's Heading

HDG 000.0° COG 350°

Shows COG if SOG is selected for ship's speed, blank if STW selected. True Heading always displayed. If Gyro Compass is fitted, readout flashes ON and OFF until compass is aligned. To align compass, left click on readout, move joystick/trackerball left or right to align heading, left click when correct heading set. Refer to Chapter 4 of User Guide. If Magnetic Compass fitted, and depending on the set up during initialisation, left and right clicks used to select magnetic variation, deviation or heading.

Ship's Speed

SOG 17.4 KT NAV

Shows an abbreviation of the speed mode selected, e.g. MAN, NAV, ECHO REF. Left click on caption to reveal list of speed modes available, then left click on the mode required. When Echo Ref mode first selected, left click on acquired target to select that target as the echo reference. Can only be changed when Manual Speed Mode (MAN) selected. Left click on readout, move joystick/trackerball left or right to change readout, left click to accept new speed. Refer to Chapter 4 of User Guide. Shows SOG when a ground-locked speed mode selected, or STW if a water-locked mode selected. To select a new reference target if Echo Ref mode selected, left click on caption, then left click on new target.

Vector Mode

Left click on VECTORS caption to toggle for Relative (R) or True (T) vector mode. To select a new vector time, left click on TIME readout, move joystick/trackerball left or right to change time, left click to accept new time.

Trails Mode

Right click on TRAILS caption to toggle for 'trails shown' or 'trails hidden'. To select a new trails time, left click to reveal list of options available, left click on the option required; RESET, SHORT, LONG, PERM (Permanent), or OFF.

EBLs, ERLs & VRMs

Left click on EBL or VRM caption to toggle for ON or OFF. EBL displayed as dashed radial. VRM displayed as dashed range ring. A right click on caption will reveal options for carry and drop (VRM/EBL2 ONLY). If EBL ON, but associated VRM OFF, displayed as combined ERL (EBL as dashed radial and VRM as small dashed circle on radial). To change readings, left click on appropriate readout, move joystick/trackerball left or right to change, left click to accept. Changes can also be effected by dragging the VRM/EBL intersection. To quickly take the range and bearing of an item of interest in the video circle, move the cursor over the item, and then press and hold the left key. The VRM/EBL will jump to that position, switching ON automatically if previously OFF. Release the key.

Alarms

To acknowledge an alarm, left click on the ALARM caption box. Right click to access list of acknowledged alarms. Audible Buzzer and Watch Alarm. Refer to Chapter 13 of the User Guide for more information.

Target Data

This box is normally used for the display of Target Data, refer to Chapter 7 of User Guide. Chapter 7 deals with the plotting and acquiring of targets, acquisition zones and guard zones and running a trial manoeuvre. Chapter 8 deals with other ARPA/ATA/EPA radar functions.

User Specified Data

Left click on top line of box to toggle for display of required data. A right click will reveal a list of options, left click on option required, or right click again to exit. The options available are, Own Ship's Position, Waypoint Data, Wind and Depth, or ROT and Rudder Angle. Note - This depends on Radar configuration.

Function Soft Keys

A left click will access the menu for the function. A right click on some keys will provide additional functionality, for example, switching the Maps in the video circle ON or Off. See Table of Soft Key Functions at left side of page. While the on-screen cursor is inside the video circle, the soft keys are replaced with an information box giving details of the CURSOR POSITION within the video circle.

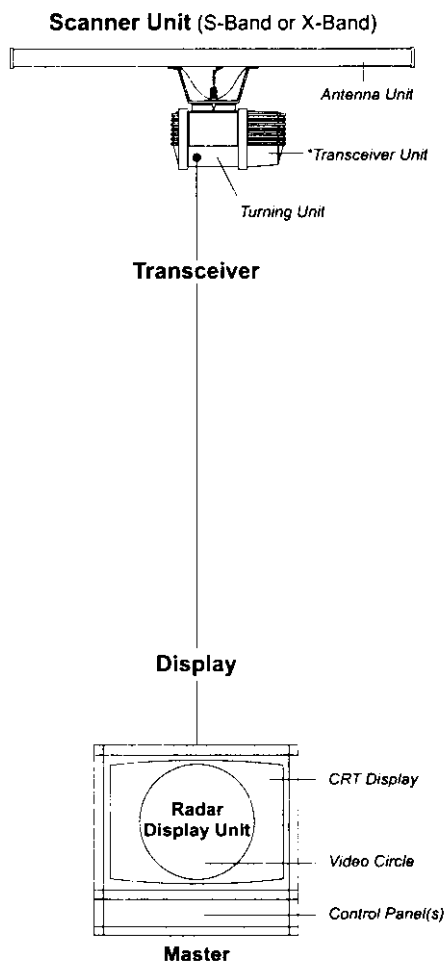
About your radar

The major components of a typical BridgeMaster E Radar installation are as follows:

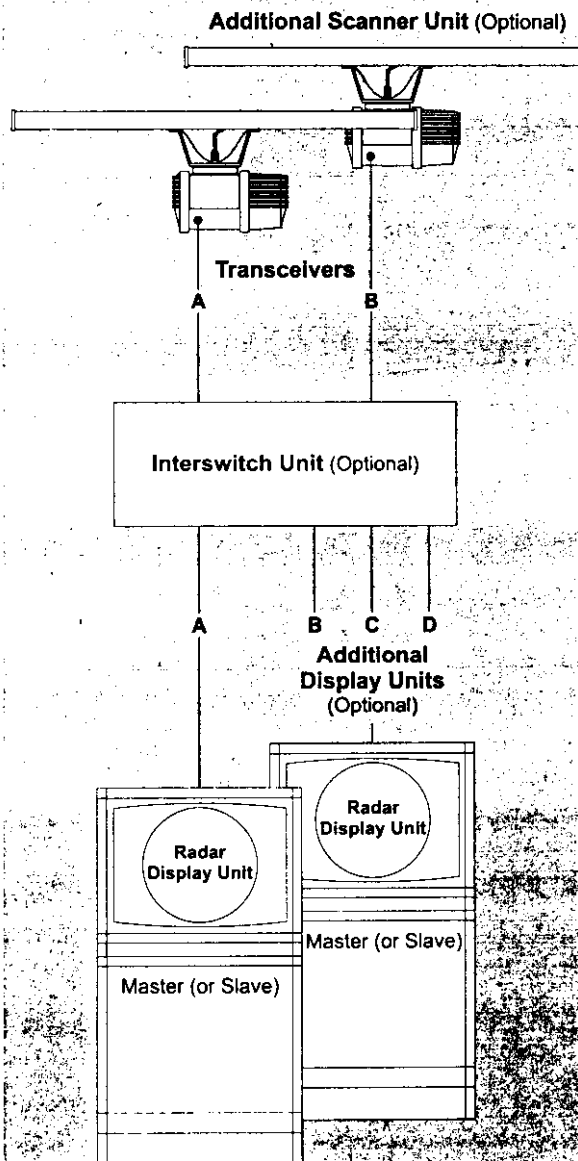
- Colour Display
- Joystick/Trackerball, Memory Card Unit, Brilliance Control (additional Dedicated Control Panel optional, see front page of this card)
- Antenna Unit
- Antenna Turning Unit (S-Band or X-Band)
- Transceiver Unit (Either Masthead or Bulkhead mounted)
- Optional Performance Monitor (mounted on Turning Unit)
- Mains Isolation Switch
- Scanner Control Unit for switching the scanner ON and OFF (In S-Band Systems ONLY)

The basic, single-scanner/single-display configuration can be expanded by the introduction of an Interswitch Unit and additional scanners and displays. The arrangement illustrated below caters for the simple addition of a second scanner and/or a second display, or for a multiple configuration of up to two scanners and four displays.

Basic System



Interswitched System



Control p

The radar Display (a joystick or trackerball) is a duplicate operation. Memory

An optional Dedicated Control Panel is normally be access

Radar Display U

Simple Control Panel (Modular)

Dedicated Control Panel (Optional)

Getting s

If the radar is already installed, the compass has be

However, if the radar is not in TRANSMIT mode, it is working on, or is in

1. If fitted, ensure
2. Using the joystick
3. Left click to select



*The Transceiver may be an integral part of the turning unit, or a bulkhead mounted unit.

Note - During Initialisation, your radar will have been set up, by an experienced commissioning engineer, for its present configuration. This configuration is remembered by the radar and is recalled each time it is switched ON. It is, therefore, recommended that any change of configuration, or any selections that will affect the correct operation or function of the radar (such as transceiver tuning, pulse length selection etc.), only be undertaken by a qualified operator using an appropriate publication like the User Guide or the Ship's Manual.

APPENDIX 6

TRANSMITTER TUNE-UP PROCEDURE

FOUR (4) PAGE ALIGNMENT PROCEDURE
FOLLOWS THIS SHEET

(MAGNETRON CURRENT SETTING)

TRANSMITTER TUNE-UP
PROCEDURE
FCC ID: BT9BME25

APPENDIX 6

3.3 X-Band Scanner Unit

3.3.1 Access to Masthead Transceiver

Set Transceiver Unit to Standby and switch off the Display Unit from the front panel.

Isolate and remove both Ship's Switch Fuses in DC systems.

Isolate the radar from the ship's mains supply using the Isolating Switch provided for AC systems.

Turn the antenna into the service position, i.e. across the Transceiver axis, clear of any obstructions.

Undo the **four** captive bolts on the underside of each the upper casting. These secure the upper casting to the base casting.

Raise the upper casting into the upright position and **ensure that the support stay engages in the locked position. The sliding pivot should be pushed into the bottom of the slot in the stay to prevent inadvertent release of the upper casting.** Refer to Figure 6.26.

3.3.2 Access to Bulkhead Transceiver

Set Transceiver Unit to Standby and switch off the Display unit from the front panel.

Isolate and remove both Ship's Switch Fuses in DC systems.

Isolate the radar from the ship's mains supply using the Isolating Switch provided for AC systems.

Undo the **four** screws that retain the upper cover to the lower chassis and lift clear.

3.3.3 Removing and Replacing the Transceiver from Masthead Turning Unit

Refer to sub-section 3.3.1 (Access to Masthead Transceiver), paying attention to all safety aspects. Check that the transceiver is fully isolated from the ship's supply.

Note - *The Masthead and Bulkhead Transceiver Units are identical and only minor differences exist in terms of fixtures.*

Disconnect the cables from the following sockets:-

SKXV	Video co-axial cable to receiver assembly.
PLYB	Ribbon cable to Trigger PCB.
PLTK	Cable from PSU to Motor Drive PCB.
PLTA	Cable from PSU to Input Filter PCB (mains supply).
PLTG	Cable from PSU to Input PCB.

Refer to Figure 6.28.

Situated around the base of the Circulator plate, release the four M6 captive screws that hold the microwave assembly to the waveguide transition.

Remove the three screws that hold the Modulator heatsink to the chassis.

Slacken the two large bolts that hold the PSU heatsink to the chassis.

The PSU heatsink has slotted holes that enable the transceiver to be slid upwards (towards the microwave output transition) and removed without fully removing the two bolts. Before sliding up and removing the Transceiver, ensure that no cables are caught on any of the metalwork to avoid damage.

Replacement

The replacement sequence is as follows:-

Locate the Transceiver approximately onto the upper casting using the two large slotted holes in the PSU heatsink.

Slacken the two screws that hold the PSU chassis plate to the Modulator chassis plate, see Figure 6.28.

Slacken the screw that holds the Circulator mounting plate to the PSU chassis plate.

The three screws in the Modulator heatsink should be fitted but only **partially** tightened.

The four M6 microwave assembly retaining screws can now be fully engaged and tightened.

The three screws in the Modulator heatsink can now be fully tightened.

The two large bolts in the slotted holes in the PSU heatsink can now be fully tightened.

The two screws that hold the PSU chassis plate to the Modulator chassis plate can now be fully tightened.

The screw that holds the circulator mounting plate to the PSU chassis can now be fully tightened.

Note - *This sequence is important to ensure that the microwave alignment takes priority in terms of mechanical tolerances.*

Replace all cables removed earlier.

3.3.4 Removing and Replacing the Transceiver from Bulkhead Transceiver Chassis

Refer to sub-section 3.3.2 (Access to Bulkhead Transceiver), paying attention to all safety aspects. Check that the Transceiver is fully isolated from the ship's supply.

Note - *The Masthead and Bulkhead Transceiver Units are identical and only minor differences exist in terms of fixtures.*

Disconnect the cables from the following sockets:-

SKXV	Video co-axial cable to receiver assembly.
PLYB	Ribbon cable to Trigger PCB.
PLTK	Cable from PSU to Input PCB (motor supply)
PLTA	Cable from PSU to Input Filter PCB (mains supply).
PLTG	Cable from PSU to Input PCB.

Refer to Figures 6.28 and 6.33.

Situated around the base of the Circulator plate, release the four M6 captive screws that hold the microwave assembly to the waveguide transition.

Remove the three screws that hold the Modulator heatsink to the chassis.
 Slacken the two large bolts that hold the PSU heatsink to the chassis. The PSU heatsink has slotted holes that enable the transceiver to be slid upwards (towards the microwave output transition) and removed without fully removing the two bolts. Before sliding up and removing the Transceiver, ensure that no cables are caught on any of the metalwork to avoid damage.

Note - *On Bulkhead Transceivers, a small clip is fitted to the chassis to retain the lower edge of the Modulator PCB and support plate. This is purely a slide-in fixture and does not require undoing.*

Replacement

Locate the Transceiver approximately onto the chassis using the two large slotted holes in the PSU heatsink.

Ensure that the small clip fitted to the chassis engages the lower edge of the Modulator PCB and support plate during the replacement process.

Slacken the two screws that hold the PSU chassis plate to the Modulator chassis plate, refer to Figure 6.33.

The three screws in the Modulator heatsink should be fitted but only **partially** tightened.

The four M6 microwave assembly retaining screws can now be fully engaged and tightened.

The three screws in the Modulator heatsink can now be fully tightened.

The two large bolts in the slotted holes in the PSU heatsink can now be fully tightened.

Note - *This sequence is important to ensure that the microwave alignment takes priority in terms of mechanical tolerances.*

Replace all cables removed earlier.

3.3.5 Magnetron Replacement - Masthead and Bulkhead Transceivers

Refer to sub-section 3.3.1 (Access to Masthead Transceiver), paying attention to all safety aspects. Check that the transceiver is fully isolated from the ship's supply.

Refer to Figure 6.28.

Disconnect the two EHT leads from the Modulator PCB terminal block.

Remove the four screws holding the Magnetron to the Circulator plate.

Replacement

Replacement is the reverse of the removal process

Ensure that the polarity of the EHT leads is correct. The PCB is marked 'Y' for yellow and 'G' for green.

Ensure that any earth bonding leads to the Magnetron are refitted

After replacement, the magnetron current must be set up as in the following sub-section.

3.3.6 Setting the Magnetron Current

Refer to Figure 6.34 for the necessary procedure for setting Magnetron current.

3.3.7 Trigger PCB - Replacement

Refer to sub-section 3.3.1 (Access to Masthead Transceiver), paying attention to all safety aspects. Check that the transceiver is fully isolated from the ship's supply.

Refer to Figure 6.35 for the necessary procedure for replacing the Trigger PCB.

3.3.8 Trigger PCB - Link Settings

Refer to Figure 6.36 for the necessary procedure for setting the link settings on the Trigger PCB.

3.3.9 Modulator PCB - Replacement

Refer to sub-section 3.3.1 (Access to Masthead Transceiver), paying attention to all safety aspects. Check that the transceiver is fully isolated from the ship's supply.

Refer to Figure 6.37 for the necessary procedure for replacing the Modulator PCB.

3.3.10 Modulator PCB - Link Settings

Refer to Figure 6.38 for the necessary procedure for setting the link settings on the Modulator PCB.

3.3.11 PSU PCB - Replacement

Refer to sub-section 3.3.1 (Access to Masthead Transceiver), paying attention to all safety aspects. Check that the transceiver is fully isolated from the ship's supply.

Refer to Figure 6.39 for the necessary procedure for replacing the PSU PCB.

3.3.12 PSU PCB - Link Settings

Refer to Figure 6.40 for the necessary procedure for setting the link settings on the PSU PCB.

3.3.13 Bearing and Heading Marker PCB - Replacement

Refer to sub-section 3.3.1 (Access to Masthead Transceiver), paying attention to all safety aspects. Check that the transceiver is fully isolated from the ship's supply.

Refer to Figure 6.29.

The PCB is attached to a support casting and should be removed as a combined assembly by slackening the two screws retaining the support casting, and then sliding it towards the outside of the upper casting to clear the screws.

The PCB and support casting can then be removed after the cable has been unplugged from PLRE.

Note - When refitting the PCB to the support casting there are dowel pegs of different diameters used to locate the PCB in the correct orientation.

Before refitting the assembly, check that the link LK1 is set for either Normal Speed (pins 1-2) 28 RPM or High Speed (pins 2-3) 45 RPM.

APPENDIX 7

CIRCUITS AND DEVICES TO STABILIZE FREQUENCY

Operating frequency is established by characteristics of the magnetron.

Pulse width and pulse repetition rate is established by conventional digital circuitry.

CIRCUITS AND DEVICES TO
STABILIZE FREQUENCY
FCC ID: BT9BME25

APPENDIX 7

APPENDIX 8

CIRCUITS TO SUPPRESS SPURIOUS RADIATION
LIMIT MODULATION AND CONTROL POWER

- a. Spurious emission suppression is accomplished by waveguide characteristics which attenuate lower frequencies. Spurious radiation suppression is accomplished by shielding and by-passing.
- b. Modulation limiting is provided by characteristics of the PRF generator circuitry, trigger SCR, and magnetron.
- c. Power output is maintained by power supply regulation, trigger SCR and magnetron.

CIRCUITS TO SUPPRESS....
FCC ID: BT9BME25

APPENDIX 8