CONTEC

SpO_2 Assistant

USER MANUAL

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CONTENTS

1. Foreword

SpO_2 Assistant Software (called "Software" hereinafter) can real time monitor,review and analyse SpO_2, pulse rate and perfusion index(need support of device).In real time mode, the software collect the data uploaded from pulse oximeter to monitor such parameters as SpO_2, pulse rate and perfusion index(called "PI" for short);In review analysis mode,it can review and analyse the stored data ,display analysis results and the trend charts.This manual will introduce all the features of the software and the detailed operation guidance.

Features:

- Automatic scanning device, the user can connect the pulse oximeter device according to their own actual conditions.
- Real time displaying the data uploaded from pulse oximeter,including waveform,trend,bar chart and parameter value.
- With alarm prompt for the parameter value from pulse oximeter.
- Freezing waveform, and reviewing the frozen waveforms by paging up or paging down.
- Controlling pulse oximeter to send, delete the stored data in the device, and set the ID and synchronous device time .
- With saving and altering user information function
- Supporting the setup of user information and units, multi-language saving and changing.
- Supporting data storage, review and analysis for up to 72 hours , showing four kinds of analysis reports and the editing of diagnostic information.
- Supporting the report printout.
- Supporting searches for user historical documents and "Save as..."operation for files.
- Supporting multi-country languages.

2. Main technique specification

2.1. Performance specification

Display ： Lowest resolution 800* 600, true colour,right LCD

Language： Chinese , English

Trend ： Review and analyse trend for all data

Alarm ： Limit alarm for SpO_2 and pulse,alarm of finger out,search alarm

SpO_2 display range ： 0% - 100%

Pulse rate display range ： 0bpm - 300bpm

Perfusion Index display range ： 0.0%~25.0%

2.2. Suited device

Pulse oximeter

3. System environment Requirements

processor : Pentium IV 1.8G or above

OS : Microsoft Windows XP / Vista / 7

Memory : 256MB or above

Mother board : Intel chipset recommended

Disk drive : 40GB or above

Display : 800*600, RGB24 or above
Video adapter : 64MB Memory or above
Font : Normal fonts
Keyboard : standard keyboards
Mouse : standard keyboard
Port : USB port wireless connection

4. Installation

4.1. Software installation

Double click the installation file "SpO_2 Setup_Assistant.exe" and follow installation guide (the filename may be different because of edition difference). When installing,you may find the indication as figure 4.1.1,please click "Continue Anyway" to finish.(If you connect the device for the first time,you may also find the indication as figure 4.1.1,please click "Continue Anyway") You have to confirm whether to reboot the computer after installation.It's recommended that you restart your computer for the first installation.

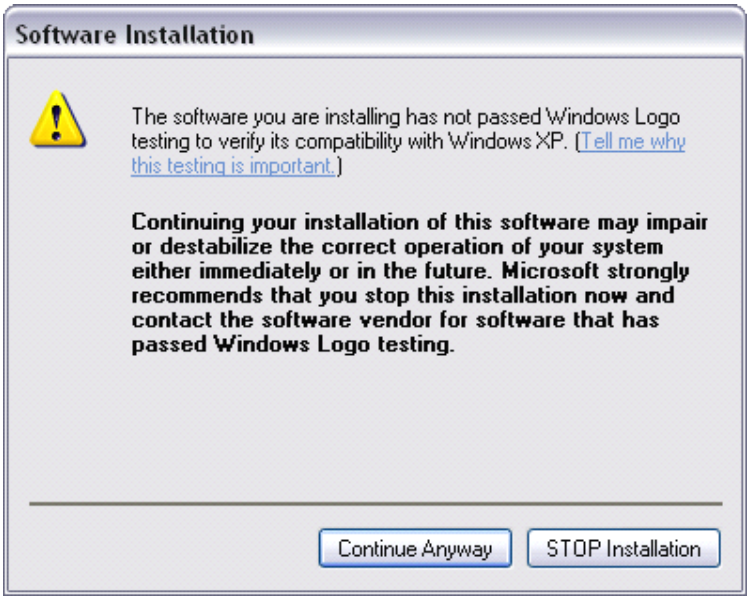

figure 4.1.1

4.2. Hardware device connection

The software hold serial interface connection and wireless connection.Please refer to correlative pulse oximeter user manual for detailed connection method

5. Instructions for use

5.1. Start SpO_2 Assistant

After installing, there is a red shortcut named "SpO_2 Assistant" on your desktop.Double click the red icon to start "SpO_2 Assistant" software,you can also start the software from start menu.
If you use the software for the first time ,there will be a dialog box as figure 5.1.1.If not,the program will enter the main interface as figure 5.1.2directly.

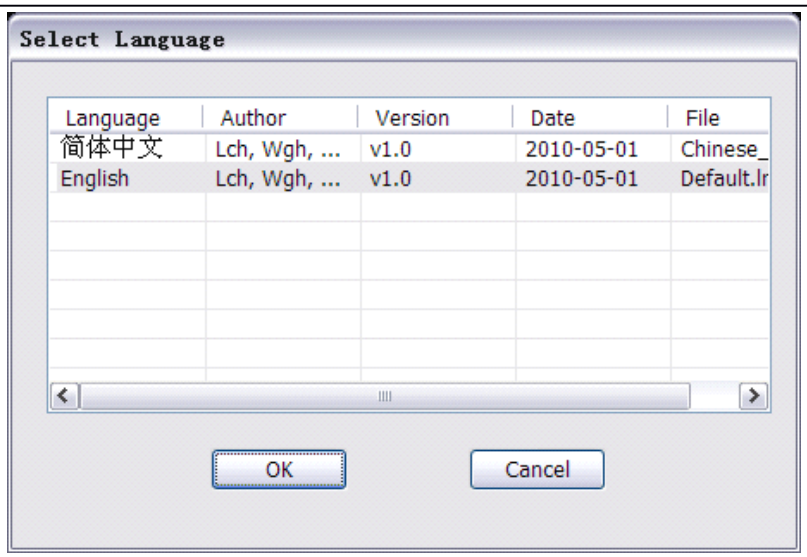

figure 5.1.1

The user could choose the language according to need.After choosing language,the program will enter the main interface.The main interface is divided into five parts :main window frame,menu bar,tool bar, client section and status bar as figure 5.1.2.

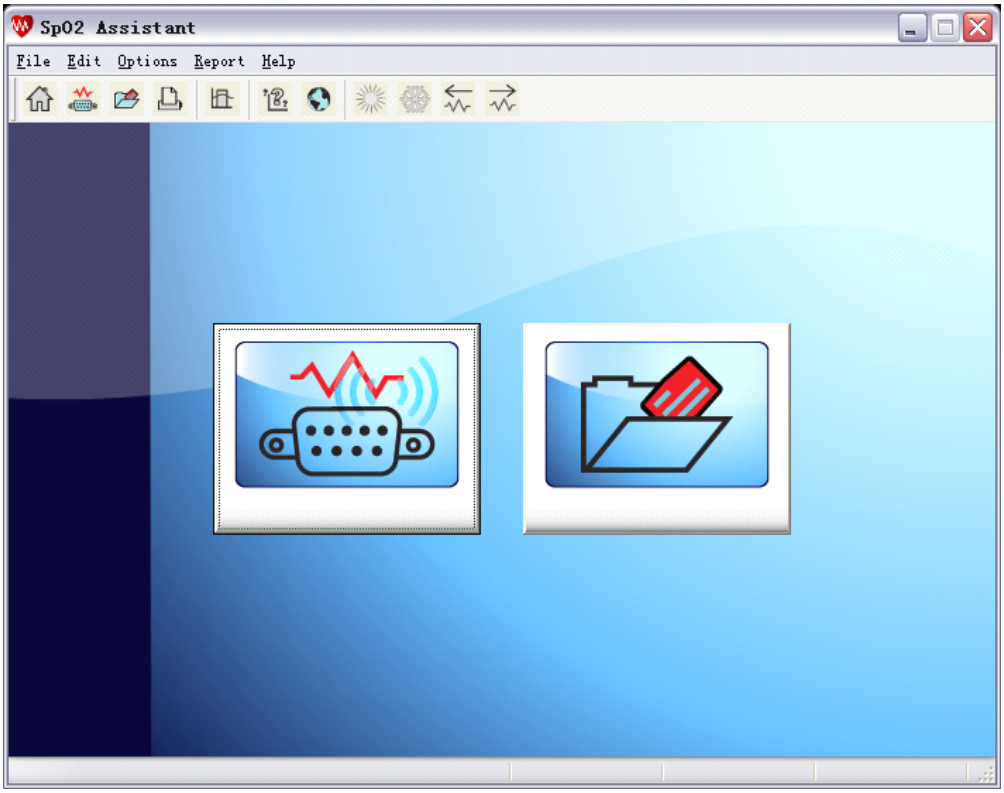

figure 5.1.2main interface

Main interface introduction：

- Tool bar

icon	function
	Switch to main window
	Turn on the device,and switch to the real time espial mode
	Open the file,switch to review analyse mode

	Review analyse mode:print
	Review analyse mode:exclude data
	Display parameter setting
	Choose Language
	Real time espial mode:Thaw wave
	Real time espial mode:Freeze wave
	Real time espial mode:move along 5 seconds wave in freezing wave state Review analyse mode:page forwards(general analyse report)
	Real time espial mode:move backward 5 seconds wave in freezing wave state Review analyse mode:page backward(general analyse report)

- State bar

In real time espial mode,current device informations are displayed in state bar,including:device connection type,device type,company name,device ID.

- Two buttons in client section：

 : turn on the device to enter real time espial mode

 : open the file to enter review analyse mode

5.2. Choose language

The user could change interface display language at any moment as follow：

- Click "Options_Select Language"
- Click button  in tool bar

Selecting language dialog box will appear if the user carry through above operation as figure 2.The user could select language according to need.Click "OK",and the interface will display corresponding language;click "cancel" to cancel operation.

5.3. Real time espial mode

5.3.1. Brief introduction

The steps to real time espial mode are as follow：

- Click "File-Connect Device"
- Click the button in tool bar 
- Click the button  in the main window interface

The dialog box of the device connection which can display the device's correlation information will appear after doing the above operation as figure 5.3.1.1.

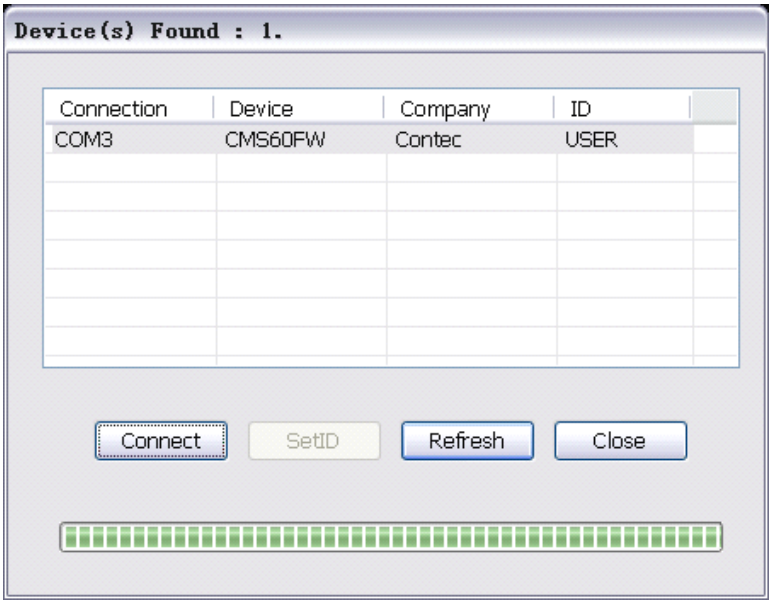

figure 5.3.1.1The dialog box of the device connection

When there are some devices which have the same ID,the user could choose one device to set ID for avoiding confusion.select one device in the list,and click "connect" to connect the device,then it will enter the real time espial interface which comprizes four areas as Figure 5.3.1.2.

- Trend chart area: trend chart display
- Waveform area: waveform display
- Parameter area: display the SpO_2 and pulse rate value,the upper and lower limit of the alarm and the alarm small bell.
- Function area: display perfusion index,bar chart,heart shape,user name,the data storage type and state.

The data storage type: single user and single segment  ,single user and multi-segment  ,multi-user and single segment  ,multi-user and multi-segment  .

The data storage state: having the storage data  ;no storage data:  .

Figure 5.3.1.2main window of the real time espial

5.3.2. Start the demo

In main interface,click "File-DEMO" to enter demo interface as Figure 5.3.2.1,the device connection type in state bar displays "Demo". The user can not set the ID and send the storage data in demo mode.

Figure 5.3.2.1Demo interface

5.3.3. Collect data

The device could collect the data after the device was connected as Figure 5.3.3.1.

The display information includes:

- Display the SpO_2 and pulse rate trend chart for two hours at best.
- Display the SpO_2,pulse rate and perfusion index real time data information.
- Real time alarm information display for SpO_2 and pulse rate
- Waveform display
- Frozen waveform and frozen time display.About freezing waveform operation,refer to 5.3.6 for details
- Bar chart and heart shape display

Figure 5.3.3.1Gather data interface

5.3.4. Set display parameter

Click "Options-Display Parameters" or tool bar button  to enter display parameter dialog box as figure 5.3.4.1:

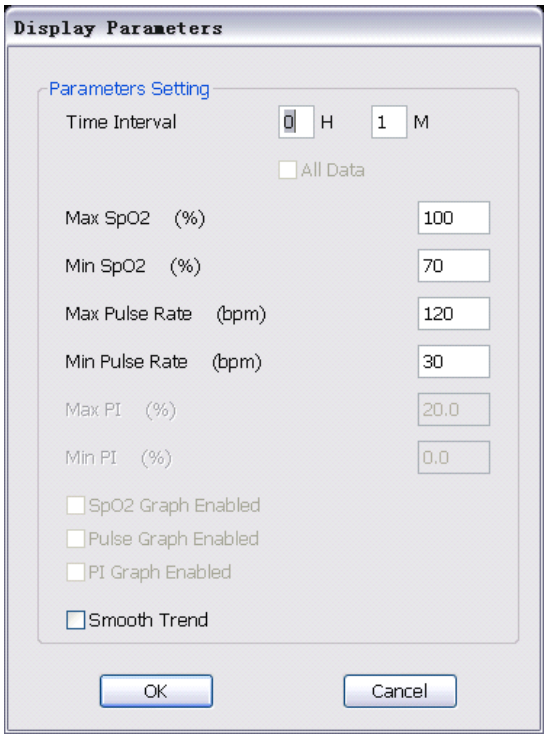

figure 5.3.4.1Display parameter dialog box

Time interval,the parameter upper and lower limit,trend chart and whether to smooth the trend chart can be set.The trend chart will be displayed according to setting after you click "OK";Click "cancel" to cancel setting.The prompt information that prompts user to input over again will appear when the value goes beyond the range.

- Time Interval:change time length.of the current page
- All data:display all data when it was selected,or display the trend chart according to the time interval.
- Max SpO_2（%）:set the upper limit of the SpO_2 trend chart coordinates.(input range is (0,100]).
- Min SpO_2（%）:set the lower limit of the SpO_2 trend chart coordinates.(input range is [0,100)).
- Max Pulse Rate(bpm):set the upper limit of the pulse rate trend chart coordinates (input range is (0,300]).
- Min Pulse Rate(bpm):set the lower limit of the pulse rate trend chart coordinates(input range is [0,300)).
- Max PI（%）:set the upper limit of the PI trend chart coordinates(input range is (0,20]).
- Min PI（%）:set the lower limit of the PI trend chart coordinates(input range is [0,20)).
- SpO_2 Graph Enabled:display(hide) the SpO_2 trend chart.
- Pulse Graph Enabled:display(hide) the pulse rate trend chart.
- PI Graph Enabled:display(hide) the PI trend chart.
- Smooth Trend:set whether to smooth the trend chart.

Note:

1、The gray style means that it can't be used.

2、Input range is expressed with area,such as the input range of SpO_2 upper limit(0,100],the input value is from 0 to 100,not including 0, including 100.

5.3.5. Alarm

5.3.5.1 Alarm setting

Click"Options-Alarm setting" to set the upper and lower limit of SpO_2 and pulse rate in alarm setting dialog box as figure 5.3.5.1.1.

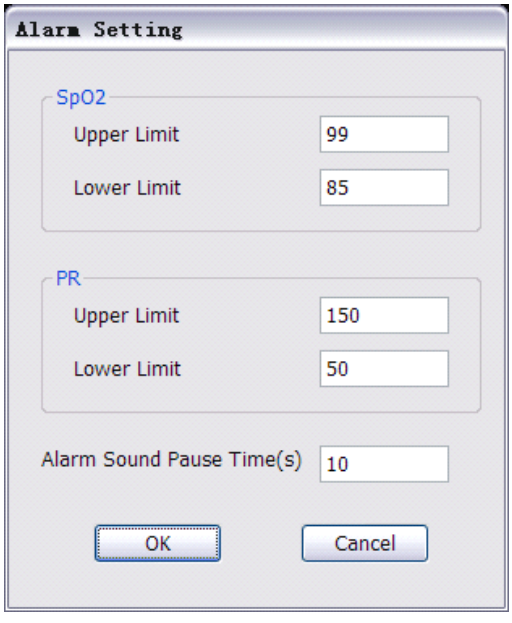

Figure 5.3.5.1.1Alarm setting dialog box

5.3.5.2. Alarm prompt

The alarm information can prompt the user by two modes of seeing and hearing.As the alarm information is important and requires timely response,this software provides the following modes to prompt the user that the alarm has happenedas figure 5.3.5.2.1.

➢ Alarm information

The alarm information which provides the disobeyed alarm limit is displayed in trend chart area.Such as "Alarm:SpO2 > 90",it means that the alarm happens for the reason of SpO_2 value exceeding the upper limit 90.

➢ Alarm sound

The software can prompt user by sound when alarm happens.

Note： Click "Edit-Pause alarm sound(10s)" to suspend the current alarm sound 10seconds. Set alarm sound pause time by alarm setting.

➢ flicker

When some physiological parameter alarm happens,the small bell icon and value in parameter display area will flicker to prompt the parameter is alarming.

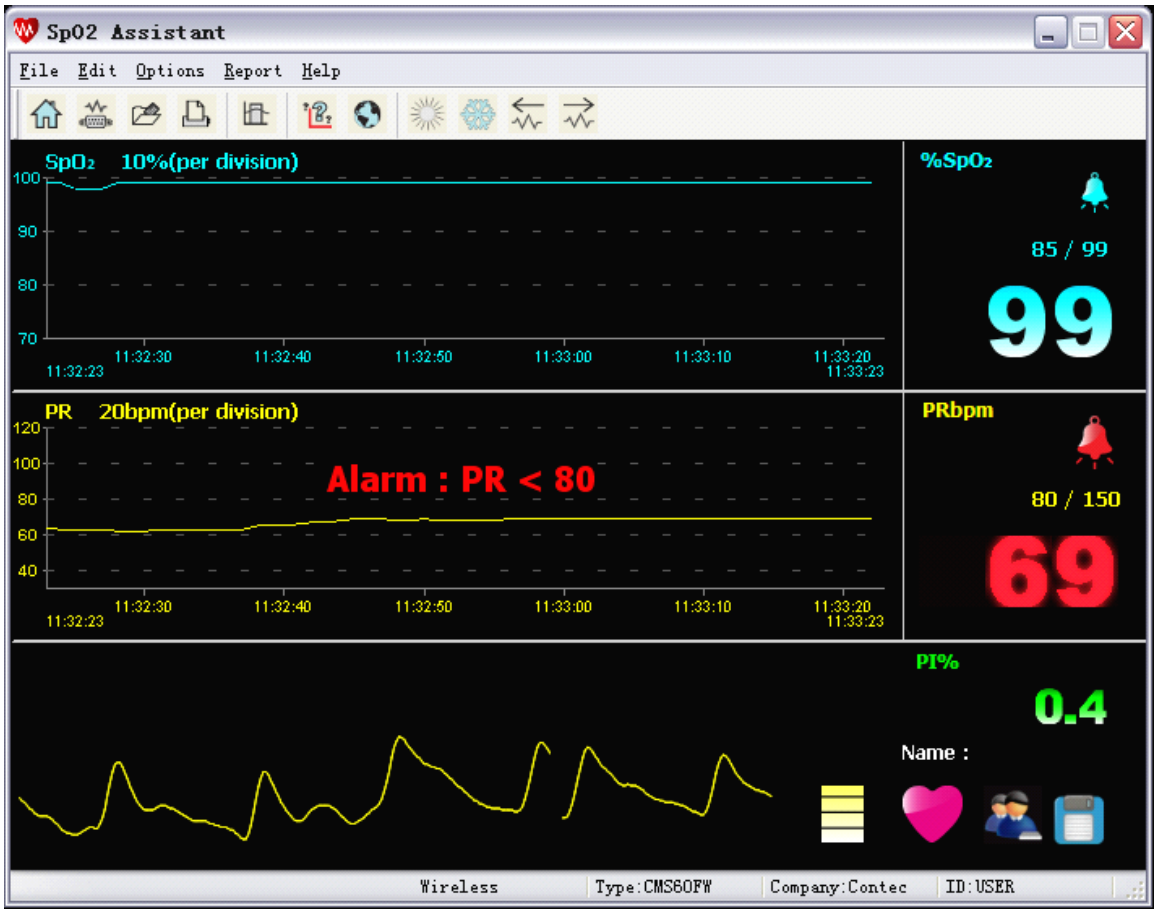

Figure 5.3.5.2.1Alarm display interface

5.3.6. Freeze and unfreeze waveform

5.3.6.1. Freeze waveform

Method as follows ：

➢ Click "Edit-Freeze Wave"

➢ Click the button  in tool bar

After the waveform is frozen,foregoing five seconds waveform, starting time and ending time for the frozen waveform will be displayed in the waveform area as figure 5.3.6.1.1.

Figure 5.3.6.1.1Frozen waveform interface

Click the button  to move along the waveform five seconds,and Click the button  to move backward the waveform five seconds.

5.3.6.2. Unfreeze waveform

Method as follows ：

- Click "Edit-Unfreeze Wave"
- Click the button  in tool bar

After the waveform was unfrozen,waveform real time espial state will be resumed.

5.3.7. Information setting

5.3.7.1. User information

Click "Options-User Information" to enter user information dialog box,then the user can examine,edit or change the current user's name,height,age,weight,sex,nationality and comment as figure 5.3.7.1.1.

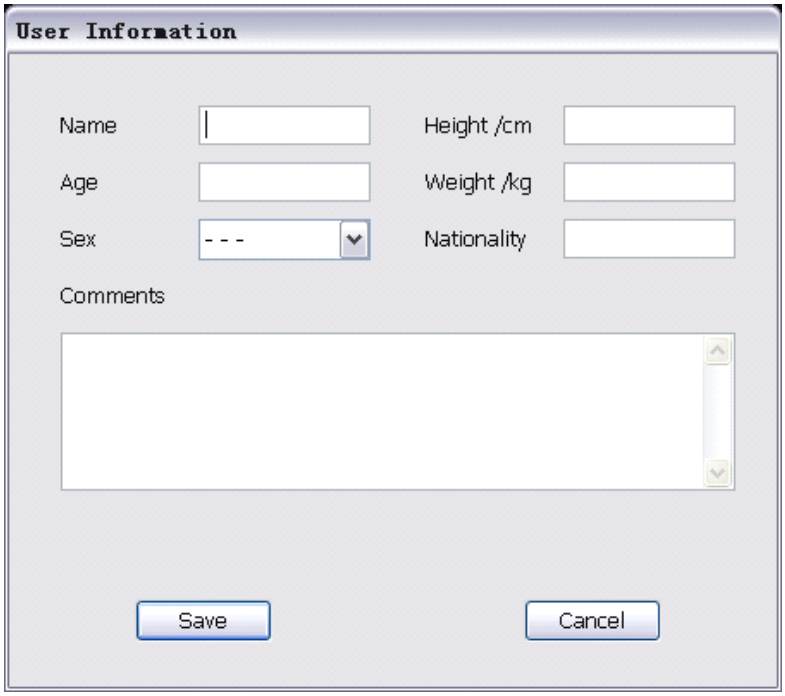

Figure 5.3.7.1.1User information

5.3.7.2. Unit setting

Click "Options-Unit Setting" to set the unit of user's height and weight as figure 5.3.7.2.1.

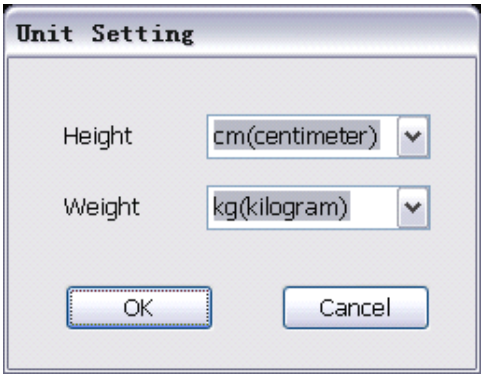

Figure 5.3.7.2.1Unit setting

5.3.8. Device stored data

In real time espial mode,click "File-Device Stored Data",and the device stored data dialog box will appear,including user index number,user name,data index,data length,start time as figure 5.3.8.1(the data storage type for figure 5.3.8.1is "multi-user and single segment ")

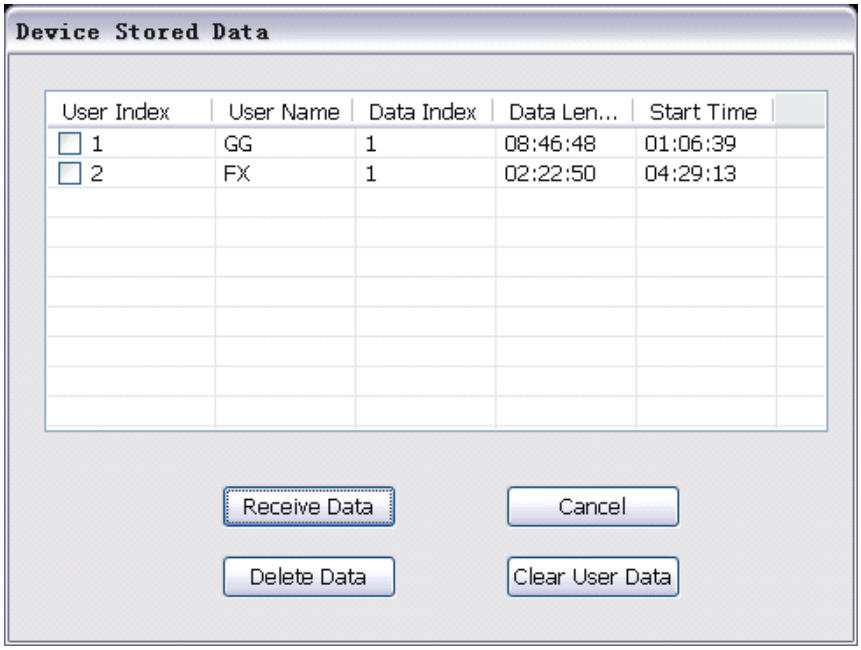

Figure 5.3.8.1Device stored data dialog box

- Store device data

Choose the stored data which is wanted to send (choose check box of user index number and you can choose many segments stored data),then click "receive data",and the schedule of receiving stored data will appear.The software could store the data automatically.The naming method of file is as follow: user name+user index number+data segment number+current store time.Click “cancel” button of schedule to cancel sending.

- Delete stored data（need device support）

Choose the data which is wanted to delete,then click "delete data " to delete the data segments which are chosen.Click "clear user data" to delete all stared data of appointed user.

5.3.9. Set device information

In real time espial mode，click "Options—Set Device Info” to set device information as figure 5.3.9.1.

Figure 5.3.9.1Setting device information dialog box

There is current device ID in dialog box.The user could edit device ID (input 7 characters at most).Click "OK" to set current device ID,and the device ID in state bar of main window will change.

5.3.10. Pulse sound setting

In real time espial mode,click "Options—Pulse Sound” to turn on/off the pulse sound.When the menu is in chosen state,there is pulse sound,whereas there is no pulse sound.

5.3.11. Real time data store

When closing the real time espial mode,the software will prompt whether to store real time data as figure 5.3.11.1.The user could edit user information and file name,then click "save" to save information.

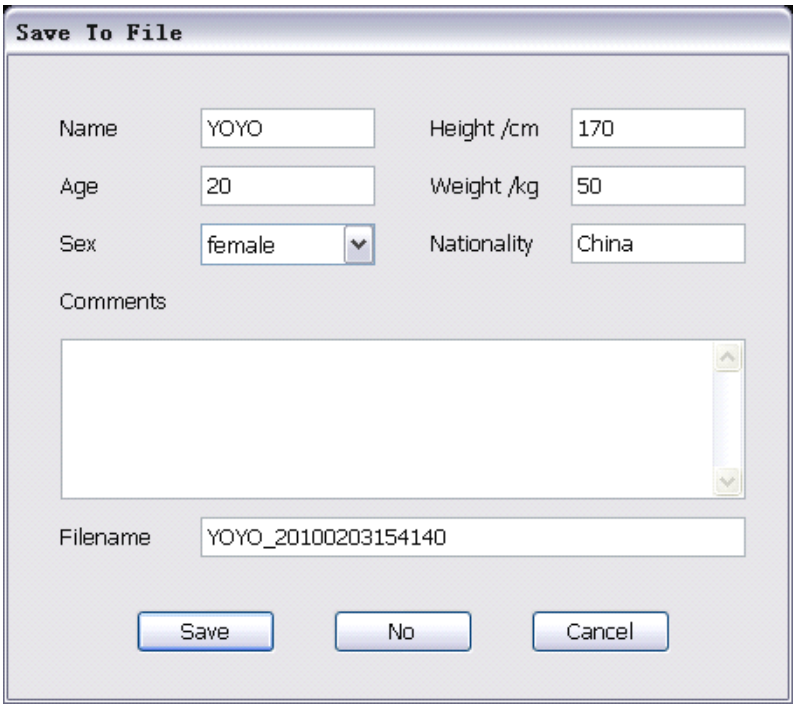

Figure 5.3.11.1Store data dialog box

Note:The software could save 72 hours data at most.

5.3.12. Synchronize device time

In real time espial mode,click "Options-Synchronizing Device Time" to set synchronizing device time and system time.

5.3.13. automatic storage of real time data

In order to avoid losing data because of software stopping,the software have automatic storage function of real time data.The software could save the received data every other minute.When finish gathering,if the user save data,the saved data will be covered,if not,the saved data will be deleted.

5.4. Review analyse mode

There are two kinds of review analyse data:the data with PI and the data without PI.If the data includes PI,the interface will display the trend charts of SpO_2 ,pulse rate and PI when the data file is opened in review analyse mode.If the data doesn't include PI,the interface will display the trend charts of SpO_2 and pulse rate,and the setting operation about PI isn't used.This section use the review data without PI as example.

5.4.1. Brief introduction for window

There are four kinds of methods to enter the review analyse mode.

- Click menu "File-Open File"
- Click button "  " in tool bar

- Click button "  " in main window interface

Opening file dialog box will appear if above operation is carried out.Open the file to enter the review analyse mode .

- Click menu "File-Query User File",and the query user file dialog box will appear as figure 5.4.1.1.

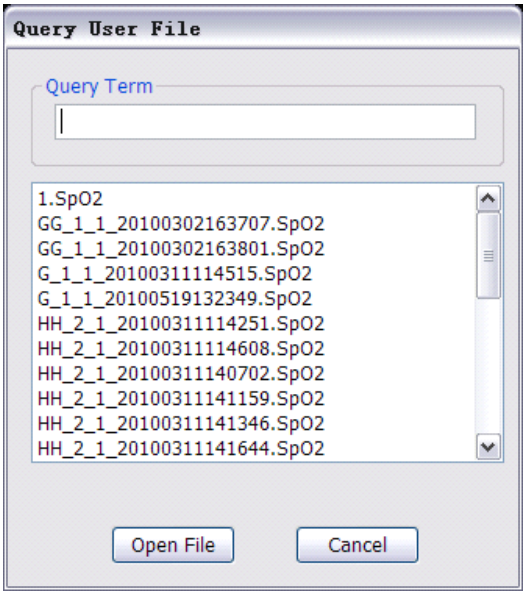

Figure 5.4.1.1Query user file dialog box

Choose one file in file list ,then click "Open File" or double click the file to enter the review analyse mode

The review analyse interface is divided into three areas mostly:caption area,user information display area,trend chart display area as figure 5.4.1.2.

Figure 5.4.1.2The review analyse mode interface（zonal chart report）

Note：The default report type is "Strip chart report" after opening the file.

5.4.2. Exclude data

In default circumstance,the software could analyse all data,cancel some useless data analysis by excluding data to make analysis result more real.Excluding data operation could only be carried out in zonal chart report.Other report only display the analysis result after excluding operation.

5.4.2.1. Excluding operation

Pressing left key of the mouse and drag mouse will draw piece of excluding area in trend chart area as figure 5.4.2.1.1.

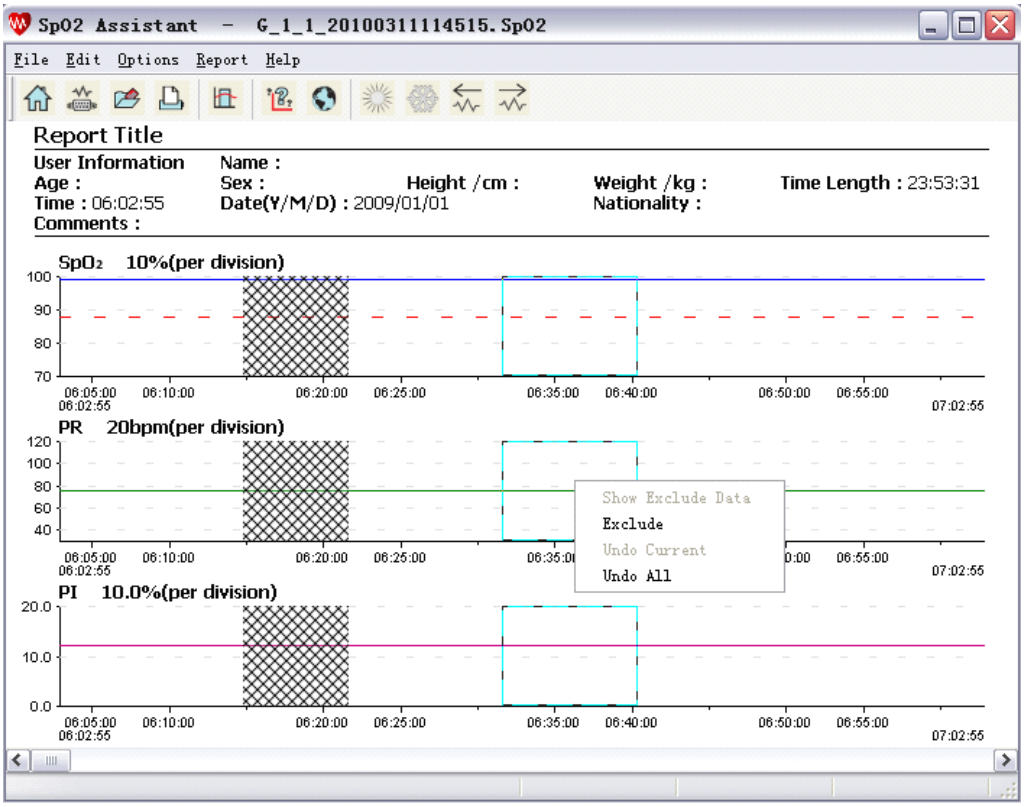

Figure 5.4.2.1.1Exclude data

Click menu "Edit-Exclude Data" or click button "" to exclude the chosen data,and pop-up all time segment information of all excluding data as figure5.4.2.2.1.Or click right key of the mouse to pop-up menu,then click "exclude" to exclude the selected data directly as figure5.4.2.1.1， The background of excluding area is filled in,and the data of excluding area isn't analysed as figure 5.4.2.1.2.

Figure 5.4.2.1.2The review analyse interface after excluding data

5.4.2.2. Undo excluding operation

In the state of having not chosen excluding data,click menu "Edit-Exclude Data" or click tool bar button "  " ,Or click right key of the mouse to pop-up menu,then click "exclude" to exclude the selected data directly as figure5.4.2.1.1. and the excluding data dialog box will appear as figure 5.4.2.2.1.There are all time segments of having excluding data in the dialog box.Choose one time segment (could choose more),and click "Undo" to undo excluding operation for this segment and clean out the display of this time segment in the list.Click "Undo All" to undo all excluding time segment and clean out excluding data list in excluding data dialog box.After completing the operation of undoing excluding,the software will analyse data and display over again as figure 5.4.1.2.

Or click right key of mouse in excluded data area of client area to pop-up menu.Click "Undo current" to undo excluding of current excluded data,and click "Undo all" to undo undo excluding of all excluded data.

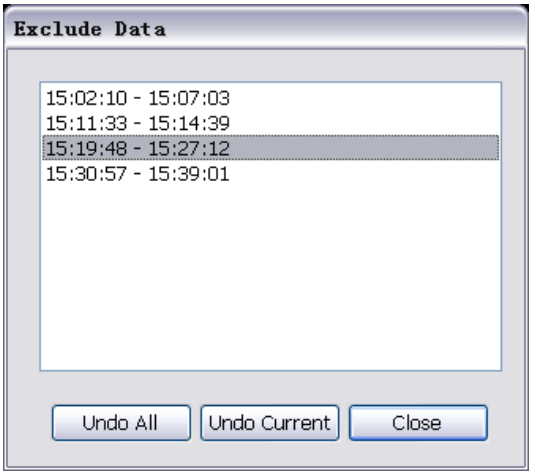

Figure 5.4.2.2.1Excluding data dialog box

5.4.3. Query user file

Click menu "File-Query User File",and the query user file dialog box will appear.In this dialog box there are all data filename under data file as figure 5.4.1.1.

The user could input the correlative character string in filename which is wanted to queried,then all filenames including these character string will be displayed in list as figure 5.4.3.1.

Note:When quering,the inputed character string don't match case.If there is blank in character string,the software could deal with both sides character of blank according to the "and" relation and query corresponding file.

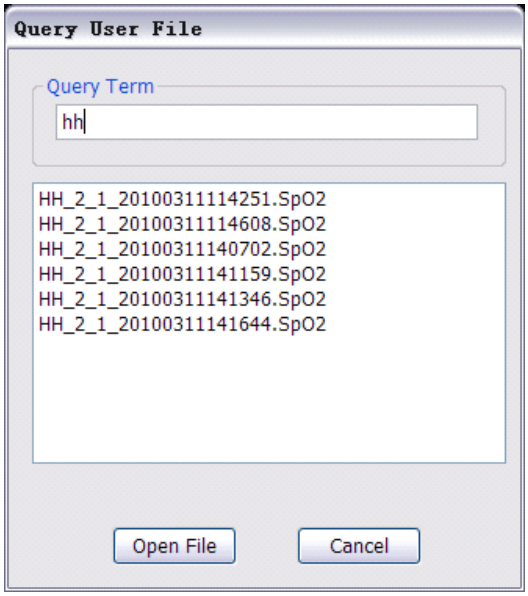

Figure 5.4.3.1Query user file dialog box

About "Open File" operation,please refer to 5.4.1 for details.

5.4.4. Analysis parameters

Analysis parameters include: SpO_2 parameter and pulse rate parameter.The software could analyse review data according to the analysis parameter value

5.4.4.1. Parameter setting

Click menu "Options-Analysis Parameters",and analysis parameters dialog box will appear as figure 5.4.1.1.1.

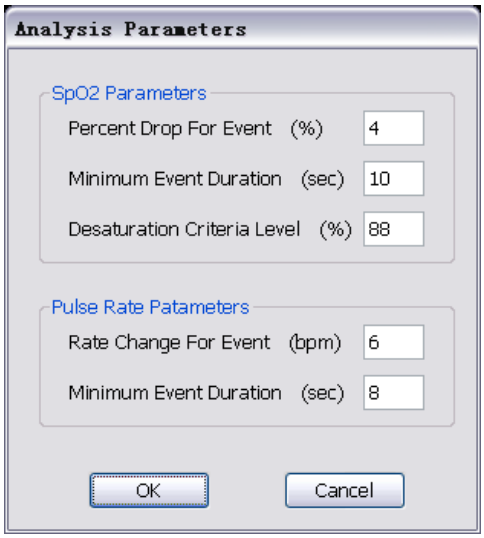

Figure 5.4.1.1 Analysis parameters dialog box

The user could set analysis parameters by this dialog box and click "OK" to make setting success.The software could analyse review data over again according to the setting value and display analysis result.Click "cancel" to cancel setting,and the software doesn't do any disposal.

5.4.4.2. Parameter explanation

SpO_2 parameters:

- Percent Drop For Event（%）: the input value uses "%" as unit to label SpO_2 Event.
- Minimum Event Duration（sec）: the input value uses "second" as unit,it is the time limit of "Percent Drop For Event" for SpO_2.
- Desaturation Criteria Level（%）: the input value uses "%" as unit.When the SpO_2 level is under the values which have been set,the software could count solely,and use red dashed to express in display area of SpO_2 data.

Pulse Rate parameters:

- Rate Change For Event（bpm）: the input value uses "bpm" as unit to set pulse rate event.
- Minimum Event Duration（sec）: the input value uses "second" as unit,it is the least time limit of "Rate Change For Event" for pulse rate.

5.4.5. Set display parameters

Please refer to 5.3.4 for details.

Note: The display parameters of review analysis mode and the display parameters of real time espial mode don't affect each other.Because the parameters are different under the two kinds of display modes,the corresponding interfaces of display parameter dialog box are a little different as figure 5.4.5.1.

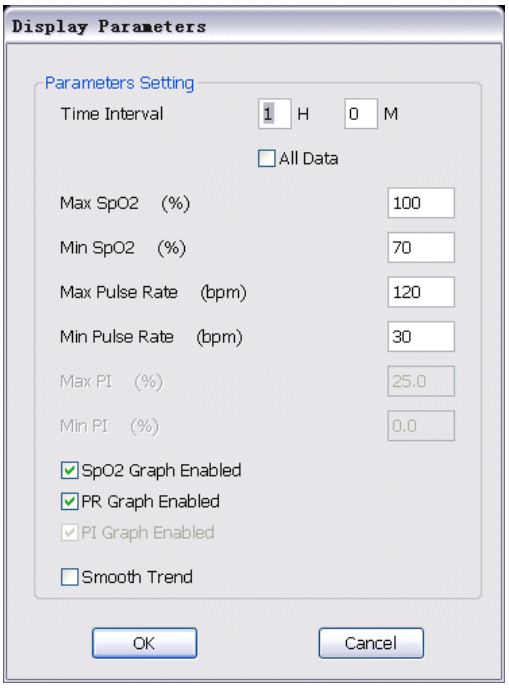

Figure 5.4.5.1Display parameter dialog box

5.4.6. Information setting

Please refer to 5.3.7 for details.

After setting,click "OK",and the result will be displayed in the interface and saved to the current data file.Click "Cancel" to cancel setting,and the information will keep former setting.

5.4.7. Report display

5.4.7.1. Strip chart report

Click menu "Report-Strip Chart Report",and the interface will display strip chart report as figure 5.4.1.2.In the strip chart report,the user could carry out a series of operations such as excluding data,displaying parameter value,moving trend wave and time axis and so on.

About excluding data operation,please refer to 5.4.2.

The methods of moving time axis and trend wave are as follows.

- Drag scroll bar to move by the left key of the mouse.
- Move by the around keys of keyboard.

Click the left key of the mouse in the effective data area of the trend chart to display the data collection time,SpO_2 value,pulse rate value for the position.

Note：If the position of left key is noneffective data,the software will not display any numerical value.

5.4.7.2. Full study report

Click menu "Reports-Full Study Report",and the interface will display full study report as figure 5.4.7.2.1.

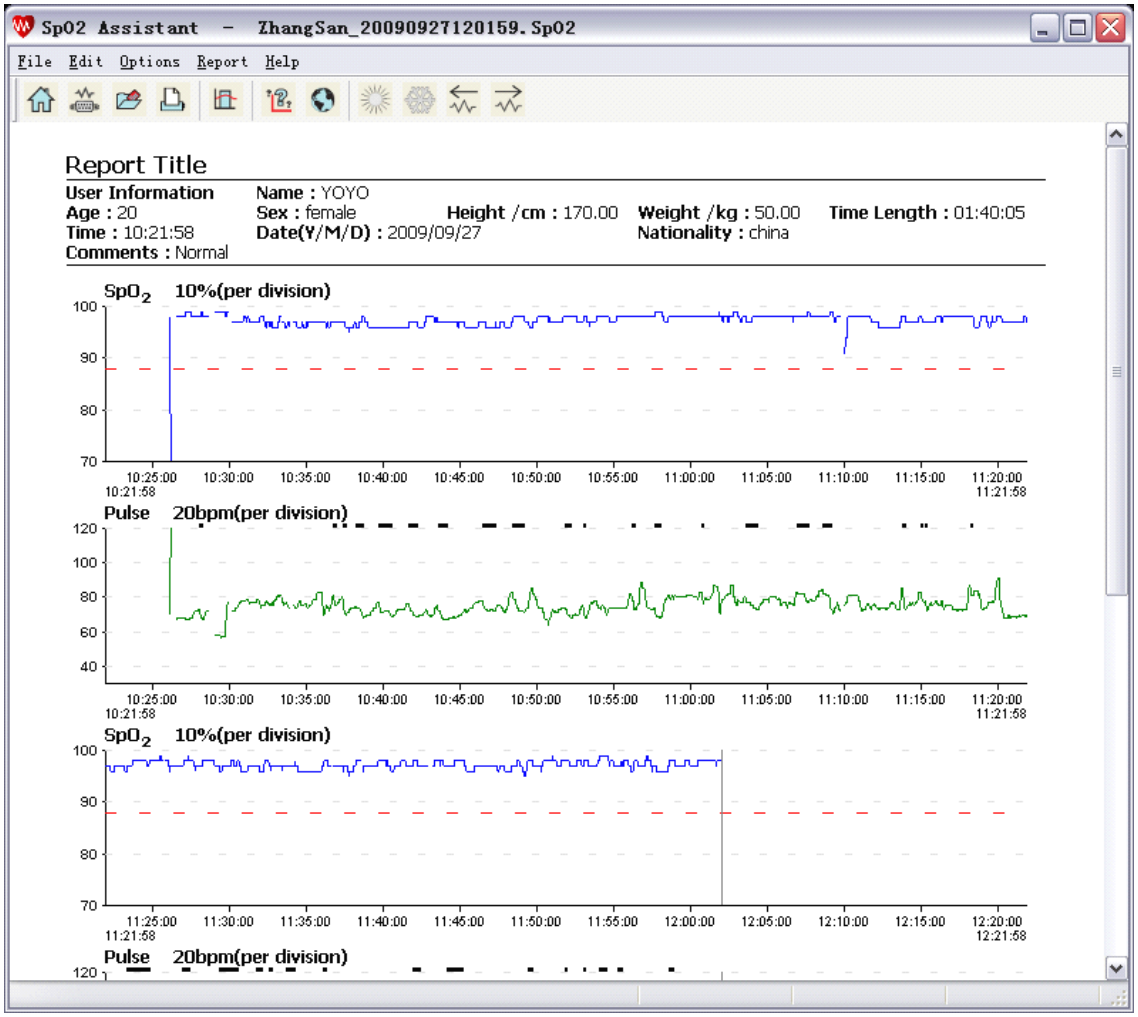

Figure 5.4.7.2..1Full study report

When the total number of pages is more than one,the user could carry paging operation according to the methods as follow.

- Click  or  to left page or right page.
- Press “Page Down” or “Page Up” on the keyboard to page.

5.4.7.3. Oximetry report

Click menu "Report-Oximetry Report",and the Oximetry report will appear in interface.The user couldn't set time length for this report.The report display all data acquiescently as figure 5.4.7.3.1.

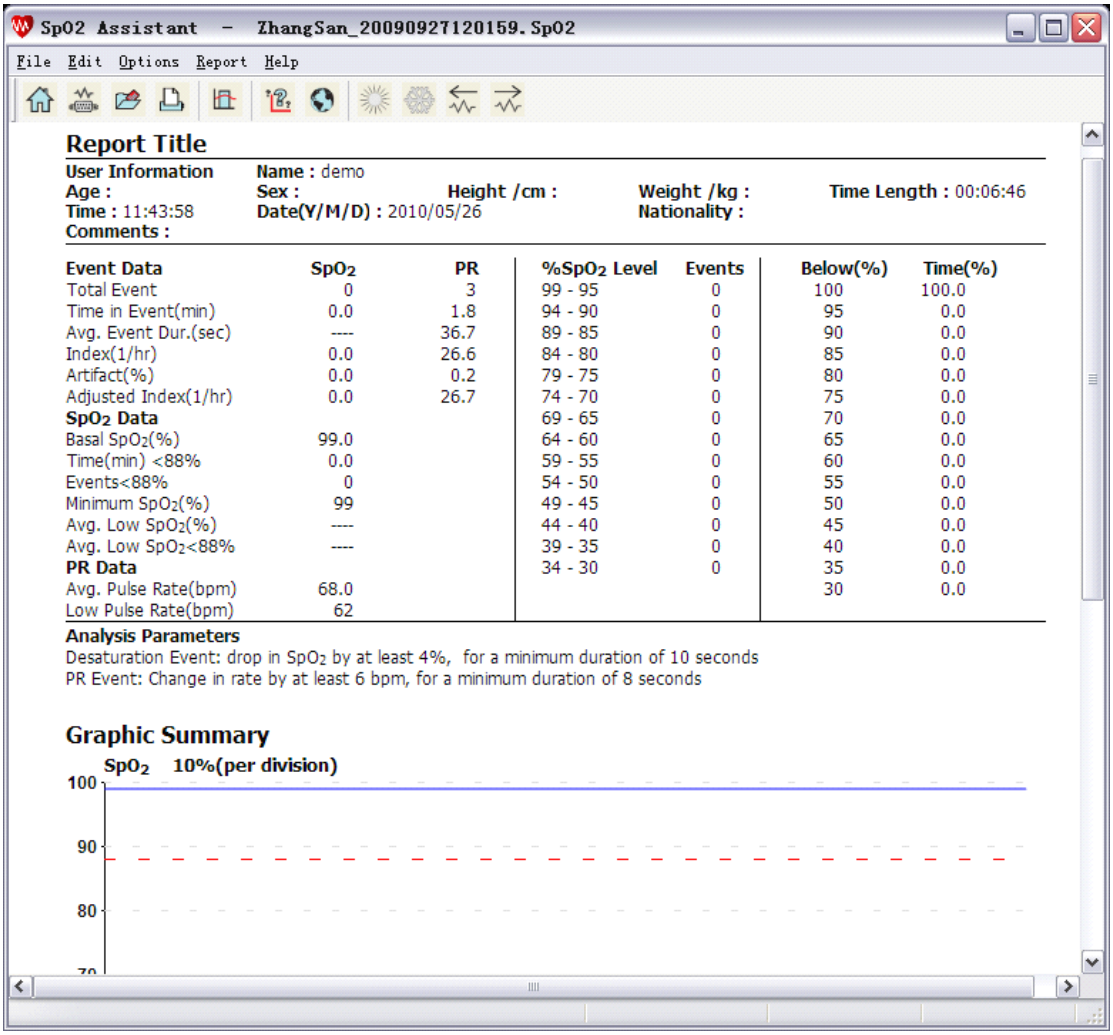

Figure 5.4.7.3.1Oximetry report

Substantival explanation in report

- Total Event：find total of event in value.
- Time in event（min）：time that all affairs are completed
- Avg. Event Dur.（sec）：the event average time equals that "Time in event" is divided by "Total Event".
- Index（1/hr）：the event number per hour.
- Artifact（%）：contrived reason makes some areas data inefficacy.Noneffective data includes that zero value area and excluding data area.
- Adjusted index（1/hr）：the event number per hour.It may unequal to "Index",because it often use "effective" time length to divide "Total Event" (except "Artifact").In general,its value equals to "Index"(the "Artifact" is 0) or is less then "index"(the "Artifact" isn't 0).
- Basal SpO_2（%）：the average value of SpO_2 total.
- Time (min)<88%：the time length of "SpO_2<88".Note:88 is a desaturation criteria level (set in analysis parameter dialog box).
- Events<88%：the event total of "SpO_2<88".
- Minimum SpO_2（%）：the minimum of all SpO_2 value.
- Avg. Low SpO_2（%）：this value relates to event,is the average value of "Minimum SpO_2" for all SpO_2 events.
- Avg. Low SpO_2<88%：the same as above,only count the average value of "Minimum SpO_2<88".88 is a desaturation criteria level (set in analysis parameter dialog box).
- Avg. Pulse Rate（bpm）：the average value of all pulse rate data.

- Low Pulse Rate（bpm）：the least value of all pulse rate data.

5.4.7.4. Summary report

Click menu "Report-Summary Report",and the interface will display summary report.The user couldn't set time length for this report.The report display all data acquiescently as figure 5.4.7.4.1.

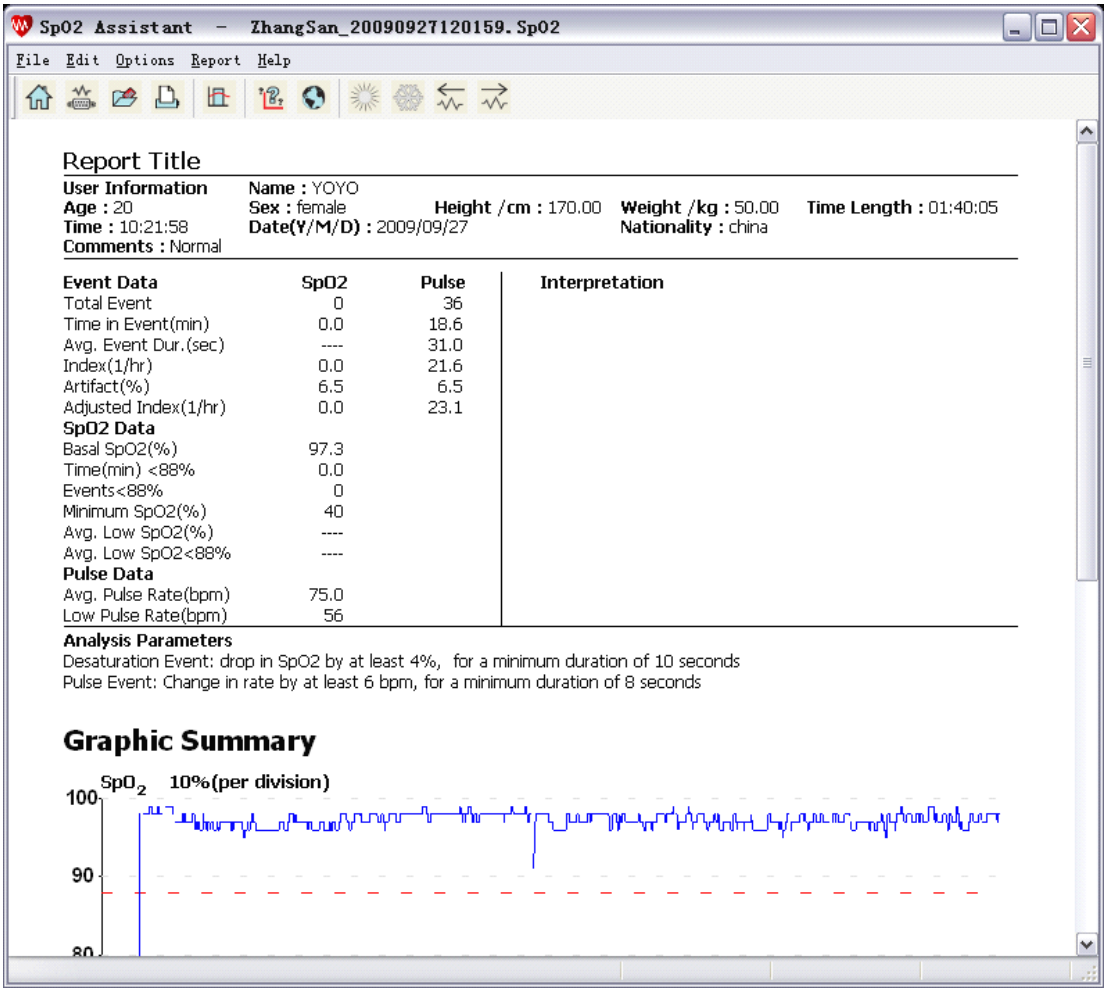

Figure 5.4.7.4.1Summary report

Substantival explanation in report:

Please refer to 5.4.7.3 for details.

5.4.7.5. Report title setting

Click menu "Report-Report Title Setting",and the report title setting dialog box will appear as figure 5.4.7.5.1.

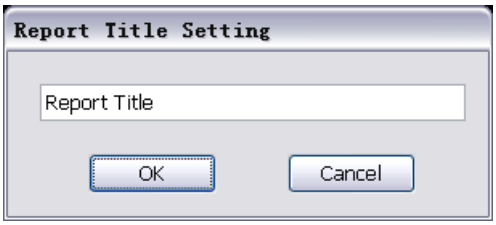

Figure 5.4.7.5.1Report title setting dialog box

The user could set report title by this dialog box.After setting,click "OK",and the title will be displayed.Click "cancel" to cancel setting,and the report title will not changed.

5.4.8. Print report

The software support printout of the reports.The print format is the same as the displayed report format.The print methods are as follows.

- Click menu "File-Print".
- Click button 

The user could cancel print operation in the process of print.

5.4.9. Diagnostic information

Click menu "Report-Diagnostic information",and the diagnostic information dialog box will appear.The user could edit diagnostic information,and the information display in the summary report as 5.4.9.1.

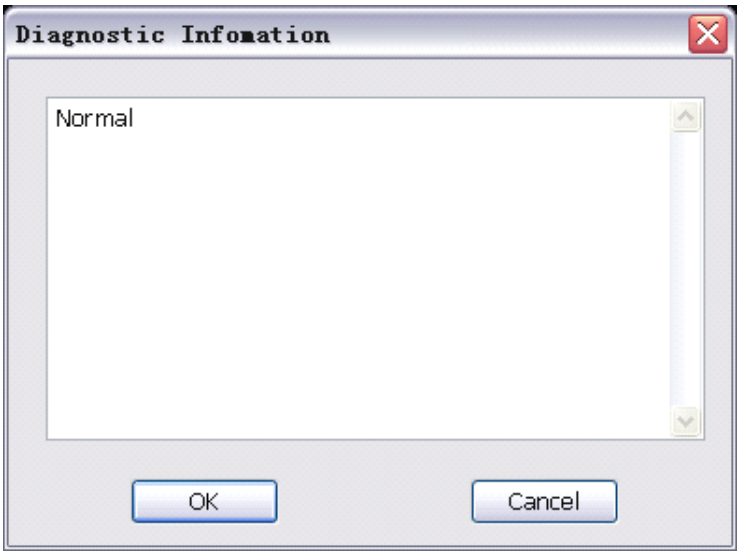

Figure 5.4.9.1Diagnostic information dialog box

5.4.10. Set SpO_2 distribution

Click menu "Report-Set SpO_2 distribution" to enter Set SpO_2 distribution dialog box as figure5.4.10.1.The user could set SpO_2 distribution and SpO_2 Event distribution.After setting,,the corresponding chart will change.

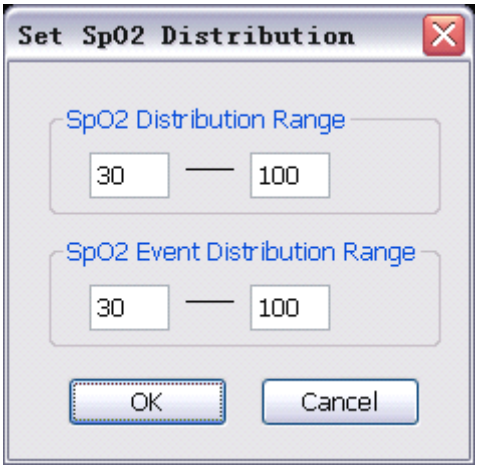

Figure 5.4.10.1Set SpO2 distribution dialog box

5.5. Mode switch

If the user wants to switch mode,the user need to close current mode according to the methods as follows.

- Click menu "File-Close"
- Click button 

After closing the current mode,the software returns to the main window interface as figure 5.1.2.The user could enter the review analysis mode and real time espial mode according to introductive methods in front.