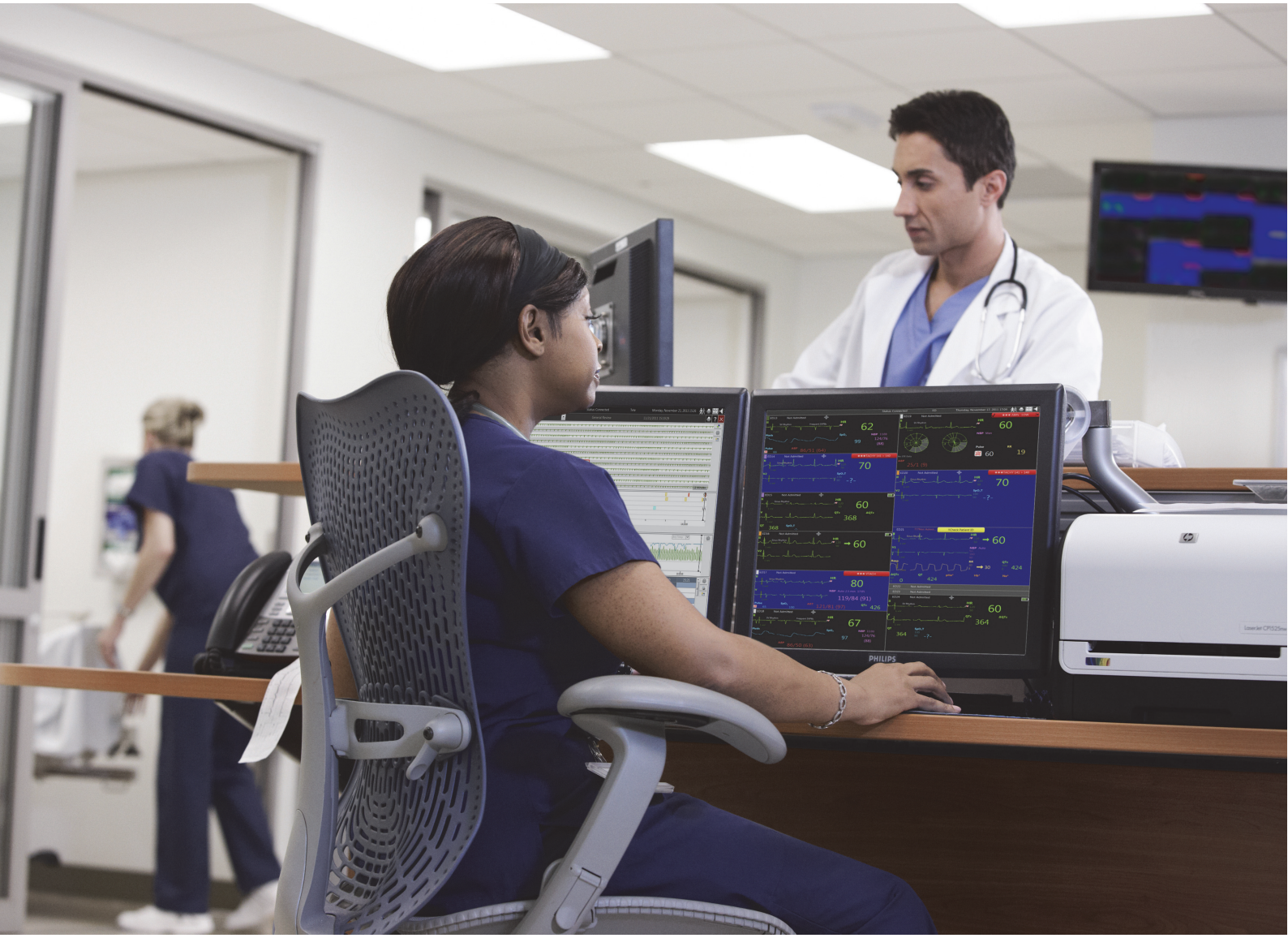

Patient Information Center iX

Instructions for Use

Release C.03

PHILIPS

Notice

Proprietary Information

This document contains proprietary information, which is protected by copyright.

Copyright

This product contains software licensed under an open source license. For acknowledgments, license texts and source code, please refer to the IntelliVue Information Center iX M3290B Software\References\README.pdf.

Manufacturer

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While handling personal information is outside the scope of this document; in general, each organization is responsible for identifying:

- Who has access to personal data and under what conditions an individual has authorization to use that data.
- What security controls are in place to protect personal and sensitive data.
- How the data is stored and the conditions by which it is stored.
- How the data is transmitted and the conditions under which that data is transmitted.

Protecting personal health information is a primary component of a security strategy. Personal and sensitive information should be protected according to the applicable laws, regulations and directives, such as HIPAA, PIPEDA and/or Council of the European Union security and privacy rules.

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Uses of the system for purposes other than those intended and expressly stated by the manufacturer, as well as incorrect use, incorrect operation, or modifications made to the system without explicit approval from Philips, may relieve the manufacturer (or his agent) from all or some responsibilities for resultant noncompliance, damage or injury.

Printing History

New editions of this document will incorporate all material updated since the previous edition. Update packages may be issued between editions and contain replacement and additional pages to be merged by a revision date at the bottom of the page. Note that pages which are rearranged due to changes on a previous page are not considered revised.

The documentation printing date and part number indicate its current edition. The printing date changes when a new edition is printed. (Minor corrections and updates which are incorporated at reprint do not cause the date to change.) The document part number changes when extensive technical changes are incorporated.

453564956621 First Edition. . . . . January 2022

About This Guide

This guide contains information specific to the Patient Information Center iX including how to perform day-to-day tasks and troubleshoot common problems. It describes all clinical applications and provides a complete list of alarm and INOP messages. For specific information on using the patient monitoring devices, please refer to your appropriate Instructions for Use.

The on-line Information Center Help provides instructions for completing basic tasks and troubleshooting problems.

Not all functionality described in this document may be available to you.

For information about your computer, printer, or other hardware, please consult the accompanying documentation. To verify that the device is installed and working correctly see the *Patient Information Center iX Service and Installation Guide.*

Document Conventions

Bold Typeface

Objects of actions in procedures appear in bold typeface. Note the following example:

Select the **Update** button.

Warnings

Warning

A Warning alerts you to a potential serious outcome, adverse event or safety hazard. Failure to observe a warning may result in death or serious injury to the user or patient.

Cautions

Caution

A Caution alerts you to where special care is necessary for the safe and effective use of the product. Failure to observe a caution may result in minor or moderate personal injury or damage to the product or other property, and possibly in a remote risk of more serious injury.

Notes

A Note contains additional information on the product's usage.

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1. Introduction to the Information Center

2. Basic Operation

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4. Equipment Management

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7. ECG, Arrhythmia, ST and QT Monitoring

8. Measurements

9. Patient Data Review

10. Reports

11. Recordings

12. Unit Management

13. Information Center Safety and Specifications

A. Feature Summary

1

Introduction to the Information Center

This section provides an overview of the Patient Information Center iX (PIC iX). It includes:

Introduction

The Philips Patient Information Center iX (PIC iX) is a regulated medical IT system that:

- Provides continuous monitoring of patient vital signs from admission to discharge
- Consolidates and communicates vital signs data from monitors and third-party devices to caregivers and to the Electronic Medical Record (EMR) for a complete patient record
- Supports industry standard interfaces to integrate into existing hospital IT infrastructure and EMR systems while meeting requirements for manageability, serviceability, and security
- Meets the needs of caregivers on the go by means of remote access to patient vital signs for information anywhere

Through a combination of advanced alarm management, mobility, and clinical decision support, Philips Patient Monitoring Systems enable reduction of non-actionable alarms, improve workflow efficiency, and facilitate early intervention of patient deterioration to improve patient care and outcomes.

Information Center Product Name

The Philips IntelliVue Information Center (also known as PIIC iX) is called Patient Information Center iX, or PIC iX. This change affects the product software and online Help as well as the related product documents. All references to Philips IntelliVue Information Center iX or PIIC iX in software, online Help, and documents refer to Patient Information Center iX or PIC iX, as appropriate. However, any references to PIIC iX are considered equivalent to PIC iX.

Intended Use

The intended use of the Philips Patient Information Center iX software application is to:

- Receive, aggregate, process, distribute, and display physiologic waves, parameters, alarms and events at locations other than at the patient, for multiple patients.
- Determine alarm conditions and generate alarm signals for Philips-approved medical devices that send physiological data and do not have the ability to determine the alarm condition. Algorithms present in the software are limited to the ST/AR ECG (for arrhythmia, ST Segment, and QT Interval Monitoring) and SpO_2.
- Generate alarm signals for user notification, based on the alarm signal determined and sent by Philips approved medical devices.
- Perform diagnostic 12-lead ECG analysis and interpretation based on raw ECG data samples provided from Philips-approved medical devices. Results may be displayed, printed and/or distributed to Philips-approved medical devices.
- Provide review and trend application data, designed to contribute to the screening of patient condition. All information or visual indications provided are intended to support the judgment of a medical professional and are not intended to be the sole source of information for decision making, thus these applications are not intended for diagnoses or active patient monitoring where immediate action is required.
- Provide connection to other systems not associated with active patient monitoring, such as information systems. The software performs the action to transfer, store, convert from one format to another according to preset specifications, or to display medical device data.

The Patient Information Center software is intended for use in professional healthcare facilities by trained healthcare professionals. The Patient Information Center software is not intended for home use. Indicated for use when monitoring adult and/or specified pediatric subgroups (Newborn (neonate), Infant, Child, and Adolescent) patients as indicated by labeling of the medical device providing the data.

Rx only.

Patient Information Center iX Models

The following base models are available to meet your patient monitoring needs.

Model	Descriptions
PIC iX Enterprise	• High-end surveillance station • Data acquisition and storage • Can be licensed as a local database for up to 32 patients or with a network option for up to 1600 patients • Compatible with low-, mid-, and high-acuity IntelliVue patient monitors
PIC iX Express	• Mid-level surveillance station • Data acquisition and local database storage for up to 32 patients • Compatible with low- to mid-acuity IntelliVue patient monitors
PIC iX Essentials	• Entry-level surveillance station • Data acquisition and local database storage for up to 32 patients • Compatible with Efficia patient monitors only
PIC iX Enterprise Link	• No surveillance display, but can be licensed for surveillance station capabilities • Networked to support up to 1600 patients • Compatible with low-, mid-, and high-acuity IntelliVue patient monitors. The Overview package is required to connect Patient Worn Devices/monitors.
PIC iX Link	• No surveillance display • Data acquisition and local storage for up to 64 patients • Compatible with low-, mid-, and high-acuity IntelliVue patient monitors

Point-of-Care Equipment

The following table shows the patient monitoring devices that communicate with each base model.

Equipment	PIC iX Enterprise	PIC iX Express	PIC iX Essentials	PIC iX Enterprise Link	PIC iX Link
IntelliVue patient monitors Release J.1 or later, including X2 and X3 MMS, MPxx and MXxxx	√	√	N/A	√	√
HeartStart MRx Release F.03.07 or later	√	√	N/A	√	√
Efficia CM Series patient monitor Release A.01 or later	N/A	N/A	√	N/A	N/A
IntelliVue MX40 wearable patient monitor Release B.02 or later	√	√	N/A	√	√
TRx4841A/TRx4851A IntelliVue Telemetry System Transceiver Release B.0 or later	√	√	N/A	N/A	√

Clinical Features

The Information Center displays information received from point-of-care equipment including waveforms, trends, alarms, and numerics. The Information Center supports communication with wired and wireless monitoring devices. The Information Center software allows you to:

- View waves and physiological measurement information sent over the monitoring network.
- Be alerted to and respond to patient alarms that have been detected by networked monitoring devices.
- Perform ST/AR (ST and Arrhythmia) multi-lead analysis on up to two leads of ECG. ST/AR ST segment monitoring provides ST elevation and depression measurements for patients being monitored by TRx4841A/TRx4851A transceivers. ST/AR analysis for IntelliVue Patient Monitors, MX40, and Efficia monitors occurs at the monitor.
- Perform QT interval monitoring for IntelliVue Telemetry System devices. QT interval monitoring can help to detect prolonged QT interval syndrome. If the patient is monitored by an IntelliVue Patient Monitor or MX40, QT/QTc analysis is provided by the IntelliVue Patient Monitor. QT interval monitoring is not available on Efficia monitors.
- Print reports from the Information Center or from the bedside device.
- Make strip recordings on the Philips 2-Channel Recorder. Recordings can be requested from the Information Center or from networked products.
- Access a retrospective review of patient data.
- View real-time and stored data for a patient monitored by another Information Center in the same clinical unit or in another unit.
- Manage nursing assignments for alert notification.

- Receive secondary notifications of alarms in text format to a receiving device, such as a mobile phone.

Disclaimer (Japan)

This guide may contain descriptions of functionality and features that are not implemented in the equipment currently shipped to Japan and/or of products that are not currently sold in Japan due to limitations and restrictions under the applicable local laws and regulations in Japan. Contact your local sales representative and/or Philips Customer Support for details.

What's New In Release C.03

This section describes key features and improvements that have been introduced with Release C.03 of the Patient Information Center iX. The features available depend on your system configuration and the options purchased by your hospital. For a list of the features that were introduced in earlier releases, see Appendix A, "Feature Summary".

Minimum QRS Detection Threshold

PIC iX Release C.03 provides a configuration for the MX40 default value for a minimum QRS detection threshold. The QRS detection threshold defines the value above which a QRS signal is counted. Configuring a minimum QRS detection threshold can prevent P-waves, T-waves and noise from being detected as QRS complexes.

The ECG Analysis application provides a graphical user interface so the user can adjust the minimum QRS detection threshold value. See "ECG Analysis" on page 7-13.

IntelliBridge Alarm Filtering

Settings in PIC iX Release C.03 System Configuration enable the user to specify which alarm types from IntelliBridge System (IBS) third-party device drivers to display at each PIC iX clinical unit. The user can filter the alarms by severity (red, yellow, or cyan), type (patient alarms and technical alarms), and device. This feature is associated with a Third Party Device Connectivity license.

Masimo Body Site Measurement Support

PIC iX Release C.03 supports Masimo body site location and measurements from an IntelliVue Patient Monitor, and measurements from an MX40. The PIC iX does not display the body site information but exports it in HL7 to the EMR.

Selecting a Print Destination

PIC iX Release C.03 allows the user to select a print destination for reports if more than one destination is required. In previous releases, PIC iX only supported one print destination for each host.

Unique Unit Names and Bed Labels Across Institutions

With PIC iX C.03, the same clinical unit names and bed labels can be used across multiple institutions. In the PIC IX application, patient selection, caption bar, surveillance (sectors), patient search, caregiver assignment, and locating equipment display the institution name. Tool tips also include the institution names, if there are multiple institutions in the topology.

Note — Equipment names remain unique across institutions and cannot be duplicated.

Other Enhancements with Release C.03

Data and device security:

- PIC-to-PIC Encryption and Node Authentication secures the communication between PIC iX hosts. Each host validates the identity of the other hosts it communicates with and encrypts the data on the wire.
- Internet Information Services (IIS) security to meet Security Technical Implementation Guide (STIG) and Web requirements.
- Updates for compliance to Department of Defense Information, Assurance, Certification, and Accreditation (DIACAP) process.
- Automatic application whitelisting controls which applications are permitted to run on PIC iX hosts.

2

Basic Operation

This section describes the basic functions of the Patient Information Center iX. It includes the following:

Information Center Display Screens

The Information Center software runs on a PC workstation with one or two displays for viewing patient data and accessing clinical applications. A mouse and keyboard are provided for entering and changing patient data and other information. If you position the cursor on a labeled application button and click, the application is immediately displayed on the screen. Note that an on-screen keyboard is not available.

With a touchscreen, you can access patient data by either using the mouse or by touching the item on the screen with your finger or a stylus. The mouse is best for making precise selections and measurements, such as using calipers. The touchscreen is best for actions such as acknowledging alarms, accessing application windows, or recording strips. When using a touchscreen, keep the area free of items that can inadvertently touch the screen. If the touchscreen becomes unavailable for any reason, you can access patient data by using the mouse and keyboard.

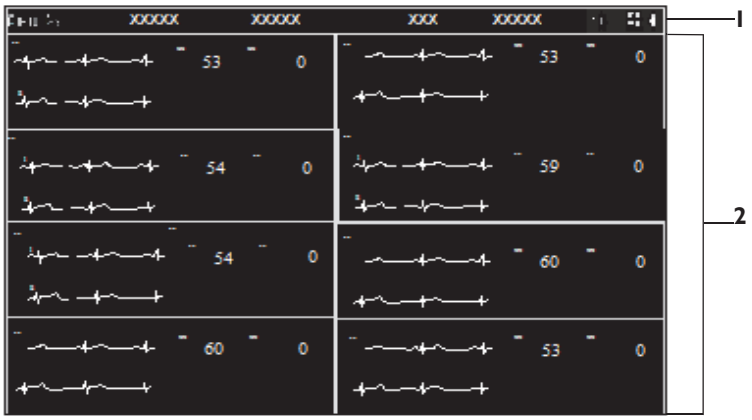
The Information Center has two types of display screens:

- The Main Screen, or resting display, that contains Patient Sectors.

- Application Windows that contain the Information Center clinical applications. Application windows can be configured to open in full screen or half screen. Full screen is only available on systems with two displays.

Main Screen

The Main Screen displays real-time waves, numerics, and alarms from multiple patients. It can be configured to show up to 64 waves, and contains the following elements:



1 Caption Bar

2 Patient Sectors

Caption Bar

The area at the top of the Information Center screens displays the items described in the following table.

Item	Description
PHILIPS	Product Support icon. Select to view product support and licensing information. See "Product Support" on page 12-15.
System status message	Status messages are color-coded to indicate the message severity: • Orange background indicates high severity. • Black background indicates low severity. Select the status message to open System Help in the application window. The Help contains a list of status messages with the possible causes and recommended actions for each message. See "Status Messages" on page 6-23.

Item	Description
Connection status	Displays the status of the connection to the server, indicated by the background color: • **Connected** (no color) — The system is connected to the server. • **Local** (orange) — The system is disconnected from the database server. • **Reconnect** (purple) — The system is ready to reconnect to the server and requires user confirmation. See "Manually Reconnecting to the Primary Server" on page 13-12. • **Reconnect Pending...** (purple) — The system is in the process of automatically reconnecting. • **Reconnecting in xx seconds** (purple) — The system will automatically reconnect (counting down from 60 seconds). Select to cancel the action and change the status to **Reconnect**. *Note* — If an operating system patch installation is pending, the following connection status may be displayed in the caption bar. The system does not reconnect automatically if a patch is active. • **Action Required** — The system is ready to install an operating system patch and requires user confirmation to reboot. See "Installing Operating System Patches" on page 13-12. • **Reboot Pending** — The system is in the process of rebooting to complete an operating system patch installation. • **Rebooting in xx seconds** — The system will restart and complete installing the operating system patch (counting down from 60 seconds). Select to cancel the action and change the status to **Action Required**. See "If Connection to the Servers is Lost" on page 13-11 for more information.
System name	The name that is associated with the Information Center (for example, **CCU Hallway1**). Select the name to access the **Clinical Settings** application, where you can configure settings to accommodate the needs of your unit.
Date and time	The current system date and time.
	*Note* — The **Caregiver Assignments** application is not available on PIC iX Essentials systems. Caregiver Assignments icon. Select to access the **Caregiver Assignments** application where you can do the following: • Set up caregivers. • Assign caregivers to paging devices. • Manage your patient to nurse and caregiver assignments. • For systems with the Alert Data Integration paging option, designate the alarms that will generate an automatic page to the caregiver's paging device. See "Caregiver Assignments Application" on page 5-1.

Item	Description
	*Note* — **Record All** is not available on PIC iX Essentials systems. Depending on your system setup, select this icon to do the following: • **Record All** — make a delayed recording for all sectors that currently have patient data. • **Print All** — print a strip for all patients in the unit. • **Save Strips** — create saved strips for all patients in the unit. Recordings do not print for sectors that are not assigned beds or equipment. If you select this icon, a message asks you to confirm that you want to proceed with the action. Select **Yes** to confirm.
	Volume icon. Select to adjust the alarm volume. See "Adjusting the Alarm Tone Volume" on page 6-5. **Warning** Be sure the minimum volume setting is still audible in your care unit. Do not rely exclusively on the audible alarm system for patient monitoring. Adjustment of alarm volume to a low level during patient monitoring may result in patient danger. Remember that the most reliable method of patient monitoring combines close personal surveillance with correct operation of monitoring equipment. *Note* — Your system can be configured to automatically change the alarm volume at two different times of the day, for example, a day volume and a night volume.

Tool Tips

Tool tips provide information about the icons and buttons in the Information Center software. To view a tool tip, move the cursor over an item such as a field, icon, or button. A description of the highlighted item appears. Tool tips are not available on a touchscreen.

Demonstration Mode

If the Information Center has a Demo System license, the system can operate in Demonstration Mode. You can use Demonstration Mode to become familiar with the system's features. When operating in Demonstration Mode, a message in the caption bar indicates **Demo: Not for patient monitoring.**

Warning

In Demonstration Mode, the Information Center displays simulated patient data and does not reflect the current patient's actual status.

If you connect a monitoring device that is operating in Demonstration Mode, the text **Demo** displays under the primary wave at the Information Center. If no waves are displayed, **Demo** displays over the

first numeric in the patient sector. Refer to the user documentation for details about the operating modes.

Patient Sectors

The Main Screens show a specific number of patient sectors configured for your unit. Patient sectors can be configured to display particular types of waves, numerics or trends. The number of waves and the amount of information in a sector depends on the size of the sector. The layout of the patient sectors depends on how your system is configured. Patient sectors can be different sizes and can be added or removed as needed for census changes. For example, you may want to view more data for patients with higher acuity. See "Changing the Sector or Patient Window Layout" on page 2-15.

In addition to the waves and numerics, the sector can contain the following items.

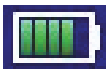
Item	Description
Bed Label	The bed label displays when a bed is assigned to the current sector. Move your cursor over the bed label to display the full bed location and equipment label(s). If there is more than one institution, the description includes the institution name. If more than one monitoring device is assigned to the bed, the device with the ECG source appears first in the list. The bed label appears in parentheses if a transport location is selected for the patient. Move your cursor over the bed label to display the temporary transport location and equipment label. Select the bed label to open the **Equipment Management** window. See "Managing Equipment" on page 4-1.

Item	Description
Patient Name	Displays the patient name, if admitted, and if the system is configured to display the patient name. Depending on the length of the complete string and the amount of available space, a minimum number of characters is shown, ending with an ellipsis (...). If the patient is assigned to a specific care group (for example, Diabetic), the patient name is outlined in the group color. Three question marks (???) precede the patient name when there is a problem identifying the patient. For example: • Patient data between the Information Center and the bedside does not match. • All required information was not entered when the patient was admitted. Move your cursor over the patient name to view the patient's full name, including the conflict indicator (???) and the group name. If the system is configured not to display the patient name in the sector, **Admitted** or **Not Admitted** displays. *Note* — The text **ID Unknown** displays at an Efficia monitor if a patient is not admitted.
Alarm message areas	All active alarms and technical alarms/INOPs display on the top right of the patient sector. See "Alarm Areas" on page 2-13.
Shortcut buttons	See "Patient Sector Buttons" on page 2-10.
Screen notes	If the sector is configured to display two header rows, you can associate text with the patient.

Sector and Patient Window Icons

The following table describes icons that display in a patient sector or the Patient Window.

Icon	Description
	Caregiver icon. Displays if the current patient has an assigned caregiver. The icon color corresponds with the patient's assigned caregiver color. Move your cursor over the icon to display the caregiver's name. Select the icon to access the **Caregiver Assignments** application. See "Caregiver Assignments Application" on page 5-1.

Icon	Description
	Group Name icon (Patient Window only). If the current patient is assigned to a patient group type for example, Diabetic, the group name is outlined in its associated color. Group name and color allow you to quickly identify patient types. Select the Group Label to access the **Manage Patient** application where you can change the group name. See "Changing Patient Information" on page 3-11.
 Do Not Resuscitate  Modified	Resuscitation icon. Indicates the patient's current resuscitation status. The icon is solid white when the patient's resuscitation status is set to **DNR** (Do Not Resuscitate). The icon is a white outline when the patient's status is set to **Modified**. The icon does not display if the patient's resuscitation status is set to **Full**. Select the icon to access the **Manage Patient** application where you can change the resuscitation status. See "Changing Patient Information" on page 3-11.
	Battery icon. If there is at least one battery-operated device assigned to this patient, the battery icon indicates the device with the least amount of battery strength. Move your cursor over the icon to view a list of equipment for this patient sorted from the lowest to highest battery charge. The battery icon has five levels: approximately 100% to 80%, 80% to 60%, 60% to 40%,40% to 20%, or -Replace Battery strength. The number of segments indicates the approximate power level. Select the icon to access the **Equipment Management** window. See "Managing Equipment" on page 4-1. *Notes —* • For battery-operated MRx monitors, the battery gauge represents the single battery with the greatest remaining battery charge and displays the nearest 20%. See your MRx monitor documentation for estimates on monitoring time available with each of the associated battery levels. • For MRx monitors, the battery icon displays in the patient sector briefly during defibrillation charge time. When the charge cycle is complete, the MRx monitor switches back to AC and the Information Center removes the icon from the patient sector. This duration is typically less than 5 seconds.

Icon	Description
 Normal  Stale  Out of range	Device Location icon. For telemetry devices, one of three icons indicate the device location: • Normal (white) – The primary telemetry device is in range and sending data. • Stale (blue and white) – The last known access point is not sending data and may be out of range. • Out of range (yellow and white) – The primary telemetry device reached a defined border access point and may be out of range. Move your cursor over the icon to view the location of the device. For example, **Hallway 2**. The icon does not display in the patient sector or Patient Window if the Device Location option is not enabled, unavailable, or if the patient has no telemetry devices assigned. *Note* — Because the coverage range of access points can sometimes overlap or span across multiple floors, the Device Location feature is not intended for use when attempting to locate a patient. Select the icon to access the **Locate Equipment** application. See "Locating Equipment" on page 12-8.
 On  Off  Unconfirmed	Paced Mode icon. Indicates the patient's current paced status. • On – The icon is white when **Paced Mode** is turned on. • Off – The icon is green with an X over it when **Paced Mode** is turned off. • Unconfirmed – A red question mark displays over the icon when the patient's paced mode is unknown or in conflict. *Important* — If **Paced Mode** is set to **Unconfirmed**, the ST/AR algorithm acts as though **Paced Mode** is turned on. Select the icon to display a menu where you can turn **Paced Mode** on or off. **Warning** If the patient has a pacemaker, **Paced Mode** must be turned on, enabling the ST/AR algorithm to detect and reject pace pulses (spikes) from the HR count. Otherwise, pace pulses could be detected as beats and the monitor may not alarm for an asystole condition. If the patient does not have a pacemaker, turn **Paced Mode** off to allow the ST/AR algorithm to work most effectively.
	Manage Patient icon. Available in sectors not currently monitoring a patient. Select the icon to access the **Manage Patient** application where you can assign a monitoring device.

Icon	Description
 Ancillary  Principal Down	Sector Assignment icon. A sector can be assigned as ancillary or principal. • Ancillary – The sector is assigned as an ancillary sector on a surveillance station. Move the cursor over the icon to view the name of the hosts where the patient is principally being monitored. If a principal sector was never assigned for this bed, the tool tip indicates that the patient is principally monitored at the bedside. • Principal Down – The sector is assigned as a principal sector on a surveillance station and at least one other principal sector for this bed is disconnected from the network. The tool tip indicates that principal monitoring for this patient has been interrupted at other hosts. The icon does not display in the patient sector or Patient Window if the sector is a principal sector and is currently connected to the network.
 Alarm Advisor  Early Warning Score (EWS)	*Note* — Notifications are not available on PIC iX Essentials systems. Notification icon. Displays an icon that represents the highest priority active Alarm Advisor or EWS notification for the patient. EWS notifications are a higher priority than Alarm Advisor notifications. If there are both Alarm Advisor and EWS active notifications, the EWS icon appears. Select the icon to view the following: • If there is one active Alarm Advisor notification associated with a measurement, the page for the measurement opens in the **Measurements** application. • If there is more than one active Alarm Advisor notification for the patient, or if a measurement does not have a separate page in the **Measurements** application, the **Notifications** page in the **Measurements** application displays a list of active notifications. • For an EWS notification, the **Notifications** page in the **Measurements** application displays the active multiparameter score (MEWS) notifications. See "Notifications" on page 8-30.
	Alarms Off icon. Displays next to the numeric when alarms are turned off for the numeric.
	Audio Off icon. Displays next to the numeric when audible alarms are acknowledged at an Efficia monitor.

MRx Monitor States

The following table describes the MRx monitor states. The current state of the MRx monitor displays over the primary wave in the patient sector and Patient Window. See your HeartStart MRx Instructions for Use for information on the MRx monitor operating modes.

State	Description
Test Data	The bedside monitor is currently running in demo or test mode.
AED	The MRx monitor is currently operating in AED mode. When in AED mode, the MRx monitor analyzes the patient's ECG and determines whether a shock is advised.
TC Pace Pause	The MRx monitor is currently operating in TCP Pause mode.
TC Pacing	The MRx monitor is currently operating in Pacing mode. Pacing mode is used to deliver pace pulses to the heart.
Sync	The MRx monitor is currently in Sync mode. If alarms are deactivated in Defib mode and you switch to Sync, alarms are reactivated automatically.
Defib	The MRx monitor is currently operating in Defib mode. All alarms are deactivated when in Defib mode. You can turn alarms back on at the MRx monitor.
Config	The MRx monitor is currently in Configuration Mode.
Pads/Paddles	If pads or paddles are being used to obtain the ECG wave, the labels **Pads** and **Paddles** display over the primary wave.

Patient Sector Buttons

All tasks start in the patient sector. Buttons in the sector become visible when you move the cursor into the sector or, if using a touch screen display, when you first touch the sector with a stylus or the tip of your finger. When you place the cursor inside a patient sector, the sector is outlined in an orange border.

You can minimize the buttons by moving the cursor into the sector and holding down the **Ctrl** key. While the cursor is inside the sector, the buttons remain minimized until you press the **Ctrl** key again. If you move the cursor out of the active sector and move it back in, the buttons become visible.

The following table describes the buttons that may be available.

Button	Description
	Patient Window button. Select to open the Patient Window.
	Record button. For systems configured to record from the patient sector, select the button to start a delayed non-continuous (timed) recording. Your system may be set up to just record, record and save a strip, or to just save a delayed strip.

Button	Description
	Print button. For systems configured to print from the patient sector, starts a printout of a delayed strip. In addition to printing, your system may be set up to save the strip when you select the button.
	Acknowledge/Review button. Turns off the alarm sound and the sector background changes from blue to black. (You can also select anywhere in the sector except on a button). Your system may be set up to open the Fast Review application for certain alarm types. See "Fast Review" on page 9-35. *Note* — For MRx monitors, you cannot acknowledge pacing alarms at the Information Center. You must acknowledge all pacing alarms at the MRx monitor.
	Review button. For systems configured to not allow acknowledgment of bedside-generated alarm conditions or red alarms from the Information Center, displays the Fast Review strip for the alarm. See "Fast Review" on page 9-35.
Notes — • Alarms can be acknowledged at the Information Center if both the Information Center and the bedside monitor are configured with remote acknowledgment enabled. • If the system requires authentication to acknowledge red alarms, you can provide the appropriate user name and password in the Patient Window.	
	Minimize. Available if your system allows minimizing of sectors and the sector is not currently monitoring a patient or is in Standby. When you select the button, the sector body collapses, the sector header turns gray and the remaining monitoring sectors resize. The sector returns to its normal size when you select the sector header or when active monitoring begins.
 or 	Available for systems that allow sector resizing, select to make the sector smaller or larger. See "Sector Display Options" on page 2-12.

Shortcut Buttons

Depending on how your system is configured, up to three shortcut buttons may be available in the patient sector. These buttons provide quick access to specific Information Center applications and tasks, including:

- **Patient Window**
- **Manage Patient**
- **Review**
- **Measurements**
- **Equipment**
- **Standby**
- **Transfer**

Sector Display Options

Your system may be configured with the following sector display options.

Option	Description
Allow minimizing of sectors	You can minimize sectors that currently are not actively monitoring a patient, where: • All assigned equipment is in standby. • There is no equipment assigned to the sector. • The sector has been cleared. Minimizing a sector allows the other sectors in the same column on the Main Screen to expand and display more information. Sectors are restored automatically when monitoring resumes or when you select anywhere on the minimized sector.
Automatically minimize when not monitoring	The system automatically minimizes a sector when there is no equipment or the equipment is put in standby.
Allow sector resizing	You can manually increase or decrease the size of individual sectors. Increasing the size of a sector makes the other sectors in that column smaller. This is turned off by default.
Enable sector auto-sizing	The system automatically resizes a sector based on the data currently available. This is turned off by default. With automatic sector resize: • If one sector is only sourcing one wave, the sector automatically resizes to give its available space to other sectors. • If each sector in a column on the Main Screen can almost fit three waves, but instead can only fit two waves and some numerics, the Information Center gives the sector sourcing the most data extra space for three waves while limiting the other sectors to two waves.
Sort sectors by bed label	The system sorts all sectors in alphanumeric order by bed label or equipment label (if configured for Easy Device Setup) as soon as the label is entered. For example, Bed8, Bed9, Bed10.

See the *Patient Information Center iX Clinical Configuration Guide* for information about sector display settings. For PIC iX Essentials systems, this information is described in the *PIC iX Essentials Installation Guide*.

Alarm Areas

Active alarm messages display in alarm areas on the top of the patient sector and the Patient Window. In the patient sector, active red and yellow patient alarms display in one area on the right side and technical alarms display in another area in the center. In the Patient Window, there are three alarm areas: one area displays red patient alarms, one area displays yellow patient alarms, and one area displays technical alarms. The color of the alarm banner matches the alarm priority. See "Visual Alarm Indicators" on page 6-2.

A check mark in front of the alarm text indicates that the alarm is acknowledged. The announce time displays to the right of the alarm text.

If there is more than one active alarm, a down arrow appears to the right of the alarm text.

- In the patient sector, move the cursor over the message area to view the list of alarms.
- In the Patient Window, the active alarm messages rotate every three seconds so that all active alarms are visible.

The highest priority alarm appears at the top of the list. Up to 10 current alarm conditions are shown in the list. If a new alarm condition occurs, the oldest alarm is removed from the list and the new alarm condition is added to the bottom of the list.

Select a red or yellow alarm from the list to view it in the Fast Review application. See "Fast Review" on page 9-35.

Select a technical alarm/INOP to display the possible cause and recommended action for the alarm in the application window. See "Technical Alarm Messages (INOPs)" on page 6-15.

Viewing and Adjusting Waves

The waves that display in a patient sector and Patient Window are configured for your unit. You can customize how the waves display to meet your specific monitoring needs.

The patient sector and Patient Window contain waves where:

- The Resp wave speed is always 6.25 mm/s. All other waves are either 12.5 or 25.0 mm/s depending on your unit setup.
- The wave color can be the same as the LAN or WLAN bedside monitors. The wave color overrides the colors from MRx monitors, Efficia monitors, and ITS Smart Hopping monitors.
- When the ECG measurement is on, the first wave displayed is the primary ECG wave. The primary wave is always used for ECG analysis. A rhythm status message displays in the upper right corner of the wave, and an arrhythmia status message displays above and in the center of the wave. See "Arrhythmia Status Messages" on page 7-17.
- The pacer spike color is always white unless the ECG wave is white. If the ECG wave is white, then the pacer spike color is green. Pacer spikes may be configured to display with fixed amplitude for increased visibility.
- The text **Demo**, **Config**, or **Service** displays under the primary wave to indicate the monitoring device's current operating mode. If no waves are displayed, the operating mode displays over the first numeric in the patient sector. For information about the operating modes, refer to the user documentation for the monitoring device.
- The current state of the MRx monitor displays over the primary wave. No monitor state displays in the patient sector when in monitoring mode. See "MRx Monitor States" on page 2-10.

- Pleth waves on an Efficia monitor are labeled as SpO2. Waves that are labeled as acResp at the Information Center are labeled as RRa on an Efficia monitor.
- With IntelliVue Patient Monitor (Release L.0 or later), the user can select an extended lead for the rhythm strip. The bedside monitor does not display the lead label if there is no wave data. However, at the Information Center iX the lead label is displayed without the wave data.

Wave Adjustments

You can adjust waves in the patient sector or Patient Window layout by selecting a wave then selecting one or more options described in the following table.

Choice	Description
Change Wave	Select a wave from the list. You cannot select the primary ECG wave.
ECG Analysis	Available if you select an ECG wave. Select to access the ECG Analysis application. See "ECG Analysis" on page 7-13.
Primary Lead	Available if you select the primary ECG wave. Select the primary lead from the list.
Size Up	Select to increase the size (gain) of the wave. *Note* — For MRx monitors, you cannot adjust the wave size up or down.
Size Down	Select to decrease the size (gain) of the wave. *Note* — For MRx monitors, you cannot adjust the wave size up or down.
Setup ECG	Available if you select an ECG wave. Select to access the **Measurements** application ECG page, where you can change heart rate limits and asystole thresholds. See "ECG" on page 8-6.

Viewing and Adjusting Numerics

The numerics that display in a patient sector and Patient Window are configured for your unit. You can customize how the numerics display to meet your specific monitoring needs. When you select a numeric, unless there is an active alarm, menu options display that allow you to customize your view of the patient data.

You can adjust any measurement limit that is displayed in the patient sector or Patient Window if controls are available. If a numeric is not associated with a wave, you can change the numeric and adjust its alarm limits. See "Device Controls" on page 4-2.

The patient sector and Patient Window display periodic or aperiodic numerics where:

- Aperiodic measurement display times depend on the numeric lifetime configuration.
- Non-invasive blood pressure numerics indicate the type of measurement mode, for example automatic, manual or sequential.
- Manually-entered numerics are indicated by an asterisk (*) next to the measurement.

- A dedicated numeric can be configured to appear in the bottom right of the sector or Patient Window.

Early Warning Score

If the Early Warning Score (EWS) feature is available, the EWS (MEWS, PEWS, SPS, and custom) subscore displays in the patient sector and Patient Window. The score displays as a colored circle with a number. The EWS subscore is a collection of one or more measurements that are used to calculate the score, along with the value and subscores for the measurements.

- The EWS subscore is only available for IntelliVue Patient Monitor Release M or later.
- The EWS subscore does not appear if the patient is in conflict.
- Move the cursor over the score value to display the associated severity level.

Warning

The EWS subscore does not display if the Information Center iX loses association with the bedside monitor, even if the monitor re-associates.

Stored records display as a trend in the SpotCheck Trend tile in the Information Center review applications. See "SpotCheck Trend Tile" on page 9-19.

Changing the Sector or Patient Window Layout

You can change the patient sector or Patient Window layout by selecting a wave or numeric in the sector, and then selecting **Change Layout** from the menu that displays. Select one or more options described in the following table. A check mark appears next to the selected options. Select the option again to clear the check mark.

Choice	Description
Big Numerics	(Patient sector only.) Select to display large numerics with one small ECG wave in the sector.
Horizon Numerics	For systems with the Trends option available, select to display an arrow next to the measurement. The arrow indicates the direction of the numeric (whether increasing or decreasing) in the last 10 to 30 minutes. To change the arrow time: **1** Select the Horizon numeric. **2** Select **Change Arrow Time**. **3** Select a time from the list.
Trends	Available with systems with the Trend Display option available. Select to display at least one row of trends. See "Viewing Trends" on page 2-17.

Choice	Description
ST Map	For systems with the ST Map option and ST Analysis on, available in full screen mode and if three or more waves fit in the sector. Select to show an ST Map. To change the scale: 1 Select the ST Map. 2 Select **Change Scale**, then use the up and down arrows to set the scale for the ST Map. The scale sets the radius of the ST Map circle. The default is 2 mm. To display the ST baseline in the ST Map, select the ST Map then select **Show Baseline**. To adjust ST alarms, turn ST analysis on or off, and set ST measurement points, select the ST Map, then select **ST Map: Measurements** to open the **Measurements** application ST page. See "ST" on page 8-11.
ST Snippets	(Patient Window only.) For systems with the ST Map option, select to display snippets next to the ST Map. To view a snapshot of a real-time ECG wave, select the ST Snippets then select **ST View**. See "ST View" on page 8-12. To display the ST baseline, select the ST Snippets then select **Show Baseline**. Select **Update Baseline** to set the current snippets as a baseline for reference.
STE Map	For systems with the STE Map option and STE Analysis on, available in full screen mode and if three or more waves will fit in the sector. Select to show an STE Map. To change the scale: 1 Select the STE Map. 2 Select **Change Scale**, then use the up and down arrows to set the scale for the STE Map. The scale sets the radius of the STE Map circle. The default is 2 mm. To make ST elevation adjustments, select the STE Map then select **STE Map: Measurements** to open the **Measurements** application STE page. See "STE" on page 8-14.
STE Snippets	(Patient Window only.) For systems with the STE Map option, select to display snippets next to the STE Map. To view a snapshot of a real-time ECG wave select the STE Snippets then select **STE View**. See "STE View" on page 8-15. To display the STE baseline select the STE Snippets then select **Show Baseline.** Select **Update Baseline** to set the current snippets as a baseline for reference.

Viewing Trends

The **Trends** option allows you to see the patient's trend data using various views. Selecting a trend area provides additional menu choices for viewing trend data. Be sure to select the area of the trending sector that contains the trend view you want to modify.

Note — Information Center trend views and bedside trend views work independently. Changes that you make to Information Center trend views have no effect on trend views in use at the bedside.

Select	To
Graphical	See how a patient has been trending over time in graphical format. Data begins collecting as soon as it is received from the bedside.
Horizon	Quickly analyze the current measurement value in relation to how the patient has been trending. An arrow indicates the percentage of change over the time period (1, 2 1/2, 5, 10, 30 or 60 minutes). The arrow does not display if there is less than 50% of valid data over the set time period. A horizon bar displays next to the arrow where you can visually identify the measurement value change. The horizon bar extends from the current value to the baseline/target value.
Graphical and Horizon	See a combination of the graphical and horizon trend views. You can see a single measurement with a horizon trend view to the right of the graphical trend view.
Change Trend	Select a different measurement to trend. The measurements available for selection are those currently trending on the Information Center.
Change Trend Time	Select the duration of the trend graph. The default is 30 minutes. *Important* — This is a sector-wide setting. Changes you make to the trend time are applied to all of the trend views for this sector.
Change Arrow Time	Select the time period for the trend arrow in the horizon trend view.
Set High Horizon	Specify the measurement high level point. The values available for selection are appropriate for the selected measurement.
Set Low Horizon	Specify the measurement low level point. The values available for selection are appropriate for the selected measurement.
Set Scale Delta	Specify the delta value for the trends by using the up and down arrows to select a value. The delta value is used to calculate the measurement minimum and maximum values.
Auto Horizon	Apply the settings only to the currently selected trend view.
Auto Horizon All	Set the currently selected values for all of the trend views.

Application Windows

The application windows display the Information Center clinical applications.

For systems with one display, when an application window is open, all of the patient sectors are visible but are compressed.

On systems with dual displays, you can view the Patient Window or application windows on a full screen. A dual display system can be configured with one or two Main Screens.

- One Main Screen — One display is used for the Main Screen, and the other is used for a full-screen application window.
- Two Main Screens — Both displays have patient sectors when the Main Screen is active. For example, for a 16-patient Information Center, the Main Screen on each display includes eight sectors.

Application windows can be configured to open in two ways: Full Main Screen or Half Main Screen.

Application Window Task Bar

The task bar on the bottom of application windows provides easy access to Information Center applications for the selected bed. Depending on the size of your display, you can use right and left arrows to scroll through the available application buttons.

Note — The right and left arrows do not display if viewing prior data for a patient.

The following table describes the application buttons and their associated applications.

Button	Description
Patient Window	Provides a real-time view of the patient's data. The **Patient Window** button provides the following menu choices: • **Patient Window**. Display a real-time view of the current patient's data. See "Patient Window" on page 2-21. • **ECG Analysis**. Use to view all available ECG leads. See "ECG Analysis" on page 7-13. *Note* — **ECG Analysis** is not available on PIC iX Essentials systems.
Manage Patient	Provides access to the **Manage Patient** application, which allows you to: • Admit, discharge, and transfer patients. • Enter or update patient demographic information. • Manage the equipment associated with the patient. • Temporarily place the bed in standby. • Enter a temporary transport location, and/or select the patient's equipment to place in standby. • Export ECG waveform data to a Philips Holter system for analysis. See "Manage Patient Application" on page 3-2.

Button	Description
Measurements	Provides access to the **Measurements** application, which allows you to: • Change alarm limits for a patient. • Turn specific alarms on or off for a patient. • Adjust measurement settings within a profile. • Set up telemetry devices. • Designate which alarms will generate a recording or report or initiate a page. • View or print an Alarm Summary. • Configure criteria to trigger alarm advisor notifications. • View active notifications. Your choices in the application depend on how your unit is set up and the equipment assigned to the patient. See "Measurements Application" on page 8-1.
Review	Provides access to clinical review applications that allow you to display a patient's physiological measurements and alarm events that have been collected from a bedside monitor or telemetry device and stored over time in the database. The review applications available depend on your purchased options and how your system is set up. See "Review Applications" on page 9-2.
Manage Unit	Provides access to Information Center unit management applications. See "Unit Management Applications" on page 12-1.
Main Setup	Provides access to all of the available Information Center clinical and support applications. See "Main Setup Window" on page 2-20.
Main Screen	Closes the open window and returns to the resting display. *Note* — The **Main Screen** button is not visible if the application window is set up as a dedicated display.

Application Window Caption Bar

The following table describes the items that display in the application window caption bar.

Item	Description
Bed Label pane	Displays the bed label and ID for the currently selected patient. Select the down arrow to select another patient to view. See "Changing Patient Focus" on page 2-23.
Time	Time focus of the data you are reviewing in the current application.
	Prior Data icon. The icon displays in the review application caption bar if data from a different unit or patient stay is available for the currently selected patient. See "Viewing Stored Patient Data" on page 9-41.

Item	Description
	Print icon. If a printer is available, starts a printout of the screen or a report. If a printer is not available or is not configured, the print icon is grayed out. For more information, see "Types of Reports" on page 10-2.
	Help icon. Select to view the online Help application. The Help application is always available and provides context-specific information on using the Information Center applications. See "System Help" on page 12-14.

Main Setup Window

The **Main Setup** window provides access to the full array of Information Center clinical and support applications, as well as the following choices:

- **System Configuration** — Use to change factory set defaults to accommodate the needs of your unit. See "Clinical Settings Menus" on page 12-16.
- **Product Support** — Use to view product support and entitlement information. See "Product Support" on page 12-15.
- **Web Browser** — If available on your system, provides access to patient retrospective data using standard web browsers and mobile devices. See "Information Center Web" on page 9-43.

  Note — **Web Browser** is not available on PIC iX Essentials systems.

The application buttons are sorted into groups, for example review applications and unit management applications. Select the button to access the application.

Unit Summary Report

The Unit Summary Report contains the following information for each patient currently admitted in the unit:

- Patient demographics
- Vital information
- Rhythm Status

Printing the Unit Summary Report

To print a Unit Summary Report for all patients currently admitted and assigned to this Information Center, select the Print icon on the **Main Setup** window caption bar.

Patient Window

The Patient Window provides a real-time view of the patient's waves and numerics. You can view patient data and perform all tasks in the Patient Window.

In addition to the waves and numerics, the Patient Window contains the following items.

Item	Description
Bed Label pane	Displays the bed label and ID for the currently selected patient. Select the down arrow to select another patient to view. See "Changing Patient Focus" on page 2-23.
	Select the Print icon in the caption bar to start a printout of the Patient Summary Report.
	Select the Help icon in the caption bar to view the on-line Help application. See "System Help" on page 12-14.
Alarm message areas	All active alarms and technical alarms/INOPs display on the top right of the Patient Window. See "Alarm Areas" on page 2-13.
Buttons	See "Patient Window Buttons" on page 2-22.

The icons in the Patient Window are the same as those in the patient sector, as described in "Sector and Patient Window Icons" on page 2-6.

For information about viewing and adjusting the patient data that displays in the Patient Window, see the following:

- "Viewing and Adjusting Waves" on page 2-13
- "Viewing and Adjusting Numerics" on page 2-14
- "Viewing Trends" on page 2-17
- "Changing the Sector or Patient Window Layout" on page 2-15

Accessing the Patient Window

Use one of the following methods to open the Patient Window:

- In the sector for the bed that you want to access, select the **Patient Window** shortcut button.
- In the application window task bar, select the **Patient Window** button.

Patient Window Buttons

The following table describes buttons in the Patient Window.

Button	Description
Continuous Recording *Note* — Not available on PIC iX Essentials systems.	Allows you to make a real-time recording of selected waves. See "Real-Time Recordings" on page 11-4.
More Data	Available if there is more data than can be shown in the Patient Window. The **More Data** button allows you to move through pages of additional waves.
Page	For systems with paging available, you can manually send a text page to the patient's assigned caregiver. See "Sending a Page From Caregiver Assignments" on page 5-7.
Pause Yellow or **Pause Alarms**	Depending on the monitoring device and your system setup, a button may be available to pause alarms for a configured period of time. The button label indicates whether you can pause all red and yellow alarms or pause all yellow alarms. If alarms are currently paused for this patient, the button is highlighted. Select the button again to resume alarms. Your system may require authentication (you must provide the appropriate user name and password) before you can pause alarms.
Resume	A **Resume** button is available if the equipment is in Standby or if the patient is on transport.
Acknowledge	Allows you to acknowledge currently active alarms for this patient. The **Acknowledge** button is available if remote control to any device assigned to the sector is enabled.

Changing Patient Focus

You can view real-time and stored patient data for any bed monitored by a networked Information Center. After you change the patient, the data in the Patient Window and all application windows reflects the selected patient. You can view the selected patient's surveillance data or review the data for that bed until you change to another patient or go to the Main Screen.

Considerations

Before changing the patient focus, note the following:

- The **Patient Name** field in the **Search** and **Select** tabs can display a maximum of 250 characters. If a name is longer than 250 characters, the field includes an ellipsis (...).
- You can use the mouse to change the width of a column. Drag the boundary between the column headings until it is the width that you want

To change the patient focus:

1 In the Patient Window or application window, select the bed label drop-down arrow on the left side of the caption bar. The **Patient Selection** window **Select** tab displays a list of the institutions and units that you can access, and the corresponding list of beds in each unit.

2 In the left pane, select the unit name.

3 In the right pane, select the patient's name. The selection window closes, and the current application refreshes with the selected patient's data.

If your Information Center is on a network and the Web Portal is configured, you can search for any current or discharged patient who is or was on servers connected to the Web Portal.

To search for current or discharged patients:

1 In the Patient Window or application window, select the bed label drop-down arrow on the left side of the caption bar. The **Patient Selection** window opens.

2 Select the **Search** tab.

3 Type search text in the **Search:** field and select the Search icon. A list of patients that match the search text displays. The list contains a maximum of 100 patients.

4 Select the patient from the list.

For current patients, the patient's data displays in the Patient Window or current application window. You can then access any other window for the selected patient.

For discharged patients or for patients on another Information Center iX or Information Center, you can use the Web review applications. See "Information Center Web" on page 9-43.

3

Patient Management

This section describes how to manage patient data using the Information Center iX. It includes:

Manage Patient Application

Note — On PIC iX Essentials systems, the **Manage Patient** application has different options. For more information, see "Manage Patient Application — PIC iX Essentials" on page 3-3.

The **Manage Patient** application provides one location where you can:

- Manage patient transitions for example, discharge, transfers and temporary transports.
- Enter and update patient information.
- Manage the equipment assigned to a patient.

The **Manage Patient** application provides the following functions.

Function	Description
Admit	Connects all stored data to a patient's name and puts the name on the display, recordings, and reports. See "Admitting a Patient" on page 3-4.
Update	Allows you to update current patient information. See "Changing Patient Information" on page 3-11.
Discharge	Clears a patient's name from the bed, stops collecting data for the patient and returns Information Center settings to unit defaults. See "Discharging a Patient" on page 3-14.
Transfer	Allows you to transfer an admitted patient to another bed within their current unit or to a bed in another connected unit without losing patient data. See "Transferring a Patient to a New Bed" on page 3-16.
Transport/Standby	Allows you to choose a temporary location, for example, **X-Ray**, when a patient is on transport and put some or all of the patient's equipment in standby. See "Using Transport/Standby" on page 3-19.
Manage equipment	Allows you to add or remove a patient's monitoring equipment. See "Managing Equipment" on page 4-1.
Assign a sector	Allows you to assign a bed and/or equipment to an empty sector for primary monitoring. See "Assigning a Bed to a Sector" on page 4-13.
Clear a sector	Allows you to unassign a bed from a sector. See "Clearing (Unassigning) a Sector" on page 4-14.
Export data	Allows you to export ECG waves to a Philips Holter system. See "Exporting ECG Data to a Philips Holter System" on page 3-20.

For patients connected to a wired IntelliVue Patient Monitor or MRx monitor you can admit, discharge, transfer, or update patients from either the bedside or the Information Center. When you admit or discharge a patient on the Information Center, the patient is also admitted or discharged on the bedside. For telemetry-monitored patients, you must admit and discharge at the Information Center.

MRx Monitor in Therapy Mode

For patients connected to an MRx monitor, any changes made in the **Manage Patient** application while the MRx monitor is in Therapy mode (Manual Defib, AED, Pacing, Synchronized Cardioversion) are not updated to the MRx monitor. When Therapy mode is complete, the MRx monitor reassociates with the Information Center. If the Information Center and the MRx monitor had the same patient prior to therapy, and neither discharged, the Information Center uses the Same Patient conflict resolution rules and merges the patient data. If the Information Center and the MRx monitor do not have the same patient when therapy is complete, three red question marks (???) display in front of the patient name in the patient sector to indicate a conflict between the patient data at the Information Center and the patient data at the MRx monitor. Select the patient name to display the **Select Patient** window where you can resolve the conflict. See "Resolving Same Patient Conflicts" on page 3-13 for information on resolving patient conflicts.

Manage Patient Application — PIC iX Essentials

The **Manage Patient** application provides one location where you can:

- Enter and update patient information.
- Manage patient transitions for example, discharge and temporary transports.
- Manage the equipment assigned to a patient.

The **Manage Patient** application provides the following functions.

Function	Description
Admit	Connects all stored data to a patient's name and puts the name on the display, recordings, and reports. See "Admitting a Patient" on page 3-4.
Update	Allows you to update current patient information. See "Changing Patient Information" on page 3-11.
Discharge	Clears a patient's name from the bed, stops collecting data for the patient and returns Information Center settings to unit defaults. See "Discharging a Patient" on page 3-14.
Change a bed label	Allows you to enter a new bed label and keep the monitor with the patient. See "Automatic Device Assignment" on page 4-9.
Transport	Allows you to choose a temporary location, for example, **X-Ray**, when a patient is on transport and put some or all of the patient's equipment in standby. See "Using Transport/Standby" on page 3-19.
Assign a sector	Allows you to assign a bed and/or equipment to an empty sector for primary monitoring. See "Assigning a Bed to a Sector" on page 4-13.

For patients connected to a wired Efficia monitor, you can admit, discharge, transfer, or update patients from either the bedside monitor or the Information Center. When you admit or discharge a patient on the Information Center, the patient is also admitted or discharged on the bedside monitor.

Admitting a Patient

The Information Center displays and saves physiological data as soon as a patient is connected. This allows you to monitor a patient immediately. You must, however, admit a patient to the Information Center in order for the patient's name to appear on the display, recordings, or reports, or before you can transfer the patient.

Use one of the following methods to admit a patient:

- Manually enter new patient information in the fields in the **Patient Demographics** section. See "Manually Admitting a New Patient" on page 3-6.
- Use the **Find Patient...** option to find a patient who is being monitored in another Information Center or who has been recently discharged. See "Selecting an Existing Patient to Admit" on page 3-7.
- Admit a patient directly from the hospital information system or bed management system to the Information Center with or without confirmation. See "Admitting a Patient from the HIS" on page 3-8.

Caution

If the system is configured to place equipment in infinite standby on discharge or transfer out, be sure that the correct patient is selected for transfers.

Warning

Read all confirmation messages and check patient alarms, settings, and paced status when automatic admission, discharge, or transfer is complete.

Considerations

Before admitting a patient, note the following:

- Since data collection starts when a patient is connected to the monitor, it is important that you perform a discharge prior to connecting a new patient. See "Discharging a Patient" on page 3-14.
- The fields that display in the **Manage Patient** application depend on how your system is configured. Your system may require that certain fields are required for admission. An asterisk (*) appears next to all required fields.
- Patients that are admitted while the Information Center is in Local/Disconnected mode will be synchronized upon connection to the primary server.
- For patients connected to an MRx monitor, Efficia monitor, or IntelliVue Patient Monitor, you can admit the patient or update patient demographic information at either the bedside or at the Information Center. When you admit a patient at the Information Center, the patient is also admitted to the bedside monitor. Patient information that you enter at the Information Center is sent to the bedside with the exception of the Alternate ID, Patient Group, and Resuscitation Status.
- You must admit patients connected to the MX40 at the Information Center. The Information Center communicates the patient's name, medical record number, paced status and patient category to the MX40.

- For patients admitted from a hospital information system, patient information is automatically updated in the **Manage Patient** application. You cannot edit data that is provided by a hospital information system.
- The demographic fields length limits for the monitoring devices are shown below. If the Information Center sends a name or ID to the monitoring device that is longer than the device maximum, the string is truncated to the maximum length supported at the device. You cannot edit the ID values at an IntelliVue Patient Monitor or MRx monitor. At an Efficia patient monitor, although you can edit the IDs, the Information Center reverts the changes to the truncated values.

  If the monitoring device does not support the number of characters in the demographic fields, a patient conflict is shown at the monitoring device on admission and the user is directed to the Information Center. See your user documentation for the monitoring device for more information.

Device	Maximum Field Length
IntelliVue Patient Monitor Release M.0 or later	First Name, Last Name, and IDs: 30 characters Middle Name: 18 characters
IntelliVue Patient Monitor Release L or earlier	Names: 18 characters IDs: 16 characters
HeartStart MRx	Names: 18 characters IDs: 16 characters
MX40	Names: 15 characters IDs: 16 characters
Efficia patient monitors	Names: 20 characters IDs: 20 characters

- Move your cursor over the patient name or ID to view a tool tip that contains the patient's full name, including the conflict indicator (???) and the group name in parentheses.
- If you plan to perform 12-lead ECG captures, be sure to specify a patient gender and date of birth to ensure optimum ECG analysis.

Caution

The Information Center does not accept duplicate patient IDs. If you are using the hospital information system interface and duplicate patient IDs exist, the Information Center will not allow you to admit the patient. Please contact your system administrator.

Manually Admitting a New Patient

This section describes how to admit a patient at the Information Center by manually entering information in the **Manage Patient** application.

Note — The system may be configured so that all admissions are done automatically from the hospital information system and you cannot admit a patient manually. See "Admitting a Patient from the HIS" on page 3-8.

To admit a patient manually:

1 In the patient sector in which you are going to admit the patient, do one of the following:

- Select the Patient Name field.
- Select the **Manage Patient** button.

The **Manage Patient** application opens.

2 Type a 1- to 30-character first and last name in the appropriate fields. You can use the **Tab** key to move from field to field.

Note — If you are admitting a patient who is being monitored by an MX40 that is assigned to an IntelliVue Cableless Measurement device, the patient's name cannot exceed 12 characters.

3 Enter 1- to 30-character patient demographic information for this patient. The fields that are available depend on your hospital's configuration and may include one or more of the following:

- Last Name
- Lifetime ID, such as medical record number (**MRN**)
- Encounter ID, such as **Visit Number**

Caution

If a patient with a matching MRN is already in the system, a message asks whether you want to transfer the patient. Verify that this is the patient you want to transfer.

Note — For patients connected to IntelliVue Patient Monitors, these fields are communicated to the bedside monitor. If the Lifetime ID and Encounter ID labels are not configured consistently between the Information Center and the IntelliVue Patient Monitor, the Information Center labels override the local configuration.

4 Select the patient's gender from the **Gender:** drop-down list.

Note — If you will be performing 12-lead ECG captures and you do not specify a gender, the gender defaults to **Male**. The capture will not be re-analyzed.

Note — If you will be measuring STE, and you do not specify a gender, the gender used to determine alarm limits will default to **Female**.

5 Specify the patient's birth date in the **Date of Birth:** field by entering a numeric date or by selecting the date on the calendar. Use the calendar's right and left arrows to scroll through months. To specify a year in the calendar select the year then use the right and left arrows to scroll to a specific year. The system automatically updates the **Age:** field.

6 Enter the patient's height in the **Height:** field. Depending on how your system is configured, valid values are 0 to 99 inches or 0 to 250 centimeters.

Note — The height and weight you provide during admit are sent to the bedside and may be used for drug calculations and cardiac output.

7 Enter the patient's weight in the **Weight:** field. For adult and pediatric patients, your system can be set up to use pounds or kilograms. For neonatal patients, the system automatically displays weight in grams. You can enter a value from 0 to 9999 grams.

Note — If the patient is readmitted or transferred from a unit or bedside monitor that uses a different unit of measure for height (centimeters or inches) or weight (kilograms or pounds), the Information Center converts the height or weight to match what is configured for the unit. Due to round-off, the height or weight value can change by 1 when it converts from one unit of measurement to another.

8 Enter the patient care information for the patient, if needed. See "Entering Patient Care Information" on page 3-9.

9 Select the **Apply** button.

10 Verify the patient category and paced mode are correct.

Note — If you readmit a patient, the Information Center maintains the patient category and paced mode settings and overrides the defaults.

Selecting an Existing Patient to Admit

The following procedure describes how to select a patient to transfer into the current bed, readmit, or admit from the hospital information system.

Note —Your system may be configured to merge patient data that has been collected since the last discharge with the current data.

1 In the patient sector in which you are going to admit the patient, select the Patient Name field.

The **Manage Patient** application opens.

2 Select the **Find Patient...** button. A search dialog box displays.

3 Enter the MRN and provide information in any additional available fields.

4 Select the **Search** button. A list of matching patient names displays on the bottom of the dialog box. If the system does not find any matching names, you will have to manually enter the patient information as described in "Manually Admitting a New Patient" on page 3-6.

Note — Only the most recent patient displays on the list. If the result does not contain the patient that you want, clear the **Most Recent Entry Only** check box to display all of the matching entries.

5 Highlight the name of the patient you want to admit and select **OK**.

6 Do one of the following:

- If you select a patient who is currently on another unit, a message asks if you want to transfer the patient into this bed. Select the orange **Transfer** button  .
- If you select a patient who was discharged within the last seven days, a message asks if you want to readmit the patient to this bed. Select the blue **Readmit** button  .

Note — You can view a list of the patient stays for each clinical unit where data is collected for the patient, including the current admission and previous admissions within the last seven days. See "Viewing Stored Patient Data" on page 9-41.

7 If the patient is not currently on another unit or has not been discharged, and the Information Center is connected to a hospital information system, a message asks if you want to admit the patient. Select **Apply**. Current stored data will be updated with the new demographic information.

The Information Center automatically fills in the patient's first and last name, and transfers any other available fields (such as medical record number, patient category, date of birth, height, weight, and gender) to the fields in the **Patient Demographics** section.

Note — Some fields are not sent with out of unit transfers, for example Resuscitation status, Alias, Screen Notes, and Patient Group.

8 Enter information in the fields in the **Patient Care Information** section, if needed. See "Entering Patient Care Information" on page 3-9.

9 Select the **Apply** button.

10 Verify that the patient category and paced mode are correct.

Note — If you readmit a patient, the Information Center maintains the patient category and paced mode settings and overrides the defaults.

Admitting a Patient from the HIS

The Information Center can be configured so that you can automatically admit a patient directly from the hospital information system or bed management system to the Information Center, and then to the bedside monitor with or without requiring confirmation. This capability is configured for the entire institution, not just for a specific unit.

When the Information Center connects to the hospital information system or bed management system, the Information Center automatically requests the current patient information for each assigned bed. Any differences in the patient's identity are indicated on the Information Center, and confirmation is required.

Considerations

Before admitting a patient from the hospital information system or bed management system, note the following:

- If you are using IntelliVue Patient Monitor Release J, K, and L or MRx monitors, a message at the bedside monitor notifies you that the conflicts and smart questions only appear at the Information Center.
- Patient conflicts between the Information Center and the bedside monitoring devices are secondary to patient conflicts between the Information Center and the hospital information system. Any notification of a conflict between the Information Center and a monitoring device only appears if you delay admission. For information about resolving conflicts between the Information Center and the monitoring devices, see "Resolving Conflicts" on page 3-12.
- The hospital information system patient conflict is shown only if you delay the admission. If you accept the patient change, the conflict clears.
- Depending on the system configuration, if the previous patient was properly discharged, the new patient is automatically admitted without confirmation. If the patient was not properly discharged, a question asks you to confirm the admission.

Caution

If your hospital uses an ADT interface, it is recommended that the MRN is the only required field throughout the patient monitoring system. In addition, the IntelliBridge Enterprise (IBE) should be configured to match only on the MRN, and the Quick Admit setting on the bedside monitor should be MRN.

To admit a patient from the hospital information system:

1 If the Information Center determines that there is a conflict with the information at the hospital information system (for example, a patient is already admitted), the patient name is displayed in red text preceded by three question marks (???) in the patient sector. (This information is also displayed at the bedside monitor.)

2 In the patient sector, select the patient name. A notification from the hospital information system asks if you want to admit the patient into this bed.

3 Do one of the following:

- To accept the patient from the hospital information system, select **Confirm**. The notification closes and the patient is admitted to the selected bed.
- To delay admission for 10 minutes, select **Delay**. Patient monitoring continues. After 10 minutes, if the conflict is not resolved, the notification opens again. You can select **Delay** as often as necessary until you are ready to confirm the admission. The notification closes when the conflict with the hospital information system is resolved.

4 Verify that the patient category and paced mode are correct.

Note — If you readmit a patient, the Information Center maintains the patient category and paced mode settings and overrides the defaults.

Entering Patient Care Information

The center section of the **Manage Patient** application provides fields for specific patient care information. For example, you can add or change the equipment assigned to the patient, or change the bed location.

To enter patient care information:

1 Add or change the monitoring equipment for this patient, if needed. The **Equipment:** field shows the equipment currently assigned to the patient. See "Adding or Removing Monitoring Equipment" on page 4-8.

Important — With each equipment change, verify that the equipment is assigned to the correct sector, that waveforms and numerics are present, and that the patient demographics appear as expected on the monitoring devices.

Note — If you change the use model at your IntelliVue Patient Monitor or MRx monitor (for example, transport to bedside), the change does not take effect until you assign the device to a bed at the Information Center and the device begins communicating with the Information Center.

2 The **Profile** and **Category** fields are read-only and cannot be edited in the **Manage Patient** application. You can change these fields in the **Measurements** application. See "Profiles" on page 8-3.

Note — The **Category** is shown in red text when there is a conflict between the profile and the category. This conflict can occur when the IntelliVue Patient Monitor Release M.0 or later has a patient category that is different from the monitor's profile category, or if an assigned telemetry device is active and the telemetry profile category is different from the patient category.

Warning

Telemetry devices do not support neonatal patients. If the patient category is **Neonatal** when a telemetry device is added to the patient, the Information Center changes the patient category to **Pediatric**. If the patient requires the neonatal algorithm that is used in the bedside monitor, do not use a telemetry device.

3 Verify that the patient's paced mode is correct. Select the **Paced Mode:** drop-down arrow then select **On** or **Off**. If the patient has a cardiac pacemaker (including demand, fixed, or any type) **Paced Mode** should be set to **On**.

Warning

If the patient has a pacemaker, **Paced Mode** must be turned on so that the ST/AR algorithm can detect and reject pace pulses (spikes) from the HR count. Otherwise, pace pulses could be detected as beats and the monitor may not alarm for an asystole condition. If the patient does not have a pacemaker, turn **Paced Mode** off to allow the ST/AR algorithm to work most effectively.

Note — If the system's default **Paced Mode** is set to **Unconfirmed**, a message asks you to select **On** or **Off**.

Note — The pacing status at the Information Center is not related to the TCPacing or TCP Pause modes at the MRx monitor. Initiating TCPacing or TCP Pause at the bedside has no effect on the pacing status at the Information Center. See your MRx monitor documentation for more information.

Important — The Category and Paced Mode are always determined by the default profile set at the Information Center for the IntelliVue Patient Monitor and telemetry devices.

4 If available on your system, change the bed location by selecting the **Location:** field ellipsis (...) button.

The **Change Bed Label** dialog box displays a list of available beds in this unit. Highlight the desired bed and select the **OK** button.

Note — Changing the bed label allows you to transfer the patient without changing the sector location.

Note — You cannot change the bed location for beds that are locked to a sector.

5 Select the patient's resuscitation status from the **Resuscitation:** drop-down list. Choices are **Full**, **DNR** (Do Not Resuscitate), or **Modified**.

Note — The Resuscitation icon displays in the patient sector and Patient Window when the patient's resuscitation status is set to **DNR**. The icon is a white outline when the patient's status is set to **Modified**. The icon does not display if the patient's resuscitation status is set to **Full** or has not been specified.

6 Assign the patient to a caregiver by selecting the **Nurse:** drop-down arrow then highlighting the caregiver name from the list. Only nurses that are currently assigned to patients are on the list. If the caregiver assignment is password-protected on your system, the **Nurse:** field is read-only. See "Assigning Caregivers to Patients/Beds" on page 5-4.

7 Assign the patient to a patient group by selecting the **Group:** drop-down arrow then highlighting the name of the group from the list. A group allows you to associate a color and a patient type, for example atrial fibrillation, with a patient. When a patient is assigned a group, the group name and color displays in the Patient Window. The group color displays around the patient name in the patient sector.

Note — The group name is not communicated to the bedside.

8 If you would like to associate text (for example the physician's name) with this patient, enter the text in the **Screen Notes** field. The text you enter displays in the Patient Window and in the patient sector if the sector is large enough and is configured to show a second header row.

Note — If the monitoring device is an IntelliVue Patient Monitor, the screen notes text will be displayed in the Admit window. If a previous screen note was entered, it will be overwritten by the text entered at the Information Center.

9 Verify that all the fields are correct then select the **Apply** button.

10 If the Information Center finds an exact match for the Lifetime, Encounter or Alternate IDs when you select **Apply** you will be prompted to confirm whether to auto-admit, readmit or transfer. Select **Confirm** to admit using this data otherwise select **Cancel** and change the appropriate fields.

Changing Patient Information

You can change patient information for example, patient's name, equipment, and medical record number by using the **Manage Patient** application.

Considerations

Before editing patient information, note the following:

- For patients connected to an MRx monitor or IntelliVue Patient Monitor, you can change the patient information at either the bedside or at the Information Center. When you change the patient information at the Information Center, the information also changes on the bedside monitor. In general, any fields changed at either the Information Center or the bedside monitor will be copied to the other device. The most recent change takes effect.
- For patients admitted from a hospital information system, patient information is automatically updated in the **Manage Patient** application. You cannot edit data that is provided by a hospital information system.

Change patient information by performing the following steps:

1 Use one of the following methods to open the **Manage Patient** application:

   - In the sector for the bed that you want to admit, select the name field or select the **Manage Patient** shortcut button.
   - In the application window task bar, select the **Manage Patient** button.

2 In the **Manage Patient** application change the patient information as necessary.

3 When you are done modifying the patient information, select the **Apply** button.

Note — Changing the patient name affects all stored data, not just the data from the update time forward.

Resolving Conflicts

Note — The PIC iX Essentials system automatically resolves patient conflicts with Efficia monitors. For more information see "Patient Conflicts — PIC iX Essentials" on page 3-14.

Because you can admit, discharge, or transfer patients from the Information Center, the IntelliVue Patient Monitor, or the MRx monitor (admit and discharge only), it is possible that the information between the two systems does not match. If user intervention is required, three red question marks (???) display for the patient name when data between the Information Center and the bedside do not match. A Conflict Resolution dialog box displays in the **Manage Patient** application where you can resolve the conflict manually.

Warnings

- It is important to resolve conflicts as soon as they are identified to avoid using incorrect or confusing data to make clinical decisions. Certain settings, for example, **Paced Mode** and patient **Category** may not match between the Information Center and the bedside monitor. If the **Paced Mode** is set incorrectly, the system could mistake a pace pulse for a QRS and fail to alarm in the case of asystole. A Check Patient ID INOP will appear when a mismatch has not been resolved.
- If conflicts are not resolved as soon as they are identified, patient identifiers (for example, patient name, medical record number) will not be available through Information Center Web.
- If a duplicate patient conflict occurs between two Information Centers in different units (this only happens if the same patient is admitted on two different Information Centers when in Local/Disconnected mode), you will be able to resolve the problem correctly, regardless of the host access settings. That is, even if you are on an Information Center that does not have host access to the other Information Center, you can resolve the conflict (for example, by moving or transferring the patient from the unit).
- Vital signs are not sent to the electronic medical record during a conflict and must be entered manually.

To resolve a patient conflict:

1 Select the patient name in the patient sector for the patient in conflict. The Select Patient window opens where you can decide which patient information to use. There can be up to three sets of patient information in the Select Patient window if the patient is different in the Information Center, bedside monitor, and MMS.

2 Do one of the following:

   - If you are sure the patient settings from the Information Center are correct, select the Information Center option. The Information Center settings are applied to the bedside monitor. Any stored bedside data (including ST/QT baselines) is cleared.
   - If you are sure the patient settings from the bedside monitor or MMS are correct, select the appropriate device option. The bedside monitor or MMS settings are applied to the Information Center. Any stored Information Center data (including ST/QT baselines) is cleared.

- If the patient information is different, but you are sure it is the same patient, select the **Same Patient** option. This merges patient information from the Information Center, the bedside and/or the MMS. The bedside, MMS and Information Center data is retained. See "Resolving Same Patient Conflicts" on page 3-13.
- If you are sure that none of the information is correct, select the **New Patient** option. This uses the data for a new patient and clears the patient information and stored data at the Information Center and the bedside.

3 Confirm your selection by selecting the **OK** button.

4 Verify that equipment and all alarm settings, including arrhythmia alarm settings, are correct.

Resolving Same Patient Conflicts

The table below describes how the Information Center resolves mismatches.

Note — The Information Center can only resolve a mismatch if none or one of the patients is not admitted, or if the conflict includes two admitted patients and the Information Center determines that they are the same patient. If the Information Center cannot determine which patient to use (for example, the mismatch occurs between two unique patients), a message warns that the patients cannot be merged.

Conflicting Information	Which Information Is Used
First name, last name, MRN, date of birth, gender or notes	• Information Center, if the patient is admitted at the Information Center. • Bedside monitor, if the patient is admitted at the bedside monitor and not at the Information Center. • MMS, if the patient is admitted at the MMS and not at the Information Center or the bedside monitor.
Height or Weight	• MMS, if connected and the values are not the defaults. • Bedside monitor, if the MMS is not connected and the values are not the defaults. • Information Center, if the bedside monitor and MMS are not connected, or the values are the defaults.
Patient Category	MMS, if connected, otherwise the bedside monitor.
Paced Mode	• **Off** if Paced Mode for at least one patient is **Off** and the rest are **Unconfirmed**. • **On** if Paced Mode for at least one patient is **On** and the rest are **Unconfirmed**. • **Unconfirmed** if Paced Mode for all devices is **Unconfirmed**. However, if one of the devices assigned is an MRx monitor, then Paced Mode is **On**.
ST/QT baselines	If both the Information Center and the bedside monitor have ST/QT baselines, the Information Center's baselines are used. If the ECG source is the monitor, the monitor's baselines are used.

Patient Conflicts — PIC iX Essentials

When a patient monitor is first connected to the PIC iX Essentials system, the Efficia monitor patient is always used, unless the patient is already in another bed on the Information Center. If a user tries to admit a patient with the same name and date of birth to the Information Center, then the Information Center admits the patient and does not discharge the existing patient.

If a user tries to admit a patient with the same ID to the Information Center, then the Information Center does not admit the patient and sends an error message to the Efficia monitor to indicate that a duplicate patient is already admitted at the Information Center.

Discharging a Patient

Use one of the following methods to discharge a patient.

- Manually discharge a patient in the **Manage Patient** application. See "Manually Discharging a Patient" on page 3-15.
- Discharge a patient directly from the hospital information system or bed management system. See "Discharging a Patient from the HIS" on page 3-16.

Considerations

Before discharging a patient, note the following:

- Discharging the patient at the Information Center also discharges the patient from the bedside monitor. All monitor and MMS settings (including arrhythmia settings) reset to their defaults.
- When you discharge a patient, the Information Center saves the patient data for all admitted patients. The system stores seven days of data and purges the stored data seven days after discharge. You can search discharged patient data without readmitting for up to seven days.
- If you readmit a patient, the discharge data is overwritten by new monitoring data as it occurs, and you will only see the full disclosure amount of data.
- Monitoring devices may be set up with predefined configurations called *profiles*. When you discharge a patient, the profile reverts to the default profile configured for the device. Refer to your monitoring device documentation for details. When you discharge an admitted patient at the IntelliVue Patient Monitor, the Information Center discharges the patient and saves the data.
- *Important —* For MRx monitors, turning off the bedside monitor for more than 10 seconds discharges the patient at the MRx monitor and resets defaults, but it does not discharge the patient from the Information Center; the patient is still admitted at the Information Center. It is important to discharge the patient before turning the MRx monitor off to avoid data being associated with the wrong patient.
- Patients that are discharged while the Information Center is in Local/Disconnected mode will be synchronized upon connection to the primary server.

Caution

- Discharging a patient at the Information Center removes the patient from the bed and changes their status to discharged. At that point, data storage begins for that bed. Before connecting a new patient, perform a discharge to ensure that data from the previous patient is not mixed with the data from the new patient and alarm limits controlled at the Information Center revert to unit settings.
- If the system is configured to place equipment in infinite standby on discharge or transfer out, be sure that the correct patient is selected for transfers.

Warning

Read all confirmation messages and check patient alarms, settings, and paced status when automatic admission, discharge, or transfer is complete.

Manually Discharging a Patient

Discharge a patient by performing the following steps:

1 Use one of the following methods to open the **Manage Patient** application:

- In the sector for the bed that you want to discharge, select the name field or select the **Manage Patient** shortcut button.
- In the application window task bar, select the **Manage Patient** button.

2 Select the **Discharge...** button. The **Discharge Patient** dialog box displays.

Note — For IntelliVue Patient Monitors, if captures are available but not yet exported, a message may display reminding you to export the 12-lead ECGs before discharging.

3 Specify whether to clear the sector (remove the bed from the sector) upon discharge by selecting or clearing the **Clear Sector** check box. The system can be configured so that the check box is selected by default. Depending on your unit practices, you may want to clear the check box so the sector is not cleared and the equipment remains assigned to the sector.

A PIC iX Enterprise Link system may allow central data collection and distribution to continue for bedside monitors.

Note — **Clear Sector** is not available for beds that are locked to a sector or on PIC iX Essentials systems.

Warnings

- Clearing a sector can stop monitoring for a bed. Therefore, be sure to check that the sector you will clear is no longer monitoring a patient.
- If **Clear Sector** is selected and the sector is either the last principal sector or is on the monitoring host, the patient is discharged but the bed label is not cleared from the sector. Devices will stop central monitoring only if the last principal sector goes off network. See “PIC iX Enterprise Link and Overview Sector Types” on page 4-12.

4 Select the pink **Discharge** button  . The Information Center discharges the patient and saves the patient data.

5 See "What Happens After Discharge" on page 3-16.

Discharging a Patient from the HIS

The Information Center can be configured so that you can discharge a patient directly from the hospital information system or bed management system with confirmation. This capability is configured for the entire institution, not just for a specific unit.

Note — Discharging from the hospital information system completes automatically if there is no sector or bedside monitor to confirm the discharge.

To discharge a patient from the hospital information system:

1 If the Information Center determines that there is a conflict with the information at the hospital information system (for example, the hospital information system has discharged the patient), the patient name is displayed in red text preceded by three question marks (???) in the patient sector. (This information is also displayed at the bedside monitor.)

2 In the patient sector, select the patient name. A notification from the hospital information system asks if you want to discharge the patient from the bed.

3 Do one of the following:

- To discharge the patient from the hospital information system, select the pink **Discharge** button  . The notification closes and patient monitoring for the patient stops.
- To delay discharge for 10 minutes, select **Delay**. Patient monitoring continues. After 10 minutes, if the conflict is not resolved, the notification opens again. You can select **Delay** as often as necessary until you are ready to confirm the discharge. The notification closes when the conflict with the hospital information system is resolved.

4 See "What Happens After Discharge" on page 3-16.

What Happens After Discharge

After a patient discharge, the following occurs:

- If configured, a Patient Summary Report prints. See "Patient Summary Report" on page 3-21.
- Equipment assigned to the bed is cleared.
- Caregiver assignments are removed.
- The patient sector automatically minimizes.
- Equipment is automatically put into Standby.

Transferring a Patient to a New Bed

The Information Center allows you to transfer an admitted patient to another bed without losing patient data. You can transfer a patient to an available bed in any sector within your unit or to another unit. If the sector does not have an assigned bed, you must first assign the bed, then transfer the patient. See "Assigning a Bed to a Sector" on page 4-13.

Use one of the following methods to transfer a patient to a new bed:

- Manually transfer a patient in the Manage Patient application. See "Manually Transferring a Patient to a New Bed" on page 3-17.
- Transfer a patient using the hospital information system. See "Transferring a Patient Using the HIS" on page 3-18.

Considerations

Before transferring a patient, note the following:

- Confirm with the sending unit prior to transferring a patient into a sector to assure they are aware of the transfer.
- Patients that are transferred while the Information Center is in Local/Disconnected mode will be synchronized upon connection to the Primary Server.
- If the Information Center is configured with remote transfer control at the bedside monitor, you can transfer an admitted patient from the current bed to any available bed in any unit in the current institution. The IntelliVue Patient Monitor can only transfer within one institution; you cannot select from multiple institutions. You can transfer an admitted patient to the current bed if not admitted by finding the patient.

Warning

Read all confirmation messages and check patient alarms, settings, and paced status when automatic admission, discharge, or transfer is complete.

Caution

If the system is configured to place equipment in infinite standby on discharge or transfer out, be sure that the correct patient is selected for transfers.

Manually Transferring a Patient to a New Bed

Transfer data for a patient by performing the following steps:

1 Use one of the following methods to open the **Manage Patient** application:

- In the sector for the bed that you want to transfer, select the name field or select the **Manage Patient** shortcut button.
- In the application window task bar, select the **Manage Patient** button.

2 Select the **Transfer...** button. The **Transfer Patient** dialog box displays a list of available beds in the institutions and units.

3 Do one of the following:

- To transfer this patient to another bed within this unit, select the bed from the list of beds in your unit.
- To transfer this patient to a bed in another unit, first select the unit name, then select a bed from the list.

4 Specify whether to clear the sector (remove the bed from the sector) upon transfer by selecting or clearing the **Clear Sector** check box. The system can be configured so that the check box is selected by default. Depending on your unit practices, you may want to clear the check box so the sector is not cleared and the equipment remains assigned to the sector.

If a bedside monitor does not require central alarming (local alarming is available), the system may allow you to clear a principal sector on a PIC iX Enterprise Link system to allow data collection and distribution to continue.

Note — **Clear Sector** is not available for beds that are locked to a sector or on PIC iX Essentials systems.

5 Select the **OK** button. A message asks if you want to transfer the patient into the selected bed.

6 Confirm the transfer by selecting the orange **Transfer** button  .

After a transfer, the patient name is cleared from the previous sector and the patient's resuscitation status is set to the unit defaults if the transfer is to another unit. See "What Happens After a Transfer" on page 3-18.

Transferring a Patient Using the HIS

The Information Center can be configured so that you can automatically transfer a patient directly from the hospital information system or bed management system to the Information Center and then to the bedside monitor with confirmation. This configuration is implemented for the entire institution, not just for a specific unit.

Note — Transferring from the hospital information system completes automatically if there is no sector or bedside monitor at either the sending or receiving unit to confirm the transfer.

Depending on the configuration, you confirm the transfer at the sending unit (called a push transfer), at the receiving unit (called a pull transfer), or at either the sending and receiving units.

Transfer data for a patient by performing the following steps:

1 If the Information Center determines that there is a conflict with the information at the hospital information system (for example, the hospital information system has transferred the patient to a different bed), the patient name is displayed in red text preceded by three question marks (???) in the patient sector. (This information is also displayed at the bedside monitor.)

2 In the patient sector, select the patient name. A notification from the hospital information system asks if you want to transfer the patient.

3 Do one of the following:

- To transfer the patient from the hospital information system, select the orange **Transfer** button  . The notification closes and the patient transfers to the new bed.
- To delay the transfer for 10 minutes, select **Delay**. Patient monitoring continues. After 10 minutes, if the conflict is not resolved, the notification opens again. You can select **Delay** as often as necessary until you are ready to confirm the transfer. The notification closes when the conflict with the hospital information system is resolved.

After transfer, the patient name is cleared from the previous sector and settings return to unit defaults. The patient's resuscitation status is set to null (no setting). See "What Happens After a Transfer" on page 3-18.

What Happens After a Transfer

Depending on how the Information Center is configured, the following occurs after transfer:

- A Patient Summary Report prints. See "Patient Summary Report" on page 3-21.
- Equipment that is locked to the previous sector returns to unit default settings.
- Caregiver assignments (not locked) are removed, if configured.

What happens to the patient's monitoring equipment upon transfer depends on whether the monitoring equipment is locked to the bed. Unlocked equipment transfers with the patient to the new bed if configured to do so.

Device pools enable you to share monitoring equipment across Information Center units. See "Device Pooling" on page 4-13.

Using Transport/Standby

Use **Transport/Standby...** to indicate a patient's transport location, for example, if the patient needs to leave the unit for a test or a procedure. In addition, if some or all of the patient's monitoring equipment will not be transported with the patient, use **Transport/Standby...** to temporarily put the equipment in standby.

Note — When a bed is in transport, the bed label in the patient sector displays in parentheses. You can move the cursor over the bed label to see the temporary location.

Use **Transport/Standby...** by performing the following steps:

1 Use one of the following methods to open the **Manage Patient** application:

- In the sector for the bed that you want to transfer, select the name field or select the **Manage Patient** shortcut button.
- In the application window task bar, select the **Manage Patient** button.

2 Select the **Transport/Standby...** button. The **Patient Location and Standby Equipment** dialog box displays a list of the equipment currently assigned to the patient.

3 Select a standby location from the **Locations** list.

4 If the equipment will be not be going with the patient to the temporary location, put it in standby by selecting the check box next to the equipment name.

5 For TRx4841A/TRx4851A and MX40, specify the duration of the standby period by selecting a time from the **Duration** drop-down list. Depending on your system's configuration, standby times can be **10 minutes**, **20 minutes**, **30 minutes**, **1 hour**, **2 hours**, **3 hours**, **4 hours**, or **Infinite**.

Note — If the patient will be discharged, select **Infinite** as the standby duration. When the new patient is connected, select the **Resume** button in the **Manage Patient** application or press the **Check** or **Main Screen** button on the telemetry device or for IntelliVue Patient Monitors select anything on the screen or press any key. Your system may be set up to automatically have an infinite standby duration.

6 Select the **OK** button. A white technical alarm message in the sector indicates that the equipment is in Standby. Move the cursor over the technical alarm to view the amount of time the device has been in Standby.

Note — Move the cursor over the bed label in the patient's sector to display the patient's temporary location.

When the patient returns to the unit, use one of the following methods to resume monitoring:

- Access the **Manage Patient** application and select the **Resume** button.
- If all of the equipment is in Standby, select or touch anywhere in the patient sector.

Telemetry Devices

If the standby period has expired when the patient returns to the unit, monitoring resumes automatically. Press the Check or Main Screen button on the telemetry device to verify that monitoring has resumed.

If the standby period has not expired when the patient returns to the unit, monitoring must be reactivated manually. Either select the **Resume** button in the **Manage Patient** application or press the Check or Main Screen button on the device. An audible tone at the device verifies that monitoring has resumed.

Exporting ECG Data to a Philips Holter System

The Information Center allows you to export ECG waveform data to a Philips Holter system for analysis. This allows you to order holter analysis on ECG data acquired by the Information Center, eliminating the need to monitor the patient separately by a patient-worn holter monitor before the analysis.

You can send up to 96 hours of stored data. The time it takes to export the data to the Philips Holter system can vary and can take several minutes depending on the amount of data that was requested.

Considerations

Before exporting ECG data to a Philips Holter system, note the following:

- The patient must be admitted with a Lifetime ID (such as medical record number).
- Derived ECG waves are not exported.
- If using a standard ECG lead set, only the primary and secondary ECG waves are exported. One of these waves must not be a Hexad derived wave. If using an EASI ECG lead set, three raw EASI waves are exported.
- If the patient will be changing between standard and EASI lead placement, perform an export before changing the type of monitoring.
- If you try to initiate an export when the Physiological Server is in Local/Disconnected mode, the message **Unexpected Failure** displays briefly in the Export popup window. Contact service personnel.
- Exporting data to the Philips Holter system will fail if patient ID fields contain more than 20 characters.

To export ECG data to a Philips Holter system:

1 From the sector for the patient you want to export, select the **Manage Patient** button. The **Manage Patient** window displays.

2 Select the **Data Export...** button. The **Philips Holter Export:** dialog box displays.

3 The **Export** tab displays a message that indicates the status of the current or most recent Philips Holter Export request that was initiated for the current patient within the past 24 hours.

4 Enter the following:

- **Requested By:** Type a 1- to 32-character name of the person requesting the export.
- **Test Reason:** Type a 1- to 32-character explanation for requesting the export.
- **Duration:** Select the duration of the waveform data from the drop-down list. The options are **8 Hours**, **12 Hours**, **24 Hours**, **48 Hours**, **72 Hours**, and **96 Hours**. The default is **24 Hours**.

5 Select the **Unit Status** tab to view the status of all Holter exports from the patient's clinical unit that were requested within the last 24 hours. For each export, the tab displays the date and time of the export, the patient ID, the duration of the export (in hours), and the status.

Note — If one or more of the hosts running the Holter Export Service cannot be reached to retrieve Holter Export job status information, no status information is available.

6 Select the **Export** button.

Note — If there are Holter export requests pending or in progress for the current patient, the **Export** button is unavailable.

Patient Summary Report

The Patient Summary Report contains the following patient demographic and measurement information:

- For telemetry-monitored patients, delta from unit setting
- Current periodic and aperiodic measurement values

  Note — An aperiodic measurement is considered current if it is within an hour of the time focus.
- Rhythm status
- Last user-saved strip if within 15 minutes, otherwise the most recent strip.

Depending on the system configuration, the report can include the following information:

- Unit Name
- Patient Name
- ID configured for the unit
- Age
- Gender
- Profile
- Group
- Screen Notes
- Location
- Equipment and assignment time
- Paced Mode
- Category
- Resuscitation status
- Nurse

When the report prints on discharge, it contains extra waves and beat labels.

When the report prints on transfer, it has the same format and fields, with the following differences:

- The most recent available measurements are printed even if the patient has not been monitored for some time and there are no vital signs on the screen.
- The most recent wave data is printed including all ECG waves, whether or not there is a user-saved strip.

Printing the Patient Summary Report

Your system can be configured to automatically print the Patient Summary Report when you discharge or transfer a patient, or at a scheduled time or frequency.

To print the Patient Summary Report manually:

1 In the Patient Window or **Manage Patient** application, select the Print icon in the caption bar.

2 If prompted, select the type of print output. The options are **Paper**, **Paper and Electronic**, and **Electronic Document.**

3 Select **OK**.

4

Equipment Management

This section describes how to manage a patient's monitoring equipment at the Information Center iX. It includes the following:

Managing Equipment

Use the **Equipment Management** window to add or remove a patient's monitoring equipment. Your system may be configured so that some equipment is locked to the bed. If equipment is locked to a bed, you will not be able to remove the equipment. You can, however, assign additional equipment to the bed if available.

Your system may be configured so that equipment can be transferred to a patient or removed automatically when the patient is discharged.

Available Devices

- TRx4841A/TRx4851A transceiver
- MX40 wearable patient monitor (WLAN, ITS Smart Hopping)
- IntelliVue Patient Monitor including X2 or X3 (wired, WLAN, ITS Smart Hopping)
- MRx monitor
- Efficia patient monitor (only with license and in specific geographic areas), only supported with PIC iX Essentials systems.

Number of Devices Allowed For Each Sector

You can assign up to four pieces of equipment to a sector. Device limits are not based on the type of connectivity (LAN, WLAN, Smart Hopping). If you assign equipment that is to remain with the patient on transfer and devices are already assigned to the patient, the equipment that you are currently assigning replaces the equipment that is already assigned to the patient.

The following limits apply:

- One wired or wireless bedside monitor
- One transport bedside monitor
- One transport X2 or X3 Multi-Measurement Module (MMS)
- One bedside X2 or X3 MMS
- One telemetry device (MX40 or TRx4841A/TRx4851A transceiver)
- Two IntelliBridge Hub devices
- Four IntelliBridge LAN devices

Note — If your system is set up to automatically assign a device to a sector when the device powers up, only one wired Efficia patient monitor or one IntelliVue Patient Monitor can be assigned to a sector. No telemetry devices can be assigned to a sector.

Device Controls

The following table lists the available device controls and indicates whether the control is available at the Information Center, the point of care, or both.

- **IC —** The control is available at the Information Center but is not available at the device.
- **D** — The control is available at the device but is not available at the Information Center.
- **B** — The control is available both at the Information Center and at the device. The control synchronizes between the Information Center and the device.
- **I** — The control is available at the device but is not integrated (independent).
- **L** — The control is available at the device and the information is not indicated at the Information Center.
- **N/A** — The control is not available.

Information Center Control	TRx4841A/ TRx4851A	MX40 with Device Remote Controls Enabled	LAN or WLAN IntelliVue Patient Monitor with Remote Controls Enabled	Smart Hopping IntelliVue Patient Monitor	MP5T or MP5SC	MRx	Efficia Patient Monitor (Audio Alarms Only)[1]
Acknowledge Alarms	IC	B	B	B	I	B[2]	B
Analysis Lead Selection	IC	B	B	D	I[3]	D	D
Analysis Relearn	IC	B	B	D	I	D	IC

Information Center Control	TRx4841A/ TRx4851A	MX40 with Device Remote Controls Enabled	LAN or WLAN IntelliVue Patient Monitor with Remote Controls Enabled	Smart Hopping IntelliVue Patient Monitor	MP5T or MP5SC	MRx	Efficia Patient Monitor (Audio Alarms Only)[1]
Arrhythmia Alarms On/Off	IC	IC	B	D	I	D	B
Arrhythmia Alarm Thresholds	IC	IC	B	D	I	D	B
Arrhythmia Analysis Mode	IC	IC	B	D	I	D	D
Bedside Controls (ADT, and so on)	N/A	N/A	D	N/A	N/A	N/A	N/A
ECG Filter	IC	IC	D	D	I	D	D
ECG Gain	IC	B	I	I	I	I	I
ECG Hexad Selection	IC	IC	D	D	I	N/A	N/A
ECG HR/Arrhythmia/Pulse Alarm	N/A	N/A	B	D	L	D	B
ECG Lead Placement Selection	D	D	D	D	D	D	D
ECG Measurement On/Off	N/A	D	D	D	I	D	D
Find Device	IC	IC	N/A	N/A	N/A	N/A	N/A
HR Alarm Limits	IC	IC	B	B	I	D	B
HR Alarm On/Off	N/A	N/A	N/A	N/A	N/A	N/A	D
HR Extreme Tachy/Brady Limits	Based on HR limits						B
Monitor Only[4] Measurement/Analysis On/Off	N/A	N/A	D	D	D	D	B
Monitor Only[4] Measurements Alarm On/Off	N/A	N/A	B	D	D	D	B
Monitor Only[4] Measurements Limits	N/A	N/A	B	D	D	D	B
MX40 Screen On Time	N/A	B	N/A	N/A	N/A	N/A	N/A
NBP Alarm On/Off	IC	IC	B	D	I	D	B
NBP Alarm Source	IC	IC	D	D	I	D	B
NBP Auto Interval	IC	D	D	D	D	D	B

Information Center Control	TRx4841A/ TRx4851A	MX40 with Device Remote Controls Enabled	LAN or WLAN IntelliVue Patient Monitor with Remote Controls Enabled	Smart Hopping IntelliVue Patient Monitor	MP5T or MP5SC	MRx	Efficia Patient Monitor (Audio Alarms Only)[1]
NBP Limits	IC	IC	B	D	I	D	B
NBP Repetition Time	IC	IC	B	D	I	D	B
NBP Start/Stop, STAT, Stop All	IC or CL NBP Pod	IC or CL NBP Pod	B	B	I	D	B
Pause Alarms	IC	B	B	D	D	D	B
Pulse Alarm On/Off	N/A	N/A	D	D	L	D	B
Pulse Limits	N/A	N/A	Set with HR limits		L	I	B
QRS Detection Threshold	N/A	IC[5]	B[6]	D	N/A	N/A	N/A
QT Alarm Limits	IC	IC	B	D	I	D	N/A
QT Alarm On/Off	IC	IC	B	D	I	D	N/A
QT Analysis	IC	IC	D	D	I	D	N/A
QT Analysis Lead Selection	IC	IC	D	D	I	D	N/A
QT Set Baseline	IC	IC	B	D	I	D	N/A
Recording: Continuous (Start/Stop)	IC	IC	B	B	N/A	D	D
Recording: Delayed (Start)	B	B	B	B	N/A	D	D
Reports from device	N/A	B	B	B	I	N/A	N/A
Resp Alarm Limits	N/A	IC	B	D	I	D	B
Resp Alarm On/Off	N/A	IC	B	D	I	D	B
Resp Apnea Time	N/A	IC	B	D	I	D	B
Resp Measurement On/Off	N/A	IC	D	D	I	D	B
SpO2 Alarm Limits	IC	IC	B	D	I	D	B
SpO2 Alarm On/Off	IC	IC	B	D	I	D	B
SpO2 Enable Pulse	IC	I	D	D	I	D	D
SpO2 Manual Measurement	B	B	N/A	N/A	B	N/A	N/A
SpO2 Measurement On/Off	IC	B	D	D	D	D	B

Information Center Control	TRx4841A/ TRx4851A	MX40 with Device Remote Controls Enabled	LAN or WLAN IntelliVue Patient Monitor with Remote Controls Enabled	Smart Hopping IntelliVue Patient Monitor	MP5T or MP5SC	MRx	Efficia Patient Monitor (Audio Alarms Only)[1]
SpO2 Mode Selection	IC	B	N/A	N/A	D	N/A	N/A
SpO2 Pleth Wave Stored	IC	IC	N/A	N/A	N/A	N/A	N/A
SpO2 Repetition Time	N/A	IC	N/A	N/A	N/A	N/A	N/A
SpO2 Suppress INOPs with NBP	IC	IC	D	D	I	D	D
ST Alarm On/Off	IC	IC	B	D	I	D	B
ST Alarm Limits	IC	IC	B	D	I	D	B
ST Analysis On/Off	IC	IC	D	D	I	D	B
ST Baseline	IC	IC	B	D	I	D	D
ST Measurement Points	IC	IC	D	D	I	D	D
Standby/Resume	D: Resume only	B	B	B	D	D	N/A
Standby Duration	IC	IC	N/A	N/A	N/A	N/A	N/A
Telemetry Button setting	IC	IC	N/A	N/A	N/A	N/A	N/A
Volume/Mute at Device	IC	IC	N/A	N/A	N/A	N/A	N/A

1.Efficia patient monitors are supported only on PIC iX Essentials systems.

2.You cannot acknowledge Pacing Stopped and Battery Low messages at the Information Center. The Acknowledge button is inactive. You must acknowledge the alarm at the bedside.

3.TRx4841A/TRx4851A only, 3-lead cable only. Controls for Analysis lead may be applied at both locations.

4.Monitor Only measurements cannot be sourced by a telemetry or MX40 device; all other measurements can be sourced by a telemetry or MX40 device but are controlled at the bedside monitor.

5.The QRS detection threshold can be set at the Information Center for MX40 Release C.01.20 or later.

6.The QRS detection threshold can be set at the Information Center for IntelliVue Patient Monitor Release N.0 or later. On Release M.0 monitors, you set the QRS detection threshold at the monitor but it synchronizes to a change made on a supported MX40.

Waves Stored By Device

The following table describes the number and type of waveforms that are stored and displayed at the Information Center for each supported device.

Note — If three ECG waves are stored, the Information Center can display seven waves, as long as both the primary and secondary are not chest leads. If both the primary and secondary are chest leads, the Information Center displays three waves.

Device	Number of Waves Stored	Number of ECG Waves Displayed
TRx4841A/TRx4851A	4 ECG	8 (Standard) 12 with Hexad
	3 ECG and 1 Pleth (no Hexad)	7 (Standard) 12 with EASI
MX40	4 ECG	8 (Standard) 12 with Hexad
	3 ECG and 1 Pleth	7 (Standard) 12 with EASI
	2 ECG, 1 Pleth, and 1 Resp	Primary and secondary ECG
LAN or WLAN IntelliVue Patient Monitor, Revision J	3-wire: 1 ECG and 7 other waves	Primary ECG
	5-wire: 7 ECG and 1 other wave	7
	6-wire: 7 ECG	7
	10-wire: 7 ECG and 5 other waves	7
LAN or WLAN IntelliVue Patient Monitor, Revisions K and L (with Full Disclosure license; otherwise see Revision J)	3-wire: 1 ECG and 15 other waves	Primary ECG
	5-wire: 3 ECG and 13 other waves	7 with EASI
	6-wire: 4 ECG and 12 other waves	6 without Hexad 12 with Hexad
	10-wire: 8 ECG and 8 other waves	12
LAN or WLAN IntelliVue Patient Monitor, Revision M or later	3-wire: 1 ECG and 27 other waves	7
	5-wire: 3 ECG and 25 other waves	12 with EASI
	6-wire: 4 ECG and 24 other waves	8
	10-wire: 8 ECG and 20 other waves	12 with Hexad
ITS IntelliVue Patient Monitor	2 ECG and 2 other waves 3 ECG and 1 other wave 4 ECG and no other waves	Primary and secondary ECG

Device	Number of Waves Stored	Number of ECG Waves Displayed
MRx monitor	0 - 3 other waves	No derivation occurs; 0 - 3 ECG
Efficia patient monitor	3-wire: 1 ECG	1
	5-wire: 7 ECG	7
	10-wire: 12 ECG	12

Waves Displayed Per Screen Resolution

The following table specifies the length (in seconds) and number of waves that can display for each screen resolution.

Note — Calibration of the wave speed changes the duration.

Screen Resolution	Columns for 3 seconds of ECG	Columns for 6 seconds of ECG	Columns for 10 seconds of ECG
1280x1024	2	1	N/A
1920x1080	3	2	1
2560x1440	3 or 4	2	1
2560x1600	3 or 4	2	1

Priority of Non-ECG Waves From Wired IPM or Wireless Devices

The following table shows the priority of non-ECG waves sent by a wired IntelliVue Patient Monitor or wireless devices to the Information Center. Starting at the leftmost column of the table, read each column from top to bottom, then continue at the top of the next column.

Pleth	CVP	P	O_2	EEG3	P5	cmResp
PLTHpr	RAP	P1	Resp	EEG4	P6	Wave1
PLTHpo	LAP	P2	AWF	Tblood	P7	Wave2
PlethT	ICP	SEV	AWP	N_2	P8	Wave4
PLETHr	UAP	ENF	AWPin	N_2O	vECG	Wave5
PLETHl	UVP	HAL	AWV	ISO	ICG	Wave6
ABP	FAP	P3	AWFin	DES	AWVexp	Wave7
ART	BAP	P4	EEG	AGT	LTEEG	Wave8
Ao	IC1	CO_2	EEG1	AGT1	RTEEG	
PAP	IC2	acResp	EEG2	AGT2	AGTs	

Priority of Non-ECG Waves From ITS Smart-Hopping IPM

An ITS Smart-Hopping IntelliVue Patient Monitor sends non-ECG waves to the Information Center in the following priority:

- ABP (specific to label)
- PAP
- CVP
- CO2
- Pleth
- Resp
- After ECG, see the table "Priority of Non-ECG Waves From Wired IPM or Wireless Devices" on page 4-7 for the wave priority.

Adding or Removing Monitoring Equipment

You can use the **Equipment Management** window to assign or unassign equipment for a patient. The window displays a list of available equipment on the left side and assigned equipment on the right side. For each assigned device, the window shows the equipment type, equipment label, a battery gauge (if appropriate), and an indication of whether the equipment is locked to the bed label. IntelliVue Patient Monitors Release M or later that are not yet assigned appear in red text.

Considerations

Before you add or remove equipment, note the following:

- Your system may be configured so that some equipment is locked to the bed. You cannot unassign locked equipment, however you can assign additional equipment to the bed, if available, by completing the steps below.
- *Important* — With each equipment change, verify that the equipment is assigned to the correct sector, that waveforms and numerics are present, and that the patient demographics appear as expected on the monitoring devices. The Category and Paced Mode fields always contain a value, regardless of whether the patient is admitted. If you do not specify settings for these fields, default settings are used.
- If you change the use model at your IntelliVue Patient Monitor or MRx monitor (for example, transport to bedside), the change does not take effect until you assign the device to a bed at the Information Center and the device begins communicating with the Information Center.
- For IntelliVue Patient Monitors Release M or later, your system can recognize when a device is powered up, regardless of whether the device is assigned to a sector. If the device is not assigned, this status message appears: **Please assign active equipment.** The message clears when the device is assigned.

To add or remove equipment:

1 Use one of the following methods to access the **Equipment Management** window:

- In the patient sector in which you are adding or removing equipment, select the bed label.
- In the **Manage Patient** application, select the **Equipment:** field ellipsis (...) button.

2 Select the **Show:** drop-down arrow then select the device type from the list of available equipment:
   - **All**
   - **Telemetry Devices**
   - **X2/X3 Monitors**
   - **Bedside Monitors**
   - **IntelliBridge Devices**
   - **Transport Monitors**

3 Select the monitoring device from the **Available** equipment list, then select the **>** button or double-click the device on the list. A message warns if you exceed the number of devices. See "Number of Devices Allowed For Each Sector" on page 4-2.

4 When you are done selecting equipment, select **OK**.

To unassign a monitoring device assigned to a bed:

- Select the device from the list of **Assigned** equipment, and then select the **<** button or double-click the device on the list. A message asks if you want to remove the equipment.

Automatic Device Assignment

Your system can be configured so that when a patient monitor is plugged into the network or powered on, the following occurs:

- If the monitor is already in a sector, the Information Center creates a bed label that matches the monitor's equipment label. If the label is already in use, then the new monitor receives a **No Central - duplicate label** message. You can change the bed label manually. See "Changing the Bed Label" on page 4-9.
- The Information Center automatically assigns the new bed to the first available sector.
- The Information Center automatically accepts the patient from the monitor. If the patient ID matches an existing patient at the Information Center, then the patient is readmitted to the bed.
- Optionally, the system can automatically sort the sectors in alphanumeric order by bed label. Any unassigned sectors remain empty. Sorting occurs after a new device is added or if you assign or remove a bed, or modify the bed label.

If the monitor goes offline, it remains assigned to the bed, and the bed remains assigned to the same sector.

Changing the Bed Label

If a bed label is already in use when the monitor is already in a sector, you can change a bed label manually:

1 Access the **Manage Patient** application.

2 Select the **Location:** field. The **Change Bed Label** dialog box opens.

3 Type a 1- to 8-character label in the field and select the **OK** button.

When Multiple Devices are Used for One Patient

This section describes how controls and settings function when more than one monitoring device is assigned to a patient.

ECG Source Controls

The Information Center checks where the valid ECG signal comes from. If the ECG source is the bedside monitor and the ECG source changes to a telemetry device, the Information Center uses the monitor settings. If the patient is disconnected from the telemetry device and reconnects to the monitor, any changes made to the settings in the meantime are sent to the monitor. This preserves the settings when the ECG source changes. For a list of the ECG settings that are synchronized with the monitoring device, see "Synchronized Settings" on page 4-11.

Measurement/Wave Behavior

Because the bedside monitor and telemetry device can potentially source the same measurements, the following rules apply when a telemetry device and an IntelliVue Patient Monitor are assigned to a bed:

- Telemetry measurements are labeled as HR, SpO2T, PulseT. Bedside measurements are labeled as HR, SpO2, SpO2l, SpO2r, SpO2pr, SpO2po, Pulse.
- When an IntelliVue Patient Monitor and a telemetry device are wirelessly connected, PulseT has no alarm capability.
- Telemetry pleth wave is labeled as PlethT. Bedside pleth wave is labeled as Pleth, Plethl, Plethr, Plethpr, Plethpo.
- The HR and ECG waveforms are displayed and stored at the Information Center from whichever device is currently sourcing the ECG (telemetry or bedside).
- Overlapping measurements and waveforms (for example, SpO2, SpO2T, Pulse, PulseT, Pleth, and PlethT) and non-overlapping measurements and waveforms (for example, ABP, CO) are displayed and trended with this patient's data.
- The Telemetry Data window at the IntelliVue Patient Monitor reflects only the telemetry waveforms and measurements.
- The own patient overview window on the IntelliVue Patient Monitor indicates that the data is delayed.
- Telemetry waveforms (for example ECG and Pleth) and waveforms sourced by the bedside (for example Pressures and Pleth) are not aligned in time when displayed together on the Information Center.

Alarm Behavior

The following describes the behavior from the Information Center's perspective.

- All ECG alarms are generated based on the current ECG source. The Information Center displays, records, stores, and reflects alarms in overview, as appropriate.
- Alarm recordings at the Information Center use the primary and alarming ECG waveforms if available; otherwise the recordings use the primary and secondary ECG waveform.

- When a telemetry device is wirelessly connected to the IntelliVue Patient Monitor, telemetry alarms are indicated on both the monitor and the Information Center, if configured. A generic Tele Alarm/Tele INOP message displays on the monitor with standard alarm tones along with its associated color, severity level, and sound. The specific alarm message (for example ***HR Low**) displays in the Telemetry Data window on the monitor and at the Information Center.

Synchronized Settings

When a patient is connected to an IntelliVue Patient Monitor, and the monitor is then connected to a telemetry device, the Information Center uses the patient monitor settings for the telemetry device. When a patient is connected to a telemetry device, and the telemetry device is then connected to an IntelliVue Patient Monitor, the Information Center uses its **Telemetry Setup** settings.

The following settings are synchronized.

Measurement	Settings
Heart Rate	HR/Pulse Alarm On/Off, Heart Rate High/Low Limit
ECG	Primary Lead, Secondary Lead, Va Lead, Vb Lead, Hexad (Va, Vb)
Arrhythmia	Analysis Mode, Asystole Threshold, Pause Threshold, VTach HR, VTach Run, PVCs/min, Vent. Rhythm, SVT HR, SVT Run, PVCs/min On/Off, Pacer not Capture On/Off, Pacer not Pacing On/Off, Non-sustain On/Off, Vent. Rhythm On/Off, Run PVCs On/Off, Pair PVCs On/Off, Missed Beat On/Off, Pause On/Off, R-on-T On/Off, Vent. Bigeminy On/Off, Vent. Trigeminy On/Off, Multiform PVCs On/Off, AFIB On/Off, Irregular HR On/Off, SVT On/Off, Some ECG Alarms
ST	ST Analysis On/Off, ST Alarm On/Off, ISO point, J point, ST point, ST Priority List, ST Alarm Limit
STE	STE Analysis On/Off, STE Alarm On/Off
QT	QT Analysis On/Off, QTc High On/Off, QTc High Alarm Limit, ΔQTc High On/Off, ΔQTc High Alarm Limit, QT Lead, QTc Correction Formula, QT Baseline
SpO2T	SpO2 Alarms On/Off, SpO2 Alarm Limits, Pulse (SpO2) On/Off, SpO2 Low Alarm delay, SpO2 High Alarm delay, Desat Alarm Limit, NBP Alarm Suppression On/Off, Measurement Mode, Repetition Time
NBP	Sys/Dia/Mean Alarm Limits, Alarms On/Off, Alarm Source
Resp	Apnea Time, Alarm Limits, Detection Mode, Alarm On/Off, Resp On/Off

Note — The Information Center and the MP5T IntelliVue Patient Monitor have independent alarm settings that are not affected when the ECG source changes.

Note — If the ECG source is initially a telemetry device, and you change the SpO2 alarm limits at the Information Center, the settings synchronize with the telemetry device. If the ECG source is then changed to an IntelliVue Patient Monitor, the SpO2 settings at the Information Center revert to the monitor's default SpO2 alarm limits.

Note — The QRS detection threshold setting synchronizes with devices that can receive changes to QRS detection, including MX40 Release C.01.20 or later and IntelliVue Patient Monitor Release M.0 or later. If a monitoring device does not support the QRS detection threshold setting, the minimum QRS detection threshold always returns to 150 µV.

PIC iX Enterprise Link and Overview Sector Types

Depending on the PIC iX Enterprise Link configuration, sectors are assigned as principal or ancillary.

Principal

A principal sector is essential for central surveillance and alarming. Multiple principal sectors (up to 10) can be assigned to a patient. If a patient is assigned to two principal sectors and one Information Center goes off the network, central surveillance is not interrupted for the assigned PIC iX Enterprise Link patients.

Note — The one sector assigned on the PIC iX Enterprise functions as a single principal sector, and all other sectors function as ancillary.

Telemetry and MX40 devices require at least one principal sector to ensure central surveillance and alarming. Bedside monitors do not require a principal sector to begin central data collection and distribution because local alarming is available.

The PIC iX Enterprise Link system can be configured so that the last principal sector with only a bedside monitor assigned can be cleared without discharging the patient if central surveillance and alarming are no longer necessary. For example, if a telemetry device is removed, bedside-only monitoring of the patient continues.

Because there can be multiple principal sectors on multiple Information Centers, if one principal sector goes off the network, this icon displays in the other principal sectors:  .

Ancillary

An ancillary sector provides secondary monitoring. The loss of an ancillary sector does not result in a loss of central monitoring. Ancillary sectors contain this icon:  .

Assigning a Bed to a Sector

You can assign a bed or equipment to a sector for monitoring.

If the sector is empty, you can use the **Sector Assignment** window in the **Manage Patient** application to assign a bed for monitoring. If a bed is already assigned, you must first clear the sector, then assign the bed or equipment. See "Clearing (Unassigning) a Sector" on page 4-14.

The following procedure describes how to assign a bed to a sector in the **Manage Patient** application. For information on assigning beds to a sector using the **Display Setup** application, see "Display Setup" on page 12-12.

Considerations

Before assigning a bed to a sector, note the following:

- Because more than one Information Center can have access to a bed at the same time, there may be situations when two or more clinicians view information for the same patient at the same time. If multiple clinicians have Full Control access to the same patient, typically the last action takes effect.
- At least one principal sector is always required for central monitoring of telemetry patients.

Assign a bed or equipment to a sector by performing the following steps:

1 Select the **Manage Patient** button in the sector where you want to assign a bed or equipment. The **Sector Assignment** window displays a list of beds available for assignment in your unit on the left side.

2 Select a different institution or unit, if needed.

3 Select the bed that you want to assign to the sector by highlighting the bed name. Be sure to select the correct label. The Information Center configuration determines whether beds are assigned for principal or secondary monitoring. See "PIC iX Enterprise Link and Overview Sector Types" on page 4-12. The following icons indicate the sector type:

   - Principal:
   - Ancillary: 

4 Select the equipment from the **Available** list and select the **>** button.

5 Select the **OK** button. The Information Center assigns the bed or equipment to the sector.

Note — Selecting the **Cancel** button cancels your changes and closes the **Sector Assignment** window.

Device Pooling

In general, monitoring devices are associated with a clinical unit, which allows the unit to maintain ownership of the devices. Devices can only be shared among units if those units belong to the same device pool. Device pools enable you to share devices across multiple units. For systems with device pooling available, devices are assigned to a sector from a pool of available devices. When the device is shared across units, once the device is assigned to a sector it is removed from the list of available equipment.

Clearing (Unassigning) a Sector

Note — If the system is configured so that a monitor is automatically assigned to a sector when it is plugged in to the network or powered on, you cannot clear a sector using the following procedure. Use the **Display Setup** application. See "Display Setup" on page 12-12.

Considerations

Before clearing a sector, note the following:

- Clearing a surveillance sector removes the bed label from the sector.
- When the sector is empty, you can assign a new bed/equipment to monitor a bed. You can also overview a bed being monitored by another connected Information Center. See "Assigning a Bed to a Sector" on page 4-13.
- For IntelliVue Patient Monitors on a PIC iX Enterprise system, when you clear the sector, all devices are removed from all central monitoring and the bed is no longer available for overview at other bedside monitors. If a patient is admitted to the bed, you must discharge the patient before clearing the sector. See "Discharging a Patient" on page 3-14.
- A PIC iX Enterprise Link system can be configured so that clearing a sector does not discharge the patient for all non-telemetry devices, such as bedside monitors. This ensures that a bedside monitor can remain assigned to the patient for central data collection and distribution if a telemetry device is removed. See "PIC iX Enterprise Link and Overview Sector Types" on page 4-12.

Clear a sector by performing the following steps:

1 From the sector you want to clear, select the **Manage Patient** button. The **Manage Patient** window displays.

2 Select the **Clear Sector...** button. Depending on the clear sector configuration setting, the following occurs:

   - If the sector is not the last principal sector, a message asks if you want to stop overview monitoring of the patient.
   - On a PIC iX Enterprise Link system, if the configuration does not allow central data collection and distribution to continue for non-telemetry devices, the following occurs:
     - If the patient is admitted, a message informs you that the patient must be discharged before clearing the sector.
     - If the patient is not admitted, a message asks if you want to stop all monitoring for this patient.
   - On a PIC iX Enterprise Link system, if the configuration allows central data collection and distribution to continue for non-telemetry devices, a message asks you to confirm that clearing the sector allows central data collection and distribution to continue for bedside monitors.

3 Select the **Clear Sector** button.

Note — Selecting the **Cancel** button does not change the sector assignment.

5

Caregiver Assignments

This section describes the **Caregiver Assignments** application. It includes the following:

Caregiver Assignments Application

Note — The **Caregiver Assignments** application is not available on PIC iX Essentials systems.

The **Caregiver Assignments** application is always available for Bed to Bed Overview with bedside monitors, and may be available for paging assignments. Care assignments are role-based. Caregivers can be assigned roles based on their job function such as Charge Nurse, Nurse, or Care Tech. Roles are set up to receive certain types of alarms through a paging device or, if using IntelliVue Patient Monitors, through the Care Group overview feature at the bedside monitor. For example, the Nurse role may be set up to receive red and yellow alarms while the Care Tech role may be set up to receive INOP/technical alarms. Your hospital-designated roles are then assigned to specific clinicians or caregivers.

Warnings

- Bed to Bed Overview at the IntelliVue Patient Monitor and the paging system is a secondary alarm notification system and is not intended for primary notification of alarms, physiological data, or demographic data. Receipt by the external software device of alerts is not confirmed, and delivery to the device is not guaranteed. Time data, including alarms may be delayed.

- Clinicians using the paging system must remain within monitoring distance of the primary alarm notification device (such as a bedside monitor). If there is no bedside monitor, the primary alarm notification device is the Information Center.

You can assign caregivers a color, a paging device, and an overview prompt tone. When the caregiver is assigned to a bed or patient, the color appears next to the bed label on the Information Center. This allows a caregiver to quickly identify (by color) the beds for which they are responsible.

For IntelliVue Patient Monitors, when a caregiver is assigned an overview prompt tone, a tone is audible at the bedside monitor when beds assigned to the caregiver have an alarm condition.

If configured, beds assigned to a caregiver remain with that caregiver across equipment changes, standby/resume, patient admit or discharge, and power cycles.

Alarm Paging

If available, the Information Center includes the Alert Data Integration paging system (available in limited geographies) for secondary notification of patient alarms. The paging system acquires patient alarm data from the monitoring system and relays it in text format to a paging device such as a pager or cellular phone. For paging devices that can display graphical images, the paging system also sends waveform snippets.

At the Information Center you can:

- Specify the types of alarms that generate an automatic page for a patient. See "Selecting Alarms to Send in a Page" on page 8-24.
- Manually send a page to a paging device from the Fast Review application. See "Sending a Page From Fast Review" on page 5-6.
- Send a text message to a paging device by selecting the **Page** button in the Patient Window or from the **Caregiver Assignments** application.

Note — If your system does not allow Philips paging assignments, caregiver assignments will not affect paging, and manual text paging is not available from the Patient Window. However, the Fast Review application and Alarm Filters are available.

Accessing the Caregiver Assignments Application

To access the **Caregiver Assignments** application, do one of the following:

- Select the Caregiver Assignments icon in the Main Screen caption bar. See "Caption Bar" on page 2-2.
- From an application window, select the **Manage Unit** button, then select **Caregiver Assignments** from the list.
- In the patient sector or Patient Window, select the Caregiver icon for any assigned caregiver. See "Sector and Patient Window Icons" on page 2-6.

The **Caregiver Assignments** application displays a list of currently defined caregivers for the selected unit on the left side of the window, a list of all beds in the unit in the center, and unit assignments on the right side. If there is more than one institution, the institution name precedes the unit name.

Setting Up Caregivers

You can use the **Caregiver Assignments** application to assign a caregiver a color and a paging device (if available). For a caregiver assigned the Overview role, you can specify whether a prompt tone sounds at the bedside monitor when an alarm condition occurs at their assigned beds.

To set up a caregiver:

1 Access the **Caregiver Assignments** application. See "Accessing the Caregiver Assignments Application" on page 5-2.

2 Select the **Setup...** button. The **Caregiver Setup** dialog box displays.

3 Select the **Caregiver:** drop-down arrow and select the caregiver's name from the list.

4 If the paging option is available, assign a paging device to the caregiver by selecting the **Paging Device:** drop-down arrow, then selecting the device from the list.

Note — If the device was assigned to another caregiver, a message asks you to confirm that you want to reassign the device to this caregiver. Select **OK**.

5 Select the **Nurse Color:** drop-down arrow and select a color to assign to the caregiver. The color appears next to the bed label in the patient sector and Patient Window for patients assigned to this caregiver.

Note — More than one caregiver can be assigned the same color.

6 For IntelliVue Patient Monitors, select or clear the **Prompt Tone** check box to specify whether a prompt tone is audible at the bedside monitor when patients assigned to this caregiver have an alarm condition. The prompt tone occurs for all bedside monitors that are assigned to the same caregiver.

7 Select the **Locked Assignment** check box to lock the color, paging device, and bed assignments for this caregiver.

Note — If a caregiver has locked assignments, the only way to remove their paging device or assigned color is to clear the **Locked Assignment** check box. You can change the caregiver's bed assignments if **Locked Assignment** is selected, however, bed assignments will not be cleared when the **Clear Assignments** button is selected on the **Caregiver Assignments** window, when Unassign Caregiver is selected during discharge, or if the sector is cleared.

8 Select **Apply** to save your selections. If your system is password protected, enter a user name and password if prompted to do so then select **OK**.

9 Repeat Step 3 through Step 8 to set up each caregiver.

Assigning Caregivers to Patients/Beds

Beds that are assigned to a caregiver remain with that caregiver throughout equipment changes, standby/resume, patient admit and power cycles. Your system may be set up so that caregivers remain with the bed or the assignment is cleared with discharge or transfer.

To assign caregivers to patients:

1 Access the **Caregiver Assignments** application. See "Accessing the Caregiver Assignments Application" on page 5-2.

2 In the left pane, select the caregiver's name to be assigned.

3 In the center pane, select the box next to the patient name in the appropriate role column (for example, **Nurse** or **Care Tech**).

Note — If you attempt to assign a caregiver to a bed that already has an assigned caregiver with the same role, the Information Center replaces the previous caregiver with the new one.

Note — If you assign a caregiver to a bed that was previously delegated to another caregiver, all previously delegated beds return to his or her care. See "Caregiver Delegation" on page 5-5.

4 Repeat Step 2 and Step 3 to assign each caregiver to patients.

5 Select **Apply**. If your system is password protected, enter a user name and password if prompted to do so then select **OK**.

Assigning Caregivers to Units

Some units may want a nurse from another unit to be paged for certain alarms, for example, all red alarms. For systems set up to allow caregiver to unit assignment, the **Caregiver Assignments** application allows you to assign a nurse to receive specific alarms for all beds in a unit. When you assign a caregiver to another unit, you are not assigning a particular bed but rather all the beds in the unit to one caregiver.

Note — Only caregivers with the unit role are available for unit assignment.

To assign a caregiver to a unit:

1 Access the **Caregiver Assignments** application. See "Accessing the Caregiver Assignments Application" on page 5-2.

2 In the left pane, select the caregiver's name in the **Caregivers** list.

3 In the right pane, select the **Unit Assignment** list.

4 Select **Apply**. If your system is password protected, enter a user name and password if prompted to do so then select **OK**.

To unassign a caregiver from a unit:

1 In the left pane, select the caregiver's name in the **Caregivers** list.

2 In the right pane, select the **Unit Assignment** list.

3 Select **Apply**. If your system is password protected, enter a user name and password if prompted to do so then select **OK**.

Clearing Caregiver Assignments

The **Caregiver Assignments** application allows you to clear specific caregiver assignments or clear all caregiver assignments for all beds in the unit at one time. Your system can be configured so that selecting **Clear Assignments** in the application removes all caregiver bed assignments (except for caregivers that have locked assignments), color assignments, and (if paging is available) paging assignments in the unit. Selecting **Clear Assignments** does not clear charge nurse assignments.

If a caregiver locked assignments and delegated their patients, clearing all assignments does not clear the delegation. If a caregiver is assigned to multiple units, clearing assignments removes the caregiver assignments across all units.

To clear all caregiver assignments:

1 Access the **Caregiver Assignments** application. See "Accessing the Caregiver Assignments Application" on page 5-2.

2 Select **Clear Assignments**.

3 Select **Apply**. If your system is password protected, enter a user name and password if prompted to do so then select **OK**.

To clear specific caregiver assignments:

1 Access the **Caregiver Assignments** application. See "Accessing the Caregiver Assignments Application" on page 5-2.

2 In the left pane, select the caregiver's name. The field is highlighted in blue.

3 In the right pane, select the box next to the patient name in the appropriate role column (for example, **Nurse** or **Care Tech**).

4 Repeat Step 2 and Step 3 for each assignment to be cleared.

5 Select **Apply**. If your system is password protected, enter a user name and password if prompted to do so then select **OK**.

Caregiver Delegation

For systems with the paging option available and where the unit is set up to use Philips paging assignments, you can use the **Caregiver Assignments** application to temporarily assign patients to another caregiver so that they can receive patients' alarms while the primary caregiver is off the unit. The **Caregiver Assignments** application allows you to delegate the beds that are currently assigned to one caregiver to another caregiver.

To delegate caregiver bed assignments:

1 Access the **Caregiver Assignments** application. See "Accessing the Caregiver Assignments Application" on page 5-2.

2 In the left pane, select the caregiver that wants to delegate their assignment.

3 Select the **Delegation...** button. The **Delegation** dialog box displays a list of caregivers who have the same role as the primary caregiver and who did not delegate their patients.

4 In the left pane, select a delegate from the **Available Delegates** list.

5 Select **OK**. If your system is password protected, enter a user name and password if prompted to do so then select **OK**.

The Information Center assigns the beds to the delegate. In the **Caregiver Assignments** application, the delegated caregiver's name displays followed by the primary caregiver's name in parentheses next to their delegated beds. For example, **Sue (Harry)** where Sue is the delegate and Harry is the primary caregiver.

It is important to end delegation so that alarm notifications go back to the original caregiver. To end the delegation and return all bed assignments to the primary caregiver:

- In the right pane, select a delegated assignment or select **Delegation...**, then select **End Delegation**.

Assigning a Charge Nurse

For systems with the paging option available and where the unit is set up to use Philips paging assignments, you can use the **Caregiver Assignments** application to assign caregivers to beds in a unit.

To assign a charge nurse for the unit:

1 Access the **Caregiver Assignments** application. See "Accessing the Caregiver Assignments Application" on page 5-2.

2 Select the **Charge Nurse:** drop-down arrow then select a name from the list.

Note — Only caregivers with the **Charge Nurse** role are available for selection.

3 Select **Apply**. If your system is password protected, enter a user name and password if prompted to do so then select **OK**.

You can clear the charge nurse assignment by selecting **None** from the **Charge Nurse:** list.

Note — Selecting the **Clear Assignments** button does not clear the charge nurse assignment.

Sending a Page From Fast Review

For systems with the paging option available and Fast Review enabled, you can send an alarm page from the Information Center by selecting the **Page** button in the Fast Review application. The system sends the alarm page to all caregivers who are currently assigned to the bed. See "Fast Review" on page 9-35.

Note — You can send a page from the Fast Review application regardless of whether the system is set up to use Philips paging assignments.

To manually send a page from the Fast Review application:

1 In the patient sector, move the cursor over the message area to view the list of alarms.

2 Select the alarm for which you want to send a page from the drop-down list. The Fast Review application displays.

3 Select  to send a page to the paging device(s) for the caregiver(s) assigned to this patient.

Sending a Manual Page

For systems with the paging option available and where the unit is set up to use Philips paging assignments, you can manually initiate a page to one or more caregiver's paging device from:

- the **Caregiver Assignments** application. See "Sending a Page From Caregiver Assignments" on page 5-7.
- the Patient Window. See "Sending a Page From the Patient Window" on page 5-7.

The manual page can include a text message that you provide or an automated message that goes to one or more caregiver's paging device indicating the current bed and alarm notification assignments. For example, at the beginning of a shift, a unit charge nurse may want to send a message to each caregiver (nurse, care technician, and so on) in the unit indicating their assigned beds and alarm notification levels (red, yellow, INOP).

Sending a Page From the Patient Window

For systems with the paging option available and where the unit is set up to use Philips paging assignments, you can manually initiate a page from the Patient Window.

To send a manual page from the Patient Window:

1 Use one of the following methods to open the Patient Window:

- In the sector for the bed that you want to send a page, select the Patient Window shortcut button.
- In the application window task bar, select the **Patient Window** button.

2 Select the Page button. The **Manual Page** window displays.

3 In the left pane, select the check box next to the name of the caregivers to receive the message. To send the message to all caregivers, select the **Select All** check box.

4 Enter a text message, if necessary, by selecting the text box on the right side of the window and typing a 1- to 250-character text message.

5 Select the **Page Bed Assignments** check box to send an automated page indicating the caregiver(s) bed and alarm severity assignments.

6 Select **OK**.

Sending a Page From Caregiver Assignments

For systems with the paging option available and where the unit is set up to use Philips paging assignments, you can manually initiate a page from the **Caregiver Assignments** application.

To send a manual page:

1 Access the **Caregiver Assignments** application. See "Accessing the Caregiver Assignments Application" on page 5-2.

2 Select the **Paging...** button. The **Manual Page** dialog box displays.

3 In the left pane, select the check box next to the name of the caregivers to receive the message. To send a message to all caregivers, select the **Select All** check box.

4 Enter a text message, if necessary, by selecting the text box on the right side of the window and typing a 1- to 250-character message.

5 Select the **Page Bed Assignments** check box to send an automated page indicating the caregiver(s) bed and alarm severity assignments.

6 Select **OK**.

Data Sent to a Paging Device

Alarms are sent in the order in which they occur. So, if a yellow alarm occurred for one bed immediately followed by a red alarm for another bed, the yellow alarm is sent first followed by the red alarm.

Caution

If a measurement value is invalid at the time of the page, its value is displayed as a question mark (?). If a measurement does not exist at the time of the page, its label and value are not displayed. The SpO2 and NBP values are the nearest values to the time of alarm.

When an alarm is acknowledged or paused, a cancel message is sent to the paging system. If the alarm page has not already been sent, it is canceled and is not sent. If the alarm page has already been sent, the paging system clears the message on the paging device, if configured.

Alarm Data

The format of the alarm data sent to the paging device depends on how your paging client is configured. The data can include the following:

- Bed label
- Alarm level, alarm text and measurement text (for example, *** Asystole HR 0 SpO2 92 NBP 120/90)
- **UNA** precedes the alarm text if the bed is not assigned to a caregiver.
- **REM** precedes the alarm text for acknowledged reminder alarms.
- **USL** precedes an unacknowledged reminder alarm if paging assignments were made with the Caregiver Assignments application.
- The time the alarm occurred.
- The Device Location information for IntelliVue Telemetry System devices and Instrument Telemetry bedsides with the Device Location option, if configured.
- Patient name if the patient is admitted and the Clinical Settings are configured to include patient name in the alarm data.

Note — For MX40 and IntelliVue Patient Monitors, one-star yellow arrhythmia alarms will not send reminder notifications to end devices. IntelliVue Telemetry devices send reminders for one-star and two-star yellow alarms, and three-star red alarms if indicated.

Waveform Data Using Philips Paging Assignments

Note — This section describes the waveform data that is included in a page sent when the system uses Philips paging assignments. For information about the waveform data that is included in a page sent with CareEvent, see the *CareEvent Instructions For Use*.

For paging devices capable of displaying images, you can view waveform snippets in addition to the textual alarm data. The waveform displays on the paging device as two separate 3-second snippets. The amount of data that displays in each snippet depends on how your system is set up. For example, if your system is configured for 5 seconds pre-context, the first wave snippet shows 3 seconds of pre-context and the second snippet shows 2 seconds of pre-context. If your system is configured for 1 second pre-context, then the first wave snippet shows the second before the alarm, the second the alarm is called and the second after the alarm. The second wave shows the following 3 seconds after the alarm.

Note — When a manual page is initiated from the Fast Review application, 6 seconds of waveform data is sent to the paging device; 5 seconds preceding the alarm and 1 second following the alarm. See "Sending a Page From Fast Review" on page 5-6.

Warning

Waveforms rendered on the user's paging device are an approximation. There are no time and voltage scales displayed nor implied. The waveform data presented on the end-device is intended to be secondary. The waveform is of sufficient resolution that the clinician can make a decision to 'respond later, walk or run', gather additional information on the patient from other sources, or go directly to the patient, in either case, to perform a primary assessment.

Loss of Connection to Primary Server

If you lose connection to the Primary Server, the availability of Alert Data Integration depends on whether it is configured as Distributed or Centralized:

- **Distributed** — Alert Data Integration runs on each Information Center iX and continues to operate if you lose connection to the Primary Server.
- **Centralized** — The Information Center sends alarm information to a Primary Server, which sends it to each paging client. If you lose connection to the Primary Server, Alert Data Integration is not available and no clinical alarms are sent to or received by the paging devices. The system message **Status: Local** displays in the Information Center caption bar. A *** alarm indicating that the paging option is not available is sent to all paging devices for each Information Center with the Alert Data Integration option available. For example, if the Information Center named ICU2 loses connection to the Primary Server, the message **Paging Unavailable for: ICU2** displays on all paging devices with assigned beds. If connection between the Information Center and the Alert Data Integration receiving device is lost for any reason, no alarms are sent and the message **Paging not available** displays in the Information Center system message area.

6

Alarms

This section describes the alarms detected by the Information Center and the adjustments you can make to the alarms. It includes the following:

Alarms Overview

The Information Center determines alarm conditions and generates alarm signals for Philips-approved medical devices that send physiological data and do not have the ability to determine the alarm condition.

Warnings

- When setting alarm limits, it is important to select appropriate values. Selecting extreme values can cause the alarm system to be ineffective.
- Each medical device may use different alarm settings. Be sure to confirm the settings for the devices in your area.

MX40 and IntelliVue Patient Monitors

If the patient is monitored by an IntelliVue Patient Monitor or an MX40, arrhythmia monitoring is provided by the bedside monitor or MX40. Controls for arrhythmia analysis and alarm limits are adjustable and viewable at both the Information Center and the IntelliVue Patient Monitor (only available if bedside controls are enabled). Controls for arrhythmia analysis and alarm limits are adjustable and viewable at the Information Center and viewable on the MX40. See your IntelliVue Patient Monitor or MX40 user documentation for information on arrhythmia monitoring.

MRx Monitors

If the patient is monitored by an MRx monitor, arrhythmia monitoring is done at the bedside monitor. All alarms (including arrhythmia alarms) are announced at the Information Center; all alarm settings are controlled at the monitor. See your MRx monitor Instructions for Use for information.

Note — Arrhythmia controls are not available at the Information Center for MRx monitors or when IntelliVue Patient Monitors are operating using a wireless IntelliVue Instrument Telemetry System network (1.4 or 2.4 GHz) connection.

IntelliVue Telemetry System

All alarms are detected and announced at the Information Center. Controls for arrhythmia analysis and alarm limits are adjustable and viewable at the Information Center.

IntelliBridge Modules

Alarms that the Information Center receives from an IntelliBridge module depend on the drivers available on the device. For information about the alarm messages, see the guide for the specific driver.

Efficia Patient Monitors

If the patient is monitored by an Efficia patient monitor, arrhythmia monitoring is provided by the bedside monitor. All alarms (including arrhythmia alarms) are announced at the Information Center. Controls for arrhythmia analysis and alarm limits are adjustable and viewable at both the Information Center and the Efficia monitor.

Physiological Alarms

Physiological alarms are red and yellow alarms. A red alarm indicates a high priority patient alarm such as a potentially life-threatening situation (for example, asystole). A yellow alarm indicates a lower priority physiological alarm (for example, a respiration alarm limit violation). Additionally, there are short yellow alarms, most of which are specific to arrhythmia-related patient conditions (for example, ventricular bigeminy). See “Physiological Alarm Messages” on page 6-10.

Technical Alarms (INOPs)

Technical alarms, or INOPs indicate that the monitoring device cannot measure or detect alarm conditions reliably. If a technical alarm interrupts monitoring and alarm detection (for example, LEADS OFF), the numeric is replaced by a question mark in the sector and Patient Window, and an audible indicator sounds. Technical alarms without this audible indicator indicate that there may be a problem with the reliability of the data, but that monitoring is not interrupted.

Most technical alarms are light blue, however there are a small number of technical alarms that are always yellow or red to indicate a severity corresponding to red and yellow alarms. See “Technical Alarm Messages (INOPs)” on page 6-15.

Visual Alarm Indicators

The Information Center indicates alarm conditions by using the following visual indicators.

Sector Background Color

In a patient sector that is alarming, the sector background color changes from black to blue (except for soft INOPs/technical alarms). The sector background remains blue until the alarm condition is resolved.

Alarm Messages

Active alarm messages display in Alarm Areas at the top of the patient sector and the Patient Window. See “Alarm Areas” on page 2-13. The background color of the alarm message matches the alarm priority: red for red alarms, yellow for yellow alarms, light blue for standard technical alarms/INOPs, red for red technical alarms/INOPs, and yellow for yellow technical alarms/INOPs.

Asterisk symbols (*) next to the alarm message match the alarm priority: *** for red alarms, ** for yellow alarms, * for short yellow alarms. Standard technical alarms/INOPs do not have a symbol, red and yellow technical alarms have exclamation marks next to the alarm message: !!! for red technical alarms and !! for yellow technical alarms.

The highest priority alarm is always shown in the alarm message area. Up to 10 current alarm conditions are shown in the list. If there are 10 alarm conditions and a new alarm condition occurs, the oldest alarm condition is removed from the list and the new alarm condition is added to the bottom of the list.

For rate alarm conditions, the message indicates which measurement is in alarm. Depending on how the system is configured, the message displays in extended or standard text format. For more information, see “Alarm Message Formats” on page 6-4.

For event alarm conditions, the message indicates the event that caused the alarm (for example, Asystole).

The system may be set so that the alarm message flashes for red and yellow alarms.

If there are concurrent red and yellow alarm conditions, the red alarm condition message displays first, and the yellow alarm condition message(s) are available in the list. Select an alarm on the list to display the Fast Review application where you can view the alarm wave and take action if necessary.

Active red and yellow alarms display in the following priority order (high to low):

1 ECG-related red alarms

2 All other red alarms

3 Arrhythmia-related yellow alarms

4 All other yellow alarms

If there is an INOP/technical alarm condition, and a new INOP/technical alarm condition occurs, the new INOP/technical alarm condition message replaces the old message.

If there is a yellow arrhythmia alarm condition, the message displays for at least 3 minutes unless acknowledged regardless of whether the alarm condition persists. If acknowledged and the alarm condition is no longer active, the message goes away immediately. If the alarm condition is still active the message remains until the alarm condition clears, whether acknowledged or not. See “Acknowledging Alarms” on page 6-6 for information on yellow alarm behavior and acknowledging alarms.

Warning

If alarm annunciation is acknowledged and alarm reminders are configured off, the alarm condition message persists but there is no audible alarm annunciation as long as the condition causing the alarm remains.

Alarm Message Formats

The Information Center can display alarm messages in either standard or enhanced text format. Alarm messages in standard text format display just the text, for example **** SpO2 Low**. Enhanced format alarm messages include the numeric value and alarm limit for the measurement. For example, in the message **** SpO2 xxx < yyy**, xxx is the value and yyy is the alarm limit.

Alarm messages from MRx monitors and Smart Hopping IntelliVue Telemetry System bedside monitors always display in standard text format at the Information Center. Messages from IntelliVue Telemetry System wireless devices display in enhanced text format. For all other devices, the message format at the bedside is independent of the format configured at the Information Center. For example, if the Information Center is configured to display enhanced text format messages and the bedside sends standard text format messages, the Information Center displays enhanced format messages.

Efficia Patient Monitors

Messages from Efficia monitors are mapped to the IntelliVue Patient Monitor alarms and use the IntelliVue Patient Monitor alarm text. If a corresponding alarm cannot be found, a message is displayed at the Information Center indicating that there are additional bedside alarms.

Audible Alarm Indicators

The audible alarm indicators depend on which alarm standard applies in your hospital. Audible alarm indicator patterns are repeated until you acknowledge the alarm by switching it off or pausing it, or until the alarm condition ceases (if audible alarm indication is set to non-latching).

Active Alarm Sounds

There can be only one alarm sound annunciating at the Information Center at one time.

- If there is an unacknowledged red level alarm in the presence of any other level alarm, the sound for the red alarm annunciates.
- If there is no unacknowledged red level alarm condition and there is an unacknowledged long yellow alarm in the presence of any other yellow or INOP/technical alarm (acknowledged or unacknowledged) the sound for the long yellow alarm annunciates.
- If there is no unacknowledged red level alarm or long yellow level alarm condition and there is an arrhythmia or nurse call event, the short yellow (*) alarm sound annunciates.
- If there are no unacknowledged red or long/short yellow alarm conditions and there is any bed with an unacknowledged hard INOP/technical alarm condition, the sound for the hard INOP/technical alarm annunciates.
- If multiple sectors are in alarm, once the highest level alarm is acknowledged in a sector the next highest alarm annunciates.
- An alarm tone indicates the alarm type. There is no sound for soft INOPs/technical alarms.

Traditional Audible Alarms

- Red alarms and red INOPs: a high-pitched sound is repeated once a second.
- Two-star yellow alarms and yellow INOPs: a lower-pitched sound is repeated every two seconds.
- One-star yellow alarms (short yellow alarms): The audible indicator is the same as for yellow alarms, but of shorter duration.
- Standard INOPs (hard and severe cyan INOPs): a continuous, slow, lower-pitched tone.

ISO/IEC Standard Audible Alarms

- Red alarms and red INOPs: a high-pitched tone is repeated five times, followed by a pause.
- Two-star yellow alarms and yellow INOPs: a lower-pitched tone is repeated three times, followed by a pause.
- One-star yellow alarms (short yellow alarms): the audible indicator is the same as for yellow alarms, but of shorter duration.
- Standard INOPs: an INOP tone is repeated every two seconds.

Adjusting the Alarm Tone Volume

To adjust the alarm tone volume, perform the following steps:

1 Select the  icon from the caption bar on the Main Screen or an application window. The **Volume Control** dialog box displays a slider control.

2 Select and drag the slider to the right to increase the alarm tone volume or to the left to decrease the alarm tone volume. At the lowest volume the tone is still audible.

Note — Perceived volume levels can be influenced by background noise, the user environment and other considerations. The approximate range of sound pressure levels provided by the product is 47 dBA to 87 dBA at 1 meter.

Warning

Be sure that the minimum setting is still audible in your care unit considering noise and stress level. Alarm volume should be adjusted and verified during installation. Do not rely exclusively on the audible alarm system for patient monitoring. Adjustment of alarm volume to a low level during patient monitoring may result in patient danger. Remember the most reliable method of patient monitoring combines close personal surveillance with correct operation of monitoring equipment.

Note — Your system can be configured to automatically change the alarm volume at two different times of the day, for example, a day volume and a night volume.

Adjusting Alarms

All alarm conditions for telemetry and MX40 announced by the Information Center have default settings (limits and on/off status) that are configured for a unit. You can adjust alarm settings to accommodate the clinical condition of the individual patient.

Warnings

- When setting alarm limits, it is important to select appropriate values. Selecting extreme values can cause the alarm system to be ineffective.
- Each medical device may use different alarm settings. Be sure to confirm the settings for the devices in your area.

The adjustments to alarm settings that you can make from the Information Center depend on the point-of-care equipment being used. See “Device Controls” on page 4-2.

When you discharge a patient from the Information Center, the alarm limits and on/off settings controlled from the Information Center go back to unit settings. This also occurs at the monitoring device if the device is associated with the Information Center at time of discharge. See the Instructions for Use for your monitoring device.

Acknowledging Alarms

Alarm conditions generated from bedside monitors can be configured to allow or not allow acknowledgment from the Information Center. To acknowledge alarms at the Information Center, select the Acknowledge button. Selecting Pause can also acknowledge an active alarm (see "Pausing Alarms" on page 6-9).

Alarms for patients being monitored by a TRx4841A/TRx4851A transceiver can only be acknowledged from the Information Center. Acknowledging an alarm condition at the Information Center turns off the audible annunciation of an alarm condition.

MX40

You can acknowledge an alarm for the MX40 either at the MX40 or at the Information Center. Acknowledging an alarm at the MX40 also acknowledges the alarm at the Information Center.

Note — If your system requires you to enter credentials before you can acknowledge a red alarm, you must enter a user name and password in the Patient Window before you can acknowledge the alarm.

Efficia Patient Monitors

Audio can be turned off at the Efficia monitor. When the monitor is in Audio Off mode, no audible alarm sounds occur, and an **AUDIO OFF** message displays in the sector and Patient Window at the Information Center. An icon displays next to all numerics  and in the alarm banner  to indicate that alarms are no longer sounding.

Warning

When Audio Pause or Audio Off mode is enabled at an Efficia monitor, audible alarms do not sound at the Information Center or at the bedside monitor.

Alarm Behavior

If the alarm annunciation is acknowledged:

- If the alarm condition is present, the sector background changes from blue to black, but the alarm banner remains until the condition ends or the timeout period ends. When the timeout period ends, if the condition is present or reoccurs, the alarm annunciates. There is no additional audible tone, unless alarm reminders are configured.
- If the alarm condition is no longer present, the alarm indicators are automatically reset.

Warning

If alarm annunciation is acknowledged and alarm reminders are configured off, the alarm condition message persists until the condition ends but there is no audible alarm annunciation.

If the alarm is NOT acknowledged:

The alarm behavior depends on the type of alarm condition and how your alarm system is configured. The table below describes the alarm system behavior for each type of alarm condition.

Type of Alarm Condition	What happens when alarm condition ends
Red arrhythmia alarms	Alarm indicators (sound, message, blue sector background) remain, whether or not the condition is present (latching).
Yellow arrhythmia alarms (short yellow)	• If the alarm condition ends during this period, the alarm indicators remain for 3 minutes, and then clear. • If the alarm condition remains after this period, the indicators remain until the condition clears. • If the alarm condition ends after this period, the alarm indicators are automatically reset.
Arrhythmia and telemetry INOPs/technical alarms	Alarm indicators are automatically reset after the condition ends (non-latching).
Telemetry ST, NBP, and SpO_2 alarms	With telemetry devices, alarm indicators can be configured to be latching or non-latching. The default is latching, alarm indicators remain whether or not the condition is present.
Alarms generated at the bedside	Alarm indicators (sound, message, blue sector background) are automatically reset (non-latching) or remain (latching), depending on how the alarms are configured at the bedside.

Alarm Reminders

Red Alarms

If the Information Center is configured to have alarm reminders, when an active alarm condition is acknowledged and the condition persists, the Information Center repeats the appropriate alarm sound once every one, two or three minutes (depending on the alarm reminder configuration time) while the alarm condition remains.

Only one alarm sound can annunciate at one time. If a continuous red alarm is annunciating for another patient the red alarm reminder will not sound until the previous alarm sound has cleared. However, if a continuous yellow alarm is annunciating, the red alarm reminder annunciates (interrupting the yellow alarm).

Yellow Arrhythmia Alarms

If a yellow arrhythmia alarm is continuous, an alarm reminder sounds every three minutes as long as the condition exists if:

- Reminders are configured
- Timeout is set to zero

Limit Alarms

If a red or yellow alarm condition exists, an alarm reminder sounds based on configuration.

INOPs/Technical Alarms (telemetry beds only)

If your Information Center is configured with INOP reminders, the hard INOP alarm sound for either Leads Off or Replace Battery repeats once every one, two, or three minutes (depending on your configuration) while the INOP condition remains active and if there are no continuous alarm sounds for other patients.

Efficia Patient Monitors

Efficia monitors do not send alarm reminders. If an alarm ends and the condition still exists, a new alarm annunciates.

MX40 and IntelliVue Patient Monitors

For MX40 and IntelliVue Patient Monitors, short yellow arrhythmia alarms do not send reminder notifications to paging devices.

IntelliVue Telemetry System

IntelliVue Telemetry System devices send reminders for short yellow (*), yellow (**), and red (***) alarms, if indicated.

Acknowledge/Review

When there is an annunciating alarm condition, the Record button  or the Print button  in the patient sector changes to the Acknowledge/Review button  to enable you to acknowledge the active alarm. The action of the button depends on whether or not Fast Review is enabled.

If your unit configuration does not allow acknowledgment of bedside-generated alarm conditions at the Information Center, the Review button  displays in the patient sector. Selecting the button displays the Fast Review strip for that alarm. See “Fast Review” on page 9-35.

Note — For IntelliVue Patient Monitors, both the monitor and the Information Center must be configured to allow acknowledgment of bedside-generated alarm conditions.

Note — If your system requires you to enter credentials before you can acknowledge a red alarm, you must enter a user name and password in the Patient Window before you can acknowledge the alarm.

Fast Review Disabled

If Fast Review is not enabled, you can acknowledge the alarm condition by selecting the Acknowledge button  or by clicking or, for touchscreen displays, touching anywhere in the patient sector, except on a button.

Fast Review Enabled

If Fast Review is enabled, selecting the Acknowledge/Review button  acknowledges the alarm and opens the Fast Review strip for that alarm. See “Fast Review” on page 9-35. If there is an application window open for any patient, when the button is selected, the Fast Review strip overlays it.

- This capability can be enabled for red alarm conditions only or for all alarm conditions.
- To acknowledge the alarm condition without displaying it, click anywhere in the patient sector, or for touchscreen displays, touch anywhere in the patient sector except on a button.
- If you select the Acknowledge/Review button  for another alarm condition, the new alarm is displayed and the current one closes.

Pausing Alarms

If you want to temporarily prevent all patient alarms from sounding, for example while you are moving a patient, you can pause alarms. The Pause button on the Patient Window allows you to turn all alarm sounds off and on. Your system may be set up to allow the pausing of yellow alarms only, red and yellow alarms or, to avoid unintentional switching off of alarms, to not allow the pausing of any alarms. Depending on how your system is set up, alarm pause time can be 1, 2 (default), or 3 minutes. Alarms automatically resume after the configured pause time ends. You can, however, resume alarms manually at any time by selecting the Pause button on the Patient Window.

Note — If your system requires you to enter credentials before you can pause alarms, you must enter a user name and password in the Patient Window before you can pause the alarm.

When yellow alarms are paused or off:

In the alarm banner, the system displays a message, together with the alarms paused or the alarms off symbol. The message depends on the number of configured devices with yellow alarms paused or off. For example, if yellow alarms are paused at one device, the Information Center displays the message **Yellow Al. Paused**, together with the alarms paused symbol.

When all (red and yellow) alarms are paused or off:

In the alarm banner, the system displays a message, together with the alarms paused, the alarms off, or the audio paused symbol. The message depends on the number of configured devices with alarms paused or off. For example, if all devices assigned to the patient have alarms off, the system displays the message **Alarms Off**, together with the alarms off symbol.

Symbols for red and yellow alarms:

 Alarms Paused

 Alarms Off

 Audio Paused

IntelliVue Patient Monitors

For IntelliVue Patient Monitors, you must enable remote controls at the bedside for the Pause button to be available to use at the Information Center. See your IntelliVue Patient Monitor documentation for information on enabling remote controls.

Efficia Patient Monitors

If audible alarms are paused temporarily at an Efficia monitor, the message **AUDIO PAUSED** displays in the patient sector and Patient Window for the specified time interval. An icon displays next to all numerics  and in the alarm banner  to indicate that alarms are no longer sounding.

Warning

When Audio Pause or Audio Off mode is enabled at an Efficia monitor, audible alarms do not sound at the Information Center or at the bedside monitor.

Physiological Alarm Messages

The following table lists physiological alarm messages alphabetically. Some alarms show both enhanced and standard text formats.

Note — Some alarms in the following table depend on the revision of the monitoring device. See the Instructions for Use for the device for details about the supported alarms.

Note — Red-level alarm conditions are announced by continuous chiming. Yellow-level alarm conditions are announced by a tone that sounds for several seconds (to distinguish them from non-arrhythmia alarm conditions that have a continuous tone).

Message	From	Description	Priority
*** AFIB**	ECG/Arrhythmia	An irregular rhythm of beats labeled as N **and** variability in PR intervals **and** P-wave variability (for adult patient category only).	Short Yellow
***** Apnea >10 min**	Resp	Respiration has stopped for longer than the preset apnea time.	Red
***** Asystole**	ECG	No beat detected for a period > the asystole threshold (2.5 to 4.0 seconds).	Red
***** Brady (Pulse)** ***** Brady/P xxx< yyy**	SpO2, Pressure, cmResp	Heart rate from the Pulse signal has fallen below the bradycardia limit. xxx denotes the lowest measured value; yyy is the bradycardia limit.	Red
***** Desat**	SpO2	The SpO2 value has fallen below the desaturation alarm limit.	Red
*** End AFIB**	ECG	Atrial fibrillation no longer detected for the Afib end delay time (for adult patient category only).	Short Yellow
*** End Irregular HR**	ECG	Irregular HR rhythm no longer detected for the irregular HR end delay time.	Short Yellow
***** Extreme Brady** ***** xBrady xxx < yyy**	ECG	Heart rate < the extreme bradycardia alarm limit. xxx denotes the lowest measured value; yyy is the extreme bradycardia limit.	Red

Message	From	Description	Priority
***** Extreme Tachy** ***** xTachy xxx > yyy**	ECG	Heart rate > the extreme tachycardia alarm limit. xxx denotes the highest measured value; yyy is the tachycardia limit.	Red
***/** HR High** ***/** HR xxx > yyy**	ECG	Heart rate > the high HR limit.	Short Yellow Yellow
***/** HR Low** ***/** HR xxx < yyy**	ECG	Heart rate < the low HR limit.	Short Yellow Yellow
*** Irregular HR**	ECG/Arrhythmia	An irregular rhythm of beats labeled as N (R-R interval changes > 12.5%).	Short Yellow
*** Missed Beat**	ECG/Arrhythmia	No beat detected for a period > 1.75 times the average R-R interval for HR < 120, **or** no beat detected for > 1 second with HR > 120 (Paced mode Off).	Short Yellow
*** Multiform PVCs**	ECG/Arrhythmia	The occurrence of two differently shaped beats labeled as V within the last 60 beats **and** each occurring at least twice within the last 300 beats.	Short Yellow
**** NBP High** **** NBP xxx > yyy**	NBP	The measured NBP value is above the high alarm limit. **s**, **d**, or **m** after the label indicates whether the systolic, diastolic, or mean pressure has crossed the limit.	Yellow
**** NBP Low** **** NBP xxx < yyy**	NBP	The measured NBP value is below the low alarm limit. **s**, **d**, or **m** after the label indicates whether the systolic, diastolic, or mean pressure has crossed the limit.	Yellow
*** Non-Sustain VT**	ECG/Arrhythmia	A run of consecutive beats labeled as V with run length < the V-Tach Run Limit **and** ventricular HR > the V-Tach HR limit.	Yellow

Message	From	Description	Priority
*** Pacer Not Capt**	ECG/Arrhythmia (paced patients only)	No beat detected for a period > 1.75 times the average R-R interval **and** pace pulse(s) detected (Paced mode On).	Yellow
*** Pacer Not Pacing**	ECG/Arrhythmia (paced patients only)	No beat detected for a period > 1.75 times the average R-R interval **and** no pace pulse(s) detected (Paced mode On).	Short Yellow
*** Pair PVCs**	ECG/Arrhythmia	Two consecutive beats labeled as V between two beats not labeled as V.	Yellow
*** Pause**	ECG/Arrhythmia	No beat detected for a period > the pause alarm threshold (1.5 to 2.5 seconds). *Note* — When the settings for Pause and Asystole are both set at 2.5 seconds, if an event occurs at 2.5 seconds, the Asystole alarm annunciates.	Yellow
**** Pulse High**	SpO2, Pressure, cmResp	The pulse rate exceeds the high alarm limit.	Yellow
**** Pulse Low**	SpO2, Pressure, cmResp	The pulse rate is below the low alarm limit.	Yellow
*** PVCs/min High**	ECG/Arrhythmia	Within 1 minute, the number of beats labeled as V > the PVCs/min limit.	Short Yellow
**** QTc High** ****QTc xxx > yyy**	ECG/QT	QTc value has exceeded the QTc high limit for > 5 minutes.	Yellow
**** ΔQTc High** ****ΔQTc xxx > yyy**	ECG/QT	ΔQTc value has exceeded the ΔQTc high limit for > 5 minutes.	Yellow

Message	From	Description	Priority
*** R-on-T PVCs**	ECG/Arrhythmia	For HR < 100, a beat labeled as V with R-R interval < 1/3 of the average R-R interval followed by a compensatory pause > 1.25 times the average R-R interval **or** two such beats labeled as V without a compensatory pause occurring within 5 minutes of each other. *Note* — When HR > 100, 1/3 of the R-R interval is too short for detection.	Short Yellow
**** RR High**	Resp	The respiration rate has exceeded the high alarm limit.	Yellow
**** RR Low**	Resp	The respiration rate has dropped below the low alarm limit.	Yellow
*** Run PVCs High**	ECG/Arrhythmia	A run of > 2 consecutive beats labeled as V with run length ≤ Vent rhythm run limit **and** ventricular HR ≤ V-Tach HR limit.	Yellow
**** <SpO2 Label> High** **** <SpO2 Label> xx>yy**	SpO2	The arterial oxygen saturation has exceeded the high alarm limit.	Yellow
**** <SpO2 Label> Low** **** <SpO2 Label> xx<yy**	SpO2	The arterial oxygen saturation has fallen below the low alarm limit.	Yellow
**** ST-<n> High** **** ST-<n> xxxx > yyyy**	ECG/ST	The ST elevation in lead <n> is higher than the limit (yyyy). Lead is not contiguous with any other lead.	Yellow
**** ST-<n> Low** **** ST-<n> xxxx < yyyy**	ECG/ST	The ST depression in lead <n> is lower than the limit (yyyy). Lead is not contiguous with any other lead.	Yellow
****ST Multi <n>,<n>**	ECG/ST	Two contiguous ST leads <n> and <n> have exceeded elevation or depression limits for > 60 seconds. Both lead violations must be either above or below respective limits.	Yellow

Message	From	Description	Priority
****STE <n>,<n>**	ECG/ST	Two contiguous leads <n> and <n> are above their respective STE limits.	Yellow
*** SVT**	ECG/Arrhythmia	A run of consecutive beats labeled as S with run length ≥ SVT run limit **and** SVT HR > SVT HR limit.	Short Yellow
*****Tachy (Pulse)** *****Tachy/P xxx>yyy**	SpO2, Pressure, cmResp	Pulse rate exceeds the extreme tachycardia alarm limit.	Red
*** Vent Bigeminy**	ECG/Arrhythmia	A dominant rhythm of beats labeled as N, V, N, V, N	Short Yellow
***** Vent Fib/Tach**	ECG/Arrhythmia	Fibrillatory wave (sinusoidal wave between 2-10 Hz) for 4 consecutive seconds.	Red
*** Vent Rhythm**	ECG/Arrhythmia	A run of consecutive beats labeled as V with run length > Vent rhythm run limit **and** ventricular HR ≤ V-Tach HR limit.	Short Yellow
*** Vent Trigeminy**	ECG/Arrhythmia	A dominant rhythm of beats labeled as N, N, V, N, N, V, N, N	Short Yellow
***** VTach**	ECG/Arrhythmia	A run of consecutive beats labeled as V with run length ≥ V-Tach Run limit **and** ventricular HR > V-Tach HR limit.	Red

Technical Alarm Messages (INOPs)

There are four levels of technical alarms:

- **Severe** — Life-threatening. Monitoring and alarm generation are disabled. Visual and audible indicators occur.
- **Hard** — Monitoring and alarm generation are disabled. Audible tone sounds.
- **Soft** — Monitoring and alarms remain active. Visual indicator displays and no audible tone sounds.
- **Red/Yellow** — A number of technical alarms can be configured to display as either red or yellow technical alarms.

Select a technical alarm/INOP in the patient sector or Patient Window to display the possible cause and recommended action for the alarm in the Fast Review application window.

The following table lists the technical alarm messages and provides a description of each alarm. The messages are listed in alphabetical order.

Message	Level	Description	Action to Take
All ECG Alarms Off	Hard	For MRx monitors, all HR/arrhythmia alarms are turned off.	HR/arrhythmia alarms are controlled at the MRx monitor. See your MRx monitor documentation for details.
Battery Low	Soft	For telemetry devices, a weak battery condition.	Replace the batteries.
Battery Low	Red (!!!)	For MRx monitor, battery strength is below 10%.	To ensure the patient is continuously paced, replace the batteries immediately when this message is present.
Cannot Analyze ECG	Hard	The arrhythmia algorithm cannot reliably analyze the ECG data on any monitored leads. *Note* — If a Leads Off condition exists, the Leads Off message has a higher priority than **Cannot Analyze ECG** and appears first in the INOP/technical alarm message area. You can view all current INOP/technical alarm messages in the list.	Improve lead position or reduce patient motion.

Message	Level	Description	Action to Take
Cannot Analyze QT	Soft	Some conditions that may make it difficult to achieve reliable QT monitoring include: • T-wave detection limitations such as flat T-wave, atrial fibrillation, atrial flutter and prominent U-waves. • QRS changes such as widened QRS. • Rhythm and rate limitations such as high heart rate (> 150 beats/min for adult patients or > 180 beats/min for pediatric or neonatal patients), paced rhythm and bigeminy rhythm.	• Select All as the QT Lead. The Information Center will use the lead or leads that have a T-wave with sufficient amplitude and can be detected. Alternatively select a single lead with a good T-wave amplitude and no visible flutter activity and without a predominant U-wave or P-wave. • If a long QTc is observed verify it is not caused by QRS widening. • If rhythm is sustained you may want to consider turning off QT interval monitoring.
Cannot Analyze ST	Soft	ST algorithm cannot generate a valid ST value for any lead for > 15 seconds, except during learning.	Review the ECG signal quality and correct if necessary. Reposition the ISO and J points.
Cannot Analyze STE	Soft	STE algorithm cannot generate a valid STE value (J point measurement) for any lead for > 15 seconds, except during learning.	Review the ECG signal quality and correct if necessary.
!!Check ECG Source	Yellow (!!)	Indicates that more than one valid ECG source is active for two paired devices.	Choose single ECG source.
CO2 Cal Required	Hard	For MRx monitors, the CO2 module should be calibrated once a year or after 4,000 operating hours.	Do not use the CO2 monitoring capabilities. Call service to calibrate. If CO2 monitoring is essential to patient care, take the device out of use.
Defib Malf	Hard	For MRx monitors, pacing hardware failure, power supply failure or replace clock battery.	Call Service

Message	Level	Description	Action to Take
!!! Defib Shutdown	Red (!!!)	For MRx monitors: • Very low battery and the device is not connected to AC/DC power. • Corrupt or incomplete configuration file.	• Insert a charged battery and/ or connect to AC/DC power. • Reload device configuration file. *Note* — For MRx monitors, you cannot acknowledge the Defib Shutdown alarm at the Information Center. The Acknowledge button displays but is not active. You must go to the bedside to acknowledge the alarm. See your MRx monitor documentation.
ECG/Arrh AlarmsOff	Soft	All ECG alarms have been switched off, or for MX40, ECG is turned off.	To resume ECG alarm generation, switch ECG alarms on, turn ECG back on from the MX40, or select ECG as the alarm source.
ECG Cable Malf	Hard	For MRx monitors, a short has been detected between a lead wire and ground.	Replace the ECG cable.
ECG Equip Malf	Hard	Failure of the ECG equipment or failure to calibrate ECG.	• Remove leadset. Remove and reinsert batteries. Let self-test complete before reinserting leadset. • Replace the transceiver. • Contact Service.
ECG Leads Off	Red (!!!), Yellow (!!), or Hard depending on system setup.	Not all of the required ECG leads are connected.	Check that all of the required ECG leads are attached, and that none of the electrodes have been displaced.
Leadset Unplugged	Red (!!!), Yellow (!!), or Hard depending on system setup.	The leadset has been unplugged from the telemetry device. With MX40 Release B.06.5X or later, the alarm can be configured as red or yellow. The default is light blue (cyan).	Reconnect the ECG leadset.

Message	Level	Description	Action to Take
More Bed Alarms	Red (!!!), Yellow (!!), or Hard depending on the severity of the alarm	The monitor is associated with a telemetry device and is sending data to the Information Center. There are currently more alarms at the bedside than can be transmitted to the Information Center.	Go to the bedside monitor to see active alarms.
NBP Cal Overdue	Hard	For MRx monitors, the NBP module needs calibration.	Call NBP module service. Do not use NBP monitoring until the calibration has been performed. If NBP monitoring is essential to patient care, take the device out of use.
No Data Bed	Hard or Soft depending on system setup	Bedside is off or cannot otherwise communicate with the Information Center.	Check bedside.
No Data Tele	Hard	The telemetry device is turned off or cannot communicate with the Information Center.	Check device.
No SpO2T, Batt Low	Cyan Hard	The battery level of the MX40 is too low to support the SpO2 measurement. ECG monitoring will continue until the battery is depleted.	Replace the battery if SpO2 monitoring is needed.
Out of Area	Hard	The wireless telemetry device is outside of the Information Center's coverage area.	Return the telemetry device to the coverage area.
PACE on Batteries	Soft	For MRx monitors, indicates you are pacing on battery power.	Connect AC power.

Message	Level	Description	Action to Take
!!! Pacing Stopped	Red (!!!)	For MRx monitors: • Pacing has stopped because of a Leads Off condition or an ECG cable disconnection. • Pacing has stopped because of poor pads/patient contact or a pads cable disconnection.	• Check that the monitoring electrodes are applied properly to the patient. Check cable connections. • Check that the pads are applied correctly to the patient. Check cable connections. *Note* — Pacing Stopped alarm cannot be acknowledged at the Information Center. The Acknowledge button displays but is not active. You must go to the bedside to acknowledge the alarm. See your MRx monitor documentation.
Paddles Cable Malf	Hard	For MRx monitors, paddles cable failure.	Replace the paddles cable.
Pads Cable Malf	Hard	For MRx monitors, a short was detected between a lead wire and ground.	Replace the pads cable and perform an Operational Check.
Pads ECG Malf	Hard	For MRx monitors, a device hardware failure was detected.	Perform an Operational Check. If the Pads/Paddles ECG Test fails with the Therapy cable, disconnect the Therapy cable from the device when prompted in order for the Pads/ Paddles ECG Test to run without the cable connected. If the Pads/Paddles ECG test passes without the cable connected, replace the Therapy cable. See your MRx monitor documentation.
Pads Off **Paddles Off**	Hard	For MRx monitors, pads or paddles are off or insecurely attached.	Check that pads or paddles are properly applied. If necessary, replace the pads.

Message	Level	Description	Action to Take
Replace Battery	Red (!!!), Yellow (!!), or Hard depending on how your system is set up	For MX40, disposable battery power is close to depleted. At least 10 minutes of monitoring time remain. Depending on your environment, you may see this message for several hours. Monitoring ceases immediately when battery is depleted.	To avoid loss of monitoring, replace the batteries when this INOP is present.
Some ECG AlarmsOff (can be disabled in Clinical Settings)	Soft	One or more * or ** level Arrhythmia alarms have been manually turned off.	Use the **Measurements** application **Arrhythmia** page to review current status of all alarms.
Some Standby	Soft	More than one but not all connected devices are in Standby.	Canceled when patient is removed from Standby.
<SpO2 Label> Equip Malf	Hard	Malfunction in the SpO2 equipment.	Call Service.
<SpO2 Label> Erratic	Hard	Erratic SpO2 measurements, often due to a faulty sensor or invalid SpO2 measurements, or incorrect transducer position.	Repeat measurement, reposition sensor on patient, or finally, replace sensor.
<SpO2 Label> Extd.Update Numeric is replaced by a -?-	Soft	The update period of displayed values is extended due to an NBP measurement on the same limb or an excessively noisy signal.	If NBP is not active, check the sensor placement. Reposition the sensor on patient, or replace sensor.
<SpO2 Label> Interference	Hard	Level of ambient light or level of electrical interference are so high that the SpO2 sensor cannot measure SpO2 and pulse rate.	Reduce ambient light to sensor or electrical noise sources.
<SpO2 Label> Low Perf	Soft	Accuracy may be reduced due to low perfusion. Data is displayed with a question mark.	Increase perfusion. Change sensor site. Avoid site distal to blood pressure cuff or intra-arterial line. Warm the site.
<SpO2 Label> No Pulse	Hard	Pulse is too weak or not detectable.	Check connection to patient. Change sensor site. Avoid site distal to BP cuff or intra-arterial line.

Message	Level	Description	Action to Take
<SpO2 Label> No Sensor	Hard	No sensor attached to SpO2 device. *Note* — Acknowledging this technical alarm turns off the SpO2 measurement.	Attach SpO2 sensor.
<SpO2 Label> NoisySignal	Hard	Excessive patient movements or electrical interference are causing irregular pulse patterns.	Reduce movement or electrical noise sources.
<SpO2 Label> Sensor Malf	Hard	Malfunction of the SpO2 sensor/adapter cable.	Replace sensor.
Tele Batt Empty	Red (!!!), Yellow (!!), or Hard depending on how your system is set up	For MX40, the lithium-ion battery is close to depleted. At least 10 minutes of monitoring time remain. Depending on your environment, you may see this message for several hours. Monitoring ceases immediately when battery is depleted.	To avoid loss of monitoring, insert a charged lithium-ion battery pack when this INOP is present.
Tele Battery Low	Hard	For MX40: • There is ≤ 20 minutes of monitoring time remaining (AA batteries). • Lithium-ion battery level is ≤ 10% or has ≤ 20 minutes remaining time.	• Replace batteries promptly to avoid shutdown and cessation of monitoring. • Insert a charged lithium-ion battery pack.
Tele Battery Temp	Hard	For MX40, the temperature of the lithium-ion battery is above 55ºC or below -5ºC.	Replace the lithium-ion battery.
Tele Check Battery	Soft	For MX40, the lithium-ion battery has ≤ 25 charge cycles remaining before reaching the charge cycle maximum limit.	The lithium-ion battery pack will soon need replacement.

Message	Level	Description	Action to Take
Tele Disconnect	Red (!!!), Yellow (!!) depending on how your system is set up	Short-range radio connection between the transceiver and MP5T has been lost due to a failure of the short-range radio connection. There are too many short-range radios operating in the same vicinity (maximum of 3 per radio channel).	If the disconnection is not intentional: • Identify and remove the interference sources. • Reduce the number of devices equipped with short-range radio capability.
Tele Malfunction	Hard	MX40 malfunction or self-test failure.	Contact Service to replace the MX40.
Tele Remove Batt	Hard	For MX40, the temperature of the lithium-ion battery is > 60ºC and the battery must be removed.	• Replace the lithium-ion battery. • Dispose of the old battery properly.
Tele Service Batt	Hard	For MX40, the lithium-ion battery has exceeded the maximum charge cycle limit and reached the end of its useful life.	• Replace the lithium-ion battery. • Dispose of the old battery properly.
Telemetry Standby	Soft	Information Center standby mode timer is active, or patient was not returned to telemetry coverage area. There is no data from bed.	Canceled when patient is removed from Standby.
Tele Weak Signal	Soft	• Patient is at outer range of the radio coverage area. • The MX40 is receiving a weak signal with high data loss from the access point. • Condition exists for multiple devices in a specific area.	• Return patient to the coverage area. • If patient is in close proximity to the access point, replace the MX40. Contact Service. • The access point covering the specific area is suspect. Contact Service.
Transmitter Malf	Hard	Transceiver malfunction.	Replace and notify service provider.
Transmitter Off	Hard	RF Auto Shutoff after 10 minutes of all leads off and no SpO_2 sensor connected.	• Reattach ECG leads to patient. • Reattach SpO_2 sensor. • Press the Check button.

Status Messages

The following status messages may display in the caption bar at the top of the Information Center screens or in the status line at the bottom left of the IntelliVue Patient Monitor screens.

Note — High-severity system status messages do not display on Overview stations outside of the current unit, even if overviewing patients on those units.

Select the message in the caption bar to display help text in the application window.

Message	Possible Causes	What to Do
12-lead analysis complete.	This message displays when the 12-lead analysis is available for review at the bedside monitor.	No action required.
12-lead Capture Rejected.	For IntelliVue Patient Monitor Release L or earlier, the Information Center has received the maximum number (four) of concurrent 12-lead ECG captures. *Note* — For IntelliVue Patient Monitor Release M or later, the Information Center can accept an unlimited number of concurrent 12-lead ECG captures, so this message does not appear.	Try sending the 12-lead capture again. Select **Store & Send** in the 12-Lead window at the patient monitor.
12-lead not stored: Printed	This message is caused by a database error.	Contact service.
12 Lead: Specify pat. age/gender	The age and gender of the patient have not been entered on the Admit window. You will be able to capture and send the 12-lead ECG but the analysis assumes a 50-year-old male for analysis.	• Enter the data in the Admit window. • Return to the 12-Lead ECG window.
Data Warehouse Connect unavailable - <DWC Server Name>. Unable to export patient data. Contact service.	The Data Warehouse Connect system is not available or the Information Center lost connection to it.	Contact service.
Database Sync failed. Host is unable to reconnect to the Primary Server. Contact service.	There was a problem synchronizing local database content with the Primary Server.	Contact service.

Message	Possible Causes	What to Do
Demo: not for patient monitoring.	This message displays if a host is licensed as a Demo system. *Note* — When running in Demo mode, the data displayed does not reflect the patient's actual status.	No action is required.
Disconnected from <Server Names>. Local data storage only. Please contact customer service.	Loss of connection to one or more Physiological Servers, preventing paging, patient transfers, and so on.	Contact service.
Electronic Reports are currently unavailable	A network share is not configured or cannot be accessed.	The error clears when a network share is available.
Export Failed: Contact service.	The connection to the export device has failed.	Contact service.
HL7 Client not reachable	A failure in communication with one or more HL7 clients.	Contact service.
HL7 electronic charting issue - <HL7 Targets>. Please contact service.	HL7 data is not available.	Contact service.
Insufficient data for 12-lead Capture.	Data has been lost during capture. Network connection to the Information Center.	• The bedside monitor tries to resend the 12-lead ECG capture five times. If five retries fail, **Store & Send** is no longer available. A new 12-lead ECG will have to be captured and sent. • Contact service.
Insufficient leads for 12-lead.	Message displays with captures using a 3-wire or 5-wire lead set. When there are less than two limb leads or no chest leads (generic V is not acceptable), the 12-lead ECG is rejected and not captured.	Connect the additional lead set to the lead cable and connect lead wires to the patient.
<Lifetime ID> required to export	This message displays when an export is initiated and the Lifetime ID was not provided. The ID label that displays in the message depends on how the label is configured on your system. For example, if the label is configured to display as MRN the message **MRN required to export** displays.	• Enter the proper ID in the Admit window. • Select Export again from the 12-Lead ECG window.

Message	Possible Causes	What to Do
Max locked captures reached	Only 30 12-lead ECGs can be locked. Message displays when a 31st locked 12-lead ECG is attempted.	Unlock one of the 12-lead ECGs.
Must admit patient to export.	This message displays when a 12-lead ECG export is initiated on a patient that is not currently admitted.	• Admit the patient. • Select Export again from the 12-Lead ECG window.
Must complete required fields	All configured required 12-lead ECG Export fields have not been entered.	• Enter the required fields at the bedside and export from bedside. • Enter the required fields at the Information Center and export from the Information Center.
Must resolve patient conflict.	A conflict exists between the devices connected to the patient.	Resolve the conflict by selecting either **Same Patient** or **New Patient** to store the 12-lead ECG capture at the Information Center.
Network conflict detected: may cause monitor overview issues. Contact service.	Multiple Information Centers have the same multicast address range configured.	Contact service.
No Alarm Recording available: <Recorder Name>.	The assigned local or remote recorder is not connected.	Contact service.
No local alarm recording available	The recorder is not available.	Contact service.
No Local Recorder connected	No recorder module is plugged into the recorder rack.	Check connections.
Paging not available - <Paging Targets>. Please contact service.	Paging is not available or the Information Center lost connection to the paging system.	Contact service.
Please assign active equipment.	A monitoring device is powered up but is not assigned to a sector.	Assign the device to a sector.
<Printer Name>: Printer is not installed; printing failed	The printer is not installed.	Install printer.
Recorder door open: <Recorder Name>.	The door to the local or remote recorder is open.	Close the door on the local or remote recorder.
Recorder fault: <Recorder Name>	There is a problem with the local or remote recorder.	Contact service.

Message	Possible Causes	What to Do
Recorder paper out: <Recorder Name>	The local or remote recorder is out of paper.	Add paper to the local or remote recorder.
Running out of Physiological data storage on <Physio storage locations>. Please contact service.	The identified physiological data storage location is low on disk space.	Contact service.
Sending 12-lead	The 12-lead ECG capture is in progress at the Information Center.	No action required.
Software update is available.	A software update is available.	Contact service.
Unable to analyze 12-lead.	Excess noise in the signal for analysis by the 12-lead ECG algorithm. 12-lead ECG capture is rejected.	• Remove the source of noise, such as patient movement, bad electrodes, or noise generated by equipment in the area. • Recapture the 12-lead ECG.
Warning: Use of the desktop is enabled. Press ALT-F11 to relock.	Access to the Windows desktop is enabled.	Press ALT-F11 to lock access to the Windows desktop.
Wave Strip Export file copy failed for Clinical Unit: <Unit Names>. Please contact service.	Wave Strip Export is not available or the Information Center lost connection to the Wave Strip Export remote file share.	Contact service.
Windows detected a hard disk problem	BIOS or Windows detects a problem with the disk on this computer.	Contact service.
Wireless monitoring loss. Please contact service.	Intermittent disruption or failure in communication between one or more patient monitoring wireless devices and the Information Center.	• Check the Wireless status log for specific information about the communication disruption. • See the IntelliVue Telemetry System Instructions for Use for corrective actions. • Contact service.
Workflow Events client is not available. Please contact service.	Workflow event export is not available or the Information Center lost connection to the workflow event system.	Contact service.

7

ECG, Arrhythmia, ST and QT Monitoring

This section describes the specifics of ECG measurement and the ST/AR arrhythmia, ST, and QT algorithms used for arrhythmia monitoring. It includes the following:

Measuring ECG

The electrocardiogram (ECG) measures the electrical activity of the heart and displays it on the Information Center as a waveform and a numeric.

In order to compare measured ECG signals, the electrodes are placed in standardized positions, forming "leads". To obtain ECG signals optimized for use in diagnosis and patient management in different care environments, different lead placements can be used, including standard lead, Hexad and EASI lead placements. For information about correct lead positioning and lead placement diagrams, see the user documentation for the monitoring device.

Selecting the Primary and Secondary ECG Leads

The telemetry device or patient monitor uses the primary and secondary lead selected at the Information Center to compute HR and to analyze and detect cardiac arrhythmias.

You should choose a primary and (if using multi-lead monitoring) secondary lead that have the following characteristics:

- the QRS complex should be either completely above or below the baseline and it should not be biphasic
- the QRS complex should be tall and narrow
- the T-wave should be less than 1/3 the R-wave height
- the P-wave should be less than 1/5 the R-wave height

To select a primary or secondary lead, see "ECG" on page 8-6.

Monitoring During Leads Off

ECG fallback is supported when the primary and/or secondary leads are in a Leads Off INOP condition. Fallback is entered after 10 seconds of Leads Off in an attempt to maintain monitoring and arrhythmia analysis. ECG fallback occurs when the primary lead is in a Leads Off INOP condition for more than 10 seconds and a secondary lead is available.

Note — Efficia monitors do not support fallback.

If there is a Leads Off technical alarm in the primary lead for more than 10 seconds, the active secondary lead becomes the primary lead. The arrhythmia algorithm switches the leads on the display. When the Leads Off condition is corrected, the leads revert to their original state.

If both the primary and secondary leads are in a Leads Off condition, the ECG source on the device switches to any available lead and a relearn occurs.

For single lead analysis, if there are two leads available, the secondary lead becomes the primary lead until the Leads Off condition is corrected. The arrhythmia algorithm performs a relearn using the available lead.

Fallback for EASI Leads

If one of the raw EASI leads is in a technical alarm condition, a flat line is displayed. After 10 seconds, the directly acquired EASI AI, AS, or ES lead (depending on which is available) is displayed with the label ECG and is analyzed by the arrhythmia system.

Note — If there is artifact in the ECG waves or an **Inop Cannot Analyze ECG** condition, you can use the three EASI leads to troubleshoot.

To determine which lead is causing the problem, display the raw leads. See "Showing Raw EASI Leads" on page 7-17. The three directly acquired EASI leads will be displayed so that you can determine which electrodes are causing the problem and need to be replaced.

ST/AR Arrhythmia Monitoring

Indications for Use

The ST/AR arrhythmia algorithm is indicated for use in instances where the clinician decides to monitor cardiac arrhythmias of adult, pediatric and neonatal (not telemetry) patients and/or the ST segment of adult patients to gain information for treatment, monitor the adequacy of treatment, or to exclude causes of symptoms.

Intended Use

The intended use of the ST/AR arrhythmia algorithm is to monitor adult, pediatric, and neonatal (not telemetry) patients' ECGs for heart rate, ventricular arrhythmias, and atrial fibrillation (for adult patients), and produce events/alarms for one or two ECG leads. The ST/AR arrhythmia algorithm is capable of monitoring both paced and non-paced patients.

You can use arrhythmia analysis to help assess a patient's condition (for example, heart rate, PVC rate, rhythm, ectopics) and manage treatment accordingly. In addition to detecting changes in the ECG, it also offers patient surveillance and alarm generation.

Warning

During complete heart block or pacemaker failure (to pace or capture), tall P-waves (greater than 1/5 of the average R-wave height) may be erroneously counted by the arrhythmia algorithm, resulting in missed detection of cardiac arrest.

Pediatric Subpopulations

Pediatric subpopulations are: Neonates, Infants, Children, and Adolescents. The recommended age ranges for these pediatric subpopulations are as follows:

- Neonates: from birth through the first 28 days of life. See *Pediatrics* 2011; 128:177-181; American Academy of Pediatrics; American College of Obstetrics and Gynecology: Appendix D: standard terminology for reporting reproductive health statistics. In: *Guidelines for Perinatal Care.* 6th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2007: 389-404.
- Infants: 29 days of age to less than two years of age;
- Children: Two years of age to less than 12 years of age; and
- Adolescents: 12 years of age through 21 years of age (up to, but not including, the twenty-second birthday).

IntelliVue Patient Monitors If the patient is monitored by an IntelliVue Patient Monitor, the ST/AR arrhythmia algorithm is provided by the IntelliVue Patient Monitor. Controls, however, for arrhythmia analysis and alarm limits are adjustable and viewable at both the Information Center and the IntelliVue Patient Monitor. The level of arrhythmia analysis on the monitor (basic or enhanced) will determine the level of arrhythmia analysis performed for that patient. See your IntelliVue Patient Monitor user documentation for more information.

MX40 If the patient is monitored by an MX40, the ST/AR arrhythmia algorithm is provided by the MX40. Controls, however, for arrhythmia analysis and alarm limits are adjustable and viewable at the Information Center and viewable at the MX40. The level of arrhythmia analysis on the MX40 (basic or

enhanced) will determine the level of arrhythmia analysis performed for that patient. See your MX40 user documentation for more information.

IntelliVue Telemetry System Devices

If the patient is monitored by an IntelliVue Telemetry System device, the ST/AR arrhythmia algorithm is provided by the Information Center. Controls for arrhythmia analysis and alarm limits are adjustable and viewable at the Information Center only. See your IntelliVue Telemetry System user documentation for more information.

MRx Monitors

If the patient is monitored by an MRx monitor, arrhythmia monitoring is done at the monitor. Controls for arrhythmia analysis and alarm limits are adjustable at the MRx monitor only. See your MRx user documentation for more information.

More than One Monitoring Device

If the patient is being monitored by more than one device the level of arrhythmia analysis between the devices may differ. See the user documentation for the device for more information.

Arrhythmia Analysis

Arrhythmia analysis provides information on the patient's condition, including heart rate, PVC rate, rhythm, and ectopics. ST/AR multi-lead analysis is performed on the user-selected primary and secondary ECG leads. If only one lead is available for multi-lead, ST/AR analysis is performed on the single available lead. For additional information on the ST/AR algorithm, refer to the *Arrhythmia Monitoring ST/AR Algorithm Application Note*.

Arrhythmia Beat Labels

The beat labels indicate how the arrhythmia system is classifying beats.

Beat Label Arrhythmia On	Beat Classification	Beat Label Cardiotach Mode
N	Normal	**B** (beat detected)
V	Ventricular ectopic	**B** (beat detected)
S	Supraventricular Premature	**B** (beat detected)
P	Paced	**B** (beat detected)
‘	Pacer spike	**‘**
"	Biventricular pacer spike	**"**
L	Learning patient's ECG	**L**
A	Artifact (noisy episode)	**A**
?	Insufficient information to classify beats	**?**
I	Inoperative condition (for example, Leads Off)	**I**
M	Pause or missed beat	**M**

Note — If the patient is both atrial and ventricular paced, the system shows two tick marks above the waveform aligned with the atrial and ventricular pacing.

Ensuring Accurate Arrhythmia Monitoring

For accurate arrhythmia monitoring, make sure the ECG waves are optimized for arrhythmia monitoring by performing the following steps:

1 Select the optimal lead at the bedside monitor or at the Information Center.

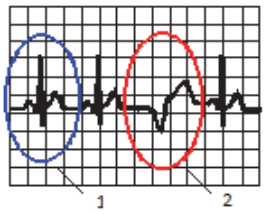
2 Review the arrhythmia alarm limits in the **Measurements** application. See "Arrhythmia" on page 8-8.

3 Verify that the patient's **Paced Mode** setting is accurate, and change it if necessary. See "Monitoring Paced Patients" on page 7-23.

4 Use the **ECG Analysis** application to troubleshoot ECG. See "ECG Analysis" on page 7-13.

Example of Optimized ECGs

The graphic below shows an ECG optimized for arrhythmia monitoring a non-paced patient.



1 Normal Beats
2 PVC

Normal QRS:

- Tall (recommended amplitude > 0.5 mV), narrow, with R-wave above or below the baseline (but not biphasic)
- T-wave smaller than 1/3 the R-wave height
- P-wave smaller than 1/5 the R-wave height

Note — In order to comply with the AAMI-EC13 specification, the detection threshold for the QRS cannot be less than 0.15 mV. This specification is aimed at preventing the detection of P-waves or baseline noise as QRS complexes during complete heart block or asystole. ST/AR removes the gain adjustment before the signal is analyzed for detection and classification. Thus increasing or decreasing gain has no effect on the ECG size used for QRS detection. Therefore, for optimal performance and to prevent false alarms such as pause or asystole, it is important that the leads selected for monitoring are optimized.

Ectopic beats:

- PVCs wider and different shape from normal beats
- PVCs not too tall or too small compared to the normal beat

Aberrantly-Conducted Beats

It is difficult and sometimes impossible for a monitoring system to distinguish between an aberrantly-conducted supraventricular beat and a ventricular beat. If the aberrant beat resembles a ventricular beat, it is classified as ventricular. You should always select a lead where the aberrantly-conducted beats have an R-wave that is as narrow as possible to minimize incorrect calls. Ventricular beats should look different from these "normal beats." Instead of trying to select two leads with a narrow R-wave, it may be easier to just select one lead and use single-lead arrhythmia monitoring. Extra vigilance is required by the clinician for this type of patient.

Atrial Fibrillation and Flutter

In some cases of atrial dysrhythmias, erratic baseline fibrillations and flutters may be greater than the algorithm's detection threshold causing erroneous detection and false alarms. If it is difficult to select two leads that have low level erratic baseline then single-lead arrhythmia monitoring should be considered.

Note — You can use the **ECG Analysis** application to adjust the detection threshold, as described in "ECG Analysis" on page 7-13.

Once the end of atrial fibrillation is detected, the *** End AFIB** alarm will occur when the atrial fibrillation condition has been absent for the Afib/IHR end delay time. This is configurable at 0, 1, 3, 5, 10, 20, or 30 minutes. This means that the end of atrial fibrillation must be detected and remain absent for the delay time. This will prevent the end of atrial fibrillation being triggered too soon. A configurable reminder time, just for the Atrial Fibrillation and Irregular HR alarms, can also be set (10, 20, 30, 60, or 120 minutes).

Sinus Arrhythmia

In some cases, during sinus arrhythmia, a false atrial fibrillation alarm may occur because the P-wave cannot be detected reliably or the P-wave morphology is varying.

Intermittent Bundle Branch Block

Bundle branch and the other fascicular blocks create a challenge for the arrhythmia algorithm. If the QRS during the block changes considerably from the learned normal, the blocked beat may be incorrectly classified as ventricular, causing false PVC alarms. You should always select a lead where the bundle branch block beats have an R-wave that is as narrow as possible to minimize incorrect calls. Ventricular beats should look different from these "normal beats." Instead of trying to select two leads with a narrow R-wave, it may be easier to just select one lead and use single-lead arrhythmia monitoring. Extra vigilance is required by the clinician for this type of patient.

Cardiotach Mode

The ST/AR algorithm provides a cardiotach function when arrhythmia is turned off. The cardiotach algorithm can process one or two simultaneous ECG channels.

For IntelliVue Multi-Measurement Module Release J.1 or later, MX40 and Information Center iX when arrhythmia is off, the QRS detection is the same as when arrhythmia is turned on. This means that all the noise and rejection tests are performed. From the beats detected, the heart rate is then calculated using the same formulas used in the arrhythmia algorithm. Working in parallel with beat detection, the asystole and ventricular fibrillation detection algorithms in arrhythmia analysis are used to detect the presence of asystole and ventricular fibrillation.

ECG and Arrhythmia Alarms

The alarm conditions detected by the ST/AR Arrhythmia system are grouped into the following categories:

- PVC alarms (for example, Pair PVCs, Vent Rhythm)
- Beat detection alarms (for example, Pause, Pacer Not Capt)
- Rate alarms (for example, SVT, HR High, HR Low)
- Afib/Irregular HR

The number of rhythms being classified, events being detected, and alarms being called depends on whether your system is configured for basic or enhanced arrhythmia capability.

The following table lists the arrhythmia alarms that are available in cardiotach, basic, and enhanced arrhythmia modes. See "Physiological Alarm Messages" on page 6-10 for descriptions of the alarms.

Cardiotach Alarms	Additional Alarms with Basic Arrhythmia	Additional Alarms with Enhanced Arrhythmia
Asystole	VTach	AFIB
Vent Fib/Tach	Pacer Not Capt	End AFIB
Extreme Brady	Pacer Not Pacing	SVT
Extreme Tachy	PVCs/min High	Missed Beat
HR High		Pause
HR Low		Irregular HR
		End Irregular HR
		Vent Rhythm
		Run PVCs High
		Pair PVCs
		R-on-T PVCs
		Vent Bigeminy
		Vent Trigeminy
		Non-Sustain VT
		Multiform PVCs

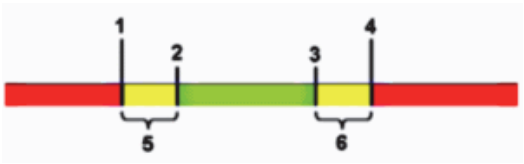
Using ECG Alarms

At the Information Center, ECG alarms can be switched on and off and the high and low alarm limits changed the same way as other measurement alarms, as described in "ECG" on page 8-6. Special alarm features that apply only to ECG are described in this section.

Extreme Alarm Limits for Heart Rate

The difference between the low HR alarm limit and the extreme bradycardia limit is unit configured. For example, if the low HR alarm limit is 60 bpm and the extreme bradycardia limit difference is configured to be 20 bpm, then the extreme bradycardia limit is 40 bpm. If the difference is configured to be 0, there is always an extreme bradycardia alarm when the HR falls below the HR low limit.

The same is true for the difference between the high HR alarm limit and the extreme tachycardia limit. In the same way, the extreme tachycardia limit is determined from the high HR limit.



1 Extreme Brady Limit
2 Low Limit
3 High Limit
4 Extreme Tachy Limit
5 Δ Extreme Brady
6 Δ Extreme Tachy

For safety, the extreme bradycardia and extreme tachycardia limits clamp at a configured value. For example, the extreme bradycardia limit for neonates has a default limit clamp at 70 bpm. Thus if the HR low alarm limit is moved to 80 bpm and the extreme bradycardia limit difference is 20 bpm, the extreme bradycardia limit will be 70 bpm. However, if you move the HR low alarm limit to 65 bpm, the extreme bradycardia limit will also be 65 bpm and only the extreme bradycardia alarm occurs if the HR falls below this limit.

Arrhythmia Alarm Timeout Periods

Normally, an arrhythmia alarm is announced when an alarm condition is detected. However, there are certain situations that can inhibit the audible and visible indications of the alarm even though the alarm condition was detected. These situations include:

- A more serious alarm condition is active.
- A timeout period is in effect for a higher priority alarm condition in that chain. See "Arrhythmia Alarm Chaining" on page 7-10.
- A timeout period is in effect for that alarm condition.

What is a Timeout Period?

When a yellow arrhythmia alarm is annunciated, it automatically initiates a timeout, or inhibitory period. This means that the same alarm condition or another condition lower on the same alarm priority chain will not annunciate an alarm during the timeout period. If the timeout period is set to 0, the alarm is immediately reset when the alarm condition is no longer active. The length of the timeout period is configured for your unit.

When the timeout period expires, the system resets, and if the condition persists, the alarm condition annunciates again.

There are two levels of timeout periods:

- First level (configured to 0, 1, 2, 3, 4, or 5 minutes) applies to all yellow ECG alarm conditions that are above Vent Bigeminy on the priority chain (Non-Sustain VT, Vent Rhythm, Run PVCs, Pair PVCs, R-on-T PVCs, Pacer Not Capture, Pacer Not Pacing, Pause, SVT, HR High, HR Low).
- Second level (configured to 0, 1, 2, 3, 4, 5, 10, or 15 minutes) applies to Vent Bigeminy and all alarm conditions that are below Vent Bigeminy on the priority chain (Vent Bigeminy, Vent Trigeminy, PVCs > xx/min, Multiform PVCs, Irregular HR).

See "Arrhythmia Alarm Chaining" on page 7-10 for illustrations of the alarm condition priority chain.

Note — Atrial fibrillation and Irregular HR alarms do not have timeout periods but do have reminders. The reminder can be configured to 10, 15, 30 (default), 60, 120 and 240 minutes. You can set the end alarms delay for Atrial Fibrillation and Irregular HR on the **Measurements** application **Arrhythmia** page. The default is 5 minutes. This delay prevents the end alarm from being triggered too soon or too often.

Clearing the Timeout Period

The timeout period is cleared if:

- the period ends,
- a learning phase occurs,
- alarms are paused or resumed.

Note — A superseding alarm does not clear the timeout period.

Alarm Announcement Priority

The Information Center displays and announces red and yellow alarms in the following priority order (high to low):

1. ECG-related red alarms
2. All other red alarms
3. Arrhythmia-related yellow alarms
4. All other yellow alarms

Alarm Behavior and Timeout Periods

During a timeout period for a particular alarm condition, the re-occurring alarm condition or a lower priority alarm condition in the same chain will not annunciate. However, alarm conditions in another priority chain will still annunciate. Once a timeout period is completed any active alarm conditions will annunciate. For example, if there is an active Vent Bigeminy alarm, a PVCs > xx/min will not become active because it is lower on the same chain. However, a high HR alarm will be detected because it is on another chain.

Higher priority alarms will supersede the previous alarm condition and the higher priority alarm condition will annunciate. For example, if a Vent Trigeminy alarm is active and a Pair PVCs occurs, the Pair alarm will be annunciated. Only one arrhythmia alarm can be annunciated for a patient at any one time.

The alarms in each chain are prioritized according to the relative level of severity.

You can view arrhythmia alarm activity in the review applications. See "Information Center Review Applications Overview" on page 9-1.

Arrhythmia Alarm Chaining

To prevent the confusion of redundant alarms or the activation of less important alarms while acknowledging serious alarms, the arrhythmia system sets alarm priorities through an alarm chaining system.

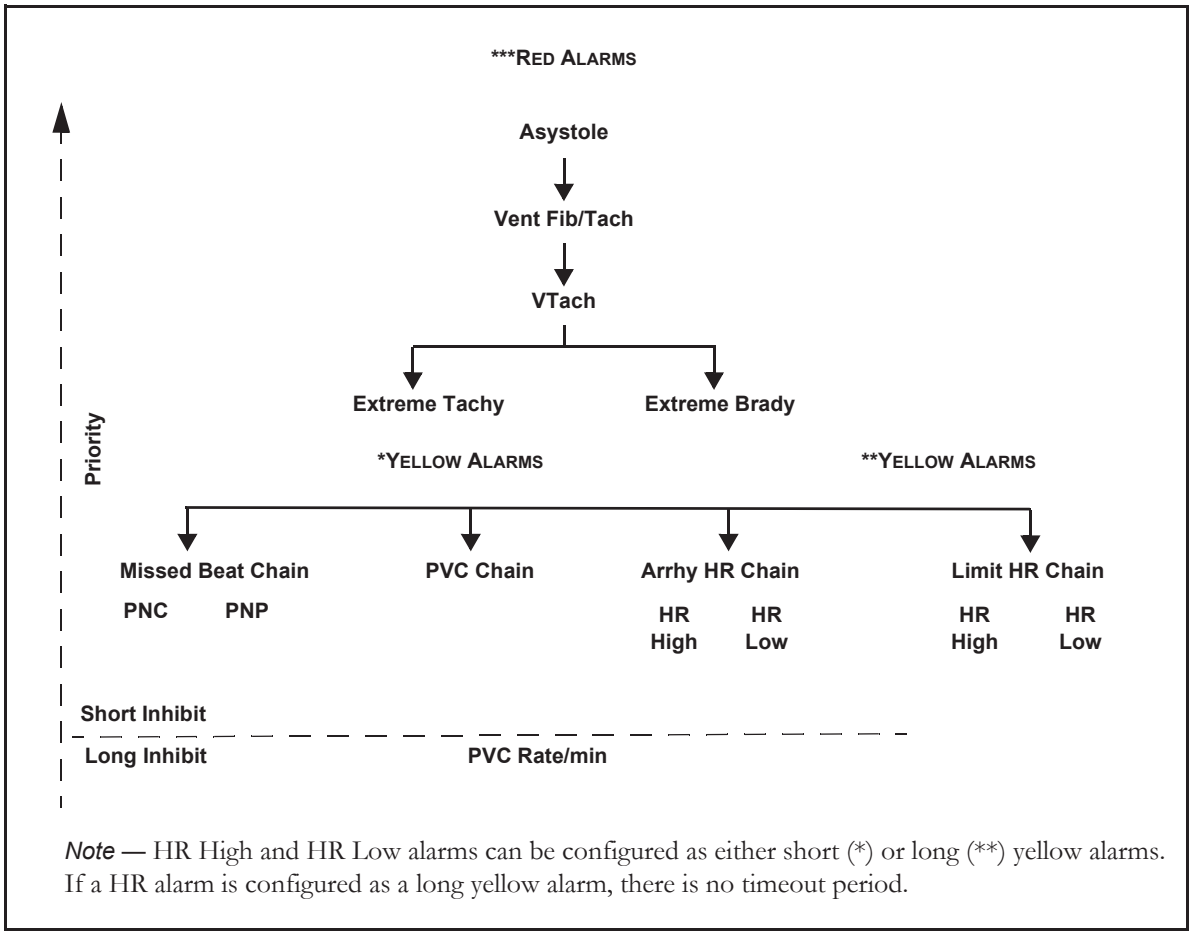
Related events, such as ventricular alarms, are grouped in a chain. The most critical alarms occupy the top of the chain and are followed by events in logical, descending order.

The manner in which the alarms are grouped and prioritized defines how the alarms are announced. Three-star red alarms with the highest priority are announced first, if present. If there are no three-star red alarms detected, then the highest priority one-star yellow alarm detected in any given alarm chain is announced. If alarms of the same priority in different alarm chains are detected, the alarm that occurred most recently is announced.

For illustrations of the alarm condition priority chains, see "Enhanced Arrhythmia Alarm Priority Chain" on page 7-11, "Basic Arrhythmia Alarm Priority Chain" on page 7-10, and "Cardiotach (Arrhythmia Off) Alarm Priority Chain" on page 7-12.

Basic Arrhythmia Alarm Priority Chain

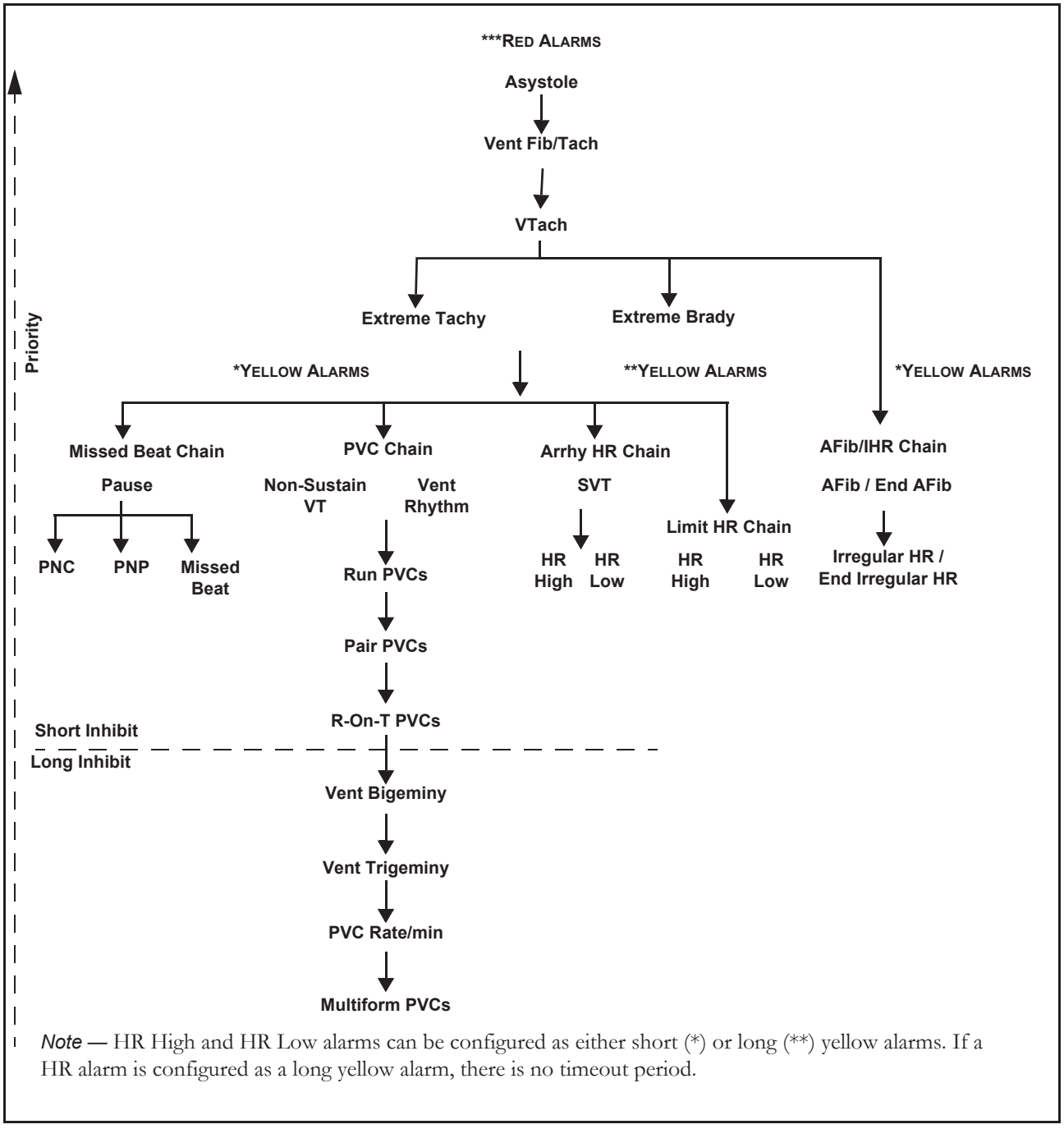
The diagram below shows the alarm condition priorities for basic arrhythmia alarms.



Note — HR High and HR Low alarms can be configured as either short (*) or long (**) yellow alarms. If a HR alarm is configured as a long yellow alarm, there is no timeout period.

Enhanced Arrhythmia Alarm Priority Chain

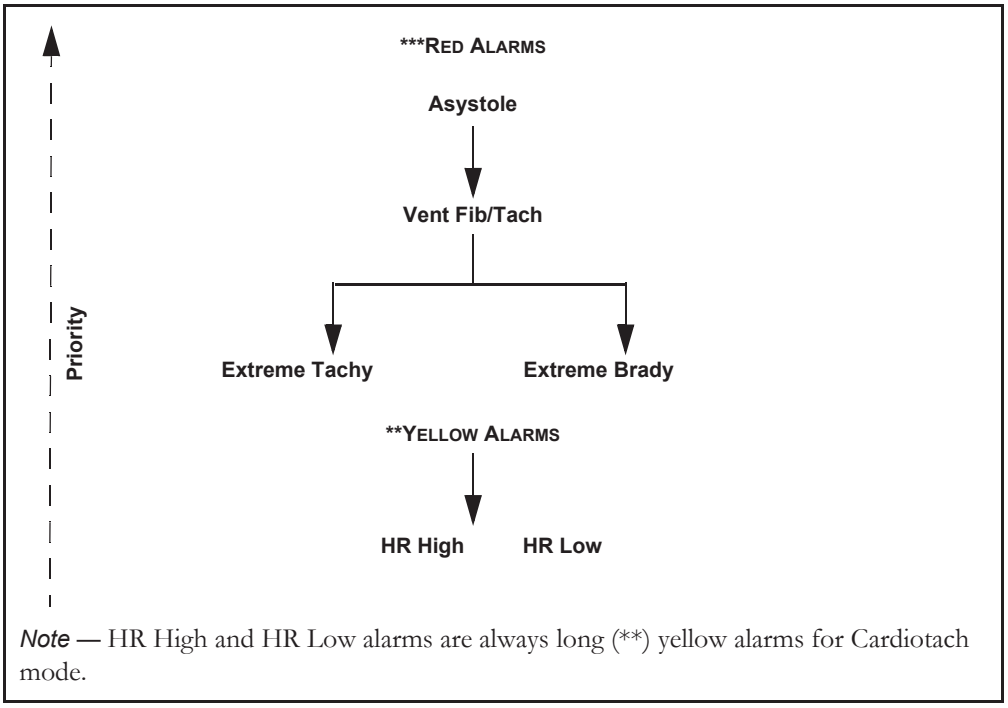
The diagram below shows the alarm condition priority chains for enhanced arrhythmia. The alarm conditions in each category are prioritized according to the level of severity.



Note — HR High and HR Low alarms can be configured as either short (*) or long (**) yellow alarms. If a HR alarm is configured as a long yellow alarm, there is no timeout period.

Cardiotach (Arrhythmia Off) Alarm Priority Chain

The diagram below shows the alarm condition priority chains for cardiotach mode. The alarm conditions in each category are prioritized according to the level of severity.



Note — HR High and HR Low alarms are always long (**) yellow alarms for Cardiotach mode.

ECG Analysis

The **ECG Analysis** application provides a real-time view of available ECG leads. You can use the application to verify that the ECG waves are optimized for arrhythmia monitoring or to troubleshoot false alarms.

Note — **ECG Analysis** is not available on PIC iX Essentials systems.

Warning

EASI and Hexad derived ECGs and their measurements are approximations to standard 12-lead ECGs, and should not be used for diagnostic interpretation.

Use one of the following methods to access the **ECG Analysis** application:

- Select the **Patient Window** button from the task bar, and then select **ECG Analysis** from the list that displays.
- In the patient sector, select an ECG wave, then select **ECG Analysis** from the menu.

The **ECG Analysis** application shows all of the available waves on a gray background. The waves are delayed by approximately 6 seconds. Both the primary and secondary lead being used for arrhythmia analysis are displayed. By default, the primary wave shows the delayed lead with beat labels.

Note — The Information Center does not receive beat labels from Smart Hopping IntelliVue Monitors or MRx devices, and many controls are available only at the device. See "Device Controls" on page 4-2 to see which controls are available at the device.

Note — Because all leads, including derived leads, display in the **ECG Analysis** application, the primary wave may not be at the top of the window.

With multi-lead analysis, the beat labels represent analysis of both the primary and secondary waves.

Note — The same ECG size is used in the Patient Window and the **ECG Analysis** application.

ECG Troubleshooting Steps

When you select **ECG Analysis**, the application displays steps for troubleshooting ECG on the right side of the window.

Before performing the steps, note the following:

- Proper skin preparation before electrode placement is crucial to successful monitoring. A clean signal is integral to accurate arrhythmia monitoring. Refer to the instructions for use for the monitoring device for details.
- Help icons  are shown next to each step. Move the mouse over the help icons to view a tool tip for each troubleshooting item. On a touch screen, touch the help icon.

These are the steps to troubleshoot ECG:

1 Choose the best leads. See "Selecting the Best Leads" on page 7-14.

2 Reclassify beats. See "Reclassifying Beats" on page 7-14.

3 Change analysis mode. See "Changing Analysis Mode" on page 7-15.

4 Change the QRS detection threshold. See "Changing the QRS Detection Threshold" on page 7-15.

Note — This step appears if the ECG signal source supports the ability to change the QRS detection threshold.

Selecting the Best Leads

Select a lead where the QRS complex is stable and has adequate amplitude. It is recommended that the amplitude is greater than 0.5 mV. You can assign any available lead whether or not it is currently displayed.

The size and shape of the QRS complex are important for beat detection and classification. Use the following guidelines to select leads that produce the best QRS morphology for analysis by the arrhythmia system:

Normal beat

- The R-wave is tall, not clipped or biphasic.
- The T-wave is less than 1/3 the R-wave height. Avoid leads with tall T-waves, if possible.
- The P-wave is less than 1/5 the R-wave height, preferably less than 0.15 mV.

Ectopic beat

- The height is at least 1/3 the normal QRS height.
- The beat is not clipped.
- The shape is distinctly different from the normal beat.

To select the best lead:

- In the **ECG Analysis** window, select **Primary Lead** or **Secondary Lead**, then select the appropriate lead.

Reclassifying Beats

Check the delayed arrhythmia wave and beat labels to ensure that the algorithm is labeling the beats correctly. For patients with pacemakers, make sure the system is not counting pacer spikes as QRS complexes. If the beat label is above the pacer spike, the algorithm is detecting the pacer spike as a QRS complex. The beat labels indicate how the arrhythmia system is classifying beats. See "Arrhythmia Beat Labels" on page 7-4.

To cause the system to reclassify beats:

- In the **ECG Analysis** window, select **Relearn Arrhythmia**.

Warning

If arrhythmia learning takes place during ventricular rhythm, the ectopics may be incorrectly learned as the normal QRS complex. This may result in missed detection of subsequent events of V-Tach and V-Fib.

For this reason, you should:

- Initiate learning only during periods of predominantly normal rhythm and when the ECG signal is relatively noise-free.
- Respond to any INOP message (for example, if you are prompted to reconnect electrodes).
- Be aware that a disconnected EASI electrode triggers an arrhythmia relearn on all leads.
- Always ensure that the arrhythmia algorithm is labeling beats correctly.

During the learning process, beats are labeled with the letter L for the first 15 valid beats. The beat shape is then learned and a new template is created. If the beats that are classified as N (normal beat) look similar to the patient's ventricular ectopic beats, change to a lead where the normal and ventricular beats look different.

In Cardiotach mode, the labels N, V, S, and P are replaced with B (beat detected).

Note — If the same signal condition exists that caused the algorithm to perform poorly, relearning will not correct the problem.

Note — During the relearn period, the only available ECG alarms are Asystole, Ventricular Fibrillation, High Heart Rate, and Low Heart Rate.

Note — After relearning is complete, check the delayed arrhythmia wave to ensure that the algorithm is labeling the beats correctly. If beats are still not classified correctly, check that the ECG is optimized for arrhythmia monitoring by changing the lead(s) or moving the electrodes, if needed. See "Example of Optimized ECGs" on page 7-5.

Changing Analysis Mode

If it is difficult to provide more than one optimized ECG lead, consider changing to single-lead arrhythmia analysis. In single-lead analysis, the system uses only the primary lead.

In the **ECG Analysis** window, select the type of arrhythmia analysis from the list:

- **Multi Lead** — The system uses the primary and secondary leads for arrhythmia analysis. Multi-lead analysis produces optimal arrhythmia detection.
- **Single Lead** — The system only uses the primary lead for arrhythmia analysis. You may want to use single-lead analysis when it is difficult to provide more than one optimized ECG lead.

Changing the QRS Detection Threshold

To prevent the Information Center from detecting P-waves, atrial fibrillatory waves, atrial flutter waves, or noise as QRS complexes during complete heart block or asystole, the QRS detection threshold never goes below the larger of 1/5 the average R-wave height. Any peak smaller than this value is not detected. The size of the P-wave can affect accurate detection of the QRS. When the P-wave is larger than 1/5 the height of the QRS, adjust the threshold level above the P-wave.

Note — The QRS detection threshold values are shown in microvolts (µV). For comparison, refer to the 1 mV calibration bar on the wave: 1 millivolt equals 1000 microvolts.

To change the minimum QRS detection threshold:

- In the **ECG Analysis** window, select a value from the **Change QRS Detection** list.
  - **High (300 µV)** — (Default) Select if the patient has tall P-waves, often seen with atrial fibrillation. This is especially important if the patient has a risk of heart block. In the event of heart block, if the P-wave is counted in the HR, an asystole alarm may not occur as expected.
  - **Low (150 µV)** — Select for patients with a low-voltage QRS.
  - **Custom...** — Select to open the **Custom QRS Detection** window in which you can visualize the threshold or change the threshold. See "Selecting a Custom QRS Detection Threshold" on page 7-16.
  - If a custom QRS detection threshold value (other than 150 µV or 300 µV) is currently selected, it is included on the list of options.

If you change the QRS detection threshold, an **Applying changes** message and a progress bar are shown for 6 seconds.

Note — Always check the current patient's ECG after you change the QRS detection threshold setting.

Selecting a Custom QRS Detection Threshold

The **Custom QRS Detection** window shows a wave strip tile. Only the gain control is available. The strip shows 10 seconds of data. The ECG waves shown depend on the current patient's analysis mode (**Multi Lead** or **Single Lead**). If **Multi Lead**, both primary and secondary ECG waves are shown; if **Single Lead**, only the primary ECG wave is shown.

The gray shaded area on each wave represents the current QRS detection threshold setting. The shaded area is centered at the middle of the wave. For example, if the QRS detection setting is 200 µV, the shaded area is 400 µV wide, centered above and below the middle of the wave.

Note — P-waves should be completely within the shaded area in case of changing P-wave morphology. This helps avoid a count of the P-wave in the heart rate if there is a loss of ventricular response.

A QRS detection icon ♥ above a beat indicates that the beat is included in the QRS detection.

To change the QRS detection threshold:

1 Move the slider button on the right side of the window to the desired threshold. As you change the threshold value, the beat labels update and the shaded area in the strip tile resizes.

2 Select **OK** to activate your selection and change the current patient's QRS detection threshold.

If you change the QRS detection threshold, an **Applying changes** message and a progress bar are shown for 6 seconds. The results indicator at the bottom of the window shows the resulting number of beats and the duration at the selected QRS detection threshold. The text is red if the result is zero.

Select the G icon to refresh the strip tile and the results with the latest wave data.

Note — Always check the current patient's ECG after you change the QRS detection threshold setting.

Note — Because the filtered display of an ECG wave and the internal unfiltered wave used by the ST/AR algorithm may differ, the shaded area in the strip tile may not always match the beat detections. If this occurs, first change the ECG waves used for analysis. When you apply a new QRS detection threshold, confirm the beat labels in the **ECG Analysis** application for optimal arrhythmia monitoring.

Note — If you change the primary lead, secondary lead, analysis mode, or QRS detection threshold on the device sourcing the ECG data, the **Custom QRS Detection** window closes without changing the patient's QRS detection threshold. See "Device Controls" on page 4-2 for information about the QRS Detection Threshold setting.

Changing ECG Analysis Window Layout

To change the window layout:

1 In the **ECG Analysis** window, select the ⚙ icon. The **ECG Analysis Settings** dialog box opens.

2 Select an option from the **Layout:** drop-down list. Choices are **12x1** (default), **6x2**, **3x4**, **3x4 1R**, **3x4 3R**, **3x4 STMap**, or **3x4 1R STMap**.

Note — On a small screen (1280 x 1024 resolution), only **12x1** and **6x2** layouts are available.

Showing Raw EASI Leads

If EASI derived 12-lead ECG is available, you can show the raw EASI leads.

1 In the **ECG Analysis** window, select the icon. The **ECG Analysis Settings** dialog box opens.

2 Select the **Show EASI raw leads** check box to display the raw EASI leads. Clear the check box to display the derived leads. The check box is selected by default, if EASI derived 12-lead ECG is available.

Displaying Beat Annotations

To display beat annotations:

1 In the **ECG Analysis** window, select the icon. The **ECG Analysis Settings** dialog box opens.

2 Select or clear the **Show beat annotations** check box. When selected, beat annotations display on the primary ECG wave and the **ECG Analysis** window background changes from black to gray. All waves are delayed 6 seconds behind the real-time data. The message **Delayed** displays at the bottom of the primary ECG wave. The morphology of the secondary wave determines the beat label. The check box is selected by default.

Arrhythmia Status Messages

The Information Center displays two types of status messages in the Patient Window:

- Rhythm Status Messages -- to indicate the patient's rhythm.
- Ectopic Status Messages -- to indicate the presence of ectopic beats.

The Information Center updates these status messages every second.

Note — If you have basic arrhythmia capability configured, you will get only messages for the basic alarms (see "ECG and Arrhythmia Alarms" on page 7-7).

Rhythm Status Messages

The following table lists the rhythm status messages alphabetically.

Message	Description
Afib Rhythm	AFIB event is active.
Asystole	No beat detected for a period > the asystole threshold (2.5 to 4.0 seconds).
Cannot Analyze ECG	Beats predominantly labeled as A or ?
Cardiotach Mode	Arrhythmia analysis mode is Cardiotach.
Irregular HR	An irregular rhythm of beats labeled as N (R-R interval changes >12.5%).
Learning ECG	Algorithm is learning the ECG beat morphology.
Learning Rhythm	Algorithm is learning the rhythm of the classified beats.
Paced Rhythm	A dominant rhythm of beats labeled as P.

Message	Description
Sinus Brady* **Sinus Rhythm*** **Sinus Tachy***	A dominant rhythm of beats labeled as N or S, most of which have detected P-waves.
Sust V-Tach	Ventricular tachycardia rhythm for more than 15 seconds.
SV Brady* **SV Rhythm*** **SV Tachy***	A dominant rhythm of beats labeled as N or S, most not having detected P-waves.
Unknown Rhythm	Rhythm cannot be determined.
V-Tach	A dominant rhythm of adjacent beats labeled as V and ventricular HR ≥ 100 (Adult), 120 (Pediatric) or 150 (Neonatal).
Vent Bigeminy	A dominant rhythm of beats labeled as N, V, N, V, N.
Vent Fib/Tach	Fibrillatory wave (sinusoidal wave of 2-10 Hz) for 4 consecutive seconds.
Vent Rhythm	A dominant rhythm of adjacent beats labeled as V and ventricular HR < 100 (Adult), 120 (Pediatric) or 150 (Neonatal).
Vent Trigeminy	A dominant rhythm of beats labeled as N, N, V, N, N, V, N, N.
* The Sinus and SV rhythm messages are updated based on the current heart rate, taking into account the patient category (adult, pediatric, or neonatal). In order to make a transition from one rhythm status to another (for example, from Sinus Rhythm to Sinus Brady) the HR must be in the new range for five beats.	

The table below indicates the ranges for Sinus and SV rhythms.

Rhythm	Adult Range	Pediatric Range	Neonatal Range
Brady	15 to 59	15 to 79	15 to 89
Normal	60 to 100	80 to 160	90 to 180
Tachy	> 100	> 160	> 180

Ectopic Status Messages

The following table lists the ectopic status messages alphabetically.

Note — If the ECG source is an MX40, the ectopic status messages do not include the counts.

Message	Description
(No message displayed)	No ectopic activity detected within the last minute.
Frequent SVPBs [number of beats labeled as S detected in last minute]	>5 beats labeled as S in the last minute.
Multiform PVCs [number of PVCs detected in last minute]	The occurrence of two differently shaped beats labeled as V in the last 300 beats repeated in the last 60 beats. The beat in question must not have adjacent beats labeled V.
Paced Beats [number of beats labeled as P in last minute]	One or more beats labeled as P in last minute and rhythm is not paced.
Pacer Not Capt [number of PNC events detected in last minute]	Long interval with pace pulse within last minute. Interval does not exceed user-specified Pause/Asystole threshold. (Paced Mode on)
Pacer Not Pacing [number of PNP events detected in last minute]	Long interval without pace pulse within last minute. Interval does not exceed user-specified Pause/Asystole threshold. (Paced Mode on)
Pair PVCs [number of PVC pairs detected in last minute]	Two consecutive beats labeled as V between two beats not labeled as V in the last minute.
Pause [number of pauses/missed beats detected in last minute]	Paced Mode on: R-R interval > user-specified pause threshold. Paced Mode off: R-R interval > variable missed beat threshold or user-specified pause threshold.
R-on-T PVCs [number of R-ON-T PVCs detected in last minute]	For HR < 100, a beat labeled as V with R-R interval < 1/3 seconds and < 1/3 of the average R-R interval followed by a compensatory pause, or 2 such beats labeled as V without a compensatory pause in 5 minutes. (When HR > 100, 1/3 R-R interval is too short for detection.)
Run PVCs [number of Vs in the longest run in the last minute]	A run of > 2 consecutive beats labeled as V in the last minute.
SV Beats [number of beats labeled as S or N in last minute]	One or more beats labeled as S or N detected in the last minute and rhythm is paced.
SVPBs [number of SVPBs in last minute]	1-5 SVPBs in the last minute

Learning

The arrhythmia system's goal is to learn the patient's normal complexes so it can differentiate abnormal beats. This "learning" process uses the first 15 valid beats (for example, free from noise) encountered during the learning phase.

While the system is learning the complex, the delayed arrhythmia wave displays the beat label **L**.

Learning Phase

A learning phase involves the system learning the patient's dominant complexes. During a learning phase:

- Alarm timeout periods are cleared.
- Stored arrhythmia templates are cleared.
- Asystole, Vfib, and HR alarms (when there are enough beats to compute the HR) are active. No other alarms are active.

Single Lead Analysis

If single lead analysis is selected, the arrhythmia system begins learning whenever:

- ECG monitoring is initiated.
- The **Relearn Arrhy** control is activated.
- The ECG lead or lead label is changed manually, or when fallback occurs. See "Monitoring During Leads Off" on page 7-2.
- A Leads Off INOP condition that has been active for more than 60 seconds ends.
- The MX40 re-associates with the Information Center.

Multi-lead Analysis

If multi-lead analysis is selected, the arrhythmia system begins a learning on *both* leads whenever:

- ECG monitoring is initiated.
- The **Relearn Arrhy** control is activated.
- A Leads Off condition that has been active for more than 60 seconds for both leads ends in either lead.
- The MX40 re-associates with the Information Center.

Multi-lead Analysis With Changes in One Lead

Since the arrhythmia system uses more than one lead for analysis, if there is a change in one lead, the system does a relearn only on the affected lead whenever:

- An ECG lead or label is changed.
- A Leads Off condition that has been active for more than 60 seconds ends.

Note — During this learning phase, the system continues monitoring using the operative lead. Therefore, the delayed arrhythmia wave is not labeled L. In addition:

- Alarm timeout periods are maintained.
- Stored arrhythmia templates are maintained for the operative lead.

- All alarms turned on are active.

Arrhythmia Events

Arrhythmia events use the ST/AR arrhythmia analysis beat labeling, rate calculation and some settings. Arrhythmia events occur whether or not arrhythmia alarms are active. The events are stored in the database for retrospective review. See "Event Tile" on page 9-12.

The following table lists the arrhythmia events alphabetically.

Event	Description
Asystole	No beat detected for a period > the asystole threshold (2.4 to 4.0 seconds).
Atrial Fibrillation	An irregular rhythm of beats labeled as N and variability in PR intervals and P-wave variability. (For adult patient category only).
Extreme Brady	Heart Rate < the Extreme Brady limit and Heart Rate > 0.
Extreme Tachy	Heart Rate > the Extreme Tachy limit.
High HR	Heart Rate > the high HR limit and Heart Rate ≤ the Extreme Tachy limit.
Irregular Heart Rate	An irregular rhythm of beats labeled as N (R-R interval changes >12.5%).
Low HR	Heart Rate < the low HR limit and Heart Rate ≥ the Extreme Brady limit.
Missed Beat	No beat detected for 1.75 times the average R-R interval for HR < 120, or no beat for > 1 second with HR > 120 (Paced Mode off).
Multiform PVC	The occurrence of two differently shaped beats labeled as V within the last 60 beats and each occurring at least once within the last 300 beats.
Non Sustain Vtach	A run of consecutive beats labeled as V with run length > 2 and run length < the V-Tach Run limit and ventricular HR > the V-Tach HR limit.
Pacer Not Capture	No beat detected for a period > 1.75 times the average R-R interval and pace pulse(s) detected (Paced Mode on).
Pacer Not Pacing	No beat detected for a period > 1.75 times the average R-R interval and no pace pulse(s) detected (Paced Mode on).
Pair PVCs	Two consecutive beats labeled as V between two beats not labeled as V.
Pause	No beat detected for a period > the pause alarm threshold (1.5 to 2.5 seconds).

Event	Description
PVCs/min High	Within 1 minute, the number of beats labeled as V > the PVCs/min limit.
R-on-T PVCs	For HR < 100, a beat labeled as V with R-R interval < 1/3 of the average R-R interval followed by a compensatory pause > 1.25 times the average R-R interval or two such beats labeled as V without a compensatory pause occurring within 5 minutes of each other. (Note: When HR > 100, 1/3 of the R-R interval is too short for detection.)
Run Paced	A run of consecutive beats labeled as P with run length ≥ 2.
Run PVCs	A run of consecutive beats labeled as V with run length > 2 and run length ≤ Vent Rhythm run limit and ventricular HR ≤ the V-Tach HR limit.
Run SVPB	A run of consecutive beats labeled as S with run length ≥ 2 and (run HR ≤ the SVT HR limit or run length < the SVT Run limit).
Run SVT	A run of consecutive beats labeled as S with run length ≥ the SVT Run limit and run HR > the SVT HR limit.
Run VQ	A run of consecutive beats labeled as V or ? with at least one beat labeled as ? and run length ≥ 2 and (run HR ≤ the V-Tach HR limit or run length < the V-Tach run limit or run length < 8).
Run VQ VT	A run of consecutive beats labeled as V or ? with at least one beat labeled as ? and run length ≥ V-Tach run limit and run length ≥ 8 and run HR > V-Tach HR limit.
Ventricular Bigeminy	A dominant rhythm of beats labeled as N, V, N, V, N.
Ventricular Fibrillation	Fibrillatory waveform (sinusoidal wave of 2-10Hz) for 4 seconds.
Ventricular Rhythm	A run of consecutive beats labeled as V with run length > the Vent Rhythm run limit and ventricular HR ≤ the V-Tach HR limit.
Ventricular Trigeminy	A dominant rhythm of beats labeled as N, N, V, N, N, V, N, N.
V-Tach	A run of consecutive beats labeled as V with run length ≥ the V-Tach run limit and ventricular HR > the V-Tach HR limit.

Monitoring Paced Patients

Warning

If the patient has a pacemaker, **Paced Mode** must be turned on, enabling the ST/AR algorithm to detect and reject pace pulses (spikes) from the HR count. Otherwise, pace pulses could be detected as beats and the monitor may not alarm for an asystole condition. If the patient does not have a pacemaker, turn **Paced Mode** off to allow the ST/AR algorithm to work most effectively.

When monitoring paced patients, it is important to set the Paced Mode correctly to enable pace pulse detection. You can change the paced mode at the Information Center in the patient sector, Patient Window or the **Measurements** application **Profiles** page.

The Paced Mode icon next to the HR numeric indicates the patient's current paced status.

Icon	Status	Description
	Paced Mode On	The icon is white when Paced Mode is turned on.
	Paced Mode Off	The icon is the color of the ECG with an X over it when Paced Mode is turned off.
	Paced Mode Unconfirmed	A red question mark displays over the icon when the patient's paced mode is unknown or in conflict.

Warnings

- Some pace pulses can be difficult to reject. When this happens, the pulses are counted as a QRS complex, and could result in an incorrect HR and failure to detect cardiac arrest or some arrhythmias. Keep pacemaker patients under close observation.
- During complete heart block or pacemaker failure (to pace or capture), tall P-waves (greater than 1/5 of the average R-wave height) may be erroneously counted by the arrhythmia algorithm, resulting in missed detection of cardiac arrest.
- When arrhythmia monitoring paced patients who exhibit only intrinsic rhythm, the monitor may erroneously count pace pulses as QRS complexes when the algorithm first encounters them, resulting in missed detection of cardiac arrest.

  For patients who exhibit intrinsic rhythm only, the risk of missing cardiac arrest may be reduced by monitoring these patients with the low heart rate limit at or slightly above the basic/demand pacemaker rate. A low heart rate alarm alerts you when the patient begins pacing. Proper detection and classification of the paced rhythm can then be determined.
- Always verify that your patient's paced setting at the Information Center accurately reflects the patient's status.

- Pacemaker pulses may not be detected when the output of a defibrillator or telemetry unit is plugged into a bedside monitor. This may result in the arrhythmia algorithm's failure to detect pacemaker non-capture or asystole.

  Instruments such as defibrillators or telemetry units produce a filtered ECG signal. When this signal is used as an input to the bedside monitor, it is filtered again. If this twice-filtered signal is passed to the arrhythmia algorithm, it may cause the algorithm to fail to detect pace pulses thus compromising paced patient monitoring performance.
- When an external transcutaneous pacemaker is being used on a patient, arrhythmia monitoring is severely compromised due to the high energy level in the pacer pulse. This may result in the arrhythmia algorithm's failure to detect pacemaker non-capture or asystole.
- Pacemakers can be susceptible to radio frequency (RF) interference which may temporarily impair their performance.

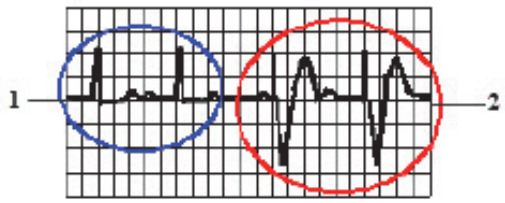
  The output power of telemetry devices and other sources of radio frequency energy, when used in the proximity of a pacemaker, may be sufficient to interfere with the pacemaker's performance. Due to the shielding effects of the body, internal pacemakers are somewhat less vulnerable than external pacemakers. However, caution should be exercised when monitoring any paced patient.

  Consult the pacemaker manufacturer for information on the RF susceptibility of their products and the use of their products with the telemetry devices.

  In order to minimize the possibility of interference, position electrodes, electrode wires, and telemetry device as far away from the pacemaker as possible.
- Only the Monitoring or Diagnostic bandwidth should be used with paced patient monitoring. Diagnostic is not available with telemetry monitoring.

Example of Optimized Paced ECG

An ECG optimized for monitoring a paced patient should look like this:



1 Normal Beats
2 Pace Pulses/Pace Beats

Normal QRS:

- Tall (recommended amplitude > 0.5mV), narrow, and above or below the baseline (not biphasic)
- T-wave smaller than 1/3 the R-wave height; P-wave smaller than 1/5 the R-wave height

Ventricular paced beats:

- Paced beat not much larger than the normal QRS, and taller than pace pulse
- Paced beat wider than Normal QRS
- Pace pulse large enough to be detected, with no width (no re-polarization).

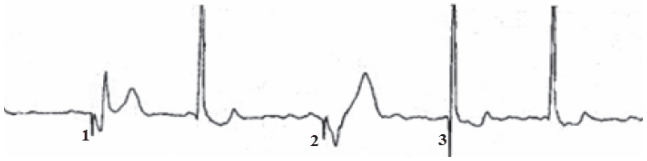
Optimizing Lead Selection for Paced Patients

Some unipolar pacemakers display pace pulses with repolarization tails. These tails may be counted as QRSs in the event of cardiac arrest or other arrhythmias.

If you note a visible repolarization tail, choose a lead that decreases the size of the repolarization tail.

1 Repolarization tail (note width)

Pacemakers can create fusion beats, which occur when an intrinsically conducted beat and a paced beat occur simultaneously, that may not be detected by the monitor's QRS detector. To avoid this, consider changing the leads or the arrhythmia analysis mode.



1 Fusion
2 Paced
3 Pseudofusion

ST/AR ST Analysis Algorithm

Intended Use

The intended use of the ST/AR ST Analysis algorithm is to monitor an adult patient's ECG for ST segment elevation or depression and produce events/alarms for all possible ECG leads. The ST Analysis algorithm is capable of monitoring paced and non-paced adult patients.

The ST/AR ST algorithm monitors ST segment elevation or depression for each available telemetry ECG lead and produces alarms simultaneously.

Note — The ST Analysis algorithm does not analyze ventricularly paced or ventricular ectopic beats.

If the patient is monitored by an IntelliVue Patient Monitor, Efficia monitor, or MX40, the ST/AR ST algorithm is provided by the monitor. Controls for alarm limits and setting baselines are adjustable and viewable at the Information Center.

Warning

This device provides ST level change information; the clinical significance of the ST level change information must be determined by a qualified clinician.

ST values update with every measurement period and annunciate, depending upon the severity of the change, and alarms as they are detected.

The ST/AR ST algorithm is approved for use only with adult non-paced and atrially-paced patients.

Caution

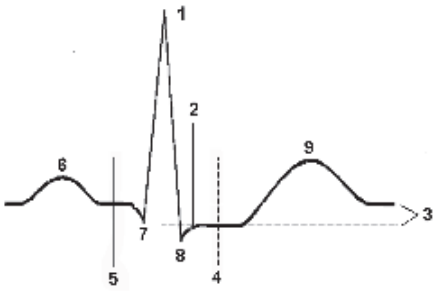
Some clinical conditions may make it difficult to achieve reliable ST monitoring, for example:

- if you are unable to select a lead that is not noisy
- if arrhythmias such as atrial fib/flutter are present, which may cause an irregular baseline
- if the patient is continuously ventricularly paced
- if the patient has left bundle branch block

ST Measurements

The ST/STE measurement for each beat complex is the vertical *difference* between two measurement points. The isoelectric point provides the baseline for both measurements.

The ST measurement uses the isoelectric point and the ST point. The ST point is positioned with reference to the J-point.



1 R-wave peak at 0 msec
2 J point
3 Difference = ST value
4 ST measurement point. Default = J+60 msec
5 Isoelectric point. Default = -80 msec
6 P wave
7 Q wave
8 S wave
9 T wave

You can manually adjust the ST measurements on the **Measurements** application ST page. See "ST" on page 8-11.

Algorithm Processing ST/STE

ST/STE analysis analyzes ECG signals to classify the heart beats. Only beats classified as normal or Supraventricular (atrially paced) are used to calculate ST elevations and depressions.

The ST/AR ST algorithm processing includes special ST filtering, beat selection and statistical analysis, calculation of ST segment elevations and depressions, and lead reconstruction and wave generation.

ST waves and associated ST/STE segment values are given for up to 12 leads, depending on the type of patient cable:

- 3-wire: one lead
- 5-wire: up to eight leads
- 5-wire: up to 12 leads if monitoring using EASI
- 6-wire: up to eight leads if monitoring two limb leads and two chest leads
- 6-wire: up to 12 leads if monitoring using Hexad
- 10-wire: up to 12 leads

Displaying ST Data

ST data can be displayed as values in the patient sector, Patient Window and application windows. A positive value indicates ST segment elevation; a negative value indicates ST segment depression. You can view ST data in the **Measurements** application ST page. See "ST" on page 8-11.

Displaying STE Data

Note — Efficia monitors do not display STE data.

STE, or ST Elevation, is similar to ST but always uses Auto J +0 for the ST Measurement points and cannot be adjusted on a per patient basis. This is the recommendation for the measurement of ST Elevation from the American Heart Association Guidelines and the American College of Cardiology. The 12-lead ECG carts use Auto J +0 for the ST Measurement points to determine if a patient is having an ST elevation myocardial infarction (STEMI).

ST Elevation allows you to have both the Auto J measurements for ST Elevation alerts in addition to ST measurements with offset, which may be useful for ST depression. Because of the different measurement points, there may be different values obtained. Thus there could be an ST alarm and an STE alarm but the STE alarm may announce sooner based upon the values obtained.

STE data can be displayed in the **Measurements** application STE page (see "STE" on page 8-14). An STE map can be displayed in the patient sector (see "Viewing and Adjusting Waves" on page 2-13).

Derived 12-lead ECG

Note — Derived lead placement is supported for adult patients only.

In view of the high degree of redundancy among standard 12-lead ECG leads, it is conceivable that a more practical lead set with a smaller number of judiciously chosen leads can be used to reconstruct the missing leads.

For Hexad derived 12-lead, the 6-electrode configuration has the capability of deriving additional chest leads if the two chest electrodes are placed in several pre-specified standard precordial locations.

Using a standard 5-electrode set in EASI lead placement, you can monitor up to 12 standard ECG leads simultaneously and continuously. EASI provides a monitoring method for trending ST segment changes that can provide an early indication of ischemia.

Warning

Derived ECGs and their measurements are approximations to the standard ECG, and should not be used for diagnostic interpretation.

EASI ST Analysis

With EASI monitoring, ST analysis is performed on up to 12 leads, and an additional value of ST index is calculated and displayed. Assessment of EASI-derived 12-lead ST measurement is recommended for adult patients.

For additional information on ST monitoring, refer to the *ST Segment Monitoring Application Note*, Part Number 452296278611.

HEXAD ST Analysis

The optional Hexad algorithm generates a Mason-Likar 12-lead ECG from a 6-wire lead set (including four limb electrodes and two chest electrodes) placed according to the Mason-Likar 6-electrode placement. Assessment of Hexad-derived ST measurements is recommended for adult patients.

To generate a derived 12-lead ECG using this configuration, eight out of the 12 leads are directly acquired (I, II, III, aVR, aVL, aVF and the two directly-recorded V leads) and only four precordial leads need to be derived. This means that eight of 12 are identical to the 12 leads acquired using a full set of 10-wire standard ECG lead set. For more information refer to the *Hexad 12-Lead ECG Monitoring Using a 6-wire Lead Set Application Note*, Part Number 452299101861.

ST Index

ST values are presented in the patient sector and Patient Window for derived leads along with STindx (ST Index). ST Index is always positive and there are no alarms associated with ST Index. STindx is a summation of three ST segment measurements, using the leads that can indicate ST segment changes in the different locations of the heart.

ST Alarms

ST alarms are yellow alarms. For telemetry-monitored patients, ST alarm limits can only be set at the Information Center. Each ST lead has its own alarm limit. ST alarms are triggered when an ST value exceeds its limit for more than one minute. Turning ST alarms off turns off alarms for all ST leads.

An ST Multi or STE alarm only occurs if two contiguous ST or STE leads exceed their corresponding alarm limits. This is true even if the alarm is expected but is not possible for a technical reason, such as in a Leads Off condition. If it is not possible for an alarm to occur on a contiguous ST lead, such as for ST-V when using a 5-wire cable, the alarm is based on the single lead limit violation.

STE Alarms

Note — Efficia monitors do not generate STE alarms.

The STE alarm is a yellow alarm. It can be turned on and off at the Information Center, however its limits are set during configuration and not adjustable on a per patient basis. The STE alarm limits are gender-specific and can be set individually for limb leads, V2/V3 leads, and V1/V4/V5/V6 leads. The default values, for example on V2 and V3 1.5 mm for females and 2.0 mm for males, are based on the recommendations from the American Heart Association and American College of Cardiology.

For STE alarms to be announced two or more contiguous ST leads must exceed the defined set of lead limits. The STE alarm is announced after exceeding alarm limits for one minute.

The ST Elevation measurements with automated J-point determination generate ST Elevation alarms, in addition to the ST measurements at the user-defined ST point (J+offset), which may be useful for ST depression alarms. When ST and STE analysis are both in use, this may result in redundant alarms for ST elevations. Because of the different measurement points, there may be different values obtained. Thus there could be an ST alarm and an STE alarm but the STE alarm may announce before or after based upon the values obtained.

ST/AR QT/QTc Interval Monitoring

Intended Use

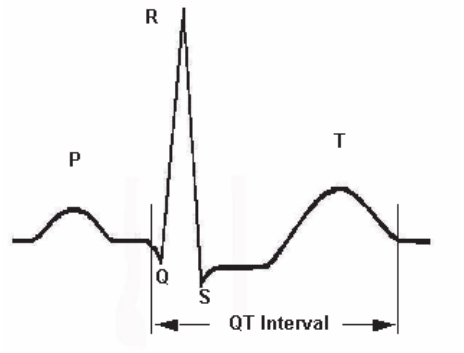
The intended use of the ST/AR QT/QTc analysis algorithm is for use by the physician in the risk assessment process indicated for neonatal, pediatric and adult patients with and without symptoms of arrhythmia. QT measurement is intended to be used by qualified health professionals in hospital or clinical environments. Composite QT (single or multi-lead derived) measures the interval only and is not intended to produce any interpretation or diagnosis of those measurements.

Warning

The device provides QT and QTc interval change information; the clinical significance of the QT and QTc interval change information should be determined by a qualified clinician.

What is QT Interval Monitoring?

QT interval monitoring can assist in the detection of prolonged QT interval syndrome. The QT interval in an ECG lead is the time interval from the onset of the earliest deflection in the QRS complex to the end of the T wave. For patients being monitored by an IntelliVue Telemetry System device, the Information Center measures the QT values once every 15 seconds.



The QT interval has an inverse relationship to heart rate. Faster heart rates shorten the QT interval and slower heart rates prolong the QT interval. To correct the QT interval for heart rate the Information Center uses the Bazett correction formula by default. Your system, however, may be set up to use the Fridericia correction formula as an alternative. The heart rate corrected QT interval is abbreviated as QTc.

Of special concern for QT monitoring is the administration of QT prolonging drugs to patients identified with risk factors for Torsades de Pointe. Females, older patients and patients with bradycardia, impaired left ventricular function (ischemia, left ventricular hypertrophy), hypokalemia and hypomagnesemia are in this increased risk category.

QT Definitions

When QT analysis is on and space is available, the Patient Window displays the current QTc and ΔQTc measurement values. You can see the QT values in the **Measurements** application. See "QT" on page 8-16. As with other measurements, the QT values are stored, trended and can be exported.

The following table describes the QT measurements.

Measurement	Definition
QT	QT interval in milliseconds (ms). The QT interval is the time between the beginning of the Q-wave and the end of the T wave.
QTc	QTc represents the heart rate corrected QT interval. By default, the Information Center uses the Bazett correction formula to correct the QT interval for heart rate. Your system may be set up to use the Fridericia correction formula.
ΔQTc	The difference between the current QTc value and the QTc baseline value.
QT-HR	The heart rate used to calculate QTc.

QT Alarms

The alarms listed below are available with QT interval monitoring. You can adjust the QT alarms in the **Measurements** application. See "Setting QT Alarm Limits" on page 8-18.

Alarm	Definition
QTc High	The QTc high limit alarm is a long yellow alarm that occurs when the QTc value is above the set alarm limit for 5 minutes.
ΔQTc High	The ΔQTc alarm is a long yellow alarm that occurs when the difference between the current value and the baseline value exceeds the set limit for 5 minutes. The ΔQTc alarm is lower priority than the QTc High alarm.
Cannot Analyze QT	If the QT measurement is invalid and the learning phase is over, the Information Center generates a Cannot Analyze QT soft INOP and displays a question mark (?) for the QT value. The Information Center displays the QT without the question mark during initial startup and during the learning phase. Text displays below the current QT values in the QT Setup window providing additional information about the INOP. See "QT Status Messages" on page 7-31.

How the QT Analysis Algorithm Works

The Information Center measures the QT values once every 15 seconds. Normal or atrial paced beats and beats with a similar morphology are averaged to form a representative waveform for further processing. Normal beats followed by a premature QRS are excluded from the measurements to prevent the premature beat from obscuring the end of the T-wave. If the algorithm cannot form a representative waveform, for example because the morphology of the beats is too varied, the

Information Center generates a Cannot Analyze QT INOP. No QT value is calculated if the QT-HR is >150 bpm (Adult) or >180 bpm (Pediatric and Neonatal).

Because of the different algorithm approaches, a QT/QTc measurement from a diagnostic 12-lead program may differ from the real-time measurement.

For QT interval monitoring to be effective, basic or enhanced arrhythmia monitoring should be turned on.

Limitations for QT Monitoring

Some conditions may make it difficult to achieve reliable QT monitoring. When this occurs the CANNOT ANALYZE QT INOP message displays at the Information Center. Some conditions that may make reliable QT monitoring difficult include:

- **T-Wave Detection Limitations** — Flat T-wave, atrial Fibrillation or atrial Flutter and prominent U-waves can make QT monitoring difficult. For these cases you should select **All** as the QT Lead on the **Measurements** application QT page. The Information Center will use the lead or leads that have a T-wave with sufficient amplitude and can be detected. Alternatively select a single lead with a good T-wave amplitude and no visible flutter activity and without a predominant U-wave or P-wave.
- **QRS Changes** — QRS changes such as widened QRS can affect QT monitoring. If a long QTc is observed verify it is not caused by QRS widening.
- **Rhythm and Rate Limitations** — Rhythm and rate limitations such as high heart rate (> 150 beats/min for adults patients or > 180 beats/min for pediatric or neonatal patients), paced rhythm and bigeminy rhythm can make reliable QT monitoring difficult. If rhythm is sustained you may want to consider turning QT interval monitoring off.

QT Status Messages

The table below provides a description of the status messages that may display in the QT window on the Information Center.

Message	Description
Asystole or Leads Off	Not all specified leads needed to perform QT analysis are available, or asystole condition is detected.
End of T not Detected	End of the T-wave cannot be accurately detected.
High QT-HR	QT-HR exceeds the specified upper limit of 150 bpm (for adults) or 180 bpm (for neonates and pediatrics).
Invalid Rhythm for QTc	Not enough valid R-R intervals to generate QT-HR, the averaged HR used for QTc calculation.
QT out of Range	QT measurement is outside the specified range of valid QT values (200-800 msec).
QT Startup	QT measurement is starting up or has been reset.
QTc Erratic	QTc measurements are not stable.
QTc out of Range	QTc measurement is outside the specified range of valid QTc values (200-800 msec).

Message	Description
Small R Wave	R-wave of the signal is too small.
Small T Wave	T-wave of the signal is too small.
Too few N labeled beats	Not enough valid QRS complexes to generate a QT measurement.

8

Measurements

This section describes the options available in the **Measurements** application. It includes the following:

Measurements Application

The Information Center **Measurements** application allows you to make patient-specific modifications to alarms and measurements. From the **Measurements** application you can:

- Turn specific alarms on or off for a patient.
- Adjust measurement settings.
- Change alarm limits for a patient.
- Designate which alarms will generate a recording or initiate a page. See "Alarm Filters" on page 8-24.
- Designate which notifications will initiate a page.
- View or print a snapshot of the alarms and trends of the major vital signs to determine whether to change alarm limits for the patient. See "Alarm Summary" on page 8-27.
- View active notifications for the patient. See "Notifications" on page 8-30.

The measurements and controls in the **Measurements** application depend on the patient's monitoring device and your unit's configuration. For telemetry-monitored patients, you can turn specific measurements on or off at the Information Center. If you are using a bedside monitor, you can turn specific measurements on or off at the bedside. For IntelliVue Patient Monitors, you can adjust alarm limits, paced mode, and arrhythmia settings at either the Information Center or at the bedside monitor. For MRx monitors, all alarm settings are controlled at the monitor. See "Device Controls" on page 4-2.

If remote controls are enabled at the bedside, you can perform actions from the Information Center to the bedside, including: change alarm limits, acknowledge and pause alarms. If these controls are disabled at the Information Center, they are no longer available, even if remote controls are enabled at the bedside monitor.

The following table describes the options in the **Measurements** application.

Note — The options available depend on the devices that are connected to the Information Center and your system configuration.

Option	Description
Profiles	Provides access to the **Profiles** page where you can change measurements and alarm settings to adapt to different monitoring situations. If the Alarm Advisor application is enabled on the Information Center, you can turn Alarm Advisor notifications on or off for patients being monitored by a telemetry device. See "Profiles" on page 8-3.
ECG	Provides access to the **ECG** page where you can change heart rate limits and asystole thresholds within a certain profile, either telemetry or the bedside. See "ECG" on page 8-6.
Arrhythmia	Provides access to the **Arrhythmia** page where you can turn arrhythmia on or off for a patient, turn specific arrhythmia alarms on or off, set arrhythmia thresholds and cause arrhythmia to relearn the ECG. See "Arrhythmia" on page 8-8.
ST	Provides access to the **ST** page where you can make adjustments to ST alarms, turn ST analysis on or off and set ST measurement points within a profile. See "ST" on page 8-11.
STE	Provides access to the **STE** page where you can make ST elevation adjustments within a profile, either telemetry or the bedside. See "STE" on page 8-14.
QT	Provides access to the **QT** page where you can adjust QT settings within a profile, either telemetry or the bedside. See "QT" on page 8-16. *Note* — The **QT** page is not available on PIC iX Essentials systems.
SpO2	Provides access to the **SpO2** page where you can make adjustments to SpO2 settings. See "SpO2" on page 8-18.

Option	Description
NBP	Provides access to the **NBP** page where you can select the NBP alarm source, adjust alarm limits and turn NBP alarms on or off within a profile, either telemetry or the bedside. See "NBP" on page 8-20.
Resp	Provides access to the **Resp** page where you can adjust patient settings for measuring respiration within a profile, either telemetry or the bedside. See "Respiration (Resp)" on page 8-21.
Telemetry Setup	For patients being monitored by a telemetry device, provides access to the **Telemetry Setup** page where you can configure your telemetry device settings to suit the specific needs of the patient. See "Telemetry Setup" on page 8-22. *Note* — The **Telemetry Setup** page is not available on PIC iX Essentials systems.
Alarm Filters	Provides access to the **Alarm Filters** page where you can specify the alarms that generate an automatic recording and/or, for systems with paging available, send an automatic page for the patient when the alarm is sounded. You can also specify the notifications that automatically send a page. See "Alarm Filters" on page 8-24. *Note* — The **Alarm Filters** page is not available on PIC iX Essentials systems.
Alarm Summary	Provides access to the **Alarm Summary** page where you can view or print a summary of the alarms that occur for the selected patient for a specific duration. See "Alarm Summary" on page 8-27. *Note* — The **Alarm Summary** page is not available on PIC iX Essentials systems.
Notifications	Provides access to the Notifications page where you can view a list of all active Alarm Advisor and Early Warning Score notifications for the patient. See "Notifications" on page 8-30. *Note* — The **Notifications** page is not available on PIC iX Essentials systems.

Profiles

A profile is a set of measurement and alarm settings, patient category and paced mode that is pre-configured for telemetry patients on your unit. Using profiles lets you change measurements and alarm settings so you can adapt to different monitoring situations. Up to 25 profiles can be configured for your unit. In addition, your unit may be set up so that certain beds are assigned to a particular profile. For example, an emergency room where multiple patient categories are possible could be set up so that certain beds are assigned to an adult profile while other beds are assigned to a pediatric profile.

Warning

For patients being monitored by an IntelliVue Patient Monitor you can assign a profile to a patient at the bedside monitor. The Information Center always sets the default patient category and paced mode default setting for all devices used. In monitoring mode, these can be changed either at the Information Center or at the bedside monitor within the profile. For telemetry-monitored patients you can change the whole profile, or change the patient category and paced mode within the profile.

Efficia Patient Monitors

For patients being monitored by an Efficia monitor, the patient category can only be changed at the Information Center. If you change the patient category, the patient is automatically discharged at the Efficia monitor and then readmitted with the new patient category. The patient is not discharged at the Information Center.

The following table describes how to use the **Profiles** page.

Select	To...
Profile	Select a different profile for the patient. Select **Profile** then select a profile from the list. When you select a profile for a patient, the measurement settings (ECG, arrhythmia, ST, STE, QT, SpO2, NBP, Resp), paced mode, and patient category associated with that profile are applied to the patient. You can modify specific settings for the patient by selecting the measurement from the list on the left side of the **Measurements** application and adjusting the settings as necessary. **Warning** If you select a different profile, the patient category and paced mode normally change to the settings specified in the new profile. However, some profiles may be set up to leave the patient category and paced mode unchanged. Always check the patient category, paced mode, and all alarms and settings when you change profiles.
Category	Change the patient category. Select **Category** then select **Adult, Pediatric,** or **Neonatal** from the list. **Caution** For IntelliVue Patient Monitors the default patient category and paced mode are set at the Information Center.

Select	To...
Paced Mode	Turn paced mode on or off for a patient. Select **Paced Mode** then select **On** or **Off**. If the patient has a cardiac pacemaker (including demand, fixed, or any type) the **Paced Mode** should be set to **On**. **Warning** It is important that the patient's paced mode is set properly. If the patient has a pacemaker, **Paced Mode** must be turned on, enabling the ST/AR algorithm to detect and reject pace pulses (spikes) from the HR count. Otherwise, pace pulses could be detected as beats and the monitor may not alarm for an asystole condition. If the patient does not have a pacemaker, turn **Paced Mode** off to allow the ST/AR algorithm to work most effectively. *Note* — The paced mode at the Information Center is not related to the TCPacing or TCP Pause modes at the MRx monitor. Initiating TCPacing or TCP Pause at the bedside has no effect on the pacing status at the Information Center. See your MRx monitor documentation for information on TCPacing and TCP Pause modes at the MRx monitor.
Setup Alarm Advisors	If the Alarm Advisor application is enabled on the Information Center, you can turn Alarm Advisor notifications on or off for patients being monitored by a telemetry device. See "Setting Up Alarm Advisor Notifications" on page 8-5.

Setting Up Alarm Advisor Notifications

The Alarm Advisor application is a clinical decision tool that provides feedback on recurring alarm limit violations for specific measurements over a period of time. The information provided can help you to adapt alarm limits for individual patients and improve the number of clinically significant alarms.

Alarm Advisor notifications for MX40 Release B.06 or later and TRx4841A/TRx4851A transceivers Release B.0 or later are configured at the Information Center. Notifications for the IntelliVue Patient Monitors are configured at monitors Release M or later. See the user documentation for the IntelliVue Patient Monitor for information about the Alarm Advisor application on the bedside monitor.

At the Information Center, Alarm Advisor notifications can be configured for the following yellow-level alarms:

- HR High and HR Low limit alarms (yellow and short yellow)
- PVC/minute high limit alarm
- SpO2 High and Low limit alarms, for all SpO2 labels
- Respiration High and Low limit alarms

If the Alarm Advisor application is enabled at the Information Center, you can turn an Alarm Advisor notification on and off for each individual alarm (for example, an HR Low alarm, a PVC/minute alarm, and so on).

1 Select the **Profiles** option in the **Measurements** application.

2 Select **Setup Alarm Advisors**.

3 If multiple devices are associated with the patient, select the device from the list.

4 Enable or disable Alarm Advisor notifications.

Note — The **Time Window**, **AcknowledgeCount**, **Time in Alarm**, and **Recommendations** settings are for viewing purposes only and can only be changed in configuration. See "Alarm Advisor Notifications" on page 8-30 for descriptions of these settings. See the *Patient Information Center iX Clinical Configuration Guide* for information about configuring Alarm Advisor notifications.

ECG

Use the **ECG** page to change heart rate alarm limits and set the asystole threshold.

Note — The Δ **ExtrTachy** and Δ **ExtrBrady** settings are for viewing purposes only and can only be changed in configuration. These settings are used with the HR High and HR Low limits to determine the Tachy/Brady limits. See "Extreme Alarm Limits for Heart Rate" on page 7-8.

The area on the right of the settings shows a summary of the patient's five most frequent HR alarms and a graphical trend of the HR data during a specific time period. The Duration shown above the trend is configured in the default profile, or if the Alarm Advisor application is enabled, the Duration is the time period (the Time Window) configured to trigger Alarm Advisor notifications. See "Alarm Advisor Notifications" on page 8-30.

Note — The graphical trend, alarm counts and notifications do not display on PIC iX Essentials systems.

If a HR Alarm Advisor notification is active, a window containing information about the highest priority notification opens above the alarm count. See "Alarm Advisor Window" on page 8-31.

To view a summary of trends and alarm counts for all of the major measurements, use the **Alarm Summary** application. See "Alarm Summary" on page 8-27.

Select	To
High Limit or **Low Limit**	Set the patient's high and low heart rate alarm limits. Select **High Limit** or **Low Limit** as appropriate then select a value from the list. When setting alarm limits, it is important to select appropriate values. Selecting extreme values can cause the alarm system to be ineffective.
Asystole Thresh.	Set the asystole threshold. Select **Asystole Thresh.** then select a threshold value from the list.

Select	To
Primary Lead or **Secondary Lead**	Select the primary and secondary lead to compute HR and to analyze and detect cardiac arrhythmias. Select **Primary Lead** or **Secondary Lead**, then select a lead from the list. Use the up and down buttons to scroll through the list. *Notes —* • The secondary lead is only available if your monitoring device is configured for multi-lead analysis. • For IntelliVue Patient Monitors you can select the primary and secondary lead at the Information Center if remote controls are enabled at the bedside. If remote controls are not enabled, you can view the primary and secondary leads, but you cannot change them.
Va Lead	Set the default Va lead label if you are using 6-lead cables. Choices include: • V1–6 • V7–9 • V3R–V5R
Vb Lead	Set the default Vb lead label if you are using 6-lead cables. Choices include: • V1–6 • V7–9 • V3R–V5R
Filter	Select the filter on the display of the ECG waves. • 0.5–40 Hz M • 0.05–40 Hz ST *Note —* You can adjust this filter in the review applications.

Select	To
Hexad	Hexad is a 12-lead derivation application. When using a 6-lead cable, the algorithm derives the four remaining V-leads to provide a non-diagnostic 12-lead view, including ECG waves and ST measurements. You must turn the Pleth wave off to get the 12 waves of ECG. Turn Hexad on, then select the set of Va and Vb leads you will be placing on the patient. When Hexad is on you can view supported pairs of Va/Vb V-lead placements. Choices include: • V1, V3 • V1, V4 • V1, V5 • V2, V4 • V2, V5 • V3, V5 • V3, V6 *Notes —* • TRx4841A/TRx4851A: Hexad is not available when the Pleth wave is turned on. The derivation occurs at the Information Center. • MX40: You can turn Hexad on but you must set all four waves to ECG to store and display all 12 ECG waves at the Information Center. The derivation occurs at the device. 12 ST snippets are still available if you want to display and store waves other than ECG.

Arrhythmia

Use the **Arrhythmia** page to turn arrhythmia on or off (Cardiotach mode) for a patient, turn specific arrhythmia alarms on or off, set arrhythmia thresholds and cause arrhythmia to relearn the ECG. The controls available on the **Arrhythmia** page depend on whether arrhythmia analysis is turned on or off.

The area on the right of the settings shows a summary of the patient's five most frequent PVC-related arrhythmia alarms and a graphical trend of the PVC data during a specific time period. The Duration shown above the trend is configured in the default profile, or if the Alarm Advisor application is enabled, the Duration is the configured time period to trigger Alarm Advisor notifications. See "Alarm Advisor Notifications" on page 8-30.

Note — The graphical trend, alarm counts and notifications do not display on PIC iX Essentials systems.

If a PVC Alarm Advisor notification is active, a window containing information about the highest priority PVC notification opens above the alarm count. See "Alarm Advisor Window" on page 8-31.

Caution

The Hidden or Locked state does not synchronize with multiple equipment use. For example, if the Pair PVCs alarm is configured as On & Locked at the bedside monitor but On & Unlocked at the Information Center, the alarm will be available to edit at the Information Center when the ECG is switched to telemetry. It is important that arrhythmia settings are configured exactly the same in both the monitor and telemetry profiles.

Note — To view a summary of trends and alarm counts for all of the major measurements, use the **Alarm Summary** application. See "Alarm Summary" on page 8-27.

Select	To...
Relearn Arrhy	Cause the arrhythmia system to relearn the ECG if you disagree with the beat labels. During the learning process, beats are labeled as L for the first 15 valid beats. The beat shape is then learned and a new template is created. If the beats that are labeled as N look similar to the patient's ventricular ectopic beats you should change the lead to one where the normal and ventricular beats look different. Initiate learning only during periods of predominantly normal rhythm and when the ECG signal is relatively noise-free. See "Learning" on page 7-20. **Warning** If arrhythmia learning occurs during ventricular rhythm, the ectopics may be incorrectly learned as the normal QRS complex. This may result in missed detection of subsequent events of V-Tach and V-Fib.
Arrhythmia On/Off	Toggle between arrhythmia analysis on and Cardiotach mode (arrhythmia analysis off). Consider turning Cardiotach mode on if: • Arrhythmia monitoring is not appropriate for the patient, or • You are not getting a reliable HR because the signal is below a minimum amplitude, unstable, or contains artifact, *and* you have tried to improve the system performance by choosing another lead, changing to Single Lead analysis, and changing electrodes. See "Cardiotach Mode" on page 7-6.
Asystole Thresh.	Adjust the time period between the point where the monitor cannot detect a QRS complex and the indication of an asystole alarm. The range is 2.50 to 4.00 seconds, in 0.25 second steps.
Pause Threshold	Adjust the time period between the point where the system cannot detect a QRS complex and the indication of a Pause alarm. The range is between 1.50 seconds and 2.50 seconds, in 0.25 second steps.

Select	To...
Afib/IHR End Dly	Specify how long the Atrial Fibrillation and Irregular HR condition must be absent before the End of Afib/IHR alarm will announce. There is no separate on/off setting for the End of Afib alarm or End of Irregular HR alarm. It follows the state of the Afib and/or IHR alarm. Choices include: • 0 min • 1 min • 3 min • 5 min • 10 min • 15 min • 30 min
VTach HR	Adjust the Ventricular Tachycardia HR alarm threshold. Both the VTach HR and VTach Run thresholds must be met for Ventricular Tachycardia alarms to be announced. The range is 20–300 bpm, in 5 bpm steps.
VTach Run	Adjust the Ventricular Tachycardia Run alarm threshold. Both the VTach HR and VTach Run thresholds must be met for Ventricular Tachycardia alarms to be announced. The range is 3 to 99 ventricular beats, in 1 beat steps.
Vent Rhythm	Adjust the threshold for the Vent Rhythm short yellow alarm to announce. The range is 3 to 99 ventricular beats.
SVT HR	Adjust the SVT HR alarm threshold. Both the SVT HR and SVT Run threshold must be met to announce an SVT alarm. The range is 120–300 bpm, in 5 bpm steps.
SVT Run	Adjust the SVT Run alarm threshold. Both the SVT HR and SVT Run threshold must be met to announce an SVT alarm. The range is 3 to 99 supraventricular beats, in 1 beat steps.
PVCs/min	Adjust the PVC rate per minute alarm thresholds. The range is 1–99 PVCs/min in steps of 1 PVC/min.
Analysis Mode	Specify the type of arrhythmia analysis to use: • **Multi Lead** — The system uses the primary and secondary leads for arrhythmia analysis. Multi-lead analysis produces optimal arrhythmia detection. • **Single Lead** — The system only uses the primary lead for arrhythmia analysis. You may want to choose single lead analysis when it is difficult to provide more than one optimized ECG lead. Make sure that this optimized lead occupies the first ECG channel when you have more than one ECG lead displayed. See "Arrhythmia Analysis" on page 7-4.

ST

Use the **ST** page to:

- For telemetry monitored patients, turn ST Analysis on or off for a patient. See "Turning ST Analysis On and Off" on page 8-11.
- For telemetry monitored patients, adjust the ST measurement points. See "Adjusting ST Measurement Points" on page 8-11.
- View an ECG wave snippet. See "ST View" on page 8-12.
- Set the ST baseline. See "Setting the ST Baseline" on page 8-13.
- Print the ST report. See "Printing an ST Report" on page 8-13.
- View a map of the patient's ST values. See "Viewing the ST Map" on page 8-13.
- Turn specific ST alarms on or off for a patient. See "Turning ST Alarms On and Off" on page 8-13.
- Set a patient's high and low ST alarm limits. See "Changing ST Alarm Limits" on page 8-14.

For information on how the ST/AR ST Analysis algorithm works, see "ST/AR ST Analysis Algorithm" on page 7-25.

Turning ST Analysis On and Off

For telemetry-monitored patients, the **ST** page allows you to turn ST analysis on or off for all available ECG leads. Consider turning ST monitoring off if any of these conditions exist:

- You are unable to get any lead that is not noisy.
- Arrhythmias such as atrial fibrillation/flutter are present, which may cause an irregular baseline.
- The patient is continuously ventricularly paced.
- The patient has left bundle branch block.

To turn ST analysis on or off:

- From the **ST** page, select **ST Analysis** and select **On** or **Off** as appropriate.

Adjusting ST Measurement Points

For telemetry-monitored patients, the **Adjust ST Points** page allows you to adjust the ST measurement points to ensure accurate data. ST measurements are done automatically but can be adjusted manually. You may need to readjust the ST measurement points if the patient's heart rate or ECG morphology changes significantly.

The current ST values and Baseline (if available) display on the top right side of the **Adjust ST Points** page.

There are three measurement cursors:

- The ISO measurement cursor positions the isoelectric point in relation to the R-wave peak.
- The J-point cursor positions the J-point in relation to the R-wave peak. The purpose of the J-point is to correctly position the ST measurement point.
- The ST measurement cursor positions the ST point a fixed distance from the J point.

The following table describes how to use the **Adjust ST Points** page.

If you want to...	Do this...
Store all current snippets as a baseline for reference	Select the **Update Baseline** button.
Display the baseline value	Select the **Show Baseline** check box.
Choose the ST values to display	Select ECG leads from the list on the left side of the window. A lead is selected when a check mark displays in the check box next to the lead name. The default is **All**.
Adjust ST measurement points	To adjust the ST measurement cursor: **1** Select the **ST** button. **2** Use the right and left arrow to adjust as necessary. **3** Select the **Apply** button. To adjust the ISO or J measurement cursor: **1** Select **Manual** from the ISO/J Point drop-down list. **2** Select the **ISO** or **J** button as appropriate. **3** Use the right and left arrow to adjust as necessary. **4** Select the **Apply** button.
Choose how to view the ST snippets	Select one of the following **Leads** options: • **Superimpose** – Display the selected snippets on top of each other. • **Separate** – Display each snippet separately. You can select a maximum of five separate leads.
Refresh the view to the most current snippet	Select the **Refresh Waves** button.

ST View

The **ST View** page allows you to view a snapshot of the ECG wave (snippet) and set the ST baseline reference beats for all available leads. Reference beats enable you to compare waveform changes, for example from admission, or prior to or after treatment.

To view a snapshot of a real-time ECG wave:

1 From the **ST** page select **ST View**. A list of available ECG leads displays on the left side of the window and the current measurement values display on the right side.

2 Select the ECG leads to view from the list.

3 Select one of the following **Leads** options:

- **Superimpose** — Display the selected snippets on top of each other.
- **Separate** — Display up to five snippets separately.

Setting the ST Baseline

To set the ST baseline select the **Update Baseline** button to replace the baseline ST value with the current ST value. If a baseline has not been set the Information Center sets the baseline to the first valid value after measuring ST for five minutes. Setting a new baseline discards the previous baseline.

Printing an ST Report

To print the ST measurement points and leads:

1 From the **ST** page select **ST Map** or **ST View**.

2 Select the  icon from the caption bar. If prompted, select the type of print output. Select **OK**. The report prints in landscape format. The ST Map prints at the selected scale.

Note — If ST trending is selected (the **Trend On/Off** check box is selected), the ST report does not print.

Viewing the ST Map

The **ST** page allows you to view a map of all the ST leads in two circular charts; a limb leads chart and a chest leads chart. Three or more leads are necessary to draw the map. The current scale displays as a horizontal line through the circle. The ST leads display as lines running through the circle. If there is no data for a lead then that lead is not drawn in the circle. If a baseline has been set for the patient it displays as a yellow line in the ST Map. A green shaded area indicates the patient's current values.

The ST Map includes a trending feature that allows you to capture a snapshot of the ST values at an interval you specify. The trending intervals display as gray lines on the ST Map trend view.

Note — Extended lead labels are not available to trend in the ST Map.

To modify the ST Map:

1 From the **ST** page select **ST Map**. The **ST Map** window displays.

2 Use the **Scale: (±)** up and down arrows to set the scale for the ST Map. The scale sets the radius of the ST Map circle. The default is 2 mm.

3 Select the **Show Baseline** check box to display the ST baseline in the ST Map. The baseline displays as a yellow line. Clear the check box to disable the display of the ST baseline.

4 Select the **Trend On/Off** check box to display the trend of ST changes, then specify a trending interval by selecting a time from the **Interval:** drop-down list. The default is 1 minute. Trending will capture a snapshot of the ST values at the interval you specify.

Note — ST trending is selected when the check box is selected. To display the current ST values without the trend information, clear the check box.

Turning ST Alarms On and Off

All alarm settings have unit defaults. You can turn ST alarms on or off to accommodate the clinical condition of individual patients.

- From the **ST** page click **Δ) Alarms** and select **On** or **Off** as appropriate.

Changing ST Alarm Limits

The **ST Alarm Limits** page lets you set the high and low ST alarm limits for individual patients based on:

- Your assessment of the patient's clinical condition.
- Unit protocols.
- Physician orders or medication specified limits.

Each ST measurement has its own alarm limit. The alarm is triggered when the two contiguous ST values exceed their alarm limits for more than one minute. ST alarms are yellow alarms.

A single lead alarm occurs only when contiguous alarms are not possible, such as a V lead with a 5-lead cable, or if leads are off the patient. The alarm message indicates the two leads that are in greatest violation of the limits. If another lead becomes deviant, the message changes but it is considered the same alarm (no new alarm sounds and it is not listed as a new event).

When more than one ST measurement is in alarm, only one alarm message displays.

If the source of data is a bedside monitor, ST Analysis must be enabled at the bedside. ST Points must also be adjusted at the bedside monitor.

To set ST alarm limits:

1 From the **ST** page, select **ST Alarm Limits**. A list of the ST High and Low alarm limits displays.

2 For telemetry and MX40 monitors, select **Auto Limits** to set the ST limits based on the current values. You can set the alarm limits ± 1 mm or ± 2 mm from the current ST value.

Note — Your system may be set up so that auto limits are on by default. In this case, the ST limits will be set ±1 mm around the ST value when either the first ST baseline is determined by the algorithm (this takes about 5 minutes) or by the ST baseline value that comes in with the patient on transfer.

3 Select the alarm limit you would like to adjust. A menu displays a list of choices.

4 Use the up and down arrows to scroll through the list of limits. Select an appropriate value to select that limit.

STE

Use the **STE** page to:

- For telemetry devices, turn ST elevation analysis on or off. See "Turning STE On and Off" on page 8-14.
- View a snapshot of the ECG wave (snippet) and set the STE baseline. See "STE View" on page 8-15.
- Print the STE report. See "Printing an STE Report" on page 8-15.
- View a map of the patient's STE values. See "STE Map" on page 8-15.
- Turn STE alarms on or off for a patient. See "Turning STE Alarms On and Off" on page 8-15.

Turning STE On and Off

For telemetry monitored patients, you can toggle the STE measurement on and off for a patient.

To turn STE on and off:

- From the **STE** page, select **STE** and select **On** or **Off** as appropriate.

STE View

The **STE View** page allows you to view a snapshot of the ECG wave (snippet) and set the STE baseline.

To view snippets and set the STE baseline:

1 From the **STE** page, select **STE View**. A list of available ECG leads is displayed on the left side and the current measurement values are displayed on the right side.

2 Select the ECG leads to view from the lead list. A lead is selected when a check mark displays in the check box next to the lead name.

3 Select the **Leads** layout from drop-down list:

- **Superimpose** — Display the selected snippets on top of each other in the STE View.
- **Separate** — Display up to five snippets separately in the STE View.

STE Map

The **STE** page allows you to view a map of all the STE leads in two circular charts; a limb leads chart and a chest leads chart. The current scale displays as a horizontal line through the circle. The ST leads display as lines running through the circle. If there is no data for a lead then that lead is not drawn in the circle. The elevation limit area is shaded in gray. When the alarm limit is violated, the area displays in red.

Note — Extended lead labels are not available to trend in the STE Map.

To view the STE Map:

1 Select **STE Map** from the **STE** page.

2 Use the **Scale** up and down arrows to set the scale for the STE Map. The scale sets the radius of the STE Map circle. The default is 2 mm.

Printing an STE Report

To print a report of the STE Map and snippets:

1 From the **STE** page select STE Map or STE View.

2 Select the  icon from the caption bar. If prompted, select the type of print output. Select **OK**. The report prints in landscape format. The STE Map prints at the selected scale.

Turning STE Alarms On and Off

To turn STE alarms on or off:

- From the **STE** page, select **Δ) Alarms** and select **On** or **Off** as appropriate.

QT

Note — For patients monitored by an IntelliVue Patient Monitor, QT/QTc analysis is provided by the IntelliVue Patient Monitor. Settings are adjustable at the Information Center. Turn QT Analysis on/off at the bedside.

Note — The **QT** page is not available on PIC iX Essentials systems.

From the **QT** page you can:

- For telemetry-monitored patients, turn QT Analysis on or off. See "Turning QT Analysis On and Off" on page 8-16.
- View a snapshot of the ECG wave (snippet). See "QT View" on page 8-16.
- Change the view mode. See "Changing the QT View Mode" on page 8-16.
- Set the QT baseline. See "Setting the QTc Baseline" on page 8-17.
- Select the leads to analyze when calculating the QT measurements. See "Selecting QT Leads" on page 8-17.
- Turn QT alarms on or off. See "Turning QT Alarms On and Off" on page 8-17.
- Set QT alarm limits. See "Setting QT Alarm Limits" on page 8-18.

Turning QT Analysis On and Off

For telemetry-monitored patients, you can turn QT Analysis on or off by clicking **I/O QT Analysis** from the **QT** page as appropriate.

When the QT measurement is on, the current values for QT, QTc, ΔQTc and QT-HR display as well as the lead labels indicating the leads used to calculate the baseline and current values.

Turning QT analysis off does not clear the baseline value. This allows you to turn QT analysis off during prolonged arrhythmias, such as bigeminy, without losing the baseline.

QT View

Select **QT View** from the QT page to view a snapshot of the wave (snippet) and to see how the QT algorithm is measuring the QT points. The Q and T points are marked with a vertical line. Select one of the lead labels at the top of the window to highlight the corresponding wave; the other waves are shown in gray.

The underlined lead labels are the leads used for the QT calculation. By selecting the numeric area you can highlight all underlined leads.

Changing the QT View Mode

The **QT View** window provides different view modes to view one set of waves in a larger scale. From the **QT View** window select one of the following radio buttons:

- **Current** — View the set of current waves.
- **Baseline** —View the set of baseline waves.
- **Split** — View both the current and baseline waves.

Setting the QTc Baseline

In order to quantify changes in the QTc value, you can set a QTc baseline. For example, to assess the effect of medication on the QT interval you can set the current value as the baseline before you begin medication. This baseline will then be used to calculate the ΔQTc value.

To set the baseline select the **Update Baseline** button to replace the baseline QTc value with the current QTc value. If a baseline has not been set the Information Center sets the baseline to the first valid value after measuring QT for five minutes. Setting a new baseline discards the previous baseline.

Notes —

- Since the ΔQTc alarm is based on the difference between the baseline and the current value, setting an inappropriate new baseline may prevent a ΔQTc alarm from being generated.
- Turning QT analysis off does not clear the baseline value. This allows you to turn QT analysis off during prolonged arrhythmias, such as bigeminy, without losing the baseline.
- Discharging a patient clears the baseline.

Printing a QT View Report

To print the QT View report:

- Select the  icon on the **Measurements** application caption bar. If prompted, select the type of print output. Select **OK**. The report prints in landscape format.

Selecting QT Leads

Select **QT Lead** from the **QT** page to select which leads to analyze when calculating the QT measurements. Select the desired lead by clicking on the QT Lead up and down arrows then highlighting the lead from the list that displays.

Choose:

- **All** if you want a global QT measurement based on all available leads. For standard placement leads I, II, III, V and V1 through V6 are used. For EASI placement directly acquired AI, AS, and ES leads are used.

  Note — The list may contain leads that are not being stored.

- **Primary** if you want to use the primary lead for the QT measurement. If the primary lead becomes unavailable or is changed the QT measurement continues with the new primary lead.
- A single lead from the list to use that lead for QT measurement. If the lead you select becomes unavailable QT monitoring stops.

  The V7, V8, V9, V3R, V4R or V5R leads are not available for single lead selection. These leads are processed, however, when you select **Primary** in the **QT Lead** field.

Turning QT Alarms On and Off

There are two QT yellow alarms (**): QTc High and ΔQTc High. The QTc High alarm occurs if the value exceeds the set alarm limit for longer than 5 minutes. The ΔQTc High alarm occurs when the difference between the current value and the baseline value exceeds the set limit for longer than 5 minutes.

To turn QT alarms on or off:

- Select **QTc High Alarm** or **ΔQTc High Alarm** from the QT page.

Setting QT Alarm Limits

Set the high alarm limits based on your assessment of the patient's clinical condition, unit protocols, physician orders or medication specified limits.

Normal values for adults:

- Men: QTc < 420 ms
- Women: QTc < 430 ms

To set the QTc or ΔQTc alarm limits:

1 Select **QTc High Limit** or **ΔQTc High Limit** from the **QT** page as appropriate. A pop-up with limit values displays.

2 Use the up and down arrows to scroll through the limit values then select a value on the list.

SpO2

The **SpO2** page allows you to adjust the SpO2 settings.

Note — Multiple controls are available if there is one or more SpO2 label. For example, if you are monitoring SpO2r and SpO2l, separate controls are available for each label.

The area on the right of the settings shows a summary of the patient's five most frequent SpO2 alarms and a graphical trend of the SpO2 data during a specific time period. The Duration shown above the trend is configured in the default profile, or if the Alarm Advisor application is enabled, the Duration is the configured time period to trigger Alarm Advisor notifications. See "Alarm Advisor Notifications" on page 8-30.

Note — The graphical trend, alarm counts and notifications do not display on PIC iX Essentials systems.

If an SpO2 Alarm Advisor notification is active, a window containing information about the highest priority SpO2 notification opens above the alarm count. See "Alarm Advisor Window" on page 8-31.

Note — To view a summary of trends and alarm counts for all of the major measurements, use the **Alarm Summary** application. See "Alarm Summary" on page 8-27.

The table below describes the adjustments you can make from the **SpO2** page.

Adjustment	Description
Adjust SpO2 alarm limits	1 Select **High Limit** or **Low Limit**. A pop-up menu with limit values displays. 2 Use the up and down arrows to scroll through the limit values then select a value on the list. **Warning** High oxygen levels may predispose a premature infant to retrolental fibroplasia. If this is a consideration, do *not* set the high alarm limit to 100%, which is equivalent to switching the alarm off.

Adjustment	Description
Adjust the Desat limit	The Desat alarm is a high priority (red) alarm notifying you of potentially life-threatening drops in oxygen saturation. 1 Select **Desat Limit**. A pop-up with limit values displays. 2 Use the up and down arrows to scroll through the limit values then select a value on the list.
Turn SpO2 alarms on or off	Select **Δ) Alarms** to turn SpO2 alarms on or off.
Set SpO2 alarm delay times	Select the **High Alarm Delay**, **Low Alarm Delay** or **Desat Delay** then select the delay time from the list. The delay time is the amount of time the measurement value must exceed the alarm limit prior to an alarm being announced.
Turn SpO2 monitoring on or off	Select **I/O SpO2** to turn telemetry SpO2 monitoring on or off.
Set the SpO2 measurement mode	SpO2 measurements can be made manually as needed, continuously, or automatically. Select **Mode** then select the appropriate option for the device: • MX40: **Manual**, **Continuous**, or **Auto** • TRx4841A/TRx4851A: **Manual** or **Continuous** • IntelliVue Patient Monitor: **Continuous**
Specify when automatic SpO2 measurements occur	For an MX40, when the measurement mode is set to **Auto**, select **Repeat Time** then select a time interval from the list.
Suppress the INOP alarm during an NBP measurement	Turn on the **NBP Alarm Suppr.** setting to prevent generating an INOP while measuring NBP and SpO2 on the same limb. If turned on, the system remembers the SpO2 value measured before the cuff inflates and suppresses any SpO2 INOP while the NBP cuff is inflated on the same limb as the SpO2 measurement. It is generally recommended to set the SpO2 sensor on the opposite arm of the NBP cuff, especially during frequent measurements.
Turn Pleth wave on or off	For TRx4841A/TRx4851A transceivers, select **Pleth Wave**. *Note* — For TRx4841A/TRx4851A transceivers, Hexad is not available when the Pleth wave is turned on.
Turn Pulse transmission on or off	For telemetry devices, toggle Pulse transmission on or off by selecting **I/O Pulse** from the **SpO2** page.

NBP

Warning

Select the correct patient category setting for your patient. An incorrect patient category may cause incorrect readings and application of the higher adult and pediatric inflation overpressure limits and measurement duration to neonatal patients.

Use the **NBP** page in the **Measurements** application to adjust patient settings for measuring Non-Invasive Blood Pressure (NBP). The controls available depend on your monitoring equipment and whether the NBP is turned on at the monitoring device.

Note — The NBP alarm delay to the Information Center from NBP Cableless Measurement with the MX40 is less than 1 second.

The area on the right of the settings shows a summary of the patient's five most frequent NBP alarms and a graphical trend of the pressure data during a specific time period. The Duration shown above the trend is configured in the default profile, or if the Alarm Advisor application is enabled, the Duration is the configured time period to trigger Alarm Advisor notifications. See "Alarm Advisor Notifications" on page 8-30.

Note — The graphical trend, alarm counts and notifications do not display on PIC iX Essentials systems.

If an NBP Alarm Advisor notification is active, a window containing information about the highest priority NBP notification opens above the alarm count. See "Alarm Advisor Window" on page 8-31.

Note — To view a summary of trends and alarm counts for all of the major measurements, use the **Alarm Summary** application. See "Alarm Summary" on page 8-27.

The table below describes the adjustments you can make from the NBP page.

Adjustment	Description
Select the NBP alarm source	You can monitor for alarm conditions in systolic, diastolic and mean pressure, either individually or in parallel. Only one alarm is given, with the priority of mean, systolic, diastolic. To select the NBP alarm source: 1 Select **Alarms from** on the **NBP** page. A list of NBP alarm sources displays. 2 To monitor for a single NBP alarm condition, select: • **Sys.** to monitor systolic pressure value. • **Dia.** to monitor diastolic pressure value. • **Mean** to monitor mean pressure value. 3 To monitor alarm conditions in parallel, select: • **Sys & Dia** to monitor systolic and diastolic pressures. • **Dia & Mean** to monitor diastolic and mean pressures. • **Sys & Mean** to monitor systolic and mean pressures. • **Sys&Dia&Mean** to monitor all three pressures.
Adjust NBP high or low alarm limits	1 Select the appropriate alarm source **High** or **Low** (**Sys. High**, **Sys. Low**, **Dia. High**, **Dia. Low**, and so on). 2 Select a limit from the list.

Adjustment	Description
Turn NBP alarms on or off	Select **Δ) Alarms**.
Start or stop an NBP measurement	Select **Start/Stop** to initiate an on-demand measurement or stop a measurement. Available for systems with remote controls enabled.
Set the time interval between two NBP measurements	1 Select **Repeat Time**. A pop-up with time values displays. 2 Select a repeat time value from the list.
Start a series of NBP measurements	Select **NBP STAT** to initiate a rapid series of measurements over a 5-minute period. Use only on supervised patients. **Caution** Use clinical judgment to decide whether to perform repeated series of STAT measurements because of the risk of purpura, ischemia and neuropathy in the limb with the cuff.
Stop all NBP measurements	Select **Stop All** to stop all automatic, manual or STAT measurements.

Respiration (Resp)

You can use the **Resp** page to adjust patient settings for measuring respiration (Resp).

The area on the right of the settings shows a summary of the patient's five most frequent Resp (awRR, RR) alarms and a graphical trend of the Resp data during a specific time period. The Duration shown above the trend is configured in the default profile, or if the Alarm Advisor application is enabled, the Duration is the configured time period to trigger Alarm Advisor notifications. See "Alarm Advisor Notifications" on page 8-30.

Note — The graphical trend, alarm counts and notifications do not display on PIC iX Essentials systems.

If a Resp Alarm Advisor notification is active, a window containing information about the highest priority notification opens above the alarm count. See "Alarm Advisor Window" on page 8-31.

Note — To view a summary of trends and alarm counts for all of the major measurements, use the **Alarm Summary** application. See "Alarm Summary" on page 8-27.

The table below describes the adjustments you can make from the **Resp** page.

Adjustment	Description
Adjust high or low Resp alarm limits	1 Select **High Limit** or **Low Limit**. 2 Select the limit value from the list.

Adjustment	Description
Set apnea time	The apnea alarm is a high priority red alarm used to detect apnea. **Apnea Time** defines the time period between the point where the monitoring device cannot detect any respiration activity and the indication of the apnea alarm. To set the apnea time select **Apnea Time** from the Resp page then select a time from the list.
Turn Resp alarms on or off	Select **Δ) Alarms**.
Turn Resp measurement on or off	For telemetry monitored patients, you can toggle the Resp measurement on or off by selecting **I/O Resp**.

Telemetry Setup

Note — The **Telemetry Setup** page is not available on PIC iX Essentials systems.

For patients being monitored by a telemetry device, the **Telemetry Setup** page allows you to change the unit default telemetry settings to suit the specific needs of the patient. All patient-specific settings are reset to the unit defaults upon patient discharge. The adjustments available on the **Telemetry Setup** page depend on whether you are monitoring the patient using a TRx4841A/TRx4851A or an MX40.

TRx4841A/TRx4851A

You can adjust the following settings for a TRx4841A/TRx4851A on the **Telemetry Setup** page

Adjustment	Description
Turn adjustable sounds on or off	Select **Mute** to switch the transceiver adjustable sounds on or off.
Set the volume level for tones at the transceiver	Select **Volume at Device** then select a volume level from the list. Choices are 1 to 5 (5 being loudest; the default is 3).
Set the Telemetry Button response	Select the Information Center's response when the **Telemetry Button** is pressed on the transceiver. Choices are: • **Nurse Call** — Generate a Nurse Call alarm that you can subsequently retrieve from **Alarm Review**. • **Record** — Generate a delayed recording (with no alarm annotation) at the Information Center. • **Call & Record** — Generate a Nurse Call alarm and a recording. • **Off** — No response at the Information Center.
Locate the telemetry device	Select **Find** to initiate repeated tone sounds on the transceiver.

Adjustment	Description
Change waves for storage and display	Turn **Hexad (Va,Vb)** on then select the set of Va and Vb leads you will be placing on the patient. When Hexad is on you can view supported pairs of Va/Vb V-lead placements. Choices include: • V1, V3 • V1, V4 • V1, V5 • V2, V4 • V2, V5 • V3, V5 • V3, V6 *Note* — Hexad is not available if the Pleth wave is turned on in the SpO2 page. The derivation occurs at the Information Center.

MX40

You can adjust the following settings for an MX40 on the **Telemetry Setup** page:

Adjustment	Description
Set the Telemetry Button response	Select the Information Center's response when the **Telemetry Button** is pressed on the MX40. Choices include: • **Nurse Call** — Generate a Nurse Call alarm that you can subsequently retrieve from **Alarm Review**. • **Record** — Generate a delayed recording (with no alarm annotation) at the Information Center. • **Call & Record** — Generate a Nurse Call alarm and a recording. • **Off** — No response at the Information Center.
Locate the telemetry device	Select **Find** to initiate repeated tone sounds on the MX40.
Change waves to store and display	Select the waves to store and display at the Information Center. You can store up to four waves. Choices include: • **Wave 1, Wave 2, Wave 3, Wave 4** • **Hexad (Va,Vb)** *Notes* — • Hexad can be turned on at the MX40 without setting all four stored waves to ECG. • Wave 1 and Wave 2 are Primary Lead and Secondary Lead, respectively. • If you turn on the Pleth wave display, the Pleth wave replaces the Vb wave in the Patient Window during 6-lead monitoring.

Alarm Filters

Note — The **Alarm Filters** page is not available on PIC iX Essentials systems.

For systems set up to allow automatic recording and/or paging, the **Alarm Filters** application allows you to:

- Specify the alarms that generate an automatic recording or printout when the alarm occurs. See "Selecting Alarms to Automatically Record or Print" on page 8-24.
- Generate an automatic page for the patient when the alarm occurs. See "Selecting Alarms to Send in a Page" on page 8-24.
- Specify the notifications that generate an automatic page for the patient when the notification occurs. See "Selecting Notifications to Send in a Page" on page 8-24.

Note — Turning off recording does not affect audible and visual indicators for these alarms.

Selecting Alarms to Automatically Record or Print

To select the alarms that will automatically record or print:

1 Select the **Alarm Filters** option in the **Measurements** application.

2 Select the **Record** button at the top of the window.

3 In the lists of red and yellow alarms, select or clear the check boxes to specify the alarms that you want to automatically generate a recording or report. See "Alarm Categories" on page 8-25.

4 When you are done selecting alarms, select **Apply**.

Select **Cancel** to cancel any changes you made for this patient, or select **Reset to Clinical Settings** to return the settings back to unit defaults.

Selecting Alarms to Send in a Page

To select the alarms to send in a page:

1 Select the **Alarm Filters** option in the **Measurements** application.

2 Select the **Page Alarms** button at the top of the window.

3 In the lists of red and yellow physiological and INOP alarms, select or clear the check boxes to specify the alarms that will generate an automatic page for the patient. See "Alarm Categories" on page 8-25.

4 When you are done selecting alarms to page, select **Apply**.

Select **Cancel** to cancel any changes you made for this patient, or select **Reset to Clinical Settings** to return the settings back to unit defaults.

Selecting Notifications to Send in a Page

To select the notifications to send in a page:

1 Select the **Alarm Filters** option in the **Measurements** application.

2 Select the **Page Notifications** button at the top of the window.

3 In the list of notifications, select or clear the check boxes to specify the notifications that will generate an automatic page for the patient. See "Notification Categories" on page 8-26.

4 When you are done selecting notifications to page, select **Apply**.

Select **Cancel** to cancel any changes you made for this patient, or select **Reset to Clinical Settings** to return the settings back to unit defaults.

Alarm Categories

The following table describes the alarm categories that can generate a recording, report or page.

An alarm category contains other alarms, for example, **All Red** contains **Red Arrhythmia**, **Red Pressure**, **Red SpO2** and **Red Resp**.

Note the following:

- To expand an alarm category, select the plus sign next to the category name.
- To select or clear all alarms in a category, select or clear the check box next to the category name.
- To turn an individual alarm in a category on or off, select or clear the check box to the left of the alarm.

Category	Description
All Red - On/Off	Select to turn all red alarm recordings, reports or pages on or off simultaneously. To view specific red alarms, select the plus sign next to the category name. To turn an individual red alarm on or off, select or clear the check box for the individual alarm.
Red Arrhythmia - On/Off	Select to turn all red arrhythmia alarm recordings, reports or pages on or off simultaneously. To view specific red arrhythmia alarms, select the plus sign next to the category name. To turn an individual red arrhythmia alarm on or off, select or clear the check box for the individual alarm.
All Yellow - On/Off	Select to turn all yellow alarm recordings, reports or pages on or off simultaneously. To view specific yellow alarms, select the plus sign next to the category name. To turn an individual yellow alarm on or off, select or clear the check box for the individual alarm.
Yellow Arrhythmia - On/Off	Select to turn all yellow arrhythmia alarm recordings, reports or pages on or off simultaneously. To view specific yellow arrhythmia alarms, select the plus sign next to the category name. To turn an individual yellow arrhythmia alarm on or off, select or clear the check box for the individual alarm.

Category	Description
All Red Inops - On/Off	Select to turn all red INOP alarm pages on or off simultaneously. Red INOP alarms are not available for recording or printing. To view specific red INOP alarms, select the plus sign next to the category name. To turn an individual red INOP alarm on or off, select or clear the check box for the individual alarm.
All Yellow Inops - On/Off	Select to turn all yellow INOP alarm pages on or off simultaneously. Yellow INOP alarms are not available for recording or printing. To view specific yellow INOP alarms, select the plus sign next to the category name. To turn an individual yellow INOP alarm on or off, select or clear the check box for the individual alarm.
All Inops - On/Off	Select to turn all INOP alarm pages on or off simultaneously. INOP alarms are not available for recording or printing. To view specific INOP alarms, select the plus sign next to the category name. To turn an individual alarm on or off, select or clear the check box for the individual alarm.

Notification Categories

The following table contains a list of the notifications that can be sent in a page.

Select	Description
Alarm Advisor - On/Off	Select to turn all Alarm Advisor notification pages on or off simultaneously.
Connection Notifications - On/Off	Select to turn all connection notification pages on or off simultaneously. The notification category includes **Data Missing** and **No Data**.
Protocol 1 – 5 - On/Off	Select to turn all protocol notification pages on or off simultaneously.
User Notifications - On/Off	Select to turn all user notification pages on or off simultaneously.

Alarm Summary

Note — The **Alarm Summary** page is not available on PIC iX Essentials systems.

The **Alarm Summary** application displays a summary of the selected patient's most frequent alarms and trends for the major vital signs measurements during a specific length of time. Viewing a snapshot of the alarm counts and trends can help you determine the correct alarm limits for the patient, and help reduce the number of alarms that require no action for this patient.

The **Alarm Summary** application displays trends and alarm counts for the measurements HR, Any SpO2, Any Resp, NBP, Any BP, PVC, and ST.

The following table lists the alarm types that the application counts for each measurement.

Measurement	Alarms
HR	• ***Asystole • ***Extreme Tachy • ***Extreme Brady • */**HR High • */**HR Low • *SVT • *AFIB • *Irregular HR • *Pause • *Missed Beat • *Pacer Not Capt • *Pacer Not Pacing
Any SpO2	• Desat • <SpO2 label> High • <SpO2 label> Low Where <SpO2 label> is: • SpO2 • SpO2pr • SpO2po • SpO2r • SpO2l • SpO2T
Any Resp	• *** Apnea • **RR High • **RR Low • **awRR High • **awRR Low
NBP	• **NBP High • **NBP Low

Measurement	Alarms
Any BP	• **/***<Press Label> High • **/***<Press Label> Low Where <Press Label> is: • ABP • ART • Ao • UAP • FAP • BAP
PVC	• ***Vent Fib/Tach • ***Vtach • *Multiform PVCs • *Non-Sustain VT • *Pair PVCs • *PVCs/min High • *R-On-T PVCs • *Run PVCs High • *Vent Bigeminy • *Vent Trigeminy • *Vent Rhythm • **Vent Rhythm
ST	• ST Single High • ST Single Low • ST Multi • STE Multi

All hard INOP/technical alarms are counted and display in an alarm count pane below the trends on the **Alarm Summary** page.

The start time and ending time display at the top of the **Alarm Summary** page. The start time is the ending time minus the duration. The ending time is the last time the database was updated for the patient (up to 1 minute ago). The ending time updates whenever you do the following:

- Select a patient and open the **Alarm Summary** page.
- Select the double arrows (**Get Latest Patient Data**) in the top right side of the page.
- Change the **Duration:**. The duration resets to the default whenever you select a patient or re-select the current patient. The default duration is 12 hours.

The **Alarm Summary** page shows the highest priority measurements available for the specified duration.

The alarm count panes list the number of occurrences of up to five alarm types for the corresponding measurements. The alarm counts are listed with the highest count at the top of the list. Only the five most frequent alarm types that occur for the measurement display in the alarm count pane. The alarm counts include deleted alarms. You can select the column header to sort the items in alphanumeric order.

The measurement label displays next to the scale on the left side of the trend. In the graphical trend for each measurement, horizontal lines indicate the alarm limits. This allows you to see where the alarm limits are violated.

For view durations greater than or equal to 4 hours, the values in the trend are 5-minute medians. As a result, the trend may not cross the alarm limit threshold lines. You can then decide whether to turn off alarms or adjust the limits. See "Graphic Trend Tile" on page 9-14 for information about changing the view duration in the Graphic Trend tile.

The following table describes how to use the **Alarm Summary** application:

If you want to...	Do this...
Change the length of time for which alarm events and trends are displayed.	Select the **Duration:** field and select the length of time from the list. The options are: **4 Hours**, **8 Hours**, and **12 Hours**. The default is **12 Hours**. The start and ending time at the top left of the window updates to reflect your selection. The duration resets to the default value whenever you select a patient.
Change the trend scale.	1 In the trend for the measurement, select the scale, then select **Customize...**. 2 Enter the range of values by using the up and down arrows. 3 Select **OK**. The new scale displays in the graphical trend and the data adjusts to the new scale. Data that is out of bounds is drawn to the top or bottom boundaries of the trend pane. A red caret indicates that the data exceeds the scale. The trend scale remains in effect for the patient until you change it. Any customized trend scale displays in all review applications and reports.
Display the most recent alarm and trend data for the selected patient.	Select the double arrows (**Get Latest Patient Data**) at the top right of the window.
Print the Alarm Summary report.	Select the print icon at the top right side of the window. See "Alarm Summary Report" on page 8-30.
View a summary count of the technical alarm (INOP) messages.	Use the scroll bars on the right side of the page, if available. The summary pane appears below the graphical trends at the bottom of the page.
View a summary count of ST alarm messages.	Use the scroll bars on the right side of the page, if available. The summary pane appears to the left of the technical alarm summary pane at the bottom of the page.

Alarm Summary Report

The Alarm Summary report contains the highest number of alarms with its associated trend to assist in the proper setting of alarms for a patient. The alarm trends include Heart Rate, SpO2, NBP, Arterial Pressure, Resp, and PVC with the highest number of alarms in each measurement. The report also includes a table of the highest number of alarms for ST and INOPs.

Note — The frequency that is configured for printing determines the duration of the trends and alarm counts in the report. For example, if you print the report every 4 hours, you will see a 4 hour trend and the total alarms for each measurement in the last 4 hours (minus one minute).

Notifications

Note — The **Notifications** page is not available on PIC iX Essentials systems.

The **Notifications** page displays a list of all active notifications for the selected patient. Each notification includes its title and description, the time it occurred, the workflow state, and buttons to perform specific actions. The notifications are listed in order of workflow state, severity, and time.

An icon next to the time indicates the workflow state:

- The notification is new (Announced): 
- The notification is selected (Recognized): 

Note — For bedside monitors, the Information Center displays the same workflow state that appears at the bedside monitor. For telemetry devices, the workflow state is always Announced.

If available, there are two types of notifications, Alarm Advisor and Early Warning Score (EWS). For information about viewing Alarm Advisor notifications, see "Viewing Alarm Advisor Notifications" on page 8-31. For information about viewing EWS notifications, see "Early Warning Score Notifications" on page 8-32.

Alarm Advisor Notifications

The Alarm Advisor application is a clinical decision tool that provides feedback on recurring alarm limit violations for specific measurements. The application tracks the frequency of the yellow alarm limit violations and the acknowledging of these alarms. If recurring or prevailing alarm violations are ignored or acknowledged, Alarm Advisor notifications are displayed at the Information Center.

If the Alarm Advisor application is enabled, the Information Center stores and collects statistical data for the MX40, TRx4841A/TRx4851A transceivers, and the IntelliVue Patient Monitor.

The Alarm Advisor application observes and analyzes yellow alarm limit violations over a configured period of time called the Time Window, which can vary from 30 minutes to 12 hours.

Two different criteria can be configured to trigger an Alarm Advisor notification within the Time Window:

- Acknowledge Count — The number of times an alarm is acknowledged in the configured Time Window. This can identify recurring alarm conditions that are generated when the measurement value is close to the alarm limit.

  For example, if Time Window is set to **60 min** and Acknowledge Count is set to **5**, an Alarm Advisor notification is triggered if the same alarm is acknowledged five times during the 60 minute Time Window.

Note — Selecting Pause Alarm at the bedside monitor or at the Information Center is not included in the Acknowledge Count.

- Time in Alarm — The percentage of the Time Window that an alarm limit is violated. This can identify prevailing alarm limit violations.

  For example, if Time Window is set to **60 min** and Time in Alarm is set to **70%**, an Alarm Advisor notification is triggered if the alarm is present for more than 70% of the time, which is 42 minutes or more.

Viewing Alarm Advisor Notifications

When the criteria for an Alarm Advisor notification are met, a Notification icon appears in the patient sector and Patient Window.

Use one of the following methods to view the notifications:

- Select the Notification icon in the patient sector or Patient Window.
  - If there is only one active Alarm Advisor notification associated with a measurement, the page for the corresponding measurement opens in the **Measurements** application. See "Alarm Advisor Window" on page 8-31.
  - If there is more than one active Alarm Advisor notification for the patient, or if a measurement does not have a separate page in the **Measurements** application, the **Notifications** page displays a list of all active notifications. Review the list and select the **Setup** button to open the corresponding measurement page.
- Select the **Notifications** option in the **Measurements** application. Review the list of active notifications and select the **Setup** button to open the corresponding measurement page.

To reset an Alarm Advisor notification, access the page for the corresponding measurement. See "Alarm Advisor Window" on page 8-31.

You can adjust the alarm limit whenever a notification or Alarm Advisor window is open. If you take action, the Alarm Advisor window closes, the notification clears, and the Time Window restarts. If you close the Alarm Advisor notification without taking action, the notification remains active as long as the criteria are met.

Caution

Changing alarm limits always requires good clinical judgment of the patient's condition and observation of hospital policy.

You can reopen the notification or Alarm Advisor window by selecting the Notification icon. If the measurement value continues to fluctuate around the alarm limit that triggered the notification, a new notification occurs after the time defined by the Time Window. In the meantime, if the criteria are no longer met, the notification clears and is not available for viewing. For more information about the Alarm Advisor criteria, see "Alarm Advisor Notifications" on page 8-30.

Alarm Advisor Window

If an Alarm Advisor notification is active, a window containing information about the highest priority notification opens above the alarm count in the measurement page.

The notification includes the following information:

Item	Description
Notification title	The title of the alarm that was violated.
Notification indication	The indication describes the reason for the notification.
Recommendation	The recommendation text suggests how you might avoid the alarm limit violations. *Note* — The Information Center does not display customized recommendations that are set up at the IntelliVue Patient Monitor; only the factory default recommendation is displayed.
Disable Advisor	Select the **Disable Advisor** button to turn off the individual Alarm Advisor notification. A message asks you to confirm that you want to disable the notification and instructs how to re-enable the notification.
Reset Counter	Select the **Reset Counter** button to clear all of the collected statistical data for the individual Alarm Advisor notification. The Time Window restarts collecting new data.

The area below the Alarm Advisor window shows a summary of the patient's five most frequent alarms and a graphical trend of the measurement during the configured Time Window.

Note — There are separate controls on each device that generates Alarm Advisor notifications. For telemetry devices, the Information Center controls both the duration in the graphical trend and the Time Window of Alarm Advisor notifications, so the values displayed in the measurement window are always the same. However, if an Alarm Advisor notification comes from a device with its own duration control (such as an IntelliVue patient monitor), the displayed values can be different.

Note — To turn off the Alarm Advisor notifications for a specific measurement, go to the **Setup Alarm Advisors** page and select **Disabled**. See "Setting Up Alarm Advisor Notifications" on page 8-5.

Early Warning Score Notifications

The Information Center can display an Early Warning Score (EWS) based on vital signs and clinical observations collected at intervals at the IntelliVue Patient Monitor. The EWS can help you recognize early signs of deterioration in patients. The Information Center can send the EWS to other connected systems.

When the criteria are met, the Notification icon showing the EWS appears in the patient sector and Patient Window.

To view the active EWS notifications, do one of the following:

- In the patient sector or Patient Window, select the Notification icon.
- Select the **Notifications** option in the **Measurements** application.

The **Notifications** page displays a list of active EWS notifications. Each notification includes its title and description, the time it occurred, the workflow state icon  , and an **Acknowledge** button. Select **Acknowledge** to clear the notification from the patient sector.

9

Patient Data Review

This section describes the Information Center's patient data review applications. It includes the following:

Information Center Review Applications Overview

The Information Center provides review applications to display a patient's physiological measurements and alarm events that have been collected from a bedside monitor or telemetry device and stored in the database. Up to seven days of data is available for each patient.

Patient data storage begins when the patient is connected to a bedside monitor or telemetry device. The review applications display data in a variety of formats to help you to evaluate the patient's status. The data in a review application does not refresh automatically; to update the data, you must navigate forward in time or exit and return to the application. It can take up to 60 seconds for data to be stored and available for viewing in the review applications.

If your system has an Advanced Specialty Review license, your system may have review applications that are set up and named specifically for your unit. These customized applications are set up and uniquely named in System Configuration. Your system can be set up to display up to 12 review applications, which can be a combination of standard and customized applications.

Information Center Web Applications

If available on your system, you can use the Information Center Web to access review applications that are comparable to the review applications on the Information Center. See "Information Center Web" on page 9-43.

Review Applications

The following table describes the review applications.

Application	Description
Basic Review Applications	
Alarm Review	Available by default, the **Alarm Review** application displays the alarm events that have been automatically stored as well as strips that have been manually saved. See "Alarm Review" on page 9-32.
Fast Review	An application that allows you to quickly view an alarm by selecting an alarm in a patient sector. See "Fast Review" on page 9-35.
General Review	Displays the data history as a dashboard of waves, events, trends and tabular data. The **General Review** application can be customized to include any of the review application tiles, as described in "Review Application Tiles" on page 9-3.
Advanced/Specialty Review Applications (available by license)	
12-lead Capture Review	Available by license, allows you to view the results of 12-lead ECG captures performed at bedside monitors. See "12-lead Capture Review" on page 9-36.
Cardiac Review	A specialty review application designed for cardiac patients that stores all ECG waves, ST Snippets, ST Maps, and ECG Statistics for retrospective review.
Hemodynamic Review	A specialty review application that displays hemodynamic relevant waves, numerics, trends and events.
Neuro Review	A specialty review application that displays neurological relevant waves, numerics, trends and events.
Respiratory Review	A specialty review application that displays respiratory relevant waves, numerics, trends and events.

Accessing Review Applications

You can use the following methods to access the review applications:

- Select **Review** in the application window caption bar and select the application from the list.
- Open the **Main Setup** window and select the application button.
- Your system can be configured to open a specific review application (for example, **Alarm Review** or **General Review**) when you select the **Review** shortcut button in the patient sector. See "Shortcut Buttons" on page 2-11.

To access the Fast Review application, select an alarm from the list of alarms in the alarm area in the patient sector or Patient Window. See "Fast Review" on page 9-35.

Review Application Tiles

The review applications can be customized to display the data history as a dashboard of tiles containing compressed waves, events, graphical trends, and tabular data, allowing you to view and compare retrospective patient data in a variety of formats.

Review applications can contain any of the following tiles for displaying data.

Tile	Description
Alarm Review Tiles	
Compressed (Alarm Review)	Available only in the **Alarm Review** application, displays 30-second compressed wave strips. See "Compressed (Alarm Review) Tile" on page 9-32.
Strip Window (Alarm Review)	Available only in the **Alarm Review** application, displays uncompressed waves for an alarm or saved strip in detail for review or annotation. See "Strip Window (Alarm Review) Tile" on page 9-34.
Tabular (Alarm Review)	Available only in the **Alarm Review** application, displays an alarm strip on the top of the window and a list of available alarms for the current timeline duration on the bottom of the window. See "Tabular (Alarm Review) Tile" on page 9-34.
Other Review Application Tiles	
Compressed Wave	Displays 1 to 60 minutes of full disclosure waves. See "Compressed Wave Tile" on page 9-7.
ECG Statistics	Displays all available ECG statistical data in rows and columns suitable for charting patient information. See "ECG Statistics Tile" on page 9-9.
Event	Provides an overview of the frequency and duration of specific events. The tile includes alarms and events. The specific events available in the **Event** tile depend on your system configuration. See "Event Tile" on page 9-12.
Graphic Trend	Displays a patient's physiological measurements collected over time from a bedside monitor or telemetry device in graphic format. The measurements available in the **Graphic Trend** tile depend on your system configuration. See "Graphic Trend Tile" on page 9-14.

Tile	Description
Multi-Lead	Provides a retrospective review of waves for all available ECG leads. See "Multi-Lead Tile" on page 9-17.
SpotCheck Trend	Displays data from EWS SpotCheck, including MEWS, PEWS, SPS, and custom protocols data in tabular format. See "SpotCheck Trend Tile" on page 9-19.
ST Map	Allows you to view a map of ST leads in two circular charts; a limb leads chart and a chest leads chart. See "ST Map Tile" on page 9-20.
ST Snippets	Allows you to view the most recent averaged snippet from ST/AR for all available ECG leads. See "ST Snippets Tile" on page 9-21.
Strip	Displays uncompressed waves for an alarm or saved strip in detail for review or annotation. See "Strip Tiles" on page 9-22.
Tabular Trend	Displays all available measurement data in rows and columns suitable for charting patient information. See "Tabular Trend Tile" on page 9-29.

Tile Icons

Each tile in a review application has its own set of controls. Icons in the tiles provide additional functions. The table below describes the icons that may be available.

Icon	Description
	Select to print a report of a single review application tile. For example, from the **Tabular Trend** tile, print a **Tabular Trend** report. *Note* — To print a review application report, select the  icon in the application caption bar. See "Printing a Review Report" on page 9-31.
	Select to initiate a strip recording. *Note* — This icon is not available on PIC iX Essentials systems.
	Select to switch between tiles. For example, in the **Alarm Review** application, you can switch from a **Compressed** tile to a **Strip Window** tile. For single-display Information Centers, select the  icon on the bottom half of the window to switch between the available tiles.
	Select to annotate strip labels, add electronic caliper measurements, re-label alarm strips, and save a strip. If available in the review application, you can also generate a report of selected strips. This is important for procedure reports.
	Select to access a larger view of the tile.
	Select to discard the strip and close the current tile. *Important* — Deleting the strip also deletes the alarm and associated event from the **Event** tile.

Icon	Description
	Select to change tile settings, including view duration, timeline duration, graphical trend strip, and tabular trend interval.
	In the Fast Review application, select this icon in the caption bar to dismiss the window and return to the previous window or display the Main Screen. In a Prior Data review application, select this icon to return to the current data.
	Available from Fast Review if paging is available on your system. Select to send a page of the alarm to the paging device(s) for the caregiver(s) assigned to this patient. See "Sending a Page From Fast Review" on page 5-6. *Note* — This icon is not available on PIC iX Essentials systems.
	Available from the **Compressed** (Alarm Review) tile, select the single up or down arrow to navigate to the previous or next alarm. Select the double up or down arrow to navigate to the previous or next page of alarms.
	Available from the **Strip Window** (Alarm Review) tile, select the single up and down arrow to navigate to the previous or next strip.
	Available from the **Strip Window** (Alarm Review) tile, select to create, delete and edit custom alarm labels.
	Available from the **Compressed** and **Strip Window** (Alarm Review) tiles, select to filter the types of alarm strips to view.
	Available from the **Compressed** and **Strip Window** (Alarm Review) tiles, select to search for specific alarm strips.
	Available from the **Compressed** and **Strip Window** (Alarm Review) tiles, select to clear the search criteria.
	Available from the **Tabular Trend** tile. Move the mouse over this icon to indicate which trend data has been uploaded.

Time Focus

The review applications display data for a specific period of time. The time focus displays in the application window caption bar.

- The **Alarm Review** application opens with the time of the most recent alarm.
- The **12-lead Capture Review** application opens with the time of the most recent capture.
- If you enter a review application from **Alarm Review**, the time focus is the same as the time of the alarm to assist with reviewing data associated with that alarm. If you enter an application from an application other than **Alarm Review**, the time focus is the current time, minus one minute.
- If you enter an application from another application and the time focus was changed, the time focus is maintained until a new patient search occurs or the application is closed.
- If you change the time focus in any tile in an application, the other tiles in the application update to reflect the new time focus.

Using the Timeline

A timeline displays on the bottom of the review application. The timeline duration shows the patient data that displays for all of the review applications. The timeline duration that is set in one review application applies to all of the applications. The timeline is divided into gray and white sections. The white section, called the view duration, indicates the length of time for which alarms, events and trends are displayed. The default timeline duration is 24 hours and the default view duration is 8 hours.

Note — There is no view duration in the **Alarm Review** application. All alarms display for the selected timeline duration.

Changes to the view duration or timeline duration only apply to data for the current patient. If you close the review application or select another patient to review, the view duration and timeline duration revert to their defaults and the current time.

The current time focus is indicated on the timeline by a black cursor (thin vertical line).

Yellow and red vertical lines on the timeline identify yellow and red alarms.

The table below describes how to use the timeline.

If you want to...	Do this...
Change the time focus.	Select anywhere in the timeline. The cursor moves to the selected location.
Change the length of the timeline for all review applications.	Select the icon to the right of the timeline. In the **Timeline Setup** dialog box, select the number of hours from the **Timeline Duration** drop-down list.
Change the length of time of the displayed alarms, events, and trend data.	Select the icon to the right of the timeline. In the **Timeline Setup** dialog box, select the number of hours from the **View Duration** drop-down list. The choices depend on the selected **Timeline Duration**.
Move back or forward in time.	Use the double arrows on the right and left of the timeline to move the time by one timeline duration. Use the single arrows to move the time by one view duration.

Resizing a Tile

You can use the mouse to change the size of a tile. Drag the boundary at the top or bottom of the tile until it is the height that you want.

Compressed Wave Tile

The **Compressed Wave** tile provides 1 to 60 minutes of full disclosure waves (default is 12 minutes). You can switch between viewing the compressed waveform, a strip, or a **Multi-Lead** tile by selecting the  icon to the right of the compressed wave.

Note — 12 minutes of full disclosure waves are available with the PIC iX Express.

Using the Compressed Wave Tile

The table below describes how to use the **Compressed Wave** tile.

If you want to...	Do this...
View waves for an event of interest.	Move the cursor into the compressed waves then move through the waves by using the right and left double arrows.
View the waves in greater or less detail.	Use one of the following methods: • Move the cursor into the compressed waves, select the number of minutes at the bottom right, and select from the list. • Select the  icon to the right of the compressed wave. In the dialog box, select the number of minutes from the **Duration** drop-down list then select **OK**. The higher the number of minutes, the less detail shown. Choices are **1 Minute**, **3 Minutes**, **6 Minutes**, **12 Minutes**, **30 Minutes**, or **60 Minutes**. A red rectangle displays on the compressed wave area indicating the corresponding time selection.
Change the wave size.	Use one of the following methods: • Move the cursor over the wave tile, select the wave gain and select the size from the list. • Select the  icon to the right of the compressed wave. In the **Compressed Wave Setup** dialog box, select the wave size from the **Wave Gain** drop-down list then select **OK**. Choices are **x1/2**, **x1**, **x2**, or **x4**.
Open a strip to view waves in greater detail.	Move the cursor to the part of the compressed wave that you want to view, and select. A strip pop-up window opens. *Note* — If you have a compressed wave and your system does not have a customized separate strip tile, you can only select areas within the 30-second strip for a wave strip report. If your system has a custom separate strip tile, you can go to other time frames to create a report. See "Using Strip Tiles" on page 9-23.

If you want to...	Do this...
Access a larger view of the compressed wave section.	Select the  icon to the right of the compressed wave. The compressed wave area expands. Select the **X** (Close) button to return to the previous view.
Change or add waves that display.	Move the cursor into the compressed wave area, then select the  icon on the top left side of the pane. Select waves from the list. The number of waves you can add depends on the duration. **Duration** — **Maximum Waves** 1 minute — 6 3 minutes — 5 6 minutes — 4 12 minutes — 3 30 minutes — 2 60 minutes — 1
Print a report of a compressed wave for a specific length of time.	**1** Move the cursor into the compressed wave area, then right-click at the point where you want the printout to begin. Select **Start** from the menu that displays. The word **Start** displays on the wave. **2** Move the cursor to the point where you want the printout to end. Right-click and select **Stop** from the menu that displays. The word **Stop** displays on the wave and the selected segment is shaded gray. **3** Right-click in the wave and then select **Print** from the menu. The maximum duration of a compressed wave that can be printed is 1 hour.
Make a recording of a compressed wave for a specific length of time.	**1** Move the cursor into the compressed wave area, then right-click at the point where you want the recording to begin. Select **Start** from the menu that displays. The word **Start** displays on the wave. **2** Move the cursor to the point where you want the recording to end. Right-click and select **Stop** from the menu that displays. The word **Stop** displays on the wave and the selected segment is shaded gray. **3** Right-click in the wave and then select **Record** from the menu. The maximum duration of a compressed wave that can be recorded is 10 minutes.

ECG Statistics Tile

The **ECG Statistics** tile displays all available ECG statistical data in rows and columns suitable for charting patient information. Each statistical value describes the ectopic activity that occurred in the one minute time period leading up to its computation. No statistics are available if Cardiotach mode is turned on for the patient.

The following table describes the information in the **ECG Statistics** tile.

Note — For statistics marked with an asterisk (*), data is only available if the **Trend Interval** is set to **Algorithm Interval** or **1 Minute**; no values are displayed in the **Total** column.

Statistics	Description
Data Availability	
Percent of Data Available	A value of 100 means that the column has statistics data to describe the entire duration of the time that the column spans.
Heart Rate Data	
Total Beats	Total number of beats.
Normal Beats	Total number of beats labeled as N.
Percent Poor Signal*	Percent poor signal identified as the sum of all R-R intervals with at least one beat labeled as A or ?.
Heart Rate Variability	
Percent Irregular Heart Rate*	Percent of the sum of all R-R intervals with adjacent intervals that vary more than 12.5% and the beats are labeled as N or S and excluding M.
Square Root of NN Variance*	Standard deviation of NN R-R intervals where R-R intervals are less than 4 seconds averaged.
pNN50*	Percent of NNN beat sequences with changes of adjacent R-R intervals > 50 msec.
Pause Events	Total number of asystole, pause, and missed beat events.
Supra-Ventricular Ectopy	
Supra-ventricular Beats	Total number of beats labeled as S and N.
Supra-ventricular Premature Beats	Total number of beats labeled as S.
Number of SVPB Runs	Total number of SVPB runs (three or more S's in a row).
Maximum HR in SVPB Runs	Maximum heart rate of runs of beats labeled as S.
Minumim HR in SVPB Runs	Minimum heart rate of runs of beats labeled as S.
Ventricular Ectopy	
PVC Beats	Total number of beats labeled as V.

Statistics	Description
Percent Ventricular Trigeminy*	Percent of Ventricular Trigeminy rhythm (N, N, V, N, N, V, N, N beat labels).
Percent Ventricular Bigeminy*	Percent of Ventricular Bigeminy rhythm (N, V, N, V, N beat labels).
Number of V? Runs	Total number of runs (≥ three beats labeled as V or ?).
Number of PVC Runs	Total number of PVC runs (three or more V's in a row).
Maximum HR in PVC Runs	Maximum heart rate of runs of beats labeled as V.
Minumim HR in PVC Runs	Minimum heart rate of runs of beats labeled as V.
Longest PVC Run*	The longest PVC run (largest number of V's in a run).
Number of R-on-T PVC Beats	Total number of R on T's within the algorithm interval. For HR < 100, a PVC with R-R interval < 1/3 the average interval followed by a compensatory pause of 1.25 times the average R-R interval or two such V's without a compensatory pause occurring within five minutes of each other. When HR > 100, 1/3 the R-R interval is too short to detect.
Number of PVC Pairs	Total number of ventricular pairs (two V's in a row).
Number of Multiform PVCs	Total number of multiform V's.
Paced Beats	
Atrial Paced Beats	Total number of beats labeled as P with detected pace pulse > 150 msec before QRS.
Ventricular Paced Beats	Total number of beats labeled as P with detected pace pulse < 150 msec before QRS.
Dual Paced Beats	Total number of beats labeled as P with a detected pace pulse < 150 msec before QRS and a detected pace pulse > 150 msec before QRS.
Total Paced Beats	Total number of beats labeled as P.
Percent of Beats that were Paced	Percent of beats labeled as P.
Percent Paced Beats that were Atrially Paced	Percent of beats labeled as P with a Pace Pulse > 150 msec before the QRS.
Percent Paced Beats that were Ventricularly Paced	Percent of beats labeled as P with a Pace Pulse < 150 msec before the QRS.
Percent Paced Beats that were Dual Paced	Percent of beats labeled as P with two pace pulses (one > 150 msec and one < 150 msec) before the QRS.
Number of Paced Runs	Total number of Paced runs (three or more P's in a row).

Statistics	Description
Number of Pacer Not Pacing Events	Total number of Pacer not Pacing (no QRS and no Pace Pulse for 1.75 times the average R-R interval). Paced Mode On only.
Number of Pacer Not Capture Events	Total number of Pacer not Capture (no QRS for 1.75 times the average R-R interval with Pace Pulse). Paced Mode On only.
Total	Contains the total for the view duration.

Using the ECG Statistics Tile

The table below describes how to use the **ECG Statistics** tile.

If you want to...	Do this...
Access a larger view of the **ECG Statistics** tile	Select the icon to the right of the tile. The area expands. Select the **X** (Close) button to return to the previous view.
Change the time focus within the table	Select the desired column in the **ECG Statistics** tile. The time focus updates to the selected column time.
Move the **ECG Statistics** display back or forward in time	Use the horizontal scroll bar on the bottom or use the right and left arrow buttons.
Change the time period	1 Select the icon to the right of the tile. The **ECG Statistics Tile Setup** dialog box displays. 2 Select the number of hours from the **View Duration** drop-down list. 3 Select **OK**. The timeline updates to reflect your selection.
Change the time resolution for the ECG statistics	1 Select the icon to the right of the tile. The **ECG Statistics Tile Setup** dialog box displays. 2 Select the **Trend Interval** drop-down arrow, then select the number of minutes. The Trend Interval specifies the time between the columns in the **ECG Statistics** tile. You can also select **Algorithm Interval**, which is the interval at which the statistics are calculated by the data source (for example, the bedside monitor or Information Center). *Note* — If you choose any other interval other than the **Algorithm Interval**, some statistics may not be available. 3 Select **OK**.
Print a report of the **ECG Statistics** tile	Select the icon to the right of the tile. If prompted, select the type of print output. Select **OK**.

Event Tile

The **Event** tile provides an overview of the frequency and duration of specific events and alarms. Alarms and events that occurred during the displayed view duration can be seen and compared to the waves, trends, or tabular data. Events include:

- Alarms generated from the Information Center, bedside monitor or MX40.
- Arrhythmia events. See "Arrhythmia Events" on page 7-21.

Note — Arrhythmia events are always displayed in the **Event** tile, even if the corresponding arrhythmia alarms are turned off.

On the left side of the **Event** tile, the events are sorted into groups. Event information is organized in hierarchical form starting from general information and moving through increasingly detailed data.

Select the + or - next to the group name to expand or collapse the list of events/alarms in the group. For example, the **Red Arrhythmia Alarms** group includes Asystole, V-Fib/Tach, V-Tach, Extreme Tachy, and Extreme Brady.

Note — The available events depend on your monitoring device and system configuration.

Note — The HR events display with one asterisk (*) whether they are configured as a long yellow (**) or short yellow (*) alarm.

To remove an individual event/alarm from the tile, clear the check box next to the individual event/alarm.

The **Event** tile provides the following information whenever the event time cursor (indicated by a thin vertical line) matches the onset of an event:

- The time and date corresponding to the position of the cursor displays on the bottom left of the tile along with the name of the event, and the value and name of the measurement (if applicable) that violated the event limit.
- The event count appears at the far right of each row. The event count is in the format X/Y, where X is the number of events that occurred at or before the time focus, and Y is the total number of the events of the same type within the current view duration. For example, 3/5 means that there is a total of five events in the row, and three of the events occurred before or at the time focus.
- You can use the left and right single arrows to scroll to the next or previous event. Alternatively, you can click and drag through the **Event** tile. This allows you to quickly move from event to event and see the associated waves (and trends in full screen).

Color-Coded Events

Each event is shown by a bar that represents the length of time the alarm message banner was displayed in the patient sector. The end time of the event bar may indicate acknowledgment if the condition is resolved or if the condition has ended for non-latched alarms. If the condition continues after acknowledgment, the alarm message banner also remains until the condition ends.

The color of the bar indicates the severity of the event.

Color	Severity
Red	*** Life threatening alarms.
Yellow	*/** Limit violation alarms and arrhythmia alarms.
Cyan	All INOP conditions and non-alarming events.
Blue	Arrhythmia events and technical alarms.

Move the cursor over an event to see its alarm text. If there are multiple events at the cursor time, the alarm text for each event displays, sorted by the event start times. Select an event to compare it with other available tiles in the application.

Signal Quality Indicator

The **Event** tile can be configured to include an additional row to identify the 12-lead signal quality. The Signal Quality Indicator (SQI) is a score of high/low signal noise and leads off. High frequency noise is measured in areas of the signal in which there is no atrial or ventricular activity. Certain rhythms, such as atrial flutter or V-Tach with a very high HR, have atrial or ventricular rhythm in every point of the signal, which the SQI will interpret as high-frequency noise. So, these rhythms may display with waves that look like good signal quality but the SQI will rank as fair or poor.

The signal quality row, identified by a signal indicator icon  displays the signal quality for all 12-lead full disclosure data.

You can use the signal quality row to:

- Find the highest quality 12-lead ECG from the historical data.
- Navigate to passages of ECG that the DXL algorithm can analyze for 12-lead reports.
- Identify the quality of the signal. Color markers in the row identify the quality of the signal, as described in the table below.
- See 12-lead capture and export times, which are identified by arrows in the signal quality row. A down arrow identifies a capture and an up arrow identifies an export. Moving the cursor over the line displays the capture time and export status. A minimum number of available leads are necessary before you can perform a 12-lead capture.

The following table describes the color indications based upon available leads. A gold grid overlays the color to differentiate between diagnostic and derived 12-lead.

Signal Quality		Minimum Valid Leads		
Color	**Description**	**12-Lead**	**Hexad**	**EASI**
Bright green	A good quality signal is available for analysis. The 12-lead will look good on paper and can be analyzed by DXL algorithm.	Two valid limb and six valid chest leads	Two valid limb and two valid chest leads	All valid leads (three raw leads)
Tan	Fair	Two valid limb leads and two valid chest leads of which one is lateral (V5, V6) and one is anterior (V1–V4) leads	Two valid limb and two valid chest leads	All valid leads (three raw leads)
Yellow	Poor	Fewer than two valid limb leads and/or the valid chest leads do not cover both lateral (V5, V6) and anterior (V1–V4) leads	Only one limb and/or only one chest	One or more invalid leads
No color	No signal quality is available	No 12-lead full disclosure	ECG is off	ECG is off

Graphic Trend Tile

The **Graphic Trend** tile displays a patient's physiological measurements collected over time from a bedside monitor or telemetry device in a linear trend format.

Five measurement labels display across the top of the tile. When you first access the tile, only the leftmost measurement with its current scale is active. Only measurements that are currently being sourced are available.

Note — If the top measurement is **Any X**, where **X** is the measurement group, no measurements for that group are being sourced at the time of the view duration.

A red caret at the top or bottom of the tile indicates that measurement data is outside of its scale.

If Trend Upload is available on your system, a gray highlight displays around numeric data that has been uploaded from an IntelliVue Patient Monitor (Release K or later) or MX40 (Release B.06 or later). Up to eight hours of numeric data that is collected while the device is not connected to the Information Center automatically uploads once the device reconnects to the Information Center.

Note — For systems configured to upload data to the electronic medical record (EMR), if the Information Center is disconnected from the EMR when the upload occurs, the data does not automatically export to the EMR when connection is restored. The data automatically exports when the next upload occurs.

Understanding Graphic Trend Values

For most parameters, the values shown in the graphic trend are the medians of measurements sampled during the view duration. For view durations less than one hour, the displayed values are the medians of five 12-second samples. For view durations greater than or equal to one hour but less than four hours, the displayed values are the medians of five 60-second medians. For view durations greater than or equal to four hours, the values are the medians of five 5-minute medians.

The following table describes how measurements are displayed in the **Graphic Trend** tile.

Measurement	Description
Continuous (Periodic)	Single-value continuously monitored measurements, such as heart rate, display as a single line plot. Triple-value periodic measurements, such as invasive blood pressure, display three lines of the same color.
Aperiodic	The presentation of aperiodic, non-continuous measurements depends on the number of values to be shown. Aperiodic measurements are presented as discrete graphic data points with an X indicator. Triple-value aperiodic measurements (for example, NBP) appear as an X at the mean value with arrow indicators at the systolic and diastolic values. Aperiodic measurements are not averaged and are always displayed as exact values. If more than one aperiodic value falls into the same column, the most recent value is shown.
Histogram	You can select one numeric measurement to display as a histogram by selecting the icon then selecting the **Graphic Trend With Histogram** radio button in the dialog box. The histogram displays on the right side of the tile.

Differences Between Trend Displays

For graphic trends, the displayed data is determined by the view duration. For tabular trends, the data displayed depends on both the view duration and the tabular interval (the time between the columns). So for example, if the view duration is one hour and a tabular interval is one minute, the tabular trend displays the median value that is closest to the tabular column time. The graphic trend shows all of the median values.

Because different median values are used to create the tabular and graphic trends, there may be a difference between the tabular and graphic trend data displayed in the trend tiles. For example, the graphic trend contains valid data but the tabular trend displays a question mark (-?-) indicating that no data displays for the measurement. Or, the graphic trend shows a HR of 80 and the tabular trend shows a HR of 120. To more closely align the resolution of the two trends, you may want to reduce the view duration to 1 Hour.

Using the Graphic Trend Tile

The table below describes how to use the **Graphic Trend** tile.

If you want to...	Do this...
Select a different measurement to trend	Select the measurement drop-down arrow then select a measurement from the list. The measurements available are currently being sourced within the Information Center.
Compare one or more measurement trends	Select the measurement name at the top of the tile. You can change the measurements to view and compare by selecting the drop-down arrow and selecting a measurement from the list. Only measurements currently being sourced are available. *Note* — You can manually move the scale by selecting and dragging it up or down as appropriate. This allows you to overlap trends to determine if changes in trends can be correlated.
Enable or disable the display of a trend	Select the measurement label and select or clear the check mark next to the measurement on the drop-down list.
Change the trend scale	1 Select the measurement scale. A dialog box displays the current scale. 2 Select **Customize...**. 3 Select the up and down arrows to select the high and low scale values. 4 Select **OK**. The new scale displays in the **Graphic Trend** tile and the data is drawn relative to the selection. Data that is outside of the scale is drawn to the respective top or bottom of the tile. A red caret at the top or bottom of the tile indicates that measurement data is outside of its scale. The trend scale remains in effect until you change it. Custom scales are saved on a per patient basis and return to defaults. *Note* — You can manually move the scale for a measurement by selecting and dragging it up or down. This allows you to overlap trends to determine if changes in trends can be correlated.
Change the time focus	Do one of the following: • Select the Graphic Trend and drag left or right to the desired time. • Select anywhere on the timeline on the bottom of the window to change the time focus. The white area, called the view duration, indicates the length of time for which the trends are displayed.

If you want to...	Do this...
Change the time period for a trend	Do one of the following: • Drag the view duration or use the arrows in the timeline. Selecting the single arrows moves the view duration by one view duration; selecting the double arrows moves the timeline by one timeline duration. • Select the icon to the right of the tile. The **Graphic Trend Setup** dialog box displays. Select the number of hours from the **View Duration** drop-down list. Select **OK**. The **Graphic Trend** tile and the view duration area on the timeline update to reflect the new time selection.
Display one measurement value in a bar chart form/histogram	1 Select a measurement to display from the leftmost measurement drop-down list. 2 Select the icon to the right of the tile. The **Graphic Trend Setup** dialog box displays. 3 Select the **Graphic Trend With Histogram** radio button. 4 Select **OK**. A histogram in bar chart form for the selected measurement displays to the right of the tile. *Note* — You can only display one measurement at a time with histogram.

Multi-Lead Tile

The **Multi-Lead** tile provides a retrospective review of waves for all available ECG leads. Lead labels display for each lead and, depending on the format, rhythm strips display. The number of leads that display depends on the number and placement of the leads on the patient. See "Waves Stored By Device" on page 4-6.

All 12 diagnostic leads will be stored if licensed. If 12 leads of wave data are being sourced from the IntelliVue Patient Monitor, it is possible to capture a diagnostic 12-lead ECG from the **Multi-Lead** tile. If any of the 12 leads are derived, then a 12-lead ECG with measurements only can be captured at the Information Center. When 12 leads of wave data are available for capture, a capture icon displays in the **Multi-Lead** tile. You can view 12-lead ECG captures generated from the full disclosure data in the **12-lead Capture Review** application. See "12-lead Capture Review" on page 9-36.

The time focus in the **Multi-Lead** tile is at the end of the waves; the capture timestamp is at the beginning of the waves.

Using the Multi-Lead Tile

The following table describes how to use the **Multi-Lead** tile. When you move the cursor over the tile, settings that you can modify are highlighted in gray.

If you want to...	Do this...
Capture a 12-lead ECG from retrospective data	For systems with the 12-lead Full Disclosure feature available, select the  icon to the right of the tile to capture the ECG. The new capture displays in the **12-lead Capture Review** application. See "12-lead Capture Review" on page 9-36. *Notes —* • The icon is only available if there are 12 leads of ECG waves available to capture. The waves must be uninterrupted for 10 seconds before and one second after the time focus. • Captures performed at the Information Center use the Information Center filter settings. Captures performed at the IntelliVue Patient Monitor use the bedside filter settings.
Export the 12-lead data	For systems with the ECG 12-Lead Export feature available, select the  icon. The **12-Lead Export Setup** window displays. See "Exporting 12-Lead ECG Data" on page 9-39.
Change the wave layout	Move the cursor over the tile, select the wave layout on the top right corner, then select a wave layout. Choices are: **12x1** (default), **6x2**, **3x4**, **3x4 1R**, **3x4 3R**, **3x4 STMap**, or **3x4 1R STMap**. With **3x4 STMap** layout an ST Map displays on the bottom of the tile. With **3x4 1R STMap** only 8 seconds of data displays across the width of the tile with an ST Map vertically oriented on the right side. You can change the scale of the ST Map by selecting the **ST Map Scale:** drop-down arrow then selecting a size from the list.
Change the wave size	Move the cursor over the tile, select the calibration bar, and then select the wave size. Leads are redrawn according to your choice. The chest gain depends on the limb wave size: • **Chest Gain: Full**: The chest wave displays the same size as the limb wave. • **Chest Gain: Half**: The chest wave displays as half the size of the limb wave.
Change the wave speed	Move the cursor over the tile, select the speed on the bottom of the window, and then select the speed. The window re-displays with the selected speed.

If you want to...	Do this...
Change the rhythm lead	Move the cursor over the tile, select the rhythm lead label (for **3x4 1R**, **3x4 3R** and **3x4 1R STMap** layouts only) on the bottom left of the window, and then select a lead.
Access a larger view of the tile.	Select the  icon to the right of the tile. The area expands. Select the **X** (Close) button to return to the previous view.
Center drifting strip waves when there is baseline wander on the ECG signal.	Move the cursor over the tile and select the **ECG Filter** check box. ECG Filter helps to keep the wave on a single flat baseline that can be seen more easily.
Minimize waves overlapping possible due to high amplitude of waves.	Move the cursor over the tile and select the **Clip Waves** check box.
Print a Multi-Lead Report	Select the  icon on the right of the tile. If prompted, select the type of print output. Select **OK**.

SpotCheck Trend Tile

The **SpotCheck Trend** tile displays records that contain all vital signs and entered data (such as clinical observations) and any calculated early warning scores (EWS) and subscores from the IntelliVue Patient Monitor (Release M.0 or later).

There are two basic types of scoring: single parameter scoring (for example, SPS) and multiparameter scoring, such as MEWS and PEWS). If available, a composite MEWS score displays in the first column of each record. Each vital sign and observation displays in separate columns in order of priority.

Note — If a patient transfers with equipment to a new unit and they have an active EWS score, when the equipment associates to the new unit, the same active EWS score displays in both the previous unit and the new unit.

The following icons in the SpotCheck trend records represent MEWS, PEWS and SPS early warning scores. The color of the icon corresponds to the severity of the measurement or observation.

Icon	Description
	Composite MEWS or PEWS score.
	SPS. The color of the icon corresponds to the severity of the measurement. A larger icon indicates a composite SPS; a smaller icon indicates a subscore.

Using the SpotCheck Trend Tile

The following table describes how to use the **SpotCheck Trend** tile.

If you want to...	Do this...
Change the time focus	Move the cursor over a row; the time focus changes to the collection time of the vital sign indicated on the row.
Change the view duration	Do one of the following: • Drag the view duration or use the arrows in the timeline. Selecting the single arrows moves the view duration by one view duration; selecting the double arrows moves the timeline by one timeline duration. • Select the icon to the right of the tile. In the **SpotCheck Trend Setup** dialog box, select the number of hours from the **View Duration** drop-down list then select **OK**. The **SpotCheck Trend** tile and the view duration on the timeline update to reflect the new time selection.
Print a SpotCheck Trend Report	Select the icon to the right of the tile.
Filter the types of metrics to display	Select the icon on the right side of the tile, then select the type of metric to view. Options are: **All**, **MEWS**, **SPS**, or **SpotCheck**.
Access a larger view of the SpotCheck Trend tile	Select the icon to the right of the tile. The area expands. Select the **X** (Close) button to return to the previous view.

ST Map Tile

The **ST Map** tile provides a view a map of ST leads in two circular charts; a limb leads chart and a chest leads chart. Three or more leads are necessary to draw the map. The current scale displays as a horizontal line through the circle. The ST leads display as lines running through the circle. If there is no data for a lead, then that lead is not drawn. If a baseline has been set for the patient, it displays as a yellow line in the ST Map. A green shaded area indicates the patient's current values.

Using the ST Map Tile

The following table describes how to use the **ST Map** tile. When you move the cursor over the tile, settings that you can modify are highlighted in gray.

If you want to...	Do this...
Set the ST Map scale	1 Select the icon to the right of the tile. The **ST Map Setup** dialog box opens. 2 Select the **Scale: (±)** drop-down arrow then select the scale size. The range is ± 1 to ± 15 mm, the default is ± 2 mm. 3 Select **OK**.
Display the baseline value in the **ST Map** tile	1 Select the icon to the right of the tile. The **ST Map Setup** dialog box opens. 2 Select the **Show Baseline** check box. 3 Select **OK**.
Change the trend interval	1 Select the icon to the right of the tile. The **ST Map Setup** dialog box opens. 2 Select the **Trend On/Off** check box. 3 Select an **Interval:** from the list. Choices are: **15 Seconds**, **1 Minute**, **5 Minutes**, **15 Minutes,** or **30 Minutes**. The default is **1 Minute**. 4 Select **OK**.
Access a larger view of the tile	Select the icon to the right of the tile. The area expands. Select the **X** (Close) button to return to the previous view.
Change the time focus back or forward by 1 minute	Select the single arrows at the bottom of the tile.

ST Snippets Tile

The **ST Snippets** tile displays up to 12 stored ST snippets (a sample of the patient's ECG beats for a given time), allowing you to examine the data for a significant episode in detail. You can view individual ST snippets, compare snippets against each other, or compare snippets against a baseline.

Using the ST Snippets Tile

The following table describes how to use the **ST Snippets** tile. When you move the cursor over the tile, settings that you can modify are highlighted in gray.

If you want to...	Do this...
View an ST Map in the **ST Snippets** tile.	Move the cursor over the **ST Snippets** tile, select the Format setting, then select **3x4 STMap**. An ST Map displays on the bottom of the tile. You can change the scale of an ST Map by selecting the map and then selecting a size.

If you want to...	Do this...
Change the wave gain.	Move the cursor over the **ST Snippets** tile, select the calibration bar, then select the wave size. Choices are **x1/2**, **x1**, **x2** or **x4**.
Change the wave speed.	Move the cursor over the **ST Snippets** tile, select the **Speed:** setting on the bottom of the tile, then select the speed. The window re-displays with the selected speed.
Superimpose the current measurement points (ISO and ST) on the ST segment.	Move the cursor over the **ST Snippets** tile and select the **Show Measurements** check box.
Display the ST baseline value in the tile.	Move the cursor over the **ST Snippets** tile and select the **Show Baseline** check box.
Set a new baseline for reference.	Select **Update Baseline**. A message asks if you want to overwrite the existing baseline. Select **Yes** to confirm.
Access a larger view of the tile.	Select the  icon to the right of the tile. The area expands. Select the **X** (Close) button to return to the previous view.
Move back or forward between ST snippets.	Select the double arrows at the bottom of the tile.
Print an ST View report.	Select the  icon to the right of the tile. If prompted, select the type of print output. Select **OK**.

Strip Tiles

Strip tiles in the review applications allow you to view uncompressed waves. Strips have 30 seconds of data. Strip tiles show one or more waveforms and measurements that correspond to the time focus.

The alarm strip shows the vital sign measurement that is currently alarming, as well as other measurements at the alarm announce time. The measurements and values display across the top of the strip. The measurements display in order of priority.

The time focus of the alarm strip for non-arrhythmia alarms is the announce time of the alarm. The alarm announce time is indicated by black carets at the top and bottom of the strip.

The time focus for arrhythmia alarms (short yellow) is the onset of the alarm. The alarm onset time is indicated by green carets at the top and bottom of the strip.

If the difference between the announce time and the onset time is less than 30 seconds, the time focus is set to the onset time of the alarm. If there is no onset time, or if the difference between the announce time and the onset time is greater than or equal to 30 seconds, the time focus is set to the alarm announce time.

Notes

- If your system is licensed for the Wave Strip Export feature, the system can be configured to automatically send all alarm and saved strips as images to a file folder for import into electronic medical records. If an alarm is ongoing and is not complete at the time of the initial export, multiple strips might be exported for the same alarm.
- Occasionally, there may be gaps in the wave data in **Alarm Review**. This can occur when a device first associates with the Information Center on the network, and the device is in a state of alarm. The alarm data may be available before the wave data, which can result in alarm strips with missing wave data. The alarm **Strip Window** tile does not include gap annotations (see "Viewing Gaps in Wave Data" on page 9-26).
- The term "alarm event" on an Efficia monitor is equivalent to the term "saved strip" on the Information Center. See your Efficia monitor documentation for more information.

Using Strip Tiles

The table below describes how to use **Strip** tiles in the review applications, including **Alarm Review** and Fast Review.

If you want to...	Do this...
Move back or forward in time.	Do one of the following: • Select the single arrows to move the time back or forward by approximately one second. • Select the double arrows to move back or forward by a page. A page is the amount of time that is viewable on your screen. *Note* — You can also move through the strip by clicking and dragging.
Change the wave size (scale).	Select the calibration bar on the wave, then choose the size from the list. Choices are **x1/2**, **x1**, **x2**, or **x4**.
Change the wave speed.	Select the speed on the bottom right of the strip, then select a speed from the list. The window re-displays with the selected speed. Choices are **6.25 mm/s**, **12.5 mm/s**, **25.0 mm/s**, or **50.0 mm/s**.
Add or remove waves from the **Strip** tile.	Select **Waves** on the bottom of the tile, then select the wave from the list. A wave is included in the **Strip** tile when a check mark displays next to the wave name. The available waves were sent to the Information Center at the requested time.
Center drifting strip waves when there is baseline wander on the ECG signal.	Select the **ECG Filter** check box to keep the wave on a single flat baseline that can be seen more easily.

If you want to...	Do this...
Minimize waves overlapping possible due to high amplitude of waves.	Select the **Clip Waves** check box. Orange carets indicate if wave data is clipped above or below the wave's viewable area. Select a caret to display the individual wave. The wave is displayed at 1/2x and the calibration bar is set to 1mv. Select the green arrow button to return to the previous view. *Note* — When displaying a clipped wave, the **Waves** option and the **Clip Waves** check box are not available.
Save a strip with comments, annotations, or alarm re-label text.	Select the icon. A dialog box opens that allows you to re-label the alarm, enter a comment, and save the strip. The label you choose and the comments you enter will be visible when the strip is displayed. If the strip is included in an alarm report, the comment will be printed in the report.
Use the electronic calipers to measure time intervals, such as R-R.	See "Using Calipers to Measure Intervals" on page 9-27.
Print a report of a single strip.	Select the icon to the right of the strip. If prompted, select the type of print output. Select **OK**.
Make a recording of the strip.	Select the icon.
Clear the strip from the screen.	Select the **X** button on the top of the strip.
Send a page of the alarm to the paging devices for the caregivers assigned to the patient. Available in Fast Review if paging is available.	Select the icon. See "Sending a Page From Fast Review" on page 5-6.
In Fast Review, dismiss the window and return to the previous window or display the Main Screen. If viewing prior data, dismiss the window and return to the current data.	Select the icon.

If you want to...	Do this...
Save or print a strip report.	1 Select the icon. A **Saved strip** dialog box opens. 2 Select the icon. The dialog box expands to display the wave strip print controls. (This is not available in **Alarm Review**.) The shaded area in the **Strip** window indicates the area that prints on the report. 3 Select **Add** to include the strip in the report. The time and any existing comments display in the Strip Report list. 4 To exclude or remove a strip, select it in the list and select **Remove**. 5 Select **Print All** to save and print the strips. *Note* — If you open a strip by selecting a compressed wave, and a **Strip** window is displayed, you can only select areas that are within the current 30-second strip to add additional strips to the wave strip report. To include other time frames in a report, toggle to the wave strip tile or, if available, select a separate custom wave strip tile.
Navigate to the next or previous strip. Available in **Alarm Review** only.	Select the single up or down arrows to the right of the Strip tile.
Filter the alarms that display for the current timeline duration. Available in **Alarm Review** only.	Select the icon, then select an alarm group from the list that displays. Choices are: **All Strips** (default), **All Alarms**, **Red Alarms**, **Yellow Alarms**, **ECG Alarms**, **Non-ECG Alarms**, or **Saved Strips**. A list of available alarms that match the filter criteria for the current timeline duration displays on the bottom of the window.
Search for alarms by alarm type, for example, Afib or by comments or annotations associated with the alarm. Available in **Alarm Review** only.	Enter a 1- to 32-character search text in the **Search** box and then select the icon. The characters in the search text must match exactly, including spaces. The Information Center searches all alarms for the current patient's timeline duration and displays a list of matching alarm strips on the bottom of the window.
Create a custom alarm label. Available in **Alarm Review** only.	1 Select the icon to the right of the strip. The **Custom Alarm Labels** dialog box opens. 2 Select **Add**. The **Add/Edit Alarm Re-Label** dialog box opens. 3 Enter a 1- to 25-character alarm label in the **Label:** field. 4 Select **OK**. 5 Select **OK** to close the **Custom Alarm Labels** dialog box. The custom label is added to the top of the label list in the **Custom Alarm Labels** dialog box. Use the up and down buttons to move the label up or down in the list.

If you want to...	Do this...
Edit an existing custom alarm label. Available in **Alarm Review** only.	1 Select the icon to the right of the strip. The **Custom Alarm Labels** dialog box opens. 2 Select an existing label from the list, then select **Edit**. The **Add/Edit Alarm Re-Label** dialog box opens. 3 Edit the alarm label in the **Label:** field. The alarm label can contain 1 to 25 characters. 4 Select **OK**. 5 Use the up arrow and down arrow buttons to move the label up or down in the list. 6 Select **OK** to close the **Custom Alarm Labels** dialog box.
Delete an existing custom alarm label. Available in **Alarm Review** only.	1 Select the icon to the right of the strip. The **Custom Alarm Labels** dialog box opens. 2 Select the label you want to delete from the list, then select **Delete**. 3 Select **OK**.

Viewing Gaps in Wave Data

If wave data is unavailable or invalid, the region of missing data displays a diagonal stripe (\\\\\) pattern in the Strip tile. A message associated with the gap is displayed in the striped area.

Note — Wave gap annotations are not available in **Alarm Review**.

In a compressed wave, only the striped area displays to represent the gap. To view the message associated with the gap in a tool tip, move the cursor over the striped area. In an uncompressed wave, the striped pattern and the message are displayed.

If no wave data is available for the entire time spanned by the strip, and the system does not detect any alerts or events, the message **No Data Available** is displayed in the striped area.

The following conditions result in a gap in wave data:

- No wave data is available for the entire time spanned by the wave strip.
- Wave data is available for some, but not all waves, for example if the SpO2 sensor is off of the patient or the Pleth wave is absent.
- Wave data is available for part of the time spanned by the wave strip.
- Wave data is available but is a flat line due to one or more of the following technical alarm messages or events:

No Data Messages

- Battery Empty
- Transmitter Off
- Out Of Area
- Replace Battery
- Remove Battery
- No Data Monitor
- No Data Tele

Flat Line Wave Messages

- <ECG Lead> Lead Off — Electrodes indicated by <ECG Lead> [RA, LA, LL, RL, A, C, E, I, S or V]
- ECG Leads Off
- Resp Leads Off
- <SpO2 Label> Sensor Off
- <SpO2 Label> No Sensor
- <SpO2 Label> No Pulse
- No SpO2T, Batt Low
- Leadset Unplugged

Standby Information Event Messages

- All Standby
- Standby
- Monitor Standby
- Tele Standby
- Some Standby

Backfilling Wave Dropouts

In case of network dropouts between the Information Center and IntelliVue MX550/MX500/MX450/MX400 patient monitors (Release M.0 or later) or wireless MX40 (Release B.05 or later), the monitoring device can resend up to the last 10 seconds of wave data to the Information Center review applications. The Information Center does not backfill wave data in real-time displays.

Notes

- The system fills the gaps *before* it stores the last minute of wave data to the database. Once the gap is in the review application, it is not filled.
- There is no guarantee that gaps will be filled because the backfill wave messages can be dropped on the network.
- Wave gaps are not backfilled if the monitoring device loses association.

Using Calipers to Measure Intervals

You can use electronic calipers in strips to measure ECG intervals, such as R-R, and save them as a comment to a strip.

To use calipers:

1 Access the review application as described in “Accessing Review Applications” on page 9-3.

2 Select the strip that you want to annotate.

3 Use one of the following methods to open the Saved strip dialog box:

- Select the  icon.
- Select the **Calipers** check box.

4 Position the cursor on the first measurement point and click or touch. This fixes the first point of the caliper to the strip.

5 Drag the cursor and release to fix the second point and click or touch. Two vertical lines representing calipers appear. The measurement value is displayed between the lines.

6 In the dialog box, select the measurement button. Choices are: **PR**, **QRS**, **QT**, **RR**, **QTc**, and **Pause**. QTc remains gray until RR and QT are measured. The measurement value displays in the Comment field for the strip.

7 To make additional measurements, repeat steps 4 through 6.

8 When you are done making comments or annotations, select the **Save** button. The measurements are saved to the strip.

Tips

To adjust a measurement horizontally:

- Place the cursor on the right or left vertical line. A right or left arrow appears. Click on the arrow and drag the line to the desired position.

To adjust a measurement vertically (for example, to move the measurement away from the waveform):

- Place the cursor between the vertical lines and drag up or down.

Printing a Strip Report

You can print a strip report from a **Strip** tile and Fast Review. The strip report contains a configured amount of data. The configured Duration includes Pre Time (onset or announce time). The measurement values and any annotations within the report's duration are printed at the top of the report. The length of each strip will be equal to the maximum number of full seconds that can fit within the report margins. Wave gains and strip speed will be the same as in the **Strip** tile where you printed the report. Consecutive strips overlap by one second. This is indicated by a gray shaded area at the end of each strip.

Note — You cannot print a strip report in **Alarm Review**.

To save or print a strip report:

1 Access the review application as described in "Accessing Review Applications" on page 9-3.

2 Select the strip that you want to print.

3 Use one of the following methods to open the **Saved strip** dialog box:

- Select the  icon.
- Select the **Calipers** check box.

4 Select the  icon. The dialog box expands to display the **Strip Report** print controls. The shaded area in the **Strip** tile indicates the area that prints on the report.

5 Select **Add** to include the strip in the report. The time and any existing comments display in the **Strip Report** list.

6 To exclude or remove a strip, select it in the list and select **Remove**.

7 Select **Print/Save** to save and print the strips.

Note — If you open a strip by selecting a compressed wave, and a **Strip** window is displayed, you can only select areas that are within the current 30-second strip to add additional strips to the wave strip report.

To include other time frames in a report, switch to the wave strip tile or, if available, select a separate custom wave strip tile.

Tabular Trend Tile

The **Tabular Trend** tile displays all available measurement data in rows and columns suitable for charting patient information.

The table contains rows of median data points for the specified measurements. Each row of measurements is displayed under its corresponding clinical group. For example, the Any HR group includes the HR and Pulse (SpO2) measurement labels.

The number of columns in the tile depends on the view duration and the time interval between measurement values. The columns are arranged according to the selected time interval, with the most recent column on the right side of the tile. A highlighted column corresponding to the nearest minute indicates the current time focus.

If Trend Upload is available on your system, a gray highlight displays around numeric data uploaded from an IntelliVue Patient Monitor (Release K or later) or MX40 (Release B.06 or later). If the monitoring device is not connected to the Information Center, the trend data automatically uploads once the device reconnects to the Information Center.

If there are multiple aperiodic measurements available for the selected interval, you can select the down arrow to view the values and timestamps.

Note — Numeric clSpO2 data that uploads from a wireless MX40 to the Information Center displays in the SpO2T row in the **Tabular Trend** tile.

Understanding Tabular Trend Values

For most parameters, the values shown in the tabular trend are the median values selected from five 12-second samples of valid data. For view durations less than one hour, the displayed values are the medians of five 12-second samples. For view durations greater than or equal to one hour but less than four hours, the displayed values are the medians of five 60-second medians. For view durations greater than or equal to four hours, the values are the medians of five 5-minute medians.

In the following example, during a 1-minute interval, the heart rate is sampled every 12 seconds (10:00:12, 10:00:24...10:01:00), for a total of five measurements. For each group of five measurements, the median value is selected (in this example, 77, 78, 81, 84, and 85). The median of these five medians (81) is displayed in the tabular trend.

12-Second Interval	Median of 5 Measurements During the Interval
10:00:12	77
10:00:24	78
10:00:36	**81**
10:00:48	84
10:01:00	85

The values in each column are grouped by the preceding minute. Using the same example, for a view duration of one minute, the column labeled 10:01 contains the median of the median measurements sampled from 10:00:12 to 10:01:00.

For triple-valued pressure measurements, the median of the mean pressure is determined and the corresponding systolic and diastolic values are used for the tabular trend values. For NBP, the time stamp on the trend report is the time the Information Center receives the NBP data from the bedside.

For ST measurements, the value displayed is the value corresponding to the maximum absolute value over the interval.

Differences Between Trend Displays

For graphic trends, the displayed data is determined by the view duration. For tabular trends, the data displayed depends on both the view duration and the tabular interval which is the time between the columns. So for example, if the view duration is one hour and the tabular interval is one minute, the tabular trend displays the median value that is closest to the tabular column time. The graphic trend shows all of the median values.

Because different median values are used to create the tabular and graphic trends, there may be a difference between the tabular and graphic trend data displayed in the trend tiles. For example, the graphic trend contains valid data but the tabular trend displays a question mark (-?-) indicating that no data displays for the measurement. Or, the graphic trend shows a HR of 80 and the tabular trend shows a HR of 120. To more closely align the resolution of the two trends, you may want to reduce the view duration to 1 Hour.

Note — You may see a difference between the value displayed in the tabular trend on the Information Center and the value displayed on the monitoring device. This is due to time drift between the monitoring device and the Information Center.

Using the Tabular Trend Tile

The table below describes how to use the **Tabular Trend** tile.

If you want to...	Do this...
Access a larger view of the **Tabular Trend** tile	Select the  icon to the right of the tile. The area expands. Select the **X** (Close) button to return to the previous view.
Change the time focus within the table	Select the desired time column in the tile. The time focus updates to the selected column time.
Expand the number of rows displayed in the table	Select the + or - button in the row to expand or collapse the rows.
Move the tabular display back or forward in time	Use the horizontal scroll bar on the bottom or use the right and left arrow buttons.
Change the time period for which trends are displayed	1 Select the  icon to the right of the tile. The **Tabular Trend Setup** dialog box displays. 2 Select the time period from the **View Duration** list. 3 Select **OK**. The **Tabular Trend** tile and the view duration on the timeline updates to reflect the new time selection.

If you want to...	Do this...
Change the tabular interval	1 Select the icon to the right of the tile. The **Tabular Trend Setup** dialog box displays. 2 Select **NBP Interval** or the time period from the **Tabular Interval** list. The options available depend on the selected **View Duration**. 3 Select **OK**. When you select **NBP Interval**, each NBP measurement generates one column in the tabular trend. The column header reflects the NBP measurement time. If there is no NBP measurement for the selected **View Duration**, the interval defaults to a selected time interval, such as 30 minutes if using an 8 hour **View Duration**. If there is an NBP measurement in the view duration, and you change to a view duration for which there is no NBP measurement, the default time interval displays and remains until you select a new patient or close the review application.
Print a report of the **Tabular Trend** tile	Select the icon to the right of the tile. If prompted, select the type of print output. Select **OK**.

Printing a Review Report

You can print a report of selected tiles from review applications. The tiles will appear on the report just as they do on the screen (with caliper measurements, at the same speed, with the same waves, and so on).

To print a review report:

1 Access the review application as described in "Accessing Review Applications" on page 9-3.

2 Select the button on the caption bar. The **Select Tiles to Print** dialog box displays.

3 Select the tiles to include in the report by selecting the check box next to the tile name.

4 Select **OK**.

5 If prompted, select the type of print output. The options are: **Paper**, **Paper and Electronic**, and **Electronic Document**.

6 Select **OK**.

Note — If you print a review report while viewing a patient's prior data, the report header and footer include the text **(Prior Data)**. This represents the unit and institution where the print request originates.

Alarm Review

The **Alarm Review** application allows you to view stored alarms and saved strips. Stored alarms are automatically added to alarm history when the alarm is generated. Saved strips are waves that you manually save from other review applications.

The number of alarms that display in **Alarm Review** depends on the current timeline duration. The default timeline duration is 24 hours. So, when you first enter **Alarm Review** the last 8 hours of alarms display. The end of the timeline duration is set to the time of the latest alarm for the current patient.

The **Alarm Review** application includes the following tiles:

- **Compressed** tile — Allows you to see 30-second compressed wave strips. See "Compressed (Alarm Review) Tile" on page 9-32.
- **Strip Window** tile — Allows you to see uncompressed waves for an alarm or saved strip in detail for review or annotation. See "Strip Window (Alarm Review) Tile" on page 9-34.
- **Tabular** tile — Allows you to see an alarm strip on the top of the window and a list of available alarms for the current timeline duration on the bottom of the window. See "Tabular (Alarm Review) Tile" on page 9-34.

Compressed (Alarm Review) Tile

The **Compressed** tile in the **Alarm Review** application allows you to view 30-second compressed wave strips. Alarm strips contain 10 seconds pre-event and 20 seconds post-event. Strips saved from other review applications have 15 seconds before/after the center of the strip as it was in the review window. In full screen mode, 10 wave strips display in the **Compressed** tile. In half screen mode, five wave strips display in the **Compressed** tile.

The alarm strips display the following:

- The date and time of the alarm/strip
- Alarm message text
- Vital signs associated with the alarm strip
- Comments or measurements associated with the strip

The strip count to the right of each compressed wave strip reads X/Y, where X is the strip number and Y is the total number of compressed wave strips available for the current timeline duration for the selected alarm filter. For example, if the filter is **Red Alarms**, 3/45 means that this is the third strip out of a total of 45 compressed red alarm wave strips.

You can move through the compressed wave strips by selecting the up or down arrow on the right side of the **Compressed** tile. You can page through the compressed wave strips by selecting the up or down double arrows on the right side of the tile. The double arrows move back or forward by a page (five or 10 alarms). The single arrows move back or forward by one alarm.

Using the Compressed (Alarm Review) Tile

The table below describes how to use the **Compressed** tile in the **Alarm Review** application.

If you want to...	Do this...
Filter the alarm(s) or saved strip(s) for viewing	Select the icon to right of the **Compressed** tile, then select a specific alarm type from the list.
Search for specific alarm strips	1 Select the . icon. The **Search** dialog box displays. 2 Enter up to a 32-character search text in the **Search:** field, then select **OK**. The characters in the search text must match exactly, including spaces. The system searches for text associated with specific alarms (for example, Afib), any alarm re-label text, comments or annotations that match your search criteria and displays the strips that contain the matching search string. 3 Select the icon to reset the displayed (filtered) strips.
Change the current timeline duration	1 Select the icon to the right of the timeline. The **Timeline Setup** dialog box opens. 2 Select a time from the **Timeline Duration** list. The default is **24 Hours**. 3 Select **OK**.
View uncompressed waves for an alarm or saved strip	Move the cursor over the compressed wave, and then select the **Strip Window** button. The **Strip Window** Alarm Review tile opens. See "Strip Window (Alarm Review) Tile" on page 9-34.
Make a recording of a compressed wave strip	Move the cursor over the compressed wave, and then select the **Record** button. You will get a recording with 30 seconds of stored waveform.
Print a report of selected compressed strips	1 Select the compressed strip(s) you want to print by selecting the **Select** check box next to the strip(s). 2 Select the icon in the caption bar. 3 If prompted, select the type of print output, and select **OK**. The two highest priority waves, if available, are printed for each alarm.
Delete compressed wave strips	1 Select the **Select** check box next to the compressed strips that you want to delete. 2 Select the icon to the right of the tile. 3 Confirm that you want to delete the strip by selecting the **Yes** button. *Important* — Deleting the strip also deletes the alarm and the associated event from the **Event** tile.

Strip Window (Alarm Review) Tile

The **Strip Window** tile allows you to view uncompressed waves for an alarm or save strips for review or annotation. In full screen mode, the strip displays on the top half of the **Alarm Review** window and up to five compressed strips display on the bottom half of the window. In half screen mode, no compressed waves display.

The alarm strip shows the vital sign measurement that is currently alarming, as well as other measurements at the alarm announce time. The measurements and values display across the top of the strip. The measurements display in order of priority.

The time focus of the alarm strip for non-arrhythmia alarms is the announce time of the alarm. The alarm announce time is indicated by black carets at the top and bottom of the strip.

The time focus for arrhythmia alarms (short yellow) is the onset of the alarm. The alarm onset time is indicated by green carets at the top and bottom of the strip.

If the difference between the announce time and the onset time is less than 30 seconds, the time focus is set to the onset time of the alarm. If there is no onset time, or if the difference between the announce time and the onset time is greater than or equal to 30 seconds, the time focus is set to the alarm announce time.

Note — Occasionally, there may be gaps in the wave data in **Alarm Review**. This can occur when a device first associates with the Information Center on the network, and the device is in a state of alarm. The alarm data may be available before the wave data, which can result in alarm strips with missing wave data. The alarm **Strip Window** tile does not include gap annotations (see "Viewing Gaps in Wave Data" on page 9-26).

Note — In case of network dropouts between the Information Center and the IntelliVue Patient Monitor (Release M.0 or later), the monitor can resend up to the last 10 seconds of wave data to the Information Center retrospective review applications. The Information Center does not backfill wave data in real-time displays.

Using the Strip Window (Alarm Review) Tile

The **Strip Window** tile in the **Alarm Review** application is similar to the Strip tile in other review applications, but includes additional options. For information about the options in all Strip tiles, "Using Strip Tiles" on page 9-23.

Tabular (Alarm Review) Tile

Alarm Review's **Tabular** tile provides an alarm strip on the top of the window and a list of available alarms for the current timeline duration on the bottom of the window. See "Strip Window (Alarm Review) Tile" on page 9-34 for information on using the **Alarm Review Strip Window** tile. You can select an alarm strip for display in the **Strip Window** tile by selecting an alarm in the alarm list.

To the left of each alarm in the tabular list, an alarm count for the current timeline duration reads X/Y, where X is the alarm number and Y is the total number of alarms available for the current timeline duration and alarm filter type. For example, if the filter is **Yellow Alarms**, 3/45 means that this is the third yellow alarm strip out of a total of 45. You can move through the list of alarms in the tabular tile by using the scroll bar on the right.

A  icon displays next to an alarm entry if the alarm is a saved strip or contains annotations.

Using the Tabular (Alarm Review) Tile

The following table describes how to use the **Tabular** tile in the **Alarm Review** application.

If you want to...	Do this...
Print a report of selected alarms.	1 Select the strip(s) by selecting the check box next to the alarm in the tabular list. To include all alarm strips in the report, select the **Select All** check box. 2 Select the  icon in the caption bar. 3 If prompted, select the type of print output. Select **OK**.
Delete selected alarm strips.	1 Select the strip(s) by selecting the check box next to the alarm in the tabular list. 2 Select the  icon on the right side of the window. 3 Confirm that you want to delete these alarm strips by selecting the **Yes** button.

Alarm Report

An Alarm report includes the following:

- Each strip on a single row.
- The strip displays as much data as will fit across the page based on whole seconds.
- The start time of the strip is the time of the event minus 5 seconds.
- Two waves print, if available for each strip. The first wave is the primary ECG wave and the second wave corresponds to the alarming measurement. For example, if the alarm is RR Low, the Resp wave displays as the second wave.
- Annotations, if available, print above the strip along with an event time stamp.

Fast Review

Fast Review enables you to quickly acknowledge and view the current alarm data and take immediate action on the alarm.

To access the Fast Review application, select an alarm from the list in the alarm area in the patient sector or Patient Window.

If an Alarm Advisor notification is active for the selected alarm, the notification appears at the top of the Fast Review strip. See "Alarm Advisor Notifications" on page 8-30.

If Fast Review is enabled, selecting the Acknowledge/Review button  displays the Fast Review strip of the highest priority alarm that has not been acknowledged. (Selecting or, for touch screen displays, touching anywhere in the sector, except on a button, acknowledges the alarm without displaying the strip.)

If your unit does not allow acknowledgment of bedside-generated alarm conditions at the Information Center, the Review  button displays instead of the Acknowledge/Review button. Selecting the button opens the Fast Review strip for that alarm.

Note — If there is an application window open for any patient, when the  button is selected, the Fast Review strip overlays it.

Depending on your screen resolution, the alarm strip contains at least 30 seconds of waves preceding the alarm and can have 15 seconds preceding the alarm announce time. Arrows enable you to navigate within the data. The strip can have up to four waves (the primary first, then the alarming wave).

Note — The Fast Review strip tile does not include beat annotations (see "Strip Window (Alarm Review) Tile" on page 9-34).

Note — 15 seconds of post-alarm data may not be available in Fast Review if the difference between the time when you acknowledge the alarm and the time when the alarm was created is less than 15 seconds.

Efficia Patient Monitors

Alarm messages that are generated by an Efficia monitor are mapped to the alarm messages that are generated by IntelliVue Patient Monitors. To view the full text of the alarm message that is displayed on the Efficia monitor at the PIC iX Essentials system, select the message. The full text of the message is displayed in the application window.

Using Fast Review

For information about using Fast Review, see "Using Strip Tiles" on page 9-23.

12-lead Capture Review

The **12-lead Capture Review** application allows you to view the results of diagnostic 12-lead ECG captures obtained from either a wired or wireless bedside monitor or from the review applications at the Information Center. For example, for information on capturing a diagnostic 12-lead ECG from the **Multi-Lead** tile, see "Multi-Lead Tile" on page 9-17.

When data is captured using a standard 10-wire lead set, 10 seconds of wave data and interval measurements (such as PR, QT, and ST) can be reviewed in the 12-lead Capture Review application. If your system is configured to display ECG analysis interpretation statements, the statements display in the 12-lead Capture Review application. See the *Philips DXL ECG Algorithm Physician's Guide* (part number 4535 641 06411) for a complete list of the interpretation statements.

When data is captured using derived leads (EASI or Hexad), 10 seconds of wave data and interval measurements can be reviewed in the 12-lead Capture Review application. Interpretation statements are not available when the capture is performed using derived leads.

A maximum of 100 12-lead captures is available per patient per database server. If the maximum number of captures is reached and a new capture is performed, the oldest, unlocked capture is automatically deleted. The Information Center or patient monitor allows you to save (lock) up to 30 captures to prevent them from being overwritten.

The Information Center accepts an unlimited number of concurrent 12-lead ECG captures from IntelliVue Patient Monitor Release M.0 or later, and a maximum of four concurrent 12-lead ECG captures from an IntelliVue Patient Monitor Release L.0 and earlier.

Caution

Because different algorithms might be used on other Information Centers and the 12-lead ECG cart, use care when comparing captures from different sources. Computerized ECG interpretation is not intended to be a substitute for interpretation by a qualified physician. The algorithm used (PH100B or PH110C) is identified on the bottom of the 12-lead captures and reports. For details on how the algorithms work, see the *Philips DXL ECG Algorithm Physician's Guide*.

Using 12-lead Capture Review

The table below describes how to use the **12-lead Capture Review** application. When you move the cursor over the tile, settings that you can modify are highlighted in gray.

If you want to...	Do this...
View a specific 12-lead capture	Select a tab with the desired date and time at the bottom of the 12-lead Capture Review application. • The  icon on the tab indicates that the capture has not been exported. • The  icon on the tab indicates that the capture has been exported.
Export the captured 12-lead ECGs to a networked destination, such as a Cardiology Management System	If the ECG 12-Lead Export feature is available, select the  icon on the right side of the window. The **12-Lead Export Setup** dialog box opens. See "Exporting 12-Lead ECG Data" on page 9-39.
Delete the selected 12-lead capture	Select the  icon on the right side of the window, and then confirm that you want to delete the capture by selecting the **Yes** button.
Change the wave layout	Move the cursor over the capture, select the layout on the top right side of the capture, and select the layout from the list. Choices are **12x1** (default), **6x2**, **3x4**, **3x4 1R**, **3x4 3R**, **3x4 STMap**, or **3x4 1R STMap**. With **3x4 STMap** layout an ST Map displays on the bottom of the tile. With **3x4 1R STMap**, 8 seconds of data displays across the width of the tile with an ST Map vertically oriented on the right side. You can change the scale of the ST Map by selecting the **ST Map Scale:** drop-down arrow then selecting a size from the list.
Change the rhythm lead	Move the cursor over the capture, select the rhythm lead label on the bottom left of the capture, and select a lead from the list. Depending on the layout, there can be up to three rhythm leads. *Note* — With IntelliVue Patient Monitor (Release L.0 or later), you can select an extended lead for the rhythm strip (for example, V9). The bedside monitor does not display the lead label if there is no wave data. However, the Information Center iX displays the lead label without the wave data.

If you want to...	Do this...
Change the wave size	Move the cursor over the capture, select the calibration bar, and select the size of the wave you want to view. The leads are redrawn. The chest gain depends on the limb wave size: • **Chest Gain: Full** displays the chest wave the same size as the limb wave. • **Chest Gain: Half** displays the chest wave as half the size of the limb wave.
Change the wave speed	Move the cursor over the capture, select the Speed on the bottom left of the capture, then select the speed from the list. Options are **25.0 mm/s** or **50.0 mm/s**. The window refreshes with the selected speed.
Change the filter bandwidth	Move the cursor over the capture, select the filter label on the bottom right of the capture, then select the bandwidth. Low Pass: **0.05 Hz**, **0.15 Hz**, **0.5 Hz** High Pass: **40 Hz**, **100 Hz**, **150 Hz** The bandwidth setting affects the displayed waves and reports. If your system is set up to filter before exporting, the filter setting affects the waves that are exported. The bandwidth selection remains in effect until it is changed.
Add comments to a capture	1 Select the tab with the desired date and time at the bottom of the 12-lead Capture Review application. 2 Select the  icon on the right side of the window. The **12-Lead Export Setup** dialog box opens. 3 Select the **Report Data** tab. 4 Enter text in the comment fields. 5 Select **Save**. The dialog box closes. *Notes —* • Comments are exported. • Once a comment is entered it always displays.
Lock a capture so it is not automatically deleted	Select the  icon on the right side of the window. Unlock the capture by selecting the icon again. You can lock up to 30 captures.
Print the currently displayed capture	Select the  icon in the caption bar. If prompted, select the type of print output. Select **OK**. The current 12-lead capture report prints in landscape format.

If you want to...	Do this...
Filter the types of captures that are available for display	Select the icon on the right side of the window, then select the type of captures from the list. You can view all bedside and retrospective captures, bedside captures only, or retrospective captures only.
Navigate to the next or previous page in a capture	Select the and icons on the right side of the window.

Exporting 12-Lead ECG Data

Use the **12-Lead Export Setup** dialog box to export 12-lead ECG data to a destination on the network. Your system may be set up so that some fields are required before you can perform an export. An asterisk displays next to the required fields.

The following additional data is exported to the destination:

- Demographic data including patient name, medical record number, lifetime ID, or encounter ID, date of birth, gender, height, and weight.

  Important — For patients where 12 leads are captured and exported, the patient should be admitted with name, medical record number, gender, and date of birth.

- Acquisition type (whether monitoring standard or derived 12-lead ECG) label.
- Hospital name.

Considerations

Before exporting 12-lead ECG data, note the following:

- The data that is accepted at the time of export is determined by the receiving system.
- Timestamps between the Information Center and the receiving device may not match due to differences in the timestamp location for the receiving device.
- Captures and exports are recorded in the Audit Log. See “Clinical Audit Trail” on page 12-3.

To export 12-lead ECG data:

1 Select the icon on the right side of the **12-lead Capture Review** application.
The **12-Lead Export Setup** dialog box opens.

2 If you have the 12-Lead ECG Order interface, select the **Orders** tab and select an order from the list. See “Filling 12-Lead ECG Orders” on page 9-40.

3 On the **Report Data** tab, enter the following:

- **Order #**: Contains the order number that you selected on the **Orders** tab. The field is unavailable for manual entry if there are current orders not yet fulfilled.
- **Reason**: Specify a reason for the export by typing a 1- to 32-character reason in the field, or if configured, select a reason from the drop-down list. A reason may already be included with the order.
- **Requested By:** Specify the name of the person ordering the export by typing a 1- to 32-character name in the field, or select a name from the list.

- **Oper:** Specify the name of the person initiating the export by typing a 1- to 32-character name in the field, or select a name from the list.
- **Fac:** Select the facility for the 12-lead ECG capture from the list. After the first export, this remains the selected facility.
- **Dept:** Select the department for the 12-lead capture from the list. After the first export, this remains the selected department.
- **Comment 1-5**: Enter up to five comments, each of which can contain up to 32 characters, in the comment fields.
- **Print on Export**: Select the check box to automatically print the 12-lead ECG Capture report on export.

4 Select the **Rx / Dx** tab.

5 Select up to four medications and up to four diagnostic items by selecting or clearing the check box next to the **Rx** and **Dx** name as appropriate.

6 Select the **Save** button.

7 Verify that the selected patient and demographic information is correct, then select the **Export** button to initiate the export.

Filling 12-Lead ECG Orders

The 12-Lead ECG Order interface allows order information from the Hospital Physician Order Entry System to be selected from a list at either the bedside monitor or at the Information Center for printing or exporting to a Cardiology Management System, such as Philips IntelliSpace ECG.

The workflow for filling a 12-lead ECG order is as follows:

1 The hospital information system forwards a pending 12-lead ECG order for a matched Patient ID to a bedside monitor or to the Information Center.

2 The clinician captures 12-lead ECG data at the bedside monitor or at the Information Center from full disclosure data.

3 To fulfill the order, the bedside monitor operator assigns a patient order number to a captured 12-lead ECG and sends the capture to the Information Center or exports the order to the ECG management system. The order number can also be assigned or selected through an order list by using the **12-Lead Export Setup** dialog box. See the IntelliVue Patient Monitor documentation for details on filling the order from the bedside monitor.

4 Order information is populated in the ECG and transferred on export to the ECG management system.

5 Once an order is exported with an ECG, the order is removed from the order work list.

When a 12-lead ECG order is fulfilled and exported, it is reviewed to ensure that it exported and includes its order number.

The following table describes the fields in the **Orders** tab in the **12-Lead Export Setup** dialog box.

Field	Description
Order Number	The number that identifies the order. An order number can be associated with the 12-lead ECG prior to export. The order number can be assigned at the bedside monitor and selected through an order list using the dialog box. An order can be assigned to a 12-lead captured from 12-lead retrospective data. It is important to use an order number for reimbursement purposes.
Order Due	Time that the order should be fulfilled by performing a 12-lead ECG.
Priority	Indicates the priority of the order. The order list displays the oldest to newest received orders, with the following exceptions: • STAT orders have the highest priority in the list. • ASAP orders have the second highest priority. • Timing-critical orders have the third highest priority.
Order Reason	Reason for the 12-lead ECG order.
Physician	The name of the physician who requested the order.

Considerations

- Assigned orders are not displayed in the order list. However, if an assigned order is unassigned from a 12-lead, it is included in the order list. A submitted order is not displayed in the list of open orders.
- If there is a patient conflict, the order list is not displayed.
- If an order is canceled, it is removed from the order list. An error is logged if an order that is already assigned to an exported ECG is canceled.
- The 12-lead Orders feature requires a 12-Lead ECG Management (12C) license and must be enabled through the license activation process following installation.

Viewing Stored Patient Data

The Information Center stores data for up to seven days for each patient on the system during the patient stay and upon discharge from the system. You can view a list of the patient stays for each clinical unit where data was collected during the current hospital admission, as well as data acquired for each previous admission within the last seven days. Each out-of-unit transfer or admission is considered a separate stay for a patient.

Current unit data and prior data are displayed separately in the review applications. Depending on whether the prior data is stored on the local monitoring system or a different monitoring system, use one of the following methods to view stored data for a patient:

- If the patient data is stored in the local database, see “Viewing Stored Data with Review Applications” on page 9-42.
- If the data for a discharged patient is stored on a Web server, see “Viewing Stored Data with Web Applications” on page 9-42.

Viewing Stored Data with Review Applications

A Prior Data  icon in the application window caption bar indicates that the selected patient has data stored in a different unit.

To access the patient data from a prior stay:

1 Select the  icon from the review application caption bar.

You see a list of all stays for the currently selected patient. If the previous data exists on the local system:

- The stays are listed in date order from most recent to oldest.
- The current stay is at the top of the list, indicated by **(Current Data)**.
- Each stay includes the unit and duration of the stay. The duration start time is the time from the last discharge in the bed to the patient's next discharge or transfer. The word **Discharged** indicates that the patient was discharged from a stay.

Note — The text **Web Prior Data:** indicates that data for the selected patient is stored on a remote server. See "Viewing Stored Data with Web Applications" on page 9-42.

2 Select a stay from the list. The application window opens. The caption bar changes from black to teal and the title of the application includes the text **(Prior Data)**. The bed label pane is not available on the left side of the caption bar.

3 Select the **Review** button in the task bar and select a review application (Alarm Review, General Review, and so on).

4 When you are done reviewing the stored data, do one of the following to return to the current data:

- Select the **Current Unit** button in the task bar.
- Select the **X** button in the caption bar.
- Select the  icon in the caption bar and select the current stay.
- Open the **Main Setup** window and select the application button.

Viewing Stored Data with Web Applications

For systems with a Web Portal host configured, you can access a browser-based view of retrospective data for a patient who was discharged from another Philips monitoring system (Web servers).

A Prior Data  icon in the application window caption bar indicates that the selected patient has data stored on a different monitoring system.

To access the patient data from a prior stay on a Web server:

1 Select the  icon from the review application caption bar.

You see a list of all stays on the local server and Web servers. The text **Web Prior Data:** indicates that data for the selected patient is stored on a Web server.

2 Select an item from the list. A browser-based view displays the stored data for the currently selected patient.

3 Select the drop-down menu from the Web application caption bar. You see a list of stays on the Web server for the currently selected patient. Each stay includes the unit and duration of the stay.

4 Select a stay from the list. The caption bar changes from black to teal and displays Prior Data and the unit, patient name, and stay duration. By default, the data opens in the Alarm Review Web application.

5 Select a web review application to view the stored data:

- Alarm Review, see "Alarm Review with Web Access" on page 9-44
- General Review, see "General Review with Web Access" on page 9-45
- Cardiac Review, see "Cardiac Review with Web Access" on page 9-48
- 12-lead Capture Review, see "Twelve-Lead Capture Review with Web Access" on page 9-47
- Patient Window, see "Patient Window with Web Access" on page 9-51

6 When you are done reviewing the stored data, select the **X** button in the caption bar to return to the current data.

Information Center Web

The Information Center Web application allows you to review a patient's physiological data at remote locations using the hospital's HIS LAN web access (intranet or internet). You can use the information provided by the Information Center Web application to supplement information that you collect through other means.

The Information Center Web applications are equivalent to the Alarm Review, General Review, Cardiac Review, 12-lead Capture Review and Patient Window applications on the Information Center. The Web applications have the same specifications, such as number of alarms available, number of hours of waveform data, and so on.

Note — You must use the 25 mm/s annotation (0.2s), rather than a ruler, on an image on the Information Center Web screen or in printed reports from the Information Center Web to make accurate measurements on waveforms.

Warning

Web access should not be used for primary monitoring. Always refer to your primary monitoring source (bedside monitor or Information Center) for current real-time data.

Accessing the Information Center Web

The method of accessing the Information Center Web depends on how your system is set up.

Note — For information on viewing patient data remotely using PIC iX Multi-Patient View, see the *Patient Information Center iX Web Installation and Configuration Guide.*

Considerations

Before accessing the Information Center Web application, note the following:

- The settings that you select in one Web application persist for other applications. That is, if you select a time focus in Alarm Review and you then access General Review, the data has the same time focus. The setting remains until you change it or select another patient.

- To print all of the content in a report, in the File menu, go to Page Setup, and change both the Left and Right margins to 0.2", and select Landscape when printing.
- To refresh the application window, select the browser **Refresh** button.
- Right-click functionality is not available on touch screen displays.

Access the Information Center Web by performing the following steps:

1 If available on your system, select **Web Browser** from the **Main Setup** window. A browser displays.

2 In the address box use the down arrow to select the URL supplied by your system administrator.

3 If required, enter a user name and password in the Windows Security dialog box. The PIC iX Web login page displays.

4 Log on as a user with the appropriate credentials.

5 Select an institution from the **Select an Institution:** drop-down list.

6 Select the unit for which to display patients from the **Select a Clinical Unit:** drop-down list.

7 Select a bed location from the list. The **Alarm Review** application displays.

8 Do one of the following:

- To use the **Alarm Review** application, see "Alarm Review with Web Access" on page 9-44.
- Select another application by selecting a tab on the top right side of the window:
  - **General Review** — See "General Review with Web Access" on page 9-45
  - **Cardiac Review** — See "Cardiac Review with Web Access" on page 9-48
  - **12-lead Capture Review** — See "Twelve-Lead Capture Review with Web Access" on page 9-47
  - **Patient Window** — See "Patient Window with Web Access" on page 9-51
- Select the **Patient Selection** tab to view data for a different patient. Repeat Step 6 and Step 7.
- End the session by selecting **Sign Out**.

Alarm Review with Web Access

The **Alarm Review** Web application allows you to view stored alarms and strips. A Strip tile is displayed on the top section of the window and a tabular list of alarms is displayed on the bottom section of the window. The time focus is set to the currently displaying alarm strip. When you first access the application, the time and strip are set to the most recent patient alarm.

Alarms appear in chronological order in the tabular list with the number and count for the selected alarm type, date/time of the alarm, and alarm text.

Select an alarm from the tabular list to view the corresponding alarm strip.

If you want to...	Do this...
Move back and forward in time	Use the single arrows below the strip to move the time back and forward by approximately one second. Use the double arrows to move back and forward by a page.

If you want to...	Do this...
Select the type of alarms to display in the tabular list	Select the alarm type from the **Alarm Filter:** list, then select the alarm from the tabular list. Choices are: **All Strips** (default), **All Alarms**, **Red Alarms**, **Yellow Alarms**, **ECG Alarms**, **Non-ECG Alarms**, or **Saved Strips**. *Note* — The display controls reset when you change the alarm filter.
View a specific alarm strip	Select the alarm in the tabular list on the bottom of the window. Select the **Previous** or **Next** button above the tabular list to navigate through the alarms.
Change the wave size (scale)	Select the **Wave Gain:** drop-down arrow, then choose the size. Choices are **x1/2**, **x1**, or **x2**.
Change the wave speed	Select the **Speed:** radio button to the left of the strip. The window re-displays with the selected speed. Choices are **6.25 mm/s**, **12.5 mm/s**, **25.0 mm/s**, or **50.0 mm/s**.
Add or remove waves from the strip	Select or clear the check boxes in the **Waves:** list. You can display up to four waves.
Center drifting strip waves when there is baseline wander on the ECG signal.	Select the **ECG Filter** check box to keep the wave on a single flat baseline that can be seen more easily.
Minimize waves overlapping possible due to high amplitude.	Select the **Clip Waves** check box.

General Review with Web Access

The **General Review** Web application provides a variety of formats for viewing retrospective data, including compressed waves, strips, events, graphical trends, and tabular trends.

In the top section of the window, you can switch between viewing the **Compressed Wave** and **Strip** tiles by selecting the tile from the **Change Tile:** list.

In the bottom section of the window, you can switch between viewing the **Graphic Trend**, **Tabular Trend**, and **Event** tiles by selecting the tile from the **Change Tile:** list.

Compressed Wave Tile

The compressed waves provide 12 minutes of full disclosure waves.

If you want to...	Do this...
View the waves in greater or less detail	Select the number of minutes from the **Wave Duration:** drop-down list. The higher the number of minutes the less detail shown. Choices are **1 Minute**, **3 Minutes**, **6 Minutes**, **12 Minutes**, **30 Minutes** and **60 Minutes**. A red rectangle displays on the compressed wave area indicating the corresponding time selection.
Change the wave size	Select the wave size from the **Wave Gain:** list. Choices are **x1/2**, **x1**, or **x2**.
Change or add waves that display	Select or clear the check boxes in the **Waves:** list. You can display up to four waves.

Event Tile

The **Event** tile provides an overview of the frequency and duration of specific events and alarms.

The events are sorted into groups. Select the + or - next to the group name to expand or collapse the list of events/alarms in the group.

To remove an event or group from the tile, clear the check box next to the event or group name.

An event count appears on the right side of each event row. The event count is in the format X/Y, where X is the number of events that occurred at or before the time focus, and Y is the total number of events of the same type within the current view duration. For example, 3/5 means that there is a total of five events in the row, and three of the events occurred before or at the time focus.

The time and date corresponding to the position of the event cursor displays on the bottom of the tile along with the name of the event, the actual value and name of the measurement (if applicable) that violated the event limit.

You can select the right and left single arrows to scroll to the next or previous event.

Each event indicates its duration starting from when it is detected to when it is acknowledged. The color of the event indicates its severity.

Color	Severity
Red	*** Life threatening alarms.
Yellow	** Limit violation alarms.
Cyan	All INOP conditions and non-alarming events.
Blue	Arrhythmia events.

Graphic Trend Tile

The **Graphic Trend** tile allows you to see a patient's averaged physiological measurements collected over time. One trend is displayed in the tile. By default, heart rate is displayed..

If you want to...	Do this...
View the measurement trend	Select a measurement from the **Left Parameter:** or **Right Parameter:** list.
Display one measurement in a bar chart form/histogram	1 Select a measurement from the **Left Parameter:** list. 2 Select the **Show Histogram** check box. A histogram for the selected measurement displays on the right side of the tile.

Tabular Trend Tile

The **Tabular Trend** tile displays all available measurement data in rows and columns suitable for charting patient information. The time interval between measurement values, for example every 10, 15 or 30 minutes, defaults to every Non-Invasive Blood Pressure (NBP) within the view duration. This allows you to see a full set of vital signs. The table includes rows of averaged data points for the specified measurements and columns of time indicators spaced per the selected time resolution.

The table below describes how to use the **Tabular Trend** tile.

If you want to...	Do this...
Move the tabular display back or forward in time	Use the horizontal scroll bar on the bottom or use the right and left arrow buttons.
Change the time period	Select the number of hours from the **View Duration:** list.
Change the time resolution for the tabular trends	Select number of minutes from the **Tabular Interval:** list. The number of minutes available depends on the hour selected in the **View Duration:**.

Twelve-Lead Capture Review with Web Access

The **12-lead Capture Review** Web application allows you to see the results of 12-lead ECG captures performed at the Information Center or at a wired or 802.11 wireless IntelliVue Patient Monitor. When the data is captured using a standard 10-wire lead set or derived lead placement, 10 seconds of the wave data and interval measurements can be reviewed in the 12-lead Capture Review application.

ECG analysis interpretation statements display in the 12-lead Capture Review application if available. See the *Philips 12-Lead Algorithm Physician's Guide* for a complete list of the interpretation statements.

Note — Interpretation statements are not available when the capture is performed using derived lead placement.

Note — Captures performed at the Information Center use the Information Center filter bandwidth settings. Captures performed at the IntelliVue Patient Monitor use the bedside filter bandwidth settings.

The table below describes how to use the **12-lead Capture Review** application.

If you want to...	Do this...
Display a specific 12-lead capture	On the bottom of the window, select the date/time tab for the capture to display. • A tab with this  icon indicates that the capture has not exported. • A tab with this  icon indicates that the capture has been exported.
Change the wave layout	Select the wave layout from the **Format:** drop-down list. Choices are **12x1**, **6x2, 3x4**, **3x4 1R**, **3x4 3R**, **3x4 STMap**, or **3x4 1R STMap**. With **3x4 STMap** layout an ST Map displays on the bottom of the tile. With **3x4 1R STMap** only 8 seconds of data displays across the width of the tile with an ST Map vertically oriented on the right side. You can change the scale of the ST Map by selecting the size from the **ST Map Scale:** list.
Change the rhythm lead	Select the rhythm lead label from the list.
Change the wave size	Select the size of the wave you want to view from the **Limb Gain:** list. The chest gain depends on the limb wave size: • **Chest Gain: Full** displays the chest wave the same size as the limb wave. • **Chest Gain: Half** displays the chest wave as half the size of the limb wave.
Change the wave speed	Select the **Speed:** from the list. Choices are **25.0 mm/s** or **50.0 mm/s**.
Change the filter bandwidth	Select the bandwidth from the **Filter** drop-down list. Low range: **0.05 Hz**, **0.15 Hz**, **0.5 Hz** High range: **40 Hz**, **100 Hz**, **150 Hz**

Cardiac Review with Web Access

The **Cardiac Review** Web application allows you see cardiac-relevant waves, numerics, trends and events for cardiac patients. The application stores ECG waves, ST snippets, ST Maps, and ECG statistics for retrospective review to allow you to compare cardiac data in a variety of formats.

In the top section of the window, you can switch between viewing the **Compressed Wave**, **Strip**, **Multi-Lead**, and **ST Snippets** tiles by selecting the tile from the **Change Tile:** list.

In the bottom section of the window, you can switch between viewing the **Graphic Trend**, **Tabular Trend**, **ECG Statistics**, and **Event** tiles by selecting the tile from the **Change Tile:** list.

Compressed Wave Tile

The **Compressed Wave** tile provides 12 minutes of full disclosure waves. For details on using the tile, see "Compressed Wave Tile" on page 9-46.

Strip Tile

For details on using the **Strip** tile, see "Alarm Review with Web Access" on page 9-44.

Multi-Lead Tile

The **Multi-Lead** tile allows you to view multiple leads of ECG.

If you want to...	Do this...
Change the wave layout	Select a wave layout from the **Format:** list. Choices are **12x1**, **6x2, 3x4**, **3x4 1R** (default), **3x4 3R**, **3x4 STMap**, or **3x4 1R STMap**. With **3x4 STMap** layout an ST Map displays on the bottom of the tile. With **3x4 1R STMap**, 8 seconds of data displays across the width of the tile with an ST Map vertically oriented on right side. You can change the scale of the ST Map by selecting a size from the **ST Map Scale:** list.
Change the wave size	Select the wave size from the **Wave Gain:** list. Leads are redrawn according to your choice. The chest gain is dependent on the limb wave size: • **Chest Gain: Full** displays the chest wave the same size as the limb wave • **Chest Gain: Half** displays the chest wave as half the size of the limb wave.
Change the wave speed	Select the speed from the **Speed:** list. The window re-displays with the selected speed.
Change the rhythm lead	Select a lead from the **Rhythm Waves:** list (for **3x4 1R**, **3x4 3R** and **3x4 1R STMap** only).
Access a larger view	Select the  button to the top right of the window. The view area expands. Select the  button to return to the previous view.

ST Snippets Tile

The **ST Snippets** tile displays up to 12 ST "snippets" (a sample of the patient's ECG beats for a given time) allowing you to examine the data for a significant episode in detail.

If you want to...	Do this...
Display the baseline value in the ST Snippet tile	Select the **Show Baseline** check box.

If you want to...	Do this...
Superimpose the current measurement points (ISO and ST) on to the ST segment	Select the **Show Measurements** check box.
Select the Cabrera lead order.	Select the **Cabrera** check box.
Change the size of ST waves	Select the wave size from the **Wave Gain:** list. Choices are **x1/2**, **x1**, **x2**, or **x4**.
Change the wave speed	Select the speed from the **Speed:** list. The window re-displays with the selected speed. Choices are: **25.0 mm/s** (default) or **50.0 mm/s**.
View an ST Map with ST Snippets	Select the duration from the **Format:** list. Choices are **3x4** and **3x4 STMap**. An ST Map displays on the bottom of the tile with ST Snippets on top.
Change the scale of the ST Map	Select the size from the **ST Map Scale:** list. The range is **1mm** to **15 mm**.
Access a larger view	Select the  button to the top right of the ST Snippets tile. The view area expands. Select the  button to return to the previous view.
Move back or forward by a page	Select the double arrows below the tile.
Minimize waves overlapping possible due to high amplitude.	Select the **Clip Waves** check box.

Event Tile

The **Event** tile provides an overview of the frequency and duration of events. In the Cardiac Review application, only the Cardiac event group is displayed. See "Event Tile" on page 9-46 for details on using the tile.

Graphic Trend Tile

The **Graphic Trend** tile allows you to see a patient's averaged physiological measurements collected over time. See "Graphic Trend Tile" on page 9-47 for details on using the tile.

Tabular Trend Tile

The **Tabular Trend** tile displays all available measurement data in rows and columns suitable for charting patient information. See "Tabular Trend Tile" on page 9-47 for details on using the tile.

ECG Statistics Tile

The **ECG Statistics** tile displays all available ECG data in rows and columns suitable for charting patient information. The table shows both numeric and time information. For a description of the ECG statistics, see "ECG Statistics Tile" on page 9-9.

If you want to...	Do this...
Access a larger view of the ECG Statistic tile	Select the  button to the top right of the ECG Statistics tile. The view area expands. Select the  button to return to the previous view.
Move the tile back or forward in time	Use the horizontal scroll bar on the bottom or use the right and left arrow buttons.
Change the time resolution for the ECG statistics	Select the time from the **Trend Interval** list. The Trend Interval specifies the time between the columns in the ECG Statistics tile. You can also select **Algorithm Interval**, which is the interval at which the statistics are calculated by the data source (for example, the bedside monitor or Information Center).
Change the time focus	Select anywhere on the timeline on the bottom of the window. The white section, called the view duration, identifies the length of time for which trends are displayed. You can also move forward and back in time by selecting the Graphic Trend and dragging left or right to the desired time.

Patient Window with Web Access

The Patient Window allows you to view the patient's waves and numerics. In addition, you can access a strip of all the recent alarms and related information by selecting the **Strip Chart View** button.

The table below describes how to use the strip windows to display details.

If you want to...	Do this...
Move back or forward in time	Use the single arrows to move the time back or forward by approximately one second. Use the double arrows to move back or forward by a page. *Note* — You can also move through the strip by selecting and dragging.
Change the wave size (scale)	On the desired wave, select the calibration bar and choose the size you want from the list. Choices are **x1/2**, **x1**, or **x2**.

If you want to...	Do this...
Change the wave speed	Select the speed on the bottom right of the strip window then select a speed from the list. Choices are **6.25 mm/s**, **12.5 mm/s, 25.0 mm/s**, or **50.0 mm/s**. When you select a different speed the window re-displays with the selected speed.
Minimize waves overlapping possible due to high amplitude of waves.	Select the **Clip Waves** check box.
Add or remove waves from the strip.	Select **Waves** on the bottom of the strip window then select the wave from the list. A wave is selected for inclusion in the strip window when a check mark displays next to the wave name.
Print a 30 second strip report.	Select the **Print** button to the right of the strip.
Save the strip to the clipboard.	Select the **Export** button to the right of the strip.
Clear the strip from the screen.	Select the X button on the top of the strip.

10

Reports

This section describes the reports available from the Information Center. It includes the following:

Introduction

Note — This guide does not describe how to install a networked or local printer on the Information Center or how to configure a network share destination file system. Refer to the *Patient Information Center iX Service and Installation Guide* for more information.

Note — This guide does not describe how to install or change settings on the printer. For information about operating the printer or printer errors, refer to the documentation that is supplied with the printer.

The Information Center enables you to print reports of patient monitoring information and unit information by sending reports to a networked or local printer, or by saving reports as PDF documents to a shared file system on the network. To print electronic PDF reports, you select the Print icon in the application window caption bar.

The Information Center supports reports generated from the bedside monitor and sent to printers that are connected to the Information Center. See "Monitor Reports" on page 10-7.

When a PDF file is created, an XML file containing the patient demographic information is also created.

Types of Reports

The following table describes the reports available at the Information Center and how to start printing the reports.

Report	Description	How to print
12-lead Capture	Captured ECG waves, measurement values, interpretive and severity statements, and status information.	In the 12-lead Capture Review application, select the  icon in the caption bar. See "12-lead Capture Review" on page 9-36.
Alarm	A selected set of alarm strips for the patient. If available, the report also includes the two highest priority waves for each alarm. You can choose the types of alarms to include in the report: Red Alarms, Yellow Alarms, ECG Alarms, Non-ECG Alarms, Saved Strips. The Alarm report can be scheduled to print at a specific time or frequency. See "Scheduled Reports" on page 10-6.	In the **Alarm Review** application, select the alarms to print, then select the  icon in the caption bar. See "Alarm Review" on page 9-32.
Alarm Strip	A 30-second report of a single strip.	In the **Alarm Review** application, select the  icon to the right of the tile. See "Alarm Review" on page 9-32.
Alarm Summary	A report of the highest number of alarms with its associated trend to assist in the proper setting of alarms for a patient. The Alarm Summary report can be scheduled to print at a specific time or frequency. See "Scheduled Reports" on page 10-6.	In the **Measurements** application, select **Alarm Summary**, then select the  icon in the caption bar. See "Alarm Summary Report" on page 8-30.

Report	Description	How to print
Auto Alarm Report	A report that contains alarm information for the patient for a specific duration when the alarm occurred. Alarm filter settings determine which alarms are included in the report. See "Alarm Filters" on page 8-24. The report prints on the system where the patient is being monitored.	If enabled, the report automatically prints to the configured printer.
Clinical Settings	A report of the unit settings. *Note* — The Clinical Settings report can only be printed to paper.	If authorized, access the **Clinical Settings** application, then select the  icon in the caption bar. See "Clinical Settings Menus" on page 12-16.
Device Assignment	Contains information about the equipment assigned to patients in a unit. *Note* — The Device Assignment report can only be printed to paper.	In the Main Setup window, select **Locate Equipment**, then select the  icon in the caption bar. See "Device Assignment Report" on page 12-12.
ECG Statistics	Statistics gathered from the ST/AR analysis of ECG. The ECG Statistics report can be scheduled to print at a specific time or frequency. See "Scheduled Reports" on page 10-6.	In a review application, select the  icon to the right of the tile. See "ECG Statistics Tile" on page 9-51.
Help topic	Prints the current help topic.	In the on-line Help, select a help topic, then select the  icon in the caption bar. The topic prints to the default printer.
Monitor Reports A, B, C	If configured, reports can be printed from the bedside monitor.	See "Monitor Reports" on page 10-7.
Multi-Lead	Contains waves for all available ECG leads.	• In a review application, select the  icon to the right of the tile. • In the **ECG Analysis** application, select the  icon in the caption bar. See "Multi-Lead Tile" on page 9-17.

Report	Description	How to print
Patient Summary	Includes the patient's demographics, the most recent vital signs, date and time of equipment assignment, and a wave strip. The Patient Summary report can be scheduled to print at a specific time or frequency. See "Scheduled Reports" on page 10-6.	In the Patient Window, select the  icon in the caption bar. The Patient Summary report can be set up to print on patient transfer or discharge. See "Patient Summary Report" on page 3-21.
QT	Includes the QT snippets and QTc and ΔQTc values.	In the **Measurements** application, select QT, select QT View, then select the  icon in the caption bar. See "Printing a QT View Report" on page 8-17.
Review	Prints a report of selected tiles that are currently displayed in the review application.	In a review application, select the  icon in the caption bar, then select the tiles that you want to print. See "Printing a Review Report" on page 9-31.
SpotCheck	Vital signs, clinical observations, and calculated early warning scores (EWS).	In a review application, select the  icon to the right of the tile. See "SpotCheck Trend Tile" on page 9-19.
ST	ST snippets and map data in a transversal and/or horizontal multi-axis diagram. Includes the ST measurement points and leads.	In the **Measurements** application, select ST, select ST Map or ST View, then select the  icon in the caption bar. See "Printing an ST Report" on page 8-13.
STE	STE snippets and map data in a multi-axis diagram.	In the **Measurements** application, select STE, select STE Map or STE View, then select the  icon in the caption bar. See "STE Map" on page 8-15.
Strip	An alarm strip with a configured duration of data.	In a review application, open the save strip dialog box, then select the Print icon. See "Strip Tiles" on page 9-22.

Report	Description	How to print
Tabular Trend	All available numerics and all columns within the view duration. The Tabular Trend report can be scheduled to print at a specific time or frequency. See "Scheduled Reports" on page 10-6.	In a review application, click the  icon to the right of the tile. See "Tabular Trend Tile" on page 9-29.
Unit Summary	A unit report with all of the information that is included in the Patient Summary, without the strips. The Unit Summary report can be scheduled to print at a specific time or frequency. See "Scheduled Reports" on page 10-6. *Note* — The Unit Summary report can only be printed to paper.	In the Main Setup window, select the  icon in the caption bar. See "Printing the Unit Summary Report" on page 2-20.

Configuring Reports

The Information Center can be configured to control the report settings. The following table describes the setting categories that are available from the **Reports** menu in **Clinical Settings**.

Note — On an overview station, only the **Destinations** and **Strip Settings** tabs are available.

For information about the settings, see the *Patient Information Center iX Clinical Configuration Guide.*

Category	Description
Layouts	These settings control the headers and footers, and margin sizes. Reports can print in portrait or landscape layout. Report headers can contain up to three rows that include the report name, bed label, Addressograph (if enabled), and patient demographic information. *Note* — If the Addressograph is included, patient names and IDs may be truncated. Report footers contain two rows that include the report print date/time and page number, any custom text, and the institution name. The top, bottom, left, and right margin size can be configured for each type of report on each host. Margin sizes are configured in millimeters (mm), in increments of ±1 mm. The range is 0 mm to 50 mm.

Category	Description
Destinations	These settings control the following: • Printers that are assigned to each report on the Information Center. • Portrait or landscape layout type • Print action for patient-specific reports (paper, electronic document, paper and electronic, or ask the user to select the action). The system can be configured so that the user can select a print destination. • Color or duplex print settings • Maximum number of pages for a report. The default is 10.
Scheduled	These settings control whether a report automatically prints at a set start time and frequency. Scheduled reports must be assigned to a specific printer. See "Scheduled Reports" on page 10-6.
Monitor Reports	These settings control the reports that can be printed from an IntelliVue Patient Monitor or MX40 on a printer connected to the Information Center. See "Monitor Reports" on page 10-7.
Monitor Queues	These settings control the IntelliVue Patient Monitor or MX40 queue list. Three queues can be configured. With IntelliVue Patient Monitor Release M or later, strips can be printed from the bedside monitor as an electronic recording.
Electronic Reports	These settings control the destination of PDF report files, if licensed.
Strip Settings	These settings control the Pre Time and Duration for strip reports and alarm strip reports. Pre Time is the amount of time before the time focus of the strip to print. Duration is the total run time of the report, including the Pre Time (onset or announce time).

Scheduled Reports

The following reports can be configured to automatically print at a set start time and frequency:

- **Alarm**
- **Alarm Summary**
- **ECG Statistics**
- **Patient Summary**
- **Tabular Trend**
- **Unit Summary**

The start time is the time for the first printing of the report. The default start time is the current time. The frequency setting determines the next time the report prints. Each report can be configured with its own schedule frequency.

Notes

- The frequency for printing the Alarm Summary report determines the duration of trends and alarm count in the report. For example, if the report prints every four hours, it will contain a four-hour trend and the total alarms for each measurement in the last four hours. See "Alarm Summary Report" on page 8-30.
- Because it takes up to one minute to store data in the database, your system may be configured to start printing a report at a time just after the hour, such as 8:05, to ensure that data collected by 8:00 is available for reporting.
- The ECG Statistics report may be scheduled to print every hour to ensure that all available statistics are included in the report. See "ECG Statistics Tile" on page 9-9.

Monitor Reports

Depending on availability, reports can be printed from an IntelliVue Patient Monitor or MX40 on a printer connected to the Information Center. The type of report that will print is configured at the Information Center. The available reports are:

- Alarm (default Report A)
- Alarm Summary
- Patient Summary (default Report B)
- Tabular Trend (Default Report C)

Exporting Electronic Reports

Electronic reports are exported via the Physiological Servers (because Information Centers may not have access to many network shares). However, if a Physiological Server is in Local/Disconnected mode, and all Physiological Servers are unavailable, reports are not sent. The report exports when the Physiological Server becomes available.

Recordings

This section describes the Information Center recordings. It includes the following:

Introduction

Note — Recording is not available on PIC iX Essentials systems.

The intended use of the Philips Recorder is to provide hard copy of text, graphics, and wave data for the Information Center.

You can initiate recordings from the Information Center or from the monitoring device.

Recordings are made on the Philips 2-Channel Recorder and can be automatically generated by alarm events or can be manually requested.

Delayed recordings or strip printouts contain the primary and secondary ECG waves selected at the bedside monitor, or, for telemetry devices, at the Information Center.

The Philips Recorder is not intended for home use.

Rx only.

Types of Recordings

The following types of recordings can be made at the Information Center.

Recording Type	Description
Alarm	An alarm recording is a timed, non-continuous recording that is generated automatically (if configured) when an alarm occurs. See "Alarm Recordings" on page 11-3.
Delayed	A delayed recording is a timed, non-continuous recording that shows waves before and after it is initiated. See "Delayed Recordings" on page 11-3.
Real-Time (Continuous)	A real-time recording is a continuous recording that shows waves that occur after you request the recording. See "Real-Time Recordings" on page 11-4.
Retrospective	Retrospective recordings are timed, non-continuous recordings of past events recorded from the review applications. See "Review Applications" on page 9-2.
Record All	The **Record All** option makes a series of timed recordings that when initiated, records all sectors with wave data available at the Information Center at the time of the request.

Recording Priority

If the recorder is busy or inoperable, certain types of recording requests are queued and then print when the recorder becomes available. Each configured recorder queue can hold a maximum of 640 requests, and up to 10 requests for each patient. All requests have equal priority. The queue operates on a first-in, first-out (FIFO) basis. If there are 10 recording requests in the queue and a new request is initiated, the Information Center removes the oldest recording request to make room for the new request.

Recording Type	Priority
Alarm	Queued regardless of recorder availability.
Delayed	Queued regardless of recorder availability.
Real-Time (Continuous)	No queuing. A message displays if the recorder is unavailable.
Retrospective	Queued regardless of recorder availability.
Record All	Queued regardless of recorder availability.

Alarm Recordings

An alarm recording is a timed, non-continuous recording that is generated automatically (if configured) when an alarm occurs. The recording shows waves both before and after the alarm was announced. The waves that are recorded are based on the following:

- Primary wave (usually ECG)
- Wave corresponding to the alarming measurement. If only the primary wave is available, a 40-mm single-channel recording is generated.

In order to make an alarm recording generated from the bedside at the Information Center, the recording must be configured On at both the bedside and the Information Center (in the **Measurements** application **Alarm Filters** page).

Notes

- You can make alarm recordings continuous from the recorder. See "Making an Alarm Recording or Delayed Recording Continuous" on page 11-4.
- You can turn the automatic recording or printing of specific alarms on or off in the **Measurements** application **Alarm Filters** page. See "Alarm Filters" on page 8-24.
- If an arrhythmia alarm recording is running for a patient and other arrhythmia alarms occur for the same patient (with the same waves), the recording is extended to include the superseding alarms.

Delayed Recordings

A delayed recording or strip report is a non-continuous, timed recording that shows waves prior to the record request with a few seconds of waveforms after your request. You can make a delayed recording for one patient or for all patients. Delayed recordings contain the primary and secondary waves selected at the bedside, or, for telemetry devices, in the patient sector, on the Patient Window or the **ECG Analysis** window.

Note — For IntelliVue Patient Monitors, waves are configured for recording at the monitor. When selecting waves for recording, only select waves that are available at the Information Center in the Patient Window. If you select waves that are not available at the Information Center, the Information Center substitutes the primary ECG and the highest priority bedside wave on the recording. See your IntelliVue Patient Monitor user documentation for details.

Delayed recordings can be initiated from the Information Center or from the bedside. For telemetry patients, a Nurse Call recording can be initiated when the Telemetry button on the telemetry device is pressed (if configured and turned on).

Delayed recordings can be made continuous from the recorder. Delayed recordings can be generated from the bedside monitor, MX40, or from the patient sector on the Information Center. See "Making an Alarm Recording or Delayed Recording Continuous" on page 11-4.

The length of the recordings are preset for your unit. Factory defaults are 4 seconds pre-event and 2 seconds post-event.

Note — The actual length of a delayed recording may be longer than the preset length to allow enough time to print all of the annotations. In timed recordings, since the number of seconds of pre-event and post-event waves are preset for the unit, if the event is longer than this amount of time, the recording will not capture the entire event.

Making a Delayed Recording

To make a delayed recording:

- Select the  button in the patient sector. This generates a paper recording of the primary and secondary ECG waves.

Making an Alarm Recording or Delayed Recording Continuous

You can make an alarm recording or delayed recording continuous while the recording is printing by pressing the RUN/CONT key on the recorder. To terminate a recording, press the STOP key on the recorder.

If the recording was queued (for example, because the recorder was busy or out of paper), it cannot be made continuous.

Making a Delayed Recording for All Beds

To make a delayed recording for all displayed beds, select the  icon in the resting display caption bar. The Information Center initiates a delayed recording for all sectors that currently have patient data. A recording only prints in sectors that have beds or equipment assigned.

Real-Time Recordings

A real-time recording is a continuous recording that shows waves that occur after you request the recording. You select the waves to record and have to manually stop real-time recordings. You can initiate real-time recordings from either the bedside or the Patient Window. Real-time recordings are usually used to record procedures.

To make a real-time recording:

1 In the Patient Window, select the **Continuous Recording** button. The Information Center displays a list of waves.

2 Select the waves to record from the waves drop-down lists.

Note — If the first wave that you select is the primary ECG lead, you can select the **Show Beat Labels** check box to include beat labels on the recording.

Note — If you select waves that are not available at the Information Center, the Information Center substitutes the primary ECG and the secondary wave on the recording.

3 Select or clear the **Overlap Waves** check box:

- If selected, two waves overlap in one 40 mm sector.
- If cleared, the waves do not overlap. The size of the grid is 40 mm for one wave, 20 mm for two waves.

4 Select the recorder speed from the list. Choices are: **6.25 mm/s**, **12.5 mm/s**, **25 mm/s** (default), or **50 mm/s**.

5 Select the **OK** button. The recording begins and continues until you select the **Stop Recording** button in the Patient Window or press the STOP key on the recorder.

Annotation

The annotation for delayed, real-time, and alarm recordings includes the following information:

- Patient name (as entered in the **Manage Patient** window).
- Patient medical record number (as entered in the **Manage Patient** window).
- Bed label.
- Date and time of the first wave data on the recording.
- Current alarm text (for alarm recordings only).
- If the alarms are suspended or paused, the text **Alarms Paused**.
- Technical alarm/INOP text (if available).
- Patient measurements (associated with the date and time of the recording -- subset for alarm recordings).
- Rhythm (if available).
- Recorder speed. 3-second tic marks display at the bottom of the recording adjusted to the recorder speed.
- Bandwidth (for ECG waves suitable for ST measurements).

Real-time and delayed recordings that are continued are re-annotated with a subset of the annotation information.

Alarm Review Annotation

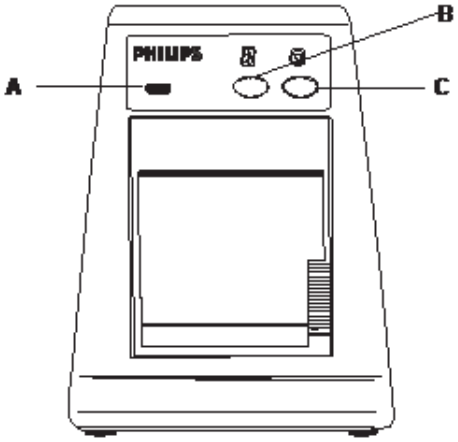
The annotation for recordings made from **Alarm Review** (for alarm strips and saved strips) includes the following information:

- Patient name (as entered in the **Manage Patient** window)
- Patient medical record number (as entered in the **Manage Patient** window)
- Bed label
- Date and time of the first wave data on the recording
- Alarm text specific to the alarm (for alarm strips only)
- Recorder speed

Note — Procedure recordings generate their own annotation.

Timed, delayed recordings continue until all of the annotation is complete.

Philips 2-Channel Recorder Controls and Indicators



	Control/Indicator	Description
A	LED Condition Indicator	Indicates the current recorder state. See the table below for descriptions.
B	RUN/CONT (continue) key	Makes a currently printing recording continuous (if possible).
C	STOP key	Stops the currently printing recording. To clear the recorder queue, simultaneously press the RUN/CONT key and the STOP key. The current recording and all jobs that are in the queue are cleared.

LED State	Description
Blinking Green	A continuous recording is in progress.
Blinking Yellow	Identifies one of the following conditions: • The recorder is powering up and establishing communication with the Information Center. • The recorder has lost communication with the Information Center. • Recorder is out of paper. • Recorder door is open. • A recording has been stopped by pressing the STOP key.
Green On	Normal record mode, either printing or in standby.
Off	Power has been removed from the recorder.

Recorder Status Messages

The messages in the table below appear in the caption bar at the top of the Main Screen.

Message	Meaning
No alarm recording available :	There is no recorder plugged into the Information Center.
Recorder door open :	The door of the 2-channel recorder is open.
Recorder fault :	The 2-channel recorder connected to the Information Center is currently faulted.
Recorder paper out :	The 2-channel recorder is out of paper.

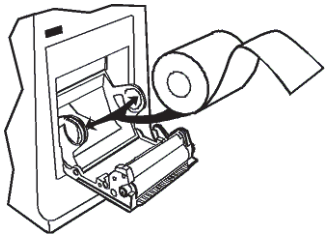
Loading 2-Channel Recorder Paper

A message appears in the Information Center caption bar when the recorder is out of paper.

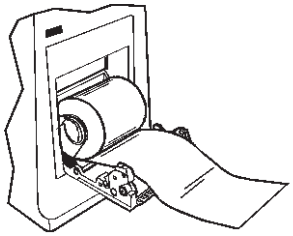
Note — The 2-channel recorder requires M4816/M4817A paper to function properly. If the wrong paper is installed, recordings do not print.

To load the paper in the recorder:

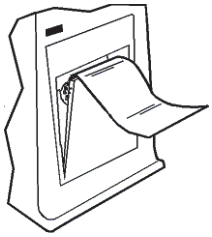
1 Insert a new roll with paper feeding from the bottom.



2 Pull the paper so it extends beyond the edge of the door.



3 Close the recorder door.

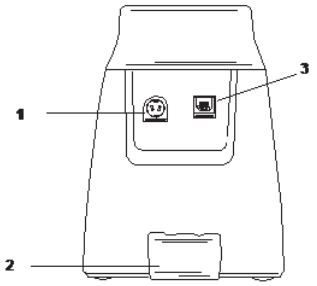


4 To test if the paper is loaded correctly, select the Record button in any patient sector that has waves. If no printing appears, the paper may be loaded backwards. Try reloading the paper.

Important — When removing a printed recording from the recorder, tear the paper in an upward or downward motion. Tearing the paper aggressively by pulling the recorder paper forward or at an angle can cause the recorder out of paper sensor to trigger causing the LED to flash and an out of paper message to display on the Information Center.

Philips 2-Channel Recorder Connections

The following diagram displays the 2-channel recorder connections.



Item	Description
1	Power - connect to Universal Power Module
2	Strain Relief Clip
3	USB Connector - Connect to Information Center PC

12

Unit Management

This section describes the unit management applications on the Information Center. It includes the following:

Unit Management Applications

The Information Center provides the following applications to assist you with unit management.

Note — The available applications depend on your system license.

Application	Description
Caregiver Assignments	Use to set up caregivers and assign caregivers to patients. See "Caregiver Assignments Application" on page 5-1. *Note* — The **Caregiver Assignments** application is not available on PIC iX Essentials systems.
Clinical Settings	Use to configure the Information Center's clinical settings. See "Clinical Settings Menus" on page 12-16.
Locate Equipment	Use to search units for specific devices as well as display the history for the device. See "Locating Equipment" on page 12-8.

Application	Description
Clinical Audit Trail	Use to view a chronological record of alarms and actions performed within a unit for a patient or all of the patients in a unit. See "Clinical Audit Trail" on page 12-3. *Note* — The **Clinical Audit Trail** application is not available on PIC iX Essentials systems.
Display Setup	Use to configure the layout of the patient sectors on the Main Screen. **Display Setup** allows you to configure the number of patient sectors that display in the columns and rows on the Main Screen. In addition, it allows you to lock a bed to a sector. Beds locked to a sector cannot be cleared. See "Display Setup" on page 12-12.
Label Assignment	Use to replace currently assigned bed labels with a different bed label. The label may need to be replaced, for example, in case of equipment failure or a lost device. See "Label Assignment" on page 12-14. *Note* — The **Label Assignment** application is not available on PIC iX Essentials systems.
System Help	Use to access help topics that describe how to use the Information Center applications. See "System Help" on page 12-14.
Product Support	Use to access read-only product support and licensing information. In addition, for systems set up to allow Philips remote support assistance, the **Product Support** application allows you to initiate a remote support session with a Philips Support Representative. See "Product Support" on page 12-15.

Accessing the Unit Management Applications

You can use the following methods to access the unit management applications:

- From an application window, select the **Manage Unit** button then select the application from the list.
- Open the **Main Setup** window and select the application button.

Clinical Audit Trail

Note — The **Clinical Audit Trail** application is not available on PIC iX Essentials systems.

The **Clinical Audit Trail** application provides a chronological record of the alarms and actions performed in a unit. You can search and display log entries of alarms and actions for a specific patient or for all patients in the unit. The unit can be in any institution to which you have host access. The Information Center stores 90 days of data. You can access 50 days at one time.

For example, if a patient incident occurs during the night shift, you can use the **Clinical Audit Trail** application to see which alarms occurred for the patient and the actions that the staff took as a result of the alarms. Or, a patient requests the hospital to provide a list of the people who accessed their protected health information. To comply with your geography's privacy regulations, you can use the **Clinical Audit Trail** application to query the system to generate a report of all the users who viewed the patient's information and see other systems to which the patient data may have been sent.

Warning

The Information Center exports the most recent 100,000 audit events or a maximum of 1MB of data. If there are more than 100,000 log entries to export, a message informs you that the export requires additional time (up to 10 minutes) to complete. You can stop or continue the export process. If you are authorized, you may want to consider exporting the data from the primary server to a shared folder on the network.

You can use the **Clinical Audit Trail** application to:

- Search for log entries for a patient or unit. See "Searching Log Records" on page 12-7.
- If available, save the log to a removable device. See "Saving an Audit Log" on page 12-8.

Audit Log Search Filters

The following table describes the search filters for each category of alarms and actions that are stored in the audit log.

Filter	Description
Alarms	
Red Alarm	The text of the red alarm, including the preceding symbols, such as ***.
Yellow Alarm	The text of the yellow alarm, including the preceding symbol, such as * or **.
Logged Inop	• All severe, yellow, or red INOP messages • All battery INOP messages • ECG Leads Off • Transmitter Off • No SpO2T, Batt Low

Filter	Description
Alert Sound	Indicates whether an alarm sound played or stopped. The Information Center plays one sound at a time. The log contains the sound associated with the highest priority alarm, such as the red sound for a red alarm, and the time that the sound was announced. The alarm sound is logged whether or not it is associated with a specific patient. The log does not include a bed label because the alarm sounded at the Information Center. If there are multiple alarms and the highest priority alarm is acknowledged, then the next highest priority sound is announced and logged.
Alarm Management	
Acknowledge	An alarm was acknowledged at the Information Center, telemetry device, or patient monitor. *Notes —* • Acknowledge at telemetry device is only audited for IntelliVue Patient Monitor Revision M.00 or later. • Acknowledge at MX40 is only audited for Revision B.05 or later. • Acknowledge at MRx is not audited.
Pause/Resume	All alarms for a patient were paused or resumed. The entry indicates where the pause or resume request was made, if on the Information Center.
QRS Detection Changed	The minimum QRS detection threshold changed.
Arrhythmia Analysis Mode	Arrhythmia analysis mode was set to single-lead or multi-lead.
Measurement On/Off	The measurement was turned on or off. This may be part of a profile change.
Alarm/Audio On/Off	The alarm associated with the measurement was turned on or off. This may be part of a profile change.
Alarm Limit Change	An alarm limit was changed. This may be part of a profile change.
Red Realarm/Remind	A red alarm reminder occurred.
Yellow Realarm/Remind	A yellow alarm reminder occurred.
Paced State Changed	The Paced Mode was changed. This may be part of a profile change.
Telemetry Profile Changed	The profile for a telemetry patient was changed. The log contains the name of the profile.
Alarm Strips	

Filter	Description
Patient Data Annotated	A wave strip was annotated and saved. The entry includes the annotation text.
Alarm Discarded	A wave strip was discarded.
Patient Management	
ADT	A patient was admitted, discharged or transferred, or patient demographics were changed. Typically, the log shows this as a **Patient update**.
Resuscitation Changed	The resuscitation setting for the patient was changed.
Patient Category Changed	The patient category (Neonate, Pediatric, Adult) was changed.
Equipment Management	
Standby/Resume	The device was placed into Standby or resumed from Standby.
Equipment Added/Removed	A monitoring device was added or removed. The name of the device appears in the log entry.
Equipment Online/Offline	Monitoring device association to the Information Center started or ended, either for care groups or paging. The user name appears in the log entry.
Sector Locked / Unlocked	The label was locked or unlocked in **Display Setup**.
Bed Cleared/Assigned	A sector with a label that is not locked was cleared. This causes a discharge if the patient was not admitted. If the patient was admitted, the patient must first be discharged.
Overview Bed Cleared/Assigned	A bed is assigned or cleared for overview of a patient on a different Information Center.
Secondary Notifications	
Caregiver assignment changed	The caregiver was changed for a bed assignment, either for care groups or paging. The user name appears in the log entry.
Filter Selection Changed	Alert filter patient settings changed.
Measurements	
ST Points	An ST measurement point (ISO, J, or ST) was adjusted.
ST Baseline Updated	The ST snippets were stored as a baseline.
QT Baseline Updated	The QT snippets were stored as a baseline.
Data Export	
12-lead Export	A 12-lead ECG capture was exported to the configured Cardiology Management System, such as IntelliSpace ECG (IECG).

Filter	Description
12-lead ECG Capture	A 12-lead ECG capture occurred. If the capture occurred at the bedside, it was sent from the bedside.
Holter Export	ECG data was exported to a Philips Holter system.
System Data	
Patient Data Accessed	Data was viewed using the Web or Mobility application.
Physio Data Lost	Connection to the Physiological Server was lost for a period of time for the specific bed label.
System Time Changed	A system time drift was identified and the time was updated.
Clinical Notification	
Clinical Notification	An Alarm Advisor notification or an Early Warning Score notification occurs.

Log Entry Format

Initially, the audit log records are sorted by the most recent event. You can sort the table by selecting a column heading. For example you can sort the table records by **Bed Label** or **Device Name**.

The log entries contain the following information:

- Event date and time — The time displayed on the Information Center when the entry occurred.
- Bed Label
- Lifetime ID (if available)
- Action — The text describing the event or alarm that occurred. For information about the log records for alarms, see "Log Entries for Alarms" on page 12-6.
- Device Name (if available) — The bedside or Information Center host name. This column is blank for wireless bedside monitors.
- Clinical User name is displayed in the log if the action performed required authorization. If a user is logged in and performs an action that is not password-protected, the Clinical User name does not display in the log.

Log Entries for Alarms

The log records for alarms contain the following information:

- Alarms display in the colors corresponding to their severity level.
- All red and yellow physiological alarms include the value of the corresponding numeric.
- The text format depends on whether the device sends standard or enhanced alarm text. IntelliVue Telemetry System bedside monitors and MRx monitors only send standard alarm text.
  - For devices that send standard alarm text, the system tries to add the vital sign value as close as possible to the time of the alarm. For example, ****HR High (HR = 122)**. This may not be the exact value that caused the alarm.
  - For devices that send enhanced alarm text, the log entry shows the actual alarm limit violation. For example, *** HR 132>130**.

- The Date column in the log record indicates the time displayed on the Information Center when the entry occurred. The Action column contains the text **Generated** when the alarm first appears in the sector, and **Ended** when the alarm no longer appears in the sector.

  Note — The time in the Action column shows the clock time of the monitoring device. The clock time may drift up to 30 seconds before the Information Center clock synchronizes to the monitoring device clock.

- The time between **Generated** and **Ended** in the Action column depends on the type of alarm and in some cases, the action taken on the alarm.
- For arrhythmia alarms, a log record is created if the alarm is acknowledged during the timeout period and the condition no longer exists, or if the alarm was not acknowledged but the timeout period ended and the condition no longer exists. If the condition persists, reminders are not shown in the log but the **Ended** time always indicates that the alarm is no longer active in the sector.
- If an alarm is latched, the log record contains the time until the alarm is acknowledged if the physiological condition is no longer active. After the alarm is acknowledged, the log record contains the time the alarm condition existed.
- If an alarm is not latched, the log record shows the time that the condition ended.
- The system creates a log record for each occurrence of an alarm condition. So, if three hosts have the same patient and the alarm occurs on each host, there are three log records.

Searching Log Records

You can search log records for a specific patient or unit.

To search log records:

1 Use one of the following methods to open the **Clinical Audit Trail** application:

- Select **Clinical Audit Trail** on the **Main Setup** window.
- From an application window, select the **Manage Unit** button, then select **Clinical Audit Trail**.

2 Select the institution in the *** Institution:** list. By default, the list only includes institutions that contain at least one unit with access to the current host.

3 Select the method to search by from the *** Search By:** list. The available fields depend on your hospital's configuration.

- To search for log records for a clinical unit, select the name of the unit in the selected institution from the Unit list. Go to step 4.
- To search for a patient's log records, select the Lifetime ID (such as MRN), Bed Label, First Name, or Last Name.

Note — You can only get results for the MRN and name if the patient is current or was discharged within the last seven days. The results do not include the MRN or name if the patient has been discharged for more than seven days.

4 Enter the related search criteria text (MRN, Bed Label, First Name, or Last Name) in the *** Search:** box.

5 Select the number of days of records by using the *** Days:** up and down control. You can search from 1 to 90 days. The default is 1 day.

6 Select the **Select All** check box to show log records for all of the filter options. Select or clear the check boxes in the pane to show log records that relate to specific alarm types, actions, or events. For descriptions of the filters, see "Audit Log Search Filters" on page 12-3.

7 Select the **Search** button. If there is more than one patient with the same name, a dialog box displays a list of matching names. Select the desired patient from the list, then select **OK**. A table of records matching your search criteria displays on the right side of the window. If there are more records than can display in the window, a scroll bar is available. The total number of matching records appears at the bottom right side of the window.

   If more than 500 records match the search criteria, use the following methods to navigate the records:

   - Select the single arrow buttons to move to the previous or next 500 records.
   - Type a number in the **Go to:** field and select the button or press **Enter** to advance to a record within the search results. The resulting record displays in the first row. The record number is displayed at the bottom of the window.

Saving an Audit Log

If you are authorized, you can save the audit log to a removable device, such as a USB flash drive.

Note — An authorized user may be able to save an audit log to a shared folder on the network. For more information, see the *Patient Information Center iX Service and Installation Guide.*

The audit log data is exported in Extensible Markup Language (XML) format. Each entry in the .xml file contains some or all of the following information, in any order:

- Row Action Type
- Clinical User
- Device Name
- Action
- Bed Label
- Institution
- Date/Time

For descriptions of the entry items, see "Log Entry Format" on page 12-6.

To save the audit log data:

1 Select the **Export** button.

2 If prompted, enter a password. The **Export** dialog box displays.

3 Select the removable device to which to export the log by selecting the **Drive Letter:** drop-down arrow then selecting a drive from the list.

4 Select the **Export** button.

Locating Equipment

The **Locate Equipment** application allows you to view all assigned and unassigned devices for a unit and see the history for those devices. Additionally, for telemetry devices and Instrument Telemetry bedsides with the Device Location option available, the **Locate Equipment** application allows you to remotely identify the last access point (and a history of access point associations) of a device within the hospital. The application remotely identifies the device location by associating the device with access points installed in the hospital. Access points provide communication between the device and the Information Center.

The **Locate Equipment** application displays device location information for all devices assigned to patients in the unit. From the **Locate Equipment** application you can:

- View all assigned and unassigned devices for a particular unit. See "Viewing Devices for a Unit" on page 12-9.
- Search for a device in unit. See "Locating a Device" on page 12-11.
- Display the history of a particular device. See "Displaying Device History" on page 12-11.
- Print information about the equipment assigned to patients in a clinical unit. See "Device Assignment Report" on page 12-12.

Viewing Devices for a Unit

To view devices for a unit:

1 Use one of the following methods to open the **Locate Equipment** application:

   - Select **Locate Equipment** on the **Main Setup** window.
   - Select **Manage Patient** on the application window task bar, then select **Locate Equipment**.

2 Select the unit name from the **Unit:** list. If there is more than one institution, the institution name precedes the unit name (for example, **Main Hospital – Unit1**).

3 Select whether to view assigned or unassigned equipment for the unit by selecting **Assigned** or **Unassigned** from the **Show:** list.

   The following table describes the fields in the **Locate Equipment** window.

Field	Description
Type	The device/equipment types assigned or unassigned to the selected unit. See "Device Types" on page 12-10.
Bed	Identifies the device's assigned bed label. This is blank if the device is not assigned to a bed.
Equipment	Identifies the device's assigned display label.
Battery	Indicates whether the device is operating on battery power. For devices operating on battery power a battery icon indicates the remaining battery strength.
Location	For telemetry devices and Instrument Telemetry monitors with the Device Location option, identifies the last access point the device associated with. The field is empty if the device location is unavailable or the device is not a telemetry device or Instrument Telemetry monitor.
Date Assigned	Date/time that the device is assigned and the total duration of the assignment.

Field	Description
Status	For telemetry devices and Instrument Telemetry monitors, an icon indicates whether the device is in range.  The device is in range and has sent data within the last 15 minutes.  The device is in range but has not sent data. The status is **Stale**.  The device is out of range. The status is **Out of Area**.

Device Types

Equipment icons represent the devices that may be located in the hospital. The following table describes these icons.

Icon	Device Type
	MP2 IntelliVue Patient Monitor
	MP5/MP5T IntelliVue Patient Monitor
	MP20/MP30 IntelliVue Patient Monitor
	MP40/MP50 IntelliVue Patient Monitor
	MX40 Wearable Monitor
	TRx4841A/TRx4851A Transceiver
	TRx+ Transceiver
	MP60/MP70 IntelliVue Patient Monitor
	MRx monitor
	Efficia monitor

	MX450 IntelliVue Patient Monitor
	MX500/MX550 IntelliVue Patient Monitor
	MX600/MX700 IntelliVue Patient Monitor
	MX800 IntelliVue Patient Monitor

Locating a Device

For assigned telemetry devices, the **Locate Equipment** application includes a Find Device feature that enables you to generate an alternating pitch repeated tone at the telemetry device to assist in locating a missing device.

To find a telemetry device:

1 From the **Locate Equipment** window, select the unit name from the **Unit:** list.

2 Search for assigned devices by selecting **Assigned** from the **Show:** list.

3 Select the telemetry device you want to find from the list on the left side.

4 Select the **Find** button. The telemetry device will produce an audible tone provided that the telemetry device has sufficient battery power and is within the coverage area.

Displaying Device History

With the **Locate Equipment** application, you can view the history for devices in a unit or you can search for the history of a specific device across units.

The device history includes the following:

- Unit to which the device is assigned.
- Bed label.
- Device locations (updated every 15 minutes if no change in location) and associated timestamps.
- For telemetry devices and Instrument Telemetry bedsides, the status icon indicates whether the device is in range. See “Viewing Devices for a Unit” on page 12-9.

To display the history for devices in a unit:

1 From the **Locate Equipment** window, select the unit name from the **Unit:** list.

2 Select whether to view the current assigned or unassigned equipment for the unit by selecting **Assigned** or **Unassigned** from the **Show:** list.

3 Select the device from the list on the left side. The device history with up to 10 location entries displays on the right side.

Note — The history includes entries when the device is assigned and unassigned. If the device was unassigned, the bed label will be blank.

To search for a device’s history across units:

- Enter the equipment name for the device in the **History for:** field then select the Search icon. Up to 10 location entries display for the device on the right side.

Device Assignment Report

The Device Assignment report includes the following information about the equipment assigned to patients in a clinical unit. The report prints the rows in the same order that they display on the screen.

- Equipment type
- Bed label
- Date assigned — The date and time that the device was assigned to the bed *or* the last date and time a discharge occurred for the bed, whichever is later.
- Battery strength
- Location

To print the report:

- Select the Print icon in the **Locate Equipment** window.

Display Setup

You can use the **Display Setup** application to change the layout of the patient sectors on the Main Screen for any Information Center (host) that you can access. Using the application, you can:

- Specify the number of columns and sectors per column that display on the Main Screen
- Assign a bed label to a sector
- Lock and unlock sectors

The number of displays and patient sectors available depends on your system configuration.

The available hosts and beds are displayed for selection in the application. After you select a host, you can assign beds to sectors. You can reassign beds to different sectors without discharging the patient.

The following procedure describes how to assign a bed label to a sector in the **Display Setup** application. For information on assigning beds to a sector using the **Manage Patient** application, see "Assigning a Bed to a Sector" on page 4-13.

Considerations

Before changing the sector layout, note the following:

- The Information Center configuration determines if a sector is principal or ancillary. See "PIC iX Enterprise Link and Overview Sector Types" on page 4-12.
- At least one principal sector is always required for central monitoring of telemetry patients. Removing the last principal sector results in the loss of central monitoring of patients regardless of the equipment type.
- On a PIC iX Enterprise Link system, a unit can be configured to allow a clear sector action to occur on a principal sector without discharging the patient for non-telemetry devices.

To change the layout of the patient sectors on the Main Screen:

1 Use one of the following methods to open the **Display Setup** application:
   - Select **Display Setup** on the **Main Setup** window.
   - From an application window, select the **Manage Unit** button, then select **Display Setup**.

2 If prompted, enter a user name and password and select OK. The **Display Setup** application displays a list of Information Centers (hosts) and units that you can access on the left side. The

available bed labels are shown in the center. Use the plus and minus signs to expand and collapse the lists.

3 Select the **Display #** tab at the top of the sector layout to change displays.

4 To increase or decrease the number of sectors in a column, select the up and down arrows below the column. The default layout is 2 columns with 4 patient sectors per column. The maximum number of sectors is 8 per column on all screen resolutions. Some features, such as the second header row for screen notes, will not be available when at 8 sectors per column.

5 To increase or decrease the number of columns, select the up and down arrows in the **Columns** field at the bottom of the window. The number of columns available to add is determined by the screen resolution, and a warning will appear if unavailable.

6 Select the unit, if needed.

7 Select the bed that you want to assign to the sector and select the sector. Be sure to select the correct label. The Information Center configuration determines whether sectors are assigned for primary or secondary monitoring. See "PIC iX Enterprise Link and Overview Sector Types" on page 4-12. The following icons represent the sector type:

- Principal: 
- Ancillary: 

8 Select the **Auto Assign** button if you want the Information Center to automatically assign the bed to the next available sector. The Information Center fills in all the bed labels in alphanumeric order starting at the top of the first column, working down, then moving to the top of the next available column.

9 To lock a bed to a sector, select **Lock** in the sector. To unlock a sector, select **Unlock**.

10 To lock all of the assigned bed labels, select **Lock Assigned**.

Note — If a bed label is locked to a sector, it cannot be cleared at discharge or transfer.

Caution

If you are using Switch Port Mapping you **must** lock bed labels to the sector.

11 To remove a bed from a sector, move the cursor over the top right corner of the sector, and select the X (**Unassign**) button. The bed label displays in red text in the list of beds.

12 When you are done setting up the sectors on the Main Screen, select **Apply** to save your changes.

Note — If there are multiple principal sectors, and you are removing the last principal sector, a message warns that the existing patient will be discharged and the patient's data will be cleared. If you do not want to discharge the patient, assign the bed label to another sector before you select **Apply**.

Label Assignment

Note — The **Label Assignment** application is not available on PIC iX Essentials systems.

Use the **Label Assignment** application to replace or change the monitoring device currently assigned to an equipment label. Equipment labels, set up during system configuration, help to identify specific monitoring devices assigned to various beds or units. Monitoring devices can be wired IntelliVue Patient Monitors, telemetry devices and IntelliBridge hubs. A label may need to be replaced in case of device failure or if a monitoring device becomes lost. You can use the **Label Assignment** application to assign the current equipment label to a new device.

See your *Patient Information Center iX Service and Installation Guide* for information on setting up equipment labels at the Information Center iX or your *IntelliBridge SC 50 Device Interfacing Engine Configuration Guide* for information on setting up Hub equipment labels at the IntelliBridge SC 50 host.

To replace a label:

1 Use one of the following methods to open the **Label Assignment** application:

- Select the **Label Assignment** button in the **Main Setup** window.
- In the application window task bar, select **Manage Unit** then select **Label Assignment** from the list.

2 If prompted, enter a user name and password.

3 Select the device for which you want to replace an equipment label from the **Assigned Devices:** list on the left side of the window.

4 Select the new device from the **Assigned Devices:** list on the right side of the window.

5 Select **Replace**. If the device you are replacing is currently monitoring a patient or is a telemetry device a message asks you to confirm that you want to unassign the device.

System Help

The online Help application is always available to answer questions and provide information on using the Information Center. To get help on a specific window or application, select the Help icon ? from the application window caption bar.

Finding Information in the Help

Use the following tabs to find information in the Help.

Tab	Description
Contents	Contains books and pages the represent the information in the online Help. Select a closed book to display sub-books and pages that link to topics. Select an open book to close it. Select a page to view it in the pane on the right side.
Index	Contains a multi-level list of keywords. Select a keyword to view a topic that contains information about a specific subject.

Tab	Description
Search	Allows you to search for help topics that contain specific words or phrases. Type a keyword or phrase then press **Enter**. A list of topics with links displays in the pane. Select the topic title to view the topic in the right pane.

Printing the Help

While using Information Center online Help, you can print topics and information from the topic window. To print a Help topic:

1 Move the cursor into the help topic.

2 Select  on the top right side of the help window.

3 The help topic prints to the default connected printer.

Product Support

You can use the **Product Support** application to access read-only product support and licensing information and initiate a remote support session with a Philips Support Representative.

Viewing Product Information

To view product support and licensing information:

1 Use one of the following methods to open the **Product Support** application:

- Select the Product Support icon on the caption bar: PHILIPS
- Select **Product Support** on the **Main Setup** window.

2 View read-only product and license information on the **Product Support** window including Service Number, Serial Number, Computer Name, Software Version, Customer Name, and feature options.

Important — When there is a software update available, a password-protected **Update Now** button is available in the Upgrade Information section of the window. This allows you to choose when you want to implement an update on your system. Upgrades should only be initiated in partnership with Philips Field Service personnel or hospital Biomedical staff.

Initiating a Remote Support Session

For systems that allow Philips remote support assistance, you can use the **Product Support** application to initiate a remote support session with a Philips Support representative.

To initiate a remote support session:

1 Use one of the following methods to open the **Product Support** application:

- Select the Product Support icon on the caption bar: PHILIPS
- Select **Product Support** on the **Main Setup** window

2 Select the **Allow** button. A message asks you to confirm that you want to start a remote support session.

3 Select **Yes** to allow a support representative to initiate a remote connection to your machine. When the remote connection is active, both you and the support representative have full access to the keyboard and mouse. Any changes performed by the support representative are visible because you also share the desktop screen. You should only select **Yes** after reviewing the following warning text.

Warnings

- Remote access to the system is enabled by the use of UltraVNC. It is configured at time of install to limit UltraVNC remote access to Philips Remote Services users. If your Health Care Facility chooses to utilize UltraVNC, the institution is responsible to ensure that internal remote access meets their security, privacy, and auditing policies.
- Certain private information, including Electronic Protected Health Information (ePHI) about patients, will become accessible to the remote operator. Be sure to stay within your institution's policy regarding disclosure of confidential information to third parties.
- Uses of the system for purposes other than those intended and expressly stated by the manufacturer, as well as incorrect use, incorrect operation, or modifications made to the system without explicit approval from Philips, may relieve the manufacturer (or his agent) from all or some responsibilities for resultant noncompliance, damage or injury.

4 When you are done with the remote session select **Disconnect** to terminate the remote support session.

Note — If you do not select **Disconnect** the remote support session will stop automatically after one hour.

Clinical Settings Menus

The Information Center comes with factory defaults that govern how your system operates. The Information Center provides clinical settings menus that contain configuration items that you can change to accommodate the needs of your unit. The available configuration choices, settings explanations, and the clinical significance of selecting one configuration item over another are described in the *Patient Information Center iX Clinical Configuration Guide*. For PIC iX Essentials systems, this information is described in the *PIC iX Essentials Installation Guide*.

Warnings

- Changing the configuration may alter the way the Information Center performs when monitoring patients. Do not change anything unless you are aware of the possible consequences, especially if you are monitoring a patient while in a clinical setting.
- Before you begin monitoring, ensure the configuration meets the unit's requirements, especially the patient category, alarm limits, and paced mode. The patient category and paced mode settings in the default unit profile will overwrite the default profile for these settings at the bedside monitor.

The Information Center provides the following clinical settings menus:

Menu	Use to...
Patient Management	• Customize the patient demographic and patient care fields that display in the **Manage Patient** application. • Specify the fields required for patient admission. • Configure workflow settings. • Configure patient groups. • Configure temporary transport locations. • Select default units of measure for height and weight.
Local Surveillance	Determine how information displays in the patient sectors and in the Patient Window, and set the alarm tone volume.
Colors	Set the color of the waves and numerics. *Note* — These settings are also found on the bedside monitor and should match if using both telemetry and bedside monitors.
Global Settings	• Configure settings for telemetry devices in this unit. • Change general alarm settings. • Control whether users can start NBP measurements, change alarm limits, acknowledge alarms and pause alarms at the bedside monitor from the Information Center. The bedside monitor must be configured to enable remote controls.
Profiles	Change profile settings. A profile is a pre-configured set of measurements, alarms, patient category and paced mode set up for your unit. Profiles let you change measurements and alarm settings so you can adapt to different monitoring situations.
Alarm Notification	Change the unit alarm notification settings. Alarm Notification settings are for secondary notification of alarms either through a paging device or, if using the IntelliVue Patient Monitors, through the Overview Status bar at the bedside.
Reports	Set up and schedule reports that will print on a regular basis for all admitted patients in the unit.
Recording	Configure recorder settings when recording wave strips. Recorder settings are needed for both real time/alarm and review application recordings.
12-lead ECG	Configure the settings for Analyze/Export 12-lead ECG, 12-lead ECG Capture Review or specialty review options.
Update Users	Edit the user login information or change the roles assigned to a user in the clinical unit.
Data Warehouse Connect	Select the beds in the unit that you want to export to a Data Warehouse Connect storage destination.

13

Information Center Safety and Specifications

This section describes specifications and safety information for the Patient Information Center iX. It includes the following:

Regulatory and Safety Specifications

Intended Use

For the full content of the Intended Use, see “Intended Use” on page 1-2.

Essential Performance Characteristics

The Patient Information Center, operating under “normal” conditions, determines alarm conditions and generates alarm signals for Philips-approved medical devices that send physiological data and do not have the ability to determine the alarm condition. Algorithms present in the software are limited to the ST/AR ECG (for arrhythmia, ST Segment and QT Interval Monitoring) and SpO2. The Information Center generates alarm signals for user notification, based on the alarm signal determined and sent by Philips-approved medical devices. The Patient Information Center provides notification of life-threatening and physiological alarm conditions in the form of audible and visual alarm signals or a technical alarm condition in the form of audible and visual alarm signals if this detection or notification of the physiological alarm condition is not possible. Audible and visual alarm signals for all monitored patients on the Patient Information Center are presented in order to protect the patient from unacceptable immediate clinical risk.

Declaration

CE 0123 The M3290B Patient Information Center Software complies with the requirements of the Council Directive 93/42/EEC of 14 June 1993 concerning medical devices. It carries CE-marking to the European Medical Device Directive. Compliance with Directive 93/42/EEC is inclusive of Amending Directive 2007/47/EEC.

CE The PC workstation, HP LaserJet printer, UPS, and displays carry CE-marking to the European Low Voltage and EMC Directives. The Philips 2-Channel recorder carries CE-marking to Council Directive 93/42/EEC of 14 June 1993. The Philips 2-Channel recorder is a Class 1 medical device and carries the appropriate labeling.

Philips system components are not suitable for installation in the Patient Care Vicinity (Patient Environment).

Note — The display, UPS, recorder and printer are not provided as part of the Patient Information Center. These components may be ordered separately.

Rx Only

Caution: Federal law restricts this device to sale by or on the order of a physician.

Authorized Australia Sponsor

Philips Electronic Australia Ltd
65 Epping Road
North Ryde, NSW, Australia 2113

Electromagnetic Compatibility

The Patient Information Center is considered a medical system. The Philips-provided system consists of medical software operating on Information Technology Equipment (ITE). The equipment complies with the electromagnetic compatibility (EMC) requirements for ITE.

Radio frequency (RF) interference from nearby transmitting devices can degrade performance of the product. Electromagnetic compatibility with surrounding devices should be assessed prior to using the product.

Fixed, portable, and mobile radio frequency communications equipment can also affect the performance of medical equipment. See your service provider for assistance with the minimum recommended separation distance between RF communications equipment and the product.

Warnings

- The use of cables other than those specified in the product service and user documentation can result in increased emissions or decreased immunity of the product.
- The product should not be used next to or stacked with other equipment. If you must stack the product, you must check that normal operation is possible in the necessary configuration before the product is used.

Reducing Electromagnetic Interference

The product and associated accessories can be susceptible to interference from other RF energy sources and continuous, repetitive, power line bursts. Examples of other sources of RF interference are other medical electrical devices, cellular products, information technology equipment, and radio/television transmission. If interference is encountered, as demonstrated by artifact on the ECG or dramatic variations in physiological measurement values, attempt to locate the source. Assess the following:

- Is the interference due to misplaced or poorly applied electrodes or sensors? If suspected, see the Instructions for Use for the specific monitor or accessory.
- Is the interference intermittent or constant?
- Does the interference occur only when the medical device data source is in a certain location? If so, please consult the Instructions for Use for the medical device.
- Does the interference occur only when in close proximity to certain medical electrical equipment?
- Do measurement values change dramatically when the AC line cord of the suspected interfering device is unplugged?

Once the source is located, attempt to attenuate the interference by distancing the product from the source as much as possible. If assistance is needed, contact your local service representative.

Restrictions for Use

Artifact on ECG and other physiological waveforms caused by electromagnetic interference should be evaluated by a physician or physician authorized personnel to determine if it will negatively impact patient diagnosis or treatment.

Information Center Display Specifications

- Up to 32 patient sectors, with up to 24 waveforms per screen single or dual displays. Up to 32 waves can be displayed on dual displays with two main screens.
- Waveforms are 3.0 seconds in length in a dual-column format and 6.0 seconds in length in a single-column format (at 25 mm/s speed, waves at 12.5 mm/s are twice as long). The length and number of waves that can display depends on the screen resolution, as shown in "Waves Displayed Per Screen Resolution" on page 4-7.
- Number of waves in Patient Window: up to 4 (single display); up to 11 (dual display). If available, you can select the **More Data** button to move between pages of patient data. See "Patient Window Buttons" on page 2-22.
- Number of measurements in Patient Window: up to 12.

Note — Philips Medical Systems (or its designees) will not install or support displays not supplied by Philips Medical Systems with Information Center purchases.

Hardware Performance Requirements

The Information Center software is designed to operate on qualified hardware components. This includes equipment from both Philips Medical Systems and equipment purchased from suppliers other than Philips Medical Systems.

The table below lists components that comprise an Information Center along with features and requirements for proper operation of the Information Center software. These requirements are not exhaustive and are primarily intended to indicate the types of features that are required for successful Information Center software performance.

Note — Components provided by Philips Medical Systems with Information Center purchases have been extensively tested and validated for system performance. Software (for example, BIOS, drivers, service packs) not supplied by Philips Medical Systems as part of an Information Center system are not approved or supported by Philips Medical Systems for use with the Information Center and IntelliVue Network/Database Server systems.

For information on hardware mass, dimensions, and environmental specifications, refer to the "Physical Specifications of PIC iX/Server System Components" in the *Patient Information Center iX Service and Installation Guide*.

System Component	Archetypical Performance Requirements
Client-Class Desktop Workstation	
Operating System	Qualified with Windows® 10 IoT Enterprise, 64-bit
Processor	Minimum Intel® Core™ i5-4570S (2.9 GHz, 6 MB cache, 4 cores, 4 threads)
Memory	Minimum 4 GB physical RAM
LAN	Minimum one 100 Mb/s network LAN on motherboard (LOM)

System Component	Archetypical Performance Requirements
Disk	• One 256 GB (or larger) internal Solid State Drive (SSD) • Two 500 GB (or larger) internal drives in a RAID 1 configuration
USB or PS/2 Devices	• Keyboard • Mouse or Trackball • One USB Recorder • Two USB Touch Screens • Printer
Audio	Philips-design-controlled audio power amplifiers used with external speakers. Amplifiers provide ≥1 W to 4 Ohm load.
Server-Class Hardware	
Operating System	Qualified with Windows Server 2016 Standard Edition for Embedded Systems
Processor	Minimum Intel Xeon® E5-2407 v2 (2.4 GHz, 4 cores, 4 threads, 10 MB L3 cache)
Memory	Minimum 12 GB physical RAM
LAN	Minimum two 1Gb/s network LOM
Disk	Minimum 300 GB RAID 1 (with two 300 GB minimum physical disks or SSD). RAID may or may not be hardware-only.
Rack	2U or 1U rack-mount form factor
External Devices	
Displays	• Up to two touch or non-touch displays • Default resolution 1280x1024 Single Display: • 1280x1024 or 1920x1080 resolution, VGA HD15 interface • 2560x1440 or 2560x1600 resolution, DisplayPort interface Second Display: • 1280x1024 or 1920x1080 resolution, VGA HD15 or DisplayPort to VGA adapter • 2560x1440 or 2560x1600 resolution, DisplayPort interface
Uninterruptible Power Supply (UPS)	• Compatible with input voltage and frequency • Minimum capacity 450 VA/280 W, 1000 VA/670 W • Power only (no added cables or software components) • Provides 10 minutes minimum runtime with new, fully-charged batteries
Printers	LAN, USB; Black/White, Color; LaserJet, InkJet Compatible with HP® Universal Print Driver for Windows PCL®6 (pre-installed by Philips)

System Component	Archetypical Performance Requirements
Keyboard/Video/Mouse Switch	PS/2 (desktop platform only) or worldwide USB

ECG Performance Disclosure/Specifications

Characteristic	Performance Disclosure/Specification
Heart Rate Averaging Method	Two different methods are used: • Normally, heart rate is computed by averaging the 12 most recent R-R intervals. • If each of three consecutive R-R intervals is greater than 1200 ms (that is, rate is less than 50 bpm) for adult and pediatric patients, then the four most recent R-R intervals are averaged to compute the HR. For neonatal patients, the R-R interval threshold is 750 ms, or 80 bpm.
Heart Rate Meter Accuracy and Response to Irregular Rhythm	Provides correct heart rates (80, 60, 90, 120 bpm) using test waveforms as indicated in ANSI/AAMI EC13 Sec. 4.1.2.1 (e).
Response Time of Heart Rate Meter to Change in Heart Rate	For a rate increase, the average time to reach the specified heart rate using test waveforms as indicated in ANSI/AAMI EC13 Sec. 4.1.2.1 (f) is 10 seconds. For a rate drop, the average time is 7 seconds.
Time to Alarm for Tachycardia	The ranges of time to alarm using test waveforms as indicated in ANSI/AAMI EC13 Sec. 4.1.2.1 (g) are 4 to 5 seconds.
Pacemaker Pulse Rejection Capability	Rejects pace pulses using test waveforms as indicated in ANSI/AAMI EC13 Sec. 4.1.4.1 (with amplitude from ±2 to ±700 mV, width from 0.1 to 2.0 ms).
Range and Accuracy of Heart Rate Meter	Meets the ANSI/AAMI EC13 Section 4.2.7 recommended minimum range and accuracy. Heart rate range is 15 to 300 bpm for adult patients and 15 to 350 bpm for pediatric patients with accuracy of ±1% of the range. *Note* — For rates less than 15 bpm, the displayed heart rate is 0.
Alarm Limit Range	Meets the ANSI/AAMI EC13 Section 4.2.8.1 standard. Lower alarm limit range: 15 bpm – 295 bpm Upper alarm limit range: 20 bpm – 300 bpm

Characteristic	Performance Disclosure/Specification
Resolution of Alarm Limit Settings	Meets the ANSI/AAMI EC13 Section 4.2.8.2 standard. Adult: ±5 bpm above 40 bpm and ±1 bpm below 40 bpm Pediatric/Neonatal: ±5 bpm above 50 bpm and ±1 bpm below 50 bpm
Alarm Limit Accuracy	Meets the ANSI/AAMI EC13 Section 4.2.8.3 standard. Error less than ±10% or ±5 bpm
Time to Alarm for Cardiac Standstill	Meets the ANSI/AAMI EC13 Section 4.2.8.4 standard: maximum alarm time < 10 seconds, using the test waveforms as indicated.
Time to Alarm for Low Heart Rate	Meets the ANSI/AAMI EC13 Section 4.2.8.5 standard: maximum alarm time < 10 seconds, using the test waveforms as indicated.
Time to Alarm for High Heart Rate	Meets the ANSI/AAMI EC13 Section 4.2.8.6 standard: maximum alarm time < 10 seconds, using the test waveforms as indicated.
Alarm Silencing	The time required for reactivation of a latched, silenced alarm can be configured at 1, 2, or 3 minutes.
ECG Waveform Display Time Base Accuracy	Meets the ANSI/AAMI EC13 Section 4.2.9.6 standard: maximum error = ±10%.
Channel Width	Meets the ANSI/AAMI EC13 Section 4.2.9.7(a) standard: minimum = 30 mm.
Aspect Ratio	Meets the ANSI/AAMI EC13 Section 4.2.9.7(b) standard: 0.4 ±0.08 s/mV.
Input Signal Reproduction Accuracy: Overall Error	Meets the ANSI/AAMI EC13 Section 4.2.9.8(a) standard: maximum = ±20%.
Frequency Response: Sinusoidal	Meets the ANSI/AAMI EC13 Section 4.2.9.8(b) standard: 0.67 to 40 Hz (3 db down).
Frequency Response: Triangular	Meets the ANSI/AAMI EC13 Section 4.2.9.8(b) standard: 0 to 25% reduction.
Impulse Response (for waves marked with ST bandwidth)	Meets the ANSI/AAMI EC13 Section 4.2.9.8(c) standard: displacement maximum = 0.1 mV; slope maximum = 0.30 mV/s.
Pacemaker Pulse Display Capability	Meets the ANSI/AAMI EC13 Section 4.2.9.12 standard: minimum = 0.2 mV RTI.

Characteristic	Performance Disclosure/Specification
Tall T-Wave Rejection Capability	Meets AAMI standard: 0.5 – 40 BW: HR of 80 bpm at all T-wave amplitudes 0.05 – 40 BW: HR of 80 bpm at all T-wave amplitudes

Specifications for the Philips 2-Channel Recorder

Declaration

CE

The Philips 2-Channel Recorder complies with the requirements of the Council Directive 93/42/EEC of 14 June 1993 concerning medical devices. The Philips 2-Channel Recorder complies with IEC 60950-1, CISPR 22 Level A, and CISPR 24.

This device is not suitable for installation in the Patient Care Vicinity (Patient Environment).

Physical

- Dimensions: (W x D x H): 14.3 cm x 14.5 cm x 11.2 cm (5.6 in. x 5.7 in. x 4.4 in.)
- Weight: 0.19 kg (.42 lbs)

Electrical

The recorder is powered by the Universal Power Converter (UPC) or other equivalent power source. It is required that the recorder be connected to an Uninterruptible Power Supply (UPS).

Environmental

- Operating Temperature: 0°C to 30°C (32°F to 86°F)
- Relative Humidity: 10% to 95% (non-condensing)
- Operating Altitude: 0 to 3,048 m (0 to 10,000 ft)

Installation Information

Warning

Installation and setup must be performed by a Philips Medical Systems service representative or designee.

Environment

Follow the instructions below to ensure a safe electrical installation. The environment where the Information Center will be used should be reasonably free from vibration, dust, corrosive or explosive gases, extremes of temperature, humidity, and so on. For a cabinet mounted installation, allow sufficient room at the front for operation and sufficient room at the rear for servicing with the cabinet access door open.

The Information Center operates within specifications at ambient temperatures between 15°C and 30°C. Allow at least 5 cm (2 in.) clearance around the instrument for proper air circulation.

Caution

The Information Center is not suitable for installation in the Patient Care Vicinity (Patient Environment).

Archetypical System Input Power Source Requirements

200 watts

Grounding Information Center and Recorder

To protect hospital personnel, the cabinets of the Information Center and the Philips Recorder must be grounded. Accordingly, the hardware is equipped with detachable 3-wire cables which ground the instrument to the power line ground (protective earth) when plugged into appropriate 3-wire receptacles or if 3-wire receptacles are not available, consult the hospital electrician.

Warning

- Do not use a 3-wire to 2-wire adapter with this instrument.
- Do not use a power strip.

Condensation

Make sure that during operation, the instrument is free of condensation. Condensation can form when equipment is moved from one building to another, thus being exposed to moisture and differences in temperature.

Explanation of Symbols

The symbols used on the Information Center and the Philips Recorder are explained below.

Symbol	Description
	Underwriters Laboratories Listing mark for US and Canada
	Certified by CSA to the applicable Canadian and US standards
	Caution, consult accompanying documents.
	This symbol identifies manufacturer and date of manufacture.
	The manufacturing batch code.
	Fragile, handle with care
	Keep dry
	Consult instructions for use
	Consult instructions for use (blue safety symbol)
	Catalog number
	Serial number
	On/Off control
	2002/96/EC (Waste Electrical and Electronic Equipment). Dispose of in accordance with your country's requirements.

UPS Devices During Power Transition or Loss

During hospital generator power transitions, uninterruptible power supply (UPS) devices normally allow the system to continue to collect and process data, sound alarms, and provide alarm recordings. Without power, the display becomes blank until the transition to generator power is complete and power is available for the display.

For the Philips-supplied UPS, beeps from the UPS are normal while on battery. When power is restored and the UPS is again supplying power, the clinical operator or support user may need to press the power switch on the PC to resume operation.

If Connection to the Servers is Lost

The Information Center servers store patient physiological data and configuration data for systems that connect to the IntelliVue Network. Patient physiological data includes raw and derived measurements. Configuration data includes all other data such as feature-based configuration settings and system topology information. The configuration data is stored on the Primary Server and patient physiological data is stored on the Physiological Server.

Connection to the Information Center can be lost because of an unplanned failure such as a hardware failure, or it can be intentionally disrupted, such as for scheduled maintenance or a system upgrade.

Warning

In the event of an Information Center iX hardware failure:

- Bedside monitors alarm and display a **No Central Monit.** INOP message
- MX40s enter Monitor mode, alarm locally and display a **No Central Monit.** message
- TRx4841A/TRx4851A transceivers generate a beep sound to indicate that there is no central monitoring

Please institute measures that you deem appropriate for no central monitoring and alarming.

Caution

It is important to document, archive and manage all factory default password changes made in System Configuration. If you lose or forget changed passwords, all Philips service personnel, including the Customer Care Service Center will be locked out of your system and will be unable to provide assistance. Without the changed passwords, an archive is required to restore and reinitialize the system.

For smaller networked systems, when you lose connection to the Primary Server, the system enters Disconnected (or Local) mode. All patient physiological data and configuration data is stored on the local machine. For larger networked systems, you can lose connection to the Primary Server, the Physiological Server, or both. If you lose connection to the Primary Server but maintain connection to the Physiological Server, patient physiological data continues to be stored on the Physiological Server but all configuration changes are only stored locally. If you lose connection to the Physiological Server but maintain connection to the Primary Server, configuration settings continue to be saved to the Primary Server but patient physiological data is stored locally. If you lose connection to both the Physiological Server and Primary Server, all patient physiological data and configuration changes are stored locally.

Disconnection from the Physiological Server

When the Physiological Server is unavailable, patient physiological data is stored locally. If the patient physiological data cannot be stored on the Physiological Server the following message appears in the Information Center caption bar: **Disconnected from <Servername> - Local data storage only. Please contact customer service.**

When the server becomes available, the data is rerouted automatically back to the Physiological Server and the message clears.

Disconnection from the Primary Server

When the Primary Server is unavailable, all configuration changes are stored locally. The connection status **Local** is displayed in the Information Center caption bar.

If the system is not configured to automatically reconnect and synchronize from Local/Disconnected status, the following occurs when the server becomes available:

- The connection status in the caption bar changes from **Local** to **Reconnect**.
- Settings that were added or changed while disconnected from the server are not saved and must be updated upon reconnecting.

Manually Reconnecting to the Primary Server

If the host is ready to transition from Local status to Connected status, the connection status **Reconnect** is displayed in the Information Center caption bar. The system requires user confirmation to reconnect.

1. Select the connection status **Reconnect**.
2. To view and export a chronological record of the alarms and actions performed for patients in a unit, select **Clinical Audit**.
3. When complete, select **Reconnect Now**.
4. When prompted, confirm your selection.
5. When the system reconnects, update any changes you made to patient demographics, equipment and settings.

Installing Operating System Patches

If there is a pending operating system patch to install, the connection status **Action Required** is displayed in the Information Center caption bar. The system requires user confirmation to complete the patch installation.

1. Select the connection status **Action Required**.
2. Select **Reboot Now**.
3. Confirm that you want to reboot and apply patches.
4. If you are authorized, enter the appropriate credentials. The system stops monitoring and reboots. When the system reboots, the patch installation completes and monitoring resumes.

Automatically Synchronizing from Disconnected Mode

While a PIC iX system is disconnected from the Primary Server, you can make configuration and application changes. If the system is configured to automatically reconnect and synchronize from Local/Disconnected mode, all of the changes that were made synchronize back to the server before connecting to it.

Synchronized patient data includes:

- Patient demographics including admit, discharge and transfer history
- Display Setup settings
- Bed and equipment assignments
- Clinical settings including Global, Profiles, Alarm Filters and Parameter Scales
- ST and QT baseline settings

Data that is not synchronized includes:

- Caregiver assignment changes
- Nurse assignment changes made in the **Manage Patient** application
- Audit logs
- Unit settings

Synchronization occurs whenever the host detects that the server is available. If the server is configured for automatic reconnection, the following occurs:

If Synchronization...	Then...
Succeeds and there are additional local changes	The remaining local changes are synchronized and the periodic synchronization process continues until all changes are synchronized.
Succeeds and there are no pending local changes	The host reconnects automatically.
Fails due to a data conflict	No synchronization occurs until you resolve the conflict. When all conflicts are resolved, the periodic synchronization continues and includes any pending local changes. When the last synchronization is successful, the host reconnects automatically. See "Resolving Synchronization Conflicts" on page 13-14.
Fails due to an error other than data conflict	The current synchronization terminates and the host retries after a specified interval. When the last synchronization is successful, the host reconnects automatically.

Example of Database Synchronization

Below is an example of database synchronization.

1 While the Information Center is disconnected from the database server, a nurse performs the following:

- Admits a new patient to Bed 1.
- Discharges an existing patient from Bed 2.
- Changes the paced mode and medical record number for a patient on Bed 3.
- Changes a patient's profile.
- Assigns the monitoring device TxMon20 to Bed 2.
- Changes the Nurse assignment of an existing patient from Nurse 1 to Nurse 2.

2 The database server becomes available. The Information Center attempts to synchronize the changes made in step 1 to the database server.

3 The synchronization is not successful because of conflicting medical record numbers for John Smith. The Information Center identifies the conflict in the sector for Bed 1.

4 The nurse resolves the conflict by selecting one of the patients from the available patient list.

5 The Information Center resolves the conflict and continues to synchronize the changes identified in Step 1 to the database server. The Information Center synchronizes all of the changes except the changes to nurse assignments.

Resolving Synchronization Conflicts

If there are conflicts with the patient data when synchronization is attempted, a **Database Synchronization Conflict Resolution** screen displays. You must resolve the conflict before the system can connect to the server and synchronization can occur.

To resolve the conflict, do one of the following:

- Select **Select Patient**.
- Select **Cancel** to close the conflict resolution screen and return to the **Manage Patient** application where you can adjust patient information. See "Changing Patient Information" on page 3-11.

Resetting the Time Zone at an Efficia Monitor

If a power loss occurs on an Efficia bedside monitor while it is connected to a PIC iX Essentials system, any configured time zone setting at the monitor reverts to the factory default time zone (GMT+00:00).

Perform the following steps at the Efficia monitor:

1 Reconfigure the time zone. See your system administrator for information about configuring the time zone at the Efficia monitor.

2 Perform a hard shutdown to permanently save the configured setting.

When the monitor reconnects to the PIC iX Essentials system, the configured settings are synchronized.

Distributed Alarm System Delays

The following table shows alarm delays through the Information Center system to the distributed alarm system displays. The system delays are particular to alarms generated by remote equipment and sent to the Information Center. The measurement is taken from the time the alarm is sent from the remote equipment to when the alarm is announced at the distributed alarm system display.

Distributed Alarm System Display	Time[1]
Information Center Monitoring Sector	2s
Information Center Client Sector	3s
Bed To Bed and Own Bed Overview	4s
Alarm Pop Ups[2]	8s + any configured delay[3]
Alert Integration[4]	4s
Information Center Web[5]	3s
Paging[5]	2s + any configured delay[3]

1 Time was calculated using worst case estimates. This estimate does not consider abnormal network events. To mitigate network issues, a **No Data** technical INOP is announced if the remote monitoring device stops communicating to the Information Center for 6 seconds.

2 The first pop-up alarm for a patient requires an extra two seconds to display. All subsequent pop-ups for the same patient are two seconds faster.

3 Technical alarms may be configured for a delay. The configured delay must be added to the system delay.

4 Announcing a TRx4841A/TRx4851A transceiver alarm at the monitor in multiple equipment configurations.

5 Time is measured from when the alarm is sent from the remote equipment to when the alarm is sent from the Information Center to the distributed alarm system display sub-system. It is impossible to guarantee maximum time to this sub-system due to factors outside of the manufacturer's control.

The Information Center generates ECG, Arrhythmia, ST, QT, SpO2 and NBP alarms for TRx4841A/TRx4851A transceivers. The following table lists the time from the alarm signal generation to the alarm announcement at the monitoring Information Center.

TRx4841A/TRx4851A Transceivers Alarm Delays	
Alarm Category	**Time[1]**
ECG/Arrhy/ST/QT	10s (according to AAMI EC13 standard)
SpO2	5s + any configured delay[2]
NBP	5s

TRx4841A/TRx4851A Transceivers Alarm Delays	
Alarm Category	**Time[1]**

1 Time was calculated using worst case estimates. This estimate does not consider abnormal network events. To mitigate network issues, a **No Data** technical INOP is announced when any configured remote monitoring device stops communicating to the Information Center for 6 seconds.

2 SpO2 alarms may be configured for delay and the configured delay must be added to the system delay.

Maintenance

Before commencing monitoring on a patient:

- Check for any mechanical damage.
- Check all the external leads, input data connections and accessories.
- Check all the functions of the instrument which will be needed to monitor the patient, and ensure that the instrument is in good working order.

Do not use the Information Center for any monitoring procedure on a patient if you identify features which demonstrate impaired functioning of the instrument. Contact the hospital biomedical engineer, or the Philips Medical Systems service engineer.

We recommend that full performance checks be done by qualified service personnel after every repair or upgrade. See your Information Center Service Manual for additional information.

All checks which require the instrument to be opened must be made by qualified service personnel. Safety and maintenance checks can also be made by Philips Medical Systems personnel. Your local Philips Medical Systems office will be glad to give you information about service contracts.

Warning

Failure on the part of the responsible individual hospital or institution employing the use of this equipment to implement a satisfactory maintenance schedule may cause undue equipment failure and possible health hazards.

Note — At this time, Philips Medical Systems will make available on request, and in English only, component part lists, descriptions, calibration instructions or other information which will assist the user's appropriate qualified technical personnel to repair those parts of the equipment which are classified by Philips Medical Systems to be repairable.

Cleaning

Use only the Philips-approved substances and methods listed to clean your equipment. The warranty does not cover damage caused by using unapproved substances or methods. Philips makes no claims regarding the efficacy of the listed chemicals or methods as a means for controlling infection. Consult your hospital's Infection Control Officer or Epidemiologist. For comprehensive details on cleaning agents and their efficacy refer to *Guidelines for Prevention of Transmission of Human Immunodeficiency Virus and Hepatitis B Virus to Health Care and Public Safety Workers* issued by the US Department of Health and Human Services, Public Health Service, Centers for Disease Control, Atlanta, Georgia, February 1989. See also any local policies that apply within your hospital and country.

If you spill liquid on the equipment or accessories, contact your service personnel or Philips service engineer.

The Information Center hardware is generally maintenance-free. However, the equipment should be kept clean and dry.

Surface Cleaning

The exterior surfaces of the Information Center components should be regularly cleaned of dust, lint, and dirt. To clean equipment surfaces, use a lint-free cloth or sponge, moistened with soap and water or a dilute, non-caustic, detergent solution.

To avoid damage to the equipment:

- Do not use abrasive material, such as steel wool or silver polish.
- Do not use Povodine, Sagrotan, or Mucocit cleaning agents or strong solvents, such as acetone.
- Do not submerge any part of the equipment in water or other liquid.
- Do not pour liquid onto the system during cleaning.
- Do not allow liquid to enter the equipment case.
- Do not allow any cleaner to remain on any of the equipment surfaces, wipe it off immediately.

Touch Screen Display Cleaning

Clean the display by performing the following steps:

1. Disable touch.
2. Verify that touch is off by touching the screen.
3. Clean the touch screen by applying window or glass cleaner on a soft, clean cloth then wiping the touch screen. Never spray or apply the cleaner directly on the screen. The active area of the touch screen is resistant to all chemicals that do not affect glass for example ammonia-based glass cleaners and vinegar.
   - Do not use alcohol (methyl, ethyl or isopropyl) or any strong dissolvent.
   - Do not use thinner or benzene, abrasive cleaners or compressed air.
   - Avoid getting liquids inside your touch monitor. If liquid does get inside have a qualified service technician check it.
   - Do not wipe the screen with an abrasive cloth or sponge that could scratch the glass surface.
4. When you are done cleaning the screen, re-enable touch.
5. Verify that touch is enabled by touching the screen.

A

Feature Summary

This section lists key features and improvements that have been introduced with Release C.02 and earlier of the Information Center iX. The features available depend on your system configuration and the options purchased by your hospital. For a list of the features that are introduced in Release C.03 see “What’s New In Release C.03” on page 1-5.

Note — See the documentation for the specific release for details about the features.

- Release C.02 Features and Enhancements
- Release C.00 Features and Enhancements
- Release B.02 Features and Enhancements
- Release B.01 Features and Enhancements
- Release B.0 Features and Enhancements
- Release A.01 Features and Enhancements

Release C.02 Features and Enhancements

12-lead ECG Export Enhancement

For 12-lead ECG Export, the user can enter the following fields at the IntelliVue Patient Monitor Release M.0 or later. With earlier releases of the monitor, the user must enter the information at the Information Center.

- Order Reason
- Requested By
- Operator
- Facility
- Department
- Comment 1-5

Additional Device Support

Release C.02 supports the following devices:

- IntelliVue X3 Multi-Measurement Modules (MMS) that are connected to IntelliVue Release M.0 patient monitors
- Efficia Rack and Modules that is connected to Efficia patient monitors

Additional Waves From IntelliVue Patient Monitors Release M.0

A maximum of 20 non-ECG waves sent from IntelliVue MX400/450/500/550 Release M.0 patient monitors can be displayed and stored at the Information Center.

Admit, Discharge, and Transfer Using a Hospital Information System

The Information Center can be configured to admit, discharge, and transfer a patient directly from the hospital information system or bed management system to the Information Center enabling data continuity from admission to discharge. You can automatically admit a patient with or without confirmation at the Information Center or bedside monitor, however the system requires confirmation for the transfer and discharge ADT HL7 messages.

Alarm Advisor Application (Frequent Alarm Notifications)

The Alarm Advisor application provides feedback on recurring alarm limit violations for specific measurements over a period of time. The information provided by Alarm Advisor notifications (called frequent alarm notifications) can help users to adapt alarm limits for individual patients and improve the number of clinically significant alarms.

Note — The Alarm Advisor application is not supported on PIC iX Essentials systems.

Backfilling Wave Dropouts

To ensure a complete patient record, the IntelliVue Patient Monitor Release M.0 or later resends lost data packets to the Information Center to the wave drawing in the retrospective review applications. In case of network dropouts between the Information Center and the patient monitor, the monitor can resend up to the last 10 seconds of wave data.

Early Warning Scoring Enhancements

The EWS (MEWS, PEWS, SPS, and custom) subscore displays in the patient sector. The EWS subscore is a collection of one or more measurements that are used to calculate the score, along with the value and subscores for those measurements. The Information Center includes the EWS score and subscore in trend data, paging, and HL7 messages. The EWS score and subscore can also be exported and stored using Data Warehouse Connect.

Extended Patient Demographic Fields

With Release C.02, these patient demographic fields accept up to 30 characters: **Last Name**, **First Name**, **Middle Name**, **Lifetime ID**, **Encounter ID** and **Alternative ID**. The **Alias** field accepts up to 18 characters.

Feature Name Change

With Release C.02, the Management Association feature (introduced with Release C.00) is named Assign Monitor to Sector at Point of Care.

Node Authentication and Encryption

Release C.02 introduces node authentication and encryption for PIC iX and IntelliVue X3, MX400/MX450/MX500/MX550.

Overview Capability on PIC iX Enterprise Link

PIC iX Enterprise Link systems can support overview patients. This enables the separation of surveillance from the Information Center to extend uptime while maintaining key system capabilities. MX40 telemetry devices are now supported on PIC iX Enterprise Link systems.

Patient Category Mismatch Displays in Red Text

If the patient category at the IntelliVue Patient Monitor Release M.0 does not match the Information Center, the **Category** field is displayed in red text in the **Manage Patient** window on the Information Center.

Saving Preadmission Data

With Release C.02, a new workflow configuration setting ensures that patient data that is collected since the last discharge merges with current data when the patient is readmitted or transferred. If the setting is on, the data in the destination bed prior to the readmit or unit transfer is included in the patient record.

Single-Patient View on PIC iX Essentials and PIC iX Express

PIC iX Essentials and PIC iX Express systems can now be licensed for the PIC iX Single-Patient View application. This allows a Web client to select a patient in order to see all available surveillance data, review physiological waves, parameters, and alarms, and perform strip workflow.

Viewing Prior Data

In the retrospective applications, the user can view a list of the patient stays for each clinical unit where data is collected during the current hospital admission, as well as data collected for each previous admission within the last seven days. Each out of unit transfer or admission is considered a separate patient stay.

Web Proxy

The Web Proxy enables IntelliVue Patient Monitor Release M.0 or later monitors to display retrospective data as shown with web applications, such as Information Center iX Web. The IntelliVue Patient Monitor Instructions for Use is available in PDF format at the patient monitor.

Other Enhancements with Release C.02

- Watchdog performance enhancements
- Scalability:
  - Data Warehouse Connect now supports up to 1024 beds
  - Support for up to 1250 beds on 200 hosts
- Data and device security: Disk Encryption on Gen10 servers and HP rp5810 PC
- Released with operating system Windows® 10 IoT Enterprise 64-bit and Windows Server 2016 Standard Edition for Embedded Systems (64-bit only).

  Note — Windows 10 IoT Enterprise is only supported starting with HP rp5810 PC; older PC models are not supported. Also, any server platforms older than the HP Gen9 server model are not supported with the exception of virtualized servers.
- Support for Microsoft System Center Configuration Manager (SCCM) on servers

- Support for running PIC iX Release C.02 in a test environment

Release C.00 Features and Enhancements

Data Warehouse Connect Enhancements

The Data Warehouse Connect (DWC) feature permits exporting of patient data directly from surveillance stations to long-term data storage. A clinical user can use the DWC Viewer to review the patient data in the long-term data storage.

With Release C.00, exported measurements include complex numerics for a selected patient. Complex numerics include SpotCheck measurements, Early Warning Score (MEWS and SPS), Bedside Calculations, and ECG Statistics.

In addition, DWC can export data that it receives from IntelliBridge EC40 and EC80 Hubs and from IntelliBridge EC10 modules that are connected to IntelliVue Patient Monitors.

Increased Bed Support

With Release C.00, the Information Center iX supports large-scale enterprise systems with up to 1024 beds.

Device Assignment Report

A new report includes the following information about the equipment assigned to patients in a clinical unit:

- Equipment type
- Bed label
- Date/time that the device is assigned and the total duration of the assignment
- Battery strength
- Location

See “Device Assignment Report” on page 12-12.

Management Association

Information Center iX Release C.00 can recognize when a device is powered up, whether or not the device is assigned to a sector.

In the **Equipment Management** window, unassigned devices appear in red.

If configured, the system displays a status message in the caption bar to indicate that a device is not assigned to a sector: **Please assign active equipment.** The message clears when the device is assigned.

This feature is supported with the IntelliVue Patient Monitor Release L.2 or later.

Note — With Patient Information Center iX Release C.02, this feature is renamed Assign Monitor to Sector at Point of Care.

Trend Upload for MX40 Release B.06

The Information Center iX Release C.00 supports Trend Upload from an 802.11 MX40 Release B.06 and from wired and 802.11 wireless IntelliVue Patient Monitors. A gray highlight displays around the uploaded numeric data. With Trend Upload, numeric data that is collected while the device is not connected to the Information Center iX automatically uploads once the device connects to the Information Center iX. Up to 8 hours of data can be uploaded.

New HR and PVC Events for Telemetry Devices

The Information Center iX Release C.00 supports additional HR and PVC events for patient wearable devices. These events support existing alarms to highlight how long an event is occurring, even without an alarm. The supported devices include MX40 (Release B.06 or later) and TRx4841A/ TRx4851A transceivers.

Support for Efficia CM Series Patient Monitors (PIC iX Essentials)

The PIC iX Essentials system supports the Efficia CM Series patient monitors using TCP/IP. The Information Center can interface with the Efficia monitors and provide all applicable PIC iX features.

The following features are *not* available with Efficia monitors:

- Overview of other beds
- Bedside-initiated print requests
- 12-lead ECG captures
- ST snippets at the Information Center
- Label assignment
- Viewable and printable beat annotated waveforms at the Information Center

Release B.02 Features and Enhancements

Release B.02 of the Information Center iX includes the following enhancements:

- The Multi-Patient View patient monitoring Windows application allows connection to one or more Information Center iX B.02 Web Servers in one browser window, and connection to a single Information Center iX A.02.xx Web Server in a separate browser instance.
- Mobility Server interface enhancements.
- Microsoft Hyper-V is supported for virtual installation of PIIC iX software on customer-supplied hardware.
- SQL Server Offloading — All dedicated servers running on Windows Server can offload all of their databases to a remote SQL server. Each server requires a dedicated SQL Server instance.
- Security Hardening of Windows 8.1, Server 2012 R2, SQL Server 2014, and .NET Optional compliance to the Department of Defense Information, Assurance, Certification, and Accreditation Process (DIACAP).
- Uninterrupted Power Supplies (UPS) — A UPS is required for all Information Center iX systems (Surveillance, Overview, and all servers). Placing these systems on an Emergency Power system is highly recommended. This will ensure the ability to continue to monitor critically ill patients during power disruption events. If the power outage duration exceeds either the UPS time or the Emergency Power, Philips recommends that users turn off the Information Center iX software application and the operating system (planned shutdown) instead of a hard shutdown.

Release B.01 Features and Enhancements

Release B.01 of the Information Center iX includes the following enhancements:

Display Setup Enhancements

- Release B.01 provides enhancements to the **Display Setup** feature and adds the Remote Display Setup capability, which is available in the System Configuration and Information Center host to host. A user with permission can change sector assignments on any host that is connected to the user's host, provided that the user's host has Full or Read Only access to the unit of the host that is being set up.
- You can now assign beds from other hosts for overview monitoring.
- Users with permission can set up the local display and the displays of other connected hosts.
- You can reassign beds to different sectors without discharging the patient. While you are making sector reassignments, surveillance assignments are shown in red text in the Surveillance list and overview assignments are shown in the Overview list.

Alarm Summary Application

The **Alarm Summary** application is designed to assist you in setting appropriate alarm limits. The most frequent alarms for each patient are shown for each of the major vital signs, along with a graphical trend. The trend provides information to enable you to determine the correct alarm status limits for a patient.

Patterns for Wave Gaps

The Information Center iX displays a diagonal stripe pattern in the Strip tile to represent gaps in wave data. This feature is not available in **Alarm Review**.

12-Lead ECG Order Interface

The 12-lead ECG Order interface allows order information from the Hospital Physician Order Entry System to be chosen from a list at either the bedside monitor or at the Information Center for printing or export to a Cardiology Management System, such as Philips IntelliSpace ECG.

Note — 12-lead orders in Release B.01 or later are compatible with IntelliVue patient monitor Release K.2 or later.

Recorder Enhancements

- You can now clear the recorder queue by simultaneously pressing the **RUN/CONT** (continue) key and the **STOP** key on the recorder.
- Your system can be set up to extend the recording running time so that all measurements will be printed at the top of a recording strip. This is the default behavior. If the system does not extend the running time, measurements will be cut off when the configured running time is reached. For alarm recording, alarm measurements will always appear at the top of the strip. The string "..." at the end of the strip header will indicate that the measurements are cut off.

Early Warning Score

The Early Warning Score (EWS) feature displays the Modified Early Warning Scoring (MEWS) in the patient sector. For more information, see "Early Warning Score" on page 2-15.

Data Warehouse Connect

The Data Warehouse Connect (DWC) feature allows patient data, including waves, alarms, events, and trends to be exported directly from surveillance stations to long-term data storage. This feature is designed for clinical research, and can also be used for sentinel event review for a single patient, particularly for events that are more than 7 days after discharge.

Clinical users can use the DWC Viewer to review patient data, which includes admitted and discharged patients, in long-term data storage. Advanced users (Research, Algorithm Analysis, Pharmaceutical, and Holter) can develop database queries to extract data of interest directly from the long-term data storage given appropriate permissions and documentation.

- For information on reviewing patient data with the DWC Viewer, see the *Data Warehouse Connect Installation and Use Guide*.
- For details on setting up the export destination for DWC, see the *Service and Installation Guide*.
- For information on configuring the export settings for the clinical unit, see the *Clinical Configuration Guide*.

Holter Export

Holter Export stores patient ADT and ECG wave data (including 12-lead) in a repository, making it available for use by the Philips Holter monitoring system. If you are using the **Holter Export** feature, the host is licensed to export ECG waves only.

Wave Strip Export

The Information Center can be configured to automatically export wave strips to a shared file destination. If the Wave Strip Export feature is available, wave strip images are generated for all patient alarms and user-saved strips. The exported images can be imported into electronic medical records.

- For details on setting up the export destination and a description of the exported files, see the *Service and Installation Guide*.
- For information on enabling **Wave Strip Export**, see the *Clinical Configuration Guide*.

Information Center iX Express Model

The Information Center iX Express is a local database system that provides real-time waveform monitoring and alarms for up to 16 patients on a single display. It provides access to up to four days of full disclosure data (one day, by default) and access to the **Alarm Review** and **General Review** applications for retrospective review of physiological measurements and alarm events that have been collected from a bedside monitor or telemetry device and stored in the database. The Information Center iX Express does not include overview and only provides a limited type of monitor connections.

Release B.0 Features and Enhancements

Trend Upload

With Trend Upload, up to 8 hours of numeric data collected on an IntelliVue Patient Monitor (Release K or later) while the monitor is not connected to the Information Center is automatically uploaded to the Information Center once the monitor is able connect to the Information Center.

Numeric data that has been uploaded appears with a gray highlight in the review application **Tabular Trend** and **Graphic Trend** tiles.

Auto-Reconnect and Settings Synchronization

If Database Synchronization and Auto Reconnect is enabled, systems not currently connected to the database server continue to make changes to patient demographic settings as well as admissions, discharges and transfers. When the connection to the database server is restored, the changes that you made locally are automatically synchronized back to the database server. This ensures that the database server remains in synch with changes made locally. Any patient conflicts that may exist need to be resolved before the system can reconnect to the server and synchronization can occur.

12-Lead Enhancements

- Two algorithm choices for 12-lead analysis: PH100B and PH110C. Your unit can be set up to use either algorithm.
- Continuous 12-lead ECG: The IntelliVue Patient Monitor Release K.1 or later sends all ECG waves to the Information Center iX at a diagnostic bandwidth to allow 12 waves to be stored at the Information Center iX. Waves are stored according to the Full Disclosure license.
- The Signal Quality event row displays in the Cardiac Review Events tile to help you find the highest quality 12-lead ECG from the historical data.
- 12-lead ECG Diagnostic Capture: You can capture a 12-lead ECG from stored continuous 12-lead wave data in **Cardiac Review**; export the ECG to a Cardiology Management System; and view 12-lead captures in the **12-lead Capture Review** application.

Patient Link Information Center iX Model

The Patient Link Information Center iX (Patient Link) is a Small Primary Server licensed with the Patient Connection feature. The Patient Link provides a central location for bedside recordings and reports initiated from IntelliVue Patient Monitors. In addition, the Patient Link provides support for bed to bed overview and alarm reflection on IntelliVue Patient Monitors. The Patient Link is not available with patients being monitored by a telemetry device.

Retrospective Configuration

The Specialty Review license provides a new Retrospective Configuration application, available in System Configuration, where you can create and configure new Review applications and customize the existing Review applications available locally to clinicians in your unit. Changes you make using the Retrospective Configuration application apply locally. You can, however, copy the entire Review application configuration to other units.

Profile Enhancements

- Through **Clinical Settings**, you assign certain beds within the unit to different default profiles.
- Through System Configuration you can:
  - Add a new profile by selecting and renaming an existing profile.
  - Remove a profile.
  - Assign beds to a profile.
  - Change a unit's default profile.
  - Import bedside profiles created with the bedside Support Tool.

Distributed Paging

Systems with the Alert Data Integration paging system provide a new configuration option, Distributed, available in System Configuration. Distributed, turned on by default, allows the Alert Data Integration paging system to run on each Information Center iX. In this way, paging is still available and continues to operate if connection to the database server is lost.

Miscellaneous Enhancements

- **Screen Calibration**. A new configuration choice is available in the **Clinical Settings** and System Configuration applications that allows you to calibrate the speed of the waves to match your specific display. When you select **Screen Calibration** a dialog box opens where you can click the plus (+) and minus (-) buttons to increase or decrease the number of pixels that display in one inch.
- **Automatic ST/STE map**. A new configuration choice allows you to automatically change a patient from an ST map to an STE map and vice versa. This is turned off by default. If enabled on your system, an ST map and snippets replace an STE map and snippets when monitoring ST only, or an STE map and snippets replace an ST map and snippets when monitoring STE only.
- **Automatic sector resize.** Systems with Advanced Sector Setup can be configured to automatically resize a sector based on the data currently available. This is turned off by default. If one sector is only sourcing one wave, the sector automatically resizes to give its available space to other sectors. If the sectors in a column on the Main Screen are such that each sector could almost fit three waves, but instead can only fit two and some numerics, the Information Center will give the sector sourcing the most data extra space for three waves while maintaining the other sectors at two waves.
- **Allow sector resizing.** A configuration option allows you to manually increase or decrease the size of individual sectors. This is turned off by default. If your system is configured to allow you to resize the sector, two icons are available from the patient sector.
- **Automatic Minimize Sector.** A configuration option automatically minimizes a sector when there is no equipment or the equipment is on standby. This is turned off by default.
- **Show PVC**. Your system can be configured to show PVC by default.
- **Print from a sector**. A configuration option that allows you to specify whether users can print from a sector, record from a sector, or save strips. When configured for recording the  button is available in the patient sector. When configured for print the  button is available. Alternatively, you can disable both **Print** and **Record**.
- You can choose to have more than one item display in the patient sector or Patient Window. For example, you can display an ST Map and trends in a sector if you have the space available.
- Sectors can have a small wave in addition to specialty tiles. For example, a patient sector with an ST Map could be smaller than it was previously and more such sectors can fit in a single column.
- **Dedicated Numeric.** You can select a numeric to display in the lower right side of every patient sector. For example, you can have NBP display on the bottom right of every sector in the Main Screen.
- **Fast Review** now shows 15 seconds of post-alarm data. Previously, 1 second of post-alarm data was available in the Fast Review window.

  Note — 15 seconds of post-alarm data may not be available in Fast Review if the difference between the time when you acknowledge the alarm and the time when the alarm was created is less than 15 seconds.

- **Standby Time**. The Standby white technical alarm now displays the amount of time a device has been in standby. Move the cursor over the Standby alarm in the patient sector or Patient Window to display a drop-down list that indicates the amount of time the device has been in Standby.
- **Automatic volume adjustment.** Your system can be configured to automatically change the alarm volume at two different times of the day. For example, a day volume and a night volume.
- **Reporting Enhancements.** The ability to send reports to more than one location. Also your system can be configured to print an alarm summary report on shift change.
- **New icons** in the patient sector and Patient Window. See "Sector and Patient Window Icons" on page 2-6.

Release A.01 Features and Enhancements

Support for the Philips MRx Monitor Release F.03 or Later

MRx monitors (wired and wireless) can connect to the Information Center iX. The MRx monitor can source up to four waveforms to the Information Center. Valid ECG waveforms can be acquired through pads and paddles as well as standard lead sets (3-lead, 5-lead, and 10-lead). When the ECG wave is acquired through pads or paddles the word **Pads** or **Paddles** displays over the primary wave in the patient sector. You can admit patients at either the MRx monitor or at the Information Center. When you admit the patient at the Information Center, that patient is also admitted to the MRx monitor.

The following features are not available with MRx monitors:

- Overview of other beds
- Bedside initiated print requests
- 12-lead captures
- Arrhythmia controls at the Information Center
- ST snippets at the Information Center
- Label assignment
- Viewable and printable beat annotated waveforms at the Information Center

ECG Statistics Tile with Cardiac Review application

The **ECG Statistics** tile displays ECG statistical data in rows and columns. See "ECG Statistics Tile" on page 9-9.

Cardiac Review with Information Center Web Access

Cardiac Review with Information Center Web Access allows you to see cardiac-relevant waves, numerics, trends and events for patients across care units. It stores all ECG waves, ST Snippets, ST Map and ECG statistics for retrospective review, allowing you to compare retrospective data in a variety of formats. See "Cardiac Review with Web Access" on page 9-48.

Information Center Remote iX Multi-Patient View Application

You can review physiological waves and measurements for a single or multiple patients from a location remote from the Information Center iX, such as from a doctor's lounge, using the Information Center Remote iX Multi-Patient View application. You can view and print alarm strips, and export strips to the clipboard.

View Retrospective Data Using a Web Browser

You can view retrospective data for patients discharged from either an Information Center Release N+ or an Information Center iX using a web browser. For systems with a Web Portal host configured, the Information Center iX allows you to access a browser-based view of a patient's retrospective data for patients discharged with **Save Data with Discharge** from an Information Center Release N or later or for patients discharged from another Information Center iX. When you access a review window for a patient, the system searches to see if any previous data exists for patients with a matching medical record number. If a match is found you can select the  icon in the review window to view the previous data.

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