

GE Healthcare

# CARESCAPE™ Monitor B850

## Technical Manual

Software Version 1



CARESCAPE™ Monitor B850  
English  
2040387-004 (CD)  
2040386-004D (paper)  
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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.

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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.

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## Patient monitor technical manual

### 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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# 1 Introduction

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# Manual information

## Revision history

Each page of the document has the document part number and revision at the bottom of the page. The revision changes whenever the document is updated.

Revision	Comment
A	Initial release
B	Updated the CARESCAPE Monitor B850 Addendum for Device Compatibility.
C	Configure Time Zone added in Time configuration and Module voltage low case added in error messages. Updated the "Replace the processor board" and "Replaceable parts" chapters.
D	Hostname configuration chapter added, Network configuration and Citrix chapters updated.

## 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.

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## 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

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## 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.



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# 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.

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## 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

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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 vigorous software verification and validation process. Any software update needs will be communicated by GE.

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## 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

Source device	Destination device	Protocol	Destination port	Use
Any	CARESCAPE Monitor B850	icmp	N/A	ping
Customer defined		tcp	10000	Webmin
Customer defined		tcp	10001	Software transfer
DHCP server		tcp	67, 68	DHCP

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

Source device	Destination Device	Protocol	Destination port	Use
CARESCAPE Monitor B850	Any	icmp	N/A	ping
	us1-ws.service.gehealthcare.com	tcp	443	InSite with ExC (Web Services)
	us1-rd.service.gehealthcare.com	tcp	443	InSite with ExC (Remote Tunnel)
	Citrix Server	tcp	1494	Citrix
	Printer	tcp	631	Printing
	MUSE	tcp	80	MUSE

Packets that are part of the communication initiated by the patient monitor are allowed into the IX Network (reflexive).

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## **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**


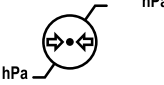







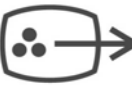


For detailed product security information, go to one of the following Web addresses:










- <http://www.gehealthcare.com/usen/security>
- <http://www.gehealthcare.com/usen/security/mds2.html>






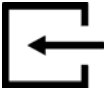






# Equipment symbols

## NOTE












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











lbl p/n	Abbreviation for label part number.
	Alternating current.
	Atmospheric pressure limitations.
	Batch or lot number.
	Battery.
	Bell cancel. Audio off.
	Bell cancel. Temporary audio off.
	Color display connector port.
	Color video input. Video input connector for digital or analog source.
	Color video output, digital. Video output for digital source.
	Color video output. Video output for analog source.
	Communication.
	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.






 	Defibrillator synchronization connector port.
<b>IPX1</b>	Degree of ingress protection.
<b>REF</b>	Catalog or orderable part number.
<b>SN</b>	Device serial number.
	Direct current.
 <b>3</b>	Display brightness controls.
<b>a u</b> 	Display speaker volume controls.
	Equipotentiality. Connect device to a potential equalization conductor.
 	Ethernet connector port.
	European authorized representative.

	European Union Declaration of Conformity.
	FCC. USA only. Complies with applicable US government (Federal Communications Commission) radio-frequency interference regulations.
 	Fragile. Handle with care.
	Fuse. Replace with identical type and rating fuse.
	Gas inlet.
	Gas outlet.
	General alarm.
	Home. Return to the main display.
	Humidity limitations.
	Keep dry. Protect from rain.
	Manufacturer name and address.



	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.)
	ON. Power connection to the mains.
	Power indicator.
	Power supply connector.
	Power switch.
<b>Rx ONLY U.S.</b>	Prescriptive Device. USA only. For use by or on the order of a Physician, or persons licensed by state law.
	Press to open.
	Protective earth ground. Connectors grounded to the AC power source.
	Recycled materials or may be recycled.
 <b>ME20</b>	Russia only. GOST-R mark.
	Serial interface.
	Signal/power input.


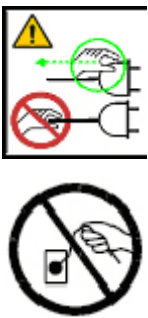







	Signal/power input/output (combined).
	Signal/power output.
	Stacking limit by number.
	Standby or power indicator.
	Temperature limitations.
	This way up.
	Tram-Net and ePort connector for PDM module, E-module frame, Tram-Rac housing, and TRAM modules.
	Underwriters Laboratories product certification mark.
	USB connector port.
<b>Z</b>	Zero all.
	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.



   	<p><b>NOTE</b></p> <p>The following symbols (required by China law only) are representative of what you may see on your equipment.</p> <p>The number in the symbol indicates the EFUP period in years, as explained below. Check the symbol on your equipment for its EFUP period.</p> <p>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”.</p> <p>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.</p> <p>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.</p>
	<p>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.</p>

# Safety symbols

## NOTE

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












	ATTENTION: Consult accompanying documents.
	CAUTION — Safety ground precaution. Remove power cord from the mains source by grasping the plug. Do not pull on the cable.
	Consult operating instructions.
	Electrostatic sensitive device. Connections should not be made to this device unless ESD precautionary procedures are followed.
	LASER RADIATION: Do not stare into beam. Class 2 laser product.
	Non-ionizing electromagnetic radiation. Interference may occur in the vicinity of this device.
	Shock Hazard. Dangerous voltage. To reduce the risk of electric shock, do not remove cover. Refer servicing to qualified service personnel.
	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.
	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.





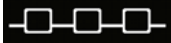







	Type CF (IEC 60601-1) defibrillator-proof protection against electric shock. Isolated (floating) applied part suitable for intentional external and internal application to the patient, including direct cardiac application.
	Type CF (IEC 60601-1) protection against electric shock. Isolated (floating) applied part suitable for intentional external and internal application to the patient, including direct cardiac application.




## User interface symbols

### NOTE

The following symbols appear in the software user interface.

	Active audio alarms paused indicator. Indicates an active audio alarm is temporarily paused.
	Alarm off indicator. Indicates the alarm is disabled (turned off).
	Alarm priority indicator: High (red). Indicates a high priority alarm.
	Alarm priority indicator: Medium (yellow). Indicates a medium priority alarm.
	Alarm priority indicator: Low (blue). Indicates a low priority alarm.
	Alarm volume icon. Adjust the minimum alarm tone volume.
	Audio alarms off indicator. Indicates the specified alarm group ( <b>ALL</b> , <b>APN</b> , <b>APN ECG</b> or <b>ECG</b> ) audio alarms are turned off.
	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.
	Beat volume icon. Adjust the volume of the QRS beep tone.
	BIS and Entropy sensor impedance check indicator. Displays for each sensor as the impedance check is in progress.
	BIS and Entropy sensor impedance check error indicator. Indicates the specified sensor failed the impedance check.

	BIS and Entropy sensor impedance check passed indicator. Indicates the specified sensor passed the impedance check.
<b>a</b>	Completed NIBP volume icon. Adjust the volume of the tone that sounds when an NIBP measurement result is available.
	Home icon. Close all menus/applications displayed on the monitor.
<b>4</b>	Locking setting indicator. Indicates this setting is locked and cannot be adjusted.
<b>k</b>	Manual NIBP icon. Start a manual NIBP measurement.
	Nellcor OxiMax SatSeconds indicator. Indicates the amount of time the SpO2 saturation is outside the limits before alarms are generated.
	NMT Stimulus beep volume icon. Adjust the volume of the tone that sounds when a stimulus pulse is generated.
	Network connection indicator. Indicates the monitor is connected to the Local Area Network (LAN).
	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.
	PDM battery charging indicator. Indicates the battery is charging.
	PDM battery failure indicator. Indicates the battery is not available for use.
	PDM battery gauge indicator. Indicates the charge level of the battery.
	Progress bar. Indicates the amount of time remaining until the next automatic measurement.
	Reminder volume icon. Adjust the volume of the tone that sounds every two minutes when audio alarms are turned off.
	Respiration indicator. Indicates a breath is detected by the impedance respiration algorithm.

	Snapshot indicator. Indicates the event has an associated snapshot.
	SpO2 signal strength indicator. Indicates the signal strength, with three asterisks indicating the strongest signal.
	Touch volume icon. Adjust the volume of the tone that sounds when a user touches a touchscreen display.

## Service information

### Service requirements

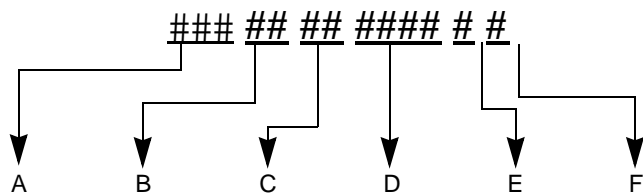
Follow the service requirements listed below.

- 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.

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## Equipment identification

Every GE device has a unique serial number for identification. A sample of the information found on a serial number label is shown below.



	Description
A	product code
B	year manufactured
C	fiscal week manufactured
D	production sequence number
E	manufacturing site
F	miscellaneous characteristic

## Device plate location

The device plate is located on the outside of the patient monitor.





# 2 System overview

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# 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.

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## 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.



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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.



**PDM with F5 Frame**



**PSM with F5 Frame**

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.

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## 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.

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## 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.

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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)

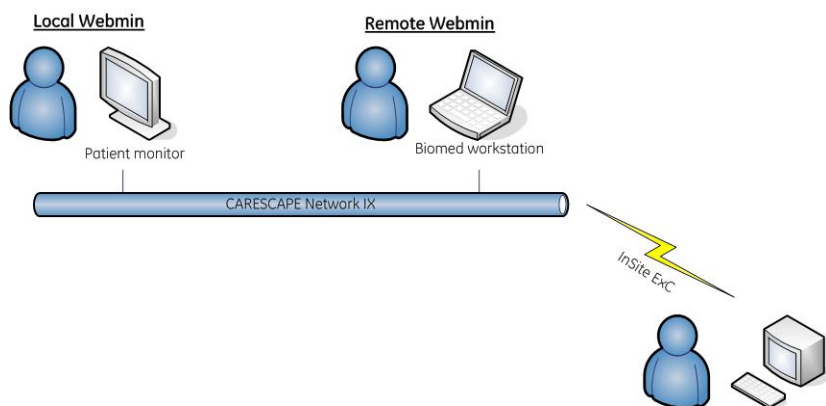
Supports both analog and digital video signals.

## 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.





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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

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# 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

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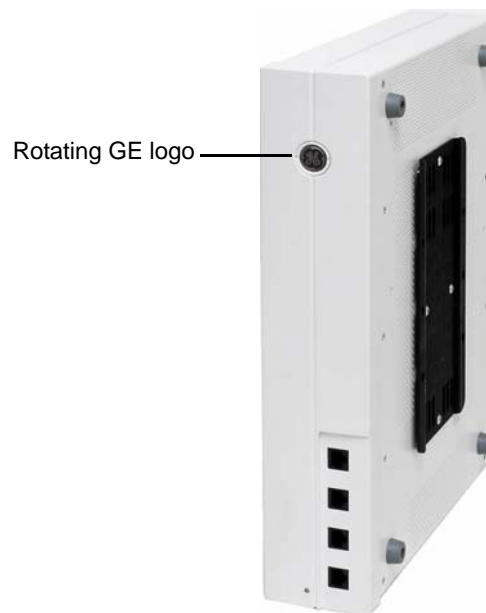
# Mounting

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.

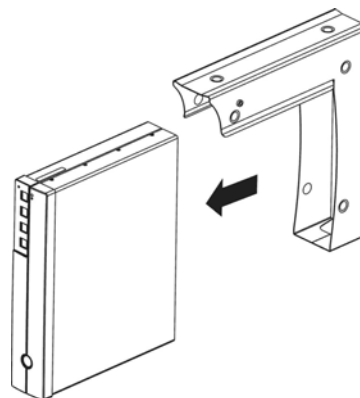
## NOTE

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.



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## Connect system components

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### 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.

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### 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.

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### 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).

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### 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.

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## Power cords

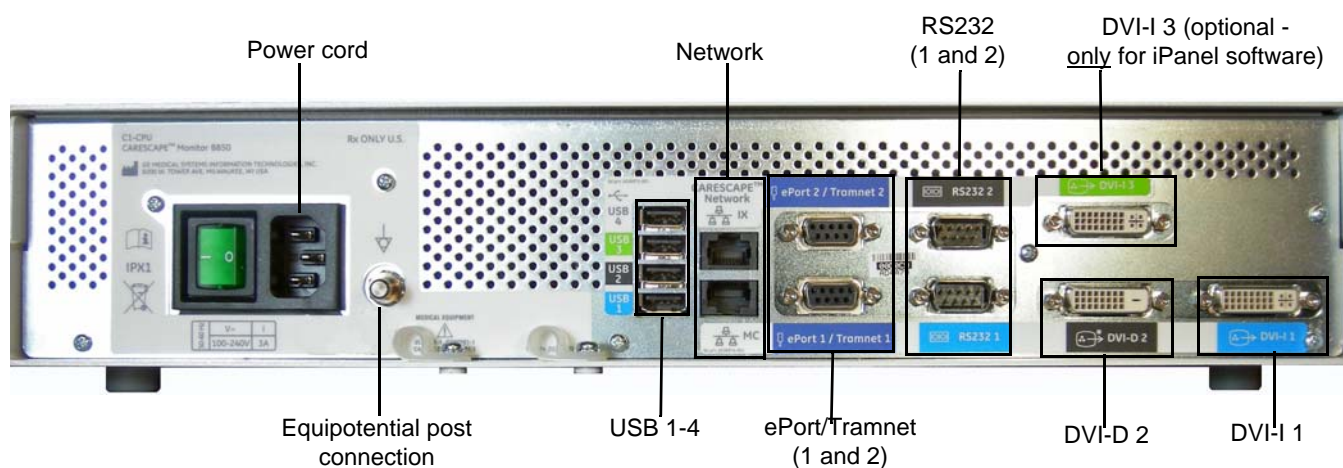
Connect power cords to the mains power supply inlet and to a wall outlet on all system components that require AC mains power input. Do not power on any devices.

### 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

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## 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.

Display port	Number of displays	Touch interface ports
DVI-I 1	Display 1	USB 1 or RS232 1
	Display 1 cloned	USB 1 or RS232 1
DVI-D 2	Display 2	USB 2 or RS232 2
DVI-I 3	Display 3	USB 3
	Display 3 cloned	No touch interface available

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.

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### WARNING

Do not use the monitor without manufacturer approved mounting attached.

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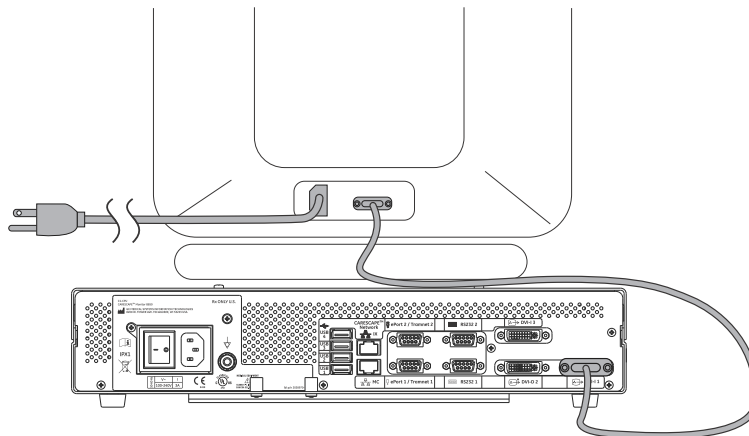
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1. Connect either an analog or digital display to **DVI-I 1**.

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.

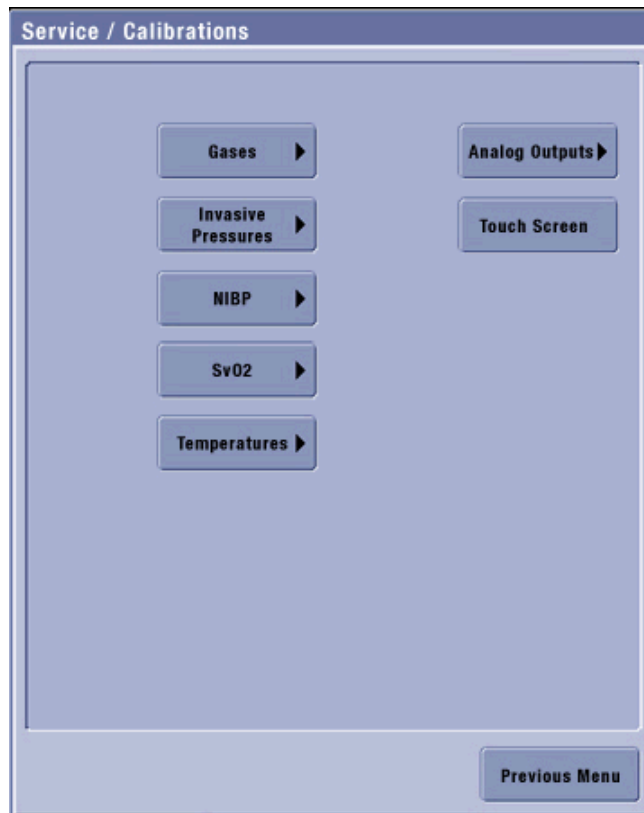
NOTE

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.

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## 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.

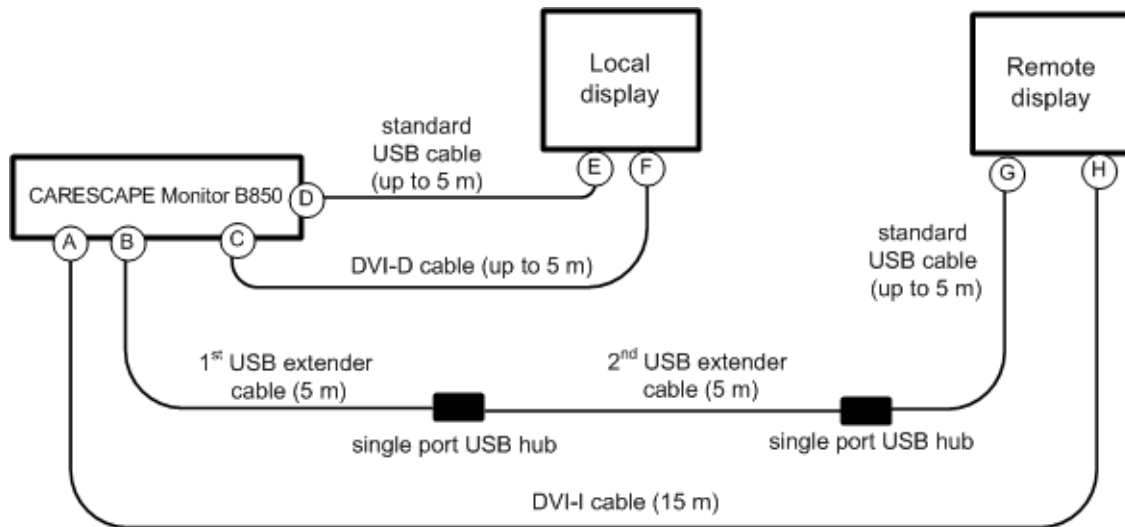
- 5-meter USB extender (p/n 2042768-001)



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.



A to H = DVI-I connection  
 B to G = USB remote (2 USB extenders required)  
 C to F = DVI-D connection  
 D to E = USB standard cable

## Setup instructions

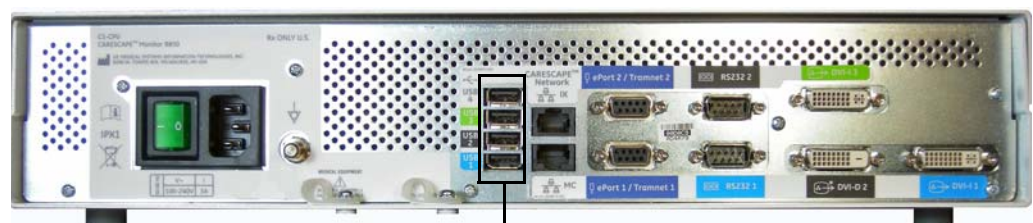
### NOTE

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

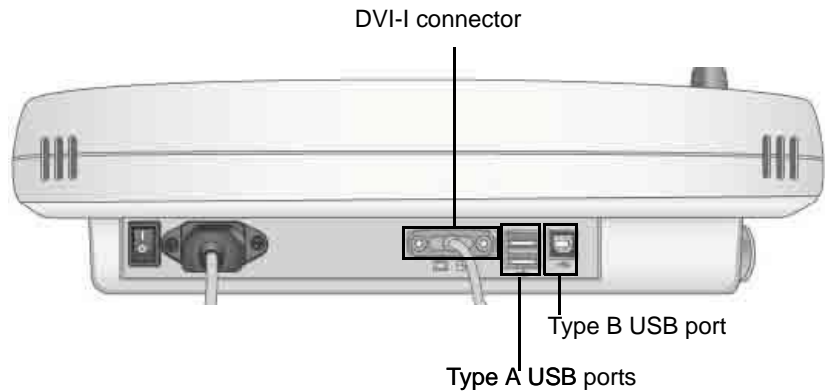
If you are connecting a touchscreen display, see the display port table on page 3-6 for details on which port to use.



Type A USB ports

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.

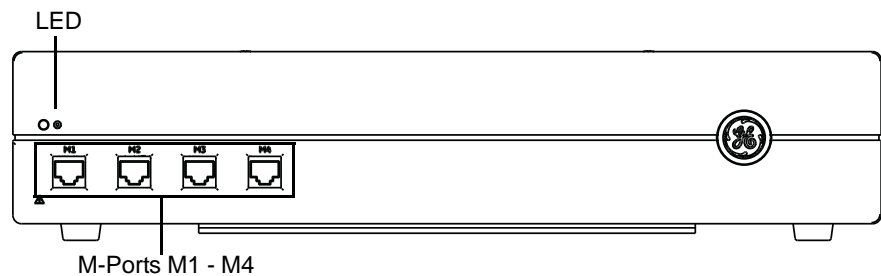


## Non-medical grade displays

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

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### 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.

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### 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.

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### 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.

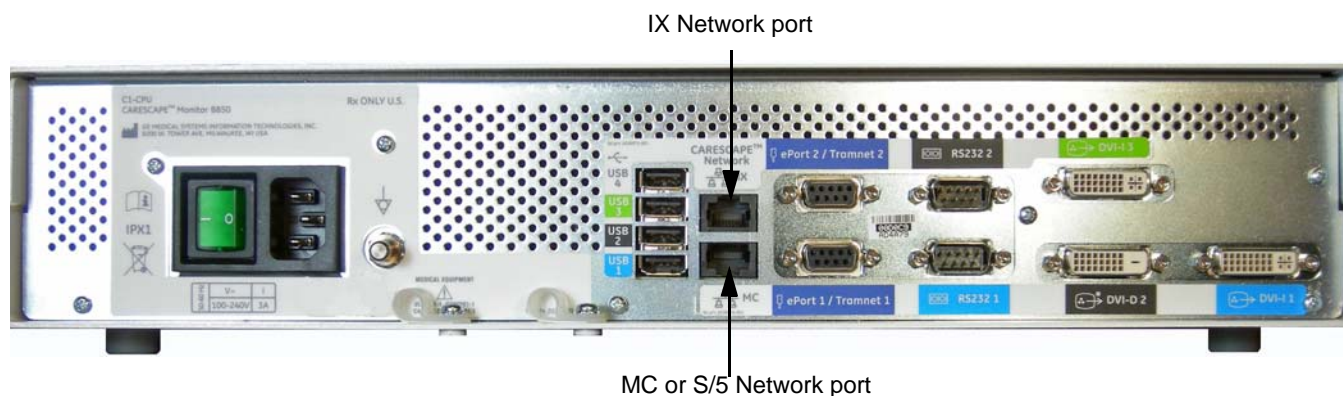
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### NOTE

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.”

		ePort 1/Tramnet 1 connected devices				
		PDM	Tram-Rac housing	Tram-Rac housing (AC Mains powered)	F5 Frame	F7 Frame
ePort 2/ Tramnet 2 connected devices	PDM		X	X	X	X
	Tram-Rac housing	X		X		
	Tram-Rac housing (AC Mains powered)	X	X	X	X	X
	F5 Frame	X		X	X	
	F7 Frame	X		X		

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.

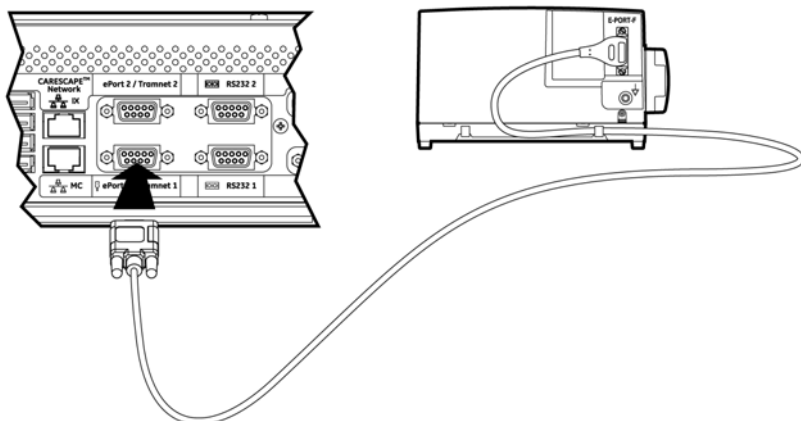
Example: If a PDM is connected to **ePort 2**, you cannot connect a second PDM to **ePort 1**. However, you can connect *one* of the following devices to **ePort 1**:

- Tram-Rac housing
- Tram-Rac housing (AC Mains powered)
- F5 Frame
- F7 Frame

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## 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.

---

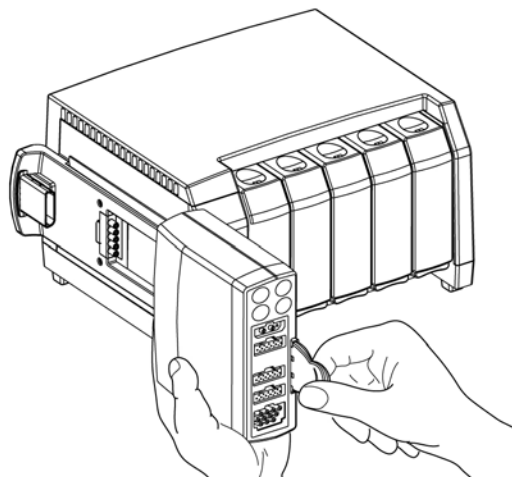
Refer to the “CARESCAPE Monitor B850 Addendum for Device Compatibility” for a list of compatible devices.

### 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.



**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**

---

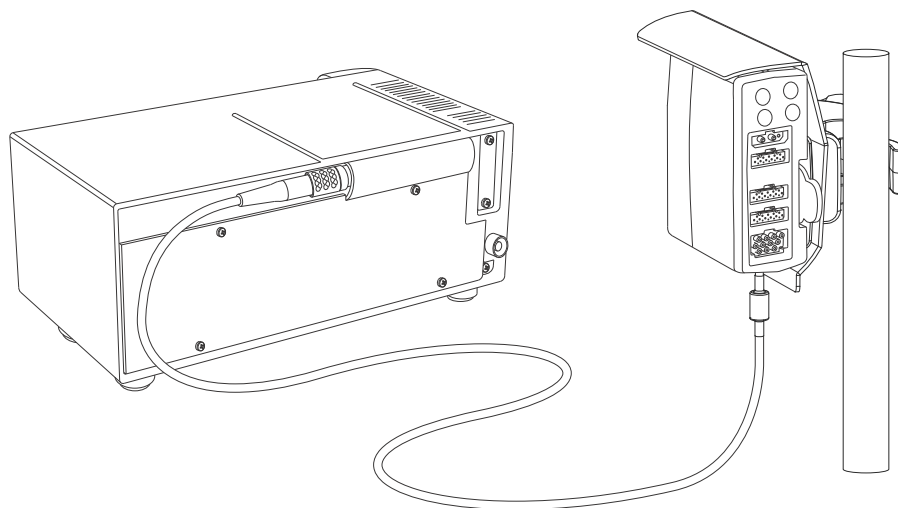
**WARNING**

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

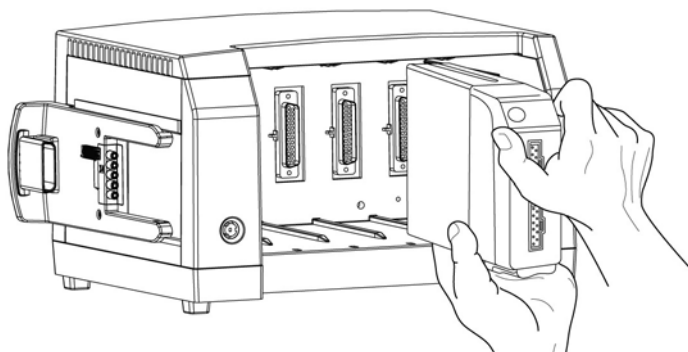
Do not use identical measurement modules or modules that map a measurement to the same channel or parameter window. If such modules have been connected, remove the module that has been most recently connected. You can also remove both modules and re-connect the new module after five seconds.

---

---

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.

---

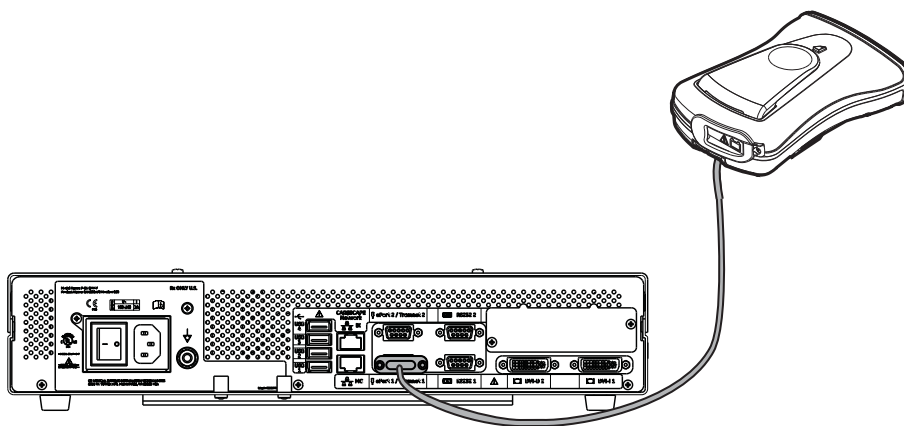
---

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

### NOTE

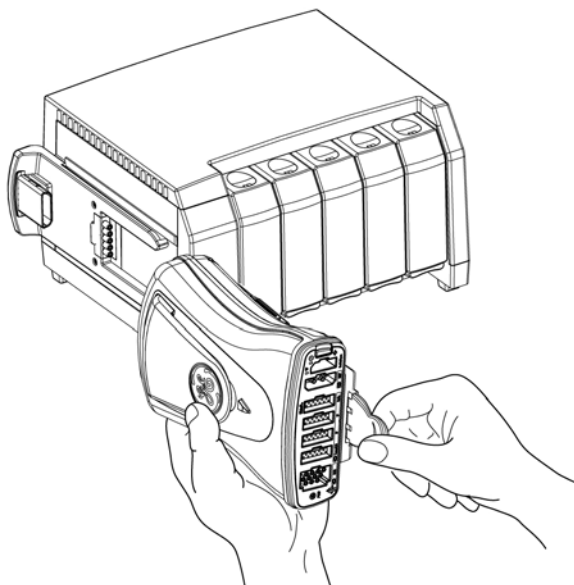
- ◆ PDM software v1.2 is required for use with CARESCAPE Monitor B850 software.
- ◆ The PDM can not be installed to an F7 Frame.
- ◆ Refer to the “CARESCAPE Monitor B850 Addendum for Device Compatibility” for a list of compatible devices.
- ◆ When the PDM is used without a battery, it is necessary to 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.”

		ePort 1/Tramnet 1 connected devices				
		PDM	Tram-Rac housing	Tram-Rac housing (AC Mains powered)	F5 Frame	F7 Frame
ePort 2/ Tramnet 2 connected devices	PDM		X	X	X	X
	Tram-Rac housing	X		X		
	Tram-Rac housing (AC Mains powered)	X	X	X	X	X
	F5 Frame	X		X	X	
	F7 Frame	X		X		

In the table above:

- X = supported
- Shaded = not supported

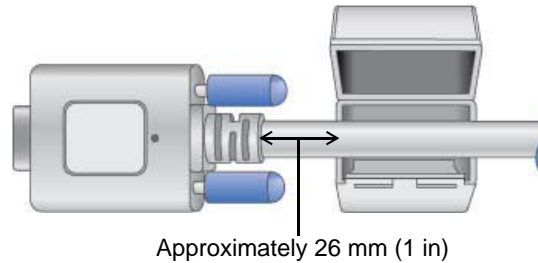
## Example

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**:

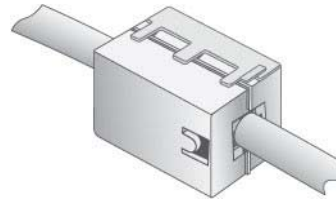
- Tram-Rac housing
- Tram-Rac housing (AC Mains powered)
- F5 Frame
- F7 Frame

## To connect the Tram-Rac housing to an ePort/Tramnet connector

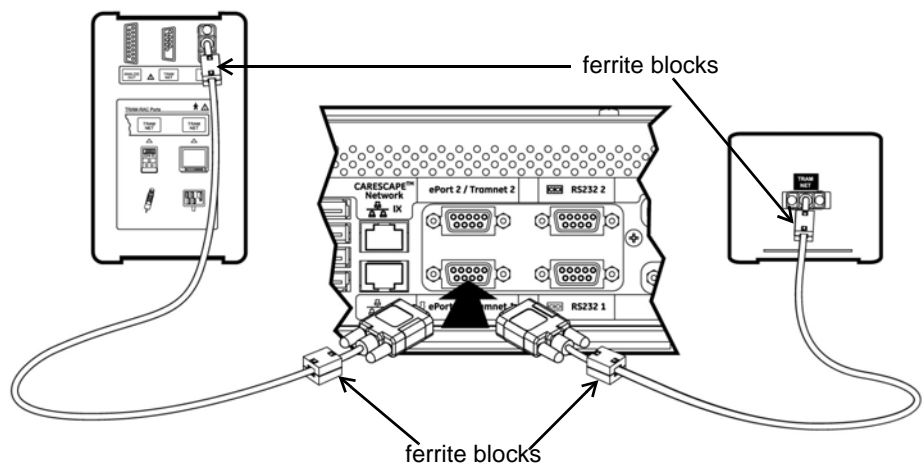
1. Install the ferrite blocks that came with the patient monitor to both ends of the Tram-Net cables.
  - a. Place one end of cable in the groove of the ferrite block, approximately 26 mm (1 in) from the end of the cable.



- 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

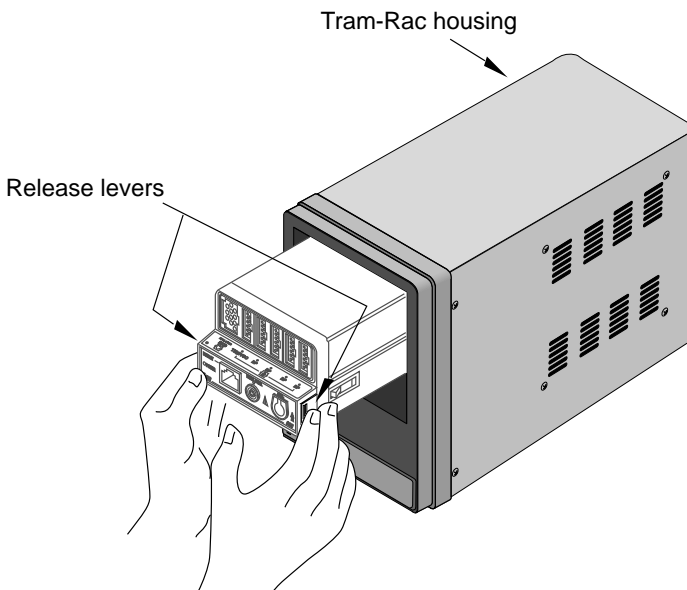
An error message displays if an incompatible module is connected. Refer to the “CARESCAPE Monitor B850 Addendum for Device Compatibility” for details.

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.



511A

## 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

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### 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.

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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”.

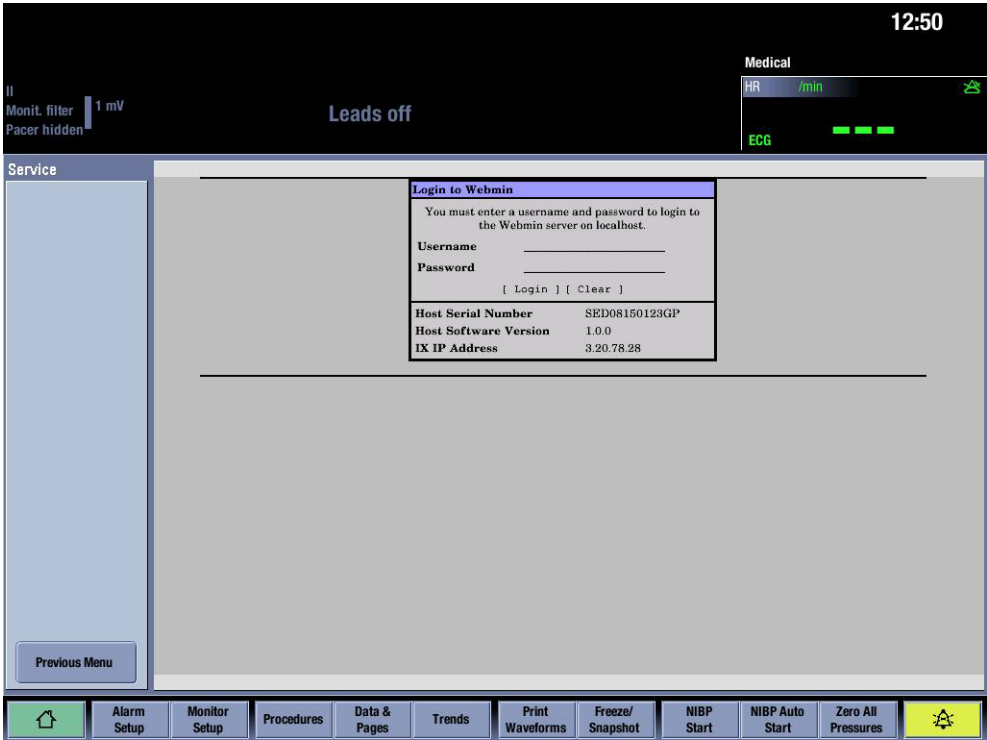
## Access to Webmin

### 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.



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.

6. Launch a web browser.
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

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### 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.

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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

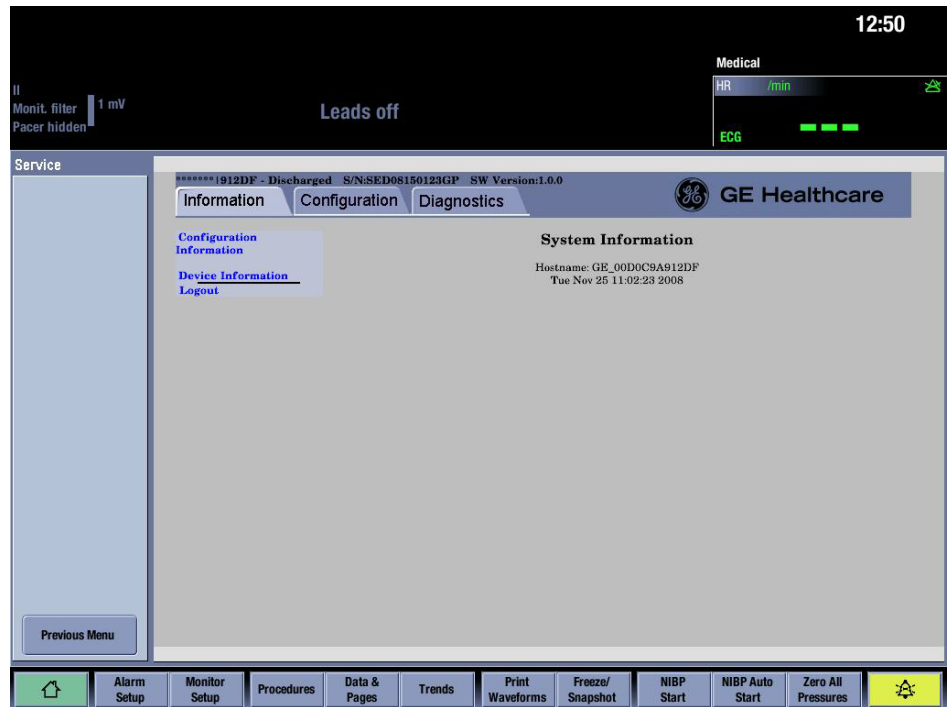
NOTE

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

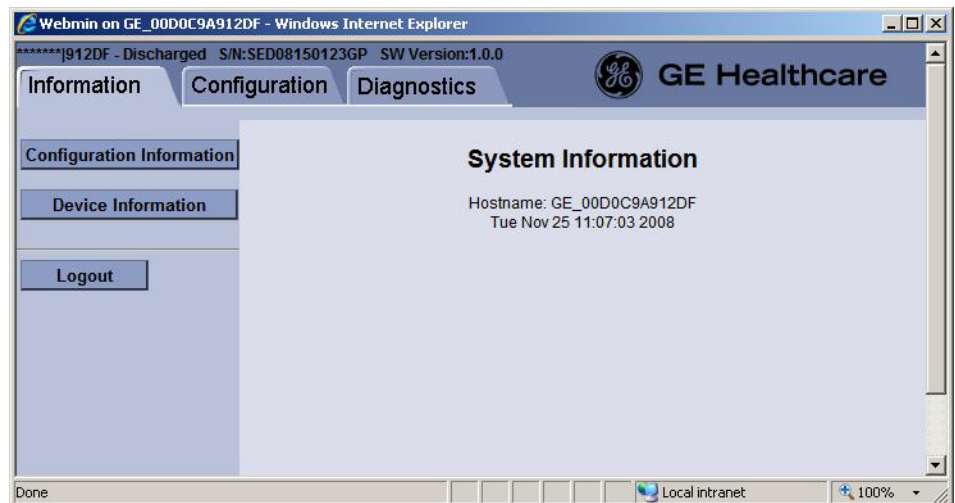
NOTE

Username and password are case sensitive.

The Webmin application opens and defaults to the *Information* tab.



Webmin accessed locally



Webmin accessed remotely


2. Select the *Configuration* tab.

NOTE

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

Webmin on GE\_00D0C9A912DF - Windows Internet Explorer

\*\*\*\*\*912DF - Discharged S/N:SED08150123GP SW Version:1.0.0

Information Configuration Diagnostics  **GE Healthcare**

**System Information**

Hostname: GE\_00D0C9A912DF  
Tue Nov 25 11:13:11 2008

Admit Settings  
Citrix  
Host Asset Settings  
Language  
Licenses  
MUSE/12SL  
Modules  
National Requirements  
Network  
Passwords  
Power Frequency  
Printers  
Remote Service  
Settings  
Software Management  
Time  
Unit and Bed Name  
Logout

Local intranet 100%



---

# 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**.
3. On the **Sub-Modules for Network** menu, select **Hostname**.
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**.
3. On the **Sub-Modules for Network** menu, select **Wired Interfaces**.
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

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### 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**.
3. On the **Sub-Modules for Printers** menu, select **Print Test Page**.
4. On the **Print Test Page** window, select the printer.
5. Select **Submit**.

## Licenses

### Enable software package

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#### WARNING

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

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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**.
3. On the **Sub-Modules for Licenses** menu, select **Software Package**.
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.
4. On the **Configuration** tab, select **Licenses**.
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.

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

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 *Female*.
3. Under *Fixed Option*, select the applicable value:

Item	Item selection on the top part of the screen	Fixed Option selection
Height Unit	Both <i>Height</i> and <i>Height Unit</i>	<i>Non-Fixed</i> .
	<i>Height</i> only	Select value from drop down list.
Weight Unit	Both <i>Weight</i> and <i>Weight Unit</i>	<i>Non-Fixed</i> .
	<i>Weight</i> only	Select value from drop down list.
Age Unit	Both <i>Age</i> and <i>Age Unit</i>	<i>Non-Fixed</i> .
	<i>Age</i> only	Select value from drop down list.

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

All changes take effect immediately.

**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

Item	Starting Position	Length
<i>MRN</i>	1	10
<i>First Name</i>	11	10
<i>Last Name</i>	21	15
<i>Day of Birth</i>	46	2
<i>Month of Birth</i>	48	2
<i>Year of Birth</i>	50	4
<i>Age</i>	36	5
<i>Age Unit</i>	41	5
<i>Gender</i>	54	1
<i>Height</i>	55	5

The following sample shows the corresponding entries on the *Admit/Discharge Configuration* window.

Item	Position (1-300)	Length (1-99)
MRN	1	10
First Name	11	10
Last Name	21	15
Day of Birth	46	2
Month of Birth	48	2
Year of Birth	50	4
Age	36	5
Age Unit	41	5
Gender	54	1
Height	55	5
Height Unit		
Weight		
Weight Unit		
Visit Number		
Primary Physician		
Referring Physician		

Item	Select Fixed Option
Height Unit	Meters
Weight Unit	Non-Fixed
Age Unit	Non-Fixed

Submit Back

## 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:

Item	Item selection on the top part of the screen	Fixed Option selection
Height Unit	Both <i>Height</i> and <i>Height Unit</i>	<i>Non-Fixed.</i>
	<i>Height</i> only	Select value from drop down list.
Weight Unit	Both <i>Weight</i> and <i>Weight Unit</i>	<i>Non-Fixed.</i>
	<i>Weight</i> only	Select value from drop down list.
Age Unit	Both <i>Age</i> and <i>Age Unit</i>	<i>Non-Fixed.</i>
	<i>Age</i> only	Select value from drop down list.

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.

Item	Sequence number of the item in the barcode
<i>MRN</i>	4
<i>First Name</i>	5
<i>Last Name</i>	6
<i>Day of Birth</i>	1
<i>Month of Birth</i>	2
<i>Year of Birth</i>	3
<i>Age</i>	11
<i>Age Unit</i>	12
<i>Gender</i>	7
<i>Height</i>	8

Item	Sequence number of the item in the barcode
<i>Height Unit</i>	9
<i>Weight</i>	10

The following sample shows the corresponding entries on the *Admit/Discharge Configuration* window.

The screenshot displays the 'Admit/Discharge Configuration' window, specifically the 'Character Delimited Parser' tab. It features a table for configuring fields and a 'Fixed Option' section below it.

Item	Position (1-99)	Field Delimiter
MRN	4	Delimiter #
First Name	5	
Last Name	6	
Day of Birth	1	Gender Code
Month of Birth	2	Male M
Year of Birth	3	Female F
Age	11	
Age Unit	12	
Gender	7	
Height	8	
Height Unit	9	
Weight	10	
Weight Unit		
Visit Number		
Primary Physician		
Referring Physician		

Item	Select Fixed Option
Height Unit	Non-Fixed
Weight Unit	Kilograms
Age Unit	Non-Fixed

At the bottom of the window are 'Submit' and 'Back' buttons.

## 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.

Item	Maximum length	Valid entries	Comments
<i>MRN</i>	99	Both letters and numbers	Forbidden characters are those that are not allowed by the monitor, including the following characters: !"#%&/'()=?`@£\$€{[]}\*^_~; <>
<i>First Name</i>	99		
<i>Last Name</i>	99		
<i>Day of Birth</i>	2	1-31	If Day of Birth is present in the barcode, then Month of Birth and Year of Birth also need to be present.
<i>Month of Birth</i>	2	1-12	If Month of Birth is present in the barcode, then Day of Birth and Year of Birth also need to be present.
<i>Year of Birth</i>	4	1880 to current year	If Year of Birth is present in the barcode, then Day of Birth and Month of Birth also need to be present.
<i>Age</i>	99	Numeric 9999.9999	Either a period or comma is accepted as a decimal symbol.
<i>Age Unit</i>	99	<ul style="list-style-type: none"> <li>■ A, Y, YR, YRS (years)</li> <li>■ MO, MOS (months)</li> <li>■ WK, WKS (weeks)</li> <li>■ D, DAY, DYS (days)</li> </ul>	
<i>Gender</i>	1		If gender is configured (not fixed), this must be 1 character.
<i>Height</i>	99	Numeric 9999.9999	Either a period or comma is accepted as a decimal symbol.
<i>Height Unit</i>	99	<ul style="list-style-type: none"> <li>■ FT (feet)</li> <li>■ IN (inches)</li> <li>■ M (meters)</li> <li>■ CM (centimeters)</li> <li>■ MM (millimeters)</li> </ul>	
<i>Weight</i>	99	Numeric 9999.9999	Either a period or comma is accepted as a decimal symbol.
<i>Weight Unit</i>	99	<ul style="list-style-type: none"> <li>■ KG, KGS (kilograms)</li> <li>■ G, GM, GMS (grams)</li> <li>■ MCG (micrograms)</li> <li>■ OZ, OZS (ounces)</li> <li>■ LB, LBS (pounds)</li> </ul>	
<i>Visit Number</i>	99	Both letters and numbers	Forbidden characters are those that are not allowed by the monitor, including the following characters: !"#%&/'()=?`@£\$€{[]}\*^_~; <>
<i>Primary Physician</i>	99		
<i>Referring Physician</i>	99		

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## Power frequency

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### WARNING

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

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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:

Value	Description
<i>None</i>	Select the normal defaults.
<i>France</i>	Enable the following country specific monitoring: <ul style="list-style-type: none"><li>■ At least 1 audible and visual occurrence must remind either as an un-inhabitable audible and visual alarm or as an audible and recurring recall repeated at least every 3 minutes and also inhabitable.</li><li>■ Heart Rate high alarm limit maximum 230 instead of 250.</li><li>■ Reminder beep will sound every 2 minutes when alarms have been silenced permanently.</li></ul>

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.



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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.

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### CAUTION

Do not disable the ECG Filter during clinical use.

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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

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### 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.

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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:

HTTP Proxy Server Configuration		
Item	Description	Comments
<i>Address</i>	<ul style="list-style-type: none"><li>■ If this site uses an HTTP proxy server, a specific site proxy server IP <i>Address</i> and <i>Port</i> number are required for the <b>Remote Service</b> communication to work. Otherwise, select <b>None</b>.</li><li>■ If the HTTP proxy server requires user authorization, a specific <i>Username</i>, and <i>Password</i> is required. Otherwise, select <b>None</b>.</li></ul>	These values are determined by the customer.
<i>Port</i>		
<i>Username and Password</i>		

Remote Service Configuration		
Item	Description	Comments
<i>System ID</i>	Identifies the system to the GE backoffice servers.	These values are read-only and are unique.
<i>Serial Number</i>	Identifies the unit and is set at the time of manufacture.	

Remote Service Configuration		
Item	Description	Comments
<i>Enterprise URL</i>	If required, designate the address of the GE backoffice servers required to communicate with the <i>Remote Service Agent</i> .	This address should never be changed unless explicit instructions are given to do so.
<i>Enterprise Tunnel URL</i>	If required, designate the address of the GE backoffice servers required to communicate with the tunneling agent.	
<i>Protocol</i>	Identifies the protocol used to communicate with the enterprise servers.	This field is read-only and cannot be changed.

5. Select **Save**.

The changes will take effect immediately.

## 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.
2. On the **Configuration** tab, select **Remote Service**.
3. On the **Sub-Modules for Remote Service** menu, select **Control**.
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.

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## 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.

Type of setting	Configuration information that can be saved or loaded
Platform settings	<ul style="list-style-type: none"><li>■ Admit settings</li><li>■ Citrix</li><li>■ Host asset numbers</li><li>■ Host license</li><li>■ Language</li><li>■ MUSE/12SL</li><li>■ National requirement</li><li>■ Network</li><li>■ Password</li><li>■ Power frequency</li><li>■ Printers</li><li>■ Remote service</li><li>■ Time</li><li>■ Unit and bed name</li></ul>
Clinical settings	<ul style="list-style-type: none"><li>■ Care unit settings</li><li>■ Profile settings</li></ul>

## 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**.
3. On the **Sub-Modules for Settings** menu, select **Save**.
4. On the **Save Settings** window, select the radio button next to the type of settings you want to save.
5. Select **Save**.

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## 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**.
3. On the **Sub-Modules for Settings** menu, select **Load**.
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**.
4. On the **Sub-Modules for Settings** menu, select **Activate**.
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

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# 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.



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# 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.

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### WARNING

Only perform maintenance procedures specifically described in the manual.

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### WARNING

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

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### 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.

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## Test equipment

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

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

<sup>1</sup>. 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

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a regulatory-approved cord for the country of use.

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**WARNING**

Use only AC power cords recommended or manufactured by GE.

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## Ground (earth) integrity

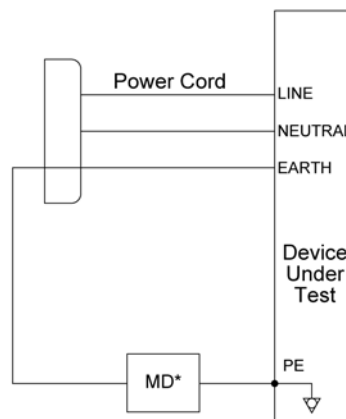
Listed below are two methods for checking the ground (earth) integrity, “Ground continuity test” and “Impedance of protective earth connection”. These tests determine whether the device’s exposed metal and power inlet’s earth (ground) connection has a power ground fault condition.

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.

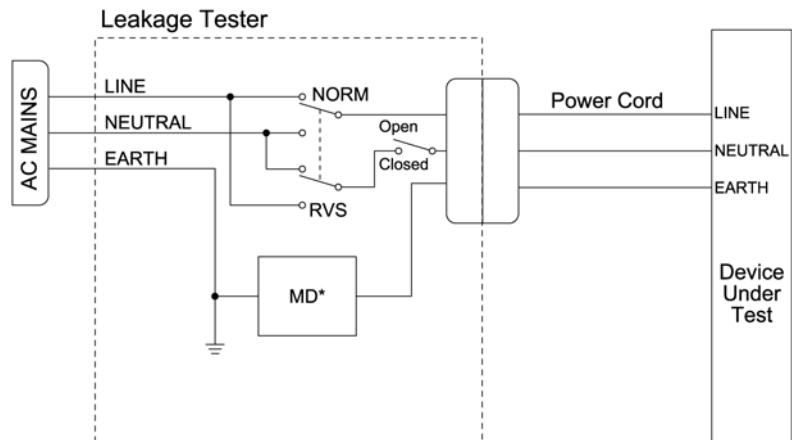
For equipment with a power supply cord, the impedance between the protective earth pin in the mains plug and any accessible metal part which is protectively earthed shall not exceed 0.2 ohms.

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



#### NOTE

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

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  $\mu$ A, and the device under test is powered from 100-120 VAC/50-60 Hz
- (USA only) 300  $\mu$ A, 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  $\mu$ A, 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

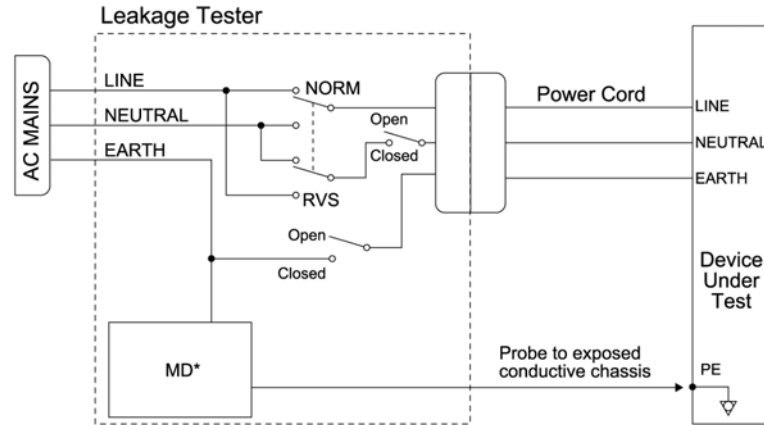
- (USA only) 300  $\mu$ A, and the device under test is powered from 100-120 VAC/50-60 Hz
- (USA only) 300  $\mu$ A, and the device under test is powered from a center-tapped 200-240 VAC/50-60 Hz, single phase circuit (UL Split Phase Exemption)
- 1000  $\mu$ A, and the device under test is powered from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

Module	Patient connector
E-BIS	Test from DSC BIS connector
E-COP, E-COPsv	P4/P8
E-EEG	EEG
E-ENTROPY	Entropy Test from Entropy cable
E-MASIMO	SpO2
E-NMT	NMT
E-NSAT	SpO2
E-NSATX	SpO2
E-P, E-PT	P3/P7
E-PP	P5-P6
E-PRESTN, PSMP	ECG SpO2
E-PRETN	ECG P1-P2
E-RESTN, PSM	ECG SpO2
M-BIS	Test from DSC BIS connector
M-COP, M-COPsv	P4
M-EEG	EEG
M-ENTROPY	Entropy Test from Entropy cable
M-NMT	NMT
M-NSAT	SpO2
M-P, M-PT	P3
M-PP	P5-P6
M-PRESTN	ECG SpO2
M-PRETN	ECG P1-P2
M-RESTN	ECG SpO2

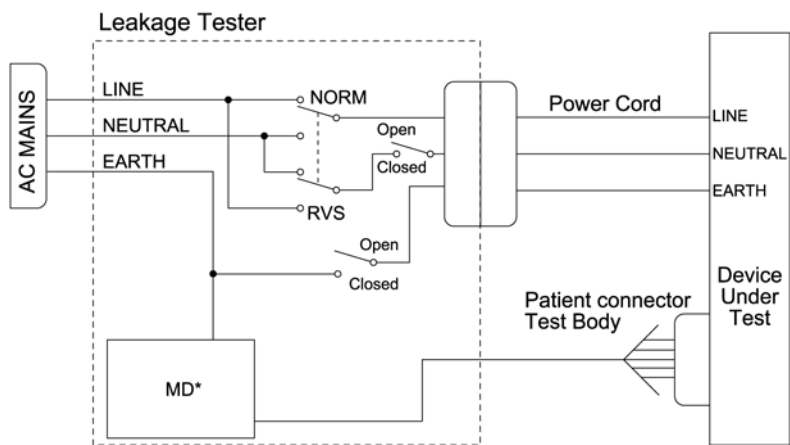


Module	Patient connector
Masimo SpO2	SpO2
PDM	ECG SpO2
SpO2	SpO2
TRAM 250SL	ECG SpO2
TRAM 450SL	ECG SpO2
TRAM 451	ECG SpO2
TRAM 451M	ECG SpO2
TRAM 451N	ECG SpO2
TRAM 451N5	ECG SpO2
TRAM 850SL	ECG SpO2
TRAM 851	ECG SpO2
TRAM 851M	ECG SpO2
TRAM 851N	ECG SpO2
TRAM 851N5	ECG SpO2

## 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  $\mu$ A, the device under test fails. Contact GE Technical Support.

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

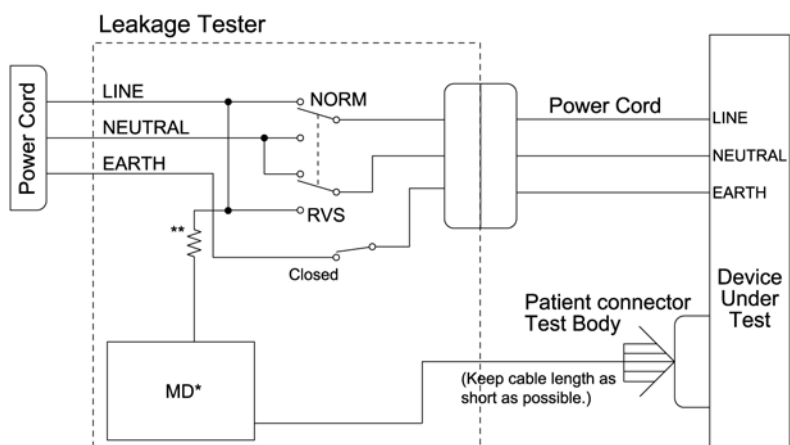
If any reading is greater than 50  $\mu$ A, the device under test fails. Contact GE Technical Support.

## 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.



### 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

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### WARNING

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

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#### 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  $\mu$ A 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.

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## 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.



- 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

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# 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

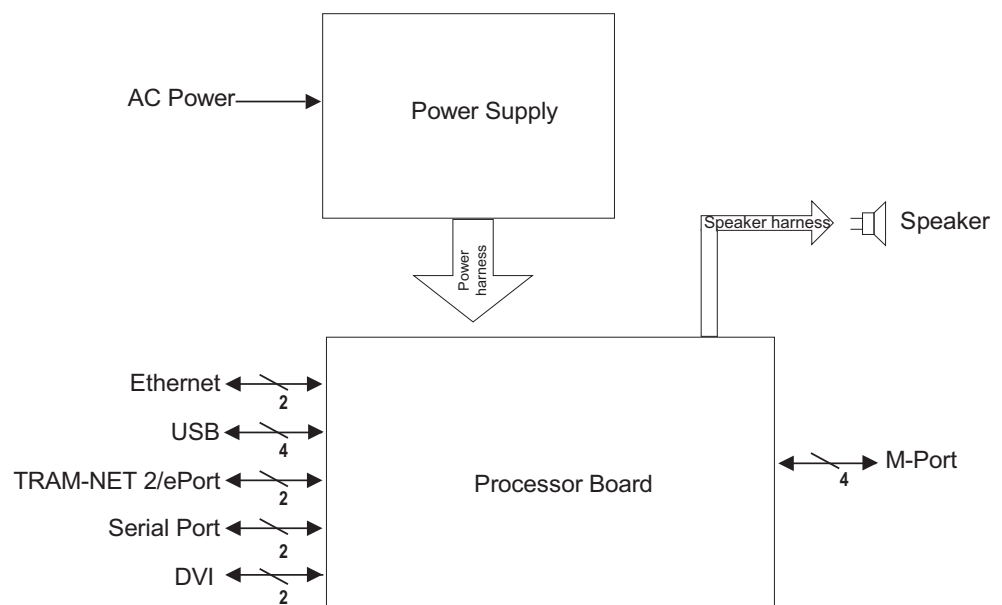
The block diagram below represents the main components and the interface connectors.

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.



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## 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 ( $\pm 5\%$ ).
- 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

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# 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

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## WARNING

Only perform maintenance procedures specifically described in the manual.

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## WARNING

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

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## 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.

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## Electrical safety tests

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

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# 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**.



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## 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

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# 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.

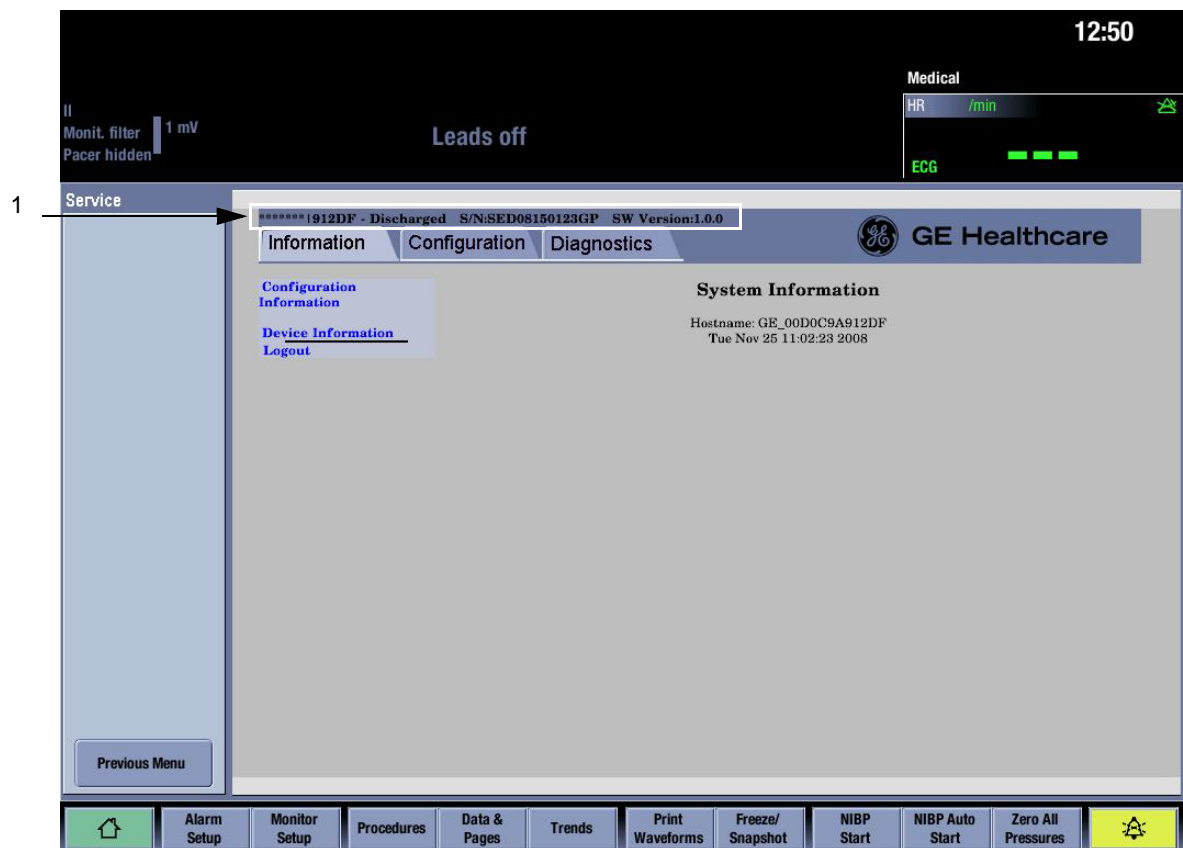
## Configuration information

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.



### 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, S/5 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 user name.
  - ◆ **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/I2SL** - 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

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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.

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## 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:

Log	Contents
Webmin Action log	<ul style="list-style-type: none"><li>■ Webmin user authentication and access related information (e.g., who accessed Webmin and when).</li><li>■ Webmin module settings changes (e.g., what was changed and when).</li><li>■ 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.</li><li>■ 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.</li><li>■ 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.</li><li>■ Settings transfer history information, including the type of the transferred settings, the origin and destination, and the date and time the settings transfer occurred.</li><li>■ 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.</li><li>■ Webmin related error messages (e.g., information about EPI layer issues detected by Webmin).</li></ul>
EMBC Frame logs	<ul style="list-style-type: none"><li>■ Date and time when the EMBC log was last updated.</li><li>■ Modbus 0, 1, 2, and 3 information, including the following:<ul style="list-style-type: none"><li>◆ System information (e.g., Sysinfo -packet)</li><li>◆ Log information (e.g., Loginfo -packet)</li><li>◆ Module node connection/disconnection information (e.g., Module Node Log)</li><li>◆ Module slot information (e.g., addresses and times in the latest modbus frame)</li><li>◆ Modbus frame statistics (e.g., total number of frames, number of synchronization errors, number of lost frames, number of unknown frames)</li></ul></li></ul>
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.



Log	Contents
System log	<ul style="list-style-type: none"> <li>■ OS events and errors, including operating system related information, such as clinical application startup and recovery information, power on self-test results, etc.</li> <li>■ InSite with ExC events and errors, including InSite with ExC agent related information.</li> </ul>
Clinical log	<ul style="list-style-type: none"> <li>■ Clinical-related application events, including module (parameter) connections/disconnections, case starts/ends, cold starts, warm starts, etc.</li> <li>■ Technical notes and errors displayed for clinical users, including all host and module related technical errors (e.g., 'Failure in Agent ID').</li> <li>■ Clinical alarms, including clinical application related patient alarms and their level (e.g., 'FiO2 Low').</li> <li>■ Clinical user interactions, such as the host keystrokes and touchscreen selections, menu setting changes, etc.</li> <li>■ EPI layer related errors, including information about EPI layer issues detected by the clinical application.</li> </ul>

## 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.

Error message	Possible cause	Action
<i>License expired</i>	Trial license expired	1. Remove trial license or enter new activation code.
<i>Configuration changes. Restart required.</i>	Changes to patient monitor settings	1. Power cycle the patient monitor.
<i>Network down</i>	No other network device observed on the MC Network.	1. Verify that the patient monitor is connected to an active network.
<i>Identical unit &amp; bed name noticed</i>	A patient monitor with the identical unit and bed name is on the network	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.
<i>Identical IP address noticed</i>	A patient monitor with the identical IP address is on the network	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.
<i>Incompatible gas module</i>	The module is not compatible.	Replace the module. See the "CARESCAPE Monitor B850 Addendum for Device Compatibility".
<i>Service Monitor - Error Code 0xHOST1001</i>	The temperature is exceeding limits.	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.
<i>Service Monitor - Error Code 0xHOST1002</i>	CPU voltage is exceeding limits.	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.

Error message	Possible cause	Action
<i>Service Monitor - Error Code 0xHOST1004</i>	Disk usage exceeds 90%.	<ol style="list-style-type: none"> <li>1. Back up the clinical and platform settings.</li> <li>2. Print the licensing information page via Webmin.</li> <li>3. Re-install software.</li> <li>4. If you need further assistance, call service.</li> </ol>
<i>Service Monitor - Replace System Battery</i>	The battery needs to be replaced.	See <a href="#">"Replace the CPU battery"</a> on page 9-8.
<i>Service Monitor - Activation Failed</i>	An error occurred in the process of activating the software or license.	<ol style="list-style-type: none"> <li>1. Repeat the steps to activate the software or license.</li> <li>2. Re-configure settings for software. See <a href="#">"Licenses"</a> on page 4-11.</li> <li>3. If you need further assistance, contact service.</li> </ol>
<i>Module voltage low</i>	Parameter module supply voltage is exceeding the low limit. Failure in a module frame for E-series modules.	<ol style="list-style-type: none"> <li>1. Turn off the patient monitor.</li> <li>2. Replace the module frame.</li> </ol> If multiple module frames for E-modules are used, identify the defective device by connecting the module frames one at a time.

# Problems and solutions troubleshooting tables

Problem	Possible cause	Action
The display is blank.	The video display has no power.	Verify that the display's power indicator is illuminated.
	The patient monitor has no power.	Verify that the power indicator on the patient monitor is illuminated.
	The video display is not properly connected to the patient monitor.	Verify that the correct cable connects the video display to one of the two (or three) video ports on the patient monitor.
	The display was turned off via the <b>Display On/Off</b> button on the keypad/remote control.	Press the <b>Display On/Off</b> button on the keypad/remote control.
The quality of the display is not good.	<ul style="list-style-type: none"> <li>■ The cable is not connected properly.</li> <li>■ The video display is bad.</li> </ul>	<ol style="list-style-type: none"> <li>1. Check the connection between the video display and the patient monitor. If necessary, replace the video display with a known good one.</li> <li>2. If the problem is not corrected, replace the processor PCB. Refer to <b>"Replace the processor board"</b> on page 9-5.</li> </ol>
The power switch button on the patient monitor does not illuminate when it is toggled.	The power supply is bad.	Replace the power supply. For instructions, refer to <b>"Replace the power supply"</b> on page 9-6.
The display does not advance beyond the GE logo screen.	There is a boot code error.	Contact GE service.
	The software or hardware is corrupt.	<ol style="list-style-type: none"> <li>1. Identify after which startup screen the computer reboots.</li> <li>2. Call technical support for service.</li> </ol>
Acquisition module patient data does not display.	<ul style="list-style-type: none"> <li>■ Module is faulty.</li> <li>■ The display screen of the patient monitor is not configured to display the parameter.</li> <li>■ The patient leadwires are not connected properly.</li> <li>■ The module is not installed correctly or is not powered on.</li> <li>■ The Frame or Tram-Rac housing is not powered on.</li> <li>■ There is a loose or faulty cable.</li> <li>■ An incompatible device is connected to the patient monitor</li> </ul>	<ol style="list-style-type: none"> <li>1. Verify patient or simulator leadwires are connected properly to the module.</li> <li>2. Verify that the module is installed correctly and powered on.</li> <li>3. Log into <b>Webmin &gt; Information &gt; Device Information</b> and verify that all modules are listed.</li> <li>4. Verify that the Frame or Tram-Rac housing is powered on.</li> <li>5. Go to <b>Monitor Setup &gt; Screen Setup</b> to verify that the parameter is selected to display on the screen.</li> <li>6. Power on the Frame, Tram-Rac housing or acquisition device.</li> <li>7. View error logs for the patient monitor and acquisition device using Webmin. Go to the <b>Diagnostics</b> tab to view or download log files.</li> <li>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.</li> </ol>

Problem	Possible cause	Action
Patient alarms are not sounding.	The speakers are disconnected.	Make sure the speakers are connected.
	The speakers are not functioning.	Test if the speaker is functioning, using <i>Monitor Setup &gt; Sound Volumes</i> .
	The alarm limits are not set correctly.	Make sure the alarms are enabled. Consult the user's manual for correct alarm settings.
	The speaker volume is very low.	Verify that the alarm volume is not turned off. Look in <i>Alarms Setup &gt; Audible &amp; Visual</i> .
	The patient is not being monitored.	The alarm function remains disabled until the patient is correctly admitted into the system. If a patient's waveform and the <b>DISCHARGED</b> message both display, consult the user's manual for correct patient admitting instructions.
	The patient monitor is off the network.	Verify network connectivity.
	USB cable from display is not connected to the patient monitor.	Connect the USB cable to the patient monitor.
Patient data from the patient monitor does not display at the other monitor(s)	A patch cable is not plugged in all the way.	Verify that the Ethernet cable is securely connected to the patient monitor.
	The MC Network is not configured properly.	Try to ping the device from the patient monitor. Refer to <i>"Ping a TCP/IP network device"</i> on page 8-5.
	There is a general networking issue.	Refer to <i>"Ping a TCP/IP network device"</i> on page 8-5.

Problem	Possible cause	Action
Graphs and alarms are not printed at the desired location.	<ul style="list-style-type: none"> <li>■ Graph location is not configured properly.</li> <li>■ Printer is not connected to the network.</li> <li>■ Printer is not configured.</li> </ul>	<ol style="list-style-type: none"> <li>1. Verify paper in central station writer is correct side up.</li> <li>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. <ul style="list-style-type: none"> <li>■ Watch for misspelling or spaces in the name.</li> <li>■ Make sure that the care unit name programmed into the patient monitor and central station match exactly.</li> </ul> <p>Typically, 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.</p> <p>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 (/) and then the bed number. The solution is to modify the patient monitor care unit name to match the central station's care unit name.</p> </li> <li>3. Generate a test print (for laser printers only). <ol style="list-style-type: none"> <li>a. Log onto <b>Webmin</b> &gt; <b>Configuration</b> &gt; <b>Printers</b> &gt; <b>Print Test Page</b>.</li> <li>b. Select the printer.</li> <li>c. Select <b>Submit</b></li> </ol> </li> </ol>
GE service unable to provide remote support through InSite with ExC	The IX Network and/or hospital network is not configured properly.	<ul style="list-style-type: none"> <li>■ Make sure the IX Network cables are connected properly (both ends of the cable are plugged into the correct ports).</li> <li>■ Make sure the IX Network is active.</li> <li>■ 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).</li> </ul>
	Serial number is corrupted	<p>Make sure the serial number exists.</p> <ol style="list-style-type: none"> <li>1. Log onto <b>Webmin</b> &gt; <b>Information</b> &gt; <b>Configuration Information</b>.</li> <li>2. Make sure the host serial number matches the physical serial number label.</li> </ol>
Unable to log onto the Webmin service interface remotely via the IX Network	<ul style="list-style-type: none"> <li>■ The patient monitor is not connected to the IX Network.</li> <li>■ The network is not configured properly.</li> <li>■ The PC used to launch Webmin remotely is not configured properly.</li> <li>■ The wireless card is on and is conflicting with wired IX connection.</li> <li>■ The computer is too slow and does not support networking.</li> </ul>	<ul style="list-style-type: none"> <li>■ Try to ping the patient monitor. Refer to "Ping a TCP/IP network device" on page 8-5.</li> <li>■ Verify that the patient monitor is properly connected to the IX Network.</li> <li>■ Contact GE service.</li> </ul>

Problem	Possible cause	Action
Unable to read from or write to the USB memory stick	The patient monitor does not support USB memory sticks.	
Barcode scanner cannot read the barcode	The barcode scanner is bad. The barcode is not configured properly (e.g., length vs. character-delimited).	Log onto <b>Webmin &gt; Configuration &gt; Admit Settings &gt; Barcode Settings</b> . Refer to <b>"Barcode settings"</b> on page 4-14.
Unable to launch iPanel software	<ul style="list-style-type: none"> <li>■ iPanel software is not licensed.</li> <li>■ IX Network is not connected to the patient monitor.</li> <li>■ The network connection is bad.</li> <li>■ The Citrix server is down.</li> <li>■ The patient monitor is not configured properly.</li> </ul>	Log onto <b>Webmin &gt; Configuration &gt; Citrix</b> . Refer to <b>"Citrix"</b> on page 4-13.
The wrong character is displayed when a key is pressed on the keyboard	The keyboard is bad.	Replace the keyboard.
	The keyboard locale is not configured properly.	Log onto <b>Webmin &gt; Configuration &gt; Language</b> . Refer to <b>"Language"</b> on page 4-21.
The wrong software application is displayed on the patient monitor	The wrong software application is activated for the device.	<ol style="list-style-type: none"> <li>1. To view the software package that is currently activated, log onto <b>Webmin &gt; Configuration &gt; Licenses &gt; Host Licensing</b>.</li> <li>2. Make sure that the desired software application is displayed under <b>Currently Active Software Package</b>.</li> <li>3. If you need to activate a different software package, access <b>Configuration &gt; Licenses &gt; Software Package</b>.</li> <li>4. Select the correct option and select <b>Activate</b>.</li> </ol>
Unable to perform a function or a feature is not available	<ul style="list-style-type: none"> <li>■ A license has not been purchased for the feature.</li> <li>■ The trial license has expired for the feature.</li> <li>■ The license is not installed properly.</li> </ul>	Refer to <b>"Licenses"</b> on page 4-11.
The user interface is displayed in the wrong language	The language is not configured properly.	Log onto <b>Webmin &gt; Configuration &gt; Language</b> and select the correct language. Refer to <b>"Language"</b> on page 4-21.
Unable to view a certain feature although the license is enabled	<ul style="list-style-type: none"> <li>■ A software package is active that does not have that feature (e.g., OR has fewer features than ICU).</li> <li>■ The active mode does not have that feature.</li> </ul>	<ol style="list-style-type: none"> <li>1. Log onto <b>Webmin &gt; Configuration &gt; Licenses &gt; Software Package</b>.</li> <li>2. Select the correct option and select <b>Activate</b>.</li> </ol>
Unable to upload a license file	<ul style="list-style-type: none"> <li>■ The license file is corrupted.</li> <li>■ The license file is for a patient monitor with a different serial number.</li> </ul>	Log onto <b>Webmin &gt; Configuration &gt; Licenses</b> . <ul style="list-style-type: none"> <li>■ If you have printed license information, select <b>Software Package</b> and <b>Host Licensing</b>.</li> <li>■ If you have a license file, select <b>Upload License</b>.</li> </ul>

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Problem	Possible cause	Action
Unable to view historical 12SL data	<ul style="list-style-type: none"><li>■ 12SL is not figured correctly.</li><li>■ The MC Network is down between CARESCAPE Monitor B850 and MUSE.</li><li>■ The MUSE server is not working.</li></ul>	<ul style="list-style-type: none"><li>■ Refer to "<b>MUSE/12SL</b>" on page 4-13.</li><li>■ Check for MC Network connection.</li></ul>
Unable to view and set reminder volume	The national requirement is set to France.	<ol style="list-style-type: none"><li>1. Log onto <i>Webmin</i> &gt; <i>Configuration</i> &gt; <i>National Requirements</i>.</li><li>2. Select <i>None</i>.</li></ol>
Unable to upload the software		See "CARESCAPE Monitor B850 Software Installation Instructions".



# 9 Disassembly and reassembly

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# 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.

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# Patient monitor

## Disassembly and reassembly procedures

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### WARNING

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

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### WARNING

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

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### 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.

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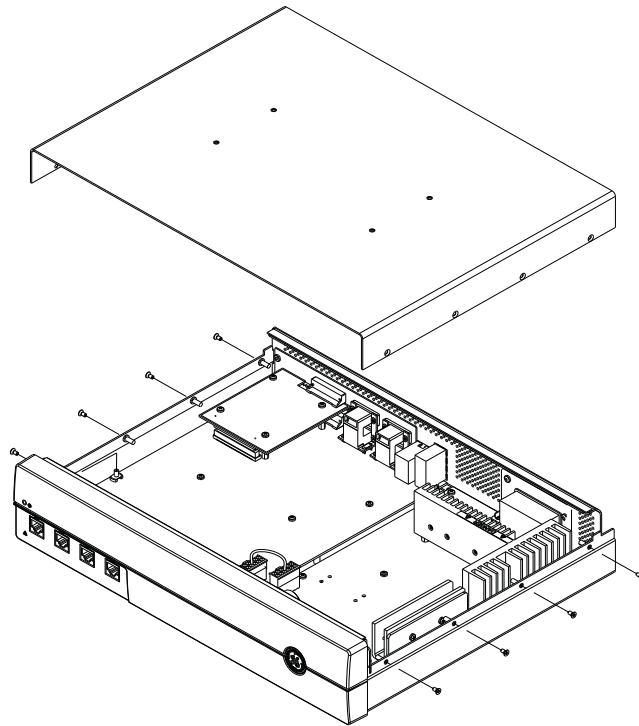
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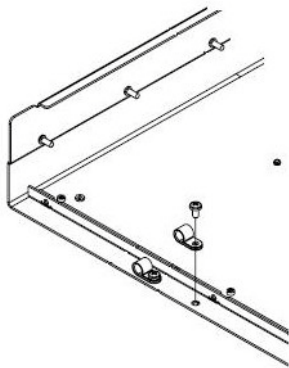
## Open the unit

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.

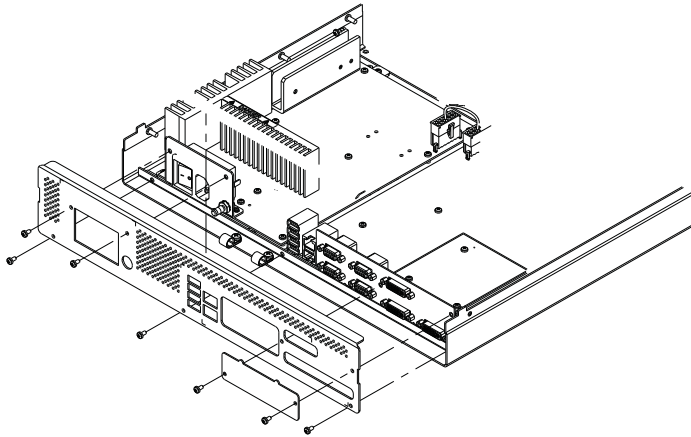
1. Turn the unit off at the rear power switch and disconnect the AC power cord and all communication cables.
2. Remove 4 screws on each side of the top cover. Remove the top cover.



3. Remove the power cord retainer and screw.

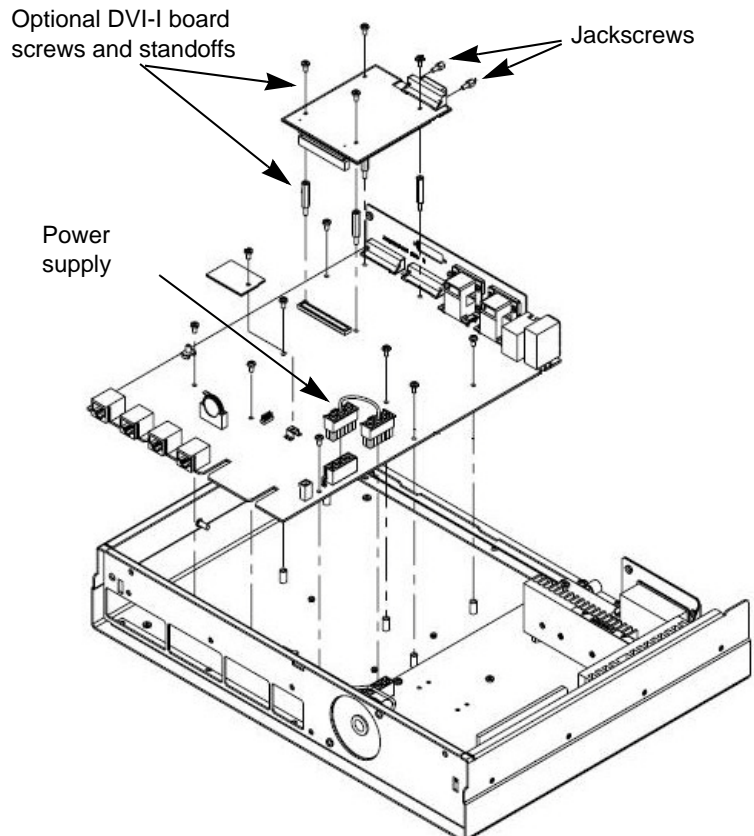


4. Remove 7 screws on the rear panel. Remove the rear panel.

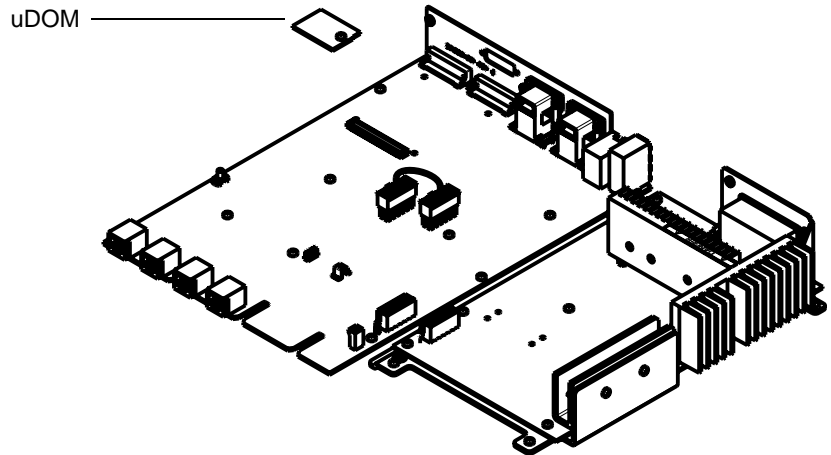


## Replace the processor board

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.



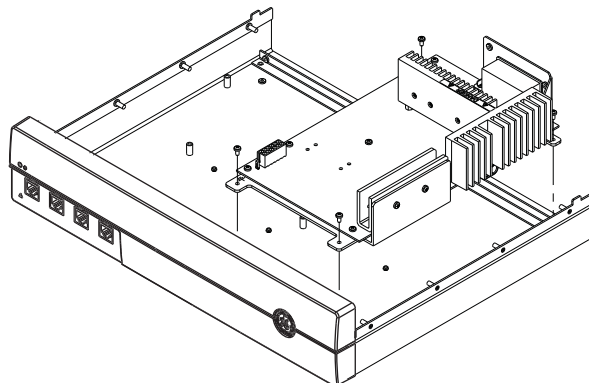
4. Remove 7 screws holding the processor board to the chassis. Remove the processor board.
5. Replace the processor board.
6. Remove the screw holding the uDOM to the old processor board. Remove the uDOM from the old processor board and reassemble it to the new processor board.



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.

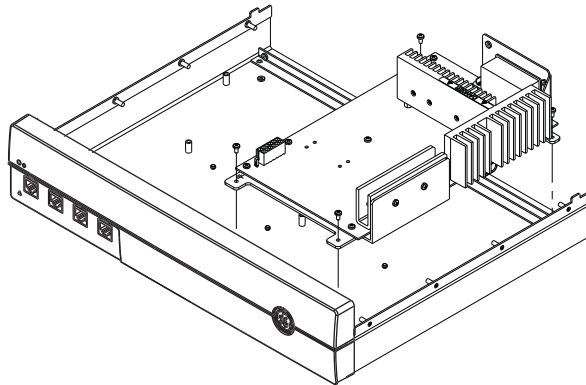


4. Replace the power supply.
5. Reassemble the patient monitor in the reverse order of disassembly.
6. **“Replace the cover on the unit”** on page 9-10.
7. Complete the procedures in **“Recommended checkout”** on page 9-10.

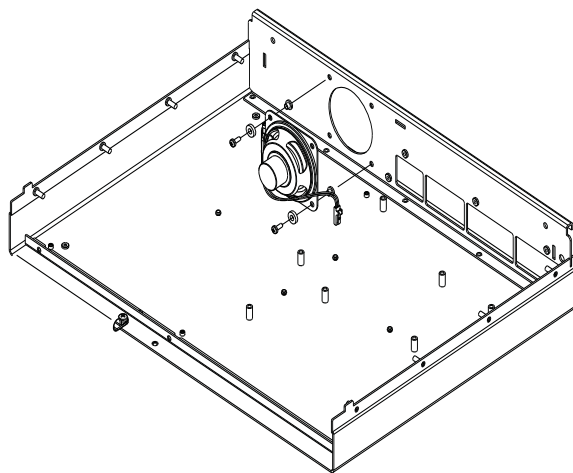
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## Replace the speaker

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.



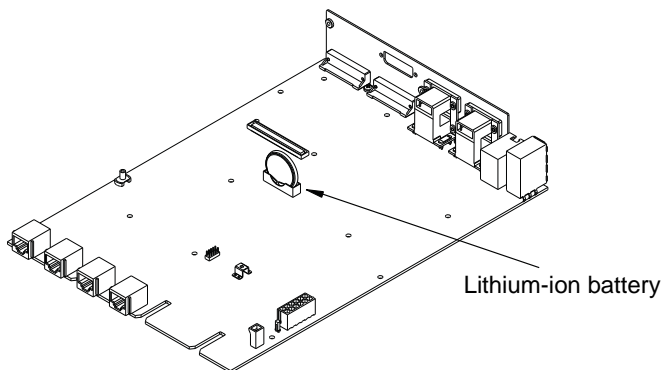
6. Replace the speaker.
7. Reassemble the power supply PCB.
8. Reassemble the patient monitor in the reverse order of disassembly.
9. **“Replace the cover on the unit”** on page 9-10.
10. Complete the procedures in **“Recommended checkout”** on page 9-10.

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## 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.



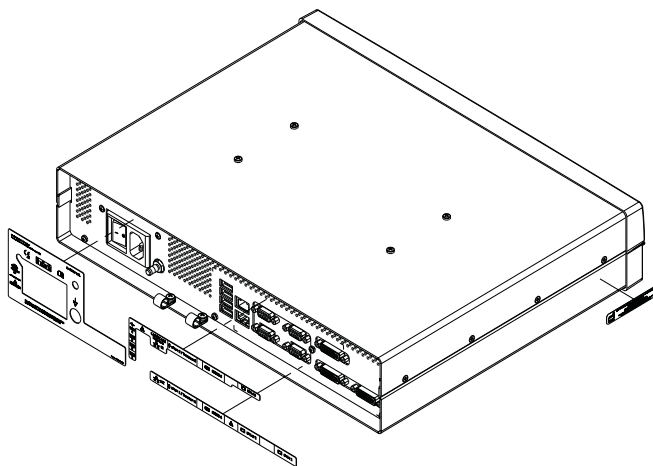
3. Replace the battery.
4. Reassemble the patient monitor in the reverse order of disassembly.
5. **“Replace the cover on the unit”** on page 9-10.
6. Complete the procedures in **“Recommended checkout”** on page 9-10.

## 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.

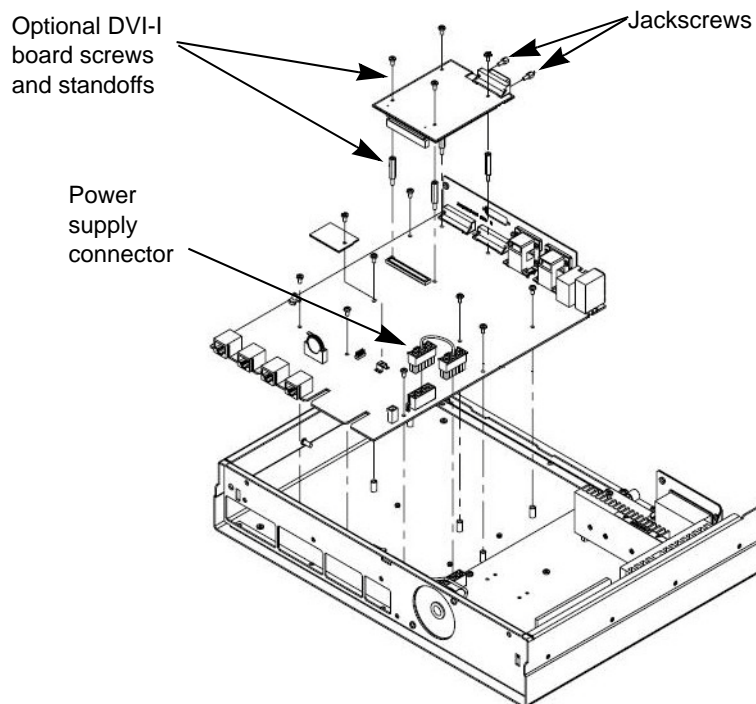




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## Replace or install the third video card

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.

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## 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.

FRU description	Functional checkout procedures
Processor board	<ul style="list-style-type: none"><li>■ “<b>Electrical safety tests</b>” on page 5-3</li><li>■ “<b>Patient monitor functional tests</b>” on page 7-4</li></ul>
Power supply	<ul style="list-style-type: none"><li>■ “<b>Electrical safety tests</b>” on page 5-3</li><li>■ “<b>Patient monitor functional tests</b>” on page 7-4</li></ul>
Speaker	<ul style="list-style-type: none"><li>■ “<b>Electrical safety tests</b>” on page 5-3</li><li>■ “<b>Patient monitor functional tests</b>” on page 7-4</li></ul>
CPU battery	<ul style="list-style-type: none"><li>■ “<b>Electrical safety tests</b>” on page 5-3</li><li>■ “<b>Patient monitor functional tests</b>” on page 7-4</li></ul>
Enclosure	<ul style="list-style-type: none"><li>■ “<b>Visual inspection</b>” on page 5-2</li><li>■ “<b>Electrical safety tests</b>” on page 5-3</li><li>■ “<b>Patient monitor functional tests</b>” on page 7-4</li></ul>
Third video card	<ul style="list-style-type: none"><li>■ “<b>Electrical safety tests</b>” on page 5-3</li><li>■ “<b>Patient monitor functional tests</b>” on page 7-4</li></ul>

---

# Display

## Disassembly and reassembly procedures

Open the unit

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---

### WARNING

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

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### WARNING

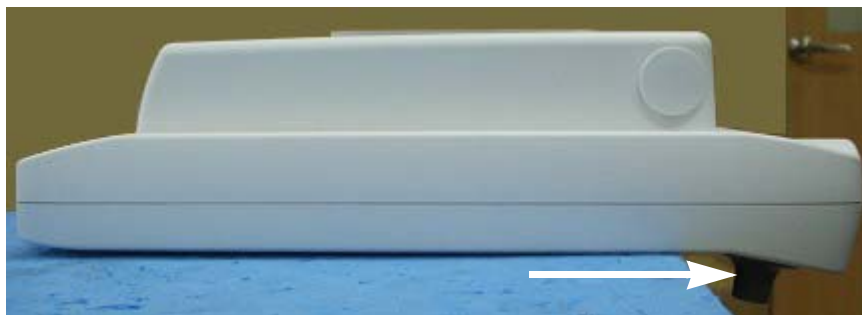
Due to possible high voltage present, use an insulated screwdriver at all times.

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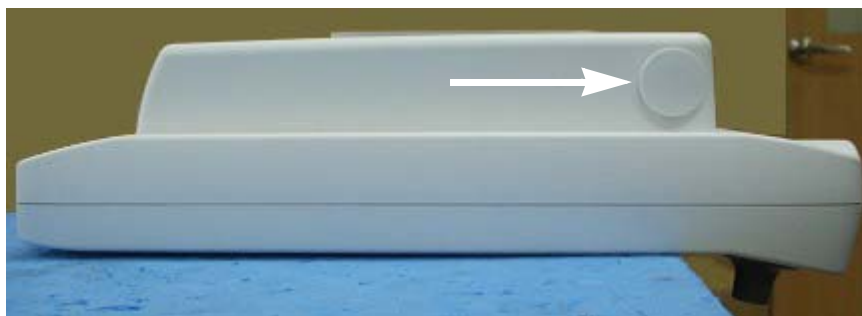
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Whenever you open the unit, you need to perform the “[Electrical safety tests](#)” on page 7-3.

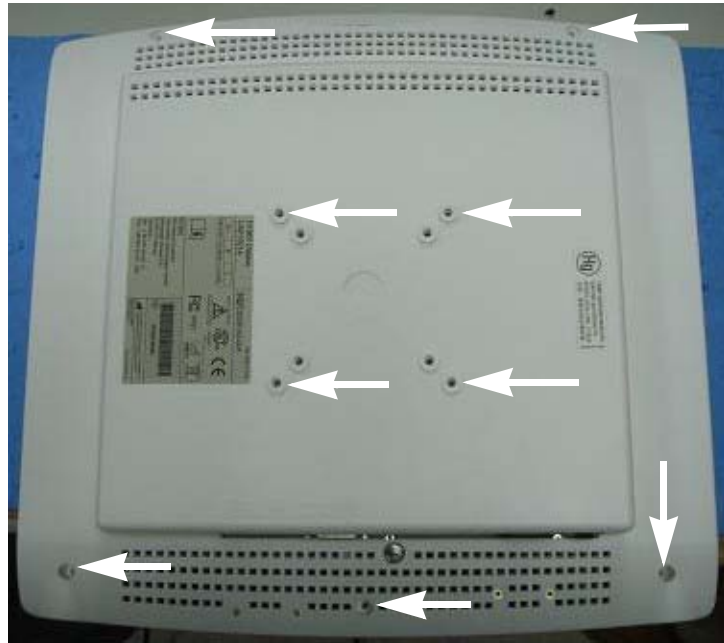
1. Turn the display power off at the rear power switch and disconnect all cables (USB, display and AC power).
2. Place the display as shown below to prevent damage to the main **TRIM KNOB**.



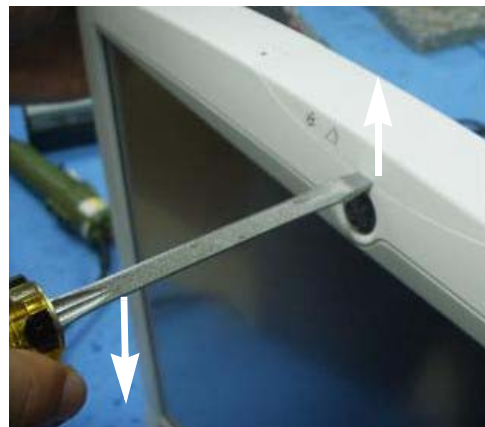
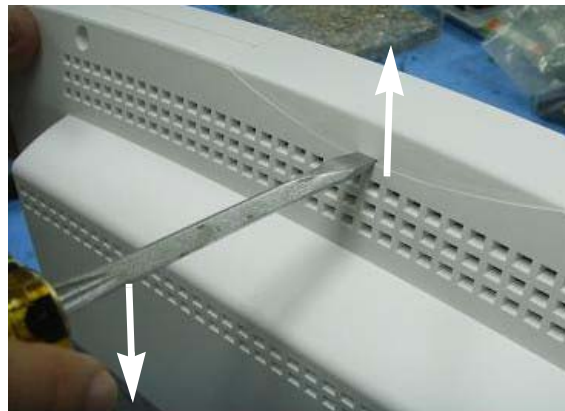
3. Remove the side **TRIM KNOB** by gently pulling the **TRIM KNOB**.



- 
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**

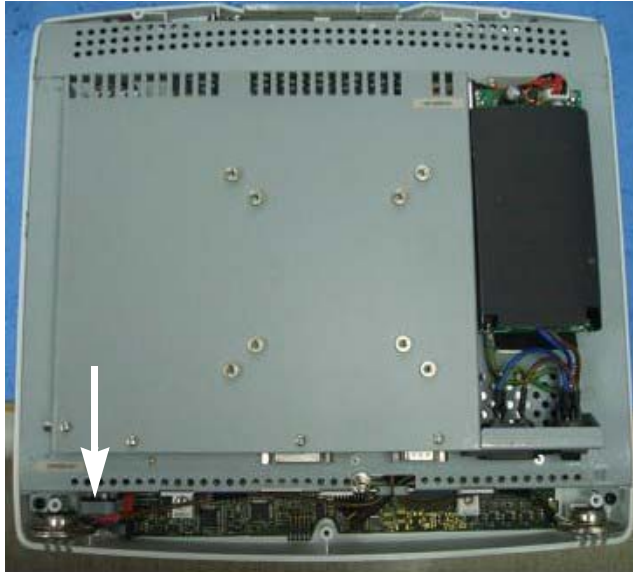


**19-inch display**

---

## 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.



**15-inch display**



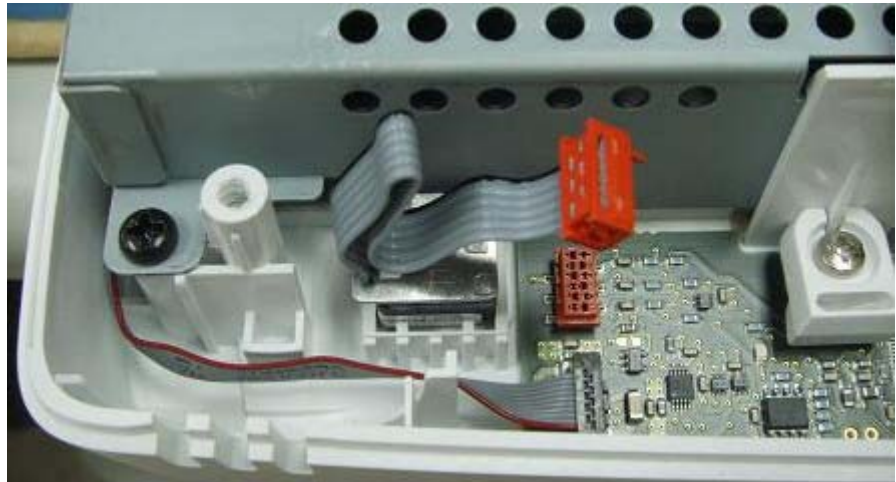
**19-inch display**

3. Pull the speaker to separate it from the front cover. Temporarily place the speaker on top of the metal enclosure.

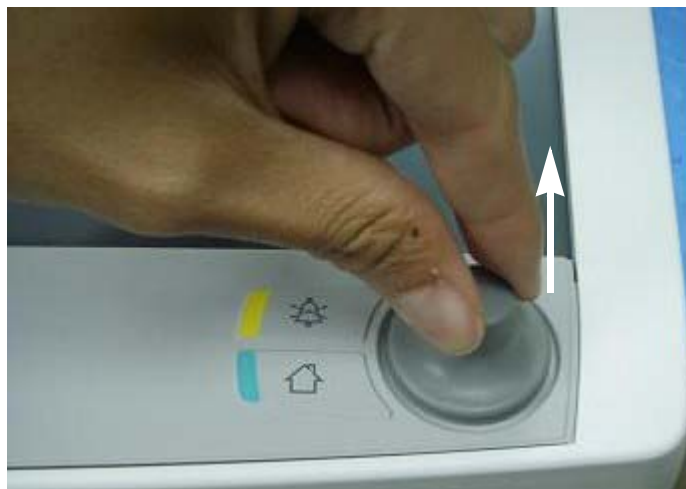




- 
4. Disassemble the connecting wire from the board.



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  $1.13 \pm 0.11$  Nm (10.0±1.0 lbf-in).

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



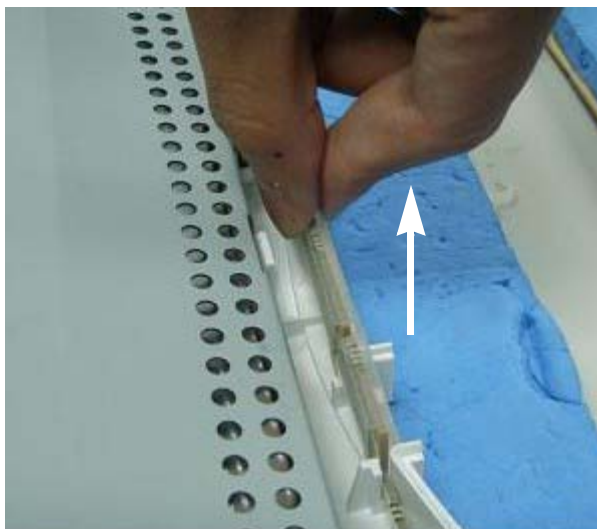
---

## 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  $1.13 \pm 0.11$  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.

FRU description	Functional checkout procedures
TRIM KNOB and rotary switch	<ul style="list-style-type: none"><li>■ "Electrical safety tests" on page 5-3</li><li>■ "Patient monitor functional tests" on page 7-4</li></ul>
Alarm light and alarm light enclosure	<ul style="list-style-type: none"><li>■ "Electrical safety tests" on page 5-3</li><li>■ "Patient monitor functional tests" on page 7-4</li></ul>

# 10 Service parts

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## Ordering parts

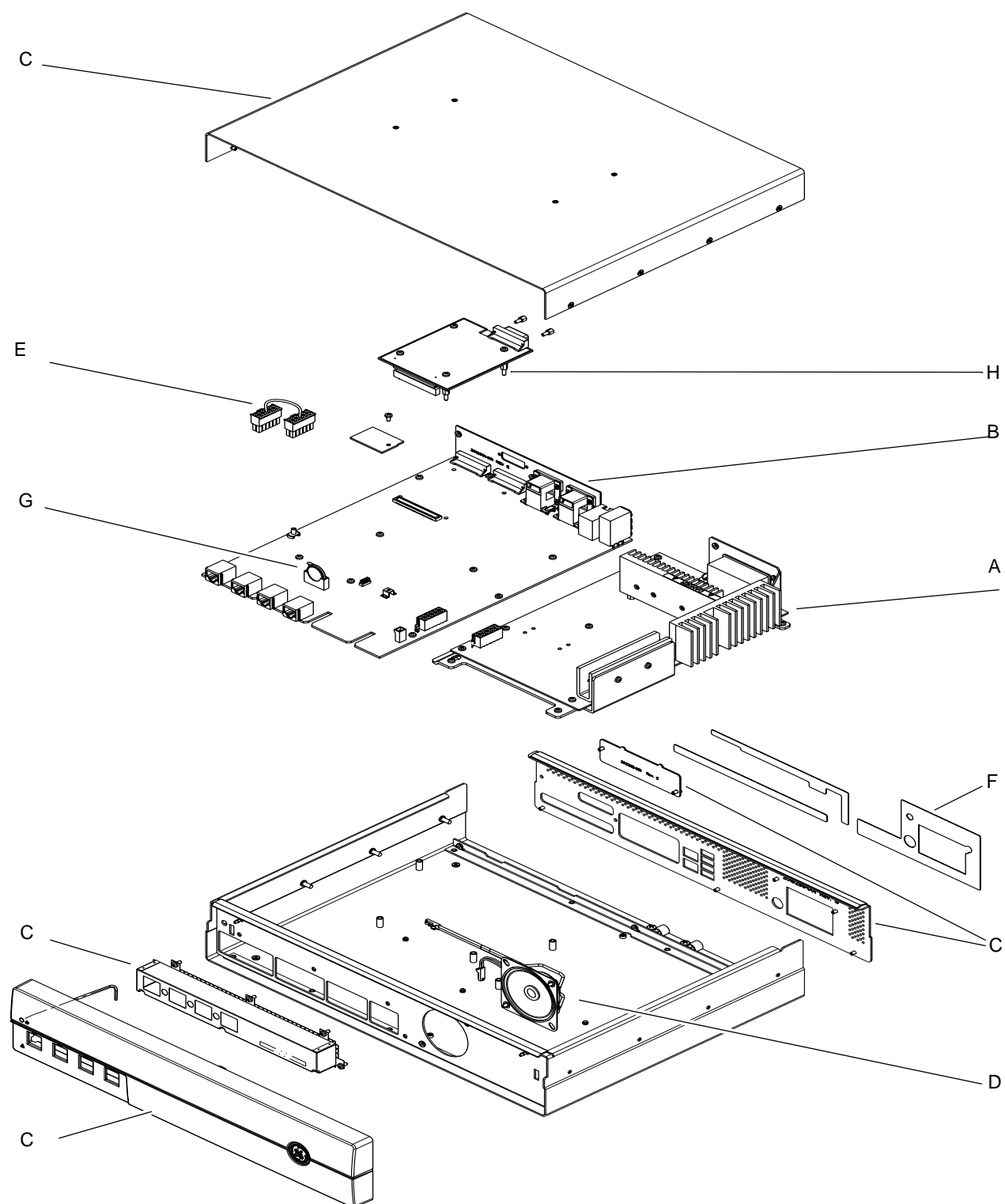
The parts listed in this section are orderable replaceable parts. To order parts, contact Service Parts at the address or telephone number listed on the “How to Reach Us...” page included with this manual.

## Patient monitor

### Replaceable parts

Part number	Description	Find number
2021440-002	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.	A
2021440-003	CPU PCB assembly	B
2021440-004	Enclosure kit. Includes front bezel, enclosure cover, back panel, and back panel labels. Order hardware kit 2021440-006 if any replacement screws are needed	C
2021440-005	Speaker assembly. Includes speaker with harness.	D
2021440-006	Hardware kit. Contains complete set of replacement screws for all replaceable assemblies and chassis EMI gaskets.	E
2021440-007	Label kit	F
2021440-008	Lithium-ion battery - 10-pack	G
2021440-009	M-Port keypad kit. Includes all language labels.	
2021440-011	Remote control kit. Includes all language labels.	
2021440-013	3rd video card	H

# Exploded view



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# Display

## Replaceable parts

Part number	Description
2042901-001	FRU Display 15-inch full keypad - ENG
2042901-002	FRU Display 15-inch full keypad - GER
2042901-003	FRU Display 15-inch full keypad - FRE
2042901-004	FRU Display 15-inch full keypad - SWE
2042901-005	FRU Display 15-inch full keypad - SPA
2042901-006	FRU Display 15-inch full keypad - ITA
2042901-007	FRU Display 15-inch full keypad - DUT
2042901-008	FRU Display 15-inch full keypad - DAN
2042901-009	FRU Display 15-inch full keypad - NOR
2042901-011	FRU Display 15-inch full keypad - POR
2042901-014	FRU Display 15-inch full keypad - HUN
2042901-015	FRU Display 15-inch full keypad - POL
2042901-016	FRU Display 15-inch full keypad - CZE
2042901-018	FRU Display 15-inch full keypad - FIN
2042909-001	FRU Display 19-inch with touch screen
2042975-001	FRU Remote alarm light PCB
2042976-001	FRU Display TRIM KNOB and switch



# A Appendix A – Electromagnetic compatibility

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# 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.

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## 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.

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## 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.

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## 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.

Emissions test	Compliance	Electromagnetic environment – guidance
RF Emissions (radiated) CISPR 11	Group 1 Class A	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.
RF Emissions (conducted) CISPR 11	Group 1 Class A	<b>CAUTION</b> 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.
Harmonic Emissions IEC 61000-3-2	Class A	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.
Voltage fluctuations/ Flicker emissions IEC 61000-3-3	Complies	

## 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.


Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment – guidance
Electrostatic Discharge (ESD) IEC 61000-4-2	± 6 kV contact ± 8 kV air	± 6 kV contact ± 8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical Fast Transient/Burst (EFT) IEC 61000-4-4	± 2 kV for power supply lines ±1 kV for input/output lines	± 2 kV for power supply lines ±1 kV for input/output lines	Mains power should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	± 1 kV differential mode ± 2 kV common mode	± 1 kV differential mode ± 2 kV common mode	Mains power should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5% $U_t$ (>95% dip in $U_t$ ) for 0.5 cycles <40% $U_t$ (>60% dip in $U_t$ ) for 5 cycles <70% $U_t$ (>30% dip in $U_t$ ) for 25 cycles <5% $U_t$ (>95% dip in $U_t$ ) for 5 s	<5% $U_t$ (>95% dip in $U_t$ ) for 0.5 cycles <40% $U_t$ (>60% dip in $U_t$ ) for 5 cycles <70% $U_t$ (>30% dip in $U_t$ ) for 25 cycles <5% $U_t$ (>95% dip in $U_t$ ) for 5 s	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.
Power frequency (50/60 Hz) Magnetic Field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

**NOTE:**

$U_t$  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.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment – guidance
<p>Conducted RF IEC 61000-4-6</p> <p>Radiated RF IEC 61000-4-3</p>	<p>3 Vrms 150 KHz to 80 MHz</p> <p>3 V/m 80 MHz to 2.5 GHz</p>	<p>3 V rms system 0.8 V rms EEG module<sup>a</sup></p> <p>3 V/m system 2 V/m BIS module<sup>a</sup></p>	<p>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.</p> <p><b>Recommended separation distance</b></p> $d = 1.2 \sqrt{P}$ $d = 1.2 \sqrt{P} \quad 80 \text{ MHz to } 800 \text{ MHz}$ $d = 2.3 \sqrt{P} \quad 800 \text{ MHz to } 2.5 \text{ GHz}$ <p>where <math>P</math> is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer, and <math>d</math> is the recommended separation distance in meters (m).</p> <p>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>.</p> <p>Interference may occur in the vicinity of equipment marked with the following symbol:</p> 

**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.

Rated maximum output power of transmitter in Watts	Separation distance in meters (m) according to frequency of transmitter		
	150 kHz to 80 MHz <sup>a</sup> $d = 1.2 \sqrt{P}$	80 MHz to 800 MHz <sup>a</sup> $d = 1.2 \sqrt{P}$	800 MHz to 2.5 GHz <sup>a</sup> $d = 2.3 \sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23
<sup>a</sup> At 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 equation 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.

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## Compliant cables and accessories

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### 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.

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

# B Appendix B – Check form

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# 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			
Product/Model	Customer asset tag	Serial number	Comments
Installation <input type="checkbox"/> Planned maintenance <input type="checkbox"/> Corrective maintenance <input type="checkbox"/>			

Measuring equipment / test gases used					
ID number	Manufacturer	Model number	Description	Serial number	Cal due date

**OK = Test passed**

**N/A = Test not applicable**

**Fail = Test failed**

Electrical safety tests	Limits	Results	Functional tests	Results ✓		
				OK	N/A	Fail
Ground continuity with power cord -or- Impedance of protective earth connection with power cord	< 0.2 ohms	ohms				
Earth wire leakage current (NC)	USA only: ≤ 300µA Outside USA: ≤ 500µA	µA	Visual inspection			
Earth wire leakage current (SFC)	USA only: ≤ 300µA Outside USA: ≤ 1000µA	µA	Cleaning			
Enclosure leakage current (NC)	≤ 100µA	µA	Calibration checks			
Enclosure leakage current (SFC)	USA only: ≤ 300µA Outside USA: ≤ 500µA	µA	Function of interface devices			
Patient (source) leakage current (NC)	≤ 10µA	µA	Network communication			
Patient (source) leakage current (SFC)	≤ 50µA	µA	Patient monitor functional tests			
Patient (sink) leakage current	≤ 50µA	µA	Alarm checkout			
Test completion			Parameter checkout			

Parts replaced			

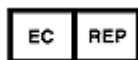
Test results: Pass <input type="checkbox"/> Fail <input type="checkbox"/>	Signature of tester:	Date:
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