

BeneVision

**Central Monitoring System
Viewer**

Operator's Manual

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NOTE

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- **This equipment must be operated by skilled/trained clinical professionals.**
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WARNING

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- **It is important for the hospital or organization that employs this equipment to carry out a reasonable service/maintenance plan. Neglect of this may result in machine breakdown or personal injury.**
-
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Company Contact

Manufacturer: Shenzhen Mindray Bio-Medical Electronics Co., Ltd.
Address: Mindray Building, Keji 12th Road South, High-tech Industrial Park, Nanshan, Shenzhen 518057, P. R. China
Website: www.mindray.com
E-mail Address: service@mindray.com
Tel: +86 755 81888998
Fax: +86 755 26582680

Distributor: Mindray DS USA, Inc.
Address: 800 MacArthur Boulevard, Mahwah, New Jersey 07430, USA
Tel: 1.800.288.2121, 1.201.995.8000
Website: www.mindray.com

Preface

Manual Purpose

This manual contains the instructions necessary to operate the product safely and in accordance with its function and intended use. Observance of this manual is a prerequisite for proper product performance and correct operation and ensures patient and operator safety.

This manual is based on the maximum configuration and therefore some contents may not apply to your product. If you have any question, please contact us.

This manual is an integral part of the product. It should always be kept close to the equipment so that it can be obtained conveniently when needed.

Illustrations

All illustrations in this manual serve as examples only. They may not necessarily reflect the setup or data displayed on your patient monitor.

Conventions

- Italic text is used in this manual to quote the referenced chapters or sections.
- The terms danger, warning, and caution are used throughout this manual to point out hazards and to designate a degree or level of seriousness.

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1 General Product Description

1.1 Functions

The BeneVision Central Monitoring System Viewer (referred to hereinafter as the Viewer) is a software used to view a single patient connected to the target CMS. It is independent of the BeneVision Central Monitoring System (referred to hereinafter as CMS) and shall be installed separately. The Viewer is for remote browsing only and cannot be used to set and control the target CMS or monitor.

The Viewer provides the following major functions:

- The ability to view data in real-time and review data of online patients on other central stations;
- The ability to view the data of discharged patients;
- The ability to configure unit of measure, communication and print settings.

NOTE

- **The Viewer and the CMS system software cannot be installed on the same PC.**
 - **The Viewer does not provide alarm sound.**
 - **In this manual, the functions are presented according to the maximum configured level of product.**
 - **The system time of the Viewer shall be consistent with the system time of the central station.**
-

1.2 Operation Window

After the CMS Viewer is opened, the “ViewBed” screen in “Remote CMS” window displays by default. Three (3) system buttons are located at the bottom of the screen: “Remote CMS”, “Discharged Patients” and “System Setup”. Tabs and drop-down lists are allocated at the top of the screen.

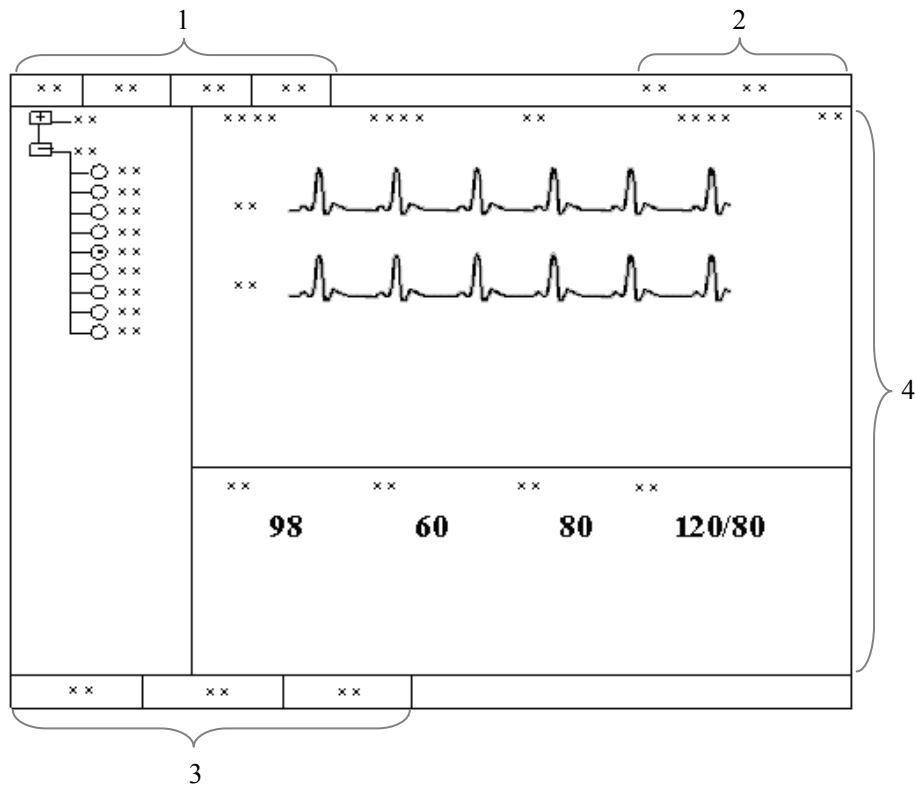


Figure 1-1 The Viewer Default Display

1. Tabs 2. Drop-down List 3. System Buttons 4. ViewBed Screen

2 Installation and Running

2.1 Operation Environment

The basic requirements for the Viewer platform are shown below:

Components	Requirements
Safety	Meets the IEC60950 requirements defined for ITE equipment, and complies with CE low voltage directives (LVD) and EMC directives.
Host	CPU: 2 cores and 3.0 GHz minimum Memory: 2GB minimum Hard disk: 280GB minimum Network adapter: 100M, Ethernet 802.3
Display	19" LCD minimum with CE marking
Operating System	Windows 7 Professional SP1 (32 bit)

2.2 Installation

2.2.1 Requirements

The following software or tools are required when installing the Viewer:

- BeneVision Central Monitoring System Viewer software CD
- BeneVision Central Station software CD
- BeneVision Central Station Dongle

2.2.2 Installation of the Viewer

Double click the *CMSViewer.exe* file under the Setup folder of the BeneVision Central Station Viewer software CD, and complete the following steps:

1. Select the installation language, and click the “Ok” button, shown below:

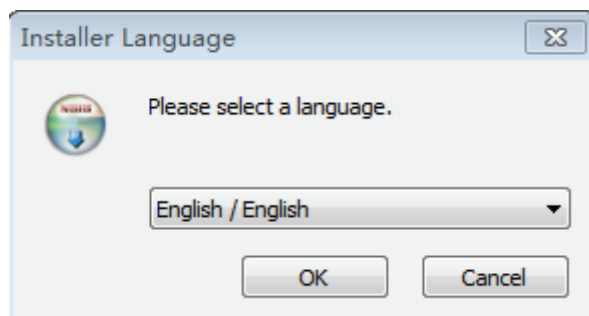


Figure 2-1

2. Select the “Next” button in the next window, shown below:

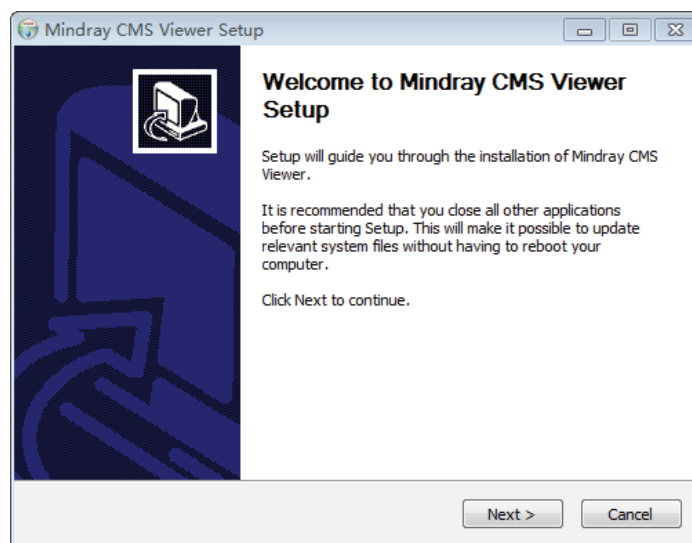


Figure 2-2

3. Select the destination folder where the Viewer is to install, then click the “Install” button, shown below. Then the installation automatically runs.

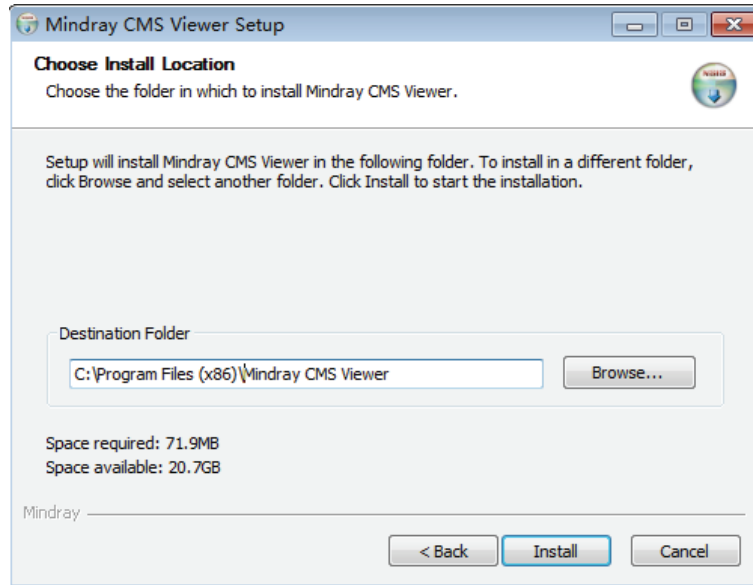


Figure 2-3

4. Select a language for the Viewer in the following window, then click the “OK” button, shown below:

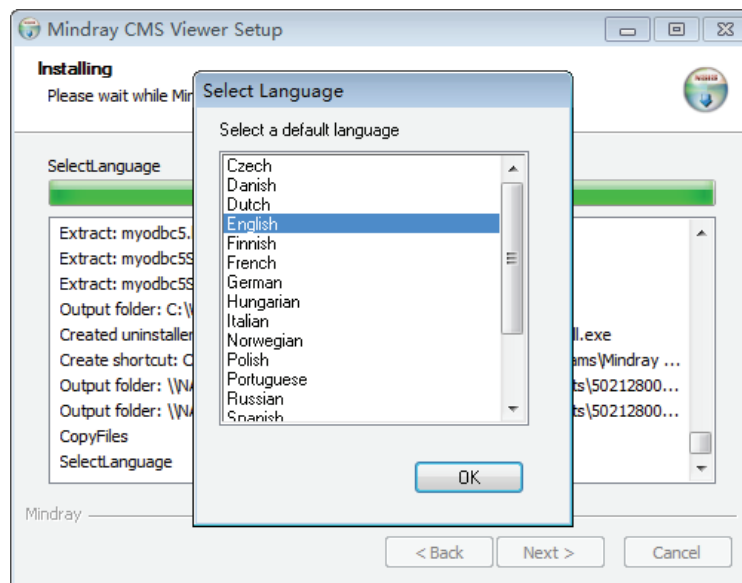


Figure 2-4

- Click “Finish”, shown below, and then the installation is done.

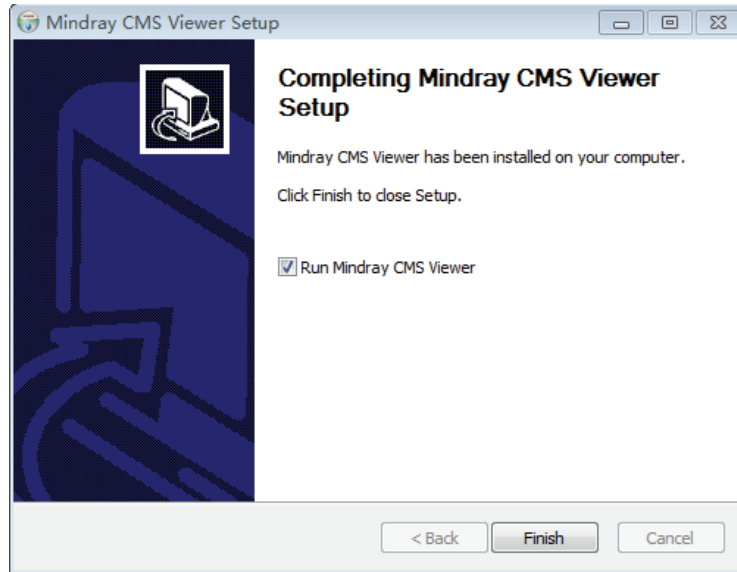


Figure 2-5

2.2.3 Installation of USB Dongle Driver

NOTE

- The USB dongle driver needs to be installed only when the dongle is used.

- Insert the BeneVision CMS software CD and then execute “MicroDogInstdrv.exe” under the “USB Dog Driver” folder to enter the following window.

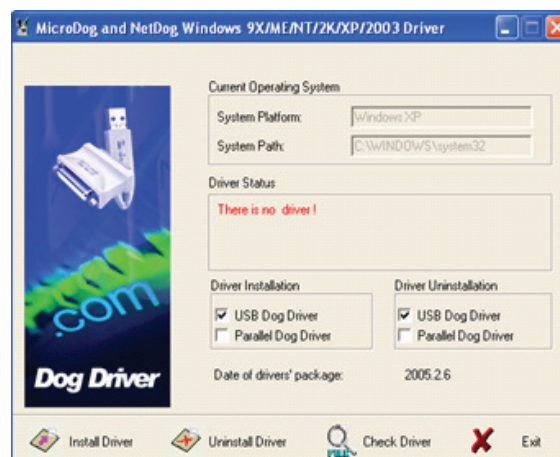


Figure 2-6

-
2. Set as the figure shows and then select “Install” to enter the following window after completing installation.



Figure 2-7

3. Select “Exit” when the prompt message “Driver Installation Completed!” appears.

2.3 Running

Double click the shortcut icon named “cmsviewer” on the desktop, the application program will run.

2.4 Authorization by a Dongle

- You can view a patient’s real-time data with the Viewer without a dongle.
- You can view a patient’s real-time data and review data, and discharged patients’ data with the Viewer, if a dongle authorizes the corresponding operation.

NOTE

-
- You can view a patient’s data on a CMS with the Viewer only when the patient is authorized to be viewed.
-

FOR YOUR NOTES

3 Remote CMS

3.1 Overview

Click the “Remote CMS” button and then the Remote CMS window is shown. Remote CMS functions include the following:

- ViewBed
- Full Disclosure
- Trend Review
- Event Review
- 12-Lead Review
- ST Review
- C.O. Review

NOTE

- **The patients on a CMS can be viewed only when the CMS is connected in the “System Setup” window of CMS Viewer. Please refer to 6 *System Setup* for details.**
-

3.2 Selecting a Central Station

When accessing the Remote CMS window, you can select a desired CMS from the drop-down list of the “CMS” item on the upper screen.

3.3 Selecting a Patient

You can select a desired patient in one of the following ways:

- In the Remote CMS window, select the bed number of the desired patient from the drop-down list of “Patient List” on the top of the screen.
- In the Remote CMS window, select the “ViewBed” tab, and click the “○” button before the desired patient in the bed list on the left of the screen. When the button turns to ⊙, it indicates the patient (target monitor) is selected.

3.4 ViewBed of Remote Central Station

Click the “ViewBed” tab to view real-time data of a selected patient, shown below.

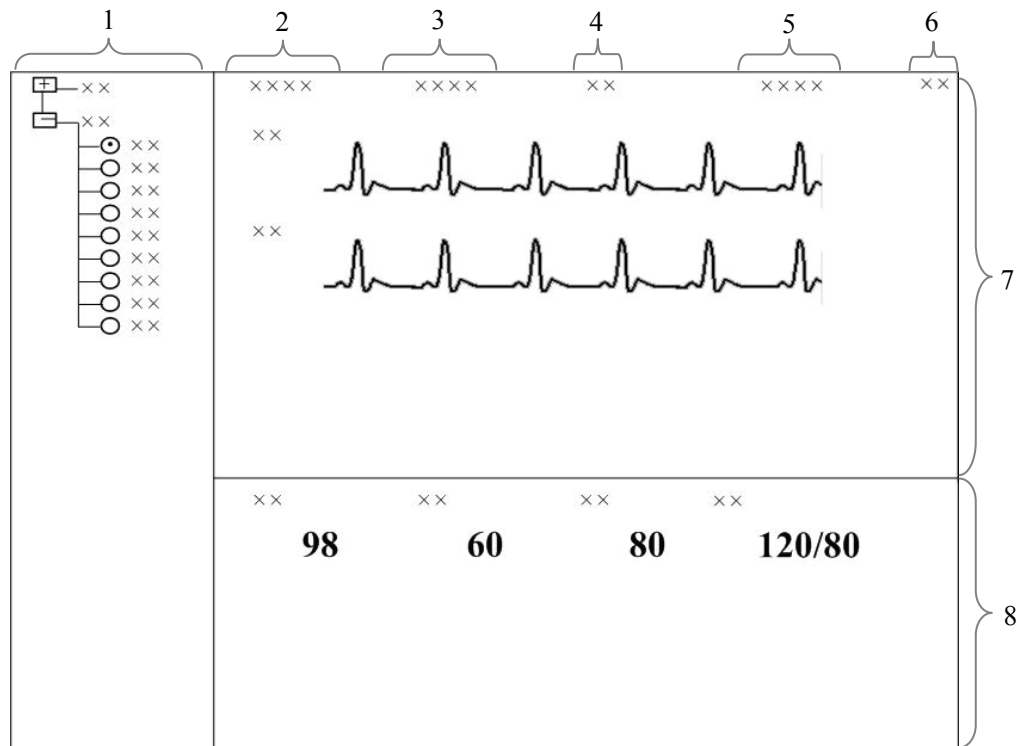


Figure 3-1 ViewBed Window of the Viewer

- | | | |
|--------------------|-----------------------------|-----------------------------|
| 1. Beds list | 2. Patient Information Area | 3. Physiological Alarm Area |
| 4. Alarm Icon Area | 5. Technical Alarm Area | 6. Button Area |
| 7. Waveform Area | 8. Parameter Area | |

3.4.1 Beds List

The beds list displays the information of all CMSs and networked bedside monitors (target monitors) on the same LAN.

When the Remote CMS screen is accessed, the CMS will automatically list other CMSs which can be viewed remotely. Only when the IP address of a CMS is added in the Communication Settings menu of the Viewer, will the names of the corresponding CMSs be automatically displayed in the list.

In the beds list, the first-level nodes are the unit names of the CMSs; the second-level nodes are the monitors connected to the CMSs. Generally, the name of the second-level node is department, bed number and patient name.

The background color indicates the status of the target monitor.

- White: indicates no alarm occurs on the target monitor.
- Red: indicates a high level alarm, nurse call or event on the target monitor.
- Yellow: indicates a medium level alarm on the target monitor.
- Cyan: indicates a low level alarm on the target monitor.
- Grey: indicates that the target monitor is in standby status.
- Light Grey: indicates that the target monitor is offline.

3.4.2 Physiological Alarm Area

This area displays the following messages coming from the viewed target monitor.

- Physiological alarm;
- The message indicating the alarm or physiological state. For example, “Alarm Pause”, “CPB Mode”.

This area displays the highest technical alarm message. If multiple highest priority messages exist, they will scroll. The alarms in descending priority are exclusive high priority alarms, high priority alarms, medium priority alarms, and low priority alarms.

Different background colors are used to indicate the alarm priorities.

- Red: indicates a high level alarm on the target monitor.
- Yellow: indicates a medium level alarm on the target monitor.
- Cyan: indicates a low level alarm on the target monitor.

3.4.3 Technical Alarm Area

The technical alarm area displays:

- The technical alarms and messages coming from monitor or the CMS;
- The work mode and initiated events of a defibrillator.

This area displays the highest technical alarm message. If multiple highest priority messages exist, they will scroll. The alarms in descending priority are exclusive high priority alarms, high priority alarms, medium priority alarms, and low priority alarms.


3.4.4 Alarm Icon Area

This area displays icons for alarm pause , alarm off , and alarm reset .

NOTE

-
- **In the Remote CMS window, only the alarm messages coming from the target monitor will be displayed.**
-

3.4.5 Button Area

Click the  button to open the “Filtering Setup” menu, from which you can select your desired waves and parameters. The waveform and parameter areas will then display the corresponding waveforms and parameters.

3.4.6 Waveform Area

This area displays the waveforms on the target monitor.

3.4.7 Parameter Area

This area displays the parameters on the target monitor. Each block displays the parameters from the same parameter module.

3.5 Remote CMS Review

Click a tab and the corresponding reviewing data of online patients on the target CMS will display. In the Remote CMS window, you will find the full disclosure tab, trend review tab, event review tab, ST review tab, 12-lead review tab and the C.O. review tab. Select a tab to access the corresponding review sheet.

NOTE

- The data shown in the review tab sheets is the review data of the selected patient. Please refer to 3.3 *Selecting a Patient* for additional information.
-

3.5.1 Full Disclosure

In the “Full Disclosure” window, you can review compressed or full size waves as required.

3.5.1.1 Compressed Waveform View

Click the “Full Disclosure” tab to open the following window, through which you can review the patient’s latest 240 hours of waveform data. Up to 32 lines of compressed waveforms are displayed on the screen.

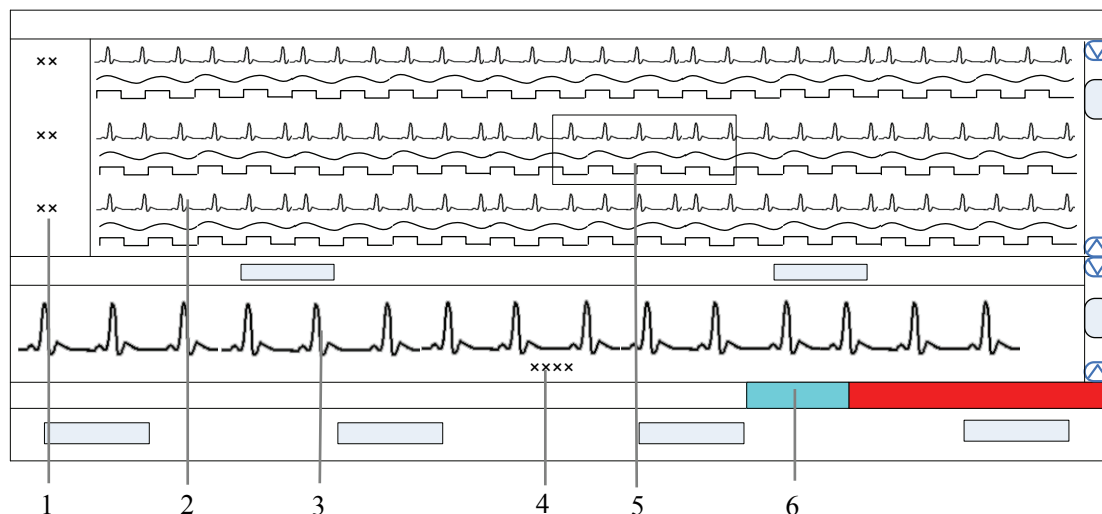


Figure 3-2 Compressed Waveform View

- | | | |
|---------------------|-----------------------------|----------------------------|
| 1. Time scale | 2. Compressed waveform area | 3. Full size waveform area |
| 4. Cursor time area | 5. Cursor | 6. Time bar |

Time Scale

Display the time to which the waveform group in the compressed waveform area corresponds.

Compressed Waveform Area

Display compressed waveforms. If some waveform signals are not detected within a specific time period, square waves are displayed.

Full Size Waveform Area

Display the full size of the corresponding compressed waveform where the cursor is located, or display the patient's parameter information.

Cursor Time Area

Display the time where the cursor is located.

Cursor

By moving the cursor, you can select 12 seconds of compressed waveforms. The waveform data contains 6 seconds before the cursor time and 6 seconds after the cursor time.

Time Bar

The time bar adopts different colors to identify the alarm status of different time periods:

- White: indicates that there are no waveforms and values.
- Green: indicates that there are waveforms and all monitored parameters are within range and no alarms are occurring.
- Cyan: indicates that some parameters have low level alarms but there are still waveforms.
- Yellow: indicates that some parameters have medium-level alarms but there are still waveforms.
- Red: indicates that some parameters have high-level alarms but there are still waveforms.

Within the time bar, there is a black line indicating the time to which the current cursor corresponds. While moving the cursor along the time bar, the time corresponding to the cursor location will appear above the time bar. By clicking the mouse, you can check the time to which the current cursor corresponds.

Operation for Compressed Waveform

In the compressed waveform view window, you can:

- Select Waveforms
- Mark Arrhythmia
- View Arrhythmia Statistics
- Refresh Data
- Show/Hide Parameters
- Zoom
- ICP waveform scale
- Print
- Save as

For details about Print and Save as, refer to *Chapter 5 Print and Save As*.

Selecting Waveforms

Click the “Wave Select” button to display the menu of waveforms. Select the checkbox beside the desired waves (at most four waves) and the compressed waveform area will display the selected waves.

To change the order of the waveform, click the waveform name, then select “Move First”, “Move Up”, “Move Down” or “Move Last”.

Marking Arrhythmia

The arrhythmia alarm waveforms can be marked with color in the compressed waveform area. From the “Arrh Mark” drop-down list, you can select the types of arrhythmias to be marked. The marked waveforms start from the point 16 seconds before the arrhythmia alarm and end when the alarm condition disappears.

NOTE

-
- **If multiple arrhythmia alarms occur at the same time, only the high priority alarm(s) will be marked; if the arrhythmia alarms are of the same level, the alarm of highest priority will be marked.**
-

Refreshing Data

Compressed waveform view data will not update automatically. Click the “Refresh” button and the data will update.

Viewing Arrhythmia Statistics

Click the “Arrh Statistics” button to view the HR value and the number of each arrhythmia type during a certain time range. You can set the time range as 24 hours, 12 hours, or 8 hours.

Showing/Hiding Parameters

- Click the “Numeric Data” button to display the patient’s parameter information in the full size waveform area.
- Click the “Hide Numerics” button to display the full size of the cursor-located compressed wave in the full size waveform area.

Zoom

Set the time span of each line in the compressed waveform window. The options are 15s, 30s, 45s, 1min and 2min. The longer the time span of each line gets, the more lines of compressed waveforms display on the screen. Up to 32 lines of waveforms can be displayed.

ICP Waveform Scale

When ICP is displayed in the compressed waveform area, you can right click the mouse to adjust the ICP waveform amplitude. Each time you right click the mouse, the scale is adjusted in the preset order. There are four levels of the scale: 0-15 mmHg, 0-20 mmHg, 0-30 mmHg and 0-40 mmHg. After the change, the scale level displays above the ICP waveform.

3.5.1.2 Full Size Waveform View

Full Size Waveform Screen

Click the “Full Disclosure” tab. Click the “Full Size” button to open the following window, through which you can review the patient’s latest 240 hours of waveform data.

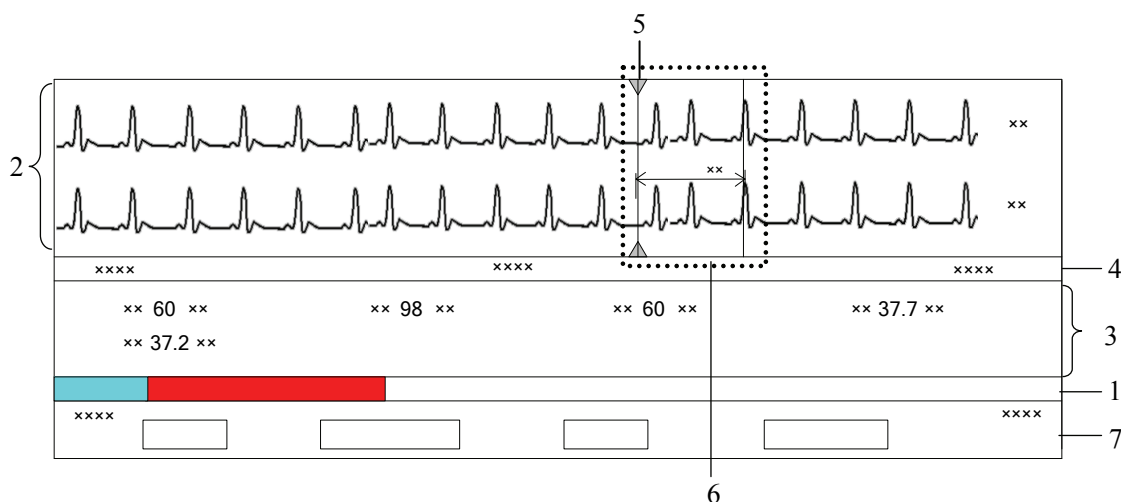


Figure 3-3 Full Size Waveform View

1. Time bar
2. Waveform area
3. Parameter area
4. Waveform time display area
5. Current cursor
6. Caliper
7. Button area

Time Bar

Same functions as in the compressed waveform view.

Waveform Area

This area displays the waveform segment over a specific period. Click in the waveform area, and the grey triangles on the top of and at the bottom of the waveform area will appear indicating the current time corresponding to the cursor location.

Caliper Measurement

Left click the mouse at a place in the waveform area and then hold it down while dragging the cursor until your desired location is reached. During dragging, a caliper with two arms and a middle measurement line marking the real time measurement will appear on the waveforms. You can drag the cursor in vertical or horizontal direction:

- In horizontal direction, the PR, QRS, RR, QTC, and QTC can be measured. The horizontal caliper is shown in Figure 3-4 Horizontal Caliper.
- In vertical direction, the ST can be measured. The vertical caliper is shown in Figure 3-5 Vertical Caliper.

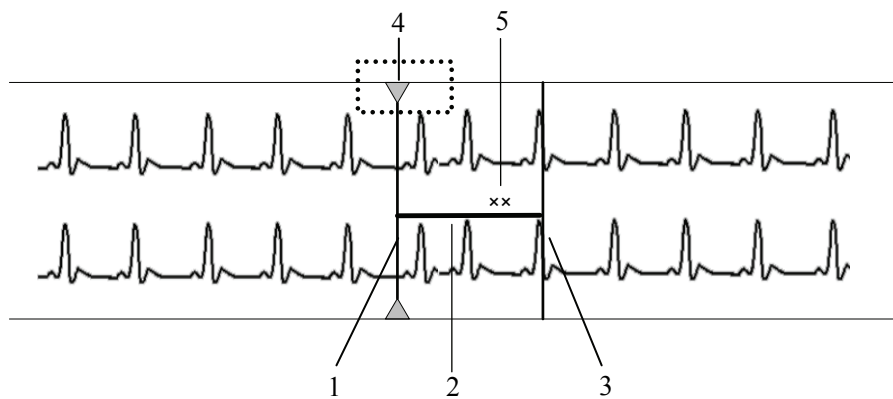


Figure 3-4 Horizontal Caliper

- | | | |
|-------------------|--------------------------|--------------|
| 1. Left arm | 2. Measurement line | 3. Right arm |
| 4. Current cursor | 5. Real-time measurement | |

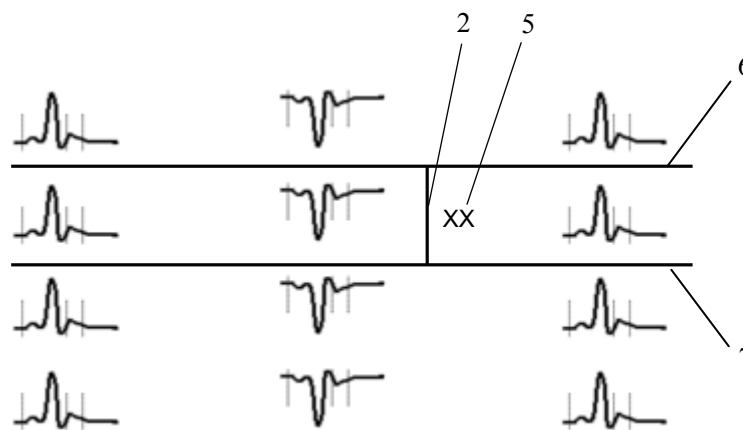


Figure 3-5 Vertical Caliper

- | | | |
|-------------------|--------------------------|--------------|
| 1. Left arm | 2. Measurement line | 3. Right arm |
| 4. Current cursor | 5. Real-time measurement | 6. Upper arm |
| 7. Lower arm | | |





When a caliper is formed, you can adjust the caliper by the following operations to measure the time difference between any two points:

- ◆ When the cursor is positioned at the caliper arm, and the cursor turns to , you can horizontally move the arm.
- ◆ When the cursor is positioned at the measurement line, and the cursor turns to , you can vertically move the measurement line.
- ◆ When the cursor is positioned between the two arms, and the cursor turns to , you can move the whole caliper.

In the waveform area, right click the mouse, select “Change Caliper” in the pop-up menu to switch between vertical caliper and horizontal caliper.

ECG Waveform Gain

You can set the ECG waveform gain in the waveform area in one of the following ways:

- ◆ When the cursor is positioned at any ECG waveform, the buttons  and  will display at the left end of the waveform. Click the  button to increase the gain, and click the  button to decrease the gain.
- ◆ Right click the mouse, and select “Zoom in ECG Gain” or “Zoom out ECG Gain” in the pop-up menu.







Sweep Speed

You can set the sweep speed in one of the following ways:

- ◆ In the waveform area, right click the mouse, and select “Zoom in Sweep Speed” or “Zoom out Sweep Speed” to adjust the speed.
- ◆ In the button area, click “Sweep Speed” to set the waveform sweep speed. Refer to **3.5.1.2 Full Size Waveform View -Full Size Waveform-Select Sweep Speed** for additional information on selecting sweep speed.

Adjust Buttons

You can further adjust the black line by using the following buttons and the waveform will also move accordingly.

- : Clicking it will move the black line to the leftmost, i.e. the review start time.
- : Clicking it will move the black line left, so that the waveforms in the waveform area move left at the length of one screen.
- : Clicking it will move the black line left in short increments.
- : Clicking it will move the black line right in short increments.
- : Clicking it will move the black line right, so that the waveforms in the waveform area move right at the length of one screen.
- : Clicking it will move the black line to the rightmost, i.e. the review end time.

Parameter Area

By default, the parameter area is hidden. Clicking the “Numeric Data” button will show the parameter area. If the parameter area is displayed, clicking the “Hide Numerics” button will hide the parameter area.

The parameter area shows all current parameter values.

- Parameters having high-level alarms are highlighted in red and “***” is shown in front of the parameter values.
- Parameters having medium level alarms are highlighted in yellow and “**” is shown in front of the parameter values.
- Parameters having low level alarms are highlighted in cyan and “*” is shown in front of the parameter values.
- Parameters that have a message are shown with black as the background color, but no indication of “*” before parameter values.
- Parameters from integrated devices are shown in white and indicated with a “+” before the parameter name.

Waveform Time Display Area

In this area, waveform start time and end time are respectively shown at leftmost and rightmost; the current cursor time is shown in the middle. By clicking the “Refresh” button, you can update the end time to current system time and the start time changes accordingly.

Button Area

Refer to *3.5.1.2 Full Size Waveform View-Full Size Waveform* for additional information about the button function.

Full Size Waveform Operation

In the full size waveform view window, you can:

- Select waveforms
- Select sweep speed
- Auto play
- Refresh Data
- Print
- Save as

For details about print and save as, refer to *5 Print and Save As*.

Selecting Waveforms

Click the “Wave Select” button, and a list of available waveforms will be shown. By default, all waveforms are selected. You can deselect a waveform by selecting its check box. You can also drag a waveform name to change its display order.





Selecting Sweep Speed

By clicking the “Sweep Speed” button, you can set the width of waveforms displayed in the waveform area. Available options are 6.25 mm/s, 12.5 mm/s, 25 mm/s and 50 mm/s.

Changing sweep speed will affect the time length of the waveform area. At the 1280×1024 resolution, the sweep speed and time length correlate as follows:

Sweep Speed	Time length (approximate)
6.25 mm/s	52.0s
12.5 mm/s	26.0s
25 mm/s	13.0s
50 mm/s	6.5s

Auto Play

By clicking “Auto Play” and then selecting the , ,  or  buttons, you can review waveforms in the auto mode.

Refreshing Data

Compressed waveform data will not update automatically. Click the “Refresh” button and the data will update.

3.5.2 Trend Review

3.5.2.1 Overview

Clicking the “Trend Review” tab will enter a tab sheet, through which you can store and review up to 240 hours of trend data. Trend changes can be observed in a graphic or tabular format. You can switch between the tabular and graphic format by simply clicking their respective buttons.

3.5.2.2 Operation

In this tab sheet, you can:

- Set Resolution or Zoom
- View Parameter Values at a Certain Time
- Select Trend Group
- Refresh Data
- Switch Tabular/Graphic Trends
- Print
- Save as

For details about print and save as, refer to *5 Print and Save As*.

Setting Resolution or Zoom

In the tabular trends, you can set a time interval as the resolution to display the tabular trends.

- When the resolution is set to “1 sec”, “5 sec”, “1 min”, “5 min”, “10 min”, “15 min”, “30 min”, “1 hour”, or “2 hours”, the tabular trends will display the measured parameter values for the selected time period.
- When the resolution is set to “NIBP” or “TEMP”, up to 240 hours of the measured values and other parameter values to which NIBP or TEMP measurement time corresponds can be displayed.
- When the resolution is set to “Manually Saved”, all the manual data can be displayed.

NOTE





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- **The resolution “TEMP” and “Manually Saved” are available only when Accutorr 7 monitor is connected.**
-





In the graphic trends, you can set the desired resolution for reviewing graphic trends. Resolution options include 15 min, 30 min, 1 hour, 2 hours, 4 hours, 8 hours, 12 hours, 24 hours and 48 hours.

Viewing Parameter Values at a Certain Time

By clicking a point in the graphic trends, you can place the cursor at that position and view the corresponding parameter values of the cursor time. In the tabular trends, the cursor time is the same as it is in graphic trends. Conversely, if you select a row in the tabular trends, the cursor in the graphic trends will be positioned at the time corresponding to that row.

You can further position the time at which the cursor is located by clicking these buttons:

Buttons	Graphic
	Clicking this button will move to the previous graphic page.
	Clicking this button will move the graph to the left by a time range of one
	Clicking this button will move the graph to the right by a time range of one
	Clicking this button will move to the next graphic page.

Buttons	Tabular
	Clicking this button will move to the next tabular page.
	Clicking this button will move the cursor down one line.
	Clicking this button will move the cursor up one line.
	Clicking this button will move to the previous tabular page.

Selecting Trend Group

Click the “Trend Group” drop-down list to select the desired trend group to review.

NOTE

-
- **Selecting different trend group views in the “Trend Review” screen shows different trend parameters.**
-

Refreshing Data

Trend data will not update automatically. Therefore, if you want to view current trend data, you have to manually refresh the screen. Clicking the “Refresh” button will open a dialog box, through which you can input a start time and then select “OK” to reload data. After refreshing, the select status and order of parameters remain unchanged.

Switching between Tabular Trends and Graphic Trends

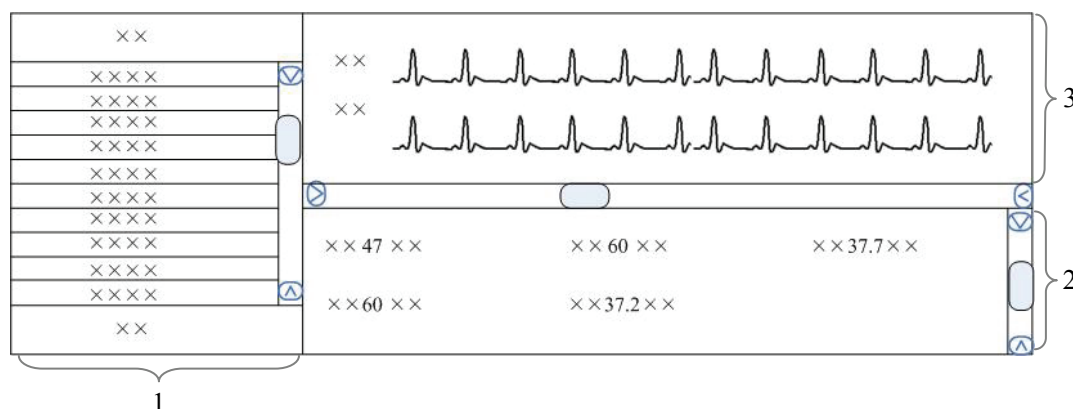
The “Tabular” and “Graphic” button shares the same location. Select the button to switch to the different view.

- If currently it is in the Tabular view, the “Graphic” button displays. Select it to display the Graphic view.
- If currently it is in the Graphic view, the “Tabular” button displays. Select it to display the Tabular view.

3.5.3 Event Review

3.5.3.1 Overview

Clicking the “Event Review” tab will enter the following tab sheet, through which you can view all event parameters and waveforms of a patient.



1. Event list
2. Event parameter area
3. Event waveform area

1. Event list: displays event status (locked or not), time, message, priority, and description.

NOTE

- If a “*” appears before the event message, this indicates that a page has been sent to the pager. The description of the event includes whether the page is sent out or failed.
2. Event parameter area: displays all parameter values in each event time. The integrated device parameters are indicated with a “+” before the parameter name, and the relevant text is shown in white. The CMS prompts if an alarm occurs for a specific parameter and indicates the alarm priority by using different background colors.

-
- ◆ Black: no alarm generated
 - ◆ Red: high level alarm generated
 - ◆ Yellow: medium level alarm generated
 - ◆ Cyan: low level alarm generated
3. Event waveform area: displays relevant parameters' waveforms within ± 16 seconds around the event time. You can use the caliper to measure the time difference between any two points on a waveform. Please refer to **3.5.1.2 Full Size Waveform View -Full Size Waveform Screen -Waveform Area** for how to use the caliper, how to adjust ECG waveform gain and how to adjust sweep speed in the waveform area.

Select an event from the event list to view its corresponding parameter values and waveforms in the event parameter area and the event waveform area.

NOTE

-
- **For the integrated device events, there are no corresponding waveforms in the event waveform area.**
-

3.5.3.2 Operation

In the "Event Review" sheet, you can:

- Select Event Type and Alarm Priority
- Sequence the Event List
- Refresh Data
- Sweep speed
- Print
- Save as

For sweep speed, refer to **3.5.1.2 Full Size Waveform View-Full Size Waveform-Selecting sweep speed.**

For details about print and save as, refer to **5 Print and Save As.**

Selecting Event Type and Alarm Priority

Above the event list, there are two drop-down list boxes: “Filter by Event” and “Filter by Priority”. By clicking the down arrow buttons next to them, you can select event type and level. The selected events will be listed in the event list.



Options for event type are “ALL”, “ECG”, “SpO₂”, “RESP”, “NIBP”, “IBP”, “C.O.”, “TEMP”, “CO₂”, “GAS”, “ICG”, “BIS”, “RM”, “CCO”, “SvO₂”, “ScvO₂”, “Arr.”, “ST Analysis”, “Saved Event”, “Event”(only for telemetry monitor), “Anesthesia”, “Ventilator”, “Unknown Phys. Alarm”, “User Initiated”(only for defibrillator), and “Manual Event”. Options for alarm priority include “ALL”, “HIGH”, “MED”, “LOW” or “Message”. By default, “All” for event type and “ALL” for alarm priority are selected.

Sorting the Event List

You can sort all events ascendingly or descendingly by clicking the heading of any column:

- Time: Clicking it will sort all alarms ascendingly or descendingly by time.
- Message: Clicking it will sort all alarms ascendingly or descendingly by parameter.
- Description: Clicking it will sort all alarms ascendingly or descendingly by description.
- Priority: Clicking it will sort all alarms ascendingly or descendingly by priority.

At the same time, one of the following symbols will appear to the left of the heading:

-  for ascending sequence, and
-  for descending sequence.

By default, all events are sorted in descending order by time.

Refreshing Data

Alarm data will not update automatically. Click the “Refresh” button and the data will update.

3.5.4 12-lead Review

If the bedside monitor supports the 12-lead analysis function, you can click the “12-lead Review” tab to review the 12-lead analysis result obtained from the bedside monitor.

Please refer to **3.5.1.2 Full Size Waveform View -Full Size Waveform Screen – Waveform Area** for how to use caliper, how to adjust ECG waveform gain and how to adjust sweep speed in waveform area.

In the “12-lead Review” sheet, you can:

- View 12 analysis waveforms
- Refresh data
- Sweep speed
- Print
- Save as

For sweep speed, refer to *3.5.1.2 Full Size Waveform View-Full Size Waveform-Selecting sweep speed*.

For details about print and save as, refer to *5 Print and Save As*.

Viewing 12 analysis waveforms

12 analysis waveforms will be displayed on the right side by selecting an analysis result and clicking the “Waveforms” button. You can move the vertical scroll bar to view the waveforms.

To view the analysis results, click the “List” button.

Refreshing Data

12-lead analysis results will not update automatically. Click “Refresh” button and the data will update.

3.5.5 ST Review

3.5.5.1 Overview

Click the “ST Review” tab to open the “ST review” window as shown in Figure 3-6. In this window, you can view the historical ST segments. You can also print out ST segments.

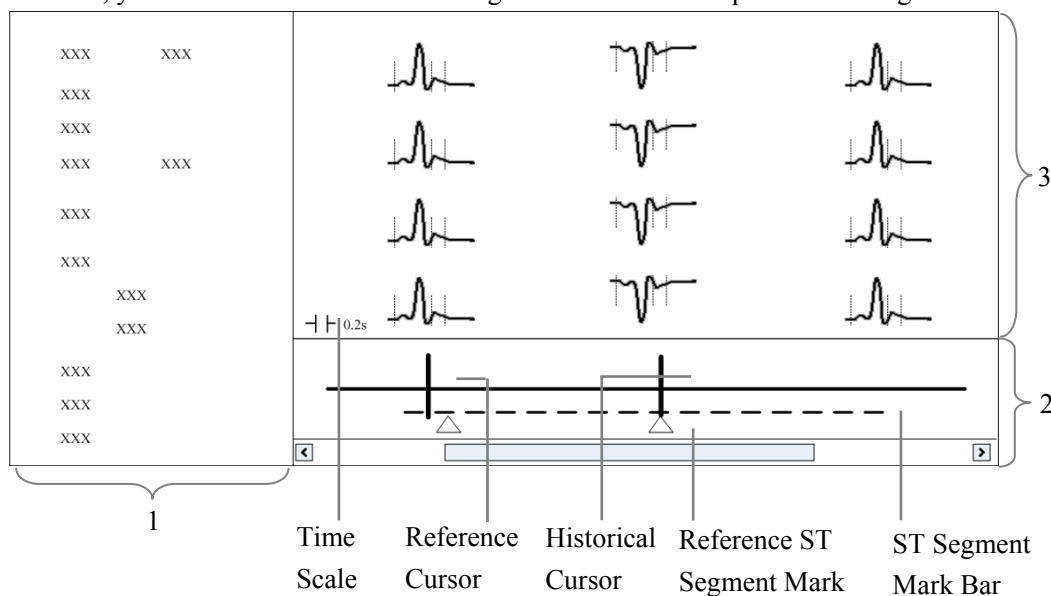


Figure 3-7 ST review

1. Setting control area
2. Trend parameter area
3. ST segment area

1. Setting control area: sets up ST segments and trend parameters.
2. Trend parameter area: displays trend parameters, reference cursor, historical cursor and ST segment mark.
3. ST segment area: displays historical ST segments and reference ST segment.

WARNING

- **The ST algorithm has been tested for accuracy of the ST segment data. The significance of the ST segment changes need to be determined by a clinician.**
-

3.5.5.2 Operation

In the ST Review window, you can:

- View Historical ST Segment
- Select Reference ST Segment
- Display Reference ST Segment
- Set Waveform Speed
- Set Trend Parameter
- Refresh Data
- Print

For details about print, refer to *Chapter 5 Print and Save As*.

Viewing Historical ST Segment

In the setting control area, you can select “Historical” to view historical ST segments by using the “View Hist.” buttons. You can also view historical ST segments by clicking any position in the parameter trend area.

Selecting Reference ST Segment

In the setting control area, you can click the “Change Ref.” button to set the reference ST segment located at the reference cursor to the current reference ST segment.

Displaying Reference ST Segment

In the setting control area, click “Show Ref.”, the reference ST segment is overlapped with the ST segment. The reference ST segment is shown in white.

Setting Waveform Speed

You can click the “Sweep Speed” drop-down list to set different waveform speeds. The time scale in the ST segment area is related to the waveform speed set. The greater the waveform speed, the smaller the time scale.

Setting Trend Parameter

You can click the “Trend Parameter” drop-down list to select two different trend parameters and “Zoom” drop-down list to set different time lengths.

Refreshing Data

The parameter trend data is not refreshed automatically. You can click the “Refresh” button and set start time in the pop-up window, and then click “OK” to read the data again.

3.5.6 C.O. Review

3.5.6.1 Overview

Clicking the “C.O. Review” tab will enter a tab sheet, through which you can view up to 720 C.O. measurement curves and parameter values of a patient.

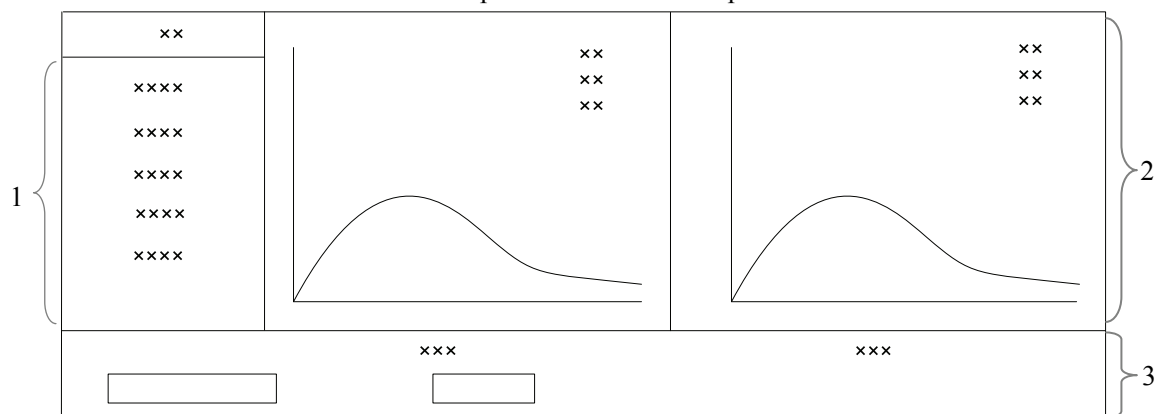


Figure 3-8 C.O. Review

1. Measurement list

2. Waveform area

3. Button area

The average C.O. and C.I. values of the selected C.O. measurements are shown below the C.O. review window.

3.5.6.2 Operation

In the “C.O. Review” window, you can:

- Select Measurements
- Refresh Data
- Print
- Save as

For details about print and save as, refer to **5 Print and Save As**.

Selecting measurements

The time corresponding to each measurement is listed in the “Measure results list”, from which you can select up to 6 measurements. To the right of the “Measure results list”, there are six (6) C.O. review windows, displaying the C.O. curves and parameter values measured at six (6) different times.

Click in a C.O. review window. The border of the window will highlight in blue when it is selected.

Refreshing Data

C.O. data will not update automatically. Click the “Refresh” button and the data will update.

FOR YOUR NOTES

4 Discharged Patients

The Viewer is capable of searching and reviewing the data of historic patients. It includes all patients, patient management, full disclosure, trend review, event review, 12-lead review, ST review and C.O. review. By clicking the “Discharged Pat.” tab, you can enter the tab sheet, which contains nine tabs as follows:

- All patients
- Patient Mgmt.
- Full Disclosure
- Trend Review
- Event Review
- 12-lead Review
- ST Review
- C.O. Review

NOTE

- **The patient management, full disclosure, trend review, event review, 12-lead review, ST review and C.O. review for discharged patients are essentially the same as that for online patients. For details, refer to *Chapter 3 Remote CMS*.**
 - **The patients on a CMS can be viewed only when the CMS is connected to the monitoring network. Please refer to *6 System Setup* for additional information.**
-

4.1 All Patients

4.1.1 Overview

In the “All patients” tab sheet, you can view discharged patients’ data from all CMSs on the network. Brief information of discharged patients on the selected CMS is shown in the patient list, with one line for each discharged patient.



4.1.2 Operation

In the “All patients” tab sheet, you can:

- Sequence discharged patients
- Search discharged patients
- Refresh Data


Sequencing Discharged Patients

You can sequence all discharged patients ascendingly or descendingly by clicking the heading of any column. At the same time, one of the following symbols will appear to the left of the heading:

-  for ascending sequence, and
-  for descending sequence.

By default, all discharged patients are sequenced ascendingly by discharged time.

Searching Discharged Patients

1. Click the  button at the left of the “All patients” tab sheet, and the “All patients” tab sheet will show an area for inputting search conditions at its left.
2. Input search conditions, e.g. “name” and “Patient ID”. You can click “More Options” to input more search conditions.
3. Click the “Search” button. The system will search and display the discharged patients that meet the search conditions.

Refreshing data

Clicking the “Refresh” button will update the discharged patient list.

NOTE

-
- **Only after selecting a discharged patient from the “All patients” tab sheet can you switch to other tab sheets for review.**
-

4.2 Patient Management

In the “Patient Mgmt.” sheet, you can view the target patient’s information, such as gender, type, admit/discharge date, and print the information.


5 Print and Save As

5.1 Print

Through the printer, the Viewer can print:

- Waveforms
- Arrhythmia Statistic Results
- Graphic or Tabular Trends
- Events
- 12-lead Review
- ST Segment Waveforms
- C.O. Measurements

Printing Compressed Waveforms

1. Enter the “Full Disclosure” tab sheet. If full size waveforms are displayed, click the “Compressed” button in the lower right corner of the screen.
2. Click the  icon on the right side of the “Print” button and select “Print Preview” to preview the printout.
3. Click the “Print” button.



Printing Waveform Segment Reports

1. Enter the “Full Disclosure” tab sheet. If full size waveforms are displayed, click the “Compressed” button in the lower right corner of the screen to change to Compressed Waveform view.
2. Select the desired waveform groups by double-clicking to add them to a report. At most, six (6) waveform groups can be printed on each page. You can also deselect a waveform group by double clicking it again. The “Prev” and “Next” button can be used to toggle between the selected waveform groups.
3. Select “Print Preview” to preview the printout.
4. Click the “Print All” button.



Printing Arrh Statistics Results

1. Enter the “Full Disclosure” tab sheet. If full size waveforms are displayed, click the “Compressed” button in the lower right corner of the screen to change to Compressed Waveform view.
2. Click the “Arrh Statistics” button to enter the “Arrh Statistics” menu where you can view the HR value and the number of each arrhythmia type that occurred during a specified time range.
3. Click the “Print” button.



Printing Full Size Waveforms

1. Enter the “Full Disclosure” tab sheet. If compressed waveforms are displayed, click the “Full Size” button in the lower right corner of the screen to change to the Full Size Waveform view.
2. Select the current review time.
3. Click the  icon on the right side of the “Print” button and select “Print Setup” to perform print setups as prompted.
4. Click the  icon on the right side of the “Print” button and select “Print Preview” to preview the printout.
5. Click the “Print” button.


Printing Graphic or Tabular Trends

1. Enter the “Trend Review” tab sheet.
2. Set the resolution or zoom per part **3.5.2 Trend Review**.
3. Click the  icon on the right side of the “Print” button in the tabular trends and select “Print Setup” to set up the printing options.
4. Click the  icon on the right side of the “Print” button and select “Print Preview” to preview the printout.
5. Click the “Print” button.



Printing Event Lists

1. Enter the “Event Review” tab sheet.
2. Click the  icon on the right side of “Print” button under event list in the tabular trends and select “Print Setup” to set up the printing options.
3. Click the  icon on the right side of the “Print” button and select “Print Preview” to preview the printout.
4. Click the “Print” button.



Printing Events

1. Enter the “Event Review” tab sheet.
2. Select an event from the event list.
3. Click the  icon on the right side of “Print” button under the event parameter area and select “Print Preview” to preview the printout.
4. Click the “Print” button.


Printing 12-lead Analysis Results

1. Enter the “12-lead Review” tab sheet.
2. Click the  icon on the right side of the “Print” button and select “Print Setup” to set the “Time Span”.
3. Click the  icon on the right side of the “Print” button and select “Print Preview” to preview the printout.
4. Click the “Print” button.


Printing 12-lead Analysis Waveforms

1. Enter the “12-lead Review” tab sheet.
2. Click the “Wave” button after an analysis result is selected.
3. Click the  icon on the right side of the “Print” button and select “Print Setup” to set up the printing options.
4. Click the  icon on the right side of the “Print” button and select “Print Preview” to preview the printout.
5. Click the “Print” button.

Printing ST Segment Waveforms

1. Enter the “ST Review” tab sheet.
2. Click the  icon on the right side of the “Print” button and select “Print Preview” to preview the printout.
3. Click the “Print” button.

Printing C.O. Measurements

1. Enter the “C.O. Review” tab sheet.
2. Select one or more C.O. measurements.
3. Click the  icon on the right side of the “Print” button and select “Print Preview” to preview the printout.
4. Click the “Print” button.

5.2 Save As

The Viewer can save the following items as HTML files:

- Graphic Trends
- Tabular Trends
- Full Disclosure
- C.O. Review
- Alarm Review
- Alarm Event Review
- 12-Lead Review

With the file name defaulted as “XXXX-patient name YYYY”, in which the “XXXX” represents one of the above items. If no patient name is input, the file name will have no patient name. If it is the first time saving, the “YYYY” will be 0001, which will automatically add one (1) every time data is saved.

The saved files can be browsed using the Internet Explorer.

The files can be saved to local disks, mobile hard disk, or flash drives. If the files are to be saved in a mobile storage medium, the mobile storage medium must be connected to the CMS before saving.

Operation

- Select one tab.
- Operate as introduced in *3.5 Remote CMS Review*.
- Click the “Save as” button.
- Select the drive from the pop-up dialog, then click “OK”.

6 System Setup

Click the “System Setup” button, and you can set up the following in the window:

- Unit of measure
- ECG Lead Sequence
- Print
- Central Station Connection
- Communications

6.1 Unit Setting

You can modify the parameter’s measure unit as required.

6.2 ECG Lead Sequence

You can choose an option from “Standard” and “Cabrera” for “ECG Lead Sequence” to set the waveform sequence for multi-lead ECG:

- Standard: I, II, III, aVR, aVL, aVF, V1, V2, V3, V4, V5, V6
- Cabrera: aVL, I, -aVR, II, aVF, III, V1, V2, V3, V4, V5, V6

After the ECG lead sequence is set, the waveform sequence will be updated in the following:

- The display in 12-lead review
- The real-time display in multi-lead ECG screen
- 12-lead analysis waveform report
- 12-lead analysis waveform strip
- The XML file of 12-lead analysis waveform
- 12-lead ECG report
- Multi-lead ECG report

6.3 Print Setup

- Select the waveform sweep speed
- Enable/disable to print grid

6.4 Central Station Connection

This area lists all the CMSs in the network with their names, IP addresses, and connected status. You can connect or disconnect the CMS Viewer with some CMSs.

Connecting a CMS

To connect the CMS Viewer with a CMS:

1. Select a CMS in the list.
2. Select the “Connect” button.
3. If access to the selected CMS requires a password, a password dialog box will display. You need enter the required password.

If the CMS is connected, the “Connected Status” changes to “Connected”, and the CMS will be available in the “CMS” list of the “Remote CMS” screen.

Disconnecting a CMS

You can select a CMS in the list and then select the “Disconnect” button.

Refreshing

You can update the list by clicking the “Refresh” button.

6.5 Communication Settings

To set up communications between a CMS Viewer and the master server, you need to set the following:

- Master Server IP Address: Enter the IP address of a CentralStation which is used as the master server.
- IP address: In the drop-down list, select the CMS Viewer’s IP address which is for the communication between the CMS Viewer and CMSs.
- Multicast IP address : Enter the IP address of multicast communication between a CMS and a CMS Viewer.

