EDANUSA

MFM-CNS

Central Monitoring System

Release 2.8

$C\epsilon_{0123}$

About this Manual

P/N: 01.54.13095-28

Release Date: June 2011

Statement

This manual will help you understand the operation and maintenance of the product better. It is reminded that the product shall be used strictly complying with this manual. User's operation failing to comply with this manual may result in malfunction or accident for which EDAN INSTRUMENTS, INC. (hereinafter called EDAN) can not be held liable.

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Responsibility of the Manufacturer

The manufacturer only considers itself responsible for any effect on safety, reliability and performance of the equipment if:

Assembly operations, extensions, re-adjustments, modifications or repairs are carried out by persons authorized by the manufacturer, and

The electrical installation of the relevant room complies with national standards, and

The instrument is used in accordance with the instructions for use.

Upon request, the manufacturer may provide, with compensation, necessary circuit diagrams, and other information to help qualified technician to maintain and repair some parts, which the manufacturer may define as user serviceable.

Terms Used in this Manual

This guide is designed to give key concepts on safety precautions.

WARNING

A **WARNING** label advises against certain actions or situations that could result in personal injury or death.

CAUTION

A **CAUTION** label advises against actions or situations that could damage equipment, produce inaccurate data, or invalidate a procedure.

NOTE

A **NOTE** provides useful information regarding a function or a procedure.

Table of Contents

Chapter 1 Introduction

CAUTION

1 Federal U.S. laws restrict this device to sale, distribution, and use by, or on the order of a physician.

2 Read this user manual prior to using the device.

NOTE:

1 This manual is explained basing on the highest configuration and advanced users. Some functions can not be operated with other configuration or by general users.

2 This manual only describes operation of the software. The configuration of the network system is introduced in *MFM-CNS Central Monitoring System Service Manual.*

1.1 Intended Use

The Maternal Fetal Monitoring – Central Nurse System (hereinafter called "MFM-CNS") is a clinical data managing software application and is indicated for antepartum and intrapartum monitoring of pregnant women in a healthcare setting.

The MFM-CNS is intended to manage perinatal monitoring data acquired from bedside monitors or manual input for viewing at the central nursing station. The system also produces an electronic medical record.

The MFM-CNS has display fields for the following obstetric data:

- ◆ patient demographics
- ◆ provider notes
- ◆ fetal heart rate (FHR)
- ◆ uterine activity (via tocodynamometry or IUP)
- ◆ Maternal heart rate
- ◆ SpO2
- ◆ non-invasive blood pressure (NIBP)
- ◆ respiratory rate
- ◆ temperature
- ◆ pulse

WARNING

1 Check the displayed results on the corresponding bedside prior to intervening based on this data.

2 The MFM-CNS is intended to be operated by or under guidance of qualified healthcare professionals. It is not intended for home use.

3 The MFM-CNS is intended to be used in obstetric area. The maternal vital signs monitoring is applicable during antepartum period, delivery and post partum. It is not intended to be used in ICU or CCU.

4 As medical information equipment, the physiological waveforms and parameters displayed on the screen can only be used for reference of the doctor. But they can not be criterion of clinical treatment.

1.2 Hardware Requirements

Components	Specification
System	Meet the IEC control requirements defined for ITE equipment. CE marked, meeting LVD (Low voltage directive) and EMC directive requirements.
PC workstation	PC compatible CPU: Intel 2G RAM: XP 512M, Win7 2G 80G Fixed Diskette 1440 x 900, 65536 Color, 75Hz non-interlaced 10 Base – T 802.3 controller 4 USB ports CE Mark
Keyboard	PS/2 or USB keyboard with CE Mark
Mouse	PS/2 or USB mouse with CE Mark
Display	Display Monitor with CE Mark 19" LCD 1440 x 900

Printer	HP LaserJet series with CE Mark
	 Printer performance specifications:
	      Resolution: 600DPI * 600DPI
	      Interface: USB port
	      Paper size: A4

Speaker	PC or built-in in the display. It should adopt liable connecting mode and should bear some measures to adjust the volume, preventing the sound device from being turned off.
UPS	1000 W with CE Mark

CAUTION

1 Make sure the computer hardware meets the installing and running requirements of the software, otherwise the software may not work normally.

2 The hardware specifications require the use of PC that complies with IEC requirements for ITE equipment.

3 The configuration mentioned above is not permanent. EDAN preserves the right to change and update system settings.

1.3 Operating System Requirements

1) Microsoft Windows XP Professional with service pack 3 or Win7 32.

2) Microsoft MSDE2000A database system.

CAUTION

1 Make sure the computer operating system meets the installing and running requirements of the software, otherwise the software may not work normally.

2 The manufacturer only guarantees that MFM-CNS runs normally when the operating system language is the same as the software language.

Chapter 2 Safety Guide

2.1 Precautions

WARNING and **CAUTION** messages must be observed. To use the system safely and effectively, please read the user manual in detail to be familiar with the proper operation method.

<u>WARNING</u>

1   The system should be installed by a qualified service engineer.

2   Do not turn on the device until all cables have been properly connected and verified.

3   Do not use the device in the presence of flammable anesthetics due to explosion risk.

4   **SHOCK HAZARD** - the power receptacle must be a three-wire grounded outlet. A hospital grade outlet is required. Never adapt the three-prong plug to a two-slot outlet.

5   **SHOCK HAZARD** - Do not attempt to connect or disconnect a power cord with wet hands. Make sure your hands are clean and dry before touching a power cord.

6   **SHOCK HAZARD** - Do not remove the covers during operation or while power is connected. Only authorized service engineer could remove the unit cover.

7   Do not move the main unit, monitor or other parts of the device when they are electrified.

8   The system is designed for continuous operation.

9   Only connect the equipment to EDAN supplied or recommended accessories.

10 Ensure that the environment in which the system is operated is not subject to any sources of strong electromagnetic interference, such as radio transmitters, mobile telephones, etc. Keep them far away.

11 Clinical decision making based on the output of the device is left to the discretion of the provider.

12 Prior to intervening based on the data displayed on the MFM-CNS, providers must verify this data with the corresponding bedside monitor.

13 Make sure the speaker is always in a state of activation.

14 It is strictly prohibited to mute the speaker or turn down its volume. Make sure that the alarm sound can always be heard.

15 Do not unplug the computer hardware when the MFM-CNS is in operation.

<u>CAUTION</u>

1   The system should be used within temperature range from +10°C (+50°F) to +30 °C (+86°F).

2   Keep the environment clean. Keep the system hardware far from corrosive medicine, dust area, high-temperature and humid environment.

CAUTION

3   Check if the power cable is worn out or damaged before each use. If damage is evident, replacement is recommended.

4   Turn off the system power before connecting or disconnecting any accessories.

5   If the system does not work properly, or any abnormality is detected, stop using it at once and contact the manufacturer for service.

6   Turn off the system power and remove the power cable before servicing or maintaining the system.

7   If RJ45 interface is used, when inserting or pulling out the network cable, please press the spring of the cable port to avoid the damage caused by incorrect operation.

8   Precautionary maintenance, including periodic cleaning and appearance checking can be finished by the users because this maintenance does not touch the interior.

9   Turn off the system power before cleaning. Cleaning consists of removing all dust from the exterior surface of the equipment with a soft brush or cloth. Use a brush to dislodge any dirt on or around the connectors and panel edges. Remove dirt with a soft cloth, slightly dampened with a mild detergent solution or 70% ethanol or isopropranol.

10 Avoid pouring liquids on the device while cleaning, and do not immerse any parts of the device into any liquids.

11 This system is the device special for medical use. Forbid installing any other software in this system to avoid virus and system breakdown.

12 Forbid deleting or revising any file on the hard disk to avoid that the operating system and monitoring software can't run normally.

13 MFM-CNS can not replace the bedside monitoring completely, the users should not stay at the central monitoring station and leave the patient alone for a long time, because the accuracy of the software depends on the stability of the operating system, the performance of PC station and network.

2.1 Symbols

SN	Serial Number
	Date Of Manufacture
	Manufacturer
EC REP	Authorized Representative in the European Community
CE 0123	The symbol indicates that the device complies with the European Council Directive 93/42/EEC concerning medical devices.

	The symbol indicates that the device should be sent to the special agencies according to local regulations for separate collection after its useful life.
Rx only (U.S.)	Federal (U.S.) Law restricts this device to sale by or on the order of a physician.

NOTE:

CE only aims at the software.

Chapter 3 Functions and Operation

3.1 Main Interface

Switch on the computer and accompanying accessories. After a 'Do' alarm sound is heard, the system enters the main interface automatically, as shown in figure below.

CAUTION

A 'Do' alarm sound must be heard when starting-up this software. If any abnormality is heard, do not use this system. Check the audio output devices or contact the manufacturer for service.

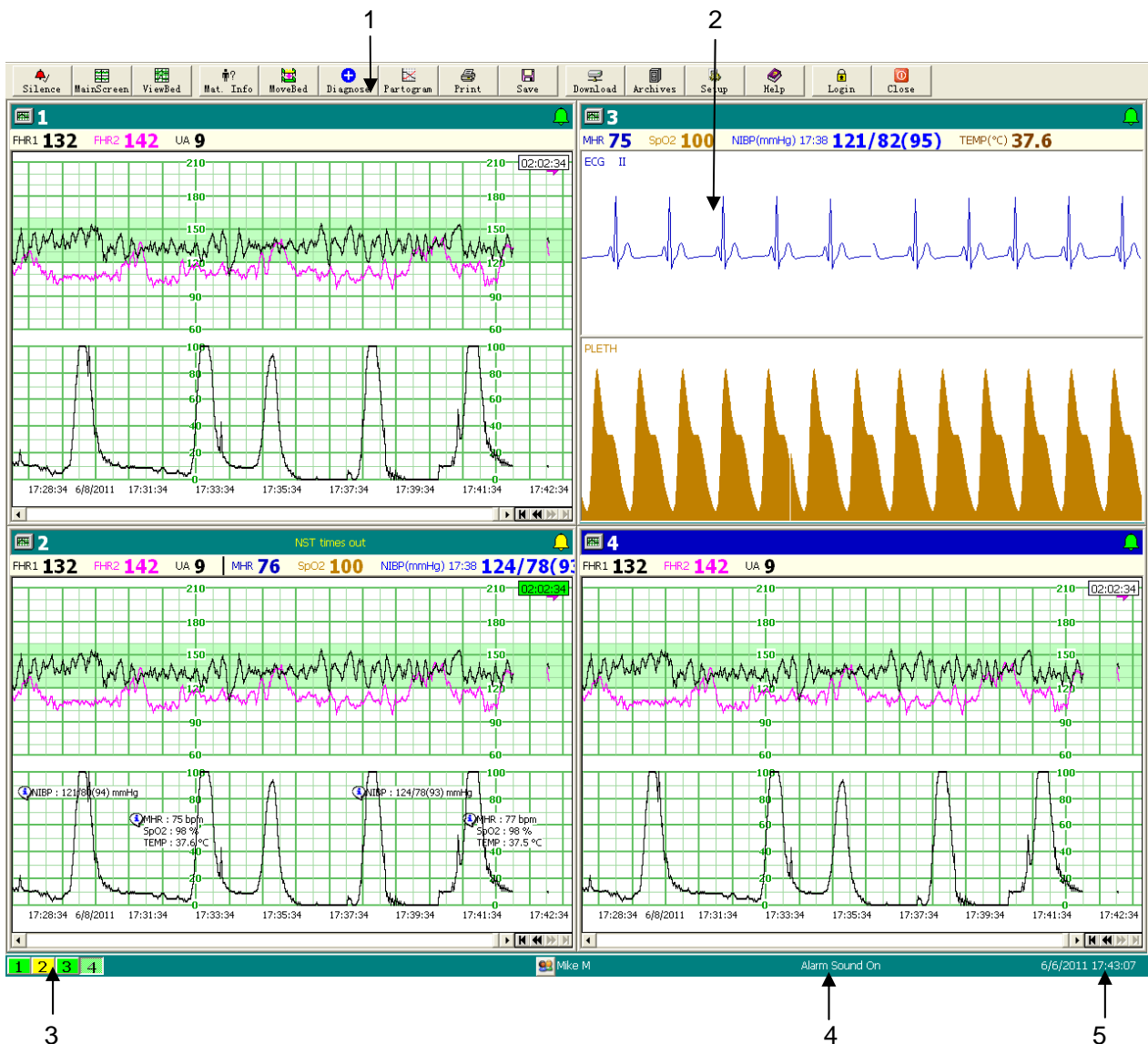

Figure 3-1 Main operation interface

1 Tool Bar   2 Monitoring Window   3 Device Light

4 Audio Alarm Indication   5 System Time

NOTE:

You should wait until the main interface opens before starting the operation.

3.1.1 Toolbar

The toolbar is located on the top of the main interface. Some of the buttons in the toolbar has a corresponding shortcut key on the keyboard. Pressing these shortcut keys is equal to clicking on the relevant button. Refer to the following table for details.

Button	Shortcut Key	Function
MainScreen	F2	Return to the **Monitoring** window from the **ViewBed** window.
ViewBed	F3	Maximize the current **Monitoring** window and enter the **ViewBed** window to observe the data and trends.
Mat.Info	F4	Open the **Mat.Info** window to input maternal information.
MoveBed	F5	Move the data from one bedside monitor to another.
Diagnose	F6	Make a diagnosis to the fetal monitoring data.
Print	F7	Preview and print the monitoring report.
Save	F8	Save all monitoring data to the database.
Archive		Enter the **Archive** window to view, search or load monitoring records.
Setup		Enter the **Setup** window to change the settings.
Help	F1	Get help information of the software operation.
Login/Logout		Log in/Log out of the current operating user.
Close		Close the MFM-CNS system.

3.1.2 Device Light

Device light shows the status of the bedside monitor: black means offline, green means online and yellow means an alarm is active. A device light is corresponding to a monitoring window, for example, **1** is corresponding to the monitoring window of device **1**.

Besides, the device light can remind the user with different colors and flicker frequencies at the time of alarm.

Device Light	Alarm Frequency	Alarm Level
Yellow with 0.5Hz flicker frequency	Interval between two alarm sounds is 8 seconds	Medium
Yellow and no flicker	Interval between two alarm sounds is 16 seconds	Low

3.1.3 System Alarm

The system has two types of alarm: patient alarm and technical alarm. Patient alarms indicate the situation of vital sign exceeding its configured limit. Technical alarms indicate the disconnection of the transducers, signal loss of the bedside monitor, and therefore the monitor can not detect critical patient conditions reliably.

In terms of severity, the alarms have two levels: medium and low. Medium level alarm is a moderate warning, labeled with the symbol **; low level alarm is a general warning. The alarm levels are preset, and can not be changed.
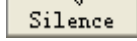
The medium level alarms have higher priority than low level alarms. If both types of alarms are active at the same time, the monitor gives the sound for the medium level alarms.

When an alarm is active, the system issues both audio and visible signals to draw your attention.
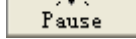
(1) Audio alarm is given by speakers:

- Medium level alarm: a "Do" tone is repeated three times, and then pauses for 8 seconds.

- Low level alarm: a "Do" tone is sounded once, and then pauses for 16 seconds.
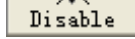
The alarm silence duration has several options: **Silence**, **Pause** (for 1min, 2 min or 3) and **Off**. It is set in **General Setup**.

If the alarm silence duration is set to **Silence**. A silence button appears in the toolbar. When an alarm is active, you can click on this button to disable the alarm sound, and the audio alarm indicator on the interface reads "Silence". During the silence period, if another alarm presents, the system enables the alarm sound automatically. Alternatively, you can click on the button to enable alarm sound manually.

If the alarm silence duration is set to **Pause**. A pause button appears in the toolbar. When an alarm is active, you can click on this button to disable the alarm sound temporarily, and the audio alarm indicator on the interface reads "Alarm Sound Paused" and the remaining time is shown next to it, e.g. 2:20 (2 minutes and 20 seconds). When the remaining time is out, the system enables the alarm sound automatically. Alternatively, you can click on the button to enable alarm sound manually.

If the alarm silence duration is set to **Off**. A silence button appears in the toolbar. When an alarm is active, you can click on this button to disable the alarm sound, and the audio alarm status indicator on the interface shows the flickering message "Alarm Sound Off". The sound is not enabled until the button is pressed.

(2) Visual alarms appear in the title bar area of each monitor frame.

 When an alarm is active, the system shows the following information on the interface:

- **Alarm indicator** **:** the alarm indicator is shown on the right end of the title bar. It is illuminated in green if there is no alarm, and it turns yellow when a low level alarm occurs, or flickers in yellow when a medium level alarm is active.

- **Alarm message:** the alarm message appears in the middle of the title bar. If there are more than one message, they appear at the same area in succession.

- **Alarm symbol** 🔔: the system marks an alarm symbol on the CTG at the place where a patient alarm occurs.

The alarm messages that might appear during monitoring are listed in the table in Appendix 1.

NOTE:

Alarms of MFM-CNS and bedside monitors are separated. MFM-CNS evaluates the patient vital signs and triggers patient alarms according to its alarm settings, but does not deal with the alarm status or limits on bedside monitors.

To test the functions of visible and audible alarms, perform the following procedures:

1 Start up the system.

2 Enable the alarm.

3 Set the alarm limits to a small range.

4 Stimulate a signal that is higher than the upper limit or lower than the lower limit. Or disconnect one of the plugs.

5 Verify if the visible and audible alarms are working properly.

3.1.4 System Time

The system time shows the date and time of the computer.

The data/time and their formats are set in the control panel of the computer. You can not change them on MFM-CNS.

WARNING

To avoid possible hazards caused by the difference between the system time and local time, you must set the computer time correctly before starting up the MFM-CNS, or restart the MFM-CNS after the computer time is changed.

3.2 Monitoring Interface

3.2.1 Selecting Display Mode

Every monitoring interface of a bedside monitor has three display mode options: **Fetal Monitoring Mode**, **Mat. Fet. Monitoring Mode** and **Maternal Monitoring Mode**.

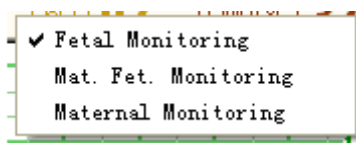Right-click in the numeric area of the interface, the following dialogue is shown:

Figure 3-2 Display mode selecting menu

Select one display mode, and the interface changes accordingly.

NOTE:

When viewing a bed, you can only right-click on the mouse to select display mode in the monitoring frame.

3.2.2 Monitoring Frame – Mat. Fet. Monitoring
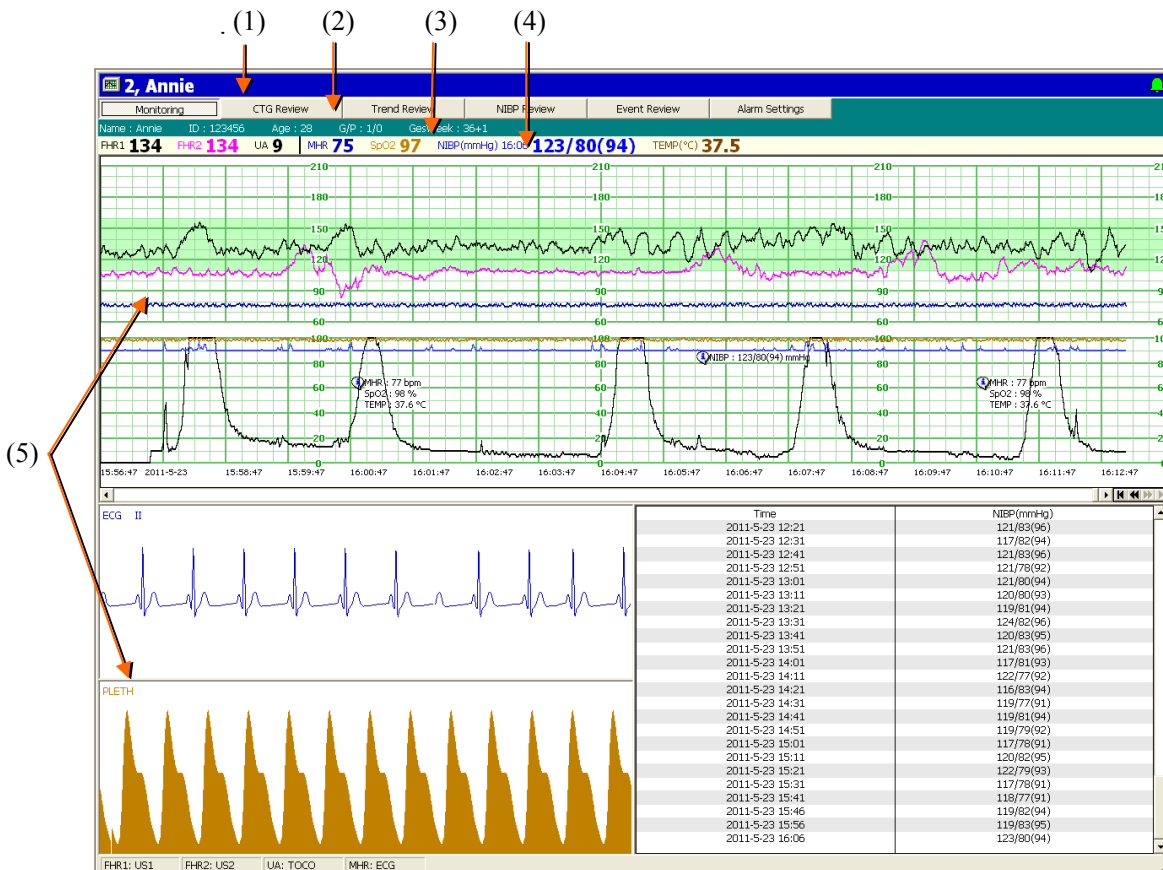
Figure 3-3 Monitoring window

(1) Title Bar

The title bar shows the device number of the bedside monitor and the patient name. When an alarm is active, the alarm message is displayed in the middle of the bar and the alarm indicator flickers in yellow.

(2) Review Frame Option

Click on one of the frames to open this frame.

(3) Maternal Information

The information of the patient you input is displayed in this area.

(4) Numeric Area

The numeric measurement result of fetal monitoring includes FHR (fetal heart rate), UA (uterine activity) and MFM (manual fetal movement count). That of maternal monitoring may include

MHR (maternal heart rate), SpO$_2$ (arterial oxygen saturation), NIBP (non-invasive blood pressure) and TEMP (temperature).

(5) Trend Area

According to the display mode, the trend area displays fetal and/or maternal monitoring traces.

3.2.3 Monitoring Frame – Fetal Monitoring
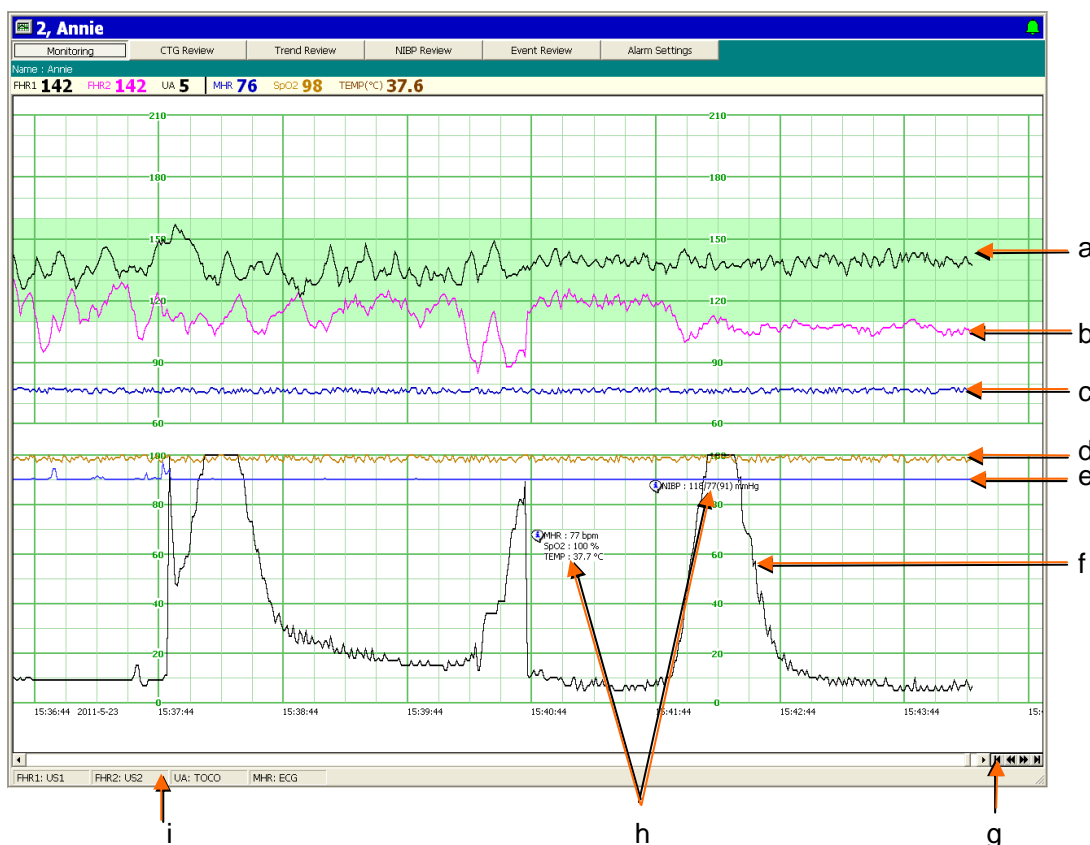
Figure 3-4 Fetal Monitoring display

NOTE:

The displayed time corresponds to the thick graduation on the left.

You can read the following information on this interface:

(a, b) FHR1/FHR2 Trace

The range of FHR numerics has three options: 60bpm ~ 210bpm, 30bpm ~ 240bpm, or 50 bpm ~ 210 bpm.

The dark band in between the fetal heart rate panes indicates the FHR safety range. (according to the preset alarm limits, and the top edge is not higher than 180, the bottom edge is not lower than 100). It makes it easy to observe if the FHR exceeds the normal range. So you can tell if the fetal heart rate is too low or too high.

NOTE:

Due to the screen resolution and window size, the traces may look different on

different LCDs. The screen with high resolution and big size provides the interpreter with better reading effect. The diagnosis should be made based on the printed monitoring report.

(c) HR Trace

Maternal heart rate trace, the y-axis of the trace indicates the numerics of HR.

(d) SpO₂ Trace

Maternal SpO_2 trace, the y-axis of the trace indicates the numerics of SpO_2.

(e) AFM Trace

The y-axis indicates the scope of fetal movement.

NOTE:

The AFM trace is only for reference, please take the MFM marks as criterion.

(f) TOCO Trace

The y-axis indicates the numeric of TOCO. The range is 0% ~ 100%.

(g) Scroll Control

To review more data, you can drag the scroll bar left or right or use the play back and review keys.

Scroll Bar   Playback and Review Keys

Figure 3-5 Scroll control keys

Alternatively, you can right-click in the trace area and select the keys in the pop-up menu.
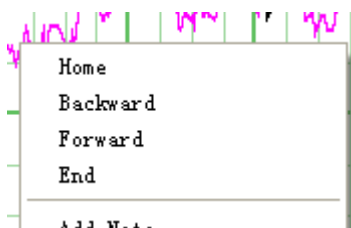

Figure 3-6 Scroll control keys in Right-Click Menu

Icon	Description	Function
	Scroll Bar	Drag the scroll bar to jump to the required position.
⏮	**Home**	Click on **Home** or ⏮ to jump to the start of the monitoring trend;
⏪	**Backward**	Click on **Backward** or ⏪ to play the monitoring trend backward fast. Click in the trend display area to stop playing midway.
⏩	**Forward**	Click on **Forward** or ⏩ to play the monitoring trend forward fast. Click in the trend display area to stop playing midway.
⏭	**End**	Click on **End** or ⏭ to jump to the end of the monitoring trend.

(h) Maternal Vital Signs

If maternal monitoring is in process, the MHR, SpO$_2$ and TEMP are listed every 10 minutes, and NIBP is listed when it is performed.

(i) Signal Sources

The sources of FHR, UA and MHR are shown beneath the trends.

Parameter	Source	Description
FHR1	US	FHR1 signal comes from an ultrasound transducer.
	DECG	FHR1 signal comes from a fetal scalp electrode.
FHR2	US	FHR2 signal comes from an ultrasound transducer.
UA	TOCO	UA signal comes from a TOCO transducer.
	IUP	UA signal comes from an IUPC.
MHR	ECG	HR signal comes from ECG leads.
	Pulse	HR signal comes from a SpO$_2$ sensor.

Besides, some other symbols appear among the traces:

➡	New monitoring, it indicates the screen starts advancing.
⇨	The bedside monitor starts new monitoring by pressing the **START** key.
↑	A manual fetal movement. It appears after the patient presses the FM marker when she feels a fetal movement.
🎽	Note icon, indicating a note is added on CNS or the **MARK** key is pressed on the bedside monitor.
✕✕	The monitor is zeroed by pressing the **AUTO ZERO** key.
🔔	A patient alarm is active.
💕	Signals overlap.
ℹ	Maternal vital sign list, or maternal NIBP result.

NOTE:

The screen starts advancing when there is 3-second continuous fetal heart signal, or if the UA change in 3 seconds is larger than 3. It stops advancing if no valid fetal heart signal is received in 1 minute, and the UA change in 1 minute is smaller than 3.

3.2.4 Monitoring Frame – Maternal Monitoring
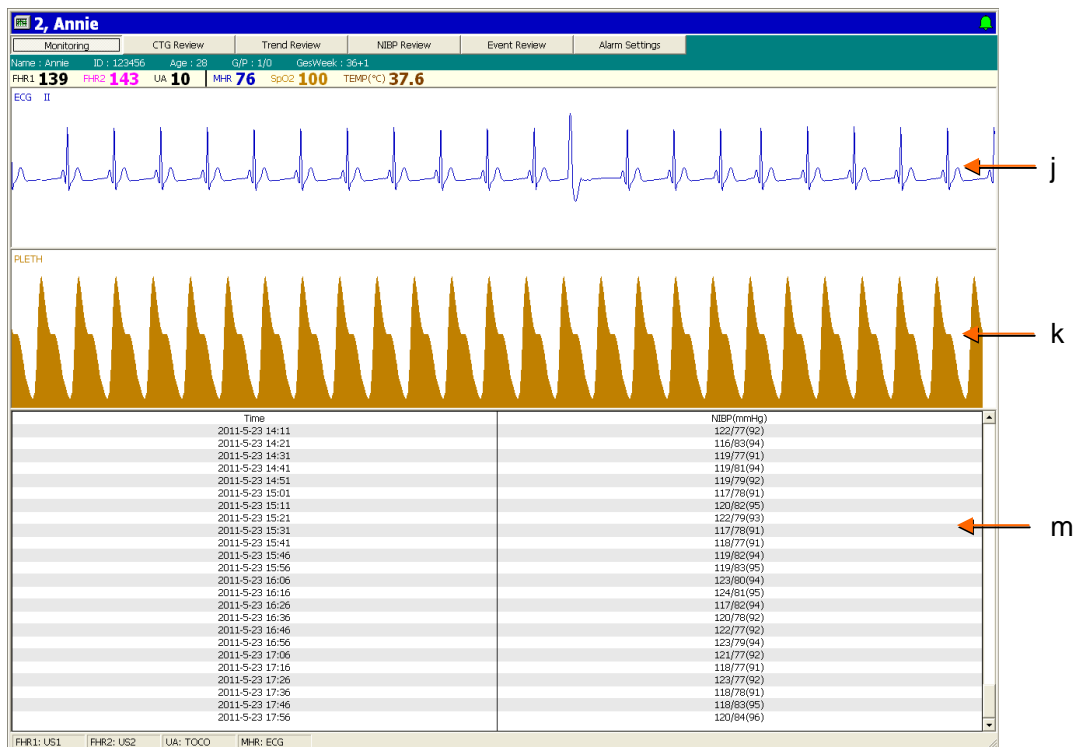
Figure 3-7 Maternal monitoring window

You can read the following information on this interface:

(j) ECG waveform

ECG waveform is a continuous waveform of the patient's cardiac electric activity detected by one of the leads.

(k) SpO₂ waveform

SpO_2 waveform is a plethysmogram indicating the oxygen saturation of hemoglobin in the arterial blood.

(m) NIBP list

The system keeps records of NIBP in the format of SYS/DIA(MAP).

NOTE:

The bedside monitor type and network protocol determine whether the maternal ECG/PLETH will be transferred to MFM-CNS.

3.2.5 Selecting a Section Manually

The auto section length in the **CTG Review** frame is preset and fixed. You can also select a section manually. The manual section has the highest priority when making a diagnosis and printing, and the auto section take the second place.

Right-click in the fetal heart trend area and then choose **Select Section Start**, a "☞"symbol shows up. Move the cursor to the next position, right click on the mouse and then choose **Select**

Section End, a "⬛" symbol shows up, and the selected area is encircled.
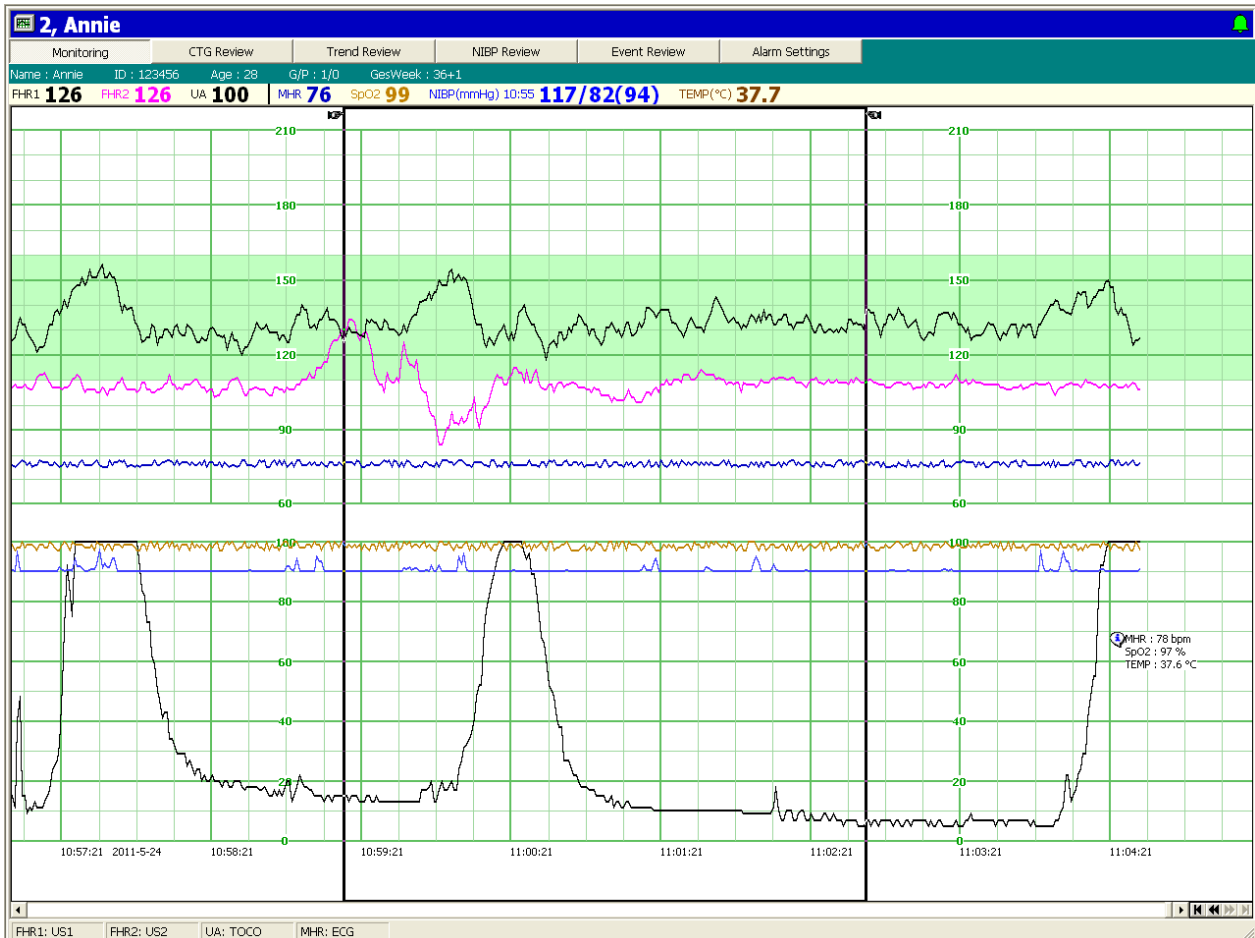
Figure 3-8 Select a section

NOTE:

The manual section should include at least 1-minute CTG data, and the start/end can only be selected in the valid data area. If the section start and (or) end points are located between the gridlines, the system moves them to the closest gridline automatically when printing the report or making a diagnosis.

The manual section is cleared after performing diagnosing, printing, saving, clearing, or clicking on another window.

3.2.6 Making Notes

When there is a significant event, for example the patient takes injection or changes position, you can make a note on the trend.

1) Adding a Note

Move the cursor to the fetal monitoring trend area, right click on the mouse and then select **Add Note**.
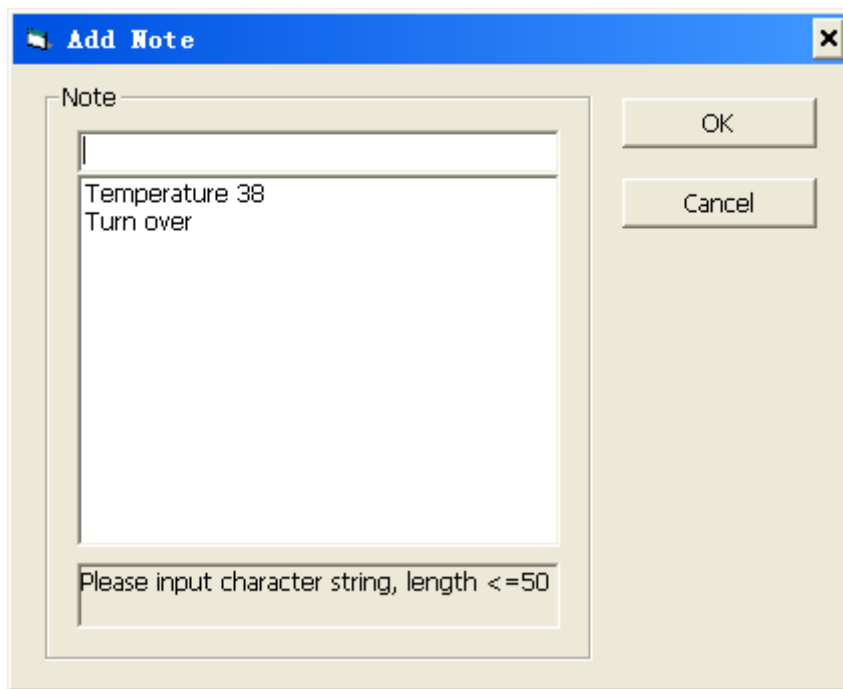
Figure 3-9 Adding a Note

In the pop-up dialog box, you can type in the note content (At most 50 letters are allowed.), or select one of the notes from the note list below, and then click on **OK**.

A note icon "🐝" appears in the CTG area where the mouse was clicked, with the event content displayed next to it. For example:

Figure 3-10 The event

NOTE:

1 To avoid the note covering the trend, click on the mouse at a vacant area.

2 At most 1024 notes can be added in a monitoring window. After the note amount has reached the maximum, save the data to start new monitoring.

2) Editing a Note

To change the content of a note, move the cursor to this note icon, right click on the mouse and select **Edit Note**. Type in the new content and then click on **OK**.

3) Deleting a Note

To delete a note, move the cursor to this note icon, right click on the mouse and then select **Delete Note**.

3.2.7 Highlighting a Section

Highlighting a section of a trace makes this section noticeable.

To highlight a section,

1) Right-click on a trace and select **Highlight Start**. A "⇌" symbol shows up.

2) Move the cursor to the next point, right click on the mouse and then select **Highlight End**, this section of the trace is shown in bold.
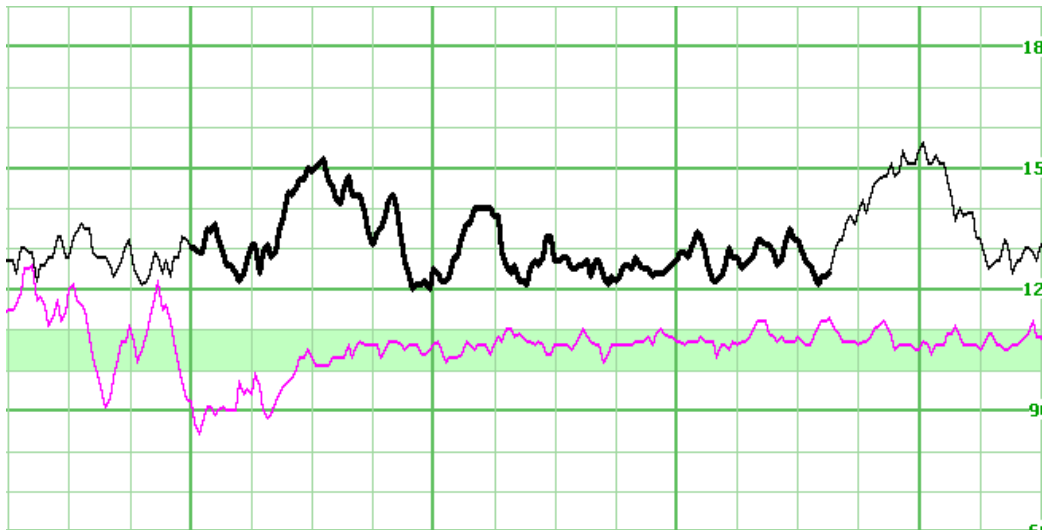
Figure 3-11 Highlight a section

NOTE:

If the mouse is not clicked on a trace, the system highlights the closest trace automatically.

3.2.8 NST Timer

The NST timer measures the NST monitoring duration and signals when the time is out.

Right-click in the fetal monitoring trend area, click on **NST Timer** and then select a length.
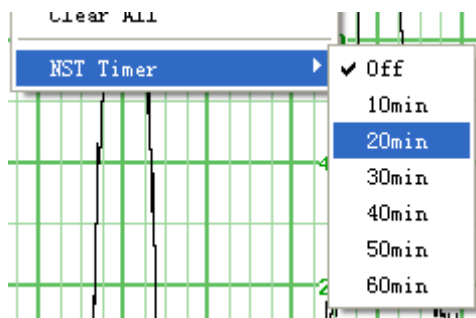
Figure 3-12 Setting NST timer

The elapsed time appears in the top right corner of the trend area, with a purple background 18:43 . When the time is out, the timer background turns into green and the message "NST overtime" is issued.

32:37   NST times out

Save the data to start new monitoring, the timer will be reset.

NOTE:

Instead of the time span, the NST timer counts the length of effective CTG that the system has received. The timer stops if no data is transferred to the system. (When the bedside monitor is offline/ does not has signal, or MFM-CNS is closed.)

3.2.9 Saving the Data

After a patient finishes monitoring, you should save her data as a study in the archives. If it is not saved, data of the new patient will be connected to that of the previous patient, making it difficult to distinguish and diagnose.

If the current window contains data of only one patient, you can click on the **Save** button

Save in the toolbar. All data will be saved as a study in the archives. The data includes patient information, CTG trends, maternal vital sign trend and NIBP list. You can load the study for review, diagnosis and printing.

If the current window contains data of more than one patient, you can save it partially.

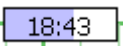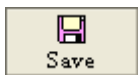Drag the scroll bar or click on the playback key to the new monitoring mark ➡, right click on the mouse and select **Save Previous**. Click on **Yes** to confirm saving. The system saves the previous data as a study in the archives, and clears it from the current window.

NOTE:
1 The system automatically saves the data every minute. You only need to save the data once at the end of every monitoring.
2 If the monitoring continues after 24 hours, the system saves the data as a study in the archives, and begins new monitoring.

3.2.10 Clearing the Data

For the useless data, you can clear it.

To clear the data partially, move the cursor to a point, right-click in the CTG area and then select **Clear Previous**. Click on **Yes** to delete the data previous to the point, or click on **No** to cancel.

If you want to clear all data of the current window, right click on the mouse and then select **Clear All**. Click on **Yes** to delete all data, or click on **No** to cancel.

NOTE:

The cleared data cannot be restored. Make sure the data is useless before clearing it.

3.3 Viewing a Bed

The monitoring window of every monitor is arranged equally on the main interface, and the selected window is marked with dark title bar. In order to observe a bed in detail, you can select it and then click on the **ViewBed** button `ViewBed` in the toolbar or double-click on the mouse in the trend display area.

The **ViewBed** window includes several frames: **Monitoring, CTG Review, Trend Review, NIBP Review, Event Review** and **Alarm Settings**.

In the **ViewBed** window, click on the **MainScreen** button `MainScreen` in the toolbar or double-click on the mouse in the CTG area to return to the main interface.

3.3.1 Monitoring Frame

By default, the system enters the **Monitoring** frame after the **ViewBed** window is open. You should enter this frame before having access to other frames.

The monitoring frame is the full size of the monitoring interface. You can perform all operations introduced in section 3.2.

3.3.2 CTG Review Frame

Figure 3-13 CTG review frame

The top half of the **CTG Review** frame is the CTG trend of the whole monitoring process (24 hours at most).

Click on the mouse in the top half area, the system covers a section (auto section) with black background. The bottom half shows details of it. The length and start of this auto section are set in the **Monitoring Setup** menu.

3.3.3 Trend Review Frame

The **Trend Review** frame lists maternal monitoring parameters of 24 hours, and it is saved every minute. The parameters include MHR, MSpO$_2$, NIBP and TEMP.

Time	MHR	SpO2	NIBP(mmHg)	TEMP(°C)
2011-5-24 15:45	77	99	- - -/- - -	37.7
2011-5-24 15:46	77	99	- - -/- - -	37.7
2011-5-24 15:47	76	98	- - -/- - -	37.6
2011-5-24 15:48	77	98	- - -/- - -	37.6
2011-5-24 15:49	76	99	- - -/- - -	37.6
2011-5-24 15:50	77	99	- - -/- - -	37.6
2011-5-24 15:51	76	98	- - -/- - -	37.6
2011-5-24 15:52	77	99	- - -/- - -	37.6
2011-5-24 15:53	76	98	- - -/- - -	37.7
2011-5-24 15:54	77	98	123/79(94)	37.7
2011-5-24 15:55	77	99	- - -/- - -	37.7
2011-5-24 15:56	77	98	- - -/- - -	37.7
2011-5-24 15:57	76	98	- - -/- - -	37.6
2011-5-24 15:58	76	99	- - -/- - -	37.6
2011-5-24 15:59	76	99	- - -/- - -	37.7
2011-5-24 16:00	76	99	- - -/- - -	37.7
2011-5-24 16:01	76	98	- - -/- - -	37.7
2011-5-24 16:02	76	98	- - -/- - -	37.7
2011-5-24 16:03	76	98	- - -/- - -	37.6
2011-5-24 16:04	76	99	117/79(92)	37.6
2011-5-24 16:05	77	98	- - -/- - -	37.7
2011-5-24 16:06	76	98	- - -/- - -	37.6
2011-5-24 16:07	76	98	- - -/- - -	37.7
2011-5-24 16:08	76	99	- - -/- - -	37.6
2011-5-24 16:09	77	98	- - -/- - -	37.7
2011-5-24 16:10	76	99	- - -/- - -	37.6
2011-5-24 16:11	77	99	- - -/- - -	37.6
2011-5-24 16:12	76	99	- - -/- - -	37.7
2011-5-24 16:13	77	99	- - -/- - -	37.7
2011-5-24 16:14	76	98	117/77(90)	37.6
2011-5-24 16:15	76	99	- - -/- - -	37.7
2011-5-24 16:16	76	99	- - -/- - -	37.7
2011-5-24 16:17	76	98	- - -/- - -	37.7
2011-5-24 16:18	77	99	- - -/- - -	37.6
2011-5-24 16:19	77	99	- - -/- - -	37.6
2011-5-24 16:20	76	98	- - -/- - -	37.6
2011-5-24 16:21	77	98	- - -/- - -	37.6
2011-5-24 16:22	77	99	- - -/- - -	37.6
2011-5-24 16:23	77	99	- - -/- - -	37.7
2011-5-24 16:24	76	99	116/80(92)	37.6
2011-5-24 16:25	76	99	- - -/- - -	37.6
2011-5-24 16:26	77	98	- - -/- - -	37.6
2011-5-24 16:27	77	99	- - -/- - -	37.6
2011-5-24 16:28	76	99	- - -/- - -	37.7
2011-5-24 16:29	77	99	- - -/- - -	37.6
2011-5-24 16:30	76	98	- - -/- - -	37.7
2011-5-24 16:31	76	98	- - -/- - -	37.7
2011-5-24 16:32	76	99	- - -/- - -	37.7
2011-5-24 16:33	76	99	- - -/- - -	37.7
2011-5-24 16:34	76	99	119/78(92)	37.7

Figure 3-14 Trend review frame

3.3.4 NIBP Review Frame

NIBP Review frame can list 200 groups of NIBP measured during monitoring. The system saves a group of data after every NIBP measurement.

Time	NIBP(mmHg)
2011-5-23 15:41	118/77(91)
2011-5-23 15:46	119/82(94)
2011-5-23 15:56	119/83(95)
2011-5-23 16:06	123/80(94)
2011-5-23 16:16	124/81(95)
2011-5-23 16:26	117/82(94)
2011-5-23 16:36	120/78(92)
2011-5-23 16:46	122/77(92)
2011-5-23 16:56	123/79(94)
2011-5-23 17:06	121/77(92)
2011-5-23 17:16	118/77(91)
2011-5-23 17:26	123/77(92)
2011-5-23 17:36	118/78(91)
2011-5-23 17:46	118/83(95)
2011-5-23 17:56	120/84(96)
2011-5-24 10:45	119/83(95)
2011-5-24 10:55	117/82(94)
2011-5-24 11:05	124/80(95)
2011-5-24 11:15	119/81(94)
2011-5-24 11:25	118/78(91)
2011-5-24 11:35	121/77(92)
2011-5-24 11:45	118/83(95)
2011-5-24 11:55	123/82(96)
2011-5-24 12:05	120/81(94)
2011-5-24 12:15	117/81(93)
2011-5-24 12:25	118/84(95)
2011-5-24 12:35	118/79(92)
2011-5-24 12:45	119/82(94)
2011-5-24 12:55	121/80(94)
2011-5-24 13:05	123/83(96)
2011-5-24 13:15	123/79(94)
2011-5-24 13:25	124/82(96)
2011-5-24 13:35	118/79(92)
2011-5-24 13:45	123/83(96)
2011-5-24 13:55	122/78(93)
2011-5-24 14:04	122/83(96)
2011-5-24 14:24	123/82(96)
2011-5-24 14:34	117/79(92)
2011-5-24 14:44	124/78(93)
2011-5-24 14:54	121/84(96)
2011-5-24 15:04	122/79(93)
2011-5-24 15:14	119/78(92)
2011-5-24 15:24	116/78(91)
2011-5-24 15:34	118/81(93)
2011-5-24 15:44	123/78(93)
2011-5-24 15:54	123/79(94)
2011-5-24 16:04	117/79(92)
2011-5-24 16:14	117/77(90)
2011-5-24 16:24	116/80(92)
2011-5-24 16:34	119/78(92)

Figure 3-15 NIBP review frame

3.3.5 Event Review Frame

The top half of the **Event Review** frame shows the CTG, and the bottom half of the **Event Review** frame lists all the events.

Click on one of the events, the system positions it at the center of the screen, marked with a pink vertical line.
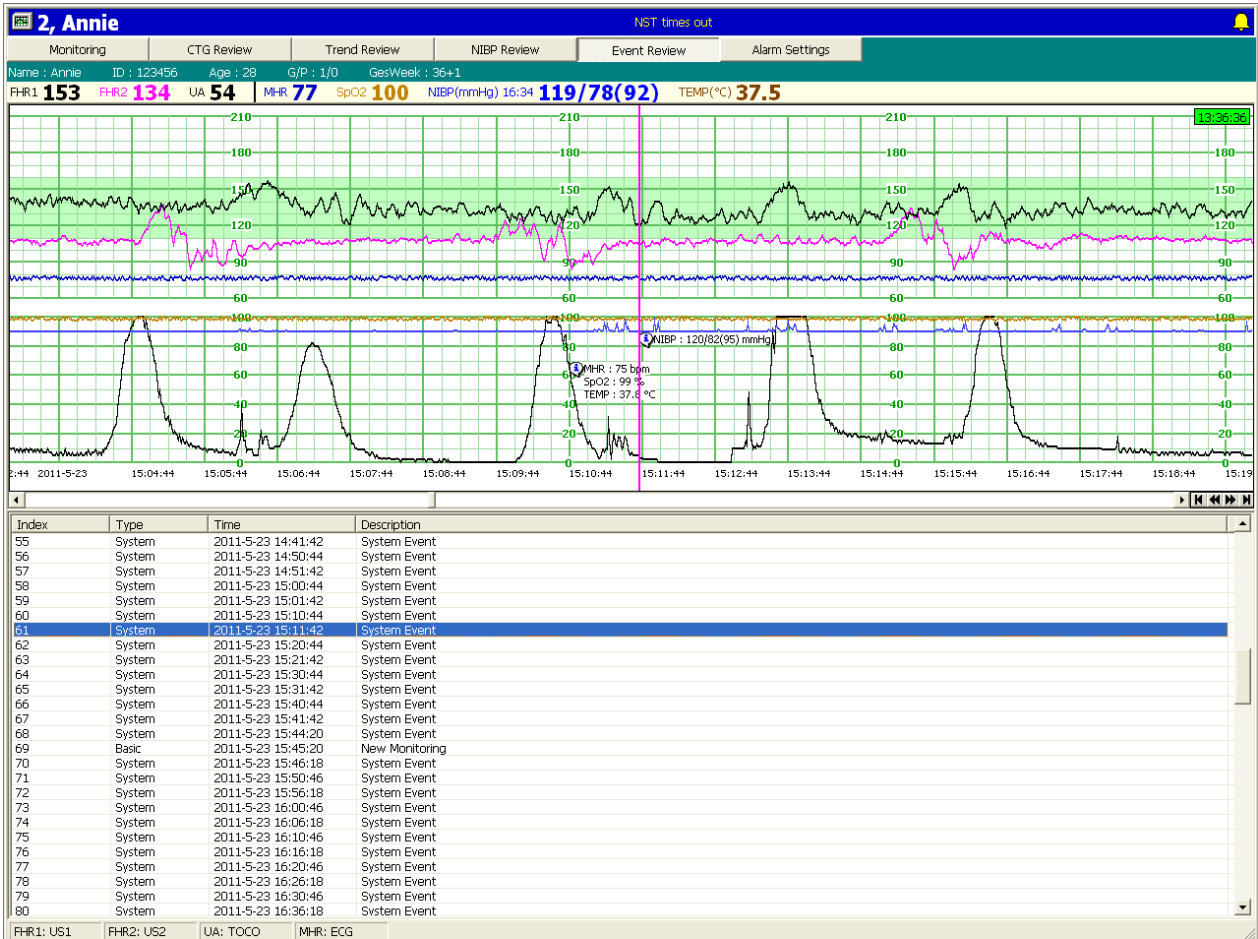

Figure 3-16 Event review frame

The events in the list are divided into four types: **Basic**, **Note**, **Alarm** and **System**. You can choose to show some or all types of events. Right-click in the event list, and tick the type(s) of the event you want to show.
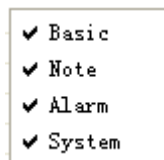
Figure 3-17 Event type selection

3.3.6 Alarm Settings Frame

The **Alarm Settings** frame shows alarm settings of this window. You can change the setting or load default settings.
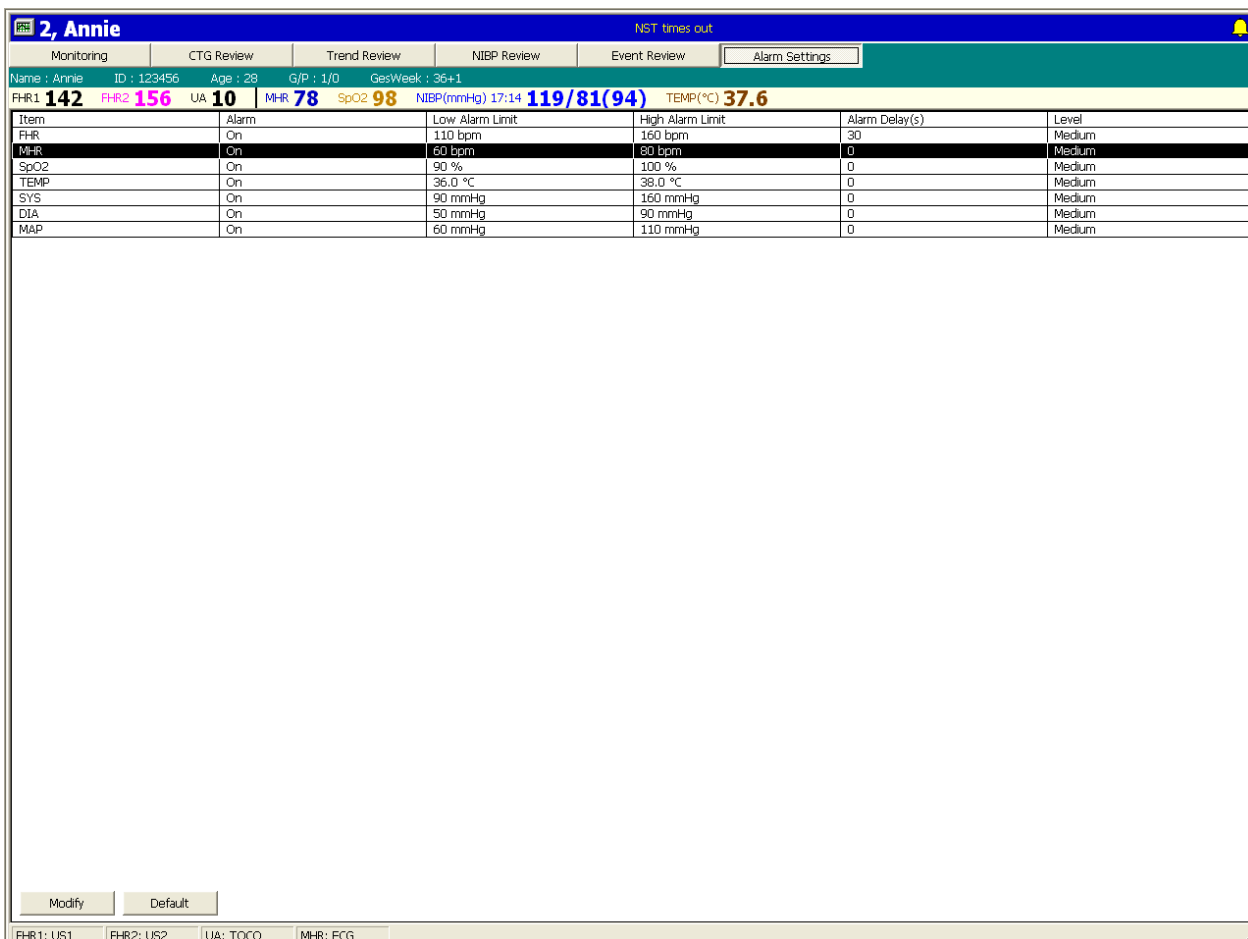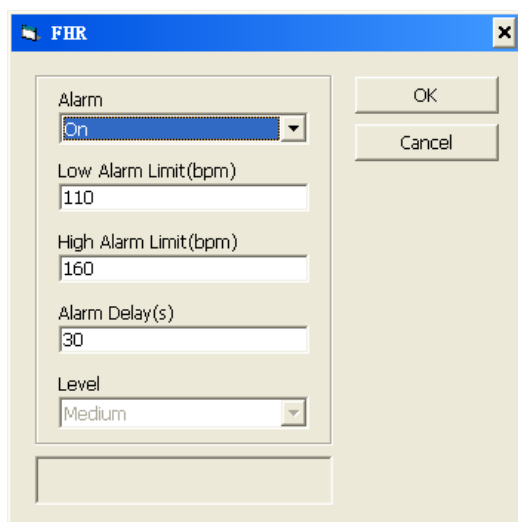

Figure 3-18 Alarm setting frame

The alarm items and their status and other information are listed. If you want to change the alarm settings, select the alarm item and then click on the **Modify** button. The following figure takes FHR alarm settings as an example.

Alarm:
To switch the alarm on or off

Low Alarm Limit:
The lower limit that will trigger the alarm

High Alarm Limit:
The upper limit that will trigger the alarm

Alarm Delay:
The continuous time of the vital sign exceeding its limit that will trigger the alarm.

Figure 3-19 FHR Alarm setup menu

The table below lists options and default setting of each alarm item:

Item	Options	Default Setting
FHR (bpm)		
Alarm	On/Off	On
Low Alarm Limit (bpm)	60 ~ 209	120
High Alarm Limit (bpm)	61 ~ 210	160
Alarm Delay (s)	0 ~ 300	10
MHR (bpm)		
Alarm	On/Off	On
Low Alarm Limit (bpm)	30 ~ 239	50
High Alarm Limit (bpm)	31 ~ 240	120
SpO2 (%)		
Alarm	On/Off	On
Low Alarm Limit (bpm)	0 ~ 99	90
High Alarm Limit (bpm)	1 ~ 100	100
Temp (°C)		
Alarm	On/Off	On
Low Alarm Limit (bpm)	21.0 ~ 43.9	36.0
High Alarm Limit (bpm)	21.1 ~ 44.0	38.0
SYS (mmHg)		
Alarm	On/Off	On
Low Alarm Limit (bpm)	50 ~ 239	90
High Alarm Limit (bpm)	51 ~ 240	160

DIA (mmHg)		
Alarm	On/Off	On
Low Alarm Limit (bpm)	15 ~ 179	50
High Alarm Limit (bpm)	16 ~ 180	90
MAP (mmHg)		
Alarm	On/Off	On
Low Alarm Limit (bpm)	25 ~ 199	60
High Alarm Limit (bpm)	26 ~ 200	110

NOTE:

The alarm setting change is valid only for the current monitoring of the window. When the monitor starts new monitoring, or after data saving or clearing is performed, the user default alarm settings are restored. The factory default alarm settings remain.

If you want to load the user default alarm settings, click on the **Default** button in the bottom left corner.

3.3.7 Viewing Mode

By default, the **ViewBed** window provides a full screen of the current monitoring information. Optionally, two more viewing modes are available: **Up and Down** split mode and **Left and Right** split mode. It is configurable by service engineers.
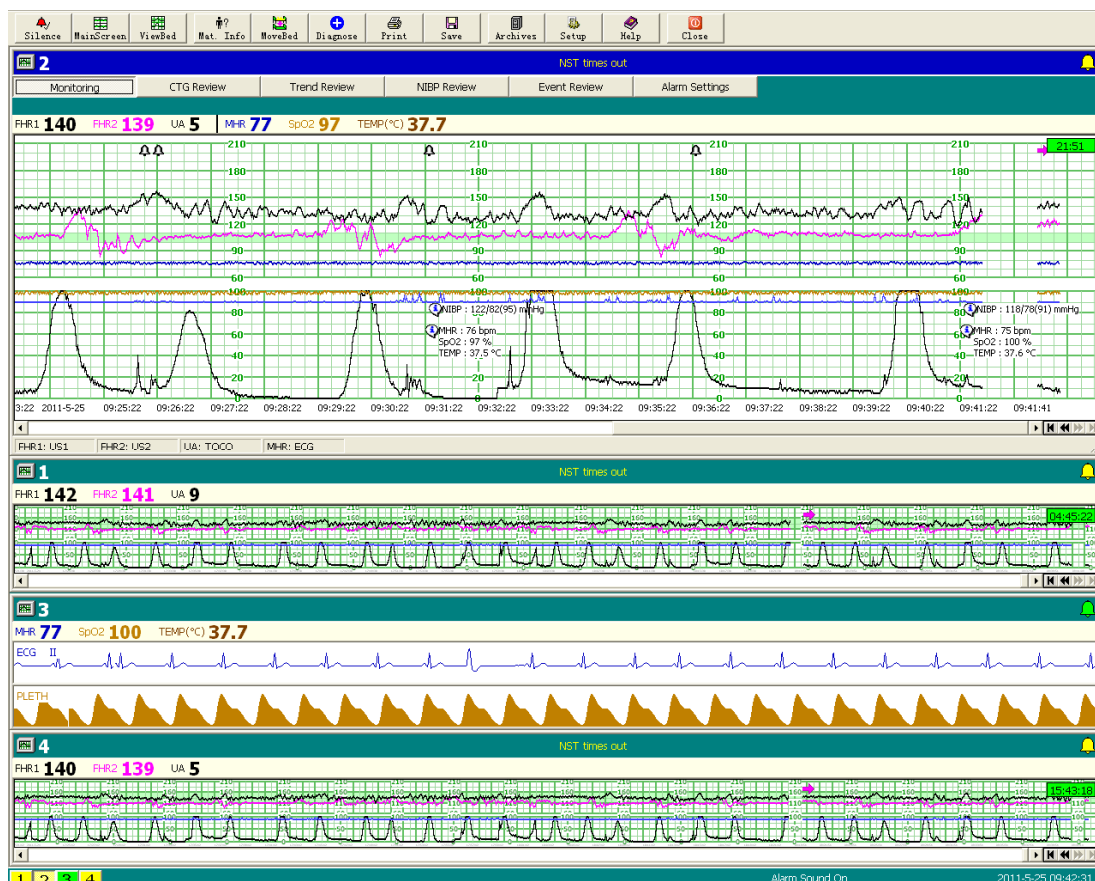

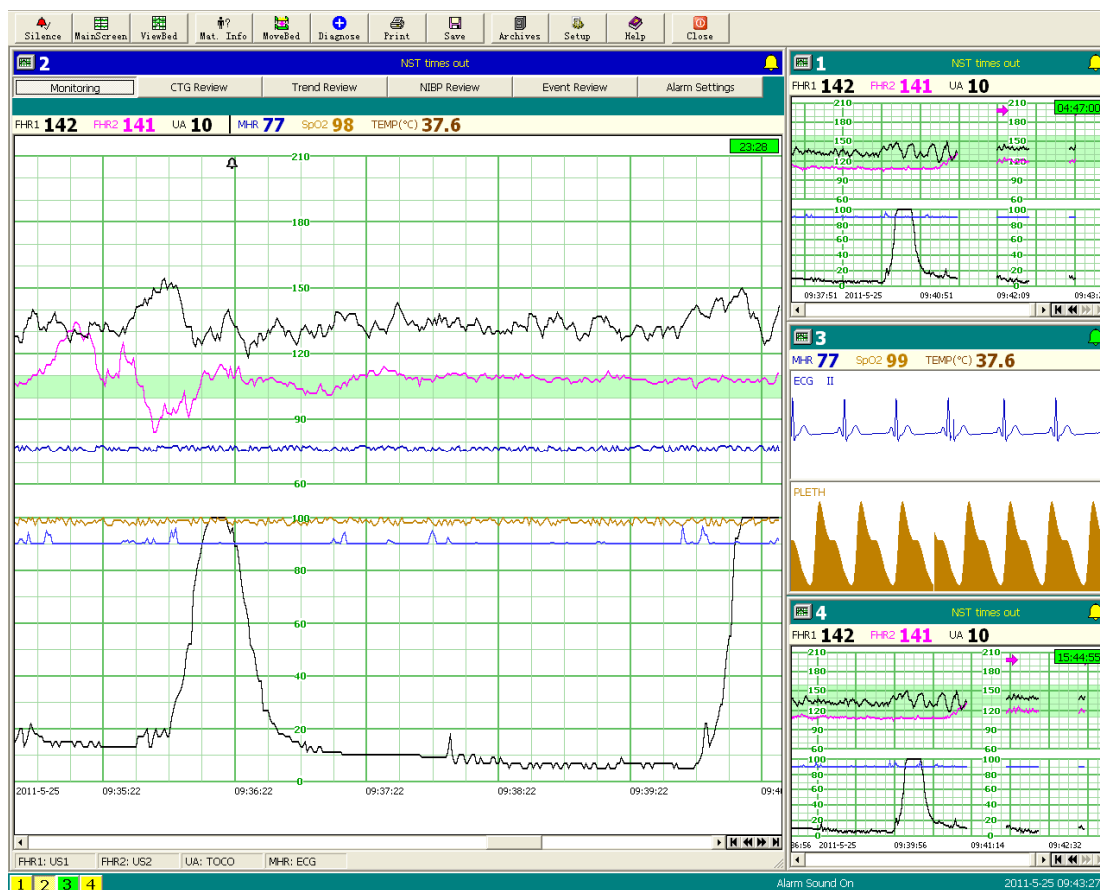**Figure 3-20** Up and down split screen viewbed

Figure 3-21 Right and left split screen viewbed

To acquire optimal split-screen effect, the screen specification should meet the following requirements:

Viewing Mode / Monitor Qty	Full Screen	Up and down Split	Right and left Split	Dual Screen
1 ~ 8	17" LCD 1024x768	19" LCD 1280x1024	19" LCD 1440×900	19" LCD 1440×900
9 ~ 16	19" LCD 1440×900	24" LCD 1920x1200	24" LCD 1920×1200	19" LCD 1440×900
17 ~ 32	24" LCD 1920x1200	Not available	Not available	24" LCD 1920×1200

NOTE:

1 Resolution of the LCD should be set to the factory default; otherwise the display may be affected.

2 If all the optional functions are enabled, the LCD resolution should be set to 1440X900 or greater.

3 Only Win XP operating system supports dual-screen viewing mode.
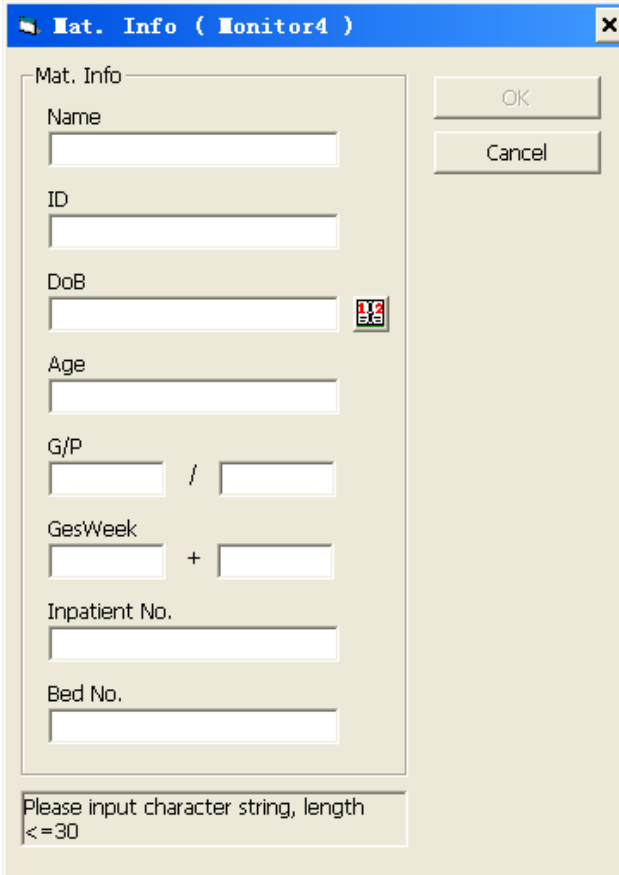
3.4 Maternal Information

It is recommended to enter the maternal information at the beginning of every monitoring, to make sure that one monitoring record is corresponding to one patient. For the studies in the archives, you can load them to the main interface and then enter/edit the maternal information.

NOTE:

By default, CNS does not accept the patient information from the bedside monitors. You should enter this information for the patient on CNS.

Operation Method:

1) Click on the **Mat.Info** button [Mat.Info] in the toolbar, and the **Mat.Info** window opens.

Figure 3-22 Maternal information editing menu

NOTE:

Some of the items in the above figure may not be shown, depending on the items ticked in the **Mat.Info Setup** menu.

2) To input the information, type in the content directly. The box at the bottom of the window indicates the format of content.

3) To input **DOB** or **EDC**, click on the calendar [icon] next to **DOB** or **EDC** box.

Figure 3-23 Calendar

– Click on the figure of the year, e.g. 1980, two selection icons are enabled. Click on them to select a year.

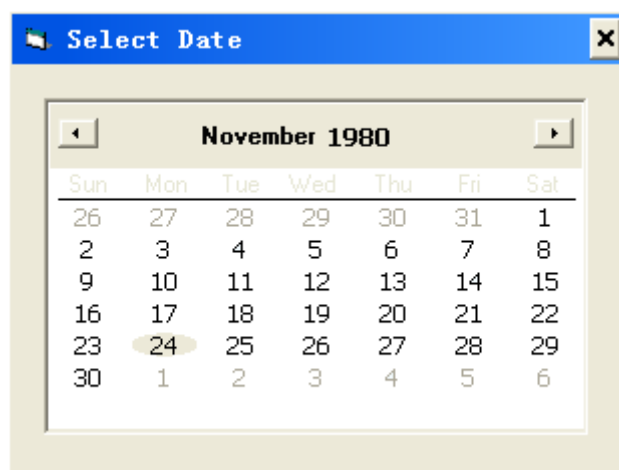– Click on the month, e.g. **November**, all month options are enabled. Select the month. Alternatively, you may use these two icons to select the month:

– Double click on the date to select DOB (date of birth) or EDC (expected date of childbirth).

NOTE:

1 The system gives **Age** automatically in accordance with **DOB**. Or you can input the age.

2 The system automatically updates the patient's **GesWeek** until it reaches 50+6.

3 Before **GesWeek** reaches 40+0, the system automatically calculates **EDC** accordingly. If gestation week or gestation day is not inputted, the system takes it as 0.

3) Click on **OK**.

The system keeps the maternal information in its database. When inputting the name, all the maternal names which start with the same letters appear next to the blank. If you choose a patient whose information is saved in the database, the system loads her information and calculates the gestation week and day automatically.

NOTE:

After (50+6) gestation time, the patient's name will not be displayed.

3.5 Moving Bed

To move a bed is to transfer monitoring data of the source monitor to the target monitor, and then connect their data. This often happens when moving a patient from predelivery room to delivery room. For example, after monitoring a patient with a fetal monitor (Monitor 1) in the predeliver room, you need to move her to the delivery room with a fetal & maternal monitor (Monitor 2).

Select the source monitor, and then click on the **MoveBed** button [MoveBed] in the toolbar to open the **Movebed** menu.
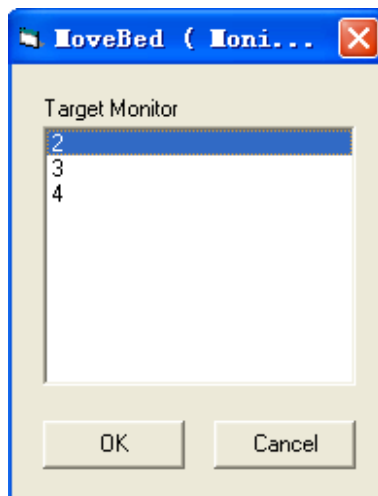
Figure 3-24 Bed moving

Select a target monitor number and click on **OK**. Data of the source monitor is transferred to the target monitor, and is saved in the front of the new data. You can save data of the two parts in one study.

There are a few limitations on moving a bed:

◆ The source monitor should not be empty.

◆ The time should not conflict. If time conflict exists, a dialog box "CTG time conflict, are you sure to move bed?" pops up.

◆ The total time length of the data should not exceed 24 hours.

Moving bed can be carried out between any types of bedside monitor. All the data will be transferred when a bed is moved, including maternal information, fetal monitoring data and maternal vital signs.

3.6 Diagnosing

In the diagnose window, you can grade and give comments. The manual section (at least 5-minute data) has the priority for diagnosing.

Click on the **Diagnose** button [Diagnose] to open the diagnose window:
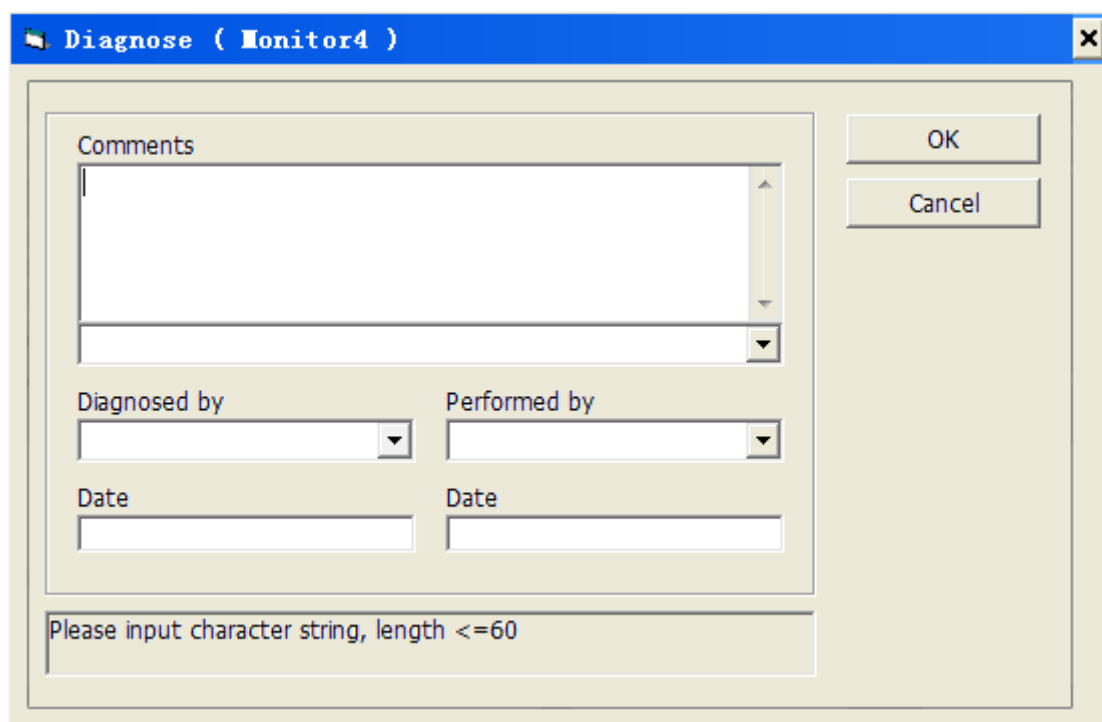
Figure 3-25 Diagnose window

Input the comments and select the operators.

The messages inputted before in the comments and signature areas are automatically saved. You can open the pull-down menus to find the used messages. 10 previous comments can be saved.

3.7 Printing

There are four types of monitoring report: fetal monitoring graph, maternal trend list, NIBP list and event list. You can print them with a printer or export them.

3.7.1 Printing Reports

1) Fetal Monitor Graph

Click on the **Print** button [Print] in the **Monitoring** frame or **CTG Review** frame of a bed.

NOTE:

There must be more than 1-minute data before you have access to the printing interface.
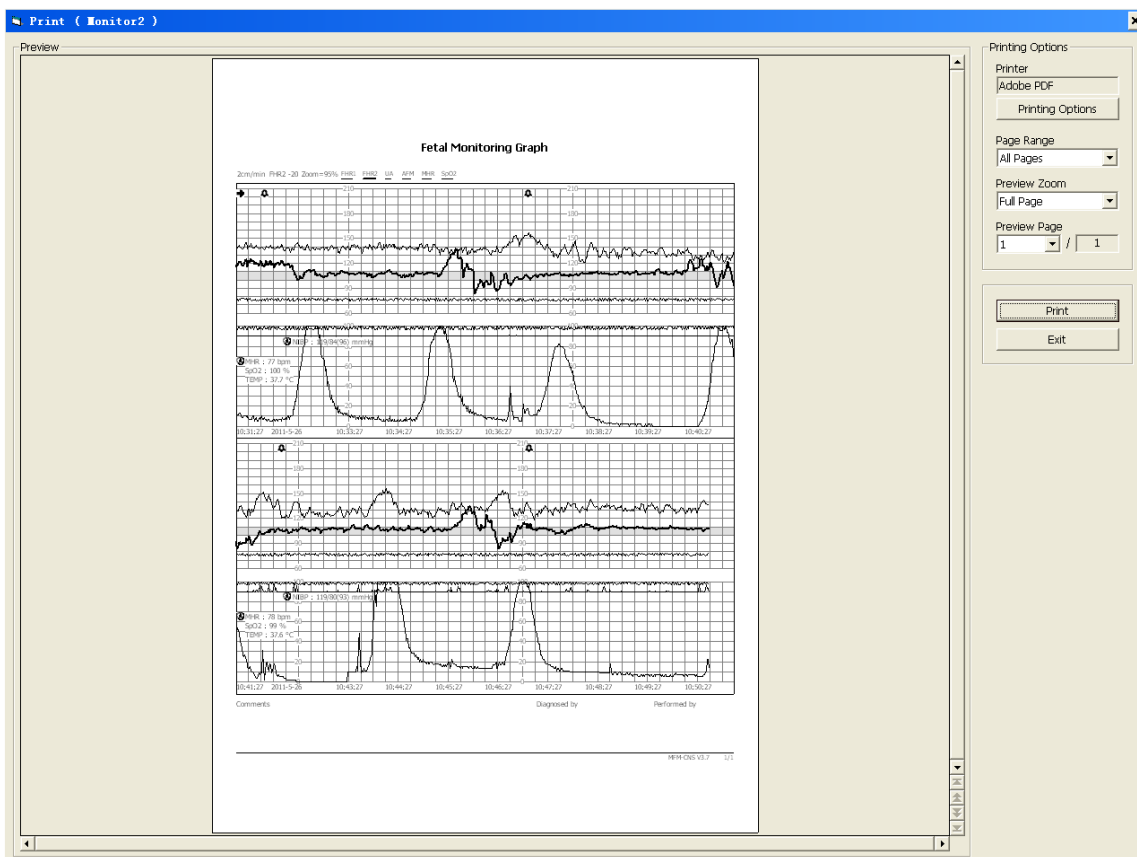
Figure 3-26 Fetal Monitoring Graph

To acquire the required report, all the items should be set properly according to the print content.

Figure 3-27 Print options

- **To select a printer:** The pull-down menu of **Printer** lists all the supported printers.
  NOTE:

  Select the connected printer, and set the printing quality to **Best** to acquire the optimum printing effect.

- **To select the report orientation:** The monitoring report is either in **Portrait** or **Landscape** orientation.
- **To select print shade:** To add some shade to the report printout: **Light**, **Demitint** or **Dark**.
- **To add page footer:** To input some information, this will be printed on the footer area of the report.
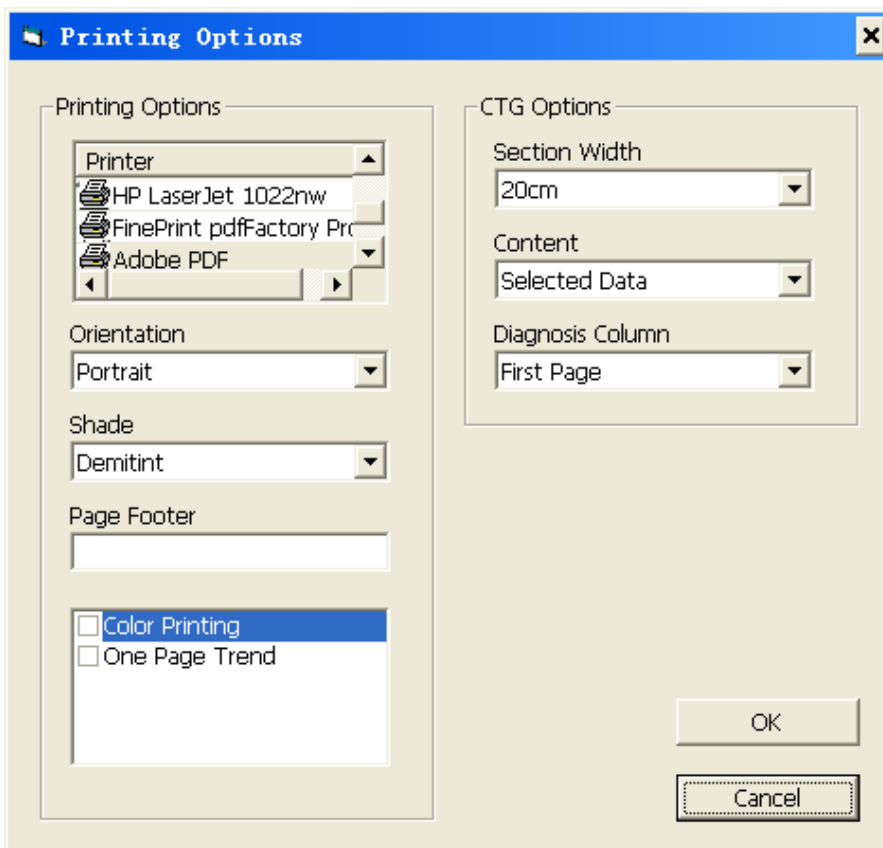- **To select report color:** Tick **Color Printing**, the report is chromatic, otherwise the report is monochromatic.
  NOTE:

  The report is printed chromatically only if a color printer is used, and if the screen color is set to **Orange** or **Green**. Do not tick this item if a mono printer is used.

- **To select trend report format:** Tick **One Page Trend**, the system compresses the trend list to fit one page.
- **To select the CTG length of every section**
  The CTG length of every section is the product of the paper speed and the time span of this section. For example, if the printing speed is 3cm/min and the CTG length is 60cm, the time span of every section of the report is 20min.

  You can set it to 20cm, 30cm, 40cm, 50cm, 60cm or **All**.

  The manufacturer recommends 30cm CTG length for landscape direction, or 20cm CTG length for portrait direction.

  NOTE:

  1 To acquire optimum readability, choose the **Landscape** direction for the section length of 40cm, 50cm and 60cm.

  2 "All" only takes effect on exporting the report in a PDF file, the longest CTG length is 1 hour.

- **To select the diagnosis column:** choose whether to print the diagnosis column on the report , or where to print it.
- **To select the paper range**
  If you want to print all the data, select **All Pages**.

  If you want to print the page that is shown in the window only, select **Current Page**.

  NOTE:

  Do not print all the pages when receiving data.

● **To zoom in/zoom out the report in the preview area**
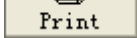
Select the preview scale in the pull-down menu of the **Preview Zoom** item. **Full Page**, **25%**, **50%**, **75%**, **100%**, **150%** and **200%** are available.

● **To select a page to preview:** Depending on the CTG data, the report might include several pages. Select a page to review.

Click on **Print** to start printing the report.
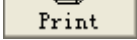
Click on **Exit** to exit.

2) Maternal Vital Sign List

Open the **Trend Review** frame of a bed and click on the **Print** button 🖨 Print to print the maternal vital sign list.
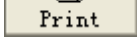
Set the items as introduced above.

3) NIBP List

Open the **NIBP Review** frame of a bed and click on the **Print** button 🖨 Print to print the NIBP list.

Set the items as introduced above.

4) Event List

Open the **Event Review** frame of a bed and click on the **Print** button 🖨 Print to print the event list.

Set the items as introduced above.

3.7.2 Exporting

You can export the report into PDF, JPG or TIF file(s).

To export the report,

1) Open the **Print** window.

2) Set all the items properly.

3) Click on **Export**, type in the file name, select a file format and a path, and then click on **OK**.
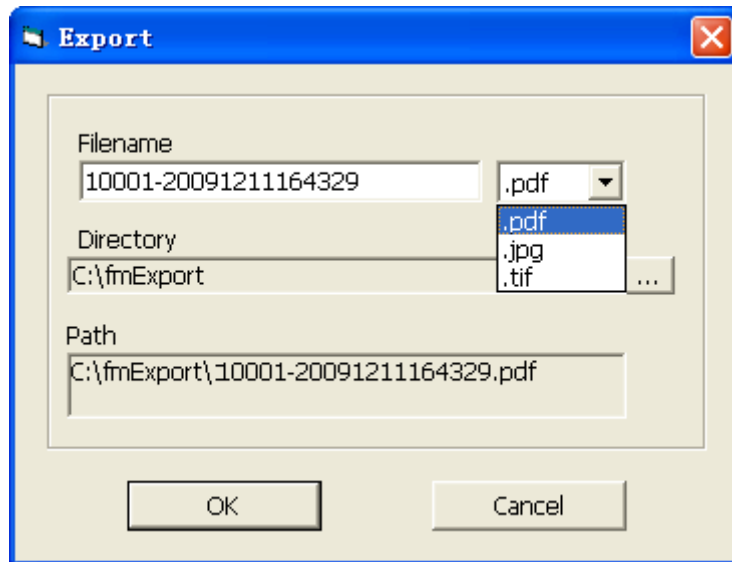
Figure 3-28 Export the report

The report is exported to the preset directory.

NOTE:

1 The program **PDF Creator** needs to be installed before you have access to exporting a report in a *.pdf file.

2 Wait until export completes before performing any other operations.

3 When exporting a multipage report in JPG format, each page is saved in a separated *.jpg file. The page numbers differentiate their file names, e.g. xxxx-1.jpg, xxxx-2.jpg.

4 Do not export more than 10 pages at a time.

3.7.3 Emailing

NOTE:

Windows XP sends email with **Outlook**, and **Win 7** sends email with **Windows live**. Make sure this software can send emails normally before attempting to email the reports.

You can email the report file to others. The file format is set in the export window.

To email the report,

1) Open the **Print** window.

2) Set all the items properly.

3) Click on **Email to**, select a recipient, type in the subject and note, and then click on **OK**.
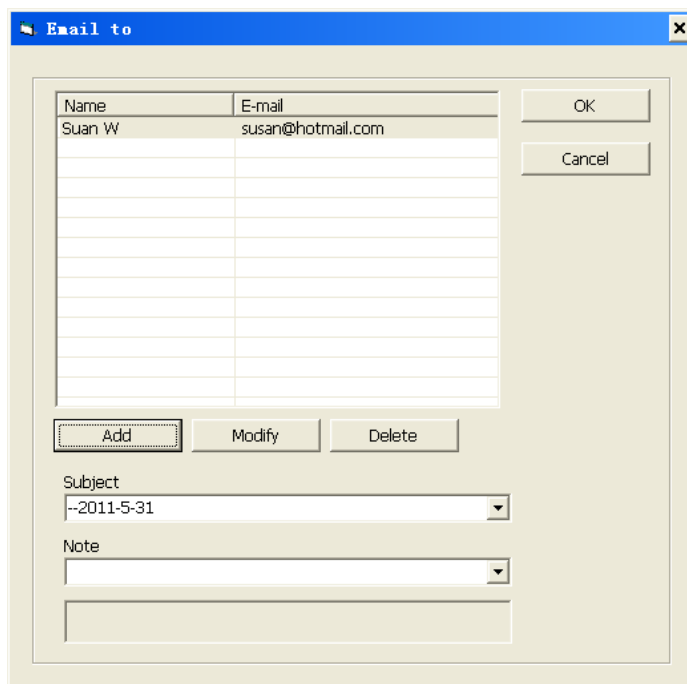
Figure 3-29 Email the report

The report is attached in the email and sent.

To add a recipient,

    1) Open the **Email to** window, and click on **Add**.
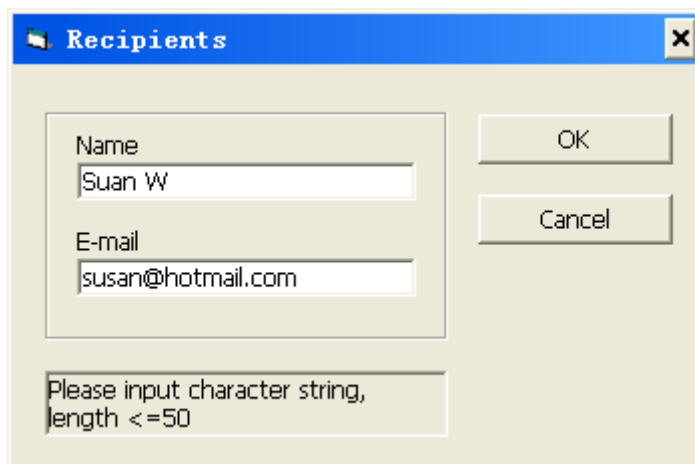
Figure 3-30 Add a recipient

    2) Type in the recipient name and Email address.

    3) Click on **OK**, this recipient is added.

To change a recipient information,

    1) Open the **Email to** window, and click on **Modify**.

    2) Edit the recipient name and/or Email address.

    3) Click on **OK**, the new information is saved.

To delete a recipient,

1) Open the **Email to** window, and click on **Delete**.

2) Click on **Yes**, the recipient is deleted.

3.8 Archives

Click on the **Archives** button [Archives] to open the **Archives** window. It lists all the monitoring studies and the patient information. By clicking on the page turners on the bottom left corner, you can review more studies.

Figure 3-31 Archive window

3.8.1 Searching for a Study

When you are looking for a study, use the search tool to find it quickly.

Search Method:

1) Select a search condition in the pull-down menu on the right of the interface, e.g. "Name".

2) Input the key word (either a part or all of the key word).

3) Click on **Search**. All the monitoring studies that meet the requirement are listed in the window.

Record No.	ID	Name	Age	G/P	GesWeek	Inpatient No.	Bed No.	Start Time	CTG Duration	File Name
2283		Alice	42	1/0	39+2		19	2011-4-6 09:33:17	00:30:17	2011\04\17162-201
2284		Ammie	40	3/1	39+5		33	2011-4-6 10:26:14	00:28:29	2011\04\17165-201

Figure 3-32 Searching for a study

4) To return to the previous archives window, click on the **Refresh** button.

3.8.2 Loading a Study

For the studies in the archives, you can load them to the main interface. At most 35 windows are allowed to be open at the same time.

Select a study in the list, click on the **Load** button, or double click on it. It will be loaded to the **ViewBed** window.

You can review the traces and other information, edit maternal information, make diagnosis or print the reports.

Click on the [×] button to close the window.

NOTE:

After modifying or inputting maternal information, the change takes effect after the **Archives** window is closed.

3.8.3 Statistic

The statistic feature is used to search for the studies that were performed between the specified dates.

Click on the **Statistic** button in the **Archive** window, input the start date and the end date (in the same format as the system date), and then click on **OK**.
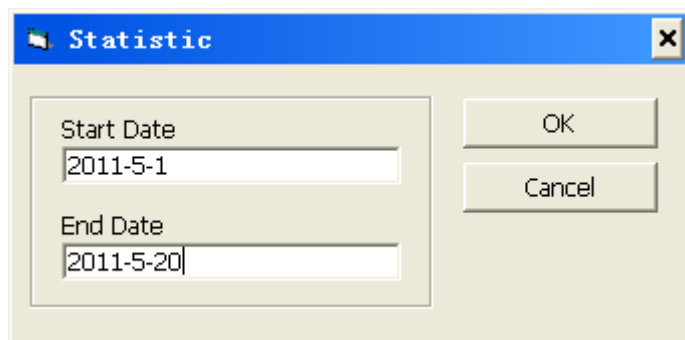
Figure 3-33 Archive statistic menu

The studies that meet the requirement are listed in the window. To return to the previous archives window, click on the **Refresh** button.

NOTE:

Statistic only supports the date between 2000-1-1 and the current date.

3.9 System Setup

Click on the **Setup** button [Setup] in the toolbar to open the **Setup** window. In this window, you can change setting of the system.

NOTE:

1 Settings of MFM-CNS and the bedside monitors are separated; they do not affect each other.

2 The following setup can only be performed by advanced users. General users do not have access to the setup window. **System Setup** and **Service Setup** are supposed to be operated by authorized service engineers.

3.9.1 Fetal Monitoring Setup

After the **Setup** button is clicked, the system enters the **Monitoring Setup** interface. You can set the fetal monitoring items listed in the following table, and the parameters underlined are default values.

Item	Options	Explanation
Paper Speed	1cm/min 2cm/mim 3cm/min	Speed of the CTG trend paper advancing.
FHR2 Offset	-20 0 +20	When monitoring twins, set FHR2 offset to separate the two FHR trends.
Paper Style	Compact (USA) USA International	The background paper style for CTG trend. − Compact (USA): 60bpm ~ 210bpm, vertical ordinate is 30bpm/cm; − USA: 30bpm ~ 240bpm, vertical ordinate is 30bpm/cm; − International: 50bpm ~ 210bpm, vertical ordinate is 20bpm/cm.
Time Scale	Real Time Relative Time	The time format of the x-axis. − Real Time: The x-axis displays the real time. − Relative Time: The x-axis displays the elapsed time of the system running.
Auto Section Length	20min 30min	When the manual section is empty, the system selects a section automatically for review, diagnosing and printing. This section length is adjustable. − 20min: The length is 20min − 30min: The length is 30min

| Select Position | Start
Center | For every auto section,
− Start: The cursor stays at the start of the section.
− Center: The cursor stays at the center of the section. |
| Grid Line Style | Solid
Dashed | − Solid: The trend background has solid grid line.
− Dashed: The trend background has dashed grid line. |

3.9.2 Maternal Monitoring Setup

On the **Monitoring Setup** interface, you can set the maternal monitoring items listed in the following table, and the parameters underlined are default values.

Item	Options	Explanation
NIBP Unit	mmHg kPa	Select NIBP unit.
Temp Unit	℃ ℉	Select temperature unit.
HR Source	ECG Pulse	Select maternal HR source priority. If the set HR source does not have input signal, the system switches the source to the other automatically.

◆ Fill Wave: Choose the way of describing respiratory wave and PLETH, and the default is Fill Wave☑;

3.9.3 CTG Option Setup

On the **Monitoring Setup** interface, you can set the CTG items listed below.

◆ **Show normal FHR range**: Choose whether to show FHR safe range with green background in the FHR trend display area, and the default is ☑.

The green band indicates the preset alarm range (the top edge is not higher than 180 and the bottom edge is not lower than 100). It makes it easy to observe if the FHR exceeds the normal range, and you can tell if the fetal heart rate is too low or too high.

◆ **Show mat. name synchronously**: Show maternal name synchronously when showing date and time every 10 minutes, and the default is ☐.

◆ **Show AFM trace** : Choose whether to show AFM trace, and the default is ☐;

◆ **Show fetal movement count**: choose whether to show the count of fetal movement mark on the CTG, and the default is ☐;

◆ **Show CTG duration**: choose whether to show the monitoring duration timer for each bed, and the default is ☐.

◆ **Show MHR trace**: Choose whether to show MHR trace, and the default is ☐;

◆ **Show MSpO2 trace**: Choose whether to show MSpO2 trace, and the default is ☐;

3.9.4 Interface Setup

Enter the **Setup** interface and then click on **General Setup**. You can set the interface items listed below.

◆ **Screen Color:** Select the color style for the **Monitoring** window, Orange, <u>Green</u>, Blue, Black, Customize.

◆ **Color Customizing:**

When **Screen Color** is set to **Customize**, **Item Color** is enabled. You can customize the color for a certain item by performing the following procedures:

1) Select **Customize** in the pull-down menu of **Color Config**.

2) Select the item that you want to customize color for in **Item Color**, for example "FHR1".

3) Click on the color box on the right of the item;

4) Select a new color in the **Color** window and then click on **OK**;

From the color box, you can see that the color of selected item has been changed.
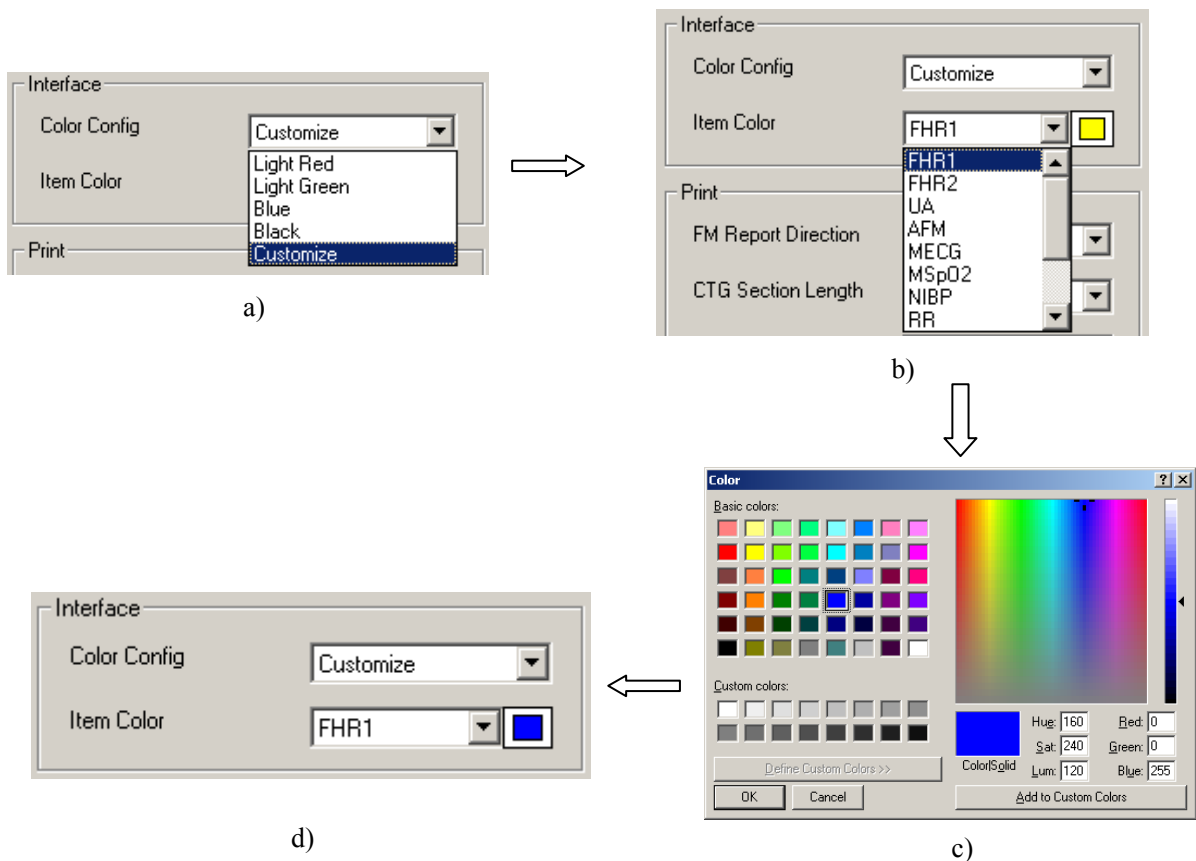
Figure 3-34 Color Customizing

◆ **Numeric Window:** Select the position of the numeric window relative to the trend area, Right, <u>Top</u>, Left, Bottom.

NOTE:

To acquire optimal display effect, the numeric window should be set at a proper place according to the LCD size and screen split mode. We recommend you to set

the numeric window to **Top** or **Bottom** for **Up and Down** split mode, and set it to **Left** or **Right** for **Left and Right** split mode.

3.9.5 Inputting Hospital Name

Enter the **Setup** interface and then click on **General Setup**. You can input the hospital name.

Input the hospital name in the blank under the **Hospital** item. This name will be shown on the monitoring report.

NOTE:

You should set the hospital name before the monitoring starts. If the hospital name is changed, it will take effect after new monitoring starts.

3.9.6 Setting Alarm Sound

Enter the **Setup** interface and then click on **General Setup**. You can change the alarm settings.

◆ **(Alarm) Volume:** Select the alarm volume to level **1**, **2** or **3**. **1** is the lowest level and **3** is the highest level. The default is **2**.

◆ **Silence Duration:** Select the alarm silence mode: **Silence**, **Alarm Sound Paused 1min / 2min/3min**, or **Alarm Sound Off**. The default is **Silence**.

◆ **Modify Default:** You can change the alarm settings here and save them as user default. This default will be loaded in the **Alarm Settings** frame.

To change the alarm user default:

a) Click on **Modify Default**.
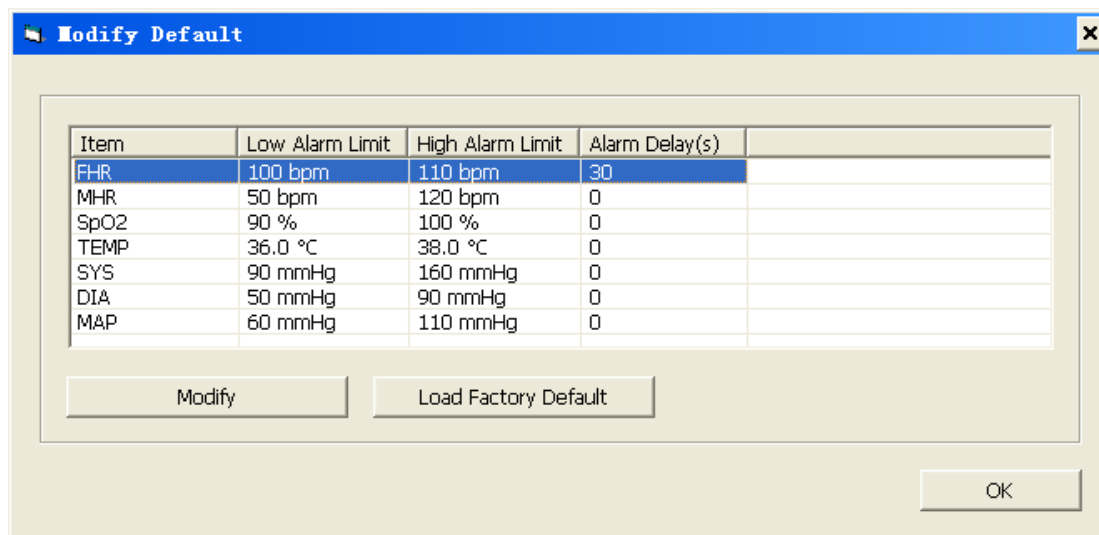
Figure 3-35 Modify alarm default

b) Select an alarm item, and then click on **Modify**.
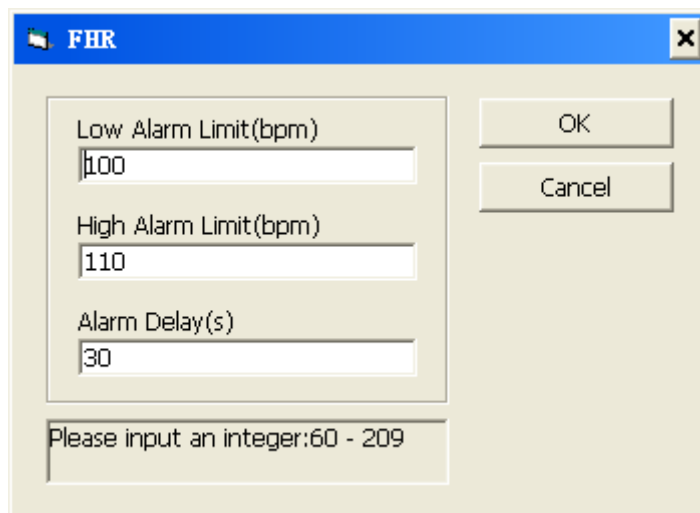
Figure 3-36 Modify FHR default

    c) Change the editable items, and then click on **OK**.

◆ **Load Factory Default:** Set all user default to factory default by clicking on the **Load Factory Default** button.

3.9.7 Setting Auto Saving Timer

Enter the **Setup** interface and then click on **General Setup**. You can set the auto saving timer. If the bedside monitor is offline, the system saves the data automatically after this preset interval.

◆ **Auto. Saving Timer:** Select **None**, **10 min** ~ **60 min**; the default is **30 min**.

NOTE:

The system does not save the data automatically if the window is being opened or modified.

3.9.8 Note Management

Enter the **Setup** interface and then click on **General Setup**. You can manage the note list on the **Note Management** interface.
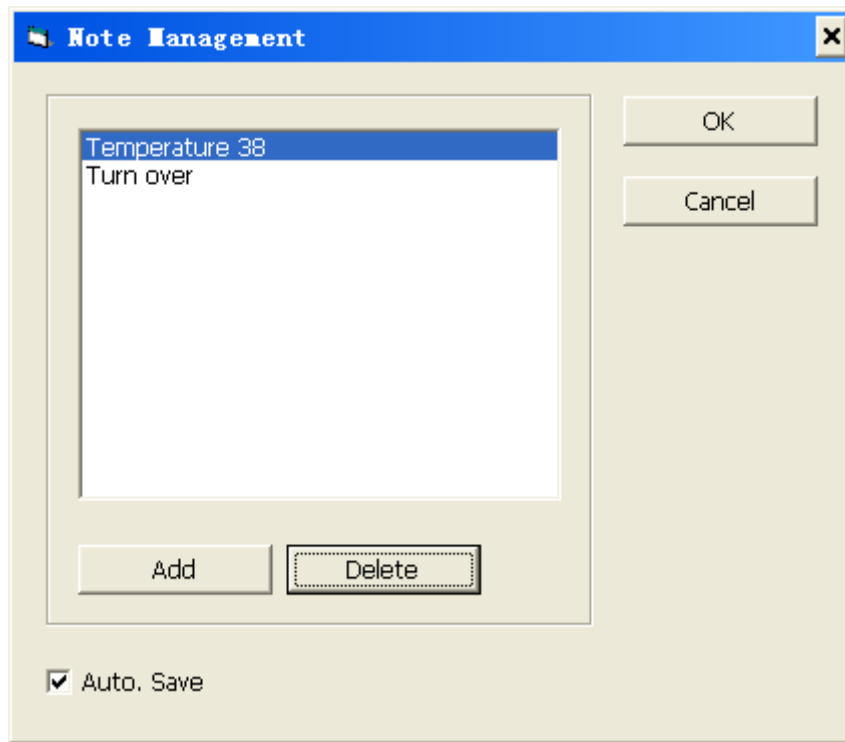
Figure 3-37 Note management

◆ **Adding a note to the list:** Click on **Add**, input the note content in the following dialogue box and then click on **OK**, this note is added to the note list.
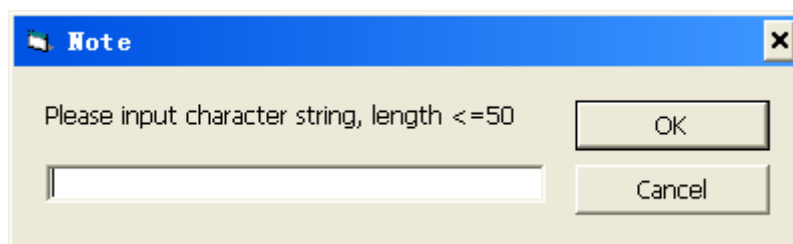
Figure 3-38 Add a note

◆ **Deleting a note from the list:** Select a note and then click on **Delete**, select **Yes**, this note is deleted from the note list.

◆ **Saving a note to the list automatically:** If the **Auto. Save** item is ticked, the system saves a new note to the note list for future use after it is inputted. You can click on the buttons **Ctrl**+**Del** to delete a note from the list. If this item is not ticked, the inputted note is not saved, and can not be deleted directly.

3.9.9 Setting Maternal Information Options

Enter the **Setup** interface and then click on **Mat. Info Setup**. You can choose the maternal information options.

By default, only some of the items are shown. You can select or deselect the items as required in the **Mat Info** area.

After an item is selected, it will appear in the maternal information menu, the archives interface and the pull-down menu of study searching condition.

3.9.10 Setting Auto Created ID

Enter the **Setup** interface and then click on **Mat. Info Setup**. You can choose whether to create an ID automatically.

If both **Auto Create ID** and **ID** in **Mat. Info** are selected, the system creates an ID for the patient when inputting maternal information. This ID is editable, and is available for real-time monitoring.

3.9.11 Service Setup

The items in the **Service Setup** menu are password protected. Only service engineers can change their settings. Once they are changed, the software should be restarted. Therefore, do not change the service settings during monitoring.

♦ **User Login**: The user management feature. In order to protect the user's operation, the software should be logged in to using a username and the correct password. The default is on.

♦ **Protect settings**: Password is required for entering setup interface. The default is off.

♦ **Protect archives**: Password is required for entering the **Archives** window. The default is off.

♦ **Download**: To download the data in the memory of the bedside monitors (F9, software of version 2.4 or greater). The default is off.

♦ **Open file**: To open the downloaded files from the bedside monitors (at most 10 files are allowed to be opened at one time, and only the files on the local hard drive are openable.), or the files imported from USB disk. The default is off.

♦ **Export**: Export the monitoring report to a file. The default is off.

♦ **Email to**: Send the exported file as attachment by email. When the report has more than one page, it should be exported in the format of PDF or tif. Only the first page will be sent if the report is in JPG format. The default is off.

♦ **Chalkboard**: Summarize all patient information in a small window for quick review. The default is off.

♦ **Partogram**: According to the inputted patient's parameter during delivery, the system draws a partogram for the physician's or midwife's reference. The default is off.

♦ **Enable MoveBed**: When the patient is moved from one bed to another, the system allows moving the data from the source monitor to the target monitor. The default is on.

♦ **Enable time conflicting (MoveBed)**: When the time of the source monitor and the target monitor conflicts (Ending time of the source data is later than the starting time of the target monitor), the system allows the moving bed operation. The default is on.

♦ **Accept ID from monitor**: The system accepts the ID (made up of digitals or English letters) inputted on the bedside monitor (F9, software of version 2.5 or greater). The default is off.

NOTE:

Even this feature is enabled, the user can still input patient ID on CNS, and the most recently modified one will prevail.

♦ **Send ID to monitor**: The system sends the inputted ID (made up of digitals or English letters) to the bedside monitor. This feature is reserved, and the default is off.

♦ **Show RESP**: Show RESP waveform and numeric. The default is off.

♦ **Signals Overlap**: When the twin signals or the fetal heart signal and maternal heart signal overlap, the system issues a message. The default is off.

♦ **Transfer**: To monitor the fetus and the mother synchronously, transfer the real-time data of a patient monitor to a fetal monitor. The default is off.

NOTE:

When this feature is enabled, you can set the transfer condition on the monitoring window by right clicking on the mouse and choosing **Transfer**. If the data transfer succeeds, the window title flickers and shows "3->5", indicating that data of monitor 3 is transferred to monitor 5. If the transfer fails, you should check if the source monitor is a patient monitor and the target monitor is a fetal monitor, and if the same patient ID is inputted on both monitors.

If you want to transfer the data by ID, patient ID should be inputted on the patient monitor before new monitoring starts. Otherwise the data cannot be transferred to the target window correctly.

♦ **Copy to**: To copy the opened file or study and save it in the target directory. The default is off.

♦ **Manual Section**: To select the start and end of a section manually. The default is on.

♦ **Clear Previous**: To clear the data previous to a point on CTG interface. The default is on.

♦ **Save Previous**: To save the data previous to a point on CTG interface. The default is on.

♦ **NST Timer**: After choosing NST duration, the system shows the elapse time of the monitoring, and gives a message when time is out. The default is off.

♦ **Highlight**: To highlight a section of a trace. The default is off.

♦ **Show initials (notes)**: To show initials of the user next to the note (on the condition of that the user login feature is enabled). The default is off.

♦ **Show deleted notes**: To show the deleted notes on the CTG interface. The default is off.

♦ **Enable closing monitor window**: To enable a closing button in each real-time monitoring window. The default is off.

♦ **Fixed CTG Duration (ViewBed)**: When viewing a bed, the CTG duration on the screen is fixed to 20 or 30 minutes (depending on the auto section length). The default is off.

♦ **Disable OS**: To disable the operating system when the software is running, the user cannot

run other software. The default is off.

♦ **Shutdown after exit**: To shut down the computer automatically after exiting the software. The default is off.

3.10 User Login

NOTE:

1 This is an optional feature enabled or disabled in **Service Setup**. To protect the user's operation, it is recommended to enable this feature.

2 Only advanced users can add, modify or delete user information. But information of users who already logs in is not modifiable.

3.10.1 Login

The login dialog box pops up when running the software:
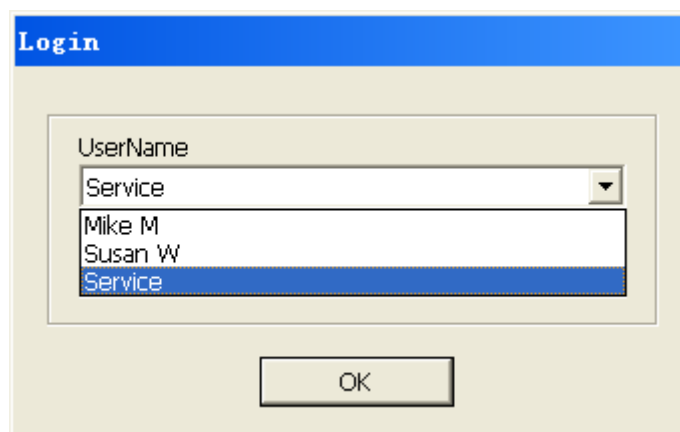
Figure 3-39 User login

All user names are listed in the pull-down menu of the **UserName** item. Select your user name, type in the correct password and then click on **OK** to login. The user name is shown on the main

interface .

3.10.2 Modifying Password

After login, you can change your password.

1) Click on the user name button 🖼 on the main interface.
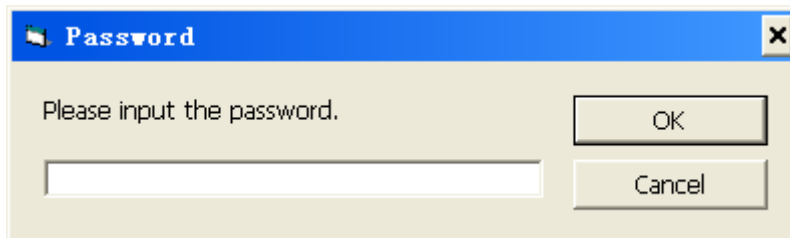
Figure 3-40 Confirm user identity

2) Input the old password to confirm the user's identity.
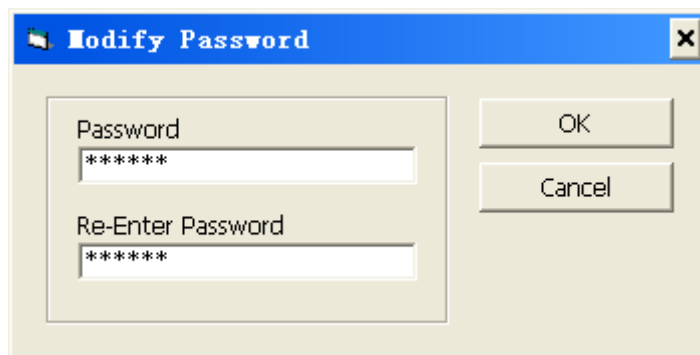
Figure 3-41 Modify password

3) Input the new password twice, and then click on **OK**. The password is changed.

NOTE:

General users can only change their passwords in this way. However, advanced users can also change password by modifying user information on the **User Management** interface.

3.10.3 Logout

Click on the **Login** button [Login] in the tool bar, the **Login** dialog box pops up. You should log in again to get access to the operation.

3.10.4 Adding a User

Enter the **Setup** interface and then click on **General Setup**. On the **User Management** interface, you can add, modify or delete a user's information.
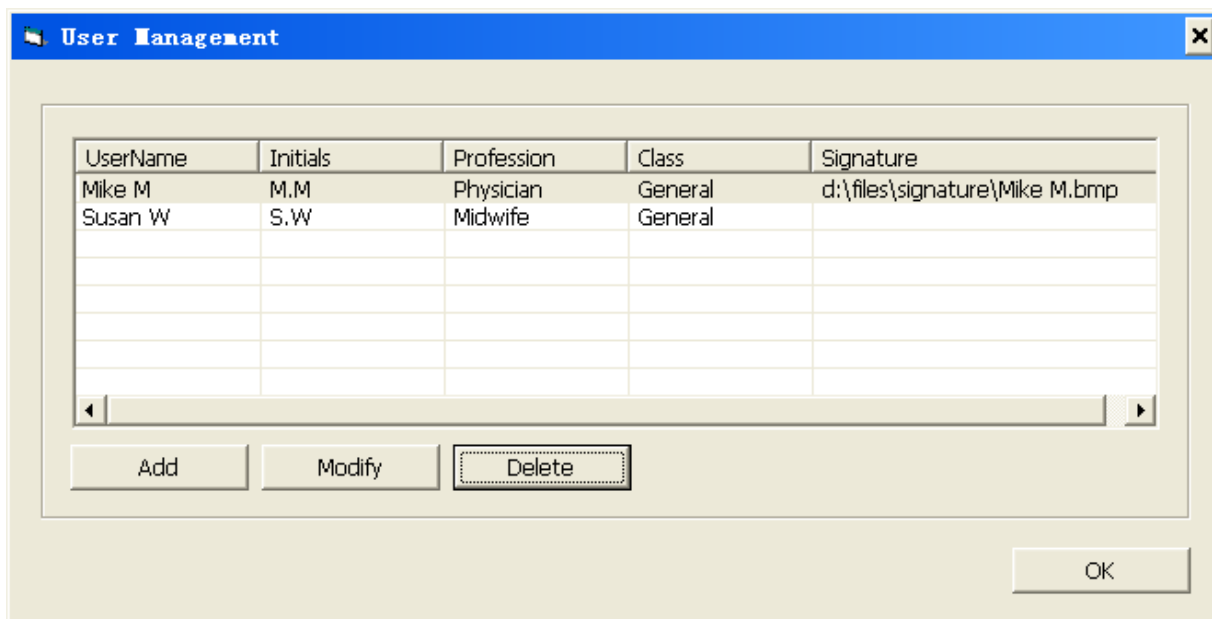
Figure 3-42 User management

To add a user:

1) Click on **Add** in the **User Management** interface.
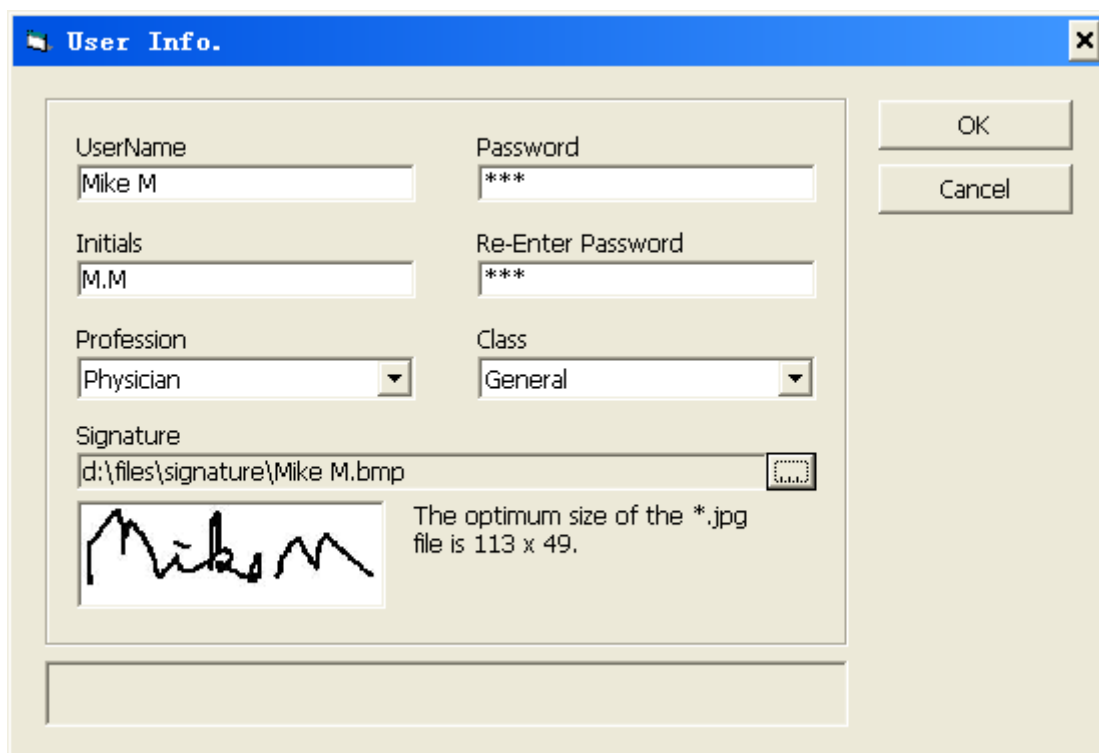
Figure 3-43 Input user information

2) On the **User Info.** interface, type the user name and the password (the password can only be case insensitive letters a ~ z or numbers 0 ~9); select a profession (**Nurse**, **Midwife**, **Technologist** or **Physician**) and a class (**General** or **Advanced**).

3) Click on the directory icon [...] and choose the *.jpg file of your signature.

4) Click on **OK**, this user is added to the user list.

NOTE:

1 Only the physicians can make a diagnosis.

2 Scan the signature and save it in a *.jpg file in advance. The optimum size of the *.jpg file is 113x49.

3 After the customized picture signature is added, the system saves the *.jpg file in the folder D:\files\signature. Do not delete it.

3.10.5 Modifying a User's Information

To change a user's information:

1) Select a user on the **User Management** interface.

2) Click on **Modify**.

3) Retype in the user's information.

4) Click on **OK**.

3.10.6 Deleting a User

To delete a user:

1) Select a user on the **User Management** interface.

2) Click on **Delete**.

3) Click on **Yes** to confirm operation, this user is deleted from the list.

3.11 Downloading Data

NOTE:

1 This is an optional feature enabled or disabled in **Service Setup**.

2 The system can only receive the data from the memory of F9/F6 series fetal & maternal monitors (F9 with software of version 2.4 or greater and F6 with software of version 1.5 or greater).

3 Only the data files whose time length is shorter than 16 hours are transmittable.

4 Do not unplug the connecting cable in the process of downloading data.

5 The downloaded data does not include maternal vital signs.

When the bedside monitor is offline, the data is saved in the monitor memory. You can download this data after the monitor gets online again.

To download the data from the memory,

1) Click on the **Download** button [Download] to open the **Download** window. All examinations from the memory are listed, and the examinations that do not exist in the database are marked with **New Archives**, and their progress is 0.0%.

File No.	ID	Start Time	CTG Duration	File Size	New Archives	Progress
☑ 1	358NXJDYW	18/02/2002 14:45:21	04:07:44	64,16K	Yes	0,0%
☑ 2	0202172227	17/02/2002 22:27:27	00:01:58	1,69K	Yes	0,0%
☑ 3	94940	18/02/2002 18:57:57	00:17:10	6,16K	Yes	0,0%
☑ 4	VKGIT84	18/02/2002 19:23:56	18:40:06	263,86K	Yes	0,0%
☑ 5	666	18/02/2002 13:59:30	00:45:21	11,86K	Yes	0,0%
☑ 6	59NH	17/02/2002 22:30:07	15:29:03	219,43K	Yes	0,0%
☑ 7	0202242108	24/02/2002 21:08:17	00:12:30	4,04K	Yes	0,0%
☑ 8	0202242026	24/02/2002 20:26:31	00:41:28	10,95K	Yes	0,0%
☑ 9	0202242026	24/02/2002 20:26:11	00:00:20	1,19K	Yes	0,0%
☑ 10	0202242024	24/02/2002 20:24:09	00:01:43	1,63K	Yes	0,0%
☑ 11	0202242023	24/02/2002 20:23:26	00:00:42	1,28K	Yes	0,0%
☑ 12	0202241918	24/02/2002 19:18:52	01:04:16	16,52K	Yes	0,0%
☑ 13	0202232303	23/02/2002 23:03:31	19:59:04	282,26K	Yes	0,0%
☑ 14	0202232303	23/02/2002 23:03:30	00:00:01	1,23K	Yes	0,0%
☑ 15	0202232303	23/02/2002 23:03:09	00:00:21	1,31K	Yes	0,0%
☑ 16	0202232111	23/02/2002 21:11:00	01:52:09	27,51K	Yes	0,0%
☑ 17		23/02/2002 21:05:17	00:05:43	2,57K	Yes	0,0%
☑ 18	0202232103	23/02/2002 21:03:51	00:01:26	1,56K	Yes	0,0%
☑ 19	0202232101	23/02/2002 21:01:27	00:02:23	1,79K	Yes	0,0%
☑ 20		23/02/2002 21:01:09	00:00:17	1,29K	Yes	0,0%
☑ 21	0202232054	23/02/2002 20:54:35	00:06:34	2,65K	Yes	0,0%
☑ 22	0202232042	23/02/2002 20:42:33	00:11:43	3,86K	Yes	0,0%

Options:
File Type: New Archives
Select All
Select None
Directory: d:\fmdata\download
Download
Exit

Figure 3-44 Download offline data

2) Select the examination(s) you want to download. **Select All** is used to select all the examinations, and **Select None** is used to deselect them.

3) Click on **Download**.

4) When downloading is completed, click on **Exit** to exit.

5) The data is saved in the preset directory d:\fmdata\download.You can perform operations on them like other files, e.g. saving, printing, and making notes.

3.12 Opening Files

For the downloaded files and other .trc files imported from USB disk, you can load them to the main interface.
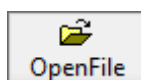
Click on the **OpenFile** button [OpenFile] on the tool bar, the downloaded files are listed.
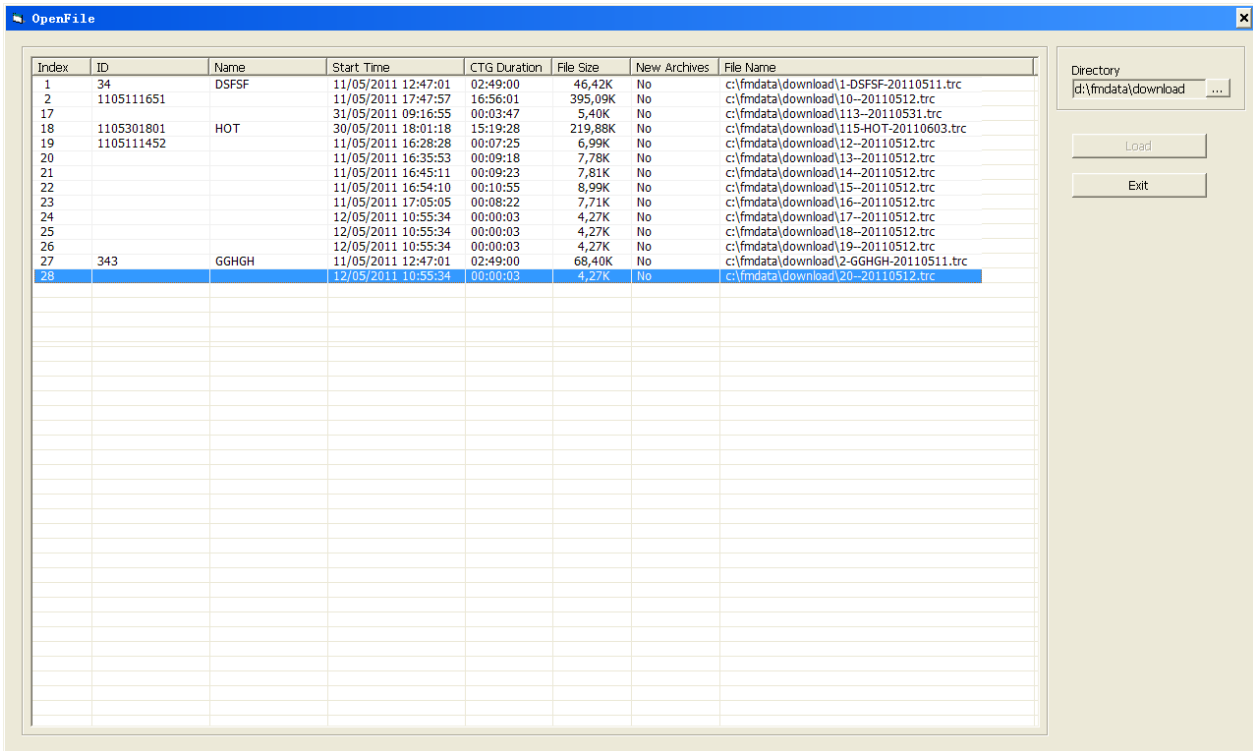
Figure 3-45 Open files

To load a file, select a file in the list, right click on the mouse and select **Load**, or click on the **Load** button on the right. This file is opened.

To delete a file, select a file in the list, right click on the mouse and select **Delete**, click on **Yes**, the file is deleted.

To open the files in another directory, you can click on the directory icon [...] to find other files and open them.

3.13 Help

Press the **Help** button [Help] in the toolbar or shortcut button **F1** to get help information of this software.

3.14 Exit from MFM-CNS

After finishing monitoring, you should close the system software. Click on the **Close** button [Close] in the toolbar to exit from the system.
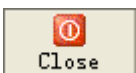
If there is still monitoring data that has not been saved to database, a dialogue box will pop up to remind you. Click on **Yes** to save the data in the current monitoring window, and exit from the system. When the system is running again, it will automatically reload the data saved temporarily last time.

Chapter 4 Shortcut for Operation

Please follow the basic operation flow below when monitoring the pregnant woman with MFM-CNS System.

```
            ┌──────────────────┐
            │     Power On      │
            └──────────────────┘
                     │
            ┌──────────────────┐
            │ Register Mat.Info │
            └──────────────────┘
                     │
            ┌──────────────────┐
            │ Monitor/View Curves,│
            │    Parameters     │
            └──────────────────┘
                     │
            ┌──────────────────┐
            │ MoveBed (Optional)│
            └──────────────────┘
                     │
            ┌──────────────────┐
            │     Diagnose      │
            └──────────────────┘
                     │
            ┌──────────────────┐
            │      Print        │
            └──────────────────┘
                     │
            ┌──────────────────┐
            │      Save         │
            └──────────────────┘
```

1) After connecting the system, turn on the power of the host, monitor and printer, etc., the system enters the main interface several seconds later.

2) **Login**/**Logout** (optional): Click on the **Login** button, select a user name, enter the password, and then click on **OK** to confirm user login. Click on the **Logout** button to logout the current user.

3) **Select a bed**: Click on the device light or the window of a bedside monitor to select a bed.

   NOTE:

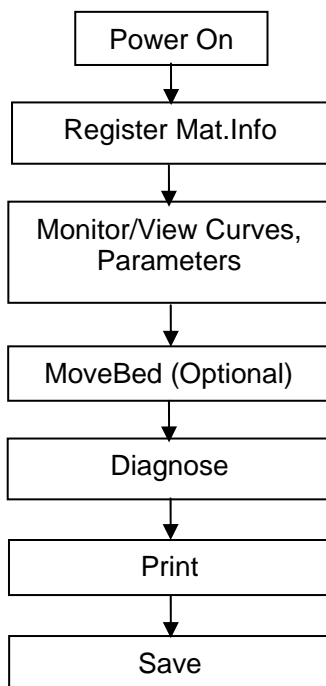   To avoid performing operation on the wrong bedside monitor, the monitor's device number should be confirmed before taking any action.

4) **Register maternal information**: Click on the **Mat.Info** button, and enter maternal information in the **Mat.Info** window. Click on **OK** to save the information.

5) **Start monitoring**: Turn on the bedside monitor, and monitor the patient with transducers. The central station receives data from the monitors automatically, including fetal monitoring trends, or maternal monitoring trends and other parameters.

6) **ViewBed**: Click on the **ViewBed** button or double click in the **Monitoring** window to enter the **ViewBed** window. You can review CTG, trends and NIBP.

7) **Note Mark**: When you want to mark a note during monitoring, right click on the position in the note display area, and select **Add Note** in the right-click menu. Also you can edit or delete the note marker by right clicking on the note icon "🐝", and then select **Edit Note** or **Delete Note.**

8) **Jump and play**: When the monitoring data is more than one screen, you can drag the scroll bar at the bottom of the interface directly, or click on the **Playback and Review** buttons to view the previous monitoring trends.

9) **Diagnose**: Click on the **Diagnose** button to open the **Diagnose** window and then input diagnostic contents directly.

10) **Print report**: Click on the **Print** button to preview or print fetal monitoring graph, maternal vital signs list or NIBP list.

11) **Save**: Click on the **Save** button to save all the monitoring data in the current window to database, and clear it afterward.

12) **Archives**: Click on the **Archives** button to open the **Archives** window. You can select one of the records, load it to the **ViewBed** window to make a diagnosis, revise maternal information, or print report, etc. If there are too many records, click on the **Search** button to find all the necessary records of the pregnant woman.

13) **Setup**: Click on the **Setup** button to open the **Setup** window and change settings of the system.

14) **Help**: Click on the **Help** button to get the information of how to use this software.

15) **Exit**: Click on the **Close** button to exit from MFM-CNS.

Chapter 5 Maintenance

You should be familiar with the operation process and method of this system. Read this manual in detail and understand the whole operation process before operating it.

MFM-CNS needs simple maintenance during use. However, proper operation is required to guarantee longtime， steady working of the system.

WARNING

Turn off the power and remove the power cords before cleaning.

Maintenance for the Main Unit and Monitor

1) Keep the main unit and the monitor clean. The main unit casing can be cleaned with a soft cloth dampened with water (or mild detergent, if necessary). Use liquid very sparingly to prevent liquid from entering the equipment, and remove any residue completely afterward.

2) The main unit and the monitor should be placed in the dry and well-ventilated place. The air path for cooling the system should be kept well ventilated. Avoid being placed in the dusty and humid environment.

CAUTION

Avoid pouring liquids on the device while cleaning, and do not immerse any parts of the device into any liquids.

Chapter 6 Service

If you have any question about maintenance, technical specifications or malfunctions of devices, contact your local distributor.

Alternatively, you can send an email to EDAN service department at: support@edan.com.cn.

Appendix 1 Alarm Messages

The following table lists the alarm/prompt messages that might appear during monitoring, their respective causes and countermeasures.

Alarm Message	Cause	Countermeasure
Patient Alarm (Medium Level)		
**FHR1 HIGH, >xxx bpm, > y s or **FHR2 HIGH, >xxx bpm, > y s	FHR1 or FHR2 measuring result is higher than the set upper limit (xxx) over the alarm delay time (y).	Check if the alarm limits are suitable; check the patient's condition.
**FHR1 LOW, <xxx bpm, > y s or **FHR2 LOW, <xxx bpm, > y s	FHR1 or FHR2 measuring result is lower than the set lower limit (xxx) over the alarm delay time (y).	
**HR HIGH, >xxx bpm	Maternal HR result is higher than the upper limit (xxx).	
**HR LOW, < xxx bpm	Maternal HR result is lower than the upper limit (xxx).	
** SpO$_2$ HIGH, >xxx%	SpO$_2$ result is higher than the upper limit (xxx).	
** SpO$_2$ LOW, <xxx%	SpO$_2$ result is lower than the upper limit (xxx).	
**SYS HIGH, >xxx mmHg	SYS result is higher than the upper limit (xxx).	
**SYS LOW, <xxx mmHg	SYS result is lower than the upper limit (xxx).	
**DIA HIGH, >xxx mmHg	DIA result is higher than the upper limit (xxx).	
**DIA LOW, <xxx mmHg	DIA result is lower than the upper limit (xxx).	
**MAP HIGH, >xxx mmHg	MAP result is higher than the upper limit (xxx).	
**MAP LOW, <xxx mmHg	MAP result is lower than the upper limit (xxx).	
**TEMP HIGH, > xxx °C	TEMP result is higher than the upper limit (xxx).	
**TEMP LOW, < xxx °C	TEMP result is lower than the upper limit (xxx).	

Technical Alarm (Low Level), Prompt Message		
US1 UNPLUGGED or US2 UNPLUGGED	US transducer 1 or US transducer 2 is not well connected.	Check the connection of the transducer.
US1 SIGNAL LOSS or US2 SIGNAL LOSS	FHR1 or FHR2 signal is too weak for the system to analyze.	Check if the US transducer is aimed at the fetal heart; check if the alarm limits are suitable; check the patient's condition.
TOCO UNPLUGGED	TOCO transducer is not well connected.	Check the connection of the transducer.
DECG LEADS OFF	The spiral electrode is not well connected.	Check the connection of the spiral electrode.
DECG UNPLUGGED	The DECG cable is not well connected to the monitor.	Check the connection of the DECG cable.
DECG SIGNAL LOSS	DFHR signal is too weak for the system to analyze.	Check if the spiral electrode is well attached to the fetus scalp; check if the alarm limits are suitable; check the patient's condition.
IUP UNPLUGGED	The IUPC and/or connecting cable are/is not well connected to the monitor.	Check the connection of the IUPC and connecting cable.
ECG LEADS OFF	ECG leads are not well connected.	Check the connection of ECG leads.
SpO$_2$ SENSOR OFF	SpO$_2$ sensor is not well connected.	Check the connection of SpO$_2$ sensor and finger placement.
TEMP UNPLUGGED	TEMP transducer is not well connected.	Check the connection of TEMP transducer.
Signals Overlap (FHR1, FHR2)	Two ultrasound transducers are aimed at the same fetal heart.	Adjust one of the transducers to find the other fetal heart.
Signals Overlap (FHR1, MHR)	US transducer 1 has picked the maternal heart signal.	Adjust the US transducer 1 to find the fetal heart.
Signals Overlap (FHR2, MHR)	US transducer 2 has picked the maternal heart signal.	Adjust the US transducer 2 to find the fetal heart.
NST times out	The NST duration has exceeded the preset timer.	Complete the monitoring as required.
Event list overflows.	The event amount of the window has reached the limit.	Save the data and start new monitoring.
Trend list overflows.	The maternal trend amount of the window has reached the limit.	Save the data and start new monitoring.
NIBP list overflows.	The NIBP amount of the window has reached the limit.	Save the data and start new monitoring.

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