

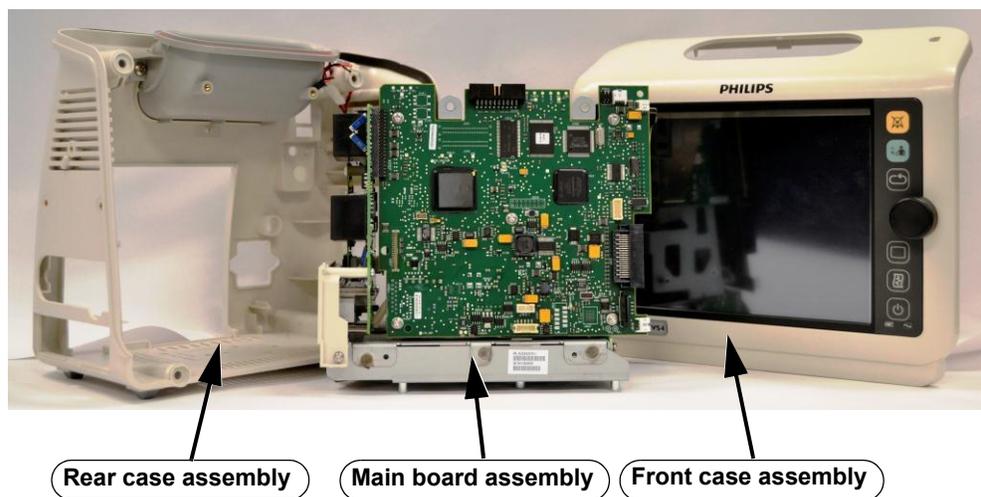
# Repairing the Monitor

## Disassembling the Monitor

This chapter contains the procedures for disassembling the monitor to replace defective assemblies or components.

The monitor has three main assemblies:

- Rear case
- Main board
- Front case



The monitor can be further disassembled into all major components, including:

- Printed circuit boards (boards)
- Battery
- Cables
- LCD
- Measurement modules

**For more information about replaceable parts, see Chapter 6, “Replacement Parts and Assembly Drawings.”**

---

---

### **Warning**

**Before you open or disassemble the monitor, disconnect the AC power from the monitor and remove the battery.**

**After any monitor repair, you must perform the recommended Performance and Safety tests before you put the monitor into operation. Failure to perform these tests can result in erroneous monitor readings. For more information about performing safety and performance tests, see Chapter 3, “Performance Verification Testing.”**

---

---

### **Caution**

**Observe ESD (electrostatic discharge) precautions when working inside the monitor.**

**Do not dispose of this product (or any parts of it) in industrial or domestic waste. The system may contain hazardous substances that can cause serious environmental pollution. The system also contains privacy sensitive information. Philips recommends that you contact your Philips Service Organization before disposing of this product.**

**To avoid contaminating or infecting personnel, the environment or other equipment, disinfect and decontaminate the monitor before disposing of it in accordance with your country's laws. For more information, see the resources listed below.**

**Philips Healthcare gives support for:**

- **Recovery of reusable parts.**
- **The recycling of useful materials by competent disposal companies.**
- **Safe and effective disposal of equipment**

**For advice and information, contact your Philips Service Organization and see <http://www.healthcare.philips.com/main/about/sustainability/recycling/index.wpd> for more information.**

**Before disposing of a SureSigns monitor, delete all patient information. For instructions on deleting patient data, see “Clearing Patient Data” on page 4-40.**

**If the device label on your monitor indicates that it may contain mercury, recycle or dispose of the monitor in accordance with local, state, or federal laws for mercury.**

**If this product is to be passed on to another user who is to use it for its intended purpose, then it should be passed on in its complete state. In particular, the existing user should make sure that all the product support documentation — including all Instructions for Use — are passed on to the new user. A new user should be made aware of the support services that Philips Healthcare provides for installing, commissioning, and maintaining the equipment or system, and for the comprehensive training of operators. Existing users must bear in mind that passing on medical electrical equipment to new users may present serious technical, medical, privacy, and legal risks. The original user may remain liable even if the equipment is given away.**

**Existing users are strongly advised to seek advice from their local Philips Healthcare representative before agreeing to pass on any equipment.**

**After the equipment has been passed on to a new user, the previous user may still receive important safety-related information, such as bulletins and field change orders. In many jurisdictions there is a clear duty on the previous user to communicate such safety-related information to new users.**

**Previous users who are not able or prepared to do this should inform Philips Healthcare about the new user, so that Philips Healthcare can provide the new user with safety-related information.**

---

## Tools Required for Service

The following tools and additional test equipment are required to disassemble, repair, and re-assemble the monitor.

- #1, #2 Phillips screwdrivers
- Torx T10, T20 screwdrivers
- Small and medium flathead screwdrivers
- 10 mm, 12 mm wrenches
- Needle nose pliers
- Plastic cable zip ties
- Wire-cutters
- ESD mat and wrist strap

## Shutting Down the Monitor

Perform a hard shutdown whenever you need to power down the monitor for repair. Performing a hard shutdown ensures that all patient and system data is saved in memory.

To perform a hard shutdown:

Step	
1	Open the <b>System Menu</b> . See “Accessing the System Menu” on page 3-4.
2	Select the <b>Shutdown</b> button.
3	In the confirmation window that appears, select the <b>Yes</b> button. The monitor shuts down.

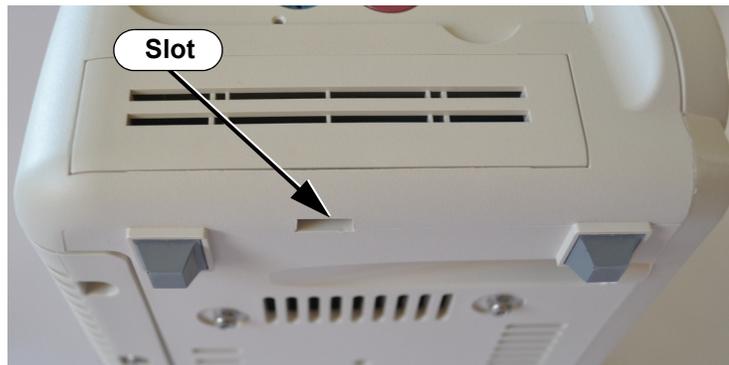
## Removing the Battery

**Caution** Before you remove the battery, perform a monitor hard shutdown.

To remove the battery:

Step	
1	Shut down the monitor. See “Shutting Down the Monitor” on page 5-3.
2	Disconnect the AC power cord from the rear of the monitor.
3	Tip the monitor and insert a flathead screwdriver into the slot in the bottom of the case under the battery cover. <div data-bbox="604 1312 1333 1677" data-label="Image"> </div> <p><b>Caution</b> Do not try to remove the battery cover by inserting the screwdriver into the vents in the cover. This can damage the battery case cover.</p>
4	Slightly twist the screwdriver to pop the battery cover off of the case.

- 
- 3 Tip the monitor and insert a flathead screwdriver into the slot in the bottom of the case under the battery cover.



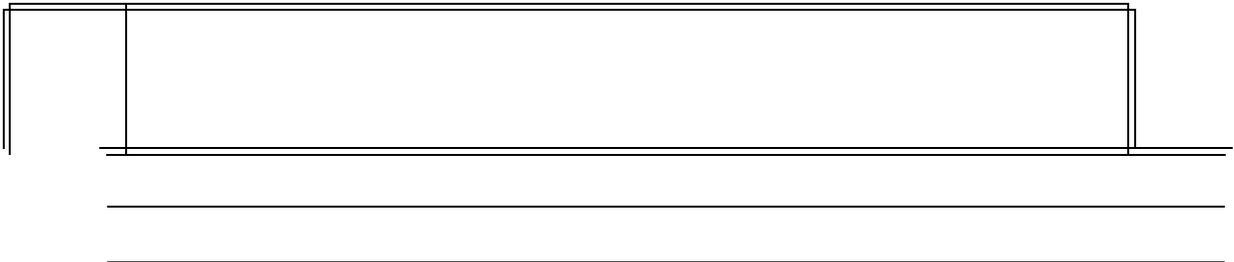
---

**Caution**

**Do not try to remove the battery cover by inserting the screwdriver into the vents in the cover. This can damage the battery case cover.**

---

- 4 Slightly twist the screwdriver to pop the battery cover off of the case.



## Reinstalling the Battery

To reinstall the battery:

Step	
1	Orient the battery so that the contacts and ribbon are on the right.
2	<p>Insert the battery into the empty battery compartment and push it in until the battery snaps into place behind the metal retaining clips.</p> 
3	<p>Replace the battery cover by inserting it into the battery opening with the two tabs facing up.</p> 
4	Snap the battery cover into place by pressing it firmly against the monitor case.

## Removing a Fuse

To remove a fuse in the AC power connector:

Step	
1	Disconnect the AC power cord from the rear of the monitor.
2	Remove the battery from the monitor (see “Removing the Battery” on page 5-3).
3	Use needle nose pliers to lift the fuse holder away from AC power connector. <div data-bbox="483 594 1268 1039" data-label="Image"> </div>
4	Replace the fuse(s), and then push the fuse holder back into the power connector until it snaps into place.

## Removing the Predictive Temperature Module and Probe Cover Holder

To remove the predictive temperature module and probe cover holder:

Step	
1	Disconnect the AC power cord from the rear of the monitor.
2	Disconnect the temperature probe.
3	Remove the battery from the monitor (see “Removing the Battery” on page 5-3).

4

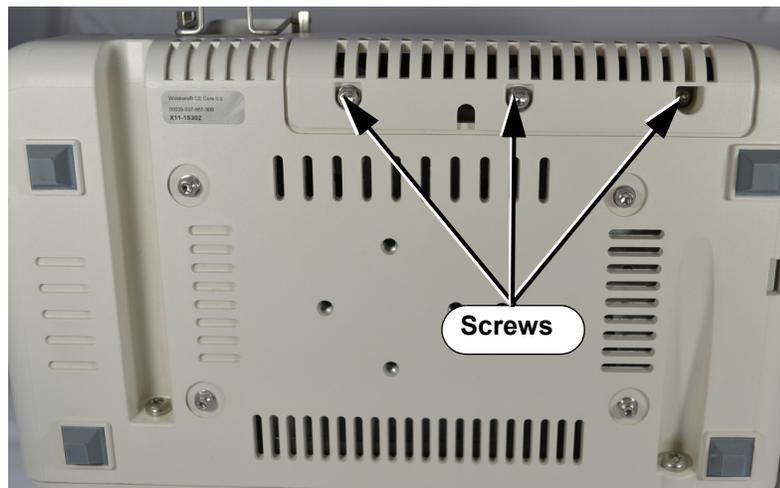
Remove the Torx T10 screw and washer from the probe cover holder and remove the holder from the case.



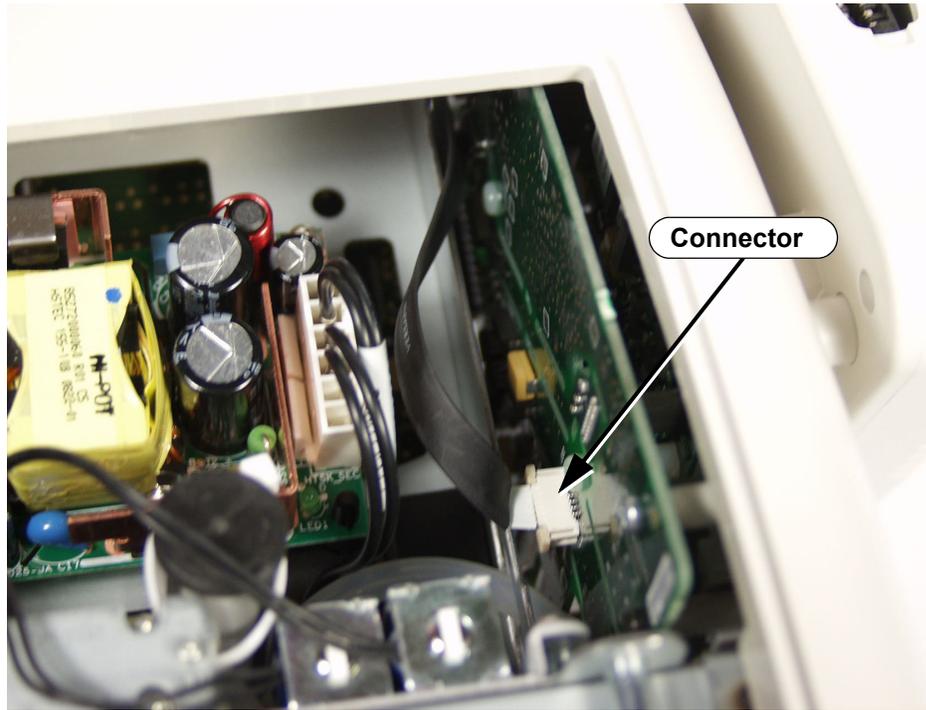
5

For monitors with a CO<sub>2</sub> module, remove the module by following the procedure in “Removing the CO<sub>2</sub> Module” on page 5-15.

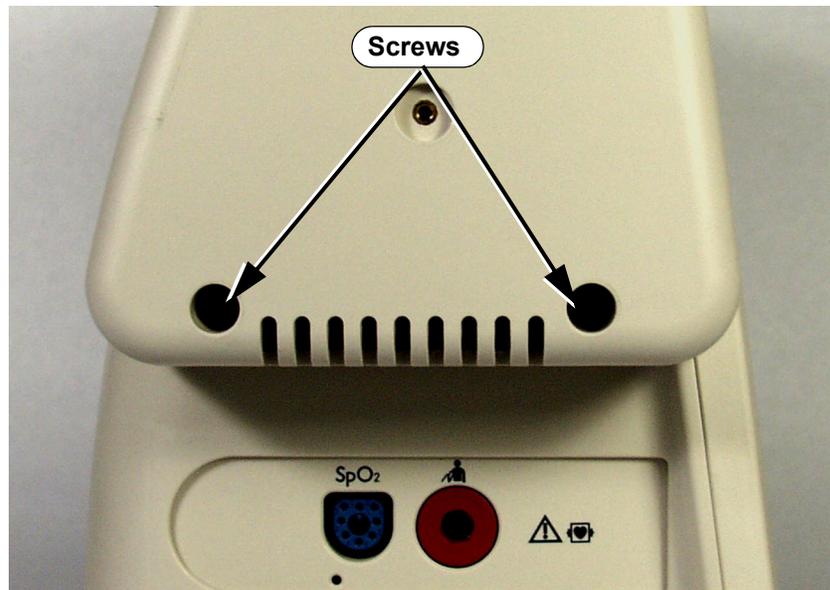
For monitors without a CO<sub>2</sub> module, remove the three Torx T10 screws and washers from the bottom of the rear cover and remove the cover from the monitor case.



- 6 Disconnect the temperature module cable from the connector on the front end assembly board.



- 7 Remove the two Torx T10 screws and washers from the temperature module.



- 8 Gently pull the temperature module and temperature module cable away from the monitor.

## Reinstalling the Predictive Temperature Module

To reinstall the temperature module:

Step	
1	<p>Use isopropyl alcohol to clean the surface where the adhesive strip will be applied. Ensure that the surfaces are clean and free of any adhesive residue. Dry the surface thoroughly.</p> <div data-bbox="532 493 1393 976" style="text-align: center;"> <p><b>Clean here</b></p> </div>
2	Place a new adhesive strip on the temperature module.

<p>3</p>	<p>Feed the temperature module cable through the top vent slot on the side of the monitor and over the top of the front end board.</p> <p><b>Note</b> — You may need to open the front and rear case assemblies to reattach the temperature module cable. See “Separating the Front and Rear Case Assemblies” on page 5-16.</p> <div data-bbox="607 396 1127 1047" data-label="Image"> </div>
<p>4</p>	<p>Reattach the temperature module cable to the front end board. Be sure the gold leads of the temperature module cable are facing toward the back of the monitor.</p>
<p>5</p>	<p>Remove the paper backing from the adhesive tape on the temperature module.</p>
<p>6</p>	<p>Align the screw holes of the temperature module with the screw holes on the monitor.</p>
<p>7</p>	<p>Secure the temperature module to the monitor with two Torx T10 screws.</p>
<p>8</p>	<p>Place the monitor on its side and then place a 10 lb to 15 lb weight on the module and leave it in place for 15 minutes to ensure a strong bond.</p> <hr/> <p><b>Caution</b></p> <p><b>This step is crucial to ensure a secure bond. It takes 24 hours to attain full bonding.</b></p> <hr/>
<p>9</p>	<p>Reattach the rear cover and temperature probe cover holder to the monitor.</p>

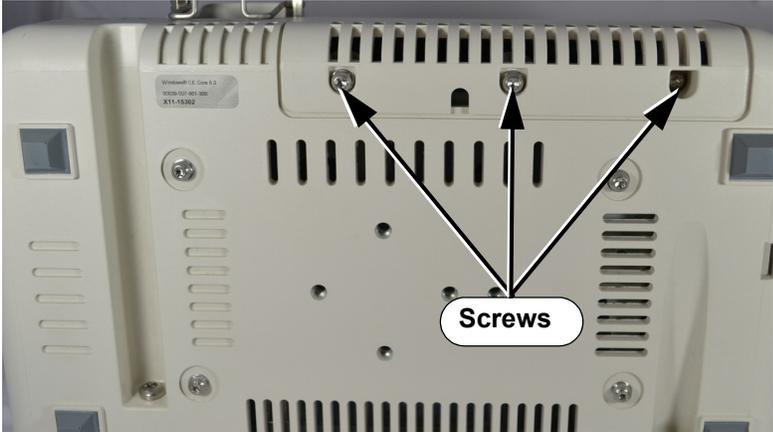
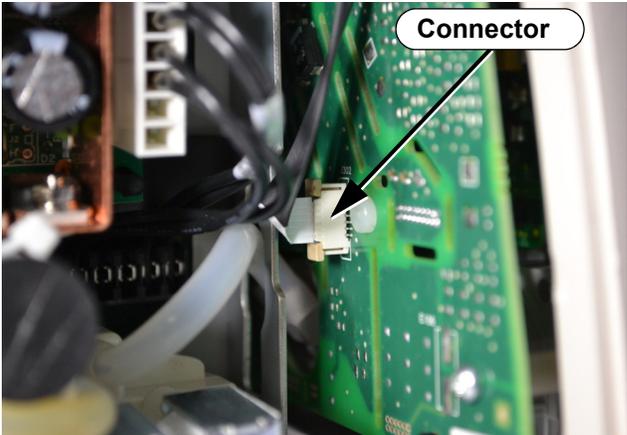
---

**Caution** After you replace the temperature module, complete all necessary performance tests. For more information, see “Testing and Inspection Guidelines” on page 3-1.

---

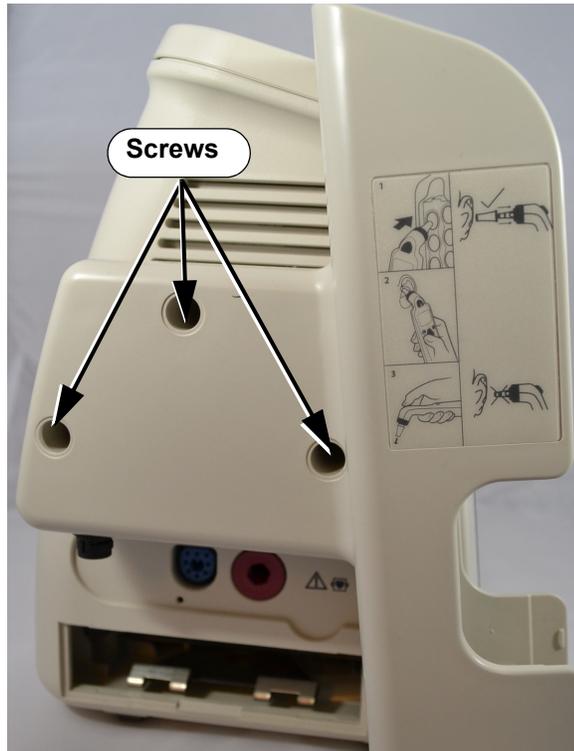
## Removing the Tympanic Temperature Module

To remove the tympanic temperature module:

Step	
1	Disconnect the AC power cord from the rear of the monitor.
2	Disconnect the temperature probe.
3	Remove the battery from the monitor (see “Removing the Battery” on page 5-3).
4	Separate the front and rear cases. See “Separating the Front and Rear Case Assemblies” on page 5-16.
5	<p>For monitors with a CO<sub>2</sub> module, remove the module by following the procedure in “Removing the CO<sub>2</sub> Module” on page 5-15.</p> <p>For monitors without a CO<sub>2</sub> module, remove the three Torx T10 screws and washers from the bottom of the rear cover and remove the cover from the monitor case.</p> 
6	<p>Disconnect the temperature module cable from the connector on the front end assembly board.</p> 
7	Remove the plastic labels covering the three screw holes.

8

Remove the three Torx T10 screws and washers from the temperature module.



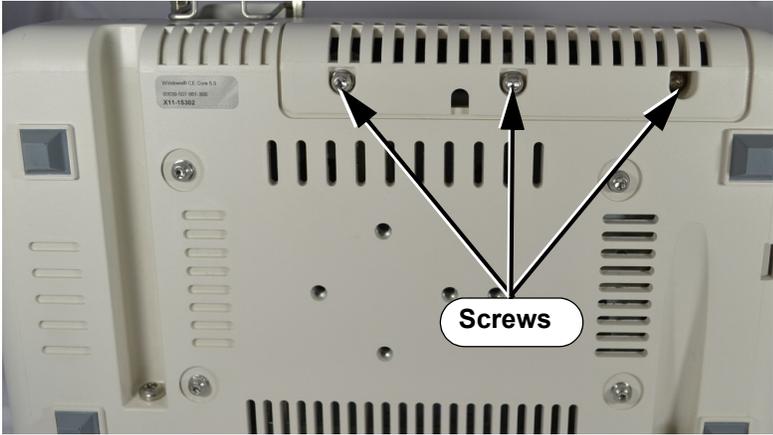
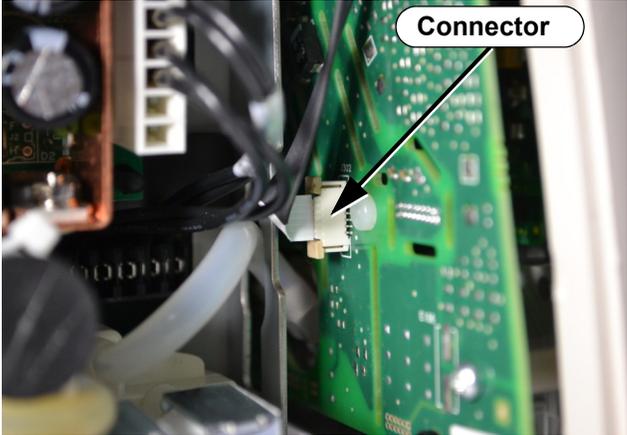
9

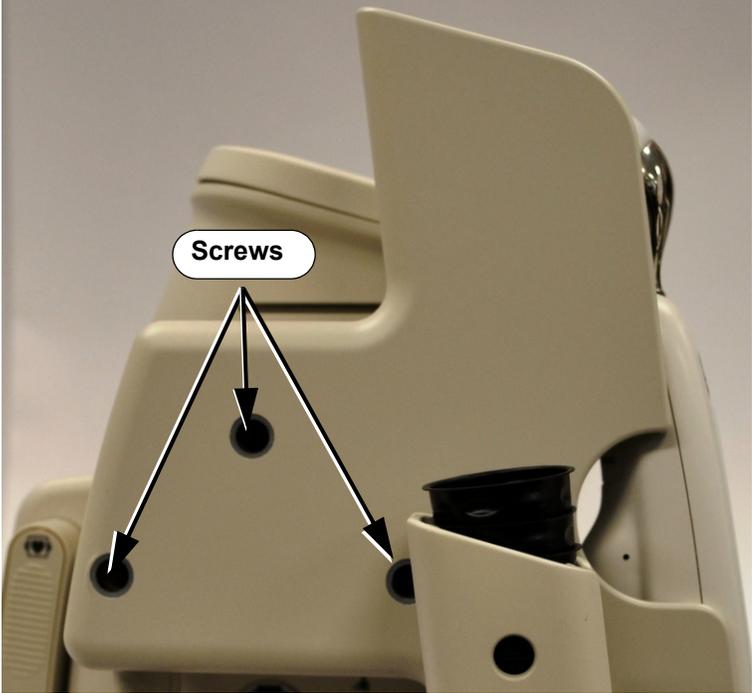
Gently pull the temperature module cable out of the monitor and remove the temperature module from the monitor.



## Removing the Temporal Temperature Module

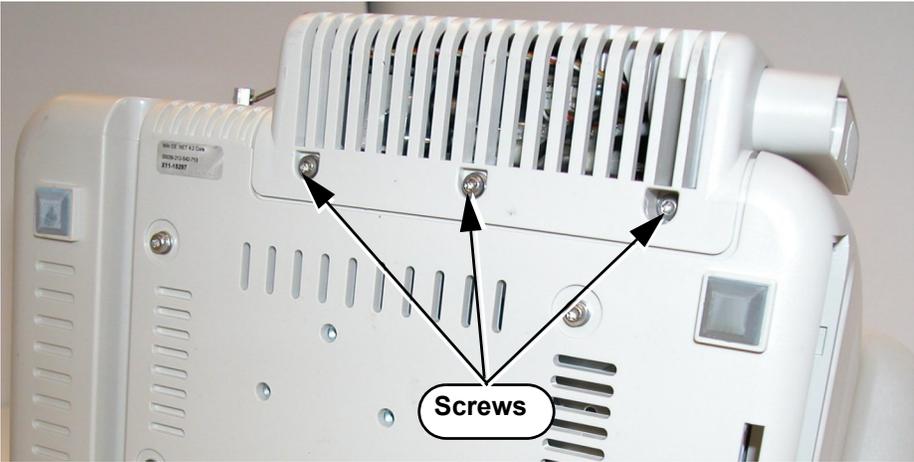
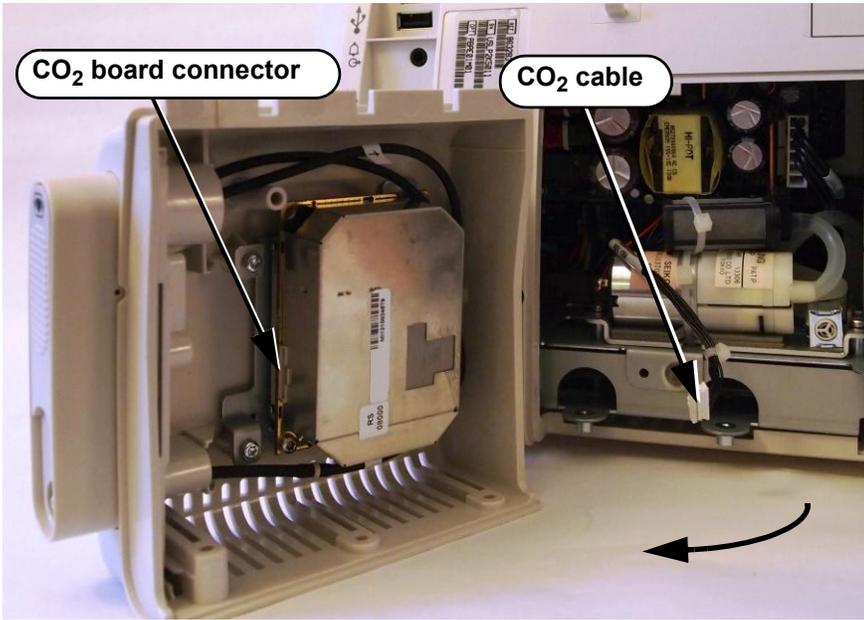
To remove the temporal temperature module:

Step	
1	Disconnect the AC power cord from the rear of the monitor.
2	Disconnect the temperature probe.
3	Remove the battery from the monitor (see “Removing the Battery” on page 5-3).
4	Separate the front and rear cases. See “Separating the Front and Rear Case Assemblies” on page 5-16.
5	<p>Remove three Torx T10 screws and washers from the bottom of the rear cover and remove the cover from the monitor case.</p> <p>For monitors with a CO<sub>2</sub> module, remove the module by following the procedure in “Removing the CO<sub>2</sub> Module” on page 5-15.</p> <p>For monitors without a CO<sub>2</sub> module, remove the three Torx T10 screws and washers from the bottom of the rear cover and remove the cover from the monitor case.</p> 
6	<p>Disconnect the temperature module cable from the connector on the front end assembly board.</p> 

7	Remove the plastic labels covering the three screw holes.
8	<p>Remove the three Torx T10 screws and washers from the temperature module.</p>  <p>The image shows a close-up of the temperature module on the monitor. Three screws are highlighted with arrows pointing to them from a label 'Screws' in a white oval. The screws are located on the top surface of the module.</p>
9	<p>Gently pull the temperature module cable out of the monitor and remove the temperature module from the monitor.</p>  <p>The image shows the temperature module being pulled away from the monitor. The cable connection point is highlighted with an arrow pointing to it from a label 'Cable' in a white oval. The cable is a white plastic connector.</p>

# Removing the CO<sub>2</sub> Module

To remove the CO<sub>2</sub> module:

Step	
1	Remove the AC cord from the rear of the monitor.
2	Remove the battery from the monitor (see “Shutting Down the Monitor” on page 5-3).
3	Remove the three Torx T10 screws and washers from the CO <sub>2</sub> module cover. 
4	Push the module down to disengage it from the monitor case and then pull the module away. 
5	Disconnect the CO <sub>2</sub> cable from the CO <sub>2</sub> module.

---

## Separating the Front and Rear Case Assemblies

To install internal replacement parts, you must first separate the front and rear case assemblies.

To separate the front and rear case assemblies:

---

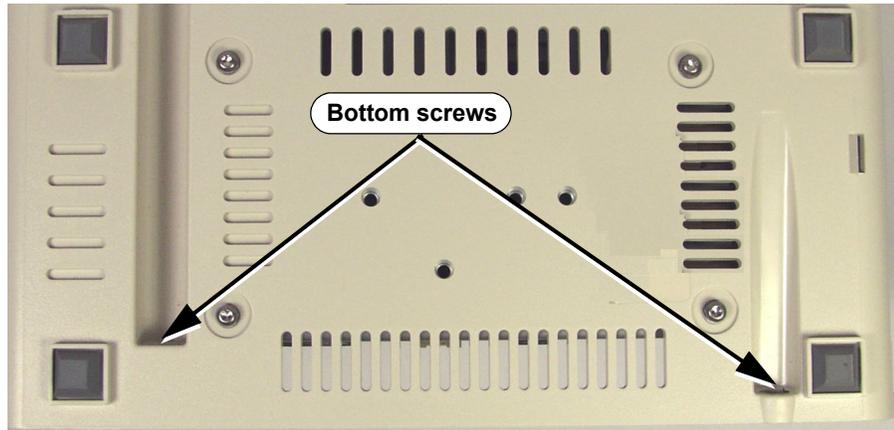
**Warning** The metal edges on the inside of the front case assembly are sharp. Use extreme caution when handling the separated monitor assemblies.

---

Step	
1	Disconnect the AC power cable from the back of the monitor.
2	Disconnect all external cables from the monitor.
3	Remove the battery from the monitor (see “Removing the Battery” on page 5-3).
4	Remove the USB hub (if attached) from the rear cover.
5	<p data-bbox="386 890 1105 919">Remove the two Torx T20 screws from the top of the rear case.</p>  <p data-bbox="386 1360 1040 1430"><b>Caution</b> Cables run between the front and rear case assemblies.</p>

6

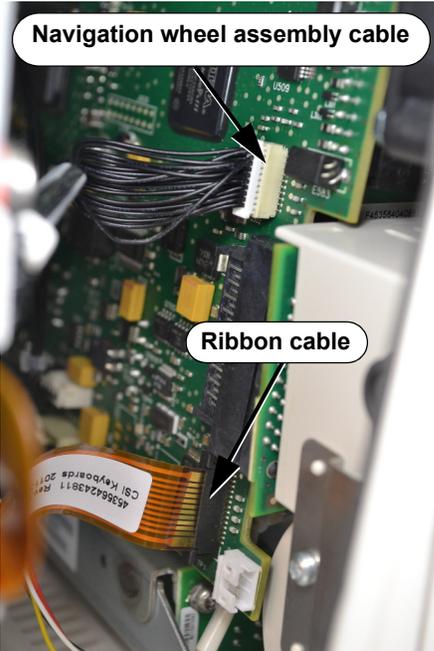
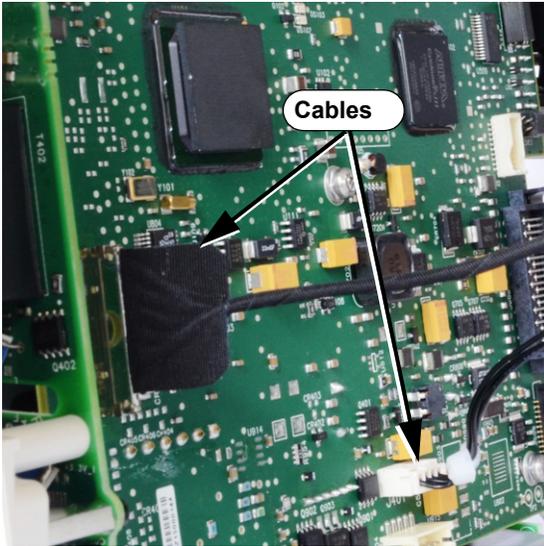
Remove the two Torx T20 screws from the bottom of the rear case.



7

Separate the front and rear case assemblies by pulling the lower edge of the front case assembly and slowly lifting it up over the handle.



8	<p>Carefully disconnect the ribbon cable and the navigation wheel assembly board cable from the main board.</p> 
9	<p>Rotate the monitor and disconnect the two cables from the opposite side of the main board.</p> 

### Reassembling the Front and Rear Cases

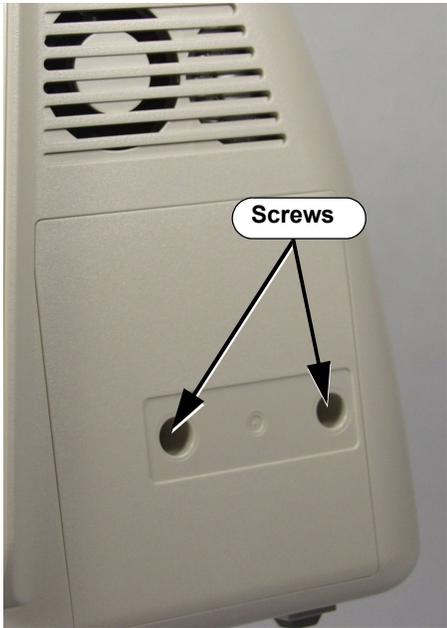
To reassemble the front and rear cases:

Step	
1	Connect all cables.

2	Line up the tab on the front assembly case with the handle on the rear case, and then slip the front assembly case over the handle.
3	Snap the two assembly cases together and install the four screws.
4	Power up the monitor. If the monitor starts properly, perform the required performance tests (see “Testing and Inspection Guidelines” on page 3-1).

## Removing the Faceplate or Recorder

To remove the faceplate or optional recorder:

Step	
1	Shut down the monitor. See “Shutting Down the Monitor” on page 5-3.
2	Go to the step appropriate for your monitor: For monitors without the optional recorder, go to step 3. For monitors with an optional recorder, go to step 5.
3	Remove the plastic labels covering the two Torx T10 screws holding the faceplate to the monitor case.
4	Remove the two screws, and lift the faceplate off.  
5	Open the recorder door on the rear case assembly and remove the paper roll.

6

Loosen (do not remove) the two Torx T10 screws holding the recorder to the monitor case.



7

Place your thumbs on either side of the recorder case and pull it straight out of the assembly and away from the recorder connector on the main board.



---

**Caution**

**When you reassemble the recorder or faceplate, do not overtighten the screws.**

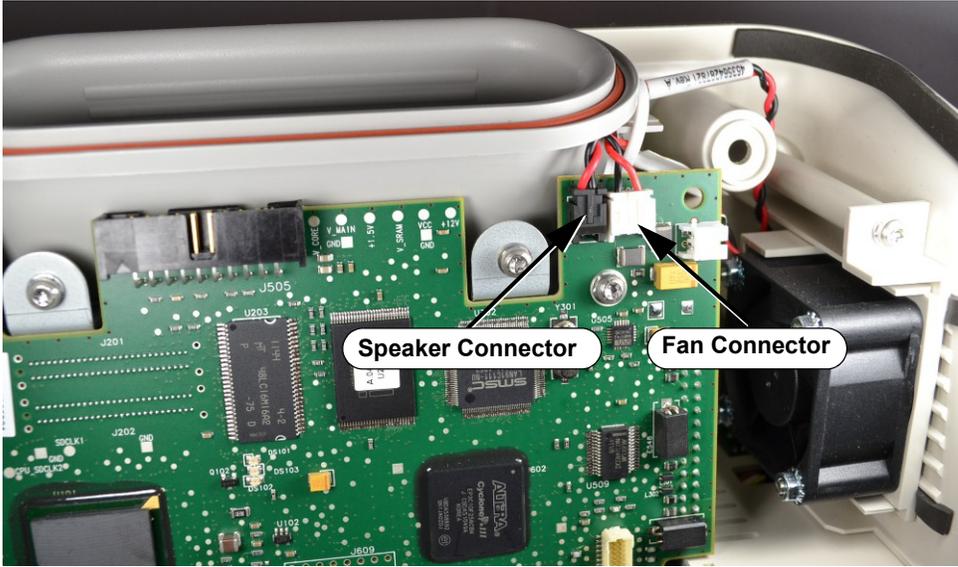
---

## Removing the Main Board Assembly

This section describes how to remove the main board assembly from the rear case and how to reinstall it.

### Removing the Main Board Assembly

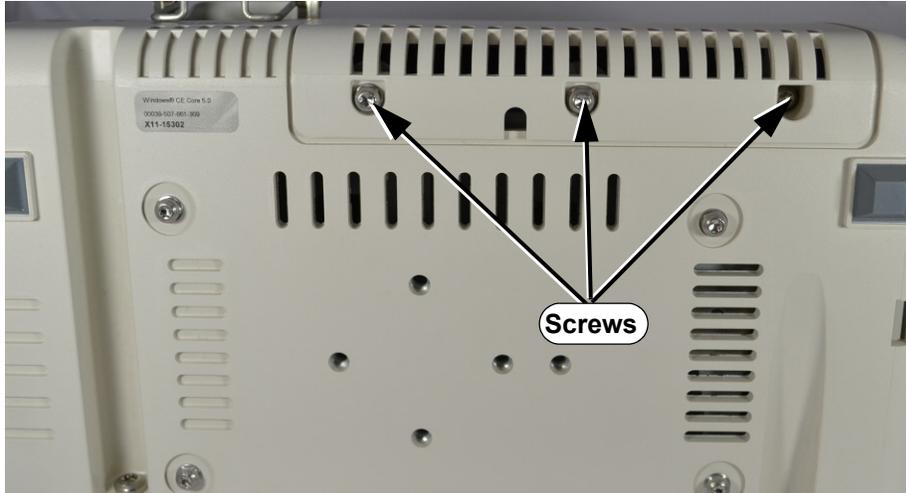
To remove the main board assembly from the rear case:

Step	
1	Separate the front and rear case assemblies. See “Separating the Front and Rear Case Assemblies” on page 5-16.
2	Remove the faceplate or recorder. See “Removing the Faceplate or Recorder” on page 5-19.
3	<p>Disconnect the fan and speaker cables from the connectors on the main board.</p> 

4

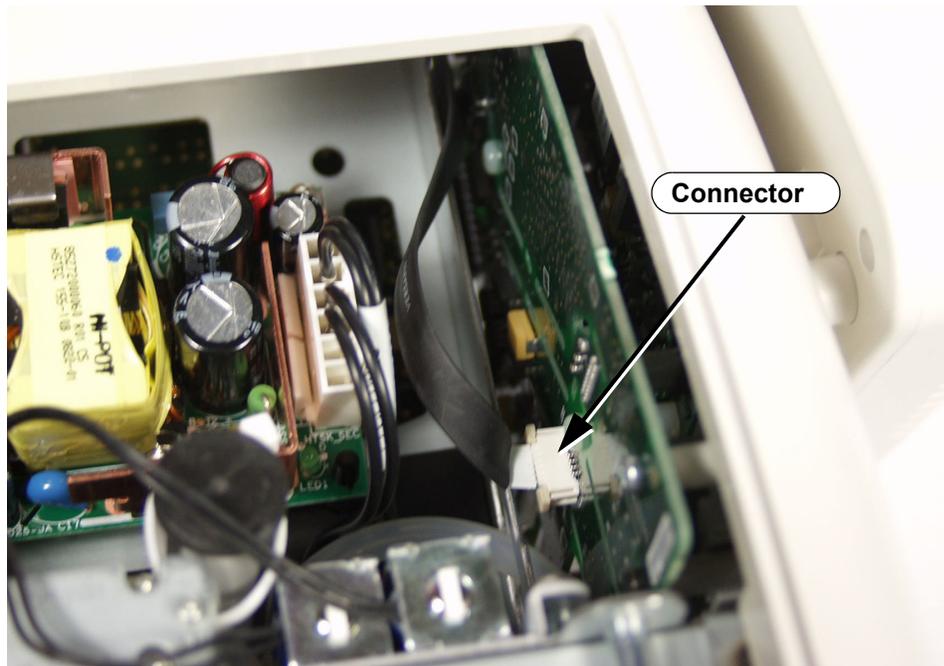
For monitors with a CO<sub>2</sub> module, remove the module by following the procedure in “Removing the CO<sub>2</sub> Module” on page 5-15.

For monitors without a CO<sub>2</sub> module, remove the three Torx T10 screws and washers from the bottom of the rear cover and remove the cover from the monitor case.

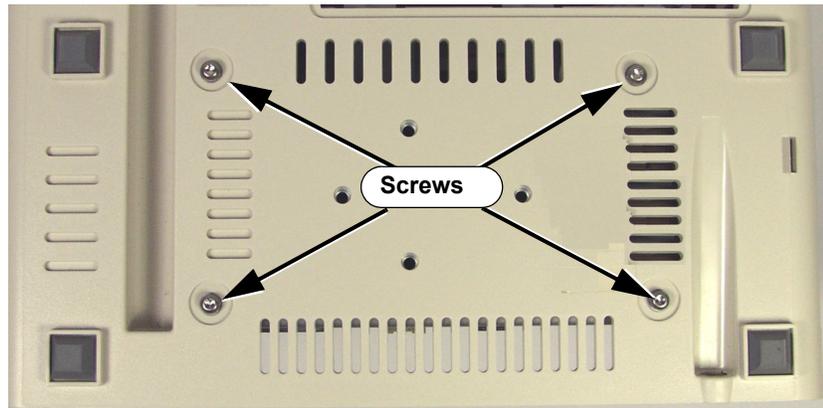


5

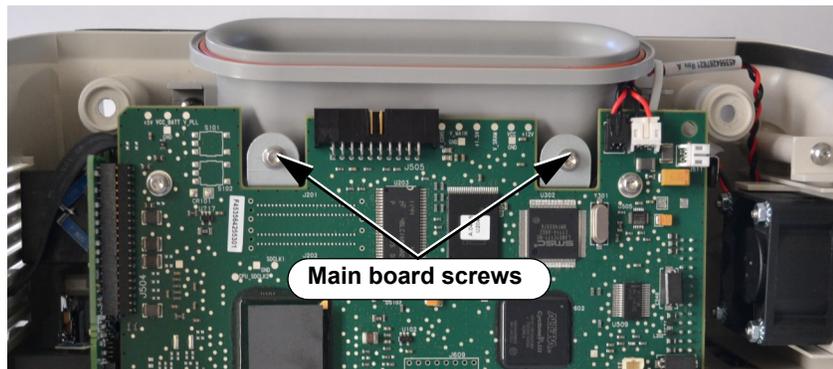
For monitors with the optional temperature module, disconnect the temperature cable connector from the front end assembly board.

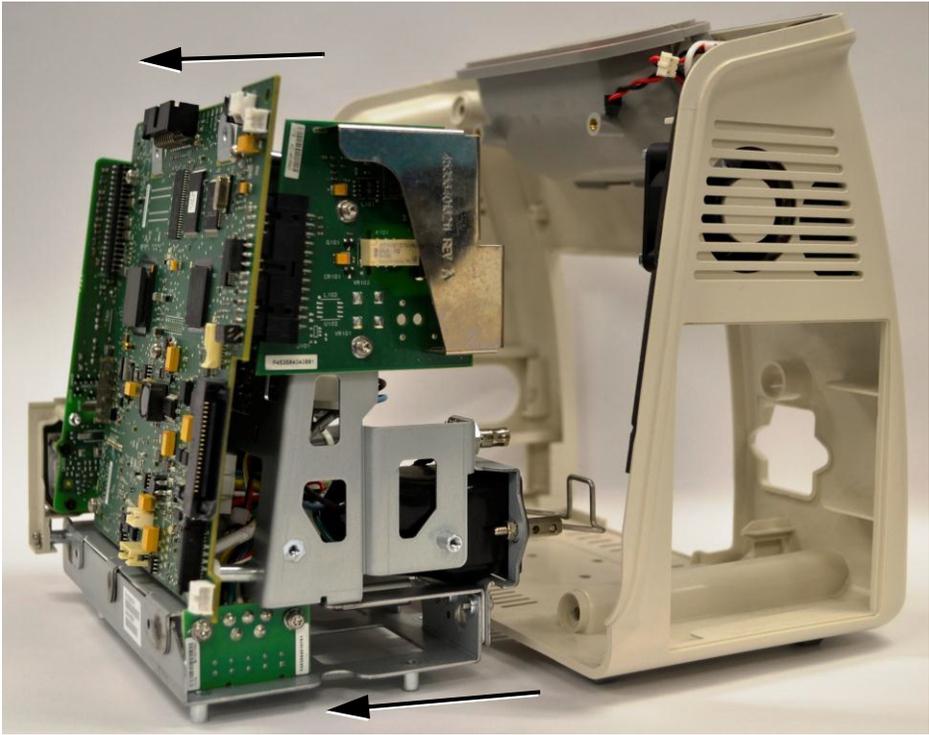


- 6 Remove the four Torx T10 screws and washers on the bottom of the rear case assembly.



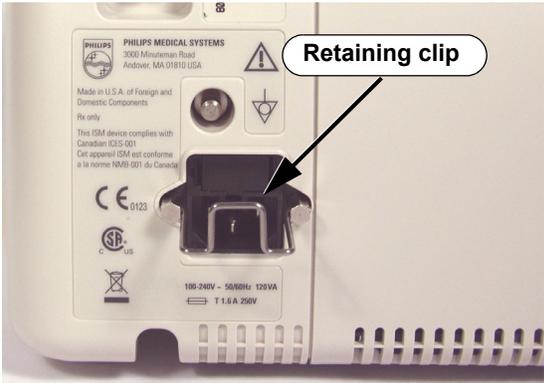
- 7 Remove the two Torx T10 screws and washers from the main board assembly.



<p>8</p>	<p>Pull the main board assembly out of the rear case.</p> 
----------	--

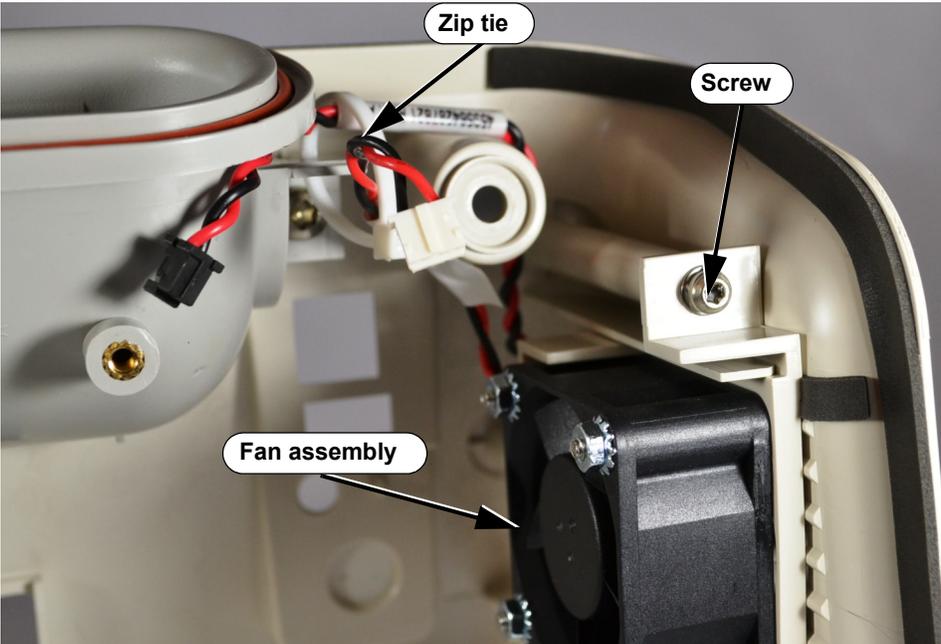
### Reinstalling the Main Board Assembly

To reinstall the main board assembly:

Step	
<p>1</p>	<p>Slide the main board assembly into the rear case (guiding the power cord retaining clip through the rear cover).</p> 
<p>2</p>	<p>Push the assembly until it snaps into place in the case.</p>
<p>3</p>	<p>Replace the four Torx T10 screws and washers on the bottom of the rear case to ensure that the main board assembly fits correctly in the case.</p>

## Removing the Fan and Speaker

To remove the fan and speaker:

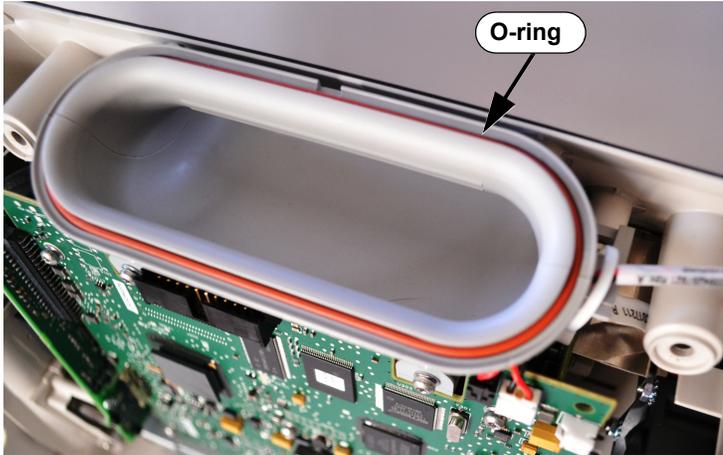
Step	
1	Separate the front and rear case assemblies. See “Separating the Front and Rear Case Assemblies” on page 5-16.
2	Remove the main board assembly. See “Removing the Main Board Assembly” on page 5-21.
3	<p>Pull the cables through the zip tie.</p> 
4	Remove the Torx T10 screw and washer holding the fan assembly in place.
5	Slide the fan assembly and then the speaker out of the rear case.

## Replacing the Handle O-Ring

**Caution** Do not try to remove the handle from the rear case. It is part of the rear case and not a replacement part.

## Removing the Front End Assembly

To replace the handle O-ring:

Step	
1	Separate the front and rear case assemblies. See “Separating the Front and Rear Case Assemblies” on page 5-16.
2	Gently pull the O-ring from the inside of the handle. If the O-ring is damaged or torn, remove all pieces from the channel in the handle. 
3	Insert a new O-ring in the handle and press it into place along the channel in the handle.

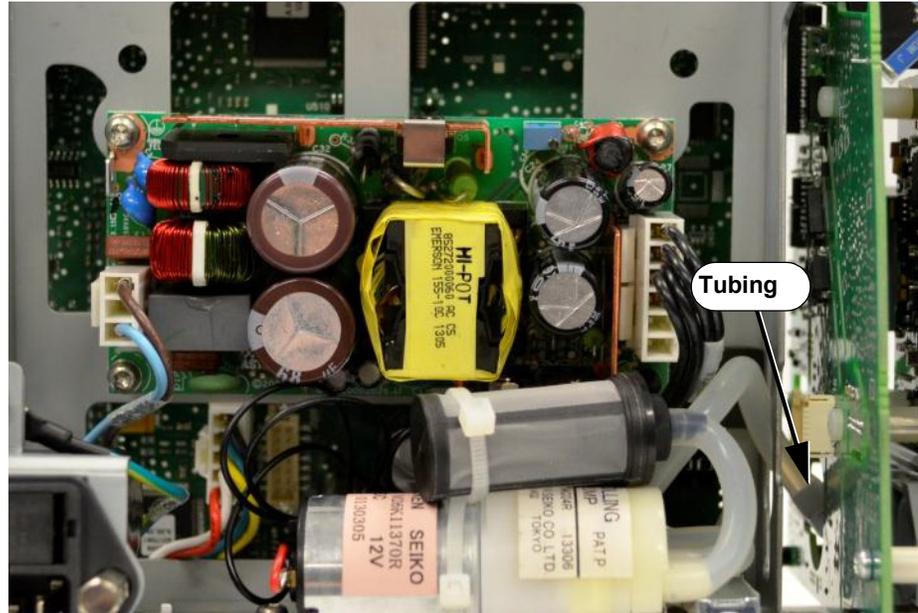
---

## Removing the Front End Assembly

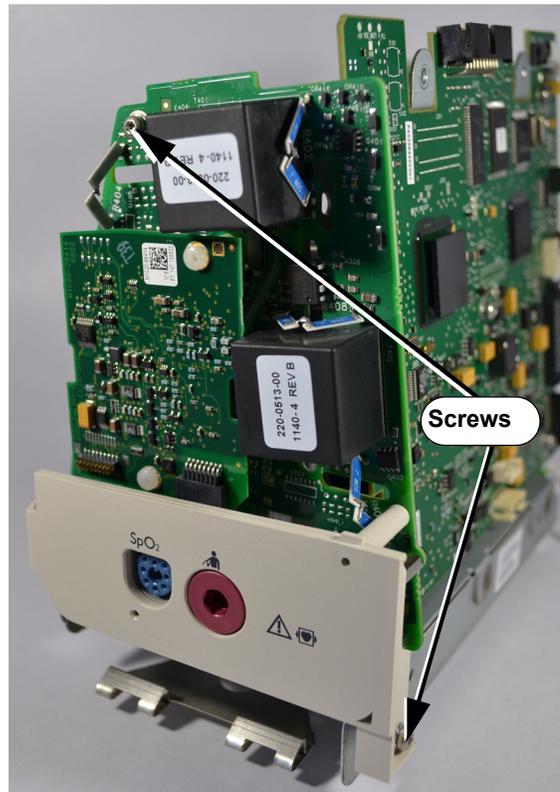
To remove the front end assembly:

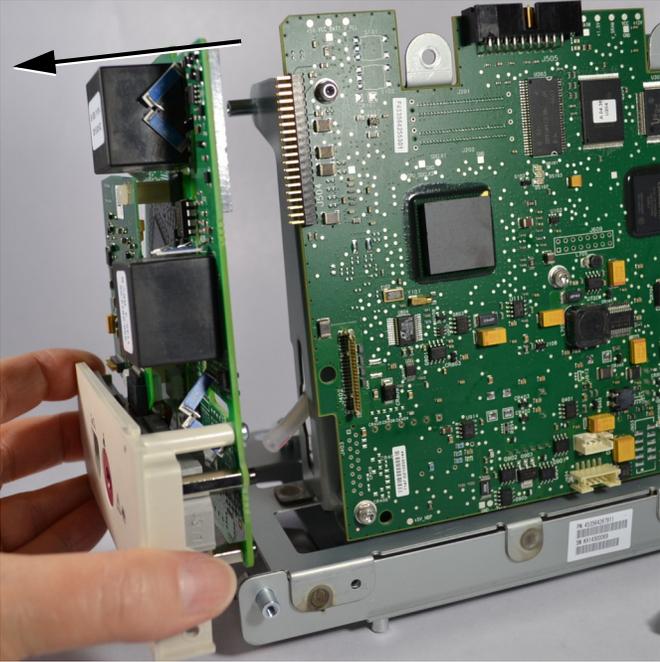
Step	
1	Separate the front and rear monitor case assemblies. See “Separating the Front and Rear Case Assemblies” on page 5-16.
2	Remove the main board assembly. See “Removing the Main Board Assembly” on page 5-21.

- 3 Disconnect the NBP tubing from the front end board.



- 4 Remove the two Torx T10 screws and washers holding the front end assembly to the frame.



5	<p>Pull the front end assembly away from the 40-pin connector on the side of the main board.</p> 
---	---

## Replacing the SpO<sub>2</sub> Board

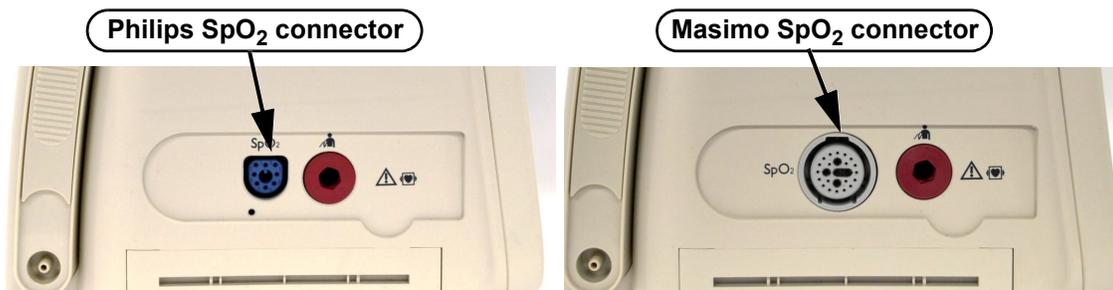
The type of SpO<sub>2</sub> board, Philips or Masimo, in the monitor determines how it is replaced:

- For Philips SpO<sub>2</sub> modules, go to “Removing the Philips SpO<sub>2</sub> Board” on page 5-29.
- For Masimo SpO<sub>2</sub> modules, you must return the monitor to Philips for repair. Contact the Philips Customer Care Center or your local Philips representative.

## Determining the Type of SpO<sub>2</sub> Board

You can determine the type of SpO<sub>2</sub> board in either of two ways:

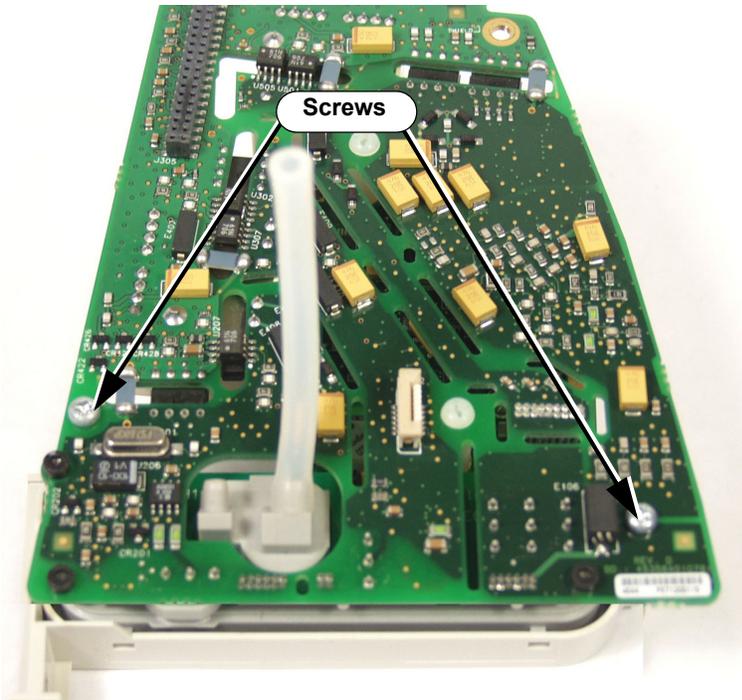
- View the external connector:



- Open the **System Admin Menu** to view the SpO<sub>2</sub> configuration. See “Accessing the System Admin Menu” on page 3-5.
  - If **SpO<sub>2</sub>-P** is displayed, the monitor is equipped with a Philips SpO<sub>2</sub> module.
  - If **SpO<sub>2</sub>-M** is displayed, the monitor is equipped with a Masimo SpO<sub>2</sub> module.

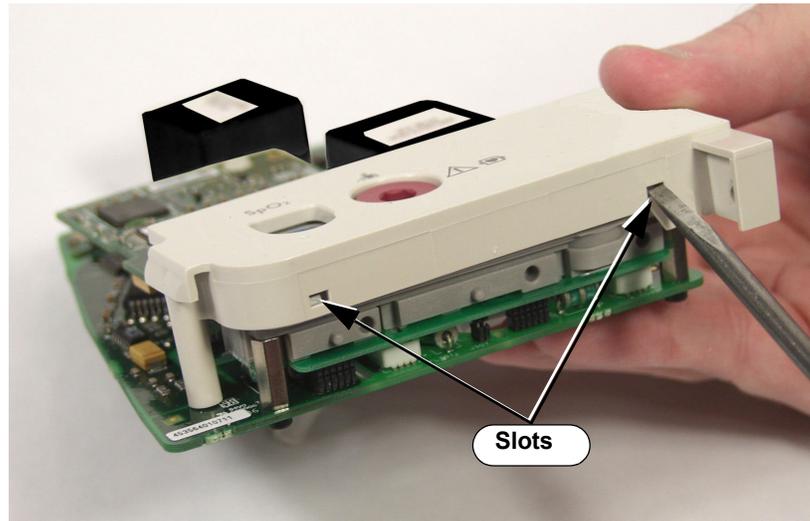
## Removing the Philips SpO<sub>2</sub> Board

To remove the SpO<sub>2</sub> board:

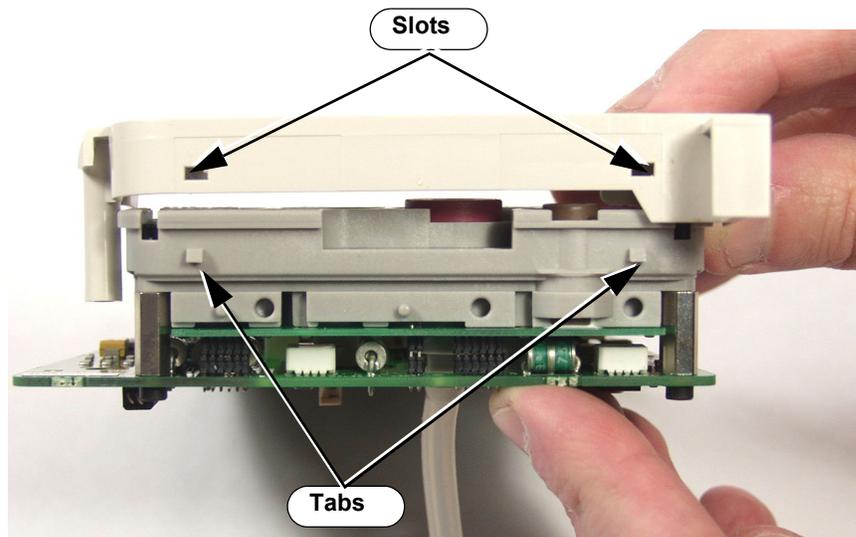
Step	
1	Separate the front and rear monitor case assemblies. See “Separating the Front and Rear Case Assemblies” on page 5-16.
2	Remove the main board assembly. See “Removing the Main Board Assembly” on page 5-21.
3	Remove the front end assembly. See “Removing the Front End Assembly” on page 5-26.
4	<p>Remove the two Torx T10 screws holding the plastic cover to the front end assembly board.</p> 

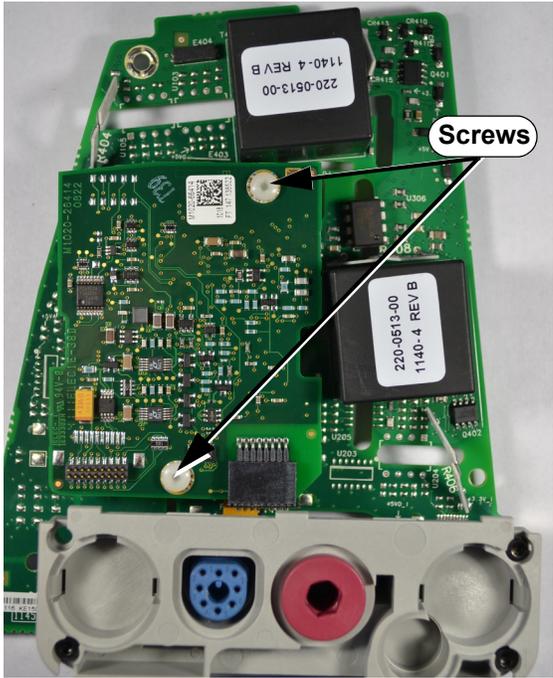
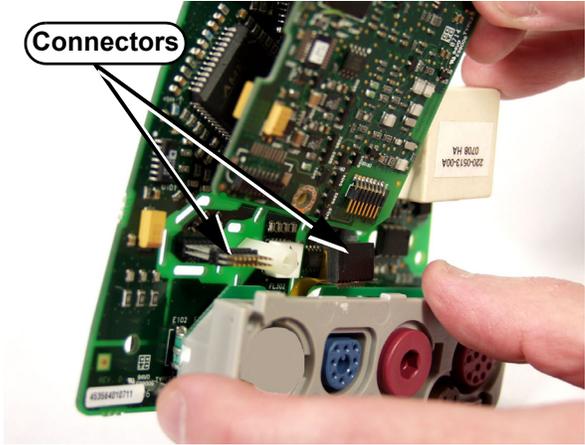
5

Remove the front end assembly cover by inserting a small flathead screwdriver into the two slots at the bottom of the cover and pushing the tabs.



**Note** — To reattach the cover, line up the slots in the cover with the tabs on the assembly and snap the cover into place by pressing it onto the assembly.

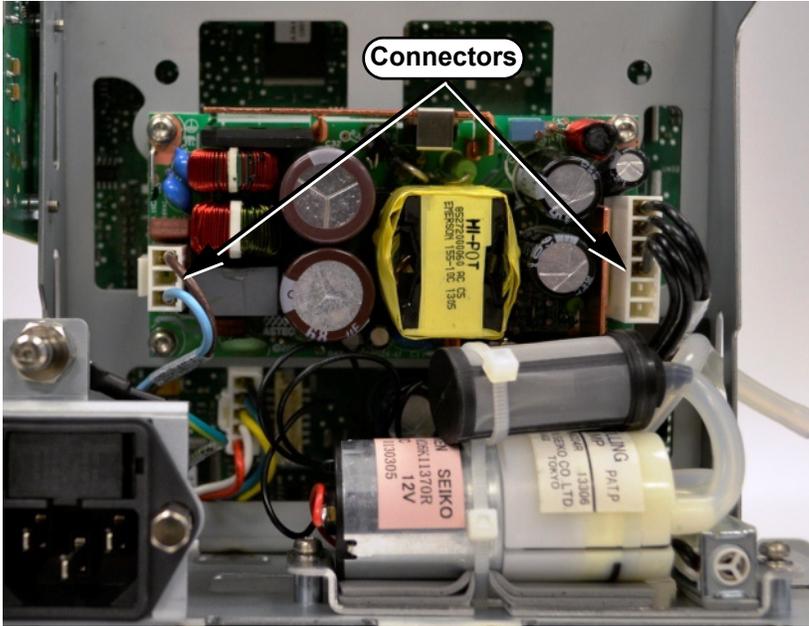


<p>6</p>	<p>Remove the two plastic Phillips screws on the front end assembly.</p> 
<p>7</p>	<p>Disconnect the SpO<sub>2</sub> board from the two connectors on the front end assembly board and remove the SpO<sub>2</sub> board.</p> 

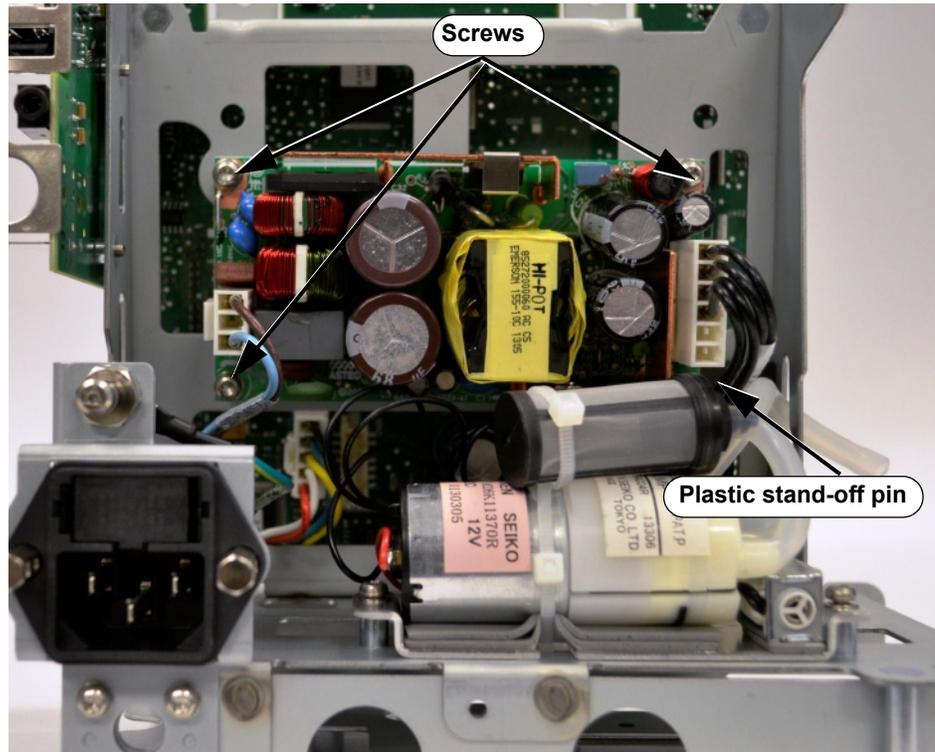
## Removing the Power Supply

To remove the power supply:

Step	
1	Separate the front and rear monitor case assemblies. See “Separating the Front and Rear Case Assemblies” on page 5-16.

2	Remove the main board assembly. See “Removing the Main Board Assembly” on page 5-21.
3	<p data-bbox="373 275 1380 346">Disconnect the 2-pin and 6-pin power supply connectors from the back of the main board assembly.</p>  <p data-bbox="373 1045 1380 1176"><b>Caution</b> When you reconnect the power supply, connect the white 6-pin connector cable to the power supply and the black connector on the end of the cable to the main board. If you reverse the connectors, the monitor will not power up.</p>

- 4 Remove the three Torx T10 screws and washers, use pliers to release the plastic stand-off pin, and then remove the power supply from the assembly.



## Removing the Main Board

**Caution** Before you replace the main board, export the current configuration settings. For more information, see the “Export Settings” section of the *SureSigns VS4 Installation and Configuration Guide*.

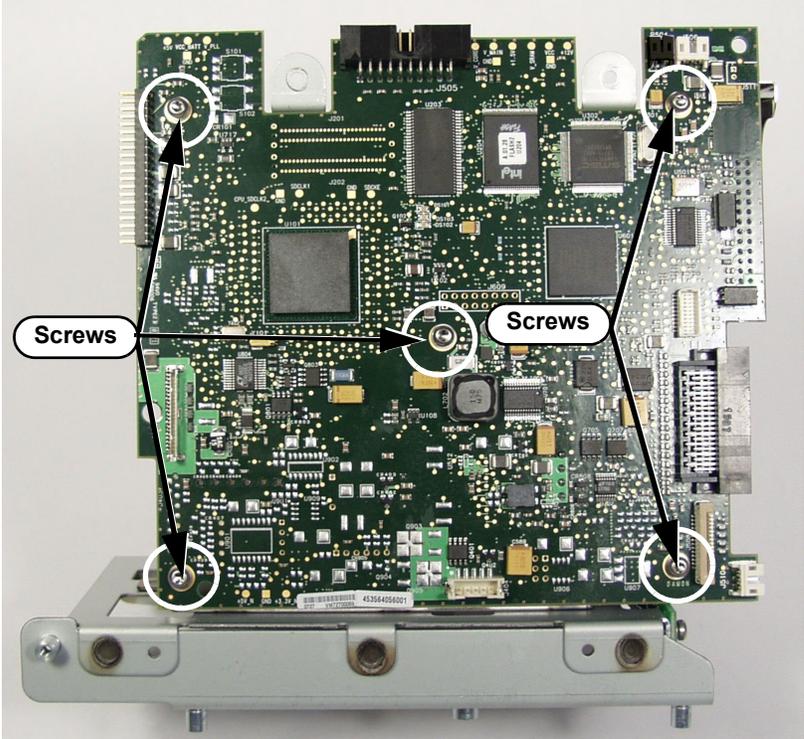
After you replace the main board, you must reset the monitor serial number and reconfigure the system.

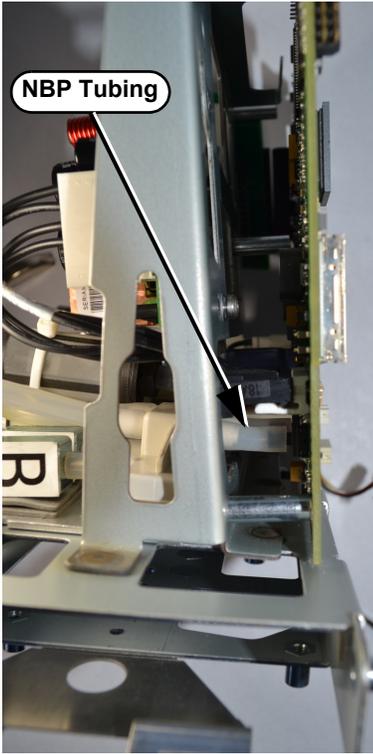
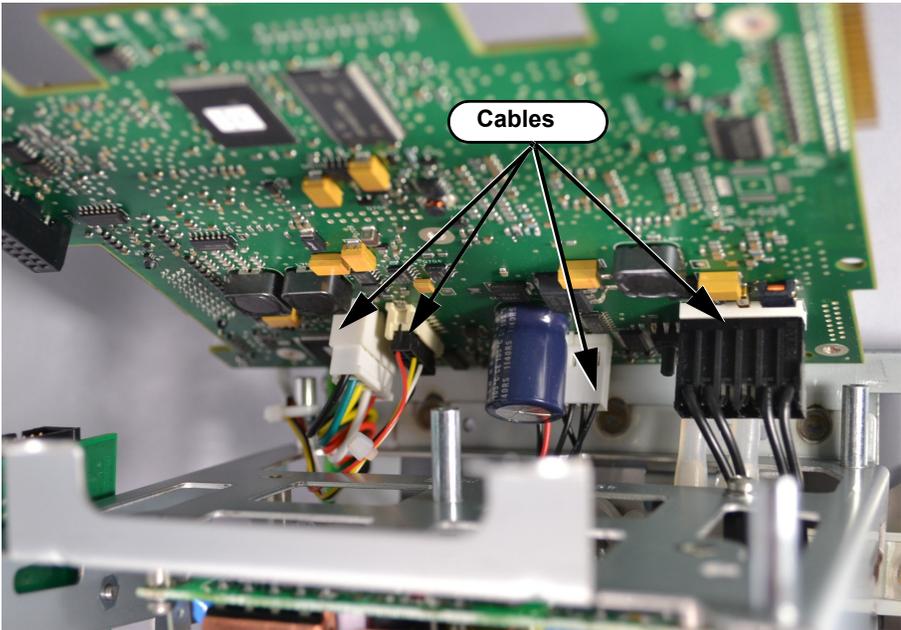
For information about resetting the serial number, see “Resetting the Serial Number” on page 5-36.

For information about configuring the system, see “Setting the System Configuration” on page 5-36.

To remove the main board:

Step	
1	Separate the front and rear monitor case assemblies. See “Separating the Front and Rear Case Assemblies” on page 5-16.
2	Remove the main board assembly. See “Removing the Main Board Assembly” on page 5-21.

3	Remove the front end assembly. See “Removing the Front End Assembly” on page 5-26.
4	<p>Remove the five T10 screws from the main board.</p> 

<p>5</p>	<p>Disconnect the NBP tubing from the main board.</p>  <p>The image shows a close-up of the main board assembly. A red and black NBP tubing is connected to a port on the board. A callout box labeled "NBP Tubing" has an arrow pointing to the connection point. The assembly is housed in a grey metal frame.</p>
<p>6</p>	<p>Disconnect the four cables from the connectors on the main board.</p>  <p>The image shows a close-up of the main board assembly. Four cables are connected to connectors on the board. A callout box labeled "Cables" has four arrows pointing to each of the cable connections. The board is green and populated with various components. The assembly is housed in a grey metal frame.</p>
<p>7</p>	<p>Remove the board from the assembly.</p>

## Resetting the Serial Number

When you replace the main board, you must reset the serial number. The serial number appears in a label (marked **SN**) on the back of the monitor.

To reset the serial number:

Step	
1	Open the <b>Maintenance</b> options of the <b>System Diagnostics</b> menu. See “Accessing Maintenance Options” on page 3-12.
2	Select the <b>Reset S/N</b> button. The <b>Reset Serial Number</b> menu appears. <div data-bbox="516 682 1266 1297" style="border: 2px solid blue; padding: 10px; margin: 10px auto; width: fit-content;"> <div style="background-color: #000080; color: white; padding: 5px;"><b>Reset Serial Number</b></div> <div style="text-align: center; margin-top: 10px;"> <b>Serial Number:</b>  <div style="border: 1px solid white; border-radius: 10px; padding: 2px 10px; display: inline-block; margin: 5px;">US93619750</div> </div> <div style="display: flex; justify-content: center; gap: 20px; margin-top: 10px;"> <div style="border: 1px solid white; border-radius: 10px; padding: 5px 15px; display: inline-block;">Apply</div> <div style="border: 1px solid white; border-radius: 10px; padding: 5px 15px; display: inline-block;">Cancel</div> </div> </div>
3	Select the <b>Serial Number</b> field. A keyboard appears.
4	Enter the serial number. Use the <b>Back</b> button to backspace, the <b>Cancel</b> button to close the keyboard without saving, or the <b>OK</b> button to save the changes.
5	Select the <b>Apply</b> button. A confirmation window displays the message: <b>System will restart now.</b>
6	In the confirmation window, select the <b>OK</b> button. The monitor restarts.

## Setting the System Configuration

When the monitor performs a self test, it first checks its system configuration. If you replace the main board, you must reprogram the system configuration.

---

**Caution**     **The system configuration settings must match the hardware installed on the monitor. Incorrect settings may result in system malfunction alarm messages and the monitor may not start. If this happens, correct the system configuration settings.**

---

**To reset the system configuration:**

Step	
1	In the <b>System Diagnostics</b> menu, select the <b>Configuration</b> button. The <b>Configuration</b> menu appears.
2	Select each option installed in the monitor. <b>Note — If Masimo SpO2 is configured on your monitor, the option is selected but unavailable. You cannot select Philips SpO2.</b>
3	Select the <b>Apply</b> button. A confirmation window displays the message: <b>System will restart now.</b>
4	In the confirmation window, select the <b>OK</b> button. The monitor restarts.

---

## Removing the NBP Module

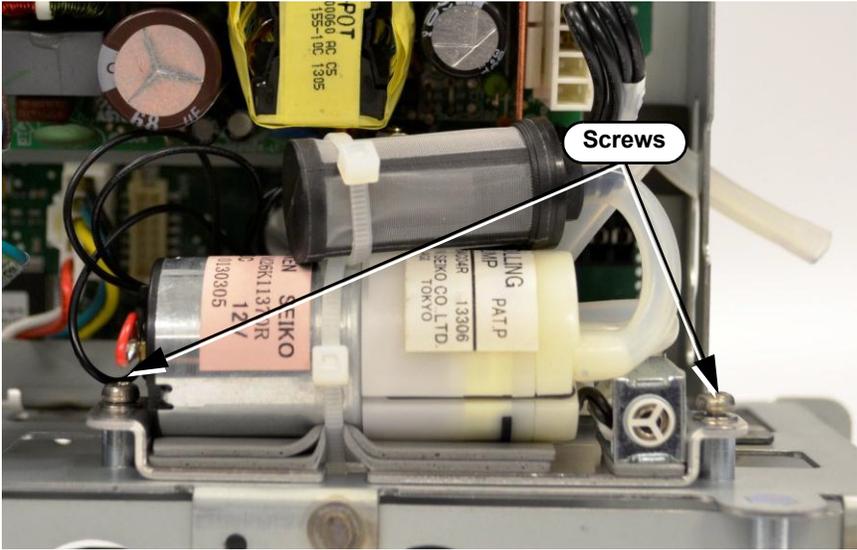
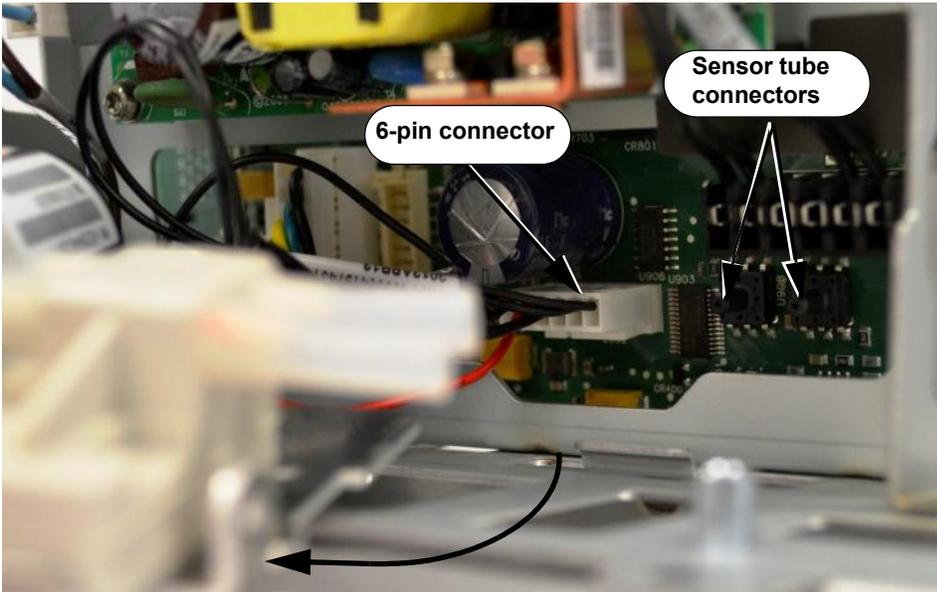
---

**Caution**     **After replacing the NBP module, you must reset the NBP cycle count and run the NBP tests. For more information about resetting the NBP cycle count, see “Viewing and Resetting Tracked Parameters” on page 4-37. For information about running the NBP test, see “NBP Test” on page 3-17.**

---

To remove the NBP module:

Step	
1	Separate the front and rear monitor case assemblies. See “Separating the Front and Rear Case Assemblies” on page 5-16.
2	Remove the main board assembly. See “Removing the Main Board Assembly” on page 5-21.
3	Remove the front end assembly. See “Removing the Front End Assembly” on page 5-26.

<p>4</p>	<p>Remove two Torx T10 screws and washers from the metal bracket holding the NBP module assembly to the bottom of the main board.</p> 
<p>5</p>	<p>Lift the NBP module and <i>gently</i> pull it free from the pressure sensor tube connectors on the main board.</p> 
<p>6</p>	<p>Disconnect the 6-pin connector from the main board and remove the NBP module.</p>

## Removing the NBP Filter

To remove the NBP filter:

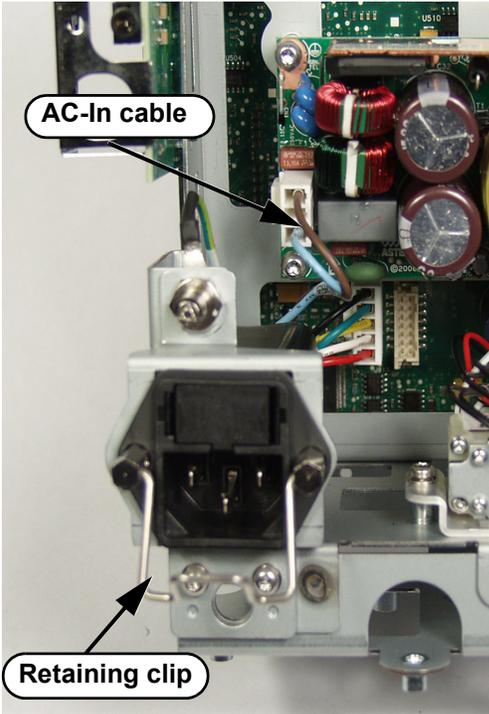
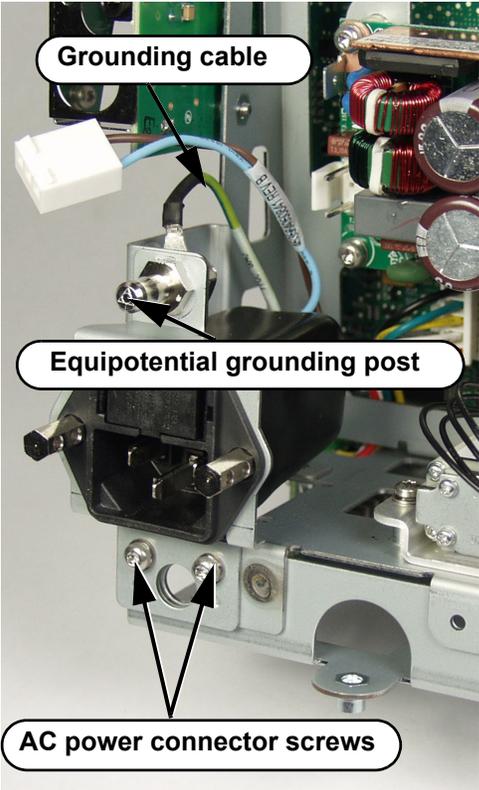
Step	
1	Separate the front and rear monitor case assemblies. See “Separating the Front and Rear Case Assemblies” on page 5-16.

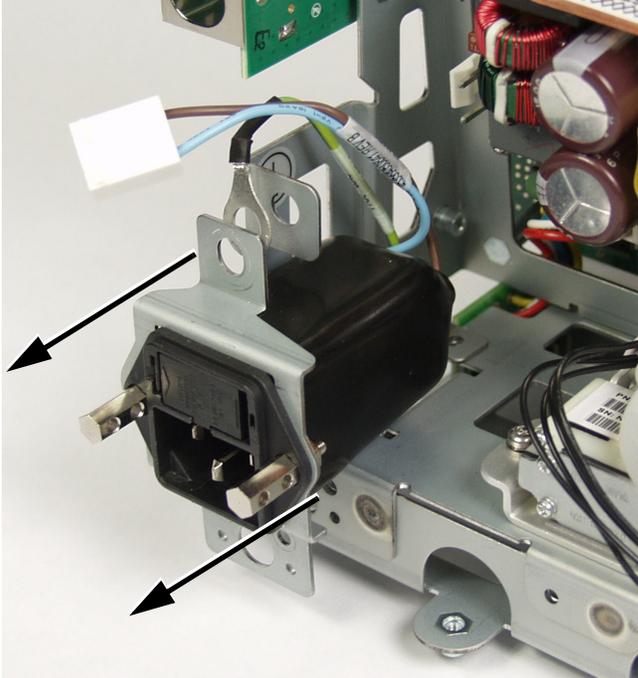
2	Remove the main board assembly. See “Removing the Main Board Assembly” on page 5-21.
3	Remove the front end assembly. See “Removing the Front End Assembly” on page 5-26.
4	Remove the NBP module. See “Removing the NBP Module” on page 5-37.
5	<p>Use wire cutters to cut the plastic zip tie securing the filter to the module, and then disconnect the filter from the NBP filter tube.</p> <div data-bbox="630 510 1312 1262" data-label="Image"> </div> <hr/> <p><b>Caution</b></p> <p><b>When you reassemble the NBP filter, secure it to the NBP module with a new plastic zip tie.</b></p> <hr/>

## Removing the AC Power Connector

To remove the AC power connector:

Step	
1	Separate the front and rear monitor case assemblies. See “Separating the Front and Rear Case Assemblies” on page 5-16.
2	Remove the main board assembly. See “Removing the Main Board Assembly” on page 5-21.

<p>3</p>	<p>Squeeze the power cord retaining clip and remove it from the bolts.</p>  <p>AC-In cable</p> <p>Retaining clip</p>
<p>4</p>	<p>Disconnect the AC-In cable from the main board assembly.</p>
<p>5</p>	<p>Remove the two AC power connector screws.</p>  <p>Grounding cable</p> <p>Equipotential grounding post</p> <p>AC power connector screws</p>

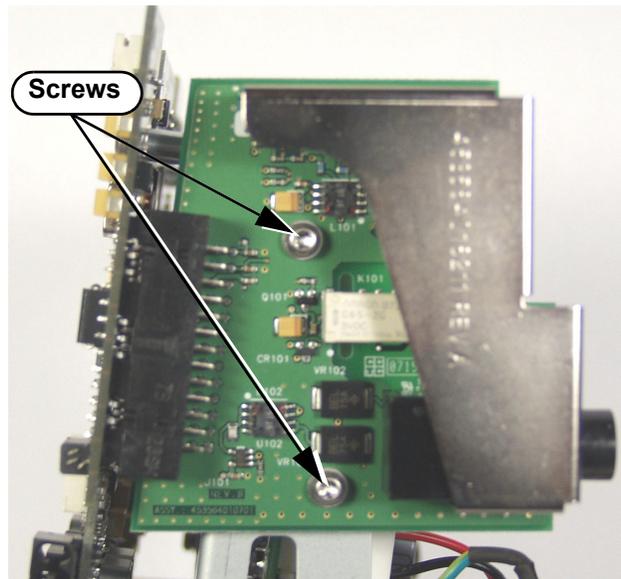
6	Use a 10 mm wrench to remove the washer from the equipotential grounding post and disconnect the cable from the lug.
7	<p>Slide the AC power connector out of the mounting bracket.</p> 

## Removing the Communications (LAN) Board

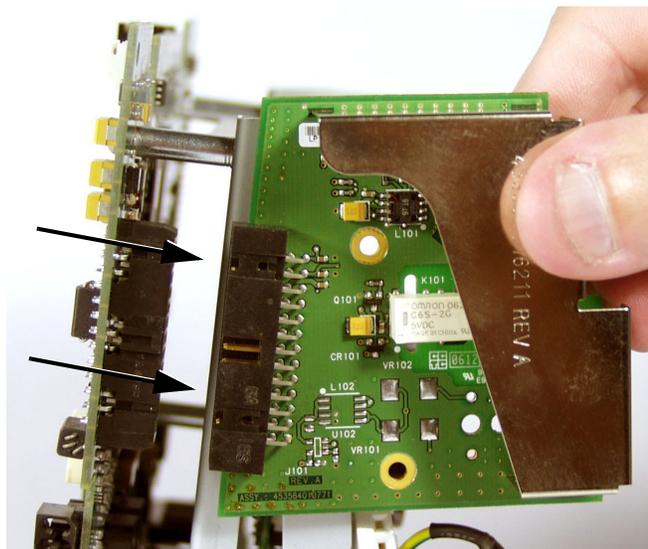
To remove the communications board:

Step	
1	Separate the front and rear monitor case assemblies. See “Separating the Front and Rear Case Assemblies” on page 5-16.
2	Remove the main board assembly. See “Removing the Main Board Assembly” on page 5-21.

- 3 Remove the two Torx T10 screws and washers holding the communications board to the main board assembly.

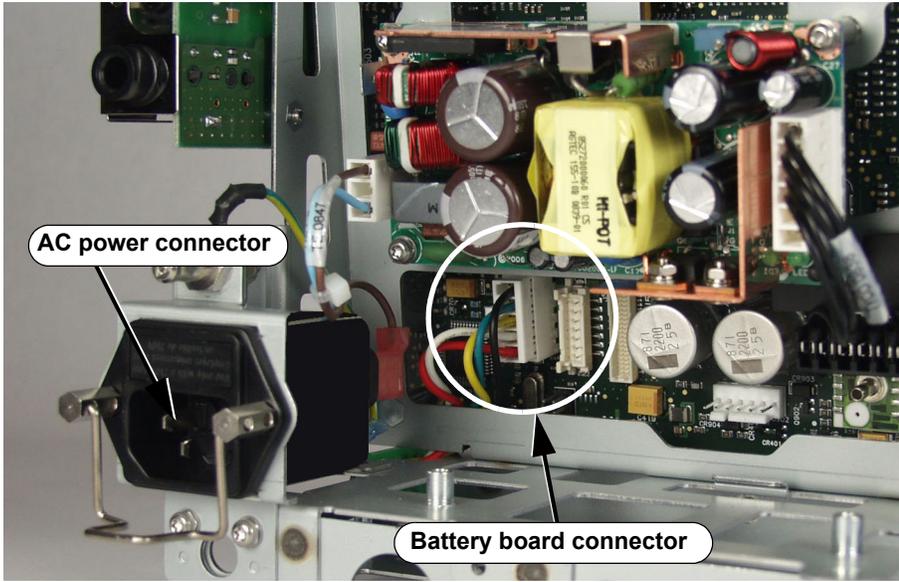
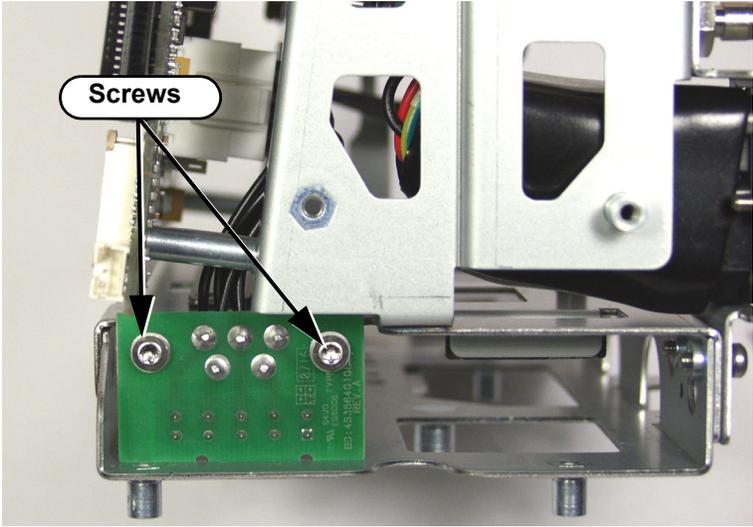


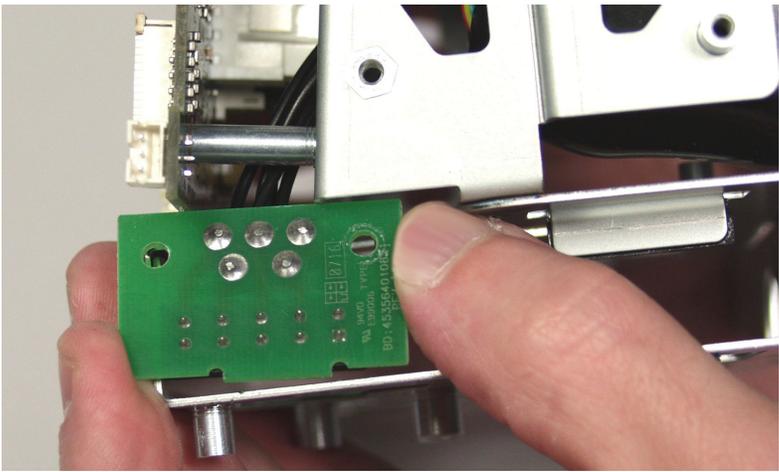
- 4 Pull the LAN board away from the 26-pin connector on the main board and remove it.



## Removing the Battery Connector Board

To remove the battery connector board:

Step	
1	Separate the front and rear monitor case assemblies. See “Separating the Front and Rear Case Assemblies” on page 5-16.
2	Remove the main board assembly. See “Removing the Main Board Assembly” on page 5-21.
3	<p>Disconnect the battery board connector from the main board on the main board assembly.</p> 
4	<p>Remove the two Torx T10 screws and washers holding the battery connector board.</p> 

5	<p>Lift the board out of the slot in the metal frame and remove it.</p> 
---	--

---

## Removing the LCD Assembly

---

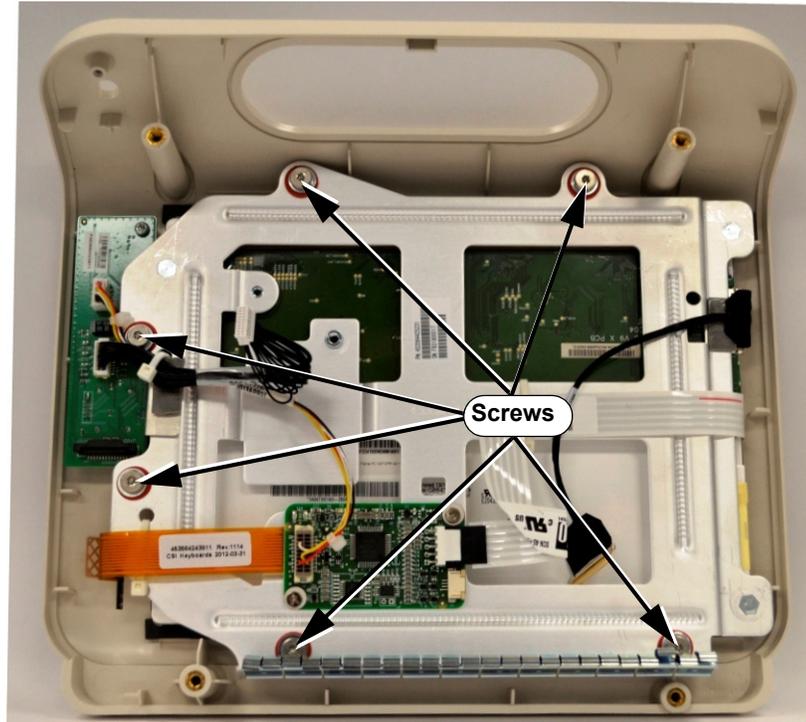
**Caution** Perform this procedure in a dust-free environment to avoid damage to the LCD display. After replacing the LCD, you must reset the LCD usage hours. For more information about resetting the LCD usage hours, see “Viewing and Resetting Tracked Parameters” on page 4-37.

---

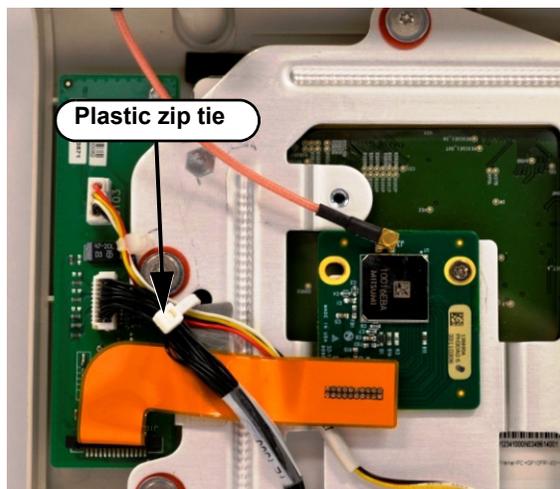
To remove the LCD assembly:

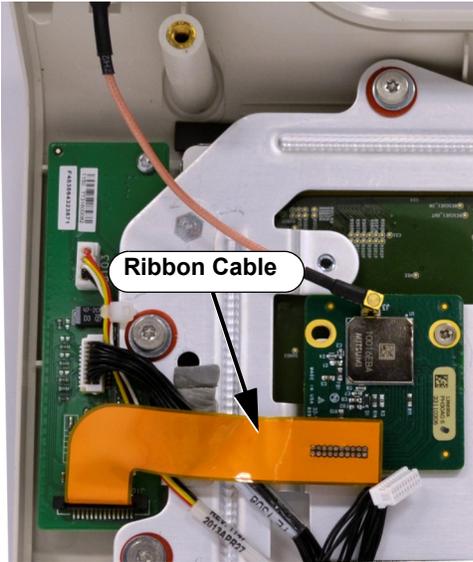
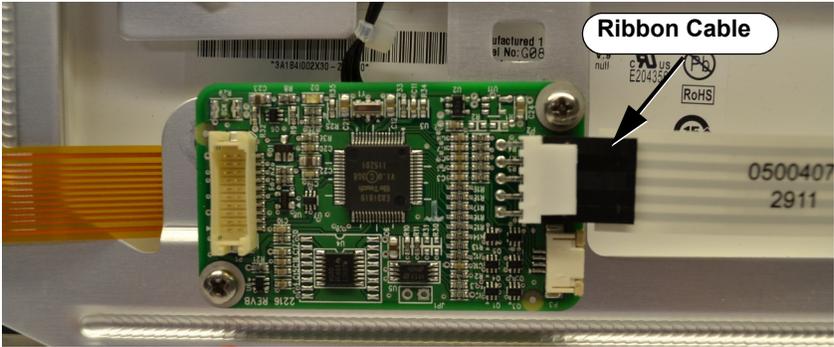
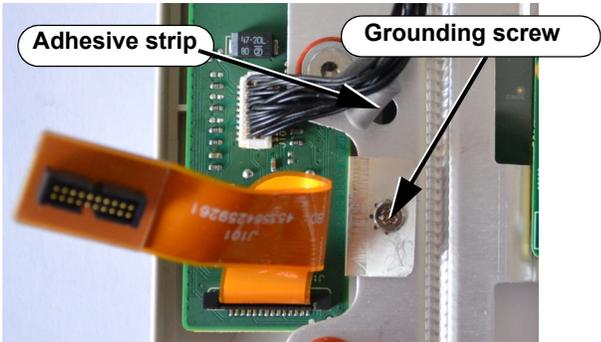
Step	
1	Separate the front and rear monitor case assemblies. See “Separating the Front and Rear Case Assemblies” on page 5-16.

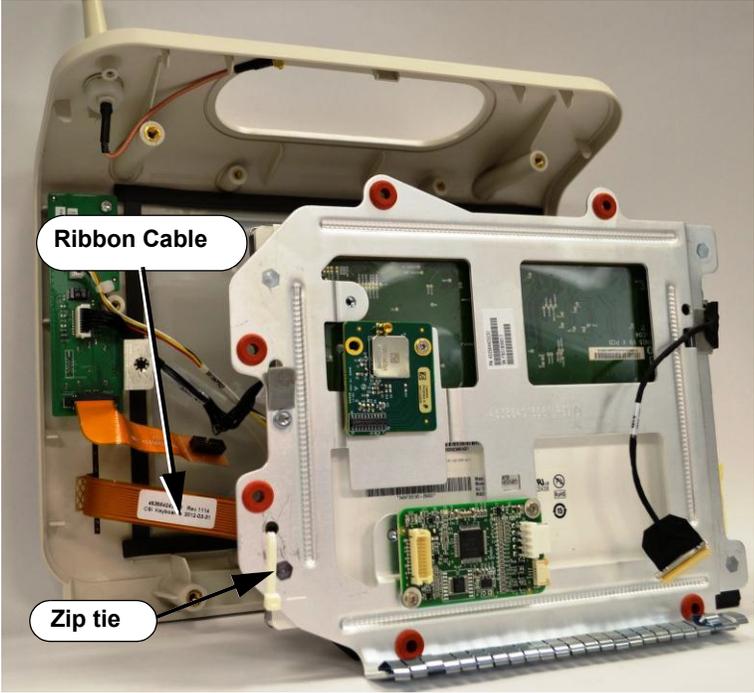
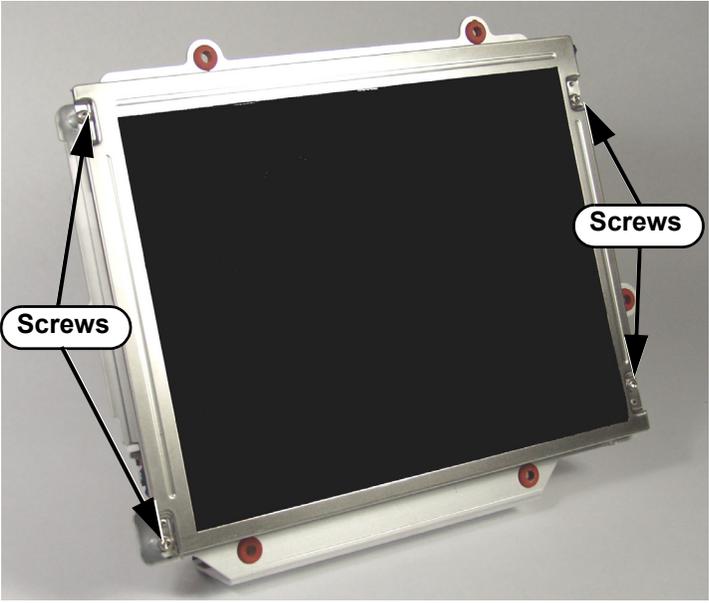
- 2 Remove the six Torx T10 screws that hold the LCD assembly and frame in place.



- 3 Remove the plastic zip tie from the navigation wheel cable.



4	<p>Disconnect the wireless board ribbon cable from the wireless board.</p>  <p>The image shows a green printed circuit board (PCB) with various components. A prominent orange ribbon cable is connected to a white connector on the board. A black arrow points from a white callout box labeled "Ribbon Cable" to the connection point.</p>
5	<p>Disconnect the touch screen board ribbon cable.</p>  <p>The image shows a green PCB with a white connector. A black arrow points from a white callout box labeled "Ribbon Cable" to the connection point. The PCB has various markings, including "Manufactured 1", "No. G08", "RoHS", and "0500407 2911".</p>
6	<p>Gently peel the adhesive strip from the LCD frame and lift the cables away from the LCD frame to expose the grounding screw.</p>  <p>The image shows a close-up of the LCD frame assembly. A white adhesive strip is being peeled away from the frame. A black arrow points from a white callout box labeled "Adhesive strip" to the strip. Another black arrow points from a white callout box labeled "Grounding screw" to a screw on the frame. An orange ribbon cable is also visible.</p> <p><b>Note</b> — Save the adhesive strip to use when you reassemble the front panel.</p>
7	<p>Remove the grounding screw with a Phillips screwdriver.</p>

<p>8</p>	<p>Gently pull the membrane switch ribbon cable through the zip tie and lift the LCD assembly out of the front case.</p>  <p>The image shows the internal components of the monitor's front case. A white plastic frame holds various electronic components, including a green printed circuit board (PCB) with a microcontroller and other chips. A black ribbon cable is connected to the PCB. A white zip tie is used to secure the cable. A label 'Ribbon Cable' with an arrow points to the black cable, and another label 'Zip tie' with an arrow points to the white tie. The case is open, showing the back of the LCD assembly.</p>
<p>9</p>	<p>Remove the four Phillips screws from the LCD frame.</p>  <p>The image shows a close-up of the LCD frame, which is a silver metal bezel surrounding the black LCD panel. Four Phillips screws are visible, one at each corner of the frame. Two arrows labeled 'Screws' point to the top-left and bottom-right screws, indicating they should be removed.</p>
<p>10</p>	<p>Remove the LCD from the LCD frame.</p>

## Removing the Navigation Wheel Assembly Board

To remove the navigation wheel assembly board:

Step	
1	Separate the front and rear monitor case assemblies. See “Separating the Front and Rear Case Assemblies” on page 5-16.
2	Remove the LCD assembly. See “Removing the LCD Assembly” on page 5-44.
3	Pull the wheel off of the stem. 

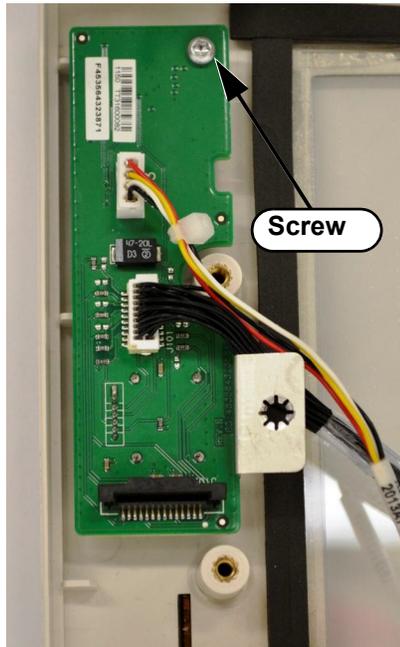
4

Remove the locking nut and washer.



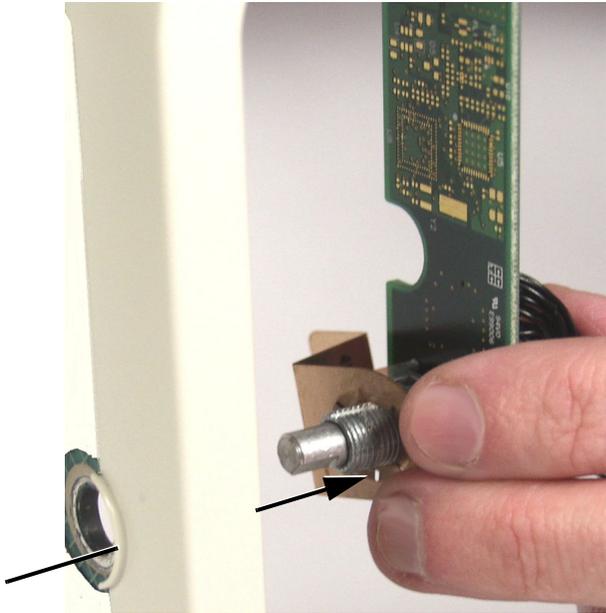
5

Remove the Torx T10 self-tapping screw.



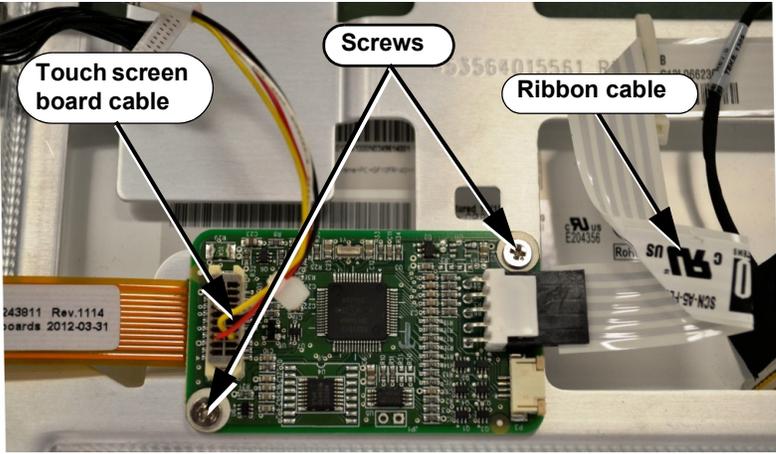
6 Press the stem while lifting off the wheel assembly.

**Note** — When you reattach the wheel, line up the flat side of the wheel to the flat side of the wheel stem.



## Removing the Touch Screen Board

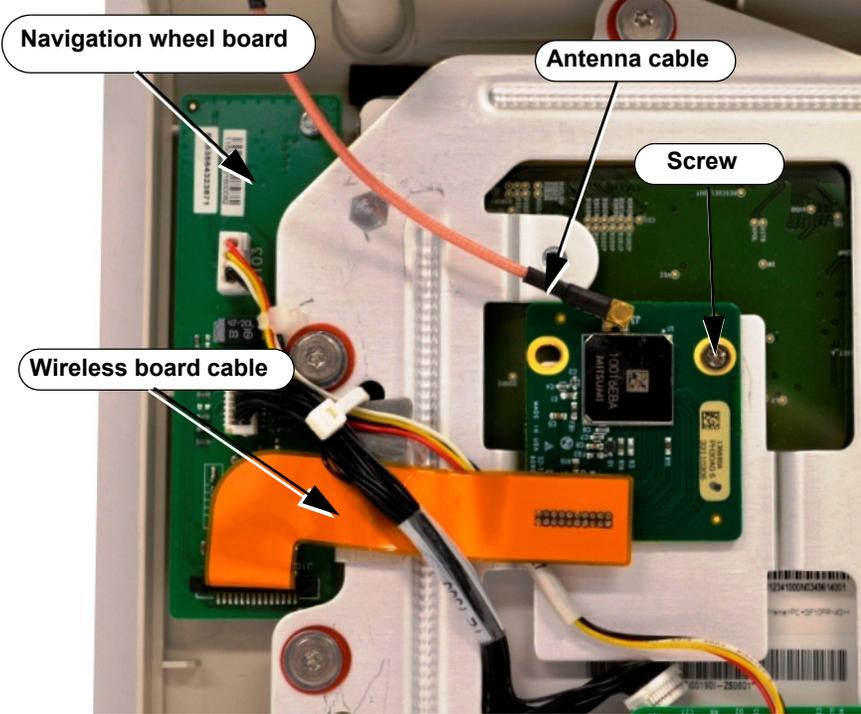
To remove the touch screen board:

Step	
1	Separate the front and rear case assemblies. See “Separating the Front and Rear Case Assemblies” on page 5-16.
2	<p>Disconnect the touch screen board cables.</p> 

3	Remove the two Phillips screws from the board, and then remove the board from the LCD frame.
---	--

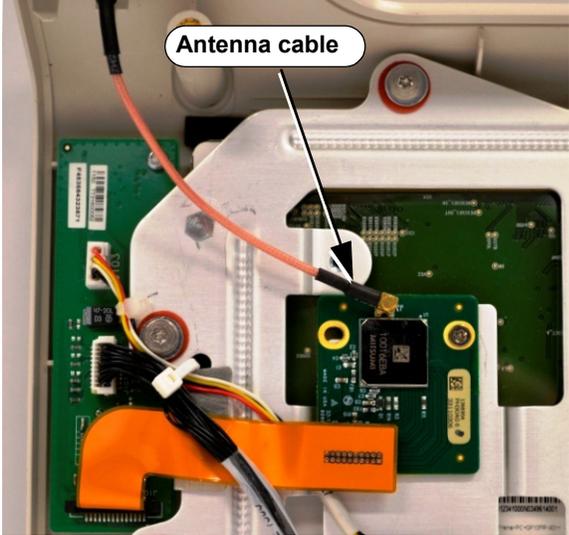
## Removing the Wireless Module

To replace the wireless module:

Step	
1	Separate the front and rear case assemblies. See “Separating the Front and Rear Case Assemblies” on page 5-16.
2	<p>Pull the antenna cable upward to disconnect it from the wireless board.</p>  <p>The photograph shows the internal components of a monitor. A green navigation wheel board is on the left, and a green wireless board is on the right. An orange antenna cable is connected to the wireless board. A black screw is visible on the wireless board. A black wireless board cable is connected to the navigation wheel board. Labels with arrows point to these components: 'Navigation wheel board', 'Antenna cable', 'Screw', and 'Wireless board cable'.</p>
3	Disconnect the wireless board cable from the navigation wheel board.
4	Remove the Phillips screw from the wireless board and remove the board from the LCD frame.

## Removing the Antenna

To replace the antenna:

Step	
1	Separate the front and rear case assemblies. See “Separating the Front and Rear Case Assemblies” on page 5-16.
2	Disconnect the antenna cable from the wireless board. 
3	With a 12 mm wrench, remove the washer and locking nut from the antenna and then remove the antenna from the front panel. 