3 First Line Servicing

WARNING:
BEFORE REMOVING ANY COMPONENT PARTS, THE EQUIPMENT MUST BE ISOLATED FROM THE MAINS SUPPLY.

3.1 Display Units

(Including Processor Electronics Units and Control Modules)

3.1.1 Preliminary Notes

1. Isolate the mains supply to the display unit.
2. Before disassembling the Processor Electronics Unit or Display Monitor Unit components of the Display Unit, ensure that the integrity of the connections to the units has been checked.
3. All radar user controls, except for display monitor brilliance are routed through the Display Processor board. Consequently, a display processor fault may indicate faults on the Display Processor board, the Joystick/Trackerball, the Memory Card Unit or the Keyboard.

3.1.2 Removal and Replacement of Processor Electronics Unit (PEU) Sub-assemblies

PEU sub-assemblies may include the following units:-

- Display Power Supply
- Display/Radar Processor board(s)
- Integral Keyboard (optional)
- Integral Joystick/Trackerball
- Integral Memory Card Unit
- On/Off Switch assembly

The Processor Electronics Unit is located in the pedestal of console mounted displays, or underneath the display monitors of integral (desk mounted) displays. Refer to Figure 6.1 and the steps below for access to these units.

Ensure that access is available to the front of the PEU. This is identified by the location of the sloping moulding on the unit. In console displays, pedestal covers will have to be removed and the PEU unbolted for access. Unplug any cables connected to the front of the PEU.

To release the outer PEU moulding, remove the two fixing screws at the front, and pull the moulding forward.

Removing and Replacing the Fan Filter

If an integral keyboard is fitted in the outer moulding, the fan filter can be accessed by the removal of the four screws securing the fan grill to the inner moulding.

If no keyboard is fitted in the outer moulding, the fan filter is located in the rectangular filter recess at the front of the inner moulding. It is removable once the outer moulding has been released.

Removing and Replacing the Integral Keyboard (optional)

The integral Keyboard can be removed and replaced at this stage. Be sure to re-connect its cable.

If the outer moulding contains a keyboard, disconnect its cable where it plugs into the inner moulding. Remove the four fixing screws securing the inner moulding to the PEU main body, and pull the moulding away from the body. Disconnect all cables to units in the inner moulding at the processor boards and power supply in the main body of the PEU.

Removing and Replacing the Integral On/Off Switch assembly

The switch fixing plate can be removed from the inner moulding using a small M3 spanner, and the switch assembly pushed out of the fixing plate. Reverse the procedure for replacement.

Removing and Replacing Integral Joystick/Trackerball and Memory Card assemblies

If a memory card assembly is fitted, disconnect the cable linking it to the joystick/trackerball assembly. Loosen the locating screw for the appropriate assembly - see Figure 6.1. Pull the required assembly out from its moulding aperture by pivoting it on the lower edge of the aperture, and then lifting up. Reverse the procedure for replacement.

Removing and Replacing the Power Supply

Disconnect the power cable at the front of the power supply. The power supply can then be removed by pulling on the strap at the front of the power supply cover, and sliding the unit out.

Slide the replacement unit back in, ensuring that it is firmly pressed home. Reconnect the power cable.

Removing and Replacing the Processor Board(s)

In displays with a single Combined Processor board, replace this board if either radar processor or display processor faults are suspected.

In displays with separate Radar and Display Processor boards, identify the board to be replaced. The display processor has more connectors on its edge than the radar processor. Remove any cables still connected to the board. Use the plastic ejection levers at each end of the board to lever out, and then pull out the board.

Remove all daughter boards from the processor board, and transfer them to the replacement board, ensuring correct orientation and location. Ensure that links on the replacement board are set appropriately.

Replace the board ensuring that the ejection levers are in their home position when the board is plugged in. Ensure that the board is firmly pressed home. Reconnect any cables, if appropriate, to other processor boards.

Removing and Replacing the Compass Board

The Compass board is a daughter board on the Display Processor board or Combined Processor board. Use the above procedure for replacing the processor board(s) in this case, but only replace the compass board, with one of the same type. Ensure that the links on the replacement board are set appropriately.

Re-assembling the Processor Electronics Unit

Reconnect cables from front PEU moulding, and re-secure the mouldings, remembering to re-connect the Keyboard, if appropriate. Refer to Figure 6.7 in case of difficulty.

3.1.3 Removal and Replacement of Kit Control Panel Modules

Kit Control Panel modules may include the following modules:-

- Keyboard module (optional)
- Joystick/Trackerball module
- Memory Card module
- On/Off Switch module
- Brilliance module

Each module is secured by nuts from underneath the console control panel top surface. Access can be obtained by removing the control panel lower cover, removing the two control panel fixing screws, and hinging the control panel down. See Figure 6.2. Unplug connecting cables to the modules before removing them.

Replacement is the reverse of the above procedure.

3.1.4 Removal of Display Monitor unit Sub-assemblies

Integral Display Monitors

Remove monitor outer cover by unscrewing the two screws on the top of the cover, lifting the cover up and then forward, and unplugging the brilliance control cable at the Brilliance board (mounted on the bezel moulding). The Brilliance board can be removed, if necessary, by unscrewing it from the bezel moulding.

Unplug all cables connected to the monitor, taking note of the location of the Secondary Viewer cable, if fitted.

Unscrew the four screws at the edge of the finned drive board heatsink, that secure it to the chassis, and hinge it away from the chassis. Using the appropriate monitor block diagram for the particular monitor display (figures 6.3 to 6.6), identify the monitor components contained within the dotted outline in the diagram. These must be replaced as a group. Leaving the drive board until last, and first having ensured that at least 3 minutes has elapsed from switch-off for the CRT anode voltage to safely discharge, disconnect the identified

interconnected components from the rest of the unit. The drive board assembly (this includes the finned heatsink) can be removed by unscrewing the hinge arms and board stay from the unit.

Console and Kit Display Monitors

To gain access to the display monitor in the 340 split cabinet console, refer to Figure 6.2. Ensure that the console is securely assembled and deck mounted. Remove the control panel lower cover. Whilst supporting the console control panel, release its two captive fixing screws, and then let it swing down. Release the two captive monitor fixing bolts under the monitor. They are accessible from between the control panel and display monitor. Remove the display top handle by undoing its three fixing screws. Undo the four CRT bezel fixings, and guide the top of the monitor forward into the unit's service position.

Unplug all cables connected to the monitor, taking note of the location of the Secondary Viewer cable, if fitted.

Release the two latch levers securing the finned drive board heatsink to the chassis, and hinge it away from the chassis. Using the appropriate monitor block diagram for the particular monitor display (Figures 6.3 to 6.6), identify the monitor components contained within the dotted outline in the diagram. These must be replaced as a group. Leaving the drive board until last, and first having ensured that at least 3 minutes has elapsed since switch-off for the CRT anode voltage to safely discharge, disconnect the identified interconnected components from the rest of the unit as a group. The drive board (this includes the finned heatsink) can be removed by detaching the earth braid connection to the chassis at the drive board, releasing the board stay, and sliding the drive board hinges apart.

3.1.5 Replacing and Setting-up of Display Monitor Unit Sub-assemblies

Replace the boards using the appropriate board set as shown in Section 4.1 of this chapter. To fit the board sets, use the reverse of the removal procedure. After reconnecting the external monitor cables, connect the internal brilliance control up (if applicable), and leave the drive board in its hinged down position to facilitate adjustments during the setting up procedure below.

Note *-: If an RGB output board is fitted to the drive board that is being replaced, this must be transferred to the drive board in the replacement board set. It is secured by two screws on the drive board heatsink, and its ribbon cable plugs into the drive board.*

After checking that the display boards are fully reconnected, power up the radar display, and check that the fan (if fitted) is operating. Refer to 'Monitor Test Mode' section in Chapter 5 of the Ship's Manual 6580001 0B for the following adjustments:

Adjust the brilliance control to a normal level. Access the monitor test mode, and select Test Pattern 1.
Identify the location of the focus and screen (Grid 2) controls. If they are not situated on the

LOPT, they will be found on the adjoining dual focus module.

Adjust the focus control(s) for the sharpest white grid lines.

Geometry

Using the Monitor Test menu on the screen, adjust (if necessary) the geometrical parameters in the left hand column of the menu to produce the closest match to Test Pattern 1 as shown in the manual. If necessary, adjust the horizontal linearity inductor L1 to match the width of the left hand squares to the other squares. Adjust the pattern size to fill the screen with its white border fully visible.

Colour Level Adjustment

This must be carried out under the minimum operating ambient light level conditions. Select Test Pattern 2, and adjust the display brilliance control to maximum.Adjust the preset brightness parameter (Monitor Test menu) so that the pattern is just visible.

Select Test Pattern 3 with a solid white rectangle displayed. Adjust the display brilliance control, black level (red) and black level (blue) so that the white rectangle is just visible and a good white.

Adjust the display brilliance, and red and blue gain controls to give the brightest picture without any signs of video overload (streaking), and a white rectangle with a hint of blue. If necessary, the green gain can also be adjusted.

Repeat the colour level adjustment procedure until no further adjustments are required.

If any problems are encountered regarding insufficient control range on any of the controls, adjust the screen (G2) control on the drive board as follows:

Using a DVM, measure the voltages on TP26, 27 and 28 on the drive board (on external connectors edge of board) with respect to the chassis. Adjust the screen control so that the three voltages measured are in the range 65 to 95V. The colour level adjustment procedure must then be carried out once more.

As a final step, set the display brilliance to maximum, and adjust the preset contrast control to give the brightest picture without video overload.

Switch off and complete the re-assembly of the display monitor. If the picture size was adjusted without the CRT bezel fitted, re-adjust the picture size so that the white border of Test Pattern 1 is fully visible.

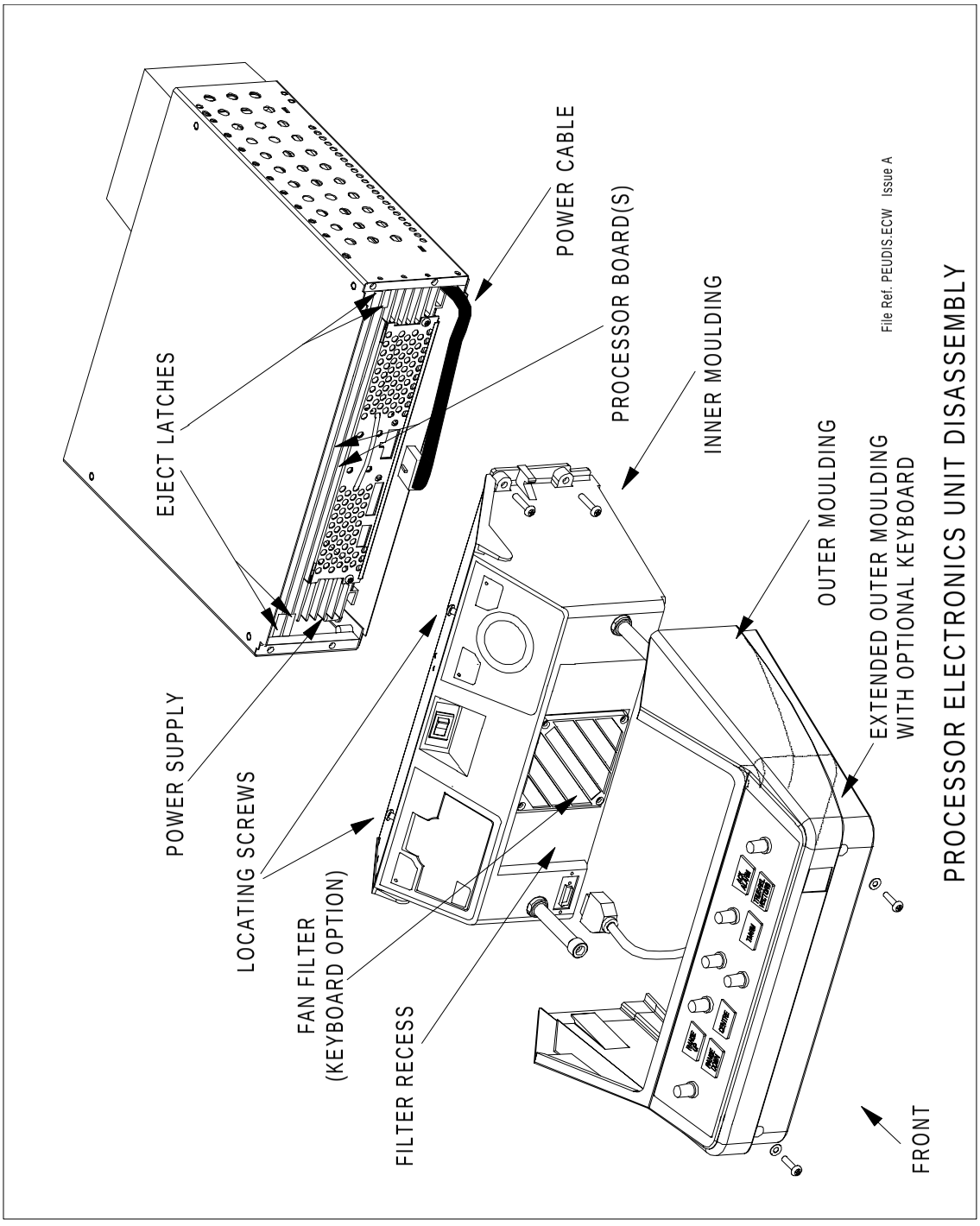


Figure 6.1 Processor Electronics Unit - Disassembly

3 First Line Servicing

WARNING:
BEFORE REMOVING ANY COMPONENT PARTS, THE EQUIPMENT MUST BE ISOLATED FROM THE MAINS SUPPLY.

3.1 Display Units

(Including Processor Electronics Units and Control Modules)

3.1.1 Preliminary Notes

1. Isolate the mains supply to the display unit.
2. Before disassembling the Processor Electronics Unit or Display Monitor Unit components of the Display Unit, ensure that the integrity of the connections to the units has been checked.
3. All radar user controls, except for display monitor brilliance are routed through the Display Processor board. Consequently, a display processor fault may indicate faults on the Display Processor board, the Joystick/Trackerball, the Memory Card Unit or the Keyboard.

3.1.2 Removal and Replacement of Processor Electronics Unit (PEU) Sub-assemblies

PEU sub-assemblies may include the following units:-

- Display Power Supply
- Display/Radar Processor board(s)
- Integral Keyboard (optional)
- Integral Joystick/Trackerball
- Integral Memory Card Unit
- On/Off Switch assembly

The Processor Electronics Unit is located in the pedestal of console mounted displays, or underneath the display monitors of integral (desk mounted) displays. Refer to Figure 6.1 and the steps below for access to these units.

Ensure that access is available to the front of the PEU. This is identified by the location of the sloping moulding on the unit. In console displays, pedestal covers will have to be removed and the PEU unbolted for access. Unplug any cables connected to the front of the PEU.

To release the outer PEU moulding, remove the two fixing screws at the front, and pull the moulding forward.

Removing and Replacing the Fan Filter

If an integral keyboard is fitted in the outer moulding, the fan filter can be accessed by the removal of the four screws securing the fan grill to the inner moulding.

If no keyboard is fitted in the outer moulding, the fan filter is located in the rectangular filter recess at the front of the inner moulding. It is removable once the outer moulding has been released.

Removing and Replacing the Integral Keyboard (optional)

The integral Keyboard can be removed and replaced at this stage. Be sure to re-connect its cable.

If the outer moulding contains a keyboard, disconnect its cable where it plugs into the inner moulding. Remove the four fixing screws securing the inner moulding to the PEU main body, and pull the moulding away from the body. Disconnect all cables to units in the inner moulding at the processor boards and power supply in the main body of the PEU.

Removing and Replacing the Integral On/Off Switch assembly

The switch fixing plate can be removed from the inner moulding using a small M3 spanner, and the switch assembly pushed out of the fixing plate. Reverse the procedure for replacement.

Removing and Replacing Integral Joystick/Trackerball and Memory Card assemblies

If a memory card assembly is fitted, disconnect the cable linking it to the joystick/trackerball assembly. Loosen the locating screw for the appropriate assembly - see Figure 6.1. Pull the required assembly out from its moulding aperture by pivoting it on the lower edge of the aperture, and then lifting up. Reverse the procedure for replacement.

Removing and Replacing the Power Supply

Disconnect the power cable at the front of the power supply. The power supply can then be removed by pulling on the strap at the front of the power supply cover, and sliding the unit out.

Slide the replacement unit back in, ensuring that it is firmly pressed home. Reconnect the power cable.

Removing and Replacing the Processor Board(s)

In displays with a single Combined Processor board, replace this board if either radar processor or display processor faults are suspected.

In displays with separate Radar and Display Processor boards, identify the board to be replaced. The display processor has more connectors on its edge than the radar processor. Remove any cables still connected to the board. Use the plastic ejection levers at each end of the board to lever out, and then pull out the board.

Remove all daughter boards from the processor board, and transfer them to the replacement board, ensuring correct orientation and location. Ensure that links on the replacement board are set appropriately.

Replace the board ensuring that the ejection levers are in their home position when the board is plugged in. Ensure that the board is firmly pressed home. Reconnect any cables, if appropriate, to other processor boards.

Removing and Replacing the Compass Board

The Compass board is a daughter board on the Display Processor board or Combined Processor board. Use the above procedure for replacing the processor board(s) in this case, but only replace the compass board, with one of the same type. Ensure that the links on the replacement board are set appropriately.

Re-assembling the Processor Electronics Unit

Reconnect cables from front PEU moulding, and re-secure the mouldings, remembering to re-connect the Keyboard, if appropriate. Refer to Figure 6.7 in case of difficulty.

3.1.3 Removal and Replacement of Kit Control Panel Modules

Kit Control Panel modules may include the following modules:-

- Keyboard module (optional)
- Joystick/Trackerball module
- Memory Card module
- On/Off Switch module
- Brilliance module

Each module is secured by nuts from underneath the console control panel top surface. Access can be obtained by removing the control panel lower cover, removing the two control panel fixing screws, and hinging the control panel down. See Figure 6.2. Unplug connecting cables to the modules before removing them.

Replacement is the reverse of the above procedure.

3.1.4 Removal of Display Monitor unit Sub-assemblies

Integral Display Monitors

Remove monitor outer cover by unscrewing the two screws on the top of the cover, lifting the cover up and then forward, and unplugging the brilliance control cable at the Brilliance board (mounted on the bezel moulding). The Brilliance board can be removed, if necessary, by unscrewing it from the bezel moulding.

Unplug all cables connected to the monitor, taking note of the location of the Secondary Viewer cable, if fitted.

Unscrew the four screws at the edge of the finned drive board heatsink, that secure it to the chassis, and hinge it away from the chassis. Using the appropriate monitor block diagram for the particular monitor display (figures 6.3 to 6.6), identify the monitor components contained within the dotted outline in the diagram. These must be replaced as a group. Leaving the drive board until last, and first having ensured that at least 3 minutes has elapsed from switch-off for the CRT anode voltage to safely discharge, disconnect the identified

interconnected components from the rest of the unit. The drive board assembly (this includes the finned heatsink) can be removed by unscrewing the hinge arms and board stay from the unit.

Console and Kit Display Monitors

To gain access to the display monitor in the 340 split cabinet console, refer to Figure 6.2. Ensure that the console is securely assembled and deck mounted. Remove the control panel lower cover. Whilst supporting the console control panel, release its two captive fixing screws, and then let it swing down. Release the two captive monitor fixing bolts under the monitor. They are accessible from between the control panel and display monitor. Remove the display top handle by undoing its three fixing screws. Undo the four CRT bezel fixings, and guide the top of the monitor forward into the unit's service position.

Unplug all cables connected to the monitor, taking note of the location of the Secondary Viewer cable, if fitted.

Release the two latch levers securing the finned drive board heatsink to the chassis, and hinge it away from the chassis. Using the appropriate monitor block diagram for the particular monitor display (Figures 6.3 to 6.6), identify the monitor components contained within the dotted outline in the diagram. These must be replaced as a group. Leaving the drive board until last, and first having ensured that at least 3 minutes has elapsed since switch-off for the CRT anode voltage to safely discharge, disconnect the identified interconnected components from the rest of the unit as a group. The drive board (this includes the finned heatsink) can be removed by detaching the earth braid connection to the chassis at the drive board, releasing the board stay, and sliding the drive board hinges apart.

3.1.5 Replacing and Setting-up of Display Monitor Unit Sub-assemblies

Replace the boards using the appropriate board set as shown in Section 4.1 of this chapter. To fit the board sets, use the reverse of the removal procedure. After reconnecting the external monitor cables, connect the internal brilliance control up (if applicable), and leave the drive board in its hinged down position to facilitate adjustments during the setting up procedure below.

Note *-: If an RGB output board is fitted to the drive board that is being replaced, this must be transferred to the drive board in the replacement board set. It is secured by two screws on the drive board heatsink, and its ribbon cable plugs into the drive board.*

After checking that the display boards are fully reconnected, power up the radar display, and check that the fan (if fitted) is operating. Refer to 'Monitor Test Mode' section in Chapter 5 of the Ship's Manual 6580001 0B for the following adjustments:

Adjust the brilliance control to a normal level. Access the monitor test mode, and select Test Pattern 1.

Identify the location of the focus and screen (Grid 2) controls. If they are not situated on the LOPT, they will be found on the adjoining dual focus module.

Adjust the focus control(s) for the sharpest white grid lines.

Geometry

Using the Monitor Test menu on the screen, adjust (if necessary) the geometrical parameters in the left hand column of the menu to produce the closest match to Test Pattern 1 as shown in the manual. If necessary, adjust the horizontal linearity inductor L1 to match the width of the left hand squares to the other squares. Adjust the pattern size to fill the screen with its white border fully visible.

Colour Level Adjustment

This must be carried out under the minimum operating ambient light level conditions. Select Test Pattern 2, and adjust the display brilliance control to maximum.Adjust the preset brightness parameter (Monitor Test menu) so that the pattern is just visible.

Select Test Pattern 3 with a solid white rectangle displayed. Adjust the display brilliance control, black level (red) and black level (blue) so that the white rectangle is just visible and a good white.

Adjust the display brilliance, and red and blue gain controls to give the brightest picture without any signs of video overload (streaking), and a white rectangle with a hint of blue. If necessary, the green gain can also be adjusted.

Repeat the colour level adjustment procedure until no further adjustments are required.

If any problems are encountered regarding insufficient control range on any of the controls, adjust the screen (G2) control on the drive board as follows:

Using a DVM, measure the voltages on TP26, 27 and 28 on the drive board (on external connectors edge of board) with respect to the chassis. Adjust the screen control so that the three voltages measured are in the range 65 to 95V. The colour level adjustment procedure must then be carried out once more.

As a final step, set the display brilliance to maximum, and adjust the preset contrast control to give the brightest picture without video overload.

Switch off and complete the re-assembly of the display monitor. If the picture size was adjusted without the CRT bezel fitted, re-adjust the picture size so that the white border of Test Pattern 1 is fully visible.

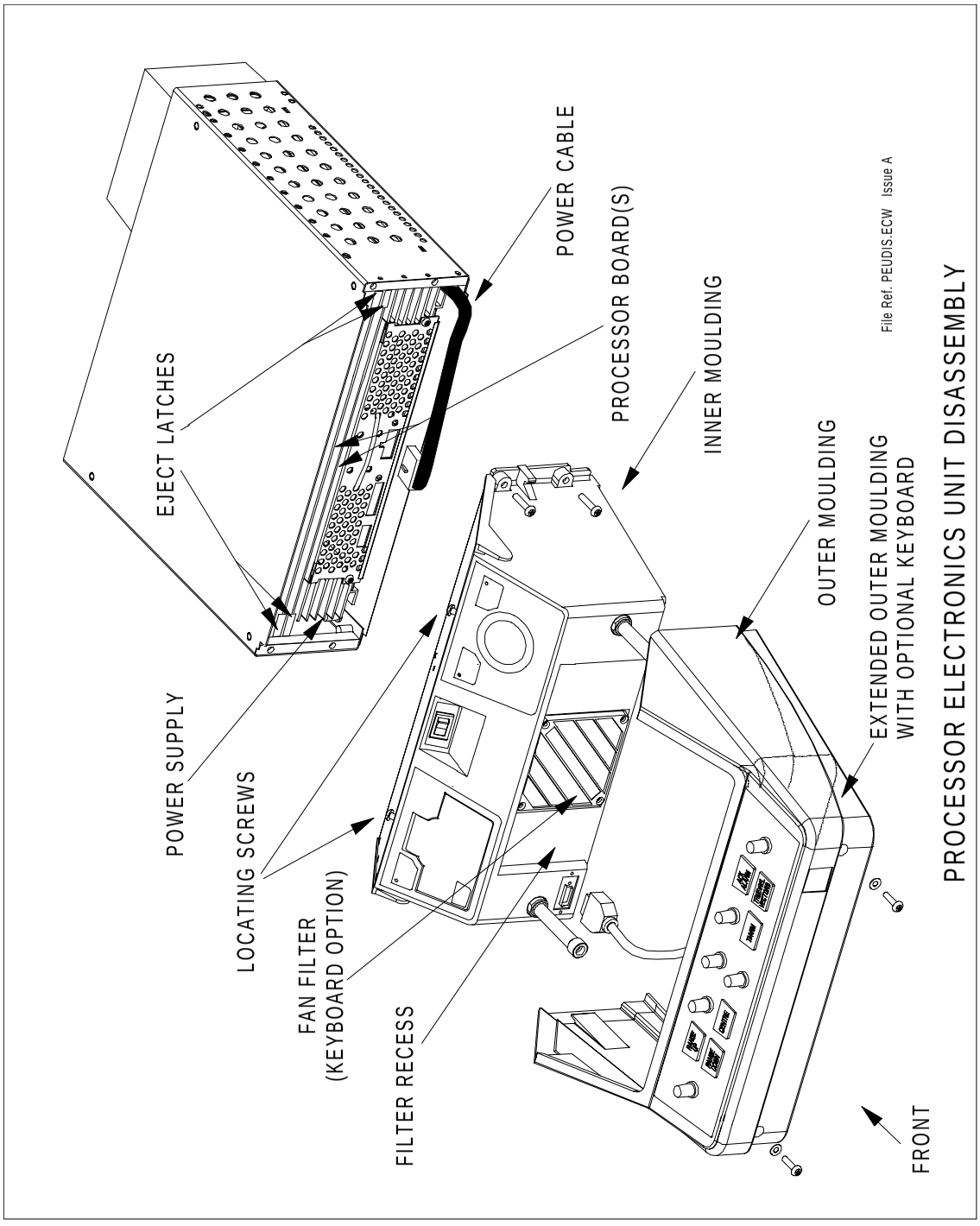


Figure 6.1 Processor Electronics Unit - Disassembly

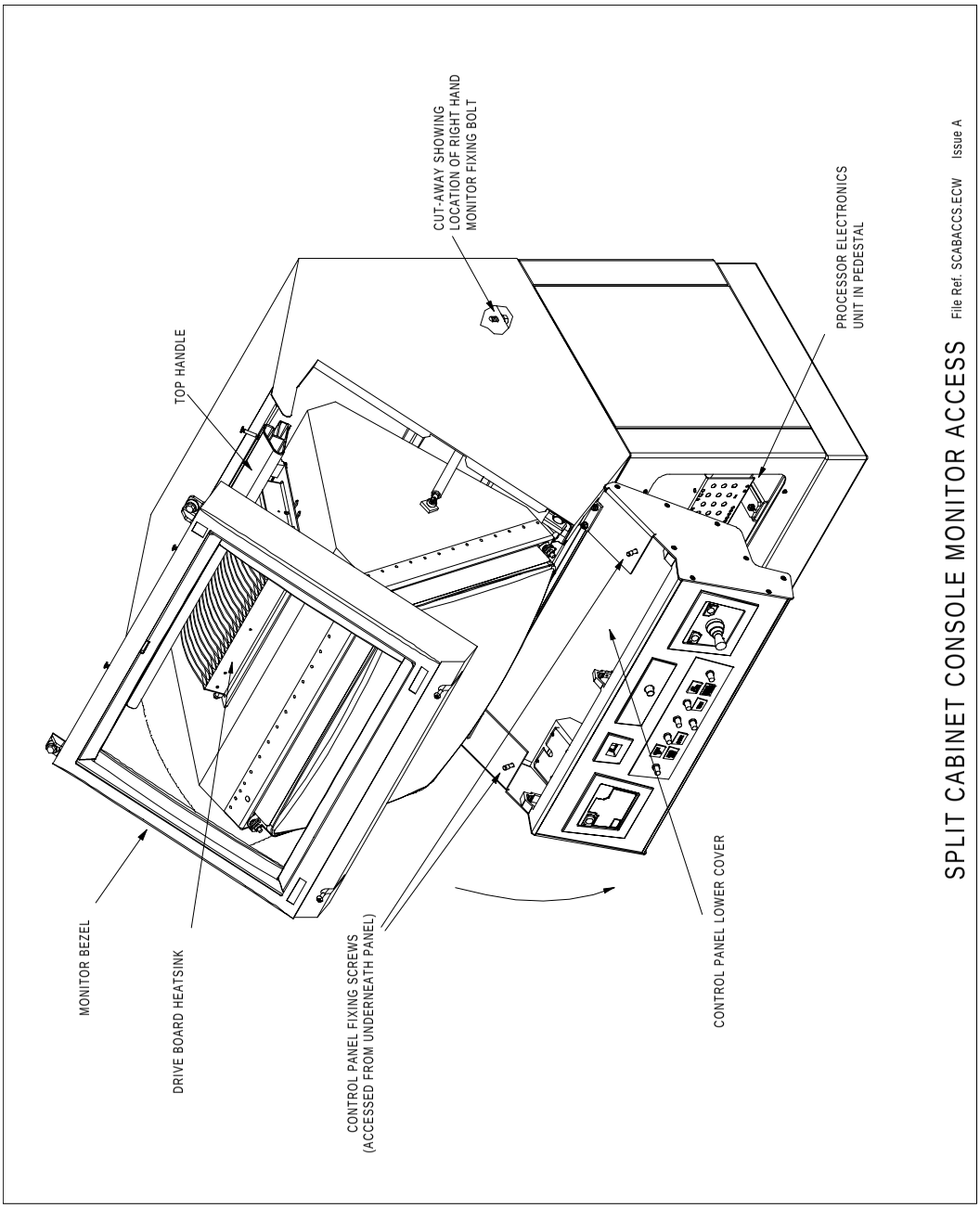


Figure 6.2 Split Cabinet Console - Monitor Access

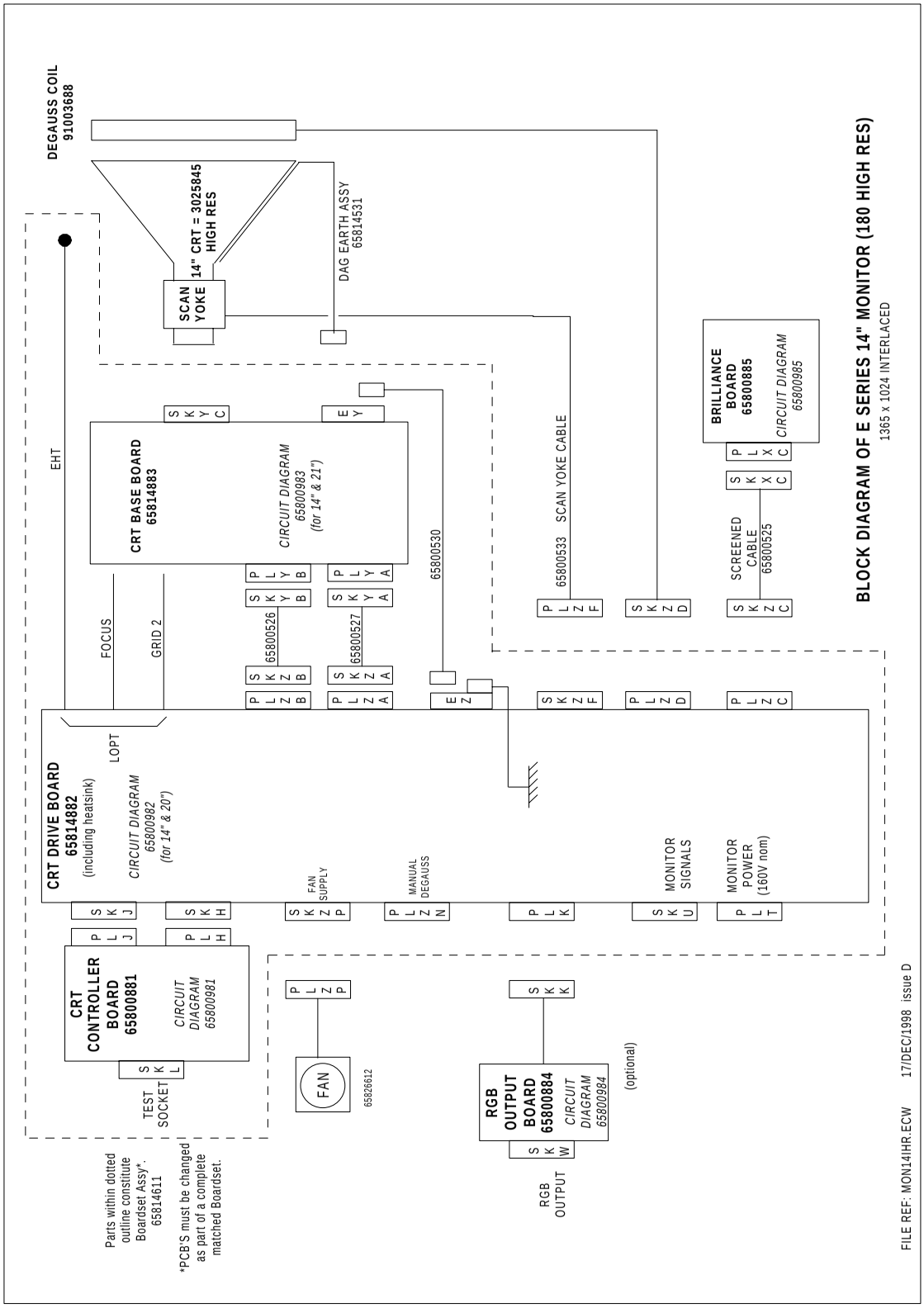


Figure 6.3 Block Diagram - 180 Monitor (14" High Resolution)

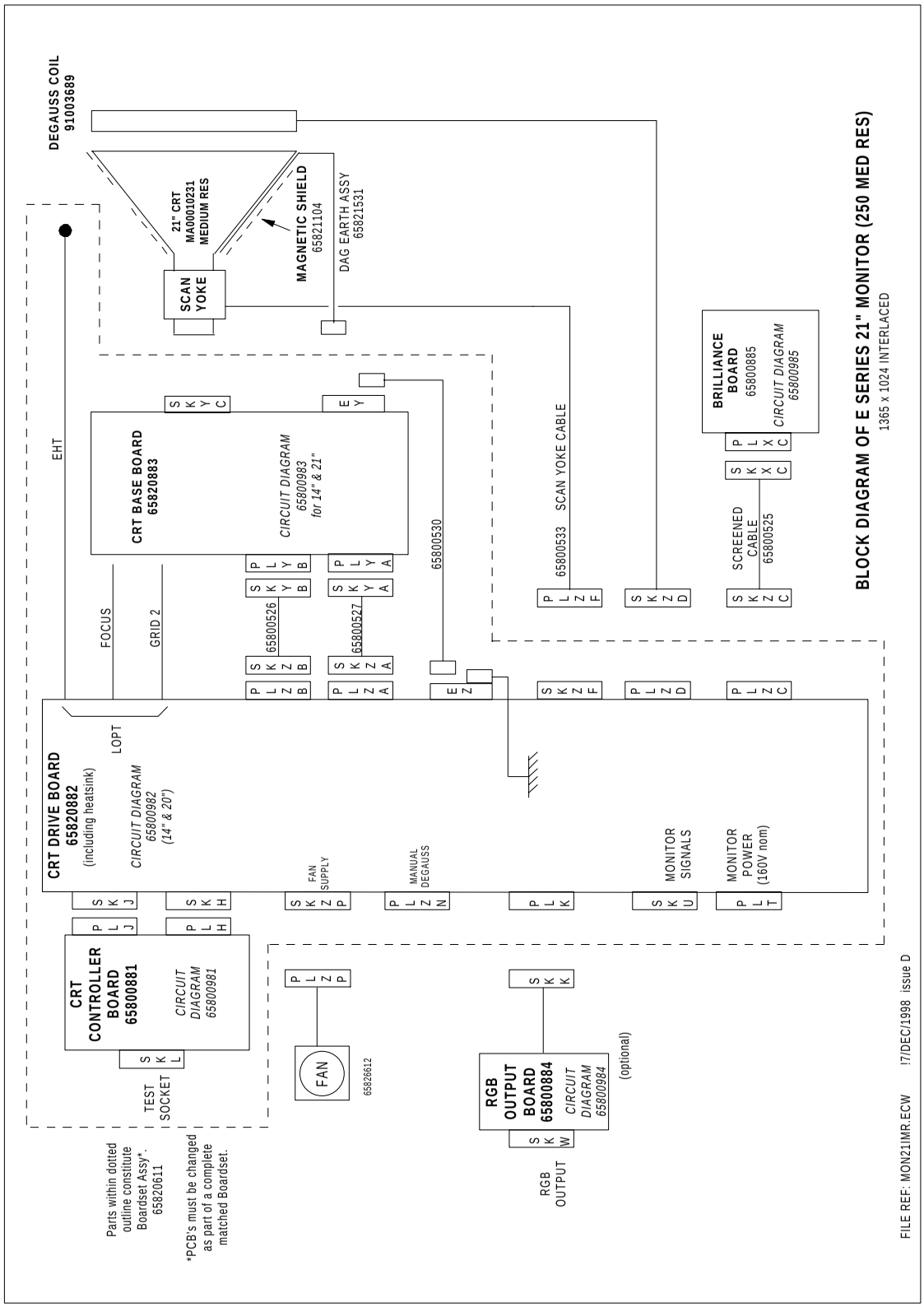


Figure 6.4 Block Diagram - 250 Monitor (21" Medium Resolution)

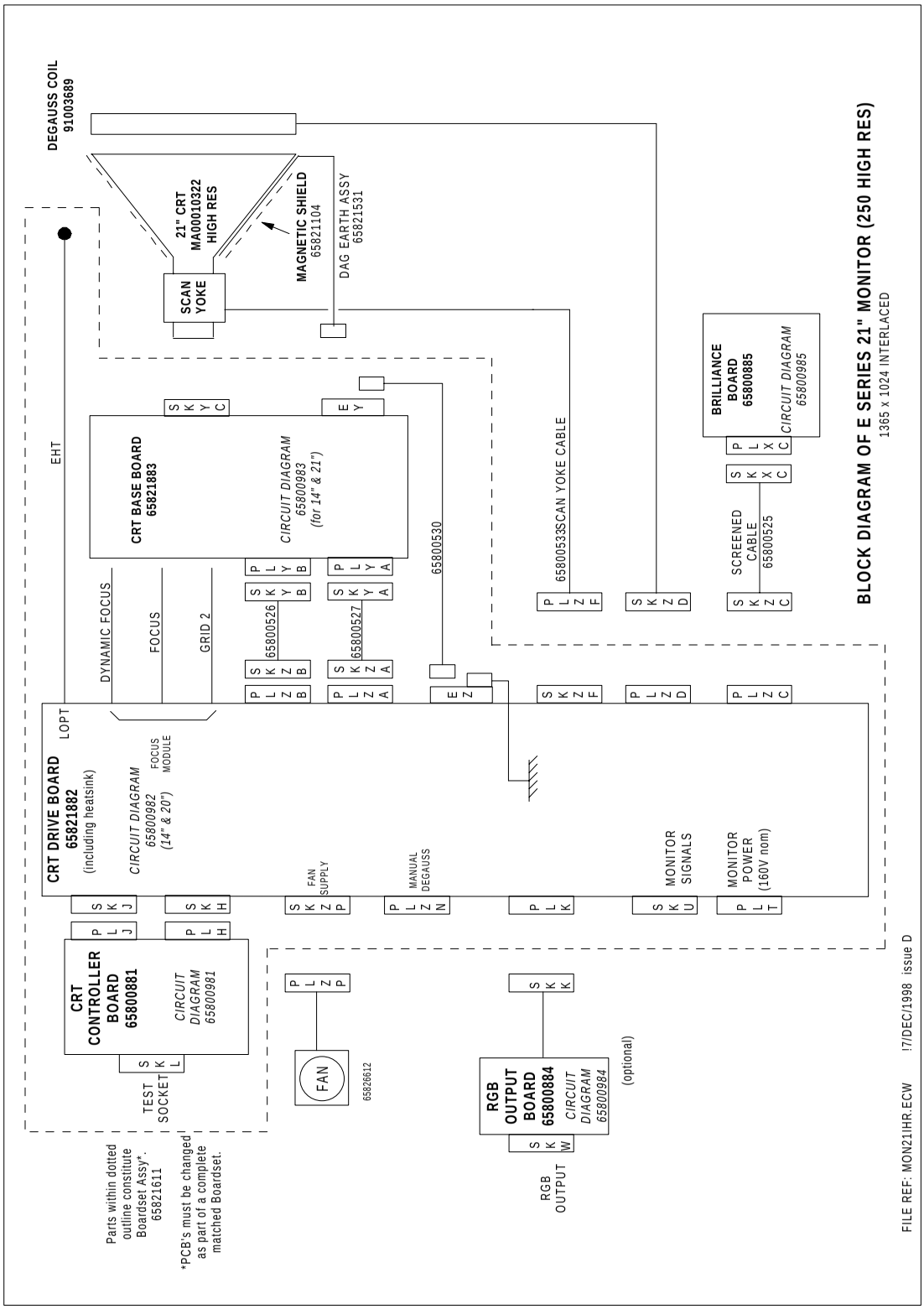


Figure 6.5 Block Diagram - 250 Monitor (21" High Resolution)

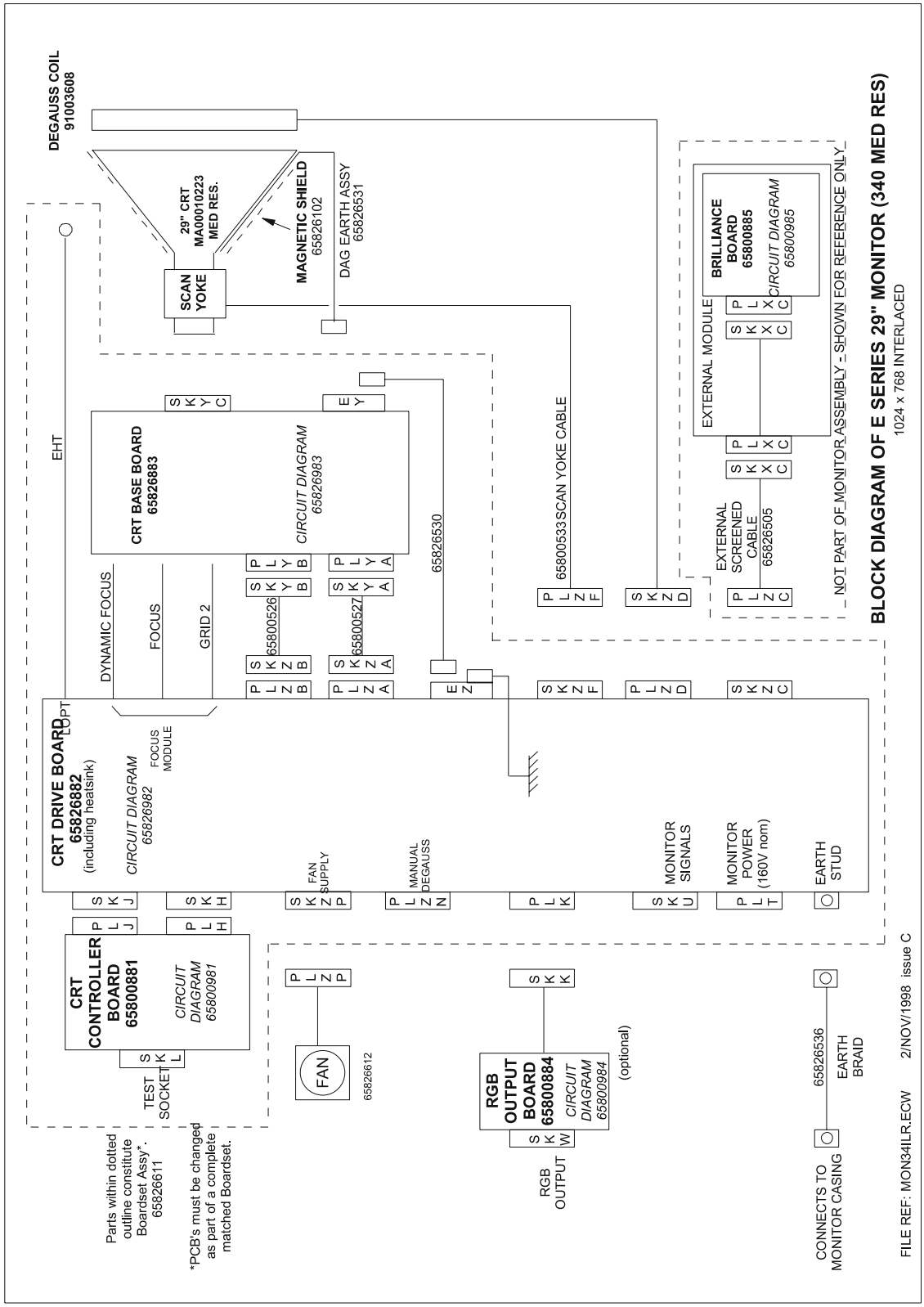


Figure 6.6 Block Diagram - 340 Monitor (29" Medium Resolution)

Intentionally Blank

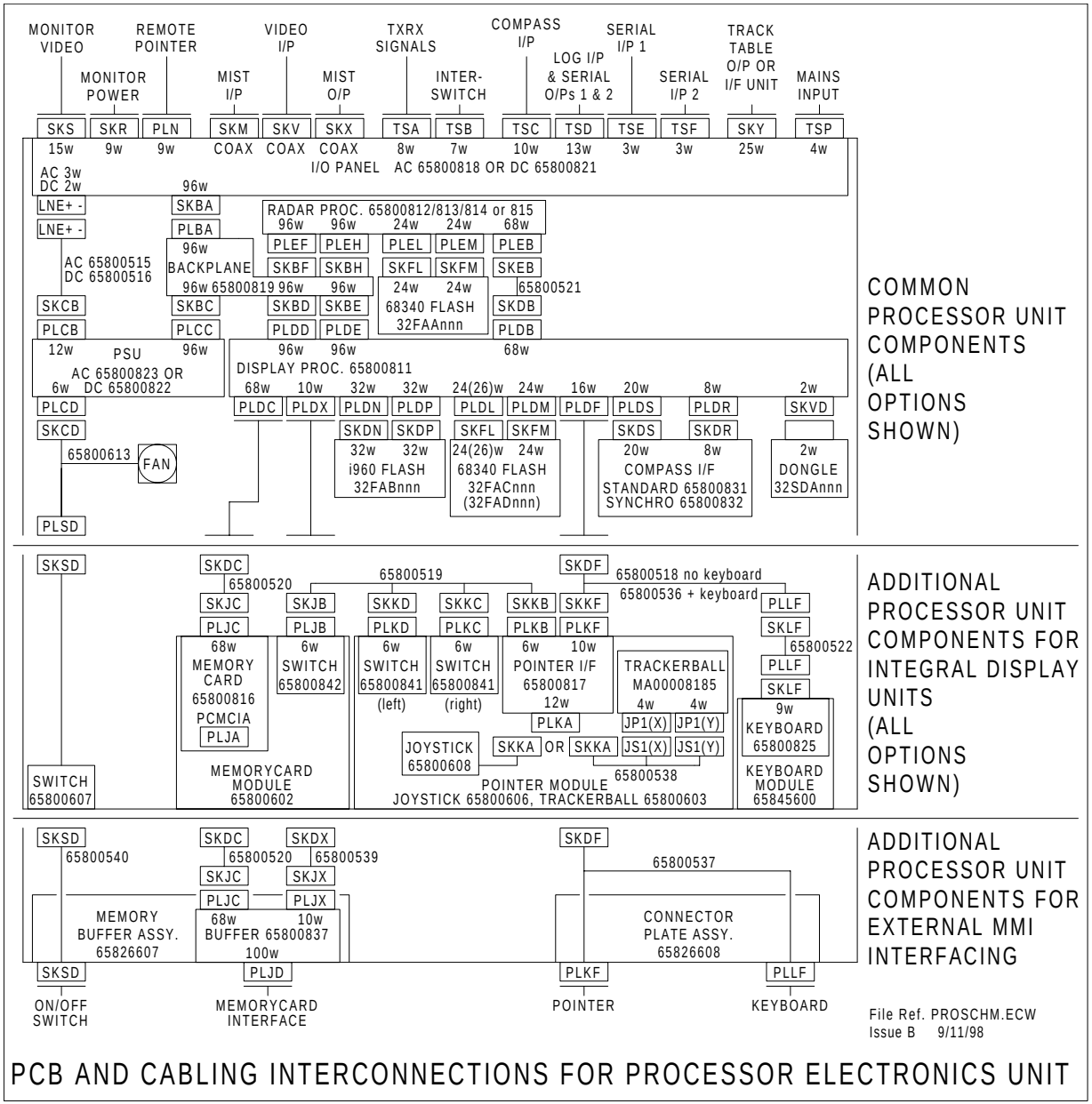


Figure 6.7 Interconnection Diagram - Processor Electronics Unit

A3 page 6-73/74 Figure 6.7, discard this A4 sheet.

3.2 S-Band Scanner Unit

3.2.6 Magnetron Replacement

(Scanner Unit - Masthead Transceiver)

At the Scanner Control Unit set the isolating switch to the 'OFF' position and lock it. Rotate the antenna until the front face is pointing away from the transceiver.
Isolate the radar from the ship's mains supply using the isolating switch provided.

Refer to Figure 6.8, and remove the transceiver cover from the scanner unit. Refer to Figure 6.13, and follow the procedure for removing and replacing the magnetron.

Magnetron Current (Scanner Unit with Integral Transceiver)
When a Magnetron is replaced, the magnetron current must be set as follows:
On the Trigger pcb set links LK5 and LK6 to position 2-3.
Reconnect the ship's mains supply, and switch the radar ON.
Wait 3 minutes for the magnetron time delay to expire, and select long pulse.
Set the magnetron current as detailed in Figure 6.14.

Isolate the radar from the ship's mains supply using the isolating switch provided.
Reset LK5 and LK6 to position 1-2.
Replace the transceiver cover.

Note *- Servicing kit (Part No. 65830700) is available to enable S-Band Masthead Transceivers to be run below decks on a dummy load (included in kit).*

3.2.7 Magnetron Replacement (Bulkhead Transceiver)

Isolate the radar from the ship's mains supply using the isolating switch provided.

Refer to Figure 6.9, and remove transceiver cover. Refer to Figure 6.13, and follow the procedure for removing and replacing the magnetron.

Magnetron Current (Bulkhead Transceiver)

When a magnetron is replaced, the magnetron current must be set as follows:
Reconnect the ship's mains supply, and switch the radar ON.
Wait 3 minutes for the magnetron time delay to expire, and select long pulse.
Set the magnetron current as detailed in Figure 6.14.

Isolate the radar from the ship's mains supply using the isolating switch provided.
Replace the transceiver cover.

3.2.8 Heading Marker Replacement

At the Scanner Control Unit set the isolating switch to the 'OFF' position and lock it.

Isolate the radar from the ship's mains supply using the isolating switch provided.

Rotate the antenna until the front face is pointing away from the transceiver.

Refer to Figure 6.22, and remove the Performance Monitor cover. The location of the Pulse Bearing pcb is shown in Figure 6.23. Remove the two securing screws and remove the pcb. Replace the pcb and secure with two screws. Two dowels of different diameters locate the pcb in the correct orientation.

3.2.9 Heading Marker Alignment

Alignment of the Heading Marker is achieved via the Initialisation menu at the Display Unit.

DANGER!
LETHAL VOLTAGES ARE EXPOSED WHEN COVERS ARE REMOVED. ENSURE TRANSCEIVER IS ISOLATED FROM SHIP'S SUPPLY, AND THAT THE SHIP'S SUPPLY TO THE SCANNER MOTOR IS ISOLATED AT THE SCANNER CONTROL UNIT.

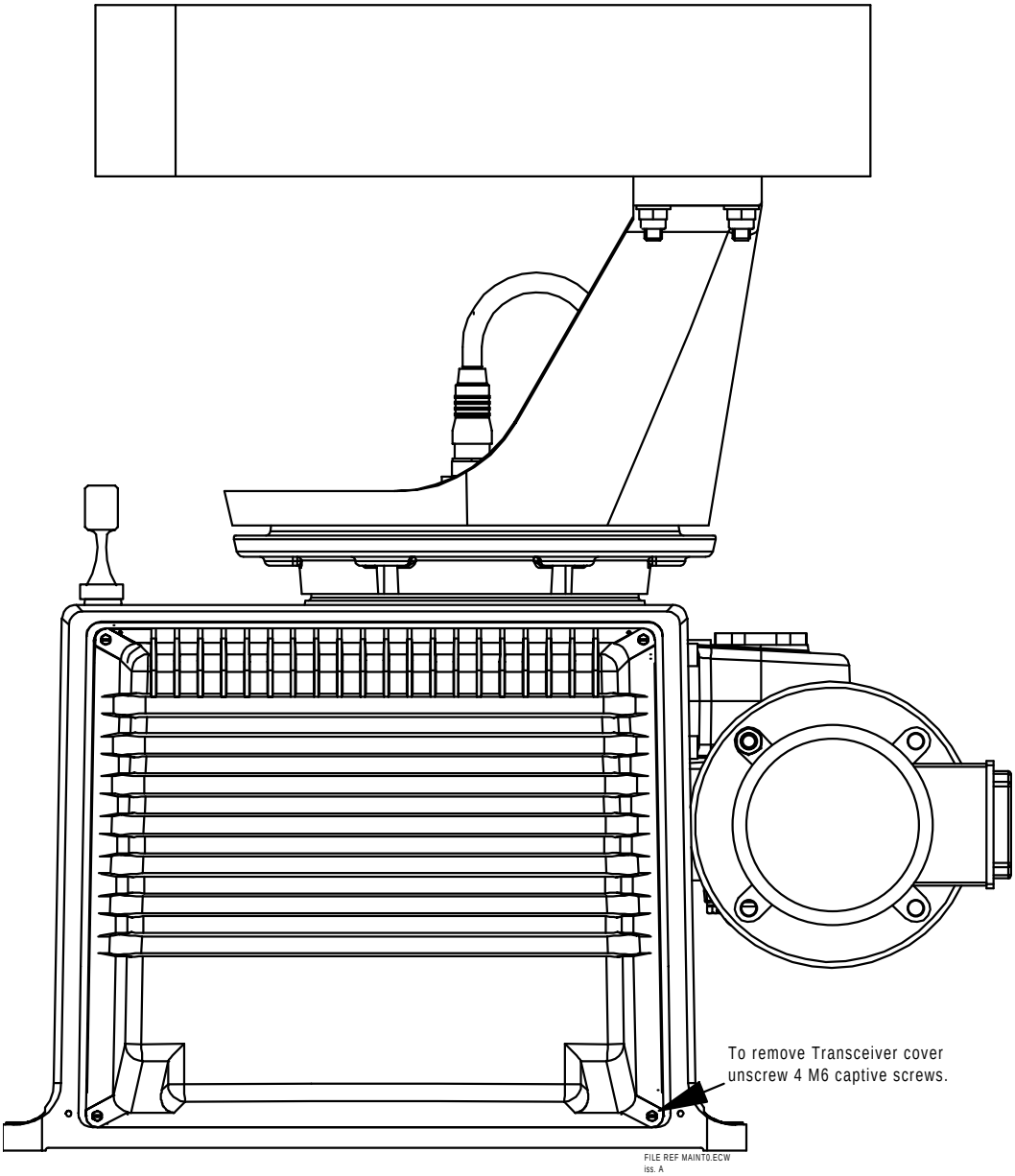


Figure 6.8 Access to Transceiver (Turning Unit with Integral Transceiver)

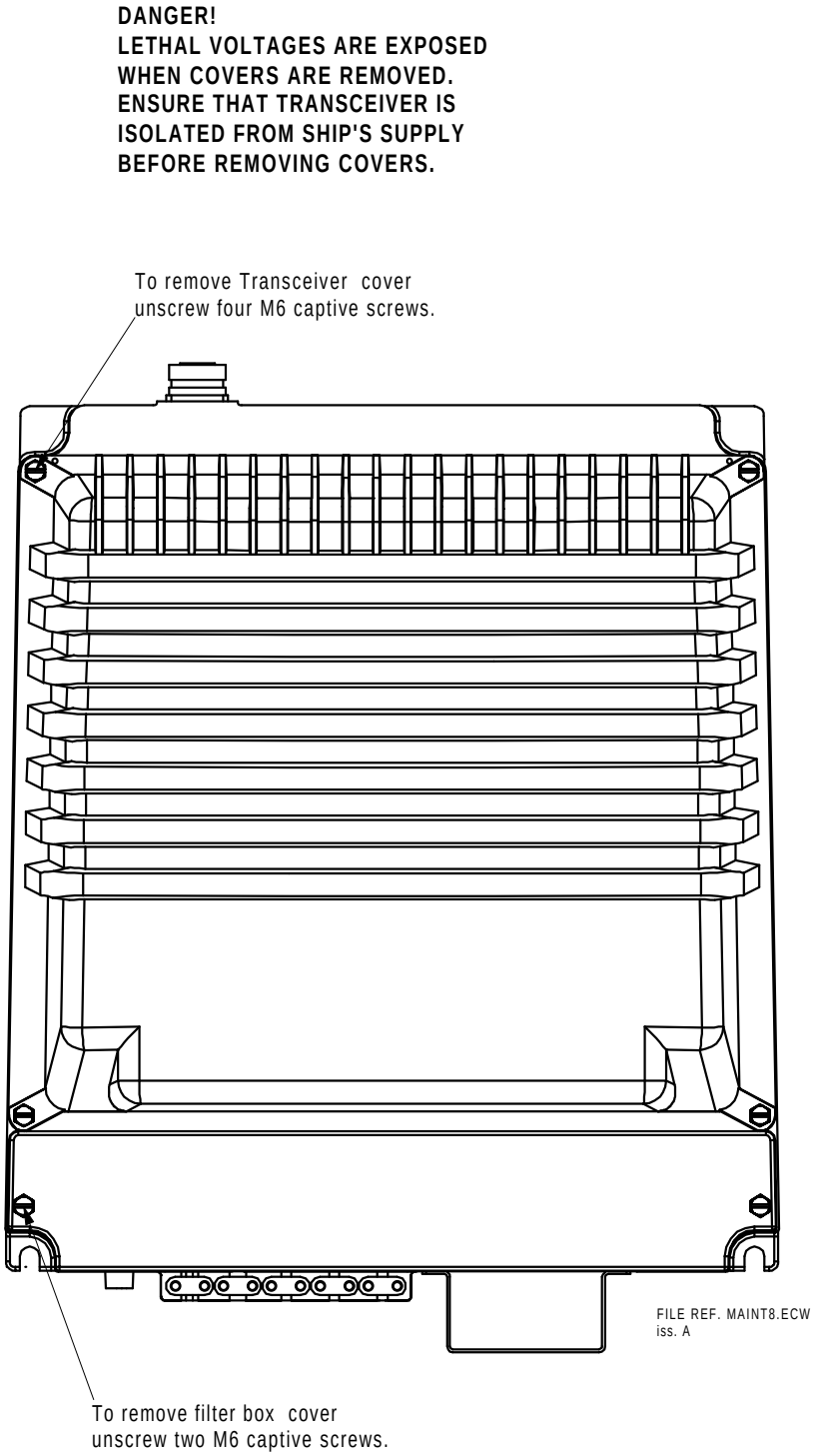


Figure 6.9 Access to Transceiver (Bulkhead Transceiver)

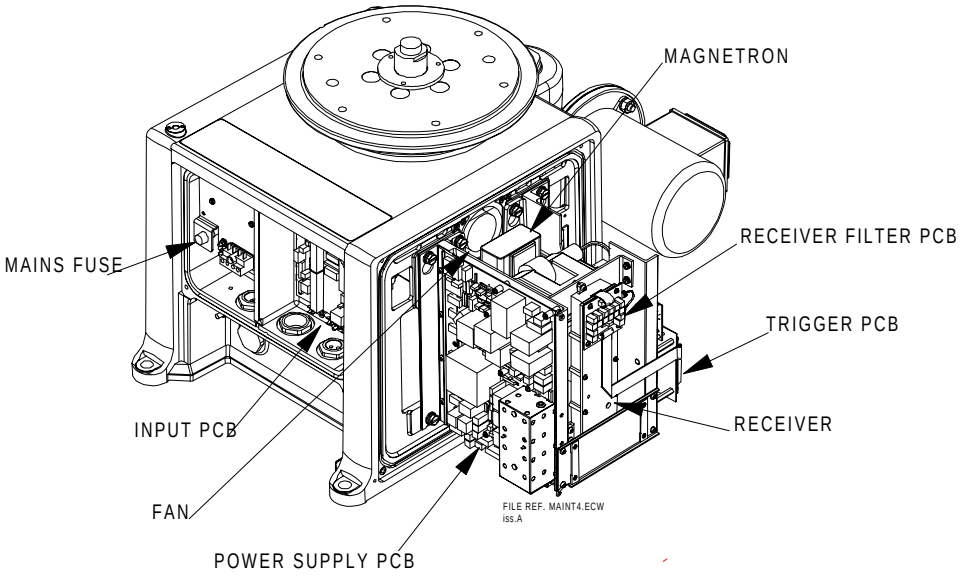


Figure 6.10 Location of Major Parts

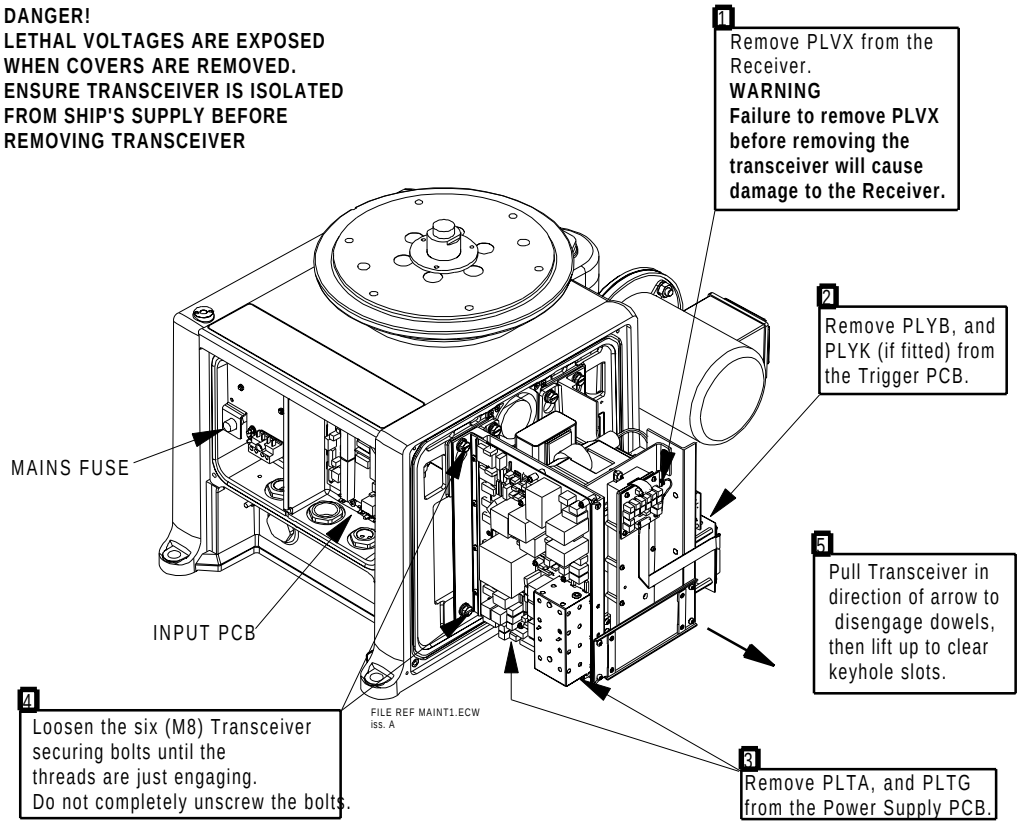


Figure 6.11 Removing Transceiver from Turning Unit

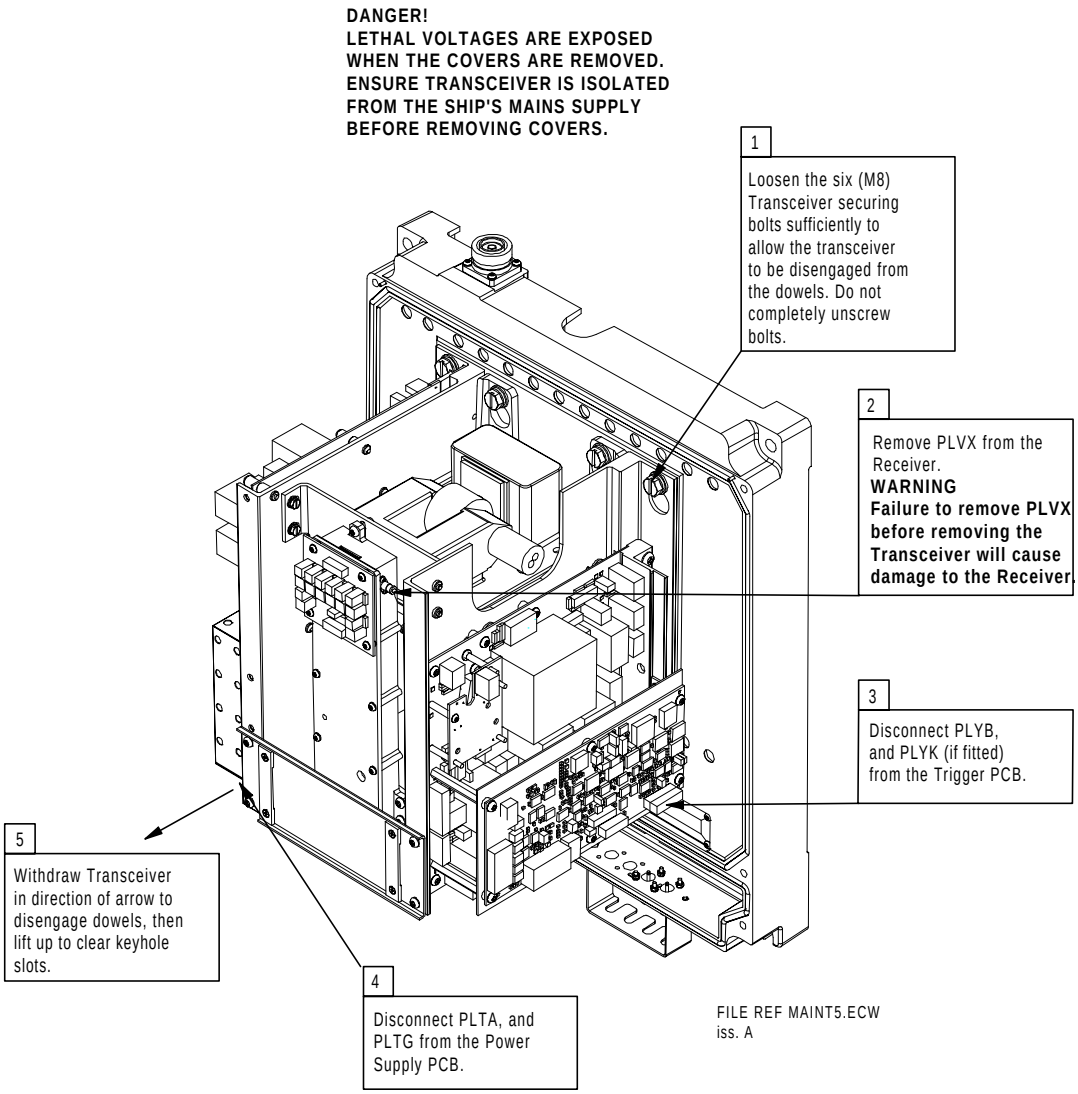


Figure 6.12 Removing Transceiver Assembly 65830630 (Bulkhead Transceiver)

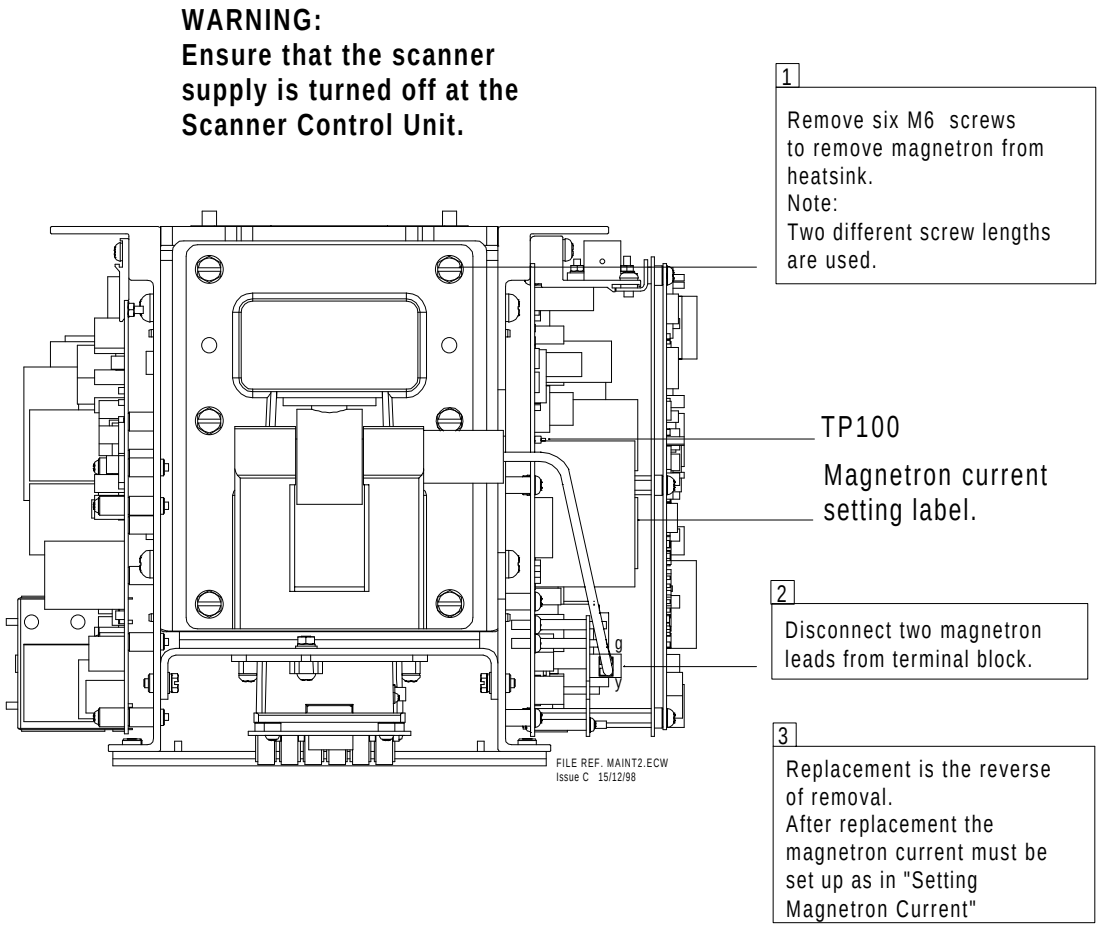


Figure 6.13 Magnetron Replacement

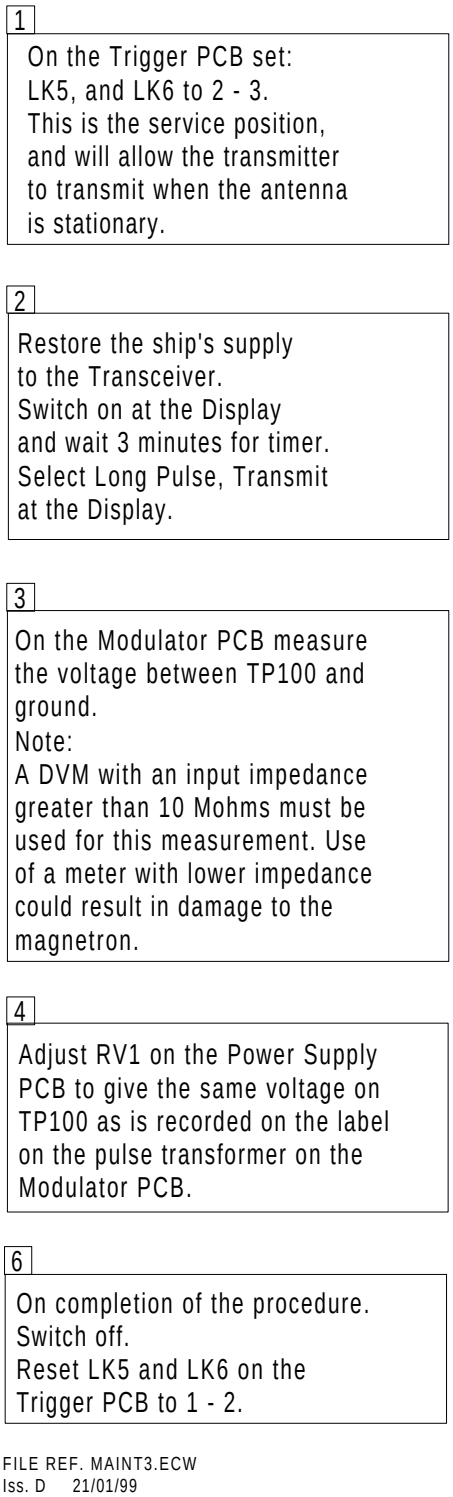


Figure 6.14 Setting Magnetron Current

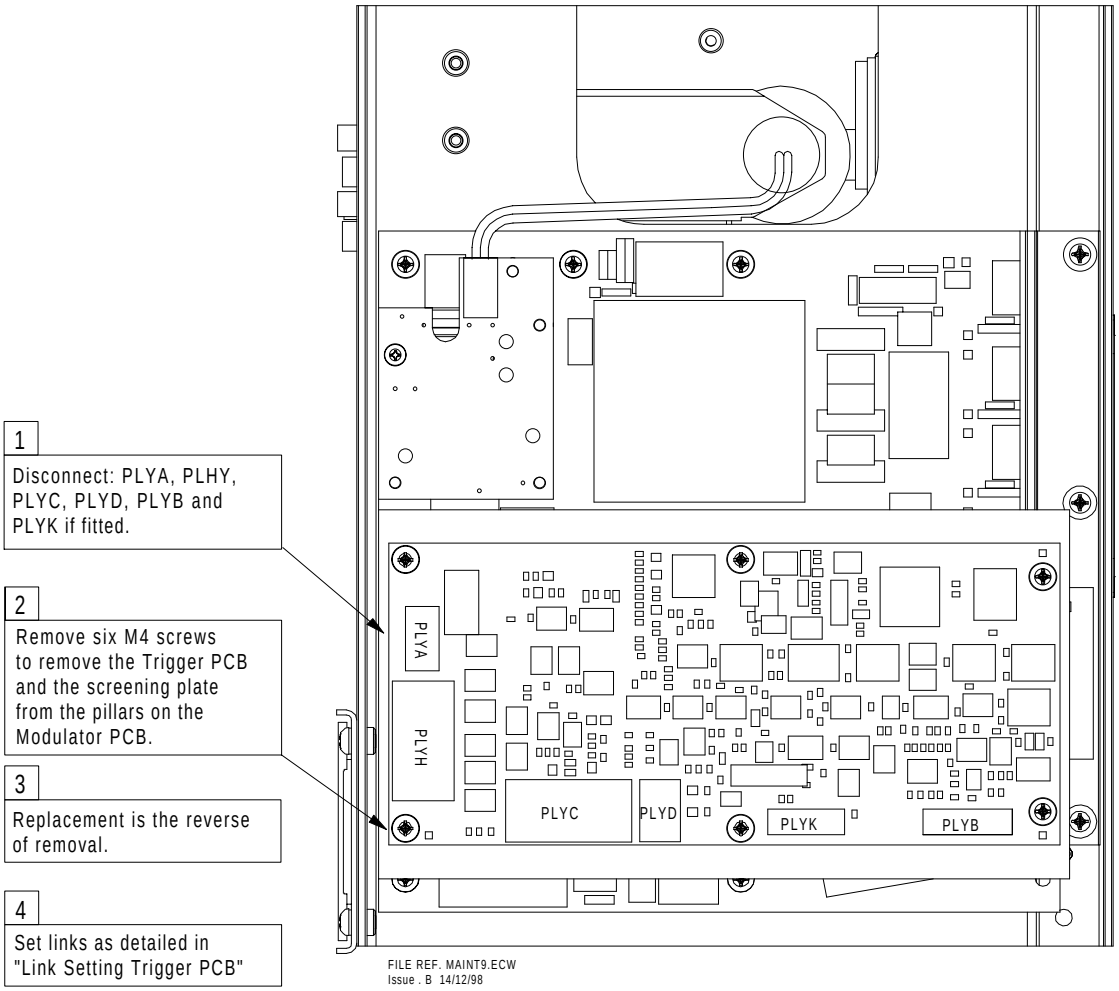
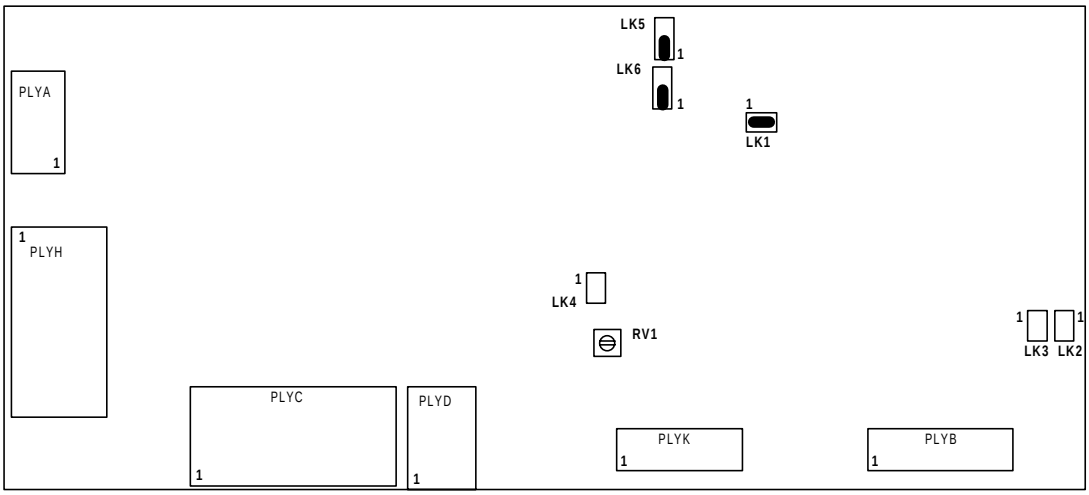


Figure 6.15 Replacing Trigger PCB



FILE REF. TRIGGER.ECW
iss. C

ATE TEST LINKS
LK1 FITTED
LK4 NOT FITTED

BAUD RATE LINKS
LK2 NOT FITTED
LK3 NOT FITTED

SERVICE LINKS
LK5 NORMAL OPERATION FITTED 1 - 2
LK6 NORMAL OPERATION FITTED 1 - 2

LK5 SERVICE FITTED 2 - 3
LK6 SERVICE FITTED 2 - 3
WHEN FITTED 2 - 3 THE TRANSMITTER WILL OPERATE WHEN THE ANTENNA IS STOPPED.

RV1 SWEPT GAIN DELAY
FACTORY SET DO NOT ADJUST

Figure 6.16 Link Settings Trigger PCB

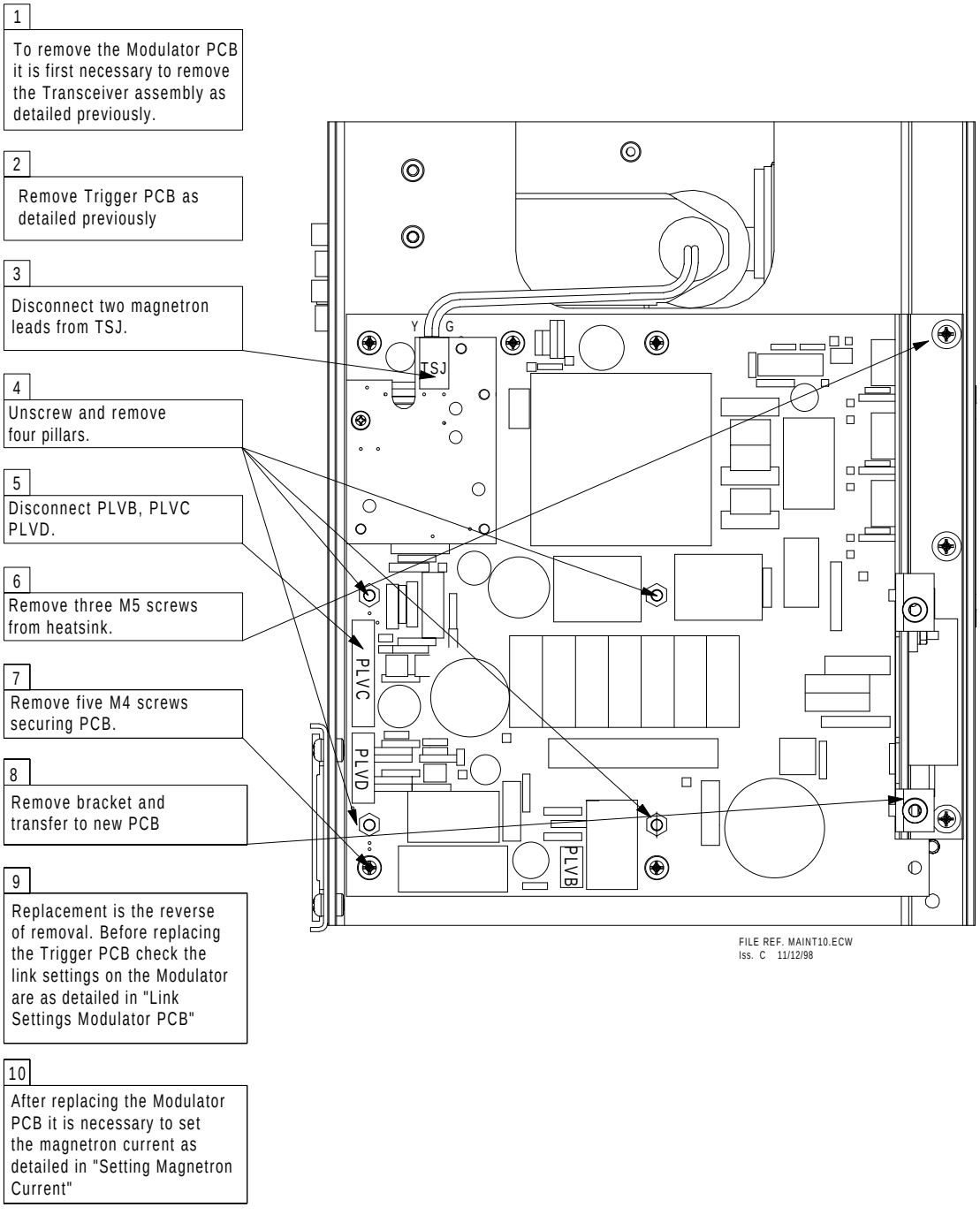
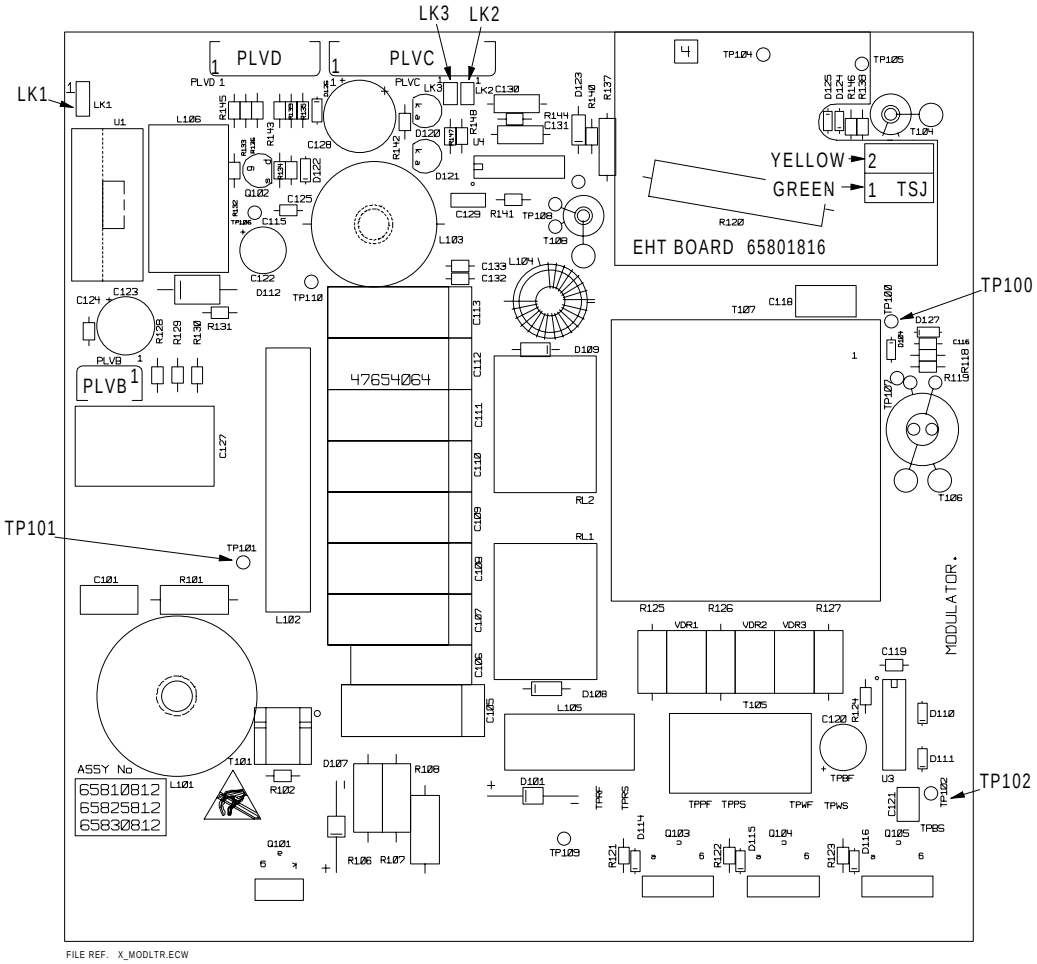


Figure 6.17 Replacing Modulator PCB



MODULATOR LINK SETTINGS FOR 65810812 / 65825812 / 65830812

	S-BAND	10 kW X-BAND	25 kW X-BAND
LK1	FITTED 2 - 3	FITTED 1 - 2	FITTED 1 - 2 FOR MAGNETRON MG5424
LK1			FITTED 2 - 3 FOR MAGNETRON M1458
LK2	FITTED	NOT FITTED	NOT FITTED
LK3	NOT FITTED	FITTED	NOT FITTED

NOTE THAT LINK 1 IS CONFIGURABLE FOR HEATER TURNDOWN ON 25kW X-BAND
NOTE THAT LINKS 2 & 3 ARE HARDWIRED FOR SPECIFIC USEAGE.

TEST POINTS:
TP100 MAGNETRON CURRENT MONITOR
TP101 CHARGE TRIGGER
TP102 MODULATOR TRIGGER

Figure 6.18 Link Settings - Modulator PCB

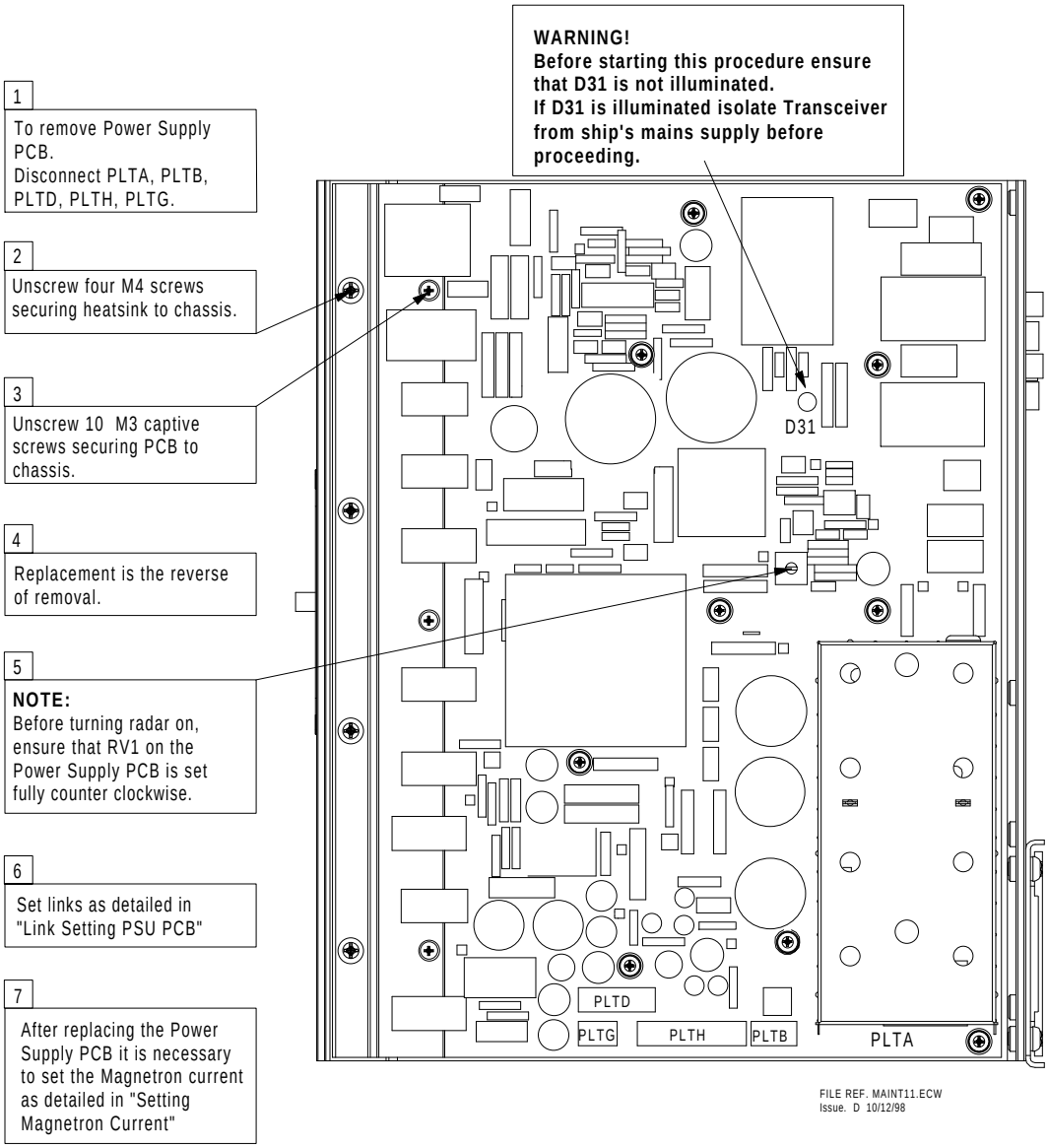
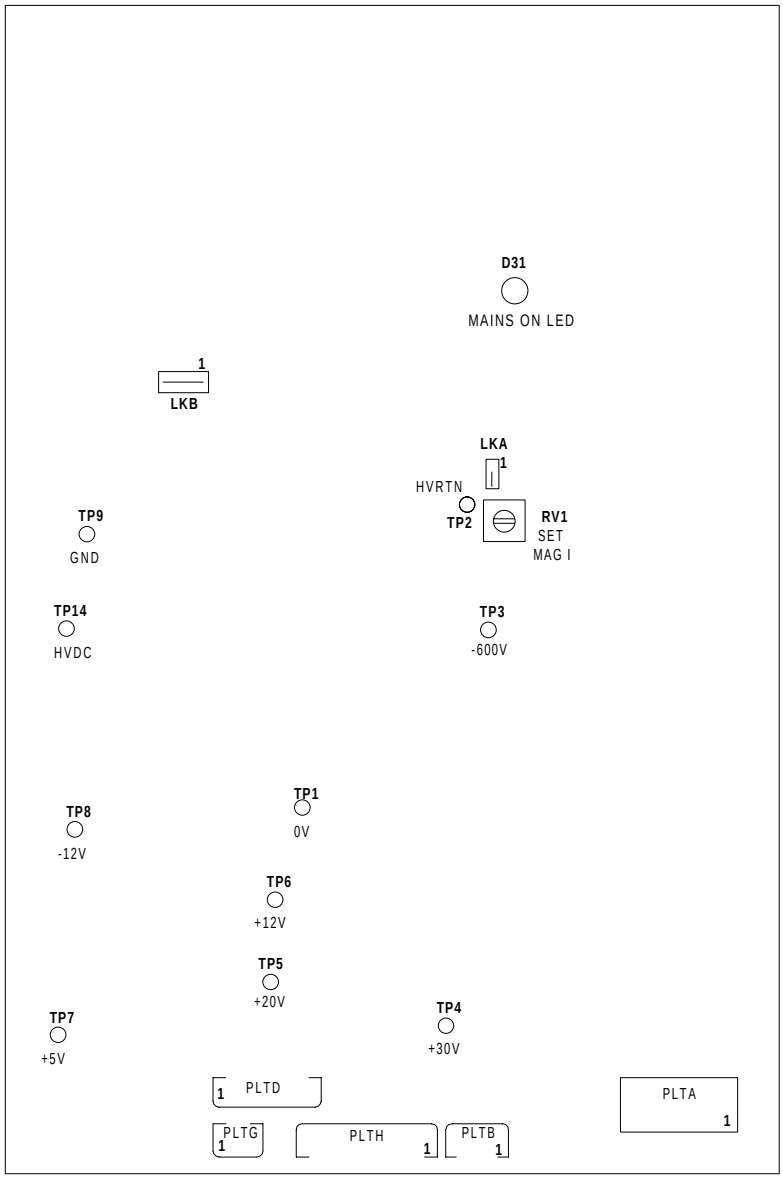


Figure 6.19 Replacing Power Supply PCB



FILE REF PSU.ECW
Issue. D 15/12/98

TEST POINTS

TP1 0V
TP3 -600V
TP4 +30V
TP5 +20V
TP6 +12V
TP7 +5V
TP8 -12V

The above voltages are measured with respect to TP1.

TP2 HVRTN
TP14 HVDC (380V)

The voltage on TP14 is measured with respect to TP2.

"LKA" START TEST LINK

LKA NORMAL OPERATION FITTED 2 - 3
LKA TEST FITTED 1 - 2
WHEN IN THE TEST POSITION THIS LINK ALLOWS THE POWER SUPPLY TO OPERATE WITHOUT BEING CONNECTED TO THE CONTROL SIGNALS FROM THE DISPLAY COMPATIBILITY UNIT.

"LKB" HIGH VOLTAGE ISOLATION LINK

LKB NORMAL OPERATION FITTED
LKB ISOLATE HV SUPPLY NOT FITTED

THIS LINK CAN BE USED TO ISOLATE THE POWER FACTOR CORRECTION CIRCUIT FROM THE REST OF THE POWER SUPPLY AS AN AID TO FAULT FINDING.

Link Setting Power Supply PCB

Figure 6.20 Link Settings - Power Supply PCB

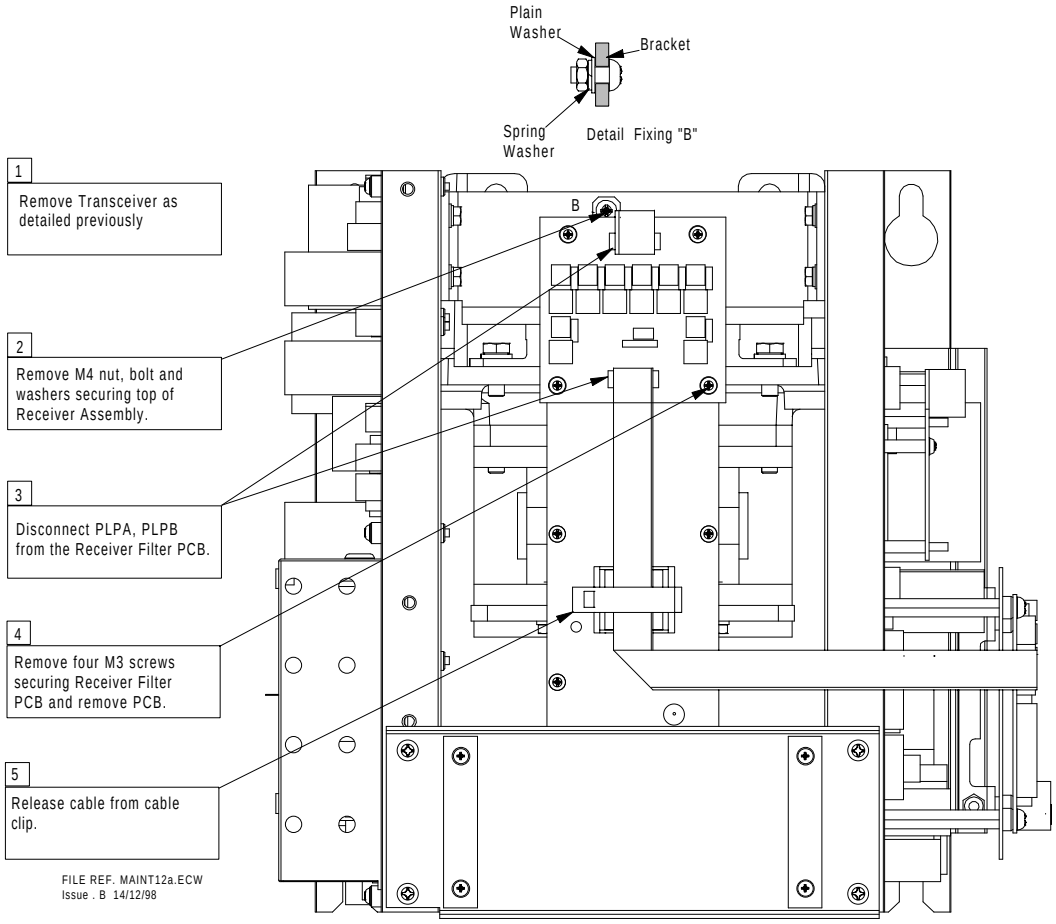


Figure 6.21 (Sheet 1 of 2) Replacement of Receiver Assembly 65830616

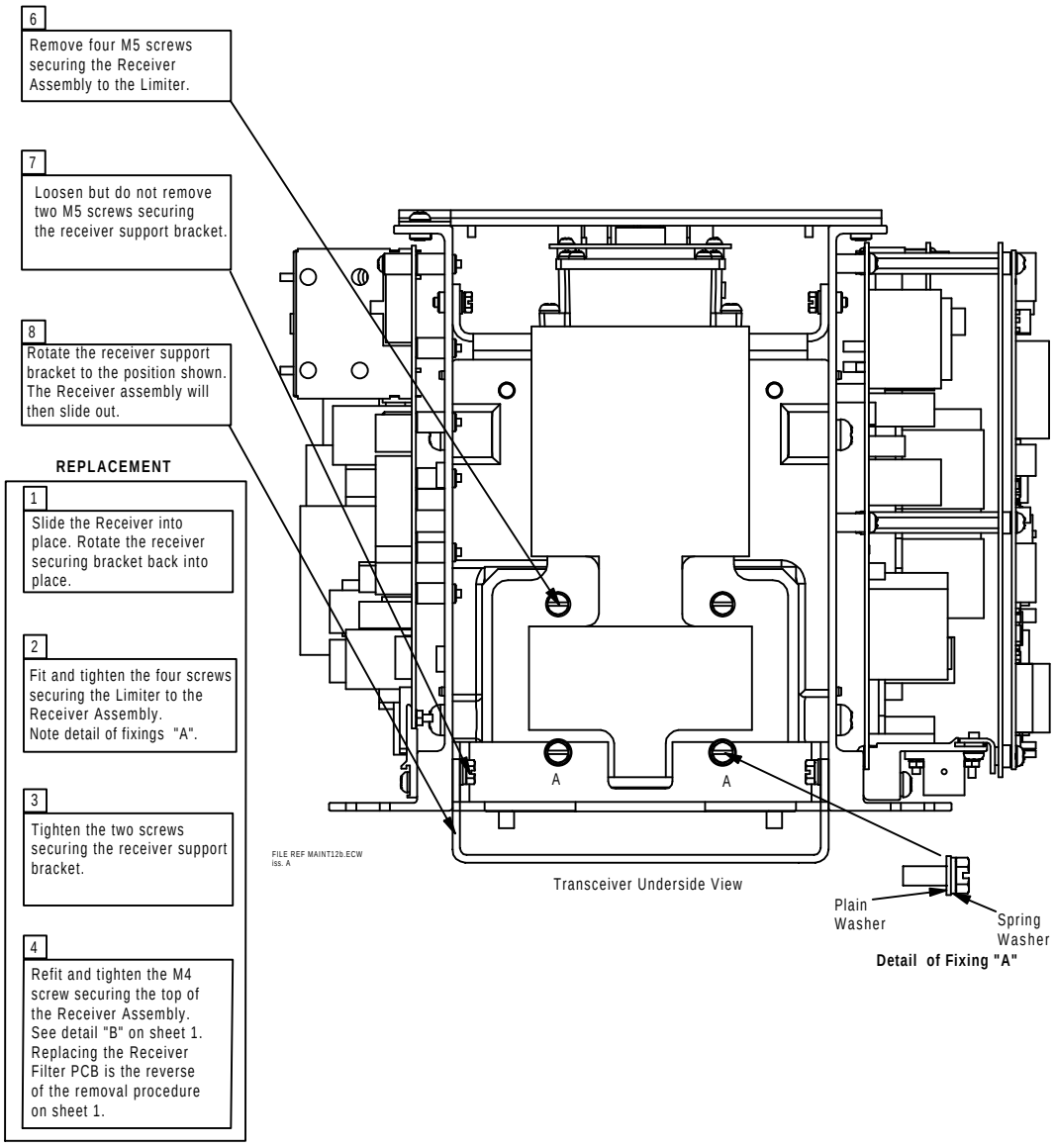


Figure 6.21 (Sheet 2 of 2) Replacement of Receiver Assembly 65830616

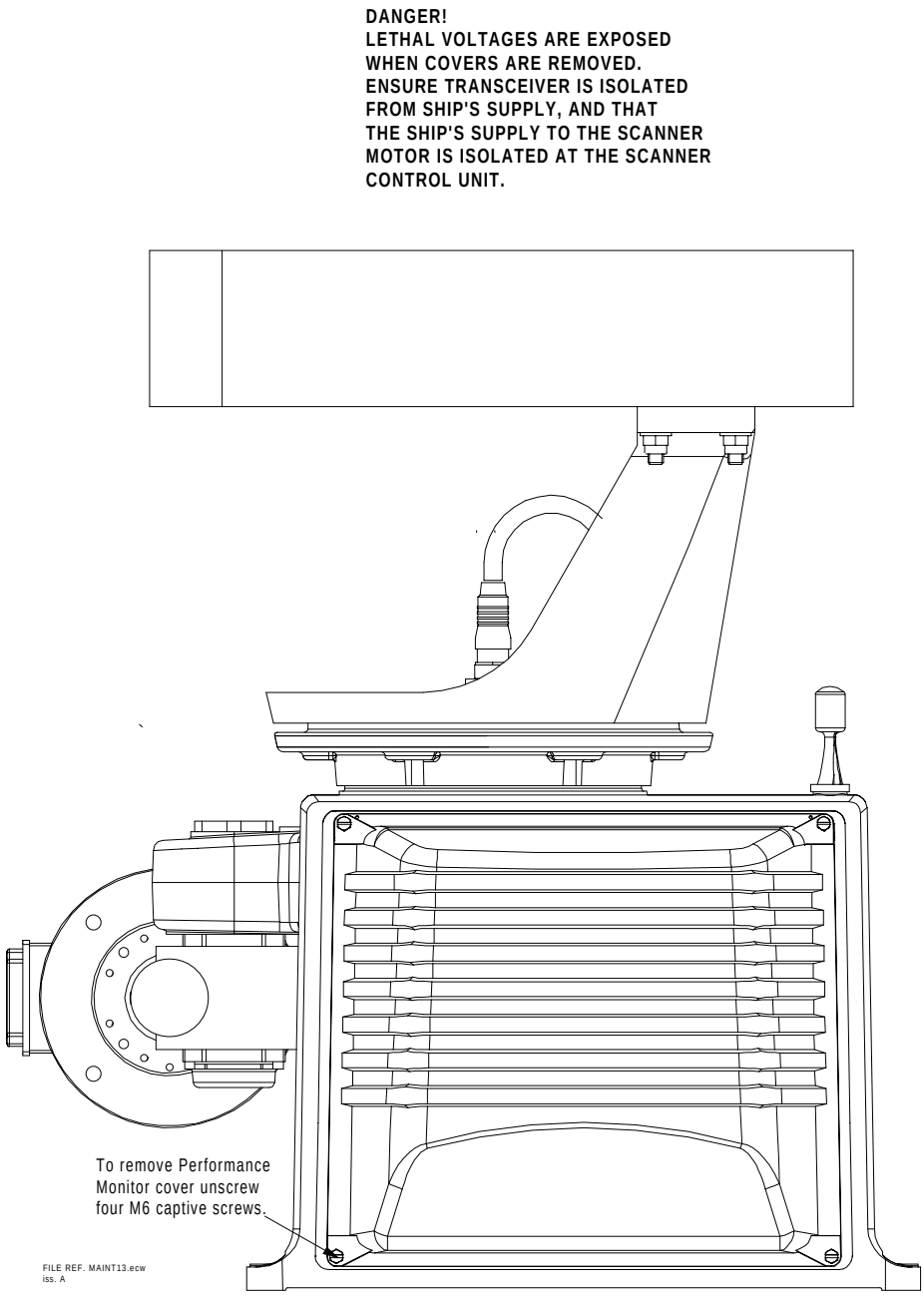


Figure 6.22 Access to Performance Monitor and Bearing and Heading Marker PCB

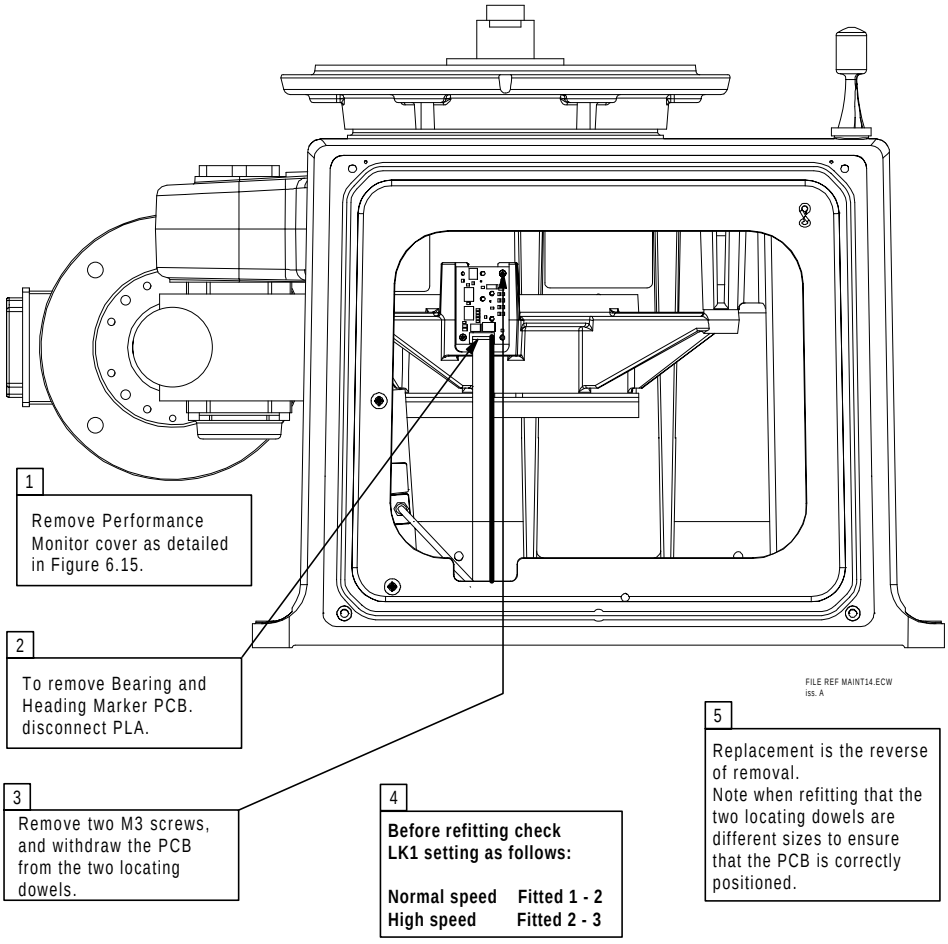


Figure 6.23 Replacing Bearing and Heading PCB

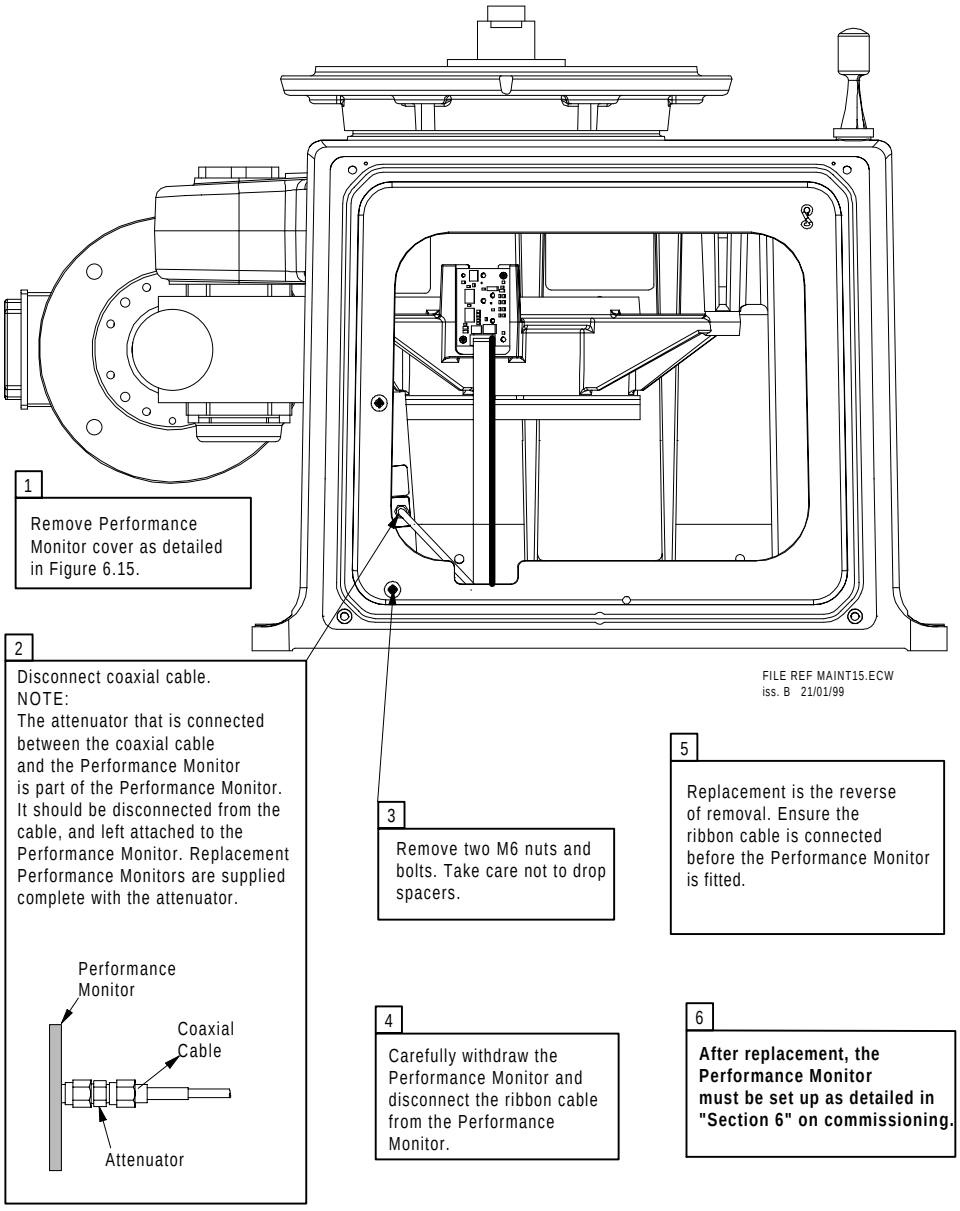


Figure 6.24 Replacing Performance Monitor

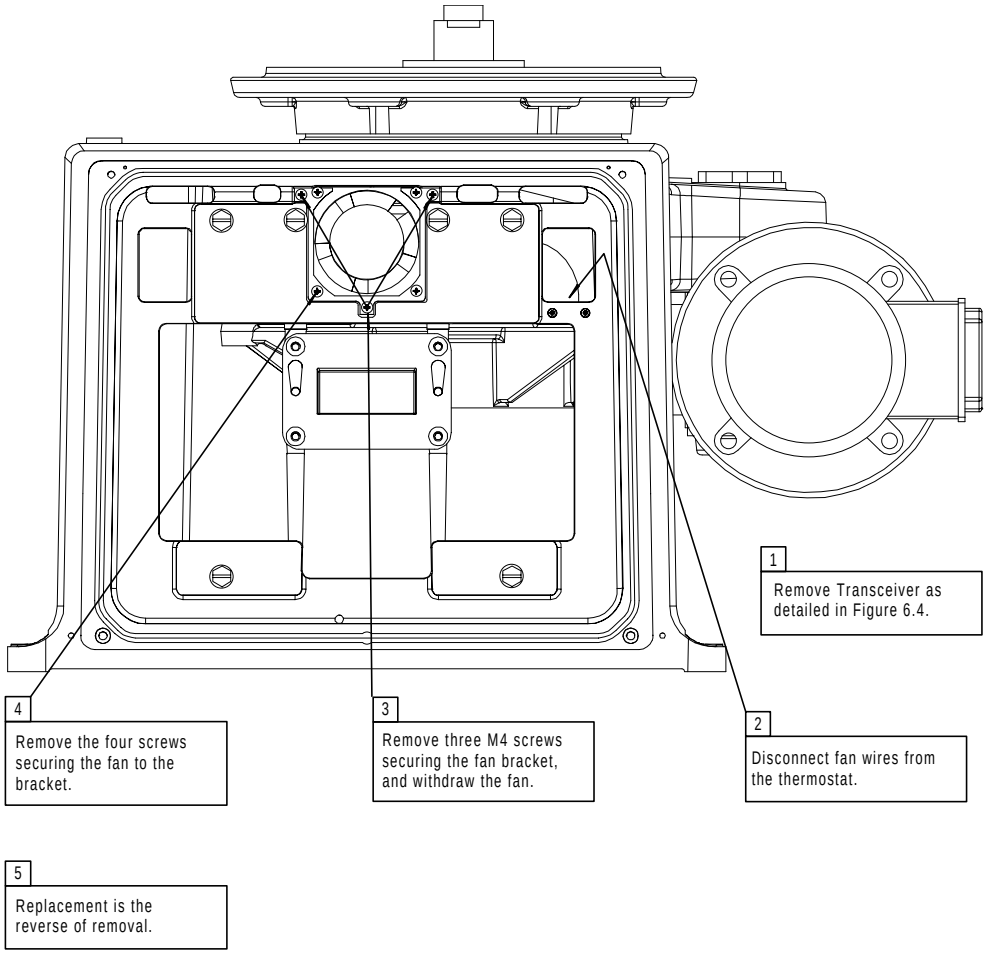


Figure 6.25 Replacement of Fan Assembly

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 locking bolt should be pushed to the bottom of the slot in the stay to prevent inadvertent release of the upper casting**.
Refer to Figure 6.26.

Note *- Servicing kits (65810700 (10kW) and 65825700 (25kW)) are available to enable X-Band Masthead Transceivers to be run below decks on a dummy load (included in kit).*

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:-
SKV 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:-
SKV 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 magnetron mounting 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 Figure 6.34.

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 necessay 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.

3.3.14 Heading Marker Alignment

Alignment of the Heading Marker is achieved via the Initialisation menu at the Display Unit.

3.3.15 Receiver Assembly - Replacement (Masthead)

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.
Remove the Transceiver Assembly as described at sub-section 3.3.3.

Unplug the ribbon cable from the Receiver to the Receiver Filter PCB
Unplug the ribbon cable from the Receiver Filter PCB to the Trigger PCB.
Refer to Figure 6.28 for location of the screws securing the Low Noise Front End (LNFE) to the Limiter.

Note - *The replacement Receiver is supplied with the LNFE already fitted.*

Remove the four screws that hold the LNFE to the Limiter.
Remove the bracket that secures the Receiver to the microwave assembly at the Receiver end, and remove the whole Receiver assembly.
Before fitting the replacement assembly, remove the Receiver Filter PCB from the old unit, and fit it to replacement unit.

Replacement is the reverse of the removal process.

3.3.16 Receiver Assembly - Replacement (Bulkhead)

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.
Refer to Figures 6.28 and 6.33.
Unplug the ribbon cable from the Receiver to the Receiver Filter PCB.
Unplug the ribbon cable from the Receiver Filter PCB to the Trigger PCB.
Unplug the video co-axial cable from the Receiver.
Refer to Figure 6.28 for the location of screws securing the Low Noise Front End (LNFE) to the Limiter.

Note - *The replacement Receiver is supplied with the LNFE already fitted.*

Remove the four screws that hold the LNFE to the Limiter and remove the whole assembly.
Before fitting the replacement assembly, remove the Receiver Filter PCB from the old unit, and fit it to replacement unit.

Replacement is the reverse of the removal process.

3.3.17 Performance Monitor - 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.
Remove the two retaining screws that hold the Performance Monitor to the upper casting (see Figure 6.29) and withdraw the unit.
Un-screw the bar that retains the RF absorber to the body of the Performance Monitor.
Disconnect the ribbon cable to the Performance Monitor.

Replacement is the reverse of the removal process.
Ensure that after the ribbon cable is reconnected to the Performance Monitor, the RF absorber is refitted.

After replacement, the Performance Monitor must be set up as detailed in Chapter 4 under 'Selecting the Performance Monitor' Facility

3.3.18 Motor Drive Board - 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.

Unplug the three cable assemblies from the Motor Drive PCB, and remove the three screws (refer to Figure 6.30).
Slide the PCB out of the retaining clip at the opposite end of the PCB.

Before fitting the replacement PCB, ensure that the speed setting link LK1 is correctly set for the intended operational speed. Positions 1 & 2 marked 'LO' is for 28 RPM operation. Position 2 & 3 marked 'HI' is for 45 RPM operation. If in doubt, compare the setting with the old PCB.

Replacement is the reverse of the removal process.
Ensure that all three cable assemblies are reconnected to the PCB.

3.3.19 Motor and Gearbox Assembly - 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 for the location of the three screws that retain the motor support casting to the upper casting, and remove the screws.
The motor support casting complete with Motor Drive PCB can now be withdrawn from the belt drive.

Remove the four screws that retain the motor and gearbox assembly to the support casting.

Note *- These four countersunk screws are fitted with screw retaining fluid. When fitting the new motor, these screws should be refitted using 'Loctite Screwlock 222' low breaking strength fluid.*

Remove the impeller from the old motor and fit to the replacement.

Replacement is the reverse of the removal process, taking care to engage the motor pulley into the drive belt.

3.3.20 Drive Belt - 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.

Remove the Transceiver as detailed at sub-section 3.3.3.
Remove the motor support casting and motor assembly as detailed at sub-section 3.3.19.

Refer to Figure 6.29.
Remove the three bolts as indicated that retain the waveguide transition support casting to the rotating joint.

Note - *Since the waveguide transition support casting has two sleeve inserts to aid accuracy in alignment, some resistance may be felt when removing it.*

Care should be exercised when removing the casting to avoid damage to the assembly or to the brass microwave probe at the centre of the hub.

The replacement drive belt can now be fitted.
Re-assembly is the reverse of the removal process.
Care should be exercised to avoid damage to the brass microwave probe at the centre of the hub during re-insertion into the transition.
Ensure that the motor pulley is correctly engaged into the belt.

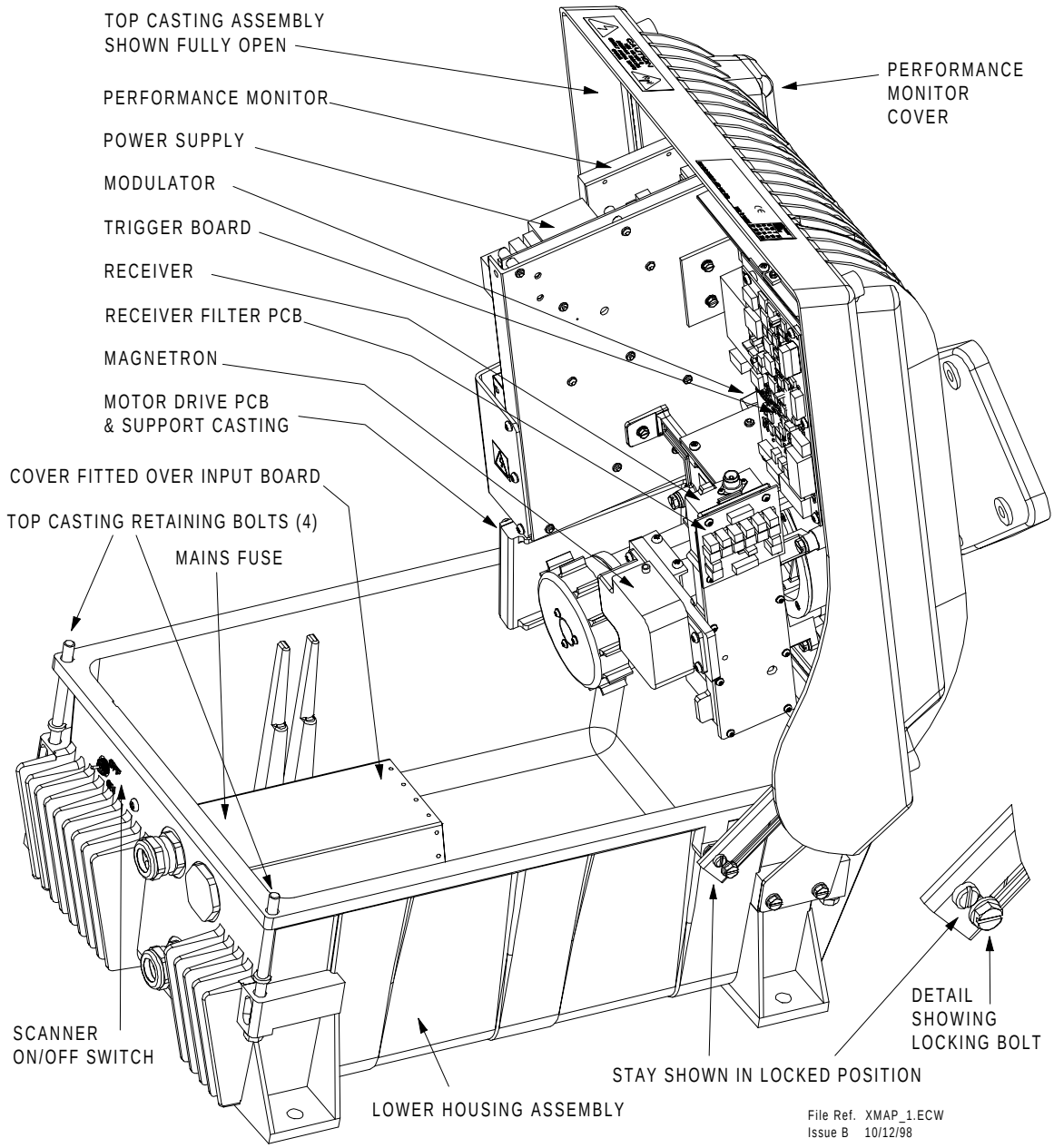


Figure 6.26 X-Band Masthead Turning Unit - Internal view showing Transceiver

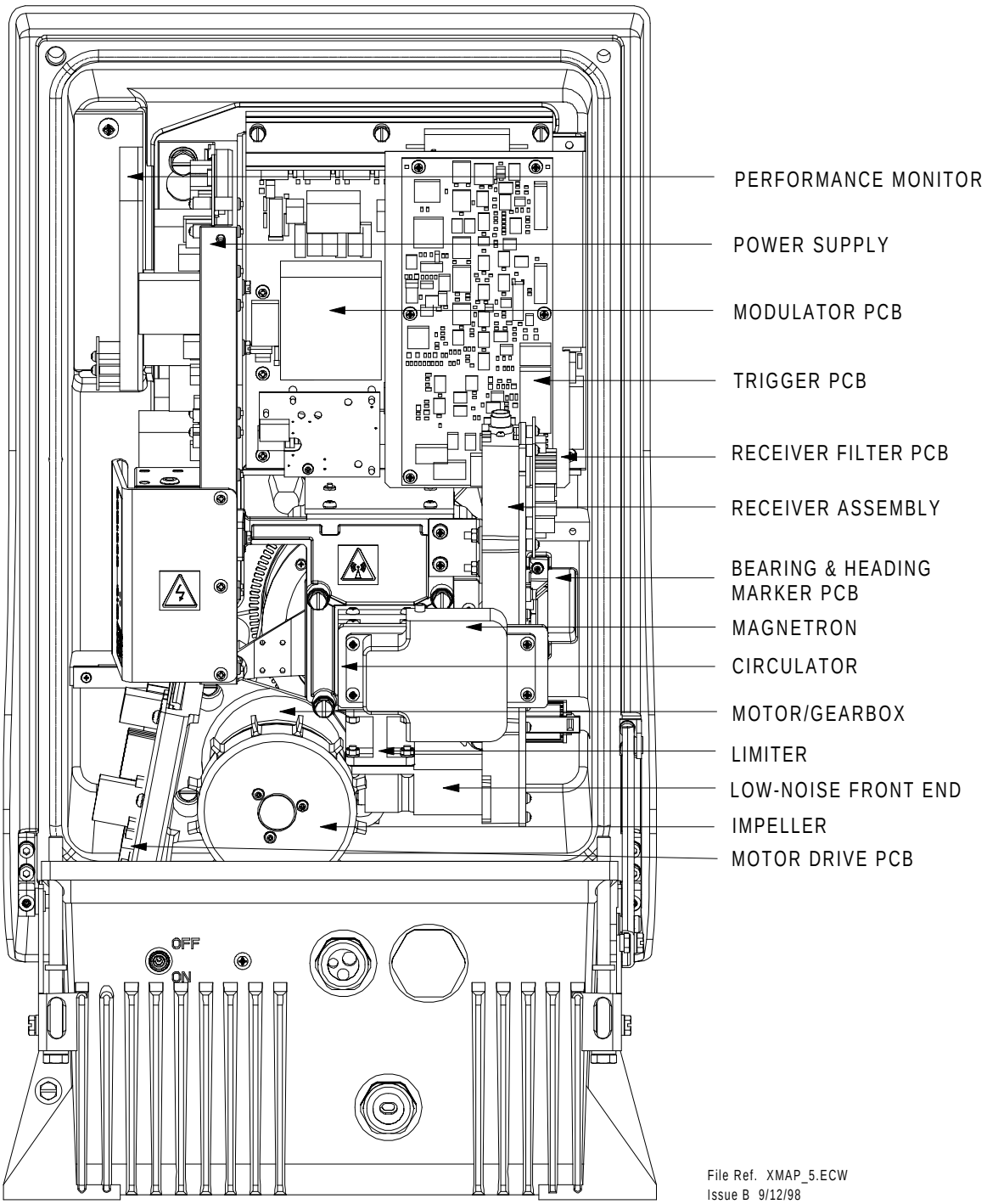


Figure 6.27 X-Band Masthead Turning Unit - View showing Main Assemblies

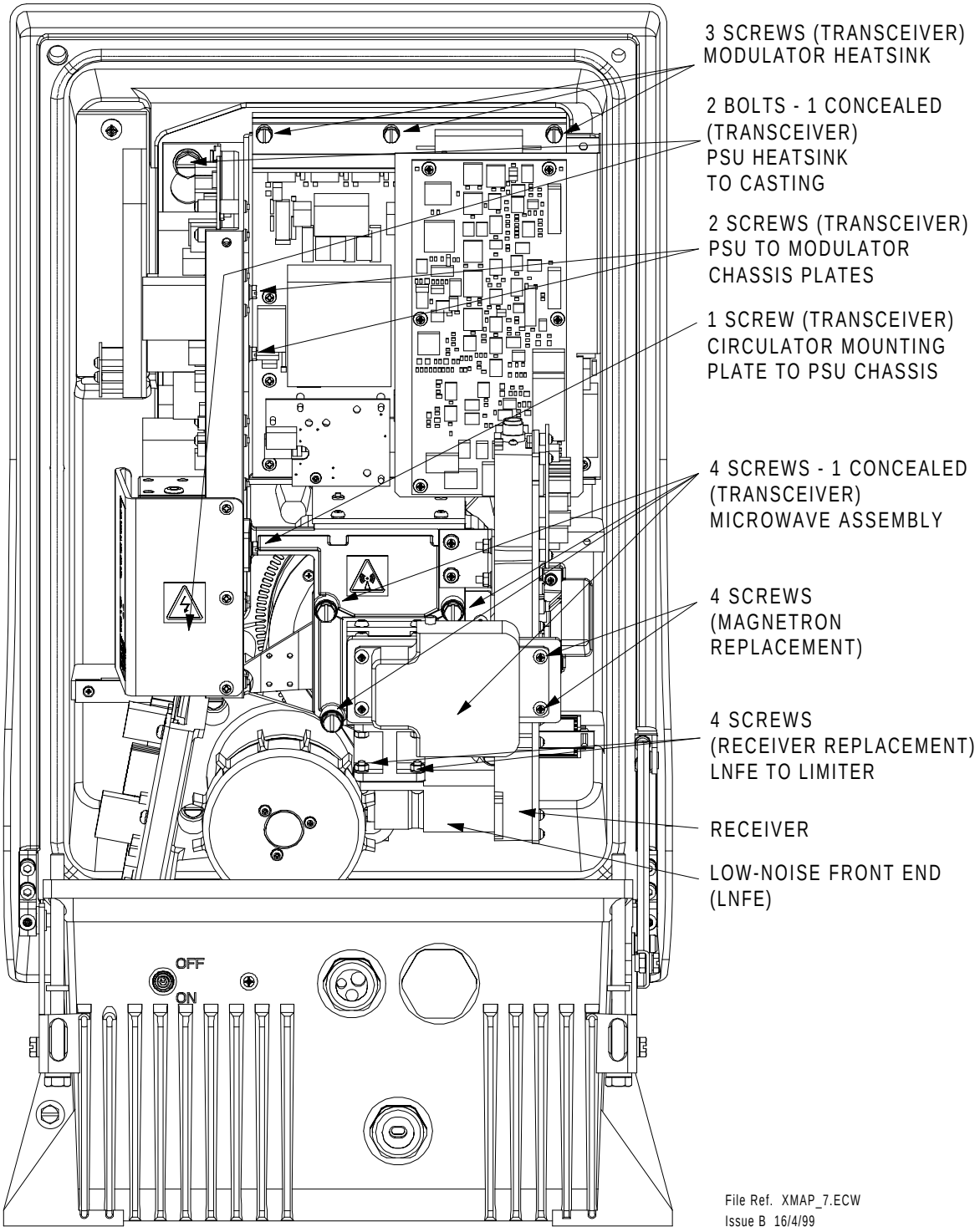


Figure 6.28 X-Band Masthead Turning Unit - Fitment of Main Assemblies

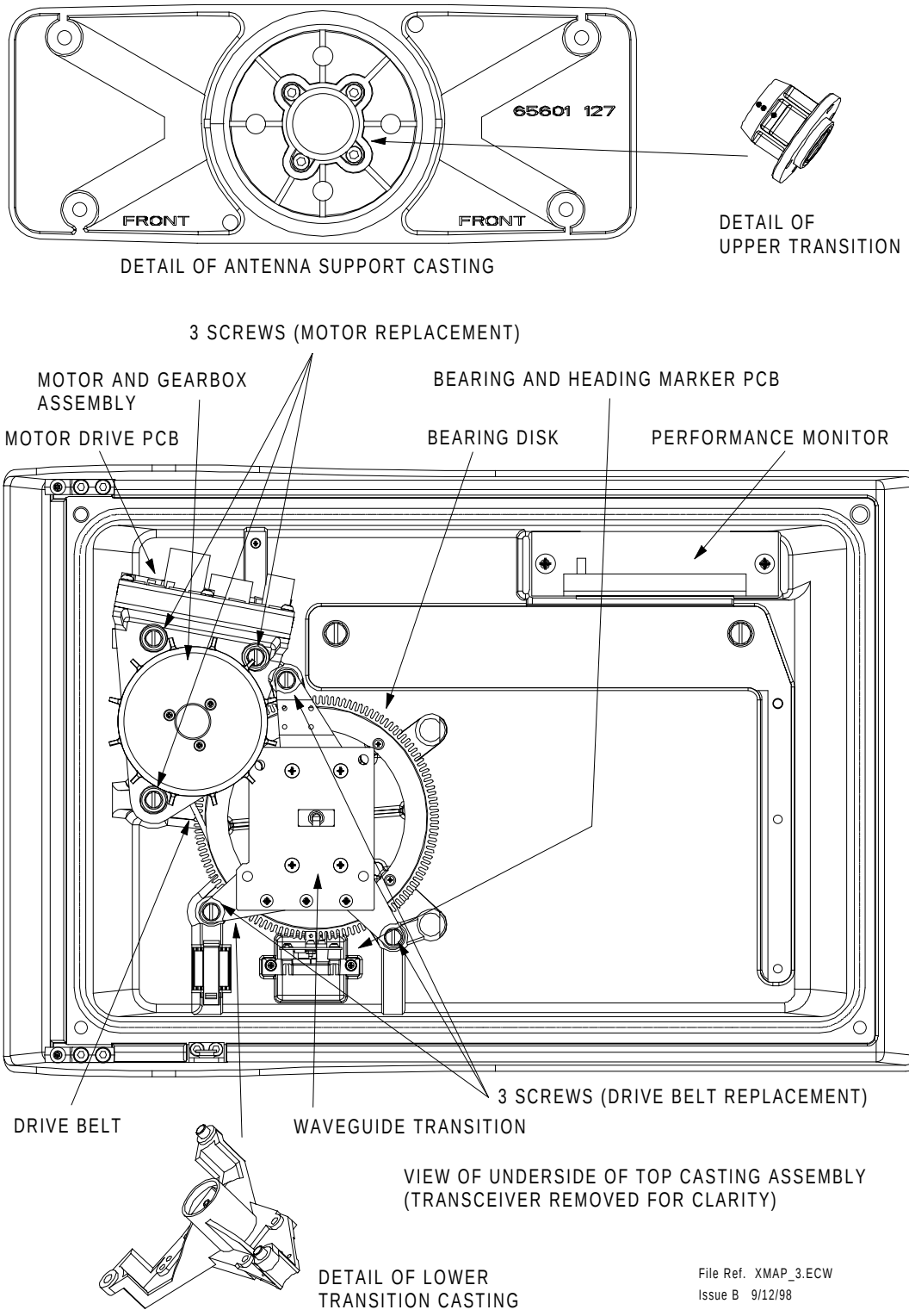


Figure 6.29 X-Band Masthead Turning Unit - View inside upper casting with Transceiver removed

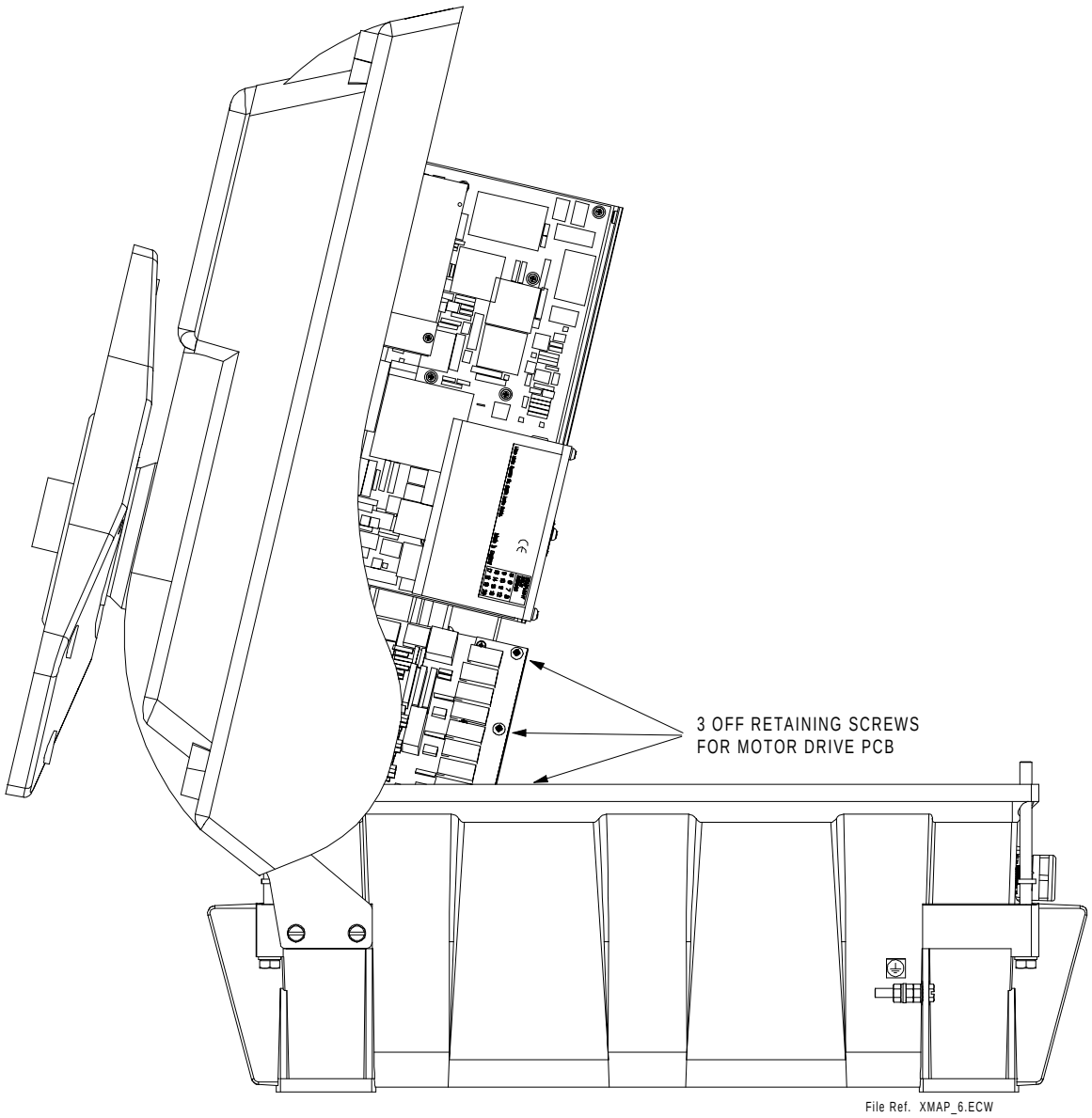


Figure 6.30 X-Band Masthead Turning Unit - Side view showing Motor Drive Board retaining screws

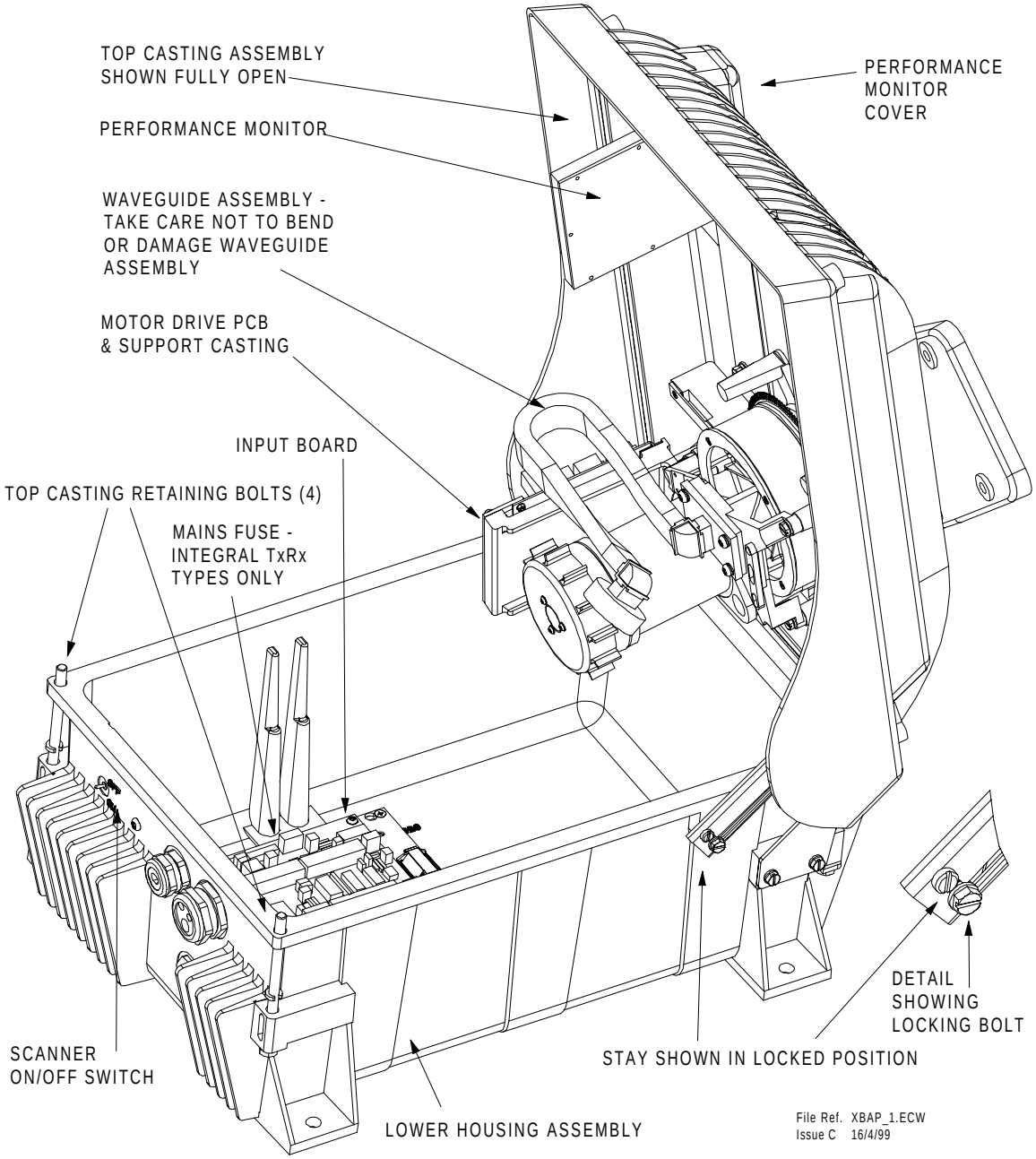


Figure 6.31 X-Band Bulkhead Turning Unit - View showing Main Assemblies

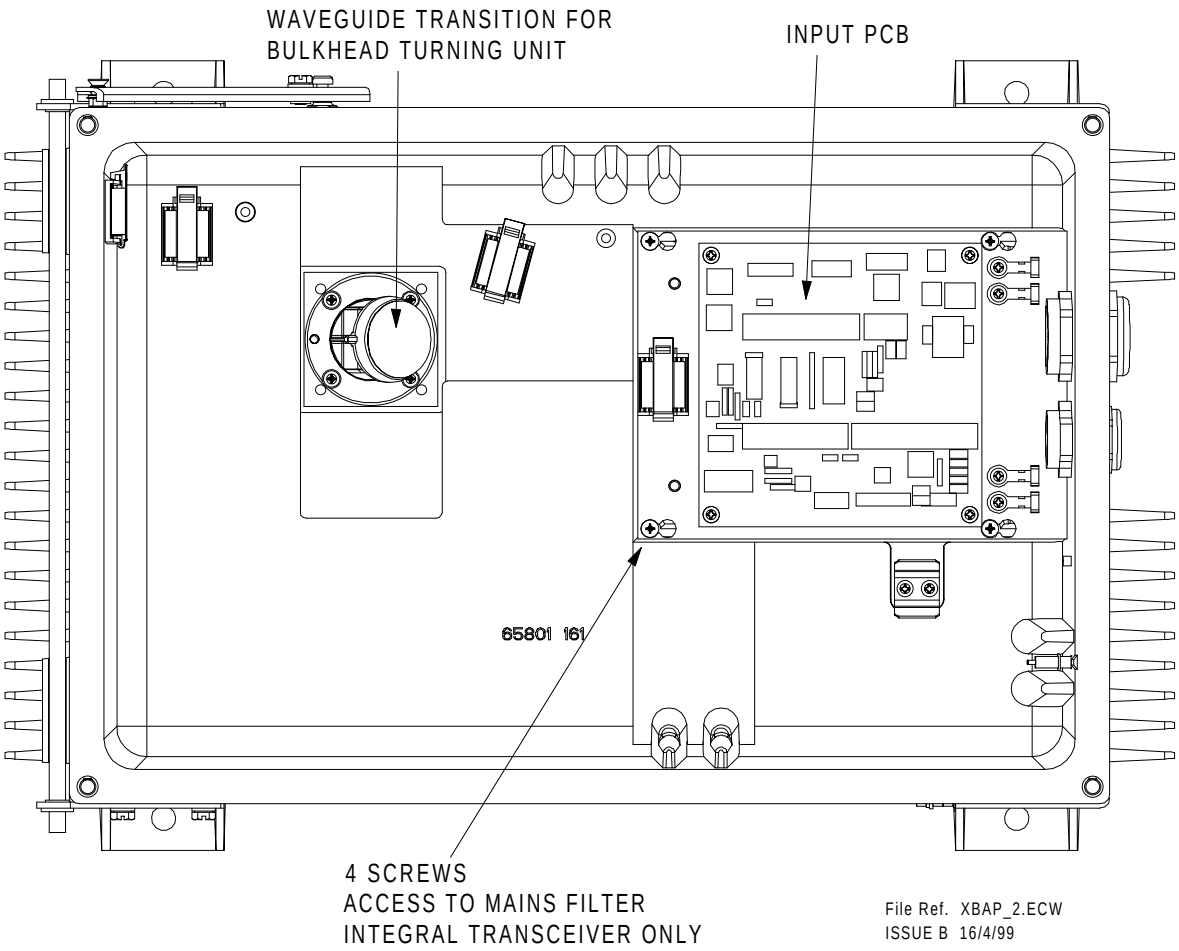
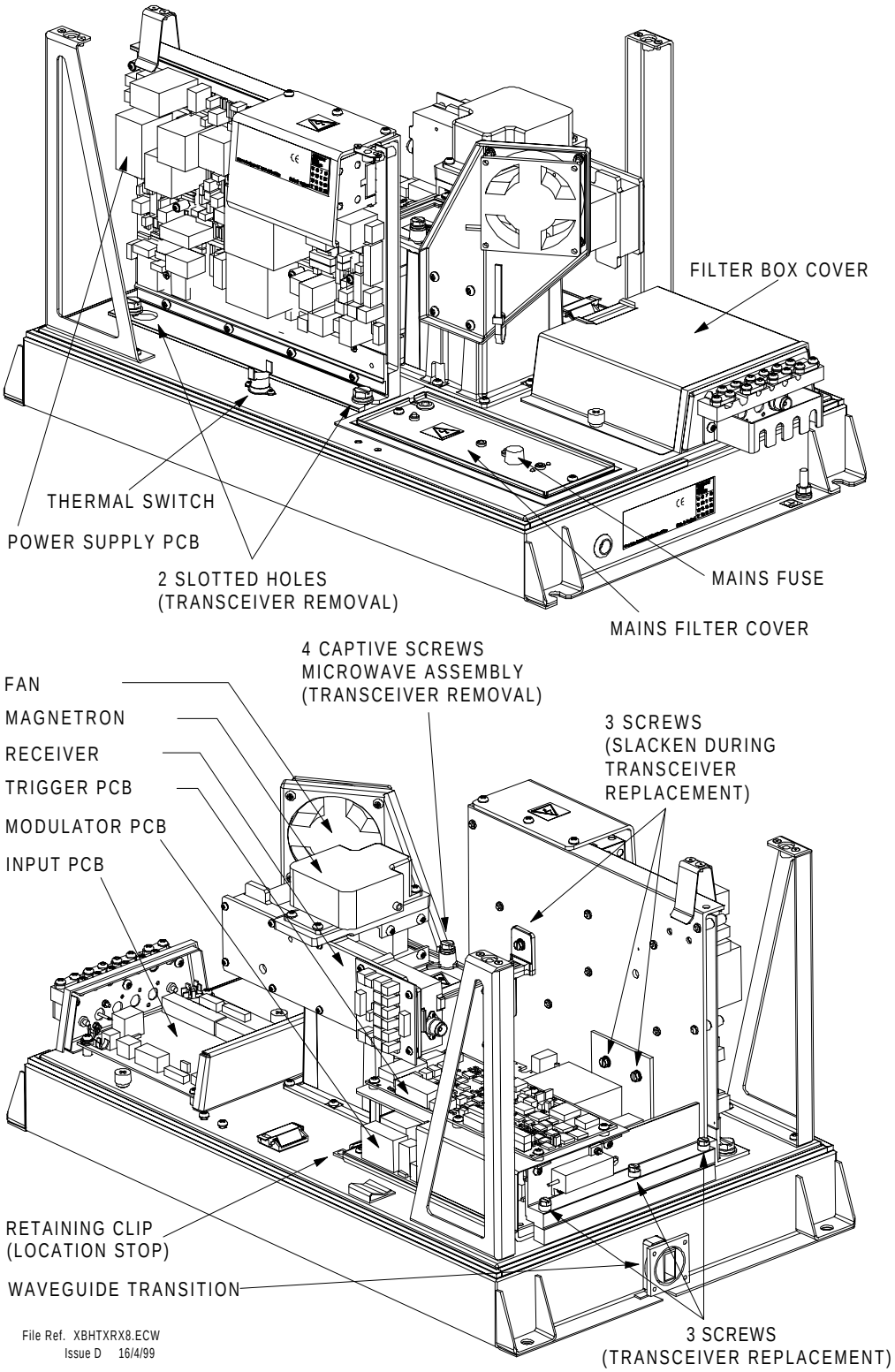


Figure 6.32 X-Band Bulkhead Turning Unit - View showing assemblies fitted to lower casting.



VIEW OF BULKHEAD TRANSCEIVER WITH COVER REMOVED

Figure 6.33 Bulkhead Transceiver - View with Cover Removed

1

On the Trigger PCB set:
LK5, and LK6 to 2 - 3.
This is the service position,
and will allow the transmitter
to transmit when the antenna
is stationary.

2

Restore the ship's supply
to the Transceiver.
Switch on at the Display
and wait 3 minutes for timer.
Select Long Pulse, Transmit
at the Display.

3

On the Modulator PCB measure
the voltage between TP100 and
ground.
Note:
A DVM with an input impedance
greater than 10 Mohms must be
used for this measurement. Use
of a meter with lower impedance
could result in damage to the
magnetron.

4

Adjust RV1 on the Power Supply
PCB to give the same voltage on
TP100 as is recorded on the label
on the pulse transformer on the
Modulator PCB.

6

On completion of the procedure.
Switch off.
Reset LK5 and LK6 on the
Trigger PCB to 1 - 2.

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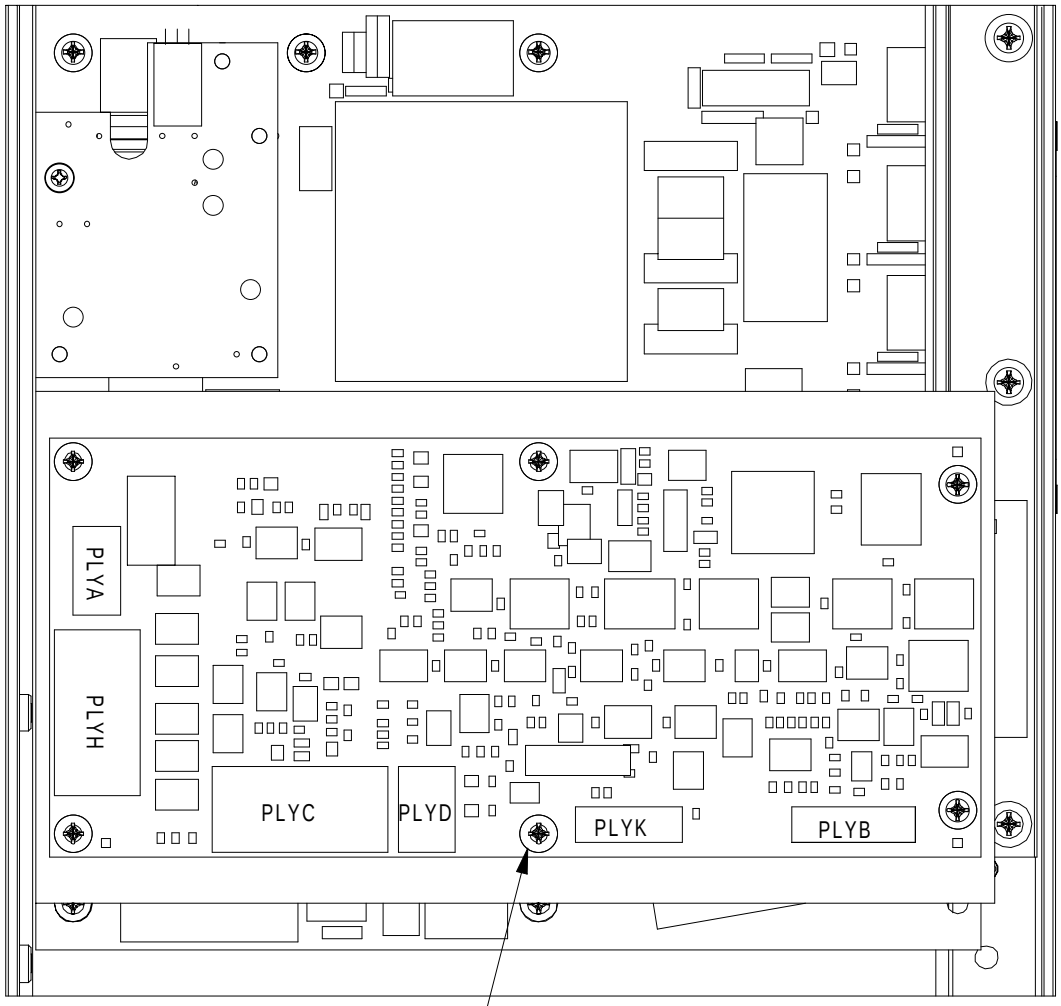
Iss. D 21/01/99

Figure 6.34 Setting Magnetron Current



1
Disconnect: PLYA, PLHY, PLYC, PLYD, PLYB and PLYK if fitted.

2
Remove six M4 screws to remove the Trigger PCB and the screening plate from the pillars on the Modulator PCB.

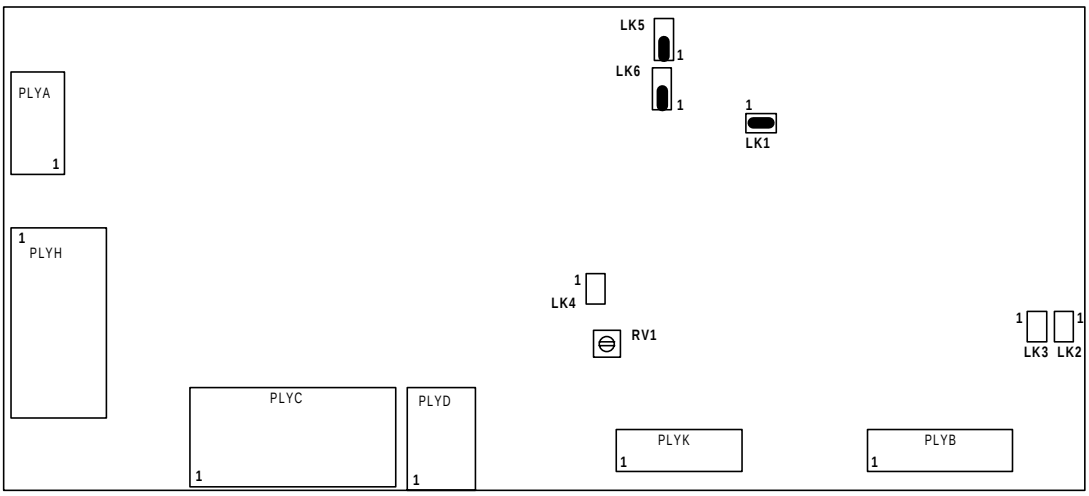
3
Replacement is the reverse of removal.

4
Set links as detailed overleaf.

FILE REF. XMAINT9.ECW
iss. A

REPLACING TRIGGER PCB

Figure 6.35 Replacing Trigger PCB



FILE REF. TRIGGER.ECW
iss. C

ATE TEST LINKS
LK1 FITTED
LK4 NOT FITTED

BAUD RATE LINKS
LK2 NOT FITTED
LK3 NOT FITTED

SERVICE LINKS
LK5 NORMAL OPERATION FITTED 1 - 2
LK6 NORMAL OPERATION FITTED 1 - 2

LK5 SERVICE FITTED 2 - 3
LK6 SERVICE FITTED 2 - 3
WHEN FITTED 2 - 3 THE TRANSMITTER WILL OPERATE WHEN THE ANTENNA IS STOPPED.

RV1 SWEPT GAIN DELAY
FACTORY SET DO NOT ADJUST

Figure 6.36 Link Settings - Trigger PCB

1
To remove the Modulator PCB it is first necessary to remove the Transceiver assembly as detailed previously.

2
Remove Trigger PCB as detailed previously.

3
Disconnect two magnetron leads from TSJ.

4
Unscrew and remove four pillars.

5
Disconnect PLVB, PLVC PLVD.

6
Remove three M5 screws from heatsink.

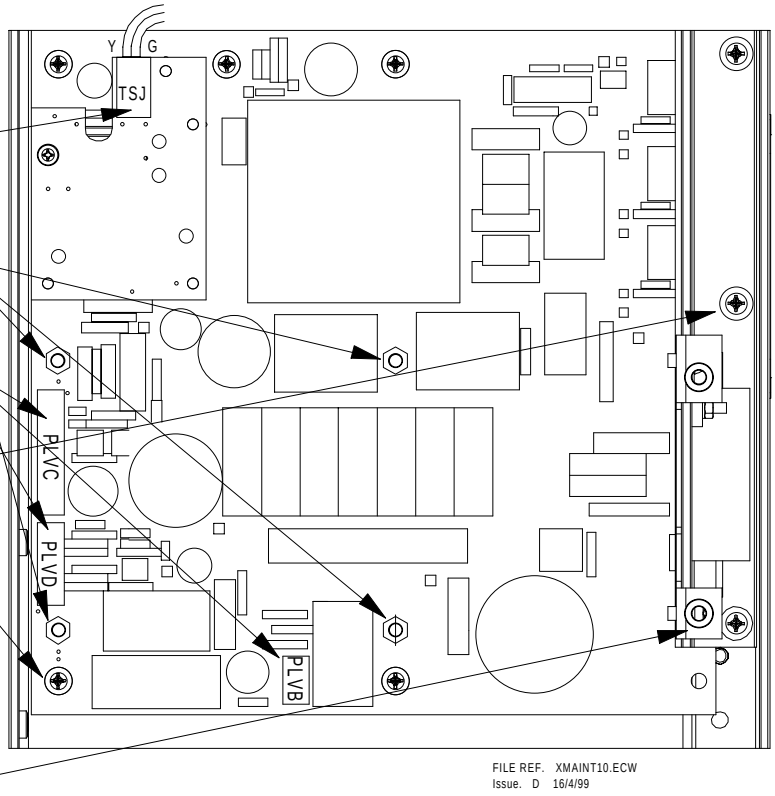
7
Remove five M4 screws securing PCB.

8
Remove three M4 screws underneath securing PCB

9
Remove bracket and transfer to new PCB

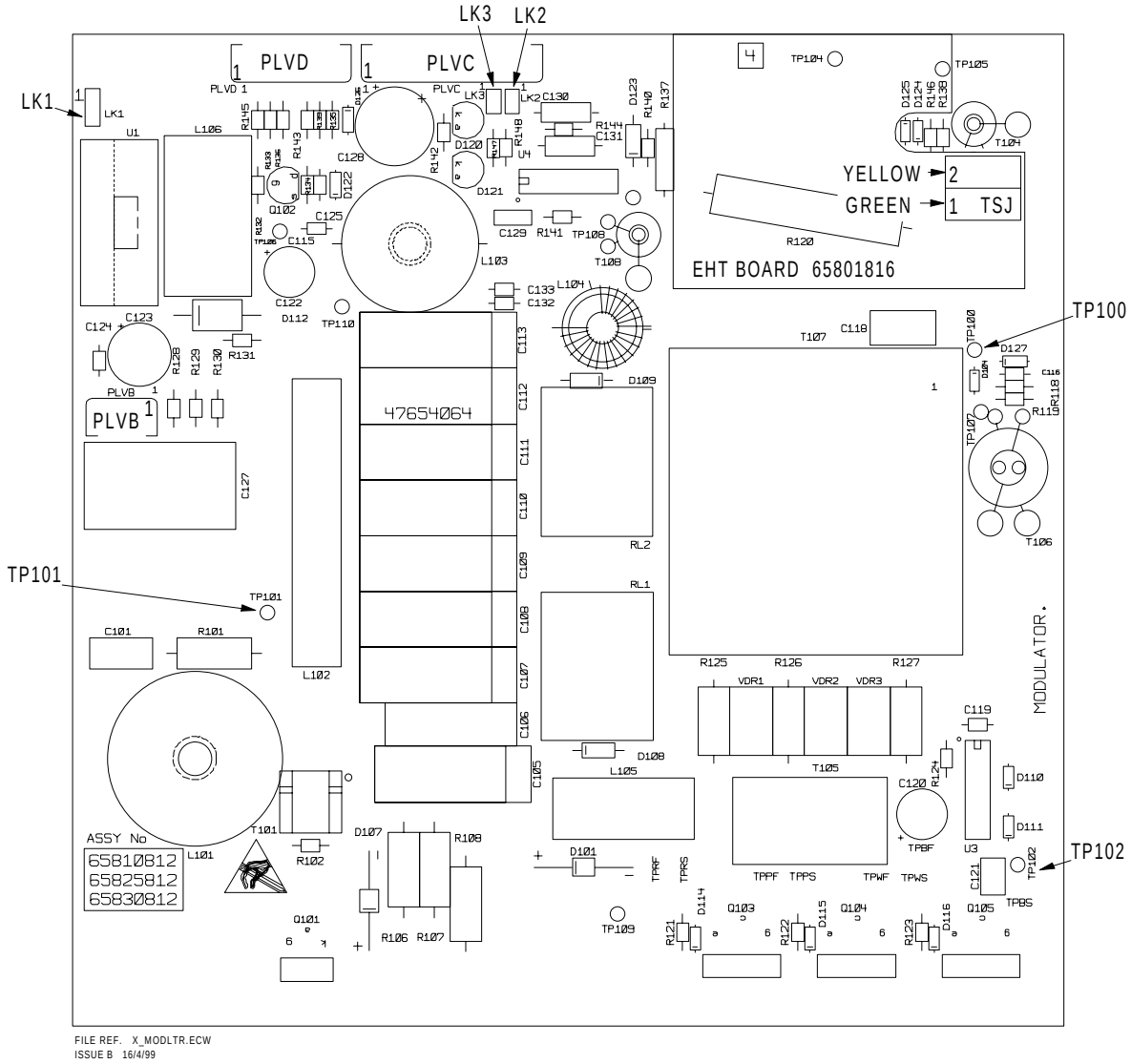
10
Replacement is the reverse of removal. Before replacing the Trigger PCB check the link settings on the Modulator are as detailed in "Link Settings Modulator PCB"

11
After replacing the Modulator PCB it is necessary to set the magnetron current as detailed in "Setting Magnetron Current"



REPLACING MODULATOR PCB

Figure 6.37 Replacing Modulator PCB



MODULATOR LINK SETTINGS FOR 65810812 / 65825812 / 65830812

	S-BAND	10 kW X-BAND	25 kW X-BAND
LK1	FITTED 2 - 3	FITTED 1 - 2	FITTED 1 - 2 FOR MAGNETRON MG5424
LK1			FITTED 2 - 3 FOR MAGNETRON M1458
LK2	FITTED	NOT FITTED	NOT FITTED
LK3	NOT FITTED	FITTED	NOT FITTED

NOTE THAT LINK 1 IS CONFIGURABLE FOR HEATER TURNDOWN ON 25kW X-BAND

NOTE THAT LINKS 2 & 3 ARE HARDWIRED FOR SPECIFIC USEAGE ON LATER MODULATORS.

TEST POINTS:

TP100 MAGNETRON CURRENT MONITOR

TP101 CHARGE TRIGGER

TP102 MODULATOR TRIGGER

Figure 6.38 Link Settings - Modulator PCB

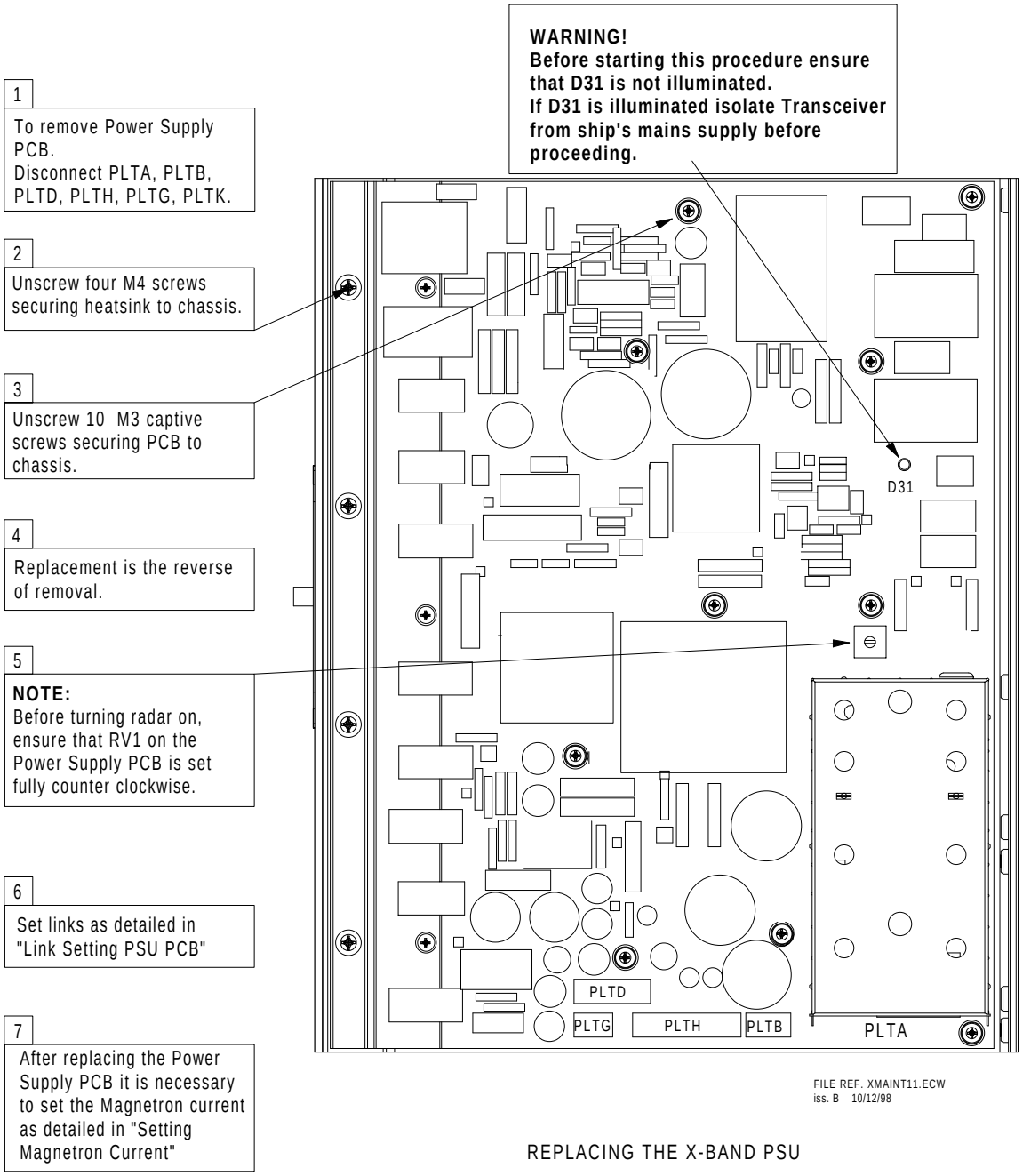
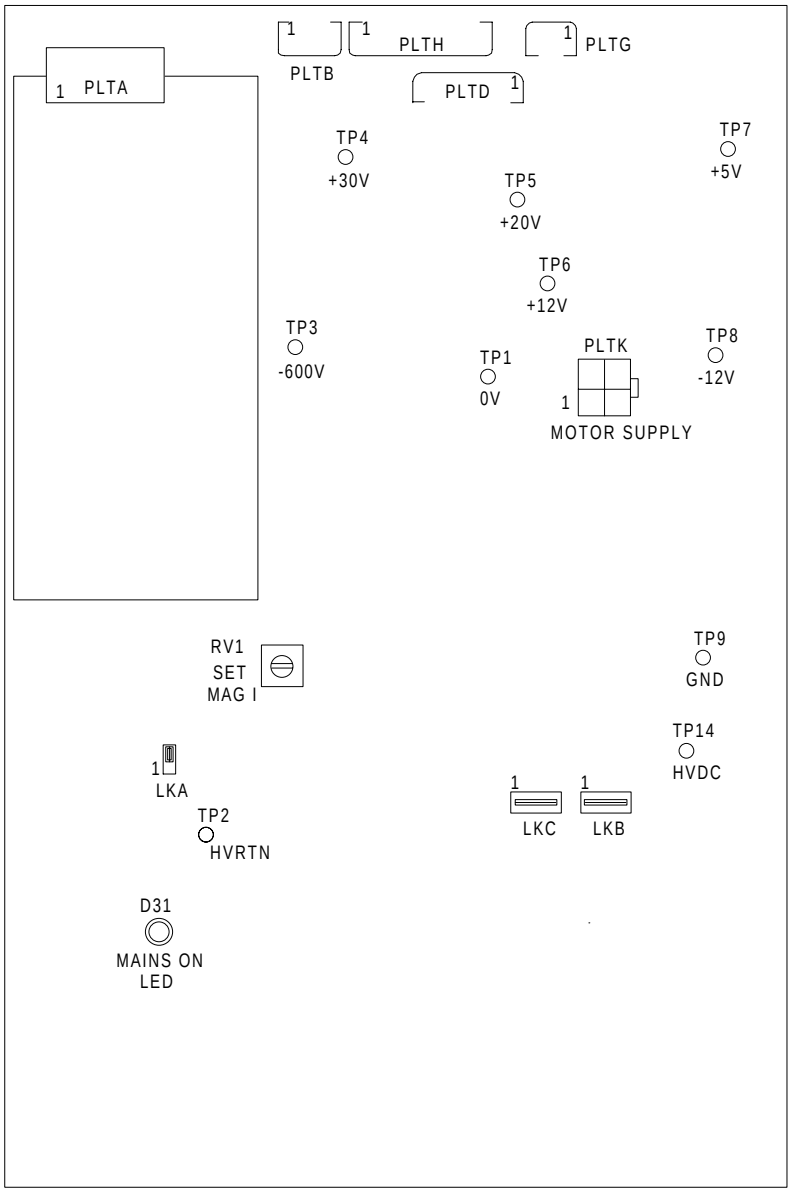


Figure 6.39 Replacing PSU PCB



"LKA" START TEST LINK
LKA NORMAL OPERATION FITTED 2 - 3
LKA TEST FITTED 1 - 2
WHEN IN THE TEST POSITION THIS LINK ALLOWS THE POWER SUPPLY TO OPERATE WITHOUT BEING CONNECTED TO THE CONTROL SIGNALS FROM THE DISPLAY UNIT.

HIGH VOLTAGE ISOLATION LINK
LKB NORMAL OPERATION FITTED
LKB ISOLATE HV OPERATION NOT FITTED
THIS LINK CAN BE USED TO ISOLATE THE POWER FACTOR CORRECTION CIRCUIT FROM THE REST OF THE POWER SUPPLY AS AN AID TO FAULT FINDING

LKC - MOTOR SUPPLY ISOLATION LINK
NORMALLY FITTED

TEST POINTS
TP1 0V
TP3 -600V
TP4 +30V
TP5 +20V
TP6 +12V
TP7 +5V
TP8 -12V
THE ABOVE VOLTAGES ARE MEASURED WITH RESPECT TO TP1

TP2 HVRTN
TP14 HVDC (380V)
THE VOLTAGE ON TP14 IS MEASURED WITH RESPECT TO TP2.

FILE REF XPSU.ECW
ISS. B 4/12/98

LINK SETTING AC X-BAND POWER SUPPLY PCB 65825816

Figure 6.40 Link Settings - PSU PCB