

Removal and Replacement Procedures

Introduction

This section provides detailed information on the removal and replacement of components, but it is not necessary to do this for most service tasks. You should only disassemble the monitor as far as you need to replace an item.

In order to help with the descriptions, the monitor is divided into three sections. These are:

1. The Rear Assembly:
 - Power Supply
 - Boards
 - Backplane
 - Batteries
2. The Recorder Assembly
3. The Front Assembly:
 - Front Cover
 - Frontend Board
 - Loudspeaker
 - Digital Interface Board
 - Display Board
 - Function Switches
 - Recorder Keys
 - LCD Display Board
 - Tilt Mechanism
 - Display Assembly

As no components on the boards are replaceable, the removal procedures will only go down as far as removal and replacement of the boards themselves.

Test/Inspection and Safety Procedures

It is very important to perform the test, inspection and safety tests detailed in Chapter 9, “Safety, Maintenance, and Calibration,” whenever you connect a monitor to an OB system, or have worked on individual monitor components.

Tools

The following tools are needed to dismantle the monitor:

- pozidrive screwdriver size 1
- safety test equipment
- PC for configuration
- Configuration software “pegserv.exe”
- Cable to link PC to fetal monitor

Removing the Top Cover

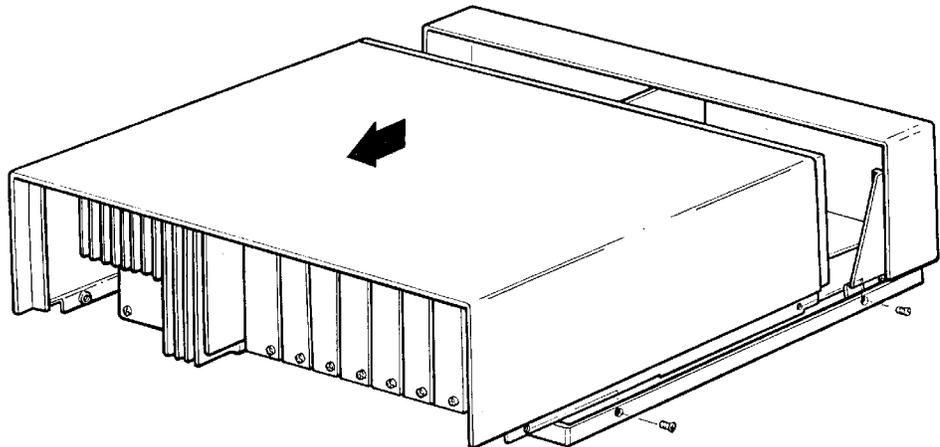
Warning

Electrical power is dangerous. Prior to attempting to remove any component from the system the power to the system must be disconnected.

Access to most of the items within the monitor is only possible with the top cover of the monitor removed.

To remove the top cover:

1. Turn the system off and disconnect the power cable.
2. Undo the four screws situated on the sides of the monitor.
3. Slide the cover towards the rear of the monitor and lift it off.



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Figure 11-1 Removing the Top Cover

Replacement of the cover is a reversal of the above procedure.

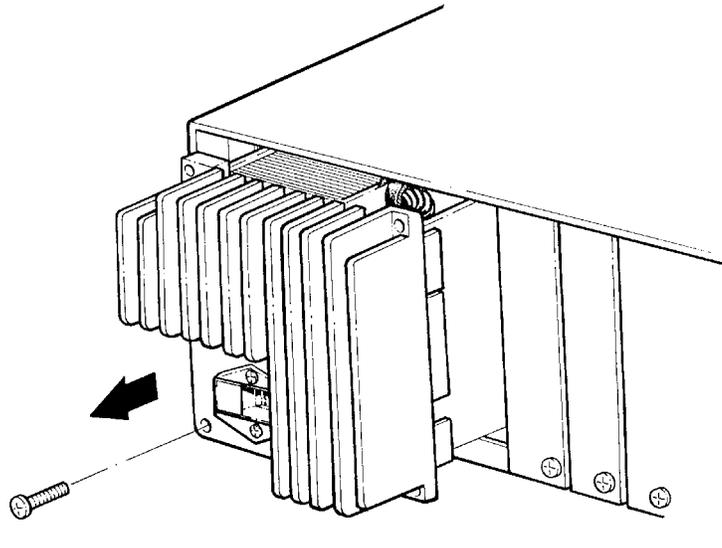
Note

The boards and power supply can be removed from the rear of the monitor without removing the top cover. If you do remove the top cover, take care when you slide it back that the RFI spring does not fall into the Fetal Monitor. This could damage the components.

Rear Assembly

Removing the Power Supply Assembly

1. Turn the system off and disconnect the power cable.
2. Remove the top cover (see page 167).
3. Remove the ON/OFF button by pulling it forwards. You hear a click as the end of the buttons's extension arm comes forward one notch from the switch unit located in the power supply. Release the end of the extension arm with the aid of a flat-bladed screwdriver. Turn the button/arm 90 degrees counter-clockwise, then pull it straight out.
4. Undo the four screws from the rear of the power supply assembly.
5. Pull the power supply assembly out of the rear of the monitor.

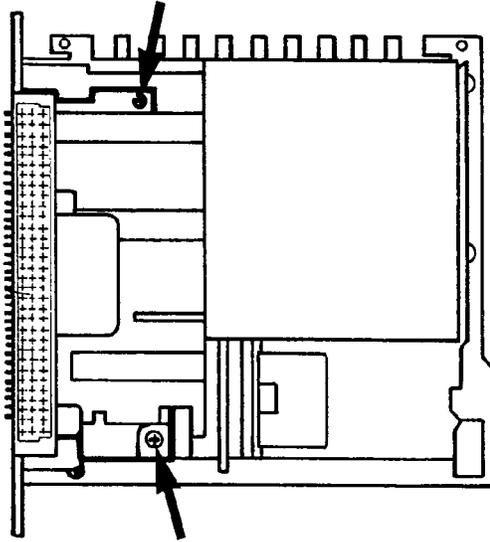


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Figure 11-2 Removing the Power Supply Assembly

6. If you are exchanging the power supply assembly, remove the power supply board for later refitting to the new power supply assembly.

Removing the Power Supply Board

1. Remove the power supply assembly as described on page 168.
2. Turn the power supply over and remove the two screws holding the board in place.



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3. Remove the power supply board.

Figure 11-3 Removing the Power Supply Board

Replacing the Power Supply Board

Replacement of the Power Supply board is a reversal of the above procedure.

Replacing the Power Supply Assembly

1. If you are exchanging the power supply assembly, first fit the power supply board to the new power supply.
2. Replacement of the power supply assembly is the reversal of the removal procedure (see “Removing the Power Supply Assembly” on page 168).

Note— **DO NOT force the power supply assembly into the rear of the monitor. If it will not locate, remove and check that the pins connecting the supply to the Backplane are not bent. Reinsert the power supply assembly.**

3. Replacement of the ON/OFF button is a reversal of the removal procedure (see step 4 on page 168). You should hear two clicks as the end of the button’s extension arm locates on the notches on the switch unit in the power supply.
4. Perform the Instrument Safety Test (see page 120) after you have worked on the power supply.

Fuses

1. Remove the power supply board as previously described.
2. The location of the fuses is shown below.

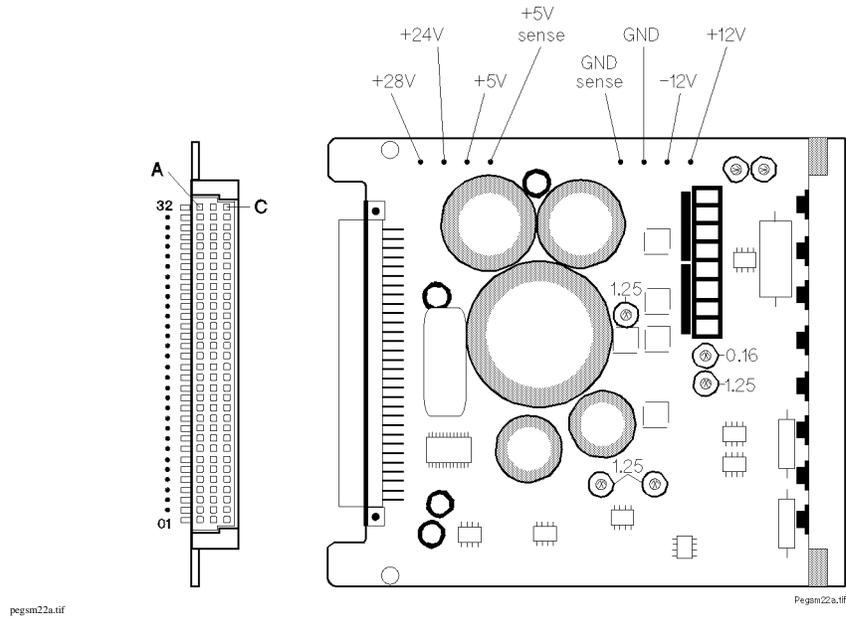


Figure 11-4 Output Voltage from Power Supply Board

3. To remove the fuses, pull them out.

Table 11-1 Fuses

Philips part number	Description	Qty
2110-0830	bipin fuse 1.25A	4
2110-0833	bipin fuse 0.16A	1

Boards

To remove a board from the monitor:

1. Turn the system off and disconnect the power cable.
2. Undo screws 1 at the top and bottom of the board you want to remove.
3. Move lever 2 upwards of the monitor.

NIPB and SpO₂ Boards Only

Slide the board out for a few centimeters, until you can easily disconnect the NIPB tubing, or SpO₂ cable.

Detach the connection.

4. Remove the board from the monitor.

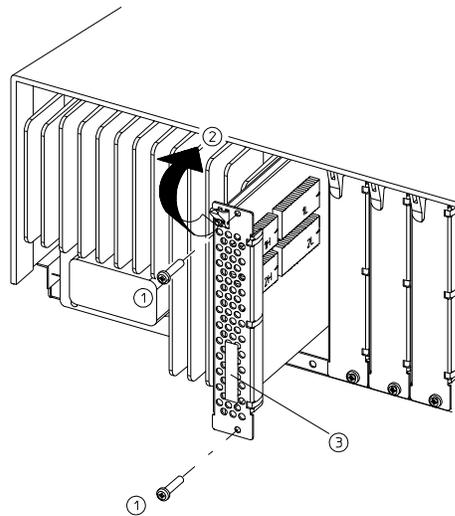


Figure 11-5 Replacing a Board

To replace a board:

1. Push the board into the appropriate slot inside the rear of the monitor. You cannot insert the board in the wrong compartment.
2. Replace the screws and tighten securely.

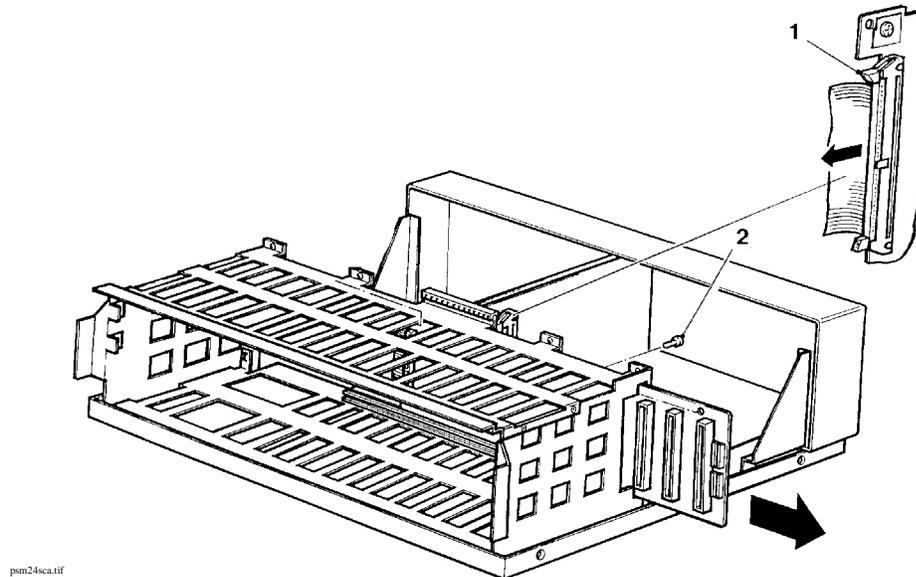
If the CPU board has been replaced, you must write the serial number (3) and feature settings of the monitor to the EPROMS on this board and reload the functionality with the PC software. (See Chapter 3, “Configuring the Monitor” for details.) **The serial number and feature setting can only be written once.**

When you replace either the SpO₂ or the NIBP boards, you must disconnect the SpO₂ cable, or NIBP tubing as appropriate before completely removing the boards.

Perform the Instrument Safety Test as described in page 120 after you have worked on the maternal SpO₂ board.

Backplane

To remove the Backplane proceed as follows:



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Figure 11-6 Removing the Backplane

1. Turn the system off and disconnect the power cable.
2. Remove the Monitor Top Cover.
3. Remove all boards from the rear of the monitor.
4. Remove the system power supply.
5. Disconnect the system bus connector 1 from the Digital Interface board.
6. Remove the three screws 2 connecting the Backplane to the monitor chassis.
7. Gently pull the Backplane out of the side of the monitor.

Replacement is a reversal of the above procedure.

Batteries

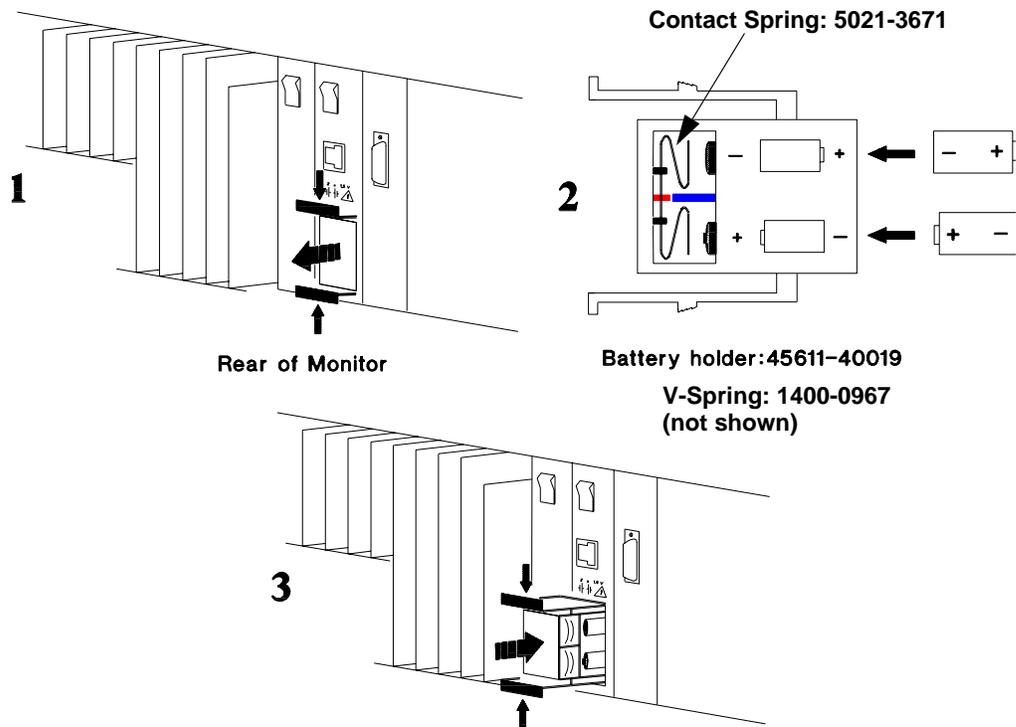
The monitor's clock is powered by two batteries located in the rear panel of the monitor. The average life span of these batteries is one year. When the battery charge is low, the message **EFF BATT** is displayed, and  is printed on the recorder trace. When this happens, the batteries should be changed as soon as possible.

If the batteries are not changed, the specific settings will return to their default values and will have to be reset each time the monitor is switched on. (For example, the date is set to 4.4.44)

Replace the batteries with two alkaline 1.5 Volt size N batteries (recommended type: MN9100).

To replace the batteries:

1. Switch off the monitor. If you don't,  will continue to be printed on the recorder trace.



pegs74b.hpg

Figure 11-7 Replacing the Batteries

2. Replace the batteries (see Figure 11-7).
3. Switch on the monitor.
4. Reset the time and date (see "Chapter 4. Getting Started (Basic Considerations and Operation)" on page 39). If you don't, the wrong time and date will be printed on the recorder trace.

Recorder Assembly

To remove the Recorder Assembly proceed as follows:

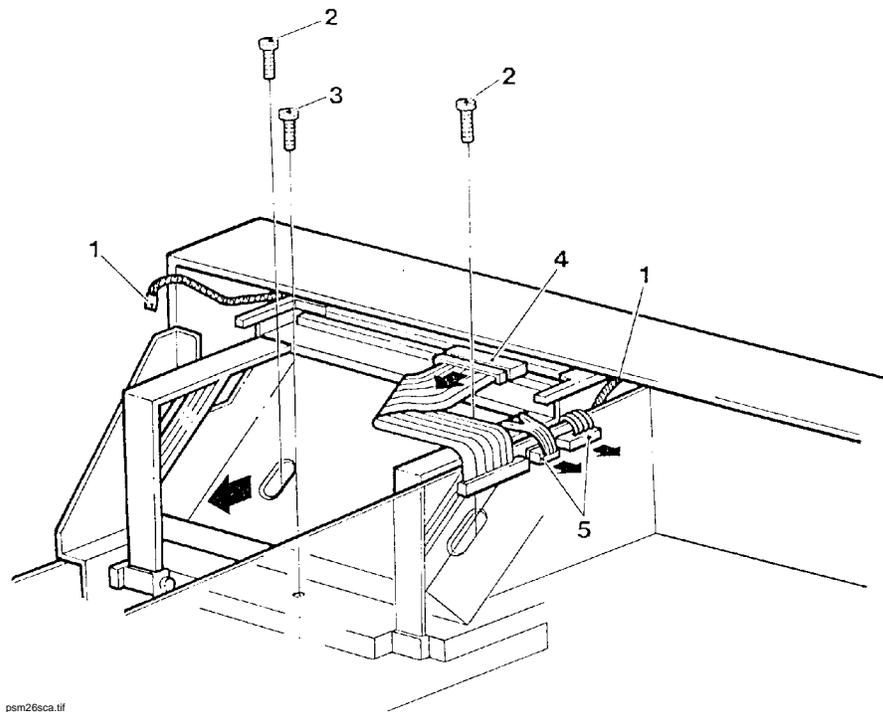
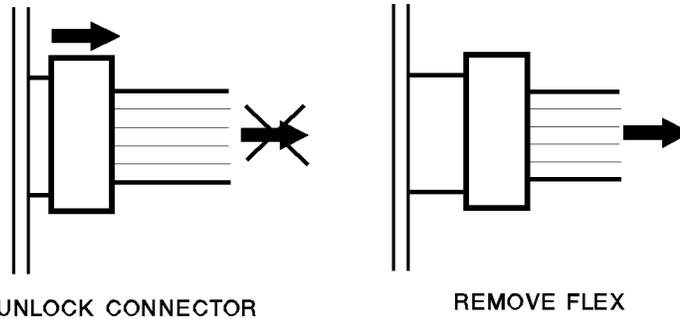


Figure 11-8 Removing the Recorder Assembly

1. Turn the system off and disconnect the power cable.
2. Remove the recorder paper.
3. Remove the monitor top cover.
4. Disconnect the two earth straps **1** from the front assembly.
5. Loosen screws **2** and **3**. Screws **2** are accessible via holes in the paper tray.
6. Disconnect the cables **4** and **5** between the Digital Interface board and the recorder. Remove screw **3**.

7. Unlock the flex layer by pulling it slightly forward.



8. Lift the recorder assembly out of the monitor casing
9. Place it in the new base assembly, reversing the above procedure. Take care that the paper eject lever fits back into the paper eject knob.

Note

Take care not to lose the small O-rings when you have removed screws 2 and 3.

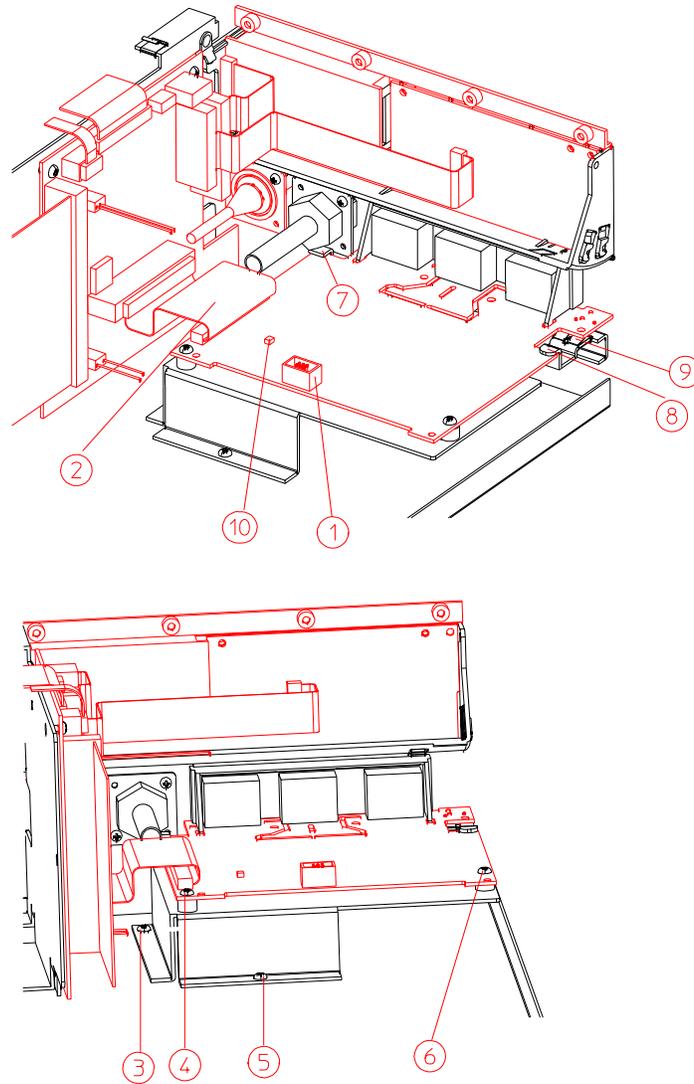
Replacing the Recorder Assembly is a reversal of the above procedure.

Caution

The use of recorder paper that is not approved by Philips can damage the monitor. This type of damage will not be covered by warranty.

Frontend Board

To remove the Frontend board proceed as follows:



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Figure 11-9 Removing the Frontend Board

1. Turn the system off, disconnect the power cable and all transducers.
2. Remove the monitor top cover.

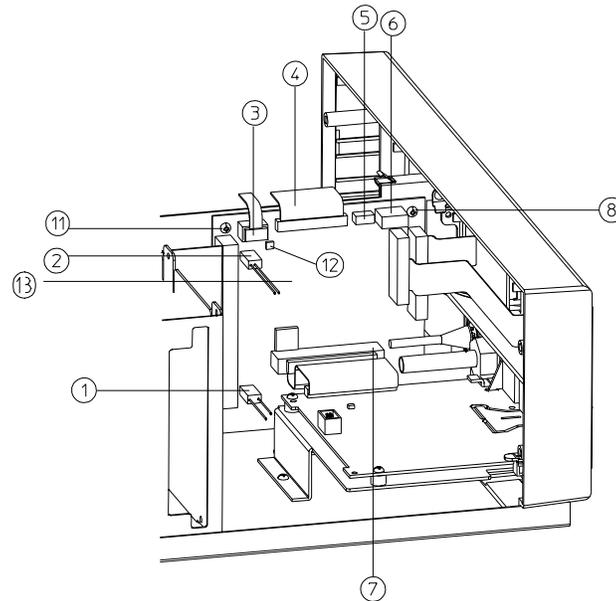
3. Disconnect the switch board cable (1).
4. Disconnect the cable (2) from the connector on the DIF board.
5. Remove screws (3) and (5) and release the clips on either side of the transducer connectors.
6. Remove the Frontend board, with its metal holder, from the monitor.
7. Slide the Frontend board carefully to the rear of the monitor and lift it up out of the unit.
8. Remove screws (4) and (6) to remove the Frontend board from the metal part.

Replacement of Frontend Board

To replace the Frontend board, reverse the above procedure. Ensure that you position the board under the two metal holders (7) and (8) and the ground clips (9) are still in place. Now fix the board to the metal holder with screws (4) and (6). Put the assembly back into the unit and slide the complete assembly towards the front to click the connectors back into their clips. Ensure that all connectors are fully inserted (check this from the front) before you fix the board back in place using the two screws (3) and (5).

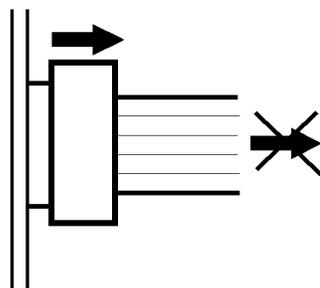
Perform the Instrument Safety Check (see page 120) after working on the Frontend board.

Digital Interface Board

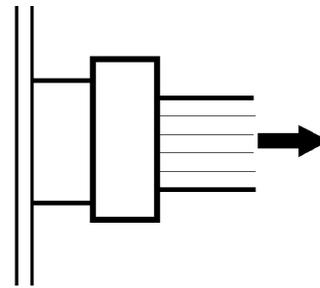


difboard.hpg

1. If this is not already done, turn the system off. Disconnect the power cable and all transducers and remove the monitor top cover.
2. Disconnect all the cables:
 - loudspeaker cable (1)
 - power LED connector (2)
 - recorder switch board connector (3)
 - recorder sensing board connector (5). Unlock the flex layer connector by pulling it slightly forwards



UNLOCK CONNECTOR



REMOVE FLEX

- recorder stepper motor (6)
- frontend board connector (7)
- backplane flat cable (13).

3. Disconnect the recorder print head (4) from the recorder assembly.
4. Remove the two screws (8) and (11) that hold the board in place.
5. Slide the digital interface (DIF) board towards the rear of the monitor before lifting the board up, to give the marker connector a “chance”.
6. Remove the label from the front end connector area. Score carefully around the connectors in the area with a flat bladed knife. Do not allow any adhesive to remain on the front panel.

Item 12 shows the error LED, which is red until the monitor successfully passes its self test.

Replacement is a reversal of the above procedure.

Display Assembly

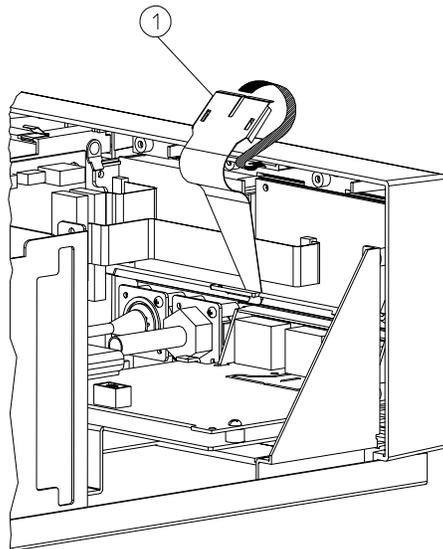
To remove the display assembly you must first remove the frontend board, and then the digital interface board.

Removing and Replacing the Maternal Display Panel

Monitors with serial numbers greater than 3545G01115 have a factory fitted-clip that secures the tiltable maternal display panel. Monitors with numbers below have no factory-fitted securing device. However, it is possible that a “spring and spacer” arrangement may have been fitted by a Customer Engineer.

Before removing the display assembly, you must first remove the clip or spring and spacer.

Removing the Clip

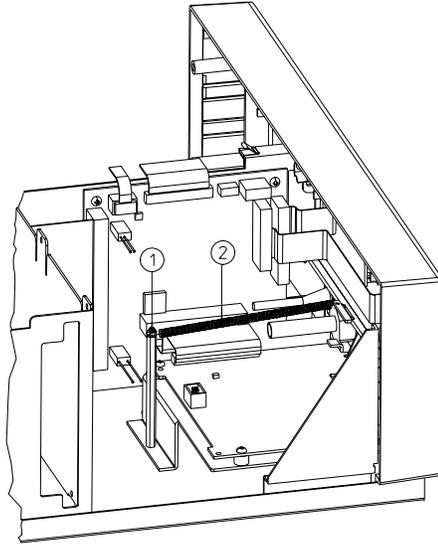


clip.jpg

1. Gently slide the top of the clip from the slot located at the top and middle of the display panel (1). Take care not to bend the clip so far that it does not spring back to its original shape.
2. Remove the smaller end of the clip from the slot in the protruding tab on the edge of the display assembly.

Reverse this procedure to replace the clip.

Removing the Spring and Spacer



spring1.jpg

1. Make sure that the display panel is shut.
 2. Unscrew the spacer (1) from the frontend board as shown in the diagram.
 3. Remove the end of the spring from the small hole on the protruding tab of the edge of the display assembly.
 4. Move the other end of the spring from the groove in the spacer.
- Reverse this procedure to replace the spring and spacer.

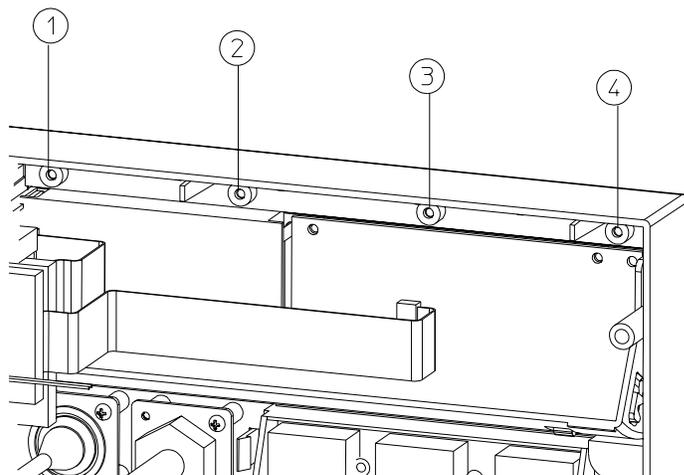


Figure 11-10 Removing the Display Assembly

To remove the complete display assembly with the tilt mechanism:

1. If you have not done this already, turn the system off, disconnect the power cable and all transducers.
2. Remove the monitor top cover.
3. Remove screws (1), (2), (3) and (4).
4. Disconnect the cables from their connections on the DIF board.
5. Slide the entire display assembly a small way through the front panel.
6. Remove the ground cable and then remove the assembly completely.

Replacement is a reversal of the above procedure. Insert all four screws to center the (closed) display assembly before you tighten the screws.

Caution

Ensure that you use the correct screws. Exert a minimum of pressure when tightening the screws. Excess force can damage the display assembly.

Exchanging the Display Assembly Housing

1. Remove the maternal display panel as described under “Removing and Replacing the Maternal Display Panel” on page 180.

There are two versions of the display housing: one with an LCD display, and one without.

2. a. If your display assembly contains an LCD display, first remove this. Remove the two screws on the right side of the rear of the LCD display assembly using a Phillips Screwdriver size 0 (Zero) and take out the LCD display. **DO NOT TOUCH THE LCD DISPLAY SCREEN.**
Take out the LCD window glass and try to avoid fingerprints or dust/dirt on it.
- b. If your display assembly has no LCD display, it contains a plastic blanking cover. Remove this for later reuse.
3. Remove the earth strap by removing the screw and nut. Ensure that you retain the fixings, including the washer, for later reassembly.
4. Remove the remaining screws from the frontend display/switch board.
5. Lift the edge of the display/switch board, pull the board forward, at the same time making sure to free the switches from the housing, and remove the board.
6. Take the new plastic display assembly and fit the LCD display board or blanking cover, as appropriate, to the display assembly, following the reverse of the above procedure. (Note: You may need to apply mild force when re-seating the switches.)
7. a. If your display assembly contains an LCD display, make sure the matt side of the display window faces outside. Try to avoid any fingerprints and dust on the LCD window glass and LCD display.
- b. If your display assembly has no LCD display, refit the plastic blanking cover.
8. Use the Overlay Label Kit and stick the labels on the new display assembly.
9. Fit the new display assembly to the monitor front panel as described above (see “Removing and Replacing the Maternal Display Panel” on page 180).

SpO₂ Cable and NIBP Connector Tubing

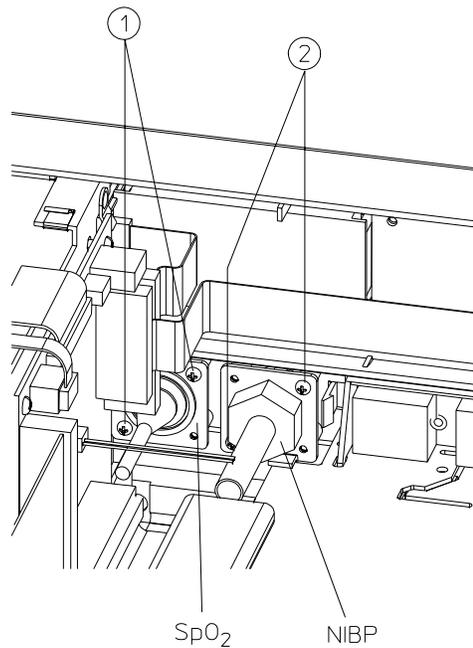


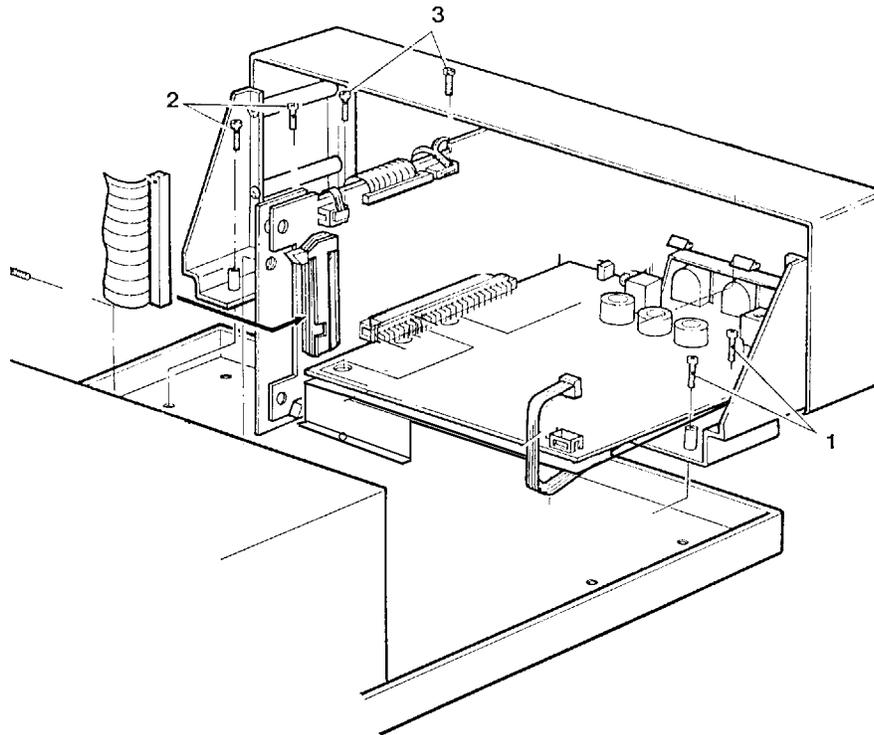
Figure 11-11 Removing the SpO₂ Cable and NIBP Connector Tubing

1. Turn the system off, disconnect the power cable and all transducers.
2. Remove the monitor top cover.
3. Remove screws (1) and (2) from the SpO₂ and/or NIBP connector.
4. Slide the NIBP board and/or SpO₂ board slightly out of the unit. Do not remove them completely.
5. Disconnect the NIBP tubing and/or SpO₂ cable from the boards.
6. Release the cable and tubing from where it is fixed to the metal chassis.

Replacement is a reversal of the above procedure.

Perform the Instrument Safety Test (see page 120) after working on the maternal SpO₂ board.

Front Panel Assembly



remfesca.tif

Figure 11-12 Removing the Front Panel Assembly

1. Turn the system off, disconnect the power cable and all transducers.
 2. Remove the Monitor top cover.
 3. Remove the Recorder Assembly as described in “Recorder Assembly” on page 174.
 4. Remove the FE board as described in “Frontend Board” on page 176.
 5. Remove the DIF board as described in “Digital Interface Board” on page 178.
 6. Remove the power switch extension jig.
 7. Remove the screws (1), (2) and (3) to release the holder from the bottom plate.
 8. Slide the front panel backwards and remove it.
 9. Release the three metal front panel holders from the front panel.
- Replacement is a reversal of the above procedure.

Switch Boards

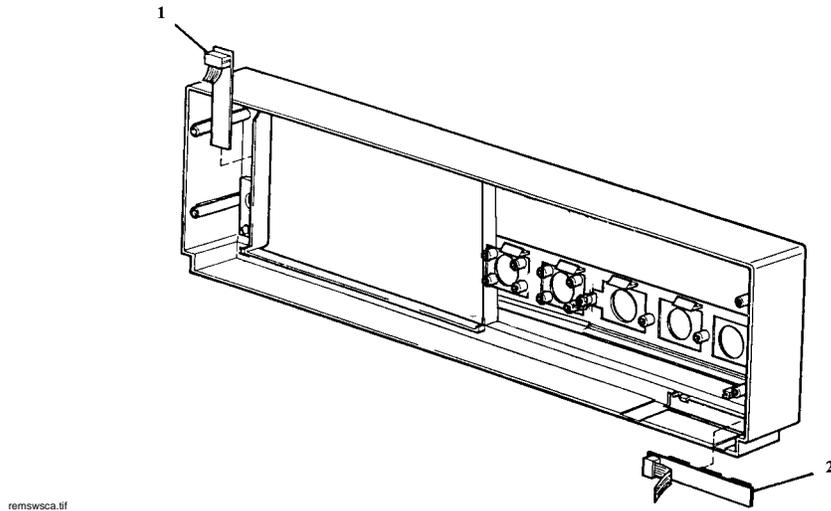


Figure 11-13 Removing the Switch Board

You can remove the recorder keys board without removing the Monitor's front cover.

Recorder Keys Board

- Uncap the Recorder Keys board (1) and lift it clear of the front cover.
- Replacement is a reversal of the above procedure.

Function Switches Board

- Remove the Front Assembly and Front Cover from the monitor.
 - Unclip the Function Keys board (2) and put the board clear of the Front Cover.
- Replacement is a reversal of the above procedure.

Loudspeaker

- Remove the loudspeaker cable going to the DIF board.
- Remove the four screws holding the loudspeaker in place.

Caution

The strong magnet will pull your screwdriver towards the membrane. Be careful not to damage the membrane.

Replacement is a reversal of the above procedure.