IntelliVue Information Center iX

Instructions for Use

Release B.01

PHILIPS

Notice

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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.

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About This Book

This User's Guide contains information specific to the Information Center iX including information on performing day-to-day tasks and troubleshooting common problems, as well as detailed information about all clinical applications. It also provides a complete list of alarm and INOP messages and configuration choices. For specific information on using the Philips IntelliVue Telemetry System or the MX40 Wearable monitor, please refer to your appropriate *Instructions for Use* manual.

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

Not all functionality described in this manual 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 "Performance Assurance" section of the Philips Information Center Service Manual.

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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Introduction to the Information Center

This section provides an overview of the IntelliVue Information Center iX.

What's New

This section lists the most important new features and improvements introduced with each release of the Philips Information Center iX. Detailed information is provided in other sections of this book. The features available depend on your system's configuration and options purchased by your hospital.

What's New in Release B.01

Release B.01 of the IntelliVue 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. For more information, see "Display Setup" on page 11-6.

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. For more information, see "Alarm Summary" on page 4-53.

Patterns for Wave Gaps

The IntelliVue Information Center iX now annotates gaps in wave data by displaying diagonal hash characters to represent gaps in wave data. This feature is not available in **Alarm Review**. For more information, see "Strip Window View" on page 9-10.

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 IntelliVue Information Center for printing or export to a Cardiology Management System, such as Philips IntelliSpace ECG.

Note—12-Lead orders in Release B.01 and greater are compatible with bedside monitor version K.2 and greater.

For more information, see "12-Lead ECG Orders" on page 9-31.

Recorder Enhancements

The following new recording enhancements are available:

- You can now clear the recorder queue by simultaneously pressing the **RUN/CONT** (continue) key and the **STOP** key on the recorder. See "Philips 2-Channel Recorder Controls and Indicators" on page 5-4.
- Your system can be set up to extend the recording running time so that all parameters will be printed at the top of a recording strip. This is the default behavior. If the system does not extend the running time, parameters will be cut off when the configured running time is reached. For alarm recording, alarm parameters will always appear at the top of the strip. The string "..." at the end of the strip header will indicate that the parameters 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 1-18.

Data Warehouse Connect

The Data Warehouse Connect 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 Data Warehouse Connect 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 Data Warehouse Connect Viewer, see the *IntelliVue Information Center iX Release B.01 Data Warehouse Connect Installation and Use Guide* (part number 4535 645 40411). For details on setting up the export destination for Data Warehouse Connect, see the *IntelliVue Information Center iX Release B.01 Service and Installation Guide* (part number 4535 645 40541). For information on configuring the export settings for the clinical unit, see the *IntelliVue Information Center iX Release B.01 Clinical Configuration Guide* (part number 4535 645 40521).

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. For more information, see "Holter Export" on page 2-22.

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 *IntelliVue Information Center iX Release B.01 Service and Installation Guide*. For information on enabling Wave Strip Export, see the *IntelliVue Information Center iX Release B.01 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 parameters 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.

What's New in Release B.0

The following features were introduced with Release B.0 of the IntelliVue Information Center iX:

- **Trend Upload**

  With Trend Upload, up to 8 hours of numeric data collected on an IntelliVue Patient Monitor Release K or higher 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 around it in the review applications Tabular Trend and Graphic Trend views. See "Patient Data Review" on page 9-1.

- **Auto-Reconnect and Settings Synchronization**

  For systems with Database Synchronization and Auto Reconnect enabled, Release B.0 of the IntelliVue Information Center iX allows systems not currently connected to the database server to 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. See "Auto-Reconnect and Settings Synchronization" on page 13-12.

- **12-Lead Enhancements**
  - PH100B or PH110C algorithm choice

    Release B.0 of the IntelliVue Information Center iX includes two algorithm choices for 12-Lead analysis: PH100B and PH110C. Your unit can be set up to use either one. See the *Philips DXL ECG Algorithm Physician's Guide* (part number 4535 641 06411) for information on the PH100B and PH110C algorithms.
  - Continuous 12-Lead

    The IntelliVue Patient Monitor Release K.1 or higher sends all ECG waves to the IntelliVue 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. A new Signal Quality event line displays in the Cardiac Review's Event view that helps you to find the highest quality 12-Lead ECG from the historical data.

– 12-Lead Diagnostic Capture

In addition to storing 12 -Leads, with Release B.0 of the IntelliVue Information Center iX, you can also capture a 12-Lead ECG from stored continuous 12-lead wave data in **Cardiac Review**. You can also export the ECG to a Cardiology Management System, such as TraceMasterVue. You can view 12-Lead captures in the **12-Lead Capture Review** window. For details on using the **12-Lead Capture Review** window and the **12-Lead Export Setup** window, see Chapter 9, "Patient Data Review."

- **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.

  There are three versions of Patient Link: Enterprise Patient Link, Small Network Patient Link, the local Patient Link. With the Enterprise Patient Link, you can transfer patients and their data, including alarm data. You can also see data stored using the web.

  With the Patient Link models, caregivers are set up during installation/configuration. If a display is available, you can subsequently make adjustments to the caregiver settings and bed assignments using the **Caregiver Assignments** application. Other clinical applications are not accessible.

  The Patient Link does not include a display for real-time monitoring, overview, or viewing retrospective data. No bedside remote control for Information Center arrhythmia functions, and no storage of Information Center generated alarms is available. You cannot access the **Measurements** application Alarm Filters page to specify which alarms will generate a recording or page. All recordings are configured On at the Information Center.

- **Retrospective Configuration**

  For systems with the Specialty Review license, Release B.0 of the IntelliVue Information Center iX provides a new Retrospective Configuration application, available in System Configuration, where you can create and configure new Review applications as well as 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. See the *IntelliVue Information Center iX Release B.0 Clinical Configuration Guide* for details on using the Retrospective Configuration application.

- **Profile Enhancements**

  – With Release B.0, through **Clinical Settings**, you assign certain beds within the unit to different default profiles.

  – With Release B.0, through System Configuration, you can:

    ▫ Add a new profile by selecting an existing profile and renaming.

    ▫ Remove a profile.

    ▫ Assign beds to a profile.

    ▫ Change a unit's default profile.

    ▫ Import bedside profiles created with the bedside Support Tool.

  See the *IntelliVue Information Center iX Release B.0 Clinical Configuration Guide* for details on Profile Clinical Settings configuration and the *IntelliVue Information Center iX Release B.0 Service and Installation Guide* for details on configuring Profiles through System Configuration.

- **Distributed Paging**

  For systems with the Alert Data Integration paging system, Release B.0 of the IntelliVue Information Center iX provides a new configuration option, Distributed, available in System Configuration. Distributed, on by default, allows the Alert Data Integration paging system to run on each IntelliVue Information Center iX. This way paging is still available and continues to operate if connection to the database server is lost.

- **Miscellaneous Enhancements**

  Release B.0 of the IntelliVue Information Center iX includes the following miscellaneous enhancements:

  – Screen Calibration. A new configuration choice, Screen Calibration, 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 an inch. See the *IntelliVue Information Center iX Release B.0 Clinical Configuration Guide* or your *IntelliVue Information Center iX Release B.0 Service and Installation Guide* for details.

  – Automatic ST/STE map. Release B.0 includes a new configuration choice that allows you to automatically change a patient from an ST Map to an STE Map and vice versa. Off by default. If enabled on your system an ST map and snippets will replace an STE map and snippets when monitoring ST only or a STE map and snippets will replace an ST map and snippets when monitoring STE only.

  – Automatic sector resize. Available for systems with Advanced Sector Setup, your system may be set to automatically resize a sector based on the data currently available. 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 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 new configuration option allows you to manually increase or decrease the size of individual sectors. Off by default. When your system has been set up to allow you to resize the sector two resize icons are available from a patient sector. Click  to make the sector smaller or  to make the sector larger.

  – Automatic Minimize Sector. With Release B.0 a new configuration option is available that will automatically minimize a sector when there is no equipment or the equipment is put on standby. Off by default.

  – Show PVC. With Release B.0 your system can be configured to show PVC by default.

  – Print from a sector. Release B.0 includes a configuration option that allows you to specify whether you want users to be able to print from a sector, record from a sector or save strips. When configured for recording the record icon () is available in the patient sector. When configured for print the printer icon () is available. Alternatively, you can disable both **Print** and **Record**.

  – You can now choose to have more than one item display in the patient sector or **Patient Window**. So, for example, you could have an ST Map and Trends in a sector if you had the space available.

  – Sectors can now 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.

– Release B.0 of the Information Center iX allows you to choose a numeric to display in the lower right side of every patient sector. For example, you could have NBP display on the bottom right of every sector in the Main Screen.
– Fast Alarm Review now shows 15 seconds of post alarm data. Previously, 1 second of post-alarm data was available in the Fast Alarm Review window.

  Note—15 seconds of post-alarm data may not be available in Fast Alarm 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. With Release B.0 the Standby white technical alarm now displays the amount of time a device has been in standby. Hovering over the Standby alarm in the patient sector or **Patient Window** displays a drop down list that indicates the amount of time the device has been in Standby.
– Automatic volume adjustment. With Release B.0 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. Release B.0 includes 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**

  Release B.0 of the IntelliVue Information Center iX includes the following new icons that provide easier access to applications from patient sectors or the **Patient Window**.

Icon	Description
	**Resuscitation** icon. Displays in the patient sector and **Patient Window** as a solid white icon when the patient's status is set to no resuscitation or as an icon outlined in white when the patient's status is set to modified. Click the icon to launch the **Manage Patient** application where you can change the resuscitation status if desired.
	**Patient Window** icon. Click to access the **Patient Window**.
	**Volume** icon. Click to adjust the alarm tone volume.
	**Silence/Review** icon. Use to silence currently active alarms for a patient.
	**Pause Alarms** icon. Use to turn all alarm sounds off/on. Your system may be set up to allow pausing of only yellow alarms, red and yellow alarms or, to avoid turning off alarms unintentionally, to not allow the pausing of any alarms.
	**Record** icon. Starts a delayed non-continuous (timed) recording.
	**Print** icon. Prints a delayed non-continuous strip report.

Icon	Description
	**Minimize** icon. Available if your system is set up to allow minimizing of sectors and the sector is not currently monitoring a patient.
	**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 if desired.

What's New in Release A.01

Release A.01 of the IntelliVue Information Center iX includes:

- Support for the Philips MRx monitor Release F.03 or higher. With Release A.01 of the Information Center iX, MRx monitors (wired and wireless) can now 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 "Pad" or "Paddle" 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 is 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.

- A new ECG Statistics view with the Cardiac Review application. The ECG Statistics view displays ECG statistical data in rows and columns. See ECG Statistics View for information on using the ECG Statistics view.

- 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 9-38 for information on using the **Cardiac Review** web application.

- The ability to review physiological waves and parameters 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 alarm strips as well as print and export the strips to the clipboard. For information on viewing patient data remotely through PIIC Remote iX Multi Patient View see the *PIIC iX Web Application Service and Users Guide*.

- The ability to view retrospective data through a web browser for patients discharged from either a Information Center Release N+ or from an Information Center iX. For systems with a Web Portal host configured, the IntelliVue 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 IntelliVue Information Center Release N or higher 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 click the  icon in the review window header to view the previous data. See "Accessing Prior Unit Data" on page 9-32.

Introducing the IntelliVue Information Center iX

The Philips IntelliVue Information Center iX is a powerful information hub that consolidates real-time physiological waves and parameters and annunciation of alarms to provide a clear, simple view of patient status. The IntelliVue Information Center iX permits the capturing of complete waveforms, trends, alarms, and numerics from networked IntelliVue Patient Monitors and Telemetry System devices.

The following models are available to meet your specific patient monitoring needs:

- **IntelliVue Surveillance Information Center**

  A Surveillance Information Center provides real-time patient waveform monitoring and alarms. A Surveillance Information Center system can range from a single stand-alone Surveillance Information Center to a high availability networked system supporting 1024 beds and connected to various systems; such as Web Servers, Hospital Information Systems, External Time Sources, Paging Systems, ECG Management Systems, and bedside monitors.

- **IntelliVue Overview Information Center**

  An Overview Information Center provides real-time waveform monitoring at a location such as a hallway for patients being monitored by a primary Surveillance Information Center on the IntelliVue Clinical Network. An Overview Information Center is a system that has the surveillance feature for viewing patient data only but not the patient connection feature. Overview Information Centers can be used to view and control the beds monitored by a Surveillance Information Center in additional locations in the unit or in other locations in the hospital.

Differences in features or functionality are noted where appropriate.

Intended Use

The intended use of the Information Center Software is to display physiologic waves, parameters, and trends, format data for strip chart recordings and printed reports, and provide the secondary annunciation of alarms from other networked medical devices at a centralized location. The Information Center Software provides for the retrospective review of alarms, physiologic waves and parameters from its database.

An additional intended use of the Information Center Software is to provide primary annunciation of alarms and configuration and control access for networked telemetry monitors.

This product is intended for use in health care facilities by trained healthcare professionals. This product is not intended for home use.

Rx only.

Clinical Features

The Information Center displays information received from point of care equipment including waveforms, trends, alarms, and numerics. The Philips IntelliVue Information Center iX software allows you to:

- View waves and physiological parameter information sent over the monitoring network.
- Be alerted of patient alarms that have been detected by networked monitoring devices and respond to the alarms.
- Perform ST/AR multi lead arrhythmia analysis on up to two leads of ECG. ST/AR ST segment monitoring provides ST elevation and depression measurements for patients being monitored by IntelliVue TRx Transceivers.

  ST/AR analysis for IntelliVue Patient Monitors and MX40 Wearable monitors is done at the monitor.
- Perform QT interval monitoring for IntelliVue Telemetry System devices. QT interval monitoring can assist in the detection of prolonged QT interval syndrome. If the patient is monitored by an IntelliVue Patient Monitor or the MX40 Wearable monitor, QT/QTc analysis is provided by the IntelliVue Patient Monitor.
- Make strip chart recordings on the Philips 2-Channel Recorder and (if a printer is available) printed reports requested from the point-of-care and/or the Information Center.
- 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 notification of alarms in textual format to a receiving device such as a pager. This option, Alert Data Integration, is for secondary notification of alarms. It is not intended for primary notification of alarms.
- Supports communication with wired and wireless patient monitors.

Recordings and Reports

Recordings can be requested from the Information Center or from networked products.

If a printer is connected, reports requested from the Information Center or from the bedside can be printed.

Point-of-Care Equipment

The Information Center communicates with the following monitoring devices:

- Bedside monitors: IntelliVue Patient Monitors Release J.0 or higher. In this book the term *IntelliVue Patient Monitor* refers to the family of Philips IntelliVue MPxx or MXxx bedside monitors. Differences in features or functionality are called out where appropriate.
- Philips IntelliVue MX40 Wearable monitor Release B.02 or higher.
- Philips IntelliVue TRx Transceivers Release B.0 or higher.
- Philips MRx monitor Release F.03.

In this guide, the term *telemetry* refers to the MX40 Wearable monitor and the IntelliVue TRx Transceivers. Differences in features or functionality are noted where appropriate.

The table below provides the functionality available at the Information Center for point-of-care equipment.

Function	IntelliVue Patient Monitors	MX40 Wearable Monitor	TRx Transceivers	MRx Monitors
Central monitoring (patient management alarm annunciation, and so on.)	Yes	Yes	Yes	Yes
ST/AR Arrhythmia monitoring at the Information Center	Yes -- ST/AR Arrhythmia functionality is available at the Information Center but is provided by the bedside monitor.	Yes -- ST/AR Arrhythmia functionality is available at the Information Center but is provided by the Wearable monitor.	Yes	ST/AR Arrhythmia control is at the bedside; review is available at the bedside and at the Information Center.
Arrhythmia control and review at the bedside.	Yes	Yes	N.A.	Arrhythmia control is at the bedside; review is available at the bedside and at the Information Center.
ST/AR ST segment monitoring at the Information Center	Yes -- if present, ST segment monitoring is provided from the bedside. The bedside ST values display in the **Patient Window**. The ST values are stored and available in **Measurements** application ST page.	Yes	Yes	No

Function	IntelliVue Patient Monitors	MX40 Wearable Monitor	TRx Transceivers	MRx Monitors
QT interval monitoring at the Information Center	Yes -- If present, QT interval monitoring is provided by the bedside. The bedside QTc and ΔQTc values display in the **Patient Window**. The QT, QTc, ΔQTC and QT-HR values are stored and available in the **Measurements** application QT page.	Yes -- If present, the MX40 provides the QT interval monitoring	Yes	No
ST trends and snippets	Yes	Yes	Yes	No
EASI™ ECG capability	Yes	Yes	Yes	No
Hexad ECG capability	Yes -- available with release K.2	Yes	Yes	No
Information Center printing of recordings and reports requested from the point-of-care	Yes	Yes	Yes - recordings via telemetry button on the telemetry device (if configured).	No

Information Center Display Screens

One or two displays can be available for viewing patient data and accessing clinical applications. Displays are ordered to match your specific unit requirements. A mouse is provided for accessing patient data or touch screens may be available. Simply move the mouse cursor to a labeled application button and click, and the button's application is immediately displayed on the screen. A keyboard is also provided for entering and changing patient data and other information. (Note that an on-screen keyboard is not available.)

With a touch screen display you can access patient data by either using the mouse or by pressing the screen element directly on the display using the tip of your finger or a stylus. The touch display is most effective for maneuvers such as silencing alarms on the display, accessing application windows or generating recording strips. More precise selections and measurements, for example caliper measurements, may be more accurately performed using the mouse. Should the touch screen display

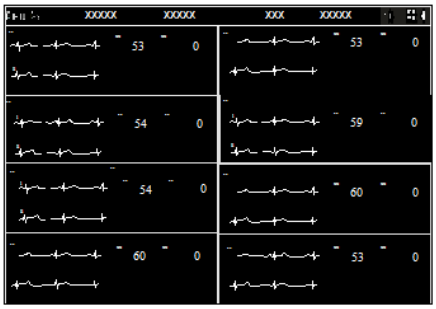
become unavailable for any reason patient data can be accessed by using the mouse and keyboard. When using touch screen, be sure to keep the area free of items that may inadvertently touch the screen.

The Information Center has two types of screens on the display:

- Main Screen, or resting display, which has patient sectors. No application windows are open.
- Application window screens that contain the Information Center clinical applications. You perform most tasks from within Information Center application windows.

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 set up to have a dedicated numeric, such as NBP, always displayed in the bottom right of the sector. The sector can also be customized per patient. See "Patient Sector Adjustments" on page 1-20.



Caption Bar

An area at the top of the Information Center screens displays system status messages, connection status, date and time, any name that may be associated with this Information Center, for example, **CCU Hallway1** and icons that provide access to other Information Center applications. Clicking the name provides access to the Clinical Settings application which contains configuration items that you can set to accommodate the needs of your unit.

The status messages that display in the caption bar are color-coded to indicate the message severity. Orange background indicates high severity; contact service personnel immediately. Black background indicates a low severity message. Resolve the issue or contact service personnel. For additional information on status messages see "Status Messages" on page 4-18.

Your current connection status displays in the caption bar to indicate your current connection to the server, where:

- A black background indicates you are currently connected.
- An orange background indicates you are currently disconnected and should contact service.
- A purple background indicates the server is ready to reconnect or is in the process of automatically reconnecting.

See "If Connection to the Servers is Lost" on page 13-10 or the IntelliVue Information Center iX Service Manual for details on connection status.

Clicking an icon on the caption bar provides access to the following:

Icon	Description
	Select this icon to view product support and licensing information. See "Product Support" on page 11-9.
	Select this icon to access the **Caregiver Assignments** application where you can: • Set up caregivers. • Assign caregivers to paging devices. • Manage your patient to nurse/caregiver assignments. • For systems with the Alert Data Integration paging option, designate the alarms that will generate an automatic page to the caregivers paging device. See Chapter 3, "Caregiver Assignments."
	Depending on your system setup select this icon to: • Make a delayed recording for all sectors that currently have patient data. • Print a strip for all patients in the unit. • Create saved strips for all patients in unit. Recordings do not print for sectors that are not assigned beds or equipment.
	Select this icon to adjust the alarm tone volume. See "Adjusting the Alarm Tone Volume" on page 4-29. **Warning** Be sure the minimum 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 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.

Patient Sectors

Your screen shows a specific number of patient sectors configured for your unit. Patient sectors can be configured to display particular types of waves, parameters 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 on the Main Screen can vary depending on how your system is set up. Patient sectors can be configured to be different sizes and can be added or removed as needed for census changes.

Some patients may have a higher acuity than others, and it is beneficial to see more data for those patients. To accommodate this, patient sectors can be configured to have varying sizes.

Your system may be set up with the following sector display options:

- **Manual Minimize Sector**

  Allows you to minimize sectors that currently are not actively monitoring a patient. Minimizing sectors allows the other sectors on the Main Screen to become larger and display more information. If available, you can minimize a sector if:

  – All assigned equipment is in standby.
  – There is no equipment assigned to the sector.
  – Sector has been cleared.

  Sectors are restored automatically when monitoring resumes or when you click anywhere on the minimized sector.

- **Automatic Minimize Sector**

  Your system may be set up to automatically minimize a sector when there is no equipment or the equipment is put on standby. Automatic minimize sector is off by default.

- **Automatic Sector Resize**

  Your system may be set to automatically resize a sector based on the data currently available. 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 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**

  Your system may be set up to allow you to manually increase or decrease the size of individual sectors. Increasing the size of a sector makes the other sectors in that column smaller. **Allow Sector Resizing** is off by default.

  When your system has been set up to allow you to resize the sector two resize icons are available from a patient sector. Click  to make the sector smaller or  to make the sector larger.

Patient Sector Items

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

Item	Description
	Caregiver icon. Displays in the patient sector when 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. Click the icon to launch the **Caregiver Assignments** application. See Chapter 3, "Caregiver Assignments."

Item	Description
Bed Label	Displays when the current sector has a bed assigned. Move your cursor over the bed label to display the full bed location and equipment label(s). If more than one monitoring device is assigned to the bed the device with the ECG source is listed first. The bed label appears in parentheses when the current patient is on transport. Move your cursor over the bed label to display the temporary transport location and equipment label. Click the bed label to open the **Equipment Management** window.
Patient Name	Displays patient name if admitted and your system is configured to display patient name. Three question marks (???) precede the patient name when there is a problem identifying the patient. Problems can occur when: • Patient data between the Information Center and the bedside do not match. • All required information was not entered when the patient was admitted. Move your cursor over the patient name to display the patient's full name. If the patient is assigned to a specific group (for example, Diabetic), the patient name is outlined in the group color. Click the patient name to launch the **Manage Patient** application. Depending on whether your system is set up to display patient names in the patient sector, the words **Admitted** or **Not Admitted** display as appropriate.
	Resuscitation icon. Indicates the patient's current resuscitation status. Displays as a white icon when the patient's status is set to no resuscitation or as an icon outlined in white when the patient's status is set to modified. Click the icon to launch the **Manage Patient** application where you can change resuscitation status if desired. See Chapter 2, "Patient Management."

Item	Description
	Battery icon. Displays for battery operated devices to indicate the device with the least amount of battery strength. If multiple assigned devices are on battery power, then the device with the least amount of battery strength is displayed. The battery icon has five levels: approximately 100% to 80%, 80% to 60%, 60% to 40%,40% to 20%, or -Replace Battery strength. Move your cursor over the icon to display a list of equipment for this patient sorted from the lowest to highest battery charge. Click the icon to display the **Manage Patient** application. *Note*s • 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.
  	Device Location icon. For wireless devices and systems with device location set up, one of three icons display in the **Patient Window** to indicate the wireless device location. • If the primary wireless device is in range and has sent data within the last 15 minutes, the normal device location icon displays. • If the primary wireless device is in range but has not sent data within the last 15 minutes a blue question mark displays over the icon. • If the primary wireless device is out of range a yellow circle with a line through it displays over the icon. Move your cursor over the icon to display text indicating the location of the device for example, **Hallway 2**. The icon does not display in the patient sector if device location is not enabled, is unavailable or if the patient has no wireless devices assigned. Because the coverage range of Access Points can sometimes overlap, including floor levels, the Device Location feature is not intended for use when attempting to locate a patient.

Item	Description
  	Pacer icon. Indicates the patient's current paced status. The icon is green with an X over it when pacer detection is set to off. A red question mark displays over the icon when the patient's paced status is unknown or in conflict. Click the icon to display a pop-up menu where you can set pacer detection on or off. If the patient has a cardiac pacemaker (including demand, fixed, or any type) **Paced Mode** should be set to **On** indicating that pace pulse detection is on. **Warning** If the patient is paced, pace pulse detection must be 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. In addition if the patient does not have a pacemaker, set pacer detection 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 if desired.
	Overview icon. Displays in the patient sector if the bed is being overviewed at this Information Center. Move your cursor over the icon to display the name of the Information Center currently monitoring this patient. Click the icon to launch the **Manage Patient** application.
Demo, **Config**, or **Service**	The text **Demo**, **Config** or **Service** displays over the primary wave to indicate the monitoring device's current operating mode.

Item	Description
MRx State	The current state of the MRx monitor displays over the primary wave in the patient sector. No monitor state displays in the patient sector when in monitoring mode. The following MRx monitor operating modes may display: • 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 analyzes the patient's ECG and determines whether a shock is advised. When in AED mode, the only wave available is the primary lead. All alarms are deactivated when in AED mode. You can turn alarms back on at the MRx monitor. • TCP Pause — The MRx monitor is currently operating in TCP Pause mode. • TCPacing — The MRx monitor is currently operating in Pacing mode. Pacing mode is used to deliver pace pulses to the heart. • 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. • 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. • 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 **Paddle** display over the primary wave. See your HeartStart MRx Instructions for Use for information on the MRx operating states.
Alarm Messages	INOP and alarm messages display on the top right of the patient sector. Click the drop down arrow next to the alarm message to display a list of acknowledged but still active alarms, unacknowledged alarms and INOPs. Select an alarm from the list to display in the Fast Alarm Review window.

Early Warning Score

If the Early Warning Score (EWS) feature is available, a Modified Early Warning Scoring (MEWS) may display as a colored circle with a number in the window. This is turned off by default. In addition a warning message displays if the clinician selects EWS for display.

Caution

This feature provides a single EWS only. The Information Center does not provide trending, review, reporting, or notification.

Patient Sector Buttons

All tasks start in the patient sector. Normally, there are no buttons visible in the sector. Buttons in the sector are activated when the cursor is in the sector or, when using a touch screen display, the sector is selected by touching the screen with a stylus or the tip of your finger. When you place your cursor inside a patient sector the sector becomes outlined in an orange border and the buttons become visible.

Depending on how your system is configured, up to three shortcut buttons may be available in the patient sector. These shortcut buttons provide quick access to specific Information Center applications. See "Application Window" on page 1-22 for descriptions of the application buttons.

The **Patient Window**  button provides access to the **Patient Window**. The other buttons available in the patient sector depend on how your system is configured. The following table describes the buttons that may be available.

Condition	Button	Action when Button Selected
No alarm pending		For systems configured to record from the patient sector, starts 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.
		For systems configured to print from the patient sector starts a printout of a delayed strip. In addition printing your system may be set up to save the strip when the icon is clicked.
Alarm Pending		Turns the alarm sound off, and the sector changes to its normal color (can also click or, for touch screen, touch anywhere in the sector except on a button). In addition your system may be set up to open the Fast Alarm Review window for the alarm. *Note*—For MRx monitors, you cannot silence pacing alarms at the Information Center. You must silence all pacing alarms at the MRx monitor.
		For systems configured to not allow silencing of bedside generated alarm conditions or red alarms at the Information Center, displays the Fast Alarm Review strip for that alarm.
Alarms can be silenced at the Information Center if both the Information Center and the bedside monitor are configured with remote silence enabled. *Note*—If the system requires authentication to silence red alarms, you can provide the appropriate user name and password from the **Patient Window**.		
No active monitoring		Available if your system is set up to allow minimizing of sectors and the sector is currently is not currently monitoring a patient or is in Standby. When you click the button the sector body collapses, the sector header turns gray and the remaining monitoring sectors resize. The sector returns to normal size when the sector header is clicked or when active monitoring begins.

Condition	Button	Action when Button Selected
Active monitoring		Available for systems that allow sector resizing, click to make the sector smaller.
		Available for systems that allow sector resizing, click to make the sector larger.

Patient Sector Adjustments

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

When you click on a numeric or wave in the patient sector, unless the sector has an active alarm, menu choices display that allow you to customize your view of patient data.

Waves

If ECG is on the first wave is always the primary ECG wave. You can change the primary ECG wave or adjust the size of the wave up or down. To change the size, click the primary ECG. A menu displays where you can adjust the size of the wave up or down.

To change another wave click on the wave you would like to change. A menu displays where you can select a different wave for display or adjust the size of the wave up or down.

Note—For MRx monitors, you cannot adjust the wave size up or down.

ECG Analysis

Select to access the **ECG Analysis** window, which provides a real time view of available ECG leads. You can use this window to verify that the ECG waves are optimized for arrhythmia monitoring. See "ECG Analysis" on page 1-33.

Setup ECG

Select to access the **Measurements** application ECG page where you can change heart rate limits and asystole thresholds. See "ECG" on page 4-33.

Numerics

You can adjust numerics or change a numeric if the numeric is not associated with a wave. Click the numeric to display a menu where you can adjust the parameter alarm limits or change the numeric. You can adjust most parameter limits from within the patient sector as well as turn alarms on or off.

Change Layout

You can change the patient sector layout by clicking 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. Click the option again to clear the check mark.

Choice	Description
Big Numerics	Select to display large numerics with one small ECG wave in the sector.
Horizon Numerics	For systems with the Trend option available, select to display an arrow next to the parameter. The arrow indicates the direction to which the numeric has been headed in the last 10 to 30 minutes. To change the arrow time: 1 Click the Horizon Numeric. 2 Select **Change Arrow Time**. 3 Select a time from the list that displays.
Trends	Available with systems with the Trend Display option available. Select to display a Horizon and Graphical trend in the sector. See "Trends" on page 1-32 for additional information on using Trends.
ST Map	For systems with the ST Map option and ST Analysis on, available in full screen mode and if three or more waves will fit in the sector. Select to show an ST Map. To change the scale: 1 Click 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 2mm. To display the ST baseline in the ST Map click the ST Map then select **Show Baseline**. To make adjustments to ST alarms, turn ST analysis on or off and set ST measurement points click the ST Map then select **ST Map: Measurements** to go the **Measurements** application ST page. See "ST" on page 4-39.

Choice	Description
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 Click 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 2mm. To make ST elevation adjustments click the STE Map then select **STE Map: Measurements** to open the **Measurements** application STE page. See "STE" on page 4-42.

Application Window

The Application Window displays the Information Center clinical applications. You perform most tasks from within an application window.

With Single Display

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

With Dual Display

Systems with dual displays offer the advantage of enabling clinicians to view the **Patient Window** or applications 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 Main Screen is active. For example, for a 16-patient Information Center, the Main Screen of each display includes eight sectors.

The Application Window can be configured to open in two ways:

- Full Main Screen
- Half Main Screen

Application Window Task Bar

A task bar on the bottom of application windows provides easy access to other Information Center applications for the selected bed. When you click an application button on the task bar, a menu displays applications associated with that button. Depending on the size of your display, you can use right and left arrows to scroll through the available application buttons.

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 1-26. • **ECG Analysis**. Use to view all available ECG leads. See "ECG Analysis" on page 1-33.
Manage Patient	Provides access to the **Manage Patient** application, which allows you to: • Enter or update patient demographic information. • Admit, discharge, and transfer patients. • Temporarily place the bed in standby. • Manage the equipment associated with the patient. • Transport the patient to a temporary location, and/or select the patient's equipment to be put in standby. • Export ECG waveform data to a Philips Holter system for analysis. See Chapter 2, "Patient Management," for information on using the **Manage Patient** application.
Measurements	Provides access to the **Measurements** application, where you can make patient-specific adjustments to alarms, measurements, the profile, and measurements within the profile. Your choices in the application depend on how your unit is set up and the equipment assigned to the patient. See Chapter 4, "Alarms and Measurements."
Review	Provides access to clinical applications that allow you to display a patient's physiological parameters and alarm events that have been collected from a bedside monitor or telemetry device and stored over time in the database. The clinical review applications available depend on your purchased options and how your system is set up. See Chapter 9, "Patient Data Review."

Button	Description
Manage Unit	Provides access to the following menu options. • **Caregiver Assignment**. Use to manage caregiver assignments including caregiver to bed assignments and caregiver to device assignments. See Chapter 3, "Caregiver Assignments." • **Clinical Settings**. Use to modify configuration settings to accommodate the specific needs of your unit. See Chapter 12, "Information Center Configuration." • **Locate Equipment**. Use to access the Locate Equipment application where you view all assigned and unassigned devices in a specific unit, view the device history or search through multiple units for a specific device. See "Locate Equipment" on page 11-4. • **Display Setup**. Use to assign beds to patient sectors and set up the layout of the patient sectors on the Main Screen. See "Display Setup" on page 11-6. • **System Help**. Use to access help topics that describe how to use the Information Center applications. See "System Help" on page 11-8. • **Label Assignment**. Use to replace or change the monitoring device currently assigned to an equipment label. See "Label Assignment" on page 11-7. • **Clinical Audit**. Use to view a read-only chronological record of actions performed for a patient including patient management actions and alarm history. See "Clinical Audit" on page 11-2.
Main Setup	Provides access to Information Center clinical and support applications. The **Main Setup** button also provides access to the following menu choices: • **System Configuration**. Use to change factory set defaults to accommodate the needs of your unit. See Chapter 12, "Information Center Configuration." • **Product Support**. Use to view product support and entitlement information. See "Product Support" on page 11-9. • **Web Browser**. If available on your system, provides access to patient retrospective data using standard web browsers and mobile devices. See "Information Center Web Access" on page 9-33.
Main Screen	Closes the open window and returns to the resting display.

Application Window Caption Bar

Button	Description
Bed Label	Allows you to switch the patient in the open application. Click on the Bed Label pane to display the Patient Selection dialog box, which contains two tabs: **Select** and **Search**. Use the **Select** tab to select another patient for which to display data. You can view a patient in another unit by clicking the name of the unit on left side of the dialog box then selecting the patient's name from the list that displays on the right. Use the **Search** tab to search for current or discharged patients. You can then view their data. For discharged patients only retrospective data is available to view. See "Search for Patients" on page 1-35. If your Information Center iX is part of a network with a Web Portal configured, you can search for any patients (including discharged patients) that are or were on servers connected to the portal. The review applications will be the same as from the Surveillance Station. If the patient is on another Information Center iX server, or a classic Information Center server, you will see the web review applications.
	Print icon. If a printer is available, starts a printout of the screen or a report. When selected from the: • **Patient Window** or **Manage Patient** window prints a Patient Summary Report. • **Measurements** application prints an Alarm Summary Report except in the QT or ST view. The QT and ST measurements have a separate report. • Review application windows (other than **Alarm Review** or **12-Lead Capture Review**) prints a Review Report for the current review window. • **Alarm Review** prints a report of selected alarms. • **12-Lead Capture Review** prints the current 12-Lead capture. • Clinical Settings prints a report of the current unit's clinical settings. • Help prints the current open help topic. • Main Setup prints a Unit Summary Report for all patients currently admitted and assigned to this Information Center. If a printer is not available or is not configured, the print icon is grayed out.
	Help icon. Click to view the on-line Help application. The Help application is always available and provides information on using the Information Center applications.

Patient Window

The **Patient Window** provides a real-time view of the patient's waves and numerics.

Waves

- The Resp wave is always 6.25 mm/s. All other waves are either 12.5 or 25.0 mm/s depending on your unit setup.
- Wave color depends on how your system is set up. The wave color can be set the same as the bedside or it can be configured specifically for your unit.
- A rhythm message displays for primary ECG waves as well as an arrhythmia status message in the upper right-hand corner of the wave.
- The pacer spike color is always white unless the ECG is white. If the ECG 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 for the primary wave to indicate the monitor's current operating mode.

Numerics

The **Patient Window** displays 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 parameter.

Early Warning Score

If the Early Warning Score (EWS) feature is available, a Modified Early Warning Scoring (MEWS) may display as a colored circle with a number in the window. This is turned off by default. In addition a warning message displays if the clinician selects EWS for display.

Caution

This feature provides a single Early Warning Score only. The Information Center does not provide trending, review, reporting, or notification.

Icons

The following icons display in the **Patient Window**:

Icon	Description
	Caregiver icon. Displays if the current patient has an assigned caregiver. The color of the icon corresponds with the caregiver's assigned color. Move your cursor over the Caregiver icon to display the name of the patient's assigned nurse/caregiver. Click on the Caregiver icon to display the Caregiver Assignment application.

Icon	Description
	Group Name icon. If the current patient is assigned to a patient group type for example, Diabetic, the group name outlined in its associated group color displays in the **Patient Window**. Group name and color allows you to quickly identify patient types. Click the Group Label to display the **Manage Patient** application where you can change the group name if desired.
	Resuscitation icon. Indicates the patient's current resuscitation status. Displays as white icon when the patient's status is set to no resuscitation or as an icon outlined in white when the patient's status is set to modified. Click the icon to launch the **Manage Patient** application where you can change resuscitation status if desired. No resuscitation icon displays in the **Patient Window** if the current patient's status is set to full resuscitation.
  	Pacer icon. Indicates the patient's current paced status. The icon is green with an X over it when pacer detection is set to off. A red question mark displays over the icon when the patient's paced status is unknown or in conflict. Click the icon to display a pop-up where you can set pacer detection on or off. If the patient has a cardiac pacemaker (including demand, fixed, or any type) the Paced Mode should be set to **On** indicating that pace pulse detection is on. **Warning** If the patient is paced, pace pulse detection must be 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. In addition if the patient has no pacemaker be sure to set pacer detection off to allow the ST/AR algorithm to work most effectively.
	Overview icon. Displays in the **Patient Window** if the current sector is an overview sector. Move your cursor over the icon to display the name of the unit currently monitoring this patient. Click the icon to display the **Manage Patient** application.
	Battery icon. If there is at least one battery-operated monitoring device assigned to this patient, a battery icon displays in the **Patient Window** indicating the remaining battery strength. Move your cursor over the icon to view a list of all equipment assigned to this patient sorted by device from lowest to highest battery charge. The battery icon has five levels: approximately 100% to 75%, 75% to 50%, 50% to 25%, 25% to Battery Weak, or Battery Weak-Replace Battery strength. Click the icon to display the **Manage Patient** application.

Icon	Description
	Device Location icon. For wireless devices and systems with device location set up, one of three icons display in the **Patient Window** to indicate the wireless device location. • If the primary wireless device is in range and has sent data within the last 15 minutes, the normal device location icon displays. • If the primary wireless device is in range but has not sent data within the last 15 minutes a blue question mark displays over the icon. • If the primary wireless device is out of range a yellow circle with a line through it displays over the icon. Move your cursor over the icon to display text indicating the location of the device for example, "Hallway 2."
	Print icon. Prints a Patient Summary report for the currently selected patient. The report contains the following patient demographic and vital information: • Last five alarms (red and yellow only) within the last 12 hours • For telemetry monitored patients, delta from unit setting • Current periodic and aperiodic parameter values • Rhythm Status • Last user-saved strip if within 15 minutes, otherwise the most recent strip In addition, depending on how your system is set up can include the following: • Unit Name • Patient Name • ID configured for the unit • Age • Gender • Profile • Group • Screen Notes • Location • Equipment • Pacer algorithm • Category • Resuscitation Status
	Help icon. Click to view the on-line Help application.

Patient Window Buttons

The **Patient Window** provides the following buttons that allow you to perform actions within the **Patient Window**:

Button	Description
Page	For systems with paging available, allows you to manually send a text page to the patient's assigned caregiver. See "Sending a Text Message" on page 3-6.
Silence	Allows you to silence currently active alarms for this patient.
Continuous Recording	Allows you to select waves to continuously record. If a continuous recording is currently being printed clicking the button stops the recording in progress.
Pause	Depending on how your system is set up, a **Pause** button may be available that lets you either pause all alarms or only yellow alarms. If alarms are currently paused for this patient, the button is highlighted. Click the button to resume alarms. Your system may require authentication (you must provide the appropriate user name and password) before you can pause alarms.
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.
Resume	A **Resume** button is available if the equipment is in Standby or if the patient is on transport.

Patient Window Adjustments

You can customize how the waves and numerics display in the **Patient Window** or within the patient sector to meet your specific monitoring needs. When you click on a numeric or wave in the **Patient Window** or in a patient sector, unless the sector has an active alarm, menu choices display that allow you to customize your view of patient data.

Waves

When the ECG measurement is on, the first wave displayed in the sector and the **Patient Window** will always be the primary ECG. The primary ECG is always used for ECG analysis. You can change the primary ECG wave and adjust the size of the wave up or down. To change the size click the primary ECG. A menu displays where you can adjust the size of the wave up or down.

To change another wave click on the wave you would like to change. A menu displays where you can select a different wave for display or adjust the size of the wave up or down.

Note—For MRx monitors, you cannot adjust the wave size up or down.

ECG Analysis

Select to access the **ECG Analysis** window, which provides a real time view of available ECG leads. You can use this window to verify that the ECG waves are optimized for arrhythmia monitoring. See "ECG Analysis" on page 1-33.

Setup ECG

Select to access the **Measurements** application ECG page where you can change heart rate limits and asystole thresholds. See "ECG" on page 4-33.

Numerics

You can adjust numerics or change a numeric if the numeric is not associated with a wave. Click on the numeric to display a menu where you can adjust the parameter alarm limits or change the numeric. You can adjust most parameter limits from within the patient sector as well as turn alarms on or off.

Change Layout

You can change the **Patient Window** layout by clicking anywhere in the **Patient Window** then selecting **Change Layout** from the menu that displays. Choices may include:

Choice	Description
Horizon Numerics	Select to have an arrow display next to the parameter. The arrow indicates the direction to which the numeric has been headed in the last 10 to 30 minutes. To change the arrow time: 1 Click the Horizon Numeric. 2 Select **Change Arrow Time**. 3 Select a time from the list that displays.
Trends	Available with systems with the Trend Display option available. Select to show at least one row of trends. See "Trends" on page 1-32 for more information on using trends.
ST Map	For systems with the ST Map option, select to show an ST Map. To change the scale: 1 Click 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 2mm. To display the ST baseline in the ST Map click the ST Map then select **Show Baseline**. To make adjustments to ST alarms, turn ST analysis on or off and set ST measurement points click the ST Map then select **ST Map: Measurements** to go the **Measurements** application ST page. See "ST" on page 4-39.

Choice	Description
ST Snippets	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 click on the ST Snippets then select **ST View**. See "ST View" on page 4-41. To display the ST baseline click 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, select to show an STE Map. To change the scale: 1 Click 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 2mm. To make ST elevation adjustments click the STE Map then select **STE Map: Measurements** to go the **Measurements** application STE page. See "STE Map" on page 4-43.
STE Snippets	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 click the STE Snippets then select **STE View**. See "STE View" on page 4-43. To display the STE baseline click the STE Snippets then select **Show Baseline.** Select **Update Baseline** to set the current snippets as a baseline for reference.

Trends

The Trends option allows you see the patient's trending data through the use of various trending views. Clicking on a trend area provides additional menu choices for viewing trend data. Be sure to click on the area of the trending sector that contains the trend view you wish to modify.

Note—Information Center trend views and bedside trend views work independently. Changes 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 parameter value in relation to how the patient has been trending. An arrow displays in the Horizon view to indicate the percentage of change over the last 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 last 10 minutes. In addition a horizon bar displays next to the arrow where you can visually identify the parameter value change. The horizon bar extends from the current value to the baseline/target value.
Graphical and Horizon	See a combination of the Graphic and Horizon trend views. The Graphical and Horizon view allows you to see a single parameter with a Horizon trend view attached to the right of the Graphical trend view.
Change Trend	Select a different parameter to trend. The parameters available for selection are those currently being trended within 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 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 parameter high level point. The values available for selection are appropriate for the selected parameter.
Set Low Horizon	Specify the parameter low level point. The values available for selection are appropriate for the selected parameter
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 parameter min and max values.

Select	To
Auto Horizon	To apply the settings to only the currently selected trend view.
Auto Horizon All	Select to set the currently selected values for all the trend views.

ECG Analysis

The **ECG Analysis** window provides a real time view of available ECG leads. You can use this window to verify that the ECG waves are optimized for arrhythmia monitoring.

To access the **ECG Analysis** window, do one of the following:

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

Note—EASI 12-Lead or the 4 leads derived with Hexad are approximations to conventional 12-Lead ECGs and should not be used for diagnostic interpretations.

How to Use the ECG Analysis Window

The table below describes how to use the **ECG Analysis** window:

Select	To
Arrhythmia On/Off	Turn arrhythmia monitoring on or off. When arrhythmia is off the text **Cardiotach Mode** displays in the rhythm status area. The system prompts you to confirm when entering cardiotach mode. See Chapter 6, "ST/AR Arrhythmia Monitoring."
Analysis Mode	Switch between single-lead and multi-lead analysis. Multi-lead analysis uses two leads of ECG for analysis, the primary and secondary leads. You can use this to verify that the ECG waves are optimized for arrhythmia monitoring.
Primary Lead	Select the primary lead for arrhythmia analysis.
Secondary Lead	Select the secondary lead for arrhythmia analysis.
Show Raw Leads	Available with EASI derived 12-Lead, placing a check mark in the box displays the raw EASI leads. When no check mark is in the box the derived leads display.
Layout Drop-Down Box	Change the layout of the **ECG Analysis** window. Clicking the drop down arrow provides you with a list of available layouts. The default layout is 12x1.

Select	To
Show Beat Annotations	Display beat annotations. When there is a check mark in this box all waves are delayed, beat annotations display on the primary ECG wave and the **ECG Analysis** window background changes from black to gray. On by default.
Relearn Arrhy	Cause the arrhythmia system to relearn the ECG if you do not agree with how beats are labeled. During the learning process beats are labeled with the letter L for the first valid 15 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 you should change the lead to one where the normal and ventricular beats look different. See "Example of Optimized ECGs" on page 6-6. In Cardiotach (Arrhythmia Off) mode, the labels N, V, and S are replaced with B (beat detected). During a relearn, only life-threatening alarms are available.

Viewing Other Patients

You can view both real-time and stored patient data for patients monitored by other networked Information Centers.

There are two ways to do this:

- *View the bed temporarily*, in the **Patient Window** or in an application window

  You select the patient via the Patient Selection box **Select** tab. You can then monitor the patient or review the data for that bed until you change to another patient or go to the Main Screen. If configured, you may also be able to admit, discharge, and transfer data for that bed. See "View a Bed Temporarily" on page 1-35.

- *Overview a bed* in a sector on your Information Center

  You use the Sector Assignment window to overview a bed that is monitored by another networked Information Center. The actions allowed for overview beds depend on how the system is configured. See "Types of Access" on page 1-36.

  Note—This is not available if the patient is on a Patient Link.

View a Bed Temporarily

You can view data temporarily for any bed monitored by another networked Information Center.

View other patients temporarily by performing the following steps:

1 On the **Patient Window** or application window, click the bed label drop down arrow on the left side of the caption bar. The Patient Selection box displays with a list of beds in this unit.

To view a list of the patients in another unit click the unit name. A list of beds in the selected unit displays.

To view a list of patients in other units on other networked institutions in your topology click the institution name then click on an available unit. The Patient Selection box displays with a list of patients in this unit. Only patients in units with the Patient Connection license to which you have access (full or read-only) are available for selection.

Alternately, you can search for discharged patients via the **Search** tab. You can then review their retrospective data.

– Click the **Search** tab.

– Provide search text in the **Search:** box then press Enter. A list of patients with matching names or IDs displays.

Note—When the Web Portal is running, all units on the Web Portal to which My host has host access are searched. When the Web Portal is not running, only units to which My host has access are searched.

2 Select the patient you want. That patient's data displays in the **Patient Window** or current application window. You can then access any other window for that patient.

You don't have to return to the **Patient Window**. For example, if you are on the **Alarm Review** window, you can remain there and change the patient you are viewing. Other windows you access will then be for that patient.

Search for Patients

To search for current or discharged patients:

1 On the **Patient Window** or application window, click the bed label drop down arrow on the left side of the caption bar. The Patient Selection box displays.

2 Click the **Search** tab.

3 Type search text in the **Search:** box, then press **Enter**. A list of patients with matching names or IDs displays.

Note—When the Web Portal is running, all units on the Web Portal to which My host has host access are searched. These are not associated with specific software options.

4 Select the patient.

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

For discharged patients or for patients outside of your current topology a web control displays that you can use to access the patient's retrospective data. Discharged patient data is read-only (except data that is exported to a Philips Holter system).

See "Accessing Prior Unit Data" on page 9-32 and "Information Center Web Access" on page 9-33 for information on viewing patient data through the Web Portal.

Overview Beds

You can overview a bed on your Main Screen that is monitored by another networked Information Center. See "Assigning an Overview Bed to a Sector" on page 2-20 for information on assigning overview beds.

Note—This is not available if the patient is on a Patient Link.

Types of Access

Each networked Information Center can be configured to specify the following types of access control of beds monitored by another Information Center:

- Full Control (read-write) access -- you can view patient data and change measurement controls (such as alarm limits).
  Note—Functions that affect the Information Center as a whole, rather than a specific bed, such as volume control are accessible for the local Information Center only.
- Read-Only access -- you can view patient data, but controls cannot be changed.
- No access -- you cannot access any bed on that Information Center.

Full Control if Multiple Viewers

Since more than one Information Center can have access to a bed at the same time, there may be situations when two or more clinicians are viewing information for the same patient at the same time. If multiple clinicians have full control access to the same patient then the last operation takes priority. For example, whichever task was completed last, such as a limit change, will be the one saved.

Main Setup

The Main Setup window provides access to the full array of Information Center clinical and support applications. Click a button to access the related application. Click the print icon on the Main Setup caption bar to print a unit summary report for all patients currently admitted and assigned to this Information Center. The report prints the patient demographics and vital information for patients in the unit.

2

Patient Management

This section describes how to manage patient data using the Philips IntelliVue Information Center iX.

Introduction

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

- Enter and update patient information.
- Manage patient transitions for example, discharge, transfers 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 Patients" on page 2-3.
Update	Allows you to update current patient information. See "Changing Patient Information" on page 2-7.
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 2-9.
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 Patient Data to a New Bed" on page 2-11.
Transport/Standby	Allows you to choose a temporary location, for example, X-Ray or Cath-Lab, when a patient is on transport and put some or all of the patient's equipment in standby. See "Transport/Standby" on page 2-12.
Equipment Management	Allows you to add or remove a patient's monitoring equipment. See "Equipment Management" on page 2-13.

Function	Description
Sector Assignment	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 2-19.
Overview	Allows you to overview patients that are currently being monitored by another connected Information Center (the primary Information Center). See "Assigning an Overview Bed to a Sector" on page 2-20.
Clear Sector	Allows you to unassign a bed from a sector. • Clear a Surveillance sector - clears bed label and equipment from a sector. Admitted patients must be discharged first. • Clear an Overview sector - clears bed label of overview sector only. See "Clearing (Unassigning) a Sector" on page 2-21.
Holter Export	Allows you to export ECG waves to a Philips Holter system. See "Holter Export" on page 2-22.

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.

Important—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 patient data at the Information Center and patient data at the MRx monitor. Click the patient name to display the **Select Patient** window where you can resolve the conflict. See "Resolving Conflicts" on page 2-7 for information on resolving patient conflicts.

Admitting Patients

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 or save data with discharge in order for the name to appear on the display, recordings, or reports or before you can transfer a patient.

With MRx or IntelliVue Patient Monitors

For patients connected to an MRx 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 you enter at the Information Center is sent to the bedside with the exception of the Alternate ID, Patient Group, and Resuscitation Status.

With MX40

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.

With Hospital Information Systems

For patients admitted from a hospital information system, patient information is updated in the **Manage Patient** window automatically. Fields that contain information that came from the hospital information system are unavailable.

How to Admit

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 2-9 for information on discharging patients.

When admitting a patient, it is very important to provide the patient's gender and date of birth for optimum ECG analysis. The height and weight you provide during admit are sent to the bedside for calculations.

Note — The fields that display on the **Manage Patient** window depend on how your system is set up. In addition, your system may be set up so that certain fields are required for admission. If a field is required before you can admit the patient, an asterisk (*) displays next to the field name.

Note — The **Profiles** and **Category** fields are read-only and may be changed in the **Measurements** window. See Chapter 4, "Alarms and Measurements."

Admit a patient to the Information Center by performing the following steps:

1 On the **Patient Window** for the bed to which you want to admit, select the **Manage Patient** button. The **Manage Patient** window displays.

2 Specify a patient to admit by doing one of the following:
   – Type a 1- to 18-character first and last name in the appropriate **Patient Demographics** fields. You can use the **Tab** key to move from field to field.
   – Select the name of a previously admitted or discharged patient or by selecting a patient name from a hospital information system, if available. To select a patient name:

a. Click the **Find Patient** button. The **Find Patient** dialog box displays.

Note — The **Find Patient** button is not available when the current patient has been admitted from the hospital information system or the current patient is in conflict.

b. Enter a full or partial patient name and provide information in any additional available fields as desired.

c. Click the **Search** button. A list of matching patient names displays on the bottom of the dialog box.

d. Highlight the name of the patient.

If you select a patient who is currently on another unit, you will be asked to confirm that you want to transfer the patient into this bed. Any current data stored prior to the transfer into the unit will be removed. It is advised to transfer in as soon as possible to avoid losing any current data. Confirm with the sending unit prior to transferring a patient into a sector to assure they are aware of this action.

If you select a patient who was discharged within the last seven days, you will be asked to confirm that you wish to readmit the patient to this bed. Any current data stored prior to the readmit into the unit will be removed. It is advised to readmit as soon as possible to avoid losing any current data.

If neither of these two conditions exist and you are connected to a hospital information system, you will be asked to confirm the admit of the patient. Current data stored will be updated with the new demographic information.

e. Highlight the name of the patient you wish to admit, then select the **OK** button. If a warning dialog box displays, verify that you would like to readmit or transfer this patient by selecting the **Continue** button.

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) in the **Manage Patient** window.

Note — If you are admitting a patient from a HIS and the patient first or last name is longer than 18 characters, the Information Center will only take the first 18 characters on admit. In addition, when you admit from a HIS, other demographic fields on the **Manage Patient** window are no longer editable.

3 Enter 1- to 16-character demographic information for this patient in the **Patient Demographics** fields. 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**

For patients connected to IntelliVue Patient Monitors, these fields are communicated to the bedside monitor. The Lifetime ID and Encounter ID label must be configured consistently between the Information Center and the IntelliVue Patient Monitor. If not the Information Center Lifetime ID and Encounter ID label will override any local configurations.

Note—If you are admitting a patient from a HIS and the patient demographic data is longer than 16 characters the Information Center will only take the first 16 characters on admit. In addition when you admit from a HIS other demographic fields on the **Manage Patient** window are no longer editable.

4 Select the **Gender** from the drop-down list. If you will be performing 12-Lead captures and you do not specify a gender, the gender defaults to **Male**. The capture will not be re-analyzed.

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 click on the year then use the right and left arrows to scroll to a specific year.

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.

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 rounding, the height or weight value can change by 1 when it converts from one unit of measurement to another.

8 Add or change the monitoring equipment for this patient if desired by:

a. Clicking the **Equipment** field ellipsis (...) button. The **Equipment Management** dialog box displays with a list of available monitoring devices listed on the left and assigned devices listed on the right.

b. Filter the list of devices, if desired, by selecting the **Show** drop-down arrow then highlighting the device type from the list that displays. A list of available devices that match your selection displays.

c. Assign new equipment to this bed, if desired, by selecting desired monitoring device(s) from the **Available** equipment list then clicking the **>** button to assign the device.

d. Unassign a monitoring device(s) assigned to this bed, if desired by selecting the device from the list of **Assigned** equipment list then clicking the **<** button.

e. When finished selecting equipment, click the **OK** button. If you are unassigning a monitoring device(s) confirm your selection by clicking **Yes** on the warning dialog box that displays.

Note —Your system may be set up so that some equipment may be locked to the bed. If monitoring equipment is locked to a bed you will not be able to unassign the equipment. You can still assign additional equipment to the bed, if available, by completing the steps above.

9 Turn paced mode on or off for the patient by clicking the **Paced Mode** drop down arrow then selecting **On** or **Off** on the list that displays. If the patient has a cardiac pacemaker (including demand, fixed, or any type) the **Paced Mode** should be set to **On** indicating that pace pulse detection is on.

Note—If the system's default **Paced Mode** is unconfirmed, a pop-up message asks you to select **On** or **Off**.

Warning

It is important that the patient's paced mode is set properly. If the patient is paced, pace pulse detection must be 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. In addition if the patient has no pacemaker be sure to set pacer detection off to allow the ST/AR algorithm to work most effectively.

Note—For MRx monitors, the pace 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 information on TCPacing and TCP Pause modes at the MRx monitor.

10 If available on your system, change the bed location by:

a. Clicking the **Location** field ellipsis (...) button. The **Change Bed Label** dialog box displays a list of available beds in this unit.

Note —This option allows you to transfer the patient without changing the sector location.

b. Highlight the desired bed.

c. Select the **OK** button.

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

11 Specify the patient's resuscitation status if desired by clicking the drop down arrow next to the **Resuscitation** field then selecting the status from the list that displays. Choices are **Full**, **DNR** (no resuscitation), or **Modified**.

Note —The **Resuscitation** icon  displays in the patient sector and **Patient Window** when the patient's resuscitation status is **DNR**. The icon is outlined in white when the patient's resuscitation status is **Modified**. No icon displays when the resuscitation status is **Full** or if the patient's resuscitation status has not been specified.

12 Assign the patient to a nurse/caregiver by selecting the **Nurse** drop-down arrow then highlighting the nurse/caregiver name from the list that displays. If your system is set up so that the nurse/caregiver assignment is password-protected, the **Nurse** field is visible but not editable. See Chapter 3, "Caregiver Assignments." for information on setting up and assigning caregivers to patients.

13 Assign the patient to a patient group if desired by selecting the **Group** drop-down arrow then highlighting the name of the group from the list that displays. 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.

14 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.

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

Important—With each admission or 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 that **Category** and **Paced Mode** always contain a value, regardless of whether the patient is admitted or not. If you do not specify settings for these fields, default settings are used. 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.

Changing Patient Information

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

With MRx or IntelliVue Patient Monitors

For patients connected to a 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 last entry wins.

With Hospital Information Systems

For patients admitted from a hospital information system, patient information is updated in the **Manage Patient** window automatically as it is received from the system. You cannot change patient demographic information received from the hospital information system. If a field is supplied and not editable it will be grayed out on the **Manage Patient** window.

How to Change Patient Information

Change patient information by performing the following steps:

1 On the **Patient Window** for the bed for which you want to change information, select the **Manage Patient** button.

2 On the **Manage Patient** window change the patient information in the appropriate fields as necessary. For information on specific fields see "Admitting Patients" on page 2-3.

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

Since you can admit, discharge, or transfer patients from either the Information Center, the IntelliVue Patient Monitor, or the MRx monitor (admit and discharge only) a possibility exists 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. In addition, when in the **Manage Patient** application, a Conflict Resolution screen will display on the Information Center where you can resolve the conflict manually.

Warning

- It is important to resolve the conflicts as soon as they are identified. Failure to do so could result in using incorrect or confusing data to make clinical decisions. Certain settings, for example, **Paced Mode** and patient **Category** between the Information Center and the bedside may not match. 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. It is important that the patient **Category** is set correctly so the ECG can be analyzed correctly and initial arrhythmia alarm limits set. 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 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).

How to Resolve Conflicts

To resolve a patient conflict:

1 Click the patient name in the patient sector for the patient in conflict. The **Manage Patient** application displays with the Select Patient window. Up to three sets of patient information can appear in the Select Patient window; one from the Information Center, one from the bedside monitor, or one from the MMS.

2 Resolve the conflict by choosing one of the following:

– **Select Patient**

a. If you are sure the patient settings from the Information Center are correct choose the **Select Patient** button for the Information Center. The Information Center settings are applied to the bedside monitor. Any stored bedside data (including ST/QT baselines) is cleared.

b. If you are sure the patient settings from the bedside monitor or MMS are correct choose the appropriate **Select Patient** button. The bedside or MMS settings are applied to the Information Center. Any stored Information Center data (including ST/QT baselines) is cleared.

▫ **Same Patient**

If you want to merge patient information from the Information Center, the bedside and/or the MMS select the **Same Patient** button. When you choose Same Patient the bedside, MMS and Information Center data is retained. See the table below for details on what happens when you merge the patient information.

▫ **New Patient**

If you want to clear the patient information and stored data at the Information Center and the bedside select the **New Patient** button.

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

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

Same Patient: Conflict Resolution

Conflict with	Then...
First name, last name, medical record number, date of birth, gender or notes	The Information Center's values are used if patient is admitted at Information Center. Otherwise, if the patient is not Information Center admitted, the bedside values are used. If the patient is not admitted at either the Information Center or the bedside but admitted at the MMS/X2 the MMS/X2 values are used.
Height or weight	If the values are not the default values MMS/X2 values are used. If the MMS is not connected and the values are not the defaults then the bedside values are used. The Information Center values are used if either the MMS/X2 values are the defaults.
Patient category	If the MMS/X2 is connected the MMS/X2 patient category is used otherwise the monitor's patient category is always used.
Paced setting	If at least one of the paced settings is set to **Off** and the rest are unconfirmed then the paced setting is set to **Off**. If at least one of the paced settings is set to **On** and the rest are unconfirmed then the paced setting is set to **On**. If the paced setting for all devices is unconfirmed then the paced setting remains unconfirmed unless one device is an MRx monitor in which case the paced setting is set to **On**.
Both the Information Center and the monitor have ST/QT baselines.	The Information Center's baseline is used unless the ECG source is the monitor in which case the monitor's baselines is used.

Discharging a Patient

Discharging from the Information Center removes a patient from the bed and changes their status to discharged. At that point, data storage begins for that bed. For this reason, you should perform a discharge prior to connecting a new patient. This ensures that data from a previous patient is not mixed with the data from the new patient. It also ensures that alarm limits controlled at the Information Center go back to unit settings.

Discharging the patient at the Information Center also discharges the patient from the bedside monitor. All monitor and measurement server settings (including arrhythmia settings) are reset to their defaults.

When you discharge a patient, the Information Center saves the patient data on all admitted patients. The data is still available for review and comparison if you need to readmit the patient soon. The amount of data you can view is based upon the full disclosure option (1, 2, 3, 4, 5, 6 or 7 days) and how long after discharge the data is viewed. Seven days after discharge, stored data is completely purged. Regardless of the full disclosure option 24 hours of data is available for up to six full days.

The table below shows what you would see from point of discharge up to seven days given different full disclosure options.

Option	At Time of Discharge	End of Day 1	End of Day 2	End of Day 3	End of Day 4	End of Day 5	End of *Day 6	End of *Day 7
D01 – 1 day	I day	1 day	1 day	1 day	1 day	1 day	1 day	none
D02 – 2 days	2 days	2 days	2 days	2 days	2 days	2 days	1 day	none
D03 – 3 days	3 days	3 days	3 days	3 days	3 days	2 days	1 day	none
D04 – 4 days	4 days	4 days	4 days	4 days	3 days	2 days	1 day	none
D07 – 7 days	7 days	6 days	5 days	4 days	3 days	2 days	1 day	none

This chart assumes no new monitoring is added. If you readmit the patient, the discharge data is overwritten by new monitoring data as it occurs, as you will only ever see the full disclosure amount of data.

*From discharge time on (for example, noon) on Day 6 until same time on Day 7, the amount of data is dependent on time of view due to purging going on throughout the day. For example, if the patient data is viewed at 8am Day 7, you would see 4 hours of discharge data.

IntelliVue Patient Monitors

With IntelliVue Patient Monitors your monitor may be set up with predefined monitor configurations called profiles. When you discharge a patient the profile is reset to the default profile configured for that monitor. Refer to your bedside documentation for details. When you discharge an admitted patient at the IntelliVue Patient Monitor the Information Center discharges the patient and saves the data.

MRx Monitors

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. For MRx monitors, it is important to discharge the patient before turning the MRx monitor off to avoid data being associated with the wrong patient.

How to Discharge

Discharge a patient by performing the following steps:

1. From the sector for the patient you wish to discharge click the **Manage Patient** button. The **Manage Patient** window displays.
2. Click the **Discharge** button. The **Discharge Patient** dialog box displays.

   For IntelliVue Patient Monitors, if captures are available but not yet exported, a dialog box may display reminding you to export the 12 leads before discharging.
3. Specify whether to clear the sector upon discharge by selecting the **Clear Sector** check box. **Clear Sector** is selected when a check mark displays in the check box.

   Note —Depending on your unit practices you may want to clear this check box so the sector is not cleared and the equipment remains assigned to the sector. Clear sector is not available for beds that are locked to a sector.

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

Your system may be set up so that one or more of the following occurs upon discharge:

- A patient summary report prints.
- Equipment assigned to the bed is cleared.
- Caregiver assignments are removed.
- The patient sector automatically minimizes.
- Equipment is automatically put into Standby.

Transferring Patient Data 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 2-19.

How to Transfer

Transfer data for a patient by performing the following steps:

1 From the sector for the patient you wish to transfer click the **Manage Patient** button. The **Manage Patient** window displays.

2 Click the **Transfer** button. The **Transfer Patient** dialog box displays with a list of available beds in the unit.

3 Specify whether to transfer this patient to another bed within this unit by selecting the bed from the list of beds in your unit or specify whether to transfer to a bed in another unit by clicking the unit name then selecting a bed from the list that displays.

4 Specify whether or not to clear the current sector upon transfer by clicking the **Clear Sector** check box. **Clear Sector** is selected when a check mark displays in the check box. The check box is not available if the bed is locked to the sector.

5 Click the **OK** button. The **Transfer Patient** warning box displays.

6 Confirm the transfer by clicking the **Transfer** button.

After Transfer

What happens with the patient's monitoring equipment upon transfer depends on whether the monitoring equipment is locked to the bed or not. If the patient's current equipment is locked to the bed then the equipment remains with the bed upon patient transfer.

If the patient's current equipment is not locked to the bed the equipment is transferred with the patient to the new bed if configured to do so. Monitoring equipment can be shared among units if those units belong to a device pool. Device pools allow you to share monitoring equipment across Information Center units.

After transfer the patient name is removed from the previous sector and the patient's DNR status is set to the unit defaults if the transfer is to another unit.

Depending on how your system is set up the following occurs after transfer:

- A patient summary report prints.
- Equipment locked to the previous sector returns to unit default settings.

- Caregiver assignments (not locked) are removed if configured.

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 location of the bed label in the patient sector displays in parentheses. You can hover over the bed label to see the temporary location.

How to Use Transport/Standby

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

1. From the sector for the patient you wish to transfer click the **Manage Patient** button. The **Manage Patient** window displays.
2. Click 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 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 TRx transceivers and MX40 Wearable monitors 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 min**, **20 min**, **30 min**, **1 h**, **2 h**, **3 h**, **4 h**, 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** window 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. Click the **OK** button. A white technical alarm will show in the sector indicating the equipment is in Standby. Hovering over the technical alarm displays a drop down list where you can see the amount of time the device has been in standby.

   Note —Hovering over the bed label in the patient's sector displays the patient's temporary location.
7. When the patient returns to the unit click the **Resume** button in the **Manage Patient** window to resume monitoring. If all the equipment is in standby you can also click in the patient sector to resume monitoring.

TRx Transceivers and MX40 Wearable Monitors

If the standby period has expired when the patient returns to the unit, monitoring will resume automatically. Press the **Check** or **Main Screen** button on the telemetry device to verify the resumption of monitoring

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

Equipment Management

Use the **Equipment Management** window to add or remove a patient's monitoring equipment. Your system may be set up so that some equipment may be 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.

You can assign up to four pieces of equipment to a patient. The following limits apply:

- One wired or wireless bedside monitor
- One transport bedside monitor
- One IntelliVue X2
- One transport IntelliVue X2
- One telemetry device (Philips IntelliVue MX40 Wearable monitor or Philips IntelliVue TRx Transceiver)
- Two IntelliBridge Hub devices
- Four IntelliBridge LAN devices

How to Add or Remove Monitoring Equipment

Add or remove monitoring equipment by performing the following steps:

1. Click the bed label from the appropriate patient sector. The **Equipment Management** dialog box displays with a list of available monitoring devices listed on the left and assigned devices listed on the right. The listed equipment displays with equipment label and an icon indicating equipment type, for example, telemetry device or bedside monitor. The assigned equipment also displays an icon with battery gauge (if appropriate) and an indication of whether the equipment is locked to the bed label.
2. Filter the list of devices, if desired, by clicking the **Show:** drop-down arrow then highlighting the device type from the list that displays. A list of available devices that match your selection displays on the left.
3. Assign new equipment to this bed, if desired, by selecting the device from the **Available** equipment list, and then clicking the **>** button.
4. Unassign a monitoring device, if desired, by selecting the device from the **Assigned** equipment list, and then clicking the **<** button.
5. When you are finished selecting equipment, click the **OK** button. If you are unassigning a monitoring device, confirm your selection by clicking **Yes** on the warning dialog box that displays.

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 that Patient Category and Paced Mode always contain a value, regardless of whether the patient is admitted or not. If you do not specify settings for these fields, default settings are used.

Device Controls and Settings

The sections that follow describe how the various controls and settings operate when more than one monitoring device is assigned to a bed.

ECG Controls

If ECG source is the bedside monitor, and then the ECG source changes to telemetry, the Information Center will take the monitor settings. If later the patient is disconnected from the telemetry device, and reconnected to the monitor again any changes in the settings made in the meantime are passed on to the monitor. In this way, settings continuity is preserved when the ECG source changes.

If the ECG was invalid for the previous minute and the ECG source changes from telemetry to the IntelliVue Patient Monitor, the IntelliVue Patient Monitor displays the message "To synchronize settings with other device, select confirm." Select **Confirm** to synchronize the settings. If you select **Cancel** the settings are not synchronized and the IntelliVue Patient Monitor will continue to use its own settings.

Parameter/Wave Behavior

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

- Telemetry parameters are labeled as HR, SpO2T, PulseT.
  Bedside parameters 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 parameters and waveforms (for example, SpO2, SpO2T, Pulse, PulseT, Pleth, and PlethT) and non-overlapping parameters 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 parameters.
- The Other Device window 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 upon the current ECG source and displayed, recorded, stored and reflected in overview (as appropriate) by the Information Center.
- Alarm recordings at the Information Center use the primary and alarming waveforms if available otherwise it uses the primary and secondary waveform.

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

Alarm 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 Information Center telemetry settings.

The following settings are synchronized:

Alarm Setting	Synchronization
Heart Rate	HR/Pulse Alarm On/Off, Heart Rate High/Low Limit
ECG	Primary Lead, Secondary Lead, Va Lead, Vb Lead
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 Pace 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 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
Hexad	Reconstruction Mode

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

Control Behavior

The table below indicates how controls work when more than one monitoring device is assigned to a bed. All controls are integrated unless noted where:

- **X** indicates Information Center control.
- **Both** indicates integrated controls and assumes remote controls are enabled at the bedside.
- **Independent** indicates controls available at each device but are not integrated.

Note —For MRx monitors, arrhythmia monitoring is done at the bedside monitor. All alarm settings are controlled at the monitor. See your MRx monitor Instructions for Use for information.

Information Center	TRx Transceiver	MX40 Wearable monitor	Wired or 802.11 Bedside	Wireless IntelliVue Telemetry System Bedside
Arrhythmia Alarms On/Off	X	X	Both	At device only
Arrhythmia Analysis Mode	X	X	Both	At device only
Central Reports	X	Both	Both	Both
ECG Measurement On/Off	N/A	At device only	Both	At device only
ECG HR Alarm On/Off	N/A	X	At device only	At device only
ECG HR Limits	X	X	Both	Both
ECG Lead Placement Selection	At device only	At device only	At device only	At device only
ECG Lead Selection	X	X (and at local device)	Both	At device only
ECG Gain Selection	X	Independent	Independent	At device only
ECG Filter Selection	X	X	Independent	At device only
Find Equipment	X	X	N/A	N/A
NBP: Alarm Limits	X	X	Both	At device only
NBP: Alarm Selection	X	X	Both	At device only
NBP: Start/Stop	X	Both	Both	Both
NBP: Stat	X	Both	Both	Both
NBP: Stop All	X	Both	Both	Both

Information Center	TRx Transceiver	MX40 Wearable monitor	Wired or 802.11 Bedside	Wireless IntelliVue Telemetry System Bedside
Pause Alarms	X Available at device if remote suspend is enabled.	X Available at device if remote suspend is enabled.	Both if remote controls enabled at bedside	At device only
QT Alarms On/Off, and Limits	X	X	Both	At device only
QT Analysis On/Off	X	X	At device only	At device only
QT Lead Selection	X	X	At device only	At device only
QT Set Baseline	X	X	At device only, but viewable at the Information Center	At device only
Recording: Continuous (Start/Stop)	X	X	Both	N/A
Recording: Delayed (Start)	X Available at the device if Telemetry button configured	Both	Both	Both
Relearn Arrhy	X	Both	Both	At device only
Resp Measurement On/Off	N/A	X	At device only	At device only
Resp Alarm On/Off	N/A	X	Both	At device only
Resp Alarm Limit	N/A	X	Both	At device only
Resp Apnea time	N/A	X	Both	At device only
Resp Wave On/Off	N/A	X (and local at device)	Device	At device only
Silence	X	Both	Both	Both
SpO2: Alarm Limit	X	X	Both	At device only
SpO2: Alarm On/Off	X	X	Both	At device only

Information Center	TRx Transceiver	MX40 Wearable monitor	Wired or 802.11 Bedside	Wireless IntelliVue Telemetry System Bedside
SpO2: Enable	X	X	At device only	At device only
SpO2: Enable Pulse	X	Independent	At device only	At device only
SpO2: Mode Selection	X	Both	N/A	N/A
SpO2: Pleth Wave On/Off	X	Display of the pleth wave from device is independently controlled at both the device and the Information Center. To see the pleth wave on the Information Center, change a wave in Telemetry Setup to Pleth.	At device only	At device only
SpO2: Repetition Time	N/A	X	N/A	N/A
SpO2: Manual Measurement	X	Both	N/A	N/A
ST Alarms Limit	X	X	Both	At device only
ST Analysis On/Off	X	X	At device only	At device only
ST ISO Point, J Point Offset from RWave Peak, and ST Measurement Offset from J Point	X	X	At device only	At device only
ST Update Baseline	X	X	Both	At device only
Standby	X	Both	Both	Both
Standby Duration	X	Independent	N/A	N/A
Resume Monitoring	Both	Both	Both	Both
Telemetry Button	X	X	N/A	N/A
Mute	X	N/A	N/A	N/A

Information Center	TRx Transceiver	MX40 Wearable monitor	Wired or 802.11 Bedside	Wireless IntelliVue Telemetry System Bedside
Volume at Device	X	N/A	N/A	N/A

Assigning a Bed to a Sector

The Information Center allows you to assign a bed and/or equipment to an empty sector for primary monitoring or overview monitoring.

If the sector is empty

Clicking the **Manage Patient** button brings you directly to the **Sector Assignment** window where you can assign a bed for primary or overview monitoring. See "Assigning an Overview Bed to a Sector" on page 2-20 for information on assigning an overview bed.

If there is a bed and equipment assigned

You must first clear the sector. See "Clearing (Unassigning) a Sector" on page 2-21. Then, you can use the **Sector Assignment** window to assign the bed/equipment.

With Device Pooling

In general, monitoring devices are associated with a clinical unit. This association allows ownership of the devices to be maintained by that unit. Devices can only be shared among units if those units belong to the same device pool. Device pools allow 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.

How to Assign Bed/Equipment to a Sector

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

1. Click the **Manage Patient** in the sector to which you wish to assign a bed/equipment. The **Sector Assignment** window displays with a list of beds available for assignment in your unit name on the left.
2. Select the bed you want to assign to the sector by highlighting the bed name. Be sure to select the correct bed label.
3. Select the equipment to assign to this bed, if desired, by selecting the equipment from the **Available** equipment list then clicking the **>** button.

   Note —You can filter the list of devices, if desired, by clicking the **Show:** drop-down arrow then highlighting the device type from the list that displays. A list of available devices that match your selection displays. Only equipment not currently assigned to a sector is available. If the desired equipment is not on the available list, the equipment needs to removed from the prior sector assignment. Use the **Locate Equipment** application to find the location of the desired equipment.
4. Click the **OK** button to confirm your selection. The Information Center assigns the bed/equipment to the sector.

Assigning an Overview Bed to a Sector

The Information Center allows you to overview patients that are currently being monitored by another connected Information Center (the primary Information Center). Sectors that do not currently have a bed or equipment assigned are available for overview. If the sector already has an overview bed, you must clear the sector before assigning another bed to overview. See "Clearing (Unassigning) a Sector" on page 2-21.

Note — Clear sector is not available for overview beds that are locked to a sector.

Overview Bed Controls

The controls available when viewing an overview bed depend upon how your system is configured and whether you have Read-Only or Full Control access. Read-Only access means you can view the patient data but cannot make any changes. Full Control access means you can view the patient data and make changes.

Each networked Information Center can be configured to specify the following types of access control of beds monitored by another Information Center:

- Full Control (read-write) access — You can view patient data and change measurement controls (such as alarm limits).
- You can clear the sector of the primary monitoring station using the Display Setup feature. For more information, see "Display Setup" on page 11-6.
  - Functions that affect the Information Center as a whole, rather than a specific bed, such as volume control are accessible for the local Information Center only.
- Read-Only access — You can view patient data, but you cannot change measurement controls, admit, discharge, or transfer a patient, or manage equipment.
- No access

Full Control if Multiple Viewers

Since more than one Information Center can have access to a bed at the same time, there may be situations when two or more clinicians are viewing information for the same patient at the same time. If multiple clinicians have full control access to the same patient, then, in general, the last operation wins.

How to Assign an Overview Bed

Note—The following procedure describes how to assign an overview bed in the **Manage Patient Sector Assignment** window. For information on assigning beds to a sector using **Display Setup**, see "Display Setup" on page 11-6

To assign a sector to a bed currently being monitored by another connected Information Center perform the following steps:

1. Access the **Sector Assignment** window by clicking the **Manage Patient** button in the sector to which you wish to assign an overview bed. The **Sector Assignment** window displays with a list of units for which you have access listed on the left.
2. Select the unit that contains the bed you want by clicking the desired unit name. A list of assigned beds in this unit displays beneath the unit name on the left side of the window. The Overview icon  displays next to the bed names to identify them as beds available for overview.

3 Select the bed you want to overview by clicking the bed name from the list.

4 Click the **OK** button to confirm your selection. The Information Center assigns the bed to the sector for overview.
Note —Selecting the **Cancel** button cancels your changes and removes the **Sector Assignment** window.

Clearing (Unassigning) a Sector

Clearing a sector removes the bed/equipment that is currently displayed in the sector and returns equipment to its default settings. If a patient is admitted to the bed, you must discharge the patient before clearing the sector. See "Discharging a Patient" on page 2-9.

Note—If the sector is only for overview, clearing that sector only clears that sector; it does not discharge the patient from the primary monitoring or clear the primary monitoring sector.

When the sector is empty, you can:

- Assign a new bed/equipment to monitor a bed.
- Overview a bed being monitored by another connected Information Center.

For IntelliVue Patient Monitors, when you clear the sector the bed will no longer be available for overview at other bedsides. See your user documentation for information on using overview at the IntelliVue Patient Monitor.

How to Clear a Sector

Clear a sector by performing the following steps:

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

2 Click the **Clear Sector** button.

3 On the confirmation box that displays click the **Continue** button. The Information Center clears the bed/equipment assignment from this sector, clears all retrospective data for the bed and resets equipment to its default settings.

Warning

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.

Note—Selecting the **Cancel** button keeps the sector assignment in its initial condition.

Holter Export

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 Physiologic Server is in local mode, the message **Unexpected Failure** displays briefly in the Export popup window. Contact service personnel.

Exporting ECG Data to a Philips Holter System

To export ECG data to a Philips Holter system:

1. From the sector for the patient you want to export, click the **Manage Patient** button. The **Manage Patient** window displays.
2. Click 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 in order to retrieve Holter Export job status information, no status information is available.
6. Click the **Export** button.

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

3

Caregiver Assignments

The **Caregiver Assignments** application is always available for bed-to-bed overview with bedside monitors, and may be available for paging assignments. **Caregiver Assignments** is a role-based application. Caregivers can be assigned roles based on their job function such as charge nurse, nurse, or care tech. Roles are setup during system configuration. These roles are configured to receive certain types of alarms, either through a paging device or, if using IntelliVue Patient Monitors, through the Care Group Overview Status bar at the bedside (see your bedside user documentation for details). For example, the **Nurse** role may be setup to receive red and yellow alarms while the **Care Tech** role may be setup to receive INOP alarms. Your hospital designated roles are then assigned to specific clinicians or caregivers.

If needed, you can assign caregivers a color, a paging device and an overview prompt tone. When the caregiver is assigned to a bed/patient the color appears next to the bed label on the Information Center. This allows a caregiver to quickly identify (by color) beds for which they are responsible. For IntelliVue Patient Monitors, when a caregiver is assigned an overview prompt tone, a tone will be audible at the bedside 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.

Use the **Caregiver Assignments** application to:

- Set up caregivers including assigning the caregiver color, a paging device, an overview prompt tone and lock assignment. See “Caregiver Setup” on page 3-2.
- Assign caregivers to beds/patients. See “Assigning Caregivers to Patients/Beds” on page 3-3.
- If paging is available, assign a caregiver to all beds in a unit. See “Assigning Caregivers to Units” on page 3-3.
- Clear caregiver/bed assignments. See “Clearing Caregiver Assignments” on page 3-4.
- Delegate a current caregiver’s bed assignments to another caregiver. See “Caregiver Delegation” on page 3-5.
- Assign a charge nurse for the unit. See “Assigning a Charge Nurse” on page 3-5.
- For systems with the paging option available, manually send a page to a caregiver’s paging device. See “Sending a Text Message” on page 3-6.

Caregiver Setup

The **Caregiver Setup** dialog box allows you to setup caregivers by assigning them a color, a paging device (if available) and, for caregivers assigned the **Overview** role, specifying whether a prompt tone will sound at the bedside when beds assigned to the caregiver have an alarm condition.

To set up caregivers:

1 Access the **Caregiver Assignments** application by doing one of the following:
   – Click the **Caregiver** icon in the top caption bar of the Main Screen.
   – From an application window, click the **Manage Unit** button then select **Caregiver Assignments** from the list.

   The **Caregiver Assignments** window displays a list of currently defined caregivers for this unit on the left side of the window and a list of all beds in the unit on the right side.

2 Click the **Setup:** button. The **Caregiver Setup** dialog box displays.

3 Select the name of the caregiver you wish to set up by clicking the **Caregiver:** drop down arrow then selecting the caregiver name from the list that displays.

4 For systems with the paging option available, assign a paging device to the caregiver, if desired, by clicking the **Paging Device:** drop down arrow then selecting the device from the list that displays.

   Note — If you select a device previously assigned to another caregiver a dialog box displays asking you to confirm removing the device from the previous caregiver and assigning it to this caregiver. Click **OK** to confirm, if appropriate.

5 Assign a color to the caregiver, if desired, by clicking the **Nurse Color:** drop down arrow then selecting a color from the list that displays. The color you assign will appear next to the bed label on the Information Center for patients assigned to this caregiver.

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

6 For IntelliVue Patient Monitor bedsides, specify whether a prompt tone will be audible at the bedside when beds assigned to this caregiver have an alarm condition by selecting the **Prompt Tone** check box. If you do not select **Prompt Tone**, no tone will be audible at the bedside when beds assigned to this caregiver have an alarm condition. **Prompt Tone** is selected when a check mark displays in the check box. The prompt tone will occur for all of the bedsides that are assigned to the same caregiver.

7 Select the **Locked Assignment** check box to lock the caregiver color, paging device and bed assignments to this caregiver. **Locked Assignment** is selected when a check mark displays in the check box.

   Note —When 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 still 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 Click the **Apply** button to save your selections. If your system is password protected, enter a user name and password if prompted to do so then click **OK**.

9 Setup additional caregivers, if desired, by repeating Steps 3 through 8.

Assigning Caregivers to Patients/Beds

To assign caregivers to patients:

1 Access the **Caregiver Assignments** application by doing one of the following:
   – Click the **Caregiver** icon in the top caption bar of the Main Screen.
   – From an application window, click the **Manage Unit** button then select **Caregiver Assignments** from the list.

   The **Caregiver Assignments** window displays a list of currently defined caregivers for this unit on the left side of the window and a list of all beds in the unit on the right side.

2 Select the caregiver to which you wish to assign patients by clicking on the caregiver name on the left side of the window.

3 In the appropriate caregiver column (for example, **Nurse** or **Care Tech**) on the right side of the window click in the box next to the patient name to assign the caregiver to that patient. 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. Assigning a caregiver to a bed that was previously delegated to him/her results in all previously delegated beds to return to his/her care. See "Caregiver Delegation" on page 3-5.

4 Assign additional patients to this caregiver, if desired, by repeating Step 3.

5 When you are done assigning caregivers to patients click the **Apply** button to save your selections. If your system is password protected, enter a user name and password if prompted to do so then click **OK**.

Beds assigned to a caregiver remain with that caregiver across 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.

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 just assigning a particular bed but rather all the beds in the unit to one caregiver.

Note —Only caregivers given the unit role during User Management configuration are available for unit assignment.

To assign a caregiver to a unit:

1 From an application window, access the **Caregiver Assignments** application by clicking the **Manage Unit** button then selecting **Caregiver Assignments** from the list that displays.

2 Select the caregiver to which you wish to assign to the unit by clicking on the caregiver name in the **Caregivers** list on the left side of the window.

3 Assign the caregiver to the unit by clicking in the **Unit Assignment** list on the right side of the window.

To unassign a caregiver from a unit:

1 Select the caregiver from the **Caregivers** list on the left side of the window.

2 Unassign the caregiver from the unit by clicking the caregiver name on the **Unit Assignment** list on the right side of the window.

Clearing Caregiver Assignments

The **Caregiver Assignments** window allows you to clear specific caregiver assignments or clear all caregiver assignments for all beds in the unit at once with the exception of those caregivers with locked assignments (see "Caregiver Setup" on page 3-2). If a caregiver is setup with locked assignments and has delegated their patients to another caregiver, clearing all assignments does not clear the delegation. If a caregiver is assigned to multiple units clearing all assignment removes the caregiver assignments across the units.

To clear all caregiver assignments:

1. From an application window, access the **Caregiver Assignments** application by clicking the **Manage Unit** button then selecting **Caregiver Assignments** from the list that displays. The **Caregiver Assignments** window displays.
2. Click the **Clear Assignments** button.
   Note —The **Clear Assignments** button does not clear charge nurse assignments.
3. Click the **Apply** button. If your system is password protected, enter a user name and password if prompted to do so then click **OK**.

What happens when you select the **Clear Assignments** button depends on whether your system alarm notification setting is set up as **Bed Only** or **All**. If your system is set up as **Bed Only**, selecting the **Clear Assignments** button removes all caregiver bed assignments and color assignments in the unit with the exception of caregivers that have locked assignments. If your system is set up as **All**, selecting the **Clear Assignments** button removes all caregiver bed assignments, color assignments and paging assignments in the unit.

To clear specific caregiver assignments:

1. From an application window, access the **Caregiver Assignments** application by clicking the **Manage Unit** button then selecting **Caregiver Assignments** from the list that displays. The **Caregiver Assignments** window displays.
2. Select the caregiver for whom you wish to clear a patient(s) assignment from the caregiver list on the left side of the window.
3. In the appropriate caregiver role column (for example, **Nurse** or **Care Tech**) on the right side of the window click in the box for the desired bed to clear the caregiver/patient assignment.
4. Clear other caregiver assignments, if desired, by repeating steps 2 and 3.
5. When you are done clearing caregiver assignments click the **Apply** button to save your changes. If your system is password protected, enter a user name and password if prompted to do so then click **OK**.

Caregiver Delegation

It may be necessary to temporarily assign your patients to a different caregiver, so they can receive your patients' alarms while you are off the unit. The **Caregiver Assignments** application allows you to delegate the beds currently assigned to you to another caregiver.

To delegate your caregiver bed assignments:

1 From an application window, access the **Caregiver Assignments** application by clicking the **Manage Unit** button then selecting **Caregiver Assignments** from the list that displays. The **Caregiver Assignments** window displays with a list of caregivers that match the current caregiver's role and who do not already have delegated patients assigned to them.

2 Select the caregiver for whom you wish to delegate assignments from the caregiver list on the left side of the **Caregiver Assignments** window.

3 Click the **Delegation** button. The **Delegation** dialog box displays with a list of available caregivers who have the same role and who have not previously delegated their patients.

4 Select a caregiver to which to assign your beds from the **Available Delegates** list on the left.

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

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

To end a delegation:

When appropriate it is important to end delegation so that alarm notifications go back to the original caregiver. You can end the delegation and return all bed assignments to the primary caregiver at any time by clicking on one of the delegated assignments on the right side of the **Caregiver Assignments** window or by clicking **End Delegation** from the **Delegation** dialog box.

Assigning a Charge Nurse

For systems with the paging option available and where the unit is set up to Use Local 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 From an application window, access the **Caregiver Assignments** application by clicking the **Manage Unit** button then selecting **Caregiver Assignments** from the list that displays. The **Caregiver Assignments** window displays.

2 Specify a charge nurse by clicking the **Charge Nurse:** drop down arrow then selecting a name from the list that displays.

Note — Only caregivers that have been assigned to the **Charge Nurse:** role are available for selection.

3 Click the **Apply** button to save your selection. If your system is password protected, enter a user name and password if prompted to do so then click **OK**.

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

Sending a Text Message

For systems with the paging option available, the **Caregiver Assignments** application allows you to send a manual page to one or more caregiver's paging device. The page you send can include a text message you provide, if desired, and/or it can be an automated message that goes out to one or more caregiver's paging device indicating the caregiver's current bed and alarm notification assignments. For example, a unit charge nurse, at the beginning of a shift, may want to send a message to each of the caregivers (nurse, care technician, and so on) in the unit indicating the beds to which they are assigned along with the alarm levels (red, yellow, INOP) for which they are setup to receive pages.

To send a manual page:

1. From an application window, access the **Caregiver Assignments** application by clicking the **Manage Unit** button then selecting **Caregiver Assignments** from the list that displays. The **Caregiver Assignments** window displays.
2. Click the **Paging...** button. The **Manual Page** dialog box displays.
3. Select the caregiver(s) to which to send a message by clicking in the check box next to the caregiver's name on the left side of the dialog box. A caregiver is selected when a check mark displays in the box. Alternatively you can select to send a message to all caregivers by placing a check mark in the **Select All** check box.
4. Enter a text message, if desired, by clicking inside the text box on the right side of the dialog box and typing a 1- to 250-character message.
5. Select the **Page Bed Assignments** check box if you would like to send an automated page indicating the caregiver(s) bed and alarm severity assignments.
6. When you are done entering text select the **OK** button to send the message to the selected caregiver's paging devices.

4

Alarms and Measurements

This section describes the alarms detected by the Information Center as well as the adjustments you can make to alarms and measurements.

Overview

All alarm conditions generated by the Information Center for telemetry patients have default settings (limits and on/off status) that are configured for a unit (see Chapter 12, "Information Center Configuration"). In addition, you can adjust alarm settings to accommodate the clinical condition of the individual patient.

Warning

- 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 Wearable monitor, arrhythmia monitoring is provided by the bedside monitor or MX40. 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 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 Wearable monitor. See your IntelliVue Patient Monitor or MX40 user documentation for information on arrhythmia monitoring.

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.

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.

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.

Alarm Indicators

The Information Center indicates alarm conditions by using the following signals:

- The patient sector turns blue (except for soft INOPs/technical alarms).
- An alarm message displays in the patient sector and in the **Patient Window**.
  - For rate alarm conditions, the message indicates which parameter is in alarm. Depending on how the system is configured, the message displays in enhanced or standard text format. For more information, see "Alarm Message Formats" on page 4-5.
  - For event alarm conditions, the message indicates the event that caused the alarm (for example, Asystole).
- An alarm tone sounds that indicates the alarm type.

  Note—There is no sound for soft INOPs/technical alarms.

All active alarms for bedside monitors are annunciated at both the bedside and at the Information Center.

All active alarms for MX40 Wearable monitors are visually displayed on the MX40 if the screen is on, and can be heard if the MX40 is in monitor mode. Additionally all active alarms for MX40 devices are annunciated at the Information Center.

All alarms for TRx Transceiver monitored beds are only annunciated at the Information Center.

Alarm Levels and Priorities

There are three levels of alarm conditions:

- Red
- Yellow
- INOP (technical alarm)

The Information Center indicates the level of the alarm by:

- The alarm sound.

  Note— Depending on how your system is setup the alarm sounds can be configured for either Traditional/CareNET or IEC/ISO standard alarm sounds. See the table below.
- The number of asterisks (*) or, for technical alarms (INOPs), the number of exclamation marks (!) in the alarm message. Red INOPs are marked with three (!!!) exclamation marks; yellow INOPs are marked with two (!!) exclamation marks.
- The color of the message. In addition your system may be set so that the alarm message flashes for red and yellow alarms.

The table below lists the levels of alarms in order of priority.

Alarm Level	Sound	Message	Meaning
Red (***)	*Traditional CareNet:* Continuous high-pitch rapid tone *IEC ISO:* Repeated bursts of five rapid high-pitch beeps	*** next to the alarm message	Life threatening, for example, Asystole
Red (!!!) technical alarm	*Traditional CareNet:* Continuous high-pitch rapid tone *IEC ISO*: Repeated bursts of five rapid high-pitch beeps	!!! next to the alarm message	Red technical alarm detected
Yellow (**)	*Traditional CareNet:* Continuous medium-pitch tone *IEC ISO:* Repeated bursts of three rapid low-pitch beeps	** next to the alarm message	Non-arrhythmia alarm limit violation *Note*—This may apply to arrhythmia HR alarms if your system is set up for yellow HR alarms.
Yellow (*) Nurse Call (Telemetry) (short yellow)	*Traditional CareNet:* Noncontinuous medium-pitch tone (for several seconds) *IEC ISO:* Two rapid low-pitch beeps	* next to the alarm message	The telemetry button on the telemetry device has been pressed (and the system is configured to alarm and the telemetry button is on).
Yellow (!!) technical alarms	*Traditional CareNet:* Continuous medium-pitch tone *IEC ISO:* Repeated bursts of three rapid low-pitch beeps	!! next to the alarm message	Yellow technical alarm detected
Yellow (*) Arrhythmia (short yellow)	*Traditional CareNet:* Noncontinuous medium-pitch tone (for several seconds) *IEC ISO:* Two rapid low-pitch beeps	* next to the alarm message	Arrhythmia yellow alarm detected

Alarm Level	Sound	Message	Meaning
Hard INOP/Technical Alarm (inoperative condition)	*Traditional CareNet:* Continuous slow low-pitch tone *IEC ISO:* Repeated bursts of two slow low-pitch beeps	No exclamation marks appear next to the message	Inoperative condition that prevents monitoring, for example, Leads Off
Soft INOP/Technical Alarm (inoperative condition)	none	No asterisks or exclamation marks appear next to the message	Inoperative condition which prevents the system from processing signals properly, for example, Noisy ECG. Monitoring usually continues during this condition.
High Severity INOP	*Traditional CareNet*: Continuous slow low-pitch tone *IEC ISO*: Repeated bursts of two slow low-pitch beeps	No asterisks appear next to the message !!! appears next to Red INOP message !! appears next to Yellow INOP message	Life threatening INOP. For example: NPB Cuff Overpressure.

Active Alarm Sound

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 will annunciate.
- 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 will annunciate.
- 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 will annunciate.
- 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 silenced in a sector the next highest alarm will annunciate.

Alarm Messages

There are three alarm condition message areas in the patient sector and the **Patient Window**: one area for red level alarm messages, one area for yellow level alarm messages, and one area for INOPs/technical alarms. If you place the cursor over the alarm condition message, the message displays with the time of the alarm or INOP/technical alarm condition.

If there is more than one alarm or INOP/technical alarm condition present the alarm messages rotate automatically. If an arrow displays next to the alarm message, you can click the arrow to display a list of the active alarm condition messages (with times indicated), the oldest alarm condition appearing first. 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.

Note— The highest priority alarm is always shown in the alarm conditions message area. Up to 10 current alarm conditions are shown in the pull-down list. If more alarms are active, then some will not be shown in the list. A review of all active bedside alarms is available at the bedside. See your bedside documentation.

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 pull-down list. Selecting an alarm from the list displays the Fast Alarm Review window where you can view the alarm wave and take immediate action on the alarm if necessary. See "Fast Alarm Review" on page 9-14.

- Red arrhythmia alarms have the highest priority.
- If there is a red alarm condition, and a new red alarm occurs, the new alarm message replaces the old.
- If there is a yellow alarm condition, and a new yellow alarm condition occurs, the new alarm condition message replaces the old.
- 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.
- If there is a yellow arrhythmia alarm condition, the message displays for at least 3 minutes unless silenced regardless of whether the alarm condition persists or not. If silenced 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 silenced or not. See "How to Silence an Alarm" on page 4-28 for information on yellow alarm behavior and silencing alarms.

Warning

If alarm annunciation is silenced and alarm reminders are configured off, the alarm condition message will persist but there will be 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 format display just the text, for example ****SpO2 Low**. Enhanced format alarm messages include the numeric value and alarm limit for the parameter. For example, in the message ****SpO2 xxx < yyy**, xxx is the value and yyy is the alarm limit.

Alarm messages from MRx and IntelliVue Telemetry System bedside devices always display in standard format at the Information Center. Messages from IntelliVue Telemetry System wireless devices display in enhanced 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 format messages and the bedside sends standard format messages, the Information Center displays enhanced format messages.

Physiological Alarm Messages

The following table lists the physiological alarm messages and provides a description of each alarm. Some alarms show both enhanced and standard text formats.

Note—For Arrhythmia alarms the messages that display depend on whether you have basic or enhanced arrhythmia. See "Levels of Arrhythmia Analysis" on page 6-2.

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	Level	Description
*** Apnea	Red	Respiration has stopped for longer than the preset apnea time.
*** Asystole	Red	No beat detected for a period > the asystole threshold (2.5-4.0 seconds).
*** Vent-Fib/Tach	Red	Fibrillatory wave (sinusoidal wave between 2-10 Hz) for 4 consecutive seconds.
*** VTach	Red	A run of consecutive beats labeled as V with run length ≥ V-Tach Run limit **and** ventricular HR > V-Tach HR limit.
***Extreme Tachy ***xTachy xxx > yyy	Red	Heart rate > the extreme tachycardia alarm limit. xxx denotes the highest measured value; yyy is the tachycardia limit.
***Brady (Pulse) ***Brady/P xxx< yyy	Red	Only available on bedside monitors. Heart rate from the Pulse signal has fallen below the bradycardia limit. xxx denotes the lowest measured value; yyy is the bradycardia limit.
***Extreme Brady ***xBrady xxx < yyy	Red	Heart rate < the extreme bradycardia alarm limit. xxx denotes the lowest measured value; yyy is the extreme bradycardia limit.
***Desat	Red	The SpO2 value has fallen below the desaturation alarm limit.
**Multi ST Lx, Ly	Yellow	Two ST leads (Lx and Ly) exceed alarm limit elevation or depression for > 60 seconds.
**NBP High	Yellow	The measured NBP value is above the high alarm limit.
**NBP Low	Yellow	The measured NBP value is below the low alarm limit.

Message	Level	Description
**NBPs T xx > yy	Yellow	NBP Systolic value (xx) is greater than the upper NBP Systolic limit (yy).
**NBPs T xx < yy	Yellow	NBP Systolic value (xx) is less than the lower NBP Systolic limit (yy).
**NBPd T xx > yy	Yellow	NBP Diastolic value (xx) is greater than the upper NBP Diastolic limit (yy).
**NBPd T xx < yy	Yellow	NBP Diastolic value (xx) is less than the lower NBP Diastolic limit (yy).
**NBPm T xx > yy	Yellow	NBP Mean value (xx) is greater than the upper NBP Mean limit (yy).
**NBPm T xx < yy	Yellow	NBP Mean value (xx) is less than the lower NBP Mean limit (yy).
**RR High	Yellow	The respiration rate has exceeded the high alarm limit.
**RR Low	Yellow	The respiration rate has dropped below the low alarm limit.
**ST <n> Low **ST <n> xxxx < yyyy	Yellow	The ST depression in lead <n> is lower than the limit (yyyy). Lead is not contiguous with any other lead.
**ST <n> High **ST <n> xxxx > yyyy	Yellow	The ST elevation in lead <n> is higher than the limit (yyyy). Lead is not contiguous with any other lead.
**ST Multi <n>, <n>	Yellow	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.
**STE <n>, <n>	Yellow	Two contiguous leads <n> and <n> are above their respective STE limits.
**QTc High **QTc xxx > yyy	Yellow	QTc value has exceeded the QTc high limit for > 5 minutes.
**ΔQTc High **ΔQTc xxx > yyy	Yellow	ΔQTc value has exceeded the ΔQTc high limit for > 5 minutes.
* Non-Sustain VT	Yellow	A run of consecutive beats labeled as V with run length < the V-Tach Run Limit **and** ventricular HR > the V-Tach HR limit.
* Run PVCs	Yellow	A run of > 2 consecutive beats labeled as V with run length < Vent rhythm run limit **and** ventricular HR ≤ V-Tach HR limit.

Message	Level	Description
* Pair PVCs	Yellow	Two consecutive PVCs between non-PVCs.
* Pause	Yellow	No QRS detected for a period > the pause alarm threshold (1.5 to 2.5 seconds). *Note*—With a pause/asystole event lasting > 2.5 seconds and when the time interval for asystole is set to 2.5 seconds and the pause interval is set to 2.5 seconds, the system will annunciate for asystole.
* Pacer Not Capt	Yellow	No beat detected for a period > 1.75 times the average R-R interval **and** pace pulse(s) detected (Paced mode On).
* Pacer Not Pace	Short Yellow	No beat detected for a period > 1.75 times the average R-R interval **and** no pace pulse(s) detected (Paced mode On).
* Missed Beat	Short Yellow	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).
** SpO2T High	Yellow	High SpO_2. SpO_2 value (yyy) greater than high SpO_2 limit (xxx)
** SpO2T Low	Yellow	Low SpO_2. SpO_2 value (yyy) less than low SpO_2 limit (xxx).
* SVT	Short Yellow	A run of consecutive beats labeled as S with run length ≥ SVT run limit **and** ventricular HR > SVT HR limit.
* R-On-T PVCs	Short Yellow	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** 2 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 beat detection.)
* Vent Bigeminy	Short Yellow	A dominant rhythm of beats labeled as N, V, N, V, N (N = supraventricular beat, V = ventricular beat)

Message	Level	Description
* Vent Rhythm	Short Yellow	A run of consecutive beats labeled as V with run length > the Vent rhythm limit **and** ventricular Heart Rate ≤ the V-Tach limit.
* Vent Trigeminy	Short Yellow	A dominant rhythm of beats labeled as N, N, V, N, N, V, N, N (N = supraventricular beat, V = ventricular beat).
* PVCs/min High * PVCs/min > yy/min	Short Yellow	PVCs detected within a minute > the alarm limit (yy).
* Multiform PVCs	Short Yellow	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.
* AFIB	Short Yellow	An irregular rhythm of beats labeled as N **and** variability in PR intervals **and** P-wave variability. (For adult patient category only.)
*/** HR High */** HR xxx > yyy	Short Yellow Yellow	Heart rate (xxx) > the high HR alarm limit (yyy).
*/** HR Low */** HR xxx < yyy	Short Yellow Yellow	Heart rate (xxx) < the low HR alarm limit (yyy).
* Irregular HR	Short Yellow	An irregular rhythm of beats labeled as N (R-R interval changes > 12.5%).
* End AFIB	Short Yellow	Absence of the atrial fibrillation condition for the specified time period.
* End Irregular HR	Short Yellow	Irregular HR rhythm no longer detected for the irregular HR end delay time.
** STE Lx, Ly	Yellow	Two contiguous leads (Lx, Ly) above their respective STE limits.

Technical Alarm Messages (INOPs)

The following table lists the technical alarm messages and provides a description of each alarm.

Message	Level	Description	Action to Take
All ECG Alarms Off	Hard INOP/ Technical Alarm	For MRx monitors, all HR/arrhythmia alarms are turned off.	HR/arrhythmia alarms are controlled at the MRx monitor. See your MRx documentation for details.
Battery Low	Soft INOP/Technical Alarm (no sound)	Telemetry weak battery condition.	Replace the batteries.
Battery Low	Red (!!!) Technical Alarm	The battery strength for your MRx monitor is below 10%.	Replace the batteries immediately.
Cannot Analyze ECG	Hard INOP/Technical Alarm	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 will be displayed first in the INOP/Technical Alarm message area. You can view all current INOP/Technical Alarm messages in the pull down list.	Improve lead position; reduce patient motion.

Message	Level	Description	Action to Take
Cannot Analyze QT	Soft INOP/Technical Alarm (no sound)	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 adults 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 that is not caused by QRS widening. • If rhythm is sustained you may want to consider turning QT interval monitoring off.
Cannot Analyze ST	Soft INOP/Technical Alarm	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 INOP/Technical Alarm	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 (!!) Technical Alarm	Indicates that more than one valid ECG source is active for two paired devices.	Choose single ECG source.
CO2 Cal Required	Hard INOP/ Technical Alarm	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.

Message	Level	Description	Action to Take
Defib Malf	Hard INOP/ Technical Alarm	For MRx monitors, pacing hardware failure, power supply failure or replace clock battery.	Call Service
Defib Shutdown	Red (!!!) Technical Alarm	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 silence the Defib Shutdown alarm at the Information Center. The Silence button displays but is not active. You must go to the bedside to silence the alarm. See your bedside documentation
ECG/Arrh Alarm Off	Soft INOP/Technical Alarm	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 INOP/Technical Alarm	For MRx monitors, a short has been detected between a lead wire and ground.	Replace the ECG cable.
ECG Equip Malf	Hard INOP/Technical Alarm	Failure of the ECG equipment or failure to calibrate ECG.	• Remove leadset. Remove and re-insert batteries. Let self-test complete before reinserting leadset. • Replace the transceiver. • Contact Service.
ECG Leads Off	Red (!!!), Yellow (!!), or Hard INOP/Technical Alarm depending on how your system is set up.	Not all the required leads for ECG monitoring are connected.	Check that all of the required ECG leads are attached, and that none of the electrodes have been displaced.

Message	Level	Description	Action to Take
More Bed Alarms	Red (!!!), Yellow (!!), or Hard INOP/Technical Alarm 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 INOP/Technical Alarm	For MRx monitors, the NBP module needs calibration.	Call NBP module service. Do not use the 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 INOP/Technical Alarm depending on system setup	Bedside is off or cannot otherwise communicate with the Information Center.	Check bedside.
No Data Tele	Hard INOP/Technical Alarm	Philips IntelliVue telemetry is off or cannot otherwise communicate with the Information Center.	Check device.
No SpOT, Batt Low	Cyan Hard INOP/Technical Alarm	The battery level of the sensor is low.	Replace the battery.
Out Of Area	Hard INOP/Technical Alarm	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 INOP/Technical Alarm (no sound)	For MRx monitors, indicates you are pacing on battery power.	Connect AC power.

Message	Level	Description	Action to Take
Pacing Stopped	Red (!!!) Technical Alarm	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 silenced at the Information Center. The **Silence** button displays but is not active. You must go to the bedside to silence the alarm. See your bedside documentation.
Pads Cable Malf	Hard INOP/Technical Alarm	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 INOP/Technical Alarm	For MRx monitors, a device hardware failure was detected.	Perform an Operational Check. If the Pads/Paddles ECG Test fails with Therapy cable, disconnect the Therapy cable from the device when prompted in order for the Pads/ Paddles ECG Test to run without the cabled connected. If the Pads/Paddles ECG test passes without the cable connected, replace the Therapy cable. See your MRx documentation for details.
Pads/Paddles Off	Hard INOP/Technical Alarm	For MRx monitors, Pads/Paddles are off or insecurely attached.	Check that pads/paddles are properly applied. If necessary, replace the pads.
Paddles Cable Malf	Hard INOP/Technical Alarm	For MRx monitors, paddles cable failure.	Replace paddles cable.

Message	Level	Description	Action to Take
Replace Battery	Red (!!!), Yellow (!!), or Hard INOP/Technical Alarm depending on how your system is set up	The battery level for your telemetry device or IntelliVue Patient Monitor is low or empty. No monitoring is occurring.	Replace the batteries immediately.
Some ECG Alarms Off (can be configured to be disabled in Clinical Settings)	Soft INOP/Technical Alarm (no sound)	One or more */** level Arrhythmia alarms have been manually turned off.	Use the **Measurements** application Arrhythmia page to review current status of all alarms.
Some Standby	Soft INOP/Technical Alarm	More than one but not all connected devices is standby.	Canceled when patient is removed from Standby.
SpO2/SpO2T Equip Malf	Hard INOP/Technical Alarm	Malfunction in the SpO2 equipment.	Call Service.
SpO2/SpO2T Erratic	Hard INOP/Technical Alarm	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/SpO2T Extd. Update Numeric is replaced by a -?-.	Soft INOP/Technical Alarm	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/SpO2T Interference	Hard INOP/Technical Alarm	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/SpO2T Low Perf	Soft INOP/Technical Alarm	Accuracy may be reduced due to low perfusion. Data displayed with ?.	Increase perfusion. Change sensor site. Avoid site distal to BP cuff or intra-arterial line. Warm the site.

Message	Level	Description	Action to Take
SpO2/SpO2T No Sensor *Note*—Silencing this technical alarm turns off the SpO2 measurement.	Hard INOP/Technical Alarm	No sensor attached to SpO2 device.	Attach SpO2 sensor.
SpO2/SpO2T Noisy Signal	Hard INOP/Technical Alarm	Excessive patient movements or electrical interference are causing irregular pulse patterns.	Reduce movement or electrical noise sources.
SpO2/SpO2T No Pulse	Hard INOP/Technical Alarm	Pulse is too weak or not detectable.	Check connection to patient. Change sensor site. Avoid site distal to BP cuff or intra-arterial line.
SpO2/SpO2T Sensor Malf	Hard INOP/Technical Alarm	Malfunction of the SpO2 sensor/adapter cable.	Replace sensor.
Tele Disconnect	Red (!!!), Yellow (!!), Technical Alarm 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 Battery Low	Soft INOP/Technical Alarm	Lithium-ion battery level is ≤ 20% or has ≤ 30 remaining time.	Insert a charged lithium-ion battery pack.
Tele Batt Empty	Red (!!!), Yellow (!!), or Hard INOP/Technical Alarm depending on how your system is set up	Lithium-ion battery level is critically low. A 10-minute countdown begins. The MX40 will shut down if the condition is not cleared.	Insert a charged lithium-ion battery pack.
Tele Battery Temp	Hard INOP/Technical Alarm	The temperature of the lithium-ion battery is above 55°C or below -5°C.	Replace the lithium-ion battery.

Message	Level	Description	Action to Take
Tele Check Batt	Soft INOP/Technical Alarm	Lithium-ion battery has ≤ 25 charge cycles remaining before reaching the charge cycle maximum limit.	Be aware that the Lithium-ion battery pack will soon need replacement.
Tele Malfunction	Hard INOP/Technical Alarm	MX40 malfunction or self-test failure.	Contact Service to replace the MX40.
Tele Remove Batt	Hard INOP/Technical Alarm	The temperature of the lithium-ion battery is > 60°C and the battery must be removed.	• Replace the lithium-ion battery. • Dispose of old battery properly.
Tele Service Batt	Hard INOP/Technical Alarm	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 old battery properly.
Tele Standby	Soft INOP/Technical Alarm	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 INOP/Technical Alarm	• Patient is at outer range of the radio coverage area. • The MX40 is receiving a weak signal with high data loss from the AP. • Condition exists for multiple devices in a specific area	• Return patient to the coverage area. • If patient is in close proximity to AP, replace the MX40. Contact service. • The AP covering the specific area is suspect. Contact Service
Transmitter Malf	Hard INOP/Technical Alarm	Transceiver malfunction	Replace and notify service provider.
Transmitter Off	Hard INOP/Technical Alarm	RF Auto Shutoff after 10 minutes of all leads of and no SpO2 sensor connected.	• Reattach ECG leads to patient. • Reattach SpO2 sensor. • Press the Check button.

Message	Level	Description	Action to Take
Unsupported LAN	Hard INOP/Technical Alarm	There is a problem with the communication to the network and central monitoring is currently not possible. Check the connection.	If the INOP persists, switch off the monitor and contact service personnel.

Status Messages

Below is a list of system status messages that may display in the caption bar at the top of the Information Center screens or display in the status line at the bottom left of the IntelliVue Patient Monitor screens.

Message	Possible Causes	What to Do
Disconnected from: X. Local data storage only. Contact service.	Loss of connection to the Server, preventing paging, patient transfers, and so on.	Contact service.
Electronic Reports are currently unavailable	A network share has not been configured or cannot be accessed.	Cleared when a network share is available.
Excessive wireless data loss	Data loss (no signal or excessive dropout of signal) because of too many wireless devices using an Access Point, excessive interference or weak signal.	• Contact service. • Turn off all unused devices. • If a microwave is in use, move monitors away from the microwave signals or each other.
Excessive wireless interference	Dropout of signal on one or more wireless devices due to interference of the signal, for example, microwave oven interference.	• Contact service. • Turn off all unused devices. • Make sure all microwave ovens are turned off or at least 20 feet from the devices. • Keep the devices away from each other.
Paging not available. Contact service.	Paging is not available or the Information Center has loss connection to the paging system.	Contact service.
Printer is not installed; printing failed	Printer is not installed.	Install printer.
Recorder paper is out	No recording can be made on this recorder module until you replace the paper.	Replace paper.

Message	Possible Causes	What to Do
Recorder door is open	No recording can be made on this recorder module until you close the recorder module door.	Close recorder door.
No local recorder connected	No recorder module is plugged into the recorder rack.	Check connections.
Recorder has faulted	The recorder module is inoperable.	Contact service.
Recorder Rack or Power Supply Fault or No Recorder	There is a fault in the recorder rack or the rack power supply.	Contact service if the message persists.
Software update is available	A software update is available.	Contact service.
Weak radio signal	Dropout of signal on one or more wireless devices due to distance from the Access Point or signal interruption, such as metal doors and walls.	• Contact service. • Turn off all unused monitors. • Make sure all monitors are within the intended coverage area.
Wireless monitoring loss, call service	Intermittent disruption or failure in communications 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.
HL7 Client not reachable	A failure in communication with one more HL7 clients.	Contact service.
Sending 12 Lead	The capture is in progress at the Information Center.	No action required.
Insufficient data for 12 Lead	Data has been lost during capture. Network connection to the Information Center.	• When this message occurs the bedside monitor will make up to five attempts to re-send the 12-Lead. If five retries have failed, **Send and Store** is no longer available. A new 12-Lead will have to be captured and sent. • Contact service

Message	Possible Causes	What to Do
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 is rejected and not captured.	Connect the additional lead set to the lead cable and connect lead wires to the patient.
Unable to analyze 12 Lead	Excess noise in the signal for analysis by the 12-Lead Algorithm. 12-Lead capture is rejected.	• Remove the source of noise. Patient movement, bad electrodes or noise generated by equipment in the area. • Re-capture 12-Lead ECG.
Patient Conflict must be resolved	A conflict exists between the devices connected to the patient.	Resolve the conflict to either Same Patient or Bedside Patient to store the capture at the Information Center.
12 Lead not stored: Auto Printed	This message is caused by a database error.	Contact service
12-Lead: Patient age/gender unknown. Select "Admit Patient"	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 will assume a 50-year-old male for analysis.	• Enter the data in the Admit window. • Return to the 12-Lead ECG window.
Max locked captures reached	Only 30 12-Leads can be locked. Message displays when a 31st locked 12-Lead is attempted.	Unlock one of the 12-Lead ECGs.
Retry Sending 12-Lead	Four concurrent 12-Leads can be taken per Information Center. This message displays when the maximum number of concurrent 12-Leads is reached.	Select **Send and Store** again in the 12-Lead window.
12 Lead Analysis Complete	This message displays when the 12-Lead analysis is available for review at the bedside monitor.	No action required.
Must admit patient to export	This message displays when a 12-Lead export is initiated on a patient that is not currently admitted.	• Admit the patient. • Select Export again from the 12-Lead window.

Message	Possible Causes	What to Do
<Lifetime ID> required for export	This message displays when an export is initiated and the Lifetime ID has not been 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 for export** displays.	• Enter the proper ID in the Admit window. • Select Export again from the 12-Lead window.
Must complete required fields	All configured required 12-Lead Export fields have not been entered. The export can only be done at the Information Center iX when Reason, Requested By, Operator or Rx are required fields.	• Enter the required fields at the bedside - Lifetime ID and order number and export from bedside. • Enter the required fields at the Information Center and export from the Information Center.
Export Failed: Contact service	The connection to the export device has failed.	Contact service.
Windows detected a hard disk problem	HP BIOS or Windows has detected a problem with the disk on this computer.	Contact service.

Alarm Adjustments

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

Warning

- 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.

Arrhythmia and ST Controls

The adjustments to alarm settings that you can make from the Information Center depend on the point-of-care equipment being used. The following table summarizes the arrhythmia and ST alarm controls.

IntelliVue Patient Monitors	IntelliVue Telemetry Devices	IntelliVue MX40
Arrhythmia Controls		
• At the bedside • At the Information Center if remote controls are enabled See your IntelliVue Patient Monitor documentation for information on enabling remote controls.	• At Information Center	• At the Information Center
ST/STE/QT Controls		
• At the bedside monitor • At the Information Center if remote controls are enabled with the exception of ST measurement point adjustment See your IntelliVue Patient Monitor documentation for information on enabling remote controls.	• At the Information Center	• At the Information Center

Note—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. The same occurs at the monitoring device if the device is associated with the Information Center at time of discharge. See your appropriate Instructions for Use.

Timeout Periods

Normally, an arrhythmia alarm is annunciated upon the detection of an alarm condition. 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 "Alarm Chaining" on page 4-23.
- A timeout period is in effect for that alarm condition.

Timeout periods and alarm priority chains are explained below.

When a yellow arrhythmia alarm is annunciated, it automatically initiates a timeout, or inhibitory period. This means that during the timeout 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 has expired, the system is reset, and if the condition persists, the alarm condition will be annunciated 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 Paced, Pause, SVT, HR>, HR<).
- 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 “Enhanced Arrhythmia Chain” on page 4-25 and “Basic Arrhythmia Chain” on page 4-26 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 of alarm from being triggered too soon or too often.

Clearing the Timeout Period

The timeout period is cleared if it is ended or a learning phase occurs. See “Learning” on page 6-10 for information on learning.

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

Alarm Chaining

For arrhythmia alarms, the presence of multiple alarm conditions is quite possible. Announcing all of the detected alarm conditions would be confusing, and less serious conditions might hide a more serious condition. For this reason, the alarms are prioritized and put in alarm “chains” so that the most serious or highest priority alarm condition is announced. See “Enhanced Arrhythmia Chain” on page 4-25 and “Basic Arrhythmia Chain” on page 4-26 for illustrations of the alarm condition priority chain.

Alarm Groupings

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

- PVC Alarms (for example, Pairs, Vent Rhythm)
- Beat Detection Alarms (for example, Pause, Pacer Not Capt)
- Rate Alarms (for example, SVT, High/Low HR)
- Afib/IHR

Alarm Announcing

The Information Center displays and announces:

- Life threatening (red) alarms are announced first, since they have the highest priority level.
- If there are no life threatening red alarm conditions active, the highest priority ** limit alarm in any chain is announced.
- If there are no ** limit alarm conditions active then * yellow arrhythmia alarm is announced.
- If alarm conditions in different chains are detected, the alarm condition that occurred most recently is announced.

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 become 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 seriousness.

You can view arrhythmia alarm activity in the Patient Data Review applications. See Chapter 9, “Patient Data Review” for information on the review applications.

Enhanced Arrhythmia 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.

Red Alarms Chain

Asystole

↓

V-Fib/Tach

↓

V-Tach

↓

Extreme Tachy/Extreme Brady

Yellow Arrhythmia Alarms

PVC Alarms Chain

Non Sustain VT/Vent Rhythm

↓

Run PVCs

↓

Pair PVCs

↓

R-On-T PVCs

↓

Rate Alarms Chain

SVT

↓

HR > xxx or HR < xxx

Beat Detection Alarms Chain

Pause

↓

Pacer Not Capture/Pacer Not Pace/Missed Beat.

First Level Timeout Period

Second Level Timeout Period

Vent Bigeminy

↓

Vent Trigeminy

↓

PVCs >xx/min

↓

Multiform PVCs

AF/HR Chain

Afib/End Afib

↓

IHR/End IHR

Basic Arrhythmia Chain

The diagram below shows the alarm condition priorities for basic arrhythmia and the timeout levels for yellow alarm conditions.

Red Alarms

Asystole

↓

V-FIb/Tach

↓

V-Tach

↓

Extreme Tachy/Extreme Brady

↓

Yellow Arrhythmia Alarms

PVC Alarms Chain	**Beat Detection Alarms Chain**	**Rate Alarms Chain**
	Pacer Not Capture/Pacer Not Pace	HR > xxx or HR < xxx

First Level Timeout Period

Second Level Timeout Period

PVCs >xx/min

Silencing Alarms

Alarm conditions generated from bedside monitors can be configured to allow or not allow acknowledgment from the Information Center. Alarms are acknowledged at the Information Center by using the **Silence** button (selecting **Pause** can also acknowledge an active alarm see "Pausing Alarms" on page 4-29).

Alarms for patients being monitored by a Philips IntelliVue TRx Transceiver can only be silenced from the Information Center. Silencing an alarm condition at the Information Center turns off the audible annunciation of an alarm condition. You can silence an alarm for the MX40 either at the device or at the Information Center. Silencing an alarm at the MX40 silences the Information Center.

Note — Some systems may be set up to require you to supply user credentials before allowing silencing of red alarms. If this is the case, red alarms can be silenced in the **Patient Window** after entering credentials.

Alarm Behavior

If the alarm annunciation is silenced:

- *If the alarm condition is present,* the blue background goes away, but the alarm banner remains until the condition ends or the timeout period is over. When the timeout period is over if the condition is present or re-occurs the alarm is annunciated. 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 silenced and alarm reminders are configured off, the alarm condition message will persist until the condition ends but there will be no audible alarm annunciation.

If the alarm is NOT silenced:

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 highlighting in sector) 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 until the 3-minutes are over, then go away. • *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.
INOPs/technical alarms-arrhythmia and telemetry	Alarm indicators are automatically reset after the condition ceases (non-latching).
Telemetry ST, NBP, and SpO2 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 highlighting in sector) will be automatically reset (non-latching) or will remain (latching), depending on how the alarms are configured at the bedside.

Alarm Reminders

Red Alarms

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

Only one alarm sound can annunciate at one time. Therefore, 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 will annunciate (interrupting the yellow alarm).

Yellow Arrhythmia Alarms

If a yellow arrhythmia alarm is continuous, an alarm reminder will sound every 3 minutes as long as the condition exists if:

- Reminders are configured
- Timeout is set to 0

Limit Alarms

If a red or yellow alarm condition exists an alarm reminder will sound based on configuration.

INOPs/Technical Alarms (telemetry beds only)

If your Information Center is configured to have 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.

How to Silence an Alarm

When there is an annunciating alarm condition, the Record icon () or the Print icon () in the patient sector changes to the Silence icon () to enable the clinician to silence the active alarm. The action of the icon depends on whether or not Fast Alarm Review is enabled.

Note —Your unit may be configured to not allow silencing of bedside-generated alarm conditions at the Information Center. If this is the case, the Fast Alarm icon ( ) displays. Selecting the icon displays the Fast Alarm Review strip for that alarm. See "Fast Alarm Review" on page 9-14. If the bedside monitor is an IntelliVue Patient Monitor, both the monitor and the Information Center must be configured to allow silence of bedside-generated alarm conditions.

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

Fast Alarm Review Disabled

If Fast Alarm Review is not enabled, the clinician can silence the alarm condition by selecting the Silence icon () or by clicking or, for touch screen displays, touching anywhere in the patient sector, except on a button.

Fast Alarm Review Enabled

If Fast Alarm Review is enabled, selecting the Silence icon ( ) silences the alarm and opens the Fast Alarm Review strip for that alarm. See "Fast Alarm Review" on page 9-14 for information on using Fast Alarm Review. If there is an application window open for any patient, when the button is selected, the Fast Alarm Review strip overlays it.

- This capability can be enabled for red alarm conditions only or for all alarm conditions.
- To silence the alarm condition without displaying it, click anywhere in the patient sector, or for touch screen displays, touch anywhere in the patient sector except on a button.
- If you select the Silence icon ( ) for another alarm condition, the new one is displayed, and the current one is closed.

Pausing Alarms

If you want to temporarily prevent alarms from sounding, for example while you are moving a patient, you can pause alarms. A **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 is up. You can, however, resume alarms manually at any time by clicking the **Pause** button on the **Patient Window**.

Note—Your system may be set up to require you to enter credentials before you can pause alarms. If this is the case you can pause alarms after you enter a user name and password.

When all alarms (red and yellow) are paused, the message **Alarms Paused** displays. When yellow alarms are paused, the message **Yellow Al. Paused** displays.

Note—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.

Adjusting the Alarm Tone Volume

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

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

Measurements

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/off for a patient.
- Adjust measurement settings as well as turn specific measurements on or off.
- Change alarm limits for a patient.
- Designate which alarms will generate a recording or will initiate a page being generated for a patient.
- View a snapshot of the patient's alarms along with trends of the major vital signs to assist you in determining if alarm limit changes for the patient are appropriate. For more information, see "Alarm Summary" on page 4-53. You can also print an Alarm Summary report.

The measurements and controls available to you in the **Measurements** application depend on the patient's monitoring device and your particular unit's configuration. For telemetry monitored patients you can turn specific parameters on/off at the Information Center. If you are using a bedside monitor you turn specific parameters on or off at the bedside. For IntelliVue Patient Monitors alarm limits, paced mode and arrhythmia settings can be adjusted at either the Information Center or at the bedside monitor. For MRx monitors all alarm settings are controlled at the monitor. See your MRx Instructions for Use for information.

Note—You must enable remote controls at the IntelliVue Patient Monitor for them to be available to use at the Information Center. See your IntelliVue Patient Monitor documentation for information on enabling remote controls.

Access the **Measurements** window by selecting the **Measurements** button on the **Patient Window**. The panel on the left side of the window provides access to specific measurement application pages where you can make patient-specific adjustments.

The sections that follow describe each of the possible menu choices.

Menu	Description
Profiles	Provides access to the **Profiles** page where you can change measurements and alarm settings as a whole to adapt to different monitoring situations. See "Profiles" on page 4-32.
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 4-33.
Arrhythmia	Provides access to the **Arrhythmia** page where you can make adjustments to arrhythmia alarms and thresholds within a certain profile, either telemetry or the bedside. See "Arrhythmia" on page 4-36.
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, either telemetry or the bedside. See "ST" on page 4-39.
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 4-42.
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 4-44.
SpO2	Provides access to the **SpO2** page where you can make adjustments to SpO2 settings. See "SpO2" on page 4-46.
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 4-47.
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 "Resp" on page 4-49.
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 4-50.
Alarm Filters	Provides access to the **Alarm Filters** page where you can specify the alarms that will generate an automatic recording and/or, for systems with paging available, will generate an automatic page for the patient when the alarm is sounded. See "Alarm Filters" on page 4-51.
Alarm Summary	Provides access to the **Alarm Summary** page where you can view a summary of the alarms that occur for the selected patient for a specific duration. See "Alarm Summary" on page 4-53.

Profiles

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 as a whole 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 others are assigned a pediatric profile.

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, and 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 category and paced mode within the profile.

The following table describe how to use the **Profiles** page.

Select	To...
Profile	Select a different telemetry profile for the patient. Click **Telemetry Profile** then select a profile from the list that displays. When you select a different telemetry profile for a patient the measurement settings (ECG, arrhythmia, ST, STE, QT, SpO2, NBP, Resp), paced setting and patient category associated with that profile are applied to the patient. You can make individual modifications to those settings for the patient by selecting the measurement from the list on the left side of the **Measurements** window and adjusting the settings as necessary. **Warning** If you select a different profile, the patient category and paced settings normally change to those specified in the new profile. However some profiles may be set up to leave the patient category and paced status unchanged. Always check the patient category, paced status, and all alarms and settings when you change profiles.
Category	Change the patient category. Click **Category** then select **Adult, Pediatric,** or **Neonatal** from the list that displays. **Caution** For IntelliVue Patient Monitors the default for patient category and paced mode is set at the Information Center.

Select	To...
Paced Mode	Turn paced detection on or off for a patient. Click **Paced Mode** then select **On** or **Off** on the list that displays. If the patient has a cardiac pacemaker (including demand, fixed, or any type) the **Paced Mode** should be set to **On** indicating that pace pulse detection is on. **Warning** It is important that the patient's paced mode is set properly. If the patient is paced, pace pulse detection must be 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. *Note*—For MRx monitors, the pace 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 documentation for information on TCPacing and TCP Pause modes at the MRx monitor.

ECG

Use the **ECG** page to change heart rate alarm limits and set the asystole threshold.

Note— Δ **ExtrTachy** and Δ **ExtrBrady** are for viewing purposes only and can only be changed in configuration. They are used with the High/Low HR limits to determine the Tachy/Brady limits.

Select	To
High Limit or **Low Limit**	Set the patient's high and low heart rate alarm limits. Click **High Limit** or **Low Limit** as appropriate then select a value from the list that displays. 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. Click **Asystole Thresh.** then select a threshold value from the list that displays.

Select	To
Primary Lead or **Secondary Lead**	Select the primary and secondary lead to compute HR and to analyze and detect cardiac arrhythmias. Click **Primary Lead** or **Secondary Lead** as appropriate then select a value from the list that displays. Use the up and down buttons to scroll through the list of available leads. The secondary lead is only available if your monitoring device is configured for multilead analysis. *Note*—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 will be able to see the primary and secondary lead but cannot change them. You should choose a lead as primary or secondary lead that has the following characteristics: • QRS complex should be either completely above or below the baseline and it should not be biphasic • QRS complex should be tall and narrow • P-waves and T-waves should be less than 0.2 mV
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*—It is not necessary to set the filter to ST when using ST monitoring, and this filter may increase baseline wander.

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 *Note*—For IntelliVue Telemetry System transceivers, Hexad is not available when the Pleth wave is turned on. For MX40 telemetry devices 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 will occur at the device and 12 ST snippets will still be available if you wish 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.

Select	To...
Relearn Arrhy	Cause the arrhythmia system to relearn the ECG if you don't agree with how beats are labeled. During the learning process beats are labeled with the letter **L** for the first valid 15 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 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 6-10 for additional information the learning process. During the relearn period the only available ECG alarms are asystole, ventricular fibrillation and high and low heart rate. If you initiate learning 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. When arrhythmia analysis is turned off (Cardiotach mode is on), only these alarms are available: *** Asystole *** Vent Fib/Tach *** Extreme Brady *** Extreme Tachy ** HR High ** HR Low See "Cardiotach Mode (Arrhythmia Analysis Off)" on page 4-38 for important information about no arrhythmia analysis.

Select	To...
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.
Afib/IHR End Dly	Specify how long the Afib or 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 steps of 5 bpm.
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 steps of 1 beat.
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 steps of 1 beat.
PVCs/min	Adjust the PVC rate per minute alarm thresholds. The range is 1–99 PVCs/ min in steps of 1 PVC/min.

Select	To...
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.

Cardiotach Mode (Arrhythmia Analysis Off)

If the Information Center is in Cardiotach mode (arrhythmia analysis is turned off), note the following:

- The only available ECG alarms are: Asystole, VFib, Extreme Tachy, Extreme Brady, High HR, Low HR.
- The following controls are available on the **Measurements** application Arrhythmia page:
  - The **Arrhythmia On/Off** control is available so that arrhythmia can be turned back on.
  - For telemetry, the following controls are active:
    - Asystole threshold detection
    - HR alarm limit controls. (ECG Analysis mode is available on the **Patient Window**).
- The status message **Cardiotach Mode** appears in the patient sector.
- **Arrhythmia Analysis** and other arrhythmia controls return to the unit setting when the patient is discharged from the Information Center.

Alarm Adjustment Effects

In some cases changing an arrhythmia alarm limit at the Information Center will affect other alarm limits.

Extreme Bradycardia and Extreme Tachycardia Alarms

The difference between the low HR alarm limit and the extreme bradycardia limit is unit configured. For example, if the low alarm limit is 60 b/min and the extreme bradycardia limit difference is configured to be 20 b/min, then the extreme bradycardia limit is 40 b/min. If the difference is configured to be 0, there will always be 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.

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 b/min. Thus if the HR low alarm limit is moved to 80 b/min and the extreme bradycardia limit difference is 20 b/min, the extreme bradycardia limit will be 70 b/min. However, if you move the HR low alarm limit to 65, the extreme bradycardia limit will also be 65 and only the extreme bradycardia alarm will occur if the HR falls below this limit.

ST

Use the **ST** page to:

- For telemetry monitored patients, turn ST Analysis on or off for a patient.
- For telemetry monitored patients, adjust ST measurement points.
- View a ECG wave snippet and set the ST baseline.
- View a map of the patient's ST Values.
- Turn specific ST alarms on or off for a patient.
- Set a patient's high and low ST alarm limits.

For information on how the ST/AR ST Analysis algorithm works, see Chapter 7, "ST Monitoring."

Turning ST Analysis On/Off

For telemetry monitored patients, the **ST** page allows you to turn ST monitoring on or off (telemetry only) for all available ECG leads. You would turn ST monitoring off if:

- You are unable to get any lead that is not noisy.
- Arrhythmias such as atrial fibrillation/flutter cause irregular baseline.
- The patient is continuously ventricularly paced.
- The patient has left bundle branch block.

From the **ST** page click **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. The current ST values and Baseline (if available) display on the top right side of the page.

The table describes how to use the **Adjust ST Points** page.

If you want to...	Do this...
Set the current snippets as a baseline for reference	Click 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**.

If you want to...	Do this...
Adjust ST measurement points	ST measurements are done automatically but can be adjusted manually. The ST measurement points may need to be re-adjusted if the patient's heart rate or ECG morphology changes significantly. 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. To adjust the ST measurement cursor: 1 Select the **ST** button. 2 Use the right and left arrow to adjust as necessary. 3 Click 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 Click the **Apply** button.
Choose how to view the ST snippets	If you would like to superimpose the selected snippets on top of each other select **Superimpose** from the **Leads** drop down list. If you would like to display each snippet separately select **Separate** from the **Leads** drop down list. You can select a maximum of five separate leads.
Refresh the view to the most current snippet	Click 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 real-time ECG wave and set the ST baseline:

1 From the **ST** page select **ST View**. The **ST View** window displays with a list of available ECG leads on the left-side of the window and the current measurement values on the right.

2 Select ECG leads to view from the ECG lead 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.

3 Select the **Leads** layout from drop-down list:
- **Superimpose** — Display the selected snippets on top of each other in the ST View.
- **Separate** — Display up to 5 snippets separately in the ST View.

4 Select the **Update Baseline** button to set the current snippets as a baseline for reference.

You can print a report of the ST Map and snippets by clicking the  icon from the **Measurements** application caption bar. The report prints in landscape format.

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 intervals you specify. The trending intervals display as gray lines on the ST Map trend view. In addition you can print a report of the ST Map and snippets by clicking the  icon from the **Measurements** application caption bar.

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 2mm.

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. If you want to display the current ST values without the trending information, clear the check box. Printing the trend on the ST Map is not available when ST trending is selected.

ST Alarms

All alarm settings have unit defaults. The **ST** page allows you to turn ST alarms on or off to accommodate the clinical condition of individual patients.

From the **ST** page click **Alarms** and select **On** or **Off** as appropriate.

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 parameter has its own alarm limit. The alarm is triggered when the two contiguous ST values exceed their alarm limits for 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 parameter 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 Select **Auto Limits** if you would like to set the ST limits around the current value. You can set the alarm limits +1/-1mm or +2/-2mm from the current ST value (Tele/MX40 only).
Note—Your system may be set up so that auto limits are on (default). In this case, the ST limits will be set +/- 1mm 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 Click on the alarm limit you would like to adjust. A menu displays with a list of possible limit choices.

4 Use the up and down arrows to scroll through the list of limits. Click on an appropriate value to select that limit.

STE

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 ST Elevation from the American Heart Association Guidelines and the American College of Cardiology. The 12-Lead ECG carts today 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.

The STE alarm limits can only be adjusted in configuration. The factory default alarm limits for females on V2 and V3 is 1.5mm, but for males is 2.0mm. This is also recommended by the American College of Cardiology.

Use the **STE** page to:

- For telemetry devices, turn ST elevation analysis on or off.
- View a snapshot of the ECG wave (snippet) and set the STE baseline.
- View a map of the patient's STE Values.
- Turn STE alarms on or off for a patient.

Turning STE On/Off

For telemetry monitored patients, you can toggle the STE measurement on and off for a patient.

From the **STE** page, click **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.

Perform the following steps to view snippets and set the STE baseline:

1. From the **STE** page select **STE View**. The STE View window displays with a list of available ECG leads on the left side of the window and the current measurement values on the right.
2. Select the ECG leads to view from the ECG lead 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.
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 5 snippets separately in the STE View.

You can print a report of the STE View and snippets by clicking the  icon from the **Measurements** application caption bar. The report prints in landscape format.

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.

Access the STE Map by selecting **STE Map** from the **STE** page. You can 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 2mm.

You can print a report of the STE Map and snippets by clicking the  icon from the **Measurements** application caption bar.

Note—Extended lead labels are not available to trend in the STE Map.

STE Alarms

You can toggle STE Alarms on or off. From the **STE** page, click **) Alarms** and select **On** or **Off** as appropriate.

QT

The **QT** page allows you to adjust QT settings.

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.

From the **QT** page you can:

- For telemetry monitored patients, turn QT Analysis on or off.
- View a snapshot of the ECG wave (snippet) and set the QT baseline.
- Select which leads to analyze when calculating the QT parameters.

Turning QT Analysis On/Off

For telemetry monitored patients, you can toggle 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. By selecting one of the lead labels at the top of the window you can 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.

To Change the QT View Settings

The **QT View** window provides different view modes to view one set of waves in a larger scale. From the **QT View** window select:

- The **Current** radio button to view the set of current waves.
- The **Baseline** radio button to see the set of baseline waves.
- The **Split** radio button to return to the combined view with current and baseline waves.

To Set the QT 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.

To Print the QT View window

Click  on the top of the window. A landscape printout of the **QT View** window prints.

QT Lead

Select **QT Lead** from the **QT** page to select which leads to analyze when calculating the QT parameters. 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/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.

Toggle the QTc or ΔQTc alarm on or off by clicking on **QTc High Alarm** or Δ**QTc High Alarm** from the QT page as appropriate.

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 milliseconds
- Women: QTc < 430 milliseconds

To set the QTc or ΔQTc alarm limits:

1. Click **QTc High Limit** or Δ**QTc 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 click on a value on the list to select that limit.

SpO2

The **SpO2** page allows you to make adjustments to SpO2 settings. The table below describes the adjustments you can make from the SpO2 page.

Note—Multiple controls are available if there is one or more SpO2 label. So, for example, if you are monitoring SpO2r and SpO2l separate controls for each label are available.

Adjustment	Description
Adjust Alarm Limits	To set the SpO2 alarm limits: 1 Click **High Limit** or **Low Limit** from the SpO2 page as appropriate. A pop-up with limit values displays. 2 Use the up and down arrows to scroll through the limit values then click on a value on the list to select that limit. **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.
Adjust Desat Limit	The Desat alarm is a high priority (red) alarm notifying you of potentially life threatening drops in oxygen saturation. To set the Desat limit: 1 Click **Desat Limit** from the SpO2 page as appropriate. A pop-up with limit values displays. 2 Use the up and down arrows to scroll through the limit values then click on a value on the list to select that limit.
Turn SpO2 Alarms On/Off	Click **Δ) Alarms** to toggle SpO2 alarms on or off as appropriate.
Set the SpO2 Alarm Delay Times	Click the **High Alarm Delay**, **Low Alarm Delay** or **Desat Delay** as appropriate then select the delay time from the list that displays. The delay time is the amount of time the parameter value must exceed the alarm limit prior to an alarm being announced.
Turn SpO2 Monitoring On/Off	Click **I/O SpO2** from the SpO2 page to toggle telemetry SpO2 monitoring on or off as appropriate.
Set the SpO2 Measurement Mode	SpO2 measurements can be made manually on an as-needed basis in **Manual** mode, or continuously in **Continuous** mode. To set the SpO2 measurement mode: 1 Click **Mode** from the SpO2 page. A pop-up list displays. 2 Select **Manual**, **Continuous** or, for MX40 monitors, **Auto** from the pop-up list as appropriate.

Adjustment	Description
Specify When Automatic SpO2 Measurements Occur	For MX40 Wearable monitors when the Measurement Mode is set to **Auto**, specify when to have the automatic SpO2 measurements occur by clicking **Repeat Time** then selecting a time interval from the list that displays.
NBP Alarm Suppression	Click **NBP Alarm Suppr.** from the SpO2 page if you would like to suppress the NBP INOP alarm. Turn this **On** if you do not want an SpO2 alarm during an NBP measurement. It is generally advised to set the SpO2 sensor on the opposite arm of the NBP cuff, especially during frequent measurements.
Turn Pleth Wave On/Off	For Philips Telemetry System transceivers you can toggle the Pleth wave on or off by clicking **Pleth Wave** from the **SpO2** page as appropriate. *Note*—For IntelliVue Telemetry System transceivers, Hexad is not available when the Pleth wave is turned on.
Turn Pulse Transmission On/Off	For telemetry devices you can toggle Pulse transmission on or off by clicking **I/O Pulse** from the **SpO2** page as appropriate.

NBP

The **NBP** page allows you to adjust patient settings for measuring Non-Invasive Blood Pressure (NBP). The Controls available to you on the NBP page depend on your monitoring equipment and whether the NBP is on at the monitoring device. The table below describes the adjustments you can make from the NBP page.

Note—The NBP alarm delay to the Information Center from NBP Cableless Measurement with the MX40 is less than 1 second.

Adjustment	Description
Set 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 Click **Alarms from** on the **NBP** page. A list of NBP alarm source choices 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 High/Low Alarm Limits	To set NBP alarm high or low limits: 1 On the **NBP** page click the appropriate alarm source **High** or **Low** (**Sys. High**, **Sys. Low**, **Dia. High**, **Dia. Low**, and so on). A pop-up with limit values displays. 2 Use the up and down arrows to scroll through the limit values then click on a value on the list to select that limit.
Turn NBP Alarms On/Off	Click (**Alarms** to toggle NBP alarms on or off as appropriate.
Start/Stop an NBP Measurement	Click **Start/Stop** to initiate an on demand measurement or stop a measurement. Available for systems with remote controls enabled.
Set Interval Repeat Time	To set the time interval between two NBP measurements: 1 Click **Repeat Time**. A pop-up with time values displays. 2 Use the up and down arrows to scroll through the possible time values then click on a value on the list to select that repeat time.

Adjustment	Description
Start series of NBP measurements	Click **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.

Resp

The **Resp** page allows you to adjust patient settings for measuring respiration (Resp). The table below describes the adjustments you can make from the **Resp** page.

Adjustment	Description
Adjust High/Low Alarm Limits	To set the Resp alarm limits: 1 Click **High Limit** or **Low Limit** from the Resp page as appropriate. A pop-up with limit values displays. 2 Use the up and down arrows to scroll through the limit values then click on a value on the list to select that limit.
Set Apnea Time	The apnea alarm is a high priority red alarm used to detect apnea. The **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 click **Apnea Time** from the Resp page then select a time from the pop-up list that displays.
Turn Resp Alarms On/Off	Click **Alarms** to toggle Resp alarms on or off as appropriate.
Turn Resp Measurement On/Off	For telemetry monitored patients, you can toggle the Resp measurement on or off by clicking **I/O Resp** from the Resp page as appropriate.

Telemetry Setup

For patients being monitored by a telemetry device, the **Telemetry Setup** page allows you to configure your telemetry device 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 to you on the Telemetry Setup page depend on whether you are monitoring the patient using a IntelliVue Telemetry System transceiver or the MX40. You can adjust the following telemetry device settings on the Telemetry Setup page:

Adjustment	Description
Turn adjustable sounds on or off	For IntelliVue Telemetry System transceivers, click **Mute** to toggle the telemetry device adjustable sounds on or off as appropriate
Set Volume at Device	To set the volume level for IntelliVue Telemetry System transceivers: 1 Click **Volume at Device**. A pop-up displays with volume levels from 1 to 5 with 5 being the loudest. 2 Click on a value on the list to select that volume level. The default is 3.
Set Telemetry Button Response	Select what the Information Center's response will be when the telemetry button is pressed on the telemetry device. The following choices are available: • **Nurse Call** — Select to generate a **Nurse Call alarm that you can subsequently retrieve from **Alarm Review**. • **Record** — Select to generate a delayed recording (with no alarm annotation) at the Information Center. • **Call & Record** — Select to generate both a nurse call alarm and a recording. • **Off** — Select to have no response at the Information Center when the telemetry button is pressed.
Locate Telemetry device	To assist you in locating a telemetry device, click **Find** to initiate repeated tone sounds on the telemetry device.
Changing Waves for Storage and Display	For MX40 telemetry devices, the **Telemetry Setup** page lets you choose the waves for storage and display. The waves you choose affect not only the ECG waves that are displayed but the ECG waves that are stored. You can store up to four waves. *Note*—When you set the display of the Pleth wave on, the Pleth wave replaces the Vb wave in the **Patient Window** during 6-lead monitoring.

Adjustment	Description
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 *Note*—For IntelliVue Telemetry System transceivers, Hexad is not available when the Pleth wave is turned on. For MX40 telemetry devices you can turn Hexad on but must set all four waves to ECG to store and display all 12 ECG waves at the Information Center. The derivation will occur at the device and 12 ST Snippets will still be available if you wish to display and store waves other than ECG.

Alarm Filters

For systems set up to allow automatic recording and/or paging, the **Alarm Filters** page allows you to specify the alarms that will generate an automatic recording and/or, for systems with paging available, will generate an automatic page for the patient when the alarm is sounded.

Note—Turning off recording does not affect audible and visual indicators for these alarms.

Turning Alarm Recording and Paging On/Off

Perform the following steps to turn alarm recording and paging on/off:

1. Click the **Record** button on the **Alarm Filters** page to access the **Alarm Filters Record** window.
2. Specify which alarms to record by clicking the appropriate check box to the left of the alarm. A check mark in the box selects the alarm for recording. See the table below for a description of alarm choices for recording.
3. If paging is available on your system, click the **Page** button to access the **Alarm Filters Page** window. If paging is not available on your system proceed to Step 5.
4. Select the alarms that will generate an automatic page for the patient by clicking in the appropriate check box to the left of the alarm. A check mark in the box selects the alarm for paging.

   Note—The **Page** window provides the same alarm choices as the **Record** window in addition you can select to page all INOP alarms or specific INOP alarms.

5 When you are done selecting alarms to record or page for the patient click the **Apply** button. You can select **Cancel** to cancel any changes you made for this patient or click the **Reset to Clinical Settings** button to return the settings back to unit defaults.

Select	To
All Red - All On/All Off	Select if you want to turn all red alarm recordings on or off simultaneously. A check mark in the check box turns all on. No check mark turns all off. You can still select individual red alarms after selecting the **All Red - All On/All Off** check box.
Red Arrhythmia - All On/All Off	Select if you want to turn all red arrhythmia alarm recordings on or off simultaneously. A check mark in the check box turns all on. No check mark turns all off. You can still select individual red arrhythmia alarms for recording after selecting **Red Arrhythmia All On/All Off**.
Red Alarms	Select specific red alarms to record or not record by clicking in the appropriate check box to the left of the alarm. A check mark in the box selects the alarm for recording.
All Yellow - All On/All Off	Select if you want to turn all yellow alarm recordings on or off simultaneously. For example, the last shift turned off several yellow alarm conditions, but you are not familiar with the patient's clinical condition and you want all alarms turned on. Rather than turning each individual alarm on, you can use this function to accomplish your goal in one step. A check mark in the check box turns all on. No check mark turns all off. You can still select individual alarms after selecting the **All Yellow - All On/All Off** check box.
Yellow Arrhythmia - All On/All Off	Select if you want to turn all yellow arrhythmia alarm recordings on or off simultaneously. A check mark in the check box turns all on. No check mark turns all off. If your system is configured to not allow the enabling/disabling of all arrhythmia alarms this field is not available for selection. This field is for arrhythmia alarm recordings only -- the status of ST alarm recordings is not affected. You can still select individual yellow arrhythmia alarms after selecting **Yellow Arrhythmia All On/All Off**.
Yellow Alarms	Select specific yellow alarms to record or not record by clicking in the appropriate check box to the left of the alarm. A check mark in the box selects the alarm for recording.

Alarm Summary

The **Alarm Summary** page displays a summary of the selected patient's most frequent alarms and trends for the major vital signs parameters 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 non-actionable alarms.

The **Alarm Summary** page displays trends and alarm counts for the parameters HR, Any SpO2, Any Resp, NBP, Any BP, PVC, and ST. The following table lists the alarm types that are counted for each parameter.

Parameter	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

Parameter	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 current wall time minus one minute. The ending time updates whenever you do the following:

- Select a patient and open the **Alarm Summary** page.
- Click 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 parameter. The alarm counts are listed with the highest count appearing at the top of the list. Only the five most frequent alarm types that occur for the parameter display in the alarm count pane. The alarm counts include deleted alarms.

The parameter label displays next to the scale on the left side of the trend. In the trend for each parameter, horizontal lines indicate the alarm limits. This allows you to see where the alarm limits are violated. You can then decide whether to turn off alarms or adjust the limits.

The following table describes how to use the **Alarm Summary** page:

If you want to...	Do this...
Change the length of time for which alarm events and trends are displayed.	Click 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 parameter, click on the scale, then select **Customize**. 2 Enter the range of values by using the up and down arrows. 3 Click **OK**. The new scale displays in the parameter graphic 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.	Click the double arrows (**Get Latest Patient Data**) at the top right of the window.
Print the Alarm Summary report.	Click the print icon at the top right side of the window.
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.

5

Recordings and Reports

This section describes the Information Center recordings and reports.

Introduction

The intended use of the Philips Recorder is to provide hardcopy of text, graphics, and wave data for the Information Center.

You can initiate recordings and reports (if a printer is available) from the Information Center or from the bedside monitor including the MX40 Wearable monitor.

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 print contain the primary and secondary waves selected at the bedside, or, for IntelliVue telemetry devices, on the **Patient Window**.

You select the waves for real-time recordings. Continuous recordings can have overlapping waves. The 2-channel recorder speed is configured at 6.25 mm/s, 12.mm/s, 25 mm/s, or 50 mm/s.

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	Printed Strips	Description
Alarm	Not applicable	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. Alarm recordings can be made continuous from the recorder.
Delayed	No auto alarm printing or continuous printing	A delayed recording is a timed non-continuous recording that shows waves both before and after it is initiated. Delayed recordings can be made continuous from the recorder. Delayed recordings can be generated from either the bedside, MX40 Wearable monitor, or from the patient sector on the Information Center.

Recording	Printed Strips	Description
Real-Time/ Continuous	Not applicable	A real-time recording is a continuous recording that shows waves that occur after you request the recording. Real-time recordings must be manually stopped. You can initiate real time recordings from either the bedside or the **Patient Window**. Real-time recordings are usually used to record procedures.
Retrospective	No auto alarm printing or continuous printing	Retrospective recordings are timed non-continuous recordings of past events recorded from the review applications.
Record All	Print all	Record all is a series of timed recordings that when initiated, records all sectors that have wave data available at the information center at the time of the request.

Alarm Recordings

You can turn off the automatic recording of specific alarms in the **Measurements** application **Alarm Filters** page. See "Alarm Filters" on page 4-51.

The waves that are recorded are based on the waves:

- Primary wave (usually ECG)
- Wave corresponding to the alarming parameter. If only the primary wave is available, a 40-mm single-channel recording is generated.

Note—In order for an alarm recording generated from the bedside to be made 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).

Arrhythmia Alarm Recordings

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 will be 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 your 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, 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 at the monitor, only select waves that are available to you at the Information Center are present in the **Patient Window**. If you select waves that are not available at the Information Center, the Information Center will substitute 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).

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 that the preset length to allow for all of the annotations to print. 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, you will not capture the entire event.

Making a Delayed Recording

Selecting the  button in the patient sector initiates a delayed recording. This generates a paper recording of the primary and secondary waves.

Making an Alarm/Delayed Recording Continuous

You can make an alarm or delayed recording continuous while the recording is printing by pressing the RUN/CONT key on the recorder module. 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 beds that are displayed, click the  icon from an application window or resting display system message area. The Information Center will initiate a delayed recording for all sectors that currently have patient data. A recording does not print in sectors without beds or equipment assigned.

Making 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.

To make a real-time recording:

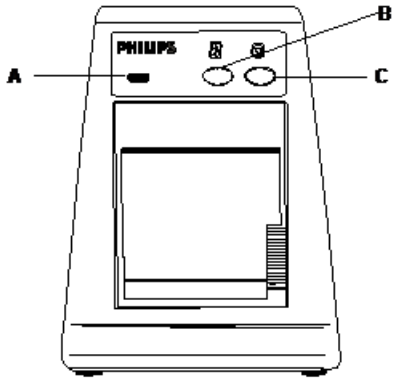
1. In the **Patient Window** select the **Continuous Recording** button. The Information Center displays a pop-up box.
2. Select the waves to record by selecting the waves from the waves drop-down lists.

   Note— Beat labels can be recorded by checking the **Show Beat Labels** box which is enabled only if the first wave selected is the primary ECG lead.

   Note— If you select waves for recording that are not available to you at the Information Center the Information Center substitutes the primary ECG and the secondary wave on the recording.
3. Specify whether to overlap the waves or not by clicking the **Overlap Waves** box. When you select **Overlap Waves** two waves overlap in one 40 mm sector.

   With no overlap no waves overlapped, the size of the grid is 40 mm for one wave, 20 mm for two waves.
4. Specify a recorder speed by clicking the speed drop-down arrow and highlighting a speed from the list that displays. The default speed is 25 mm/second.
5. Select the **OK** button. The recording begins and continues until you select the **Stop Recording** button in the **Patient Window** or press STOP on the recorder.

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.

Clearing the Recorder Queue

To clear the recorder queue, simultaneously press the RUN/CONT (continue) 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.

Recording Priority

If the recorder module is busy or inoperable, certain types of recording requests are queued (stacked). Recordings then print when the recorder becomes available.

The Information Center holds 10 recording requests in the recording queue and operates on a first-in-first-out (FIFO) basis. There is no prioritizing of recording requests. If there are already 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.

Delayed Recordings	Queued regardless of recorder availability.
Retrospective Recordings	No queuing. A message displays if recorder is unavailable.
Alarm Recordings	Queued regardless of recorder availability.
Record All	Queued regardless of recorder availability.
Real-Time/Continuous Recordings	No queuing. A message displays if recorder is unavailable.

Recording Status Messages

The messages in the table below appear in the status message line at the top of the Main Screen.

Message	Meaning
No local USB alarm recorder connected.	There is no recorder plugged into the Information Center.
USB recorder two channel door open	The door of the 2-channel recorder is open.
USB two-channel recorder fault	The 2-channel recorder connected to the Information Center is currently faulted
USB two-channel paper out	The 2-channel recorder is out of paper.

Annotation

The recording 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/paused, the text **Alarms Paused**.
- INOP text (if available).

- Patient parameters (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).

The recording annotation for recordings made from **Alarm Review** (for both 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.

Re-Annotation

Real-time and delayed recordings that are continued are re-annotated every 50 mm with a subset of the annotation information.

Loading Paper into the Philips 2-Channel Recorder

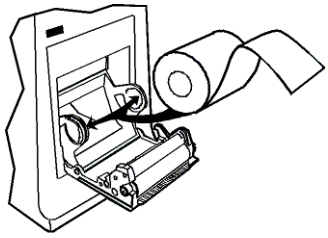
A message appears at the top of the screen when the recorder is out of paper. The USB 2-channel recorder requires M4816/17A paper to operate properly.

Note—The only paper that can be used with the USB 2-channel recorder is M4816/17A. If the wrong paper installed, no recordings are printed on the paper.

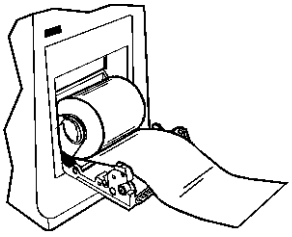
How to Load Paper

To load paper into the recorder perform the following steps:

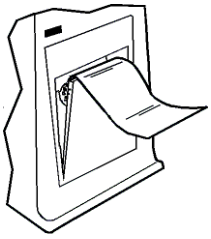
1 Insert a new roll with paper feeding from the bottom.



2 Pull the paper so it extends beyond the edge of the door.



3 Close the door.



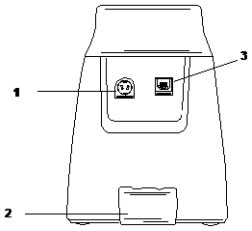
Testing

You can test to see if the recorder paper is loaded correctly by selecting the **Record** button in any Patient Sector that has waves. If no printing appears on the strip, the paper is loaded backwards. Remove the roll and reload.

Important— When removing a printed recording from the USB 2-channel recorder be sure to 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.

Ordering Recorder Paper

Paper for the 2-Channel Recorder Module

Part Number M4816/17A Recorder paper

Printing Reports

If an Information Center printer is connected, you can initiate reports from the Information Center or from a bedside monitor.

For operating information on printers, see the documentation that shipped with your printer.

6

ST/AR Arrhythmia Monitoring

The ST/AR arrhythmia algorithm is indicated for use in instances where the clinician decides to monitor cardiac arrhythmias of adult, pediatric and neonatal 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.

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 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 aid in assessment of 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.

IntelliVue Patient Monitors

If the patient is monitored by a 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 information specific to IntelliVue Patient Monitors.

IntelliVue MX40

If the patient is monitored by a IntelliVue MX40, the ST/AR arrhythmia algorithm is provided by the IntelliVue MX40. Controls, however, for arrhythmia analysis and alarm limits are adjustable and viewable at the Information Center and viewable at the IntelliVue 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 IntelliVue MX40 user documentation for information specific to IntelliVue MX40s.

IntelliVue Telemetry System Devices

If the patient is monitored by a 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 information specific to IntelliVue Telemetry System devices.

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 information specific to the MRx monitor.

With 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 your appropriate user documentation for information specific to that device.

Levels of Arrhythmia Analysis

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.

Cardiotach Mode (Arrhythmia Off)

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 Server Release J.0 and higher, 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.

Cardiotach Alarms

The arrhythmia alarms available are a subset of the basic arrhythmia alarms. The alarms included are:

- Asystole
- V-fib/Tach
- Extreme Tachy
- Extreme Brady
- High Heart Rate
- Low Heart Rate

Basic Arrhythmia

The basic arrhythmia capability configuration provides the basic cardiotach functions and the detection of the 10 alarms listed below.

- Asystole
- Vfib/Tach
- VTach

- Extreme Tachy
- Extreme Brady
- Pacer Not Capture
- Pacer Not Paced
- Frequent PVCs (PVC > limit)
- High Heart Rate
- Low Heart Rate

Enhanced Arrhythmia

The enhanced arrhythmia capability configuration provides all of the basic functions, as well as the detection of the 13 additional alarms listed below. In addition it provides rhythm and ectopic status messages.

Basic Alarms

- Asystole
- Vfib/Tach
- VTach
- Extreme Tachy
- Extreme Brady
- Pacer Not Capture
- Pacer Not Paced
- Frequent PVCs (PVC > limit)
- High Heart Rate
- Low Heart Rate

Additional Alarms

- Nonsustained V-Tach
- Supraventricular Tach
- Ventricular Rhythm
- Run PVCs
- Pair PVCs
- Pause
- R-on-T PVCs
- Ventricular Bigeminy
- Ventricular Trigeminy
- Multiform PVCs
- Missed Beat
- Atrial Fibrillation/End AFib
- Irregular HR/End Irreg HR

How the ST/AR Algorithm Works

ST/AR multi-lead analysis is performed on the user-selected primary and secondary leads. If only one lead is available for multi-lead, ST/AR analysis is performed on the single available lead.

Arrhythmia analysis consists of several steps:

1 The ECG signal is pre-processed to filter out baseline wander, muscle artifact, and signal irregularities. In addition, if the Paced status is On or Unconfirmed, pace pulses are detected then rejected from the processing to avoid seeing them as QRS beats.

2 Beat detection to locate the QRS complexes for further analysis.

3 Feature measurement such as R-wave height, width, and timing.

4 Beat classification. Templates are created and are matched to incoming beats, and the appropriate beat label is determined.

5 Atrial Fibrillation Detection. Analyzes the RR intervals and P waves.

6 Ventricular Fibrillation Detection. Looks for a flutter or sinusoidal wave pattern in both ECG channels

7 Rhythm and alarm detection. Beat labels are used to produce the values and events needed to generate rhythms and alarms.

Working in parallel with beat detection and classification, a separate detector examines continuously for ventricular fibrillation, asystole, and noise.

The quality of the ECG signal is important for accurate arrhythmia analysis. The section below provides guidelines for optimizing signals for arrhythmia analysis.

For additional information on the ST/AR algorithm, refer to the *Arrhythmia Monitoring ST/AR Algorithm Application Note*.

Ensuring Accurate Arrhythmia Monitoring

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

1 Once you have selected the optimal lead at the bedside monitor or at the Information Center, check the arrhythmia alarm limits by reviewing the limits on the **Measurements** application Arrhythmia page (see “Arrhythmia” on page 4-36).

Note — See “Example of Optimized ECGs” on page 6-6 for examples of optimized leads.

2 Verify that the patient paced setting is accurate, and change it if necessary.

3 Check the arrhythmia beat labels on the **ECG Analysis** window (see "ECG Analysis" on page 1-33). The beat labels display when **Show Beat Annotations** is selected (on by default) on the **ECG Analysis** window.

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

N = Normal

V = Ventricular Ectopic

S = Supraventricular Premature

P = Paced

‘ = Pacer spike (If the patient is both atrial and ventricular paced, the system will show two ‘ marks above the waveform aligned with the atrial and ventricular pacing.)

" = Biventricular pacer spike

L = Learning

A = Artifact (noisy episode)

? = Insufficient information to classify beats

I = Inoperative (for example, Leads Off)

M = No beat detected

Note—In cardiotach mode (arrhythmia off), N, V, and S are replaced with:

B = Beat detected

When **Show Beat Annotations** is selected on the **ECG Analysis** window, waves are delayed by approximately 6 seconds.

When you select **Show Beat Annotations** you will see all the waves that are available. The primary and secondary lead being used for arrhythmia analysis are both displayed. The primary wave shows the delayed lead with beat labels. With multilead analysis the beat labels represent analysis of both the primary and secondary waves. The ECG size used in the **Patient Window** is also used in the **ECG Analysis** window.

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

4 If you don't agree with how beats are labeled, you can cause arrhythmia to relearn the ECG by selecting **Relearn Arrhy** in the **ECG Analysis** window. During the learning process beats are labeled with the letter L for the first valid 15 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 you should change the lead to one where the normal and ventricular beats look different (see "Example of Optimized ECGs" on page 6-6).

Note—During the relearn period the only available ECG alarms are asystole, ventricular fibrillation and high and low heart rate.

Note—Initiate learning only during periods of predominantly normal rhythm and when the ECG signal is relatively noise-free. See "Learning" on page 6-10 for additional information about the learning process.

Warning

- If you initiate learning 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.
- When using EASI ECG monitoring, Relearn happens automatically when there is a LEADS OFF INOP condition (see "Monitoring During Leads Off" on page 6-11). If 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. Be sure to check the beat labels and initiate a relearn to correct.

5 After relearning is complete, check the delayed arrhythmia wave to ensure that the algorithm is labeling the beats correctly.

6 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 6-6 for examples of optimized ECGs.

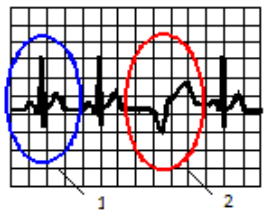
Available leads for viewing in the **ECG Analysis** window:

- If only one lead is sourced then only one lead displays.
- If two leads are being sourced and one of the leads is a chest lead then the two leads are displayed. If both leads are limb leads then six leads are displayed.
- If three leads are being sourced and all three leads are limb leads then six leads are displayed. If two leads are limb leads and one lead is a chest lead then eight leads are displayed (seven plus MCL). If only one lead is a limb lead and two leads are chest leads then three leads are displayed.
- If the bedside or telemetry system has EASI 12-Lead capability all 12 derived leads will be displayed, enabling you to determine the optimal leads.
- For devices using Hexad, four waves are sourced from the telemetry device, eight waves plus the four derived V leads will display.

Example of Optimized ECGs

Non-Paced ECG

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 R-wave height
- P-wave smaller than 1/5 R-wave height

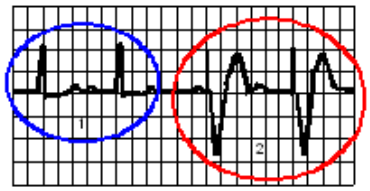
Note—In order to comply with the AAMI-EC13 specification, ST/AR internally removes the gain adjustment before the signal is analyzed for detection and classification. The detection threshold for the QRS cannot be less than 0.15 mV. This specification is aimed at preventing the detection of P-waves or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

Paced ECG

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



1 Normal Beats
2 Pace Pulses/Beats

Normal QRS:

- Tall (recommended amplitude > 0.5mV), narrow, and above or below the baseline (not biphasic)
- T-wave smaller than 1/3 R-wave height; P-wave smaller than 1/5 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). See "Repolarization Tails" on page 6-9 for more information.

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 morphology, 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. Any 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 the single lead arrhythmia monitoring option. 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.

Once the end of atrial fibrillation is detected, the **End AFIB** alarm will occur when the atrial fibrillation condition has been absent for the a-fib/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

The phenomenon of bundle branch or any of the other fascicular blocks creates 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. Any 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 the single lead arrhythmia monitoring option. Extra vigilance is required by the clinician for this type of patient.

Paced Patients

When monitoring paced patients, it is important to set the pacing status correctly to enable pace pulse detection. You can change pacing status at the Information Center in the patient sector, **Patient Window** or the **Measurements** application Profiles page. When the pacing status is on, the paced icon  displays in the sector and in the **Patient Window**. The icon is the color of the ECG with an X through it when pacer detection is set to **Off**.

Note — A red question mark displays over the paced icon when the patient's paced mode status is unconfirmed. The Information Center assumes the **Paced Mode** is **On**. If the patient has a cardiac pacemaker (including demand, fixed, or any type) the **Paced Mode** should be set to **On** indicating that pace pulse detection is on. In addition if the patient has no pacemaker be sure to set pacer detection **Off** to allow the ST/AR algorithm to work most effectively.

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 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 noncapture 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.

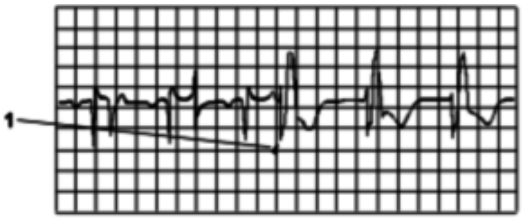
  Consult the pacemaker manufacturer for information on the RF susceptibility of their products and the use of their products with the telemetry devices.

  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.

Repolarization Tails

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.

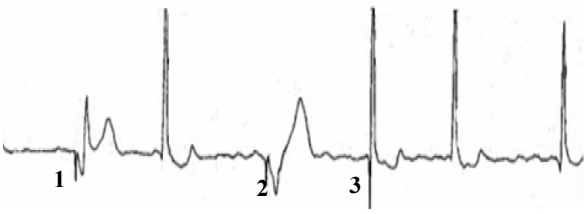
If you note a visible repolarization tail, choose a lead that decreases the size of the repolarization tail.



1 Repolarization tail (note width)

Fusions and Pseudofusion Beats

Avoid fusions and pseudofusion beats.



1 Fusion
2 Paced
3 Pseudofusion

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 15 first 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.
- All other alarms are not 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 "Fallback" on page 6-11.
- A **Leads Off** INOP condition that has been active for more than 60 seconds ends.
- When the MX40 re-associates with the Information Center.

Multilead Analysis

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

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

Multilead 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. This happens whenever:

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

Note—During this learning phase the system will continue 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.

EASI ECG Monitoring

Whenever there is an INOP condition, the arrhythmia algorithm performs a Relearn, using the available lead.

Warning

Since Relearn happens automatically, if 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:

1 Respond to the INOP message (for example, re-connect the electrode(s).

2 Ensure that the arrhythmia algorithm is labeling beats correctly.

Monitoring During Leads Off

Fallback

Multilead Analysis

If there is a **Leads Off** INOP in the primary lead for >10 seconds, the active secondary lead becomes the primary lead. This is known as lead fallback. In lead fallback, the arrhythmia system switches the leads on the display. When the Leads Off condition is corrected, the leads are switched back.

Singlelead Analysis

For single lead analysis, if there are two leads available, the other lead is made the primary lead (until the **Leads Off** condition is corrected).

EASI ECG Monitoring

If one of the derived EASI leads has an INOP condition (for example, A, I, E, or S **Leads Off**), 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 a **Cannot Analyze ECG** INOP condition, you can use the three EASI leads to troubleshoot.

1 Access the **ECG Analysis** window by clicking the **Patient Window** button from the task bar then select **ECG Analysis** from the list that displays.

2 Select **Show Raw Leads**.

3 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.

Extended Monitoring (Telemetry)

For telemetry-monitored patients, when both the primary and secondary leads have a **Leads Off** condition, if another lead is available it becomes the primary lead and the system does a relearn. This is called extended monitoring.

Extended monitoring applies if:

- Telemetry is configured for extended monitoring ON.
- The lead set provides more than two leads — 5-wire or 6-wire lead set if using IntelliVue Telemetry System or MX40 device.

Status Messages

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

- Rhythm 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 "Levels of Arrhythmia Analysis" on page 6-2).

Rhythm Status Messages

Message	Description
Asystole	No beat detected for a period > the asystole threshold (2.5 to 4.0 seconds)
Vent Fib/Tach	Fibrillatory wave (sinusoidal wave between 2-10 Hz) for 4 consecutive seconds
V-Tach	A run of consecutive beats labeled as V with run length ≥ V-Tach Run limit **and** ventricular HR > V-Tach HR limit
Sust V-Tach	Ventricular Tachycardia rhythm for more than 15 seconds
Vent Rhythm	A run of consecutive beats labeled as V with run length > than the Vent rhythm limit **and** ventricular Heart Rate ≤ the V-Tach limit
Vent Bigeminy	A dominant rhythm of N, V, N, V, N
Vent Trigeminy	A dominant rhythm of N, N, V, N, N, V, N, N
Paced Rhythm	A dominant rhythm of paced beats
Irregular HR	An irregular rhythm of beats labeled as N (R-R interval changes >12.5%)

Message	Description
Sinus Brady* **Sinus Rhythm*** **Sinus Tachy***	A dominant rhythm of SV (supraventricular) beats preceded by P-waves
SV Brady* **SV Rhythm*** **SV Tachy***	A dominant rhythm of SV (supraventricular) beats not preceded by P-waves
Unknown Rhythm	Rhythm cannot be determined
Learning ECG	Algorithm is learning the ECG beat morphology
Learning Rhythm	Algorithm is learning the rhythm of the classified beats
Cannot Analyze ECG	Beats predominantly labeled as A or ?
Cardiotach Mode	Arrhythmia analysis mode is Cardiotach

*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 5 beats.

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

Rhythm	Adult Range	Ped Range	Neo Range
Brady	15 to 60	15 to 80	15 to 90
Normal	60 to 100	80 to 160	90 to 180
Tachy	> 100	> 160	> 180

Ectopic Status Messages

Message [Numeric definition is in brackets]	Explanation
(No message displayed)	No ectopic activity detected within the last minute
Run PVCs [longest run in last minute]	A run of > 2 consecutive beats labeled as V in the last minute
Pair PVCs [number of pairs in last minute]	Two consecutive beats labeled as V between two beats not labeled as V in the last minute

Message [Numeric definition is in brackets]	Explanation
Pause [number of pauses/missed beats in last minute]	Paced mode: R-R interval > user-specified pause threshold Non-paced mode: R-R interval > variable missed beat threshold or user-specified pause threshold
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 Pace [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)
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.)
Multiform PVCs [number of PVCs detected in last minute]	The occurrence of two different shaped beats labeled as V in the last 300 beats repeated in last 60 beats. The beat in question must not have adjacent beats labeled V.
Frequent SVPBs [number of beats labeled as S detected in last minute]	>5 beats labeled as S in the last minute
SVPBs [number of SVPBs in last minute]	1-5 SVPBs 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
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

False Alarms

If you are getting false alarms perform the following steps:

1 Access the **ECG Analysis** window by clicking the **Patient Window** button from the task bar then select **ECG Analysis** from the list that displays. The Information Center displays the leads available for this patient. Check the arrhythmia beat labels by selecting **Show Beat Annotations** (on by default) on the **ECG Analysis** window. The beat labels indicate how the arrhythmia system is classifying beats.

2 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 -- the beat label should not be above the pacer spike which would indicate that the algorithm is detecting the pacer spike as a QRS.

3 If you don't agree with how beats are labeled select **Relearn Arrhy** to cause the system to relearn the patient's ECG. See "Learning" on page 6-10 for additional information on learning.

Note—If you initiate learning 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.

4 If you still don't agree with how the system is labeling beats, change the ECG lead(s) to get better waves for arrhythmia analysis.

5 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. If you change to single-lead analysis, make sure that this optimized lead occupies the first ECG channel when you have more than one ECG lead displayed.

7

ST Monitoring

This section describes the ST Segment algorithm.

Introduction

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 or the MX40 Wearable monitor, 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 needs to 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

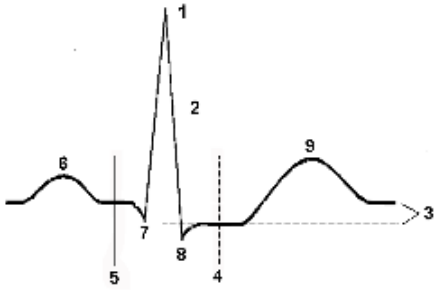
Some clinical conditions may make it difficult to achieve reliable ST monitoring, for example:

- 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

The 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 Setup page.

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

Displayed ST Data

ST data can be displayed as values in the patient sector, **Patient Window** and other 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.

Displayed STE Data

STE data can be displayed in the **Measurements** application STE page (see “STE” on page 4-42). An STE map can be displayed in the patient sector (see “Patient Sector Adjustments” on page 1-20).

Derived 12-Lead ECG

In view of the high degree of redundancy among the standard 12-Lead ECG leads, it is quite conceivable that a more practical leadset 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.

Caution

Derived ECG 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

When operating with the IntelliVue Information Center iX, the optional Hexad algorithm generates a Mason-Likar 12-lead ECG from a 6-wire leadset (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 *12 Lead ECG Monitoring Using a Reduced Lead Set Application Note*, Part Number 452296278591.

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. If contiguous leads are present, ST values in two contiguous leads have to exceed the lead specific alarm limits. If no contiguous leads are present, alarms will be based on single lead limit violation. Turning ST alarms off turns off alarms for all ST leads.

STE Alarms

The STE alarm is a yellow alarm. It is announced after exceeding alarm limits for one minute. It can be turned on and off at the Information Center, however its limits are set during configuration and not adjustable on per patient basis (see “Information Center Configuration” on page 12-1). 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.

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 sooner based upon the values obtained.

8

QT/QTc Interval Monitoring

This section describes QT interval monitoring.

Intended Use

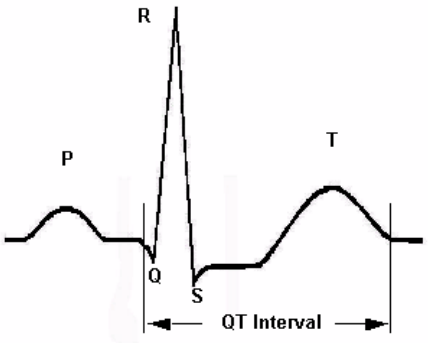
The intended use of the ST/AR QT/QTc analysis algorithm is for use by the physician in the risk assessment process indicated for neonatal, pediatric and adult patients with and without symptoms of arrhythmia. QT measurement is intended to be used by qualified health professionals in hospital or clinical 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 parameter values. You can see the parameter values for QT, QTc, ΔQTc and QT-HR in the **Measurements** application QT page. Access the QT page by selecting the **Measurements** button in the **Main Setup** window then selecting **QT** from the **Measurements** window. As with other parameters the QT parameter values are stored, trended and can be exported.

The table below provides descriptions for each of the QT measurements.

Measurement	Definition
QT	QT interval in milliseconds. The QT interval is the time between the beginning of the Q-wave and the end of the Twave.
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, however, 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 QT page.

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.

Alarm	Definition
Cannot Analyze QT	When the QT parameter 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 parameter value. The Information Center displays the QT parameters without the question mark during initial startup and during the learning phase. In addition text displays below the current QT values in the QT Setup window providing additional information regarding the INOP. See "QT Status Messages" on page 8-4 for a description of the QT status messages that display.

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 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 that 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
QT Startup	QT measurement is starting up or has been reset.
Asystole Or Leads Off	Not all specified leads needed to perform QT analysis are available, or asystole condition is detected.
Insufficient Valid Leads	Not enough valid QRS complexes to generate a QT measurement.
Invalid Rhythm For QTC	Not enough valid RR intervals to generate QT-HR, the averaged HR used for QTc calculation.
High QT-HR	QT-HR exceeds the specified upper limit of 150 bpm (for adults) or 180 bpm (for neonates and pediatrics).
QT Out Of Range	QT measurement is outside the specified range of valid QT values (200-800 msec)
QTc Out Of Range	QTc measurement is outside the specified range of valid QTc values (200-800 msec)
QTc Erratic	QTc measurements are not stable
Small T Wave	T-wave of the signal is too small.
Small R Wave	R-wave of the signal is too small.
End Of T Not Detected	End of the T-wave cannot be accurately detected.

9

Patient Data Review

This section describes the Information Center's patient data review applications.

The Information Center Review Applications

Patient data storage begins when the patient is connected to a bedside monitor or telemetry device. The Information Center provides review applications that allow you to display a patient's physiological parameters and alarm events that have been collected from a bedside monitor or telemetry device and stored over time in the database.

Note —It can take up to 60 seconds for data to be stored and available for viewing in the Information Center review applications.

The review applications display data in a variety of formats so that clinicians can use it to evaluate the patient's status and make rapid diagnosis/prognosis, medication adjustments, and discharge/transfer decisions.

Note —At times, all available data sections may not be visible. You can use the  button to switch between data sections.

The Information Center provides a set of standard review applications. In addition (depending on the license available on your system) you may have customized review windows available to you. The customized review windows 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 Information Center standard review windows and review windows that have been created and uniquely named for you. **Alarm Review** is always available.

Information Center Standard Review Applications

All available Information Center review applications are accessible from the **Main Setup** window as well as from any Information Center application window. The Information Center default review applications are **Alarm Review** and **General Review**. The other review applications are available by license.

Window	Description
Alarm Review	Displays the alarm events that have been automatically stored as well as strips that have been manually saved. See "Alarm Review" on page 9-8.

Window	Description
General Review	Displays the data history as a dashboard of waves, events, trends and tabular data. See "General Review" on page 9-15.
Hemodynamic Review	A specialty review, similar to **General Review**, that displays hemodynamic relevant waves, numerics, trends and events.
Respiratory Review	A specialty review, similar to **General Review**, that displays respiratory relevant waves, numerics, trends and events.
Neuro Review	A specialty review, similar to **General Review**, that displays neurological relevant waves, numerics, trends and events.
Cardiac Review	A specialty review specifically designed for cardiac patients. This review application retrospectively stores all ECG waves and stores ST Snippets and ST Maps for review.
12-Lead Capture Review	Displays a 10-second retrospective review of the 12 EASI derived ECG waves for EASI-enabled bedside monitors and telemetry or the results of 12-Lead captures performed at an IntelliVue Patient Monitor or from the **Cardiac Review** Multi-Lead view at the Information Center. See "12-Lead Capture Review" on page 9-27.

Customized Review Windows

For systems with the Advanced Speciality Review license, in addition to the standard Information Center review windows, your system may have review windows available that have been set up and named specifically for your unit. These customized review windows, set up in **System Configuration**, can be modifications to a standard review window or they can be a new, uniquely named review window set up to meet the specific monitoring needs of your unit.

Customized review windows can contain any of the following views for displaying data:

View	Description
Graphic Trend	Allows you to see a patient's physiological parameters collected over time from a bedside monitor or telemetry device in graphic format. See "Graphic Trend View" on page 9-21.
Tabular Trend	Displays all available parameter data in rows and columns suitable for charting purposes. See "Tabular Trend View" on page 9-23.
Compressed Wave	The compressed waves provides 1 to 60 minutes of full disclosure waves. See "Compressed Waves View" on page 9-16.
Strip	The Strip Window view allows you to see uncompressed waves for an alarm or saved strip in detail for review or annotation. See "Strip Window View" on page 9-10.
Event	Provides an overview of the frequency and duration of specific events. See "Events View" on page 9-18.

View	Description
ST Map	Allows you to view of all ST leads in two circular charts; a limb leads chart and a chest leads chart.
ST Snippets	Allows you to view the most recent averaged snipped from ST/AR for all available ECG leads.
Multi-Lead	Provides a retrospective review of waves for all available ECG leads. See "Multi-Lead View" on page 9-25.
ECG Statistics	Displays all available ECG statistical data in rows and columns suitable for charting purposes.

See the *IntelliVue Information Center iX Release B.01 Clinical Configuration Guide* for details on the Retrospective Configuration application and configuring and customizing review windows.

Review Window Features

The Information Center review windows provide the following basic functionality:

Feature	Description
Reporting	You can print a report from the review windows by selecting the Print button  on the top of the window. When you select the print button a dialog box displays where you can select the parts of the review window you would like to print. With **Alarm Review** you can select specific alarms or saved strips to print.
Time Focus	The review windows allow you to display data for a specific period of time. The time focus, for review application windows, displays in the caption bar. If you enter a review window from another review window, the cursor time position for that patient is the same as it was on the previous review window. If you enter a review window directly from another application window other than a review application window the current time frame and current values are displayed. **Alarm Review** and 12-Lead open with the time focus of the most recent stored event. If you navigate to the other review applications, you keep the time focus of the event in focus.
Timeline	A timeline displays on the bottom of the Information Center review windows. The default timeline is 24 hours. The timeline is divided into gray and white sections. The white section, called the View Duration, identifies the length of time for which alarms events and trends are displayed. The View Duration default is 8 hours. Click anywhere on the timeline to change the time focus. Alarms are identified on the timeline by corresponding red and yellow lines. *Note* —**Alarm Review** has no View Duration. The **Alarm Review** timeline displays all alarms per selected alarm filter.

Feature	Description
Cursor/Page Arrows	The current time focus is indicated on the timeline by a black cursor. Clicking anywhere on the timeline changes the time focus. You can also change the time focus in review windows by "paging" backward and forward. In the timeline, you move by a timeline duration with the double arrows and a view duration with the single arrows. The default view duration is 8 hours.
	Settings icon. Use to change the View Duration or Timeline Duration. The default View Duration is 8 hours and the default Timeline Duration is 24 hours. Changes you make to the View or Timeline Duration only apply to data for the patient you are currently viewing. Closing the review window or selecting another patient for which to review data returns the View and Timeline Durations to their defaults and the current time.
	Prior Unit icon. Available for systems with Web Portal configured. The icon displays in the review window header to indicate that data from a prior unit is available for the current patient. Clicking the icon provides a web-based view of the patient's previous retrospective data. See "Accessing Prior Unit Data" on page 9-32.
Data Updating	The data in a review window updates when you navigate forward in time or exit and return to the window.

Review Window Icons

Icons on the right side of the Information Center review application windows provide access to additional functions. The table below describes the icons that may be available.

Icon	Description
	Use to print a report of a review window section.
	Use to initiate a recording of a strip.
	Use to switch between review window views. For example, you can switch from a graphic trend to a tabular trend, and then switch to an event view.
	Available from **Alarm Review**, use to filter the type of alarm strips that display for review. For example, you can view all alarm strips or only yellow alarm strips.
	Use to navigate to the next or previous strip.

Icon	Description
	Use to annotate strip labels, add e-caliper measurements and re-label alarm strips. If available in the review application, you can also generate a wave strip report of strips you select. This is particularly important for procedure reports. See "Using Strips in Review Windows" on page 9-5.
	Use to access a larger view of the review window section.
	Use to delete the current strip.
	Use to change review window settings.
	Available from **Alarm Review**, use to create, delete and edit custom alarm labels.

Using Strips in Review Windows

Strips in the review applications enable you to view wave details. Strips have 30 seconds of data.

The table below describes how to use the strip windows to display details.

If you want to...	Do this...
Move back/forward in time	Use the single arrows to move the time back/forward by approximately one second. Use the double arrows to move back/forward by a page. A page is how much time is viewable on your screen. *Note*—You can also move through the strip by clicking and dragging.
Change the wave size (scale)	On the desired wave, click the calibration bar and choose the size you want from the list that displays. Choices are **x1/2**, **x1**, **x2** and **x4**.
Change the wave speed	Click the speed on the bottom right of the strip window then select a speed from the list that displays. Choices are **6.25 mm/s**, **12.5 mm/s**, **25 mm/s**, or **50 mm/s**. When you select a different speed the window re-displays with the selected speed.
Add or remove waves from the strip window	Click **Waves** on the bottom of the strip window then select the wave from the list that displays. A wave is selected for inclusion in the strip window when a check mark displays next to the wave name. The waves available are those that were sent to the Information Center at the requested timeframe.

If you want to...	Do this...
Center drifting strip waves when there is baseline wander on the ECG signal	Select the **ECG Filter** check box. ECG Filter helps to keep the wave on a single flat baseline that can more easily be seen.
Minimize waves overlapping possible due to high amplitude of waves.	Select the **Clip Waves** check box. Orange triangles indicate if wave data is clipped above or below the wave's viewable area. Red arrows are visible if waves are drawn outside of the viewable area in the strip.
Save the strip.	Click the  icon. A **Saved strip** dialog box opens that allows you to re-label the alarm, enter a comment, make measurements and/or save the strip. The label you choose and the comments you enter will then be visible when the strip is displayed in **Alarm Review**. If the strip is included in an alarm report, the comment will be printed in the report.
Add comments or use the electronic calipers for ECG measurements, such as the R to R interval. *Note*—Electronic calipers is a purchased option. The option is not available on the IntelliVue Information Center iX Express.	To make a measurement: 1 Click the  icon (alternatively you can select the **Calipers** check box). 2 If using **Alarm Review**, select a label, if desired, from the **Label** drop down list. 3 Specify a comment, if desired, by typing in the **Comment** box. 4 Click the strip once to fix the first point of the caliper to the strip. 5 Drag the cursor and release to fix the second point and display the measurement. 6 Select a measurement by clicking on a measurements button. 7 Make additional measurements if desired by completing steps 3 through 5. 8 When you are done making comments or annotations, click the **Save** button. The measurements are saved to the strip. To adjust measurements Horizontally: • Click the right vertical arrow or left vertical arrow as appropriate and drag the line to the desired position. Vertically (for example, to move the measurement away from the waveform): • Click between the vertical lines and drag up or down as appropriate. The measurement is removed when another action is taken in the strip window. Therefore, to print the strip with the measurement, first make the measurement, then print the strip.

If you want to...	Do this...
Print a report of a single strip.	Click the  icon to the right of the strip.
Make a recording of the strip.	Click the  icon.
Save or print a strip report.	1 Click the  icon. A **Saved strip** dialog box opens. 2 Click 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 Click **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 click **Remove**. 5 Click **Print All** to save and print the strips. *Note*—If you open a strip by clicking a compressed wave, and your system does not have a separate custom wave strip tile, 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.
Clear the strip from the screen.	Select the X button on the top of the strip.

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 Window view. 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, hover 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 sense any alerts or events, the message **No Data Available** is displayed in the striped area.

Conditions That Result in a Wave Gap

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.
- 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

Alarm Review

The **Alarm Review** window allows you to view stored alarms and saved strips. Stored alarms are alarms that are automatically added to alarm history when the alarm is generated. Saved strips are waves that you manually save from other review windows.

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.

Views

The **Alarm Review** window provides the following views of stored alarms and saved strips:

- Compressed Waves — Allows you to see 30-second compressed wave strips. See “Compressed View” on page 9-9.
- Strip Window — Allows you to see uncompressed waves for an alarm or saved strip in detail for review or annotation. See “Strip Window View” on page 9-10.

- Tabular — 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 View" on page 9-13.

You can use the  button on the right side of the window to switch between the views. The sections that follow describe how to use each of the views.

Compressed View

The Compressed view 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 windows 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 view. In half screen mode five wave strips display in the Compressed view.

The alarm strips display:

- The date and time of the alarm/strip.
- The alarm text.
- Vital signs associated with the alarm strip.
- Any 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 specific 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 waves strips by clicking the up or down arrow on the right side of the Compressed view. You can page through the compressed wave strips by clicking the up or down double arrows on the right side of the Compressed view. The double arrows move back/forward by a page (five or 10 alarms). The single arrows move back/forward by one alarm.

The table below describes how to use the Compressed view.

If you want to...	Do this...
Filter the alarm(s) or saved strip(s) for viewing	Click the  icon on the right side of the Compressed view then select a specific alarm type for viewing from the list that displays.
Search for particular alarm strips	Enter up to a 32-character search text in the **Search** field then click the Search icon. The Information Center 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 all alarms that match.
Change the current timeline duration	1 Click the  icon on the bottom right of the Compressed view. 2 To change the timeline duration, click the **Timeline Duration** down arrow then select a time from the list that displays. The default is **24 Hours**. 3 Click **OK**.

If you want to...	Do this...
View uncompressed waves for an alarm or saved strip	Click on the alarm then select the **Strip Window** button. The strip displays with waves for viewing and printing in an uncompressed format for the alarm. Use the arrow keys to scroll backward and forward.
Make a recording of a compressed wave strip	Move your cursor over the desired compressed wave 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 would like to print by clicking in the **Select** check box next to the desired strip(s). 2 Click the  icon from the **Alarm Review** window header. The two highest priority waves, if available, are printed for each alarm.
Delete compressed wave strips	1 Select the strip(s) you would like to delete from **Alarm Review** by clicking in the **Select** check box next to the desired compressed strip(s). 2 Click the  icon on the right side of the Compressed view. 3 Confirm that you would like to delete the strip by clicking the **Yes** button. *Important*—Deleting the strip also deletes the alarm and associated event from the Events view.
Change the wave size	Click on the calibration bar on the desired compressed strip then select the size of the wave you want. Choices are **x1/2**, **x1**, **x2**, and **x4**.

Strip Window View

The Strip Window view allows you to see uncompressed waves for an alarm or saved strips in detail 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, the strip displays with no compressed waves on the bottom.

The alarm strip shows the vital sign parameter that is currently alarming, as well as other parameters at the alarm announce time. The parameters and values display across the top of the strip. The parameters 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—Rarely, there may be gaps in the wave data in **Alarm Review**. This can occur when a device first comes online and associates with the Information Center, 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 view does not include gap annotations (see "Viewing Gaps in Wave Data" on page 9-7).

The following table describes how to use the Strip Window view.

If you want to...	Do this...
Move back/forward in time.	Use the single arrows on the bottom of the strip to move the time back/forward by approximately one second. Use the double arrows to move back/forward by a page. *Note*—You can also move through the strip by clicking and dragging.
Navigate to the next/previous alarm.	Click the right or left arrows to the right of the strip as appropriate.
Filter the alarms that display for the current timeline duration according to certain groups of alarms for example ECG alarms or red alarms only.	Click the  icon then select an alarm group from the list that displays. A list of available alarms for the current timeline duration that match the filter criteria 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.	Enter a 1- to 32-character search text in the **Search** box and then click the  icon. 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.
Change the wave speed.	Click the speed on the bottom right of the strip window, then select a speed from the list that displays. Choices are **6.25 mm/s**, **12.5 mm/s**, **25 mm/s**, or **50 mm/s**. When you select a different speed the window re-displays with the selected speed.
Add or remove waves from the strip.	Click **Waves** on the bottom of the strip window then select the wave from the list that displays. A wave is selected for inclusion in the strip window when a check mark displays next to the wave name.
Center drifting strip waves when there is baseline wander on the ECG signal.	Select the **ECG Filter** check box. ECG Filter helps to keep the wave on a single flat baseline that can more easily be seen.
Minimize waves overlapping possible due to high amplitude of waves.	Select the **Clip Waves** check box.

If you want to...	Do this...
Re-label the alarm.	Click the  icon. A dialog box will appear 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 then 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 caliper in strips to measure intervals, such as R-to-R.	To make a measurement: 1 Click the  icon (alternatively, select the **Calipers** check box). 2 Re-label the alarm, if desired by selecting a label from the **Re-label:** drop down list. 3 Specify a comment, if desired, by typing in the **Comment** box. 4 Click the strip once to fix the first point of the caliper to the strip. 5 Drag the cursor and release to fix the second point and display the measurement. 6 Select a measurement by clicking on its button. 7 Make additional measurements if desired by completing steps 3 through 5. 8 When you are done making measurements click the **Save** button. The measurements are saved to the strip. To adjust measurements Horizontally: • Click the right vertical arrow or left vertical arrow as appropriate and drag the line to the desired position. Vertically (for example, to move the measurement away from the waveform): • Click between the vertical lines and drag up or down as appropriate.
Print a 30-second strip report of a single strip.	Click the  icon to the right of the strip.
Make a recording of the strip.	Click the  icon. You will get a recording with 30 seconds of stored waveform.

If you want to...	Do this...
Add a custom alarm label	1 Click the icon to the right of the strip. The **Custom Alarms Labels** dialog box displays. 2 Click the **Add** button. 3 Enter a 1- to 25-character alarm label in the box that displays. 4 Select the **OK** button. You can assign the new custom label to the current alarm strip by clicking the icon. Custom alarm labels appear at the top of the label list.
Edit an existing custom alarm label	1 Click the icon to the right of the strip. The **Custom Alarms Labels** dialog box displays. 2 Select an existing custom alarm label from the list. 3 Select the **Edit** button. 4 Enter a 1- to 25-character alarm label in the box that displays. 5 Select the **OK** button. *Note*—You can assign the edited label to the current alarm strip by clicking the icon.
Delete an existing custom alarm label	1 Click the icon to the right of the strip. The **Custom Alarms Labels** dialog box displays. 2 Select the label you want to delete from the list. 3 Select the **Delete** button.

Tabular View

Alarm Review's Tabular view 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 View" on page 9-10 for information on using the **Alarm Review** strip windows). You can select an alarm strip for display in the strip window by clicking on 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 view by using the scroll bar on the right.

If you want to...	Do this...
Add comments or use the electronic calipers for ECG measurements, such as the R to R interval. *Note*—Electronic calipers is a purchased option. Electronic calipers are not available on the IntelliVue Information Center iX Express.	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 Click the  icon on the top of the **Alarm Review** window. A report prints with: - 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 parameter. So, for example, if the alarm is RR Low, the Resp wave will be shown as the second wave. - Annotations, if available, print above the strip along with an event time stamp.
Delete selected alarm strips.	1 Select the strip(s) by clicking in the check box next to the alarm in the tabular list. An alarm is selected when a check mark displays in the check box. 2 Click the X button on the right side of the **Alarm Review** window. 3 Verify that you would like to delete these alarm strips by clicking the **Yes** button.

Fast Alarm Review

Fast Alarm Review enables you to quickly silence and view the alarm wave and take immediate action on the alarm. This capability is configurable for all red alarms only, all alarms, or is disabled.

If enabled, selecting the Silence/Review icon  for an active alarm silences the alarm and opens a strip for that alarm. (Clicking or, for touch screen displays, touching anywhere in the sector, except on a button, silences the alarm without displaying the strip.) If your unit does not allow silencing of bedside-generated alarm conditions at the Information Center, the Fast Alarm icon  displays instead of the Silence/Review icon. Selecting the icon opens the Fast Alarm Review strip for that alarm.

Note—If there is an application window open for any patient, when the  icon is selected, the Fast Alarm Review strip overlays it.

Depending on your screen resolution, the alarm strip contains at least 30 seconds of unannotated 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—15 seconds of post-alarm data may not be available in Fast Alarm 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.

When Fast Alarm Review is open, the following buttons are available:

Button	Action
	Dismisses the window and returns to the previous window or displays the Main Screen.
	Deletes the alarm (it will not be stored) and closes the window.
	Produces a 15-second recording of the alarm.
	Prints the Fast Alarm Review screen.
	If paging is available on your system, sends a page of the alarm to the paging device(s) for the caregiver(s) assigned to this patient.
	Use to annotate strips labels, add electronic caliper measurements and re-label the alarm strip. *Note* —Electronic calipers are not available with the IntelliVue Information Center iX Express.

See “Using Strips in Review Windows” on page 9-5.

General Review

The **General Review** window displays the data history as a dashboard of compressed waves, events, graphic trends, and tabular display allowing you to view and compare retrospective patient data in a variety of formats. It provides a comprehensive way for you to review your patient's monitoring history.

Views

The following views are available with the **General Review** window for displaying retrospective data:

- Compressed Waves — The Compressed waves view provides 1 to 60 minutes of full disclosure waves. You can switch between viewing the compressed waveform or a strip by clicking the  icon to the right of the compressed wave or by clicking on the compressed wave. See “Compressed Waves View” on page 9-16.
- Strip Window — The Strip Window view allows you to see uncompressed waves for an alarm or saved strip in detail for review or annotation. See “Strip Window View” on page 9-10.
- Events — Provides an overview of the frequency and duration of specific events. The specific events available in the Events view depend on your system configuration. See “Events View” on page 9-18.
- Graphic Trend — Allows you to see a patient’s physiological parameters collected over time from a bedside monitor or telemetry device in graphic format. The parameters available in the Graphic Trend view depend on your system configuration. See “Graphic Trend View” on page 9-21.
- Tabular Trend — Displays all available parameter data in rows and columns suitable for charting purposes. See “Tabular Trend View” on page 9-23.

For single-display Information Centers, click the icon on the bottom half of the window to switch between the available views.

Reports

You can print a report of selected views within **General Review**. To print a report:

1 Click the print button () on the **General Review** window header. The **Select Tiles to Print** dialog box displays.

2 Select the views to include in the report by selecting the check box next to the view name.

3 Click **OK**. A report of the selected views prints on your default printer.

Compressed Waves View

The Compressed Waves view provides 1 to 60 minutes of full disclosure waves (default is 12 minutes).

You can switch between viewing the compressed waveform or a strip by clicking the icon to the right of the compressed wave.

Note—12 minutes of full disclosure waves are available with the IntelliVue Information Center iX Express.

The table below shows how to use the compressed wave view.

If you want to...	Do this...
View waves for an event of interest (for example, an episode of VTACH)	Move your 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.	1 Click the icon to the right of the compressed wave. The Compressed Wave Setup dialog box opens. 2 Select the number of minutes from the **Duration** drop-down list. The larger the number of minutes the less detail shown. Choices are **1 minute**, **3 minutes**, **6 minutes**, **12 minutes**, **30 minutes**, and **60 minutes**. 3 Click **OK**. A red rectangle displays on the compressed wave area indicating the corresponding time selection. *Note* —Alternatively, you can click the number of minutes on the bottom right of the compressed wave and select a number of minutes from the list that displays.

If you want to...	Do this...
Change the wave size.	1 Click the  icon to the right of the compressed wave. The **Compressed Wave Setup** dialog box opens. 2 Select the wave size from the **Wave Gain** drop-down list. Choices are **x1/2**, **x1**, **x2**, and **x4**. 3 Click **OK**.
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 click. 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 Strips in Review Windows" on page 9-5 for details on using review window strips.
Access a larger view of the compressed wave section.	Click the  icon to the right of the compressed wave. The compressed wave area expands. Click the **X** (**Close**) button to return to the previous view.
Change or add waves that display.	Move your cursor into the compressed wave area, then click the Waves 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: 1 minute duration = 6 maximum waves 3 minute duration = 5 maximum waves 6 minute duration = 4 maximum waves 12 minute duration = 3 maximum waves 30 minute duration = 2 maximum waves 60 minute duration = 1 maximum waves

If you want to...	Do this...
Print a report or make a recording of a compressed wave for a specific length of time.	1 Move your cursor into the compressed wave area, then right-click at the point where you want the printout or recording to begin. Select **Start** from the menu that displays. The word Start displays on the wave. 2 Move your cursor to the point where you want the printout or 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 Do one of the following: - To print a recording of the specified wave duration, right-click in the wave and then select **Record** from the menu. - To print a report of the specified wave duration, right-click in the wave and then select **Print** from the menu.

Events View

The Events view provides an overview of the frequency and duration of specific events (for example, V-Tach). 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 Wearable monitor.
- Arrhythmia events for example, R-on-T.

On the left side of the Events view, events are sorted into groups. Event data or information is organized in hierarchical form starting from general information and moving through increasingly detailed data. Click the plus sign next to the group name to expand the list to view specific alarms/events. For example, the Red Arrhythmia Alarms category includes V-Fib/Tach, V-Tach, Extreme Tachy, Tachy (Pulse), Extreme Brady, and Brady (Pulse). An event or event group is selected for view if a check mark appears in the check box. Clear the check box to remove the display of specific events or alarms.

Note —The available events depend on your monitoring device and system configuration.

Note —The HR event appears as a ***HR** in the Events view whether or not it is configured to be a yellow (**) or short (*) yellow alarm.

Cursor/Event Information

The Events view provides the following information whenever the event cursor matches the onset of an event:

- The time and date corresponding to the position of the event cursor displays on the bottom left of the Event view along with the name of the event, the actual value and name of the parameter (if applicable) that violated the event limit.
- The event count to the right of each event bar reads X/Y, where X is the number of events at and to the left of the event cursor and Y is the total number of such events within the current View Duration. For example, 3/5 tells you that there are a total of 5 events in that row, and 3 of the events occurred before or at the time of the cursor bar.

- You can use the left and right cursor arrows to jump to the next (or previous) event. Alternatively, you can click and drag through the Events view area. This allows you to quickly go from event to event and see the associated waves (and trends in full screen).

Event Bars

The Events view provides bars to show the duration from the detection of the event to when the event was acknowledged (silenced) or the condition ended for non-latched alarms.

Event bars are color-coded to represent 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.

Hover over an event to see the alarm text for the event. If there are multiple events at the cursor time, then the alarm text for each of the events displays sorted by their start times. Click on an event to compare with other data view sections (Compressed Wave, Graphic Trend, and Tabular Trend views).

Signal Quality Indicator

The Events view 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 Vtach 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. Hovering 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 12-Lead and derived 12-Lead.

Color	Signal Quality	Minimum Valid Leads		
	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	Less 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	None	Less than six chest leads available and/or less than two limb leads available.	ECG is off	ECG is off

Graphic Trend View

The Graphic Trend view allows you to see a patient's physiological parameters collected over time from a bedside monitor or telemetry device in linear trend format. It allows you to see how a patient has been trending over time.

- Data begins collecting as soon as it is received from the bedside or telemetry device.
- Five parameter labels display across the top of the Graphic Trend view.
- Only the first parameter with scales is active upon entry. Activate additional parameters, if desired, by clicking on the parameter name.
- You can change the parameters to view and compare by clicking the parameter drop down arrow then selecting a parameter from the list that displays. Only parameters currently being sourced are available for selection.

  Note —If the top parameter is **Any X** then no parameters for that group are being sourced at the time of the view duration.
- Data that is out of bounds is drawn to the respective top or bottom of the view with a red arrow indicating that the data is outside of the scale.
- If Trend Upload is available on your system, a gray highlight displays around numeric data uploaded from an IntelliVue Patient Monitor. With Trend Upload numeric data collected on an IntelliVue Patient Monitor Release K or higher while the monitor is not connected to the Information Center is automatically uploaded once the monitor connects to the Information Center. Up to 8 hours of data can be uploaded.

  Note —For systems configured to upload to the EMR, if the Information Center is disconnected from the EMR when the trend upload happens the data does not automatically export to the EMR when connection is regained. The data will automatically export when the next trend upload occurs.

The table below describes how the Information Center displays different parameters.

Parameter	Display
Continuous	The Information Center displays single-value continuously monitored parameters, such as heart rate with a single line plot and triple-value periodic parameters, such as invasive blood pressure with three lines of the same color. The values used in the trend are the median over one minute. For view durations less than 1 hour, values are 12-second medians. For view durations that are greater than or equal to 1 hour but less than 4 hours, the values are 60-second medians. For view durations greater than or equal to 4 hours, the values are 5-minute medians.
Aperiodic	The presentation of aperiodic, non-continuous, parameters depends on the number of values to be shown. Aperiodic parameters are presented as discrete graphic data points with an X indicator. Triple-value aperiodic parameters (for example, NBP) appear as an X at the mean value with arrow indicators at the systolic and diastolic values. Aperiodic parameters are not averaged and are always displayed as exact values. If more than one aperiodic value falls into the same column, the latest value is shown.
Rates	Rates (Paced Rate, S-S Rate, V-V Rate, and so on) are displayed in graphic form as two trend lines.

Parameter	Display
Histograms	Numerics can be presented as histograms by clicking the icon then clicking the **Graphic Trend With Histograms** radio button on the dialog box that displays.

The table below describes how to use the Graphic Trend view.

If you want to...	Do this...
Select a different parameter to trend	Click the **Parameter** drop down arrow then select a parameter from the list that displays. The parameters available are those that are currently being sourced within the Information Center.
Compare one or more parameter trends	To select additional parameters to view and compare, click on the parameter name on the top of the Graphic Trend view. You can change the parameters to view and compare by clicking the parameter drop down arrow then selecting a parameter from the list that displays. Only parameters currently being sourced are available.
Remove/inhibit the display of a parameter trend from the Graphic Trend view	Click on the parameter label to enable/disable the parameter and it's data from being displayed.
Change the trend scale	To create your own custom scale: 1 Click on the desired parameter scale then select **Customize**. 2 Provide a high and low scale value by using the up and down arrows. 3 Click **OK** to set your selection. The new scale displays in the Graphic Trend view and data is drawn relative to the new scale selection. Data that is out of bounds is drawn to the respective top or bottom of the view. A red caret indicates that the data is outside of the 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 by clicking and dragging it up or down as appropriate. This allows you to overlap trends to determine if changes in trends can be correlated.
Change the time focus	Click anywhere on the timeline on the bottom of the window to change the time focus to that time. The white section, called the View Duration, identifies the length of time for which trends are displayed. You can move forward and backward in time by clicking on the Graphic Trend and dragging left or right to the desired time.

If you want to...	Do this...
Change the time period for a trend	1 Click the icon on the right side of the Graphic Trend view. The **Graphic Trend Setup** dialog box displays. 2 Select the number of hours from the **View Duration** drop-down list. 3 Click **OK**. The Graphic Trend view and the View Duration on the timeline updates to reflect the new time selection. Alternatively, you can drag the view duration or use the arrows in the timeline. Clicking on the single arrows moves the view duration by one view duration; clicking the double arrows moves the timeline by one timeline duration.
Display one parameter value in a bar chart form/histogram	1 Select a parameter to display from the left most parameter drop down list. 2 Click the icon on the right side of the Graphic Trend view. The **Graphic Trend Setup** dialog box displays. 3 Select the **Graphic Trend With Histogram** radio button. 4 Click **OK**. A histogram in bar chart form for the selected parameter displays to the right of the Graphic Trend view. You can only display one parameter at a time with histogram.

Tabular Trend View

The Tabular Trend view displays all available parameter data in rows and columns suitable for charting purposes. The time interval between parameter values, for example 10, 15 or every 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, and if desired, print only those vital signs with NBP.

The table includes:

- Rows of data points for the specified parameters.
- Columns of time indicators spaced per the selected time resolution.
- The parameter label is always in black.
- A highlighted column corresponding to the nearest minute for 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. If an IntelliVue Patient Monitor, Release K or higher, is not connected to the Information Center, the trend numeric data is automatically uploaded once connection to the Information Center is established.

Note the following:

- For most parameters, the value in the tabular trend is the median value. For view durations less than 1 hour, the displayed values are 12-second medians. For view durations greater than or equal to 1 hour but less than 4 hours, the displayed values are 60-second medians. For view durations greater than or equal to 4 hours, the values are 5-minute medians.

- For triple-valued pressure parameters, the median of the mean pressure is determined and the corresponding systolic and diastolic values are used for the tabular trend values.
- For ST parameters, the value displayed is the value corresponding to the maximum absolute value over the interval.
- For NBP, the timestamp printed in the tabular report is the time the Information Center received the NBP data from the bedside.
- If there are multiple aperiodics available for the selected interval, a drop down arrow is available where you can view all with their associated timestamp.

The table below describes how to use the Tabular Trend view.

If you want to...	Do this...
Access a larger view of the Tabular Trend view	Click the  icon to the right of the compressed wave. The compressed wave area expands. Click the X (close) button to return to the previous view.
Change the time focus within the table	Click on the desired time column in the Tabular Trend view. The time focus updates to the selected column time.
Expand the number of rows displayed in the table	Click on the +/- button in the row to expand or collapse the sub rows. When you click + number of tabular rows displayed increases.
Move the tabular display backward or forward in time	Use the horizontal scroll bar on the bottom or use the right and left arrow buttons.
Change the View Duration	1 Click the  icon on the right side of the Tabular Trend view. The Tabular Trend Setup dialog box displays. 2 Select the number of hours from the View Duration drop-down list. 3 Click **OK**. The Tabular Trend view 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 Click the  icon on the right side of the Tabular Trend view. The **Tabular Trend Setup** dialog box displays. 2 Select NBP Interval or the number of minutes from the **Tabular Interval** drop-down list. The options available depend on the hour selected in the View Duration. 3 Click **OK**. When you filter by NBP Interval, each NBP parameter occupies one column in the Tabular Trend view. The column header reflects the NBP time. If there is no NBP for the selected View Duration, the interval will default to a select time interval, such as 30 minutes if using an 8 hour View Duration. If there is an NBP in the View Duration, but you move to a different View duration for which there is no NBP 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 view	Click the  icon to the right of the Tabular Trend view.

Multi-Lead View

The Multi-Lead view 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.

If:

- Only one lead is sourced then only one lead displays.
- Two leads are being sourced and one of the leads is a chest lead then the two leads display.
- Both leads are limb leads then six leads display.
- Three leads are being sourced and all three leads are limb leads then six leads display.
- Two leads are limb leads and one lead is a chest lead then seven leads display.
- Only one lead is a limb lead and two leads are chest leads then three leads display.
- If using EASI or Hexad derivation, then all 12 leads will display. For EASI, all 12 leads are derived. For Hexad, eight waves are measured and four V-leads are derived.

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 view. If any of the 12 leads are derived, then a 12-Lead with measurements only can be captured at the Information Center. When 12 leads of wave data are available for capture, a capture button  displays in the Multi-Lead view. You can view 12-Lead captures generated from the full disclosure data in the **12-Lead Capture Review** window. See “12-Lead Capture Review” on page 9-27.

Using This Window

The table below describes how to use the Multi-Lead View window.

Note—When you move your cursor over the Multi-Lead view, settings that are available for modification are highlighted in gray. The table below describes each of these settings.

If you want to...	Do this...
Capture a 12-Lead ECG from retrospective data	For systems with 12-Lead Full Disclosure available, click the  icon to the right of the Multi-Lead View window to capture the ECG. The new capture displays in a **12-Lead Capture Review** window. You can store up to 100 12-Lead captures for a patient per database server. If the maximum number of stored captures is reached and you attempt to capture the ECG the Information Center automatically deletes the oldest, unlocked capture. See "12-Lead Capture Review" on page 9-27 for information on using the 12-Lead Capture window. *Note*—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. *Note*—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 12 Lead Export feature available, click the  icon. The **12-Lead Review Export Setup** window displays. See "12-Lead Export Setup" on page 9-30 for information on using the export feature.
Change the wave layout	Move your cursor over the Multi-Lead view, click the wave layout on the top right side of the window, then select a wave layout from the list. With **3x4 ST Map** layout an ST Map displays on the bottom of the view. With **3x4 1R ST Map** only 8 seconds of data displays across the width of the view with an ST Map vertically oriented on the right side. You can change the scale of the ST Map by clicking on the map and selecting a size from the list.
Change the wave size	Move your cursor over the Multi-Lead view, click on the calibration bar, then select the wave size. Leads are redrawn according to your choice. The chest gain is dependent 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 your cursor over the Multi-Lead view, click on the speed on the bottom of the window then select the speed from the list that displays. The window re-displays with the selected speed.

If you want to...	Do this...
Change the rhythm lead	Move your cursor over the Multi-Lead view, click on the rhythm lead label (for 3x4 1R, 3x4 3R and 3x4 1R ST Map only) on the bottom left of the window then select a lead from the list that displays.
Access a larger view.	Click the  icon to the right of the Multi-Lead View window. The view area expands. Click the **X** (close) button to return to the previous view.
Center drifting strip waves when there is baseline wander on the ECG signal.	Move your cursor over the Multi-Lead view then select the **ECG Filter** check box. ECG Filter helps to keep the wave on a single flat baseline that can more easily be seen.
Minimize waves overlapping possible due to high amplitude of waves.	Move your cursor over the Multi-Lead view then select the **Clip Waves** check box.
Print a report	Click the  icon on the right of the Multi-Lead View window. A report of the current Multi-Lead View layout prints.

Customized Views

If your hospital is licensed for specialty reviews, you may have review applications customized for your unit. In addition to the tiles described in "General Review" on page 9-15, you may also have four additional types of data views, including Multi-Lead, ST Snippets, ST Map, and ECG Statistics.

12-Lead Capture Review

The **12-Lead Capture Review** window allows you to see the results of 12-Lead ECG captures performed at a wired or wireless IntelliVue Patient Monitor or from any review window on the Information Center that is configured to display the Multi-Lead view (for example, the Cardiac Review's Multi-Lead view).

When data is captured using a standard 10-wire lead set, 10 seconds of wave data and interval measurements can be reviewed in the **12-Lead Capture Review** window. ECG analysis interpretation statements display in the **12-Lead Capture Review** window if your system is set up to show interpretation statements. See the *Philips DXL ECG Algorithm Physician's Guide* (part number 4535 641 06411) for a complete list of the interpretation statements.

When the data is captured using derived leads (EASI or Hexad) 10 seconds of the wave data and interval measurements may be reviewed in the **12-Lead Capture Review** window. Interpretation statements are not available when the capture is performed using derived lead placement.

A maximum of 100 12-Lead captures are available per patient per database server. If the maximum number of captures is reached and a new capture is performed then the oldest, unlocked capture is automatically deleted. The Information Center and the IntelliVue Patient Monitor allow you to save (lock) up to 30 specific captures so they are not deleted.

Caution

If different algorithms are used on other IntelliVue Information Centers iX or the 12 Lead Cart, care must be taken 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* part number 4535 641 06411 Edition 4.

Using this Window

The table below describes how to use the **12-Lead Capture Review** window.

Note—When you move your cursor over the capture, settings that can be modified 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** window. • 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 capture data to a networked machine	If the 12-Lead Export feature is available, click the  icon on the right side of the window. The **12-Lead Export Setup** window displays. See "12-Lead Export Setup" on page 9-30 for information on the export feature.
Delete the selected 12-Lead capture	Click the  icon on the right side of the window, and then confirm that you want to delete the capture by clicking the **Yes** button.
Change the wave layout	Move your cursor over the capture, click the layout on the top right side of the capture, and select a layout from the list. If you select **3x4 STMap**, an ST Map displays at the bottom of the capture. If you select **3x4 1R STMap**, 8 seconds of data displays across the width of the capture. An ST Map displays vertically on the right side of the capture.
Change the rhythm lead	Move your cursor over the capture, click the rhythm lead label on the bottom left of the capture, and select a lead from the list.

If you want to...	Do this...
Change the wave size	Move your cursor over the capture, click on the calibration bar, and select the size of the wave you want to view. The leads are redrawn. The chest gain is dependent on the limb wave size. Select **Chest Gain: Full** to display the chest wave the same size as the limb wave. Select **Chest Gain: Half** to display the chest wave as half the size of the limb wave.
Change the wave speed	Move your cursor over the capture, click on 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 your cursor over the capture, click on the filter label on the bottom right of the capture, then select the bandwidth from the list. The setting you choose 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** window. 2 Click 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 Click **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	Click the  icon on the right side of the window. Unlock the capture by clicking the icon again. You can lock up to 30 captures.
Print the currently displayed capture	Click the  icon on the top of the window. A landscape report of the current **12-Lead Capture Review** layout prints.
Filter the types of captures that available for display	Click 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	Click the and icons on the right side of the window.

12-Lead Export Setup

Use the **12-Lead Export Setup** dialog box to export 12-Lead ECG data. 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.

Note—The data that is accepted at the time of export is determined by the receiving system.

Note—Do not export 12-Lead Hexad data to TraceMasterVue. Although the Information Center does not prevent you from exporting Hexad data and the export appears to be successful, TraceMasterVue does not accept Hexad data.

To export 12-Lead data:

1 Select the  icon on the right side of the **12-Lead Capture Review** window.

The **12-Lead Export Setup** dialog box opens.

2 Select the **Report Data** tab.

3 Enter the following:

- **Order #**: Enter a 1- to 24-character order number. If an order number has been entered at the bedside, the number will display in this field.

  Note—The **Order #** field is unavailable for manual entry if you have the 12-Lead ECG Order interface and there are current orders not yet fulfilled.
- **Reason**: Specify a reason for requesting this export by typing a 1- to 32-character reason in the field, or if your system has been set up with configured reasons, select a reason from the drop down list.
- **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 drop down 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 drop down list.
- **Fac**: Select the facility for the 12-Lead capture from the drop down list. After the first export, this will be the default facility.
- **Dept**: Select the department for the 12-Lead capture from the drop down list. After the first export, this will be the default department.
- **Comment 1-5**: Enter up to five comments, each of which can contain up to 32 characters, in the comment fields.

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 Click the **Save** button.

7 Verify that the selected patient and demographic information is correct, then select the **Export** button to initiate the export.

Note—Timestamps between the Information Center and the receiving device may not match due to differences in timestamp location for the receiving device.

Note—Captures and exports are all logged in the Audit Log.

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 conventional 12-Lead or EASI 12-Lead) label.
- Hospital name.

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 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 guide 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 audited and includes the 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, selected through an order list using the dialog box, or entered manually when there are no orders from the order interface. An order can be assigned to a 12-Lead captured from 12-Lead retrospective data. It is important to use an order number ID for reimbursement purposes.
Order Due	Time that the order should be fulfilled by performing a 12-Lead.
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 un-assigned from a 12-Lead, it will be 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 cancelled, the order is removed from the order list. An error is logged if an order that is already assigned to an exported ECG is cancelled.
- The 12-Lead Order feature is associated with a license and must be enabled through the License activation process following installation.

Accessing Prior Unit Data

For systems with a Web Portal host configured, the IntelliVue 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 IntelliVue Information Center Release N or higher 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 an icon  displays in the review window header that you can click to view the previous data.

To access patient data from a prior unit:

1 Click the  icon from the review window header.

2 Select the correct patient then click **OK**. A web-based view of the selected patient's retrospective data for the current review application displays. The amount of data available depends on where the patient data is stored; either the Information Center iX or Information Center Release N+. See your appropriate Instructions For Use for information on how data is saved on Discharge.
If you are accessing data for a patient discharged from another Information Center iX then the web based review window that displays matches the review window you have open when you select the  icon. If you are accessing data for a patient discharged from an IntelliVue Information Center Release N+ the web review application that initially displays depends on the review window you have open when you click the  icon. See the table below for details.

3 When you are done reviewing the previous unit data, click the **X** button in the review window title bar to return to the currently open review window.

If This Information Center iX Review Window is Open	This Information Center Release N+ Web Review Window Displays
Alarm Review	Alarm Review
12 Lead Capture Review	Captured 12 Lead
General Review	Wave Review
Any other review window	Wave Review

Information Center Web Access

This section describes how to use review windows with the Information Center Release N or higher.

Intended Use

The Information Center Web application is intended for read-only viewing of patient's physiologic data, at remote locations via the hospital's HIS LAN web access (hospital intra/internet) including review of existing Alarm, Event, Wave, Trend, and ST segment (adults) to gain information for treatment, to monitor adequacy of treatment, or to exclude causes of symptoms. The Information Center Web is a retrospective application that provides access to near real-time physiologic data or alarms, and is not intended to support real-time event annunciation or triage of real-time clinical situations. All access to data is read-only.

The clinical use of the information provided by the Information Center Web is to supplement information gathered through other means.

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.

For information on setting up the system, please see the Information Center Service Manual.

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. The functionality of Information Center Web applications is comparable to the **Alarm Review**, **General Review**, **Cardiac Review**, **12 Lead Capture Review** and **Patient Window** applications on the Information Center. This review includes ST Snippets, Multi Lead, and ECG statistics.

Note —For information on viewing patient data remotely through PIIC Remote iX Multi Patient View see the *PIIC iX Web Application Service and Users Guide*.

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 a user name and password is required enter them in the **Windows Security** dialog box. The **Patient Selection** page displays.
4. Select a unit for which to display patients by clicking the **My Unit** drop down arrow then selecting the unit name from the list that displays. The units included in the list are units to which you have access and are being actively monitored by an Information Center. The **Patient Selection** page displays a list of all beds in the unit. If the patient has been admitted to the Information Center, the name and medical record number display along with the bed label.
5. Select the patient or bed you want. The **Alarm Review** window displays with the bed label and patient name/medical record number (if available) at the top the window.

6 Select another application, if desired, by clicking on the appropriate tab on the top right side of the window. Choices include **Alarm Review**, **General Review**, **Cardiac Review**, **12-Lead Capture Review** and **Patient Window**.

You can use navigation buttons on each application window to view the desired data. The applications are equivalent to the Data Review applications at the Information Center, with the same specifications, such as number of alarms available, number of hours of waveform data, and so on.

See the sections that follow for instructions on individual applications.

7 To view data for a different patient/bed, click the **Patient Selection** tab.

8 To end the session, click **Sign Out**.

Notes on Use

- Settings selected in one application persist for other applications. That is, if you select a time focus in **Alarm Review**, when you go to **General Review**, the data will have 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.
- The browser controls, such as Back, Refresh, Save, Print, and Stop operate as they normally do with other web applications.
- To refresh the application window, right-click in the window, and click **Refresh** on the popup menu.

  Note —Right-click functionality is not available on touch screen displays.

Alarm Review with Web Access

The **Alarm Review** window contains an alarm strip on the top of the window with a tabular list of alarms on the bottom left of the window. The time focus is set to the currently displaying alarm strip. When you first enter the window 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 that alarm type, date/time of the alarm and alarm text on the bottom of the window. You can select a specific group of alarms to view in the tabular list, for example, **Red Alarms** by selecting the specific alarm type from the **Alarm Filter** list on the bottom right side of the window. The default is **All Alarms**. Select an alarm from the tabular list to view the corresponding alarm strip. Click the **Previous** or **Next** buttons to move back and forth sequentially within the list of alarms or use the tabular list.

The table below describes how to use this window.

If you want to...	Do this...
Move back/forward in time	Use the single arrows on the bottom of the strip to move the time back/forward by approximately one second. Use the double arrows to move back/forward by a page.
View a specific alarm strip	Select the alarm for the tabular list on the bottom of the window. *Note*—You can navigate to a specific alarms by selecting the alarm type from the **Alarm Filter** list then selecting the alarm from the tabular list.

If you want to...	Do this...
Change the wave size (scale)	Click the **Wave Gain** drop down arrow then choose the size you want from the list that displays. Choices are **x1/2, x1**, **x2** and **x4**.
Change the wave speed	Click the **Speed** desired radio button to the right of the right of the strip. Choices are **25 mm/s** and **50 mm/s**. When you select a different speed the window re-displays with the selected speed.
Add or remove waves from the strip	Click in the **Waves** check box for the desired waves. You can select up to four waves to display. A wave is selected for inclusion in the strip when a check mark displays next to the wave name.
Center drifting strip waves when there is baseline wander on the ECG signal.	Select the **ECG Filter** check box. ECG Filter helps to keep the wave on a single flat baseline that can more easily be seen.
Minimize waves overlapping possible due to high amplitude.	Select the **Clip Waves** check box.

General Review with Web Access

The **General Review** window provides you with a variety of formats for viewing retrospective data. The compressed waves display on the top half of the window. On the bottom half of the window you can switch between viewing a Graphic Trend, Tabular Trend, or Event view by clicking the **Change Tile** drop down arrow then selecting the desired view from the list that displays.

Compressed Waves View

The compressed waves provide 12 minutes of full disclosure waves. You can switch between viewing the compressed waveform or an alarm strip by clicking **Change Tile** drop down arrow then selecting **Strip**.

If you want to...	Do this...
View the waves greater/less detail	Select the number of minutes from the **Wave Duration** drop-down list. The larger 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** drop-down list. Choices are **x1/2**, **x1**, **x2**
Get a strip to view waves in greater detail	Click the **Change Tile** drop down arrow then select **Strip**. See "Using Strips in Review Windows" on page 9-5 for details on using review window strips.

If you want to...	Do this...
Change or add waves that display	Click in the **Waves** check box for the desired waves. You can select up to four waves to display. A wave is selected for inclusion in the strip when a check mark displays next to the wave name.

Events View

The Events view provides an overview of the frequency and duration of specific events.

- **Cursor/Event Information**

  The Events view provides the following information whenever the event cursor matches the onset of an event:

  – The time and date corresponding to the position of the event cursor displays on the bottom left of the Events view along with the name of the event, the actual value and name of the parameter (if applicable) that violated the event limit.

  – The event count to the right of each event bar reads X/Y, where (X) is the number of events at and to the left of the event cursor and (Y) is the total number of such events on the screen. For example, 3/5 tells you that there are a total of 5 events in that row, and 3 of the events occurred before or at the time of the cursor bar.

  You can use the left and right cursor arrows to jump to the next (or previous) event.

- **Event Bars**

  The Events view provides event bars to show the duration from the detection of the event to when the event was acknowledged (silenced).

  Event bars are color coded to represent the severity of the event. The color of the event indicates the severity.

Color	Severity
Red	*** Life threatening alarms.
Yellow	** Limit violation alarms.
Cyan	All INOP conditions and non-alarming events.
Blue	Arrhythmia events.

Graphic Trend View

The Graphic Trend view allows you to see a patient's averaged physiological parameters collected over time. See "Graphic Trend View" on page 9-21 for additional information on the Graphic Trend view.

If you want to...	Do this...
Select a different parameter to trend	Click the **Left Parameter** drop down arrow then select a parameter from the list that displays.
Compare parameter trends	To select another parameters to view and compare click the **Right Parameter** drop down arrow then select a parameter from the list that displays.

If you want to...	Do this...
Display one parameter value in a bar chart form/histogram	1 Select a parameter to display from the left most parameter drop down list. 2 Click in the **Show Histogram** check box. A histogram in bar chart form for the selected parameter displays to the right.

Tabular Trend View

The Tabular Trend view displays all available parameter data in rows and columns suitable for charting purposes. The time interval between parameter values, for example 10, 15 or every 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 parameters and columns of time indicators spaced per the selected time resolution.

Note — For most parameters the value displayed in the tabular trend is the *median* value selected from five 12-second samples (valid data only). For triple-valued pressure parameters, the median of the mean pressure is determined and the corresponding systolic and diastolic values are used for the tabular trend values. For ST parameters, the value displayed is the value corresponding to the maximum absolute value over the interval. For P, S, and V rates, the minimum and maximum within the interval is displayed. For NBP the timestamp printed in the tabular report is the time that the Information Center received the NBP data from the bedside.

The table below describes how to use the Tabular Trend view.

If you want to...	Do this...
Move the tabular display backward 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** drop-down list.
Change the time resolution for the tabular trends	Select number of minutes from the **Tabular Interval** drop-down list. The number of minutes available depend on the hour selected in the **View Duration**.

Twelve-Lead Capture Review with Web Access

The **12-Lead Capture Review** window allows you to see the results of 12-Lead captures performed at the IntelliVue 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 10 seconds of the wave data and interval measurements can be reviewed in the **12-Lead Capture Review** window. ECG analysis interpretation statements display in the **12-Lead Capture Review** window if available. See the *Philips 12-Lead Algorithm Physician's Guide* (M5000-91000) for a complete list of the interpretation statements.

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.

When the data is captured using derived leads 10 seconds of the wave data and interval measurements may be reviewed in the **12-Lead Capture Review** window. Interpretation statements are not available when the capture is performed using derived lead placement.

The table below describes how to use the **12-Lead Capture Review** window.

If you want to...	Do this...
Select a particular capture for display	On the bottom of the window select the tabs labeled with dates and time to display a capture for a particular time. • 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	Click the **Format** drop down arrow on the right side of the window the select a wave layout from the list that displays. With **3x4 ST Map** layout the ST Map displays on the bottom of the view. With **3x4 1R ST Map** the ST Map displays on right side.
Change the rhythm lead	Click on the rhythm lead label then select a lead from the list that displays.
Change the wave size	Click **Limb Gain** drop down arrow then select the size of the wave you want. Leads are re-drawn according to your choice. The chest gain is dependent on the limb wave size. Select **Chest Gain: Full** if you want the chest wave to display as the same size as the limb wave or select **Chest Gain: Half** to display the chest wave as half the size of the limb wave. Chest leads are re-drawn according to your choice.
Change the wave speed	Click on the **Speed** drop down arrow then select the speed from the list that displays (25 mm/s or 50 mm/s). When you select a different speed the window re-displays with the selected speed.
Change the filter bandwidth	Click on the **Filter** drop down arrow then select the desired bandwidth from the list that displays.

Cardiac Review with Web Access

Cardiac Review is a review application specifically designed for cardiac patients that allows you see cardiac relevant waves, numerics, trends and events. It provides a variety of formats for viewing retrospective data. When you first enter the **Cardiac Review** window with Web Access the compressed waves display on the top half of the window and an Event view displays on the bottom. On the Compressed Waves view you can switch between viewing a strip, a Multi-Lead, or ST Snippets view by clicking the **Change Tile** drop down arrow and selecting your desired view from the list that displays. On the bottom half of the window you can switch between viewing a Graphic Trend, Tabular Trend, ECG Statistics or Event view by clicking the **Change Tile** drop down arrow then selecting the desired view from the list that displays. The sections that follow describe how to use each of the **Cardiac Review** views.

Compressed Waves View

The compressed waves view provides 12 minutes of full disclosure waves. You can switch between viewing the compressed waveform, a strip, a Multi Lead view, or ST Snippets by clicking the **Change Tile** drop down arrow then selecting your desired view from the list that displays.

If you want to...	Do this...
View the waves greater/less detail	Select the number of minutes from the **Wave Duration** drop-down list. The larger 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** drop-down list. Choices are **x1/2**, **x1**, **x2**
Get a strip to view waves in greater detail	Click the **Change Tile** drop down arrow then select **Strip**. See "Using Strips in Review Windows" on page 9-5 for details on using review window strips.
Change or add waves that display	Click in the **Waves** check box for the desired waves. You can select up to four waves to display. A wave is selected for inclusion in the strip when a check mark displays next to the wave name.
Access a larger view of the Compressed Wave or Strip	Click the **Maximize**  button to the top right of the compressed wave or strip. Click the **Minimize**  button to return to the previous view.

Multi-Lead View

The Multi-Lead view allows you to view multiple leads of ECG.

If you want to...	Do this...
Change the wave layout	Click the **Format** drop down arrow then select a wave layout from the list that displays. With **3x4 ST Map** layout an ST Map displays on the bottom of the view. With **3x4 1R ST Map** only 8 seconds of data displays across the width of the view with an ST Map vertically oriented on right side. You can change the scale of the ST Map by clicking on the **ST Map Scale** drop down arrow then selecting a size from the list that displays.

If you want to...	Do this...
Change the wave size	Click **Wave Gain** drop down arrow then select the size of the wave you want. Leads are re-drawn according to your choice. The chest gain is dependent on the limb wave size. Select **Chest Gain: Full** if you want the chest wave to display as the same size as the limb wave or select **Chest Gain: Half** to display the chest wave as half the size of the limb wave. Chest leads are re-drawn according to your choice.
Change the wave speed	Click the **Speed** drop down arrow then select the speed from the list that displays. The window re-displays with the selected speed.
Change the rhythm lead	Click the **Rhythm Waves** drop down arrows (for 3x4 1R, 3x4 3R and 3x4 1R ST Map only) then select a lead from the list that displays.
Access a larger view.	Click the **Maximize**  button to the top right of the window. The view area expands. Click the **Minimize**  button to return to the previous view.

ST Snippet View

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 view	Select the **Show Baseline** check box.
Superimpose the current measurement points (ISO and ST) on to the ST segment	Select the **Show Measurements** check box.
Change the size of ST waves	Click the **Wave Gain** drop down arrow then select the wave size from the pop-up list that displays.
Change the wave speed	Click the **Speed** drop down arrow then select the speed from the list that displays. The window re-displays with the selected speed.
View an ST Map along with the ST Snippets	Click the **Format** drop down arrow then select **3x4 ST Map**. An ST Map displays on the bottom of the view with ST Snippets on top. You can change the scale of the ST Map by clicking **ST Map Scale** drop down arrow and selecting a size from the list that displays.

If you want to...	Do this...
Access a larger view	Click the **Maximize** button to the top right of the ST Snippets view window. The view area expands. Click the **Minimize** button to return to the previous view.
Scroll to next and/or previous ST Snippets	Click the double arrows below the ST Snippets view.

Events View

The Event view provides an overview of the frequency and duration of cardiac events.

- **Cursor/Event Information**

  The Event view provides the following information whenever the event cursor matches the onset of an event:

  – The time and date corresponding to the position of the event cursor displays on the bottom left of the Event view along with the name of the event, the actual value and name of the parameter (if applicable) that violated the event limit.

  – The event count to the right of each event bar reads **X/Y,** where (X) is the number of events at and to the left of the event cursor and (Y) is the total number of such events on the screen. For example, 3/5 tells you that there are a total of 5 events in that row, and 3 of the events occurred before or at the time of the cursor bar.

  – All events for the specific time focus are listed in the **Select Current Event** drop down list on the bottom left side of the Event view sorted by event start times.

  You can use the left and right cursor arrows to jump to the next (or previous) event.

  On the left side of the Events view events are sorted into groups. Event data or information is organized in hierarchical form starting from general information and moving through increasingly detailed data. Click the plus sign next to the group name to expand the list to view specific alarms/events. You can remove the display of specific events/alarms by clicking the **Event Group:** check box next to the event or event group. An event is selected for view when a check mark appears in the box.

  – **Event Bars**

  The Event view provides event bars to show the duration from the detection of the event to when the event was acknowledged (silenced).

  Event bars are color coded to represent the severity of the event. The color of the event indicates the severity.

Color	Severity
Red	*** Life threatening alarms.
Yellow	** Limit violation alarms.
Cyan	All INOP conditions and non-alarming events.
Blue	Arrhythmia events.

Graphic Trend View

The Graphic Trend view allows you to see a patient's averaged physiological parameters collected over time.

If you want to...	Do this...
Select a different parameter to trend	Click the **Left Parameter:** drop down arrow then select a parameter from the list that displays.
Compare parameter trends	To select another parameters to view and compare click the **Right Parameter:** drop down arrow then select a parameter from the list that displays.
Display one parameter value in a bar chart form/histogram	1 Select a parameter to display from the left most parameter drop down list. 2 Click in the **Show Histogram** check box. A histogram in bar chart form for the selected parameter displays to the right.

Tabular Trend View

The Tabular Trend view displays all available parameter data in rows and columns suitable for charting purposes. The time interval between parameter values, for example 10, 15 or every 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 parameters and columns of time indicators spaced per the selected time resolution.

Note — For most parameters the value displayed in the tabular trend is the *median* value selected from five 12-second samples (valid data only). For triple-valued pressure parameters, the median of the mean pressure is determined and the corresponding systolic and diastolic values are used for the tabular trend values. For ST parameters, the value displayed is the value corresponding to the maximum absolute value over the interval. For P, S, and V rates, the minimum and maximum within the interval is displayed. For NBP the timestamp printed in the tabular report is the time Information Center received the NBP data from the bedside.

Note — You may note differences in where the Information Center records data in the tabular trend as compared to where the IntelliVue Patient monitor records data even though the reported data is close if not exact. The data is the same. The difference is only in where that data shows up in the tabular report.

The table below describes how to use the Tabular Trend view.

If you want to...	Do this...
Move the tabular display backward 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** drop-down list.
Change the time resolution for the tabular trends	Select number of minutes from the **Tabular Interval** drop-down list. The number of minutes available depend on the hour selected in the **View Duration**.

ECG Statistics View

The ECG Statistics view displays all available ECG data in rows and columns suitable for charting purposes. The table shows both numerical and time information.

If you want to...	Do this...
Access a larger view of the ECG Statistic view	Click the **Maximize**  button to the top right of the ECG Statistics view window. The view area expands. Click the **Minimize**  button to return to the previous view.
Move the view backward 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	Click the **Trend Interval** drop down arrow then select number of minutes from the drop-down list. The Trend Interval specifies the time between the columns in the ECG Statistics view. In addition to fixed time lengths you can select **Algorithm Interval**. Algorithm Interval refers to the interval at which the statistics is calculated by the data source for example the bedside monitor or Information Center.
Change the time focus	Click anywhere on the timeline on the bottom of the window to change the time focus to that time. The white section, called the View Duration, identifies the length of time for which trends are displayed. You can also move forward and backward in time by clicking on 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 all the recent alarms and related information by clicking 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/forward in time	Use the single arrows to move the time back/forward by approximately one second. Use the double arrows to move back/forward by a page. *Note*—You can also move through the strip by clicking and dragging.
Change the wave size (scale)	On the desired wave, click the calibration bar and choose the size you want from the list that displays. Choices are **x1/2**, **x1**, **x2** and **x4**.

If you want to...	Do this...
Change the wave speed	Click the speed on the bottom right of the strip window then select a speed from the list that displays. Choices are **6.25 mm/s**, **12.5 mm/s, 25 mm/s**, and **50 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	Click **Waves** on the bottom of the strip window then select the wave from the list that displays. 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 of the strip.	Click the **Print** button to the right of the strip.
Save the strip to the clipboard.	Click 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

Alarm Paging

This section describes using the Alert Data Integration paging option.

Introduction

Optionally, 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 textual format to a paging device such as a pager or cell-phone. In addition, for paging devices capable of displaying graphical images, waveform snippets are sent.

Warning

The paging system is a secondary alarm notification system. It is not for primary notification of alarms, physiological, or demographic data. Receipt by the external software device of alerts is not confirmed and delivery to the end 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. The primary alarm notification device is the bedside monitor if there is one. If there is no bedside monitor the primary alarm notification device is the Information Center.

Your paging system can be set up to automatically send alarm pages to paging devices when specific alarm types occur. In addition your system may be set up that certain caregiver roles automatically receive pages for certain alarm types. For example, the **Nurse** role may be configured to receive red and yellow alarms, and the **Care Tech** role may be configured to receive just INOP alarms. At the Information Center you can:

- Assign caregivers to paging devices. See "Caregiver Setup" on page 3-2.
- Specify the types of alarms that will generate an automatic page for a patient through the **Measurements** application **Alarm Filters** page. When a matching alarm occurs for the patient a page is sent to the patient's assigned caregiver's paging device. See "Alarm Filters" on page 4-51.
- Manually send a page to a paging device(s) from Fast Alarm Review. See "Sending a Page From Fast Alarm Review" on page 10-3.
- Send a text message to a paging device by selecting the **Page** button in the **Patient Window** or from the **Caregiver Assignments** window. See "Sending a Text Message" on page 10-4.

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**. The Fast Alarm Review window and Alert Filters page, however, are available.

Data Sent

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.

Caution

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

When an alarm is silenced (acknowledged/audio paused) a cancel message is sent out to the paging system. If the alarm page has not already been sent, it is canceled and is not sent out. 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 parameter text (for example, *** Asystole HR 0 SpO2 92 NBP 120/90).
- If the bed is not assigned to a caregiver, **UNA** precedes the alarm text. **REM** precedes the alarm text for silenced reminder alarms and **USL** precedes an unsilenced reminder alarm.
- The time the alarm occurred.
- The Device Location information for IntelliVue Telemetry System devices and Instrument Telemetry bedsides with the Device Location option.
- Patient name if the patient is admitted and the Clinical Settings are configured to include patient name in the alarm data.

Waveform Data

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. So, for example, if your system is configured for 5 seconds pre-context, the first wave snippet will show 3 seconds of pre-context and the second snippet would show 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 Alarm Review window, 6 seconds of waveform data is sent to the paging device; 5 seconds preceding the alarm and 1 second preceding the alarm. See “Sending a Page From Fast Alarm Review” on page 10-3 for information on manual paging.

Warning

Waveforms rendered on the end-user 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 in nature. 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

The availability of Alert Data Integration should you lose connection to the Primary Server depends on how Alert Data Integration is set up in System Configuration; Distributed or Centralized.

If your system is set up as Distributed, Alert Data Integration runs on each Information Center iX and will continue to operate if you lose connection to the Primary Server.

If your system is set up as Centralized, the Information Center sends alarm information to a Primary Server, which in turn sends it to each paging client. If you lose connection to the Primary Server, Alert Data Integration will not be available and no clinical alarms will be sent to or received by the paging devices. When connection to the Primary Server is lost, the system message **Status: Local** displays in the Information Center caption bar. In addition, a *** alarm indicating that the paging option is not available is sent out to all of the 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 **ICU2:***No Alarm Paging** displays on all the 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 **Alarm paging not available** displays in the Information Center system message area.

Sending a Page From Fast Alarm Review

For systems with the paging option available and Fast Alarm Review enabled, you can send an alarm page from the Information Center by selecting the **Page** button on the Fast Alarm Review window.

The Fast Alarm Review window allows you to send pages, for alarms currently set up to receive pages, to all paging devices for caregivers currently assigned to this bed. When you select the **Page** button an alarm page is sent out to all caregivers currently assigned to this bed and that type of alarm.

Task Summary

To manually send a page from the Fast Alarm Review window perform the following steps:

1. Select the alarm for which you want to send a page by placing your cursor over the alarm/INOP condition message area in the appropriate patient sector then selecting the alarm or INOP from the drop-down list. The Fast Alarm Review window displays.
2. Select the  icon to send a page to the paging device(s) for the caregiver(s) assigned to this patient.

Sending a Text Message

For systems with the paging option available, the Information Center allows you to manually initiate a page to one or more caregivers paging device. You can send a manual page from the **Caregiver Assignments** window or from the **Patient Window**. The page you send can include a text message you provide, if desired, and/or it can it can be an automated message that goes out to one or more caregiver's paging device indicating the caregiver's current bed and alarm notification assignments. For example, a unit charge nurse, at the beginning of a shift, may want to send a message to each of the caregivers (nurse, care tech, and so on) in her unit indicating the beds to which they are assigned along with the alarm the alarm levels (red, yellow, INOP) for which they are setup to receive pages.

To send a manual page from the **Patient Window** perform the following steps:

1. On the Main Setup window select the **Patient Window** button. The **Patient Window** displays.
2. Select the **Page** button. The **Manual Page** window displays.
3. Select the caregiver(s) to which to send a message by clicking in the check box next to the Caregiver's name on the left side of the dialog box. A caregiver is selected when a check mark displays in the box. Alternatively you can select to send a message to all caregivers by placing a check mark in the **Select All** check box.
4. Enter a text message, if desired, by clicking inside the text box on the right side of the dialog box and typing a 1- to 250-character text message.
5. Select the **Page Bed Assignments** check box if you would like to send an automated page indicating the caregiver(s) bed and alarm severity assignments.
6. When you are done entering text select the **OK** button to send the message to the selected caregivers paging devices.

11

Unit Management

This section describes the Philips IntelliVue Information Center iX applications available to assist in your unit management.

Introduction

The Information Center provides the following applications to assist you with unit management:

Application	Description
Caregiver Assignments	Use to setup caregivers and assign caregivers to patients. See Chapter 3, "Caregiver Assignments."
Clinical Settings	Use to configure the Information Center's clinical settings. See Chapter 12, "Information Center Configuration."
Locate Equipment	Use to search units for specific devices as well as display the history for the device. See "Locate Equipment" on page 11-4.
Clinical Audit	Use to view a chronological record of alarms and actions performed within a unit for a patient or all the patients in a unit. See "Clinical Audit" on page 11-2.
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 11-6.
Label Assignment	Use to replace currently assigned bed labels with a different bed label. Label may need to be replaced, for example, in case of equipment failure or a lost device. See "Label Assignment" on page 11-7.
System Help	Use to access help topics with descriptions on how to use the Information Center applications. See "System Help" on page 11-8.

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 11-9.

Clinical Audit

The **Clinical Audit** feature provides a view of a chronological record of alarms and actions performed within a unit for a patient or all the patients in a unit. For example, a patient incident occurs during the night shift and you need to review exactly what happened. You can use the **Clinical Audit** to see what alarms occurred for the patient, where the alarms went, and the actions staff took as a result of the alarms. Or say, for example, a patient requests that a hospital provide a list for all the people who accessed their protected health information. In order to comply with your geography's privacy regulations, you may need to query the system to generate a report of all the users who viewed the patient's information as well as see the other systems to which the patient data may have been sent. You can use the **Clinical Audit** to complete this function. The Information Center stores 90 days of data. You can access 50 days at one time. You can search and display records of alarms and events for a specific patient or you can search and display records for all patients in a particular unit.

Patient Audit Log

To search for records for a specific patient:

1 Click the **Search By:** drop down arrow then select **Patient** from the list that displays.

2 Click the **Search Patient By:** drop down arrow and select whether to search for the patient by bed label, last name or first name.

3 Enter the related **Search Patient By** criteria in the **Search Text:** field. For example, if you are searching by last name enter the patient's last name in this field.

4 Specify a date for which to search for records by entering a date in the **Date** field or by clicking the **Date** drop down arrow then selecting a date on the calendar that displays.

5 Specify the duration for which to display patient data by clicking the **Duration** drop down arrow then selecting a time from the list that displays. The default is to display data for the last 15 minutes.

6 Indicate whether to show records related to specific events or user actions by clicking in the appropriate check boxes in the **Search Filters** fields. You can filter your results to show records for specific alarm types for example, red alarms or by specific user actions for example turning alarms off or changes to caregiver assignments or to filter by both alarm and events.

7 Click the **Search** button. If there is more than one patient with the same name, a dialog box with a list of matching names displays. Select the desired patient from the list then click **OK**. A table with up to 500 records matching your search criteria displays in a table on the right side of the window. If there are more records than can display in the window a scroll bar is available on the right side of the window that you can use to cycle through the records.

The following information displays in the search results:

- Event date/time
- Bed Label

- Action — Alarms display in corresponding colors. Generated and Ended. Generated indicates when the alarm banner first appears in the sector, and Ended when the banner no longer shows in the sector.

  Note—For devices that cannot send enhanced alarm text, all yellow alarms are appended with the value of the corresponding numeric (for example: ** HR High (HR = 122). This numeric is the value obtained closest to the time, but may not be the exact value that caused the alarm. Intellivue Telemetry System bedsides and the MRx monitor only send simple alarm text.

- Lifetime ID (if available)
- Device Name (if available) — The bedside or Information Center host name. This column is blank for wireless bedside monitors.
- Clinical User (if available)

Initially, the records in the table are listed by the most recent event. You can sort the table any way you like by clicking on a column head. For example you can sort the table records by **Bed Label** or **Device Name**.

Unit Audit Log

The Information Center audit logs allow you to search for records for all patients within a unit.

1 Click the **Search By:** drop down arrow then select the unit from the list that displays.

2 Specify a date for which to search for records by entering a date in the **Date** field or by clicking the **Date** drop down arrow then selecting a date on the calendar that displays.

3 Specify the duration for which to display patient data by clicking the **Duration** drop down arrow then selecting a time from the list that displays. The default is to display data for the last 15 minutes.

4 Indicate whether to show records related to specific events or user actions by clicking in the appropriate check boxes in the **Search Filters** fields. You can filter your results to show records by:
   – Specific alarm types for example, red alarms.
   – Specific user actions such as whether the user turned alarms off or made changes to caregiver assignments.
   – Both alarm and events.

5 Click the **Search** button. Select the desired patient from the list then click **OK**. A table with up to 500 records matching your search criteria displays in a table on the right side of the window. If there are more records than can display in the window a scroll bar is available on the right side of the window that you can use to cycle through the records.

Saving an Audit Log

To save the audit log to a removable device:

1 Click the **Export** button and provide a password if prompted. The **Export** dialog box displays.

2 Select the removable device to which to export the log by clicking the **Drive Letter:** drop down list and selecting the drive from the list that displays.

3 Click the **Export** button.

Note — It is also possible to save an audit log in System Configuration to a shared folder on the network. See the *IntelliVue Information Center iX Service and Installation Guide* for details on this process.

Locate 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 location of a device within the hospital. The Locate Equipment application remotely identifies the location of a device by associating the device with access points installed in the hospital. Access points provide communication between the device and the Information Center.

Access the Locate Equipment application by selecting **Locate Equipment** from the **Main Setup** window or by clicking **Manage Unit** from an application window task bar then selecting **Locate Equipment** from the list that displays. The **Locate Equipment** window displays with device location information for all devices assigned to patients in the unit. From the **Locate Equipment** window you can:

- View all assigned and unassigned devices for a particular unit. See "Viewing Devices for a Unit" on page 11-4.
- Search for a device in unit. See "Locating a Device" on page 11-5.
- Display the history of a particular device. See "Displaying Device History" on page 11-6.

Viewing Devices for a Unit

To view devices for a unit from the **Locate Equipment** window:

1 Click the **Unit** drop down arrow then select the unit name from the list that displays.

2 Select whether to view assigned or unassigned equipment for the unit by clicking the **Show** drop down arrow then selecting **Assigned** or **Unassigned** from the list that displays. The **Locate Equipment** window displays the following information:

– **Type**

The device/equipment types assigned or unassigned to the selected unit where:

This Icon	Identifies
	MP2 IntelliVue Patient Monitor
	MP5 IntelliVue Patient Monitor
	MP20/MP30 IntelliVue Patient Monitor
	MP40/MP50 IntelliVue Patient Monitor
	MX40 Wearable Monitor

	TRx Transceiver
	TRx+ Transceiver
	MP60/MP70 IntelliVue Patient Monitor
	MRx monitor

– **Bed**

Identifies the device assigned bed label.

– **Equipment**

Identifies the device assigned display label.

– **Battery**

Indicates whether the device is operating on battery power or not. For devices operating on battery power a battery icon displays indicating remaining battery strength.

– **Location**

For telemetry devices and Instrument Telemetry bedsides with the Device Location option available, identifies the current location of the device. The Location information is empty if the location is unavailable or if the bedside is a device other than a telemetry device or Instrument Telemetry bedside.

– **Timestamp**

Indicates the timestamp the device was at the given location.

– **Status**

For telemetry devices and Instrument Telemetry bedsides, indicates whether or not the device is in range. If the device is in range and has sent data within the last 15 minutes, the device location icon  displays. If the device is in range but has not sent data within the last 15 minutes a blue question mark displays over the icon. If the device is out of range the status is **Out of Area**, and a yellow circle with a line through it displays over the icon.

Locating a Device

For assigned telemetry devices, the **Locate Equipment** window 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 device:

1 From the **Locate Equipment** window select a unit to search by clicking the **Unit** drop down arrow then selecting the unit name from the list that displays.

2 Select to search for assigned devices by clicking the **Show** drop down arrow then selecting **Assigned**.

3 Select the telemetry device you want to find from the list on the left.

4 Click 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** window you can view the history for devices in a unit or you can search for the history of a specific device across units.

To display the device history for devices in a unit:

1 Click the **Unit** drop down arrow then select the unit name from the list that displays.

2 Select whether to view assigned or unassigned equipment for the unit by clicking the **Show** drop down arrow then selecting **Assigned** or **Unassigned**. The **Locate Equipment** window displays.

3 Select the device for which you would like to display history by clicking the device from the list on the left side of the window. The history for the device with up to 50 location entries displays on the right.

To search for a particular device's history across units enter the equipment name for the device in the **History for:** field then click **Search**. Up to 50 location entries display for the device on the right.

The device history includes the following:

- Unit to which the device is assigned.
- 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 indicates whether or not the device is in range. If the device is in range and has sent data within the last 15 minutes, the device location icon  displays. If the device is in range but has not sent data within the last 15 minutes a blue question mark displays over the icon.

Display Setup

Display Setup allows you to change the layout of the patient sectors on the Main Screen. You can specify the number of columns and the number of patient sectors per column that display on the Main Screen. The number of displays and patient sectors available depend on your system configuration.

Available hosts and overview beds are displayed for selection in the **Display Setup** window. After you select a host to set up, you can assign beds to sectors on your host, or assign overview beds from the list on the right to sectors. You can reassign beds to different sectors without discharging the patient. While you are making reassignments, surveillance assignments are shown in red text in the Surveillance list and overview assignments are shown in the Overview list.

To change the layout of the patient sectors on the Main Screen:

1 Access the **Display Setup** application by selecting **Display Setup** on the **Main Setup** window. If prompted, enter a user name and password. The **Display Setup** window displays a list of available beds in the current unit. The default layout is 2 columns with 4 patient sectors per column.

2 To increase or decrease the number of sectors in a column, click the up and down arrows below the desired column. The maximum number of sectors is 8 per column on all screen resolutions. Some features, such as the second header row, will not be available when at 8 sectors per column.

3 To increase or decrease the number of columns, click the up and down arrows in the **Columns** field at the bottom right of the window. The number of columns available to add is determined by the screen resolution, and a warning will appear if unavailable.

4 To assign a bed to a sector, click the desired bed in the **Surveillance** list, then click in the desired sector. Click the **Auto Assign** button if you want the Information Center to automatically assign the bed to the next available sector. When you select **Auto Assign**, the Information Center fills in all the bed labels starting on the left, working down, then moving to the next column to the right.

5 To lock the beds to the sector, click the **Lock Assigned** button or click the lock icon. You can unlock a locked sector by clicking the lock icon again.

Caution

If you are using Switch Port Mapping you **must** lock bed labels to the sector.

6 To remove a bed from a sector, move your cursor over the top right corner of the desired patient sector, and click the X (**Unassign**) button to unassign the bed.

7 When you are done setting up the sectors on the Main Screen, click the **Apply** button to save your changes.

Label Assignment

Use the **Label Assignment** window to replace/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/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. With the **Label Assignment** application you would assign the current equipment label to a new device.

See your *IntelliVue Information Center iX Installation and Service 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 Access the **Label Assignment** window by selecting **Label Assignment** from the **Main Setup** window or by clicking **Manage Unit** from an application window task bar then selecting **Label Assignment** from the list that display. If prompted enter a user name and password.

2 Select the device for which you want to replace an equipment label from the **Assigned Devices** list on the left side of the window.

3 Select the new device from the **Available Devices** list on the right side of the window.

4 Click **Replace**. If the device you are replacing is currently monitoring a patient or is a telemetry device a warning box displays asking you to confirm that you want to unassign.

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** button () from the application window header. You can find information in the Help in several ways.

To find information in the online Help

Select:	To:
Contents Tab	View the table of contents for the online Help. Click each book to display pages that link to topics. Click each page to display the corresponding topic in the right pane.
Search Tab	Search for specific words or phrases. Type a keyword then click **Go**. A list of corresponding topics with links displays on the right. Click the link to display the topic in the right pane.

Moving around in the Help

Use the following types of navigation in the Help to move around and display information:

Navigation	Description
Hyperlinks	Hyperlinks are clickable items that display another topic.
Drop-down text	When you click a drop down hotspot, more information is displayed below the hotspot. You only need to click the hotspots you want to read. To hide the text, click the hotspot again.
Popup windows	When you click a popup link, either a small window with text "pops up" or a topic opens on top of the currently open topic. Popup windows enable you to read additional information without leaving the current topic. When you finish reading the information in the popup window, you can click any links it contains to jump to other information or close it by clicking any place other than popup link.

Printing the Help

While using Information Center online Help, you can print topics and information right from the topic window. To print a Help topic:

1 Move your cursor to within the help topic.

2 Click  on the top right side of the help window.

3 The help topic prints to the default connected printer.

Product Support

The **Product Support** window provides read-only product and license information including Service Number, Serial Number, Computer Name, Software Version, Customer Name, and feature options. You can access the **Product Support** window by clicking the Philips icon on the Information Center caption bar or by clicking **Product Support** from the **Main Setup** window.

When there is a software update available, a password-protected **Update Now** button is available that 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 Biomed staff.

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. A remote support session provides you with support assistance by allowing the Philips Support Representative to remotely access your system.

Initiating a Remote Support Session

To initiate a remote support session:

1. Access the **Product Support** window by clicking the Philips icon on the Information Center caption bar or by clicking **Product Support** from the **Main Setup** window. The **Product Support** window displays.
2. Click the **Allow** button on the **Product Support** window. A **Remote Support Session Request** dialog box displays.
3. Click **Yes** to allow a support person to initiate a remote connection to your machine. When the remote connection is active both you and the support specialist have full access to the keyboard and mouse. Any changes performed by the support representative are visible because you also share the desktop screen. **Yes** should only be selected after reviewing the remote access text in the warning below.
4. When you are done with the remote session click **Disconnect** to terminate the remote support session.

   Note — If you do not select **Disconnect** the **Remote Support Session** will stop automatically after one hour.

Warning

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.

12

Information Center Configuration

This section provides the configuration items for which you can change factory set defaults to accommodate the needs of your unit.

Information Center Clinical Settings Menus

The Information Center comes with factory set defaults that govern how your system operates. You do not need to spend a lot of time setting up the system because it has been configured for you. The Information Center does, however, provide 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 *IntelliVue Information Center iX Release B.01 Clinical Configuration Guide*.

Warning

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 clinical settings.

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. Also, specify the fields required for patient admission.
Local Surveillance	Determine how the information in the patient sectors and **Patient Window** will appear, as well as 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.

Menu	Use to...
Global Settings	• Configure unit-wide settings for telemetry devices in this unit. • Change general alarm settings. • Change ECG measurement settings. • Indicate whether to allow remote start of NBP from the Information Center.
Telemetry Profiles	Change telemetry 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.
Clinical Reports	Set up and schedule reports that will print on a regular basis for all admitted patients in the unit.
Recording	Configure your recording settings when recording wave strips. Recording settings are needed for both real time/alarm and review application recordings.
ECG 12 Lead	To configure either the Analyze and Export 12-Lead ECGs or specialty review options.
Local Display Setup	To configure the number of columns and rows per column per display as well as lock bed labels to sectors.
Wave Strip Export	Configure the settings for exporting wave strips to a network share destination.

Accessing the Clinical Settings Menus

You can access any of the Information Center Clinical Settings menus by completing the following steps:

1 Click the unit name on the Main Screen caption bar or select the **Clinical Settings** button on the **Main Setup** window.

2 In the login dialog box that opens, enter the **User Name** and **Password**, and then click **OK**. The **Clinical Settings** window opens.

3 Click a menu name on the left side of the window. The related settings display on the right side of the window. For some menus, the settings are displayed on multiple tabs across the top of the window.

Note—Some items on the **Clinical Settings** menus display but may not be enabled depending on the licensing available in your unit.

Important—The system automatically times out of password-protected functions 30 minutes after a user logs in or after 10 minutes of inactivity, whichever comes first. If the function times out, you must log in again.

Printing the Unit Settings

If the **Print** button is enabled on the **Clinical Settings** windows, you can print a report of the settings for that window (if a printer is available).

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Information Center Safety and Specifications

This section provides configuration items you can change to accommodate the needs of your unit.

Regulatory and Safety Specifications

Declaration

CE 0123 The M3290B Information Center Software Release B.01 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 This product is not intended for home use. Rx only.

The PC workstation, HP LaserJet printer, UPS, and displays carry CE-marking to the European Low Voltage and EMC Directives, except for the Philips 2-Channel recorder which carry CE-marking to Council Directive 93/42/EEC of 14 June 1993. Philips 2-Channel 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 Information Center. These components may be ordered separately.

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Electromagnetic Compatibility

Medical electrical equipment can either generate or receive electromagnetic interference. The IntelliVue Information Center is considered a medical electrical system. The Philips provided system has been evaluated for electromagnetic compatibility (EMC) with the appropriate accessories to IEC 60601-1-2 the standards for EMC for medical electrical equipment.

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.

Warning

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.

Warning

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 parameter measurement values, attempt to locate the source. Assess the following:

- Is the interference due to misplaced or poorly applied electrodes or sensors? If so, re-apply electrodes and sensors correctly according to directions in the product's *Instructions for Use*.
- Is the interference intermittent or constant?
- Does the interference occur only in certain locations?
- Does the interference occur only when in close proximity to certain medical electrical equipment?
- Do parameter 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 3.3 seconds in length in a dual-column format and 7.0 seconds in length in a single-column format (at 25 mm/s speed -- waves at 12.5 mm/s are twice as long).
- Number of waves in **Patient Window**: up to 4 (single display); up to 11 (dual display).
- Number of parameters 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 and cannot guarantee their compliance with ANSI/AAMI EC-13 (ECG Aspect Ratio or 25mm/s specifications), or the EMC Directive.

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 tables below list 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 an Information Center system are not approved or supported by Philips Medical Systems for use with the Information Center and IntelliVue Clinical Network/Database Server systems.

System Component	Archetypical Performance Requirements
Desktop Workstation	Qualified with Windows® 7 32-bit
	Intel® Core™ 5-2400 Processor (3.10 GHz, 6M cache, 4 cores/4 processors)
	6 GB DDR3 Memory
	10/100/1000 Wired LAN connection
	SATA™ 3 Gb/s 250 GB Hard Disk Drive, 7200 rpm
	2 PS/2™ ports (1 keyboard, 1 mouse)
	DB9 serial port (UPS)
	7 USB Ports
	Graphic resolutions: 1280x1024 and 1920x1080 (HD15 connector), 2560x1440 or 2560x1600 (DisplayPort)
	Philips®-design-controlled: audio power amplifier and external speaker (Mono 1 watt rms minimum at 4 Ohms).
	PCI EXPRESS® slots: one x16 and three x1
2U Rack-Mount Server	Qualified with Windows® Server 2008 R2
	Intel® Xeon® Processor E5606 (2.13 GHz, 8MB L3 Cache, 4 cores/4 processors)
	12 GB DDR3 UDIMM EEC Memory
	Two 10/100/1000 Wired LAN connections
	RAID1 with Hot Swap 300 GB Hard Disk Drives
	4 USB Ports
	Graphic resolutions: 1280x1024 (HD15 connector)

System Component	Archetypical Performance Requirements
Small Network PIIC iX	Qualified with Windows® 7 32-bit
	Intel Core 5-2400 Processor (3.10 GHz, 6M cache, 4 cores/4 processors)
	6 GB DDR3 Memory
	10/100/1000 Wired LAN connection
	SATA™ 3 Gb/s 250 GB Hard Disk Drive, 7200 rpm
	2 PS/2™ ports (1 keyboard, 1 mouse)
	DB9 serial port (UPS)
	7 USB Ports
	Graphic resolution: 1280x1024 (HD15 connector)
Keyboard	PS/2™ or USB Qwerty keyboard
Mouse	PS/2™ or USB 2 button mouse
Trackball	PS/2™ or USB 2 button trackball
Keyboard/Video/Mouse Switch	PS/2™ or USB HD15 compatible
Displays	Native Resolutions: 1280x1024 or 1920x1080 Interface: VGA HD15 Native Resolutions: 2560x1440 or 2560x1600 Interface: DisplayPort
UPS	Compatible with Desktop Workstation / Server Compatible with input voltage and frequency 500 VA 300W / 1000 VA 670 W Interface: serial port / NA
Printers	Compatible with HP® Universal Print Driver (pre-installed by Philips®) for Windows® and PCL®5
Video Splitter	300 MHz video bandwidth (1280x1024 and 1920x1080, 60 Hz video)

ECG Performance Disclosure/Specifications

Characteristic	Performance Disclosure/Specification (in italics)
Heart Rate Averaging Method	Two different methods are used: • Normally, heart rate is computed by averaging the 12 most recent RR intervals. • If each of 3 consecutive RR intervals are greater than 1200 milliseconds (i.e. rate less than 50 b/min) for adult and pediatric patients, then the 4 most recent RR intervals are averaged to compute the HR.
Heart Rate Meter Accuracy and Response to Irregular Rhythm	Provides correct heart rates (80, 60, 120, 90 b/min) 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 - 300 b/min for adults patients and 15-350 b/min for pediatric patients with accuracy of ± 1% of the range. (Note: for rates equal to or less than 15, the displayed heart rate is 0).
Alarm Limit Range	Meets the ANSI/AAMI EC13 Section 4.2.8.1 standard. Lower alarm limit is 15-295. Upper alarm limit is 20-300.
Resolution of Alarm Limit Settings	Meets the ANSI/AAMI EC13 Section 4.2.8.2 standard. The resolution is ± 5 b/min.
Alarm Limit Accuracy	Meets the ANSI/AAMI EC13 Section 4.2.8.3 standard. Error less than ± 10% or ± 5b/min
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.

Characteristic	Performance Disclosure/Specification (in italics)
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 is 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 = 30mm.
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.
Tall T-Wave Rejection Capability	Meets AAMI standard: 0.5 – 40 BW: HR of 80bpm at all T-wave amplitudes 0.05 – 40 BW: HR of 80bpm 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 a Uninterruptible Power Supply (UPS).

Environmental

Operating Temperature: 0^{o} to 30^{o}C (32^{o} to 86^{o}F)

Relative Humidity: 10% to 95% (non-condensing)

Operating Altitude: up to 3,048 m (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 completely 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 15ºC and 30ºC. Allow at least 2 inches (5 cm) 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 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

Symbol	Description
	Keep dry
	Consult instructions for use
	Consult instructions for use
	Entela Mark for Canada and US Certified by Entela to the applicable US and Canadian standards.
	Catalog number
	Serial number
	On/Off control
	2002/96/EC (Waste Electrical and Electronic Equipment). Dispose of in accordance with your country's requirements.

During Power Transitions/Loss

During hospital generator power transitions, an uninterruptible power supply (UPS) allows the system to continue to process and collect data. If the data is available, alarm sounds and alarm recordings are still functional. However, the display becomes blank until the transition to generator power is complete and line 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 in order to resume operation.

If Connection to the Servers is Lost

The Information Center servers provide data storage for systems connected to the IntelliVue Clinical Network. The Information Center stores patient physiologic data and configuration data on either a Primary Server or, depending on your system size, on a Primary Server and one or more Physiologic Servers. For smaller networked systems (up to 128 beds) both your configuration data and patient data is stored on the Primary Server. For larger systems your patient physiological data is stored on a Physiologic Server and your configuration data is stored on the Primary Server. Physiologic data includes raw and derived measurement data while configuration data includes all other data including feature-based configuration settings and system topology information.

Connection to the Information Center can be lost because of an unplanned failure such as a hardware failure, or connection can be intentionally disrupted, for example for scheduled maintenance or system upgrade. This section describes what happens in the event that you lose connections to the Physiologic or Primary server.

Important—It is important to document, archive and manage all factory default password changes made in System Configuration. Failure to do so would mean that all Philips service personnel including the Customer Care Service Center would be locked out of your system and unable to provide assistance should you need it. Without the changed passwords an archive would be necessary to restore and reinitialize the system.

For smaller networked systems when you lose connection to the Primary Server all patient physiologic data and configuration data is stored on the local machine (Local Mode). For larger networked systems you can lose connection to the Primary Server, the Physiologic Server or both. When you lose connection to the Primary Server but maintain connection to the Physiologic Server patient physiologic data continues to be stored on the Physiologic Server but all configuration changes are only stored locally. When you lose connection to the Physiologic Server but maintain connection to the Primary Server configuration settings continue to be saved to the Primary Server but patient physiologic data is stored locally. When you lose connection to both the Physiologic Server and Primary Server all patient physiologic data as well as configuration changes are stored locally.

Disconnection from Physiologic Server

When connection to the Physiologic Server is lost:

- The message "**Disconnected from Server XYZ - local data storage only. Contact Service**" displays on the Information Center caption bar.
- Patient physiologic data is stored locally.

When the server becomes available again:

- The message is cleared.
- Data storage is re-routed back to the Physiologic Server.

Disconnection from Primary Server

When connection to the Primary Server is lost:

- The text **Status: Local Mode** displays on the Information Center caption bar.
- All configuration changes are stored locally.

When the server becomes available again (Database Synchronization and Auto Reconnect are not enabled):

- The text **Status: Local Mode** changes to **Status: Reconnect** on the Information Center caption bar.
- Settings that were added or changed while disconnected from the server are not saved and must be updated upon reconnecting. Prior to reconnect, do the following:
  a. Click the text **Status: Reconnect**. A dialog box displays where you can print Patient Summary reports and review clinical Audit Logs.
  b. Click the **Print Patient Summaries** button to print a report of all setting changes made while disconnected from the server. When you are done printing reports click the message **Status: Reconnect** to return to the dialog box.

c. Click the **Clinical Audit** button to view and export a chronological record of alarms and actions performed within a unit for a patient or all the patients in a unit (see "Clinical Audit" on page 11-2). When you are done reviewing logs click the message **Status: Reconnect** to return to the dialog box.

d. When printing and review is complete select the **Reconnect Now** button to reconnect to the server. A confirmation dialog box displays.

e. Verify that you would like to reconnect to the server by clicking the **Yes** button.

f. Upon reconnect update any changes made to patient demographics, equipment and settings.

Please see the *IntelliVue Information Center iX Service and Installation Guide* for more details.

Auto-Reconnect and Settings Synchronization

For systems with Database Synchronization and Auto Reconnect enabled, the Information Center allows systems not currently connected to the database server to continue to make changes to patient settings. When the connection to the database server is restored, the changes made locally are automatically synchronized to the database server. This ensures that the database server remains in synch with changes made locally.

Synchronized data includes changes made to:

- Patient demographics including admit, discharge and transfer history.
- Display setup.
- Bed and equipment assignments.
- Clinical Settings including Global, Telemetry Profiles, Alarm Filters and Parameter Scales.
- ST and QT baseline settings.

Data not synchronized includes:

- Caregiver assignment changes
- Nurse assignment changes made in the **Manage Patient** window
- Audit logs
- Unit settings

Below is an example of database synchronization.

1 While the Information Center does not have connection to 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 telemetry 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 Bed1.

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 changes with the exception of changes to nurse assignments.

Synchronization Conflicts

If there are any conflicts with the patient data when synchronization is attempted a conflict resolution screen displays. You must resolve the conflict before the system can connect to the server and synchronization can occur. Resolve the conflict by choosing one of the following:

- Click **Select Patient** to select whichever patient applies.
- Click **Cancel** to close the conflict resolution screen and return to the **Manage Patient** application where you can make adjustment to patient information as appropriate. See "Changing Patient Information" on page 2-7 for information on using the **Manage Patient** application.

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 when any configured 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 an IntelliVue TRx 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 NIBP alarms for the telemetry IntelliVue TRx Transceivers. The following table lists the alarm signal generation to the alarm announcement at the Monitoring Information Center.

IntelliVue TRx Transceivers Alarm Delays	
Alarm Category	**Time**[1]
ECG/Arrhy/ST/QT	10s (according to AAMI EC13 standard)
SpO2	5s + any configured delay[2]
NIBP	5s

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 in this chapter to clean your equipment. 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 U.S. 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 touchscreen. Never spray or apply the cleaner directly on the screen. The active area of the touchscreen 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 finished cleaning the screen, re-enable touch.
5. Verify that touch is enabled by touching the screen.

14

Event Definitions

Defined Events

Defined events are arrhythmia events and other defined events such as alarms off or patient button. Arrhythmia events use the ST/AR arrhythmia analysis beat labeling, rate calculation and some settings. Arrhythmia events do not require the arrhythmia alarm to be active.

N = Normal beat
V = Ventricular beat
P = Paced beat
S = Supraventricular premature beat
? = Insufficient information to classify beat

The duration of the defined event bars is dependent on the length of the event. If the event is active for 5 minutes, the event duration is 5 minutes. For example an event such as **Pair V Event** is a short event; two Vs are detected and the event is complete. An event such as **Ventricular Bigeminy** the bar extends until the event is over, therefore showing you the duration of the ventricular bigeminy.

Event	Definition
Some ECG Alarms off	One or more * level Arrhythmia alarms have been manually turned off.
Alarms off	NO ARRHYTHMIA, ALL ARRH ALRMS OFF, and ALARMS SUSPENDED trigger the **Alarms Off** event.
AFIB Event	Irregular RR intervals and the absence of a stable PR interval.
Arrhythmia Event	Any of the following arrhythmia events:
Pair V Event	Two beats labeled as **V**
Run V Event	Two or more beats labeled as **V** with a V rate of 60-120 b/min
Fast Run V Event	Two or more beats labeled as **V** with a V rate of > 120 b/min
Long Run V Event	Two or more beats labeled as **V** which lasts > 8 seconds
Pair V? Event	Two beats labeled as **V** and **?**

Event	Definition
Run V? Event	Two or more beats labeled as **V** and **?** with a V rate of 60-120 b/min
Fast Run V? Event	Two or more beats labeled as **V** and **?** with a V rate of > 120 b/min
Long Run V? Event	Two or more beats labeled as **V** and **?** which lasts > 8 seconds
Run P Event	Two or more beats labeled as **P** with a P rate of 60-120 b/min
Fast Run P Event	Two or more beats labeled as **P** with a P rate of > 120 b/min
Fast Long Run P	Two or more beats labeled as **P** with a P rate of > 120 b/min which lasts > 8 seconds
Slow Long Run P	Two or more beats labeled as **P** with a P rate of < 60 b/min which last > 8 seconds
Slow Run P Event	Two or more beats labeled as **P** with a P rate of < 60 b/min
Pair SVPB Event	Two beats labeled as **S**
Run SVPB Event	Two or more beats labeled as **S**
Fast Run SVPB	Two or more beats labeled as **S** with S rate > 120 b/min
Missed Beat Event	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).
Pause Event	No QRS detected for x seconds. Choices of > 1.5 to 2.5 seconds.
Pacer Not Capture Event	No QRS for 1.75 times the average R-R interval with Pace Pulse (Paced Mode On)
Pacer Not Paced Event	No QRS and Pace Pulse for 1.75 times the average R-R interval (paced patient only)
R-on-T PVC Event	R-on-T detected
Multiform PVC Event	Multiform PVCs detected
Vent Rhythm Event	A dominant rhythm of adjacent Vs > vent rhythm limit and ventricular HR < V-Tach HR limit
Vent Bigeminy	A dominant rhythm of N, V, N, V, N (N=supraventricular beat, V=ventricular beat)
Vent Trigeminy	A dominant rhythm of N, N, V, N, N, V, N, N (N=supraventricular beat, V=ventricular beat)

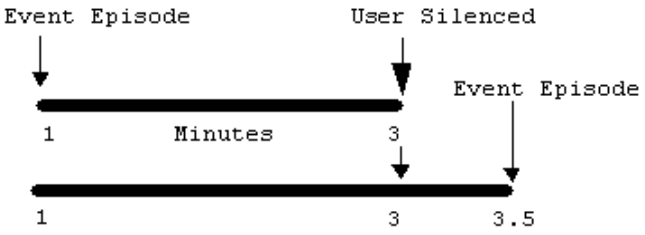
Event	Definition
Asystole Event	No QRS detected for x seconds. Choices of > 2.5 to 4 seconds
Vfib/Vtach Event	Fibrillatory wave (sinusoidal wave between 2-10 Hz) for 4 consecutive seconds
Irregular HR Event	Consistently irregular rhythm (irregular R-R intervals)

Alarm Defined Events

Alarm defined events include arrhythmia alarms as well as other measurement alarms. Alarm defined events are defined by the alarm settings for arrhythmia and other measurements.

The duration of the alarm event bars is dependent on the length of episode and the user's response to the alarm. In other words, the length of the event bar reflects the length the alarm message was displayed. If the event is short in duration, the alarm message will be displayed until the user responds (latched alarms) or until the event is over (non-latched alarms). If the episode is long in duration the message continues until the event is over and the event bar is longer, even if the user responds.

For example, a short run of VTACH, user responds in 3 minutes.



Event	Definition
YLW Alarms	All yellow alarms - both arrhythmia, ST and bedside generated alarms
All Alarms	All alarms - Red and Yellow arrhythmia, ST and bedside generated alarms
Arrhy Alarms	All alarms - Red and Yellow arrhythmia
Red Arrhy Alarms	Red arrhythmia alarms
Ylw Arrhy Alarms	Yellow arrhythmia alarms
Bed Alarms	Any Red or Yellow bedside generated alarm
Red Bed Alarms	Any Red bedside generated alarm
Ylw Bed Alarms	Any Yellow bedside generated alarm
ST Alarms (Tel)	Yellow ST Alarms for Telemetry
***Asystole**	No beat detected for a period > the asystole threshold (2.5-4.0 seconds)

Event	Definition
***Vfib/Vtach	Fibrillatory wave (sinusoidal wave between 2-10 Hz) for 4 seconds
***V-Tach	A run of consecutive beats labeled as V with run length > V-Tach Run limit **and** ventricular HR > V-Tach HR limit
***Extreme Brady	Heart Rate < the Extreme Brady limit
***Extreme Tachy	Heart Rate > the Extreme Tachy limit
*AFIB	An irregular rhythm of beats labeled as N **and** variability in PR intervals **and** P-wave variability (for adult patient category only)
*Non Sustain Vtach	A run of consecutive beats labeled as V with run length < the V-Tach Run limit **and** ventricular HR > V-Tach HR limit
*Vent Rhythm	A run of consecutive beats labeled as V with run length > Vent rhythm run limit **and** ventricular HR < V-Tach HR limit
*Run PVCs	A run of > 2 consecutive beats labeled as V with run length < Vent rhythm run limit **and** ventricular HR ≤ the V-Tach HR limit
*Pair PVCs	Two consecutive beats labeled as V between two beats not labeled as V
*R-On-T PVC	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** 2 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.)
*Vent Bigeminy	A dominant rhythm of beats labeled as N, V, N, V, N (N = supraventricular beat, V = ventricular beat)
*Vent Trigeminy	A dominant rhythm of beats labeled as N, N, V, N, N, V, N, N (N = supraventricular beat, V = ventricular beat)
*PVC Rate	Within one minute, the number of beats labeled as V > the PVCs/min limit
*Multiform PVCs	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

Event	Definition
***Pace Not Capt**	No beat detected for a period > 1.75 times the average R-R interval **and** pace pulse(s) detected (Paced mode on)
***Pace Not Pace**	No beat detected for a period > 1.75 times the average R-R interval **and** pace pulse(s) detected (Paced mode on)
***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 (non-paced patient only)
***Pause**	No beat detected for a period > the pause alarm threshold (1.5 to 2.5 seconds)
***SVT**	A run of consecutive beats labeled as S with run length > SVT run limit **and** SVT HR > SVT HR limit
***Irregular HR**	An irregular rhythm of beats labeled as N (R-R interval changes > 12.5%)
***HR High**	Heart Rate greater than the upper HR limit
***HR Low**	Heart Rate lower than the lower HR limit
****Resp High**	Respiration Rate greater than the upper RR limit
****Resp Low**	Respiration Rate lower than the lower RR limit
*****Apnea**	Respiration has stopped for longer than the set apnea time
****SPO2 High** ****SPO2 Low**	SpO2 greater than the upper SpO2 limit SpO2 lower than the lower SpO2 limit
****SVO2 High** ****SVO2 Low**	SvO2 greater than the upper SvO2 limit SvO2 lower than the lower SvO2 limit
****ST <n> High** ****ST <n> Low**	ST elevation in lead <n> is higher than the upper ST limit ST depression in lead <n> is lower than the lower ST limit
****QTc High** ****ΔQTc High**	QTc greater than the upper QTc limit. ΔQTc greater than the upper ΔQTc limit
****Pulse High** ****Pulse Low**	Pulse greater than the upper Pulse limit Pulse lower than the lower Pulse limit
***** Desat**	SpO2 value has fallen below the desaturation alarm limit.
****Multi ST**	ST depression or elevation is outside the limit in two or more leads

Event	Definition
**NBP High **NBP Low	NBP greater than the upper NBP limit NBP lower than the lower NBP limit
**CPP High **CPP Low	CPP greater than the upper CPP limit CPP lower than the lower CPP limit
**awRR High **awRR Low	awRR greater than the upper awRR limit awRR lower than the lower awRR limit
**etCO2 High **etCO2 Low	EtCO2 greater than the upper EtCO2 limit EtCO2 lower than the lower EtCO2 limit
**FiO2 High **FiO2 Low	FiO2 greater than the upper FiO2 limit FiO2 lower than the lower FiO2 limit
**imCO2 High	imCO2 greater than the upper imCO2 limit
**tcpO2 High **tcpO2 Low	tcpO2 greater than the upper tcpO2 limit tcpO2 lower than the lower tcpO2 limit
**tcpCO2 High **tcpCO2 Low	tcpCO2 greater than the upper tcpCO2 limit tcpCO2 lower than the lower tcpCO2 limit
**<Temp Label>High **<Temp Label>Low	<Temp Label> greater than the upper <Temp Label> limit <Temp Label> lower than the lower <Temp Label> limit
**<Press Label> High **<Press Label>Low	<Press Label> greater than the upper <Press Label> limit <Press Label> lower than the lower <Press Label> limit
***P1 Disconnect ***P2 Disconnect ***P3 Disconnect ***P4 Disconnect ***ABP Disconnect ***PAP Disconnect ***IUP Disconnect ***ART Disconnect ***UAP Disconnect ***AO Disconnect	The pressure is non-pulsatile and the mean pressure is continuously less than 10 mmHg (1.3 kPa). This alarm occurs only with arterial pressures (P, ABP, ART, AO, UAP, PAP). numeric flashes, red alarm lamp, alarm tone.
***Ventilator Disconnect	Ventilator disconnected from patient. (Availability depends on Vuelink Device)
***Ventilator Failure	Ventilator failed. (Availability depends on Vuelink device.)

Event	Definition
**CCO High **CCO Low	CCO greater than the upper CCO limit CCO lower than the lower CCO limit
**BIS High **BIS Low	BIS greater than the upper BIS limit BIS lower than the lower BIS limit
**Vuelink Other Alarm	Type of alarm depends on Vuelink Device

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