NOTE: The information in this manual applies to CARESCAPE B850 monitors.

NOTE: For technical documentation purposes, the abbreviation GE is used for the legal entity name, GE Medical Systems Information Technologies and GE Healthcare Finland Oy.

Listed below are GE Medical Systems Information Technologies and GE Healthcare Finland Oy trademarks used in this document. All other product and company names contained herein are the property of their respective owners.

MUSE, TRAM, Tram-Net, Tram-Rac, TRIM KNOB, and Unity Network are trademarks of GE Medical Systems Information Technologies registered in the United States Patent and Trademarks Office.

12SL, CARESCAPE, and iPanel are trademarks of GE Medical Systems Information Technologies.

Entropy is a trademark of GE Healthcare Finland Oy.

NOTE: The Patient Data Module (PDM) is described in promotional materials as the CARESCAPE™ Patient Data Module.

NOTE: A portion of the Entropy software is derived from the RSA Data Security, Inc. MD5 Message-Digest Algorithm.
Notes to the reader

This technical manual is presented in two parts.

- Part I, system installation, provides an overview of the patient monitoring system and contains information needed to initially install, configure, check out and troubleshoot the system. Make sure you understand the procedures before installing the patient monitor. Observe all safety hazard statements.
- Part II, repair and maintenance, contains detailed descriptions of the patient monitor components (such as processor board and power supply) and the display. Instructions for calibration, planned maintenance, troubleshooting, disassembly and field replaceable units are also included.

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Introduction to Patient Monitor Repair Overview

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1 Introduction
### Intended use

The CARESCAPE™ Monitor B850 is a multi-parameter high acuity patient monitor intended for use in multiple areas within a professional healthcare facility.

The CARESCAPE Monitor B850 is intended for use on adult, pediatric, and neonatal patients and on one patient at a time.

The CARESCAPE Monitor B850 system is indicated for monitoring of Hemodynamic (including ECG, ST Segment, Arrhythmia Detection, ECG Diagnostic Analysis and Measurement, Invasive Pressure, Noninvasive Blood Pressure, Pulse Oximetry, Cardiac Output, Temperature, Impedance Respiration and SvO2 (Mixed Venous Oxygen Saturation)), Airway Gases (Fi/Et CO2, O2, N2O and Anesthetic Agent), Spirometry, Gas Exchange (O2 Consumption (VO2), CO2 production (VCO2), energy expenditure (EE), and respiratory quotient (RQ)) and neurophysiological (including electroencephalography (EEG), Entropy, Bispectral Index (BIS) and Neuromuscular Transmission (NMT) Monitoring) status.

The CARESCAPE Monitor B850 provides alarms, trends, snapshots and events, and calculations and can be connected to displays, printers and recording devices. The CARESCAPE Monitor B850 can be a stand-alone monitor or interfaced to other devices. It can also be connected to other monitors for bed to bed viewing and to data management software devices via a network.

The CARESCAPE Monitor B850 is intended for use under the direct supervision of a licensed healthcare practitioner, or by personnel trained in proper use of the equipment in a professional healthcare facility. In addition to the healthcare practitioner, the CARESCAPE Monitor B850 is designed to provide configuration and troubleshooting capabilities to qualified service personnel.

The CARESCAPE Monitor B850 is not intended for use during MRI.
Manual purpose

This manual supplies technical information for service representatives and technical personnel so they can install and maintain the equipment to the assembly level. Use it as a guide for installation, maintenance and electrical repairs considered field repairable. Where necessary the manual identifies additional sources of relevant information and technical assistance.

See the user’s manual for the instructions necessary to operate the equipment safely in accordance with its function and intended use.

Intended audience

This manual is intended for service representatives and technical personnel who install, maintain, troubleshoot, or repair this equipment.

Ordering manuals

A paper copy of this manual will be provided upon request. Contact your local GE representative and request the part number on the first page of the manual.

Related documents

- CARESCAPE Monitor B850 Addendum for Device Compatibility
- CARESCAPE Monitor B850 Defaults Reference Manual
- CARESCAPE Monitor B850 Software Installation Instructions
- CARESCAPE Monitor B850 Supplies and Accessories document
- CARESCAPE Monitor B850 Technical Specifications Supplement
- CARESCAPE Monitor B850 User’s Manual
- CARESCAPE Monitors Clinical Reference Manual
- CARESCAPE Network Configuration Guide
- Module Frames and Modules Technical Manual
- Mounting Reference Guide
- TRAM and Tram-Rac Modules Supplemental Information manual
Conventions used in this manual

Within this manual, special styles and formats are used to distinguish among terms viewed on screen, a button you must press, or a list of menu commands you must select:

- For technical documentation purposes, the abbreviation GE is used for the legal entity names, GE Medical Systems Information Technologies and GE Healthcare Finland Oy.
- Names of hardware keys on the equipment, keypad, remote control, and modules are written in **bold** typeface: *Zero All*.
- Menu items are written in *bold italic* typeface: *ECG Setup*.
- Emphasized text is in *italic* typeface.
- Menu options or control settings selected consecutively are separated by the > symbol: *ECG Setup > AFIB*.
- When referring to different sections in this manual, section names are enclosed in double quotes: “Cleaning and care.”
- The word “select” means choosing and confirming.
- Messages (alarm messages, informative messages) displayed on the screen are written inside single quotes: *‘Learning’*
- Note statements provide application tips or other useful information.

Product references

In this manual, the CARESCAPE Monitor B850 is referred to as the patient monitor.
Safety information

Responsibility of the manufacturer

GE is responsible for the effects of safety, reliability, and performance only if:

- Assembly operations, extensions, readjustments, modifications, or repairs are carried out by persons authorized by GE.
- The electrical installation of the relevant room complies with the requirements of the appropriate regulations.
- The equipment is used in accordance with the instructions for use.
- The equipment is installed, maintained and serviced in accordance with the instructions provided in the related technical manuals.

Product availability

Some of the products mentioned in this manual may not be available in all countries. Please consult your local representative for the availability.

General safety statements

See the user’s manual for a list of general safety statements.

This device is intended for use under the direct supervision of a licensed health care practitioner.

Contact GE for information before connecting any devices to the equipment that are not recommended in this manual.

Parts and accessories used must meet the requirements of the applicable IEC 60601 series safety standards, and/or the system configuration must meet the requirements of the IEC 60601-1-1 medical electrical systems standard. Refer to the CARESCAPE supplies and accessories document for compatible parts and accessories.

Periodically, and whenever the integrity of the device is in doubt, test all functions.

The use of accessory equipment not complying with the equivalent safety requirements of this equipment may lead to a reduced level of safety of the resulting system. Consideration relating to the choice shall include:

- use of the accessory in the patient vicinity; and
- evidence that the safety certification of the accessory has been performed in accordance to the appropriate IEC 60601-1 and/or IEC 60601-1-1 harmonized national standard.

If the installation of the equipment, in the USA, will use 240VAC rather than 120VAC, the source must be a center-tapped, 240VAC, single-phase circuit.
Safety message signal words

Safety message signal words designate the severity of a potential hazard.

Danger: Indicates a hazardous situation that, if not avoided, will result in death or serious injury. No danger messages apply to this system.

Warning: Indicates a hazardous situation that, if not avoided, could result in death or serious injury.

Caution: Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

Notice: Indicates a hazardous situation not related to personal injury that, if not avoided, could result in property damage.

Product security

The patient monitoring software incorporates an assortment of security features designed to allow a flexible approach to safe and secure implementation, focusing on the principles of confidentiality, integrity, and availability. These features assist you in using the system in a manner that protects patient privacy and security in your setting, and also addresses expectations for the environment where the system will be used.

Security features

Access control

Access control is the overall mechanism used to determine and enforce the following:

- Who has access
- How individuals gain access
- When access is permitted
- What information may be accessed

Other than clinical and Webmin applications, access to other sub-systems (e.g., BIOS) are restricted. The clinical and Webmin application interfaces have a role-based access control (e.g., biomed and clinical). A user may log into these interfaces (e.g., Webmin) to perform operations that are limited to the generic user. See the user and technical manuals for detailed information on available features.

Authentication

Authentication is the process of proving individual identity, and is a key element in an access control system. In the clinical and Webmin applications, there are certain features that requires user authentication. To access these features, the user must log into the clinical and Webmin applications with a valid username and password. See “Passwords” on page 4-24 for detailed information on managing passwords.

Authorization

Authorization is the process of granting and revoking access to information, and is another key element in an access control system. Although primarily an
administrative process that is driven by an organization’s policies and procedures, the patient monitor contains features that will help implement and enforce an organization’s method.

Both clinical and Webmin applications have an authorization mechanism to provide information to the user.

**Audit**
The ability to record and examine system activity is crucial to a successful information security program, as well as a regulatory requirement in most environments. The patient monitor stores system and Webmin access logs.

**Malicious software protection**
Vigilant defense on many levels is required to keep systems free from compromise by malicious software. Effective protection requires cooperation and partnership between GE and our customers.

Based on the Linux Operating System, the patient monitor has a built-in firewall to allow external communication to occur on a limited number of ports on the IX Network. See “Network security” on page 1-8 for details.

The following product features contribute to defense against malicious software:

- **System integrity checking**
  The patient monitor performs integrity checking on the root file system to detect any changes to the file system contents. Any modification to the root file system contents will generate an error to the patient monitoring software application. The patient monitoring software will then display a technical alarm to the user.

- **Device design and configuration (hardening)**
  The patient monitor has been hardened through the restriction and removal of user access to core operating system functionality. In addition, unneeded functionality has been removed or restricted.

- **Antivirus software**
  To provide seamless real-time patient monitoring, the patient monitor does not have antivirus software.

- **Security updates and patching processes**
  Security updates and patches cannot be applied to the CARESCAPE product without going through GE’s rigorous software verification and validation process. Any software update needs will be communicated by GE.
Security operations

Network security
GE requires that the MC port of the patient monitor be connected to a physically or virtually dedicated CARESCAPE Network MC Network, isolated from all other networks.

GE requires that the IX port of the patient monitor be connected to a physically or virtually dedicated CARESCAPE Network IX Network with controlled connection to the organization’s general purpose computing network. Traffic between the organization’s network and IX port of the patient monitor must be limited to the following packet flows listed below.

Inbound

<table>
<thead>
<tr>
<th>Source device</th>
<th>Destination device</th>
<th>Protocol</th>
<th>Destination port</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any</td>
<td>CARESCAPE Monitor B850</td>
<td>icmp</td>
<td>N/A</td>
<td>ping</td>
</tr>
<tr>
<td>Customer defined</td>
<td></td>
<td>tcp</td>
<td>10000</td>
<td>Webmin</td>
</tr>
<tr>
<td>Customer defined</td>
<td></td>
<td>tcp</td>
<td>10001</td>
<td>Software transfer</td>
</tr>
<tr>
<td>DHCP server</td>
<td></td>
<td>tcp</td>
<td>67, 68</td>
<td>DHCP</td>
</tr>
</tbody>
</table>

Packets that are part of the communication initiated by authorized devices in the organization’s network are allowed to go out of the IX network (reflexive).

Outbound

<table>
<thead>
<tr>
<th>Source device</th>
<th>Destination Device</th>
<th>Protocol</th>
<th>Destination port</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>CareSCAPE Monitor B850</td>
<td>us1-ws.service.gehealthcare.com</td>
<td>tcp</td>
<td>443</td>
<td>InSite with ExC (Web Services)</td>
</tr>
<tr>
<td></td>
<td>us1-rd.service.gehealthcare.com</td>
<td>tcp</td>
<td>443</td>
<td>InSite with ExC (Remote Tunnel)</td>
</tr>
<tr>
<td>Citrix Server</td>
<td>tcp</td>
<td>1494</td>
<td>Citrix</td>
<td></td>
</tr>
<tr>
<td>Printer</td>
<td>tcp</td>
<td>631</td>
<td>Printing</td>
<td></td>
</tr>
<tr>
<td>MUSE</td>
<td>tcp</td>
<td>80</td>
<td>MUSE</td>
<td></td>
</tr>
</tbody>
</table>

Packets that are part of the communication initiated by the patient monitor are allowed into the IX Network (reflexive).
**Maintenance**
After performing maintenance, record the service performed by using the check form provided with the technical manuals.

**Media Access Control Points**
The patient monitor will ignore all external USB storage devices.

**Product change management**
GE has rigorous software verification and validation processes. Any software update needs will be communicated by GE. The patient monitoring system, including all aspects of software, should be used as it was intended by GE.

**Communication**
For detailed product security information, go to one of the following Web addresses:

## Equipment symbols

**NOTE**

The following symbols appear on one or more of the devices.

<table>
<thead>
<tr>
<th>Abbreviation for label part number.</th>
<th>Alternating current.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atmospheric pressure limitations.</td>
<td>Bell cancel. Audio off.</td>
</tr>
<tr>
<td>Batch or lot number.</td>
<td>Bell cancel. Temporary audio off.</td>
</tr>
<tr>
<td>Battery.</td>
<td>Color display connector port.</td>
</tr>
</tbody>
</table>

Date of manufacture. This symbol indicates the date of manufacture of this device. The first four digits identify the year and the last two digits identify the month.
<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defib. Sync.</td>
<td>Defibrillator synchronization connector port.</td>
</tr>
<tr>
<td>IPX1</td>
<td>Degree of ingress protection.</td>
</tr>
<tr>
<td>REF</td>
<td>Catalog or orderable part number.</td>
</tr>
<tr>
<td>SN</td>
<td>Device serial number.</td>
</tr>
<tr>
<td></td>
<td>Direct current.</td>
</tr>
<tr>
<td></td>
<td>Display brightness controls.</td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
<tr>
<td>a u</td>
<td>Display speaker volume controls.</td>
</tr>
<tr>
<td></td>
<td>Equipotentiality. Connect device to a potential equalization conductor.</td>
</tr>
<tr>
<td></td>
<td>Ethernet connector port.</td>
</tr>
<tr>
<td>EC REP</td>
<td>European authorized representative.</td>
</tr>
<tr>
<td>Icon</td>
<td>Description</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
</tr>
<tr>
<td>☀️</td>
<td>European Union Declaration of Conformity.</td>
</tr>
<tr>
<td>☀️</td>
<td>FCC. USA only. Complies with applicable US government (Federal Communications Commission) radio-frequency interference regulations.</td>
</tr>
<tr>
<td>🍷</td>
<td>Fragile. Handle with care.</td>
</tr>
<tr>
<td>🌐</td>
<td>Fuse. Replace with identical type and rating fuse.</td>
</tr>
<tr>
<td>⛃️</td>
<td>Gas inlet.</td>
</tr>
<tr>
<td>⛃️</td>
<td>Gas outlet.</td>
</tr>
<tr>
<td>⚠️</td>
<td>General alarm.</td>
</tr>
<tr>
<td>🏡</td>
<td>Home. Return to the main display.</td>
</tr>
<tr>
<td>🌡️</td>
<td>Humidity limitations.</td>
</tr>
<tr>
<td>🌧️</td>
<td>Keep dry. Protect from rain.</td>
</tr>
<tr>
<td>🏦</td>
<td>Manufacturer name and address.</td>
</tr>
</tbody>
</table>
Mercury. This product consists of devices that may contain mercury, which must be recycled or disposed of in accordance with local, state, or country laws. (Within this system, the backlight lamps in the monitor display contain mercury.)

<table>
<thead>
<tr>
<th>Icon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON.</td>
<td>Power connection to the mains.</td>
</tr>
<tr>
<td></td>
<td>Power indicator.</td>
</tr>
<tr>
<td></td>
<td>Power supply connector.</td>
</tr>
<tr>
<td></td>
<td>Power switch.</td>
</tr>
<tr>
<td>Rx ONLY U.S.</td>
<td>Prescriptive Device. USA only. For use by or on the order of a Physician, or persons licensed by state law.</td>
</tr>
<tr>
<td></td>
<td>Press to open.</td>
</tr>
<tr>
<td></td>
<td>Protective earth ground. Connectors grounded to the AC power source.</td>
</tr>
<tr>
<td></td>
<td>Recycled materials or may be recycled.</td>
</tr>
<tr>
<td>Russia only. GOST-R mark.</td>
<td></td>
</tr>
<tr>
<td>Serial interface.</td>
<td></td>
</tr>
<tr>
<td>Signal/power input.</td>
<td></td>
</tr>
<tr>
<td>Icon</td>
<td>Description</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
</tr>
<tr>
<td><img src="image" alt="Signal/power input/output (combined)." /></td>
<td>Signal/power input/output (combined).</td>
</tr>
<tr>
<td><img src="image" alt="Signal/power output." /></td>
<td>Signal/power output.</td>
</tr>
<tr>
<td><img src="image" alt="Stacking limit by number." /></td>
<td>Stacking limit by number.</td>
</tr>
<tr>
<td><img src="image" alt="Standby or power indicator." /></td>
<td>Standby or power indicator.</td>
</tr>
<tr>
<td><img src="image" alt="Temperature limitations." /></td>
<td>Temperature limitations.</td>
</tr>
<tr>
<td><img src="image" alt="This way up." /></td>
<td>This way up.</td>
</tr>
<tr>
<td><img src="image" alt="Tram-Net and ePort connector for PDM module, E-module frame, Tram-Rac housing, and TRAM modules." /></td>
<td>Tram-Net and ePort connector for PDM module, E-module frame, Tram-Rac housing, and TRAM modules.</td>
</tr>
<tr>
<td><img src="image" alt="Underwriters Laboratories product certification mark." /></td>
<td>Underwriters Laboratories product certification mark.</td>
</tr>
<tr>
<td><img src="image" alt="USB connector port." /></td>
<td>USB connector port.</td>
</tr>
<tr>
<td><img src="image" alt="Zero all." /></td>
<td>Zero all.</td>
</tr>
<tr>
<td><img src="image" alt="This symbol indicates that the waste of electrical and electronic equipment must not be disposed as unsorted municipal waste and must be collected separately. Please contact an authorized representative of the manufacturer for information concerning the decommissioning of your equipment." /></td>
<td>This symbol indicates that the waste of electrical and electronic equipment must not be disposed as unsorted municipal waste and must be collected separately. Please contact an authorized representative of the manufacturer for information concerning the decommissioning of your equipment.</td>
</tr>
</tbody>
</table>
NOTE

The following symbols (required by China law only) are representative of what you may see on your equipment.

The number in the symbol indicates the EFUP period in years, as explained below. Check the symbol on your equipment for its EFUP period.

This symbol indicates the product contains hazardous materials in excess of the limits established by the Chinese standard SJ/T11363-2006 Requirements for Concentration Limits for Certain Hazardous Substances in Electronic Information Products. The number in the symbol is the Environment-friendly User Period (EFUP), which indicates the period during which the toxic or hazardous substances or elements contained in electronic information products will not leak or mutate under normal operating conditions so that the use of such electronic information products will not result in any severe environmental pollution, any bodily injury or damage to any assets. The unit of the period is “Year”.

In order to maintain the declared EFUP, the product shall be operated normally according to the instructions and environmental conditions as defined in the product manual, and periodic maintenance schedules specified in Product Maintenance Procedures shall be followed strictly.

Consumables or certain parts may have their own label with an EFUP value less than the product. Periodic replacement of those consumables or parts to maintain the declared EFUP shall be done in accordance with the Product Maintenance Procedures. This product must not be disposed of as unsorted municipal waste, and must be collected separately and handled properly after decommissioning.

This symbol indicates that this electronic information product does not contain any toxic or hazardous substance or elements above the maximum concentration value established by the Chinese standard SJ/T11363-2006, and can be recycled after being discarded, and should not be casually discarded.
# Safety symbols

**NOTE**
The following safety-related symbols appear on one or more of the devices.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image-1.png" alt="Exclamation Mark" /></td>
<td>ATTENTION: Consult accompanying documents.</td>
</tr>
<tr>
<td><img src="image-2.png" alt="CAUTION" /></td>
<td>CAUTION — Safety ground precaution. Remove power cord from the mains source by grasping the plug. Do not pull on the cable.</td>
</tr>
<tr>
<td><img src="image-3.png" alt="Information" /></td>
<td>Consult operating instructions.</td>
</tr>
<tr>
<td><img src="image-4.png" alt="Electrostatic Sensitive" /></td>
<td>Electrostatic sensitive device. Connections should not be made to this device unless ESD precautionary procedures are followed.</td>
</tr>
<tr>
<td><img src="image-5.png" alt="LASER RADIATION" /></td>
<td>LASER RADIATION: Do not stare into beam. Class 2 laser product.</td>
</tr>
<tr>
<td><img src="image-6.png" alt="Non-Ionizing Electromagnetic Radiation" /></td>
<td>Non-ionizing electromagnetic radiation. Interference may occur in the vicinity of this device.</td>
</tr>
<tr>
<td><img src="image-7.png" alt="Shock Hazard" /></td>
<td>Shock Hazard. Dangerous voltage. To reduce the risk of electric shock, do not remove cover. Refer servicing to qualified service personnel.</td>
</tr>
<tr>
<td><img src="image-8.png" alt="Type BF (IEC 60601-1) Defibrillator-Proof Protection" /></td>
<td>Type BF (IEC 60601-1) defibrillator-proof protection against electric shock. Isolated (floating) applied part suitable for intentional external and internal application to the patient, excluding direct cardiac application.</td>
</tr>
<tr>
<td><img src="image-9.png" alt="Type BF (IEC 60601-1) Protection Against Electric Shock" /></td>
<td>Type BF (IEC 60601-1) protection against electric shock. Isolated (floating) applied part suitable for intentional external and internal application to the patient, excluding direct cardiac application.</td>
</tr>
<tr>
<td>Symbol</td>
<td>Description</td>
</tr>
<tr>
<td>--------</td>
<td>-------------</td>
</tr>
<tr>
<td><img src="image1.png" alt="Heart" /></td>
<td>Type CF (IEC 60601-1) defibrillator-proof protection against electric shock. Isolated (floating) applied part suitable for intentional external and internal application to the patient, including direct cardiac application.</td>
</tr>
<tr>
<td><img src="image2.png" alt="Heart" /></td>
<td>Type CF (IEC 60601-1) protection against electric shock. Isolated (floating) applied part suitable for intentional external and internal application to the patient, including direct cardiac application.</td>
</tr>
</tbody>
</table>

## User Interface Symbols

**NOTE**
The following symbols appear in the software user interface.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image3.png" alt="Alarm" /></td>
<td>Active audio alarms paused indicator. Indicates an active audio alarm is temporarily paused.</td>
</tr>
<tr>
<td><img src="image4.png" alt="Alarm" /></td>
<td>Alarm off indicator. Indicates the alarm is disabled (turned off).</td>
</tr>
<tr>
<td><img src="image5.png" alt="Alarm" /></td>
<td>Alarm priority indicator: High (red). Indicates a high priority alarm.</td>
</tr>
<tr>
<td><img src="image6.png" alt="Alarm" /></td>
<td>Alarm priority indicator: Medium (yellow). Indicates a medium priority alarm.</td>
</tr>
<tr>
<td><img src="image7.png" alt="Alarm" /></td>
<td>Alarm priority indicator: Low (blue). Indicates a low priority alarm.</td>
</tr>
<tr>
<td><img src="image8.png" alt="Alarm" /></td>
<td>Alarm volume icon. Adjust the minimum alarm tone volume.</td>
</tr>
<tr>
<td><img src="image9.png" alt="Alarm" /></td>
<td>Audio alarms off indicator. Indicates the specified alarm group (<strong>ALL</strong>, <strong>APN</strong>, <strong>APN ECG</strong> or <strong>ECG</strong>) audio alarms are turned off.</td>
</tr>
<tr>
<td><img src="image10.png" alt="Alarm" /></td>
<td>Audio alarms paused indicator. Indicates all audio alarms are paused and the amount of time remaining for the alarm pause period displays as a countdown timer.</td>
</tr>
<tr>
<td><img src="image11.png" alt="Beat" /></td>
<td>Beat volume icon. Adjust the volume of the QRS beep tone.</td>
</tr>
<tr>
<td><img src="image12.png" alt="BIS" /></td>
<td>BIS and Entropy sensor impedance check indicator. Displays for each sensor as the impedance check is in progress.</td>
</tr>
<tr>
<td><img src="image13.png" alt="BIS" /></td>
<td>BIS and Entropy sensor impedance check error indicator. Indicates the specified sensor failed the impedance check.</td>
</tr>
<tr>
<td>Icon</td>
<td>Description</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
</tr>
<tr>
<td>![Check Mark]</td>
<td>BIS and Entropy sensor impedance check passed indicator. Indicates the specified sensor passed the impedance check.</td>
</tr>
<tr>
<td>![Volume]</td>
<td>Completed NIBP volume icon. Adjust the volume of the tone that sounds when an NIBP measurement result is available.</td>
</tr>
<tr>
<td>![Home]</td>
<td>Home icon. Close all menus/applications displayed on the monitor.</td>
</tr>
<tr>
<td>![Lock]</td>
<td>Locking setting indicator. Indicates this setting is locked and cannot be adjusted.</td>
</tr>
<tr>
<td>![SatSeconds]</td>
<td>Nellcor OxiMax SatSeconds indicator. Indicates the amount of time the SpO2 saturation is outside the limits before alarms are generated.</td>
</tr>
<tr>
<td>![NMT Stimulus Beep]</td>
<td>NMT Stimulus beep volume icon. Adjust the volume of the tone that sounds when a stimulus pulse is generated.</td>
</tr>
<tr>
<td>![Network Connection]</td>
<td>Network connection indicator. Indicates the monitor is connected to the Local Area Network (LAN).</td>
</tr>
<tr>
<td>![Pause Audio Alarms]</td>
<td>Pause audio alarms icon. Selecting this option results in different silence alarm behaviors depending whether alarms are active and/or latched or not. For more information, refer to the user’s manual.</td>
</tr>
<tr>
<td>![PDM Battery Charging]</td>
<td>PDM battery charging indicator. Indicates the battery is charging.</td>
</tr>
<tr>
<td>![PDM Battery Failure]</td>
<td>PDM battery failure indicator. Indicates the battery is not available for use.</td>
</tr>
<tr>
<td>![PDM Battery Gauge]</td>
<td>PDM battery gauge indicator. Indicates the charge level of the battery.</td>
</tr>
<tr>
<td>![Progress Bar]</td>
<td>Progress bar. Indicates the amount of time remaining until the next automatic measurement.</td>
</tr>
<tr>
<td>![Reminder Volume]</td>
<td>Reminder volume icon. Adjust the volume of the tone that sounds every two minutes when audio alarms are turned off.</td>
</tr>
<tr>
<td>![Respiration]</td>
<td>Respiration indicator. Indicates a breath is detected by the impedance respiration algorithm.</td>
</tr>
</tbody>
</table>
Follow the service requirements listed below.

- Refer equipment servicing to GE authorized service personnel only.
- Any unauthorized attempt to repair equipment under warranty voids that warranty.
- It is the user’s responsibility to report the need for service to GE or to one of their authorized agents.
- Failure on the part of the responsible individual, hospital, or institution using this equipment to implement a satisfactory maintenance schedule may cause undue equipment failure and possible health hazards.
- Regular maintenance, irrespective of usage, is essential to ensure that the equipment will always be functional when required.
Every GE device has a unique serial number for identification. A sample of the information found on a serial number label is shown below.

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A product code</td>
</tr>
<tr>
<td>B year manufactured</td>
</tr>
<tr>
<td>C fiscal week manufactured</td>
</tr>
<tr>
<td>D production sequence number</td>
</tr>
<tr>
<td>E manufacturing site</td>
</tr>
<tr>
<td>F miscellaneous characteristic</td>
</tr>
</tbody>
</table>

The device plate is located on the outside of the patient monitor.
2 System overview
System introduction

The patient monitor is a complete high-acuity patient monitoring system generally composed of these main parts:

- Monitor
- Software
- 38.1 cm (15 inches) or 48.3 cm (19 inches) display
- Input devices
- Module Frames for E-series modules or Tram-Rac housing for TRAM and Tram-Rac modules
- Acquisition modules: E-series modules (such as PSM, E-PRESTN), PDM, TRAM or Tram-Rac modules
- Printers and writers
- Accessories and supplies (for example, ECG leadwires/cable sets, mounts)
System components

Monitor

The primary function of the patient monitor is to render a clinically meaningful display of acquired patient data and allow the caregiver control (alarms, configuration, etc.) of the system through the user interface. The patient monitor is the central processing unit for the patient monitoring system and provides a link between parameter acquisition and I/O devices. It also facilitates network communication and interface to several ancillary devices (for example, printers, displays). The patient monitor works with multi parameter acquisition devices.

In addition to the primary function to display patient data, the patient monitor software has a service interface for performing device level service tasks such as configuration, maintenance and troubleshooting. Refer to the “CARESCAPE Monitor B850 Defaults Reference Manual” for care area specific software and features.
Displays

Displays integrate auditory and visual alarms and are available in 15-inch non-touch or 19-inch touch LCD with integrated keypads. Both displays include an integrated alarm light.

15-inch non-touch LCD 19-inch touch LCD

Refer to the “CARESCAPE Monitor B850 Addendum for Device Compatibility” for a list of compatible devices.

Input devices

Input devices include remote control, keypad, keyboard, mouse and barcode reader.

- The remote control and keypad provide all patient monitor controls on a portable component with a TRIM KNOB control. The remote control is connected to the patient monitor via one of the USB connectors at the back of the processing unit or at the bottom of the display. The keypad is connected to an M-port and can be mounted on the display or on a separate holster that has various mounting configurations.

- A standard keyboard and mouse may be connected to the patient monitor or display via one of the USB connectors on the back of the processing unit or at the bottom of the display.

- The barcode reader, which may be connected to the patient monitor or display via one of the USB connectors on the back of the processing unit or at the bottom of the display, can be used to scan patient data from barcodes when admitting patients.
Refer to the “CARESCAPE Monitor B850 Addendum for Device Compatibility” for a list of compatible devices.

**Module Frames and Tram-Rac housing**

F5 and F7 Module Frames provide an interface between the patient monitor and E-Modules. The F5 Module Frame has 5 module slots that support a series of E-module acquisition devices. It supports both PDM and PSM with a slide mount. The F7 Module Frame has 7 module slots.

The Tram-Rac housing provides an interface between the patient monitor and a TRAM module or a single parameter Tram-Rac module.

Refer to the “CARESCAPE Monitor B850 Addendum for Device Compatibility” for a list of compatible devices and parameters monitored by PDM, each E-module, TRAM module and single parameter Tram-Rac module.

**Acquisition modules**

Hemodynamic multi parameter acquisition modules are the Patient Data Module (PDM), Patient Side Modules (PSM), E-PRESTN and TRAM modules. They provide connection to the patient, process patient data signals, and send patient data signals to the patient monitor.

Refer to the “CARESCAPE Monitor B850 Addendum for Device Compatibility” for a list of compatible devices and parameters monitored by PDM, each E-module, TRAM module and single parameter Tram-Rac module.

**E-Modules and PDM**

E-modules and the PDM offer a wide variety of parameter acquisition capability to the patient monitoring system. Refer to the “Module Frames and Modules Technical Manual” for detailed information on each E-module and the PDM.
TRAM modules

TRAM modules are also compatible with the patient monitor and provide parameter acquisition for the patient monitoring system. Refer to the “TRAM and Tram-Rac Modules Supplemental Information” manual for detailed information.

Printers and writers

The patient monitor can print to a configured network laser printer or digital writer (PRN 50-M or PRN50 with the M-port adapter).

The digital writer thermally records patient data on a 2-inch paper strip. The digital writer can graph any parameter or trace that can be viewed on a patient monitor.

Refer to the “CARESCAPE Monitor B850 Addendum for Device Compatibility” for a list of compatible devices.
Processing unit connections

M-ports

M-ports are used for connecting the Unity Network ID connectivity device, keypad, and digital writer.

The Unity Network ID connectivity device acquires digital data from up to eight peripheral devices (not necessarily manufactured by GE), then the device transmits the formatted data to the patient monitor. See the appropriate connectivity device technical manual for additional information.

For installation instructions, refer to “Interface devices” on page 3-11.

RS-232 serial ports

The RS-232 serial ports are used with a touchscreen display.

USB ports

USB ports are used to connect devices such as keyboard, mouse, remote, barcode scanner, and touchscreen display. Refer to the “CARESCAPE Monitor B850 Addendum for Device Compatibility” for a list of compatible devices.

Network ports

The patient monitor supports CARESCAPE Network and S/5 Network communication.

- The CARESCAPE Network consists of CARESCAPE Network Mission Critical (MC) and CARESCAPE Network Information Exchange (IX) Networks.
  - The MC Network is used to communicate patient data, such as waveforms and parameters.
  - The IX Network is used to communicate non-critical information, such as iPanel, printer and Webmin.
  Refer to the “CARESCAPE Network Configuration Guide” for details.

- The S/5 Network is used to communicate patient data. The IX Network can also be used when the S/5 Network is configured to communicate patient data.
Dedicated networks for the MC Network, IX Network, and S/5 Network must be tested before use.

**ePorts/Tram-Net**

ePorts are used to power devices such as the PDM, TRAM, Tram-Rac housing, F5 and F7.

Refer to the “CARESCAPE Monitor B850 Addendum for Device Compatibility” for a list of supported devices.

**Video connectors**

The patient monitor can support up to three independent displays.

**DVI-I 1**
Supports both analog and digital video signals.

**DVI-D 2**
Supports only digital video signals.

**DVI-I 3 (optional - only for iPanel software)**
Supports both analog and digital video signals.

**Supported devices**

Refer to the “CARESCAPE Monitor B850 Addendum for Device Compatibility” for a list of all supported devices.

**Service interface**

Webmin is a browser-based interface that provides service and diagnostic functions for the patient monitor. Using a simple web browser, the user can connect to Webmin to configure, diagnose and retrieve system information. The user can access Webmin either locally at the device or remotely over the network.
Refer to the “CARESCAPE Network Configuration Guide” for details on configuring the CARESCAPE Network.

Local Webmin

The user can access Webmin locally through the patient monitor. For instructions, refer to “Local access to Webmin using the patient monitor” on page 4-2.

Remote Webmin

The user can access Webmin remotely from a configured service laptop connected to the patient monitor. For login instructions, refer to “Using a service PC with a crossover cable” on page 4-3.

InSite with ExC

InSite with ExC provides a set of software applications to manage, diagnose and track systems at customer sites by using the Internet for secure communications between the customers’ and GE’s firewalls. InSite with ExC consists of Enterprise Server, which resides at GE’s support center, and Remote Service Agent that resides on a system at the customer site (or on a PC controlling the system(s) at the customer site).
3 Hardware installation
Installation requirements

Environmental

For information about the operating environment for the patient monitor, refer to “Intended use” on page 1-2.

Check the “CARESCAPE Monitor B850 Technical Specifications Supplement” for power, temperature and operating conditions requirements.

Pre-installation

Make sure the following is in place before installing the patient monitoring system hardware.

- Power outlets that meet the required power specifications for each of the following:
  - patient monitor
  - each display
  - powered Tram-Rac housing
  - Unity Network ID and each interface device
  - PRN 50-M digital writer
- Network port for CARESCAPE Network Mission Critical (MC) or S/5 Network
- Network port for CARESCAPE Network Information Exchange (IX)
- Mounting hardware for the monitor, display(s) and acquisition modules
Mounting

The patient monitor ships with a mounting plate on the bottom enclosure. This facilitates all mounting options for the monitor. For details, refer to the mounting instructions included with the mounting hardware.

For details about the available mounting solutions, refer to the Mounting Reference Guide.

NOTE
The GE logo can be rotated for vertical mounting configurations.

Water shield

For vertical mounting configurations, a water shield is available. The water shield lowers the probability of the ingress of fluids into the assembly. The shield can be installed in two orientations and should be placed to ensure the top surface of the patient monitor is protected. For details, refer to the installation instructions included with the water shield.
Connect system components

**WARNING**
INCOMPATIBLE DEVICES—Before connecting an interfacing module to the device, verify compatibility. Verify the connectivity of device interfaces before using the equipment. Verify the compatibility of software versions before using the equipment.

**WARNING**
EXCESSIVE LEAKAGE CURRENT—When interfacing the device with other equipment, the devices may only be interconnected with each other or to parts of the system when it has been determined by qualified biomedical personnel that there is no danger to the patient, the operator, or the environment as a result.

**WARNING**
POWER SUPPLY—The device must be connected to a properly installed power outlet with protective earth contacts only. If the installation does not provide for a protective earth conductor, disconnect the monitor from the power line. All devices of a system must be connected to the same power supply circuit. Devices which are not connected to the same circuit must be electrically isolated when operated (electrically isolated RS232 interface).

**WARNING**
Do not under any circumstances remove the grounding conductor from the power plug. Always check that power cord and plug are intact and undamaged.
Power cords

Connect power cords to the mains power supply inlet and to a wall outlet on all system components that require AC mains power input. Do not power on any devices.

**NOTE**
- Be sure that all power cords are securely connected and that they are routed through the retaining clips, as applicable.
- Be sure that the retaining clips are not damaged or broken, and that they are securely attached to the device.

Rear panel connections

Refer to the figure below for the patient monitor rear panel connections.

The following connectors are available for system components:

- Four USB ports
- Two Ethernet network ports
- Two serial RS232 ports
- Two video display ports (a third optional port may also be available)
- Two ePort/Tramnet ports
USB and serial port management

Proper function of serial or USB touchscreen displays is dependent on the usage of the correct RS232 and USB ports on the patient monitor.

**NOTE**

The patient monitoring system only supports the D19KT and D15K displays with respect to USB.

Refer to the following table when connecting your displays containing either USB or serial touchscreens.

<table>
<thead>
<tr>
<th>Display port</th>
<th>Number of displays</th>
<th>Touch interface ports</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVI-I 1</td>
<td>Display 1</td>
<td>USB 1 or RS232 1</td>
</tr>
<tr>
<td></td>
<td>Display 1 cloned</td>
<td>USB 1 or RS232 1</td>
</tr>
<tr>
<td>DVI-D 2</td>
<td>Display 2</td>
<td>USB 2 or RS232 2</td>
</tr>
<tr>
<td>DVI-I 3</td>
<td>Display 3</td>
<td>USB 3</td>
</tr>
<tr>
<td></td>
<td>Display 3 cloned</td>
<td>No touch interface available</td>
</tr>
</tbody>
</table>

Unused USB ports may be connected to other accessories such as keyboard, mouse, barcode reader, or remote control.

**If the D15K or D19KT displays are not used**

If you are not using the D15K or D19KT displays, there are no restrictions on connecting devices to USB ports.

Displays

The patient monitor can support up to three independent displays when equipped with an optional third video card. The optional third video can only be used to support the iPanel application. The patient monitor also supports two additional cloned displays on the **DVI-I 1** and **DVI-I 3** ports. Cloned displays must be connected using a DVI-I to DVI-D and VGA splitter and must support analog video.

Refer to the “CARESCAPE Monitor B850 Addendum for Device Compatibility” for a list of compatible devices.

---

**WARNING**

Do not use the monitor without manufacturer approved mounting attached.
1. Connect either an analog or digital display to DVI-I 1.

   **NOTE**
   - Additional displays can be connected to DVI-D 2 or DVI-I 3.
   - DVI-D 2 only supports digital displays.
   - If only one display is connected, it must be connected to DVI-I 1.

2. If the display supports a serial touchscreen, connect the serial port of the display to RS232 1 or RS232 2. For more information on which port to use, refer to the display port table on page 3-6.

3. If the display is a D15K or D19KT, connect the upstream USB port of the display to USB 1, USB 2, or USB 3. For more information on which port to use, refer to the display port table on page 3-6.

   **NOTE**
   A USB hub should not be used to connect the USB touchscreen to the patient monitor.

   **NOTE**
   To prevent accidental disconnection and loss of display screen information, firmly tighten the DVI connector screws into the DVI connector port.

4. If the displays contain a touchscreen, calibrate as follows:
   a. Select *Monitor Setup > Service Calibrations*.
   b. Log in with your service username and password and press Enter.
   - Username: biomed
   - Password: Change<space>Me

   **NOTE**
   Username and password are case sensitive.
c. On the Service / Calibrations menu, select Touch Screen. The Touch screen calibration menu displays.

d. Touch the cross hair (+) in each corner of the screen.

**NOTE**
Repeat steps 4 and 6 whenever a new touchscreen display is connected.

5. If the third video card is licensed, configure it. Follow these steps:
   a. Go to Monitor Setup > Default Setup > Care Unit Settings > Screens.
   b. Under Show Applications, click on Screen 3.

6. Restart the patient monitor.
Remote displays

**NOTE**
All installations should be compliant with IEC 60601-1-1 and local electrical codes.

**Non isolated communication lines**
If complete isolation is not required, this method will provide the most cost effective means of extending your USB installation. This type of installation should not be used for connections to non-medically used rooms per IEC 60601-1-1.

Displays may be extended up to 15 meters from the patient monitor using the following cables:

- 15-meter DVI-I cable (p/n 2042766-001)
  The connections for the DVI-I cable are the same as any other video cable.

- 5-meter USB extender (p/n 2042768-001)

In the following example, two 5-meter USB extenders, plus a standard 5-meter USB cable extend the remote display up to 15 meters from the patient monitor. See “Setup instructions” on page 3-10 for instructions on setting up the remote display as shown in the example.

**NOTE**
Only the display interface connections (video and USB connections) are shown. Not all other connections are shown.
Setup instructions

NOTE
Be sure that all cables are securely connected.

1. Connect the Type A plug of the first USB extender to one of the downstream ports (Type A USB port) on the back of the patient monitor.

NOTE
If you are connecting a touchscreen display, see the display port table on page 3-6 for details on which port to use.

2. Connect the Type A plug of the second USB extender to the Type A receptacle on the first USB extender.

3. Connect the Type A plug of the standard USB cable to the Type A receptacle on the second USB extender.
4. Connect the Type B plug of the standard USB cable to the upstream port (Type B USB port) on the bottom of the display.

Non-medical grade displays

The patient monitor with a non-medical grade display, which is IEC 950-rated or equivalent, meets UL and IEC specifications if a medical grade isolation transformer is used. If a non-medical grade display is to be used, the configuration must meet the IEC 60601-1-1 standard. Refer to IEC 60601-1-1 for requirements if using non-medical grade displays in the patient environment.

Interface devices

1. Connect a USB keyboard, mouse, remote, or barcode scanner to available USB ports.
2. Connect the following interface devices to an M-Port on the front panel:
   - Unity Network ID connectivity device
   - PRN 50-M
   - keypad
 Networks

**WARNING**
MISSED ALARMS—Do not use with iCentral software with Versions 5.0.2 and earlier or with Mobile Care Server with Version 5.2 and earlier.

**WARNING**
INCORRECT CALCULATIONS—Using the CARESCAPE Monitor B850 with the Aware Gateway software version 1.4 or earlier could result in incorrect patient height and weight information. This could lead to incorrect drug dose calculations, hemodynamic calculations, or oxygenation calculations. Prior to installing the CARESCAPE Monitor B850, please contact the GE Healthcare Aware Gateway HL7 Integration Engineering Team or your GE Healthcare service representative to verify or update your Aware Gateway configuration.

**WARNING**
EXCESSIVE LEAKAGE CURRENT—Connect only certified UL 60950/IEC 60950 equipment to the Ethernet MC or IX network RJ-45 connections. This equipment may need to be used with a separating device, isolation module or redundant grounding in accordance with the medical system standard IEC/EN 60601-1-1 in order to meet system leakage current requirements.

**NOTE**
Refer to the “CARESCAPE Monitor B850 Addendum for Device Compatibility” for compatible CARESCAPE Network and S/5 Network devices.

1. Connect the MC Network or S/5 Network cable to the **CARESCAPE Network MC** port on the device.

2. Connect an IX Network cable to the **CARESCAPE Network IX** port on the device.
Frame and E-Modules

The patient monitor provides support to connect multiple parameter modules at a time. The ePort and Tramnet ports allow connection of E-Module Frame, Tram-Rac housing and PDM.

**Configuration options**
See the following table for possible configuration options. For detailed information on compatibility, refer to the “CARESCAPE Monitor B850 Addendum for Device Compatibility.”

<table>
<thead>
<tr>
<th>ePort 1/Tramnet 1 connected devices</th>
<th>PDM</th>
<th>Tram-Rac housing</th>
<th>Tram-Rac housing (AC Mains powered)</th>
<th>F5 Frame</th>
<th>F7 Frame</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDM</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Tram-Rac housing</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tram-Rac housing (AC Mains powered)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>F5 Frame</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F7 Frame</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In the table above:
- **X** = supported
- **Shaded** = not supported

**WARNING**
ELECTRIC SHOCK - Do not use the F7 Frame for standalone use. Ventilation holes on the F7 E-module Frame will be covered only if installed within an Aisys, Avance, or Aespire anesthesia machine.

Example: If a PDM is connected to ePort 2, you cannot connect a second PDM to ePort 1. However, you can connect **one** of the following devices to ePort 1:
- Tram-Rac housing
- Tram-Rac housing (AC Mains powered)
- F5 Frame
- F7 Frame
Procedure

1. Connect an F5 or F7 frame to ePort/Tramnet.

2. Connect the module. Refer to the following instructions:
   - “To install a PSM module to an F5 Frame” on page 3-14
   - “To install a PSM module to an F7 Frame” on page 3-15
   - “To install another E-series parameter module” on page 3-16

To install a PSM module to an F5 Frame

WARNING
Do not use identical measurement modules or modules that map a measurement to the same channel or parameter window. If such modules have been connected, remove the module that has been most recently connected. You can also remove both modules and re-connect the new module after five seconds.

Refer to the “CARESCAPE Monitor B850 Addendum for Device Compatibility” for a list of compatible devices.

NOTE
To ensure proper grounding of the Frame, secure the cable connections by using a screwdriver to fully seat all thumbscrews.
1. Connect a PSM module by aligning it with the insertion guides on the outside of the frame. Push the module into the frame until it stops.

![Image of PSM module alignment]

**NOTE**
An error message displays if an incompatible module is connected. Refer to the “CARESCAPE Monitor B850 Addendum for Device Compatibility” for details.

2. To remove the PSM module, pull the pull tab out and slide the module out of the guides.

**To install a PSM module to an F7 Frame**

**WARNING**
Do not use identical measurement modules or modules that map a measurement to the same channel or parameter window. If such modules have been connected, remove the module that has been most recently connected. You can also remove both modules and re-connect the new module after five seconds.

Refer to the “CARESCAPE Monitor B850 Addendum for Device Compatibility” for a list of compatible devices.
1. Connect the PSM pole mount or frame mount cable to the back of the F7 Frame.

2. Connect the PSM module to the mount.

**To install another E-series parameter module**

**WARNING**

Do not use identical measurement modules or modules that map a measurement to the same channel or parameter window. If such modules have been connected, remove the module that has been most recently connected. You can also remove both modules and re-connect the new module after five seconds.

Refer to the “CARESCAPE Monitor B850 Addendum for Device Compatibility” for a list of compatible devices.

1. With the module properly oriented, align the module insertion guide slot with the insertion guide.

2. Push the module into the frame until it clicks.

**NOTE**

An error message displays if an incompatible module is connected. Refer to the “CARESCAPE Monitor B850 Addendum for Device Compatibility” for details.
3. To remove a parameter module, grasp it firmly, press the release lever on bottom of module, and pull out of the guides.

**To install a PDM module**

---

**WARNING**

Do not use identical measurement modules or modules that map a measurement to the same channel or parameter window. If such modules have been connected, remove the module that has been most recently connected. You can also remove both modules and re-connect the new module after five seconds.

---

The PDM module can be connected directly to the patient monitor or it can be mounted to F5 Frame insertion guides.

**NOTE**

- PDM software v1.2 is required for use with CARESCAPE Monitor B850 software.
- The PDM can not be installed to an F7 Frame.
- Refer to the “CARESCAPE Monitor B850 Addendum for Device Compatibility” for a list of compatible devices.
- When the PDM is used without a battery, it is necessary to allow additional time to power up. Do not interrupt the startup sequence by unplugging the PDM.

**To connect the PDM module to the patient monitor** – Connect one end of the ePort cable to the PDM and the other end of the ePort cable to the *ePort/Tramnet* connector on the patient monitor.
To connect the PDM module to an F5 Frame – Align the PDM with the insertion guides on the outside of the frame. Push the module into the frame until it stops.

NOTE
An error message displays if an incompatible module is connected. Refer to the “CARESCAPE Monitor B850 Addendum for Device Compatibility” for details.

Tram-Rac housing and modules

The patient monitor provides support to connect multiple parameter modules at a time. The ePort and Tramnet ports allow connection of E-Module Frame, Tram-Rac housing and PDM.

NOTE
A Tram-Net hub is not supported.
Configuration options
See the following table for possible configuration options. For detailed information on compatibility, refer to the “CARESCAPE Monitor B850 Addendum for Device Compatibility.”

<table>
<thead>
<tr>
<th>ePort 2/Tramnet 2 connected devices</th>
<th>PDM</th>
<th>Tram-Rac housing</th>
<th>Tram-Rac housing (AC Mains powered)</th>
<th>F5 Frame</th>
<th>F7 Frame</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDM</td>
<td>X</td>
<td>X</td>
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<td></td>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>F5 Frame</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>F7 Frame</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In the table above:

- X = supported
- Shaded = not supported

Example
If a PDM is connected to **ePort 2**, you cannot connect a second PDM to **ePort 1**. However, you can connect **one** of the following devices to **ePort 1**:

- Tram-Rac housing
- Tram-Rac housing (AC Mains powered)
- F5 Frame
- F7 Frame
To connect the Tram-Rac housing to an ePort/Tramnet connector

1. Install the ferrite blocks that came with the patient monitor to both ends of the Tram-Net cables.
   a. Place one end of cable in the groove of the ferrite block, approximately 26 mm (1 in) from the end of the cable.
   b. Press the sides of the block together until you hear a click. Make sure both snap fingers are fully engaged, and they are flush against the housing.
   c. Repeat steps a and b for the other end of the cable.
   d. Repeat steps a-c for all Tram-Net cables.

2. Connect the Tram-Rac housing to an ePort/Tramnet connector with ferrite blocks on the patient monitor.

   NOTE
   - A TRAM module must always occupy the top position in the Tram-Rac housing. Other modules are installed below it.
   - When using more than one Tram-Rac housing, one of the Tram-Racs must have a power supply.
   - Make sure the Tram-Net cable has ferrite blocks on both ends.
To install a module

**CAUTION**

SIMULTANEOUS CONNECTION OF TRAM AND PDM — The patient monitor only supports patient monitoring from one primary ECG acquisition device at a time. A Patient Data Module (PDM) and a TRAM module cannot be used to monitor a patient at the same time.

If a PDM is connected to the patient monitor when monitoring from a TRAM module has already been established, a ‘**CONNECTING**’ message is displayed on the monitor.

If a TRAM module is connected to the patient monitor when monitoring from a PDM has already been established, no parameter or waveform data from the TRAM module is displayed.

**NOTE**

When switching between primary acquisition devices (e.g., TRAM module to PDM, or PDM to TRAM module), the patient monitor will perform a reconnection cycle that can last up to two minutes. During this cycle, there is a loss of displayed parameters and waveform data.

**NOTE**

An error message displays if an incompatible module is connected. Refer to the “CARESCAPE Monitor B850 Addendum for Device Compatibility” for details.

1. Face the Tram-Rac housing and guide the back of the module into the appropriate position.
2. Gently push the module into the housing. You will hear a click when the module is fully inserted.

**To remove a module:**

1. Push the module into the Tram-Rac housing. This releases the module and makes it easier to remove.
2. Press and hold the release levers found on each side of the front of the module.
3. Pull the module out about 15 cm (6 inches).
4. Grasp the module firmly with both hands and remove it. Do not try to hold the module by the release levers.

The release levers for TRAM modules are recessed in the side of the protruding front of the module.
Unity Network ID connectivity device

Refer to the “CARESCAPE Monitor B850 Addendum for Device Compatibility” for a list of compatible devices.

1. Make sure that the Unity Network ID is configured as follows:
   - IP address is 192.168.253.x, where x is a number between 2 and 254
   - Netmask is 255.255.255.0
   - The location of the Unity Network ID is set to a value other than the default (XXXX-XXX). For example, BAY3\UNID3+

   **NOTE**
   Refer to the “Unity Network Interface Device (ID) Service Manual” for instructions on changing the IP address.

2. Connect the ethernet port of the Unity Network ID to one of the M-Ports on the patient monitor.

Remote Alarm Box (RAB) and Remote Alarm Box with Remote Light (RAB RL)

Refer to the “CARESCAPE Monitor B850 Addendum for Device Compatibility” for a list of compatible devices.

To install and configure the RAB or RAB RL, follow the instructions as described in the “Remote Alarm Box (RAB) and Remote Alarm Box with Remote Light (RAB RL) Service Manual” for the Solar monitor.

**NOTE**
The RAB and RAB RL will function when the patient monitor’s alarm tone is configured to either *Legacy* or *IEC*. 
USB devices

After connecting the USB touchscreen, connect other USB input devices, such as keyboard, mouse, barcode reader, and remote.

USB extender restrictions

USB ports support passive extenders up to a total of 5 m/16.4 ft (per USB 2.0 standards). The standard keyboard is supplied with a 1.8 m/6 ft cable, so a USB passive extender up to an additional 3.2 m/10.5 ft can be used.

NOTE
Refer to the CARESCAPE supplies and accessories document for compatible cables and accessories.

Laser printer

---

**WARNING**

EXCESSIVE LEAKAGE CURRENT - Laser printers are UL 60950/IEC 60950 certified equipment, which may not meet the leakage current requirements of patient care equipment. This equipment must not be located in the patient environment unless the medical system standard EN 60601-1-1 is followed. Do not connect a laser printer to a multiple socket outlet supplying patient care equipment. The use of multiple socket outlet for a system will result in an enclosure leakage current equal to the sum of all the individual earth leakage currents of the system if there is an interruption of the multiple socket outlet protective earth conductor.

---

The patient monitor supports printers configured on the CARESCAPE Network MC and IX ports. To add a laser printer that is on the hospital enterprise network or IX Network, see “Printers” on page 4-10.

Printers that are configured on the MC Network port do not need to be added to the patient monitor. See the user’s manual for assigning printouts to a print location.

Refer to the “CARESCAPE Monitor B850 Addendum for Device Compatibility” for a list of compatible devices.
4 Configuration
Overview

This section describes configuration modules under the Configuration tab of the service interface browser and how to perform service configuration tasks.

**NOTE**
- For PDM configuration, see the “Module Frames and Modules Technical Manual”.
- If you need to configure saturation, temperature and pressure (STP) settings, see the “Module Frames and Modules Technical Manual”.

Access to Webmin

Local access to Webmin using the patient monitor

**NOTE**
A USB keyboard and mouse are needed to access Webmin at the patient monitor.

1. Select **Monitor Setup > Service**. The local browser opens and displays the Login to Webmin dialog box.

2. Continue to “Log into Webmin” on page 4-4.
Using a service PC over the network

1. Verify that the patient monitor is connected to a live IX Network.
2. Record the IP and Netmask addresses of the patient monitor:
   Static IP address: ______________________
   Netmask: ________________________
3. Verify that the service PC is on the same network as the patient monitor by performing a network ping to the patient monitor. If needed, configure the service PC’s IP and Netmask addresses.
4. From a computer connected to the same network as the patient monitor, launch a web browser.
5. In the Address field, type https://[IX IP address]:10000 and press Enter.
   **NOTE**
   [IX IP address] is the IX Network IP address of the patient monitor.
   The Login to Webmin dialog box displays.

   ![Login to Webmin dialog box](image)

   6. Continue to “Log into Webmin” on page 4-4.

Using a service PC with a crossover cable

1. Verify that the IX Network on the patient monitor is configured in manual configuration mode.
2. Record the IP and Netmask addresses of the patient monitor:
   Static IP address: ______________________
   Netmask: ________________________
3. Verify that the service PC’s network is configured in manual configuration mode to allow communication with the patient monitor. If needed, configure the service PC’s IP and Netmask addresses.
4. Verify that the service PC is able to perform a network ping to the patient monitor. See “Ping a TCP/IP network device” on page 8-5.
5. Connect a correctly configured service laptop to the CARESCAPE Network IX connection port on the patient monitor using a crossover cable.

7. In the Address field, type https://[IX IP address]:10000 and press Enter.

   NOTE
   [IX IP address] is the IX Network IP address for the host monitor.

   The Login to Webmin dialog box displays.

8. Continue to “Log into Webmin” on page 4-4.

Log into Webmin

---

WARNING
Control of this user’s password is critical to ensure that Webmin on this device is accessed by only trained and authorized personnel. Failure to limit access of Webmin to trained and authorized personnel only may compromise patient safety and/or system performance.

---

1. On the Login to Webmin dialog box, type the username and password and select Login or press Enter.

   - **Username**: biomed
   - **Password**: Change<space>Me

   NOTE
   The default password is Change<space>Me. The password may have been changed.

   NOTE
   Username and password are case sensitive.
The Webmin application opens and defaults to the **Information** tab.

2. Select the **Configuration** tab.

**NOTE**

The following is an example of the **Configuration** tab when Webmin is accessed remotely.
System Information

Hostname: GE_00DOC3A912DF
Configuration procedures and options

Network

NOTE
A path must exist from the IX Network to other devices such as Citrix servers, browser services, and network printers. In addition, a path must exist to the Internet for InSite with ExC.

DNS addresses can be used for browser sources and for InSite with ExC configuration only.

Hostname configuration

1. If you have not already done so, “Log into Webmin” on page 4-4 and select the Configuration tab.
2. On the Configuration tab, select Network.
4. In the Hostname Configuration window, the current hostname is shown in the Current Value column. To change the hostname, enter a new hostname to the Change Value to column.

NOTE
Hostname is a unique, 4 to 32 character long identifier of a patient monitor in the network. It is mainly used in Citrix sessions. Use alphanumeric characters A-Z, a-z, 0-9. The hostname may include also characters "-" and "_", but it can't start or end with these characters.

5. Select Save.

Hostname configuration will take effect immediately.

Network configuration

To view the current network configuration, see the Present Configuration table on the Network Configuration window in Webmin. Configure another network as follows:

1. If you have not already done so, “Log into Webmin” on page 4-4 and select the Configuration tab.
2. On the Configuration tab, select Network.
4. Under Select Network Type on the Network Configuration window (screen 1), select the applicable network type (CARESCAPE Network or S/5 Network).
5. Select Next.
CARESCAPE Network settings

1. On the **Network Configuration** window (screen 2) under **MC Network**:
   a. Enter a **Static IP** address.
   b. Enter a valid **Netmask** level.
   c. Enter a valid **Gateway**.
   d. Select the applicable **Speed & Duplex** option.

2. If needed, configure the **MC Static Route**:
   a. Enter a **Destination Address**.
   b. Enter a **Destination Netmask**.
   c. Enter an **MC Gateway**.

3. Under **IX Network**, select **DHCP** or **Manual Configuration**.
   If **Manual Configuration** is selected, enter the following information in the entry fields:
   a. Enter a **Static IP** address.
   b. Enter a valid **Netmask** level.
   c. Enter a valid **Gateway**.
   d. Enter valid **DNS Server** addresses, if applicable.

4. Select the applicable **Speed & Duplex** option.

5. Select **Save**.
   The network configurations will be saved and become active when the system is restarted.

S/5 Network settings

1. On the **Network Configuration** window (screen 2) under **S/5 Network**, enter a **Virtual ID**.

   **NOTE**
   - Valid values are within the range of 50000 to 55000, inclusive.
   - The Virtual ID must be unique for each patient monitor connected to the S/5 Network

2. Under **IX Network**, select **DHCP** or **Manual Configuration**.
   If **Manual Configuration** is selected, enter the applicable information in the entry fields.

3. Select the applicable **Speed & Duplex** option.

4. Select **Save**.
   The network configurations will be saved and become active when the system is restarted.
Time

**CAUTION**

NETWORK DEVICE TIME SYNCHRONIZATION — When adding a new device to the CARESCAPE Network, the existing devices on the CARESCAPE Network will synchronize to the new device’s time. To prevent potential time synchronization issues, you should set the new device’s time to be as close as possible to the time (within one minute or less) used by the existing GE devices on the CARESCAPE Network.

1. If you have not already done so, “Log into Webmin” on page 4-4 and select the Configuration tab.
2. On the Configuration tab, select Time.
3. Under Configure Date and Time on the Time Configuration window, update the following fields as needed:
   - Date
   - Month
   - Year
   - Hour:Minute
   - AM/PM
   - 12/24 Hrs
4. Under Configure Time Zone on the Time Configuration window, update UTC Offset as needed.

**NOTE**
The time zone configuration applies only to communication with Citrix server.

5. Select Save.
   All configuration takes effect immediately.

**Unit and bed name**

**NOTE**

Unit and Bed Name selections are not available if network selection is S/5.

1. If you have not already done so, “Log into Webmin” on page 4-4 and select the Configuration tab.
2. On the Configuration tab, select Unit and Bed Name.
3. On the Unit and Bed Name Configuration window, view or set the unit name and bed name for the device.
4. Select Submit.
   The unit and bed name configuration takes effect immediately.
Printers

NOTE

◆ Printer configuration is for printers connected on the IX Network.
◆ Laser printers that are installed on central stations do not need to be installed from the patient monitor. Refer to the user’s manual for details on configuring the printer.
◆ Refer to the “CARESCAPE Monitor B850 Addendum for Device Compatibility” for a list of supported printers.

Install a laser printer

1. If you have not already done so, “Log into Webmin” on page 4-4 and select the Configuration tab.
2. On the Configuration tab, select Printers.
3. On the Sub-Modules for Printers menu, select Install Laser Printer.
4. Under Printer Configuration Information on the Install Laser Printer window, provide the following information:
   a. Select either the Hostname or IP Address radio button, as applicable.
   b. In the Hostname or IP Address field, enter the printer Hostname or IP Address.
   c. In the Printer Name field, enter the Printer Name.
   d. Select Yes from the drop down list next to Test Page.
5. Select Save.
6. From the patient monitor, select Monitor Setup > Printing.
7. Select the Devices tab.
8. From the Printout menu, select what to print out (for example, Waveforms, Alarm Waveforms, Numeric Trends, Reports).
9. Under Location, select the radio button next to Network.
10. From the drop down list next to Network Device, select the desired printer.
    The change will take effect immediately.

Delete a laser printer

NOTE
Before deleting any printer, check if there is any printer assigned for printing.

1. If you have not already done so, “Log into Webmin” on page 4-4 and select the Configuration tab.
2. On the Configuration tab, select Printers.
3. On the Sub-Modules for Printers menu, select Delete Laser Printer.
4. On the Delete Printer window, select the printer to delete.
5. Select Submit.
The change will take effect immediately.

Print a test page

1. If you have not already done so, “Log into Webmin” on page 4-4 and select the Configuration tab.
2. On the Configuration tab, select Printers.
4. On the Print Test Page window, select the printer.
5. Select Submit.

Licenses

Enable software package

---

**WARNING**

If the software package is changed, all clinical settings will reset to factory defaults.

---

Enter the activation code to enable a software package.

1. If you have not already done so, “Log into Webmin” on page 4-4 and select the Configuration tab.
2. On the Configuration tab, select Licenses.
4. On the Software Package window, enter the activation code by the appropriate software package.
5. To activate a software package, select the desired radio button in the Active column.
6. From the Status drop down list, select ENABLED.
7. Select Activate.

All license changes take effect after the next system restart.

Host licensing

Enable a software feature as follows:

1. If you have not already done so, “Log into Webmin” on page 4-4 and select the Configuration tab.
2. On the Configuration tab, select Licenses.
3. On the Sub-Modules for Licenses menu, select Host Licensing.
4. On the Host License window, select Enabled in the Status column of the appropriate host license feature.

5. Select Submit.

   NOTE
   To activate the OPTIONAL-TRIAL license, enter the expiration date and the activation code.

   All license changes take effect after the next system restart.

Upload license file

   NOTE
   This option is available only when you log into Webmin remotely. The option is not available locally at the patient monitor.

Upload a license file as follows:

1. Unzip the license file.

   NOTE
   If the software license is for only one patient monitor, the file will not be zipped.

2. Verify that the serial number on the license file matches the serial number of the device.

3. If you have not already done so, “Log into Webmin” on page 4-4 and select the Configuration tab.


5. On the Sub-Modules for Licenses menu, select Upload License.

6. Click on Browse to select a file.

7. Select Upload and Activate.

8. Verify that the information populated in the Software Package and Host License tables is accurate.

   All license changes take effect after the next system restart.
Citrix

Configure the Citrix connection for iPanel software.

**NOTE**
GE is not responsible for installing or configuring the Citrix setting.

1. If you have not already done so, “Log into Webmin” on page 4-4 and select the Configuration tab.
2. On the Configuration tab, select Citrix.
3. On the Citrix Configuration window, enter the applicable information in the following fields:
   - Server Address
   - Initial Program (e.g., #MUSE)
   - Citrix Session Timeout (in Minutes)
   - Username
   - Password
   - Confirm Password
   - Encryption Level

**NOTE**
The hospital’s IT Administrator or biomedical department can supply these values.

4. Select Save.
All changes take effect immediately.

MUSE/12SL

Settings to send 12SL data

1. If you have not already done so, “Log into Webmin” on page 4-4 and select the Configuration tab.
2. On the Configuration tab, select MUSE/12SL.
3. On the MUSE/12SL window, enter the applicable information in the following fields:
   - Location ID
   - Site Number
4. Select Save.
The 12SL settings take effect immediately after they are submitted.

Settings to view 12SL data

1. If you have not already done so, “Log into Webmin” on page 4-4 and select the Configuration tab.
2. On the Configuration tab, select MUSE/12SL.
3. On the **MUSE/12SL** window, enter the following:
   - **MUSE Web Username**
   - **MUSE Web Password**
   - **Confirm Password**
   - **MUSE Web URL**

4. Select **Save**.

   The MUSE settings take effect immediately after they are submitted.

### Admit settings

**Patient ID prefix**

The patient ID prefix is used as the first two characters when generating temporary patient IDs to ensure that the patient ID is unique.

1. If you have not already done so, “Log into Webmin” on page 4-4 and select the **Configuration** tab.
2. On the **Configuration** tab, select **Admit Settings**.
3. On the **Sub-Modules for Admit Settings** menu, select **Patient ID**.
4. On the **Patient ID Prefix** window, enter a 2-character prefix.

   **NOTE**
   
   Valid values are uppercase letters and numbers.

5. Select **Submit**.

   All changes take effect immediately.

### Barcode settings

Barcode settings must be configured if a barcode reader is used to input patient data to the Admit/Discharge menu.

**NOTE**

For details on barcode data requirements and restrictions, see “Barcode data specifications” on page 4-19.

1. Select the parser type.
   a. If you have not already done so, “Log into Webmin” on page 4-4 and select the **Configuration** tab.
   b. On the **Configuration** tab, select **Admit Settings**.
   c. On the **Sub-Modules for Admit Settings** menu, select **Barcode Settings**.
   d. Under **Barcode Setup** on the **Barcode Settings** window, select the applicable
parser type.

<table>
<thead>
<tr>
<th>Parser type</th>
<th>Used with this type of barcode</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Parser</td>
<td>Simple barcode that contains one piece of information, but no data control, so there is no need for a parser.</td>
</tr>
<tr>
<td>Length Delimited Parser</td>
<td>Barcode that specifies the beginning position and length of each field on the barcode.</td>
</tr>
<tr>
<td>Character Delimited Parser</td>
<td>Barcode that specifies a special character that separates each field on the barcode.</td>
</tr>
</tbody>
</table>

2. Select Submit.

If you selected No Parser, the barcode setting configuration is complete.

For a Length or Character Delimited Parser, follow the applicable instructions.

◆ “Configure length delimited parser information” on page 4-15.
  or
◆ “Configure character delimited parser information” on page 4-17.

**Configure length delimited parser information**

**Points to note**

- If you configure Age, you must either select the Age Unit item or one of the age units (e.g., Years, Months, Weeks, Days) under Fixed Option.
- If you configure Height, you must either select the Height Unit item or one of the height units (e.g., Feet, Inches, Meters, Centimeters, Millimeters) under Fixed Option.
- If you configure Weight, you must either select the Weight Unit item or one of the weight units (e.g., Kilograms, Grams, Micrograms, Pounds, Ounces) under Fixed Option.
- For an example of admit/discharge configuration for a length delimited parser, refer to “Sample length delimited parser information” on page 4-16.

1. On the Admit/Discharge Configuration window, enter the location and length information for each data item.
   
   If an item is not included in the barcode, type 0 in the item’s Position and Length fields, or leave the Position and Length fields blank.
   
   a. In the Position column, type the beginning position of the field in the data string (from 1 to 300).
   b. In the Length column, type the number of characters (from 1 to 99) that the field contains.

2. For Gender Format, select Fixed or Configured.

   If you select Configured:
   
   a. Type the character that identifies Male.
b. Type the character that identifies \textit{Female}.

3. Under \textit{Fixed Option}, select the applicable value:

<table>
<thead>
<tr>
<th>Item</th>
<th>Item selection on the top part of the screen</th>
<th>Fixed Option selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height Unit</td>
<td>Both \textit{Height} and \textit{Height Unit}</td>
<td>Non-Fixed.</td>
</tr>
<tr>
<td></td>
<td>\textit{Height} only</td>
<td>Select value from drop down list.</td>
</tr>
<tr>
<td>Weight Unit</td>
<td>Both \textit{Weight} and \textit{Weight Unit}</td>
<td>Non-Fixed.</td>
</tr>
<tr>
<td></td>
<td>\textit{Weight} only</td>
<td>Select value from drop down list.</td>
</tr>
<tr>
<td>Age Unit</td>
<td>Both \textit{Age} and \textit{Age Unit}</td>
<td>Non-Fixed.</td>
</tr>
<tr>
<td></td>
<td>\textit{Age} only</td>
<td>Select value from drop down list.</td>
</tr>
</tbody>
</table>

4. Scroll to the bottom of the window, and select \textit{Submit}.

All changes take effect immediately.

\textbf{Sample length delimited parser information} – In this example, the barcode contains 10 items. The following table lists the starting position and length of each item:

<table>
<thead>
<tr>
<th>Item</th>
<th>Starting Position</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRN</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>First Name</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>Last Name</td>
<td>21</td>
<td>15</td>
</tr>
<tr>
<td>Day of Birth</td>
<td>46</td>
<td>2</td>
</tr>
<tr>
<td>Month of Birth</td>
<td>48</td>
<td>2</td>
</tr>
<tr>
<td>Year of Birth</td>
<td>50</td>
<td>4</td>
</tr>
<tr>
<td>Age</td>
<td>36</td>
<td>5</td>
</tr>
<tr>
<td>Age Unit</td>
<td>41</td>
<td>5</td>
</tr>
<tr>
<td>Gender</td>
<td>54</td>
<td>1</td>
</tr>
<tr>
<td>Height</td>
<td>55</td>
<td>5</td>
</tr>
</tbody>
</table>
The following sample shows the corresponding entries on the *Admit/Discharge Configuration* window.

### Configure character delimited parser information

**Points to note**

- If you configure *Age*, you must either select the *Age Unit* item or one of the age units (e.g., Years, Months, Weeks, Days) under **Fixed Option**.

- If you configure *Height*, you must either select the *Height Unit* item or one of the height units (e.g., Feet, Inches, Meters, Centimeters, Millimeters) under **Fixed Option**.

- If you configure *Weight*, you must either select the *Weight Unit* item or one of the weight units (e.g., Kilograms, Grams, Micrograms, Pounds, Ounces) under **Fixed Option**.

- For an example of admit/discharge configuration for a length delimited parser, refer to “Sample character delimited parser information entry” on page 4-18.

1. In the *Position* column of the *Admit/Discharge Configuration* window, enter the sequence number of each item included in the barcode. Use incremental numbers from 1 (the left-most field) up to 16 (the right-most field).

   If an item is not included in the barcode, leave the *Position* field blank for the item.
2. Under **Field Delimiter**, in the **Delimiter** field, enter the special character that separates the fields on the barcode.

**NOTE**
- Allowed characters are ASCII characters 33-126.
- Forbidden characters are control characters (ASCII characters 0-31), the space character (ASCII character 32), and ASCII characters 127 and above.
- If the character selected exists in any field in the barcode, it will be misinterpreted as a field delimiter.

3. Under **Gender Code**, enter the codes that identify **Male** and **Female**.

4. Under **Fixed Option**, select the applicable value:

<table>
<thead>
<tr>
<th>Item</th>
<th>Item selection on the top part of the screen</th>
<th>Fixed Option selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height Unit</td>
<td>Both <strong>Height</strong> and <strong>Height Unit</strong></td>
<td><strong>Non-Fixed.</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Height</strong> only</td>
<td>Select value from drop down list.</td>
</tr>
<tr>
<td>Weight Unit</td>
<td>Both <strong>Weight</strong> and <strong>Weight Unit</strong></td>
<td><strong>Non-Fixed.</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Weight</strong> only</td>
<td>Select value from drop down list.</td>
</tr>
<tr>
<td>Age Unit</td>
<td>Both <strong>Age</strong> and <strong>Age Unit</strong></td>
<td><strong>Non-Fixed.</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Age</strong> only</td>
<td>Select value from drop down list.</td>
</tr>
</tbody>
</table>

5. Scroll to the bottom of the window, and select **Submit**.

All changes take effect immediately.

Sample character delimited parser information entry – In the following example, the barcode contains 12 items and uses the pound sign (#) as a delimiter.

<table>
<thead>
<tr>
<th>Item</th>
<th>Sequence number of the item in the barcode</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRN</td>
<td>4</td>
</tr>
<tr>
<td>First Name</td>
<td>5</td>
</tr>
<tr>
<td>Last Name</td>
<td>6</td>
</tr>
<tr>
<td>Day of Birth</td>
<td>1</td>
</tr>
<tr>
<td>Month of Birth</td>
<td>2</td>
</tr>
<tr>
<td>Year of Birth</td>
<td>3</td>
</tr>
<tr>
<td>Age</td>
<td>11</td>
</tr>
<tr>
<td>Age Unit</td>
<td>12</td>
</tr>
<tr>
<td>Gender</td>
<td>7</td>
</tr>
<tr>
<td>Height</td>
<td>8</td>
</tr>
</tbody>
</table>
The following sample shows the corresponding entries on the Admit/Discharge Configuration window.

<table>
<thead>
<tr>
<th>Item</th>
<th>Sequence number of the item in the barcode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height Unit</td>
<td>9</td>
</tr>
<tr>
<td>Weight</td>
<td>10</td>
</tr>
</tbody>
</table>

Barcode data specifications

Points to note

- The maximum length of the entire barcode is 300.
- If the field value is longer than the maximum length indicated, the right-most characters will be truncated when the value is displayed on the Admit/Discharge menu.
- If a field contains a forbidden character, that character will be replaced with a space when it is displayed on the Admit/Discharge menu.
<table>
<thead>
<tr>
<th>Item</th>
<th>Maximum length</th>
<th>Valid entries</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRN</td>
<td>99</td>
<td>Both letters and numbers</td>
<td>Forbidden characters are those that are not allowed by the monitor, including the following characters: ! &quot; # $ % &amp; ’ ( ) * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; &lt; = &gt; ? <code>[ \ ] ^ _ </code></td>
</tr>
</tbody>
</table>
Power frequency

**WARNING**
Incorrect power line frequency setting could adversely affect ECG and EEG processing.

1. If you have not already done so, “Log into Webmin” on page 4-4 and select the **Configuration** tab.
2. On the **Configuration** tab, select **Power Frequency**.
3. On the **Power Frequency** window, select the applicable power line frequency.
4. Select **Submit**.
   The power frequency changes take effect after the next system restart.

Language

1. If you have not already done so, “Log into Webmin” on page 4-4 and select the **Configuration** tab.
2. On the **Configuration** tab, select **Language**.
3. On the **Language** window, select the patient monitor language and keyboard language:
   a. Select the monitor language from the drop-down list and select **Submit**.
   b. Select the keyboard locale from the drop-down list and select **Submit**.
4. Select **Submit**.
   The language takes effect after the patient monitor is restarted.

National requirements

Select the national requirements for the system.

1. If you have not already done so, “Log into Webmin” on page 4-4 and select the **Configuration** tab.
2. On the **Configuration** tab, select **National Requirements**.
3. On the **National Requirement** window, select the applicable option:

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>Select the normal defaults.</td>
</tr>
<tr>
<td>France</td>
<td>Enable the following country specific monitoring:</td>
</tr>
<tr>
<td></td>
<td>- At least 1 audible and visual occurrence must remind either as un-inhibitable audible and visual alarm or as an audible and recurring recall repeated at least every 3 minutes and also inhibitable.</td>
</tr>
<tr>
<td></td>
<td>- Heart Rate high alarm limit maximum 230 instead of 250.</td>
</tr>
<tr>
<td></td>
<td>- Reminder beep will sound every 2 minutes when alarms have been silenced permanently.</td>
</tr>
</tbody>
</table>

4. Select **Submit**.

The national requirements changes take effect after the next system restart.

## Host asset settings

**NOTE**

The **Host Serial Number** field is view only and cannot be changed.

To set the host asset number:

1. If you have not already done so, “Log into Webmin” on page 4-4 and select the **Configuration** tab.
2. On the **Configuration** tab, select **Host Asset Settings**.
3. On the **Host Asset Settings** window, enter the user-assigned host asset number in the **Change Value to** column.
4. Select **Submit**.

The host asset changes take effect immediately.

## Modules

### Asset settings

**NOTE**

- This configuration applies only to the PDM.
- The **Device Serial Number** field is view only and cannot be changed.

To set the device asset number of a PDM:

1. If you have not already done so, “Log into Webmin” on page 4-4 and select the **Configuration** tab.
2. On the **Configuration** tab, select **Modules**.
3. On the **Sub-Modules for Modules** menu, select **Assets Settings**.
4. On the **Assets Settings** window, enter the user-assigned asset number for the device in the **Change Value to** column.
5. Select *Submit*.
   The change will take effect immediately.

**Licensing**

**NOTE**
This configuration applies only to the PDM.

To activate the license for a PDM:

1. If you have not already done so, “Log into Webmin” on page 4-4 and select the *Configuration* tab.
2. On the *Configuration* tab, select *Modules*.
3. On the *Sub-Modules for Modules* menu, select *Licensing*.
4. On the *Licensing* window, enter the activation code by the appropriate feature.
5. Select *Activate*.

**NOTE**
To remove the license, select *Remove* next to the feature you want to remove.

6. After adding and activating the license(s), perform the appropriate parameter checkout.
   The changes will take effect after the PDM is power-cycled.

**ECG filter configuration**

**NOTE**
This configuration applies only to the PDM.

The ECG Filter is always enabled. It can be disabled temporarily, but it will always default to an enabled state after a power cycle or reboot of the PDM.

**CAUTION**
Do not disable the ECG Filter during clinical use.

To set the acquisition ECG filter for the PDM:

1. If you have not already done so, “Log into Webmin” on page 4-4 and select the *Configuration* tab.
2. On the *Configuration* tab, select *Modules*.
3. On the *Sub-Modules for Modules* menu, select *ECG Filter Configuration*.
4. On the *ECG Filter Configuration* window, select the applicable radio button to *Enable* or *Disable* the line frequency filter.
5. Select *Submit*.
   The change will take effect immediately.
STP/TP/ST settings

**NOTE**
This procedure applies to the E-PRESTN, E-PRETN, E-RESTN, E-PSM and E-PSMP modules (which use SpO2, invasive pressure or temperature measurements) and is needed after corrective maintenance only. For more information, refer to the “Module Frames and Modules Technical Manual”.

1. If you have not already done so, “Log into Webmin” on page 4-4 and select the **Configuration** tab.
2. On the **Configuration** tab, select **Modules**.
3. On the **Sub-Modules for Modules** menu, select **STP/TP/ST Settings**.
4. Select a new configuration from the **New Configuration** drop down list.
5. Select **Submit**.

The changes will take effect after the patient monitor is restarted.

P/PT/PP settings

**NOTE**
This procedure applies to the E-P, E-PT, and E-PP modules (which use invasive pressure or temperature measurements) and is needed after corrective maintenance only. For more information, refer to the “Module Frames and Modules Technical Manual”.

1. If you have not already done so, “Log into Webmin” on page 4-4 and select the **Configuration** tab.
2. On the **Configuration** tab, select **Modules**.
3. On the **Sub-Modules for Modules** menu, select **P/PT/PP Settings**.
4. Select a new configuration from the **New Configuration** drop down list.
5. Select **Submit**.

The changes will take effect after the patient monitor is restarted.

Passwords

---

**WARNING**
Control of this user’s password is critical to ensure that Webmin on this device is accessed by only trained and authorized personnel. Failure to limit access of Webmin to trained and authorized personnel only may compromise patient safety and/or system performance.

---

1. If you have not already done so, “Log into Webmin” on page 4-4 and select the **Configuration** tab.
2. On the **Configuration** tab, select **Passwords**.
3. On the **Edit User Password** window, change the **biomed** or **clinical** user’s password as required.

4. Select **Save**.
   The change will take effect immediately.

### Remote service

#### Configuration

If the site uses an http proxy server, its address and port must be specified for remote service communication to work.

1. If you have not already done so, “Log into Webmin” on page 4-4 and select the **Configuration** tab.
2. On the **Configuration** tab, select **Remote Service**.
3. On the **Sub-Modules for Remote Service** menu, select **Configuration**.
4. On the **Remote Service Configuration** window, enter the applicable data:

<table>
<thead>
<tr>
<th>HTTP Proxy Server Configuration</th>
<th>Description</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Address</strong></td>
<td>If this site uses an HTTP proxy server, a specific site proxy server IP <strong>Address</strong> and <strong>Port</strong> number are required for the <strong>Remote Service</strong> communication to work. Otherwise, select <strong>None</strong>.</td>
<td>These values are determined by the customer.</td>
</tr>
<tr>
<td><strong>Port</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Username and Password</strong></td>
<td>If the HTTP proxy server requires user authorization, a specific <strong>Username</strong>, and <strong>Password</strong> is required. Otherwise, select <strong>None</strong>.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Remote Service Configuration</th>
<th>Description</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>System ID</strong></td>
<td>Identifies the system to the GE backoffice servers.</td>
<td>These values are read-only and are unique.</td>
</tr>
<tr>
<td><strong>Serial Number</strong></td>
<td>Identifies the unit and is set at the time of manufacture.</td>
<td></td>
</tr>
</tbody>
</table>
Control

After the server has been configured for remote serviceability, the remote service agent must be enabled for use.

NOTE
Be sure that you have read and understood all associated InSite 2.0 documentation, including “Remote service” on page 4-25. By enabling Remote Service, you are enabling supported Remote Service features for this device.

1. If you have not already done so, “Log into Webmin” on page 4-4 and select the Configuration tab.
4. Under Remote Service Control on the Remote Service Control window, enable or disable the Service Agent by selecting Enable or Disable.
5. Select Save.

The changes will take effect immediately.
Settings

The patient monitor allows the end-user to archive the clinical and platform settings to external media. By logging in remotely from a computer to the patient monitor through Webmin, the end-user can save or load the archived settings. See the following table for detailed settings information.

<table>
<thead>
<tr>
<th>Type of setting</th>
<th>Configuration information that can be saved or loaded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Platform settings</td>
<td>Admit settings</td>
</tr>
<tr>
<td></td>
<td>Citrix</td>
</tr>
<tr>
<td></td>
<td>Host asset numbers</td>
</tr>
<tr>
<td></td>
<td>Host license</td>
</tr>
<tr>
<td></td>
<td>Language</td>
</tr>
<tr>
<td></td>
<td>MUSE/12SL</td>
</tr>
<tr>
<td></td>
<td>National requirement</td>
</tr>
<tr>
<td></td>
<td>Network</td>
</tr>
<tr>
<td></td>
<td>Password</td>
</tr>
<tr>
<td></td>
<td>Power frequency</td>
</tr>
<tr>
<td></td>
<td>Printers</td>
</tr>
<tr>
<td></td>
<td>Remote service</td>
</tr>
<tr>
<td></td>
<td>Time</td>
</tr>
<tr>
<td></td>
<td>Unit and bed name</td>
</tr>
<tr>
<td>Clinical settings</td>
<td>Care unit settings</td>
</tr>
<tr>
<td></td>
<td>Profile settings</td>
</tr>
</tbody>
</table>

Save settings

**NOTE**

This option is available only when you log into Webmin remotely. The option is not available locally at the patient monitor.

1. If you have not already done so, “Log into Webmin” on page 4-4 and select the Configuration tab.
2. On the Configuration tab, select Settings.
4. On the Save Settings window, select the radio button next to the type of settings you want to save.
5. Select Save.
Load settings

NOTE
This option is available only when you log into Webmin remotely. The option is not available locally at the patient monitor.

1. If you have not already done so, “Log into Webmin” on page 4-4 and select the Configuration tab.
2. On the Configuration tab, select Settings.
4. On the Load Settings window, enter the file name or click on Browse to select a file from the Choose file dialog box.
5. Select Upload to load the settings.

Activate settings

When the settings are activated, monitors configured for the U.S. will revert to the international factory default settings. To reload the U.S. factory default settings, use the U.S. defaults CD and follow the procedure to “Load settings” on page 4-28.

NOTE
The patient monitor needs to be in a discharged state.

1. Log on to Webmin.
2. Select the Configuration tab.
3. On the Configuration tab, select Settings.
5. On the Activate Settings window, select the settings that you want to activate.
6. Select Submit.

The changes will take effect after the patient monitor is restarted.

Software Management

For information, refer to the “CARESCAPE Monitor B850 Software Installation Instructions”.

5 Installation checkout
Overview

The purpose of this installation checkout procedure is to ensure that the system is properly installed and configured for use. Record all checkouts performed using the “Check form” on page B-3, or equivalent.

Visual inspection

The patient monitor and its components should be carefully inspected every 12 months, and each time the equipment is serviced.

- Carefully inspect the device for any damage.
- Carefully inspect any devices connected to the following ports: M-ports, RS232, DVI, USB and e-Port/Tramnet.
- Carefully inspect all cables connected to all ports, including the MC Network and IX Network ports.
- Verify that the power cord and USB cables are properly secured with the supplied retaining clips.
- Verify that ferrite blocks are installed on all Tram-Net cables. See page 3-20 for details.
Electrical safety tests

Electrical safety tests provide a method of determining if potential electrical health hazards to the patient or operator of the device exist.

Recommendations

Qualified personnel must perform all safety tests presented in this section.
- Upon receipt of the device (patient monitor and its associated equipment). Refer to “Installation checkout procedure” on page 5-16 for more information.
- Every 12 months thereafter (planned maintenance). Refer to “Maintenance schedule” on page 7-2 for more information.
- Each time the main enclosure is disassembled or a circuit board is removed, tested, repaired, or replaced (corrective maintenance). Refer to “Recommended checkout” on page 9-10 and 9-20.

Record the values of each required electrical safety test in the “Check form” on page B-3, or equivalent.

These instructions are intended for every component in the system. If the Tram-Rac housing does not have its own power supply, it should remain connected to the patient monitor throughout the safety tests.

WARNING
Only perform maintenance procedures specifically described in the manual.

WARNING
Preventive maintenance should be carried out annually. Failure to implement the recommended maintenance schedule may cause equipment failure and possible health hazards.

NOTE
The manufacturer does not, in any manner, assume the responsibility for performing the recommended maintenance schedule, unless an Equipment Maintenance Agreement exists. The sole responsibility rests with the individuals, hospitals, or institutions utilizing the device.
Test equipment

The recommended test equipment required to perform electrical safety tests is listed below.

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leakage Current Tester</td>
<td>Equivalent to the circuits shown</td>
</tr>
<tr>
<td>Digital Multimeter (DMM) (optional based on leakage tester used and locality)</td>
<td>AC volts, ohms</td>
</tr>
<tr>
<td>Ground Bond Tester (if required by local regulations)</td>
<td>0 – 1 ohm</td>
</tr>
<tr>
<td>Safety Test Body Kit(^1)</td>
<td>P/N M1155870 or equivalent</td>
</tr>
</tbody>
</table>

\(^1\) Instead of the test bodies in the safety test body kit, other applicable test bodies with pins connected together may be used.

Perform electrical safety tests using an electrical safety analyzer per IEC 60601-1, UL 60601-1, EN 60601-1 or CSA C22.2 No. 601.1. The schematics in this section provide a general understanding of the test equipment. Actual configuration of test equipment may vary.

The patient monitor being tested should be placed on an insulating surface.

**NOTE**

Before proceeding, make sure that all test equipment is properly calibrated and functioning.

Setup

Ensure that all the system components are correctly connected as described in “Connect system components” on page 3-4.

Power outlet test

Verify that the power outlet is wired correctly per the country’s electrical code standard before starting the following electrical safety tests. The results of the following tests will be inaccurate unless a properly wired power outlet is used. Use only non-isolated power outlets when performing safety tests.

Power cord and plug

Verify the power cord being used with the patient monitor is good. The following are a couple of things to check for in this regard:

- Inspect the power cord for wear or damage regularly. If damage is suspected, test for continuity through each conductor of the power cord connector.
- Verify line, neutral, and earth conductors are properly connected to the power cord plug and are not short-circuited. Replace the power cord, as necessary, with
a regulatory-approved cord for the country of use.

WARNING
Use only AC power cords recommended or manufactured by GE.

Ground (earth) integrity

Listed below are two methods for checking the ground (earth) integrity, “Ground continuity test” and “Impedance of protective earth connection”. These tests determine whether the device’s exposed metal and power inlet’s earth (ground) connection has a power ground fault condition.

Perform the test in accordance with your local regulations.

Ground continuity test

Refer to the instructions contained with the safety analyzer to perform each test.

The measuring device (MD) in the diagram below may be a DMM or part of a safety analyzer.

Impedance of protective earth connection

This test, unlike a ground continuity test, will also stress the ground system by using special ground bond testers.

This test normally is only required as a manufacturing production test to receive safety agency compliance. Some country agencies do require this test after field equipment repairs (i.e., Germany’s DIN VDE 0751 standards). Consult your country/local safety agency if in question.

Compliance is checked by the following steps:

1. A current of 25A from a current source with a frequency of 50 or 60 Hz with a no-load voltage not exceeding 6VAC is passed for at least 5 seconds, but no more than 10 seconds, through the protective earth terminal or the protective earth pin
in the mains plug and each accessible metal part which could become live in case of failure in basic insulation.

2. The voltage drop between the parts described is measured and the impedance determined from the current and voltage drop. It shall not exceed the values indicated.

When taking this measurement, move the unit’s power cord around. There should be no fluctuations in resistance.

**Acceptance criteria**

For equipment without a power supply cord, the impedance between the earth terminal of the (IEC 60320) AC inlet receptacle and the protective earth (PE) terminal (or any accessible metal part which is protectively earthed) shall not exceed 0.1 ohms.

For equipment with a power supply cord, the impedance between the protective earth pin in the mains plug and any accessible metal part which is protectively earthed shall not exceed 0.2 ohms.

GE recommends that the qualified personnel performing the tests should record the values of this test on the “Check form” on page B-3.

**Ground (earth) wire leakage current tests**

Perform this test to measure current leakage through the ground (earth) wire of the equipment during normal operation.

1. Refer to the instructions contained with the safety analyzer to perform this test.

2. Configure leakage tester as follows:
   - Polarity – NORMAL
   - Neutral – CLOSED
   - GND (Earth) – CLOSED

3. Read and record the current leakage indicated on the tester.
4. Change leakage tester switches to:
   - Polarity – NORMAL
   - Neutral – OPEN
   - GND (Earth) – CLOSED

5. Read and record the current leakage indicated on the tester.

6. Change leakage tester switches to:
   - Polarity – REVERSE
   - Neutral – OPEN
   - GND (Earth) – CLOSED

7. Read and record the current leakage indicated on the tester.

8. Change leakage tester switches to:
   - Polarity – REVERSE
   - Neutral – CLOSED
   - GND (Earth) – CLOSED

9. Read and record the current leakage indicated on the tester.

If measured reading is greater than the appropriate specification below, the device under test fails. Contact GE Technical Support.

**Acceptance criteria normal condition (NC)**

- (USA only) 300 µA, and the device under test is powered from 100-120 VAC/50-60 Hz
- (USA only) 300 µA, and the device under test is powered from a center-tapped 200-240 VAC/50-60 Hz, single phase circuit (UL Split Phase Exemption)
- 500 µA, and the device under test is powered from a non-center-tapped, 200-240 VAC/50-60 Hz, single-phase circuit

**Acceptance criteria single fault condition (SFC) – ground (earth), line or neutral open**

- (USA only) 300 µA, and the device under test is powered from 100-120 VAC/50-60 Hz
- (USA only) 300 µA, and the device under test is powered from a center-tapped 200-240 VAC/50-60 Hz, single phase circuit (UL Split Phase Exemption)
- 1000 µA, and the device under test is powered from a non-center-tapped, 200-240 VAC/50-60 Hz, single-phase circuit

**NOTE**
Center-tapped and non-center-tapped supply circuits produce different leakage currents and the UL and IEC limits are different.
Enclosure (touch) leakage current test

Perform this test to measure current leakage through exposed conductive surfaces on the device under test during normal operation. Refer to the instructions contained with the safety analyzer to perform enclosure leakage current test.

**NOTE**
*The MD represents the network and voltage measuring instrument and its frequency characteristics per IEC 60601-1.*

1. Configure leakage tester as follows:
   - Polarity – NORMAL
   - Neutral – CLOSED
   - GND (Earth) – CLOSED
2. Power on device under test.
3. Read and record the current leakage indicated on tester.

**NOTE**
Center-tapped and non-center-tapped supply circuits produce different leakage currents and the UL and IEC limits are different.

4. Change leakage tester switches to:
   - Polarity – NORMAL
   - Neutral – OPEN
   - GND (Earth) – CLOSED
5. Read and record the current leakage indicated on the tester.
6. Change leakage tester switches to:
   - Polarity – NORMAL
   - Neutral – CLOSED
   - GND (Earth) – OPEN
7. Read and record the current leakage indicated on the tester.
8. Change leakage tester switches to:
   - Polarity – REVERSED
   - Neutral – CLOSED
   - GND (Earth) – OPEN
9. Read and record the current leakage indicated on the tester.

10. Change leakage tester switches to:
   - Polarity – REVERSED
   - Neutral – OPEN
   - GND (Earth) – CLOSED

11. Read and record the current leakage indicated on the tester.

12. Change leakage tester switches to:
   - Polarity – REVERSED
   - Neutral – CLOSED
   - GND (Earth) – CLOSED

13. Read and record the current leakage indicated on the tester.

14. Set the power switch of the device under test to OFF.

If measured reading is greater than the appropriate specification below, the device under test fails. Contact GE Technical Support.

**Acceptance criteria NC**

- 100 microamperes (0.1 volts on the tester), and the device under test is powered from 100-240 VAC/50-60 Hz

**Acceptance criteria SFC - ground (earth), line or neutral open**

- (USA only) 300 µA, and the device under test is powered from 100-120 VAC/50-60 Hz
- (USA only) 300 µA, and the device under test is powered from a center-tapped 200-240 VAC/50-60 Hz, single phase circuit (UL Split Phase Exemption)
- 500 µA, and the device under test is powered from a non-center-tapped, 200-240 VAC/50-60 Hz, single-phase circuit

**NOTE**

If any reading is outside the indicated acceptance criteria, contact GE Technical Support for service.

**Patient leakage current tests**

The following table lists all the modules and module connections to be tested in the patient source and patient sink leakage tests.

Use the safety test body kit (P/N M1155870 or equivalent) for all modules. This kit contains various safety test bodies for use with different parameters.

**NOTE**

Alternatively, you may use a corresponding test body with pins connected together.
For information on which test body to use for each parameter, refer to the instructions for use included in the safety test body kit.

<table>
<thead>
<tr>
<th>Module</th>
<th>Patient connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-BIS</td>
<td>Test from DSC BIS connector</td>
</tr>
<tr>
<td>E-COP, E-COPSv</td>
<td>P4/P8</td>
</tr>
<tr>
<td>E-EEG</td>
<td>EEG</td>
</tr>
<tr>
<td>E-ENTROPY</td>
<td>Entropy</td>
</tr>
<tr>
<td></td>
<td>Test from Entropy cable</td>
</tr>
<tr>
<td>E-MASIMO</td>
<td>SpO2</td>
</tr>
<tr>
<td>E-NMT</td>
<td>NMT</td>
</tr>
<tr>
<td>E-NSAT</td>
<td>SpO2</td>
</tr>
<tr>
<td>E-NSATX</td>
<td>SpO2</td>
</tr>
<tr>
<td>E-P, E-PT</td>
<td>P3/P7</td>
</tr>
<tr>
<td>E-PP</td>
<td>P5-P6</td>
</tr>
<tr>
<td>E-PRESTN, PSMP</td>
<td>ECG</td>
</tr>
<tr>
<td></td>
<td>SpO2</td>
</tr>
<tr>
<td>E-PRETN</td>
<td>ECG</td>
</tr>
<tr>
<td></td>
<td>P1-P2</td>
</tr>
<tr>
<td>E-RESTN, PSM</td>
<td>ECG</td>
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<tr>
<td></td>
<td>SpO2</td>
</tr>
<tr>
<td>M-BIS</td>
<td>Test from DSC BIS connector</td>
</tr>
<tr>
<td>M-COP, M-COPSv</td>
<td>P4</td>
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<tr>
<td>M-EEG</td>
<td>EEG</td>
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<tr>
<td>M-ENTROPY</td>
<td>Entropy</td>
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<td></td>
<td>Test from Entropy cable</td>
</tr>
<tr>
<td>M-NMT</td>
<td>NMT</td>
</tr>
<tr>
<td>M-NSAT</td>
<td>SpO2</td>
</tr>
<tr>
<td>M-P, M-PT</td>
<td>P3</td>
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<tr>
<td>M-PP</td>
<td>P5-P6</td>
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<tr>
<td>M-PRESTN</td>
<td>ECG</td>
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<td>SpO2</td>
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<td>M-PRETN</td>
<td>ECG</td>
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<td></td>
<td>P1-P2</td>
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<td>M-RESTN</td>
<td>ECG</td>
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<td></td>
<td>SpO2</td>
</tr>
<tr>
<td>Module</td>
<td>Patient connector</td>
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<td>-----------------</td>
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<tr>
<td>Masimo SpO2</td>
<td>SpO2</td>
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<tr>
<td>PDM</td>
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<tr>
<td>TRAM 451</td>
<td>ECG SpO2</td>
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<tr>
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<td>ECG SpO2</td>
</tr>
<tr>
<td>TRAM 451N</td>
<td>ECG SpO2</td>
</tr>
<tr>
<td>TRAM 451N5</td>
<td>ECG SpO2</td>
</tr>
<tr>
<td>TRAM 850SL</td>
<td>ECG SpO2</td>
</tr>
<tr>
<td>TRAM 851</td>
<td>ECG SpO2</td>
</tr>
<tr>
<td>TRAM 851M</td>
<td>ECG SpO2</td>
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<tr>
<td>TRAM 851N</td>
<td>ECG SpO2</td>
</tr>
<tr>
<td>TRAM 851N5</td>
<td>ECG SpO2</td>
</tr>
</tbody>
</table>
Patient (source) leakage current test

This procedure only applies to Class I (grounded/earthed) equipment, and measures the leakage current from the ECG/RESP connector or the SPO2 connector of the device to ground.

This procedure applies to all parameter modules connected to the patient monitor. For each module, test only those patient connections that are listed in the table on page 5-9.

**NOTE**

*The MD represents the network and voltage measuring instrument and its frequency characteristics per IEC 60601-1.

The patient connector test body shorts all signals in the connector together. Refer to the instructions contained with the safety analyzer to perform this test.

1. Connect the ECG/RESP test body to the green connector of the device under test.
2. Configure leakage tester as follows:
   - Polarity – NORMAL
   - Neutral – CLOSED
   - GND (Earth) – CLOSED
3. Power on device under test.
4. Read and record the current leakage indicated on the tester.
5. Change leakage tester switches to:
   - Polarity – NORMAL
   - Neutral – OPEN
   - GND (Earth) – CLOSED
6. Read and record the current leakage indicated on the tester.
7. Change leakage tester switches to:
   - Polarity – NORMAL
   - Neutral – CLOSED
   - GND (Earth) – OPEN
8. Read and record the current leakage indicated on the tester.
9. Change leakage tester switches to:
   - Polarity – REVERSED
   - Neutral – CLOSED
   - GND (Earth) – OPEN

10. Read and record the current leakage indicated on the tester.

11. Change leakage tester switches to:
   - Polarity – REVERSED
   - Neutral – OPEN
   - GND (Earth) – CLOSED

12. Read and record the current leakage indicated on the tester.

13. Change leakage tester switches to:
   - Polarity – REVERSED
   - Neutral – CLOSED
   - GND (Earth) – CLOSED

14. Read and record the current leakage indicated on the tester.

15. Set the power switch of the device to OFF.

16. Repeat the steps in this procedure using the appropriate SPO2 Test Body.
    Connect the SPO2 Test Body to the blue SPO2 connector of the device under test.

**Acceptance criteria NC**

With Ground and Neutral CLOSED – If reading is greater than 10 µA, the device under test fails. Contact GE Technical Support.

**Acceptance criteria SFC – ground (earth), line or neutral open**

If any reading is greater than 50 µA, the device under test fails. Contact GE Technical Support.
Patient (sink) leakage current test (mains voltage on the applied part)

This procedure only applies to Class I (grounded/earthed) equipment, and measures the leakage current from a mains voltage source into the ECG/RESP connector or the SpO2 connector.

The patient connector test body shorts all signals in the connector together. Refer to the instructions contained with the safety analyzer to perform this test. Connect the ECG/RESP Test Body to the green connector of the device under test.

Refer to the instructions contained with the safety analyzer to perform each test.

![Leakage Tester Diagram]

**NOTE**

*The MD represents the network and voltage measuring instrument and its frequency characteristics per IEC 60601-1.*

**Per IEC 60601-1, the resistance to protect the circuitry and the person performing the test. The resistance must be low enough to accept currents higher than the allowable values of the leakage current to be measured.*

1. Configure leakage tester as follows:
   - Polarity –NORMAL
   - Neutral – CLOSED
   - GND (Earth) – CLOSED

**WARNING**

Shock hazard. The following step causes high voltage at the test body. Do not touch the test body.

2. Power on device under test.
3. Read and record leakage current indicated on the tester.
4. Change leakage tester switches to:
   - Polarity – REVERSED
   - Neutral – CLOSED
   - GND (Earth) – CLOSED

5. Read and record the current leakage indicated on the tester.

6. Set the power switch on the device to OFF.

7. Repeat the steps in this procedure using the appropriate SPO2 Test Body. Connect the SPO2 Test Body to the blue SPO2 connector of the device under test.

Acceptance criteria

If measured reading is greater than the appropriate specification below, the device under test fails. Contact GE Technical Support.

- 50 µA at 120-240 VAC

Test completion

1. Disconnect the leakage tester from the power outlet.
2. Disconnect all test equipment from the device.
3. Disconnect the device power cord from the leakage tester.
4. Mark this task as complete on the “Check form” on page B-3.
Installation checkout procedure

Perform the following installation checkout procedures for the patient monitoring system. If any peripheral devices are connected to the patient monitor, perform the applicable tests.

Interface devices

Display

1. Verify the following are working properly:
   - alarm light
   - sounds
   - USB hub
   - keypad
   - touch
2. Verify that all text on the display screen is readable.
3. Verify that all images on the display screen are clear.

Touchscreen

Verify that touching a parameter window displays the screen information for that parameter.

Keypad and remote

1. Press the Data & Pages key and select the Admit/Discharge or Start/End Case by using the TRIM KNOB.
2. Verify that the TRIM KNOB can be used to navigate and select the Admit/ Discharge or Start/End Case button.

Mouse

1. For a mouse that is connected to a USB port, move the mouse cursor over to Data & Pages and select Admit/Discharge or Start/End Case.
2. Verify that the cursor moves and a new window is displayed.

Keyboard

1. Make sure that the language of the keyboard and clinical application matches.
2. Navigate to Edit Name & Number window by selecting Data & Pages > Admit/ Discharge or Start/End Case > Edit Name & Number.
3. Select the Last Name field and type all characters on the keyboard.
4. Verify that typed keys are correctly displayed.
Barcode scanner

1. Navigate to Admit/Discharge window by selecting Data & Pages > Admit/Discharge or Start/End Case.
2. Verify that Scan from Barcode button is enabled.
3. Scan the barcode.
4. Verify that information is populated in the appropriate fields (patient demographics, height, weight, etc.).

Printer and writer

A configured laser printer will display in Webmin. See “Test connected devices using Webmin” on page 5-18. Print a test page from Webmin or the patient monitor.

Make sure the software is configured to print to the PRN 50-M digital writer. Press Print Waveforms on the display keypad or remote and make sure the writer prints a strip.

Unity Network ID connectivity device

Verify that the Unity Network ID’s parameters are displayed on the screen.

Acquisition modules

Verify that all the connected parameters are displayed on the screen.

Network communication

MC Network and S/5 Network

Perform the following test for a patient monitor that is connected to an MC Network or S/5 Network.

1. Check that a network symbol is displayed in the upper right corner of the screen.
2. Make sure at least one other bed is on the network.
3. From the Main Menu area, select Data & Pages > Other Patients and select a patient from the list.
4. Select Show and verify that a window with parameters from another patient displays to the left side of the screen.
5. Select Close View to close the window.
iPanel software

Perform the following test for iPanel software.

1. From the Main Menu area, select **Data & Pages > iPanel** and verify that the iPanel home page is launched correctly.

2. Exit the iPanel software.
   a. Select the **About** button on the iPanel toolbar.
   
      ![About button](image)

   b. Select **Exit iPanel Software** on the **About iPanel Software** window.

Insite with ExC

Contact your local online support center to find out if they can view the patient monitor.

Test connected devices using Webmin

Make sure all parameter modules are securely installed in housings to ensure that the Tram-Rac housing and E-Module Frame is tested as part of the parameter tests.

Connected devices and network communication can be checked using Webmin as follows:

1. Log in to Webmin.
2. Select **Information > Device Information**.
3. Verify that all connected module racks, parameter modules, Unity Network ID interfaces, displays, writers, USB input devices and network connections are identified.

   If a connected device is not found, it is not communicating.

Complete check form

Complete the “Check form” on page B-3.
6 Patient monitor repair overview
Introduction

This section of the manual describes the controls, indicators, connectors and signals of the main components of the patient monitor.

The patient monitor is the central processing unit for a stand-alone physiological monitor when connected to acquisition module(s), user interface device(s) (touchscreen, mouse, remote control or keyboard), and a display. The patient monitor features include four M-Ports, two or three DVI video ports, two serial ports, two ePort/Tramnet ports, two Ethernet ports and four USB ports.

Main components

The block diagram below represents the main components and the interface connectors.

The main components of the patient monitor are:
- CPU processor board with uDOM
- Power supply
- Speaker
- Enclosure (cover, back panel and front bezel)

The interface connectors of the patient monitor are:
- 4 M-Ports
- 2 DVI-I video ports (a third DVI port is optional)
- 2 RS232 ports
- 2 ePort/Tramnet ports
- 2 network ports
- 4 USB ports.
Processor board

The processor board provides the processing for acquired data, generation of audible alarms, generation of the displayed information for analog and digital displays, and support for the communication channels to support M-Port peripherals, ePort/Tramnet connected acquisition systems, the CARESCAPE Network, the S/5 Network, USB devices and serial devices. The processor board also contains the uDOM, which stores all software to upgrade the patient monitor.

Power supply

The power supply has four outputs, 3.4VDC and 5.1VDC for CPU and two separate floating 16.75VDC outputs for ePort/Tramnet ports. The power entry module provides an AC input connector and a power on/off switch.

Speaker

The speaker is used for audible feedback to the end-user.

Enclosure

The enclosure houses the circuit boards and speaker, and provides a means for mounting the patient monitor. The cover provides the top portion of the enclosure, as well as the aesthetics and a platform for mounting a display. The rear panel protects and labels connectors on the back of the unit. The front bezel provides aesthetics for the front of the unit.

Controls and indicators

A green LED illuminates on the front of the patient monitor to indicate when the unit is powered.

An AC mains power switch is on the rear of the unit.

Connectors

- M-Ports (Multi-protocol Port communications interface) provide serial and ethernet communication.
- DVI-I and DVI-D video ports provide communication with analog and digital displays.
- RS232 serial ports provide communication with a serial touchscreen.
- ePort/Tramnet ports provides communication with acquisition devices within the bedside care area. Power supplied to each port is +16.75VDC (± 5%).
- CARESCAPE Network ports are 10/100BaseT ethernet ports for communication with the MC Network, IX Network, and S/5 Network.
- USB ports provide USB2.0 standard compliant ports.
7 Maintenance and checkout
Maintenance schedule

The manufacturer recommends that the following is performed by service personnel each time the unit is opened and every 12 months after installation.

- Visual inspection
- Cleaning
- Calibration
- Electrical safety tests
- Functional checkout

**WARNING**
Only perform maintenance procedures specifically described in the manual.

**WARNING**
Preventive maintenance should be carried out annually. Failure to implement the recommended maintenance schedule may cause equipment failure and possible health hazards.

**NOTE**
The manufacturer does not, in any manner, assume the responsibility for performing the recommended maintenance schedule, unless an Equipment Maintenance Agreement exists. The sole responsibility rests with the individuals, hospitals, or institutions utilizing the device.

Record test results

As you perform the maintenance checkout, use the “Check form” on page B-3 to record the results of each test and to check off each task as you complete it.

Perform visual inspection

Inspect all components of the patient monitoring system. Refer to “Visual inspection” on page 5-2.

Cleaning

Refer to the appropriate user’s manual for cleaning precautions, requirements, procedures and recommended cleaning solutions.

Calibration

For calibration instructions, refer to the technical manual for the acquisition module.
Electrical safety tests

Perform the “Electrical safety tests” on page 5-3.
Patient monitor functional tests

Perform the applicable tests for the devices and features configured for your system.

1. Power on the patient monitor.
2. Check that the patient monitor starts up properly and that the display screen appears without errors.
3. Configure the patient monitor for the parameters that are connected and check that they display correctly.
4. Leave the patient monitor powered on.

Displays

1. Verify that the picture quality is good for all connected displays. Adjust brightness and contrast if needed.
2. Verify that the touchscreen is operating properly. Recalibrate, if needed, following the procedure on page 3-7.

Connected devices and configuration information

1. “Log into Webmin” on page 4-4.
2. Select Information > Device Information and verify that all connected devices are displayed.
3. Select Information > Configuration Information, and verify that all configuration information is displayed.

IX Network

If the patient monitor is connected to the IX Network, follow these steps to verify the connection.

1. If a laser printer is configured, generate a test page in Webmin. In Webmin, select Configuration > Printers > Print Test Page.
2. If Citrix access is configured, launch iPanel. From the patient monitor’s main menu, select Data & Pages > iPanel.

MC Network

If the patient monitor is connected to the MC Network, follow these steps to verify the connection.

1. Check that a network symbol is displayed in the upper right corner of the screen.
2. Verify that another bed can be viewed. From the patient monitor’s main menu, select Data & Pages > Other Patients.
PRN 50-M digital writer

If present, verify that the PRN-50 digital writer is able to print clearly and all characters are uniform in size and contrast.

Remote and keypad

Verify that all keys are functioning properly.

Alarms

Verify that the audio and visual alarm signals are working properly.

1. Set a parameter alarm limit outside of the current measured patient values.
2. Confirm that the following alarm notification events occur:
   - The audible alarm sounds the correct tone.
   - The alarm light illuminates, if present.
   - The value flashes in the parameter block with the correct color.
   - An alarm graph prints (if enabled).

   NOTE
   See the “Alarms” section in the user’s manual for a description of alarm behavior.

3. Return the parameter alarm limit to the original value.

Parameters

For parameter planned maintenance checkout, refer to the technical manual for the acquisition module.

Auxiliary devices

For planned maintenance for all other devices connected to USB, serial and M-ports, refer to the respective technical manual.
8 Troubleshooting
Troubleshooting guidelines

The problems and solutions in this section represent only a few of the faults that you may encounter and are not intended to cover every possible problem that may occur.

Before you begin

Before beginning any detailed troubleshooting, complete a thorough visual inspection to be sure

- All I/O cable connections are secured
- All patient devices are properly powered

Visual inspection

Inspect the equipment for physical damage to the case or external connections. Check for loose connectors or frayed cables. Replace if necessary.
Webmin diagnostics

Webmin provides information such as software versions, connected devices, licensing and configuration that is helpful for troubleshooting.

Configuration information

For instructions on logging into Webmin from a service PC, follow, refer to the applicable instructions:

- “Using a service PC over the network” on page 4-3
- “Using a service PC with a crossover cable” on page 4-3

To log into Webmin from the patient monitor:

1. Select **Monitor Setup > Service**. The local browser opens and displays the Webmin login dialog box.

2. Log in to Webmin with your username and password. The Webmin tool opens and defaults to the **Information** tab.

![Webmin Screen Sample](image)

**NOTE**

The text that displays on the top of each Webmin screen (marked as 1 in the screen sample above) indicates the bed name, patient status, host serial number, and software version/part number.
3. On the **Information** tab, select **Configuration Information**. The following sections display if the corresponding devices are connected:

- **Host Information** - inactive and active software version, host serial number, asset number, MC Network IP address, IX Network IP address, MAC address, S5 Network virtual ID, and hardware version.
- **Active Software Package** - The software package (OR, ICU, etc.) that is currently running on the host.
- **PDM License Information** - license option, status, and number of licenses.
- **Host License Information** - each host license name, its current status (enabled, disabled or trial), feature code, and the expiration date for a trial license.
- **Admit Settings** - patient ID prefix.
- **Citrix** - server address, initial program, session timeout in minutes, and username.
- **Unit and bed name** - unit name and bed name.
- **Acquisition Information - E-module** - serial number, EMBC serial number, EMBC software number, EMBC software version, EMBC IP address.
- **S5 Printers** - name.
- **IX Printers** - name, host name or IP address.
- **Printer Location Information** - printout type (alarm waveforms, manual waveforms, reports, and parameters) and location.
- **Remote Service** - proxy URL, proxy port, proxy username, remote service status, system ID, serial number, enterprise’s URL, enterprise’s tunnel URL, and protocol.
- **Language** - the user interface language.
- **National Requirement** - national requirement option (none or France).
- **Network** - active configuration information, including MAC address, MC Network Type (IP address, netmask, gateway, and PHY configuration), and IX Network Type (IP address, netmask, gateway, DNS server 1, DNS server 2, and PHY configuration)
- **Power Line Frequency** - power frequency.
- **MUSE/12SL** - location ID, site number, MUSE web username, and MUSE web URL.

**Device information**

On the **Information** tab, select **Device Information**. The following sections display if the corresponding devices are connected:

- **Host Information** - inactive and active software version, host serial number, asset number, MC Network IP address, IX Network IP address, MAC address, S5 Network virtual ID, and hardware version.
- **Active Software Package** - The software package (OR, ICU, etc.) that is currently running on the host.
- **Host License Information** - each host license name, its current status (enabled, disabled or trial), feature code, and the expiration date for a trial license.
- **Acquisition Information - PDM** - software part number, active software version, main board revision, DAS board revision, serial number, asset number, MAC
address, IP address, power frequency, ECG filter.

- **Acquisition Information - E-Module Frame** - serial number, EMBC serial number, EMBC software number, EMBC software version, EMBC IP address.
- **Acquisition Information - Tram-Rac** - software part number and version
- **Installed S5 Printers** - name.
- **Installed IX Printers** - name, host name or IP address.
- **Printer Location Information** - printout type (alarm waveforms, manual waveforms, reports, and parameters) and location.
- **M-Port Information** - device name, software number and version, serial number port number, active state for each serial device connected to the patient monitor, connection type.
- **PDM License Information** - license option, status number of license.
- **UNITY ID Information** - product ID, Unity Network ID software number and version, date, time, device name and software version of each device connected.
- **USB Port Information** - product name, manufacturer, vendor code, product ID, serial number.

**Ping a TCP/IP network device**

Use this Webmin feature to verify connectivity with a network device on the MC Network and IX Network.

1. Log onto Webmin.
2. Select **Diagnostics > Ping**.
3. In the **Address to Ping** field on the **Ping Command** window, type the IP address of a known device on the network and select **ping**.

If you receive a reply, then you are able to connect to the device.

If you do not receive a reply, make sure that the patient monitor is connected to an active network.
# Log file information

Messages and errors in log files provide useful information to a trained technician. The following types of log files can be downloaded and viewed:

<table>
<thead>
<tr>
<th>Log</th>
<th>Contents</th>
</tr>
</thead>
</table>
| Webmin Action log | - Webmin user authentication and access related information (e.g., who accessed Webmin and when).  
- Webmin module settings changes (e.g., what was changed and when).  
- Software transfer history information, including the type and version of the transferred software, the origin and destination, and the date and time the software transfer occurred.  
- Host software activation information, including the host type and serial number, the type and version of the activated host software, and the date and time the host software activation occurred.  
- Module software activation information, including the module type and serial number, the type and version of the activated module software, and the date and time the module software activation occurred.  
- Settings transfer history information, including the type of the transferred settings, the origin and destination, and the date and time the settings transfer occurred.  
- Log file transfer history information, including the type of log that was transferred, the origin and destination, and the date and time the log file transfer occurred.  
- Webmin related error messages (e.g., information about EPI layer issues detected by Webmin). |
| EMBC Frame logs    | - Date and time when the EMBC log was last updated.  
- Modbus 0, 1, 2, and 3 information, including the following:  
  - System information (e.g., Sysinfo -packet)  
  - Log information (e.g., Loginfo -packet)  
  - Module node connection/disconnection information (e.g., Module Node Log)  
  - Module slot information (e.g., addresses and times in the latest modbus frame)  
  - Modbus frame statistics (e.g., total number of frames, number of synchronization errors, number of lost frames, number of unknown frames) |
| PDM log           | All PDM errors and messages.                                                                                                                                                                           |
| MPC860 Error log  | The errors that were logged within the code running on the 860 processor.                                                                                                                                  |
| TRAM log          | TRAM module errors.                                                                                                                        |
Download log files

NOTE
This option is available only when you log into Webmin remotely. The option is not available locally at the patient monitor.

1. In Webmin, select the Diagnostics tab.
2. Select Download Logfiles.
3. Select the log(s) you want to download.
4. Click Download.
5. Browse to the file location where you would like to download the log file(s) and select Save Target As to save the log file.
6. Send this log file to GE Service for further investigation.

View log files

1. In Webmin, select the Diagnostics tab.
2. Select View Logfiles.
3. On the Sub-Modules for View Logfiles menu, select the type of log you want to view.
4. Select the information you want to view.
   - For the Webmin Action Log, select the user, module, and timeframe and select Search.
   - For the other types of logs, select the link associated with the information you want to view.
## Error messages and codes

The following error messages display at the patient monitor if there is a problem with the monitor.

<table>
<thead>
<tr>
<th>Error message</th>
<th>Possible cause</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>License expired</td>
<td>Trial license expired</td>
<td>1. Remove trial license or enter new activation code.</td>
</tr>
<tr>
<td>Network down</td>
<td>No other network device observed on the MC Network.</td>
<td>1. Verify that the patient monitor is connected to an active network.</td>
</tr>
<tr>
<td>Identical unit &amp; bed name noticed</td>
<td>A patient monitor with the identical unit and bed name is on the network</td>
<td>Disconnect the patient monitor that has the identical unit and bed name. or Change the unit and bed name of the duplicate patient monitor unit and bed name.</td>
</tr>
<tr>
<td>Identical IP address noticed</td>
<td>A patient monitor with the identical IP address is on the network</td>
<td>Disconnect the patient monitor that has the identical IP address. or Change the IP address of the patient monitor that has the duplicate IP address.</td>
</tr>
<tr>
<td>Incompatible gas module</td>
<td>The module is not compatible.</td>
<td>Replace the module. See the &quot;CARESCAPE Monitor B850 Addendum for Device Compatibility&quot;.</td>
</tr>
<tr>
<td>Service Monitor - Error Code 0xHOST1001</td>
<td>The temperature is exceeding limits.</td>
<td>1. Turn off the patient monitor. 2. Move the patient monitor to a location with better air flow. 3. If you need further assistance, call service.</td>
</tr>
<tr>
<td>Service Monitor - Error Code 0xHOST1002</td>
<td>CPU voltage is exceeding limits.</td>
<td>1. Disconnect the patient monitor from monitoring patients. 2. Back up the clinical and platform settings. 3. Print the licensing information page via Webmin. 4. Call service or your local sales representative for a replacement board.</td>
</tr>
<tr>
<td>Error message</td>
<td>Possible cause</td>
<td>Action</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Service Monitor - Error Code 0xHOST1004</strong></td>
<td>Disk usage exceeds 90%.</td>
<td>1. Back up the clinical and platform settings.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Print the licensing information page via Webmin.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Re-install software.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. If you need further assistance, call service.</td>
</tr>
<tr>
<td><strong>Service Monitor - Replace System Battery</strong></td>
<td>The battery needs to be replaced.</td>
<td>See “Replace the CPU battery” on page 9-8.</td>
</tr>
<tr>
<td><strong>Service Monitor - Activation Failed</strong></td>
<td>An error occurred in the process of activating the software or license.</td>
<td>1. Repeat the steps to activate the software or license.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Re-configure settings for software.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>See “Licenses” on page 4-11.</td>
</tr>
<tr>
<td><strong>Module voltage low</strong></td>
<td>Parameter module supply voltage is exceeding the low limit.</td>
<td>1. Turn off the patient monitor.</td>
</tr>
<tr>
<td></td>
<td>Failure in a module frame for E-series modules.</td>
<td>2. Replace the module frame.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If multiple module frames for E-modules are used, identify the defective device by connecting the module frames one at a time.</td>
</tr>
</tbody>
</table>
## Problems and solutions troubleshooting tables

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible cause</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>The display is blank.</td>
<td>The video display has no power.</td>
<td>Verify that the display’s power indicator is illuminated.</td>
</tr>
<tr>
<td></td>
<td>The patient monitor has no power.</td>
<td>Verify that the power indicator on the patient monitor is illuminated.</td>
</tr>
<tr>
<td></td>
<td>The video display is not properly connected to the patient monitor.</td>
<td>Verify that the correct cable connects the video display to one of the two (or three) video ports on the patient monitor.</td>
</tr>
<tr>
<td></td>
<td>The display was turned off via the <strong>Display On/Off</strong> button on the keypad/remote control.</td>
<td>Press the <strong>Display On/Off</strong> button on the keypad/remote control.</td>
</tr>
<tr>
<td>The quality of the display is not good.</td>
<td>• The cable is not connected properly.</td>
<td>1. Check the connection between the video display and the patient monitor. If necessary, replace the video display with a known good one.</td>
</tr>
<tr>
<td></td>
<td>• The video display is bad.</td>
<td>2. If the problem is not corrected, replace the processor PCB. Refer to “Replace the processor board” on page 9-5.</td>
</tr>
<tr>
<td>The power switch button on the patient monitor does not illuminate when it is toggled.</td>
<td>The power supply is bad.</td>
<td>Replace the power supply. For instructions, refer to “Replace the power supply” on page 9-6.</td>
</tr>
<tr>
<td>The display does not advance beyond the GE logo screen.</td>
<td>There is a boot code error.</td>
<td>Contact GE service.</td>
</tr>
<tr>
<td></td>
<td>The software or hardware is corrupt.</td>
<td>1. Identify after which startup screen the computer reboots.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Call technical support for service.</td>
</tr>
<tr>
<td>Acquisition module patient data does not display.</td>
<td>• Module is faulty.</td>
<td>1. Verify patient or simulator leadwires are connected properly to the module.</td>
</tr>
<tr>
<td></td>
<td>• The display screen of the patient monitor is not configured to display the parameter.</td>
<td>2. Verify that the module is installed correctly and powered on.</td>
</tr>
<tr>
<td></td>
<td>• The patient leadwires are not connected properly.</td>
<td>3. Log into <strong>Webmin &gt; Information &gt; Device Information</strong> and verify that all modules are listed.</td>
</tr>
<tr>
<td></td>
<td>• The module is not installed correctly or is not powered on.</td>
<td>4. Verify that the Frame or Tram-Rac housing is powered on.</td>
</tr>
<tr>
<td></td>
<td>• The Frame or Tram-Rac housing is not powered on.</td>
<td>5. Go to <strong>Monitor Setup &gt; Screen Setup</strong> to verify that the parameter is selected to display on the screen.</td>
</tr>
<tr>
<td></td>
<td>• There is a loose or faulty cable.</td>
<td>6. Power on the Frame, Tram-Rac housing or acquisition device.</td>
</tr>
<tr>
<td></td>
<td>• An incompatible device is connected to the patient monitor</td>
<td>7. View error logs for the patient monitor and acquisition device using Webmin. Go to the <strong>Diagnostics</strong> tab to view or download log files.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8. Test the acquisition device according to procedures in the “Module Frames and Modules Technical Manual” or “TRAM and Tram-Rac Modules Supplemental Information” manual.</td>
</tr>
<tr>
<td>Problem</td>
<td>Possible cause</td>
<td>Action</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Patient alarms are not sounding.</td>
<td>The speakers are disconnected.</td>
<td>Make sure the speakers are connected.</td>
</tr>
<tr>
<td></td>
<td>The speakers are not functioning.</td>
<td>Test if the speaker is functioning, using Monitor Setup &gt; Sound Volumes.</td>
</tr>
<tr>
<td></td>
<td>The alarm limits are not set correctly.</td>
<td>Make sure the alarms are enabled. Consult the user’s manual for correct alarm settings.</td>
</tr>
<tr>
<td></td>
<td>The speaker volume is very low.</td>
<td>Verify that the alarm volume is not turned off. Look in Alarms Setup &gt; Audible &amp; Visual.</td>
</tr>
<tr>
<td></td>
<td>The patient is not being monitored.</td>
<td>The alarm function remains disabled until the patient is correctly admitted into the system. If a patient’s waveform and the DISCHARGED message both display, consult the user’s manual for correct patient admitting instructions.</td>
</tr>
<tr>
<td></td>
<td>The patient monitor is off the network.</td>
<td>Verify network connectivity.</td>
</tr>
<tr>
<td></td>
<td>USB cable from display is not connected to the patient monitor.</td>
<td>Connect the USB cable to the patient monitor.</td>
</tr>
<tr>
<td>Patient data from the patient monitor does not display at the other monitor(s)</td>
<td>A patch cable is not plugged in all the way.</td>
<td>Verify that the Ethernet cable is securely connected to the patient monitor.</td>
</tr>
<tr>
<td></td>
<td>The MC Network is not configured properly.</td>
<td>Try to ping the device from the patient monitor. Refer to “Ping a TCP/IP network device” on page 8-5.</td>
</tr>
<tr>
<td></td>
<td>There is a general networking issue.</td>
<td>Refer to “Ping a TCP/IP network device” on page 8-5.</td>
</tr>
<tr>
<td>Problem</td>
<td>Possible cause</td>
<td>Action</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Graphs and alarms are not printed at the desired location.</td>
<td>■ Graph location is not configured properly.</td>
<td>1. Verify paper in central station writer is correct side up.</td>
</tr>
<tr>
<td></td>
<td>■ Printer is not connected to the network.</td>
<td>2. If the patient monitor was moved from one care unit to another, reprogram the graph destinations. Refer to the user’s manual for instructions.</td>
</tr>
<tr>
<td></td>
<td>■ Printer is not configured.</td>
<td>■ Watch for misspelling or spaces in the name.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ Make sure that the care unit name programmed into the patient monitor and central station match exactly.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Using the graphs and alarms in the network, the care unit name for a patient monitor is not shown on the central station display of a patient’s data. Only the bed number is shown.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If the care unit name for a patient monitor does not match the central station care unit name, then the patient monitor identification changes. The patient monitor identifier shows the care unit name followed by a vertical slash (</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Generate a test print (for laser printers only).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a. Log onto Webmin &gt; Configuration &gt; Printers &gt; Print Test Page.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. Select the printer.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c. Select Submit.</td>
</tr>
<tr>
<td>GE service unable to provide remote support through InSite with ExC</td>
<td>The IX Network and/or hospital network is not configured properly.</td>
<td>■ Make sure the IX Network cables are connected properly (both ends of the cable are plugged into the correct ports).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ Make sure the IX Network is active.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ Make sure that the proxy server is properly configured (refer to “Remote service” on page 4-25) and that the remote service agent is enabled (refer to “Control” on page 4-26).</td>
</tr>
<tr>
<td>Serial number is corrupted</td>
<td>Make sure the serial number exists.</td>
<td>1. Log onto Webmin &gt; Information &gt; Configuration Information.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Make sure the host serial number matches the physical serial number label.</td>
</tr>
<tr>
<td>Unable to log onto the Webmin service interface remotely via the IX Network</td>
<td>The patient monitor is not connected to the IX Network.</td>
<td>■ Try to ping the patient monitor. Refer to “Ping a TCP/IP network device” on page 8-5.</td>
</tr>
<tr>
<td></td>
<td>■ The network is not configured properly.</td>
<td>■ Verify that the patient monitor is properly connected to the IX Network.</td>
</tr>
<tr>
<td></td>
<td>■ The PC used to launch Webmin remotely is not configured properly.</td>
<td>■ Contact GE service.</td>
</tr>
<tr>
<td></td>
<td>■ The wireless card is on and is conflicting with wired IX connection.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>■ The computer is too slow and does not support networking.</td>
<td></td>
</tr>
<tr>
<td>Problem</td>
<td>Possible cause</td>
<td>Action</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Unable to read from or write to the USB memory stick</td>
<td>The patient monitor does not support USB memory sticks.</td>
<td></td>
</tr>
<tr>
<td>Barcode scanner cannot read the barcode</td>
<td>The barcode scanner is bad.</td>
<td>Log onto <a href="#">Webmin &gt; Configuration &gt; Admit Settings &gt; Barcode Settings</a>. Refer to “Barcode settings” on page 4-14.</td>
</tr>
<tr>
<td>Unable to launch iPanel software</td>
<td></td>
<td>Log onto <a href="#">Webmin &gt; Configuration &gt; Citrix</a>. Refer to “Citrix” on page 4-13.</td>
</tr>
<tr>
<td>The wrong character is displayed when a key is pressed on the keyboard</td>
<td>The keyboard is bad.</td>
<td>Replace the keyboard.</td>
</tr>
<tr>
<td>The keyboard locale is not configured properly</td>
<td></td>
<td>Log onto <a href="#">Webmin &gt; Configuration &gt; Language</a>. Refer to “Language” on page 4-21.</td>
</tr>
<tr>
<td>The wrong software application is displayed on the patient monitor</td>
<td>The wrong software application is activated for the device.</td>
<td>1. To view the software package that is currently activated, log onto <a href="#">Webmin &gt; Configuration &gt; Licenses &gt; Host Licensing</a>.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Make sure that the desired software application is displayed under <a href="#">Currently Active Software Package</a>.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. If you need to activate a different software package, access <a href="#">Configuration &gt; Licenses &gt; Software Package</a>.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Select the correct option and select <a href="#">Activate</a>.</td>
</tr>
<tr>
<td>Unable to perform a function or a feature is not available</td>
<td>A license has not been purchased for the feature.</td>
<td>Refer to “Licenses” on page 4-11.</td>
</tr>
<tr>
<td></td>
<td>The trial license has expired for the feature.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The license is not installed properly.</td>
<td></td>
</tr>
<tr>
<td>The user interface is displayed in the wrong language</td>
<td>The language is not configured properly.</td>
<td>Log onto <a href="#">Webmin &gt; Configuration &gt; Language</a> and select the correct language. Refer to “Language” on page 4-21.</td>
</tr>
<tr>
<td>Unable to view a certain feature although the license is enabled</td>
<td>A software package is active that does not have that feature (e.g., OR has fewer features than ICU).</td>
<td>1. Log onto <a href="#">Webmin &gt; Configuration &gt; Licenses &gt; Software Package</a>.</td>
</tr>
<tr>
<td></td>
<td>The active mode does not have that feature.</td>
<td>2. Select the correct option and select <a href="#">Activate</a>.</td>
</tr>
<tr>
<td>Unable to upload a license file</td>
<td>The license file is corrupted.</td>
<td>Log onto <a href="#">Webmin &gt; Configuration &gt; Licenses</a>.</td>
</tr>
<tr>
<td></td>
<td>The license file is for a patient monitor with a different serial number.</td>
<td>If you have printed license information, select <a href="#">Software Package</a> and <a href="#">Host Licensing</a>.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If you have a license file, select <a href="#">Upload License</a>.</td>
</tr>
<tr>
<td>Problem</td>
<td>Possible cause</td>
<td>Action</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Unable to view historical 12SL data          | ■ 12SL is not figured correctly.  
■ The MC Network is down between CARESCAPE Monitor B850 and MUSE.  
■ The MUSE server is not working. | ■ Refer to “MUSE/12SL” on page 4-13.  
■ Check for MC Network connection.                                                        |
| Unable to view and set reminder volume       | The national requirement is set to France.                                      | 1. Log onto Webmin > Configuration > National Requirements.  
2. Select None.                                                                           |
| Unable to upload the software                |                                                                                | See “CARESCAPE Monitor B850 Software Installation Instructions”.       |
9 Disassembly and reassembly
Electrostatic discharge (ESD) precautions

All external connectors of the patient monitor are designed with protection from ESD damage. However if the module requires service, exposed components and assemblies inside are susceptible to ESD damage. This includes human hands, non-ESD protected work stations or improperly grounded test equipment.

The following guidelines may not guarantee a 100% static-free workstation, but can greatly reduce the potential for failure of any electronic assemblies being serviced:

- Discharge any static charge you may have built up before handling semiconductors or assemblies containing semiconductors.
- A grounded, antistatic wristband (3M part number 2046 or equivalent) or heel strap should be worn at all times while handling or repairing assemblies containing semiconductors.
- Use properly grounded soldering and test equipment.
- Use a static-free work surface (3M part number 8210 or equivalent) while handling or working on assemblies containing semiconductors.
- Do not remove semiconductors or assemblies containing semiconductors from antistatic containers (Velo-stat bags) until absolutely necessary.
- Make sure power to an assembly is turned off before removing or inserting a semiconductor.
- Do not slide semiconductors or electrical/electronic assemblies across any surface.
- Do not touch semiconductor leads unless absolutely necessary.
- Semiconductors and electronic assemblies should be stored only in antistatic bags or boxes.
- Handle all PCB assemblies by their edges.
- Do not flex or twist a circuit board.

Tools required

- Standard set of hand tools.
- Insulated T10 TORX-style screwdriver.
Patient monitor

Disassembly and reassembly procedures

WARNING
PATIENT MONITORING INTERRUPTION — Make sure a patient is not being monitored.

WARNING
Due to possible high voltage present, use an insulated screwdriver at all times.

WARNING
DISCONNECTION FROM MAINS - When disconnecting the system from the power line, remove the plug from the wall outlet first. Then you may disconnect the power cord from the device. If you do not observe this sequence, there is a risk of coming into contact with line voltage by inserting metal objects, such as the pins of leadwires, into the sockets of the power cord by mistake.
Open the unit

If the monitor is opened, electrical safety tests must always be performed after the monitor is reassembled. For more information, refer to the “Electrical safety tests” on page 7-3.

1. Turn the unit off at the rear power switch and disconnect the AC power cord and all communication cables.

2. Remove 4 screws on each side of the top cover. Remove the top cover.

3. Remove the power cord retainer and screw.
4. Remove 7 screws on the rear panel. Remove the rear panel.

Replace the processor board

1. Open the unit as described in steps 1 and 2 on page 9-4.
2. Disconnect the speaker cable connection, light pipe (pull gently from the receptacle on the PCB), and power supply harness.
3. If installed, remove the optional third DVI-I board.
   a. Remove 4 screws and 4 standoffs.
   b. Remove 2 jackscrews from the third DVI-I board.
4. Remove 7 screws holding the processor board to the chassis. Remove the processor board.
5. Replace the processor board.
6. Remove the screw holding the uDOM to the old processor board. Remove the uDOM from the old processor board and reassemble it to the new processor board.

7. Reassemble the patient monitor in the reverse order of disassembly.
8. “Replace the cover on the unit” on page 9-10.
9. Complete the procedures in “Recommended checkout” on page 9-10.

Replace the power supply

1. Open the unit as described in steps 1 and 2 on page 9-4.
2. Disconnect the speaker and power supply cables.
3. Remove 4 screws holding the power supply to the chassis. Remove the power supply.

4. Replace the power supply.
5. Reassemble the patient monitor in the reverse order of disassembly.
6. “Replace the cover on the unit” on page 9-10.
7. Complete the procedures in “Recommended checkout” on page 9-10.
Replace the speaker

1. Open the unit as described in steps 1 and 2 on page 9-4.
2. Disconnect the speaker and power supply cables.
3. Remove 4 screws holding the power supply to the chassis.
4. Remove the power supply PCB to access the speaker screws.
5. Remove 2 screws and washers holding the speaker to the front bezel. Remove the speaker.
6. Replace the speaker.
7. Reassemble the power supply PCB.
8. Reassemble the patient monitor in the reverse order of disassembly.
9. “Replace the cover on the unit” on page 9-10.
10. Complete the procedures in “Recommended checkout” on page 9-10.
Replace the CPU battery

Once the battery is replaced, the system loses its time and the time must be configured before connecting the patient monitor to the network. For instructions on configuring the time, see “Time” on page 4-9.

1. Open the unit as described in steps 1 and 2 on page 9-4.
2. Remove the lithium ion battery from the bracket on the processor board.

3. Replace the battery.
4. Reassemble the patient monitor in the reverse order of disassembly.
5. “Replace the cover on the unit” on page 9-10.
6. Complete the procedures in “Recommended checkout” on page 9-10.

Replace the labels

The device labels are affixed permanently. Do not try to remove them by using solutions that might cause damage. Affix new labels on top of the existing ones.

NOTE
Take care not to obstruct connector or screw openings when affixing labels.
Replace or install the third video card

1. Open the unit as described in steps 1 and 2 on page 9-4.
2. Remove the third DVI-I board.
   a. Remove 4 screws and 4 standoffs.
   b. Remove 2 jackscrews from the third DVI-I board.
3. Replace the DVI-I board.
4. Reassemble the patient monitor in the reverse order of disassembly.
5. **“Replace the cover on the unit”** on page 9-10.
6. Complete the procedures in **“Recommended checkout”** on page 9-10.

Replace the enclosure (cover, back panel and front bezel)

1. Open the unit as described in steps 1 and 2 on page 9-4.
2. Remove 2 screws on front of bezel.
3. Disconnect light pipe from receptacle on PCB.
4. Release 3 snap fingers to free bezel from front of chassis.
5. Remove the bezel.
6. Replace the bezel.
7. **“Replace the cover on the unit”** on page 9-10.
8. Complete the procedures in **“Recommended checkout”** on page 9-10.
Replace the cover on the unit

1. Fasten the rear panel to the back of the unit with the 7 screws.
2. Fasten the two power cord retainers to the unit with 2 screws.
3. Slide the top cover onto the top of the unit.
4. Replace the 8 screws that connect the cover to the sides of the unit.
5. Perform the “Electrical safety tests” on page 7-3.

Recommended checkout

Perform the recommended checkout procedures for the applicable FRU.

<table>
<thead>
<tr>
<th>FRU description</th>
<th>Functional checkout procedures</th>
</tr>
</thead>
</table>
| Processor board | • “Electrical safety tests” on page 5-3  
                        • “Patient monitor functional tests” on page 7-4 |
| Power supply    | • “Electrical safety tests” on page 5-3  
                        • “Patient monitor functional tests” on page 7-4 |
| Speaker         | • “Electrical safety tests” on page 5-3  
                        • “Patient monitor functional tests” on page 7-4 |
| CPU battery     | • “Electrical safety tests” on page 5-3  
                        • “Patient monitor functional tests” on page 7-4 |
| Enclosure       | • “Visual inspection” on page 5-2  
                        • “Electrical safety tests” on page 5-3  
                        • “Patient monitor functional tests” on page 7-4 |
| Third video card| • “Electrical safety tests” on page 5-3  
                        • “Patient monitor functional tests” on page 7-4 |
Display

Disassembly and reassembly procedures

Open the unit

---

**WARNING**

PATIENT MONITORING INTERRUPTION — Make sure a patient is not being monitored.

---

**WARNING**

Due to possible high voltage present, use an insulated screwdriver at all times.

---

Whenever you open the unit, you need to perform the “Electrical safety tests” on page 7-3.

1. Turn the display power off at the rear power switch and disconnect all cables (USB, display and AC power).

2. Place the display as shown below to prevent damage to the main TRIM KNOB.

3. Remove the side TRIM KNOB by gently pulling the TRIM KNOB.
4. Remove all rear cover screws.

5. Remove mounting bracket.

6. Use a screwdriver to disassemble the alarm light cover.
7. Place the display as shown below to remove the rear cover.

8. Remove the rear cover.

15-inch display

19-inch display
Replace the **TRIM KNOB** and rotary switch

1. Open the display as described on page 9-11.
2. Locate the rotary switch on the display.

3. Pull the speaker to separate it from the front cover. Temporarily place the speaker on top of the metal enclosure.
4. Disassemble the connecting wire from the board.

5. Pull the main TRIM KNOB.
6. Use a wrench to disassemble the rotary switch.

7. Replace the rotary switch and the main TRIM KNOB.

8. Reassemble the display in the reverse order of disassembly.

**NOTE**
The torque specification for tightening the screws and encoder washer/nut is 1.13 + 0.11 Nm (10.0+1.0 lbf-in).

9. Complete the procedures in “Recommended checkout” on page 9-20.
Replace the alarm light and alarm light enclosure

1. Open the display as described on page 9-11.
2. Locate the alarm light on the display.
3. Pull the alarm light to separate it from the front cover.
4. Disassemble the connecting wire from the board.
5. Disassemble the protective cover from the alarm light to replace the alarm light board.

6. Replace the alarm light board and while reassembling the display, replace the alarm light enclosure.

7. Reassemble the display in the reverse order of disassembly.

**NOTE**

The torque specification for tightening the screws and encoder washer/nut is 1.13 ± 0.11 Nm (10.0±1.0 lbf-in).

8. Complete the procedures in “Recommended checkout” on page 9-20.
## Recommended checkout

Perform the recommended checkout procedures for the applicable FRU.

<table>
<thead>
<tr>
<th>FRU description</th>
<th>Functional checkout procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRIM KNOB and rotary switch</td>
<td>■ &quot;Electrical safety tests&quot; on page 5-3</td>
</tr>
<tr>
<td></td>
<td>■ &quot;Patient monitor functional tests&quot; on page 7-4</td>
</tr>
<tr>
<td>Alarm light and alarm light enclosure</td>
<td>■ &quot;Electrical safety tests&quot; on page 5-3</td>
</tr>
<tr>
<td></td>
<td>■ &quot;Patient monitor functional tests&quot; on page 7-4</td>
</tr>
</tbody>
</table>
10 Service parts
## Ordering parts

The parts listed in this section are orderable replaceable parts. To order parts, contact Service Parts at the address or telephone number listed on the “How to Reach Us...” page included with this manual.

## Patient monitor

### Replaceable parts

<table>
<thead>
<tr>
<th>Part number</th>
<th>Description</th>
<th>Find number</th>
</tr>
</thead>
<tbody>
<tr>
<td>2021440-002</td>
<td>Power supply. Includes power inlet module, harness that connects to CPU board, and power supply bracket. Order hardware kit 2021440-006 if any replacement screws are needed.</td>
<td>A</td>
</tr>
<tr>
<td>2021440-003</td>
<td>CPU PCB assembly</td>
<td>B</td>
</tr>
<tr>
<td>2021440-004</td>
<td>Enclosure kit. Includes front bezel, enclosure cover, back panel, and back panel labels. Order hardware kit 2021440-006 if any replacement screws are needed</td>
<td>C</td>
</tr>
<tr>
<td>2021440-005</td>
<td>Speaker assembly. Includes speaker with harness.</td>
<td>D</td>
</tr>
<tr>
<td>2021440-006</td>
<td>Hardware kit. Contains complete set of replacement screws for all replaceable assemblies and chassis EMI gaskets.</td>
<td>E</td>
</tr>
<tr>
<td>2021440-007</td>
<td>Label kit</td>
<td>F</td>
</tr>
<tr>
<td>2021440-008</td>
<td>Lithium-ion battery - 10-pack</td>
<td>G</td>
</tr>
<tr>
<td>2021440-009</td>
<td>M-Port keypad kit. Includes all language labels.</td>
<td></td>
</tr>
<tr>
<td>2021440-011</td>
<td>Remote control kit. Includes all language labels.</td>
<td></td>
</tr>
<tr>
<td>2021440-013</td>
<td>3rd video card</td>
<td>H</td>
</tr>
</tbody>
</table>
Exploded view
## Display

### Replaceable parts

<table>
<thead>
<tr>
<th>Part number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2042901-001</td>
<td>FRU Display 15-inch full keypad - ENG</td>
</tr>
<tr>
<td>2042901-002</td>
<td>FRU Display 15-inch full keypad - GER</td>
</tr>
<tr>
<td>2042901-003</td>
<td>FRU Display 15-inch full keypad - FRE</td>
</tr>
<tr>
<td>2042901-004</td>
<td>FRU Display 15-inch full keypad - SWE</td>
</tr>
<tr>
<td>2042901-005</td>
<td>FRU Display 15-inch full keypad - SPA</td>
</tr>
<tr>
<td>2042901-006</td>
<td>FRU Display 15-inch full keypad - ITA</td>
</tr>
<tr>
<td>2042901-007</td>
<td>FRU Display 15-inch full keypad - DUT</td>
</tr>
<tr>
<td>2042901-008</td>
<td>FRU Display 15-inch full keypad - DAN</td>
</tr>
<tr>
<td>2042901-009</td>
<td>FRU Display 15-inch full keypad - NOR</td>
</tr>
<tr>
<td>2042901-011</td>
<td>FRU Display 15-inch full keypad - POR</td>
</tr>
<tr>
<td>2042901-014</td>
<td>FRU Display 15-inch full keypad - HUN</td>
</tr>
<tr>
<td>2042901-015</td>
<td>FRU Display 15-inch full keypad - POL</td>
</tr>
<tr>
<td>2042901-016</td>
<td>FRU Display 15-inch full keypad - CZE</td>
</tr>
<tr>
<td>2042901-018</td>
<td>FRU Display 15-inch full keypad - FIN</td>
</tr>
<tr>
<td>2042909-001</td>
<td>FRU Display 19-inch with touch screen</td>
</tr>
<tr>
<td>2042975-001</td>
<td>FRU Remote alarm light PCB</td>
</tr>
<tr>
<td>2042976-001</td>
<td>FRU Display TRIM KNOB and switch</td>
</tr>
</tbody>
</table>
Appendix A – Electromagnetic compatibility
Electromagnetic compatibility (EMC)

Changes or modification to this device/system not expressly approved by GE Healthcare may cause EMC issues with this or other equipment. This device/system is designed and tested to comply with applicable standards and regulations regarding EMC and needs to be installed and put into service according to the EMC information stated as follows.

**CAUTION**
Use of known RF sources, such as cell/portable phones, or other radio frequency (RF) emitting equipment near the system may cause unexpected or adverse operation of this device/system. Consult qualified personnel regarding device/system configuration.

**CAUTION**
The monitor or its components should not be used adjacent to or stacked with other equipment. If adjacent or stacked use is necessary, the monitor or its components should be observed to verify normal operation in the configuration in which it will be used.

Guidance and manufacturer’s declaration – electromagnetic emissions

The CARESCAPE Monitor B850 is intended for use in the electromagnetic environment specified below. It is the responsibility of the customer or user to assure that the CARESCAPE Monitor B850 is used in such an environment.

<table>
<thead>
<tr>
<th>Emissions test</th>
<th>Compliance</th>
<th>Electromagnetic environment – guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF Emissions (radiated) CISPR 11</td>
<td>Group 1</td>
<td>The equipment uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.</td>
</tr>
<tr>
<td></td>
<td>Class A</td>
<td></td>
</tr>
<tr>
<td>RF Emissions (conducted) CISPR 11</td>
<td>Group 1</td>
<td><strong>CAUTION</strong> The equipment is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.</td>
</tr>
<tr>
<td></td>
<td>Class A</td>
<td></td>
</tr>
<tr>
<td>Harmonic Emissions IEC 61000-3-2</td>
<td>Class A</td>
<td>The equipment is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.</td>
</tr>
<tr>
<td>Voltage fluctuations/ Flicker emissions IEC 61000-3-3</td>
<td>Complies</td>
<td></td>
</tr>
</tbody>
</table>
Guidance and manufacturer’s declaration – electromagnetic immunity

The CARESCAPE Monitor B850 is intended for use in the electromagnetic environment specified below. It is the responsibility of the customer or user to assure that the CARESCAPE Monitor B850 is used in such an environment.

<table>
<thead>
<tr>
<th>Immunity test</th>
<th>IEC 60601 test level</th>
<th>Compliance level</th>
<th>Electromagnetic environment – guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrostatic Discharge (ESD)</td>
<td>± 6 kV contact, ± 8 kV air</td>
<td>± 6 kV contact, ± 8 kV air</td>
<td>Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.</td>
</tr>
<tr>
<td>Electrostatic Discharge (ESD)</td>
<td>± 2 kV for power supply lines, ± 1 kV for input/output lines</td>
<td>± 2 kV for power supply lines, ± 1 kV for input/output lines</td>
<td>Mains power should be that of a typical commercial or hospital environment.</td>
</tr>
<tr>
<td>Surge</td>
<td>± 1 kV differential mode, ± 2 kV common mode</td>
<td>± 1 kV differential mode, ± 2 kV common mode</td>
<td>Mains power should be that of a typical commercial or hospital environment.</td>
</tr>
<tr>
<td>Voltage dips, short interruptions and voltage variations on power supply input lines</td>
<td>&lt;5% Uᵢ (&gt;95% dip in Uᵢ) for 0.5 cycles, &lt;40% Uᵢ (&gt;60% dip in Uᵢ) for 5 cycles, &lt;70% Uᵢ (&gt;30% dip in Uᵢ) for 25 cycles, &lt;5% Uᵢ (&gt;95% dip in Uᵢ) for 5 s</td>
<td>&lt;5% Uᵢ (&gt;95% dip in Uᵢ) for 0.5 cycles, &lt;40% Uᵢ (&gt;60% dip in Uᵢ) for 5 cycles, &lt;70% Uᵢ (&gt;30% dip in Uᵢ) for 25 cycles, &lt;5% Uᵢ (&gt;95% dip in Uᵢ) for 5 s</td>
<td>Mains power should be that of a typical commercial or hospital environment. If the user of the equipment requires continued operation during power mains interruptions, it is recommended that the equipment be powered from an applicably rated uninterruptible power supply or a battery.</td>
</tr>
<tr>
<td>Power frequency (50/60 Hz) Magnetic Field</td>
<td>3 A/m</td>
<td>3 A/m</td>
<td>Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.</td>
</tr>
</tbody>
</table>

**NOTE:**

Uᵢ is the AC mains voltage prior to application of the test level.
Guidance and manufacturer’s declaration – electromagnetic immunity

The CARESCAPE Monitor B850 is intended for use in the electromagnetic environment specified below. It is the responsibility of the customer or user to assure that the CARESCAPE Monitor B850 is used in such an environment.

<table>
<thead>
<tr>
<th>Immunity test</th>
<th>IEC 60601 test level</th>
<th>Compliance level</th>
<th>Electromagnetic environment – guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conducted RF IEC 61000-4-6</td>
<td>3 Vrms 150 KHz to 80 MHz</td>
<td>3 V rms system 0.8 V rms EEG module&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Portable and mobile RF communications equipment should not be used closer to any part of the equipment, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance</td>
</tr>
<tr>
<td>Radiated RF IEC 61000-4-3</td>
<td>3 V/m 80 MHz to 2.5 GHz</td>
<td>3 V/m system 2 V/m BIS module&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
</tr>
</tbody>
</table>

where $P$ is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer, and $d$ is the recommended separation distance in meters (m).

Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey<sup>b</sup>, should be less than the compliance level in each frequency range<sup>c</sup>.

Interference may occur in the vicinity of equipment marked with the following symbol:

Note 1: At 80 MHz and 800 MHz, the higher frequency range applies.

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by reflection from structures, objects, and people.

<sup>a</sup>The measurement of EEG signals, as provided in both the EEG and BIS measurement modules, is inherently a very sensitive measurement. Physiological signal levels as low as 0.1 micro volts are measured.

<sup>b</sup>Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radio, AM and FM radio broadcast, and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the equipment is used exceeds the applicable RF compliance level above, the equipment should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the equipment.

<sup>c</sup>Over the frequency range 150 KHz to 80 MHz, field strengths should be less than 2 V/m.
Recommended separation distances

The table below provides the recommended separation distances (in meters) between portable and mobile RF communications equipment and the CARESCAPE Monitor B850.

The CARESCAPE Monitor B850 is intended for use in the electromagnetic environment on which radiated RF disturbances are controlled. The customer or the user of the CARESCAPE Monitor B850 can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the CARESCAPE Monitor B850 as recommended below, according to the maximum output power of the communications equipment.

<table>
<thead>
<tr>
<th>Rated maximum output power of transmitter in Watts</th>
<th>150 kHz to 80 MHz a</th>
<th>80 MHz to 800 MHz a</th>
<th>800 MHz to 2.5 GHz a</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( d = 1.2 \sqrt{P} )</td>
<td>( d = 1.2 \sqrt{P} )</td>
<td>( d = 2.3 \sqrt{P} )</td>
</tr>
<tr>
<td>0.01</td>
<td>0.12</td>
<td>0.12</td>
<td>0.23</td>
</tr>
<tr>
<td>0.1</td>
<td>0.38</td>
<td>0.38</td>
<td>0.73</td>
</tr>
<tr>
<td>1</td>
<td>1.2</td>
<td>1.2</td>
<td>2.3</td>
</tr>
<tr>
<td>10</td>
<td>3.8</td>
<td>3.8</td>
<td>7.3</td>
</tr>
<tr>
<td>100</td>
<td>12</td>
<td>12</td>
<td>23</td>
</tr>
</tbody>
</table>

aAt 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

For transmitters rated at a maximum output power not listed above, the recommended separation distance [\( d \)] in meters (m) can be estimated using the equitation applicable to the frequency of the transmitter, where \( P \) is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

**NOTE**

These guidelines may not apply in all instances. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.
Compliant cables and accessories

WARNING
The use of accessories, transducers and cables other than those specified may result in increased emissions or decreased immunity performance of the equipment or system.

Refer to the CARESCAPE supplies and accessories document for compatible cables and accessories.
Appendix B – Check form
Completing the check form

1. Complete one sheet per unit.
2. Indicate the type of checkout being performed:
   - Installation
   - Planned maintenance
   - Corrective maintenance
3. Prior to testing, verify all equipment is calibrated via calibration labeling, and record calibration due date.
# Check form

## Test configuration, conditions and test equipment for unit under test

<table>
<thead>
<tr>
<th>Product/Model</th>
<th>Customer asset tag</th>
<th>Serial number</th>
<th>Comments</th>
</tr>
</thead>
</table>

Installation [ ] Planned maintenance [ ] Corrective maintenance [ ]

## Measuring equipment / test gases used

<table>
<thead>
<tr>
<th>ID number</th>
<th>Manufacturer</th>
<th>Model number</th>
<th>Description</th>
<th>Serial number</th>
<th>Cal due date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Electrical safety tests

<table>
<thead>
<tr>
<th>Test Description</th>
<th>Limits</th>
<th>Results</th>
<th>Functional tests</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground continuity with power cord</td>
<td>&lt; 0.2 ohms</td>
<td>ohms</td>
<td>Visual inspection</td>
<td>✔</td>
</tr>
<tr>
<td>Impedance of protective earth connection with power cord</td>
<td></td>
<td></td>
<td>Cleaning</td>
<td></td>
</tr>
<tr>
<td>Earth wire leakage current (NC)</td>
<td>USA only: ≤ 300µA Outside USA: ≤ 500µA</td>
<td>µA</td>
<td>Calibration checks</td>
<td></td>
</tr>
<tr>
<td>Earth wire leakage current (SFC)</td>
<td>USA only: ≤ 300µA Outside USA: ≤1000µA</td>
<td>µA</td>
<td>Function of interface devices</td>
<td></td>
</tr>
<tr>
<td>Enclosure leakage current (NC)</td>
<td>≤ 100µA</td>
<td>µA</td>
<td>Network communication</td>
<td></td>
</tr>
<tr>
<td>Enclosure leakage current (SFC)</td>
<td>USA only: ≤ 300µA Outside USA: ≤500µA</td>
<td>µA</td>
<td>Patient monitor functional tests</td>
<td></td>
</tr>
<tr>
<td>Patient (source) leakage current (NC)</td>
<td>≤ 10µA</td>
<td>µA</td>
<td>Alarm checkout</td>
<td></td>
</tr>
<tr>
<td>Patient (source) leakage current (SFC)</td>
<td>≤ 50µA</td>
<td>µA</td>
<td>Parameter checkout</td>
<td></td>
</tr>
<tr>
<td>Patient (sink) leakage current</td>
<td>≤ 50µA</td>
<td>µA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test completion</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Parts replaced

| Part Description | |
|------------------||
|                  ||
|                  ||

## Test results:

- Pass [ ] Fail [ ]

Signature of tester: [ ] Date: [ ]