

# CONTENTS

|          |  |    |
|----------|--|----|
| Chapter1 | Introduction.....                        | 1  |
| 1.1      | General Information.....                 | 2  |
| 1.2      | Button Functions.....                    | 3  |
| 1.3      | Interfaces.....                          | 4  |
| 1.4      | Accessories.....                         | 5  |
| Chapter2 | Getting Started.....                     | 6  |
| 2.1      | Open the Package and Check.....          | 6  |
| 2.2      | Dry battery installation.....            | 6  |
| 2.3      | Power on the instrument.....             | 6  |
| 2.4      | Connect Sensor.....                      | 6  |
| Chapter3 | Function Interface.....                  | 8  |
| 3.1      | Main Interface.....                      | 8  |
| 3.2      | Measuring Interface.....                 | 9  |
| 3.3      | Measure Result Interface.....            | 9  |
| 3.4      | System Menu.....                         | 10 |
| 3.4.1    | System setup.....                        | 10 |
| 3.4.2    | System Time.....                         | 11 |
| 3.4.3    | Data Delete.....                         | 12 |
| 3.4.4    | Alarm Setup.....                         | 12 |
| 3.4.5    | ABPM Menu.....                           | 13 |
| 3.4.6    | ABPM Data Review.....                    | 14 |
| 3.4.7    | Ordinary User Data Review.....           | 16 |
| 3.5      | ABPM Working Interface.....              | 17 |
| Chapter4 | NIBP Measuring.....                      | 19 |
| 4.1      | Introduction.....                        | 19 |
| 4.2      | NIBP Measuring.....                      | 19 |
| 4.3      | Operation Hints.....                     | 20 |
| 4.4      | NIBP Error Message and Explanations..... | 22 |
| 4.5      | Maintenance and Cleaning.....            | 23 |
| 4.6      | Transportation and Storage.....          | 24 |
| 4.7      | Key And Symbols.....                     | 24 |
| Chapter5 | Installation of the Software.....        | 25 |
| 5.1      | Demand of editor.....                    | 25 |
| 5.2      | Installation of software.....            | 25 |
| Chapter6 | Introduction to the software.....        | 26 |
| 6.1      | The main interface.....                  | 26 |
| 6.2      | Patient File Path.....                   | 26 |

|          |                                  |    |
|----------|----------------------------------|----|
| 6.3      | Wear.....                        | 27 |
| 6.4      | Data download.....               | 28 |
| 6.4.1    | data download via USB.....       | 28 |
| 6.5      | Choose patient data to edit..... | 29 |
| 6.6      | Delete data file.....            | 30 |
| 6.7      | Data file backup.....            | 31 |
| 6.8      | Edit Blood Pressure data.....    | 33 |
| 6.9      | Trend Edit.....                  | 34 |
| 6.10     | Histogram.....                   | 34 |
| 6.11     | Pie chart.....                   | 35 |
| 6.12     | Print Report.....                | 36 |
| 6.13     | Send Cases To Net Server.....    | 37 |
| Chapter7 | Troubleshooting guide.....       | 38 |

# Chapter1 Introduction

For an overall introduction to the Blood Pressure Monitor, please refer to General Information.

For basic operating instructions, please refer to Button Function.

For allocation of interface sockets, please refer to Interfaces.

## ⚠ Warning ⚠

**Possible explosion hazard if used in the presence of flammable anesthetics or other flammable substance in combination with air, oxygen-enriched environments, or nitrous oxide.**

## ⚠ Warning ⚠

**You must verify if the device and accessories can work safely and normally before using.**

## ⚠ Warning ⚠

**Ensure that the environment in which the device is operated is not subject to any sources of strong electromagnetic interference, such as radio transmitters, mobile telephones, etc. Keep them far away high level electromagnetic radiation emitted from such devices may greatly affect the instrument performance.**

## ⚠ Warning ⚠

**Dispose of the packaging material, observing the applicable waste control regulations and keeping it out of children's reach.**

## ⚠ Warning ⚠

**Please choose the accessories which are approved or manufactured by the manufacturer, or else it may damage the device.**

## ⚠ Warning ⚠

**The monitor is only for use on one patient at a time.**

## ⚠ Warning ⚠

**When the monitor is wetted, please stop using it and contact us.**

## ⚠ Warning ⚠

**If Luer lock connectors are used in the construction of tubing, there is a possibility that they might be inadvertently connected to intravascular fluid systems, allowing air to be pumped into a blood vessel.**

## ⚠ Warning ⚠

**When used with Electro-surgery equipment, you must give top priority to the patient safety.**

## ⚠ Warning ⚠

**It is recommended that you check if there is any damage on the monitor or the accessories regularly, if you find any damage, stop using it, and contact the biomedical engineer of the hospital or our Customer Service immediately.**

**In addition ,the overall check of monitor ,including the safety check such as the leakage current, should be only performed by qualified personnel once every 12 months.**

## ⚠ Note ⚠

**Please choose the computer which should be ensured compliance with the requirements of IEC 60950, or else it may damage the device.**

## ⚠ Note ⚠

**The software was developed per IEC60601-1-4. The possibility of hazards arising from errors in the software program is minimized.**

## ⚠ Note ⚠

**The Monitor shall comply with the standard EN1060 series: Part 1: General requirements; Part 3: Supplementary requirements for electro-mechanical blood pressure measuring systems (in course of preparation).**

## ⚠ Caution ⚠

**At the end of its service life, the product described in this manual, as well as its accessories, must be disposed of in compliance with the guidelines regulation the disposal of such products. If you have questions concerning disposal of the product, please contact us or its representatives.**

## 1.1 General Information

Environment:

Temperature

|                       |             |
|-----------------------|-------------|
| Working               | 5~40 (°C)   |
| Transport and Storage | -20~55 (°C) |

Humidity

|                       |         |
|-----------------------|---------|
| Working               | 15%~80% |
| Transport and Storage | ≤ 95 %  |

Altitude

80kPa~105kPa

Power Supply

|           |
|-----------|
| 3 (V) DC  |
| P ≤ 2.4VA |

Safety:



This device is defibrillator protected. Note that no precautions specific to the device is required during defibrillation, and defibrillation discharge has no effect on the monitor. The equipment uses the gray silicone airway, in case of the effect to the equipment when defibrillation device was used on the patient.

**General instruction:**

The device is applied to Blood Pressure(BP) measure and monitor for adult,pediatric, and neonatal. It most stores 300 records of common user and 358 of ambulatory Blood Pressure data. Every record includes the detailed measure time, systolic blood pressure ,diastolic blood pressure, mean blood pressure, pulse rate, error message and record number, etc.

This device has friendly operation interface ,and adopts 2.4inch color LCD. It integrates data review function and display function which includes large-print single record data review ,data list ,BP data trends chart, the current time、data、power、alarm and so on.

User can power on/off the monitor、start manual measure、set system parameters and so on with five keys in the front panel.(Please refer to "Button Functions" part for detail).

There are sound and light alarm functions that the buzzer intermittently beeping and the red light flashing to prompt low power. When the measure result exceed the alarm limit ,the color of the measure results style becomes red and arises sound alarm .The user can turn on or off the alarm sound if necessary.

The cuff socket is located on the top of the device and the USB socket at the bottom of the device.The stored data can be transferred to computer with the USB interface, and then various operations can be performed by using the PC software .(Please refer to "Software Functions" part for detailed contents)

**⚠ Note ⚠**

**If there is no operation in the common user mode, the device will turn off backlight according to the "BACKLIGHT TIME" you set, and if no action for three minutes, the device will automatically turn off. When the backlight turn off in the Ambulatory Blood Pressure mode, the green indicator intermittently flashes to prompt the device in running state.**

## 1.2 Button Functions

All the operations of the Blood Pressure Monitor could be completed with the buttons. The names of button are on them. They are:



Press the button for a long time, then the system will start. When turning on and off the monitor, the red light and the green both flash once to prompt that the on or off operation is successful. Press it for a short time to return the boot-strap interface.



The text in the middle bottom of the screen indicate the function of this key .Whatever menus the system is in, press the button and the system immediately executes a certain function.



The text in the left bottom of the screen indicate the function of this key.

Such as: The button is the alarm switch in the boot-strap interface, up key in the "System Menu", and left key in the "trend" "chart.



The text in the right bottom of the screen indicate the function of this key.

Such as: the button is the data review key of current user in the boot-strap interface and down key in the "System Menu" and right key in the "trend" chart



Start/Stop button. If measuring, press this key to cancel the current measurement

### ⚠ Note ⚠

**During uploading data with the USB, the backlight must be in awake state, and as far as possible reduce operation, and can not carry on BP measuring operation.**

### ⚠ Note ⚠

**During measurement,  three buttons are all disabled.**

The rectangular mark in the screen moving with the operation of  buttons is called “cursor”.

Operation can be performed in any position at which the cursor can stay. When the item is not selected, the cursor is yellow; when selected , the cursor becomes red.

## 1.3 Interfaces

For the convenience of operation, different kinds of interfaces are in different parts of the instrument.

NIBP cuff socket is at the top.

### ⚠ Note ⚠

**Cuff is connected to the monitor through the extended gas pipe.**

- ①Port of extended gas pipe
- ②The socket for Gas pipe

- ③Run indicator
- ④Alarm indicator

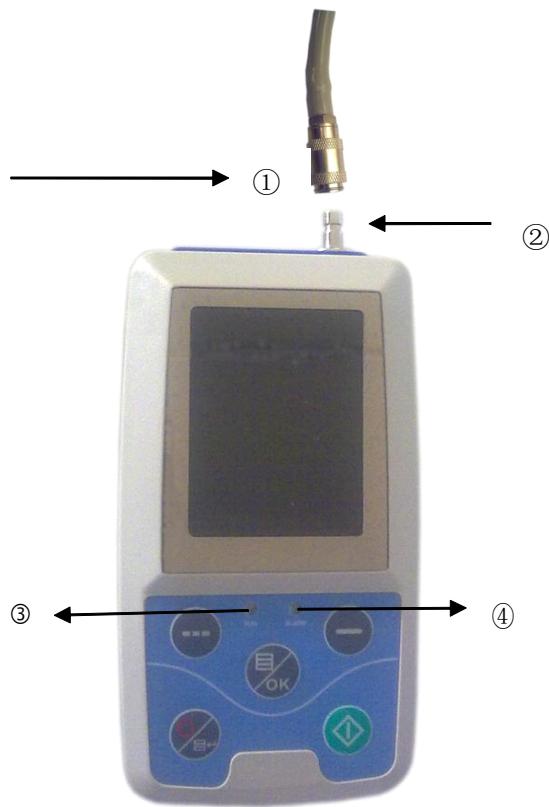


Figure 1.3.1 the top external airway

At the bottom is the socket for USB

- ①the Socket for USB, connect the data line to upload data.



Figure 1.3.2 bottom

## 1.4 Accessories

- A cuff for adult
- B a USB data line
- C a disk (PC software)
- D a user manual
- E a pouch

### ⚠ Warning ⚠

**Please use the special accessories supplied by the manufacturer or replace the accessories according to the requirements of the manufacturer in order to avoid making harms to patients.**

## Chapter2 Getting Started

- Open the package and check
- Dry battery installation
- Power on the instrument
- Connect patient sensors

### 2.1 Open the Package and Check

Open the package and take out the equipment and accessories carefully. Keep the package material for possible future transportation or storage. Check the components according to the packing list.

- Check for any mechanical damage.
- Check all the cables, modules and accessories.

If there is any problem, contact the distributor immediately.

### 2.2 Dry battery installation

The instrument will be supplied with two 'AA' alkaline batteries or high capacity. Before using the instrument, you shall put the battery in the battery box in the back of the Monitor .

#### ⚠ Note ⚠

**When you don't use the equipment, you should take out the dry battery.**

### 2.3 Power on the instrument

 Press  button to power on the instrument. The indicators will flash once, which shows the boot-strap is success ,then end pressing, the system will enter into the main interface.

#### ⚠ Warning ⚠

**If any sign of damage is detected, or the instrument displays some error messages, do not use it on any patient. Contact biomedical engineer in the hospital or our Customer Service Center immediately.**

#### ⚠ Note ⚠

**Check all the functions that possibly be used and make sure that the equipment is in good status.**

### 2.4 Connect Sensor

#### ⚠ Note ⚠

**For information on correct connection of NIBP cuff, refer to Figure 2.4.**

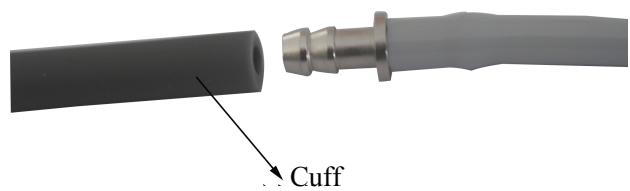


Figure 2.4 connection method

Connect the sensor between the Monitor and the measure part of the patient.

## Chapter3 Function Interface

- Main Interface
- System Menu

### 3.1 Main Interface

Press  to power on the instrument. The indicator will circularly flash once, which show the boot-strap is success, then end pressing, the system will enter into the main interface.

In common user mode, if there is no key-press operation during the time which system sets, the device will turn off LCD and enter into standby mode, if there is no any operation in the standby mode, the device will automatically turn off; the "RUN" indicator flashes once every 2 seconds to prompt the device in working state.

When the power is low, the battery progress bar is empty, at the same time the alarm sound occurs, and the red indicator flashes in fixed time.

In the Main Interface:

Alarm-switch status is displayed in the left top of the screen,  button can switch the alarm status shortly.

User bar displays the current patient type(adult, pediatric, neonatal), and the amount of the common user's data record.

Current date and time is displayed in the middle top of the screen, the precision of the time is second.

The boot-strap interface is shown as the follow:



Figure 3.1.1 common user boot-strap interface 1

#### ⚠ Note ⚠

**All interfaces except the trend retain power icon, alarm switch, as well as a small font of the current time.**

#### ⚠ Note ⚠

**After the register overflow, the first record will be overwritten, "Overflow" message is shown in the boot-strap interface. The interface is shown as the follow:**



Figure 3.1.2 common user boot-strap interface 2

### 3.2 Measuring Interface

Measuring interface displays real-time cuff pressure and the current measurement information. In the

measurement process, except the  and the  buttons, other buttons are disabled.

The measuring interface is shown as the follow:



Figure 3.2 measuring interface

#### ⚠ Note ⚠

In any interface except the measurement, press  key to exit current interface and back to the boot-strap interface.

### 3.3 Measure Result Interface

The measure result includes:

SYS: systolic blood pressure (mmHg/kPa)

DIA: diastolic blood pressure (mmHg/kPa)

PR: pulse rate (bpm)



Figure 3.3.1 measure results interface 1

If there is an error during the measurement, an error message text will appear on the screen.

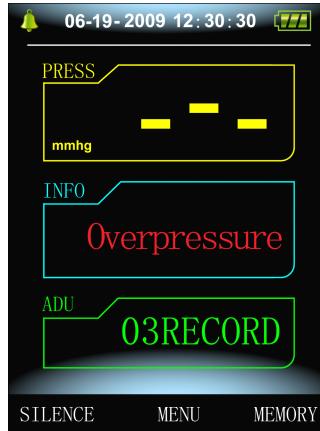


Figure 3.3.2 measure result interface 2

## 3.4 System Menu

In the boot-strap interface, according to the text in the middle bottom of the screen, press  button,

then enter the system menu and execute different option operations by using  keys .



Figure 3.4.1 system menu

### 3.4.1 System setup

Enter "SYSTEM SETUP" item in the [SYSTEM MENU], the following menu will pop up:



Figure 3.4.2 system setup

"SYSTEM SETUP" menu includes:

- "Language" item has two choices: Chinese, English;
- "Unit" item has two choice: mmHg, kPa;
- "User Purview" item can not be operated: all;
- "Measure Mode" item has three options: adult, pediatric, neonatal,
- "Backlight Time(s)" item has four choices: 15, 30, 60, 120.

**⚠ Note ⚠**

**"Backlight Time" in the "System Settings" is used by the common user, backlight time in ambulatory blood pressure monitor (ABPM) is a fixed value of 5S.**

Select "ABPM Setup" item in [System Setup] menu, the following menu will pop up:

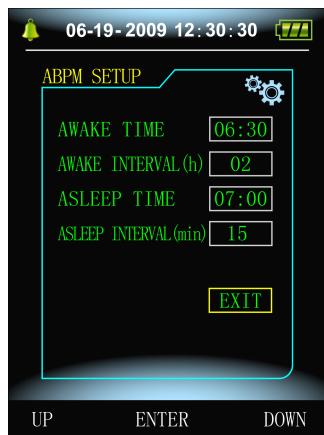


Figure 3.4.3 ABPM Setup

- "Awake measurement time interval"(min/h) could be options: 15, 30, 60, 120;
- "Asleep measurement interval"(min/h) could be options: 15, 30, 60, 120, 240;
- "Awake time" And "Asleep time" transformation unit are 30 minutes.

### 3.4.2 System Time

Select "System Time" item in [System Menu], the following menu will pop up:

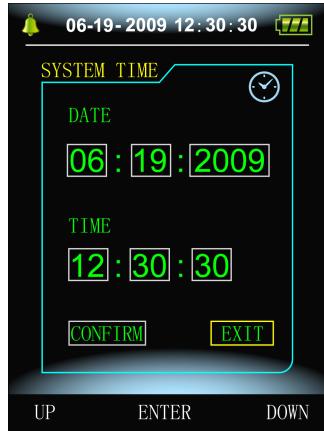


Figure 3.4.4 system time

Select "Confirm" after time setup complete, time change is successful and exit system time setup and return the previous menu.

Select "Exit" to cancel the setting and return to the previous menu.

### 3.4.3 Data Delete

Select "Yes" in "Data Delete" menu of [SYSTEM MENU], after you press certain key, the following menu will pop up:

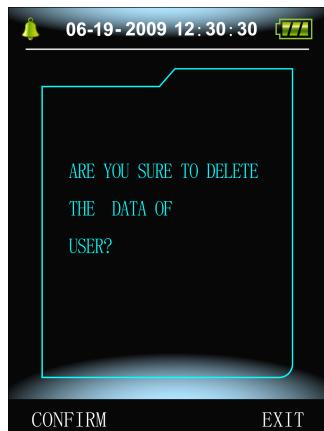


Figure 3.4.5 data delete

If press "OK", the common user data will be deleted ,if press "return", the operation will be cancelled.

### 3.4.4 Alarm Setup

Select "Alarm Setup" item in [System Menu], the following menu will pop up:

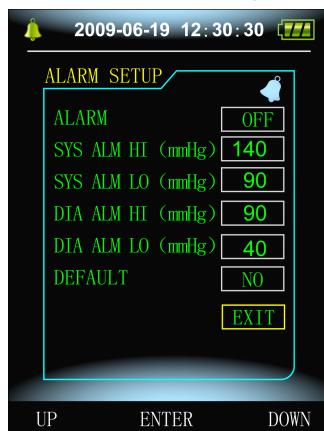


Figure 3.4.6 alarm setup

"Alarm switch" can control closing or unsealing of the sound alarm;

The alarm is on or off according to the high and low limits which have been set up. When the pressure is higher than the high limit or lower than the low limit, the alarm will occur.

The adjustable ranges of the high and low limits of the adult mode alarm are as follows:

SYS ALM: 40~270 mmHg

DIA ALM: 10~215 mmHg

The adjustable ranges of the high and low limits of the pediatric mode alarm are as follows:

SYS ALM: 40~200 mmHg

DIA ALM: 10~150 mmHg

The adjustable ranges of the high and low limits of the neonatal mode alarm are as follows:

SYS ALM: 40~135 mmHg

DIA ALM: 10~100 mmHg

"Default" includes the main content:

Default data: 2009-10-25;

Time: 10:15;

Measure mode: adult;

Alarm parameter:

| User mode | High pressure high limit | High pressure low limit | Low pressure high limit | Low pressure low limit |
|-----------|--------------------------|-------------------------|-------------------------|------------------------|
| Adult     | 140                      | 90                      | 90                      | 40                     |
| Pediatric | 120                      | 70                      | 70                      | 40                     |
| Neonatal  | 100                      | 60                      | 60                      | 20                     |

Alarm switch: close;

Measure unit: mmHg;

Language: Chinese;

Ordinary user backlight time: 10s;

ABPM switch: close;

Asleep time: 22:00;

Asleep measurement interval: 15minutes;

Awake measurement interval: 30minutes;

Awake time: 7:00;

Alarm switch: close .

### **3.4.5 ABPM Menu**

Select "ABPM" menu in [System Menu], the following menu will pop up.

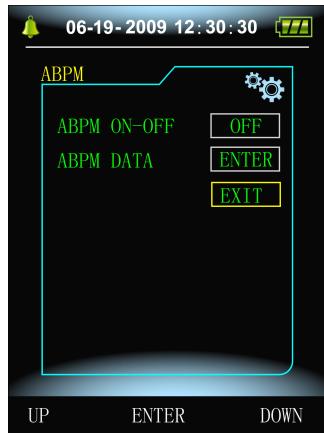


Figure 3.4.7 ABPM

In "ABPM" menu, "ABPM ON-OFF" select "open", then prompt message of ABPM of the current user, such as :

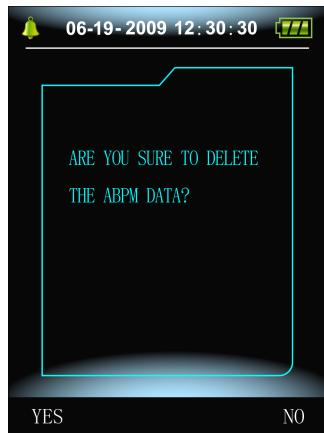


Figure 3.4.8 ABPM prompt menu

Press  button, clear the ambulatory blood pressure measure data, and enter ambulatory Blood Pressure Mode;

Press  button, save ambulatory Blood Pressure measure data, and enter ambulatory Blood Pressure Mode;

Press  button, give up the choice, and return the previous menu.

### 3.4.6 ABPM Data Review

#### 3.4.6.1 ABPM "large-print" Data Review

Select "ABPM Data" item in "ABPM" menu, the following interface will pop up:

Every record is a interface ,and display content include :the current user, total of the current user record data, serial number of the record, stored time of the record, high pressure, low pressure, mean pressure, Pulse Rate.



Figure 3.4.9 ABPM "large-print"

### 3.4.6.2 ABPM Data "Table"

Press button to select "trend" in ABPM large-print data review menu, the following interface will pop up

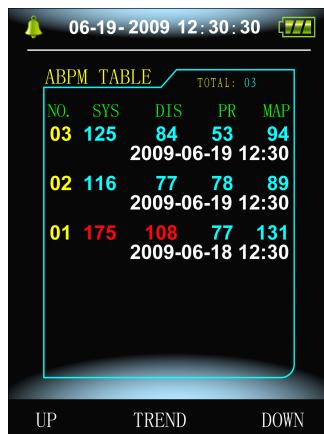


Figure 3.4.10 ABPM "Table"

A interface contain 5 records, every record includes time, high pressure, low pressure, mean pressure, Pulse Rate.

### 3.4.6.3 ABPM Trend

Press button to select "trend", in ABPM large-print data review menu, the following interface will pop up:



Figure 3.4.11 ABPM "trend"

Trend interface can trace 100 record trends, if measuring data are more than 100 items, press 

 buttons can glide trend curve for left and right, the scale of the vertical axis and the starting point, end point automatically adjust according to the width of the stored data .The displayed dates that are at the bottom of trends shown the trend for the first point and last point of data recording time.

### 3.4.7 Ordinary User Data Review

#### 3.4.7.1 Ordinary User" large-print" Data Review

Press  button enter the ordinary user "large-print" data review in boot-strap interface, the following interface will pop up:



Figure 3.4.12 ordinary user "large-print"

Display content is similar to ambulatory blood pressure large-print data review.

#### 3.4.7.2 Ordinary User Data Table

 Press  button to pop up the ordinary user data table in the ordinary user large-print data review, the interface is as shown:

| PB TABLE |     |     |    |     | TOTAL: 03        |
|----------|-----|-----|----|-----|------------------|
| NO.      | SYS | DIA | PR | MAP |                  |
| 03       | 125 | 84  | 53 | 94  | 2009-06-19 12:30 |
| 02       | 116 | 77  | 78 | 89  | 2009-06-19 12:30 |
| 01       | 175 | 108 | 77 | 131 | 2009-06-18 12:30 |

Figure 3.4.13 ordinary user data table

Display content is similar to ambulatory blood pressure large-print data review.

#### 3.4.7.3 Ordinary User Measure Data Trends

 Press  button to pop up the ordinary user data table in the ordinary user data table, the interface is

as shown:



Figure 3.4.14 trends

Display content is similar to ambulatory blood pressure large-print data review.

### 3.5 ABPM Working Interface

In ABPM working environment, backlight is only for 5 seconds, press any key to wake the backlight, ABPM working interface is as shown:



Figure 3.5.1 ABPM working interface

Long press  button, the exit ABPM hint interface will pop up :

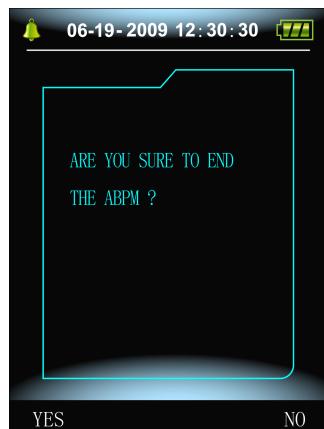


Figure 3.5.2 ABPM exiting prompt interface

Press  button to exit ABPM working environment, and enter the ordinary user working environment, and display the boot-strap interface ;

Press  or  button to exit the interface, and return the ABPM working interface.

## Chapter4 NIBP Measuring

### 4.1 Introduction

- The Non-invasive Blood Pressure (NIBP) module measures the blood pressure using the oscillometric method.
- There are two modes of measurement available: manual , automatic.
- Every mode displays the systolic, mean, diastolic blood pressure and pulse rate.
- It is applicable for adult, pediatric, and neonatal usage.

#### ⚠ Warning ⚠

1. **You must not perform NIBP measurements on patients with sickle-cell disease or under any condition which the skin is damaged or expected to be damaged.**
2. **For a thrombasthenia patient, it is important to determine whether measurement of the blood pressure shall be done automatically. The determination should be based on the clinical evaluation.**
3. **Ensure that the correct mode setting is selected when performing measurements on children and newborn (Refer to measuring mode menu setting), and use children and newborn special cuff. It may be dangerous for using error patient mode, because the upper adult blood pressure level does not apply the children and newborn.**

### 4.2 NIBP Measuring

#### ⚠ Warning ⚠

- **Before starting a measurement, verify that you have selected a setting appropriate for your patient (adult, pediatric or neonate.)**
- **Do not apply the cuff to a limb that has an intravenous infusion or catheter in place. This could cause tissue damage around the catheter when infusion is slowed or blocked during cuff inflation.**

#### ⚠ Warning ⚠

**Make sure that the air conduit connecting the blood pressure cuff and the equipment is neither blocked nor tangled.**

1. Plug in the air hose and switch on the system.
2. Apply the blood pressure cuff to the patient's upper arm following the instructions below (Figure4.2).
  - ◆ Ensure that the cuff is completely deflated.
  - ◆ Apply the appropriate size cuff to the patient, and make sure that the symbol "Φ" is over the appropriate artery. Ensure that the cuff is not wrapped too tightly around the limb. Excessive tightness may cause discoloration and eventual ischemia of the extremities.

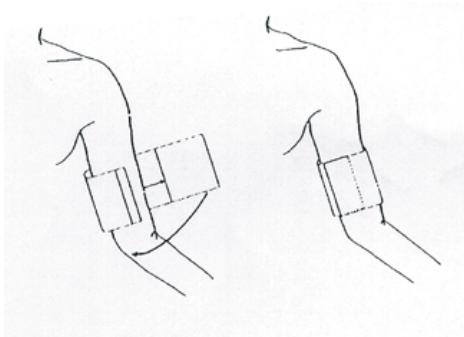


Figure 4.2 use cuff

**⚠ Note ⚠**

**The width of the cuff should be either 40% of the limb circumference (50% for neonates) or 2/3 of the upper arm length. The inflatable part of the cuff should be long enough to encircle 50-80% of the limb. The wrong size of cuff can cause erroneous readings. If the cuff size is in question, then use a larger cuff.**

**Size of reusable cuff for neonate/children/adult**

| Patient Type | Limb perimeter | Cuff width | Hose            |
|--------------|----------------|------------|-----------------|
| Infant       | 10 ~ 19 cm     | 8 cm       | 1.5 m or<br>3 m |
| Child        | 18 ~ 26 cm     | 10.6 cm    |                 |
| Adult1       | 25 ~ 35 cm     | 14 cm      |                 |
| Adult2       | 33 ~ 47 cm     | 17 cm      |                 |
| Thigh        | 46 ~ 66 cm     | 21 cm      |                 |

**Size of disposable cuff for neonate/children/adult**

| Size No. | Limb perimeter | Cuff width | Hose            |
|----------|----------------|------------|-----------------|
| 1        | 3.1 ~ 5.7 cm   | 2.5 cm     | 1.5 m or<br>3 m |
| 2        | 4.3 ~ 8.0 cm   | 3.2 cm     |                 |
| 3        | 5.8 ~ 10.9 cm  | 4.3 cm     |                 |
| 4        | 7.1 ~ 13.1 cm  | 5.1 cm     |                 |

■ **Make sure that the cuff edge falls within the range of mark <->. If it does not, use a larger or smaller cuff that fits better.**

3. Connect the cuff to the air hose. The limb chosen for taking the measurement should be placed at the same level as the patient's heart. If this is not possible you should apply the following corrections to the measured values:

■ **If the cuff is placed higher than the heart level, add 0.75 mmHg (0.10 kPa) for each inch of difference.**  
**■ If it is placed lower than the heart level, deduct 0.75 mmHg (0.10 kPa) for each inch of difference.**

4. Check whether the measure mode is appropriately selected. (the measure mode displays in the boot-strap interface information area).

5. Press  button on the front panel ,and start a measurement.

### 4.3 Operation Hints

1. To start auto measuring:

Access ABPM SETUP menu and pick the "Asleep Measurement Interval Time" item and "Awake

"Measurement Interval Time" item, in which the user may select the time interval value for auto measurement. After that, enter "ABPM" menu and select the entrance, enter into ABPM working environment, and the system is automatically inflated measurement in accordance with the setting time interval.

### **⚠ Warning ⚠**

**Prolonged non-invasive blood pressure measurements in Auto mode may be associated with purport, ischemia and neuropathy in the limb wearing the cuff. When monitoring a patient, examine the extremities of the limb frequently for normal color, warmth and sensitivity. If any abnormality is observed, stop the blood pressure measurements.**

2. To stop auto measuring:

During auto measuring, press  button at any time to stop auto measurement.

3. To start a manual measuring:

■ **Press  button to start a manual measuring in the ordinary user working environment.**

■ **During the idle period of auto measuring process, press  button at any time to start a manual measurement. Then press  button to stop manual measurement and the system continues executing auto-measuring program.**

### **⚠ Note ⚠**

**If you are in doubt about the accuracy of any reading(s), check the patient's vital signs by an alternative method before checking the functioning of the blood pressure monitor.**

### **⚠ Warning ⚠**

**If liquid is inadvertently splashed on the equipment or its accessories, or may enter the conduit or inside the monitor, contact local Customer Service Center.**

## **Measurement Limitations**

To different patient conditions, the oscillometric measurement has certain limitations. The measurement is in search of regular arterial pressure pulse. In those circumstances when the patient's condition makes it difficult to detect, the measurement becomes unreliable and measuring time increases. The user should be aware that the following conditions could interfere with the measurement, making the measurement unreliable or longer to derive. In some cases, the patient's condition will make a measurement impossible.

- **Patient Movement**

Measurements will be unreliable or can not perform if the patient is moving, shivering or having convulsions. These motions may interfere with the detection of the arterial pressure pulses. In addition, the measurement time will be prolonged.

- Cardiac Arrhythmia's

Measurements will be unreliable and may not be possible if the patient's cardiac arrhythmia has caused an irregular heartbeat. The measuring time thus will be prolonged.

- Heart-lung Machine

Measurements will not be possible if the patient is connected to a heart-lung machine.

- Pressure Changes

Measurements will be unreliable and may not be possible if the patient's blood pressure is changing rapidly over the period of time during which the arterial pressure pulses are being analyzed to obtain the measurement.

- Severe Shock

If the patient is in severe shock or hypothermia, measurements will be unreliable since reduced blood flow to the peripheries will cause reduced pulsation of the arteries.

- Heart Rate Extremes

Measurements can not be made at a heart rate of less than 40 bpm and greater than 240 bpm.

- Round Patient

The thick fat layer of body will reduce the measurement accuracy, because the fat that come from the shock of arteries can not access the cuffs due to the damping

#### 4.4 NIBP Error Message and Explanations

| Explanation                | Cause  |
|----------------------------|--|
| Self-test failure          | A/D sampling error.  |
| Loose cuff                 | Cuff is not connected correctly.   |
| Air leakage                | Air leakage in the valve or airway.  |
| Atmospheric pressure error | Valve can not be open.   |
| Signal is too weak         | Object measuring the pulse is too weak or the cuff is loose.   |
| It is over the range       | Object measuring blood pressure is over the measurement range.   |
| Excessive movement         | When measuring, signal the presence of excessive movement or pseudo-differential interference.   |
| Overpressure               | Cuff pressure is over the scope, ADU 300 mmHg, Newborn: 150mmHg.   |
| Saturated signal           | Movement or other factors lead to too big signal amplitude.  |
| Air leakage                | There is air leakage in the airway   |
| System failure             | There is something wrong with NIBP module, A/D sampling or soft of system after turning on the device.   |
| It spends too much time    | Adult: When cuff pressure is 2KPa (15mmHg,) it may spend 3 minute (180S).<br>Newborn: When cuff pressure is 0.67KPa (5mmHg,) it may spend 90S. |

## 4.5 Maintenance and Cleaning

### ⚠ Warning ⚠

- **Do not squeeze the rubber tube on the cuff.**
- **Do not allow liquid to enter the connector socket at the front of the equipment.**
- **Do not wipe the inner part of the connector socket when cleaning the equipment.**

### Reusable Blood Pressure Cuff

The cuff can be sterilized by means of conventional autoclaving, gas, or radiation sterilization in hot air ovens or disinfected by immersion in decontamination solutions, but remember to remove the rubber bag if you use this method. The cuff should not be dry-cleaned.

The cuff can also be machine-washed or hand-washed, the latter method may prolong the service life of the cuff. Before washing, remove the latex rubber bag, and for machine-washing, close the Velcro fastening. Allow the cuff to dry thoroughly after washing, then reinsert the rubber bag.

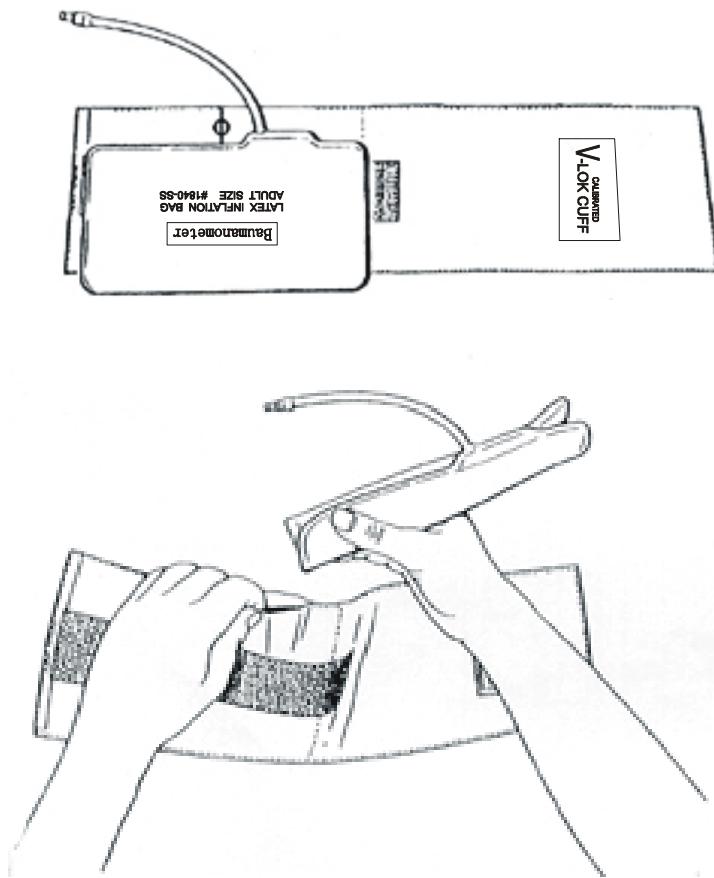


Figure 4.5 Replace Rubber Bag in Cuff

To replace the rubber bag in the cuff, first place the bag on top of the cuff so that the rubber tubes line up with the large opening on the long side of the cuff. Now roll the bag lengthwise and insert it into the opening on the long side of the cuff. Hold the tubes and the cuff and shake the complete cuff until the bag is in position. Thread the rubber tubes from inside the cuff, and out through the small hole under the internal flap.

### Disposable Blood Pressure Cuffs

Disposable cuffs are intended for one-patient use only. Do not use the same cuff on any other patient. Do not sterilize or use autoclave on disposable cuffs. Disposable cuffs can be cleaned using soap

solution to prevent infection.

### **⚠ Note ⚠**

**For protecting environment, the disposable blood pressure cuffs must be recycled or disposed properly.**

## **4.6 Transportation and Storage**

**A. The packed device can be transported by ordinary conveyance or according to transport contract.**

**The device can not be transported mixed with toxic, harmful, corrosive material.**

**B. The packed device should be stored in room with no corrosive gases and good ventilation.**

**Temperature: -20°C~60°C; Humidity: ≤95%.**

## **4.7 Key And Symbols**

| Signal  | Description  |
|---|--|
|    | Warning – See User Manual  |
| SYS   | Systolic pressure  |
| MAP   | MAP pressure   |
| DIA   | Diastolic pressure   |
| PR  | Pulse rate (bpm)   |
| ADU   | Adult  |
| PED   | Pediatric  |
| NEO   | Neonatal   |
| ABPM  | Ambulatory Blood Pressure Monitor  |
| INFO  | Information  |
|  | Open the alarm sound indication  |
|  | Close the alarm sound indication   |
|  | WEEE (2002/96/EC)  |
|  | Type BF defibrillator proofed applied parts  |
| SN  | Serial number  |
| IPX0  | Ingress of liquids rank  |
|  | This item is compliant with Medical Device Directive 93/42/EEC of June 14, 1993, a directive of the European Economic Community. |

## **Chapter5 Installation of the Software**

### **5.1 Demand of editor**

Processor: Pentium IV 1.8G or more

Operation System: Windows XP

EMS memory: 256M and more

Hard Disk: 40G or more

Display: 17 inch or more

CD-ROM

USB: 2 or more

Resolution of printer: 600 DPI

### **5.2 Installation of software**

- 1 Place the CD-ROM in the CD-ROM compartment located on your computer.
- 2 If Auto Play for CDs is enabled, place CD in reader and follow instructions when they appear in the screen; otherwise follow install instructions below:
  1. Open Windows Explorer.
  2. Click on the root CD-ROM directory.
  3. Double click file ABPM50\_Setup.EXE.
  4. Follow the instructions in the screen.

# Chapter6 Introduction to the software

## 6.1 The main interface

When the settings of the users configuration information are finished, the main interface is entered, as the following pictured displayed:



Figure 6.1 the main operating interface

①Menu bar The main operating menu of this software

②Toolbar Shortcut keys for functions of frequent use

③Displaying areas of the trending pictures

After choosing the case which is edited, it is used for displaying date of the trending picture.

④Status bar Display the name, ID, and the data collecting date of the patient.

## 6.2 Patient File Path

From the menu select "Down Load" and then select "Set File Path" will pop up the following dialog box.

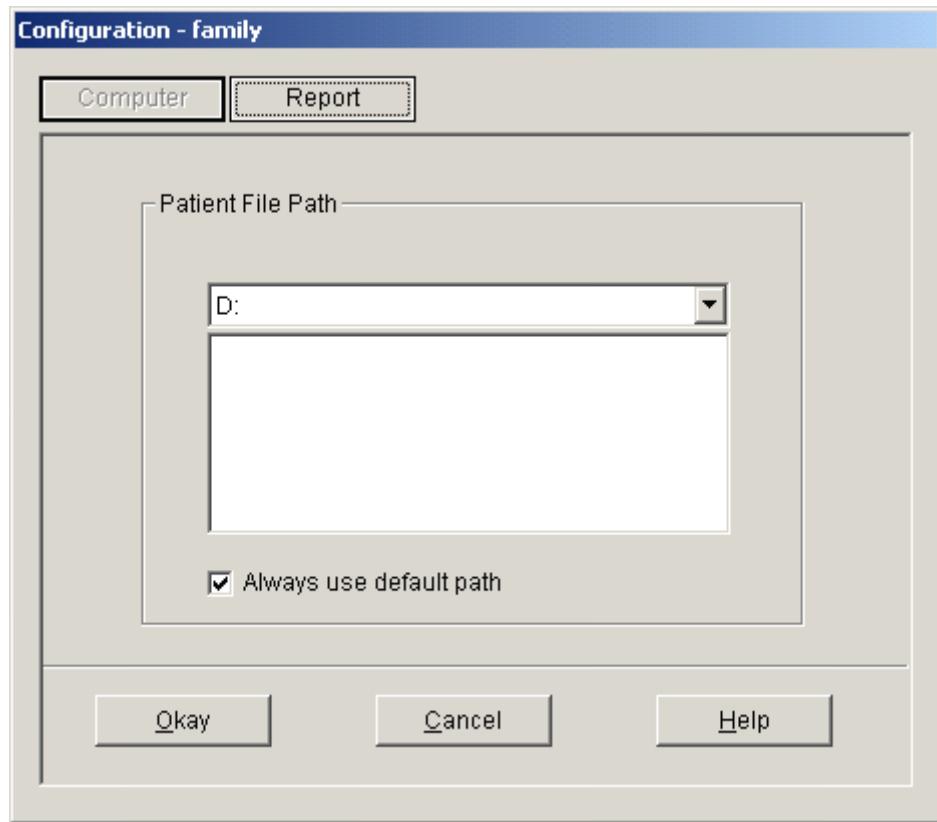


Figure 6.2 Set file path

"Patient File Path": Choose the downloading route of your case. As soon as the data are downloaded in computer, the case document will save this path.

If you pitch on the "Always use default path", then data searches will always begin at the default path.

### 6.3 Wear



Press the shortcut key **Wear** , will pop up the following dialog box.

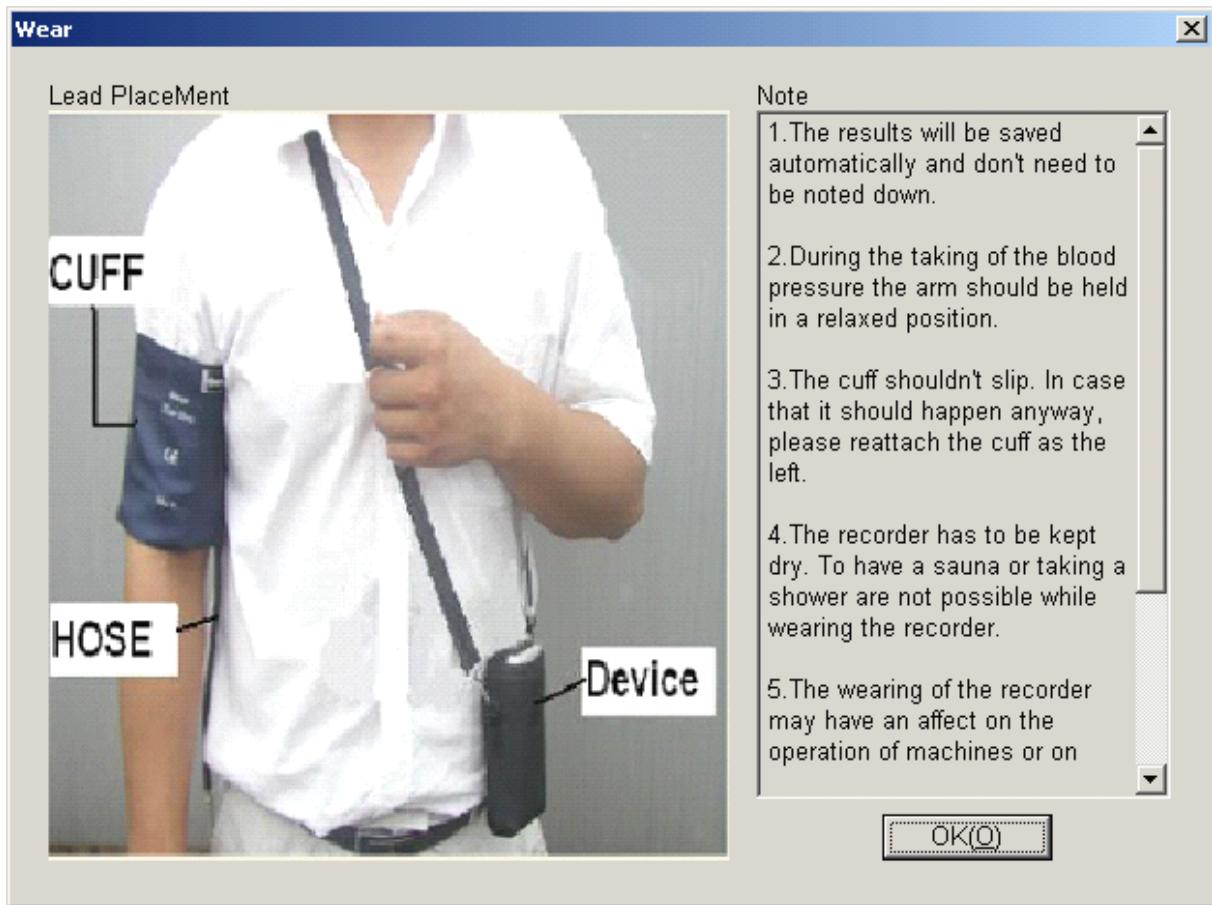


Figure 6.3 Wear

You can wear the device according to the picture above. Please read the "Note" Carefully before use.

## 6.4 Data download

### 6.4.1 data download via USB

Before you download data from device, make certain: The device is connected to the computer.

The downloaded patient data will be saved in your default computer path .Press the shortcut



key **Download** , or from the menu select "Download" and then select "Do Download" will appear the following dialog box. Permitting you select what data you want to download.



Figure 6.4.1 Select downloading mode

The following dialog box will appear to show the progress as the data is transferred.



Figure 6.4.2 Downloading progress bar

## 6.5 Choose patient data to edit



Before begin to edit, you should choose the case file which will be edited. Press shortcut key  `Open . . .`, or from the menu select "File" and select "Open data", the following dialog box will appear:

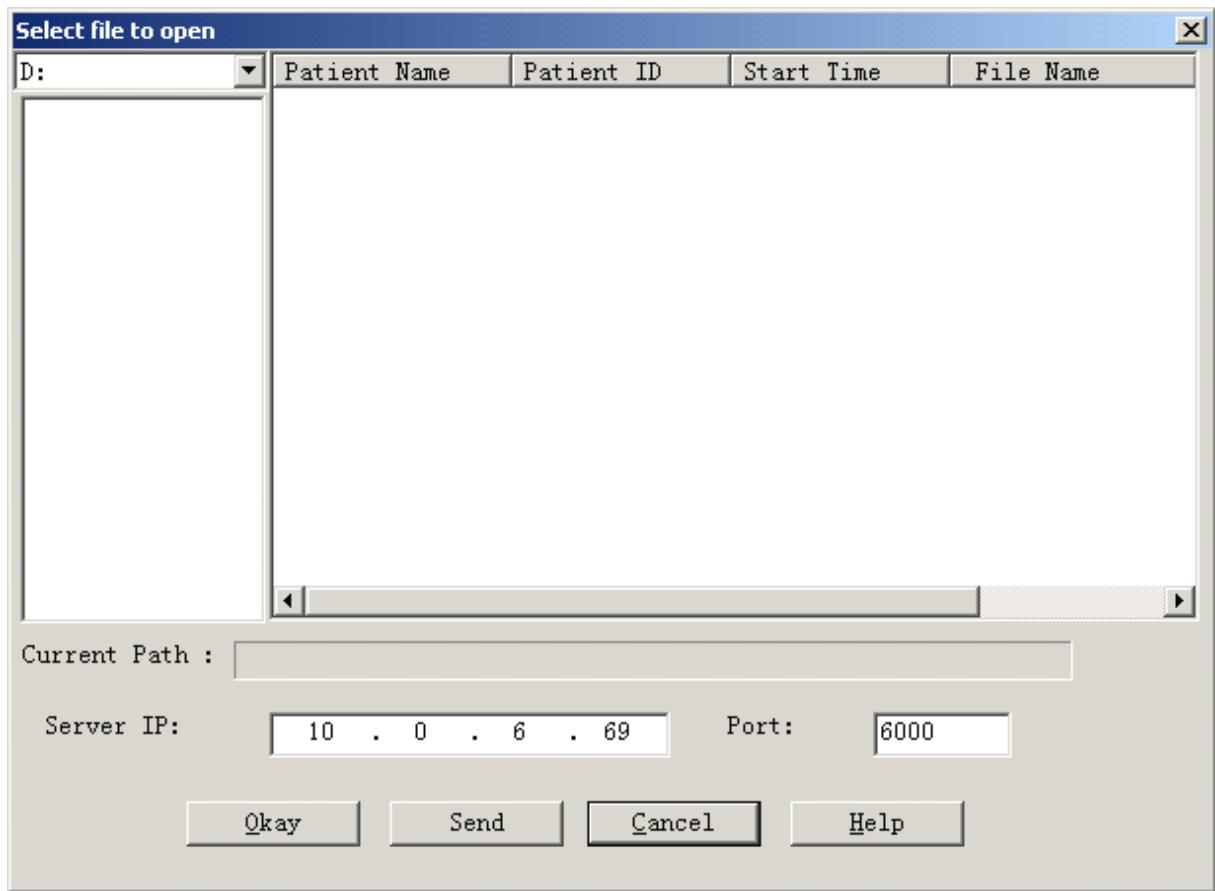


Figure 6.5 Patient file select

The above dialog box lists the data files found in your current directory. You may use the drive and directory boxes to select a different drive or directory to search for patient files. The patient file information includes: patient name, patient ID, starting time, and file name. Select the patient file which will be edited, and then press the "Okay" button, you may now edit the data.

## 6.6 Delete data file

If you feel some patient data are not necessary, you can delete them. From menu select "File" and then select "Delete Data" to show patient data delete interface which is similar to patient data select interface, showed as below:

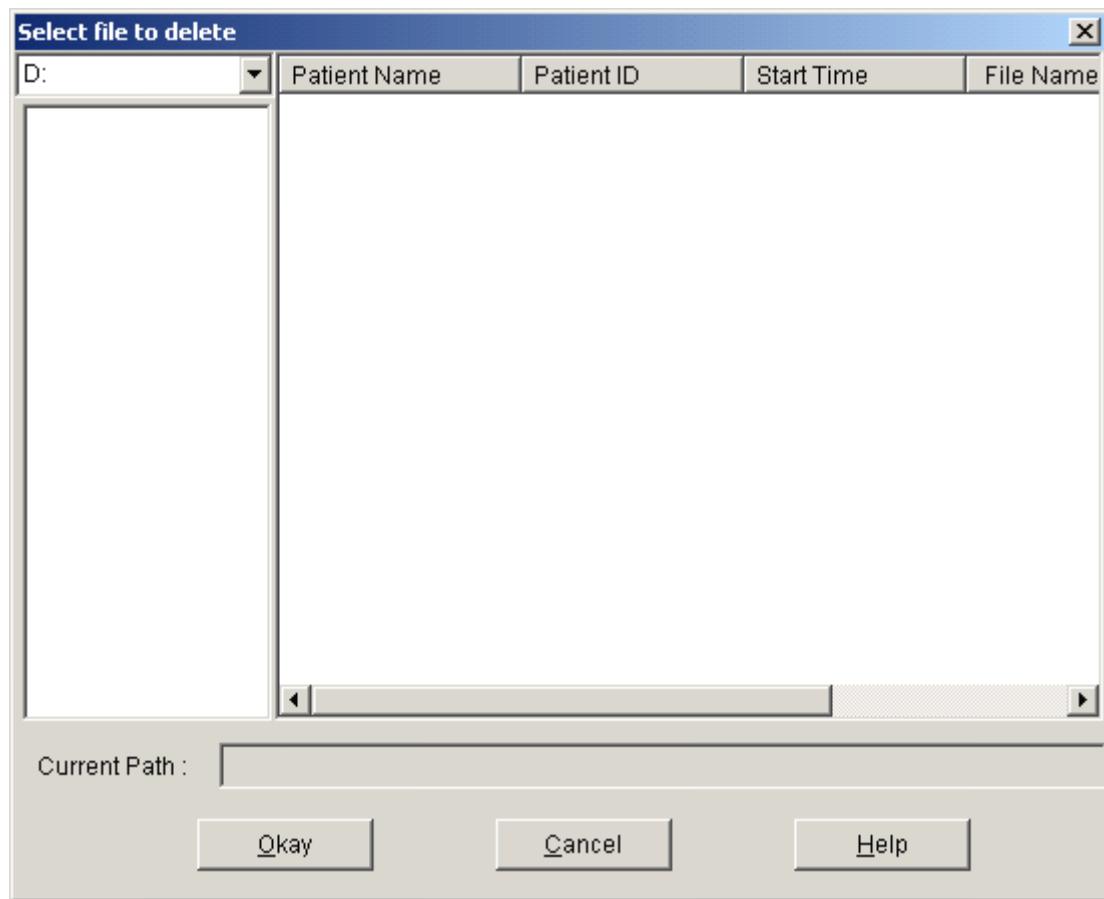


Figure6.6 Data file delete

You are able to delete one single file or some files at the same time, to delete some files at the same time; you could push "Ctrl", and click the file you want to delete at the same time. After selection, click "Okay" button, the "sure to delete" dialog box will be appear. Click "YES" to complete the delete operation. If you want to cancel, please click "NO".

## 6.7 Data file backup

Sometimes, you may want to save one original copy before you edit a file, under this situation, you should backup patient data. Our software provide the function.

From the menu select "File" and then select "Copy data", will appear the following dialog box, permitting you to select which data files to copy.

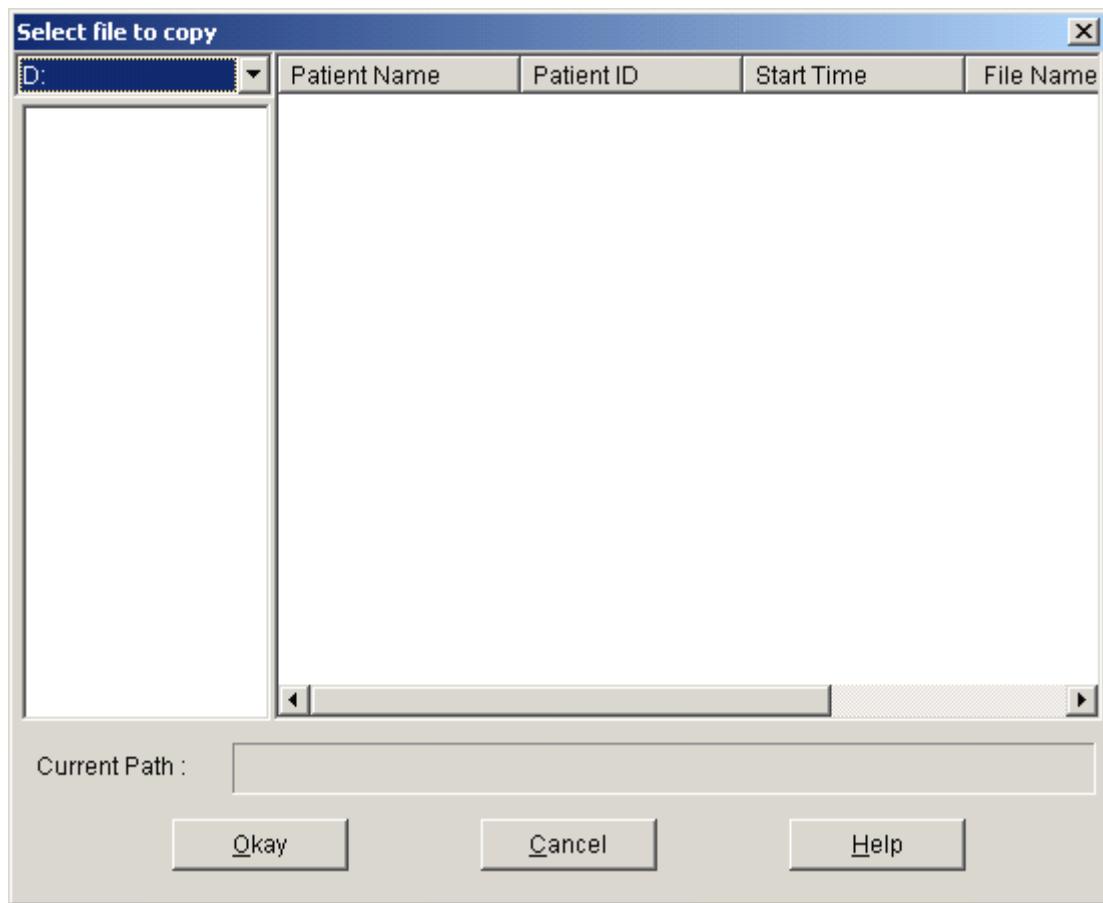


Figure6.7.1 Data file copy

Select or deselect items by clicking on the rows using the mouse. When all desired selections have been made, select "Okay".

The following dialog box will appear, permitting you to select the disk drive or directory to copy to. After completing, click "OK" to complete the operation.

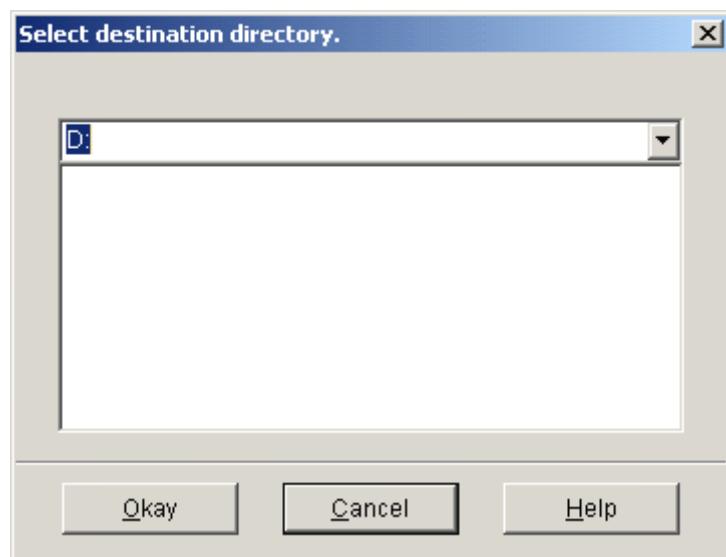


Figure 6.7.2 Backup path settings

## 6.8 Edit Blood Pressure data



Press the shortcut key **Edit**, or from the menu select "Edit" and then select "Bp Data" the following dialog box will pop up.

| Edit BP Data    |        |           |         |          |         |           |          |     |         |
|-----------------|--------|-----------|---------|----------|---------|-----------|----------|-----|---------|
| $*=0/33(0.0\%)$ | Number | Time      | Date    | BP(mmHg) | HR(BPM) | MAP(mmHg) | PP(mmHg) | TC  | Comment |
| 1               | 16:47  | 22-1-2010 | 157/96  | 80       | 107     | 61        |          |     |         |
| 2               | 16:48  | 22-1-2010 | 146/103 | 75       | 117     | 43        |          |     |         |
| 3               | 16:49  | 22-1-2010 | 127/102 | 78       | 107     | 25        |          |     |         |
| 4               | 16:51  | 22-1-2010 | 147/83  | 77       | 107     | 64        |          |     |         |
| 5               | 16:53  | 22-1-2010 | 123/65  | 82       | 79      | 58        |          |     |         |
| 6               | 16:55  | 22-1-2010 | 142/84  | 90       | 112     | 58        |          |     |         |
| 7               | 16:57  | 22-1-2010 | 113/73  | 90       | 83      | 40        |          |     |         |
| 8               | 8:49   | 25-1-2010 | 121/75  | 76       | 94      | 46        |          |     |         |
| 9               | 13:27  | 26-1-2010 | 153/103 | 87       | 107     | 50        |          |     |         |
| 10              | 13:31  | 26-1-2010 | 108/44  | 76       | 57      | 64        |          |     |         |
| 11              | 13:34  | 26-1-2010 | 129/106 | 94       | 114     | 23        |          |     |         |
| 12              | 14:01  | 26-1-2010 | 104/54  | 72       | 80      | 50        |          |     |         |
| 13              | 14:03  | 26-1-2010 | 93/56   | 67       | 73      | 37        |          |     |         |
| 14              | 16:10  | 26-1-2010 | 264/203 | 80       | 218     | 61        |          |     |         |
| 15              | 16:12  | 26-1-2010 | 260/205 | 80       | 221     | 55        |          |     |         |
| 16              | 11:00  | 27-1-2010 | 153/107 | 169      | 133     | 46        |          |     |         |
| 17              | 11:16  | 27-1-2010 | 173/98  | 68       | 129     | 75        |          |     |         |
| 18              | 11:22  | 27-1-2010 | 264/201 | 79       | 223     | 63        |          |     |         |
| 19              | 11:23  | 27-1-2010 | 258/203 | 80       | 218     | 55        |          |     |         |
| 20              | 11:25  | 27-1-2010 | 259/203 | 80       | 219     | 56        |          |     |         |
| 21              | 11:26  | 27-1-2010 | 260/202 | 80       | 218     | 58        |          |     |         |
| 22              | 11:28  | 27-1-2010 | 263/202 | 80       | 216     | 61        |          |     |         |
| ...             | ...    | ...       | ...     | ...      | ...     | ...       | ...      | ... | ...     |

Figure 6.8 Data edit page

All the BP readings are shown in the above dialog box.

$*=6/60 ( 10.0\%)$  : 60 represents the total data sum, 6 represents the data amount deleted, 10.0% stands for data present deleted.

Number: stands for data collection serial number.

Time: stands for collection time.

Date: stands for collection date.

BP: number before "/" stands for high blood pressure, number back "/" stands for low blood pressure ,the unit is mmHg .

HR: Heart rate.

MAP: Mean pressure ,the unit is mmHg .

PP: Pressure difference between high and low blood pressure .The unit is mmHg .

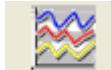
TC: error code(refer to chapter 7 )

Comment: character comment for data.

You can edit the data .In the chart,'\*'represents the data deleted ( the trending picture display, and not booking the statistics data). You can delete or add'\*' by the left key of the mouse in the chart'\*' area,in the comment bar, the data can comment with the character, the information display in the trending picture.

## 6.9 Trend Edit

When you selected the data file, the BP trend will be shown in the screen automatically. In other



interfaces, you can press shortcut key **Bp trend** enter the "BP trend" interface. The "Bp Trend" is shown as below:

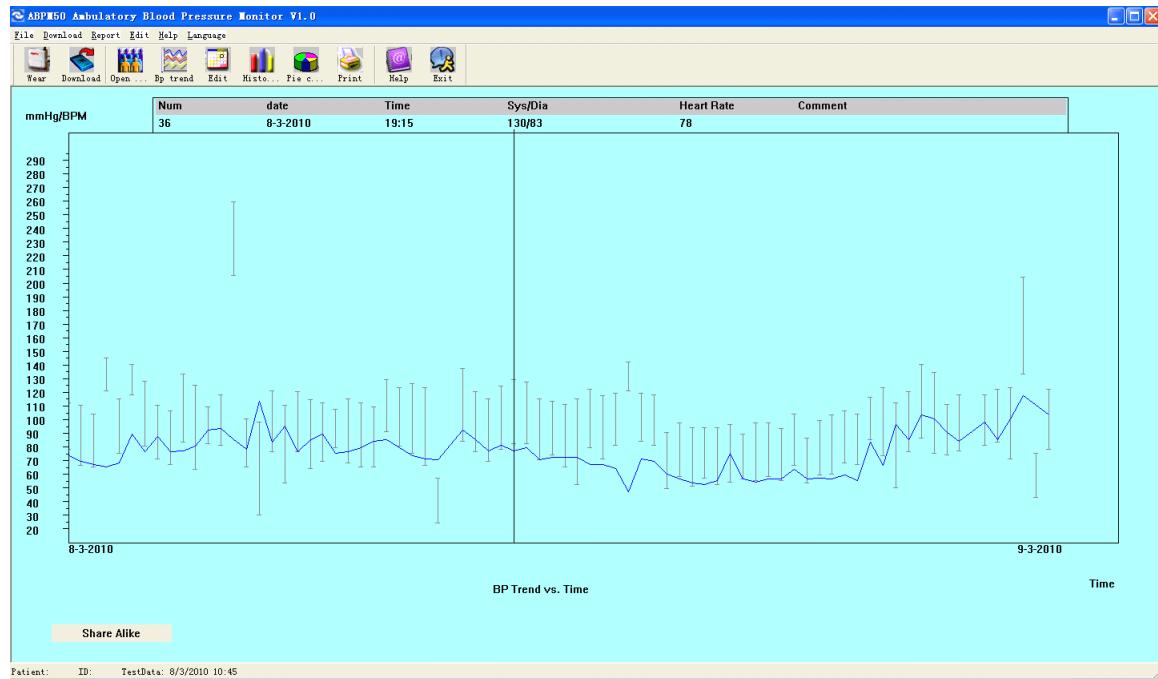


Figure 6.9 BP trend

When you move the mouse on the trend area, on the top of the trend area the detail data information about the mouse points will show, including the data serial number, collection time and collection date, high/low blood pressure value, heart rate, comment, etc. Press mouse' left button to delete or add the data point to be shown.

## 6.10 Histogram



Press the shortcut key **Histo...** will appear the following interface:

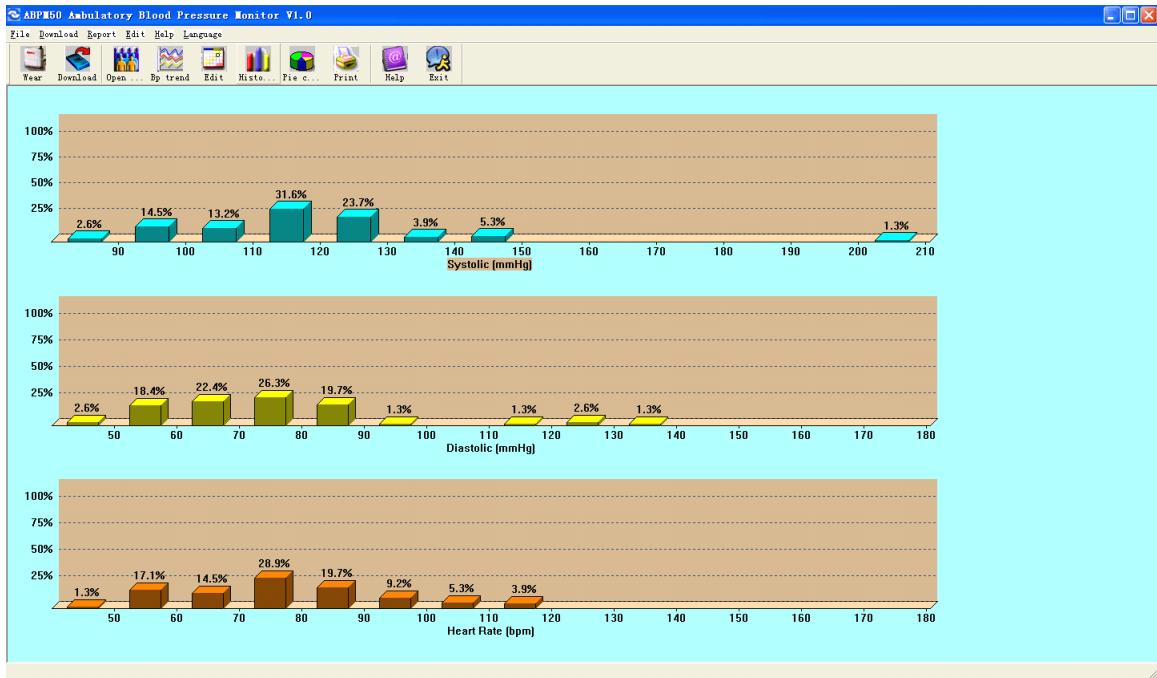


Figure 6.10 Histogram

## 6.11 Pie chart



Press the shortcut key **Pie c...**, the pie chart which BP data and HR analyse will pop up:



Figure 6.11 Pie chart

The pie chart interface have 3 areas .On the left, some statistics can be displayed, such as maximum, minimum, and average value; the second area is pie chart; the third area is the opposite setting area for

pie chart color and value.

## 6.12 Print Report

After complete editing BP data and patient diagnose information etc, the software will create a series of diagnose reports, you can select these pages or some of them for printing .

From menu select "Report" and then select "Configure Report". It will appear the following dialog box:

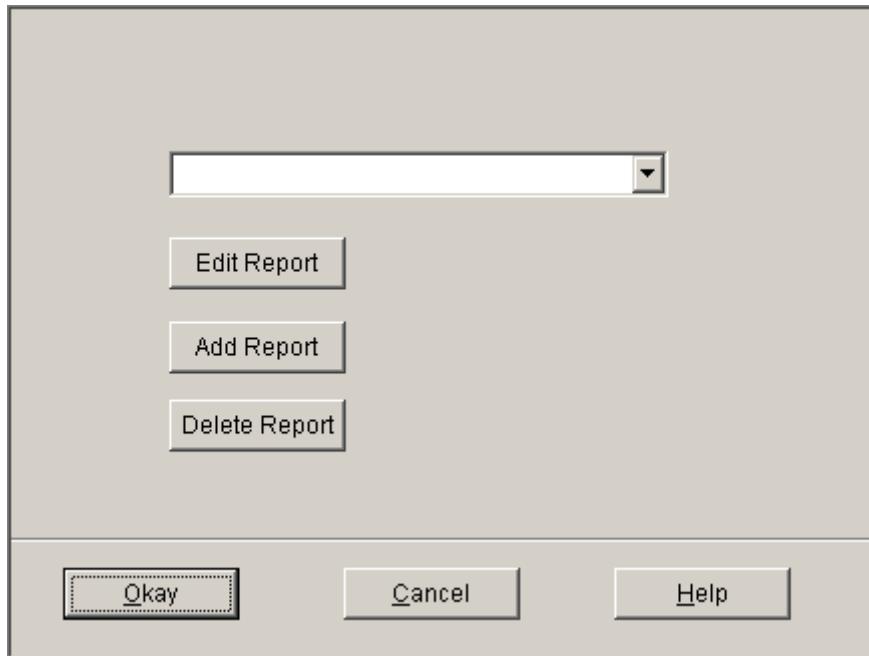


Figure 6.12 Configure Report

You can select an already exist report for print, you may also click "Edit Report" edit the selected report.

Click "Title" button, you may enter the title to print at the top of the printed report.

Of course you can also click "Add Report" adds a new report. If you don't need the current report, you can also click "Delete Report" to delete it.

The default paper size is: A4, from the menu selects "Report" and then selects "Select printer", you can select a printer. From the menu selects "Report" and then selects "Print preview", you can preview the page you selected.



When you sure you want to print the report, press shortcut key **Print** or from menu select "Report" and then select "Print".

## 6.13 Send Cases To Net Server

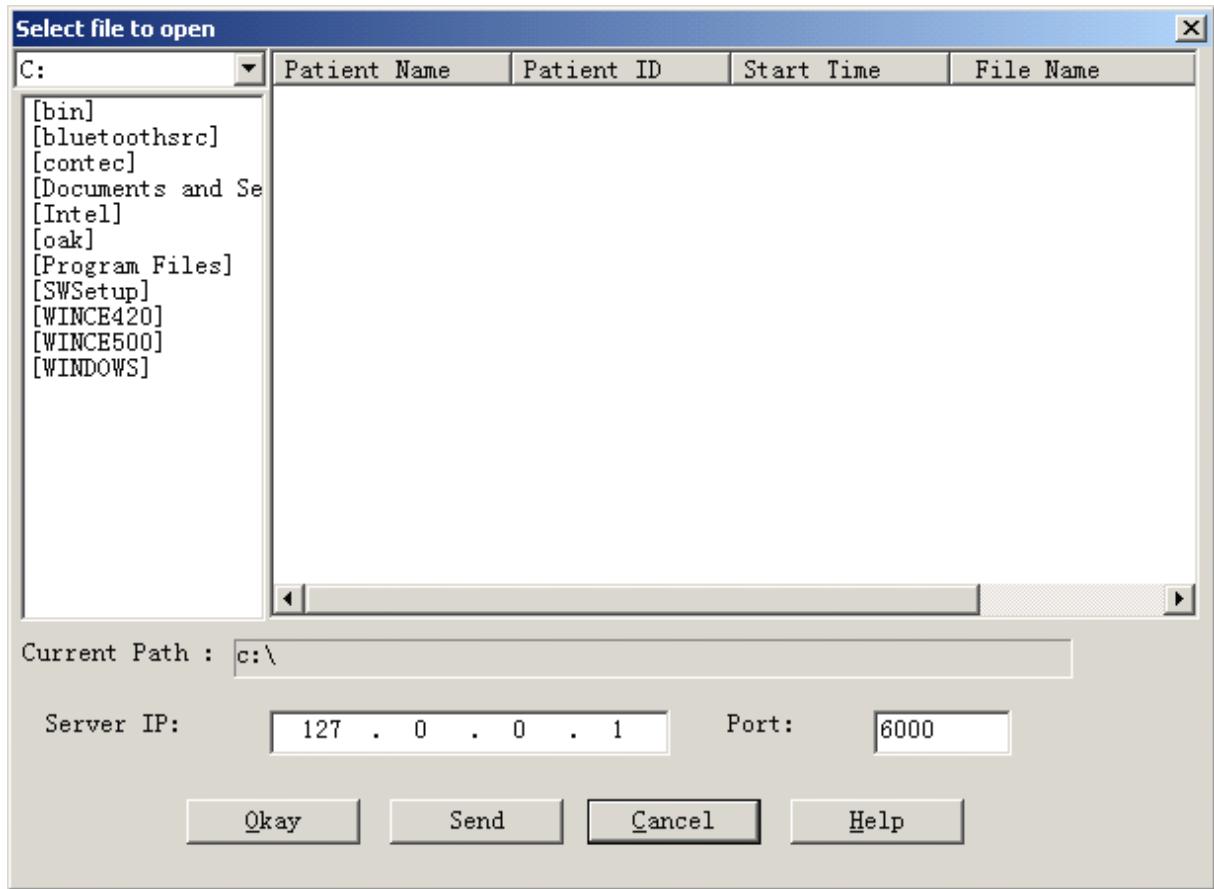


Figure 6.13 select file to open

In the file dialog box which you need to open, stuffs with the IP address and port number of server, and then selects the file which you need to send to server, and clicks "send" button.

Currently the company's server IP address is: 121.22.39.182, port number: 6000 .

## Chapter7 Troubleshooting guide

| Code | Description in Report Editor | Solution   |
|------|------------------------------|--|
| 1    | No signal                    | Check position of cuff, tighten cuff   |
| 2    | Overreach movement           | Remain still during BP reading   |
| 4    | Measurement timeout          | Check air hose connections and make certain cuff is tight                                |
| 85   | Airway obstructed            | Check air hose connections and make certain air tubing is not crimped.                   |
| 86   | Measurement cancelled        | Push START/STOP button to start reading.   |
| 87   | Cuff leak                    | Check air hose and cuff  |
| 88   | safety pause                 | Retry reading, push START/STOP button. If problem persists return monitor for servicing. |
| 89   | cuff overpressure            | Check for blocked or kinked air hose.  |
| 90   | Battery low                  | Replace batteries. If problem persists return for servicing.                             |
| 102  | Self-check failed            | Return for servicing.  |
| 110  | Out of range                 | Retry again, if problem persists return for servicing.                                   |
| 115  | System error                 | Return for servicing.  |