PHILIPS

PAGEWRITER

SERVICE MANUAL

CONTENTS

CARDIOGRAPH AND PIM CLEANING

Warnings:

- Do not connect the Geodesic Sensor Net to any device or electrical source other than that specifically authorized by the manufacturer and never use the GSN without trained supervision. Accidental connection to a power source could result in death. Refer all servicing to the manufacturer or other qualified personnel.

- The primary variable for determining the severity of electric shock is the electric current that passes through the body. This current depends on the voltage and the resistance of the path it follows through the body. The following table provides a general framework for shock effects (Source: Nave & Nave, Physics for the Health Sciences, 3rd Ed. W.B. Saunders, 1985; also at http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html). Do not use the system for any application until you are adequately and properly trained on its safe and effective operation. If you are unsure of your ability to operate the system safely and effectively, do not use it. Operation of the system without proper and adequate training could lead to fatal or other serious personal injury.

PATIENT DATA CABLE AND LEAD WIRE CLEANING

This equipment has been verified by a recognized third-party testing agency as a Class I device with Type BF and Type CF isolated patient-applied parts, and Type B non-isolated patient-applied parts. (The safety standards met by this system are included in the "Specifications" section.) For maximum safety observe these warnings and cautions:

Cautions:

- For very long-term monitoring (e.g., days), EGI recommends removing and reapplying the HCGSN at least every 12 hours to improve comfort and to decrease the risk of skin irritation or breakdown. Careful monitoring of the patient is recommended.

- EGI recommends limiting recordings of infants to only 1 hour to decrease the risk of skin irritation or breakdown. Constant monitoring of the infant is required to prevent choking or strangling, and to allow for frequent examination for skin irritation. EGI recommends checking for skin pressure points, overturned sensors, and redness under the chin strap every 15 minutes to maximize infant comfort. Use only the AC adapter supplied with your system.

REUSABLE ELETRODE CLEANING

A list of precautions related to mechanical safety follows; observe these precautions when using the system:

- To prevent subject cross-contamination, make sure that the towels used by the subject and those used with the GSN are kept separate. Do not use the same towel to dry the subject's face or hair, and then to pat the Net dry. Also do not use the same towel for more than one subject.

- When attempting to overcome an obstacle, do not push the system from either side with excessive force, which could cause the system to tip over.

- Position external hardcopy devices away from the system. Ensure that they are secure. Do not stack them on the system. When positioning the monitor, move it carefully to avoid pinching hands or extremities against other objects, such as a bed rail.

- Never park the system on an incline.

- The brakes are intended as a convenience. To increase cart security, use wheel chocks when the system is parked.

- If system operation is abnormal after you move or transport the system, contact Philips Ultrasound Customer Service immediately. System components are installed securely and can withstand considerable shock, but excessive shock can cause a system failure.

- To avoid injury, Philips recommends against lifting the system cart.

Cautions:

- Before moving the system, ensure that the system is secured for transport. On some systems, that may include ensuring that the monitor is latched, to prevent monitor damage during transport.

- Ensure that the cables for all patient-applied parts are secure before moving the system. Use the cable management system to ensure that transducer cables are protected from damage.

- Do not roll the system over transducer cables or power cables.

- Do not use the system handle or transducer holders to move the cart.

- Never move the cart with the system on it, unless the system is properly attached to the cart.

- To avoid the possibility of tipping the system cart when you move it over a threshold, lift the cart slightly with the handle on the rear of the cart and pull the cart over the threshold.

CLEANING THE PRINT HEAD

Follow these precautions to protect your system:

Cautions:

- Excessive bending or twisting of cables on patient-applied parts may cause failure or intermittent operation of the system. Do not roll the system over cables, which may damage them.

- Improper cleaning or sterilization of a patient-applied part may cause permanent damage. For cleaning and disinfection instructions, see the "Transducer Care" section.

- Do not submerge the transducer connector in solution. The cables and transducer bodies are liquid-tight, but the connectors are not.

- Do not use solvents, such as thinner or acetone, or abrasive cleaners on the system, transducers, or any hardcopy device.

- For optimal performance, connect your ultrasound system to a circuit dedicated solely for the system. Do not connect life-support devices to the same circuit as the ultrasound system.

- If systems, transducers, and peripherals have been in an environment below 10°C (50°F), allow them to reach room temperature before connecting or turning them on. Philips recommends allowing 24 hours for complete normalization. Otherwise, condensation inside the devices could cause damage. If the device was only briefly exposed to temperatures below 10°C (50°F), then the time required for the device to return to room temperature could be significantly less than 24 hours.

- To avoid damaging the flat-panel display in the monitor, do not store the system where the ambient temperature exceeds 65°C (149°F).

CHANGING THE PRINTER PAPER

Electrolyte solutions (including those used by the GSN) are excellent electrical conductors. Implement and maintain disciplined procedures so that there is no chance of spilling electrolyte on any electronic equipment, including the system.

Warnings:

System changes and additions that are made without the appropriate training or by using unapproved spare parts may void the Philips warranty. As with all complex technical products, maintenance by unqualified persons or using unapproved spare parts carries serious risks of system damage and personal injury.
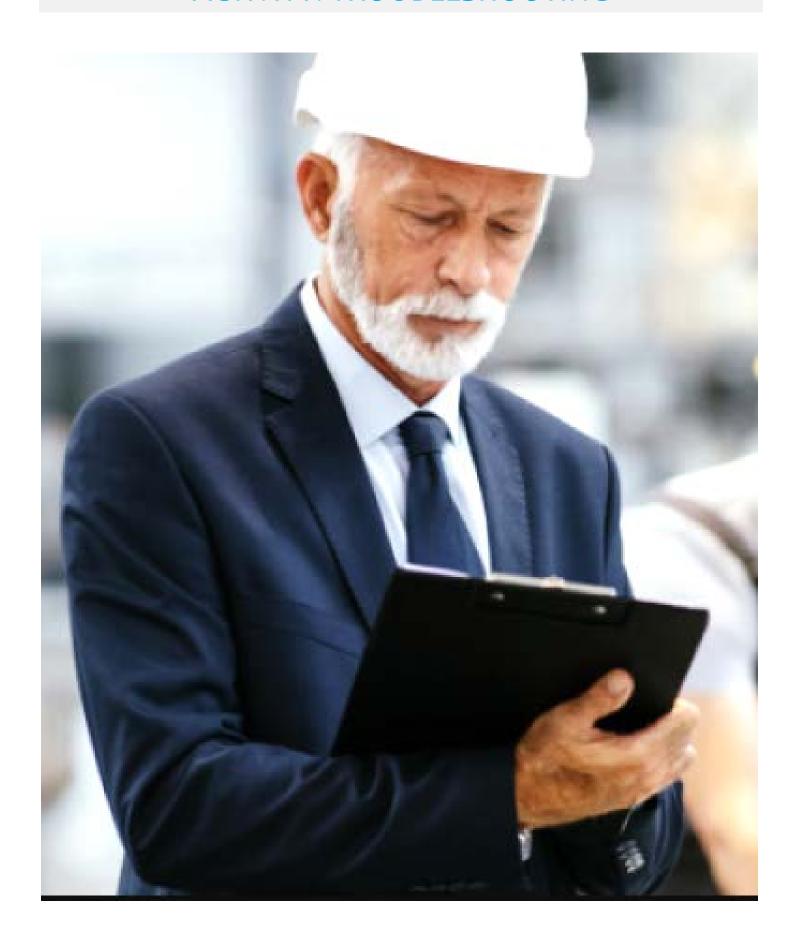
BATTERY MAINTENANCE AND CARE

This section contains information about biological safety and a discussion of the prudent use of the system.

A list of precautions related to biological safety follows; observe these precautions when using the system. For more information refer to Medical Ultrasound Safety on your user information CD.

Warnings:

- Do not use the system if an error message on the video display indicates that a hazardous condition exists. Note the error code, turn off power to the system, and call your customer service representative.

- Do not use a system that exhibits erratic or inconsistent image updating. Discontinuities in the scanning sequence indicate a hardware failure that must be corrected before use.

- Perform ultrasound procedures prudently. Use the ALARA (as low as reasonably achievable) principle.

- Use only acoustic standoffs that have been approved by Philips Ultrasound. For information on ordering approved accessories, see "Supplies and Accessories" on page 21.

- Verify the alignment of the biopsy guide before use. See the "Biopsy Guides" section.

- Verify the condition of the biopsy needle before use. Do not use a bent biopsy needle.

- Transducer covers may contain natural rubber latex. Those covers may cause allergic reactions in some individuals. See "FDA Medical Alert on Latex" on page 44.

- The M2203A bite guard strap contains natural rubber latex, which may cause allergic reactions. See "FDA Medical Alert on Latex" on page 44.

TROUBLESHOOTING CARDIOGRAPH ISSUES

In addition to the devices installed in the system cart, the system supports external devices.

- When using additional peripheral equipment powered from an electrical source other than the ultrasound system, the combination is considered to be a medical system. It is your responsibility to comply with IEC 60601-1-1 and test the system to those requirements. For more information on peripheral devices, see "Electrical Safety" on page 26. If you have questions, contact your Philips representative.

- Do not use nonmedical peripherals, such as report printers, within 1.5 m (5 ft) of a patient, unless the nonmedical peripherals receive power from an isolation transformer that meets medical safety standards, as defined by standard IEC 60601-1-1.

- Philips ultrasound systems are tested to the requirements of IEC 60601-1, with on-cart peripherals that are powered by the built-in isolation transformer. The system peripherals meet general electrical safety usage requirements, but not necessarily medical device standards.

- Off-cart devices connecting to the ultrasound system must comply with the applicable IEC or national standards, such as IEC 60601-1, IEC 60950, or the equivalent.

- Using accessories, transducers, peripherals, or cables not supplied with the ultrasound system or recommended by Philips can affect the system in the form of increased emissions or decreased immunity to external EMI/EMC occurrences.

- If systems, transducers, and peripherals have been in an environment below 10°C (50°F), allow them to reach room temperature before connecting or turning them on. Philips recommends allowing 24 hours for complete normalization. Otherwise, condensation inside the devices could cause damage. If the device was only briefly exposed to temperatures below 10°C (50°F), then the time required for the device to return to room temperature could be significantly less than 24 hours.

Note:

Any device that is not purchased from Philips or a Philips-authorized agent is not covered under a Philips service agreement or warranty.

RESTARTING THE CARDIOGRAPH

The life span of the Geodesic Sensor Net will vary depending on general care, frequency of use, and environmental differences. Most GSNs will last two years. Lightly used Nets will last considerably longer than their average life spans.

Cautions:

Never move the cart with the system on it, unless the system is properly attached to the cart.
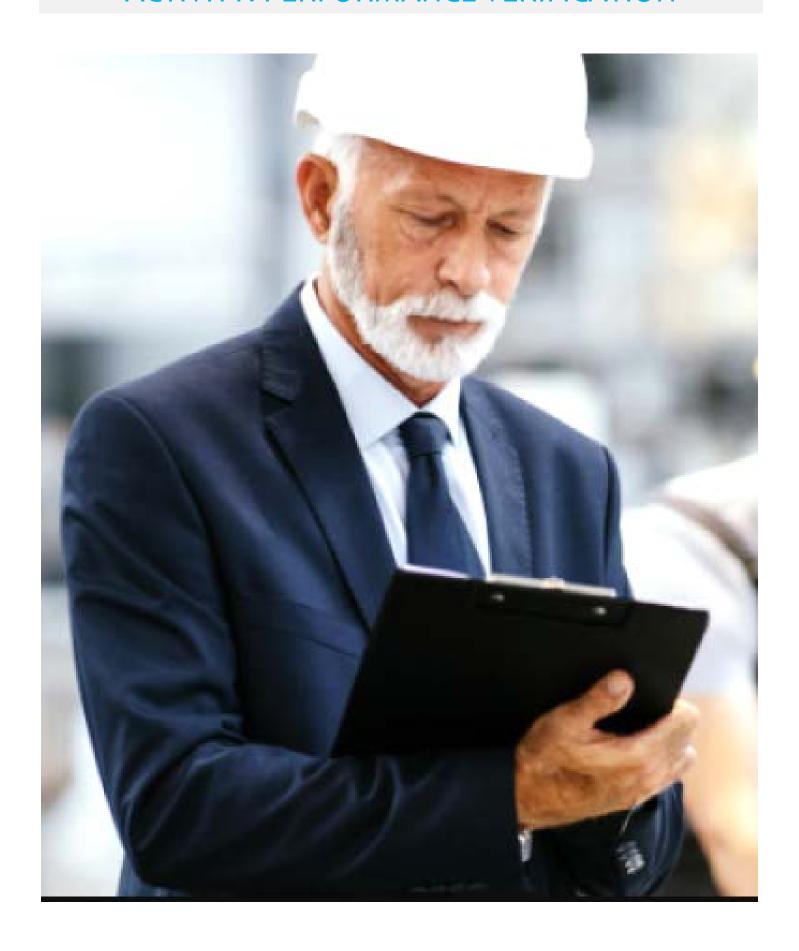
1. Slide the back of the system onto the rear latch so that the pins seat fully into the holes in the system. You may need to open and close the rear latch.

2. Lower the front of the system onto the cart until the front latch snaps into place.

3. Ensure that both latches are fully engaged and that the system is firmly attached to the cart.

4. Connect all required cables to the system.

USING THE SERVICE UTILITIES

The optional system cart includes a latch mechanism for securely attaching the system. Remove the system from the cart only when you are holding the system securely by the handle.

1. Disconnect all cables from the system.
1. Holding the handle of the system, release the front latch and slide the system out of the cart.
2. If the system configuration includes the Multiport adapter, put the connector into a transducer holder on the cart.

REQUIRED TESTING LEVELS

The ultrasound system is configured using the System setups. The configuration information for the system includes the IP address, port number, and other attributes required for transmitting images and other study data across a network.

The system must be configured before you use either the standard network support or the capabilities available through the DICOM Networking option. To configure the system, information must be typed into the corresponding fields in the System setups display.

Standard Network Support:

The system supports standard wired and wireless network functions, which include printing to local printers and report printers. Additional network capabilities are available in the DICOM Networking option.

DICOM Networking Option:

The DICOM Networking option permits network transfer of image and report information to a DICOM storage server or PACS. The system conforms to the Digital Imaging and Communications in Medicine (DICOM) standard, version 3.0. Centralized printers, print servers, network file servers, and review workstations that comply with the DICOM standard can take advantage of the DICOM Networking option.

With the DICOM Networking option, you can store ultrasound images on DICOM-compatible file servers or storage devices and review them using a workstation. You can also print studies directly to a DICOM printer. Capabilities include support for DICOM services such as Modality Worklist, Performed Procedure Step, and Storage Commit. Additionally, the DICOM Networking option includes the DICOM Structured Reporting option, which allows you to transfer tagged report data to a DICOM storage server or PACS.

The DICOM Networking option is initially set up by your Philips Ultrasound field service engineer or the system administrator. The DICOM setups are available from the System setups display or by clicking or . After you select DICOM, the options available to you depend upon the configuration of your system. The DICOM Networking option requires additional levels of setup.

Once the ultrasound system is configured, it remains that way through power cycles until you reconfigure it.

Configuration Information:

Before you can use either the standard network support or the capabilities provided by the DICOM Networking option, the system must be configured to communicate on the network. The system configuration information must contain the correct AE title, port number, and IP address for each device on the network, including the system and its subnet mask.

EXTERNAL REPAIRS

You must enter settings for your system before you connect your system to the network. If you have questions, see your network administrator.

Notes:

- You cannot make DICOM setup changes if you have a study open or if any DICOM jobs are pending. Close the open study and complete or delete pending DICOM jobs first. A message is displayed if you have pending jobs.

- If you change DICOM presets, the new preset's network settings are not applied immediately. You must first apply the network settings before trying to ping or create a new DICOM device in the new preset.

1. To avoid the possibility of conflicting IP addresses in static IP configurations, do not connect the LAN cable (if you are using a wired connection) or the wireless network adapter (if you are using a wireless connection) to the system. If it is already connected, disconnect it.

2. Press the Setup key.

3. On the System tab, click DICOM.

4. Click the DICOM Preset tab.

5. On the Change DICOM Preset menu, select the preset that you want to change.

6. Click Change Settings For Current Preset.

7. Click the This System tab.

8. In the System Name area, change the PC Name to that specified by your network administrator.

Notes:

- The AE title for each device on the network must be unique.

- AE titles are case sensitive. (That is, PACS1 is different from Pacs1.)

- In many institutions, the AE title is derived from the PC Name, which must be unique across the institution's network.

9. If the configuration of your system allows you to enter the AE title, enter it in the AE Title field as specified by your network administrator.

10. If the configuration of your system allows you to derive the AE title from the PC name, select Derive the AE Title Fromthe PC's Name and type the applicable information in the Format and PCNAME fields.

11. In the System Port Number area, type, or click the arrows to change, the port number specified by your network administrator.

INTERNAL REPAIRS

1. Press the **Setup** key.

2. On the **System** tab, click **DICOM**.

3. Click the **DICOM Preset** tab.

4. Select a preset from the **Change DICOM Preset** menu.

5. Click **Change Settings for Current Preset**.

6. Click the **This System** tab.

7. In the **System Name** area, click **Change** next to the **PC Name** field.

8. Enter the new computer name in the **Change Computer Name** dialog box.

9. Click **OK**.

10. In the **Change Confirmation** dialog box, click **OK**.

11. Shut down the system and restart it.

Notes:

After you change the PC Name, the system disables all DICOM options until you restart the system. After you restart the system, all installed DICOM options are available again.

UPGRADES

The system supports wireless networking.Wireless networking does not require the DICOM Networking option. The system supports only one wired or wireless network connection at a time.

The system supports the IEEE 802.11 b/g wireless networking specification.

Use only Philips-approved USB wireless network adapters with the system.

Notes:

- You cannot back up or restore wireless network settings, because they are not stored with DICOM presets.

- Wireless connection quality can be affected by many factors. The system may experience a connection interruption while a network job is in progress. If this occurs, the job remains in the job queue. When the connection is restored, the system resumes the job automatically.

- For more information about your wireless network adapter, see the documentation that accompanies the adapter.

- It is your responsibility to configure the wireless network security mechanisms that are compatible with your network.
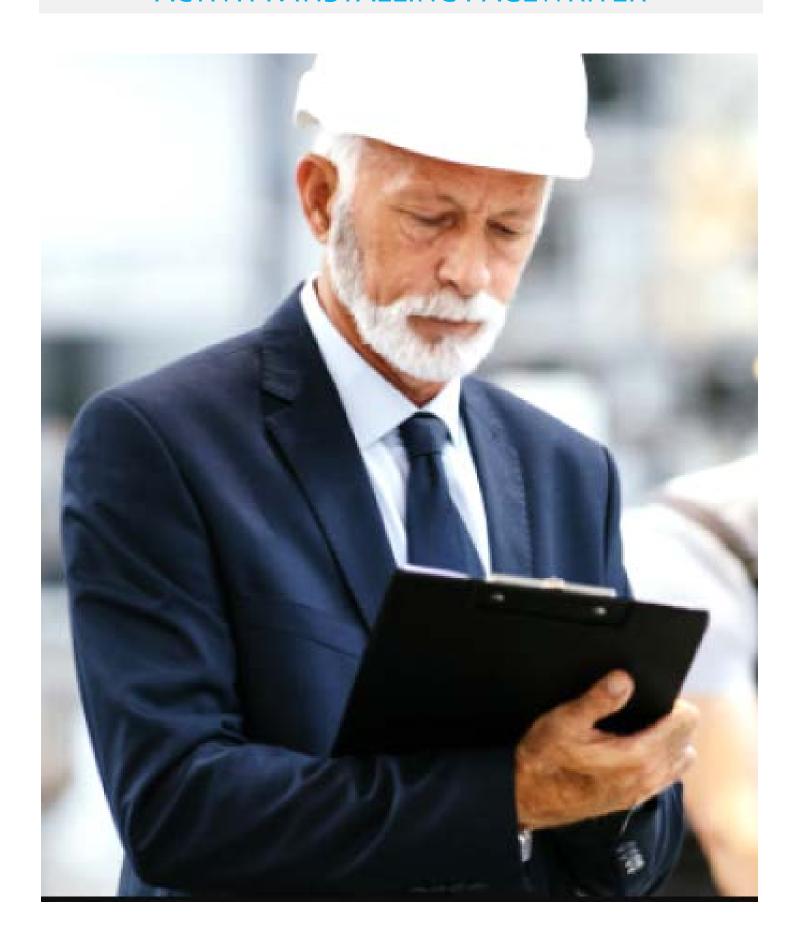
TEST AND INSPECTION MATRIX

Once you have enabled a wireless network connection, you can configure security and connection settings, including authentication and encryption methods and keys.

The following procedure includes steps for both adding and editing wireless networks. The methods for adding and editing networks differ depending on the configuration of your ultrasound system. If a step mentions a dialog box that does not appear on your system display, go to the step that follows it until the dialog box name in the step matches the dialog box that you see on your display.

Notes:

- After the wireless connection is enabled, you can remove and reconnect the wireless network adapter without disabling the wireless connection.

- The system supports Personal-level WI-Fi Protected Access (WPA) and Personal-level Wi-Fi Protected Access II (WPA2) but does not support Enterprise-Level WPA or Enterprise-level WPA2.

1. Plug the wireless network adapter into a USB port on the system.

2. Press the Setup key.

3. Click the System tab.

4. Click DICOM.

5. On the DICOM Preset tab, select a preset from the Change DICOM Preset menu, and click Change Settings for Current Preset.

6. On the This System tab, select Wireless from the Select Network Adapter list.

7. Click Wireless Properties.

8. If the Philips Medical Systems Wireless Properties dialog box appears, do the following to add a wireless network:

   a. Click Add.

   b. On the Association tab of the Wireless Network Properties dialog box, specify the wireless network settings:

SOFTWARE UPGRADES

The On/Off control is located on the upper left section of the control panel. When the system is on, the On/Off control is lit.

Cautions:

- If a charged battery is not installed in the system, do not unplug the AC adapter from the wall outlet until the system is completely off. If you unplug the AC adapter before the shutdown message appears and a charged battery is not installed in the system, you will have to wait longer than usual to use your system the next time you turn it on. You may also corrupt files, which can result in an inoperative system or the loss of patient data.

- Pressing and holding the On/Off control to force the system to shut down can cause the same problems as prematurely unplugging the system. Wait 90 seconds (or 3 minutes if DICOM activity is occurring) before assuming that the system has failed to shut down normally.

Notes:

- Always close all dialog boxes by clicking OK or Cancel before turning off the system.

- To break the connection from the main power supply, remove the ultrasound system plug from the wall outlet or remove the AC adapter connector from the system. On the cart, set the switch on the lower rear of the cart to and remove the ultrasound system plug from the wall outlet.

OBTAINING SOFTWARE

The system includes a clock/calendar function, which maintains accurate time and date even when the system is turned off and disconnected from power. The ystem uses the clock/calendar function to display the time and date on the imaging display, and to provide a time stamp on patient studies and acquired images. The system automatically adjusts the date for leap years but does not automatically update for daylight saving time.

1. Press the Setup key.
2. Click the System tab.
3. Click Date/Time.
4. If the Date and Time dialog box appears, do the following:
   a. To change the time zone: Click Change Time Zone, select your time zone from the Time Zone list, and click OK.
   b. To automatically adjust the time for daylight saving time: Click Change Time Zone, select Automatically Adjust Clock for Daylight Saving Time, and click OK.
   c. To change the date: Click Change Date and Time, change the month by clicking or . Click the date in the calendar.
   d. To change the time: Double-click the hours, minutes, and seconds, and type the correct numbers. Click AM or PM and click or .
   e. Click OK.
   f. Click OK and then click Close.

INSTALLING THE SOFTWARE UPGRADE

The compact optional compact cart provides storage for transducers and supplies, adjustable system height, and wheels that swivel for maneuverability. The cart provides isolated power for the system and for peripheral devices.

Installing the AC Adapter:

Use this procedure to install the AC adapter on the cart and connect the power cables. For instructions on connecting the AC adapter without the cart, see "Using the AC Adapter" on page 147.

Warnings:

Connect the system only to a hospital-grade outlet.

VERIFYING THE SOFTWARE INSTALLATION

The system includes a variety of controls, all of which are located on the control panel. These controls include imaging controls, quick keys, and the keyboard.

Control Panel:

The control panel contains the imaging controls. These controls include buttons, knobs, TGC and LGC slide controls, and a trackball. The control panel also allows you to select transducers, enter patient data, review and annotate images, perform measurements and calculations, and change setups.

Eight quick key controls are located along the top of the control panel. Each control corresponds to a display above it on the monitor, which may contain one or two functions. Quick key controls are specific to the current operating mode.

The keyboard is used to enter patient data, comments, and text annotations on images. CX50.

ENABLING THE UPGRADE OPTIONS

You can change the monitor brightness and tint in the setups or by using a keyboard shortcut. The system can automatically optimize the brightness of the controls and the image on the monitor based on ambient light. This feature ensures that display brightness conforms to the DICOM Grayscale Standard Display Function.

Changing the Monitor Tint:

You can change the tint of the monitor image. The tint setting affects only the appearances of images on the monitor; it does not affect saved or exported images. The following settings are available:

• sRGB (For routine use, Philips recommends this setting.)

• 1-4

Do one of the following:

• Press Ctrl+T repeatedly to cycle through the tint settings.

• On the System tab in the setups, click a setting for Monitor Tint, click Apply, and then click Close.

Changing the Monitor Brightness:

You can change the brightness of the monitor display. The brightness setting affects only the brightness of the monitor display; it does not affect saved or exported images. Also, the system can automatically control the brightness of both the monitor and the controls on the control panel, based on room lighting (see "Enabling Automatic Brightness Control" on page 138). When automatic brightness is enabled, the Monitor Brightness setting in the setups allows you to fine tune the automatic brightness setting.