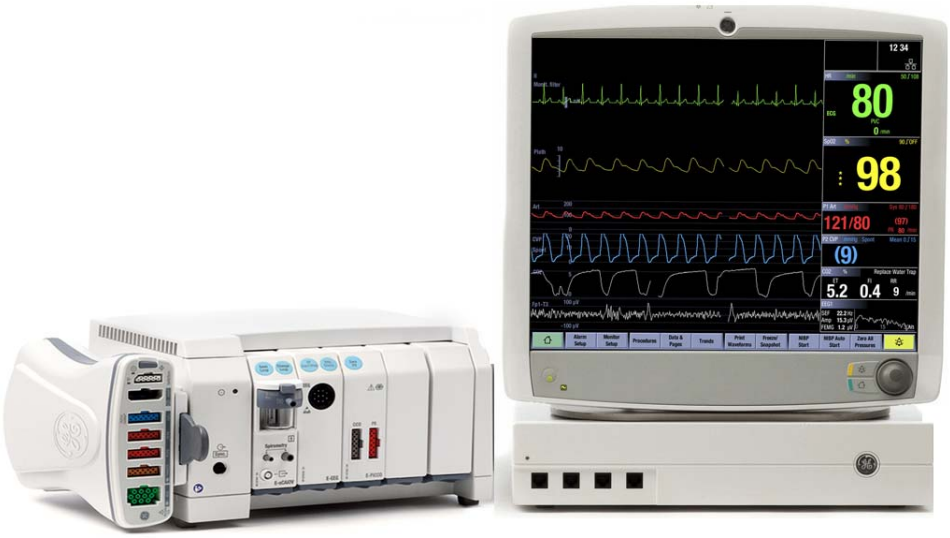
GE Healthcare

CARESCAPE Monitor B850

Service Manual

Software Version 2
Hardware Version CPU-C1



All specifications subject to change without notice.

English

2nd edition
2106778-001

19 June 2018

The information in this manual applies to the software and hardware versions listed on the first page of this manual. Due to continuing product innovation, specifications in this manual are subject to change without notice.

Table of contents

1 About this manual

1.1 Intended use of the manual

This manual contains instructions necessary to install, maintain and service the device to the assembly level. Use it as a guide for installation, maintenance and repairs considered field repairable. The list below indicates the products (brands, models and descriptions as applicable) with which this manual is to be used:

– CARESCAPE Monitor B850 B1
– CARESCAPE Monitor B850-LI B1
– CARESCAPE 19 inch Display D19KT VER01
– CARESCAPE Monitor B850-RM B1

Chapters 1 to 7 provide an overview of the CARESCAPE Monitor B850 patient monitoring system and contains information needed for system installation.

Chapters 8 to 13 provide information for the planned and corrective maintenance of the CARESCAPE Monitor B850 main unit.

Where necessary the manual identifies additional sources of relevant information and technical assistance.

See the Module Frames and Modules Service Manual for the planned and corrective maintenance information about the parameter modules.

See the supplemental information manual for the technical specifications, default settings and compatibility information, including electromagnetic compatibility.

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

1.2 Intended audience of the manual

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

1.3 Conventions used in this manual

Within this manual, special styles and formats are used to distinguish between 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* Inc. and GE Healthcare Finland Oy.
- Names of hardware keys on the equipment, keypad, remote control, and modules are written in **bold** typeface: **Start Cancel**.
- Menu items are written in ***bold italic*** typeface: ***Monitor Setup***.
- Emphasized text is in *italic* typeface.
- Menu options or control settings selected consecutively are separated by the > symbol: ***Procedures > Cardiac Output***.
- The word "select" means choosing and confirming.
- Messages (alarm messages, informative messages) displayed on the screen are written in ***bold italic*** typeface: ***Learning***.

- Note statements provide application tips or other useful information.

1.3.1 Product naming conventions

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

The following naming conventions are used to refer to different modules and module categories:

– PDM: Patient Data Module
– PSM: Patient Side Module: E-PSMP.
– Cardiac output and SvO_2 E-modules: E-COP and E-COPSv.
– Pressure and Temperature E-modules: E-PP and E-PT.
– Continuous Cardiac Output Module: E-PiCCO.
– CARESCAPE respiratory modules: E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOV, and E-sCAiOVX.
– Single-width airway module: E-miniC
– E-LoFlo module: E-LoFlo
– Specialty E-modules: E-NMT, E-EEG, E-BIS and E-ENTROPY
– SpO_2 E-modules: E-NSATX, E-MASIMO

The CARESCAPE Network MC is referred as MC network and the CARESCAPE Network IX as IX network.

Menu naming varies within software packages:

– ***Admit/ Discharge*** is also used in this manual for ***Start/End*** *case* menu (in OR and PACU software).

1.4 Illustrations and names

This manual uses illustrations as examples only. Illustrations in this manual may not necessarily reflect all system settings, features, configurations, or displayed data.

Names of persons, institutions, and places and related information are fictitious; any similarity to actual persons, entities, or places is purely coincidental.

1.5 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.

1.6 Related documents

– CARESCAPE Monitor B850, B650, B450 User's Manual
– CARESCAPE Monitor B850, B650, B450 Supplemental Information Manual
– Module Frames and Modules Service Manual
– CARESCAPE Modular Monitors Software Installation Instructions
– CARESCAPE Network Configuration Guide
– CARESCAPE Modular Monitors Mounting Solutions
– Unity Network Interface Device (ID) Operator's Manual

- iCentral and iCentral Client Technical Reference Manual
- S/5 Network Installation Guide
- iCollect user's manual
- Patient Monitoring Network Configuration Guide
- User documentation for displays

NOTE: The referred documents above are subject to change without notice. Please contact your local sales or service representative for possible updates.

1.7 Trademarks

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

GE, GE Monogram, and CARESCAPE are trademarks of General Electric Company.

iPanel is a trademark of General Electric Company or one of its subsidiaries.

MUSE, Trim Knob, and UNITY NETWORK are trademarks of GE Medical Systems, *Information Technologies*, Inc.

Entropy is a trademark of GE Healthcare Finland Oy.

1.7.1 Third party trademarks

Masimo SET is a trademark of Masimo Corporation.
PiCCO is a trademark of Pulsion Medical Systems.

1.8 Responsibility of the manufacturer

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

- Assembly operations, extensions, readjustments, modifications, servicing, or repairs are carried out by authorized service personnel.
- 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 service manuals.

1.9 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.

For your notes:

2 Safety information

2.1 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 medical electrical systems standard. Refer to the patient monitor's supplemental information manual for compatible parts and accessories.

Periodically, and whenever the integrity of the product 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 harmonized national standard.

2.2 Safety message signal words

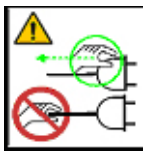
Safety message signal words designate the severity of a potential hazard.

Danger	Indicates a hazardous situation that, if not avoided, will result in death or serious injury.
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.

2.3 Safety symbols

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

	General warning sign. ISO 7010. This symbol is identified by a yellow background, black triangular band, and a black symbol. In this manual this symbol is used only in connection with those warning statements that the labels on the equipment refer to.
	Caution. ISO 7000. This symbol is identified by a white background, black triangular band, and a black symbol.
	Follow instructions for use. ISO 7010. This symbol is identified by a blue background and a white symbol.
	Consult operating instructions. / Operating instructions.
	DANGER - Shock hazard. Dangerous voltage. To reduce the risk of electric shock, do not remove cover. Refer servicing to qualified service personnel. ISO 7010. This symbol is identified by a yellow background, black triangular band, and a black symbol.
	Electrostatic sensitive device. Connections should not be made to this device unless ESD precautionary procedures are followed.
	Non-ionizing electromagnetic radiation. Interference may occur in the vicinity of this device.
	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 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 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.
	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.
 	Safety ground. Remove power cord from the mains source by grasping the plug. Do not pull on the cable.

For your notes:

3 System introduction

3.1 Short description of the equipment

The CARESCAPE Monitor B850 is a modular multi-parameter patient monitor that is meant for high-acuity applications.

The monitor can be used with most patient populations within a professional healthcare facility, but acquisition modules may have limitations for use based on the patient's age, weight, or clinical condition, or on the type of the care unit (for example, OR or ICU only). There are several types of acquisition modules to choose from based on care requirements and patient needs.

The modular system design is inherent in electronics and algorithms: some processing of the measurement signals is done by the acquisition modules and further processing happens on the monitor.

Measurement values are displayed as graphic or numeric values, like waveforms and numbers, and when applicable, also as alarm messages.

The monitor supports three independent displays, and the screen contents shown on each is user-configurable. The D19KT VER01 display has an integrated alarm light.

The user interface can be used as a touchscreen, or with a Trim Knob or a mouse and a keyboard. The most important and commonly used functions have main keys either on the main menu (soft keys) or on the monitor front panel (hard keys). The menu structure design allows access to all functions needed by the clinical user with just a few clicks.

The monitor transfers the measurement data to central stations and to the hospital patient data depositories. It communicates with a variety of other bedside medical devices and monitoring systems.

For all physical and performance specifications, refer to the supplemental information provided.

3.2 System components

The patient monitoring system is typically composed of these main parts:

- CPU unit
- Software
- Display
- Input devices
- Module frames
- Acquisition modules: Patient Data Module (PDM), Patient Side Module (E-PSMP) and other E-modules
- Network
- Printers and writers
- Accessories and supplies (for example, ECG leadwires/cable sets, mounts)

The CARESCAPE Monitor B850 monitoring system components are introduced below.

3.2.1 CPU unit

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 CPU unit is the central processing unit for the patient monitoring system and provides a link between parameter acquisition and input/output 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.

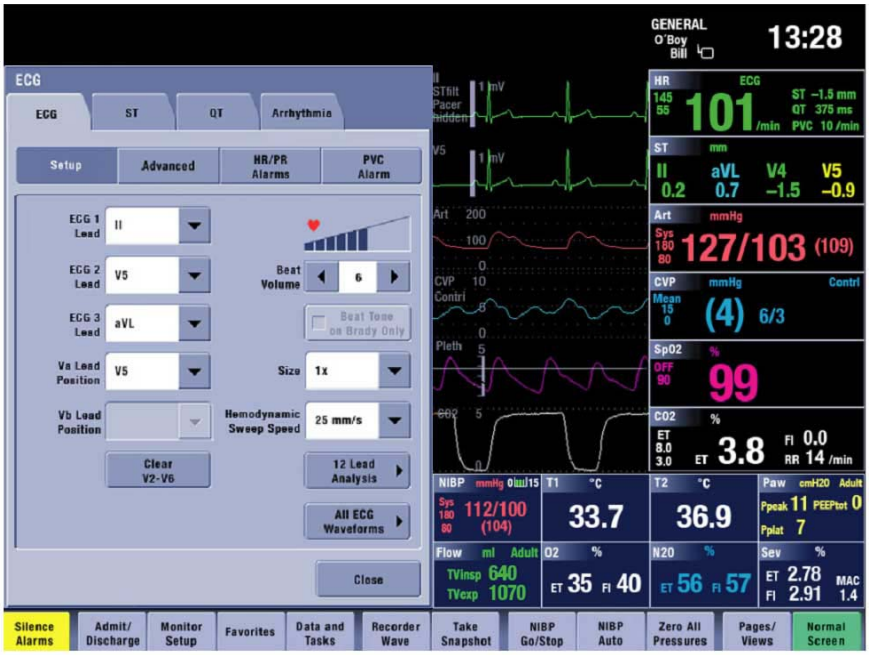
In addition to the primary function to display patient data, the patient monitor software has a service interface for performing device level service tasks such as configuration, maintenance and troubleshooting. Refer to the the patient monitor's supplemental information manual for care area specific software and features.

3.2.2 Software

The patient monitor is highly configurable and provides many monitoring possibilities with a flexible software licensing model.

The monitor supports care area specific software packages for OR, PACU, ICU, ED and NICU. Each dedicated software package provides a comprehensive feature set for the different monitoring needs and can be further extended with the optional feature licenses.

Software license model supports trial licensing and easy field upgrades with license key activation.



3.2.3 Input devices

You can connect several USB input devices to the patient monitor, including alphanumeric keyboard, mouse, remote control and barcode reader.

Refer to the patient monitor's supplemental information manual for a list of compatible USB input devices.

Keyboard

A washable, antibacterial keyboard is specified for use with the monitor. It may be connected to the monitor or display via one of the USB connectors. The keyboard allows you to enter data without using the touchscreen display.

Mouse

A standard mouse may be connected to the monitor or display via one of the USB connectors. The mouse allows you to select any on-screen items without a Trim Knob control or a touchscreen display.

Remote control

The remote control provides 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.

Barcode reader

The barcode reader can be used to scan a Technician ID and Patient Information from barcodes when admitting patients.

3.2.4 Module frames

F5 and F7 E- module frames provide an interface between the patient monitor and E-Modules. The F5 Frame has five module slots that support all E-series acquisition modules. It supports both PDM and E-PSMP with a slide mount.

The F7 Frame has seven module slots, but it does not have a slide mount for the PDM or E-PSMP. The PSMP module can be interfaced to the F5 or F7 Frame with a cable when the Module Bus Adapter for E-PSMP is used.

3.2.5 Acquisition modules

The patient monitor supports the following multiparameter hemodynamic modules: Patient Data Module (PDM) and Patient Side Module (E-PSMP).

E-PSMP

PDM

You can use different types of acquisition modules with the monitor. They provide connection to the patient, process patient data signals, and send patient data signals to the monitor.

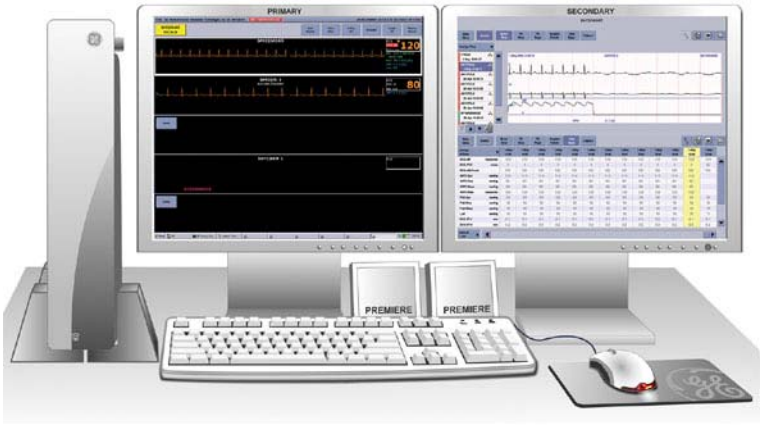
Refer to the patient monitor's supplemental information manual for a list of compatible acquisition devices and to the patient monitor's user's manual for a list of parameters each

module measures.

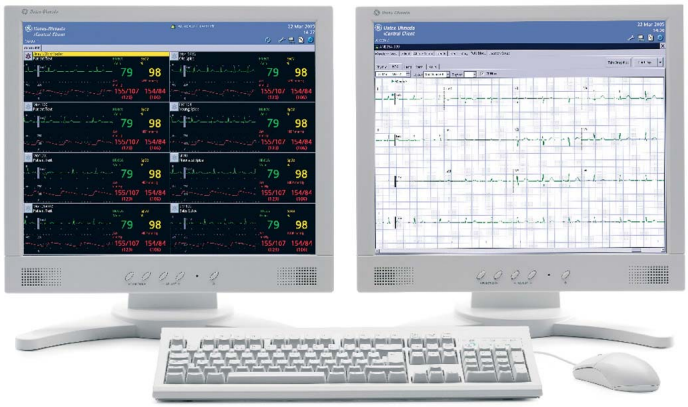
3.2.6 CARESCAPE Network MC or S/5 Network

The patient monitor is compatible both with the CARESCAPE Network MC and the S/5 Network infrastructures.

Refer to the patient monitor's supplemental information manual for a list of compatible CARESCAPE and S/5 Network devices.



The MC Network establishes communication and allows patient data to be sent to an optional CARESCAPE Central Station.



The S/5 Network establishes communication and allows patient data to be sent to an iCentral (central station).

3.2.7 CARESCAPE Network IX

The patient monitor may be connected to the CARESCAPE Network IX.

The IX Network provides you access for example to the MUSE server for MUSE/12SL reports, to Citrix server for iPanel connections and to the IX printers. It also enables centralized Webmin access for service personnel from within the hospital and the InSite RSvP remote service connectivity to GE's support center.

Refer to the CARESCAPE Network Configuration Guide for details on configuring the CARESCAPE Network.

The iPanel application, viewable from one of the monitor's display screens, gives access to desktops created by the hospital IT. These desktops provide patient information from other systems that may be installed at the hospital [e.g., Centricity Clinical Information View (Centricity CIV), MUSE Web, and Picture Archiving Communications System (PACS)]. Desktops can be created with customer defined resolutions using the hospital-wide login and identification process. The iPanel application is used through a Citrix thin client on the monitor so no additional equipment is required at the bedside.

3.2.8 Unity Network ID connectivity device

The Unity Network ID connectivity device acquires digital data from up to eight peripheral bedside devices (not necessarily manufactured by GE), processes this data and transmits the formatted data to the patient monitor.

The supported interfaces include anesthesia machines, ventilators, gas analyzers, continuous cardiac output devices, pulse oximeters, transcutaneous monitors and point-of-care blood gas monitors.

Refer to the Unity Network Interface Device (ID) Operator's Manual and the patient monitor's supplemental information manual for a list of compatible peripheral devices and to the patient monitor's user's manual for the peripheral device parameter data displayed on the patient monitor.

3.2.9 Displays

The patient monitor supports up to three independently configurable displays.

The display is a 19" touchscreen LCD with a Trim Knob control. The display provides both visual and audible alarms and connectivity to the USB input devices.

Refer to the patient monitor's supplemental information manual for a list of compatible displays.

3.2.10 Printers and recorders

The patient monitor can print to a recorder and to a laser printer.

Refer to the patient monitor's supplemental information manual for a list of compatible recorders and laser printers.

Laser printers

A laser printer can print for example waveforms, graphic and numeric trends, snapshots, events history, parameter specific printouts, stored laboratory data and calculation results and care reports. Refer to the patient monitor's user's manual for more information about printing.

The patient monitor supports printing:

- to a laser printer that is connected to the patient monitor via the IX Network or directly to the IX connector in the patient monitor.
- to a laser printer that is connected to a CARESCAPE Central Station on the MC Network.
- to a laser printer that is connected to an iCentral on the S/5 Network.

Recorders

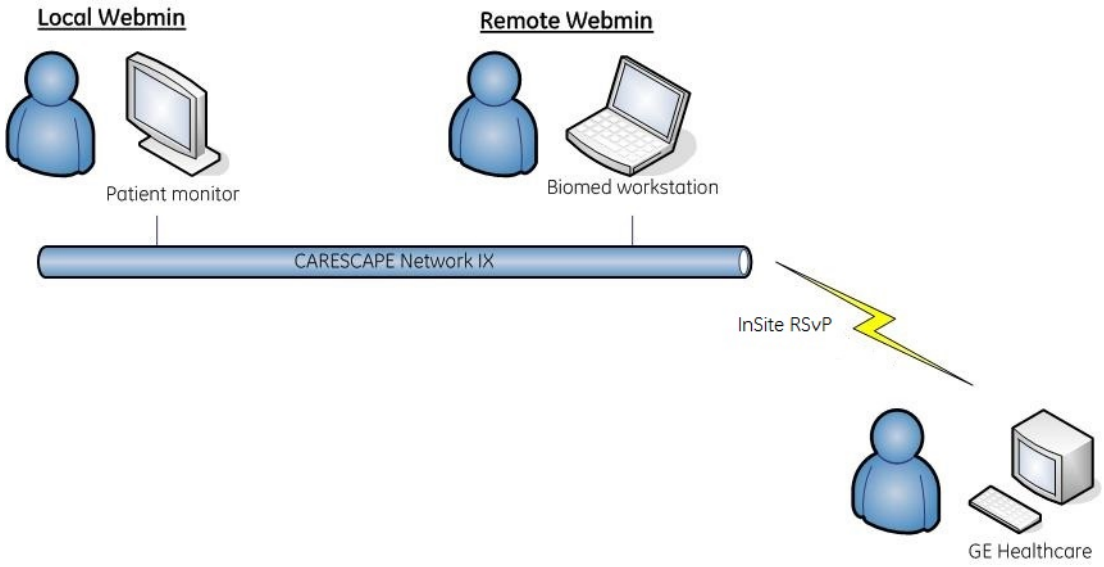
A recorder may print text, waveforms and numeric trends.

The patient monitor supports printing:

- to a PRN 50M recorder connected to another patient monitor or to a CARESCAPE Central Station on the MC Network.

3.2.11 Service Interface

Webmin is a browser-based interface that provides service and diagnostic functions for the patient monitor. Using a web browser, the user can connect to Webmin to configure, diagnose and retrieve system information. The user can access Webmin either locally on the patient monitor or remotely over the IX Network.



Local access to Webmin

The user can access Webmin locally using the integrated browser on the patient monitor.

The other way to access Webmin locally is from a configured service PC that is connected to the patient monitor with an Ethernet crossover cable.

Remote access to Webmin

The user also can access Webmin remotely using a configured service PC over the IX Network.

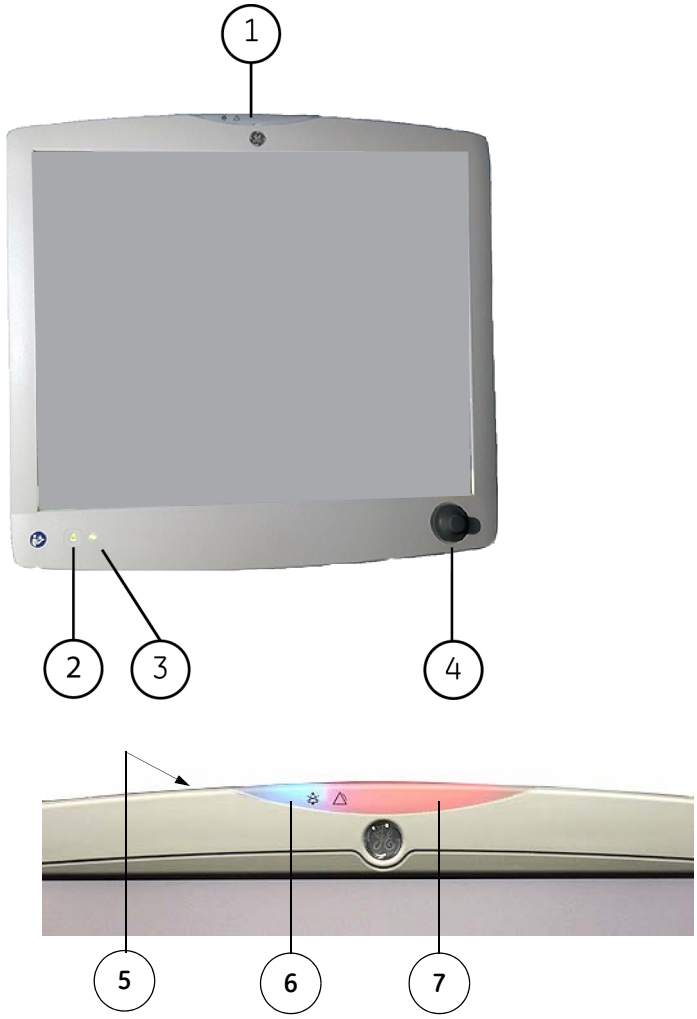
InSite RSvP

InSite RSvP 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 RSvP 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).

3.3 Controls and connectors

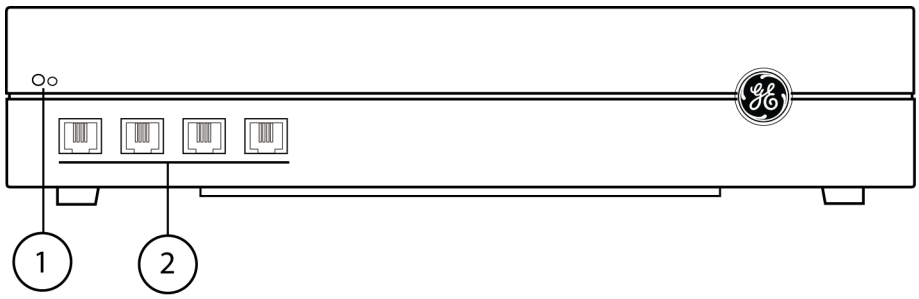
3.3.1 Front view

Display



(1) Alarm light
(2) Power on/standby button
(3) Power indicators
(4) Trim Knob control
(5) Ambient light detector lens
(6) Audio alarm paused/off area (blue)
(7) Alarm light area (blue, yellow, or red)

CPU unit



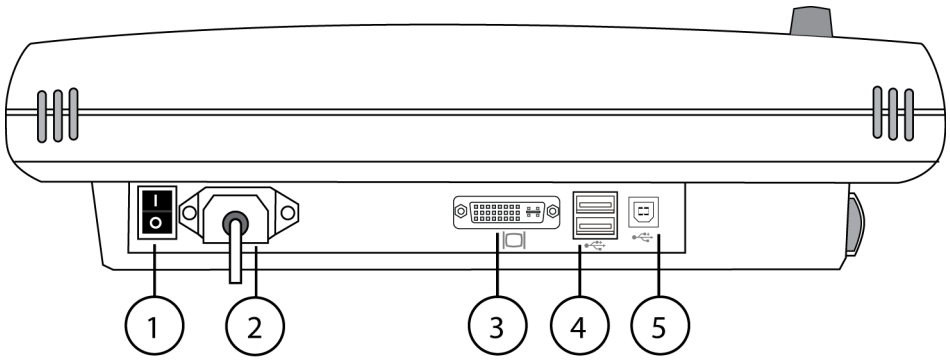
(1) Power indicator: Illuminates green when the power is turned on.

(2) Four M-ports: for connecting the remote control, PRN 50-M recorder, remote alarm box (remote nurse call), or a Unity Network Interface Device (ID) to the monitor.

(3)

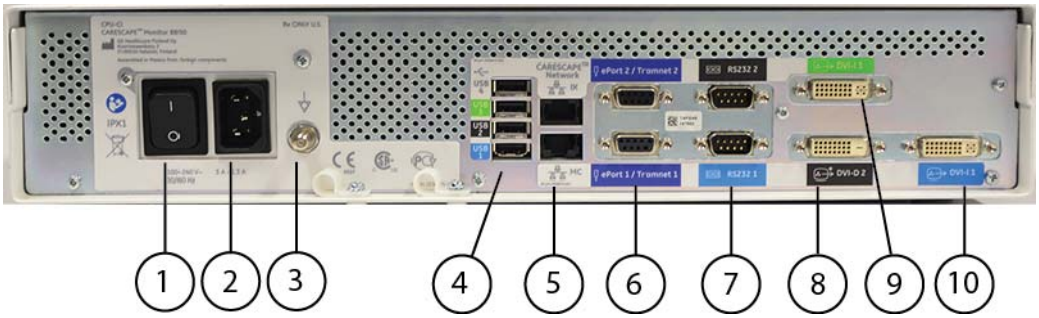
3.3.2 Rear views

Display



1. Power on/off switch
2. Receptacle for power cord
3. DVI-I connector
4. Type A USB port
5. Type B USB port

CPU unit



1. Power on/off switch
2. Power inlet connector
3. Equipotential connector
4. Four USB ports for connecting the touchscreen display, remote control, keyboard, mouse, and barcode reader
5. Two Ethernet network connectors for connecting the MC and IX networks. The MC Network establishes communication and allows patient data to be sent to a CARESCAPE Central Station. The IX Network provides access for example to the MUSE server, Citrix server, and IX printers.
6. Two ePort connectors for connecting the PDM and E-module Frame.
7. Two serial RS232 connectors
8. DVI-D 2 connector for one digital display
9. Optional 3rd video display connector, DVI-I 3 supports a digital display and a cloned analog display (iPanel application only).
10. DVI-I 1 connector for a digital display and a cloned analog display.

3.4 IEC 60601-1 classifications

- Type of protection against electric shock: Class I.
- Degree of protection against electrical shock: applied parts are marked with a symbol indicating degree of protection.
- Degree of safety of application in the presence of flammable anesthetic mixture with air or with oxygen or nitrous oxide: Not suitable.

WARNING **EXPLOSION. Do not use this equipment in the presence of flammable anesthetics, vapors or liquids.**

- Mode of operation: Continuous.
- Method(s) of sterilization or disinfection recommended by the manufacturer: see the user's manual.

IEC 60601-1-2

The system complies with IEC 60601-1-2:2007-03.

In accordance with IEC 60601-1-2, modules marked with the ESD warning symbol (IEC 60417-5134) require user training in ESD awareness and prevention as follows:

- The contents of the training are specified in the local ESD Control Program Plan, issued in accordance with IEC 61340-5-1. The training should at least include an introduction to ESD and its impacts on electrical devices and how to prevent it by using appropriate personal protection equipment, proper work practices and tools.

According to parameter-specific IEC 60601–2–x series standard requirements for ESU (electrosurgical unit) tests, the equipment is protected against malfunction caused by electrosurgery.

IEC 60529

- Degree of protection against harmful ingress of water: IPX1.

3.5 Service information

3.5.1 Service requirements

Follow the service requirements listed below.

- Refer servicing of the equipment to qualified service personnel only. Service personnel servicing this product must have an appropriate technical qualification, or equivalent work experience, and be familiar with the service requirements described in this manual and in any related service documentation. Service training for the product is recommended.
- 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.

CAUTION DISPOSAL - At the end of its service life, the product described in this manual, as well as its accessories, must be disposed of in compliance with the guidelines regulating the disposal of each product. If you have any questions concerning disposal of a product, please contact GE or its representatives.

3.5.2 Equipment identification

Unique Device Identifier (UDI)

Every medical device has a unique marking for identification. The UDI marking appears either on the device labeling or for upgraded monitors on the ***Login to Webmin*** dialog box.

The characters used in the UDI marking represent specific identifiers. In the example above:
Device identifier:

- (01) = GS1 global trade item number (GTIN) of the device.
- 1234567891234 = Global trade item number.

Production identifiers:

- (21) = GS1 application identifier for the serial number of the device.
- SPM12345678SA = Serial number, where the first three characters represent Product Code.
- (11) = GS1 application identifier for the manufacturing date of the device.
- 170329= Manufacturing date: year-month-day (YYMMDD).

Note that for some product types the production identifier can have other elements instead of the ones listed above:

- (10) = GS1 application identifier for the batch or lot number, followed by the batch or lot number.
- (17) = GS1 application identifier for the expiration date of the device, followed by the expiration date.

Device label

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

The device plate is located on the outside of the patient monitor.
The product code for the CARESCAPE Monitor B850 is SS8.

3.6 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.

3.6.1 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 subsystems (for example BIOS) is restricted. The clinical and Webmin application interfaces have a role-based access control (for example, biomed and clinical). A user may log into these interfaces (for example, Webmin) to perform operations that are limited to the generic user. See the user and service 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 require user authentication. To access these features, the user must log into the clinical and Webmin applications with a valid username and password.

Authorization

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

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

Audit

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

Malicious software protection

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

Based on the Linux Operating System, the patient monitor has a built-in firewall to allow external communication to occur on a limited number of ports on the IX Network.

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.

3.6.2 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 or S/5 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 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	Patient monitor	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
Patient monitor	Any	icmp	N/A	ping
	us1-ws.service.gehealthcare.com	tcp	443	InSite RSvP (Web Services)
	us1-rd.service.gehealthcare.com	tcp	443	InSite RSvP (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).

3.6.3 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.

3.6.4 Communication

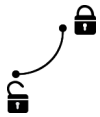
For detailed product security information, go to one of the following Web addresses:

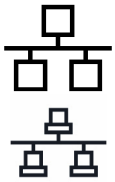
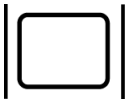
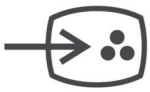
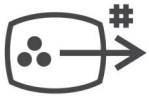
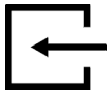
http://www.gehealthcare.com/usen/security

http://www.gehealthcare.com/usen/security/mds2.html

3.7 Equipment symbols

The following symbols appear on one or more of the devices.	
	Bell cancel. Audio off.
	Audio pause. Temporary audio off.
	General alarm.

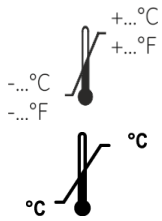
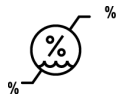
The following symbols appear on one or more of the devices.	
	Fuse. Replace with identical type and rating fuse.
	Do not reuse.
	Battery (monitor): The flashing orange symbol indicates that there is a battery failure/missing battery.
	Battery (monitor): The solid orange symbol indicates that the battery is being charged.
	Battery (monitor). The solid green symbol indicates that the monitor is being used on battery power.
	Battery (monitor). Located on the battery slot cover.
	Battery (monitor): The battery slot cover is open/closed.
	Battery (monitor): Test button on the battery to check the battery charge level.
	Battery (PDM).
	Communication. (PDM)
 (black or red)	Power indicator. (PDM)

The following symbols appear on one or more of the devices.	
	On/standby button.
	Standby or power indicator.
	USB connectors.
	Ethernet connectors.
	Serial interface.
	ePort connector for PDM module and E-module frame.
	DVI connector. Video output connector for digital or analog source.
	Color video input. Video input connector for digital or analog source.
	Color video output, digital. Video output for analog source.
	Color video output. Video output for digital source.
	Gas inlet.

The following symbols appear on one or more of the devices.	
	Gas outlet.
	Zero all. (PDM)
IPX1	Degree of ingress protection. Degree of protection against harmful ingress of water: Components not marked with an IPXn code are rated as Ordinary (no protection against fluid ingress). All other IPXn rated components have the degree of protection per the 'n' rating. IPX1: This equipment is protected against harmful effects of dripping water per IEC 60529.
	Latex-free.
	Use by.
	Add date.
	Home. Return to the main display.
	Alternating current. Green symbol on the B650 and B450 monitor front panel: the monitor is being used on mains power. Without mains connection the B650 and B450 are internally powered medical equipment.
	Direct current.
	Equipotentiality. Connect device to a potential equalization conductor.
	Protective earth ground. Connectors grounded to the AC power source.

The following symbols appear on one or more of the devices.	
  	Defibrillator synchronization connectors.
 	Stacking limit by number.
 2008-06-13  2016-01	Date of manufacture. This symbol indicates the date of manufacture of this device. The first four digits identify the year, the following two digits identify the month, and the last two digits identify the day.
 2016-01-31	Manufacturer date and address. The first four digits identify the year, the following two digits identify the month, and the last two digits identify the day.
	Manufacturer name and address.
	Batch or lot number.
lbl p/n	Abbreviation for label part number.
P/N	Abbreviation of product number.
	Identifies the device type.

The following symbols appear on one or more of the devices.	
	Catalogue or orderable part number.
	Device serial number.
	Device model or type.
	Every device has a unique marking for identification. The UDI marking appears on the device label.
	Mass of typical portable RGM (respiratory gas monitor) configuration. The indicated mass (12 kg in this example) varies per RGM configuration.
	Locked.
	Unlocked.
	No heavy load.
	Maximum total load.
	Atmospheric pressure limitations.

The following symbols appear on one or more of the devices.	
	Temperature limitations.
	Humidity limitations.
	Keep dry. Protect from rain.
	Fragile. Handle with care.
	This way up.
	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.
	Recycled materials or may be recycled.
	Recyclable Lithium-ion.
	European authorized representative.
	European Union Conformity Mark.

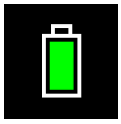
The following symbols appear on one or more of the devices.	
	Indicates that the product is certified for both the U.S. and Canadian markets.
	FCC. USA only. Complies with applicable US government (Federal Communications Commission) radio-frequency interference regulations.
Rx ONLY U.S.	CAUTION U.S. federal law restricts this device to sale by or on the order of a physician.
	Russia only. GOST-R mark.
	Eurasian Economic Union countries only. Eurasian Conformity mark. Conformity to applicable technical regulations of Customs Union.
	Brazil only. INMETRO certificate.
	NOTE: The following symbols (required by China law only) are representative of what you may see on your equipment. The number in the symbol indicates the EFUP period in years, as explained below. Check the symbol on your equipment for its EFUP period. This symbol indicates the product contains hazardous materials in excess of the limits established by the Chinese standard GB/T 26572 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 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".

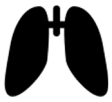
The following symbols appear on one or more of the devices.	
	In order to maintain the declared EFUP, the product shall be operated normally according to the instructions and environmental conditions as defined in the product manual, and periodic maintenance schedules specified in Product Maintenance Procedures shall be followed strictly. Consumables or certain parts may have their own label with an EFUP value less than the product. Periodic replacement of those consumables or parts to maintain the declared EFUP shall be done in accordance with the Product Maintenance Procedures. This product must not be disposed of as unsorted municipal waste, and must be collected separately and handled properly after decommissioning.
	This symbol indicates that this electronic information product does not contain any hazardous substance or elements above the maximum concentration value established by the Chinese standard GB/T 26572, and can be recycled after being discarded, and should not be casually discarded.
	Underwriters Laboratories product certification mark.
IC	Canada only. Industry Canada certification number indicates that this product meets the applicable Industry Canada technical specifications.
	China only. Chinese Compulsory Certification as required by AQSIQ. Safety & EMC compliance.
CMIIT ID	China only. China Ministry of Industry and Information Technology identification number for Radio Transmission Equipment Type Approval.
	Australia only. The product complies with the applicable Australian standard and establishes a traceable link between the equipment and the manufacturer, importer or their agent responsible for compliance.
	Japan only. The PSE mark (Product Safety Electric Appliance and Materials) is a mandatory mark required on Electrical Appliances in Japan as authorized by the Electrical Appliance and Material Safety Law (DENAN). This mark signifies that a product complies with the law according to a set of standards for electric devices.
	Japan only. Approved under Japan TELEC requirements.

The following symbols appear on one or more of the devices.	
	Brazil only. Approved under ANATEL (Agência Nacional de Telecomunicações) requirements.
	South Africa only. Approved under ICASA (Independent Communications Authority of South Africa) requirements.
	Korea only. Approved under KCC (Korea Communications Commission) requirements.
	Ukraine only. Mark of conformity with the Technical Regulations. This product meets the requirements of the Technical Regulations on medical devices, approved by Resolution No. 753 of the Cabinet of Ministers of Ukraine on October 2nd 2013.

3.8 User interface symbols

The following symbols appear in the software user interface	
	Alarm off indicator. The symbol may not display at the central station or on a remote bedside monitor.
	Alarm priority indicator: High (red). Indicates a high priority alarm.
	Alarm priority indicator: Medium (yellow). Indicates a medium priority alarm.
	Alarm priority indicator: Low (cyan). Indicates a low priority alarm.
	Alarm volume icon. Adjust the minimum alarm tone volume.
	Audio alarms off indicator.
	Audio alarms paused indicator with countdown timer - Indicates all audio alarms are paused and the amount of time remaining for the alarm pause period displays as a countdown timer.
	Pause audio alarms - Selectable from the monitor's main menu. Also an indicator of a temporarily paused active audio alarm.
	Low priority audio off alarm indicator.
	General warning sign. Displays when the priority setting deviates from the recommendation of international alarm safety standards.
	Reminder volume icon. Adjust the volume of the tone that sounds every two minutes when audio alarms are turned off.
	Touch volume icon. Adjust the volume of the tone that sounds when a user touches a touchscreen display.
	Home icon. Close all menus/applications displayed on the patient monitor.

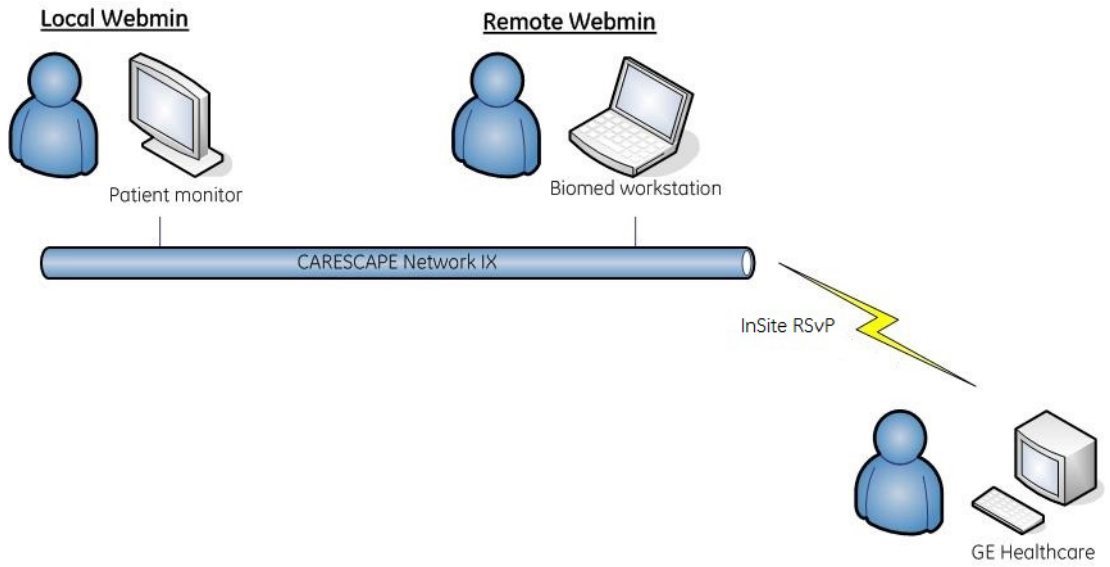
The following symbols appear in the software user interface	
	Locking setting indicator. Indicates this setting is locked and cannot be adjusted.
	Network connection indicator. Indicates the patient monitor is connected to the Local Area Network (LAN).
	Network connection indicator. Indicates the monitor is connected to the Wireless Local Area Network (WLAN).
	Network (WLAN) signal strength. The number of segments corresponds to the signal strength: four segments indicate strong signal, one segment weak signal.
	Monitor battery is full.
	Monitor battery (green). The higher the charge, the bigger the green bar within the symbol. Numbers indicate the remaining run time.
	Monitor battery (yellow). This symbol and a message indicating low battery charge appear when there is less than 20 minutes of run time left.
	Monitor battery (red). This symbol and a message indicating empty battery appear when there is less than 5 minutes of run time left.
	Monitor battery is charging. There is a white running bar inside the symbol.
	Monitor battery failure indicator. Indicates a missing battery or a battery failure.
	PDM battery charging indicator. Indicates the battery is charging.

The following symbols appear in the software user interface	
	PDM battery gauge indicator. Indicates the charge level of the battery.
	PDM battery failure indicator. Indicates the battery is not available for use.
	Snapshot indicator. Indicates the event has an associated snapshot.
	Beat source indicator.
	Respiration indicator. Indicates a breath is detected by the impedance respiration algorithm.
	BIS and Entropy sensor impedance check indicator (gray). Displays for each sensor as the impedance check is in progress.
	BIS and Entropy sensor impedance check error indicator (red). Indicates the specified sensor failed the impedance check.
	BIS and Entropy sensor impedance check passed indicator. Indicates the specified sensor passed the impedance check.
	Completed NIBP volume icon. Adjust the volume of the tone that sounds when an NIBP measurement result is available.
	Manual NIBP icon. Start a manual NIBP measurement.
	Nellcor OxiMax SatSeconds indicator. Indicates the amount of time the SpO_2 saturation is outside the limits before alarms are generated.

The following symbols appear in the software user interface	
	SpO_2 signal strength indicator. Indicates the signal strength, with three asterisks indicating the strongest signal.
	NMT Stimulus beep volume icon. Adjust the volume of the tone that sounds when a stimulus pulse is generated.
	Progress bar. Indicates the amount of time remaining until the next automatic measurement.

4 Using Webmin service interface

Webmin is a browser-based service interface that is used to configure the platform settings of the patient monitor and to diagnose and retrieve system information for maintenance and troubleshooting.



Local access to Webmin

You can access Webmin locally through the integrated browser on the patient monitor or from a configured service PC that is connected to the IX port of the patient monitor with an Ethernet crossover cable.

Remote Webmin

You can access Webmin remotely from a configured service PC that is connected to the patient monitor over the IX Network.

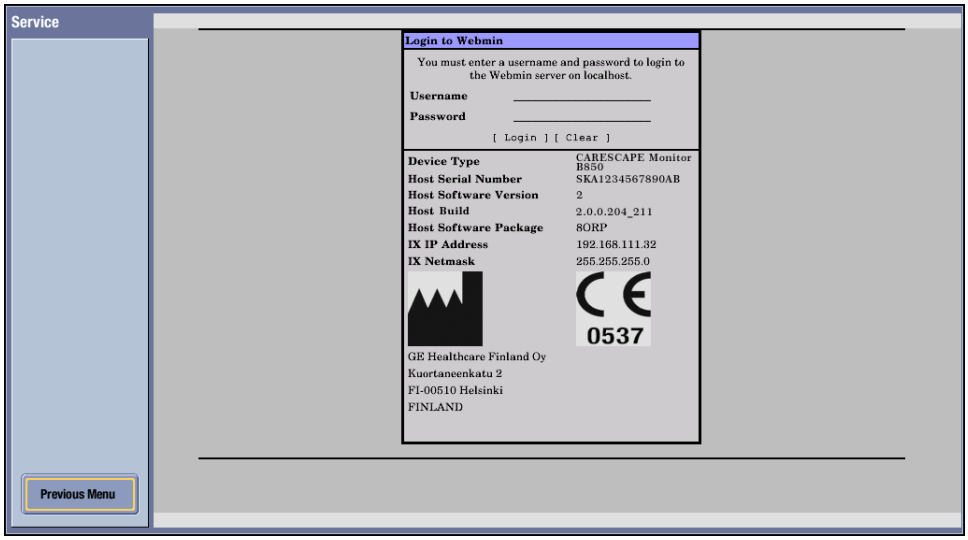
Requirements for service PC

- Network board with Ethernet port and TCP/IP network installed.
- Internet Explorer V6 or later.

4.1 Local access to Webmin using the integrated browser on the patient monitor

NOTE: A USB keyboard and mouse are needed to access the integrated Webmin browser.

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



2. Continue to 4.4. Login to Webmin.

Closing Webmin

Select  to close Webmin and return to the main display.

4.2 Local access to Webmin with a service PC

You can access Webmin locally by connecting an Ethernet crossover cable between the service PC and the IX connector of the patient monitor.

NOTE: If you disconnect the patient monitor from a live IX Network when a patient is admitted, you will temporarily lose the services provided by the IX Network, e.g., access to the IX printers and MUSE reports.

WARNING **Non-medical equipment does not provide the same level of protection against electrical shock. Do not touch the patient and any part of non-medical equipment at the same time. Some examples of non-medical equipment are laser printers and non-medical computers.**

1. Connect a service PC to the IX connector on the patient monitor using a crossover cable.
2. In patient monitor, select ***Monitor Setup*** > ***Service***. The local browser opens and displays the ***Login to Webmin*** dialog box.
3. Record the IX IP address of the patient monitor:

   IX IP address: _____

   IX Netmask: _____

NOTE: If the IX IP address field is shown as 0.0.0.0., you need to configure the patient monitor's IX Network address first. Access Webmin using the integrated browser and configure a static IP address for the IX Network.

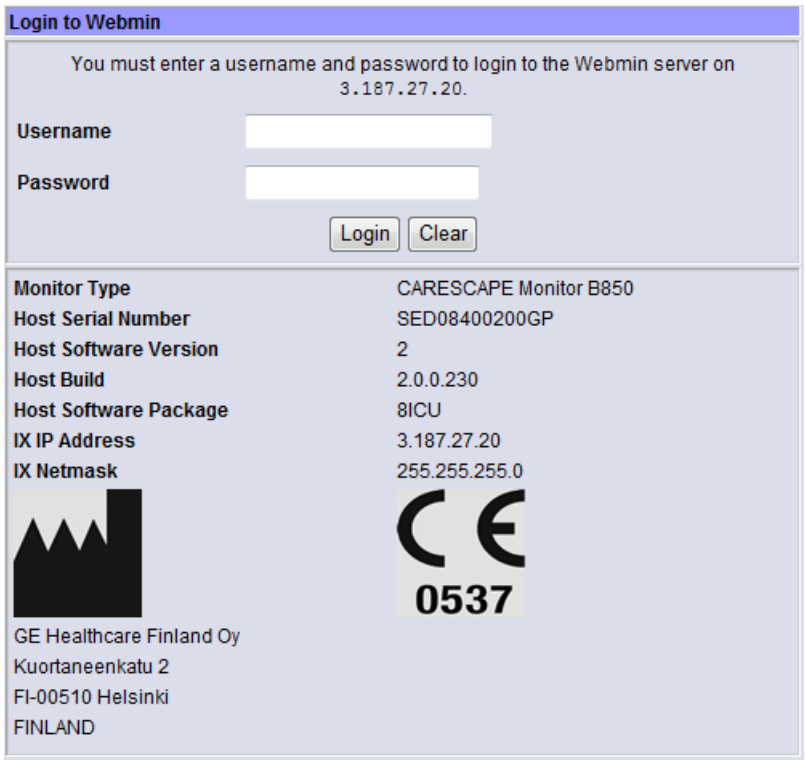
4. Configure the service PC's IP address and subnet mask to the same network segment with the patient monitor's IX Network setting.

NOTE: For more information on how to configure the IP address, refer to the PC's documentation.

5. Launch a web browser on the service PC.
6. 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.



7. Continue to 4.4. Login to Webmin.

Closing Webmin

1. Restore the patient monitor's original IX Network configuration and service PC's network settings if they were changed.
2. Disconnect the crossover cable from the patient monitor and from the service PC.
3. Reconnect the patient monitor back to the IX Network if applicable.

4.3 Remote access to Webmin using a service PC over the IX Network

1. Connect a service PC to the IX Network using a standard network cable.
2. In patient monitor, select ***Monitor Setup*** > ***Service***. The local browser opens and displays the ***Login to Webmin*** dialog box.
3. Record the IX IP address of the patient monitor:
   IX IP address: _____

IX Netmask: _____

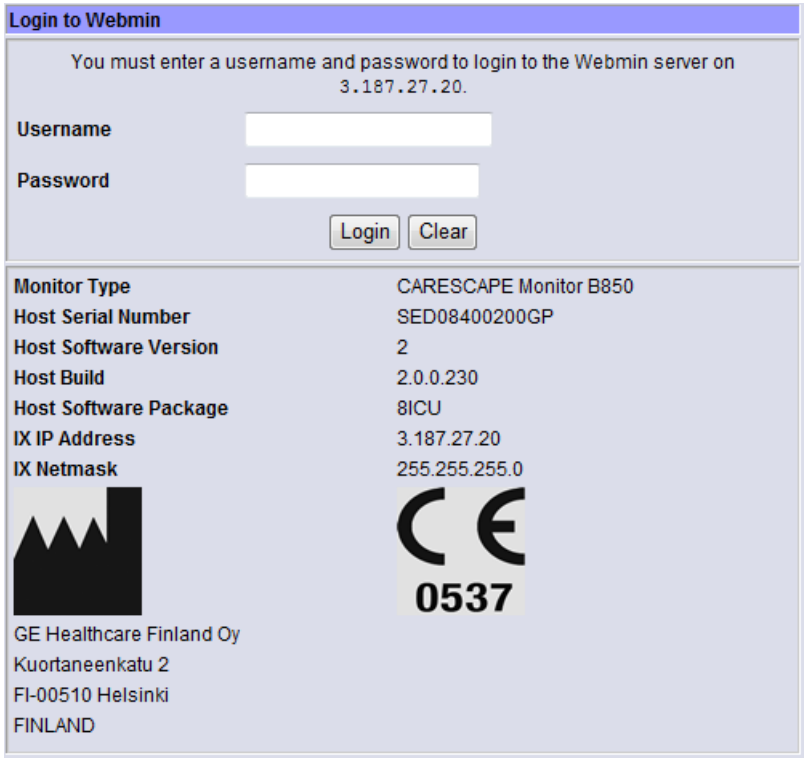
4. Configure the service PC's IP address and subnet mask to the same network segment with the patient monitor's IX Network.

NOTE: For more information on how to configure the IP address, refer to the PC's documentation.

5. Launch a web browser on the service PC.
6. 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.



7. Continue to 4.4. Login to Webmin.

Closing Webmin:

1. Restore the original network settings in the service PC.
2. Disconnect the service PC from the live IX Network.

4.4 Login to Webmin

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

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

NOTE: Username and password are case sensitive.

NOTE: "Change Me" is the factory default password for the username "biomed". Refer to section 7.14. Password management for details on how to change the default password or reset a forgotten password.

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

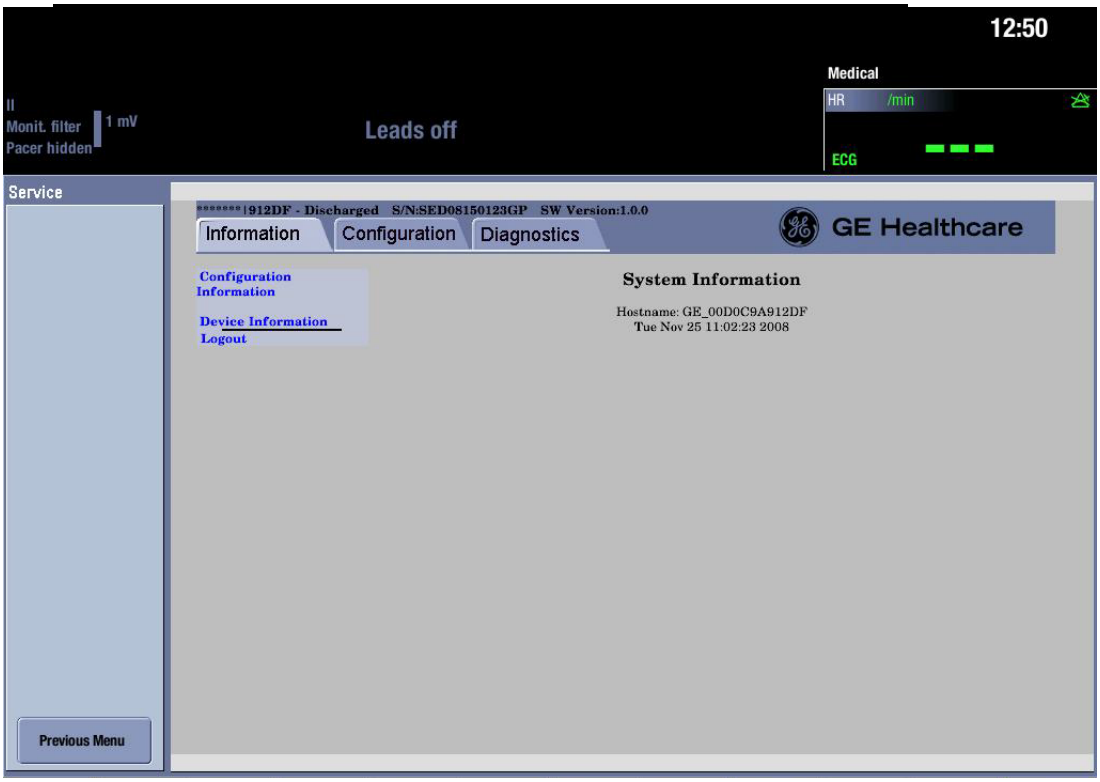
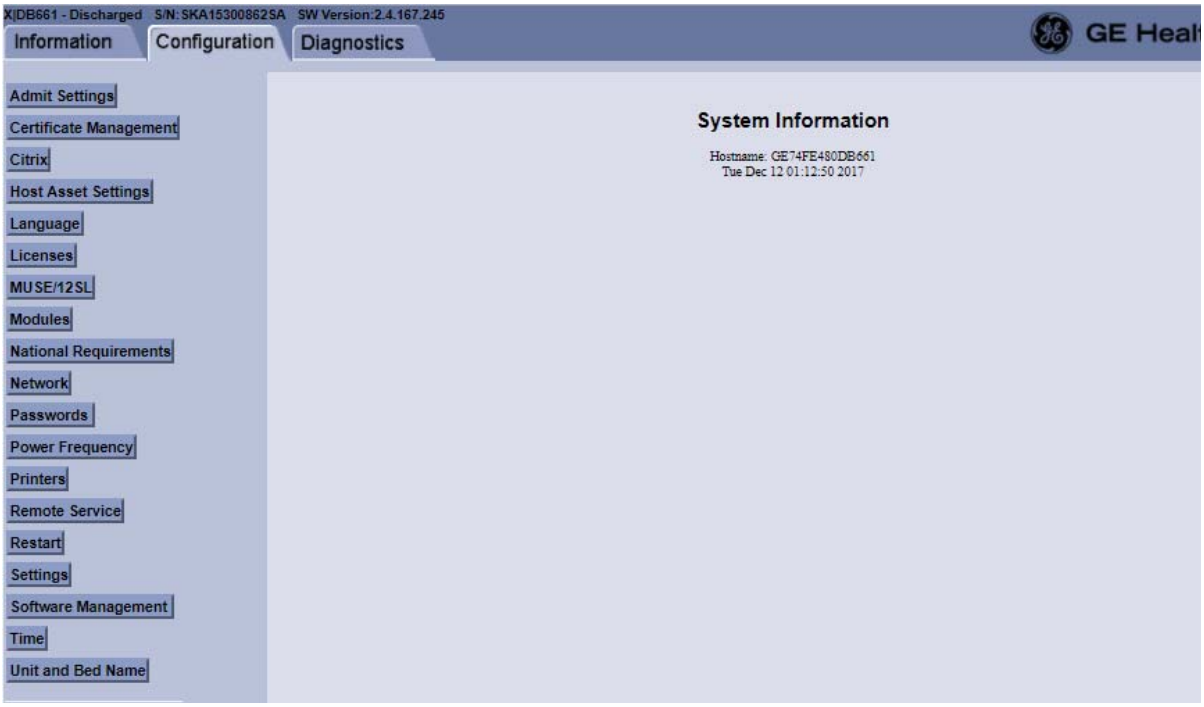


Figure 1 Webmin user interface when accessed using the integrated browser

Figure 2 Webmin user interface when accessed using the service PC

4.5 Webmin configuration modules



The Webmin service interface includes the following configuration modules. Select ***Help*** for additional information related to each Webmin module.

Webmin module	Use the module
Admit Settings	to configure Patient ID Prefix and barcode settings.
Certificate Management	to manage SSL certificates installed on the system. With this module, self-signed certificates and certificate signing requests (CSR) can be generated. Certificates can be imported, exported, deleted and viewed.
Citrix	to configure the Citrix client settings for the iPanel software: server address, initial program, Citrix session timeout, username, password, encryption level.
Host Asset Settings	to enter a host asset number and to view the host serial number.
Language	to select the language used in clinical user interface and to select the keyboard locale setting for the alphanumeric keyboard and the barcode reader.
Licenses	to enable and activate a software package, to enable and activate software features and to upload and activate a license file.
MUSE/12SL	to configure the host for sending and viewing 12SL information.
Modules	to configure some acquisition module specific settings after corrective maintenance, or for administrative purposes. These settings are saved to the permanent memory of the related acquisition module and the settings travel with the module from one patient monitor to another. Refer to the Module Frames and Modules Service Manual for detailed information how to change these settings.
National Requirements	to activate France specific defaults for the ECG HR adjustment range and the reminder beep behavior.
Network	to select and configure the real-time network as the MC Network (CARESCAPE Network or S/5 Network). It also allows the user to configure the IX and ADT Network settings.
Passwords	to change the passwords for the biomed and clinical users.
Power frequency	to set the power line frequency.
Printers	to configure the patient monitor to print to up to 12 laser printers connected on the IX Network. There are sub-modules for installing a printer, deleting a printer and for printing a test page.
Remote Service	to configure and control the InSite RSvP remote service tool.

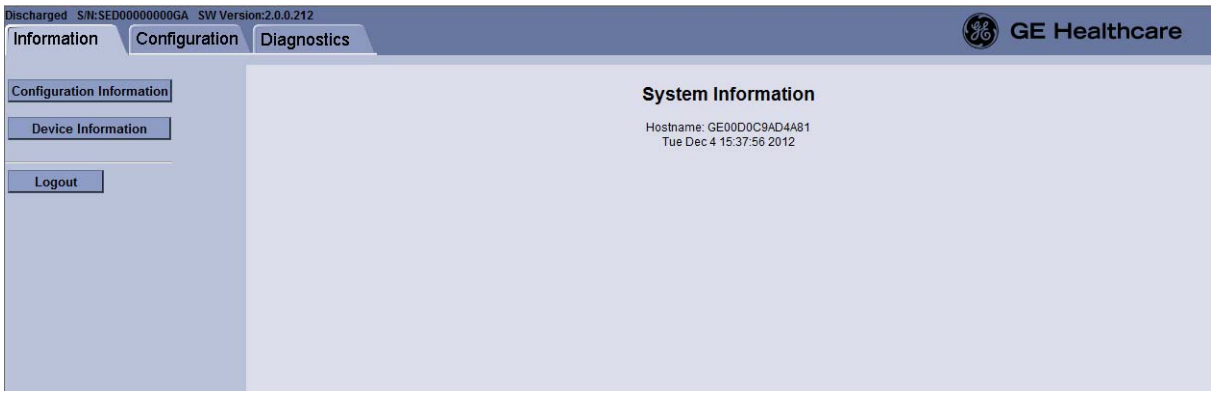
Webmin module	Use the module
Restart	to shutdown and restart the patient monitor automatically via Webmin. NOTE: The patient must be discharged in order to enable monitor restart via Webmin.
Settings	to transfer platform and/or clinical settings from one patient monitor to another, to take backup copies of the settings to an external device and to restore the settings from an external device.
Software Management	to update patient monitor and parameter module software.
Time	to set the date and time settings.
Unit and bed name	to configure the care unit name and bed name for patient monitors that are configured to connect to the MC Network.

4.6 Webmin information modules

The Webmin information modules provide useful information about the patient monitor setup especially for troubleshooting.

The Configuration Information module shows the current platform configuration of the patient monitor and the connected peripheral devices.

The Device Information module shows the hardware and software information of the patient monitor and the connected peripheral devices.



4.7 Webmin diagnostics modules

Access Webmin service interface to view hardware statistics, ping a network deviceand view or download log files.

The Hardware Statistics module displays several internal voltages, temperatures and power consumption.

Ping a TCP/IP network device- Use this Webmin feature to verify connectivity with a network device on the MC Network and IX Network.

Log files - The patient monitor collects information about different system events and errors to log files. These log files help troubleshooting problems in the patient monitor and the connected peripheral devices.

For your notes:

5 Pre-installation requirements

This chapter specifies the pre-installation requirements for the patient monitor.

5.1 Unpacking

1. Confirm that the packing box is undamaged. If the box is damaged, contact the shipper.
2. Open the top of the box and carefully unpack all components.
3. Confirm that all components are undamaged. If any of the components is damaged, contact the shipper.
4. Confirm that all components are included. If any of the components is missing, contact your GE Healthcare distributor.

WARNING **EXCESSIVE LEAKAGE CURRENT - If the device has been transported or stored outside operating temperature range allow it to stabilize back to operating temperature range before removing it from the plastic bag.**

CAUTION PACKAGING DISPOSAL - Dispose of the packaging material, observing the applicable waste control regulations.

5.2 Compatibility check

Verify the compatibility of all system components prior to the installation of the patient monitor.

- Refer to the patient monitor's supplemental information manual for a list of compatible displays and display cables.
- Refer to the patient monitor's supplemental information manual for a list of compatible network and bedside devices.
- Refer to the patient monitor's supplemental information manual for a list of compatible supplies and accessories.
- Refer to the patient monitor's supplemental information manual and Unity Network Interface Device (ID) Operator's Manual to see compatible peripheral devices.

WARNING **BEFORE INSTALLATION - Compatibility is critical to safe and effective use of this device. Please contact your local sales or service representative prior to installation to verify equipment compatibility.**

WARNING **INTERFACING OTHER EQUIPMENT - Connect only items that are specified as part of the system and as compatible. For more information, see the CARESCAPE Modular Monitors Supplemental Information Manual.**

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

WARNING **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.**

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.**

WARNING **For detailed instructions and information regarding supplies and accessories, always refer to their own instructions for use.**

5.3 Network infrastructure

Ensure that the applicable network infrastructure is in place prior to the installation of the patient monitor.

Acquire the network configuration information from the hospital IT or the related project documentation and installation files.

5.3.1 MC Network

- The MC Network infrastructure shall be installed according to the CARESCAPE Network Configuration Guide.
- The installation site of the patient monitor shall have a wall jack and a network patch cable for the MC Network.
- Refer to the sections 7.2.2. Selecting and configuring CARESCAPE Network and 7.4. Setting unit and bed name to see the configuration information you need to have available to configure the patient monitor to the MC Network.

5.3.2 S/5 Network

- The S/5 Network shall be installed according to the S/5 Network Installation Guide. Refer to the iCentral and iCentral Client Service Manual for iCentral installation instructions.
- The installation site of the patient monitor shall have a wall jack and a network patch cable for the S/5 Network.
- Refer to the section 7.2.3. Selecting and configuring S/5 Network to see the configuration information you need to have available to configure the patient monitor to the wired S/5 Network.

5.3.3 IX Network

- The IX Network infrastructure shall be installed according to the CARESCAPE Network Configuration Guide.
- The installation site of the patient monitor shall have a wall jack and a network patch cable for the IX Network.
- Refer to the section 7.2.2. Selecting and configuring CARESCAPE Network to see the configuration information you need to have available to configure the patient monitor to the IX Network.
- Refer to the following sections for the information you need to have available for:
  - 7.5. Configuring printers for IX printer configuration
  - 7.6. Configuring Citrix
  - 7.7. Configuring MUSE/12SL
  - 7.16.1. Configuring the remote service for InSite RSvP configuration.

5.4 Installing the mounting hardware

Ensure that all the applicable/ required mounting hardware is properly installed prior to the installation of the patient monitor:

- Mounting hardware for the patient monitor, either for a stand-alone installation or for an installation to an anesthesia machine or to a ventilator
- Mounting hardware for the module frame
- Mounting hardware for the PSM module
- Mounting hardware for the PDM module
- Mounting hardware for the displays
- Mounting hardware for the Unity Network ID connectivity device

NOTE: Refer to the patient monitor's supplemental information manual for compatible mounting hardware for each system component above. Each mounting kit includes the necessary hardware and the installation instructions.

WARNING **Use only manufacturer specified mounts.**

5.5 Unity Network ID connectivity device installation

The Unity Network ID connectivity device shall be properly installed, configured and tested according to the Unity Network ID Connectivity Device Service Manual prior to connecting it to the patient monitor.

Make sure that the Unity Network ID connectivity device 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+.

Refer to the Unity Network Interface Device (ID) Service Manual for instructions on checking and changing the IP address.

5.6 Power and environmental requirements

Check the patient monitor's supplemental information manual for power and environmental requirements.

WARNING **Operation of the monitor outside the specified performance range may cause inaccurate results.**

CAUTION Do not use or store equipment outside the specified temperature, humidity, or altitude ranges.

Power requirements

- The installation site shall have hospital-grade grounded power outlets and power cords for all system components.
- Verify that the power outlet is wired correctly according to the country's electrical code standard.

WARNING **EXCESSIVE LEAKAGE CURRENT - A display or printer that is a non-medical grade device and is used within the patient environment, must always be powered from an additional transformer providing at least basic isolation**

(isolating or separating transformer). Using without an isolating transformer could result in unacceptable enclosure leakage currents.

Environmental requirements

- Install the patient monitor to a location that meets the specified environmental requirements of operating temperature, humidity and atmospheric pressure.
- Set up the device in a location which affords sufficient ventilation. The ventilation openings of the device must not be obstructed.

EMI & RFI interference:

WARNING **Do not use the monitor in high electromagnetic fields (for example, during magnetic resonance imaging).**

CAUTION EMC - Magnetic and electrical fields are capable of interfering with the proper performance of the device. For this reason make sure that all external devices operated in the vicinity of the monitor comply with the relevant EMC requirements. X-ray equipment or MRI devices are a possible source of interference as they may emit higher levels of electromagnetic radiation. Changes or modifications to this device/system not expressly approved by GE 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: This device/system 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. Mains power should be that of a typical commercial or hospital environment. Device is compliant to Class A.

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.

- The patient monitor should be isolated from sources of strong electromagnetic and radio frequency interference.

NOTE: Refer to the patient monitor’s supplemental information manual for more information.

6 Hardware installation

CAUTION LOSS OF MONITORING - Leave space for circulation of air to prevent the monitor from overheating. The manufacturer is not responsible for damage to equipment caused by improperly vented cabinets, improper or faulty power, or insufficient wall strength to support equipment mounted on such walls.

WARNING **The parameter modules are not able to withstand unpacked drops from a height of 1 m without damage. If a module is dropped, please service it before taking it back into use.**

WARNING **After transferring or reinstalling the monitor, always check that it is properly connected and all parts are securely attached.**

WARNING **SITE REQUIREMENTS - Do not route cables or tubing in a way that they may present a stumbling hazard.**

WARNING **EXPLOSION - Do not use this equipment in the presence of flammable anesthetics, vapors or liquids.**

WARNING **EXCESSIVE TOUCH CURRENT - To avoid excessive patient leakage current, do not simultaneously touch the patient and the electrical connectors located at the rear panel of the CPU unit or within the module frame.**

6.1 Installing a battery into the PDM module

The battery for the PDM module, if included, is shipped separately and need to be installed and fully charged prior to taking into use.

WARNING **PHYSICAL INJURY- Make sure the battery is completely inserted and the battery door is completely closed. Falling batteries could seriously or fatally injure neonatal or other vulnerable patients.**

WARNING **EXPLOSION OR FIRE -Using non-recommended batteries could result in injury/burns to the patients or users. Only use batteries recommended or manufactured by GE.**

WARNING **EXPLOSION HAZARD - Do not incinerate a battery or store at high temperatures. Serious injury or death could result.**

NOTE: Refer to the Module Frames and Modules Service Manual for information about PDM battery maintenance.

6.1.1 Testing the battery charge

Before installing a battery, verify the battery's state of charge. Press the green **TEST** button on the battery. The number of charge level indicator LEDs that illuminate indicates the approximate charge remaining in the battery.

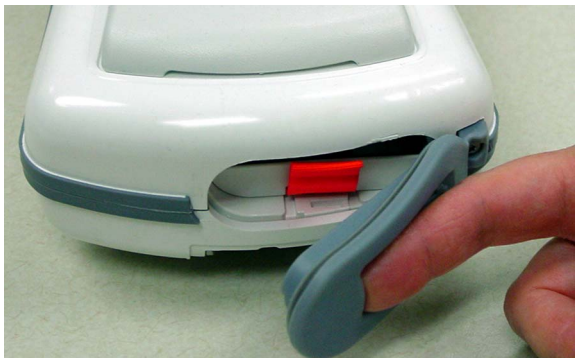
- Four LEDs illuminated: 75% – 100% of full-charge capacity.
- Three LEDs illuminated: 50% – 74.9% of full-charge capacity.
- Two LEDs illuminated: 25% – 49.9% of full-charge capacity.
- One LED illuminated: 10% – 24.9% of full-charge capacity.

– One LED flashing: < 10% of full-charge capacity remaining.

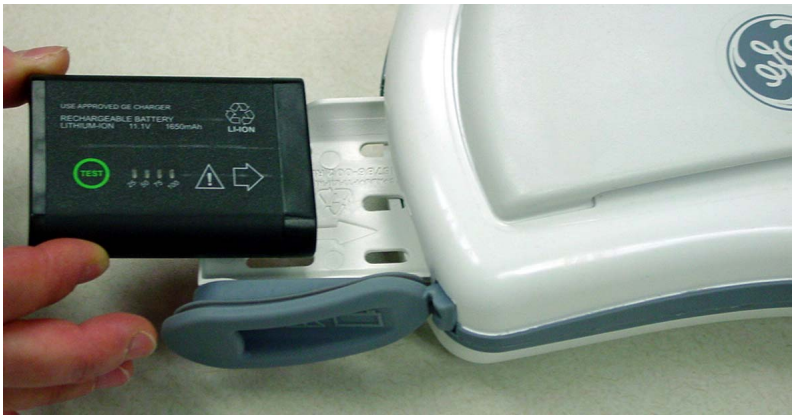
NOTE: Keep the PDM connected to the patient monitor and the patient monitor connected to the AC mains until the PDM battery is fully charged.

6.1.2 Installing the battery into the PDM module

1. Open the battery door by gently pulling on the battery door pull tab.



2. Pull the battery tray out of the PDM using the battery tray strap.
3. Insert the battery with the **TEST** button facing up and the arrow pointing into the PDM.



4. Press the battery door closed until it seals the battery compartment.

6.2 Mounting the patient monitor

The patient monitor has an integrated GCX mounting plate. This facilitates all mounting options for the patient monitor. Refer to the CARESCAPE Modular Monitors Mounting Solutions to identify the compatible mounting hardware for the patient monitor.

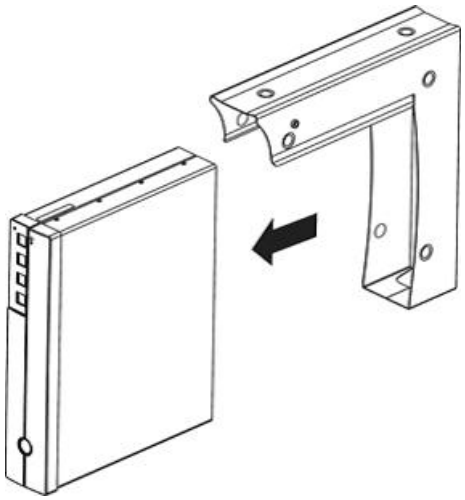
6.2.1 Installing the CPU

WARNING **EQUIPMENT MALFUNCTION - Using the CPU in a wrong position may result in equipment malfunction. The CPU must only be used in vertical or horizontal position. To avoid the risk of equipment malfunction, make sure that the CPU is not used in any other position.**

WARNING **EQUIPMENT MALFUNCTION - When the CPU is used in vertical position, it is not protected against harmful effects of dripping water (IPX1). Therefore,**

we recommend using the CPU Flush Mount Kit with environment shield to provide protection from drips or splashes of liquids. Without the shield, liquids may enter the equipment and lead to its malfunction.

For vertical mounting configurations, a flush mount is available. The flush mount lowers the probability of the ingress of fluids into the assembly. The mount 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 flush mount.



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

WARNING **Never install equipment above the patient.**

WARNING **Use only manufacturer specified mounts.**

CAUTION The device/system should not be used adjacent to, or stacked with, other equipment. Consult qualified personnel regarding device/system configuration.

6.3 Connecting displays

6.3.1 Connecting local displays

WARNING **To prevent liquids from entering the display casing, do not tilt the display more than +/-15 degrees.**

WARNING **Using other displays than the patient monitor system specific ones may result in loss of visual alarms and patient monitoring.**

WARNING **Do not connect a monochrome display to the monitor. Visual alarm indicators may not appear properly.**

NOTE: Refer to the patient monitor's supplemental information manual for a list of compatible displays and display cables.

NOTE: If only one display is connected to the patient monitor, it must be connected to the DVI-I 1 connector. Additional displays can be connected to DVI-D 2 or DVI-I 3 connector. Cloned displays can be connected only to DVI-I 1 and DVI-I 3 connectors using a video splitter.

NOTE: Ensure that you have the license for Dual Video / Triple Video, if applicable.

NOTE: Be sure that all cables are securely connected. To prevent accidental disconnection and loss of display screen information, firmly tighten the DVI connector screws into the DVI connector port.

NOTE: Refer to Configuration chapter for information about touchscreen calibration.

NOTE: Refer to the display's user manual for more information about the display adjustments and other information about the displays.

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

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

NOTE: The patient monitor with a non-medical grade display, which is IEC 60950-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 standard. Refer to IEC 60601-1 for requirements if using non-medical grade displays in the patient environment.

The primary display

The primary display can be either an analog or digital display. It can be either an USB or serial touchscreen, or a non-touchscreen display.

You may optionally connect a cloned analog display to the DVI-I 1 port. Use a DVI-I to DVI-D and VGA splitter to do so.

1. Connect one end of the video cable to the DVI-I 1 connector in the rear of the patient monitor. Connect the other end of the video cable to the display.
2. If applicable, connect a USB or serial touchscreen cable to the USB 1 or RS-232 1 connector in the rear of the patient monitor. Connect the other end of the touchscreen cable to the display.

Display port 1	Display	Touchscreen interface port
DVI-I 1	Display 1	USB1 or RS-232 1
	Display 1 cloned	USB1 or RS-232 1

The secondary display

The secondary display must be a digital display. It can be either an USB or serial touchscreen, or a non-touchscreen display. You cannot connect a cloned display to DVI-D 2 connector.

1. Connect one end of the video cable to the DVI-D 2 connector in the rear of the patient monitor. Connect the other end of the video cable to the display.
2. If applicable, connect a USB or serial touchscreen cable to the USB 2 or RS-232 2 connector in the rear of the patient monitor. Connect the other end of the touchscreen cable to the display.

Display port 2	Display	Touchscreen interface port
DVI-D 2	Display 2	USB2 or RS-232 2

The third display

The optional third display can only be used to support the iPanel application. The patient monitor must be equipped with an optional third video card.

The third display can be either an analog or digital display. It can be either an USB touchscreen, or a non-touchscreen display.

You may optionally connect a cloned analog display to the DVI-I 3 port. Use a DVI-I to DVI-D and VGA splitter to do so. The patient monitor does not support touchscreen interface for the cloned third display.

Display port 3	Display	Touchscreen interface port
DVI-I 3	Display 3	USB3
	Display 3 cloned	No touchscreen interface available

1. Connect one end of the video cable to the DVI-I 3 connector in the rear of the patient monitor. Connect the other end of the video cable to the display.
2. If applicable, connect a USB touchscreen cable to the USB 3 connector in the rear of the patient monitor. Connect the other end of the USB touchscreen cable to the display.

6.3.2 Connecting remote displays

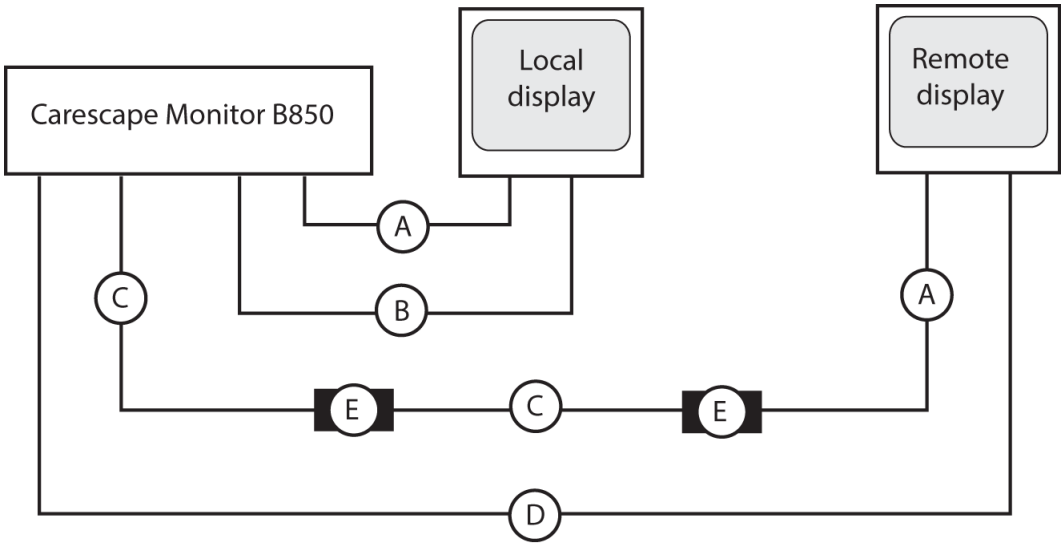
NOTE: The instructions in this chapter applies to D19KT VER01 displays.

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

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

- 15-meter DVI-I to DVI-I video cable (p/n 2042766-001).
- 5-meter USB extender (p/n 2042768-001)
- Standard USB-A to USB-B cable, up to 5 meters.

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.



A = standard USB cable (up to 5 m)
B = DVI-D cable (up to 5 m)
C = USB extender cable (5 m)
D = DVI-I cable (15 m)
E = single port USB hub

Setup instructions for extended cable lengths:

NOTE: You can extend any of the 3 displays up to 15 meters. See Connecting local displays to see to which USB and video port in the patient monitor the USB touchscreen cable and the DVI-I cable should be connected to.

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.
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.
5. Connect one end of the video cable to the specific connector in the rear of the patient monitor. Connect the other end of the video cable to the display.

6.3.3 Securing the USB cable connections of the displays

1. Secure the connected USB cables of all displays to the CPU unit. Use the existing retaining clips attached to the patient monitor.

2. Secure the USB cables connections to the displays according to the instruction included in the display package.

6.4 Installing module frames and modules

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

See the following table for possible configuration options. For detailed information on compatibility, refer to the the patient monitor's supplemental information manual.

		ePort 1 connected devices		
		PDM	**F5 Frame**	**F7 Frame**
ePort 2 connected devices	**PDM**		X	X
	F5 Frame	X	X	
	F7 Frame	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:

- F5 Frame
- F7 Frame

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 CS2, Avance CS2, or Aespire anesthesia machine.**

WARNING **EQUIPMENT MALFUNCTION. Using the module frames in a wrong position may result in equipment malfunction. The frames must only be used in**

horizontal position. To avoid the risk of equipment malfunction, make sure the frames are not used in any other position.

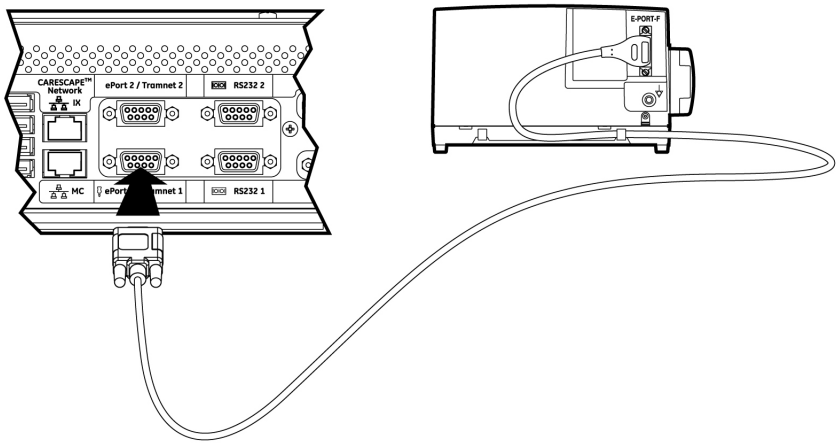
WARNING **Do not use identical measurement modules or modules that map a measurement to the same channel or parameter window. If such modules have been connected, remove the module that has been most recently connected. You can also remove both modules and re-connect the new module after five seconds.**

NOTE: Refer to the the patient monitor's supplemental information manual for a list of compatible devices.

6.4.1 Connecting a F5 or F7 Frame to a B850 patient monitor

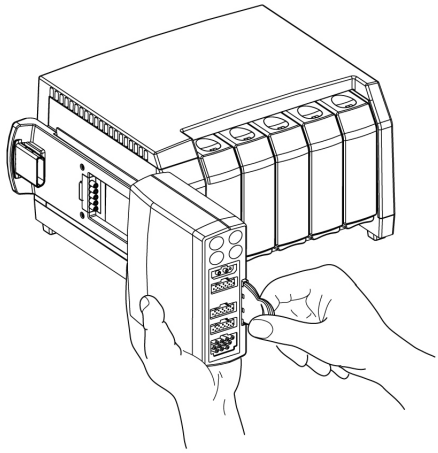
NOTE: To ensure proper grounding of the Frame, secure the cable connections by using a screwdriver to fully seat all thumbscrews.

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



6.4.2 Installing a PSMP module to an F5 Frame

1. Connect a PSMP module by aligning it with the insertion guides on the outside of the frame. Push the module into the frame until it stops.

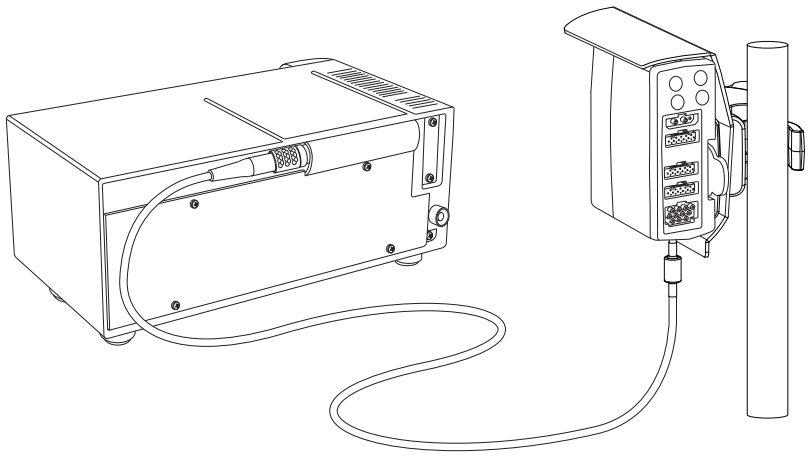


2. To remove the PSMP module, pull the pull tab out and slide the module out of the guides.

6.4.3 Installing a PSMP module to an F7 Frame

WARNING **PHYSICAL INJURY- Take care when mounting devices to an IV pole. If a device is mounted too high the IV pole may become unbalanced and tip over.**

1. Connect the PSMP pole mount or frame mount cable to the back of the F7 Frame.

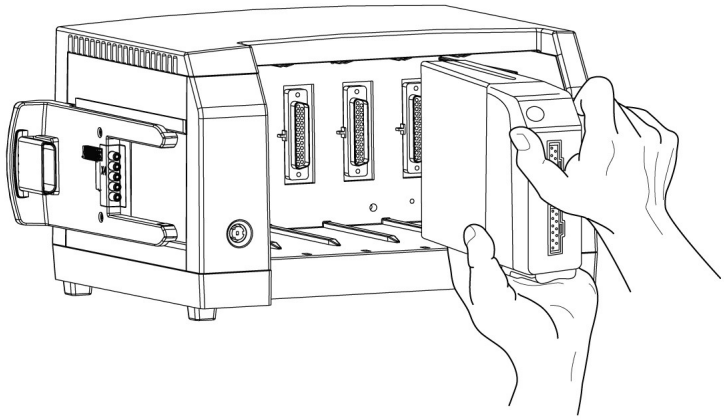


2. Connect the PSM module to the mount.

6.4.4 Installing another module to a F5 or F7 Frame

WARNING **Ensure that the CARESCAPE respiratory modules are in vertical position when used. Tilting them may result in erroneous readings.**

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

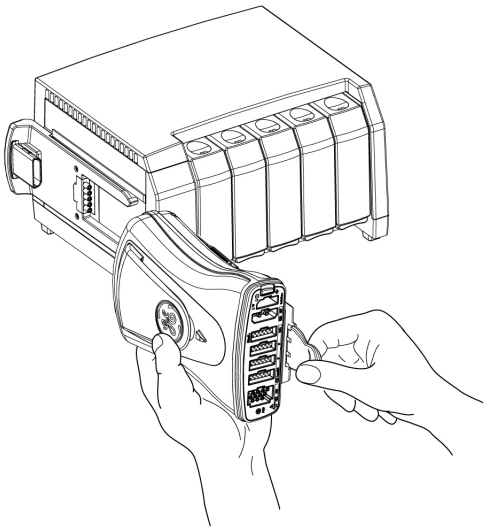


2. Push the module into the frame until it clicks.
3. To remove a parameter module, grasp it firmly, press the release lever on bottom of module, and pull out of the guides.

6.4.5 Connecting a PDM module to an F5 Frame

NOTE: 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.

1. Align the PDM with the insertion guides on the outside of the frame. Push the module into the frame until it stops.



6.4.6 Installing a PDM module to a mounting solution

WARNING **PHYSICAL INJURY- Take care when mounting devices to an IV pole. If a device is mounted too high the IV pole may become unbalanced and tip over.**

WARNING **PHYSICAL INJURY — Do not install the PDM above a patient. Make sure the battery is completely inserted and the battery door is completely closed. Falling batteries could seriously or fatally injure neonatal or other vulnerable patients.**

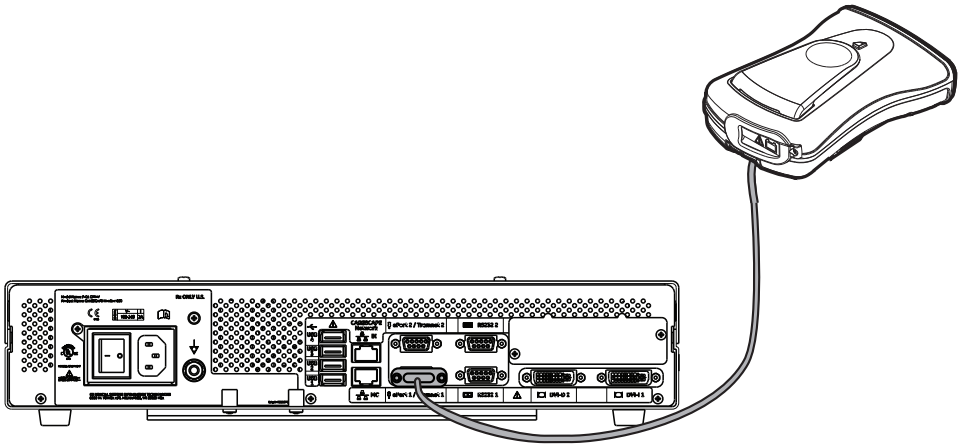
WARNING **PHYSICAL INJURY — Do not install the PDM above a patient. Leaks from the battery cells can occur under extreme conditions. The liquid is caustic to the eyes and skin. If the liquid comes in contact with eyes or skin, flush with clean water and seek medical attention.**

WARNING **To avoid accidental ingress of liquids, do not tilt the PDM in any direction or mount the PDM in a vertical position with the patient cables facing up or down.**

Mounting options include mounting to a bed headboard or footboard, an IV pole, or a roll stand using one of the docking stations. Mounting kits include all necessary hardware and installation instructions. Ensure that the selected PDM mount is properly installed according to the installation instructions.

NOTE: 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.

1. Connect the PDM module to installed mounting hardware as instructed in the accompanying installation instructions.
2. 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.



6.5 Connecting to the mains power

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

WARNING **EXCESSIVE LEAKAGE CURRENT - To avoid summation of leakage currents 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. In those instances where there is any element of doubt concerning the safety of the connected devices, the user must contact the manufacturers concerned (or other informed experts) for proper use. In all cases, safe and proper operation should be verified with the applicable manufacturer's instructions for use, and system standards IEC60601-1 must be complied with.**

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.**

WARNING **POWER SUPPLY — Always connect the device power cable to a properly installed power outlet with protective earth contacts before connecting any network cables (MC and IX networks). If the integrity of the protective earth conductor is in doubt or there is no protective earth available, do not connect the monitor to 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.**

CAUTION POWER REQUIREMENTS - Before connecting the device to the power line, check that the voltage and frequency ratings of the power line are the same as those indicated on the device's label. If this is not the case, do not connect the system to the power line until you adjust the device to match the power source. In U.S.A., if the installation of this equipment will use 240V rather than 120V, the source must be a center-tapped, 240V, single-phase circuit. This equipment is suitable for connection to public mains as defined in CISPR 11.

If a non-medical grade display is used as a display within the patient environment it must always be powered from an additional transformer providing at least basic isolation.

1. Connect power cords to the mains power supply inlet and to a wall outlet on all system components that require AC mains power input.
2. 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 or cable clamps, as applicable.

6.6 Connecting to the MC Network or the S/5 Network

WARNING **MISSED ALARMS - Do not use with iCentral software with Versions 5.0.3 and earlier or with Mobile Care Server with Version 5.2 and earlier.**

WARNING **INCORRECT CALCULATIONS - Using the System 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 System, please contact the GE Healthcare Aware Gateway HL7 Integration Engineering Team or your GE Healthcare service representative to verify or update your Aware Gateway configuration.**

WARNING **EXCESSIVE LEAKAGE CURRENT - Only devices that are specified compliant with IEC 60950-1 or IEC 60601-1 may be connected to the Ethernet MC or IX ports.**

The patient monitor can be connected either to the wired MC Network or S/5 Network.

- Connect the MC Network or the S/5 Network patch cable to the network connector labelled as “MC” in the rear panel of the patient monitor.

6.7 Connecting to the IX Network

- Connect the IX Network patch cable to the network connector labelled as “IX” in the rear panel of the patient monitor.

6.8 Connecting M-port devices

WARNING **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.**

CAUTION INSTALLATION - To avoid accidental ingress of liquids, always mount the Unity Network Interface Device (ID) in a vertical position with the connectors at the bottom.

CAUTION The use of the wrong interface adapter may cause improper operation of the supported peripheral device.

WARNING **SINGLE PATIENT USE - All eight serial ports of the Unity Network Interface Device (ID) must only be used on one patient.**

Ensure that the Unity Network ID connectivity device is properly mounted, installed and configured prior to connecting it to the patient monitor.

Connect the following interface devices to one of the four M-ports in the front of the patient monitor:

- Unity Network ID connectivity device
- PRN 50-M writer
- M-port keypad
- Remote Alarm Box

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

  NOTE: The remote alarm boxes will function when the patient monitor's alarm tone is set to either ***Legacy*** or ***IEC***.

6.9 Connecting USB devices

Connect the following devices to the USB ports in the rear panel of the patient monitor or the display:

- Alphanumeric keyboard
- Mouse
- Remote control
- Barcode reader

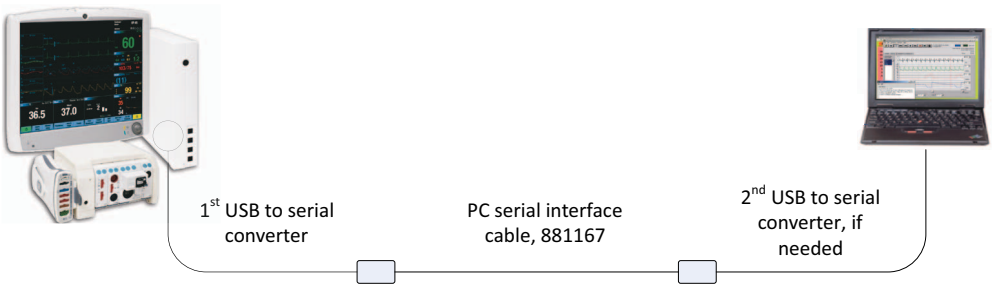
NOTE: Always use a GE-supplied barcode reader for the CARESCAPE monitors. Refer to the included installation instructions for more details.

WARNING **Use only washable keyboard with at least IPX1 protection against ingress of water.**

6.10 Connecting iCollect and other data acquisition systems

iCollect and other data acquisition systems can be connected to one of the USB connectors in the rear/side panel of the patient monitor.

NOTE: Use the ATEN UC232A USB-to-serial Converter and PC serial interface cable to connect iCollect and the other data acquisition systems to the patient monitor.



NOTE: Refer to the iCollect User's Manual for more information about the iCollect.

NOTE: Contact GE Healthcare Service to get more information about interfacing other data acquisition systems to the patient monitor.

6.11 Connecting a local printer to the IX connector

You can connect a local laser printer directly to the patient monitor's IX connector with a crossover cable.

1. Connect the Ethernet cable to the IX connector labelled as "IX" in the rear panel of the patient monitor.
2. Connect the other end of the Ethernet crossover cable to the connector in the laser printer.

NOTE: If the local printer is used within the patient environment it must always be powered from an additional transformer providing at least basic isolation.

NOTE: Refer to the printer manual on how to install and configure the printer. The printer shall be configured to communicate in the same subnet with the patient monitor's IX Network settings.

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 IEC 60601-1 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 ground leakage currents of the system if there is an interruption of the multiple socket outlet protective earth conductor.**

WARNING **Non-medical equipment does not provide the same level of protection against electrical shock. Do not touch the patient and any part of non-medical equipment at the same time. Some examples of non-medical equipment are laser printers and non-medical computers.**

For your notes:

7 Configuration

The configuration of the patient monitor consists of platform configuration and clinical configuration.

This chapter describes how to perform the platform configuration tasks needed to take the patient monitor into use for the first time and the configuration tasks needed for administration and maintenance thereafter.

For information on how to perform the clinical configuration, including care unit settings and user profiles, refer to the patient monitor's user's manual.

7.1 Adjusting display

7.1.1 Adjusting the display brightness

NOTE: Refer to the the patient monitor's user's manual for information how to setup the screens: ***Monitor Setup > Default Setup > Care Unit Settings > Screens***.

If needed, adjust the picture on the display using the Auto Adjustment feature in the display's OSD menu. Refer to the display's user documentation for details.

7.1.2 Calibrating a touchscreen

Calibrate the connected touchscreens, one by one, as follows:

1. Select ***Monitor Setup > Service Calibrations.***
2. In the ***Enter Password*** dialog box, type the username and password and press **Enter**.

   Username: **biomed**

   Password: **Change**<space>**Me**

NOTE: Username and password are case sensitive.

NOTE: The factory default password for the username "biomed" is "Change Me".

3. In the ***Service / Calibrations*** menu, select ***Touch Screen***.
4. The Touch calibration screen opens.
5. Touch the calibration mark or cross hair (+) in each corner of the screen, according to the instructions shown on the screen.

NOTE: When you touch the cross hair in the upper left hand corner of the touch screen you are calibrating, the other connected displays will turn blank until the calibration is completed.

7.2 Configuring the network

7.2.1 Configuring hostname

1. Log in to Webmin.
2. Select ***Configuration > Network > Hostname.***
   The ***Hostname Configuration*** window opens.
   The current hostname is shown in the ***Current Value*** column.
3. Enter the new hostname in the ***Change Value to*** column.

   NOTE: The hostname is a unique, 4 to 32 character long identifier of a patient monitor in the network. 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.

4. Select ***Save***.
   The hostname configuration will take effect immediately.

7.2.2 Selecting and configuring CARESCAPE Network

To select CARESCAPE Network MC for the real-time network infrastructure:

1. Log in to Webmin.
2. Select ***Configuration > Network > Wired Interfaces***.
   The current network configuration is shown in the ***Present Configuration*** table.
3. Below ***Select Network Type*** in the ***Network Configuration*** window, select the applicable network type: ***CARESCAPE Network***.
4. Select ***Next*** to proceed on network configuration.

NOTE: When ***CARESCAPE Network*** is selected, the S/5 Network is disabled.

The patient monitor may be configured to the MC Network, or IX Network, or both.

Network connection(s)	Steps to be performed
MC Network only	5, (6), and 10
IX Network only	7, 8, 9 and 10
Both MC and IX Network	5, (6), 7, 8, 9 and 10

NOTE: The following IP addresses are reserved for the monitor's internal use: 192.168.249.x, 192.168.250.x, 192.168.252.x, 192.168.253.x, 192.168.254.1 and 192.168.254.2.

5. In the ***MC Network*** area**.**
   a. Enter a ***Static IP*** address.
   b. Enter a valid ***Netmask*** level.
   c. Select ***Speed*** & ***Duplex*** option.
6. If separate MC Network segments are connected together by a router, configure the router information below the MC static route:
   a. Enter ***Destination Address***.
   b. Enter ***Destination Netmask***.
   c. Enter an ***MC Gateway.***
7. In the ***IX Network*** area, 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 ***Default Gateway***.
   d. Enter valid ***DNS Server*** addresses if applicable.
8. Enter a unique ***Custom IX MAC Address.*** By default, the MC Network MAC address is shown here. Make sure that you do not use a MAC address that is already in use on your network.

NOTE: The following addresses are reserved for the monitor's internal use (RFC 7042):

- 00:00:5E:xx:xx:xx: Reserved for IANA unicast
- 01:00:5E:xx:xx:xx: Reserved for IANA multicast
- 33:33:xx:xx:xx:xx: Reserved for IPv6 multicast

- CF:xx:xx:xx:xx:xx: Reserved by IANA for PPP
- FF:FF:FF:FF:FF:FF: Broadcast
- Multicast addresses in which the first octet is an odd number (for example, 97:xx:xx:xx:xx:xx)

9. Select the applicable ***Speed & Duplex*** option.
10. Select ***Save***.

The default network speed is 10 Mbps half duplex, which suppresses the effects of network storms resulting from network misconfigurations. Please ensure that the network in your facility meets the network configuration requirements as described in the Patient Monitoring Network Configuration Guide.

The network configurations will be saved and become active when the patient monitor is restarted.

7.2.3 Selecting and configuring S/5 Network

To select S/5 Network for the real-time network infrastructure:

1. Log in to Webmin.
2. Select ***Configuration > Network > Wired Interfaces***.
   The current network configuration is shown in the ***Present Configuration*** table.
3. Below ***Select Network Type*** in the ***Network Configuration*** window, select the applicable network type: ***S/5***.
4. Select ***Next*** to proceed on network configuration.

NOTE: When ***S/5*** Network is selected, the CARESCAPE Network is disabled.

The patient monitor may be configured to the S/5 Network, or IX Network, or both.

Network connection(s)	Steps to be performed
S/5 Network only	1 and 4
IX Network only	2, 3, and 4
Both S/5 and IX Network	1, 2, 3, and 4

1. In the ***Network Configuration*** window below ***S/5 Network***, enter a ***Virtual ID.***

NOTE: Valid values are within the range of 50000 to 55000, inclusive.

NOTE: The Virtual ID must be unique for each patient monitor connected to the S/5 Network.

2. Below ***IX Network***, select ***DHCP*** or ***Manual Configuration***.
   a. Enter a ***Static IP*** address.
   b. Enter a valid ***Netmask*** level.
   c. Enter a valid ***Default Gateway***.
   d. Enter valid ***DNS Server*** addresses if applicable.
3. Select ***Speed & Duplex*** option.
4. Select ***Save***.

The default network speed is 10 Mbps half duplex, which suppresses the effects of network storms resulting from network misconfigurations. Please ensure that the network in your facility meets the network configuration requirements as described in the Patient Monitoring Network Configuration Guide.

The S/5 virtual ID change will be applied immediately. All other network configurations will be saved and become active when the patient monitor is restarted

7.2.4 Configuring ADT server settings

1. Log in to Webmin.
2. Select ***Configuration*** > ***Network*** > ***ADT settings***.
3. In the ***ADT settings*** window, select ***Enable*** to enable the Visit Number Query.
4. Enter the ADT IX IP address.

NOTE: See section 7.2.2 Selecting and configuring CARESCAPE Network for a list of reserved addresses that must not be used as the ADT IX IP address.

5. Select ***Save***.

To disable the Visit Number Query, select ***Disable*** in the ***ADT settings*** window.

7.3 Setting time and date

NOTE: In the S/5 Network, the patient monitor's date and time is automatically synchronized with the date and time of the iCentral it is connected to. You can set the date and time locally only if the patient monitor is not connected to the S/5 Network and the patient monitor is in a discharged state.

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. Log in to Webmin.
2. Select ***Configuration*** > ***Time***.
3. In the ***Time Configuration*** window, in ***Configure Date and Time***, update the following fields as needed:
   - Date
   - Month
   - Year
   - Hour:Minute
   - AM/PM
   - 12/24 Hrs
4. In the ***Time Configuration*** window, in ***Configure Time Zone***, select the appropriate ***UTC Offset***, if applicable.

   NOTE: The time zone configuration only applies to communication with Citrix server.
5. Select ***Save***.

The manual time configuration takes effect immediately.

7.4 Setting unit and bed name

Configure the care unit name and bed name for patient monitors that are configured to connect to the MC Network.

NOTE: The same unit name must be set for all the patient monitors and CARESCAPE Central Stations (CSCS) that are connected to the same care unit in the MC Network. Bed name shall be unique to each patient monitor in the same care unit.

NOTE: Unit and bed name selections are not available if network selection is S/5.

1. Log in to Webmin.
2. Select ***Configuration*** > ***Unit and Bed Name***.
3. In the ***Unit and Bed Name Configuration*** window, view or set the unit name and bed name for the device.

NOTE: Use only capital letters A - Z, numbers, dash (-), asterisk (*) and space ( ). The unit name may be up to seven characters long and bed name up to five characters long.

4. Select ***Save***.

The unit and bed name configuration takes effect immediately.

7.5 Configuring printers

You can configure the patient monitor to print to up to 12 laser printers connected on the IX Network. Use the Webmin sub-modules to install or delete a printer and to print a test page.

NOTE: Ensure that you have the host name(s) or IP address(es) for all the connected IX printers available. Configure the IX printers according to this information.

NOTE: Laser printers that are installed on central stations do not need to be configured using Webmin. Refer to the user's manual for details on configuring the printer.

NOTE: Refer to the patient monitor's supplemental information manual for the list of supported devices.

7.5.1 Installing a printer

1. Log in to Webmin.
2. Select ***Configuration*** > ***Printers***.
3. In the ***Sub-Modules for Printers*** menu, select ***Install Printer***.
4. Below ***Printer Configuration Information*** in the ***Install 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*** > ***Setup***.
8. In the ***Printout*** menu, select what to print out (for example, ***Waveforms***, ***Alarm Waveforms***, ***Numeric Trends***, ***Reports***).
9. Below ***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.

7.5.2 Deleting a printer

NOTE: Before deleting a laser printer, check ***Monitor Setup > Printing > Devices > Status.*** If a printout is assigned to the printer to be deleted, redirect the printout to another valid printer.

1. Log in to Webmin.
2. Select ***Configuration*** > ***Printers***.
3. In the ***Sub-Modules for Printers*** menu, select ***Delete Printer***.
4. In the ***Delete Printer*** window, select the printer to delete.
5. Select ***Save***.

The change will take effect immediately.

7.5.3 Printing a test page

1. Log in to Webmin.
2. Select ***Configuration*** > ***Printers***.
3. In the ***Sub-Modules for Printers*** menu, select ***Print Test Page***.
4. In the ***Print Test Page*** window, select the printer.
5. Select ***Save***.

7.6 Configuring Citrix

Configure the Citrix connection for iPanel software.

NOTE: GE is not responsible for installing or configuring the Citrix server.

NOTE: Contact hospital's IT Administrator or biomedical department to obtain values to the following fields.

NOTE: Server address, initial program and Citrix session timeout are mandatory fields.

1. Log in to Webmin.
2. Select ***Configuration*** > ***Citrix***.
3. In the ***Citrix Configuration*** window, enter the applicable information in the following fields:

Field name	Description and valid choices
Server Version	Select the supported server version: 4.0, 4.5, 5.0, 6.0, 6.5.
Server 1 to Server 4 Addresses	Blank, server IP address or server hostname, up to 255 character long.
Initial Program	Initial Citrix- published application that will be launched, for example #MUSE. This field is mandatory, if the server address has been entered. The maximum length is 128 characters.
Citrix Session Timeout (in Minutes)	Valid values are between 0-99. Keeping the session alive allows users to quickly return to their last session, but locks a Citrix license. Selecting "0" disables the timeout feature.

Field name	Description and valid choices
Username	Any valid Windows username. You can leave this field empty to allow anonymous login. The maximum length is 128 characters.
Password	Any valid Windows password. You can leave this field empty to allow anonymous login. The maximum length is 128 characters.
Confirm Password	The password and confirmed password must be the same.
Encryption Level	Select one of the following encryption levels: - "Basic" - "RC5 (128 bit - Login Only)" - "RC5 (40 bit)" - "RC5 (56 bit)" - "RC5 (128 bit)"

4. Select ***Save***.

All changes take effect immediately.

- Citrix Session Timeout (in Minutes)
- Username
- Password
- Confirm Password

NOTE: The hospital's IT Administrator or biomedical department can supply these values.

5. Select ***Save***.

All changes take effect immediately.

7.6.1 Troubleshooting

The information entered must confirm to the following standards:

- Citrix Server Address: Any valid IPv4 address.
- Initial Program: Name of Citrix-published application to launch.
- Citrix User Name: Any valid Windows username. If blank, the user will be forced to enter it manually.
- Citrix Password: Any valid Windows password.
- Citrix Timeout: Any integer greater than or equal to 0 and less than 9999.
- Citrix Startup Time: Any integer greater than or equal to 0 and less than 9999.

7.6.2 Glossary

Citrix Server Address: IP address or DNS name of Citrix Server.

Initial Program: Name of Citrix-published application to launch.

Citrix User Name: ID used to log into Citrix session.

Citrix Password: Password used to log into Citrix session.

Citrix Timeout:	The number of minutes that a Citrix session will remain open after the Citrix Window is closed. Keeping the session alive allows users to quickly return to their last session but locks a Citrix license.
Citrix Startup Time:	Estimated time, in seconds for connecting Citrix. During this time, the Citrix Window is displayed as blank, grey rectangle.

7.7 Configuring MUSE/12SL

NOTE: MUSE viewing is a licensed software feature. You can configure the MUSE/12SL settings independent of the license status, but actual viewing of MUSE reports requires that the MuseView license is enabled.

Settings to send 12SL data

1. Log in to Webmin.
2. Select ***Configuration*** > ***MUSE/12SL***.
3. In the ***MUSE/12SL*** window, enter the applicable information in the following fields:

   - ***Location ID*** Identifies the location ID number (within the range 0 to 599) associated with the patient monitor for searching the MUSE system.
   - ***Site Number*** Identifies the site number (within the range 1 to 254) associated with the patient monitor for searching the MUSE system.

4. Select ***Save***.

These settings take effect immediately after they are submitted.

Settings to view 12SL data

1. Log in to Webmin.
2. Select ***Configuration*** > ***MUSE/12SL***.
3. In the ***MUSE/12SL*** window, enter the following:

   - ***MUSE Web Username*** Username used to authenticate with the MUSE Web to access 12-lead reports.
   - ***MUSE Web Password*** Password used to authenticate with the MUSE Web to access 12-lead reports.
   - ***Confirm Password*** The password and the confirmed password must be the same.
   - ***MUSE Web URL*** Used to locate the MUSE Web system to access 12-lead reports. Enter the URL in a valid format.

4. Select ***Save***.

These settings take effect immediately after they are submitted.

7.8 Admit settings

7.8.1 Patient ID prefix

The patient monitor will automatically generate a temporary, unique patient ID when a patient with unknown ID is admitted to the patient monitor. The patient monitor will use this temporary patient ID for all 12SL reports that are sent to MUSE until the patient is discharged from the patient monitor, or his/her patient ID is changed. The temporary patient ID is generated from the temporary patient ID prefix, care unit name, bed name, and current time.

The temporary patient ID prefix is a hospital defined prefix that is used as the first two characters in a temporary patient ID to ensure its uniqueness inside the hospital.

1. Log in to Webmin.
2. Select ***Configuration*** > ***Admit Settings***.
3. In the ***Sub-Modules for Admit Settings*** menu, select ***Patient ID Prefix***.
4. In the ***Patient ID Prefix*** window, enter a 2-character prefix.

NOTE: Valid values are uppercase letters and numbers.

5. Select ***Save***.

All changes take effect immediately.

7.8.2 Barcode settings

The barcode reader language configuration must match the host monitor keyboard locale setting. As a default the barcode reader has been configured to US English at the factory. Configure the correct language to the barcode reader itself first before you configure the barcode settings to the monitor. Follow the instructions provided with the barcode reader.

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

NOTE: Acquire detailed specification of the character-delimited or the length-delimited, multi-field barcode that the hospital uses. This will configure the barcode parser correctly.

NOTE: Acquire sample barcodes, if possible, to verify the operation of the parser configuration.

NOTE: For details on barcode data requirements and restrictions, see section 7.8.5 Barcode data specifications.

1. Select the parser type.
   a. Log in to Webmin.
   b. Select ***Configuration*** > ***Admit Settings***.
   c. In the ***Sub-Modules for Admit Settings*** window, select ***Barcode Settings***.
   d. Below ***Barcode Setup*** in the ***Barcode Settings*** window, select the applicable parser type from the drop-down list:.

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

2. Select ***Save***.

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

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

   – 7.8.3 Configuring length delimited parser information.
   or
   – 7.8.4 Configure character delimited parser information.

7.8.3 Configuring 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) below ***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) below ***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) below ***Fixed Option***.

– For an example of admit/discharge configuration for a length delimited parser, see Example of length delimited parser information on page 79.

1. In 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. Below ***Fixed Option***, select the applicable value:

Item	Item selection in the top part of the screen	Fixed Option selection
Height Unit	Both ***Height*** and ***Height Unit***	*Non-Fixed*.
	Height only	Select value from drop-down list.
Weight Unit	Both ***Weight*** and ***Weight Unit***	***Non-Fixed***.
	Weight only	Select value from drop-down list.
Age Unit	Both ***Age*** and ***Age Unit***	***Non-Fixed***.
	Age only	Select value from drop-down list.

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

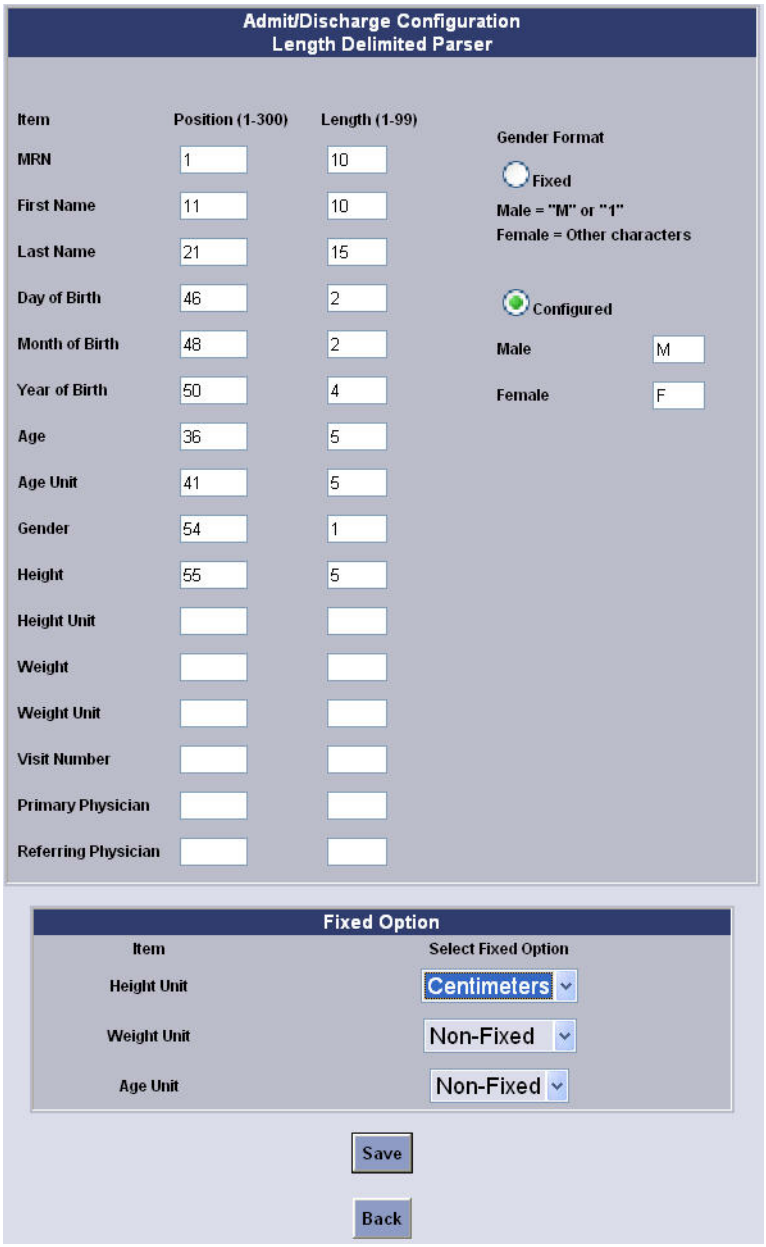
All changes take effect immediately.

Example of 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
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

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



7.8.4 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) below ***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) below ***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) below ***Fixed Option***.
- For an example of admit/discharge configuration for a length delimited parser, see Example of character delimited parser information entry on page 81.

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. Below ***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.

NOTE: Forbidden characters are control characters (ASCII characters 0-31), the space character (ASCII character 32), and ASCII characters 127 and above.

NOTE: If the character selected exists in any field in the barcode, it will be misinterpreted as a field delimiter.

3. Below ***Gender Code***, enter the codes that identify ***Male*** and ***Female***.
4. Below ***Fixed Option***, select the applicable value:

Item	Item selection in the top part of the screen	Fixed Option selection
Height Unit	Both ***Height*** and ***Height Unit***	*Non-Fixed*.
	Height only	Select value from drop-down list.
Weight Unit	Both ***Weight*** and ***Weight Unit***	***Non-Fixed***.
	Weight only	Select value from drop-down list.
Age Unit	Both ***Age*** and ***Age Unit***	***Non-Fixed***.
	Age only	Select value from drop-down list.

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

All changes take effect immediately.

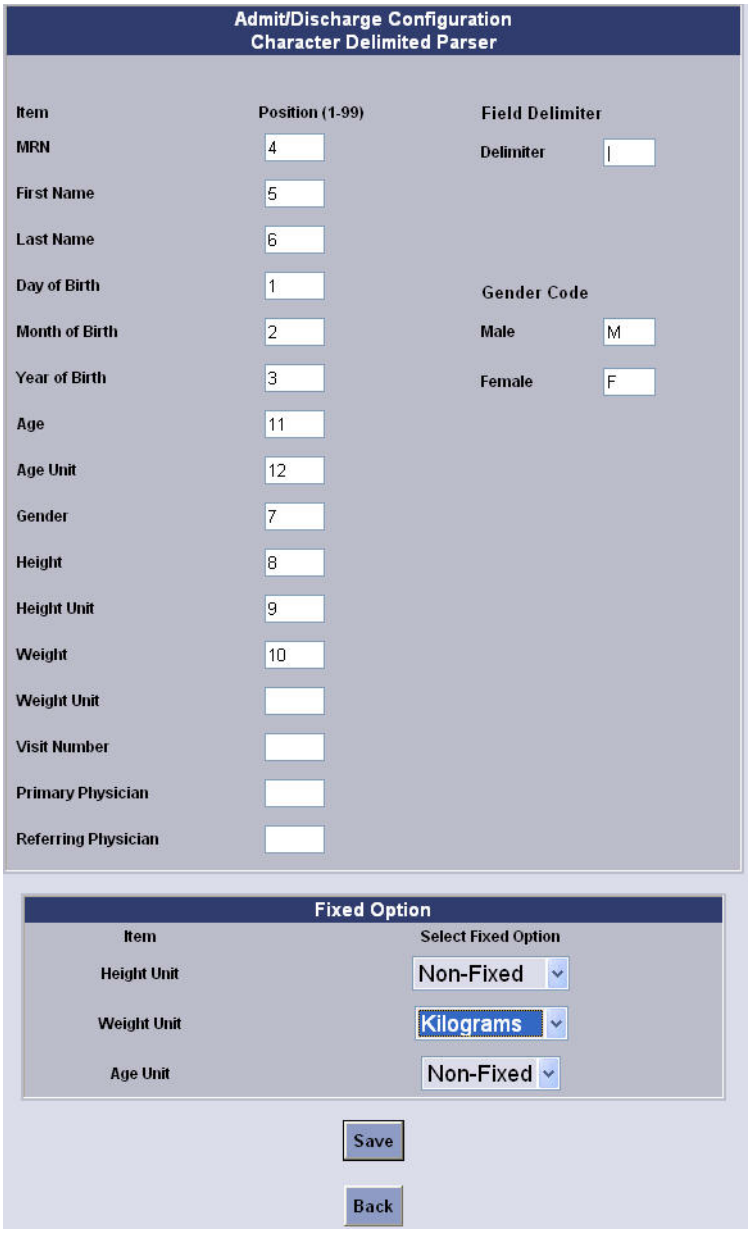
Example of character delimited parser information entry

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
MRN	4
First Name	5
Last Name	6
Day of Birth	1
Month of Birth	2
Year of Birth	3
Age	11
Age Unit	12
Gender	7

Item	Sequence number of the item in the barcode
Height	8
Height Unit	9
Weight	10

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



7.8.5 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 in the ***Admit/Discharge*** menu.

  If a field contains a forbidden character, that character will be replaced with a space when it is displayed in the ***Admit/Discharge*** menu.

Item	Maximum length	Valid entries	Comments
MRN	99	Both letters and numbers	Forbidden characters are those that are not allowed by the patient monitor, including the following characters: ! " # ¤ % & /( ) = ? ` @ £ $ € { [ ] } \ * ^ _ : ; | < >
First Name	99		
Last Name	99		
Day of Birth	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.
Month of Birth	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.
Year of Birth	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.
Age	99	Numeric 9999.9999	Either a period or comma is accepted as a decimal symbol.
Age Unit	99	A, Y, YR, YRS (years) MO, MOS (months) WK, WKS (weeks) D, DAY, DYS (days)	
Gender	1		If gender is configured (not fixed), this must be 1 character.
Height	99	Numeric 9999.9999	Either a period or comma is accepted as a decimal symbol.
Height Unit	99	FT (feet) IN (inches) M (meters) CM (centimeters) MM (millimeters)	
Weight	99	Numeric 9999.9999	Either a period or comma is accepted as a decimal symbol.
Weight Unit	99	KG, KGS (kilograms) G, GM, GMS (grams) MCG (micrograms) OZ, OZS (ounces) LB, LBS (pounds)	
Visit Number	99	Both letters and numbers	Forbidden characters are those that are not allowed by the patient monitor, including the following characters: ! " # ¤ % & /( ) = ? ` @ £ $ € { [ ] } \ * ^ _ : ; | < >
Primary Physician	99		
Referring Physician	99		

7.9 Setting power frequency

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

1. Log in to Webmin.
2. Select ***Configuration*** > ***Power Frequency***.
3. In the ***Power Frequency*** window, select the applicable power line frequency.
4. Select ***Save***.

The power frequency configuration takes effect immediately.

7.10 Selecting language and locale

Select the language used in clinical user interface and select the keyboard locale setting for the alphanumeric keyboard and the barcode reader.

1. Log in to Webmin.
2. Select ***Configuration*** >***Language***.
3. In the ***Language*** window, select the patient monitor language and keyboard language:
   a. Select the patient monitor language from the drop-down list and select ***Save***.
   b. Select the keyboard locale from the drop-down list and select ***Save***.

The language takes effect after the patient monitor is restarted. The keyboard locale takes effect immediately after it is submitted.

7.11 Selecting national requirements

Activate France specific defaults for the ECG HR adjustment range and the reminder beep behavior.

1. Log in to Webmin.
2. Select ***Configuration*** > ***National Requirements***.
3. In the ***National Requirement*** window, select the applicable option:

Value	Description
None	Select the normal defaults.
France	Enable the following country specific monitoring: - Heart Rate high alarm limit maximum 230. - Reminder beep will sound every 2 minutes when alarms have been silenced permanently.

4. Select ***Save***.

The national requirements changes take effect immediately.

7.12 Configuring modules

You can configure some acquisition module specific settings. The settings are saved to the permanent memory of the related acquisition module and the settings travel with the module from one patient monitor to another.

These settings are pre-configured at factory, except the ***Assets Settings***. You may need to re-configure them after corrective maintenance, or for administration purposes.

Refer to the Module Frames and Modules Service Manual for detailed information on how to change these settings.

Webmin sub-module	Module	Description
Assets Settings	PDM	This setting allows you to view the customer assigned asset number of the PDM.
Licensing	PDM	This setting allows you to manage the PDM feature licenses.
ECG Filter Configuration	PDM	This setting allows you to temporarily disable the ECG filter of the PDM.
STP/TP/ST Settings	E-PSMP	This setting allows you configure the STP/TP/ST setting after replacing the STP board.
P/PT/PP Settings	E-PT & E-PP	This setting allows you to configure the P/PT/PP setting after replacing the STP board.

7.12.1 Module asset settings

NOTE: This configuration applies only to the PDM.

NOTE: The ***Device Serial Number*** field is view only and cannot be changed.

To set the device asset number of a PDM:

1. Log in to Webmin.
2. Select ***Configuration*** > ***Modules***.
3. In the ***Sub-Modules for Modules*** menu, select ***Assets Settings***.
4. In the ***Assets Settings*** window, enter the user-assigned asset number for the device in the ***Change Value to*** column.
5. Select ***Save***.

The change will take effect immediately.

7.13 Setting the host asset number

Enter a host asset number and view the host serial number.

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

To set the host asset number:

1. Log in to Webmin.
2. Select ***Configuration*** > ***Host Asset Settings***.
3. In the ***Host Asset Settings*** window, enter the user-assigned host asset number (up to 32 ASCII characters long) in the ***Change Value to*** column.
4. Select ***Save***.

The host asset changes take effect immediately.

7.14 Password management

7.14.1 User accounts and passwords

The following table lists the available user names and default passwords for accessing the clinical configuration, service interface, and service calibrations.

User name	Default password	Access rights	Password change
biomed	***Change Me***	Use this user account to access service interface and service calibrations: • ***Monitor Setup > Service*** • ***Monitor Setup > Service Calibrations***	Password change in service interface is possible for the following user accounts: • ***biomed*** • ***clinical***
clinical	***Change Me***	Use this user account to access password protected clinical configurations: • ***Monitor Setup*** > ***Default Setup*** See the user's manual and supplemental information manual for more information.	Clinical user can change the default password for the clinical user account in the clinical interface: • ***Monitor Setup*** > ***Default Setup***

For information on passwords related to other user accounts, contact GE service.

7.14.2 Changing passwords

You can change the passwords for the biomed and clinical users.

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

NOTE: Username and password are case sensitive. The allowed characters for "biomed" and "clinical" passwords are: alpha [A-Z, a-z], numeric [0-9], and space. The password length shall be between 8 and 16 characters.

NOTE: The user name "biomed" is common for the ***Webmin*** and ***Service Calibrations*** login screens. A change to the "biomed" password will affect both service interfaces.

1. Log in to Webmin.
2. Select ***Configuration*** > ***Passwords***.
3. In the ***Edit User Password*** window, change the ***biomed*** or ***clinical*** user's password as required.
4. Select ***Save***.

The change will take effect immediately.

7.14.3 Resetting the password

If the valid password for the ***biomed*** user account is forgotten, contact your local GE representative to request a password reset key.

Provide the following information when requesting a password reset key:

- serial number of the monitor

When you have received the password reset key:

1. Go to the service interface login screen.
2. Select ***Forgot password?***.

   The selection appears on the login screen after an invalid login.
3. Enter the received ***Reset Key.***
4. Enter the received ***Expiration Date*** for the reset key in the following format: DDMMYYYY
5. Select ***Reset Password***.

   The ***biomed*** user account is now reset to default settings. For more information, see section 7.14.1 User accounts and passwords.

7.15 Restarting the patient monitor

You can use the Restart module in Webmin to restart the patient monitor after making configuration changes that require a manual restart to come into effect. For example after changing network or language settings, or adding activation codes for licenses.

NOTE: Loss of monitoring - This function is enabled only when the patient monitor is in a discharged state. Before restarting the patient monitor, verify that the patient is discharged from the patient monitor.

1. Log in to Webmin.
2. Select ***Configuration*** > ***Restart***.
3. In the ***Monitor Restart*** window, select ***Restart***.

   The patient monitor will shut down and restart automatically.

7.16 Setting up the remote service

7.16.1 Configuring the remote service

To configure the InSite RSvP remote service tool.

1. Log in to Webmin.
2. Select ***Configuration*** > ***Remote Service***.
3. In the ***Sub-Modules for Remote Service*** menu, select ***Configuration***.

4. In the ***Remote Service Configuration*** window, enter the applicable data:

HTTP Proxy Server Configuration		
Item	**Description**	**Comments**
Address	- If this site uses an HTTP proxy server, a specific site proxy server IP ***Address*** and ***Port*** number are required for the ***Remote Service*** communication to work. Otherwise, select ***None***. - If the HTTP proxy server requires user authorization, a specific ***Username***, and ***Password*** is required. Otherwise, select ***None***.	These values are determined by the customer.
Port		
Username and Password		

Remote Service Configuration		
Item	**Description**	**Comments**
System ID	Identifies the system to the GE back office servers.	These values are read-only and are unique.
Serial Number	Identifies the unit and is set at the time of manufacture.	
Enterprise URL	If required, designate the address of the GE backoffice servers required to communicate with the ***Remote Service Agent***.	This address should never be changed unless explicit instructions are given to do so.
Enterprise Tunnel URL	If required, designate the address of the GE backoffice servers required to communicate with the tunneling agent.	
Protocol	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.

7.16.2 Enabling remote service agent/ connection

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

1. Log in to Webmin.
2. Select ***Configuration*** > ***Remote Service***.
3. In the ***Sub-Modules for Remote Service*** menu, select ***Control***.
4. In 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.

7.16.3 Testing the connectivity

NOTE: Connectivity test works only if the connection is enabled, that is the current state is enabled/running.

1. Log in to Webmin.
2. Select ***Configuration*** > ***Remote Service***.
3. In the ***Sub-Modules for Remote Service*** menu, select ***Control***.
4. Below ***Test Connectivity*** in the ***Remote Service Control*** window, select ***Test*** to test the connectivity to the remote service server.
5. Verify that ***Connection to Enterprise URL*** and ***Connection to Tunnel URL*** both pass the test.
6. If one of the connection tests fail, check the failure description and fix the connectivity issue. Re-test the connectivity.

7.17 Transferring settings from one patient monitor to other patient monitors

You can transfer platform and/or clinical settings from one patient monitor to another, take backup copies of the settings to an external device and restore the settings from an external device.

1. Complete the platform and/or clinical configuration in one patient monitor.
2. Save the completed platform and/or clinical configuration settings to an external device (section 7.17.1 Saving settings).
3. Load the saved platform and/or clinical configuration settings from an external device to the destination patient monitors (section 7.17.2 Loading settings).
4. Activate the loaded platform and/or clinical configuration settings in the destination patient monitors (section 7.17.3 Activating settings).
5. Some platform settings can't be transferred from one patient monitor to another. See section 7.17.3 Activating settings for details. Configure these unaffected settings manually in the destination patient monitor following the instructions in sections 7.2 Configuring the network, 7.4 Setting unit and bed name, 7.13 Setting the host asset number and 7.18 License management.

NOTE: Clinical settings are software package and profile specific. For example, you can transfer clinical settings from a patient monitor with OR and PACU software only to other patient monitors with OR and/or PACU software, not to patient monitors with ICU, NICU and ED software.

7.17.1 Saving settings

NOTE: The patient monitor must not be configured to receive any alarm notifications from other monitors when the settings are saved.

Before saving the settings to a patient monitor that is connected to the MC or S/5 Network, make sure that the monitor is not receiving any alarm notifications from other monitors:

1. Select ***Data&Pages > Other Patients > Receive Alarms.***
2. Check that ***Change All Notifications*** is set to ***Off***.

Save the completed platform and/or clinical settings to a service PC or USB flash drive.

1. Log in to Webmin.

2. Select ***Configuration*** > ***Settings***.
3. In the ***Sub-Modules for Settings*** menu, select ***Save***.
4. In the ***Save Settings*** window, select the radio button next to the type of settings you want to save.
5. Select ***Save***.
6. According to your Webmin access:

a. If you are using Webmin on a service PC, you can save the settings file to any mass storage device connected to the service PC:
   - In the ***File Download*** dialog box, select ***Save***.
   - In the ***Save as*** dialog box, select the destination drive and folder and select ***Save.***

   NOTE: You may change the default filename, but do not change the file extension.

b. If you are using Webmin locally through the integrated browser, you can save the settings file to a USB flash drive that is connected to one of the patient monitor's USB ports:
   - The ***Save As*** window will show you the name of the created settings file.
   - Select ***Save*** to save the settings file to the USB flash drive.

   NOTE: You may change the default filename, but do not change the file extension.

   NOTE: Do not disconnect the USB storage device until saving is complete.

7.17.2 Loading settings

Load the saved platform and/or clinical settings from a service PC or USB flash drive to the patient monitor.

NOTE: The loaded settings will remain in an inactive state in the patient monitor until they are purposely activated by the user (see section"7.17.3 Activating settings").

1. Log in to Webmin.
2. Select ***Configuration*** > ***Settings***.
3. In the ***Sub-Modules for Settings*** menu, select ***Load***.
4. According to your Webmin access:

a. If you are using Webmin on a service PC, you can load the settings file from any mass storage device connected to the service PC:
   - In the ***Load Settings*** window, enter the file name or select ***Browse*** to select a file from the ***Choose File to Upload*** dialog box.
   - Select ***Upload*** to load the settings.

b. If you are using Webmin locally through the integrated browser, you can load the settings file from a USB flash drive that is connected to one of the patient monitor's USB ports:
   - The ***Load Settings*** window will show you the available settings files. Select the settings file to be loaded.
   - Select ***Load Settings*** to load the selected settings file from the USB flash drive.

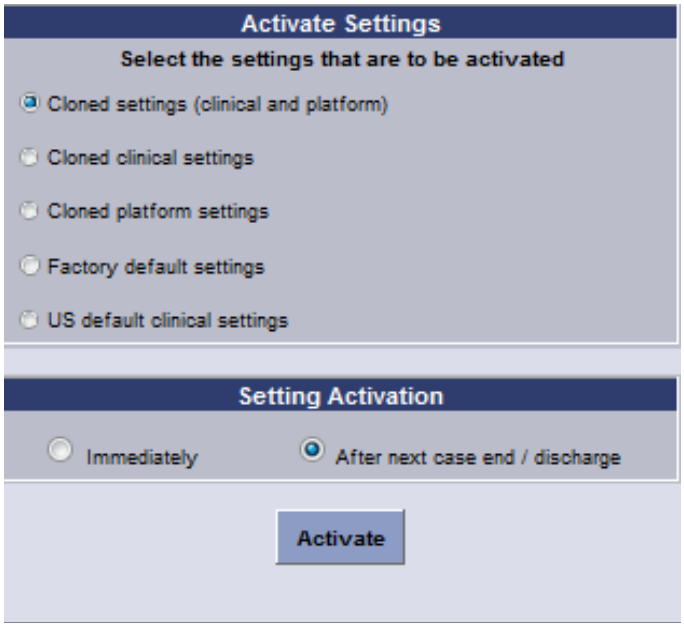
   NOTE: Do not disconnect the USB storage device until loading is complete.

7.17.3 Activating settings

NOTE: Settings activation takes place only when the patient monitor is in a case reset / patient discharged state. If you are going to activate settings immediately, verify that the patient monitor is in a case reset / patient discharged state. You can alternatively initiate the setting

activation process with a delay during an active patient case, but the new settings will activate only after the next case reset / patient discharged.

1. Log in to Webmin.
2. Select ***Configuration*** > ***Settings***.
3. In the ***Sub-Modules for Settings*** menu, select ***Activate***.
4. In the ***Activate Settings*** window, select the settings that you want to activate:



- Select ***Cloned settings (clinical and platform)*** to activate both the clinical and platform settings.
- Select ***Cloned clinical settings*** to activate only loaded clinical settings.
- Select ***Cloned platform settings*** to activate only loaded platform settings.

NOTE: Activation of the cloned clinical or platform settings will not affect the following settings in the target patient monitor:

– Network
– Unit and Bed Name
– Host Asset Settings
– Licenses

Remember to configure the unaffected settings manually in the target patient monitor.

- Select ***Factory default settings*** to restore all platform and clinical settings back to the factory defaults.
- Select ***US default clinical settings*** to restore all clinical and platform settings back to the US specific factory defaults.

NOTE: Activation of the factory defaults and US factory defaults will leave the following settings in the target patient monitor unaffected:

- Host Asset Settings

- Licenses

5. In the ***Setting Activation***, select whether you want the new settings to take effect immediately or after the next case end / discharge:

Select	To	NOTE
Immediately	Activate the new settings Immediately.	The patient monitor must be in a case reset / patient discharged state.
After next case end / discharge	Take the new settings in use with a delay, after the next case end / patient discharge.	This option allows you to initiate the setting activation process with a delay during an active patient case. The new settings will activate only after the next case end / patient discharge.

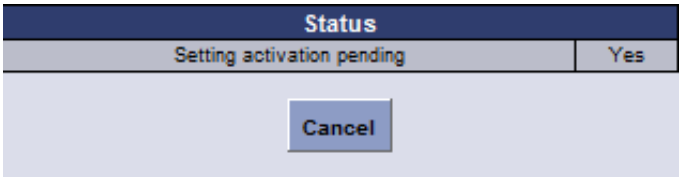
6. Select ***Activate*** to start the settings activation process.

- **If immediate settings activation was selected:**
  a. Wait until the settings activation is completed and the patient monitor has performed an automatic restart.
  b. Verify that the settings activation was successful and the patient monitor is running the activated settings.
- **If after next case end / discharge settings activation was selected:**
  a. The patient monitor will show a message ***Settings activation on next discharge/after next case end*** on the display until the next case end / patient discharge. The patient monitoring can be continued normally until then.
  b. Settings activation will start automatically after the next case end / patient discharge, unless this process is canceled by the user.
  c. Wait until the settings activation is completed and the patient monitor has performed an automatic restart.
  d. Verify that the settings activation was successful and the patient monitor is running the activated settings.

7.17.4 Canceling pending settings activation

You can cancel pending settings activation anytime while the message ***Setting activation after next case end / Setting activation after next discharge*** is shown on the display.

1. Log in to Webmin.
2. Select ***Configuration*** > ***Settings***.
3. In the ***Sub-Modules for Settings*** menu, select ***Activate***.
4. Select ***Cancel*** to cancel settings activation.



7.18 License management

You can upload a license file that contains all acquired licenses and activation codes. Alternatively, you can enable and activate individual software packages and host software feature licenses by entering the required activation code manually.

NOTE: Contact GE Healthcare to acquire activation codes for licenses.

7.18.1 Enabling and activating host software package

NOTE: As a factory default the ICU software package is always activated.

NOTE: You can have several software packages enabled, but only one of them can be selected active at a time.

Enter an activation code to enable the software package.

1. Log in to Webmin.
2. Select ***Configuration*** > ***Licenses***.
3. In the ***Sub-Modules for Licenses*** window, select ***Software Package***.
4. Below ***Software Package*** in the ***Software Package*** window:
   a. From the ***Status*** drop-down list, select ***ENABLED***.
   b. Enter a valid ***Activation Code*** for the new software version.
5. Select ***Save***.
6. To activate a software package, select the desired radio button in the ***Active*** column.
7. Select ***Save***.

All license changes take effect after the next patient monitor restart.

NOTE: The software license for the active host software version is shown in the ***Software Package*** window below the ***Active Software License***. This license is typically entered before activating a new host software version, see Software Management.

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

7.18.2 Enabling and activating host software feature licenses

Feature licenses are available either as permanent or as trial licenses. Activation codes for trial licenses are valid for 90-days.

Enter the activation code to enable a software feature.

1. Log in to Webmin.
2. Select ***Configuration*** > ***Licenses***.
3. In the ***Sub-Modules for Licenses*** menu, select ***Host Licensing***.
4. In the ***Host License*** window, enter the activation code by the appropriate ***OPTIONAL*** host license feature.

NOTE: To activate an ***OPTIONAL-TRIAL*** license, enter the expiration date in addition to the activation code.

5. From the ***Status*** drop-down list, select ***ENABLED***.
6. Select ***Save***.

All license changes take effect after the next patient monitor restart.

7.18.3 Uploading license file

Upload a valid license file as follows:

1. Log in to Webmin.
2. Select ***Configuration*** > ***Licenses***.
3. In the ***Sub-Modules for Licenses*** window, select ***Upload License***.
4. According to your Webmin access:
   a. If you are using Webmin on a service PC, you can upload the license file from any mass storage device connected to the service PC. In the ***Upload Software Package and Host License*** window, enter the file name of the license file or select ***Browse*** to select a file using the ***Choose File to Upload*** dialog box.
   b. If you are using Webmin locally through the integrated browser, you can upload the license file from a USB flash drive that is connected to one of the patient monitor's USB ports. In the ***Upload Software Package and Host License*** window, select the license file to be uploaded.

   NOTE: Do not disconnect the USB storage device until downloading is complete.
5. Select ***Upload*** to upload the license file.
6. Verify that the information populated in the ***Software Package*** and ***Host License*** tables is accurate.

All license changes take effect after the next patient monitor restart.

7.19 Certificate management

HTTPS protocol is used for secure communication between the monitor and the service PC using the Webmin web client. The purpose for using HTTPS protocol is to authenticate the connected monitor and to protect the privacy and integrity of the exchanged data between the monitor and the Webmin web client.

Certificate Management is used to configure the Webmin web client with an X.509 certificate from a trusted certificate authority. The monitor's service interface provides tools to install a custom certificate and a public key to the monitor, but first you need to use third party tools or services to generate them.

By factory default, the monitor has a self-signed certificate of the Webmin web client issued by GE. To improve access security, you can install a certificate issued and signed by a trusted certificate authority to the monitor. The certificate authority must be recognized and trusted by the web browsers used to access the service interface.

7.19.1 Generating a certificate and a private key

1. Log in to Webmin.
2. Select ***Configuration > Certificate management > Generate Self Signed Certificate and Key***.
3. In the ***Certificate Manager: Generate Self Signed Certificate and Key*** window, enter the following information:
   - ***Certificate file name:*** Enter the file name for the certificate file (default: hostcert.pem).
   - ***Key file name:*** Enter the file name for the private key file (default: hostkey.pem).
   - ***Key/Certificate pair file name***: Enter the file name for the private key/certificate file (default: hostkey+cert.pem).
   - ***Password***: Enter the password for the private key/certificate.

- ***Confirm Password***: Re-enter the password for the private key/certificate. NOTE. You must enter the password each time that an SSL service that uses this key is started. If you do not want to provide the password for each service, leave the ***Password*** field blank.
- ***Key size:*** Enter the RSA key size in bits (default: 2048).
- ***Certificate valid for***: Enter the number of days before the certificate expires (default: 730)
- ***Common Name***: Enter the name of the host device (default: hostname of the device).
- ***Organization Name***: Enter the name of the hospital requesting the certificate/key.
- ***Locality***: Enter the locality information (for example, city).
- ***State or Province (full name):*** Enter the state or province information.
- ***Country***: Enter the 2-letter country code.
- ***Email Address***: Enter the email address of the hospital requesting the certificate/key.

4. Select **Generate Key** to generate a self-signed certificate and private key.

7.19.2 Generating a certificate signing request (CSR)

1. Log in to Webmin.
2. Select ***Configuration*** > ***Certificate management*** > ***Generate Self Signed Certificate and Key.***
3. In the ***Certificate Manager: Generate Certificate Signing Request*** window, enter the following information:
   - ***Certificate file name:*** Enter the file name for the certificate file (default: hostsct.pem).
   - ***Key file name:*** Enter the file name for the private key file (default: hostkey.pem).
   - ***Password***: Enter the password for the private key/certificate.
   - ***Confirm Password:*** Re-enter the password for the private key/certificate. NOTE. You must enter the password each time that an SSL service that uses this key is started. If you do not want to provide the password for each service, leave the ***Password*** field blank.
   - ***Key size:*** Enter the RSA key size in bits (default: 2048).
   - ***Common Name:*** Enter the name of the host device (default: hostname of the device).
   - ***Organization Nam***e: Enter the name of the hospital requesting the SSL and CSR.
   - ***Locality***: Enter the locality information (for example, city).
   - ***State or Province (full name)***: Enter the state or province information.
   - ***Country***: Enter the 2-letter country code.
   - ***Email Address:*** Enter the email address of the hospital requesting the SSL and CSR.
4. Select ***Generate CSR*** to request an authenticated certificate from a Certificate Authority (CA).

7.19.3 Importing the certificate and the private key

NOTE: The certificate and the private key must be in a PEM-encoded file format, which is readable as ASCII text. Importing encrypted private keys is not supported.

1. Log in to Webmin.

2. Select ***Configuration*** > ***Certificate management*** > ***Import Key or Signed Certificate.***
3. To upload the certificate file:
   a. In the ***Certificate file to upload*** field, select ***Choose file,*** search the drive and folder where the file is located, and select the file you wish to upload. Follow the instructions of the web browser.
   b. In the ***Destination directory of certificate*** field, select the destination directory for uploading the certificate file.
   c. Enter the name of the certificate to the ***Destination filename of certificate*** field.
   d. Select ***Upload Certificate*** to upload the certificate file to the host device.
4. To upload the key file:
   a. In the ***Key file to upload*** field, select ***Choose file***. Search for the drive and folder where the file is located and select the file you wish to upload. Follow the instructions of the web browser.
   b. In the ***Destination directory of key*** field, select the destination directory for uploading the private key file.
   c. In the ***Destination filename of certificate*** field, enter the name of the private key.
   d. Select ***Upload Key*** to upload the private key file to the host device.

7.19.4 Managing the current certificate or private key

1. Log in to Webmin.
2. Select ***Configuration*** > ***Certificate management*** > ***Manage/view installed certificates and keys***.
3. Select the certificate or key file in the drop-down list and select ***View***.
   - To download the certificate or key file, select ***Download***. NOTE: The download certificate or key file is not encrypted. To encrypt the file, enter a password in the field below the certificate/key table and select ***Download As PKCS12, With Password.*** This password is user-selectable.
   - To delete the certificate or key file, select ***Delete***.

7.19.5 Managing the Webmin certificate or key

1. Log in to Webmin.
2. Select ***Configuration*** > ***Certificate management*** > ***Webmin Certificate.***
3. In the drop-down list, select the certificate file and ***Select***. The certificate file must also contain the unencrypted key.
   - To enable the selected certificate or key file, select ***Set***.
   - To reset the selected certificate or key file, select ***Reset***.

   The change will take effect immediately.

   NOTE: The service interface can become unresponsive after a new certificate is uploaded. If necessary, reload the page or reopen the browser after uploading the certificate.

7.20 Software management

Software installation consists of two main steps: software transfer and software activation.

7.20.1 Transferring the software

To begin the software installation, transfer the new software into the inactive memory partition of the patient monitor. You can use either of the following tools:

- GE Healthcare Software Transfer Utility that runs on a service PC. With this application, you can transfer new software to the patient monitors over the CARESCAPE Network IX (IX Network) or a crossover cable.
- InSite RSvP

You can transfer the software in the background, without affecting normal patient monitoring. The new, transferred software is inactive in the patient monitor(s) until you activate it.

NOTE: The software installation package contains both the patient monitor software and the Software Transfer Utility. The software transfer procedure is described in detail in the CARESCAPE Modular Monitors Software Installation Instructions that is delivered together with the software installation package.

7.20.2 Activating the installed software

After transferring the new software to the patient monitors, take the transferred, inactive software into use by activating it.

Before you start:

- Verify the compatibility of the connected bedside and network devices with the new software version. Refer to the latest version of the patient monitor's supplemental information manual for a list of compatible network and bedside devices.
- Contact GE Healthcare to get the latest version of the user and service documentation.
- Contact GE Healthcare for any inquiries regarding the software installation package and/or activation code for the new host software version.

NOTE: Loss of monitoring - Software is activated only when the patient monitor is in a patient discharged / case reset state. Normal patient monitoring is unavailable until the software activation is completed. This may take up to 10 minutes.

NOTE: The existing clinical and platform settings of the patient monitor are saved and are not affected by the activation of the new patient monitor software version. However, any new or changed clinical and platform settings in the activated patient monitor software version have their factory default values and may require manual configuration. For more information, refer to the latest version of the patient monitor's supplemental information manual.

1. Log in to Webmin.
2. Select ***Configuration*** > ***Software Management***.
   The ***Software Management*** window displays.
3. In the ***Software List***, select the software that you want to activate:

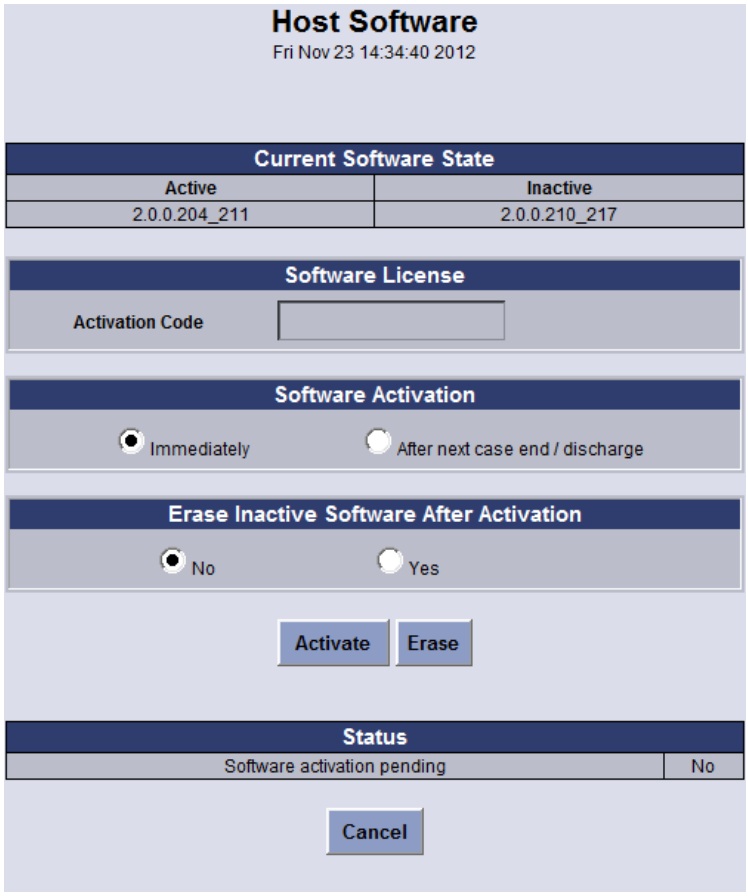
Software	Purpose of use
Host Software	Patient monitor
UIC Software	For displays and USB Remote Controller
EMBC Software	For F5 and F7 Frames
LoFlo software	E-LoFLo module
NMT software	E-NMT module Note: You can only upgrade to the E-NMT-01 version.
PDM Software	CARESCAPE Patient Data Module
PiCCO Software	E-PiCCO module
sGAS Software	CARESCAPE respiratory modules: E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOV, E-sCAiOVX

4. Select ***Next***.
   The selected ***Software activation*** window appears.
5. According to the software you are activating, proceed to:
   - Activating host software immediately
   - Activating host software after next case end / discharge
   - Activating module software
   - Activating EMBC or UIC software

Activating host software immediately

Before you start:

- Make sure the patient monitor is in a case reset / patient discharged state.



1. In the ***Host Software*** window, verify that the software you are activating is listed as ***Inactive*** in ***Current Software State***.
2. In ***Software License***, if applicable, enter the ***Activation Code*** for the new software version.
3. In ***Software Activation***, select ***Immediately***.

4. In ***Erase Inactive Software After Activation***, select:

   No - to keep the currently active software version as inactive software after the new software version is activated successfully. This option lets you restore the patient monitor to the previous software version later.

   Yes - to erase the currently active software version permanently after the new software version is activated successfully.

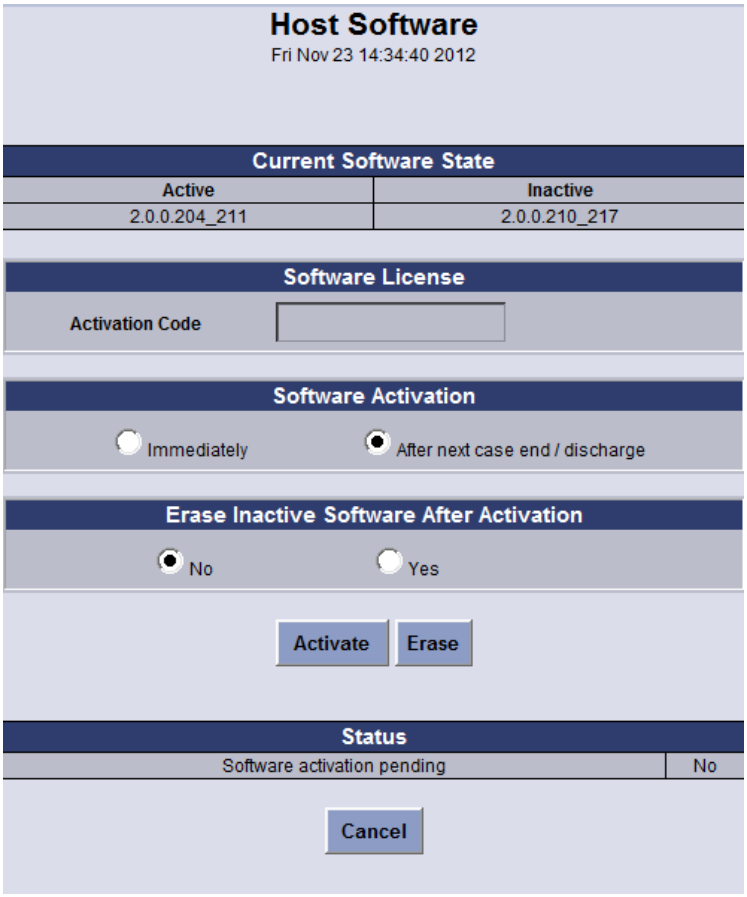
5. Select ***Activate*** to start the host software activation.
6. Confirm activation by selecting ***Yes*** in the Host Software window that opens.

   The patient monitor shows a screen saver that informs about the ongoing software activation:
   Software activation in progress. Do not disconnect any measurement modules or other peripheral devices, or shut down the monitor until the software activation is complete. Activation may take up to 10 minutes. The device will automatically restart once the software activation is complete.

   NOTE: When the software is activated first time after a uDOM replacement, the screen saver does not appear.
7. Wait until the software activation completes and the patient monitor restarts automatically.
8. Verify that the software activation is successful and the patient monitor runs the activated software.

Activating host software after next case end / discharge

If you want to activate the new host software with a time delay, that is, after the next case end / patient discharge, follow this instruction. You can initiate the software activation process with a delay during an active patient case.



1. In the ***Host Software*** window, verify that the software that you activate is listed as ***Inactive*** in ***Current Software State***.
2. In ***Software License***, if applicable, enter the ***Activation Code*** for the new software version.
3. In ***Software Activation***, select ***After next case end / discharge.***
4. In ***Erase Inactive Software After Activation***, select:

   No - to keep the currently active software version as inactive software after the new software version is activated successfully. This option lets you restore the patient monitor to the previous software version later.

   Yes - to erase the currently active software version permanently after the new software version is successfully activated.

5. Select ***Activate*** to start the software activation.
6. Confirm activation by selecting ***Yes*** in the ***Host Software*** window that opens.
   The patient monitor shows a message ***Software activation after next case end / after next discharge*** on the display until the next case end or patient discharge. The patient monitoring can be continued normally until then.
7. Software activation will start automatically after the next case end / patient discharge, unless this process is cancelled before it starts.

The patient monitor informs clinical users about pending software activation by showing the message ***Software activation after next case end / after next discharge*** on the display.

The software activation starts automatically after the clinical user performs a patient discharge / case end the next time. The patient monitor shows a screen saver that informs about the ongoing software activation:

Software activation in progress. Do not disconnect any measurement modules or other peripheral devices, or shut down the monitor until the software activation is complete. Activation may take up to 10 minutes. The device will automatically restart once the software activation is complete.

NOTE: When the software is activated first time after a uDOM replacement, the screen saver does not appear.

The clinical user must wait until the software activation is complete and the patient monitor restarts automatically. If the patient monitor starts up normally and no error messages appear on the display, the activation is successful.

Activating module software

Follow this instruction when you want to:

- activate new sGAS software to a CARESCAPE Respiratory Module
- activate new PDM software to a CARESCAPE Patient Data Module
- activate new PiCCO software to an E-PiCCO Module
- activate new NMT software to an E-NMT Module (only possible for E-NMT-01 version)
- activate new LoFlo software to an E-LoFlo Module

Before you start:

- Make sure that the patient monitor is in a case reset / patient discharge state.
- Make sure that the target parameter module is connected to the patient monitor.

NOTE: Do not disconnect the parameter module, or shut down the patient monitor until the software activation is completed and the parameter module has restarted.

NOTE: Do not activate the host software while the module software upgrade is in progress.

To activate module software:

1. In the ***PDM/sGAS/PiCCO/NMT/LoFlo Software*** window, in ***Current Software State***, verify that the software you want to activate is listed as ***Inactive***.
2. Select ***Activate*** to activate the inactive software.
3. Confirm activation by selecting ***Yes*** in the ***Host Software*** window that opens.
   The patient monitor will now start activating the module software. It will show a message ***PDM module removed*** or ***xxx measurement removed*** (xxx refers to parameter name) on the patient monitor screen. This message will remain until the module software activation is completed and the parameter module has restarted. This may take up to 15 minutes. Do not shut down the patient monitor or disconnect the parameter modules. The parameter module restarts automatically after the software activation is complete.
4. After the parameter module restarts, verify that the software activation is successful and the parameter module runs the activated software.

Activating EMBC or UIC software

Follow this instruction when you want to:

- activate new EMBC software to a F5 or F7 Frame
- activate new UIC software to a display or USB Remote Controller

You can activate new software to several peripheral devices at a time.

Before you start:

- Make sure that the patient monitor is in a case reset / patient discharged state.

- Make sure that all the target peripheral devices are connected to the patient monitor.

NOTE: Do not disconnect any peripheral device, or shut down the patient monitor, until the software activation is successfully completed.

To activate EMBC and UIC software:

1. ***EMBC/UIC Software*** window, in ***Current Software State***, verify that the software you want to activate is listed as ***Inactive***.

   The correct UIC software depends on the display REF number:

   – M1177405 is for D15K, D19KT with REF part number 2039143-001.
   – 2064128-001 is for D19KT with part number 2067141-001 and for D19KT VER01.
   – 2095419-001 for D19KT with REF part number 2042925-026 and USB Remote controller.

   If needed, transfer the correct UIC software before the activation.
2. Select the peripheral devices whose software you want to activate.
3. Select ***Activate*** to start the software activation to the selected peripheral devices.
4. Confirm activation by selecting ***Yes*** in the Host Software window that opens.
   NOTE: Software activation may take up to 10 minutes.
5. According to your Webmin access:

- If you are using Webmin on a service PC:
  a. EMBC Software – Wait until the software activation completes and the E-Module Frame (F5/F7) performs an automatic restart. The green On/Standby (Power) LED in the F5/F7 frame turns off when the EMBC software activation is started and illuminates again after the EMBC software activation is completed.
  b. UIC Software - Wait until the software activation completes and the patient monitor performs an automatic restart. It may take up to 10 minutes.
- If you are using Webmin locally via the integrated browser of the patient monitor and you are activating:
  a. EMBC Software - Wait until the software activation completes and the E-Module Frame (F5/F7) performs an automatic restart. The green On/Standby (Power) LED in the F5/F7 frame turns off when the EMBC software activation is started and illuminates again after the EMBC software activation is completed.
  b. UIC Software - Select ***Refresh*** to start the activation, then select ***Refresh*** repeatedly until the software activation progress bar shows 100%. Then wait until the software activation completes and the patient monitor performs an automatic restart.

6. Verify that the software activation is successful and the peripheral devices run the activated software.

7.20.3 Canceling pending host software activation

You can cancel a pending host software activation at any time while the message ***Software activation after next discharge/after next case end*** is shown on the display.

1. Log in to Webmin.
2. Select ***Configuration*** > ***Software Management.***
   The ***Software Management*** window opens.
3. Select ***Host Software*** from the ***Software List*** and select ***Next***.
4. In the ***Host Software*** window, below ***Status***, verify that the ***Software activation pending*** is ***Yes***.
5. Select ***Cancel***.

The pending software activation is cancelled and the patient monitor continues running the current software version.

7.20.4 Erasing an inactive software version

You can erase an inactive host software version from the patient monitor. Erasing can prevent the activation of a wrong software version by mistake.

1. Log in to Webmin.
2. Select ***Configuration*** > ***Software Management***.
   The ***Software Management*** window opens.
3. Select the software that you want to erase and select ***Next***.
   The selected software activation window appears.
4. Select ***Erase*** to erase the inactive software.

For your notes:

8 Installation checkout

The purpose of the installation checkout procedure is to ensure that the system is properly installed and configured for use.

The installation check covers the CARESCAPE B850 monitoring system including the following devices:

- CARESCAPE B850 host
- Displays
- F5/F7 Frames
- E-modules
- CARESCAPE PDM

Service personnel shall perform the following checkout procedure for the monitoring system after the hardware installation and platform configuration is completed:

- 8.1. Visual inspection
- 8.2. Electrical safety tests

  NOTE: The manufacturer has performed the electrical safety test for the patient monitor and acquisition modules during final inspection. You do not have to perform the electrical safety tests during installation checkout, if there is less than 12 months since the patient monitor was manufactured. Check the date of manufacture of the device from the device label (see section 3.5.2. Equipment identification).
- 8.3. Functional check

NOTE: Refer to chapter 10. Maintenance and checkout to see the recommended checkout procedure after corrective and planned maintenance.

8.1 Visual inspection

Perform the following visual inspection to the installed monitoring system:

- Carefully inspect the patient monitor and the connected peripheral devices for any damage.
- Verify that the patient monitor and the connected peripheral devices are properly mounted with specified mounting solutions.
- Verify that the cables between the patient monitor and the connected peripheral devices are intact, properly connected and secured to the right connectors.
- Verify that the power cord and USB cables are properly secured with the supplied retaining clips.
- Verify that all the network cables, both MC and IX Network, are intact and properly connected to the right connectors.
- Verify that the modules are properly connected and locked.

The cleaning precautions, requirements, procedures, and recommended cleaning solutions for the patient monitor are described in the patient monitor's user's manual. For details about cleaning, disinfecting and sterilizing the accessories, see the instructions for use in the accessory package.

8.2 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.

8.2.1 Test setup

Test conditions

Perform electrical safety tests under normal ambient conditions of temperature, humidity and pressure.

Test equipment

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

Tool	Part Number / Requirement
Safety Analyzer / Leakage Current Tester	Equivalent to the circuits shown.
Safety Test Body Kit [1)]	P/N M1155870 or equivalent

1 Instead of the test bodies included in the safety test body kit, other applicable test bodies with all pins connected together may be used.

Perform electrical safety tests using an electrical safety analyzer according to IEC 60601-1, AAMI ES60601-1 + C1 + A1 + A2, EN 60601-1 or CSA CAN/CSA-C22.2 NO. 60601-1:14. The schematics in this section provide a general understanding of the test equipment. Actual configuration of test equipment may vary. Refer to the instructions delivered with the safety analyzer to perform each test.

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

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

NOTE: GE recommends that the qualified personnel performing the tests should record the test results of each electrical safety test, for example by using the installation / maintenance check forms included in this manual.

System setup

These instructions are intended for every component in the system. Ensure that all system components are properly connected to the patient monitor.

8.2.2 Power outlet

Verify that the power outlet is wired correctly according to 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.

8.2.3 Power cord and plug

Verify that the power cord being used with the patient monitor is good. To do this, check the following:

- Inspect the power cord for wear or damage regularly. If damage is suspected, test for continuity through each conductor of the power cord connector. Replace the power cord, as necessary, with a regulatory approved cord for the country of use.

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

8.2.4 Ground integrity check

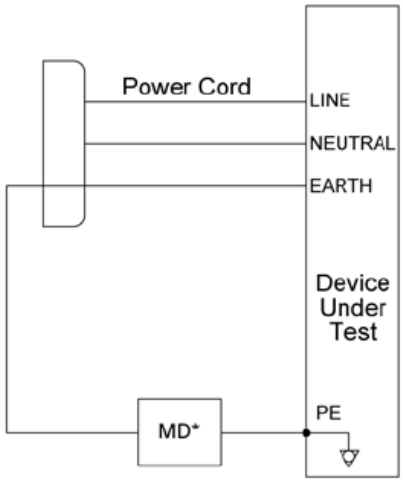
Listed below are two alternative methods for checking the ground integrity: "a) Ground continuity test" and "b) Impedance of protective ground connection". These tests determine whether the device's exposed metal and power inlet's ground connection has a power ground fault condition.

Perform either test a) or test b) in accordance to your local regulations.

NOTE: Refer to the instructions delivered with the safety analyzer to perform each test.

a) Ground continuity test

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



Acceptance criteria:

- For equipment without a power supply cord, the impedance between the protective ground terminal and any accessible metal part which is protectively grounded shall not exceed 0.1 ohms.
- For equipment with a power supply cord, the impedance between the protective ground pin in the mains plug and any accessible metal part which is protectively grounded shall not exceed 0.2 ohms.

b) Impedance of protective ground connection

This test is normally 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 doubt.

Check compliance as follows:

1. A current of 25A from a current source with a frequency of 50 or 60 Hz with a no-load voltage not exceeding 6 V is passed for at least 5 seconds, but not 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, flex the unit's power cord along its length. There should be no fluctuations in resistance.

Acceptance criteria:

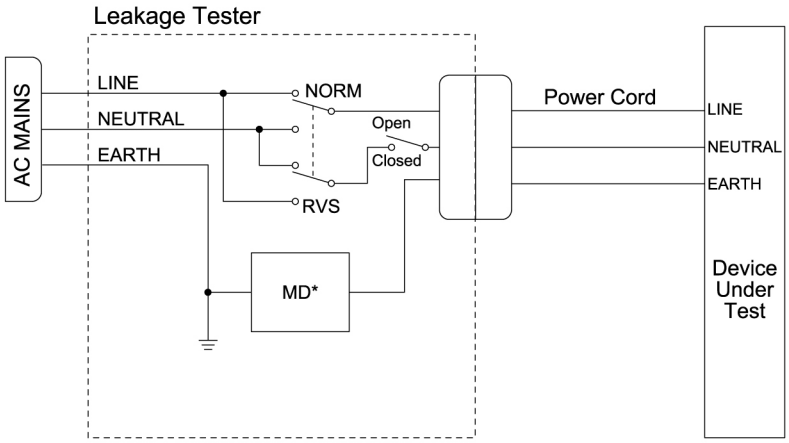
- For equipment without a power supply cord, the impedance between the protective ground terminal and any accessible metal part which is protectively grounded shall not exceed 0.1 Ohms.
- For equipment with a power supply cord, the impedance between the protective ground pin in the mains plug and any accessible metal part which is protectively grounded shall not exceed 0.2 Ohms.

8.2.5 Ground leakage current test

This test measures the current leakage flowing from the mains part through or across the insulation into the protective ground conductor of the device under test.

Perform this test both in Normal Condition (NC) and in a Single Fault Condition (SFC), where one of the supply conductors is open at a time. Perform the test with normal and reverse polarity.

NOTE: Refer to the instructions delivered with the safety analyzer to perform this test.



NOTE: *The measuring device (MD) represents the network and voltage measuring instrument and its frequency characters according to IEC 60601-1.

1. Configure the safety analyzer as follows (NC):
   – Polarity: NORMAL
   – Neutral: CLOSED

2. Power on the device under test.

3. Read and record the current leakage indicated on the safety tester.

4. Configure the safety analyzer as follows (SFC):
   – Polarity: NORMAL
   – Neutral: OPEN

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

6. Configure the safety analyzer as follows (SFC):
   – Polarity: REVERSED
   – Neutral: OPEN

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

8. Configure the safety analyzer as follows (NC):
   – Polarity: REVERSED
   – Neutral: CLOSED

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

10. Power off the device under test.

Acceptance criteria in Normal Condition (NC):

- All readings shall be less than or equal to 300 μA f*or installations that require compliance to UL 60601-1 requirements.*
- All readings shall be less than or equal to 500 μA f*or installations that require compliance to EN 60601-1 / IEC 60601-1 requirements.*

Acceptance criteria in Single Fault Condition (SFC) – one of the supply conductors open at a time:

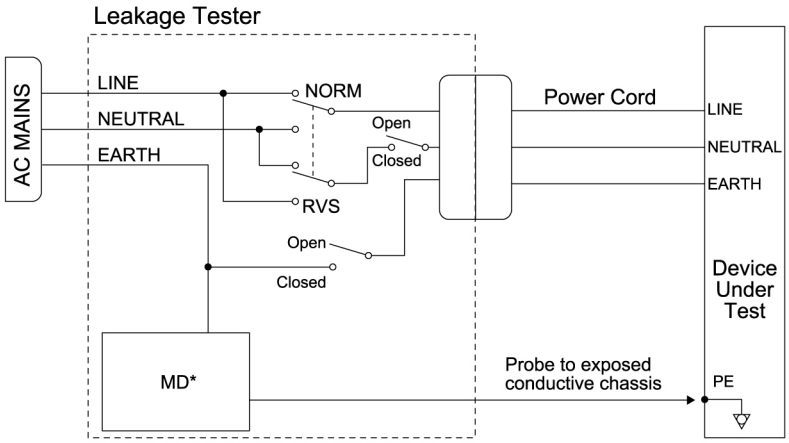
- All readings shall be less than or equal to 1 mA.

8.2.6 Testing touch current

This test measures current leakage through the exposed conductive parts on the device under test.

Perform the test in Normal Condition (NC) and in two different Single Fault Conditions (SFC): 1) earth open and 2) one of the supply conductors open at a time. Perform the test with normal and reverse polarity.

NOTE: Refer to the instructions delivered with the safety analyzer to perform this test.



NOTE: *The measuring device (MD) represents the network and voltage measuring instrument and its frequency characters according to IEC 60601-1.

1. Configure the safety analyzer as follows (NC):
   - Polarity: NORMAL
   - Neutral: CLOSED
   - Earth (GND): CLOSED

2. Power on the device under test.

3. Read and record the current leakage indicated on the safety tester.

4. Configure the safety analyzer as follows (SFC):
   - Polarity: NORMAL
   - Neutral: OPEN
   - Earth (GND): CLOSED

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

6. Configure the safety analyzer as follows (SFC):
   - Polarity: NORMAL
   - Neutral: CLOSED
   - Earth (GND): OPEN

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

8. Configure the safety analyzer as follows (SFC):
   - Polarity: REVERSED
   - Neutral: CLOSED
   - Earth (GND): OPEN

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

10. Configure the safety analyzer as follows (SFC):
    - Polarity: REVERSED
    - Neutral: OPEN
    - Earth (GND): CLOSED

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

12. Configure the safety analyzer as follows (NC):
    - Polarity: REVERSED
    - Neutral: CLOSED
    - Earth (GND): CLOSED

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

14. Power off the device under test.

Acceptance criteria in Normal Condition (NC):

- All readings shall be less than or equal to 100 µA

Acceptance criteria in Single Fault Condition (SFC) – earth open or one of the supply conductors open at a time:

- All readings shall be less than or equal to 300 µA f*or installations that require compliance to UL 60601-1 requirements.*
- All readings shall be less than or equal to 500 µA f*or installations that require compliance to EN 60601-1 / IEC 60601-1 requirements.*

8.2.7 Patient leakage current tests – overview

The following table specifies the parameter modules and the related patient connectors to be tested in the 8.2.8. Patient (source) leakage current tests and in the 8.2.9. Patient (sink) leakage current tests.

Use the safety test body kit, P/N M1155870 (or equivalent), to perform patient leakage current tests. This safety test body kit contains various patient connectors where all pins are shorted out together. For information on which test body to use for each patient connector, refer to the service instructions included in the safety test body kit.

NOTE: If not otherwise stated in the table below, each test body is connected directly to the specified connector in the patient module.

Table 1 Patient connectors to be tested with each module

Module	Patient connector
E-PSMP	ECG & SpO2
E-PT	P3/P7
E-PP	P5

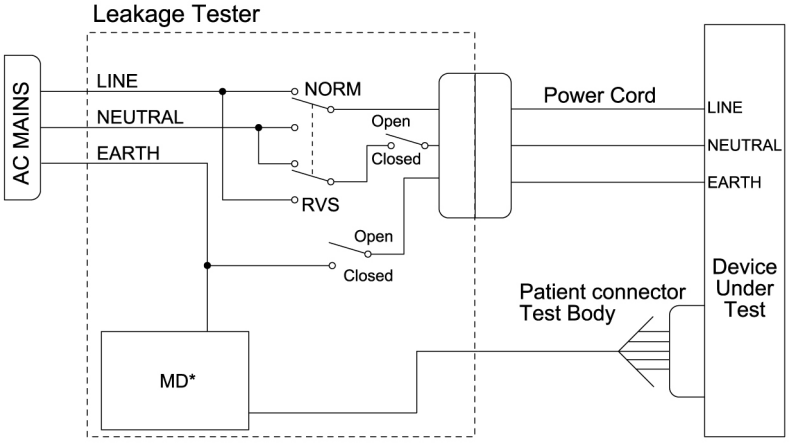
Module	Patient connector
E-COP, E-COPSv	P4/P8
E-PiCCO	P8
E-NSATX, E-NSAT	SpO2
E-Masimo	SpO2
E-NMT	NMT
E-BIS	1. Connect the BISx Digital Signal Processing Unit with the Patient Interface Cable (PIC+) to the E-BIS module. 2. Connect the specified test body to the PIC+ cable. NOTE: The patient isolation is in the BISx Digital Signal Processing Unit, not in the E-BIS module.
E-Entropy	1. Connect an Entropy sensor cable to the module. 2. Connect the specified test body to the Entropy sensor cable.
E-EEG	1. Disconnect the N-EEG headbox from the E-EEG module. 2. Connect the test body directly to the E-EEG module.
PDM	ECG & SpO2
SpO2, Masimo SpO2	SpO2

8.2.8 Patient (source) leakage current tests

This procedure measures the leakage current from an applied part connector of the device to ground.

Perform the test in Normal Condition (NC) and in two different Single Fault Conditions (SFC): 1) earth open and 2) one of the supply conductors open at a time.
Perform test with normal and reverse polarity.

NOTE: Refer to the instructions delivered with the safety analyzer to perform this test.



NOTE: *The measuring device (MD) represents the network and voltage measuring instrument and its frequency characters according to IEC 60601-1.

NOTE: Perform this test for all the connected parameter modules and patient connectors specified in Table 1.

1. Configure the safety analyzer as follows (NC):
   - Polarity: NORMAL
   - Neutral: CLOSED
   - Earth (GND): CLOSED
2. Power on the device under test.
3. Read and record the current leakage indicated on the safety tester.
4. Configure the safety analyzer as follows (SFC):
   - Polarity: NORMAL
   - Neutral: OPEN
   - Earth (GND): CLOSED
5. Read and record the current leakage indicated on the safety tester.
6. Configure the safety analyzer as follows (SFC):
   - Polarity: NORMAL
   - Neutral: CLOSED
   - Earth (GND): OPEN
7. Read and record the current leakage indicated on the safety tester.
8. Configure the safety analyzer as follows (SFC):
   - Polarity: REVERSED
   - Neutral: CLOSED
   - Earth (GND): OPEN
9. Read and record the current leakage indicated on the safety tester.
10. Configure the safety analyzer as follows (SFC):
    - Polarity: REVERSED
    - Neutral: OPEN
    - Earth (GND): CLOSED
11. Read and record the current leakage indicated on the safety tester.
12. Configure the safety analyzer as follows (NC):
    - Polarity: REVERSED
    - Neutral: CLOSED
    - Earth (GND): CLOSED
13. Read and record the current leakage indicated on the safety tester.
14. Power off the device under test.
15. Repeat this test for all the connected parameter modules and patient connectors specified in Table 1.

Acceptance criteria in Normal Condition (NC):

- All readings shall be less than or equal to 10 μA.

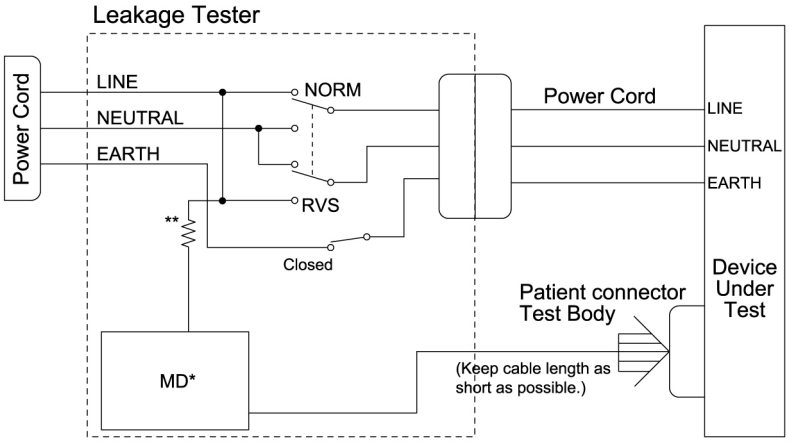
Acceptance criteria in Single Fault Condition (SFC) – earth open or one of the supply conductors open at a time:

- All readings shall be less than or equal to 50 μA.

8.2.9 Patient (sink) leakage current tests

This procedure measures the leakage current from an applied part connector of the device to ground. Perform the test in Normal Condition (NC) with normal and reverse polarity.

NOTE: Refer to the instructions delivered with the safety analyzer to perform this test.



NOTE: *The measuring device (MD) represents the network and voltage measuring instrument and its frequency characters according to IEC 60601-1.

NOTE: **According to IEC-60601, the impedance to protect the circuitry and the person performing the test, but low enough to accept currents higher than the allowable values of the leakage current to be measured.

WARNING **SHOCK HAZARD - The following step causes high voltage at the test body. Do not touch the test body.**

NOTE: Perform this test for all the connected parameter modules and patient connectors specified in Table 1.

1. Configure the safety analyzer as follows:
   - Polarity: NORMAL
   - Neutral: CLOSED
   - GND: CLOSED
2. Power on the device under test.
3. Read and record the current leakage indicated on the safety tester.
4. Configure the safety analyzer as follows:
   - Polarity: REVERSED
   - Neutral: CLOSED
   - GND: CLOSED
5. Read and record the current leakage indicated on the safety tester.
6. Power off the device under test.

7. Repeat this test for all the connected parameter modules and patient connectors specified in Table 1.

Acceptance criteria:

- All readings shall be less than or equal to 50 μA.

8.2.10 Test completion

1. Disconnect the safety analyzer from the power outlet.
2. Disconnect the test equipment from the patient monitor.
3. Disconnect the patient monitor's power cord from the leakage tester.
4. Mark this task as complete on the Appendix A. Installation check form.

8.3 Functional check

The purpose of this functional check is to ensure that the system is properly installed and configured. Cover all peripheral devices that are connected to the patient monitor by performing the applicable tests below. Skip the tests that are not applicable for the installed patient monitor.

8.3.1 Start-up

1. Connect the power cord to the wall outlet.
2. Turn on the patient monitor.

Verify that the patient monitor starts up normally:

- The speaker gives an audible beep.
- The normal monitoring screen appears and there are no error messages on the screen.

8.3.2 Display

Picture quality

Perform this test for all the connected displays .

1. Verify that all text is readable and all images are clear.
2. Verify that the brightness is good. Adjust if necessary.

Touchscreen control

Perform this test for all connected touchscreen displays.

1. Verify the operation and the calibration of a touchscreen by touching a corner of an active parameter window. Verify that the selected menu is opened.
2. Select  to close any open menu and return to the main display.

Alarm light

Perform this test for all the connected displays.

1. Create an active alarm and check that the alarm light illuminates.

8.3.3 Device Information

1. Log in to Webmin.

2. Select ***Information > Device Information***.
3. Verify that the device information is correct:
   – The connected parameter modules are identified.
   – The connected CARESCAPE Network ID interfaces are identified.
   – The connected USB input devices are identified.
4. Stay connected to Webmin.

8.3.4 Configuration Information

1. Select ***Information > Configuration Information***.
2. Verify that the patient monitor is correctly configured:
   – The host Information is correct.
   – The active software package is correct.
   – The correct host licenses are enabled.
   – The correct PDM licenses are enabled.
   – Patient ID prefix is correctly configured.
   – Unit and Bed name are correctly configured.
   – S/5 printers are correctly configured.
   – IX printers and printer locations are correctly configured.
   – Remote service is correctly configured.
   – National requirements are correctly configured.
   – Network is correctly configured.
   – Power Line Frequency is correctly configured.
   – MUSE/12SL is correctly configured.
   – Citrix is correctly configured.
3. Log out Webmin.

8.3.5 Trim knob, keypad, and remote

Perform the applicable steps for all the connected displays and for the optional remote controller.

1. Press any hard key in the keypad or remote and verify that the selected menu is opened on the screen or the selected activity is started.
2. Rotate the **Trim Knob** control in either direction to move from option to option on the display until you have an active parameter window or main menu item highlighted. Press the **Trim Knob** control once to select the highlighted option. Verify that the selected menu is opened on the screen or the selected activity is started.
3. Select  to close any open menu and return to the main display.

8.3.6 Mouse

Perform this test only if a mouse is connected to the patient monitor.

1. Move the mouse until the pointer (arrow) is over an active parameter window or a main menu item you wish to select and click the left mouse button once to select it.
2. Select  to close the open menu and return to the main display.

8.3.7 Alphanumeric keyboard

Perform this test only if an alphanumeric keyboard is connected to the patient monitor.

1. Select ***Data & Pages > Admit/Discharge*** (or ***Start / End Case***).
2. Select the ***Patient tab > Edit Name & MRN***.
3. Press **Enter** to highlight the ***Medical Record Number*** field.
4. Type some text into the ***Medical Record Number*** field using the connected alphanumeric keyboard. Include some characters that are specific to the chosen keyboard locale to verify that the keyboard language configuration is correct.
5. Select  to close the open menu and return to the main display.

8.3.8 Barcode reader

Perform this test only if a barcode reader is connected to the patient monitor.

1. Select ***Data & Pages > Admit/Discharge*** (or ***Start / End Case***).
2. Select the ***Patient*** tab.
3. Scan a test barcode that is applicable to your system:

Parser Type	Test Procedure
Length Delimited or Character Delimited Parser	4. Select ***Scan from Barcode***. 5. Scan a known test barcode obtained from the hospital. NOTE: The barcode data content must be known and in compliance with the completed parser configuration. 6. Verify that the data content in the barcode is correctly populated to the related fields in the ***Patient*** and the ***Administr. Information*** tabs.
No parser	4. Select ***Edit Name & MRN*** and press **Enter** to highlight the ***Medical Record Number*** field. 5. Scan a sample barcode that only contains one piece of information (e.g., a Serial Number barcode from a module's device label). 6. Verify that the data is correctly populated into the ***Medical Record Number*** field.

7. Select  to close the open menu and return to the main display.

8.3.9 MC Network and S/5 Network

Perform the following test only if the patient monitor is connected to a wired MC Network or S/5 Network.

NOTE: Make sure that at least one other patient monitor is on the network. The other patient monitor must be in an admitted state and have an active ECG measurement with a simulator signal.

1. Check that a network symbol  is displayed in the upper right corner of the screen.
2. Select ***Data & Pages – Other Patients*** and select a patient from the list.
3. Select ***View*** and verify that a window with parameters from another patient displays on the left side of the screen.
4. Select ***Close View*** to close the window.

8.3.10 IX printers

Perform the following test only if the patient monitor is connected to a printer in the IX Network and you did not print a test page while you configured the IX printer.

1. Log in to Webmin.
2. Select ***Configuration*** > ***Printers > Print Test Page***.
3. Select the IX Printer to test.
4. Select ***Save***.
5. Verify that the test page was printed to the selected printer.
6. Repeat steps 3 to 5 for all connected IX printers.

8.3.11 iPanel connection

Perform the following test only if the Citrix / iPanel is configured and in use.

1. Select ***Data & Pages > iPanel*** and verify that the initial program (configured in Webmin) is launched correctly.
2. Select  to exit the Citrix thin client.

8.3.12 InSite RSvP

Perform the following test only if remote service is configured and enabled, and you did not test the connectivity already while you enabled it.

1. Log in to Webmin
2. Select ***Configuration > Remote Service***.
3. In the ***Sub-Modules for Remote Service*** menu, select ***Control***.
4. In the ***Remote Service Control*** window under ***Test Connectivity***, select ***Test*** to test the connectivity to the remote service server.
5. Verify that ***Connection to Enterprise URL*** and ***Connection to Tunnel URL*** both "Pass" the test.

If one of the connection tests fail, check the failure description given and fix the connectivity issue. Re-test the connectivity.

8.3.13 Test completion

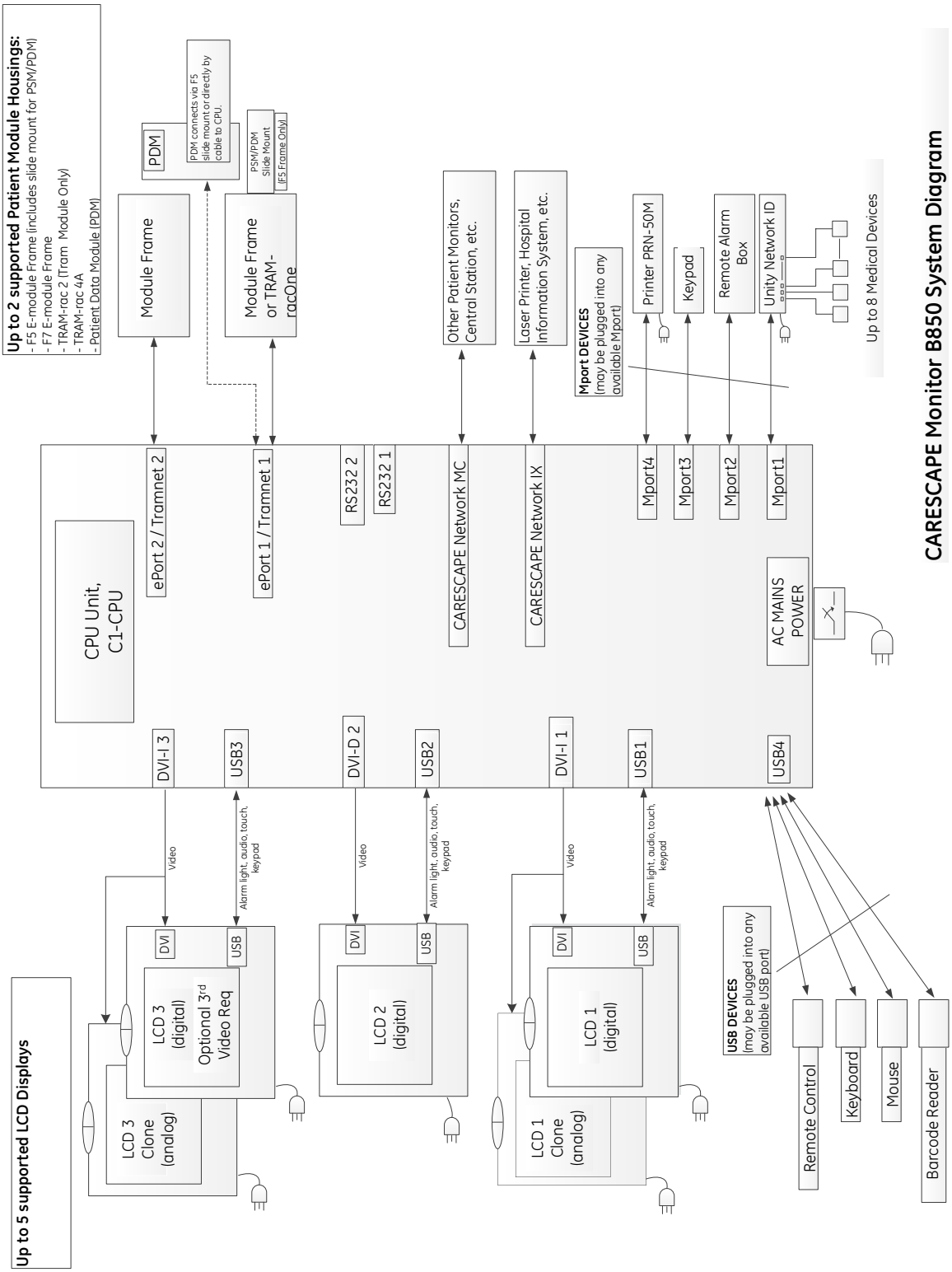
Discharge Patient or ***Reset Case*** to discard any changes made to the patient monitor configuration during checkout.

- Complete the Appendix A. Installation check form.

For your notes:

9 Theory of operation

9.1 System block diagram



The system block diagram describes the functional units of the CARESCAPE Monitor B850. The following sections describe the operation and interaction of the different subsystems.

9.2 Main components

The CPU unit is housed in a single package. The main components of the CPU unit are:

- Power supply
- CPU processor board
- 3rd video board (optional)
- Speaker assembly
- Bottom chassis, Top cover, and Back cover
- Front bezel
- Light pipe assembly

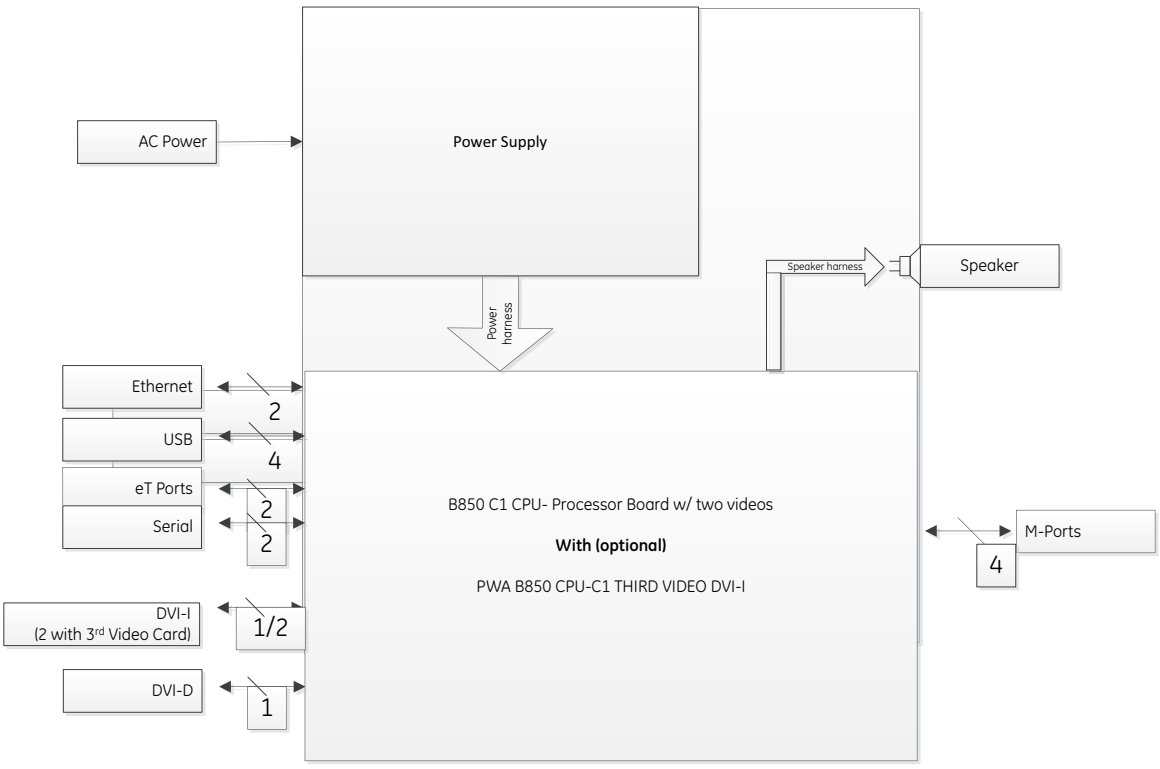
9.2.1 Power supply

The Power supply connects to the CPU processor board with a 12 pin connector and provides a 5.1V and two separate 16.75V outputs.

Power entry module

The power entry module provides an AC input connector and a power on/off switch.

9.2.2 CPU processor board



Main processor and memory:

- The main processor manages the data processing of the patient monitor.

- It has a non-volatile flash memory for the BIOS a volatile SDRAM memory for run time code execution and temporary data storage.
- A detachable, non-volatile flash memory, USB Disk On Module (uDOM), is used as the permanent memory for application and service software, and to store clinical and platform settings. The uDOM may hold two versions of the software in different partitions: inactive and active.

System supervision:

- Watchdog timers control the operation of the main processor.
- The processor board has battery backed-up real-time clock to store system date and time.

Video and audio system:

- The processor board controls the generation of audible tones and displayed information for analog and digital type displays.

Support for interfaces:

- The processor board provides support for the communication channels to support M-Port peripherals, ePort/Tramnet (eT-Ports) connected acquisition systems, the CARESCAPE or S5 Network, USB devices and Serial Devices.

9.2.3 Speaker Assembly

The speaker is used for audible tones: beat tone and alarms.

9.2.4 Bottom Chassis, Top and Back Cover

The bottom chassis houses the processor board, power supply, speaker and light pipe assembly. The bottom chassis provides the means for mounting the CPU unit to GCX or other mechanical mounts. The light pipe assembly transmits light from a LED on the processor board to the front panel of the CPU unit for presence of 5V DC.

9.2.5 User interface

The M-Port based keypad, USB touchscreen, USB remote control, USB keyboard or an USB mouse provides the user interface for the patient monitor. The USB remote control is connected to one of the USB ports at the CPU unit or at the display using a USB2.0 cable. The keyboard and mouse are connected to the CPU unit using the USB connectors. The keypad uses an M-Port on the front panel of the CPU unit.

- A green LED illuminates on the front of panel of the CPU unit when the unit is powered.
- A ***Service Monitor - Low Battery*** message is put on the display for a low lithium battery.
- Power on/off switch is lit green when it is in ON condition and power is present.

Power failure alarm

The following applies to the D19KT VER01 display only.

If there is a power failure (e.g., the supply mains is interrupted or the USB cable is disconnected), the CARESCAPE D19KT VER01 display gives a continuous beeping alarm. This alarm remains active for as long as there is some residual power left, or until it is silenced with the Trim Knob or the standby button, or until the USB cable is reconnected or the supply mains is restored. A power failure alarm is also indicated by the alarm light flashing yellow.

9.2.6 External interfaces

M-Ports

Four M-Ports are provided on the front of the CPU unit for connecting the PRN50 and Unity ID. Basic insulation (250 VAC) is provided to isolate the CPU unit from M-Port devices. Each M-Port supports the 1-Wire, Serial (RS-232) and Ethernet Protocols. Each M-Port can supply 100mA at 4.75V minimum.

The connector used for the M-Ports is an 8-pin, RJ-45 type.

eT-Ports

The connector used for the eT-Ports is a DB-9 Female.

ePort Devices	Up to two ePort devices can be connected to the eT-Ports located on the back of the CPU unit such as Module Frame and PDM.

Ethernet connections

Two Ethernet ports are located on the back of the CPU unit and they provide an ANSI/IEEE 802.3 10/100 BaseT Ethernet standard interface to the CARESCAPE Network/ S5 network and Hospital Enterprise network. Basic insulation (250 VAC) is provided to isolate the CPU unit from networked devices.

The connector used for the Ethernet ports is a dual 8-pin, RJ-45 type.

Video Outputs

A DVI-I and a DVI-D ports are located on the back of the CPU unit. An optional 3rd Video Card (2020913-003) provides an additional interface to analog and digital displays.

Each DVI-I & DVI-D port has the following features:

- DDC (Data Display Channel) support
- Resolution of 1024 x 768 x 60HZ.

DVI-I can drive displays in the following configurations:

- Digital only, using DVI-D to DVI-D cable
- Analog only using DVI-A or VGA cable
- Both digital and analog, using the Y-split cable along with a DVI-D to DVI-D cable and a DVI-A to VGA Cable. Note in this configuration image on both the analog and digital display will be the same with same resolution i.e., 1024x768 @ 60Hz.

DVI-D can drive displays in the following configuration:

- Digital only, using DVI-D to DVI-D cable

Serial port

Two RS-232C compatible serial ports are located on the back of the CPU unit to provide an interface to serial touchscreens.

The connector used for the serial ports is a DB-9M.

USB 2.0

Four USB ports are located on the back of the CPU unit to provide an interface for a USB based Remote Control Assembly, keyboard, mouse, Bar Code reader, a touch screen display, or PC interface.

10 Maintenance and checkout

This chapter specifies the checkout procedure and the maintenance activities to be performed to the patient monitor after corrective maintenance and during planned maintenance.

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

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

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

NOTE: Refer to Module Frames and Modules Service Manual for corrective and planned maintenance checkout procedures of the parameter modules.

NOTE: Refer to the PDM section in the Module Frames and Modules Service Manual for the battery maintenance procedure of the PDM battery.

Corrective maintenance

Service personnel shall perform the following checkout procedure steps after any corrective maintenance, before taking the monitor back into clinical use:

Performed service activity	Required checkout procedure		
	Visual inspections (section 10.1)	**Electrical safety test (section 10.2)**	**Functional check (section 10.3)**
After detaching or replacing: - Power supply - CPU PCB assembly - Lithium -ion battery (timekeeper)	Yes	Yes	- All steps
After detaching or replacing: - 3rd video card	Yes	Yes	- 10.3.1 Start-up - 10.3.2 Display - 10.3.3 PSM / PDM identification
After detaching or replacing: - Enclosure Kit - Hardware kit (or any part of this) - Speaker assembly	Yes	Yes	- 10.3.1 Start-up
After detaching or replacing: - Label kit	Yes	No	- 10.3.1 Start-up
After detaching or replacing: - uDOM	Yes	Yes	- All steps
After detaching or replacing: - M-Port keypad Kit - Remote Control Kit	Yes	No	- 10.3.1 Start-up - 10.3.5 Keypad and remote

Planned maintenance schedule

Perform the planned maintenance procedure every 2 years after installation. Perform the procedure in the following order:

1. Visual inspection (section 10.1)
2. Electrical safety tests (section 10.2)
3. Functional check (section 10.3, all steps)

Replace the CPU timekeeper battery every 5 years, or whenever the ***Service Monitor Error Code 0xHOST1100*** message is shown.

10.1 Visual inspection

Follow the procedure in section 8.1. Visual inspection.

10.2 Electrical safety checks

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

Perform the following electrical safety tests described in detail in chapter 8. Installation checkout:

- 8.2.1. Test setup
- 8.2.2. Power outlet
- 8.2.3. Power cord and plug
- 8.2.4. Ground integrity check
- 8.2.5. Ground leakage current test
- 8.2.6. Testing touch current

Record the values of the tests on the Appendix B. Maintenance check form.

10.3 Functional check

10.3.1 Start-up

Follow the procedure in section 8.3.1. Start-up.

10.3.2 Display

Follow the procedure in section 8.3.2. Display.

10.3.3 PSM / PDM identification

1. Configure the ECG1 waveform field and the NIBP parameter window to the patient monitor screen with adequate priority. Connect a PSM or PDM module to the patient monitor.
2. Verify that the ECG waveform field, the NIBP parameter window and the related information appear on the patient monitor screen.

10.3.4 E-module identification

1. Log in to Webmin.

2. Select ***Information > Device Information***.
3. Verify that the information about the connected module appears in the table named as ***"Acquisition Information – E-Modules"***.

NOTE: For some parameter modules, the table does not show the actual module information, but the information of the individual subassemblies inside the module.

NOTE: You may need to refresh the Webmin screen if you have connected the module to the patient monitor after entering the ***Device Information*** Webmin screen.

10.3.5 Keypad and remote

Follow the procedure in section 8.3.5. Trim knob, keypad, and remote.

10.3.6 Mouse

Follow the procedure in section 8.3.6. Mouse.

10.3.7 Alphanumeric keyboard

Follow the procedure in section 8.3.7. Alphanumeric keyboard.

10.3.8 Barcode reader

Follow the procedure in section 8.3.8. Barcode reader.

10.3.9 MC Network and S/5 Network

Follow the procedure in section 8.3.9. MC Network and S/5 Network.

10.3.10 IX printers

Follow the procedure in section 8.3.10. IX printers.

10.3.11 InSite RSvP

Follow the procedure in section 8.3.12. InSite RSvP.

10.3.12 Recorder

1. Select ***Monitor Setup > Printing > Devices > Setup*** and configure:
   Printout: Waveforms
   Location: Local

2. Select ***Monitor Setup > Printing > Waveforms*** and configure:
   Waveform 1: II
   Waveform 2: V1

3. Select one of the following options to start printing:
   – Select ***Print Waveforms*** from the main screen.
   – Select ***Monitor Setup > Printing > Waveforms > Print Waveforms***.

4. Verify that the recorder starts printing. Let the recorder print for approximately 10 seconds and verify the following things from the printout:
   – The header line contains the date, time and some other applicable status and configuration information.
   – The grid is clear.
   – The waveforms labels appear in the printout as configured.

Select one of the following options to stop printing:

– Select ***Stop Printing*** from the main screen.
– Select ***Monitor Setup > Printing > Waveforms > Stop Printing***.

10.3.13 Test completion

Select ***Discharge Patient*** or ***Reset Case*** to discard any changes made to the patient monitor configuration during checkout.

- Complete the Appendix B. Maintenance check form.

11 Troubleshooting

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.

This chapter focuses on troubleshooting technical problems. See the patient monitor's user's manual for troubleshooting monitoring problems and clinical configuration issues.

If the problem remains, call technical support for service. To ensure accurate problem solving, please be prepared to provide the following information:

- Problem description and the troubleshooting done so far.
- Configuration information (section 11.2.1)
- Device information (section 11.2.2)
- Service Logs (section 11.3.3)
- Error messages displayed, if any.
- Other information, as requested.

11.1 Visual inspection

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

- There is no physical damage.
- All peripheral devices are connected properly.
- The patient monitor and the connected peripheral devices are properly powered.

Also verify that the problem is not caused because of:

1. Incompatibility issue. See the patient monitor's supplemental information manual for the list of compatible devices.
2. Incorrect platform or clinical configuration. Refer to the chapter 7. Configuration in this manual for details about platform configuration and the patient monitor's user's manual for details about clinical configuration.

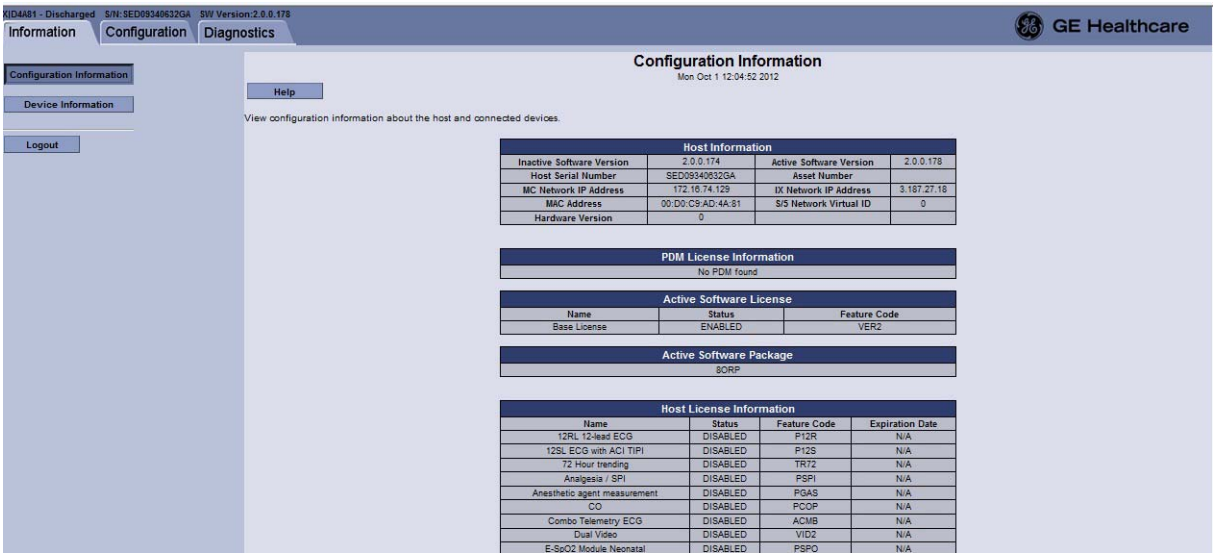
If loose parts or cable connections inside the patient monitor are suspected, disassemble the patient monitor to a level needed to perform an internal visual check. Check that:

- all screws are tightened properly
- all cables are connected properly
- there are no loose objects inside the patient monitor

NOTE: Perform the electrical safety test and the checkout procedure every time you have disassembled the patient monitor.

11.2 Webmin - Information tab

Access Webmin service interface to view configuration information and device information.



11.2.1 Configuration information

The Configuration Information module shows the current platform configuration of the patient monitor and the connected peripheral devices.

To view configuration information:

1. Log in to the Webmin.
2. Select the ***Information*** tab.
3. Select ***Configuration Information***.
4. Scroll down the page to view the configuration information:

Configuration information	
Host Information	• Active software version, Inactive software version, Host serial number, Host asset number, MC Network IP address, IX Network IP address, MC Network MAC address, IX Network MAC address, S/5 Network virtual ID, CPU hardware version.
PDM License Information	• License option, status, and number of licenses.
Active Software License	• Current monitor software license in use, status and feature code.
Active Software Package	• Current software package in use.
Host License Information	• Each host license name, its current status (enabled, disabled or trial), feature code, and the expiration date for a trial license.
Default Clinical Settings	• Current default clinical settings.
Admit Settings	• Patient ID Prefix.
Citrix	• Server address, initial program, session timeout in minutes, username and encryption level.

Configuration information	
Unit and Bed Name	• Unit name and Bed name for CARESCAPE Network.
Acquisition Information E-module	• STP/TP/ST configuration information and P/PT/PP configuration information from E- modules.
S/5 Printers	• Printer name.
IX Printers	• Printer name, hostname or IP address.
Printer Location Information	• Printout type (Alarm Waveforms, Numeric Trends, Reports, and Waveforms) and Printer location.
Remote Service	• Proxy URL, Proxy port, Proxy username, Remote service status, System ID, Serial number, Enterprises URL, Enterprises tunnel URL, and Protocol.
Language	• Clinical user interface language.
National Requirement	• Setting for country specific alarms (None or France).
Network	• Active configuration information, including MAC address, MC Network type (IP address, Netmask, Gateway, Destination IP address, Destination netmask, and PHY configuration), and IX Network type (IP address, Netmask, Gateway, DNS server 1, DNS server 2, and PHY configuration).
ADT settings	• Visit Number Query status, IX IP address of ADT server.
Power Line Frequency	• Current power line frequency setting in use.
MUSE/12SL	• Location ID, Site number, MUSE web username, and MUSE web URL.

11.2.2 Device information

The Device Information module shows the hardware and software information of the patient monitor and the connected peripheral devices.

To view Device information:

1. Log in to the Webmin.
2. Select the ***Information*** tab.
3. Select ***Device Information***.

4. Scroll down the page to view the device information:

Device information	
Host Information	• Active software version, Inactive software version, Host serial number, Host asset number, MC Network IP address, IX Network IP address, MC Network MAC address, IX Network MAC address, S/5 Network virtual ID, CPU hardware version.
Active Software License	• Current monitor software license in use, status and feature code.
Active Software Package	• Current software package in use, status and feature code.
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: Active software version, Main board revision, DAS board revision, Serial number, Asset number, MAC address, IP address, Power frequency, ECG filter.
Acquisition Information	• E-Module: Label, Software version, Control number, and Serial number.
Acquisition Information	• E-Module Frame: Frame serial number, EMBC Serial number, EMBC Software number, EMBC Software version, and EMBC IP address.
Installed S/5 Printers	• Printer name.
Installed IX Printers	• Printer name, hostname or IP address.
Printer Location Information	• Printout type (Alarm Waveforms, Numeric Trends, Reports, and Waveforms) and Printer location.
Acquisition Information - Tram RAC	• Software part number and version.
M-Port Information	• Device name, software number and version, serial number, port number, active state for each serial device connected to the patient monitor, and connection type.
PDM License Information	• License option, status, and number of licenses.
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, and Serial number.

11.3 Webmin - Diagnostics tab

Access Webmin service interface to view hardware statistics, ping a network device and view or download log files.

11.3.1 Hardware statistics

Host			
Measurement	**Current Reading**	**Lower Limit**	**Upper Limit**
CPU Core Voltage (in mV)	928	740	1210
VCC1.8	1808	1600	2000
VCC3.3	3392	3020	3580
AVCC	5107	4590	5410
1.25 Volts (in mV)	1248	1080	1420
5VSB	5082	4750	5250
Battery (in mV)	3344	1890	--
Ambient Temperature (in C)	48	0	70
CPU Temperature	70	0	95
945 Temperature (in C)	69	0	95
Video Card Temperature (in C)	59	0	95

The Hardware Statistics module displays several internal voltages and temperatures. A value is displayed in red, if the current reading exceeds a pre-determined lower or upper limit, A value is displayed either as “0” or as “--”, if it cannot be measured.

To access hardware statistics:

1. Log in to Webmin.
2. Select ***Diagnostics > Hardware Stats***.
3. Scroll down the page to view the following device information:

The controlled parameters are measured with A/D converters and temperature sensors in the specified subsystem.

Measurement	**Description**
CPU Core Voltage (in mV)	Core Voltage of Intel '423 processor
VCC1.8	Operation voltage for Intel 945GME Graphics Memory Controller Hub, Memory DDR2, LAN Controller and Power Supply
VCC3.3	General operation voltage for IC components on CPU processor board
AVCC	General operation voltage for IC components on CPU processor board.
1.25 volts (in mV)	Operation voltage for Ethernet Switch, BCM5382M, Power Supply
5VSB	General operation voltage for IC components on CPU processor board

Measurement	Description
battery (in mV)	Lithium Battery Voltage for the Real Time Clock
Ambient temperature (in C)	Ambient temperature of the CPU unit measured by the sensor in the main processor board
CPU temperature (in C)	An internal temperature of the CPU unit measured by the sensor in the main processor
945 temperature (in C)	An internal temperature of the CPU unit measured by the sensor in the Intel 945 Graphic controller chipset (1st and 2rd display port) temperature
VideoCard temperature (in C)	An internal temperature of the CPU unit measured by the sensor in the additional 3rd video board (optional)

11.3.2 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 in to Webmin.
2. Select ***Diagnostics > Ping***.
3. In the ***Address to Ping*** field in 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.

The patient monitor withstands a maximum packet loss of 5 packets per 1 million and maximum latency of 250 ms without performance degradation.

11.3.3 Log files

The patient monitor collects information about different system events and errors to log files. These log files help troubleshooting problems in the patient monitor and the connected peripheral devices.

The following table describes the available log files and the type of information that they collect.

Log file name	Contents
Webmin Action log	• Webmin user authentication and access related information (e.g., who accessed Webmin and when). • Webmin module settings changes (e.g., what was changed and when). • Software transfer history information, including the type and version of the transferred software, the origin and destination, and the date and time the software transfer occurred. • Host software activation information, including the host type and serial number, the type and version of the activated host software, and the date and time the host software activation occurred. • Module software activation information, including the module type and serial number, the type and version of the activated module software, and the date and time the module software activation occurred. • Settings transfer history information, including the type of the transferred settings, the origin and destination, and the date and time the settings transfer occurred. • Log file transfer history information, including the type of log that was transferred, the origin and destination, and the date and time the log file transfer occurred. • Webmin related error messages (e.g., information about EPI layer issues detected by Webmin).
EMBC Frame logs	• Date and time when the EMBC log was last updated. • Modbus 0, 1, 2, and 3 information, including the following: - System information (e.g., Sysinfo -packet) - Log information (e.g., Loginfo -packet) - Module node connection/disconnection information (e.g., Module Node Log) - Module slot information (e.g., addresses and times in the latest modbus frame) - Modbus frame statistics (e.g., total number of frames, number of synchronization errors, number of lost frames, number of unknown frames)
PDM log	All PDM errors and messages.
System log	• OS events and errors, including operating system related information, such as clinical application startup and recovery information, power on self-test results, etc. • InSite RSvP events and errors, including InSite RSvP agent related information.

Log file name	Contents
Clinical log	• Clinical-related application events, including module (parameter) connections/disconnections, case starts/ends, cold starts, warm starts, etc. • Technical notes and errors displayed for clinical users, including all host and module related technical errors (e.g., 'Failure in Agent ID'). • Clinical alarms, including clinical application related patient alarms and their level (e.g., 'FiO_2 Low'). • Clinical user interactions, such as the host keystrokes and touchscreen selections, menu setting changes, etc. • EPI layer related errors, including information about EPI layer issues detected by the clinical application. • Host serial number and active software versions.
MPC860 Error Log	• The errors that were logged within the code running on the 860 processor.
sGAS Log	• All CARESCAPE Respiratory Module errors and messages. Each log file contains two files, one for software error logs and one for hardware error logs.

Downloading log files

1. Log in to Webmin.
2. Select ***Diagnostics > Download Logs***.
3. Select the log(s) you want to download.
4. Select ***Download***.
5. According to your Webmin access:

a. If you are using Webmin on a service PC, you can save the log file to any storage device connected to the service PC:
   - In the ***File Download*** dialog box, select ***Save***.
   - In the ***Save as*** dialog box, select the destination drive and folder and select ***Save***.

NOTE: You may change the default filename, but do not change the file extension.

b. If you are using Webmin locally through the integrated browser, you can save the settings file to a USB flash drive that is connected to one of the patient monitor's USB ports:
   - The name of the created log file is shown on the screen.
   - Select ***Download*** to save the log file to the USB flash drive.

NOTE: Do not disconnect the USB storage device until downloading is complete.

6. Send this log file to GE Service for further investigation.

Downloading sGAS log files

NOTE: To download sGAS logs, ensure that the module is connected to the monitor and the patient is discharged.

1. Log in to Webmin.
2. Select ***Diagnostics*** > ***Download logs*** > ***sGAS log***.

3. Select ***Download sGAS Logs***.
4. According to your Webmin access:

a. If you are using Webmin on a service PC, the log file is saved to the default download folder of the service PC.

b. If you are using Webmin locally through the integrated browser, you can save the log file to a USB flash drive that is connected to one of the patient monitor's USB ports:

- The ***Download Logs*** window will show you the name of the created log file.
- Select ***Download*** to save the log file to the USB flash drive.

NOTE: Do not disconnect the USB storage device until downloading is completed.

5. Send the log file to GE Service for further investigation.

NOTE: The module is reset after you have downloaded the sGAS log. The reset takes up to 1 minute, as it calibrates the gas sensor and zeroes the measurement.

NOTE: To cancel the sGAS log download, you must admit a patient. When a patient is admitted, the module is immediately reset. If you, for example, close the browser, the download continues in the monitor and the module is reset only after that.

Viewing log files

1. Log in to Webmin.
2. Select ***Diagnostics*** > ***View Logs***.
3. Select the log file 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.

Refer to the Module Frames and Modules Service Manual for information about PDM battery.

11.4 Error messages and codes

The following error messages display in the alarm area if there is a problem with the patient monitor.

Refer to the patient monitor's user's manual for a complete list of system messages. Refer to Module Frames and Modules Service Manual for a list of parameter module specific error messages.

Message	Possible causes	Possible solutions
License expired	A trial license has expired.	Enable the license with a new activation code, if needed.
Configuration changes. Restart required	Pending configuration changes to platform settings that require patient monitor restart.	Power cycle the patient monitor.
Network down	No other network device observed on the MC Network.	Verify that the patient monitor is connected to an active network.

Message	Possible causes	Possible solutions
Identical unit & bed name noticed	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.
Identical IP address noticed	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.
Service Monitor Error Code 0xHOST1001	One of the internal temperature sensors indicate the inside temperature of the patient monitor is out of specification. The message stays on screen as long as the error condition is valid.	If temperature is too high: 1. Turn off the patient monitor. 2. Let the patient monitor cool down. 3. Check that the ventilation holes are not obstructed. 4. Ensure that the patient monitor is installed to a location that meets the specified environmental requirements of operating temperature. 5. Investigate the patient monitor thoroughly for potential short circuits and other electrical faults. 6. If possible, log in to Webmin and select ***Diagnostics> Hardware Stats*** to identify the root cause for the error message. If temperature is too low (or high): If the patient monitor has been transported or stored outside the operating temperature range, allow it to stabilize back to operating temperature range before applying power.
Service Monitor Error Code 0xHOST1002	One of the internal supply voltages is out of the specification. The message stays on screen as long as the condition is valid.	Log in Webmin and select ***Diagnostics > Hardware Stats*** to identify the supply voltage that is below or above the specification limit.
Service Monitor Error Code 0xHOST1004	Disk usage exceeds 90%.	1. Back up the clinical and platform settings and print the licensing information page via Webmin. 2. Re-install software.

Message	Possible causes	Possible solutions
Service Monitor Error Code 0xHOST1100	The CPU timekeeper battery is empty. Time and date may be reset to factory settings.	Readjust the time and date first. Then replace the CPU battery.
External alarm light disconnect. Check USB connection.	1. The USB cable between the patient monitor and a display is disconnected when the patient is admitted.	1. Reconnect the USB cable. NOTE: Secure the connected USB cable to the CPU unit. Use the existing retaining clips attached to the CPU unit.
	2. Display turned to standby when the patient is admitted.	2. Turn on the display.
	NOTE: Select ***Audio Pause*** to acknowledge the message, if the USB cable is disconnected or a display turned off on purpose.	
	3. User interface board communication failure.	3. UpdateUIC software or replace user interface board.
Setting activation after next case end./ Setting activation after next discharge.	Service user has initiated a delayed settings activation that will automatically take place after next case end. / next discharge.	If required, the service user may cancel the delayed setting activation. See section 7.17.4. Canceling pending settings activation
Software activation after next case end./ Software activation after next discharge.	Service user has initiated a delayed software activation that will automatically take place after next case end / next discharge.	If required, the service user may cancel the delayed setting activation. See section 7.20.3. Canceling pending host software activation
Service Monitor Activation Failed	Software activation failed.	Reactivate software. If that does not help, reinstall the software and then reactivate it.
	Setting activation failed.	Reactivate settings.
Module voltage low	• One of the supply voltages for the acquisition modules is out of specification. • An analog output voltage is out of specification.	Log in to Webmin and select ***Diagnostics > Hardware Stats*** to diagnose the problem. If there is a faulty board, replace it.
Application error: Webmin	The operating system informs that the Webmin local browser was terminated abnormally.	Select ***Audio Pause*** to acknowledge the message.

Message	Possible causes	Possible solutions
Speaker failure	1. Speaker cable loose.	1. Connect the speaker cable.
	2. Speaker failure.	3. Replace the speaker.
	4. Processor board tone generator or audio amplifier failure.	5. Replace the processor board.

11.5 Problems and solutions

11.5.1 Start-up failures

Problem	Possible causes	Recommended actions
Failure to turn on the patient monitor.	Power cord is loose.	Ensure that the power cord is connected properly to the wall outlet and to the patient monitor.
	Power cord is faulty.	Check the power cord for wear and damage and replace if necessary.
	The power outlet does not meet specified requirements.	Check the power outlet being used: - Refer to the patient monitor's supplemental information manual for power requirements. - Check the power outlet being used, see section 8.2.2.
	The cable between the power supply and the processor board is loose or faulty.	Check that the cable is intact and properly connected to the power supply and the processor board.
	The power supply is faulty.	Replace the power supply.
	CPU processor board is faulty.	Replace the CPU processor board.

Problem	Possible causes	Recommended actions
Multiple monitors that are connected to the same network suddenly restart, but do not resume normal functionality within 90 seconds.	The hospital network may have been incorrectly configured, resulting in network overload.	1. Temporarily switch the monitor from central monitoring to local (bedside) monitoring by disconnecting the LAN cables from the IX/MC ports on the back panel of the monitor. 2. Contact your IT department or other appropriate personnel in your facility responsible for the network. 3. After the network issue has been investigated and resolved, switch the monitor back into central monitoring by reconnecting the LAN cables to the IX/MC ports. 4. Ensure that monitoring and alarm function are working correctly.
Unable to turn on the patient monitor: - The patient monitor starts, but the start-up sequence does not advance beyond the GE logo screen. Error messages may appear to the screen.	1. uDOM is missing or loose. 2. uDOM software is corrupted. 3. uDOM has incompatible software.	1) Ensure that the uDOM is properly connected and aligned to the connector in the CPU board. 2) Replace uDOM. Contact GE service for support. 3) Ensure that the attached uDOM has correct and compatible software. Contact GE service for support.
Webmin login screen appears after the startup screen,	There is no host software in uDOM.	Transfer and activate host software to monitor, see section 7.20 or replace the uDOM. Contact GE service for support.

11.5.2 User interface issues

Display

Problem	Possible cause	Recommended actions
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 On/standby button on the monitor.	Press the On/standby button on the monitor.

Problem	Possible cause	Recommended actions
The quality of the display is not good.	• The cable is not connected properly. • The video display is bad.	1. Check the connection between the video display and the patient monitor. If necessary, replace the video display with a known good one. 2. If the problem is not corrected, replace the processor board.
The power on/off switch on the patient monitor does not illuminate when it is toggled.	The power supply is bad.	Replace the power supply.
Continuous beeping alarm and alarm light flashing yellow.	Mains supply is lost or the USB cable is disconnected.	Restore the mains supply or reconnect the USB cable.

Touchscreen

Problem	Possible cause	Recommended actions
Touchscreen operation inaccurate.	Touchscreen not calibrated.	Calibrate touchscreen, see section 7.1.2.
Touchscreen inoperative.	Touchscreen USB cable loose	Connect the USB touchscreen cable to the CPU unit or to the display. NOTE: Secure the connected USB cable to the CPU unit. Use the existing retaining clips attached to the CPU unit.
	Touchscreen USB cable connected to the wrong USB connector in the monitor.	Connect the touchscreen USB cable to the correct connector.
	Faulty touchscreen sensor.	Replace the display.

Trim Knob and alarm light issues

Problem	Possible cause	Recommended action
Trim Knob (only) is inoperative.	Trim Knob cable loose.	Connect Trim Knob encoder cable to the user interface board.
	Trim Knob encoder faulty.	Replace the Trim Knob encoder.
Alarm light does not illuminate when there is an alarm condition on (audible alarms work and alarm message is visible).	Alarm light board is faulty.	Replace the remote alarm light board.

Alphanumeric Keyboard and barcode scanner issues

Problem	Possible cause	Recommended action
Wrong character is displayed when a key is pressed on keyboard.	The keyboard locale is not configured correctly.	Configure the keyboard locale correctly, see 7.10.
Wrong character is displayed when a barcode is read.	The keyboard locale is not configured correctly.	Configure the keyboard locale correctly, see 7.10.
	The barcode reader's language configuration is incorrect.	Refer to the barcode reader manual.
Barcode reader does not read a multi-field barcode correctly. (i.e., the information is not populated correctly to the fields in the Admit menu).	Barcode reader parser configuration is incorrect.	Configure the barcode settings, see 7.8.2.
	The barcode reader is incompatible with the parser configuration (field lengths, field types, delimeters, symbologies etc.).	Check the barcode information content and compare it to the current parser configuration.

Speaker / audible alarm issues

Problem	Possible cause	Recommended action
Audible alarms are not sounding.	Audible alarms are turned off (See ***Alarms Setup > Audible & Visual.***)	Enable audible alarms.
	Alarm volume is low.	Adjust alarm volume using ***Monitor Setup > Sound Volumes***.
	The alarm limits are not set correctly.	Make sure the alarms are enabled. Refer to the patient monitor's user's manual for correct alarm settings.
	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 DISCHARGED message both display, refer to the patient monitor's user's manual for correct patient admitting instructions.
	USB cable from display is not connected to the patient monitor.	Connect the USB cable to the patient monitor.
	The speakers are disconnected.	Check that the speakers are properly connected.
	Tone generator or audio amplifier failure	Replace the processor board.
	Speaker failure	Test if the speaker is functioning, using ***Monitor Setup > Sound Volumes***. Replace the faulty speaker.

11.5.3 Incorrect system time

Problem	Possible cause	Recommended action
System time is incorrect when patient monitor is not connected to network.	CPU timekeeper battery empty	Replace CPU timekeeper battery.
	Time not configured properly	Configure date and time, see 7.2.4.
System time is incorrect when patient monitor is connected to MC Network.	Network device time synchronization error.	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.
System time is incorrect when patient monitor is connected to S/5 network.	iCentral time incorrect.	Configure iCentral time master.

11.5.4 License issues

Problem	Possible cause	Recommended action
Unable to perform a function or a feature is not available.	- A license has not been purchased for the feature. - The trial license has expired for the feature. - The license is not installed properly.	See License management chapter.

Unable to view a certain feature although the license is enabled.	The software package in use does not include the feature in question. (For example, Anesthetic agent measurement is not supported by ICU software package).	1. Log in to ***Webmin > Configuration > Licenses >Software Package.*** 2. Select the correct option and select ***Activate***.
Unable to upload a license file.	- The license file is corrupted. - The license file is for a patient monitor with a different serial number.	Log in to ***Webmin > Configuration > Licenses***. - If you have printed license information, select ***Software Package*** and ***Host Licensing***. - If you have a license file, select ***Upload License***.
The wrong software application is displayed on the patient monitor.	The wrong software application is activated for the device.	1. To view the software package that is currently activated, Log in to ***Webmin > Configuration >Licenses > Host Licensing***. 2. Make sure that the desired software application is displayed under ***Currently Active Software Package***. 3. If you need to activate a different software package, access ***Configuration > Licenses > Software Package***. 4. Select the correct option and select ***Activate***.

11.5.5 Acquisition module problems

Problem: an acquisition module does not work with the patient monitor.
Locate first whether the problem is in the patient monitor or in the acquisition module:

1. Connect another, similar, known good module to the suspect patient monitor and check if the module works normally:
   - "Yes" => The suspect module is most likely faulty. Refer to Module Frames and Modules Service Manual for troubleshooting instructions.
   - "No" => The problem is most likely in the patient monitor. Continue troubleshooting the problem according to the related troubleshooting chart below.

OR

Connect the suspect acquisition module to another, similar, known good patient monitor and check if the module works normally:

- "Yes" => The problem is most likely in the patient monitor. Continue troubleshooting the problem according to the related troubleshooting chart below.
- "No" => The suspect module is most likely faulty. Refer to Module Frames and Modules Service Manual for troubleshooting instructions.

E-module issues

Possible cause	Recommended action
Incompatible module	Refer to the patient monitor's supplemental information manual document to see the list of compatible modules.
Faulty E-Module Frame	Replace E-Module Frame or repair it with existing service parts.

PDM module issues

Possible cause	Recommended action
The external ePort cable is loose or defective.	Check that the external ePort cable is intact and properly connected to the PDM module and to the ePort connector in the CPU unit.

11.5.6 CARESCAPE Network communication issues

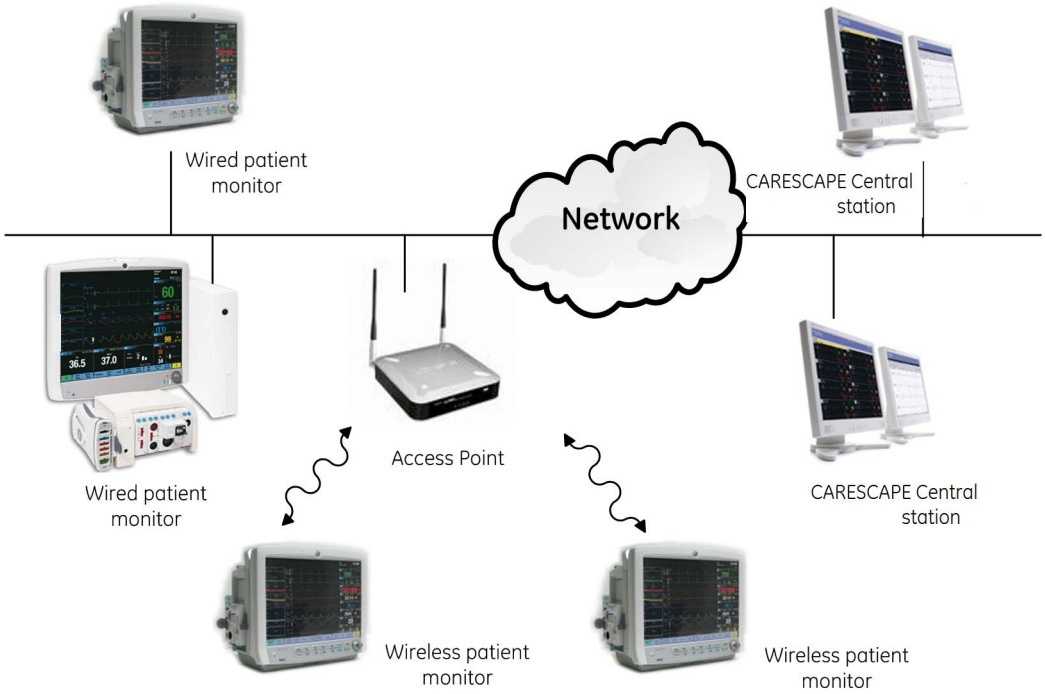
Traffic types

Two main types of communication occurs in the CARESCAPE Network: Broadcast and Unicast.

- Broadcast traffic is sent from one device to all devices on the network. Examples of CARESCAPE broadcast traffic are device discovery, alarms, and time synchronization.
- Unicast traffic is sent from one device to another specific device on the network. An example of CARESCAPE unicast traffic is patient waveforms.

Flow

- Upstream broadcast: The patient monitor sends broadcasts to other network devices.
- Downstream broadcast: The patient monitor receives broadcasts from other network devices.



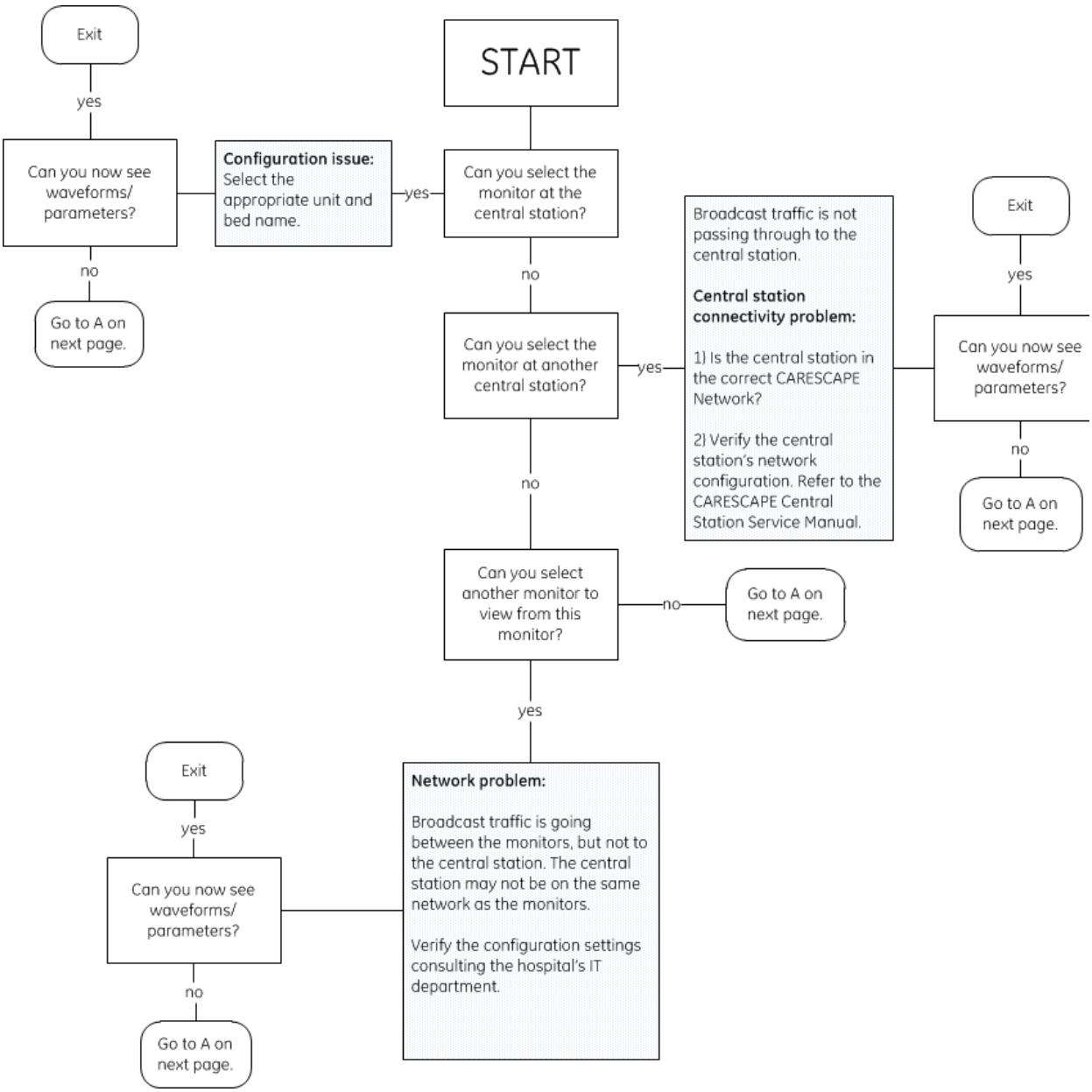
Types:
- Broadcasts (discovery, alarms, time)
- Unicasts (waveforms, ping)

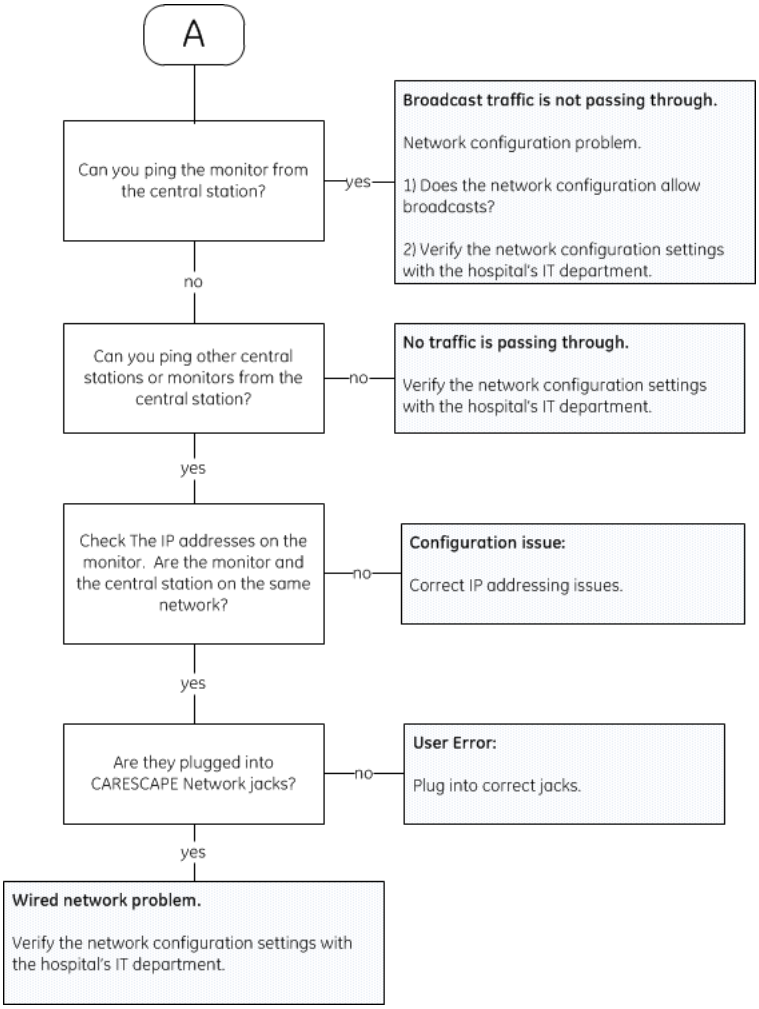
Mediums:
- Wired
- Wireless

Flow:
- Upstream Broadcast
- Downstream Broadcast
- Bi-Directional Unicast

Combinations:
- Wired Broadcast
- Wired Unicast

Problem: No waveforms or parameters are displayed at the CARESCAPE Cental Station





11.5.7 S/5 Network communication issues

Check the following things before proceeding with any detailed network troubleshooting:

- Check status of the network connection indicators, for reference see 3.8.
- Check network compatibility. Refer to the patient monitor's supplemental information manual.
- Check that each patient monitor has been assigned a unique Virtual ID key, see 7.2.3.

S/5 Network

Problem	Possible cause	Recommended action
Bedside monitor doesn't register to the Monitor Network - all bedside monitors affected.	The problem is related to the iCentral, or to the cabling between the iCentral and the hub/switch.	• Proceed to the iCentral troubleshooting. • Check the cabling between the iCentral and the hub/switch.
Bedside monitor doesn't register to the Monitor Network – only one patient monitor or some of the bedside monitors affected.	The problem is related to the bedside monitor, or to the cabling between the bedside monitor and the hub/switch.	• Check the patient monitor(s)' network configuration. • Check the cabling between the bedside monitors and the hub.
	The problem is related to network setup: the bedside monitor(s) is/are missing from the network setup.	• Check the iCentral network setup.
	The problem is related to view setup: the bedside monitor(s) is/are missing from the view setup.	• Check the iCentral view setup.

For your notes:

12 Disassembly and reassembly

12.1 Disassembly guidelines

Field repair of the patient monitor is limited to replacing field replaceable units (FRUs). See chapter 13. Service parts for a detailed list of available FRUs. Attempting a field repair on a printed circuit board, or a factory sealed component or assembly could jeopardize the safe and effective operation of the monitor.

NOTE: Only a qualified service technician should perform field replacement procedures.

NOTE: Perform the checkout procedure described in chapter 10. Maintenance and checkout always after doing any disassembly of the patient monitor.

12.1.1 ESD precautions

All external connectors of the patient monitor are protected against electrostatic discharge (ESD) damage. However during service of the patient monitor, exposed components and assemblies inside the patient monitor are susceptible to ESD damage. Human hands, non-ESD protected work stations or improperly grounded test equipment can cause ESD damage. The following guidelines do not fully guarantee 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 or heel strap should be worn at all times while handling or repairing assemblies containing semiconductors.
- Use properly grounded test equipment.
- Use a static-free work surface while handling or working on assemblies containing semiconductors.
- Semiconductors and electronic assemblies should be stored only in antistatic bags or boxes.
- Handle all PCB assemblies by their edges.
- Do not remove semiconductors or assemblies containing semiconductors from antistatic containers until absolutely necessary.
- Do not slide semiconductors or electrical/electronic assemblies across any surface.
- Do not touch semiconductor leads unless absolutely necessary.
- Do not flex or twist a circuit board.

WARNING **Pins of connectors identified with the ESD warning symbol should not be touched. Connections should not be made to these connectors unless electrostatic discharge (ESD) precautions are used.**

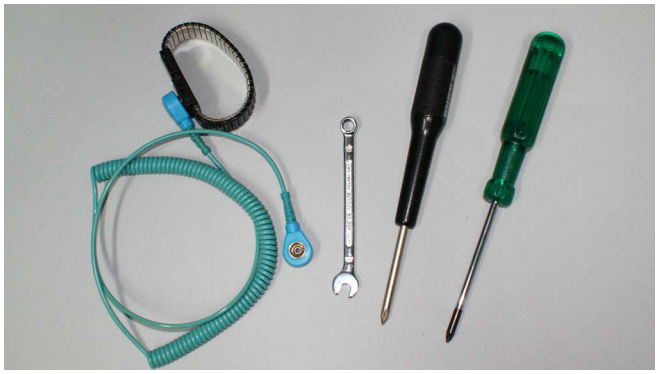
12.1.2 Reassembly precautions

Pay attention to the following precautions when reassembling the monitor:

- Note the positions of any wires, cables or connectors. Mark them, if necessary, to ensure their correct reassembly.
- Save and set aside all hardware for reassembly.

- GE recommends using the new fasteners (screws, washers, etc.) in the FRU kits rather than reusing the old fasteners. Some fasteners are not intended to be re-used more than three times.
- Use only new screws when attaching parts into light metal parts. Before fastening a screw, turn it counterclockwise until it drops into an existing thread pattern.

12.1.3 Required tools



- insulated Torx T10 screwdriver
- insulated crosshead screwdrivers (small and medium)
- antistatic ESD wristband
- spanner size 5.5 mm

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

12.1.4 Before disassembly

WARNING **PATIENT MONITORING INTERRUPTION — Make sure a patient is not being monitored while servicing the equipment.**

WARNING **DISCONNECTION FROM MAINS - When disconnecting the device 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.**

WARNING **SAFETY GROUND - Remove power cord from the mains source by grasping the plug. Do not pull on the cable.**

WARNING **ELECTRIC SHOCK - Always unplug the grounded cables when not in use. Leaving them connected could result in an electric shock from the ground contact in the other end.**

1. Turn the monitor off from the rear **On/off** switch.
2. Detach the retaining clips for the power cord and USB cables.

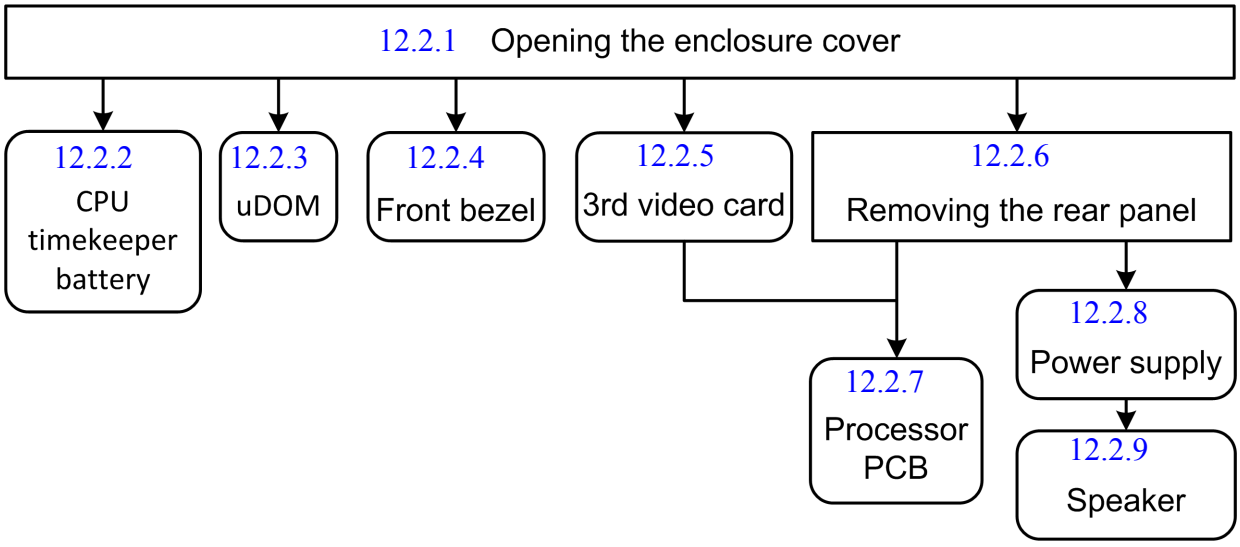
NOTE: Remember to reattach the retaining clips for the power cord and USB cables after reassembly.

3. Disconnect all external cables connected to the CPU unit.
4. Disconnect the power cord first from the wall outlet and then from the CPU unit.
5. Detach the CPU unit from the mount if installed.

Disassembly workflow

Use this workflow diagram to identify the simplest way to replace the FRU parts of the CPU C1. Numbers in the diagram refer to the related step by step instructions in the Disassembly chapter.

Follow the arrows from the top down to the required part and disassemble the monitor by following the steps in between.



12.2 Unit disassembly

12.2.1 Opening the enclosure cover

When the CPU unit is opened, the electrical safety tests must always be performed after the monitor is reassembled. For more information, refer to the Corrective maintenance requirements in the 10. Maintenance and checkout chapter.

1. Remove 4 screws (T10) on each side of the top cover. Torque [1.1 Nm].

2. Remove the top cover.

12.2.2 Replacing the CPU timekeeper battery

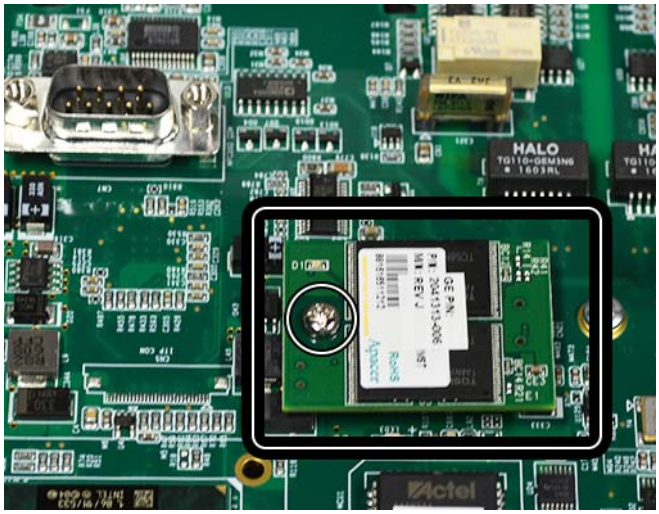
1. Open the unit as described in Opening the enclosure cover.
2. Remove the lithium ion battery from the bracket on the processor board.

3. Replace the battery.
4. Reassemble in reverse order.

To avoid network device time synchronization issues, remember to readjust the time and date before you connect the monitor to network. For instructions on configuring the time, see 7.3. Setting time and date.

12.2.3 Detaching the uDOM

1. Open the unit as described in Opening the enclosure cover.
2. Remove the screw that holds the uDOM to the processor board and detach the uDOM from the processor board connector. Torque [0.3 Nm].



3. Replace the uDOM.
4. Reassemble in reverse order.

NOTE: uDOM, disk on module, is the permanent memory of the patient monitor. The software, the licenses, and both clinical and service configurations are all stored to the uDOM.

Replacing the uDOM

Contact GE Service if you doubt that the uDOM is defective and needs to be replaced. Only GE Service can configure the new uDOM.

When you contact GE, provide the following information:

a) Monitor Type

b) Serial Number

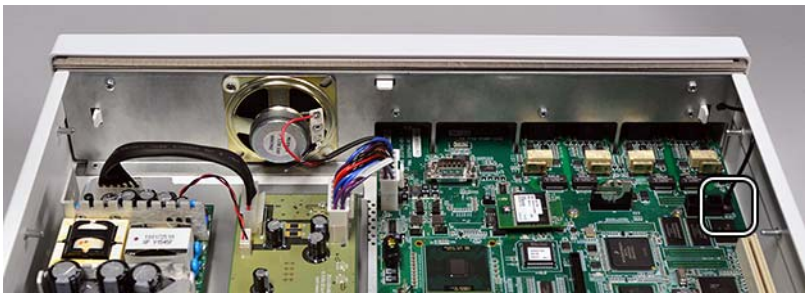
c) Software version installed, if available

12.2.4 Replacing the front bezel

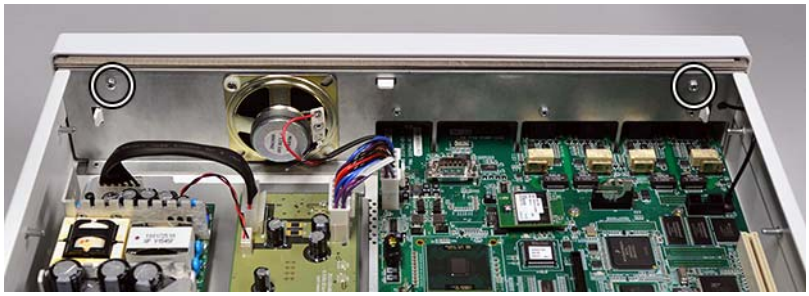
Disassemble first the following:

a. Opening the enclosure cover.

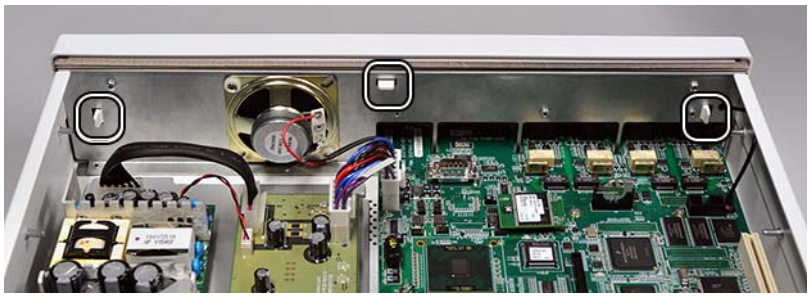
1. Disconnect the light pipe pulling gently from the receptacle on the PCB.



2. Remove 2 screws on front of bezel. Torque [1.1 Nm].



3. Release 3 snap fingers to free bezel from the front of chassis.



4. Remove the bezel.

5. Reassemble the CPU C1 unit in the reverse order of disassembly.

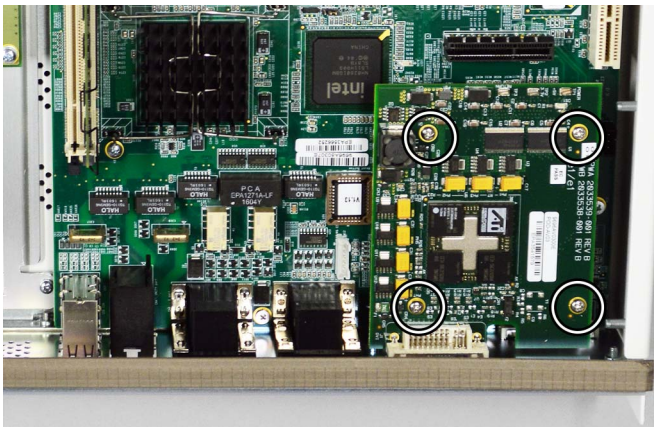
12.2.5 Replacing the third video card

Disassemble first the following:

a. Opening the enclosure cover.

1. Remove the 2 jack screws holding the DVI-I connector to the rear panel. Torque [0.6 Nm].

2. Remove 4 screws holding the video board. Torque [1.1 Nm].



3. Lift the video card to disconnect the video card connector from the processor board.

- FRU, 3rd Video Card

4. Reassemble the CPU unit in the reverse order of disassembly.

12.2.6 Removing the rear panel

Disassemble first the following:

a. Opening the enclosure cover.

1. Remove 7 screws on the rear panel. Torque [1.1 Nm].

2. If the 3rd video card is installed, remove the 2 jack screws holding the DVI-I connector to the rear panel. Torque [0.6 Nm].

3. Remove the rear panel.

12.2.7 Replacing the processor board

Disassemble first the following:

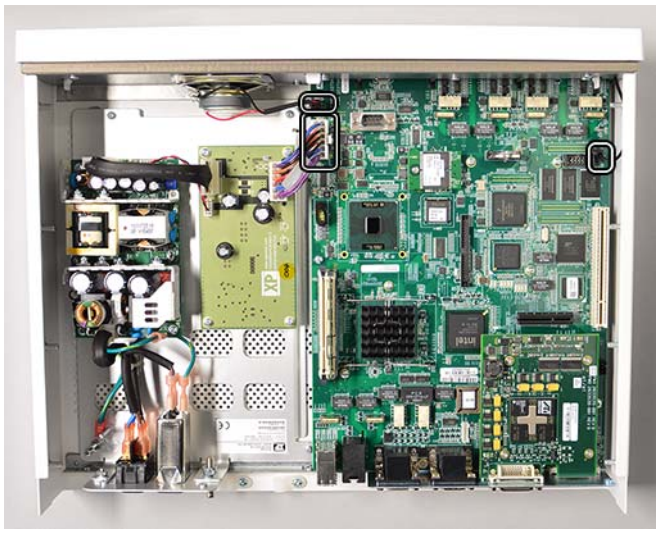
a. Opening the enclosure cover.

b. Removing the rear panel.

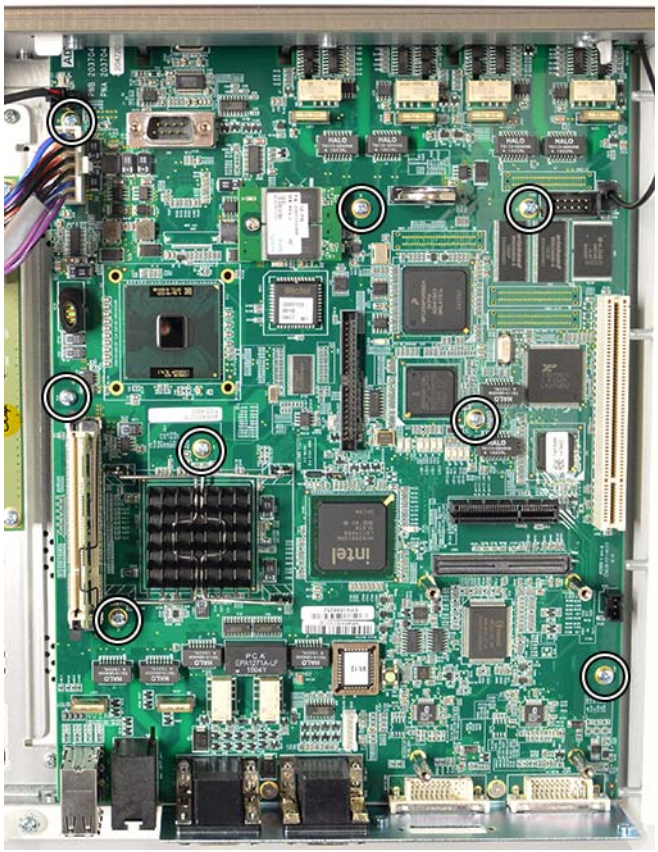
c. If the 3rd video card is installed:

- Remove the card according to Replacing the third video card.
- Remove the 4 video card standoffs.

1. Disconnect the speaker cable connection, light pipe (pull gently from the receptacle on the PCB), and power supply cable:



2. Remove the 8 screws that hold the processor board to the chassis. Remove the processor board. Torque [1.1 Nm].



3. Remove the screw that holds the uDOM to the old processor board. Remove the uDOM from the old processor board and reassemble it to the new processor board. Torque [0.3 Nm].

- FRU, CPU C1 Processor PCB

4. Reassemble the CPU C1 unit in the reverse order of disassembly.

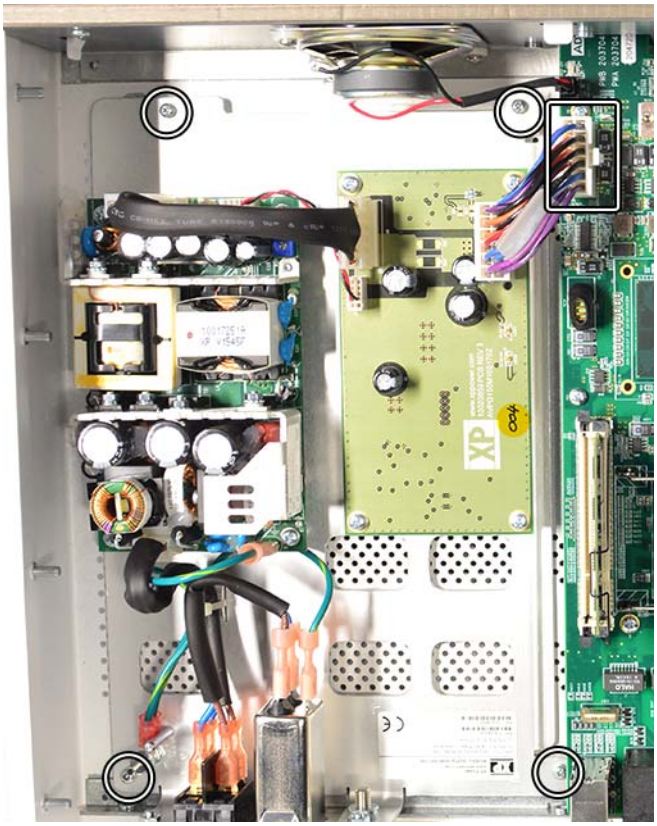
12.2.8 Replacing the power supply

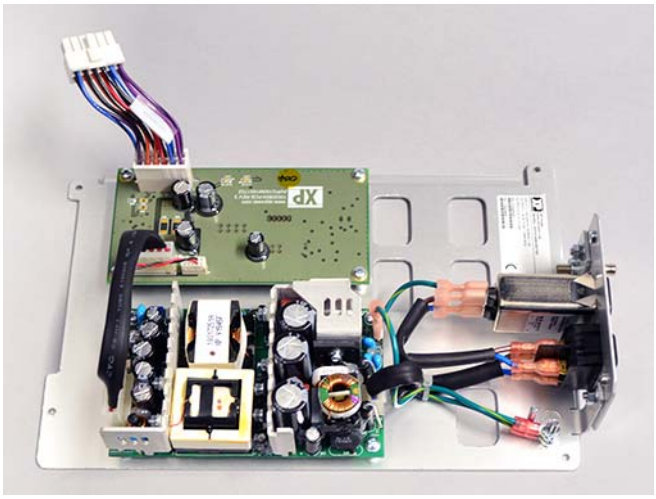
Disassemble first the following:

a. Opening the enclosure cover.

b. Removing the rear panel.

1. Disconnect the power supply cable from the CPU board.
2. Remove the 4 screws that hold the power supply to the chassis. Remove the power supply. Torque [1.1 Nm].





- FRU, CPU C1 Power supply

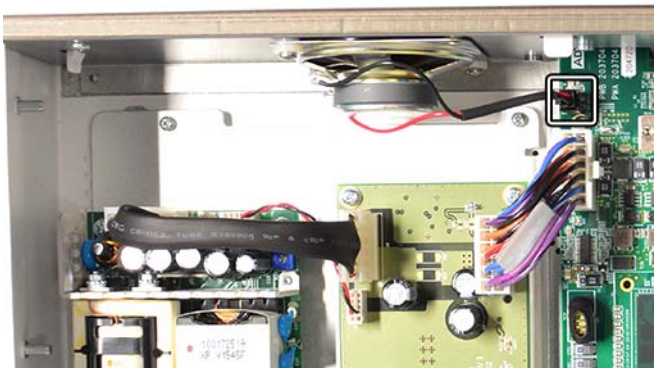
3. Reassemble the CPU C1 unit in the reverse order of disassembly.

12.2.9 Replacing the speaker

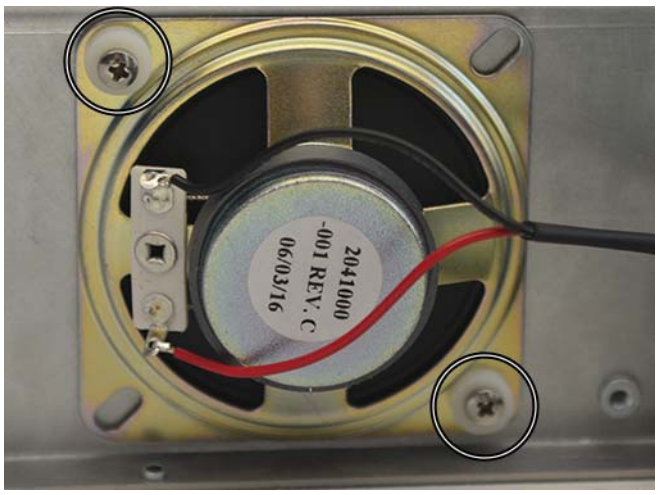
Disassemble first the following:

a. Opening the enclosure cover.
b. Removing the rear panel.
c. Remove the power supply according to Replacing the power supply

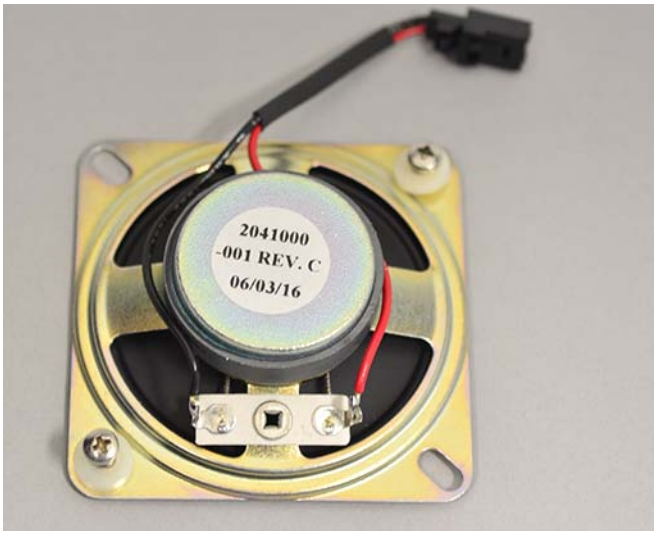
1. Disconnect the speaker cable from the CPU board.



2. Remove the 2 screws and washers, that hold the speaker to the front bezel. Remove the speaker. Torque [1.1 Nm].



3. Replace the speaker.



- FRU, Speaker assembly

4. Reassemble the CPU C1 unit in the reverse order of disassembly.

12.2.10 Replacing the rear panel labels

1. Remove the old labels and attach the new labels.

NOTE: Take care not to obstruct connector or screw openings when you fix the labels.

13 Service parts

NOTE: Perform the checkout procedure steps described in chapter 10. Maintenance and checkout after you have replaced any service parts.

13.1 Ordering parts

To order parts, contact GE Healthcare. Contact information is available at www.gehealthcare.com. Make sure you have all necessary information at hand.

13.2 List of FRUs

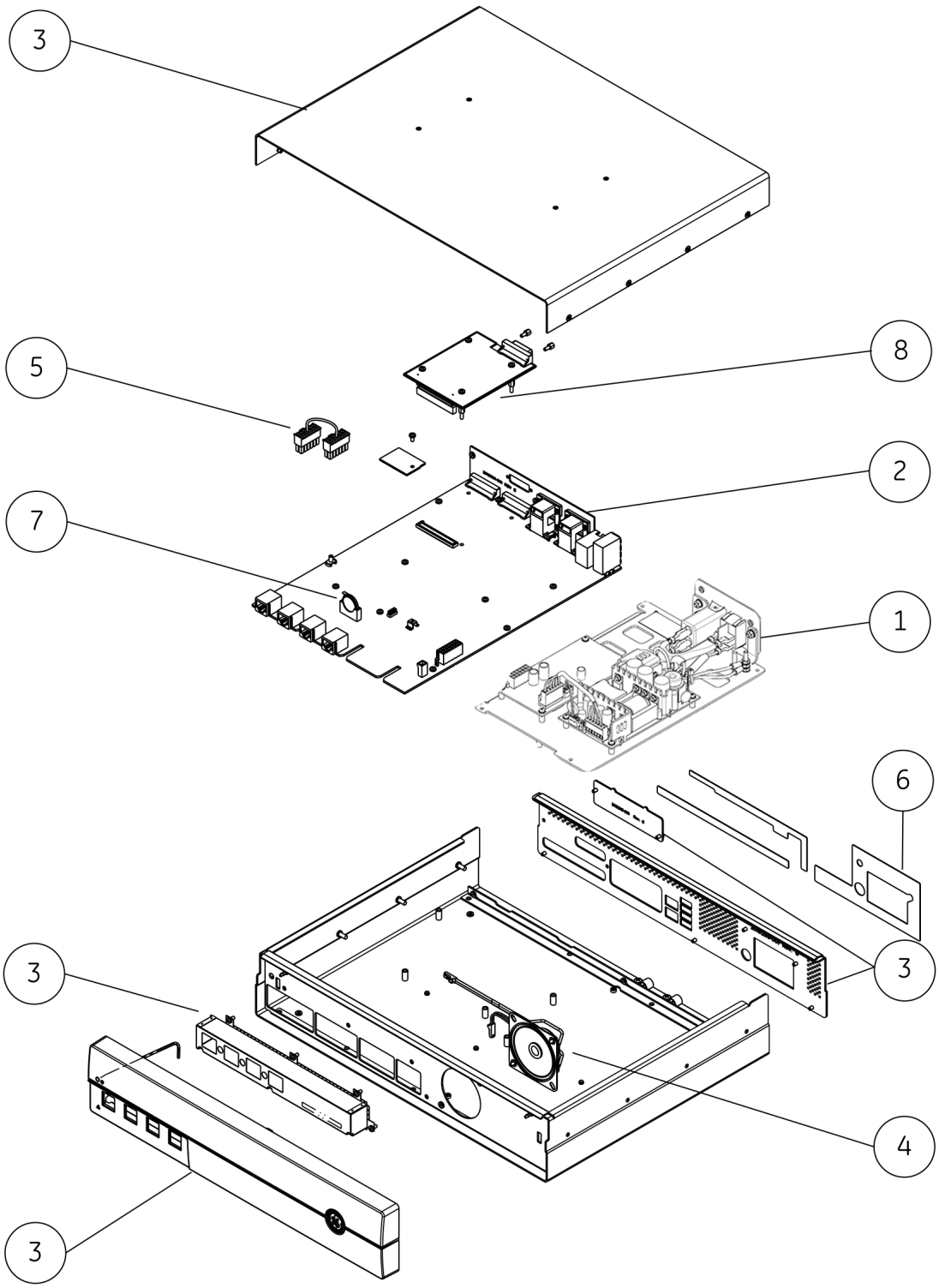
#	FRU/Item part number	FRU/Item description	FRU content
1	2067715-022	FRU, CARESCAPE CPU C1 Power supply	- Includes power inlet, harness that connects to CPU board, and power supply bracket. - Order hardware kit 2021440-006 if any replacement screws are needed.
2	2021440-003	FRU, CPU C1 Processor PCB	- Includes CPU PCB assembly and CPU timekeeper battery. - Excludes the USB Disk on Module (uDOM) with software. - Order hardware kit 2021440-006 if any replacement screws are needed

	2067713-019	FRU, uDOM memory module	- Excludes monitor software and licenses.
			- Contact GE Service to order this FRU. Only GE Service can perform some of the configuration steps required after uDOM replacement. Be prepared to provide the following information:
			  - Monitor Type
			  - Serial Number
			  - Software version installed, if available.

3	2021440-004	FRU, CARESCAPE CPU C1 Enclosure kit	- Includes front bezel, enclosure cover, rear panel, and label kit. - Order the hardware kit 2021440-006 if you need any replacement screws.
4	2021440-005	FRU, Speaker assembly	- Includes speaker with harness, 2 mounting screws, washers and spacers.
5	2021440-006	FRU, Hardware kit	- Contains complete set of replacement screws for all replaceable assemblies and chassis EMI gaskets.
6	2067715-007	Label kit	- Includes all rear panel labels; rating label and 2 connector labels.
7	2021440-008	FRU, CPU timekeeper battery (20 pcs)	- CR2032 lithium battery

#	FRU/Item part number	FRU/Item description	FRU content
8	2021440-013	FRU, CARESCPE CPU C1 3rd Video Card	- Includes 3rd video card assembly, 4 mounting screws, 4 standoff screws and 2 jackscrews.
	2021440-009	FRU, M-Port keypad kit	- Includes all M-port Keypad assembly with all language labels.
	2021440-011	FRU, Remote control kit	- Includes Remote controller assembly with all language labels

13.3 Exploded view



For your notes:

APPENDIX A: Installation check form

CARESCAPE Monitor B850

Customer	Monitor type	S/N
Service record #	Software version	
Service engineer		

Other devices connected to the monitor system			
Device	Serial number	Device	Serial number

Prior to testing verify all equipment is calibrated via "Cal" labeling and record Cal Due Dates

Measuring equipment / test gases used:				
Equipment / tool / gas:	Manufacturer:	Model/Type/Part No:	Serial Number/ID:	Cal Due Date:

PASS = Test passed **N.A. = Test not applicable** **FAIL = Test failed**

Visual inspection	**Observed result**	**PASS**	**FAIL**
The monitor and the connected peripheral devices are undamaged.		☐	☐
The monitor and the connected peripheral devices are properly mounted with specified mounting solutions.		☐	☐
The cables between the patient monitor and the connected devices are intact, properly connected and secured to the right connectors.		☐	☐
The power cord and USB cables are properly secured with the supplied retaining clips.		☐	☐
All the network cables, both MC and IX Network, are intact and properly connected to the right connectors.		☐	☐
The modules are properly connected and locked.		☐	☐

Electrical safety tests	
Date of manufacture of the device:	
Is there less than 12 months since the device was manufactured?	

Yes: ☐	Yes: you do not have to perform the electrical safety tests. To continue the installation check, mark the electrical safety test completion N.A. and proceed to Functional check. If available, attach the original electrical safety test results to this check form.			
No: ☐	No: continue to perform the electrical safety tests.			
Power outlet is correctly wired.				☐ ☐
Power cord and plug are undamaged and all conductors are properly connected.				☐ ☐
Ground integrity check		Observed result	Acceptance criteria	PASS N.A. FAIL
a.) Ground continuity test	without power cord		≤ 0.1 ohms	☐ ☐ ☐
	with power cord		≤ 0.2 ohms	☐ ☐ ☐
b.) Impedance of protective earth connection	without power cord		≤ 0.1 ohms	☐ ☐ ☐
	with power cord		≤ 0.2 ohms	☐ ☐ ☐
Ground leakage current test	Normal Condition (NC)		≤ 500 µA *EN /IEC* ≤ 300 µA *UL*	☐ ☐ ☐
	Single Fault Condition (SFC)		≤ 1 mA	☐ ☐ ☐
Testing touch current	Normal Condition (NC)		≤ 100 µA	☐ ☐ ☐
	Single Fault Condition (SFC)		≤ 500 µA *EN /IEC* ≤ 300 µA *UL*	☐ ☐ ☐

Module type	**S/N**	**Observed result**		**Acceptance criteria**	**PASS N.A. FAIL**
		ECG	**SpO2/ InvP**		
Patient (source) leakage current tests, using a test body					☐ ☐ ☐
Normal Condition (NC)	Polarity: NORMAL			≤ 10 µA	☐ ☐ ☐
Single Fault Condition (SFC)	Ground closed (normal)			≤ 50 µA	☐ ☐ ☐
	Ground open (normal)			≤ 50 µA	☐ ☐ ☐
	Ground closed (reverse)			≤ 50 µA	☐ ☐ ☐
	Ground open (reverse)			≤ 50 µA	☐ ☐ ☐
Normal Condition (NC)	Polarity: Reverse			≤ 10 µA	☐ ☐ ☐
Patient (sink) leakage current tests	Polarity: NORMAL			≤ 50 µA	☐ ☐ ☐
	Polarity: Reverse			≤ 50 µA	☐ ☐ ☐

Module type	**S/N**	**Observed result**	**Acceptance criteria**	**PASS N.A. FAIL**
Patient (source) leakage current tests, using a test body				☐ ☐ ☐
Normal Condition (NC)	Polarity: NORMAL		≤ 10 µA	☐ ☐ ☐

Module type	S/N	Observed result	Acceptance criteria	PASS N.A. FAIL
Single Fault Condition (SFC)	Ground closed (normal)		≤ 50 µA	☐ ☐ ☐
	Ground open (normal)		≤ 50 µA	☐ ☐ ☐
	Ground closed (reverse)		≤ 50 µA	☐ ☐ ☐
	Ground open (reverse)		≤ 50 µA	☐ ☐ ☐
Normal Condition (NC)	Polarity: Reverse		≤ 10 µA	☐ ☐ ☐
Patient (sink) leakage current tests	Polarity: NORMAL		≤ 50 µA	☐ ☐ ☐
	Polarity: Reverse		≤ 50 µA	☐ ☐ ☐

Electrical Safety Test completion	☐ ☐ ☐

Functional check	Observed result	Acceptance criteria	PASS N.A. FAIL
Start-up		Monitor starts up normally.	☐ ☐ ☐
Display: Picture quality		Text is readable, images are clear and brightness is good.	☐ ☐ ☐
Display: Touchscreen control		Touchscreen is correctly calibrated and operates correctly.	☐ ☐ ☐
Display: Alarm light		Alarm light illuminates.	☐ ☐ ☐
Device Information		Device information is correct.	☐ ☐ ☐
Configuration Information		Monitor is correctly configured.	☐ ☐ ☐
Trim knob, keypad, and remote: Hard key		Selected menu opens and selected activity starts.	☐ ☐ ☐
Trim knob, keypad, and remote: Trim Knob		Selected menu opens and selected activity starts.	☐ ☐ ☐
Mouse		Selected menu opens and selected activity starts.	☐ ☐ ☐
Alphanumeric keyboard		Keyboard language configuration is correct.	☐ ☐ ☐
Barcode reader		Data is correctly populated.	☐ ☐ ☐
MC Network and S/5 Network		Network symbol and other monitor's patient data is correctly shown on the screen.	☐ ☐ ☐
IX printers		Test page is printed to the selected printer.	☐ ☐ ☐
iPanel connection		The program is launched correctly.	☐ ☐ ☐
InSite RSvP		The patient monitor is active on InSite RSvP back office.	☐ ☐ ☐
Test completion			☐ ☐ ☐

Notes

Used service parts			

Signature	Date

APPENDIX B: Maintenance check form

CARESCAPE Monitor B850

Customer	Monitor type B850-	S/N
Service record #	Software version	
Service engineer	Module type	S/N
Planned maintenance ☐ Corrective maintenance ☐	Start date	

Prior to testing verify all equipment is calibrated via "Cal" labeling and record Cal Due Dates

Measuring equipment / test gases used:				
Equipment / tool / gas:	Manufacturer:	Model/Type/Part No:	Serial Number/ID:	Cal Due Date:

PASS = Test passed **N.A. = Test not applicable** **FAIL = Test failed**

Visual inspection	**Observed result**	**PASS**	**FAIL**
The monitor and the connected peripheral devices are undamaged.		☐	☐
The monitor and the connected peripheral devices are properly mounted with specified mounting solutions.		☐	☐
The cables between the patient monitor and the connected devices are intact, properly connected and secured to the right connectors.		☐	☐
The modules are properly connected and locked.		☐	☐
The pivoting module frame and battery door are properly locked.		☐	☐

Electrical safety tests						
Power outlet is correctly wired.				☐		☐
Power cord and plug are undamaged and all conductors are properly connected.				☐		☐
Ground integrity check		Observed result	Acceptance criteria	**PASS**	**N.A.**	**FAIL**
a.) Ground continuity test	without power cord		≤ 0.1 ohms	☐	☐	☐
	with power cord		≤ 0.2 ohms	☐	☐	☐
b.) Impedance of protective earth connection	without power cord		≤ 0.1 ohms	☐	☐	☐
	with power cord		≤ 0.2 ohms	☐	☐	☐
Ground leakage current test						
Normal Condition (NC)	Polarity: Normal		≤ 500 µA *EN /IEC* ≤ 300 µA *UL*	☐	☐	☐

Single Fault Condition (SFC)	Polarity: Normal		≤ 1 mA	☐ ☐ ☐
	Polarity: Reversed		≤ 1 mA	☐ ☐ ☐
Normal Condition (NC)	Polarity: Reversed		≤ 500 µA *EN /IEC* ≤ 300 µA *UL*	☐ ☐ ☐
Testing touch current				
Normal Condition (NC)	Polarity: Normal		≤ 100 µA	☐ ☐ ☐
Single Fault Condition (SFC)	Ground closed Polarity: Normal		≤ 500 µA *EN /IEC* ≤ 300 µA *UL*	☐ ☐ ☐
	Ground open Polarity: Normal		≤ 500 µA *EN /IEC* ≤ 300 µA *UL*	☐ ☐ ☐
	Ground open Polarity: Reversed		≤ 500 µA *EN /IEC* ≤ 300 µA *UL*	☐ ☐ ☐
	Ground closed Polarity: Reversed		≤ 500 µA *EN /IEC* ≤ 300 µA *UL*	☐ ☐ ☐
Normal Condition (NC)	Polarity: Reversed		≤ 100 µA	☐ ☐ ☐
Electrical Safety Test completion				☐ ☐ ☐

Functional check	**Observed result**	**Acceptance criteria**	**PASS N.A. FAIL**
Start-up		Monitor starts up normally.	☐ ☐ ☐
Display: Picture quality		Text is readable, images are clear and brightness is good.	☐ ☐ ☐
Display: Touchscreen control		Touchscreen is correctly calibrated and operates correctly.	☐ ☐ ☐
PSM / PDM identification		Hemodynamic parameter data appears on the screen correctly.	☐ ☐ ☐
E-module identification		E-module parameter data appears on the screen correctly.	☐ ☐ ☐
Trim knob, keypad, and remote: Hard key		Selected menu opens and selected activity starts.	☐ ☐ ☐
Trim knob, keypad, and remote: Trim Knob		Selected menu opens and selected activity starts.	☐ ☐ ☐
Mouse		Selected menu opens and selected activity starts.	☐ ☐ ☐
Alphanumeric keyboard		Keyboard language configuration is correct.	☐ ☐ ☐
Barcode reader		Data is correctly populated.	☐ ☐ ☐
MC Network and S/5 Network		Network symbol and other monitor's patient data is correctly shown on the screen.	☐ ☐ ☐
IX printers		Test page is printed to the selected printer.	☐ ☐ ☐

Functional check	Observed result	Acceptance criteria	PASS N.A. FAIL
InSite RSvP		The patient monitor is active on InSite RSvP back office.	☐ ☐ ☐
Recorder		The header line contains the correct information. The grid is clear. The waveforms labels appear in the printout as configured.	☐ ☐ ☐
Test completion			☐ ☐ ☐

Notes

Used service parts			

Signature	Date

For your notes:

APPENDIX C: Display D19KT VER01

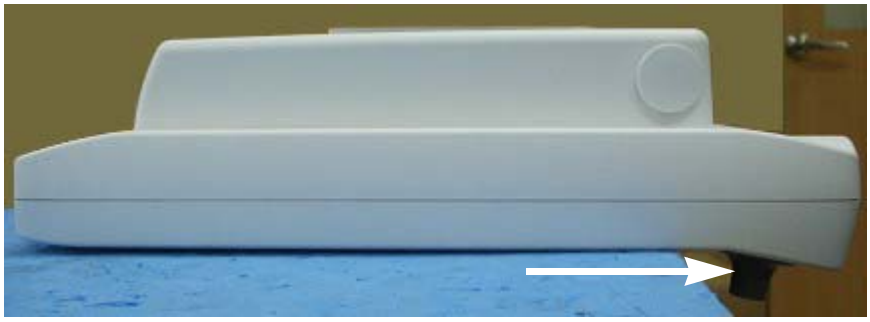
C.1 Disassembly and reassembly procedures

Before you start, read the following general guidelines and make sure to follow them:

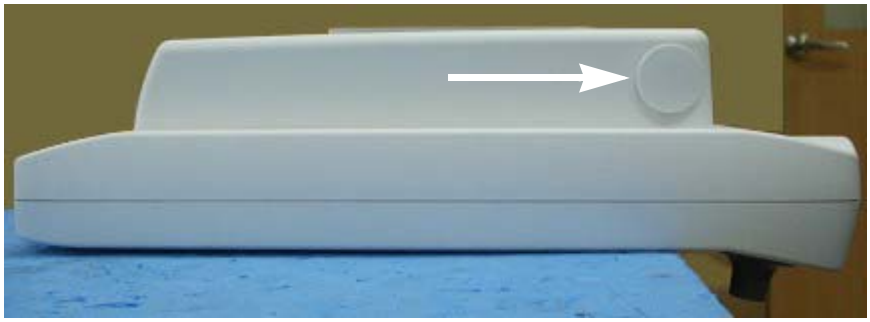
Detaching the Trim Knob, OSD Knob and/or Alarm Light Cover

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

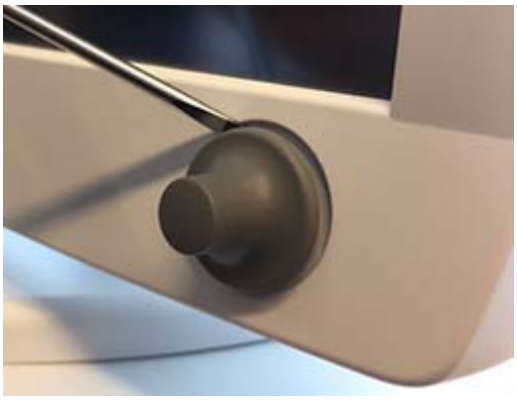
1. Turn the display power off at the rear power switch and disconnect all cables (USB, display and AC power).
2. Place the display as shown below to prevent damage to the main **TRIM KNOB**.



3. Remove the **OSD KNOB** by gently pulling the **OSD KNOB**.



4. Use a flat blade screwdriver to remove the main **TRIM KNOB**.



5. Use a screwdriver to disassemble the alarm light cover.

NOTE: Reassemble in reverse order.

NOTE: Contact GE Healthcare if the display is faulty in any other way.

C.2 Service parts

Ordering parts

To order parts, contact GE Healthcare. Contact information is available at www.gehealthcare.com. Make sure you have all necessary information at hand.

List of FRUs

FRU/Item part number	FRU/Item description
2091940-001	Trim/OSD Knobs & Alarm Light Cover, D19KT

For your notes:

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